

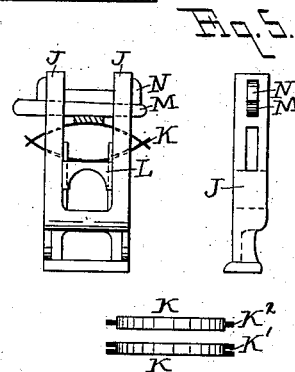
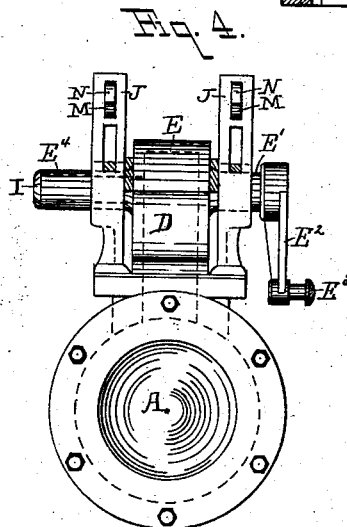
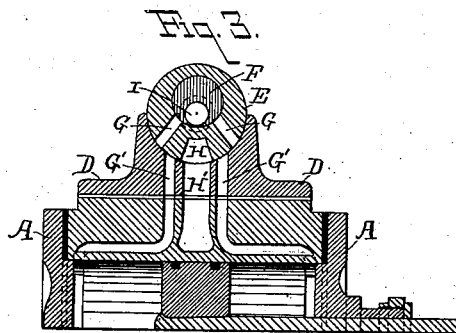
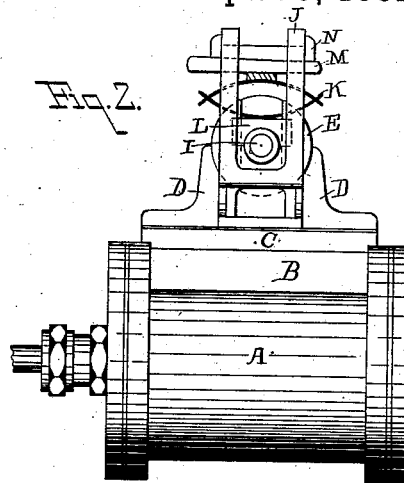
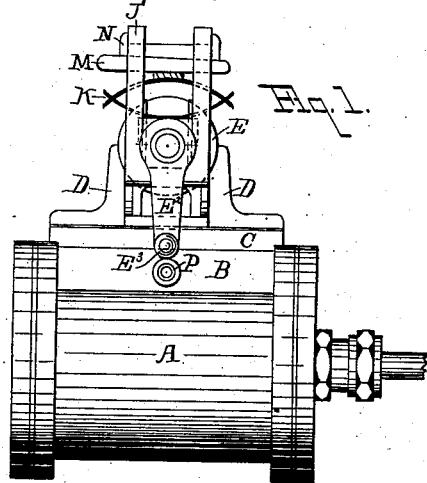
(No Model.)

S. L. WESTLEY & B. F. KRAFT.

BALANCED VALVE.

No. 264,588.

Patented Sept. 19, 1882.



Witnesses:  
Samuel P. Kinsey  
Frank P. Kinsey

Inventors:  
Samuel L. Westley  
Benjamin F. Kraft  
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# UNITED STATES PATENT OFFICE.

SAMUEL L. WESTLEY AND BENJAMIN F. KRAFT, OF READING, PA.

## BALANCED VALVE.

SPECIFICATION forming part of Letters Patent No. 264,588, dated September 19, 1882.

Application filed March 18, 1882. (No model.)

*To all whom it may concern:*

Be it known that we, SAMUEL L. WESTLEY and BENJAMIN F. KRAFT, both of the city of Reading, county of Berks, State of Pennsylvania, have invented a new and useful Improvement in Balance-Valves for Steam or Pressure Engines, of which the following is a specification.

This invention relates more particularly to the class of valves, cylindrical in form, which operate by oscillation upon their seats.

Referring to the drawings herewith, Figure 1 represents a side elevation of a steam-cylinder fitted with our improvement. Fig. 2 represents a reverse view of Fig. 1. Fig. 3 is a sectional elevation. Fig. 4 represents a cross-elevation from the piston-rod end of the cylinder; Fig. 5, detail view of the standard and spring.

Like letters of reference indicate like parts.

A represents the cylinder, provided with the usual steam and exhaust passages; B, the shell of the passages; C, the seat; D, a supplemental seat bored to suit the valve, and provided with steam and exhaust ports, which, in their continuity through the same, correspond with the ports of similar character in the seat C of the cylinder, as shown in all of the drawings.

D represents the adaptation of our improvement to engines already in use or built and for sale. In the construction of an original cylinder the seat D would be cast with and form an integral portion of the same, materially reducing the cost of construction.

E represents the valve, which is circular in cross-section, and of sufficient length to suit the ports of the engine, with an allowance at each end for bearing-surface; is provided with a hollow eccentric interior, F, out of which lead openings G G each side of the exhaust depression H, forming the steam ports or passages to the seat D, as shown. It is also provided with a solid spindle or shaft, E', at the valve-rod side, to which is attached an arm, E<sup>2</sup>, having a valve-rod pin, E<sup>3</sup>, at the opposite side or end of the valve. The spindle or shaft E<sup>4</sup> is hollow for the admission of steam or motive force, and is connected with the supply-pipe by a ground-joint and stuffing-box connection, as is usual with joints of this character.

I is the passage through the spindle or shaft for steam or motive force.

J J are stands at either end of the valve, serving as guides for the valve-spindle bearings L, the bearings resting upon the valve-spindles.

K represents elliptic or equivalent springs resting upon the above bearings; M, a key, and N a gib forming a clamp to the stand and an upper bearing to the spring, the compression of which is adjustable by the driving of the key.

P is the usual exhaust.

The valve may be adjusted to the bed and adapted to operate without the compression-springs K, the spindles or shaft being held down by a clamp-bearing and adjusting-screws. We, however, give preference to the arrangement as shown, for the compression upon the valve being adjusted slightly in excess of the difference in force upon the valve, so as to retain it upon the seat. Then any sudden access of pressure from confined water or other cause would raise the valve against the reacting pressure of the springs, and thus relieve the cylinder and save breakage. By widening the bridges between the exhaust and the steam ports of the valve, lap can be given and expansion carried to the same point as with the ordinary D slide-valve. By a proper proportioning of the interior F to the exterior diameter of the valve, the upward pressure on the same, tending to lift it from the seat, may be reduced to such an extent as to require but a slight pressure upon the bearings L to resist the movement, and the valve is practically balanced.

It will be apparent to an expert that our improvement is of more economical application to a new engine-cylinder than that of the ordinary D slide-valve. We dispense with the steam-chest, its numerous bolts, and work of planing and fitting connected therewith, also the surfacing of the valve and seat, reducing the work to that of boring and turning—two of the most simple and accurate operations of the machine-shops. Should repairs become necessary, the seat is rebored and valve re-turned, when the parts are in as good condition for service as when originally fitted. If worn too much to be corrected in this way, the valve is reduced

still more in size, and has then shrunk upon it a sleeve or cylinder of proper size to fit the enlarged bore of the seat, ports being cut through the shell after it is in place upon the valve-body.

We are aware that we are not the first to use a hollow valve of circular exterior section resting in a concave seat adapted to the same, steam being admitted to the interior of the valve through a hollow spindle connected therewith, (see Patent No. 130,506, August 13, 1872, H. P. Jones;) but we believe ourselves to be the first to construct such valves in the manner shown and described, and therefore

We desire to secure by Letters Patent the following claims:

1. The steam-valve E, having an eccentric cavity, F, with steam-passages G G leading therefrom, an external depression, H, for exhaust, a solid shaft or spindle, E', provided with an arm, E<sup>2</sup>, and connecting-rod pin E<sup>3</sup> on one end, and at the opposite end a tubular shaft or spindle, E<sup>4</sup>, having a ground-joint terminus, the passage I through the shaft being provided for the motive force, and in combination with the seats D and C, cylinder A, standards J J, bearings L, springs K, and gibs

and keys N M, substantially as shown, and for the purpose described.

2. In combination with a valve, as described and claimed, the supplemental seat D, adapted by boring to the valve E, and provided with steam-passages G' G' and exhaust-passage H', whereby it is adapted to be applied to cylinders of engines already built and in use, in combination with the standards J J, bearings L, springs K, and gibs and keys N M, substantially as and for the purpose set forth.

3. The standards J J, with their keys M and gibs N, in combination with the springs K, bearings L, valve-shafts E' E<sup>4</sup>, and seat C of cylinder A, substantially as and for the purpose specified.

4. The single-leaved elliptic springs K, constructed, as shown, with female groove K' and male tongue K<sup>2</sup>, in combination with bearings L, valve-shafts E' E<sup>4</sup>, valve E, seat D, cylinder A, and the standards J J, substantially as shown and described.

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