E. H. Bellows,

Steam Balanced Valve.

No. 70,784. Patented Nov. 12, 1867.

Fig. 2.

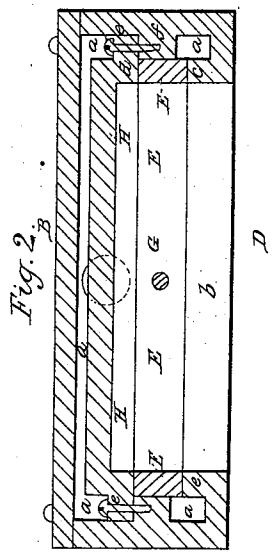


Fig. 1.

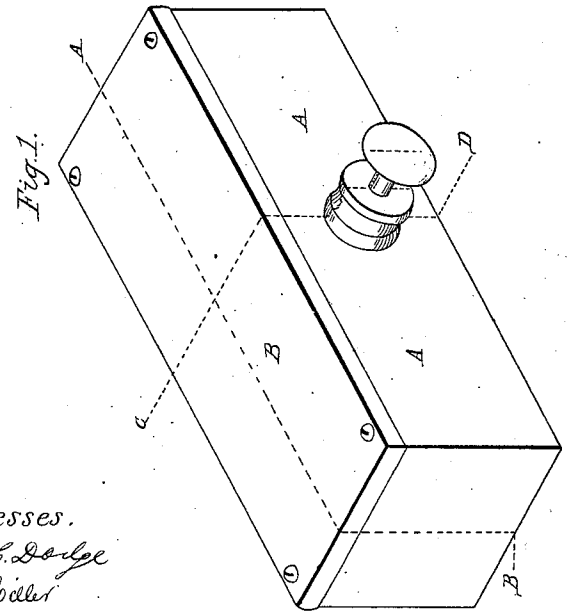
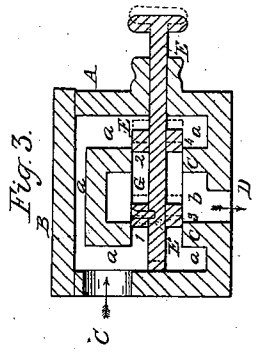


Fig. 3.



Witnesses.
Thos. H. Dodge
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UNITED STATES PATENT OFFICE.

E. H. BELLOWS, OF WORCESTER, MASSACHUSETTS.

IMPROVEMENT IN STEAM-ENGINE SLIDE-VALVES.

Specification forming part of Letters Patent No. **70,784**, dated November 12, 1867.

To all whom it may concern:

Be it known that I, E. H. BELLOWS, of the city and county of Worcester, and Commonwealth of Massachusetts, have invented certain new and useful Improvements in Balance Steam-Valves; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 represents a perspective view of the valve chest and stem. Fig. 2 represents a longitudinal central section on line A B, Fig. 1; and Fig. 3 represents a cross-section on line C D, Fig. 1.

To enable those skilled in the art to which my invention belongs to make and use the same, I will proceed to describe it more in detail.

In the drawings, the part marked A is the chest, one side, B, of which is made so that it can be easily removed. The steam is admitted at C and discharged at D. The space *a a a a* is filled with steam, so that when the valve E is moved to the position shown in red lines, Fig. 3, the steam passes to the opening *b* through four openings, 1 2 3 4, each of which openings is as wide, or nearly so, as the distance which the stem E of the valve moves.

The valve is made in rectangular form, and has a rectangular opening, G, in the center, through which the steam passes from the openings 1 and 2 when the valve is moved, as shown in red lines.

A projection, *c*, is cast or formed with the chest, and is planed off to receive and fit one side of valve E, while the other side of valve E works in contact with the flange part *d* of the cap H. The latter has two ears or projections, *e e*, which rest upon and are secured to projections *f f* upon the inside of the valve-chest, as shown in Fig. 2.

As the valve wears the cap H can be fitted down to it by planing down the projections *f f* on the chest or the under sides of the ears *e e*, and flanged part *d* may be planed down.

The projections *f f* may be so made as to leave room for small metal blocks or plates between the projections and the parts *d* and *e*, so that as the valve wears said plates or blocks can be taken out and planed off to lower the cap H and give the proper fit to the valve.

It will be seen that the pressure upon the valve is equal upon all sides, except on the side where the valve-stem F is attached, where the pressure is reduced in proportion to the size of the stem. If the end of the stem is passed through the opposite side of the chest, this inequality will be entirely obviated.

If desired, the steam-chest may be made with two or more chambers for valves and all the valves attached to and operated from one valve-stem. The valve is to be operated by proper mechanism attached to the valve-stem F in any well-known manner.

It will be observed that the valve is simple in construction, not liable to get out of order, and has the advantage of a steam-port when open nearly equal to four times the movement of the valve—a feature of great practical importance, as engineers and all those accustomed to the operations of steam-engines will bear testimony to.

The parts marked H and B may be cast in one piece or together, if preferred.

Having described my improved balanced steam-valve, what I claim therein as new and of my invention, and desire to secure by Letters Patent, is—

1. A four-port balanced valve, E, construcct ed and operating substantially as and for the purposes set forth.

2. The combination, with the steam-chest A, having a projection or flange, *c*, of the valve E, substantially as set forth.

3. The combination, with valve E, of cap H and projections or flanges *c d f f* and ears *e e*, substantially as and for the purposes set forth.

E. H. BELLOWS.

Witnesses:

THOS. H. DODGE,

D. L. MILLER.