No. 682,526.

Patented Sept. 10, 1901.

R. G. BROOKE.

STEAM TRAP.

(Application filed Feb. 9, 1901.)

(No Model.)

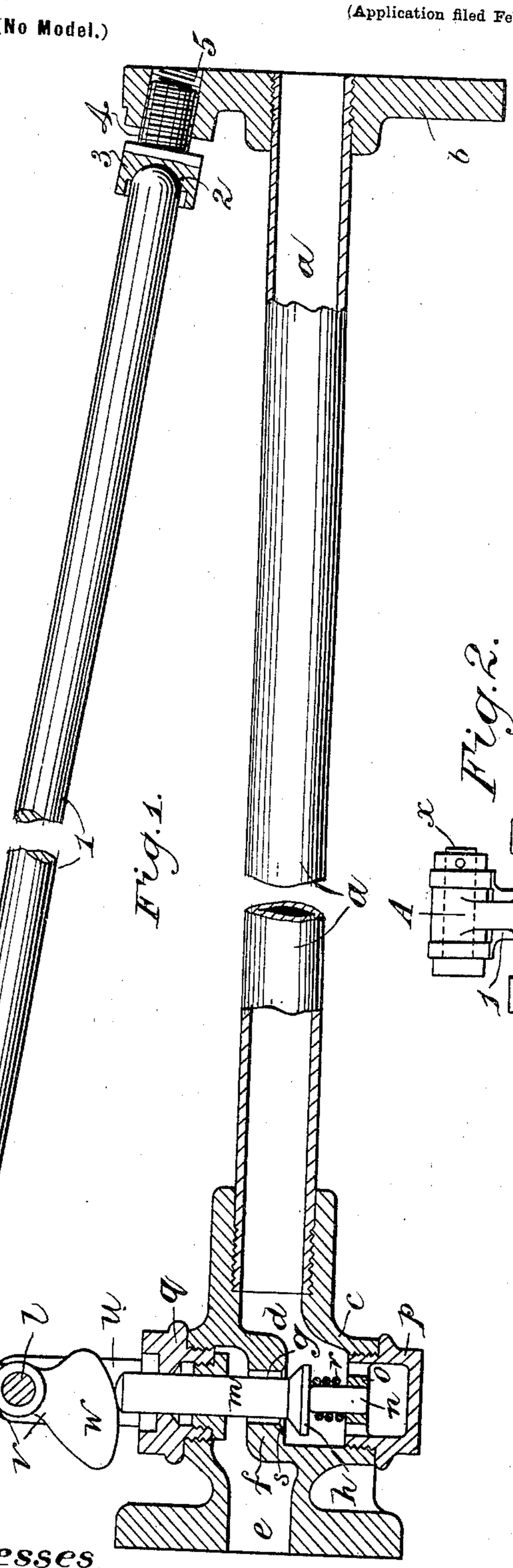

Fig. 1.

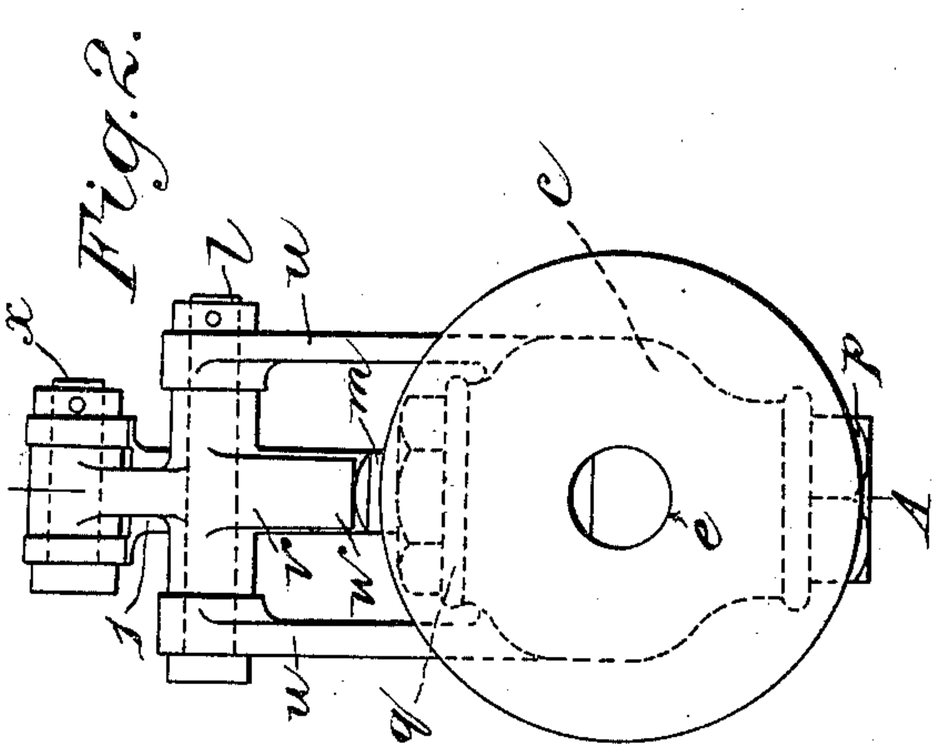

Fig. 2.

Witnesses.
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UNITED STATES PATENT OFFICE.

ROBERT GRUNDY BROOKE, OF MACCLESFIELD, ENGLAND.

STEAM-TRAP.

SPECIFICATION forming part of Letters Patent No. 682,526, dated September 10, 1901.

Application filed February 9, 1901. Serial No. 46,673. (No model.)

To all whom it may concern:

Be it known that I, ROBERT GRUNDY BROOKE, a subject of the Queen of Great Britain and Ireland, residing at Macclesfield, England, have invented Improvements in Steam-Traps, of which the following is a specification.

This invention has reference to steam-traps of the kind wherein the opening and closing of the water-discharge valve are brought about by the contraction and expansion, respectively, of one or more tubes (hereinafter referred to as the "expansion" tube or tubes) to which the water of condensation is admitted and from which it is intermittently discharged and replaced by steam; and it consists of improvements in such traps whereby their construction and adjustment are simplified and their efficiency and working improved.

In a steam-trap of the kind referred to constructed according to this invention the water-discharge opening from the expansion tube or tubes or interior of the trap is controlled by a valve that is arranged to be pushed off its seat in an inward direction against the fluid-pressure within the trap by contraction of the said tube or tubes and is closed in an outward direction by the direct action upon it of the fluid-pressure within the said tube or tubes when the latter reëxpands or reëxpand upon the admission of steam thereto, the said valve being disconnected from the device used for directly opening it, so that when pushed off its seat it is capable of opening automatically to a further extent independently of said opening device. By this construction when the valve is pressed off its seat by the contraction of the expansion tube or tubes the rush of water past it will automatically open it to a further extent, with the result that a sudden sharp discharge of water will take place like that obtaining with a pop safety-valve, after which the tube or tubes will immediately reëxpand and the valve will be quickly, positively, and effectually closed by the steam in the tube or tubes, so as to prevent any further discharge or dribble of water until the valve is again pressed off its seat by contraction of the tube or tubes. A light spring may, if desired, be combined with the valve to close the same against its seat at starting and to impart a constant closing tendency to the valve. Expansion steam-traps having a water-discharge valve arranged and operating as described can be constructed in various forms.

Figure 1 of the accompanying illustrative drawings shows, partly in longitudinal section on the line A A of Fig. 1 and partly in side elevation, one construction of steam-trap according to this invention. Fig. 2 shows the steam-trap in end elevation.

a is an expansion-tube provided at its inlet end with a flange *b*, by which it can be attached to a steam-pipe or other vessel to be drained of water of condensation, and its other or outlet end with a valve-box *c*, having longitudinal inlet and outlet branches *d* and *e*, respectively, separated by a horizontal wall or partition *f*, in which is a water-discharge aperture *g*. Below the partition *f* and on the pressure side thereof is a conical valve *h*, carried by a stem *m*, the lower part *n* of which works in a guide *o*, carried by a screw-plug *p*, fixed to the bottom of the valve-box *c*, while the upper part of the stem *m* passes through a screw cap or cover *q*, fixed, as by screwing, to the top of the valve-box *c*. Between the valve *h* and its lower guide *o* and surrounding the part *n* of the valve-stem *m* is or may be a light coiled spring *r*, that tends to raise the valve *h* to its seat *s*, which is formed on the lower or pressure side of the wall or partition *f* and around the aperture *g* therethrough.

For forcing the valve *h* inward—that is to say, away from its seat and against the pressure in the tube *a*—there is pivoted or journaled upon a pin *l*, between a pair of upwardly-extending lugs *u* on the valve-box *c*, a lever *v*, the lower end *w* of which is formed to serve as a cam and the upper end of which is jointed at *x* to the forward end of a rigid rod or bar 1, the other end of which is, as shown, adapted to bear against the flange *b*, which serves as an abutment therefor. As will be seen, the arrangement is such that when the expansion-tube *a* contracts it will move back the fulcrum-pin *l* of the lever *v*, with the result that the upper end of the said lever will be forced forward by the rigid rod or bar 1, and the lower cam-like end *w* of the lever will be caused to act upon and depress the valve-spindle *m*, so as to open the valve

h against the fluid-pressure within the trap, whereupon the said valve will be immediately opened to a further extent by the issuing water independently of the lever *v*, so as to allow of the pop-like action hereinbefore described, the valve automatically closing immediately the water is ejected and replaced by steam. The rod or bar 1 may be made adjustable endwise for setting the steam-trap to open upon any predetermined contraction of the tube taking place. This is the only adjustment necessary for putting the trap in working order. In the example shown the rear end of the rod or bar 1 is for the purpose just mentioned arranged to bear against a seat 2, formed in a rotary socket 3, provided with a screw-threaded stem 4, that works in a correspondingly-screw-threaded hole 5 in the flange *b;* but any other known or suitable means of adjusting the effective length of the rod 1 can be used.

What I claim is—

An expansion steam-trap comprising an expansion-tube having a valve-box, a valve in said box having a projecting stem, a lever intermediately pivoted at a point substantially in a line with said stem, a rigid rod connected with one end of said lever and the opposite end of the lever provided with a cam-surface engaging said projecting valve-stem, substantially as described.

Signed at the city of Manchester, in the county of Lancaster, England, this 22d day of January, 1901.

ROBERT GRUNDY BROOKE.

Witnesses:

EDWIN JONES,

WILLIAM HASLAM.