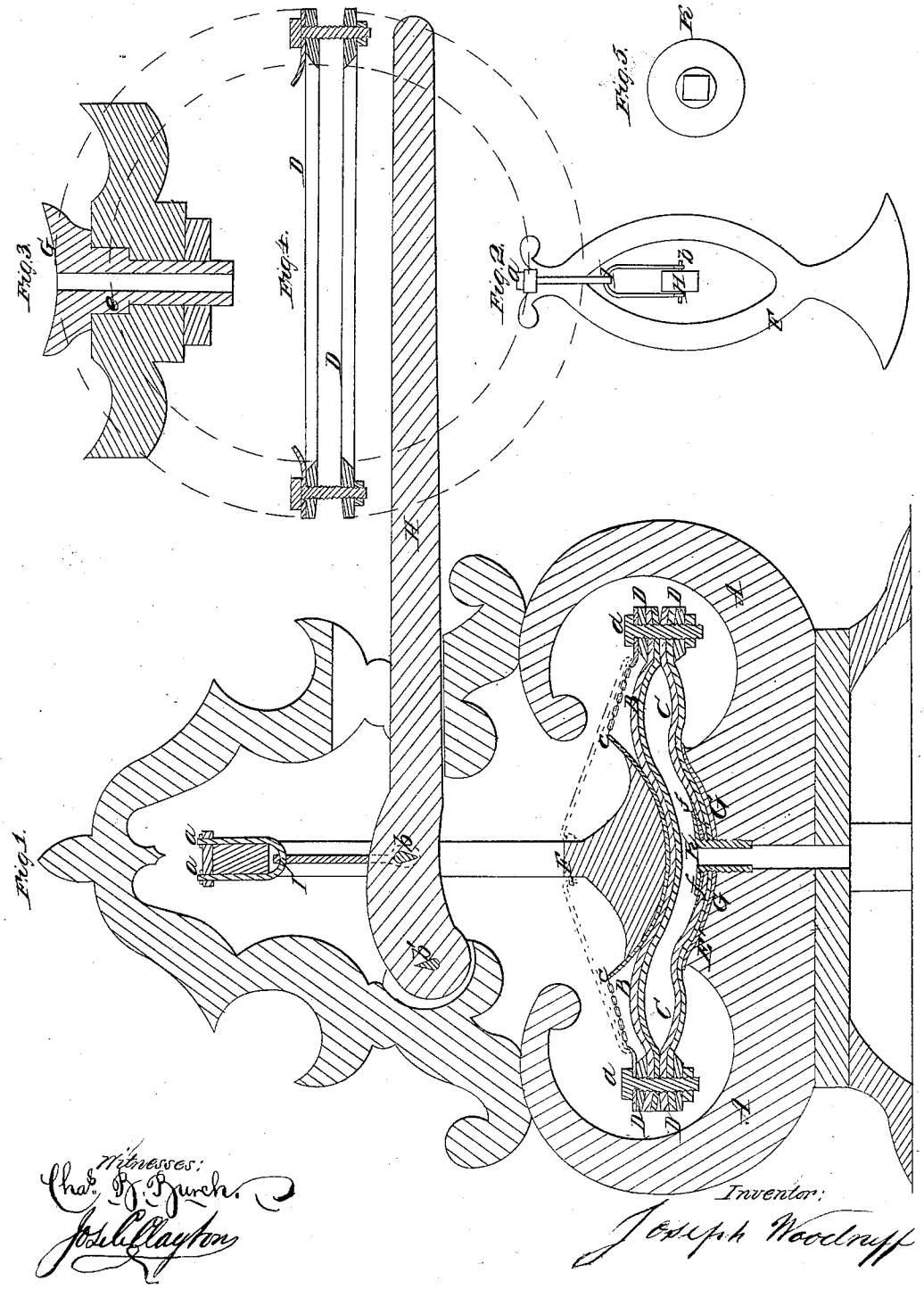
J. Woodruff,

Boiler-Furnace Draft-Regulator.

No. 27,403. Patented Mar. 6, 1860.



Witnesses:
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JOSEPH WOODRUFF, OF RAHWAY, NEW JERSEY.

IMPROVED STEAM AND FIRE REGULATOR.

Specification forming part of Letters Patent No. **27,403**, dated March 6, 1860.

To all whom it may concern:

Be it known that I, JOSEPH WOODRUFF, of Rahway, Union county, in the State of New Jersey, have invented a new and Improved Steam and Fire Regulator; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

Figure 1 is a vertical section of the regulator. Fig. 2 is a detached view of standard. Fig. 3 is a view of another mode of making the hollow cup. Fig. 4 is a section of the clamping-rings.

In order that those skilled in the art may make and use my invention, I will describe its construction and operation.

The nature of my invention consists in constructing steam and fire regulators with double diaphragms connected together by clamping-rings.

In the drawings, A is the frame-work; B, the upper and C the lower diaphragm; D, the clamping-rings; E, the plate attached to the stem or standard; E′, the plate resting on the hollow cup; F, the stem or standard; G, the hollow cup; H, the lever; I, the double clevis and yoke with regulating-screws *a*; *b* and *b′*, knife-edge pins or pivots of the lever; *c*, the chains for keeping stem F in central position; K, the hollow packing-screw; *d*, screw bolts or rivets for clamping-rings.

The dotted lines in Fig. 1 show a ring and rods for holding stem F in a central position without chains.

In Fig. 3, *e* represents a square shoulder on the hollow cup when made separate from the frame-work.

In the construction of my invention it will be seen that the frame-work A is simple in its construction, and that I use two disks or diaphragms B and C, of canvas, rubber, leather, or other suitable material impervious to water. These two diaphragms are connected together at their outer edges by clamping-rings D and bolts or rivets *d*. These clamping-rings (see Fig. 4) are made thicker at their inner edges, and are beveled to their outer edges, so as to clamp the diaphragms more tightly on the inner edge, thus producing a perfectly steam-tight joint. In some cases I may use the clamping-rings without any bevel. The office of plate E and chain *c* is to keep the stem F in proper position. I do not confine myself to this particular arrangement, for I may use the ring and rods, as represented by dotted lines in Fig. 1, or I may attach the stem F directly to the upper diaphragm by a screw, and thus guide the stem by the diaphragm. The lower diaphragm C rests on plate E′, (or it may rest on hollow cup G without the plate E′,) and is held in its proper position by hollow packing-screw K. This screw K, it will be seen, forms a steam-tight joint by holding the diaphragm tightly down to the plate E′ or the hollow cup G. This packing-screw (see K) has a square hole through it for the passage of the operating-fluids. This hole, in connection with washer *f*, enables me to screw the diaphragm down tightly, thus holding both the diaphragms and their clamping-rings in their required positions without any other guide or support.

It will be seen that the stem F rests on the diaphragm or plate E, and is so constructed as that lever H passes through it. From the upper part of this stem is suspended a double clevis and yoke I, with regulating screw-nuts *a*. This clevis serves to elevate the lever by means of a knife-edge pivot *b*, attached thereto, and *b′* the knife-edge bearing of the lever.

In the operation of my invention it will be seen that as the fluid enters the space between the diaphragms through the hollow packing-screw it (the fluid) elevates the upper diaphragm, and with it the stem, and at the same time the upper diaphragm, by reason of its connection with the lower diaphragm by the clamping-rings, elevates that portion of the lower diaphragm between the cup and the rings. Thus the stem moves twice the distance that the rings move, and, further, as the cup G and stem F are about the same size, the diaphragm B between the stem and the rings and the diaphragm C between the cup and the rings both move in the same proportion, so that when the stem ascends one inch the rings ascend half an inch. By this means I am enabled to use a thick and strong diaphragm which needs no support, and at the same time works with little or no friction. As the stem is raised by the diaphragms, the double clevis and yoke supported from the upper part of the stem raises the lever H by

its knife-edge pivot *b*. This lever then is attached by a rod to the damper and weighted by a ball, as in the ordinary manner, so that the damper is closed when the pressure becomes sufficient, and is opened when the pressure of the steam is below the required point by the weight of the ball, so as to maintain a uniform pressure.

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

1. The disks or diaphragms B and C, connected together so as to form a double diaphragm, constructed and operating substantially as set forth.

2. The clamping-rings D, when applied to the diaphragms for the purpose of making a steam or air tight joint.

3. The concave cup or bearing G for supporting the lower diaphragm when about the size of the standard or bearing F.

4. The hollow packing-screw K, constructed as described, and operating in the manner set forth.

5. The double adjustable clevis and yoke I, in combination with standard F and lever H.

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Witnesses:
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