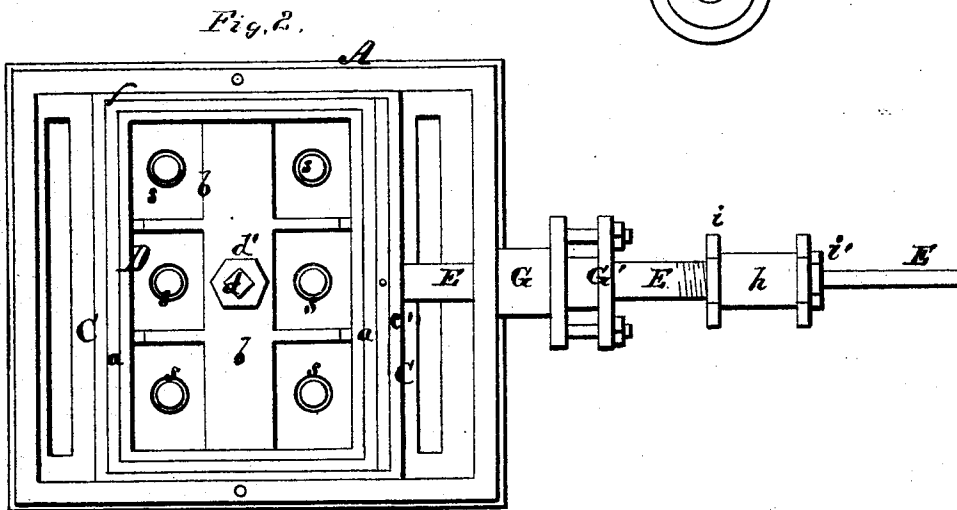
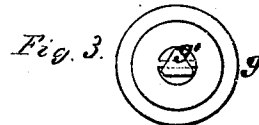
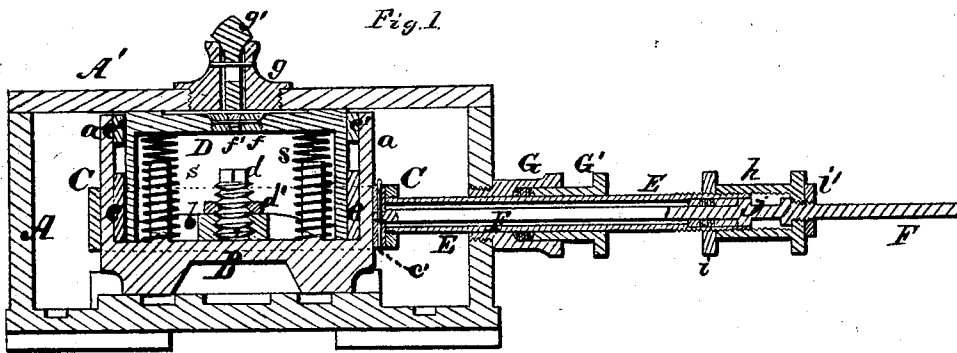


C. P. WELSH & R. J. ORR.

Balanced-Valves.

No. 145,261.

Patented Dec. 2, 1873.



Witnesses.
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UNITED STATES PATENT OFFICE.

CHARLES P. WELSH AND ROBERT J. ORR, OF MAHANOEY CITY, PA.

IMPROVEMENT IN BALANCED VALVES.

Specification forming part of Letters Patent No. **145,261**, dated December 2, 1873; application filed August 16, 1873.

To all whom it may concern:

Be it known that we, CHARLES P. WELSH and ROBERT J. ORR, of Mahanoe City, in the county of Schuylkill and State of Pennsylvania, have invented a new and valuable Improvement in Slide-Valves for Steam-Engines; and we do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a sectional view of our device. Fig. 2 is a top view of the same.

This invention relates to certain novel improvements on slide-valves for various kinds of steam-engines. Our objects are, first, to combine, with a cupped-back slide-valve, a spring-box, for allowing any steam which may get into the spring-box to escape through its top and through the chest-cover into the atmosphere, without pressing the valve down upon its seat; second, to compensate for any looseness or lost motion of the slide-valve, by means of an adjustable hollow stem, through which the valve-stem proper passes, and which is yoked to the valve and movable with it.

The following description will enable others skilled in the art to understand my improvements.

In the accompanying drawings, A A' represent the valve-chest, which, with its slide-valve B, may be provided with the well-known arrangement of ports for the entrance of steam into the steam-cylinders, and its escape therefrom. This valve is cupped, as indicated by the letters *a*, and its four sides extend up nearly to the chest-cover A'. Inside of this cupped portion is fitted an inverted box, D, which is packed steam-tight by means of narrow strips *e e'*, the lower ones of which are vertically adjustable with a spider, *b*; but the upper strips are fixed to the valve. The box D is vertically adjustable, and its top, which constitutes the valve-back proper, is held in close contact with the valve-cover A' by means of springs *s*, rising from the valve, as shown in Fig. 1. The top of the box is recessed to reduce friction, and through it is a hole which

is closed by a screw-plate, *f*, having a valve, *f'*, applied to it, that opens upward, for allowing any steam that may get into the box through its packing *e e'* to escape into said recess. Above the valve *f* is a removable screw-plate, *g*, which is tapped into the chest-cover A', and which is provided with a valve, *g'*, that opens upward and allows the steam above referred to to escape into the atmosphere.

In this way the valve will not be pressed down upon its seat by steam in the chest, and as the springs act upon it with very little force, there will be very little friction and wear on the parts.

To compensate for any wear on the valve, valve-seat, and on the top of box D and bottom of the cover A', we make the box D vertically adjustable, by means of a set-screw, *d*, which is tapped through the center of the spider *b*, so as to bear on the valve D, and which is provided with a jam-nut, *d'*, for preventing its working loose. The box D is notched upon the lateral limbs of the spider.

The screw *d* is arranged centrally beneath the screw-plate *f*, and when this screw-plate is brought directly beneath the screw-plate *g*, and these two plates are removed, access can be had to the screw *d* for adjusting the spider, and with it the box D. This adjustment can, therefore, be readily made without removing the cover A' of the valve-box.

The slide-valve is connected to the valve-stem, so that, if there be lost motion at any time, it can be remedied in a few minutes. This is done by the following means: C represents a yoke, which embraces the walls *a* of the valve, and between one end of which and one of the walls is a movable strip, *c'*, to which the valve-stem F is secured. This valve-stem passes through a hollow stem, E, as shown in Fig. 1. The stem E is secured to the yoke C, and passes through a stuffing-box, G G, applied to the chest A, and has two nuts, *h i*, on its outer end. The nut *h* is tubular, and it receives into it glands *j*, and a packing to prevent leakage of steam from the stem E around the stem F. The tubular nut *h* is also tapped on the stem F, and confined in place by means of the jam-nut *i*, and a nut, *i'*. By loosening these nuts *i i'* the nut *h* can be

adjusted, and the valve-box tightened in its yoke.

We are aware that slide-valves have been made with their backs exposed to the atmosphere, for the purpose of removing steam-pressure on them, and diminishing friction on their faces; and we do not broadly claim this feature.

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

1. The yoke C and movable strips *c'*, combined with the valve-stems E F, valve B, and nuts *h i i'*, substantially as described.

2. The steam-escape valves *f g*, combined with the anti-friction slide-valve herein described, for the purpose described.

In testimony that we claim the above we have hereunto subscribed our names in the presence of two witnesses.

CHARLES P. WELSH.
ROBERT J. ORR.

Witnesses:

WM. RAMSEY,
DOMINICK J. CONNOR.