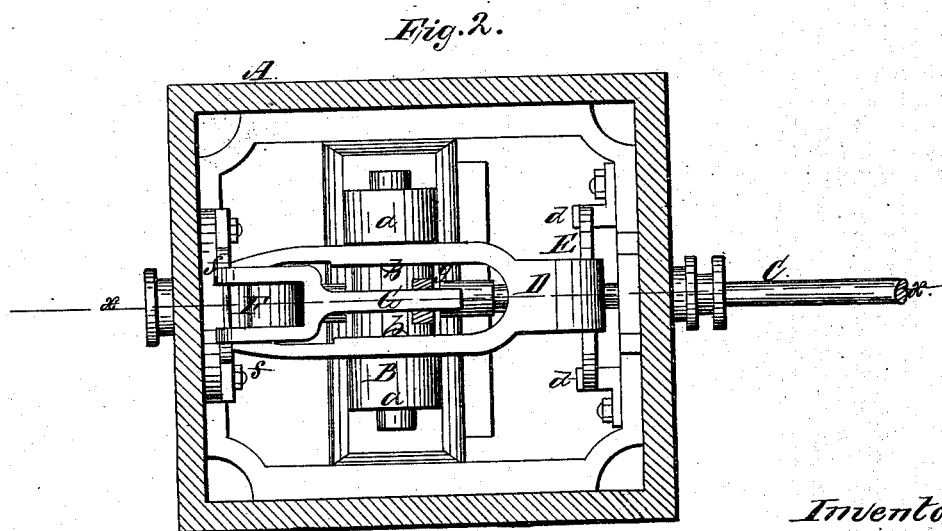
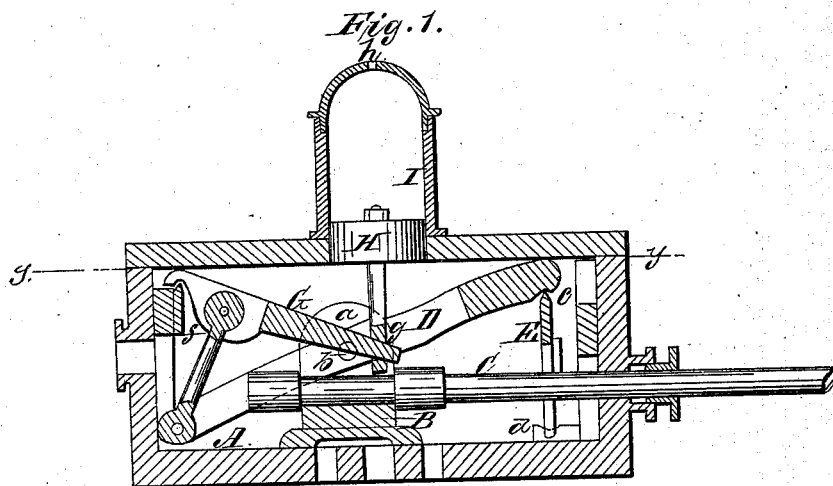


J. Rankin,
Steam Balanced Valve.
No 47,453. Patented Apr. 25, 1865.



Witnesses:
Wm. Brown
Geo. Tuck

Inventor:
James Rankin
per Munroe & Co
Attorneys

UNITED STATES PATENT OFFICE.

JAMES RANKIN, OF DETROIT, MICHIGAN.

IMPROVEMENT IN BALANCED SLIDE-VALVES.

Specification forming part of Letters Patent No. 47,453, dated April 25, 1865.

To all whom it may concern:

Be it known that I, JAMES RANKIN, of Detroit, in the county of Wayne and State of Michigan, have invented a new and Improved Balanced Slide-Valve; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents a longitudinal vertical section of this invention, the line *xx*, Fig. 2, indicating the plane of section. Fig. 2 is a horizontal section of the same, the plane of section being indicated by the line *yy*, Fig. 1.

Similar letters of reference indicate corresponding parts.

The object of this invention is to balance the pressure of the steam on the back of a slide-valve in such a manner that the same works equally free under a pressure of one hundred pounds or more to the square inch as it does in the open atmosphere. This object is obtained by combining with the valve a piston through a series of intervening levers, rockers, and links in such a manner that the upward pressure of the steam on the piston counterbalances the downward pressure on the back of the valve, and the valve is perfectly balanced.

A represents the valve-chest, the bottom of which forms the seat for the slide-valve B, and a reciprocating motion is imparted to this valve by means of the rod C in the usual manner. From the back of the valve rise two lugs, *a*, which form the bearings for the fulcrum-pins *b* of the lever D, which is supported by said pins at about the middle of its length. One end of said lever is provided with a notch, *c*, which rests upon the upper end of a rocker, E, that is stepped in suitable bearings, *d*, on the bottom of the valve-chest. The opposite end of the lever D is suspended from a link, F, which connects by a pivot, *e*, with a lever, G, one end of which rests upon a knife-edge bearing, *f*, which is rigidly connected to the side of the valve-chest, whereas its other loose

end extends through a slot in the piston-rod *g*. This rod extends from a piston, H, which is fitted into a cylinder, I, supported by the top of the steam-chest and open at its inner end. An aperture, *h*, in the top of the cylinder forms an escape for that portion of steam which may pass the piston.

If steam is admitted to the steam-chest, it forces the piston up and the valve down, and the connection between the piston and valve and the areas of said parts are so proportioned that the upward pressure on the piston just balances the downward pressure on the valve. At the same time the valve is allowed to move freely on its seat, the lever D being so arranged that it partakes of the vibrating motion of the valve.

The pressure which holds the valve down on its seat can be easily regulated by changing the position of the pin *e*, which connects the link F with the lever G. If this pivot is moved closer to the knife-edge bearing *f*, the power which tends to raise the valve from its seat is diminished, and by removing the pin *e* from the knife-edge bearing *f* closer to the piston-rod the upward pressure is diminished, and consequently the pressure which holds the valve down on its seat is increased.

By these means the slide-valve can be adjusted so nicely that it works equally free under a high pressure as it does when the steam is shut off, and that it is held down on its seat with just power enough to prevent leakage.

I do not claim as my invention the use of a steam-piston in combination with the slide-valve for the purpose of balancing the valve, such having been used before; but

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

The lever D, rocker E, link F, and lever G, in combination with the piston H and slide-valve B, constructed and operating substantially as and for the purpose set forth.

JAMES RANKIN.

Witnesses:

JOHN FULLER,
B. SPARLING.