

(No Model.)

I. V. WARNER.
Steam Balance Valve and Cut-Off.

No. 232,426.

Patented Sept. 21, 1880.

Fig. 1.

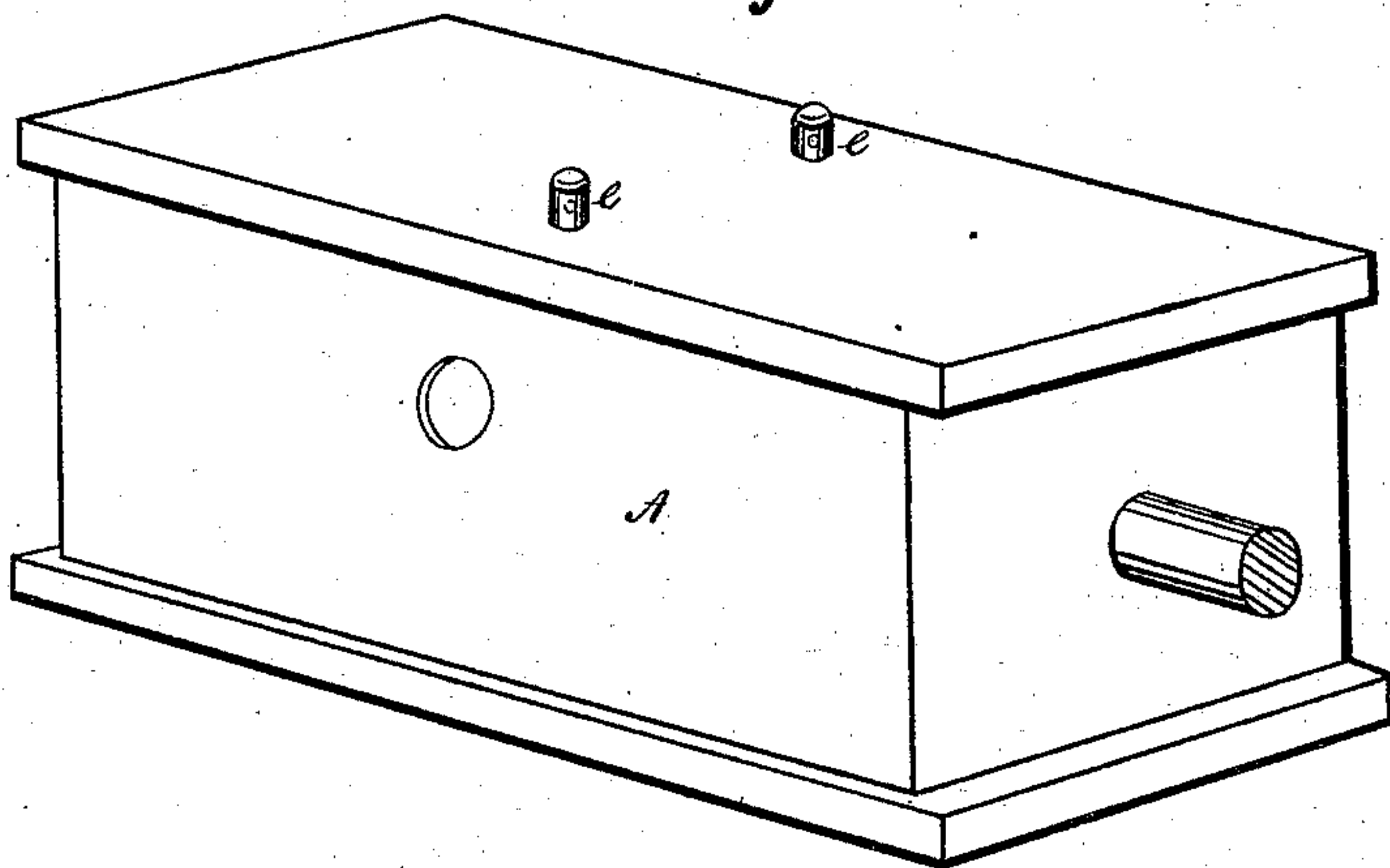


Fig. 2.

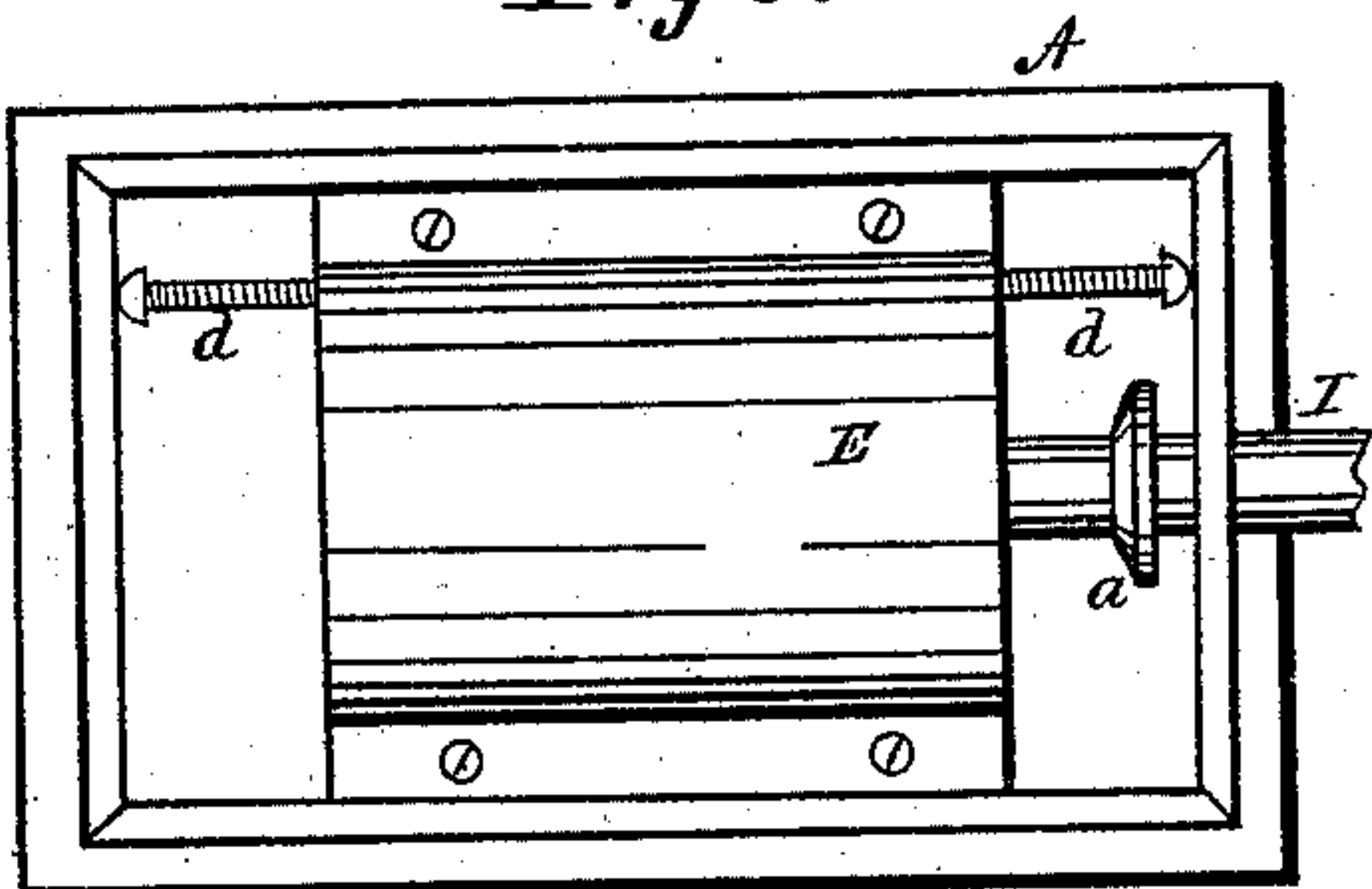


Fig. 3.

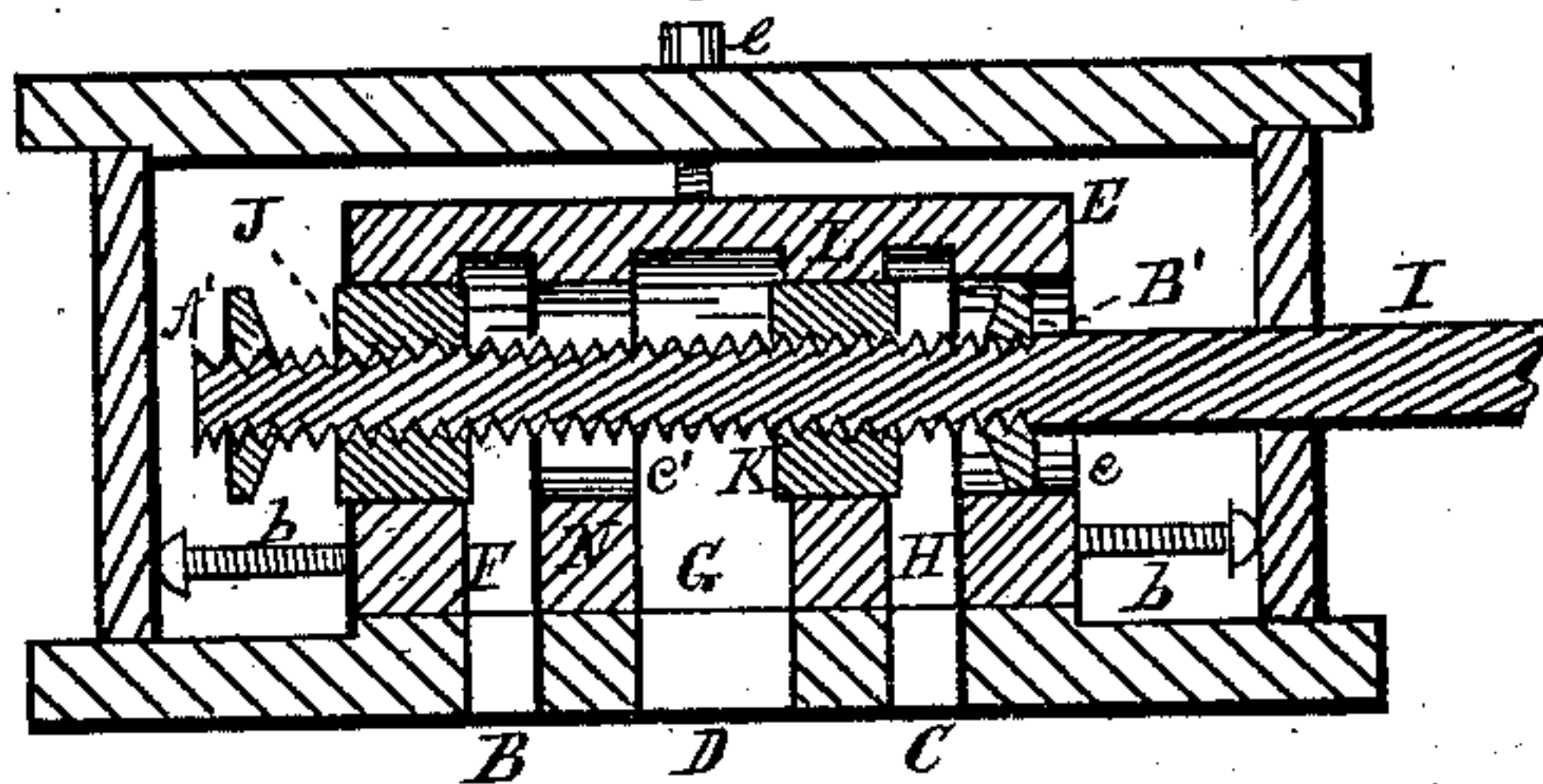


Fig. 4.

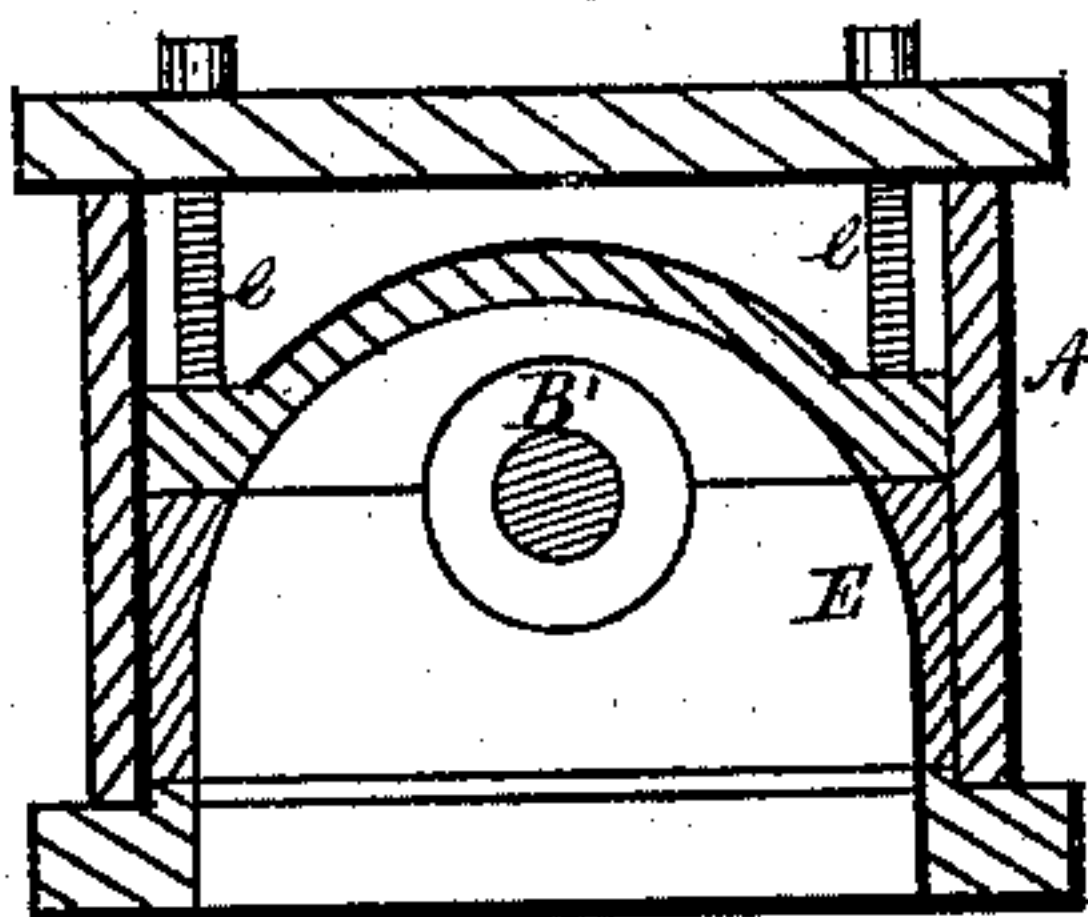
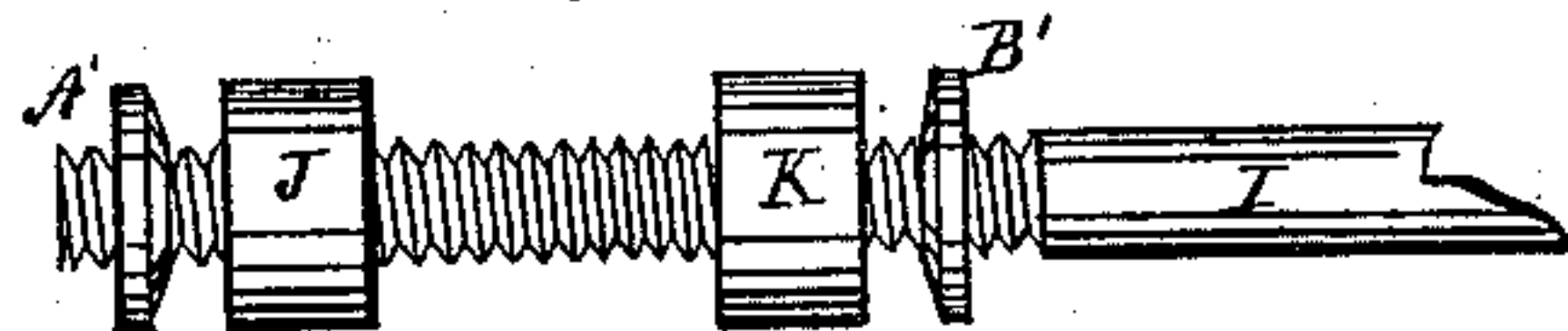


Fig. 5.



Witnesses

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UNITED STATES PATENT OFFICE.

ISRAEL V. WARNER, OF MILAN, OHIO, ASSIGNOR OF ONE-HALF OF HIS
RIGHT TO A. J. MOWRY, OF SAME PLACE.

STEAM BALANCE-VALVE AND CUT-OFF.

SPECIFICATION forming part of Letters Patent No. 232,426, dated September 21, 1880.

Application filed May 26, 1880. (No model.)

To all whom it may concern:

Be it known that I, ISRAEL V. WARNER, of Milan, in the county of Erie and State of Ohio, have invented new and useful Improvements in Steam Balance-Valves and Cut-Offs, of which the following is a description, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a perspective view of the valve-chest. Fig. 2 is a plan view of the inside. Fig. 3 is a longitudinal section. Fig. 4 is a transverse section. Fig. 5 is a detached section.

Like letters of reference refer to like parts in the several views.

This invention is a balance steam-valve so constructed as to work with but little friction, and which valve can be placed in the steam-chest of any ordinary steam-engine in place of the slide-valve without making any essential alteration of said steam-chest or valve-stem.

A more full and complete description of the valve alluded to is as follows:

In the drawings, A represents the steam-chest of any common engine. B and C are the induction-ports, and D the eduction or exhaust port corresponding to the induction and eduction ports of the cylinder, in open relation with which the ports are arranged. In said chest is secured a valve-seat, E, provided with ports F, G, and H, corresponding to the induction and eduction ports alluded to, and with which they are in open relation.

I is the valve-stem, whereon are screwed the valves J and K. On the stem are also screwed the cut-off valves A' B', respectively, in close relation to the valves J and K, as shown in Figs. 3 and 5. Said valves are circular in form and fitted in the bore of the valve-seat, as seen in Figs. 4 and 5, and work therein reciprocally by the eccentric substantially as follows: The position of the valves J and K, as shown in Fig. 3, is such as when a full head of steam has just been admitted to the cylinder through the way c and port H and is exhausting through the ports F and G, as indicated by the arrows. It will be observed that in this position of the valves the valve K closes the passage-way in the bridge L of the valve-seat, thereby shutting off the live steam

from the exhaust-port G, and that the valve J shuts off the live steam from the port F, so that a free exhaust may be had of the steam from that end of the cylinder. On the reaction of the valves the valve K closes the way c, and the valve J closes the way c' of the bridge N. This reverse movement of the valves admits the live steam into the cylinder through the port F while the spent steam is exhausting at the opposite end of the cylinder through the ports H and G, and so on alternately as the valves move from right to left and from left to right. The ports are opened and closed by the valves J and K for the induction and eduction of steam to the cylinder.

To work the steam expansively is the purpose of the valves A' and B'. Said valves may be so adjusted in their relation, respectively, to the valves J and K as to cut off the steam from said valves J and K more or less, as may be desired, by screwing them nearer to or away from them, as the case may be. When the valve J has moved to the right a certain distance, the cut-off valve A' follows and closes the steamway of said valve J, allowing the steam in the cylinder to act expansively upon the piston. In due time the cut-off valve B' opens and admits steam to the valve K, which steam, as the valve moves to the left the same distance above alluded to, is cut off by the valve B', and so on alternately the valves cut off steam at each stroke of the valves. The valves J and K may be given more or less lead by taking the cover from the valve-chest and adjusting said valves on the rod or stem, for by their being screwed thereon the most exact amount of lead can be obtained to them.

The valve-seat E is so constructed that it can be removed from the steam-chest without taking the chest from the cylinder. The cover needs only to be removed, and the valve-seat and valves can be lifted therefrom. The valve-seat is kept in place longitudinally by set-screws d, and vertically by the screws e.

Steam may be admitted into the chest through the top or at the sides, as circumstances may determine. The pressure of steam being alike at each end of the valves, they are consequently equally balanced, and therefore

work with little frictional resistance in their seats.

What I claim as my invention, and desire to secure by Letters Patent, is—

- 5 The combination of the steam-chest A, valve-seat E, provided with induction and eduction ports, steamways *c c'*, with their respective valves J K and cut-off valves A' and B', and screw valve-rod I, on which said valves are

adjustable, constructed and arranged to operate conjointly, substantially as described, and for the purpose specified.

In testimony whereof I affix my signature in presence of two witnesses.

ISRAEL V. WARNER.

Witnesses:

J. H. BURRIDGE,
JAMES W. FIELD.