(No Model.)

E. P. ROBINSON.

POP SAFETY VALVE.

No. 426,516. Patented Apr. 29, 1890.

Fig. 1,

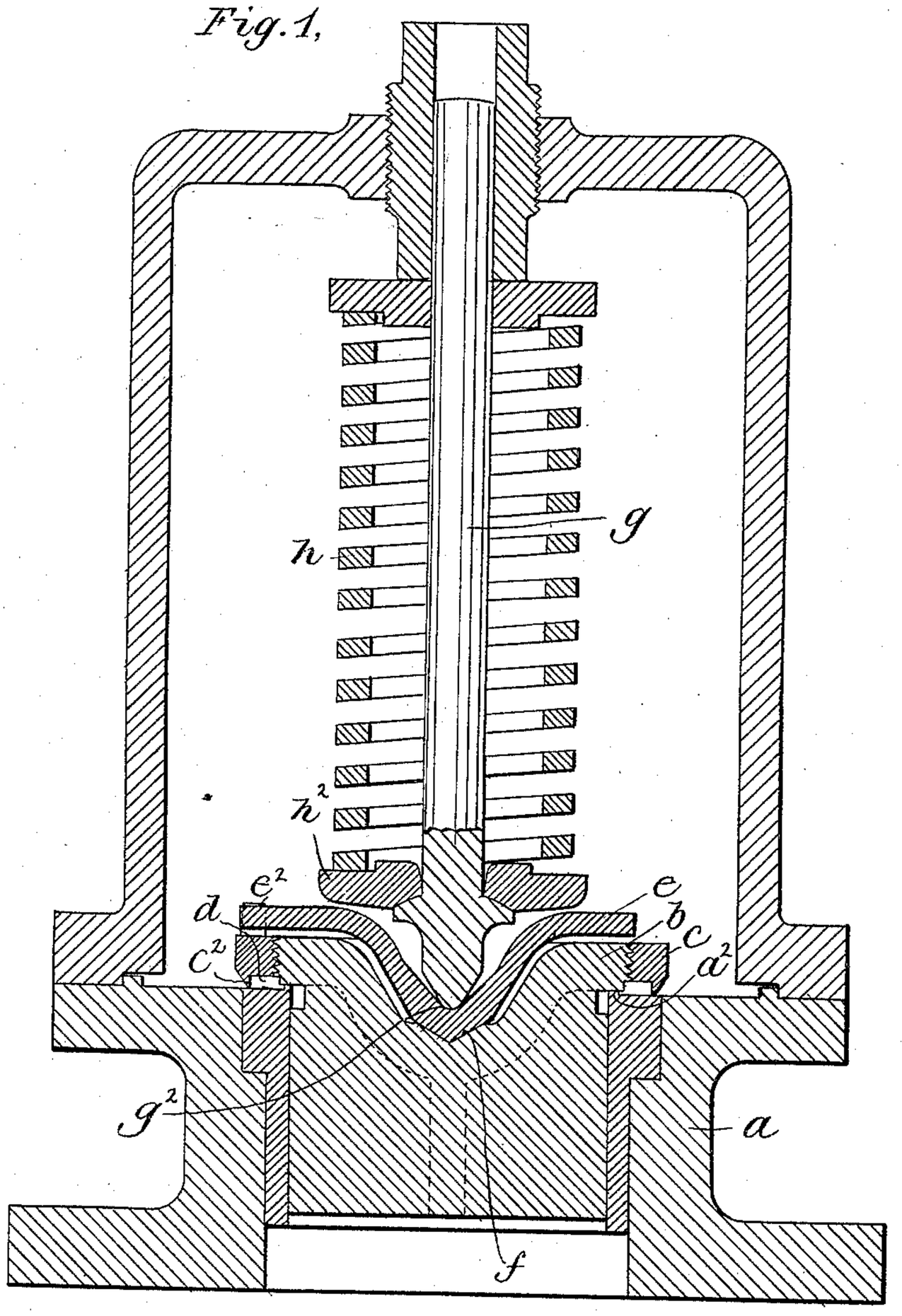


Fig. 2,

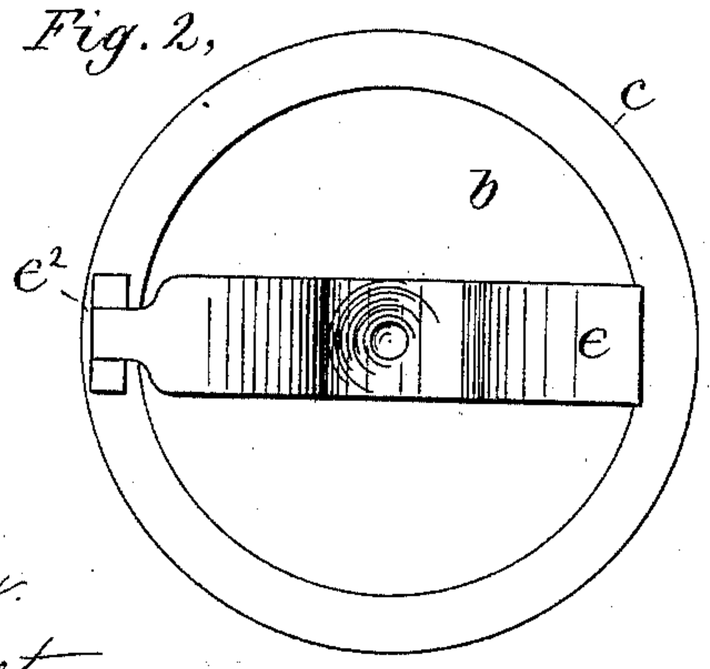
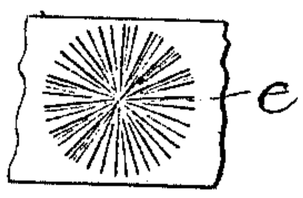


Fig. 3.



Witnesses.
Jas. J. Maloney.
Lillian E. Preston

Inventor,
Edward P. Robinson,
by Jos. P. Livermore
Att'y.

UNITED STATES PATENT OFFICE.

EDWARD P. ROBINSON, OF SOMERVILLE, MASSACHUSETTS.

POP SAFETY-VALVE.

SPECIFICATION forming part of Letters Patent No. 426,516, dated April 29, 1890.

Application filed August 23, 1889. Serial No. 321,799. (No model.)

To all whom it may concern:

Be it known that I, EDWARD P. ROBINSON, of Somerville, county of Middlesex, and State of Massachusetts, have invented an Improvement in Pop Safety-Valves, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention relates to a safety-valve of the class known as "pop-valves," in which, when the valve is opened by internal boiler pressure, an additional area is exposed to the pressure of the escaping steam, thus causing the valve to open widely and promptly relieve the boiler. The additional area forms a part of what is sometimes called a "huddling-chamber," said chamber having an orifice or outlet that is varied by the rise and fall of the valve, said outlet being between a ring or flange connected with the valve and a portion of the valve-seat and constituting a strictured orifice or outlet from the huddling-chamber. It is necessary to regulate or adjust with great nicety this strictured outlet, which is commonly done by adjusting the ring up and down upon the valve, such variations in the position of the ring or in the size of the strictured outlet producing corresponding variations in the pressure at which the valve closes and thus regulating the amount that the pressure is drawn down when the valve is opened.

The present invention relates especially to appliances for facilitating the adjustment of the stricture-ring and for retaining or locking the same in whatever position it may be set.

The invention consists, mainly, in the combination of the valve and its seat with a stricture-ring adjustable up and down on the valve by rotary movement of said ring about the valve, said parts being connected by a screw-thread and a locking device or bar interposed between the valve and its hold-down spring or equivalent, said locking device being engaged with the said ring and being restrained against movement with relation to the valve by a force greater than that which resists movement of the entire valve and locking device with relation to its hold-down spring.

Figure 1 is a longitudinal section of a safety-valve embodying this invention; Fig. 2, a plan view of the valve, its adjusting-ring, and the locking device for retaining the latter in adjusted position; and Fig. 3, a modification to be referred to.

The outer shell or casing *a*, sustaining the valve-seat a^2 and the valve *b*, may be of any suitable or usual construction, the said valve being provided with an adjustable ring *c* above its seat and extending out over the opening controlled by the valve, and said ring having a downwardly-projecting flange c^2, which incloses a small annular chamber *d* around the valve, so as to receive an additional valve-lifting pressure immediately after the valve is opened by the pressure acting upon the area initially exposed to pressure, this construction and mode of operation being well known in valves of this class and forming no part of the present invention.

By adjusting the ring *c* up and down with relation to the valve, so as to vary the space left between the lower edge of the flange c^2 and the valve-seat when the valve is closed, the additional pressure produced by the escaping steam may be varied and the valve caused to close after a greater or less diminution in the boiler-pressure, as may be desired. In order to facilitate the adjustment of the ring *c* for this purpose and to provide means for holding the said ring when properly adjusted without the use of set-screws or other clamping device, the valve is, in accordance with this invention, provided with a ring-locking device *e*, shown as a bar extending across above the top of the valve and engaging at one end, as e^2, with a stricture-ring *c*, as best shown in Fig. 2. The locking-bar *e* has a central pivotal bearing at *f* upon the top of the valve *b*, and such bearing is given considerable extent, so as to afford a considerable resistance to rotary or pivotal movement when the locking device *e* is pressed strongly against the valve. The ring *c* and connected locking device *e* may thus be turned about the valve *b* by exerting sufficient force to overcome the friction at *f*; but the said friction is sufficient to restrain said parts from turning with relation to the valve, except when external force is positively applied thereto.

The locking device *e* is interposed between

the valve and the hold-down spindle *g*, which receives the pressure of the part that holds the valve seated, and, as it were, counterbalances the internal boiler-pressure intended to raise the valve, the said counterbalancing force being, as shown in this instance, produced by a spring *h*, bearing on a yoke or collar h^2, engaged with the spindle *g*, just above the valve.

The spindle *g* bears pivotally upon the locking device *e* at g^2; but the said pivotal bearing is made small compared with the pivotal bearing at *f*, so that the frictional resistance to the rotation of the locking device *e* relative to the spindle *g* is much less than the frictional resistance to its rotation relative to the valve *b*, and, on the other hand, when the valve is pressed against its seat the frictional resistance to rotation of the valve on its seat is greater than the frictional resistance to rotation of the locking device *e* on the valve. Thus, when the valve is seated, the operator, by taking hold of the ring *c* and exerting sufficient power, can turn the said ring up and down, the locking device *e* then accompanying it, and the said locking device and ring rotating together with relation both to the valve *b* and spindle *g*, which both remain stationary. Any rotation of the spindle *g* which may occur will not, however, turn the locking device and ring, as the frictional resistance to the movement of the ring is greater than that to the movement of the spindle *g* upon the locking device. On the other hand if, when the valve is unseated, there is any tendency of the valve itself to rotate with relation to the seat, it will carry the ring *c* and locking device *e* with it in such rotation, these parts all turning upon the spindle *g* as a pivot in such movement. Thus very simple and efficient means are provided for adjusting the stricture-ring *c* and for retaining it when so adjusted against change or disturbance in the normal operation of the valve.

If desired, the holding-power at the engagement of the locking-bar with the valve at g^2 may be increased by corrugating the engaging-surfaces, as indicated in Fig. 3.

I claim—

The combination of the main valve and adjustable stricture-ring of a safety-valve with a locking device connected with said ring and engaged with the valve and its hold-down spindle, as described, the resistance at the point of engagement between the locking-bar and valve being greater than that between the locking-bar and hold-down spindle, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EDWARD P. ROBINSON.

Witnesses:
JOS. P. LIVERMORE,
JAS. J. MALONEY.