J. Rowbotham,

Steam Balanced Valve.

No. 51,393. Patented Dec. 5, 1865.

Fig. 1.

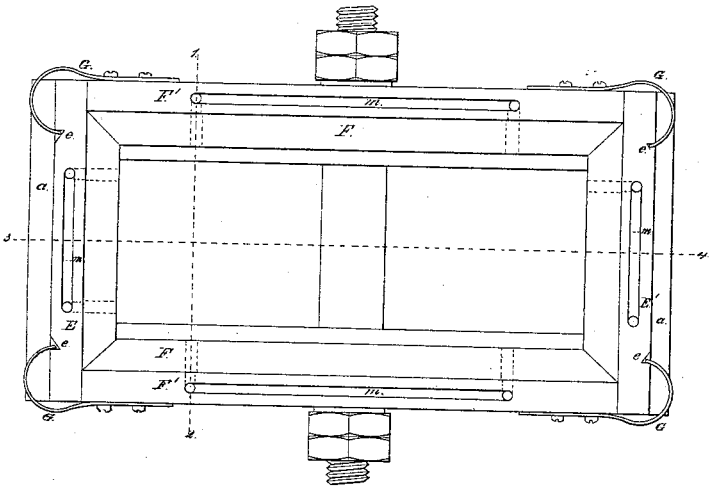


Fig. 2.

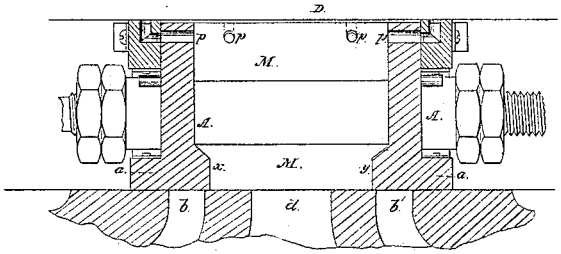


Fig. 3.

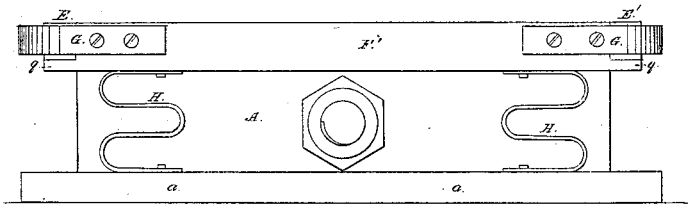
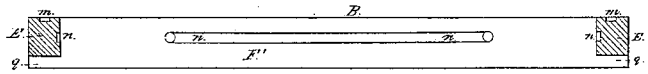


Fig. 4.



Witnesses.

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by his Attys
Howson & Howson

UNITED STATES PATENT OFFICE.

JOHN ROWBOTHAM, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO HIMSELF AND ANDREW J. DESHER, OF SAME PLACE, ASSIGNORS TO SAID ROWBOTHAM AND JAMES H. SPENCER, M. D., OF SAME PLACE.

IMPROVEMENT IN BALANCED SLIDE-VALVES.

Specification forming part of Letters Patent No. **51,393**, dated December 5, 1865.

To all whom it may concern:

Be it known that I, JOHN ROWBOTHAM, of Philadelphia, Pennsylvania, have invented an Improved Balanced Slide-Valve; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My invention consists of a slide-valve having an exhaust-chamber open to the steam-chest cover, in combination with certain strips adapted to each other, and to the said valve and cover, substantially as described hereinafter, so as to form a steam-tight joint between the valve and top of the steam-chest.

My invention further consists of certain recesses formed in the said strips and communicating with the exhaust-chamber of the valve, substantially as described hereinafter, so that there may be a sufficient pressure of steam against the strips to insure tight joints without causing undue friction.

My invention further consists of certain springs, arranged substantially as described hereinafter, for maintaining the said strips in contact with the valve and steam-chest cover.

My improved valve is so limited in dimensions that it can be readily applied to any ordinary steam-chest without altering the same, and the aforesaid strips, being capable of independent movement, will readily accommodate themselves to any unevenness in the arrangement of the steam-chest cover.

In order to enable others skilled in the art to make and apply my invention, I will now proceed to describe its construction and operation.

On reference to the accompanying drawings, which form a part of this specification, Figure 1 is a plan view of my improved balanced slide-valve; Fig. 2, a transverse vertical section on the line 1 2, Fig. 1; Fig. 3, an edge view; and Fig. 4 a section of the strips on the line 3 4, Fig. 1.

Similar letters refer to similar parts throughout the several views.

The body of the valve consists of an oblong base, A, open at the top and bottom, and having at the lower end, on all four sides, a lip or flange, *a*, the width of the exhaust-opening between *x* and *y*, Fig. 2, and the width of the valve across the flanges, being so adapted to the steam-ports *l* and *b'*, and exhaust-ports *d* on the valve-seat B, as to insure the proper lap and lead.

The height of the body A of the valve is such compared with the depth of the steam-chest that the upper edge of the said body shall always be free from contact with the under side of the steam-chest cover D.

The four sides of the body of the valve at the upper edge of the same are made perfectly true, so as to form steam-tight bearing-surfaces for the end strips, E and E', and side strips, F and F', the ends of the former resting on lips *q* formed on the ends of the latter, as seen in Figs. 3 and 4, and the ends of the strips F and F' bearing against the sides of the strips E and E', as seen in Fig. 1. In order to maintain these strips in contact with the body of the valve, I use in the present instance the springs G, each of which is secured to one of the strips F or F', and is so bent at the outer end as to fit into a notch in the adjacent strip E or E', the action of the whole of the four springs being such as to press the strips tight against the body of the valve.

Between the flange *a* and the strip F intervene two springs, H H, similar springs intervening between the flange on the opposite side of the valve and the strip F', these four springs tending to press the whole of the strips upward against the under surface of the steam-chest cover.

It will be observed that in the upper surface of each of the strips is a recess, *m*, and that there is a similar recess, *n*, in that side of each strip which bears against the body of the valve. Each of these recesses *m* and *n* communicates, through any suitable openings, *p p*, in the body of the valve, with the exhaust-space M.

It should be explained here that, although I use springs which will maintain the strips in contact with the steam-chest cover and body of the valve, I do not rely upon these springs alone for the exertion of that force necessary to maintain the strips in steam-tight contact with the cover and valve, the steam itself being relied upon to furnish this force, while the springs themselves act as auxiliaries, their main object being to keep the parts together

in adjusting the valve to its place in the first instance. The pressure of the steam against the under side of the strips would not maintain them in tight contact with the cover without the use of the recesses *m m*, which communicate with the exhaust-chamber M of the valve. It will be evident that as the area of these recesses is increased the greater will be the force exerted by the steam to press the strips upward, and that the extent of the area of these recesses may be such as to obtain the desired bearing force of the strips against the cover, to insure a perfectly steam-tight joint without causing undue friction.

The same remarks will apply to the recesses *n n* on the sides of the strips, which recesses also communicate with the exhaust-chamber M of the valve. The greater the extent of the area of these recesses the greater will be the pressure of the strips against the valve.

In ordinary slide-valves the exhaust-chamber is closed at the top by part of the valve itself. These valves are apt to jump at the time the exhaust-steam is leaving the cylinder, and strike the under side of the valve, this jumping or rising of the valve taking place invariably at the same points in its stroke, so that the seat of the valve must of necessity be unevenly worn; hence the importance of a valve in which the exhaust-chamber is open at the top, or, in other words, a valve in which the top of the exhaust-chamber is formed by the steam-chest cover against which the exhaust-steam impinges, without affecting the proper position of the valve on the seat.

The unpopularity of this class of valves appears to be owing to the difficulty of maintaining a perfectly steam-tight joint between the top of the valve and the steam-chest cover without the employment of cumbrous appliances which cause excessive friction. It will be seen from the foregoing description that the strips afford a perfectly tight joint between the valve and the steam-chest cover, and this without causing undue friction.

An important advantage of my improved valve is its limited dimensions compared with other balanced slide valves, the valve being such that it can be applied to any ordinary steam-chest without altering the same.

A further advantage is this, that if the steam-chest cover be not exactly true or parallel with the face of the valve the strips, being capable of moving independently of each other, will readily accommodate themselves to such inequality without disturbing the integrity of the joints.

Should steam, through imperfect workmanship or other cause, pass from the chest through the joint between the strips and steam-chest cover, this steam can in no way affect the valve, as it passes off at once through the exhaust-opening without exerting the slightest pressure on the valve itself.

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

1. A slide-valve having an exhaust-chamber open to the steam-chest cover, in combination with strips adapted to each other and to the said valve and cover, substantially as and for the purpose described.

2. The arrangement of the recesses formed in the said strips and communicating with the exhaust-chamber, substantially as specified.

3. The combination of the said strips with springs G, constructed and applied to the said strips, substantially as set forth.

4. The combination of the body of the valve, the strips, and the springs H, or their equivalents.

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

JOHN ROWBOTHAM.

Witnesses:
H. HOWSON,
JOHN WHITE.