W. J. WESTWOOD.

BALANCED SLIDE-VALVE.

No. 193,305. Patented July 17, 1877.

Fig. 1.

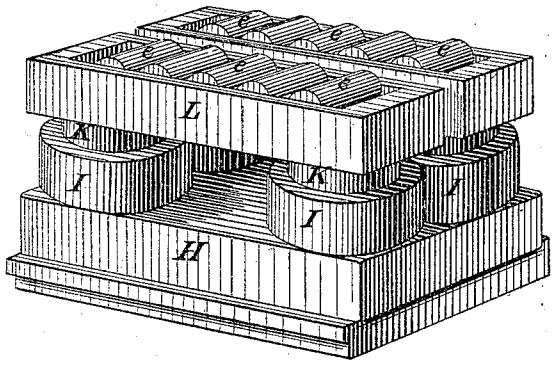


Fig. 2.

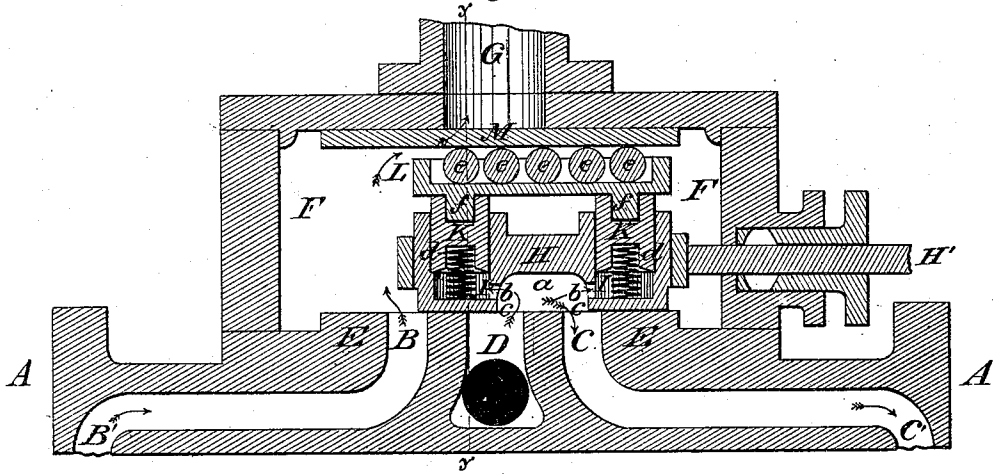
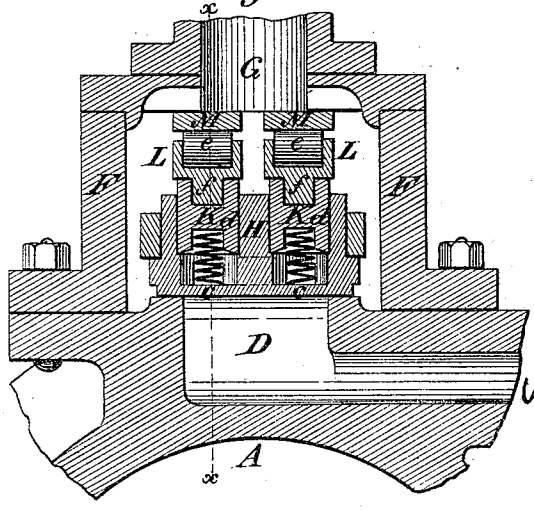


Fig. 3.



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UNITED STATES PATENT OFFICE.

WILLIAM J. WESTWOOD, OF SOUTH BEND, ASSIGNOR OF PART OF HIS RIGHT TO THOMAS JERNEGAN, TRUSTEE, OF MICHIGAN CITY, IND.

IMPROVEMENT IN BALANCED SLIDE-VALVES.

Specification forming part of Letters Patent No. **193,305**, dated July 17, 1877; application filed December 22, 1876.

To all whom it may concern:

Be it known that I, WILLIAM J. WESTWOOD, of South Bend, in the county of St. Joseph and State of Indiana, have invented a new and useful Improvement in Balanced Slide-Valve; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My invention relates to an improvement in balanced slide-valves, more particularly of that class wherein the live steam is admitted under the valve; and its object is to utilize the pressure of the live steam to keep the valve balanced and to allow the same to move upon its seat with the minimum amount of friction, and, further, to produce a valve which will be simple in construction and durable in wear, and adapted to adjust itself automatically.

My invention therein consists in the devices employed for balancing the valve and reducing the friction by means of the live steam, and in the various combinations of the operative parts, all as more fully hereinafter explained.

To enable others skilled in the art to manufacture my valve, I proceed to describe the same, having reference to the drawings, in which—

Figure 1 is a perspective view of the valve alone; Fig. 2, a vertical longitudinal section through valve-chest and part of cylinder, cutting the valve on the line *x x* in Fig. 3; and Fig. 3, a vertical cross-section of the same parts, dividing valve on line *y y* in Fig. 2.

Like letters denote corresponding parts in each figure.

A represents the cylinder. B and C are two ports, opening through the valve-seat E, and connecting, by passages B′ C′, with the ends of the cylinder. Between these ports is situated the steam-port D, which I have found, by actual test, should be about one-fifth ($\frac{1}{5}$) larger than either of the side ports. The valve-chest F is mounted upon the cylinder, and opening centrally through its cover F′ is an exhaust-pipe, G. H is the body of the valve, which is rectangular in form, and is hollowed out at *a* on its under side in the usual manner.

The valve is operated in the ordinary way by its stem H′. In the body of the valve are formed two or more cylindrical chambers, I, which open through the top of such valve, and, at their bottoms, are connected by small horizontal passages *b*, with the hollowed-out portion *a*. A shoulder, *c*, is formed in each of the chambers near its bottom. Two or more cylindrical plungers, K, turned to fit closely the chambers I, are placed in the same, and project a little above the tops of such chambers. The bottom areas of these plungers may equal or exceed the area of the valve exposed to the upward pressure of the steam. Spiral springs *d* are placed in these chambers under the plungers, and hold them upwardly. Resting upon the plungers K are one or more roller-boxes or guides, L, having sides and ends, in which are placed any desired number of rollers *e*, resting loosely in the said boxes, or, if desired, they may be journaled therein.

To keep the roller-boxes in position they are provided with suitable studs *f*, setting in holes in the tops of the plungers. The rollers in the guide-boxes bear against the steel plates M, which may be secured to the under side of the valve-chest cover, or may be spring-plates forced down by set-screws tapped through such cover.

In the operation of the valve, the plungers resting upon the springs in the cylindrical chambers, the live steam is admitted, as shown by the arrows in Fig. 2, and, as it passes through the cavity in the valve, enters through the passages *b* under the plungers, and forces them upwardly. The movement of the plungers, in connection with the downward pressure of the exhaust-steam passing through the valve-chest, overcomes the upward pressure of the live steam on the valve, and holds such valve steam-tight upon its seat. The upward movement of the plungers is about one-sixteenth ($\frac{1}{16}$) of an inch. The valve can be thus exactly balanced, and it will be seen that the friction will be but little, and the power required to move the valve thereby much reduced.

The valve, constructed as above described,

is simple and durable, since it has no parts which have to be adjusted, but adapts itself automatically to the pressure of the steam. This valve can be applied to old as well as new engines, effecting a great saving, especially in its application to large engines.

It will be seen that, instead of using four chambers and plungers in connection with my valve, two only could be employed with good result without departing from the nature of my invention. The spiral springs under the plungers could also be done away with; but I have found, by tests, that my valve will work to more advantage with them.

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

1. In a balanced slide-valve, the combination of the spring-plunger, situated in chambers in the valve and forced upwardly by steam entering such chambers from the valve-cavity, with friction-rollers between such plungers and the valve-chest cover, substantially as and for the purposes set forth.

2. In a balanced slide-valve wherein the live steam is admitted under the valve, the combination of the plungers with the roller-boxes and rollers, substantially as described and shown.

3. In a balanced slide-valve wherein the live steam is admitted under the valve, the combination of the plungers with the roller-boxes, rollers, and steel plates M, substantially as described and shown.

4. In a balanced slide-valve wherein the live steam is admitted under the valve, the combination of the chambers I, passages *b*, plungers K, spiral springs *d*, roller-boxes L, rollers *e*, and steel plates M, constructed and arranged substantially as described and shown.

This specification signed and witnessed this 20th day of November, 1876.

WILLIAM J. WESTWOOD.

Witnesses:
GEORGE PFLEGER,
THOMAS JERNEGAN.