W. Joslin,

Steam Balanced Valve.

No. 42,293. Patented Apr. 12, 1864.

Fig: 1.

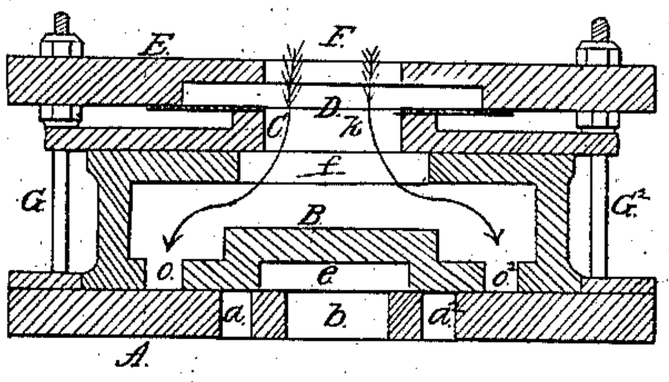


Fig: 2.

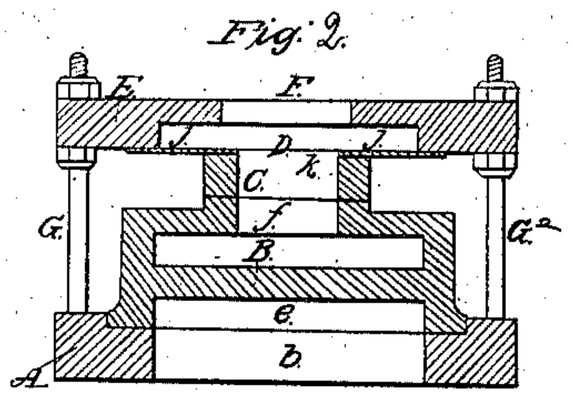


Fig: 3.

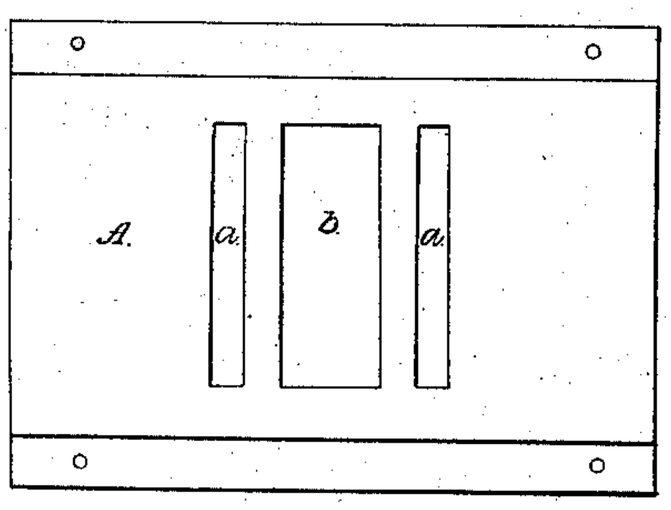


Fig: 4.

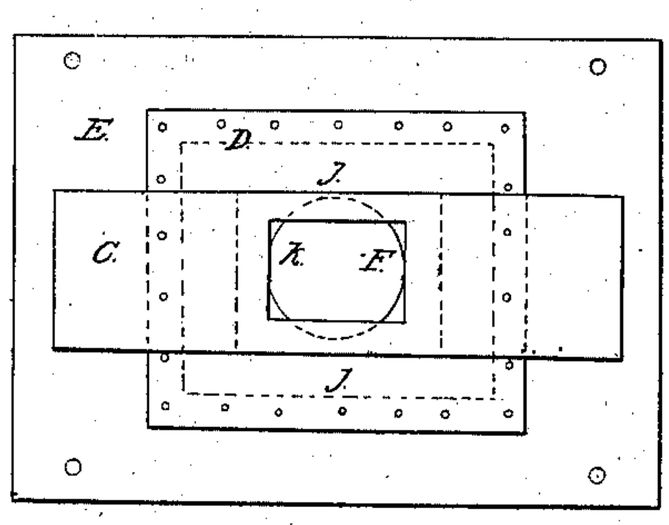


Fig: 5.

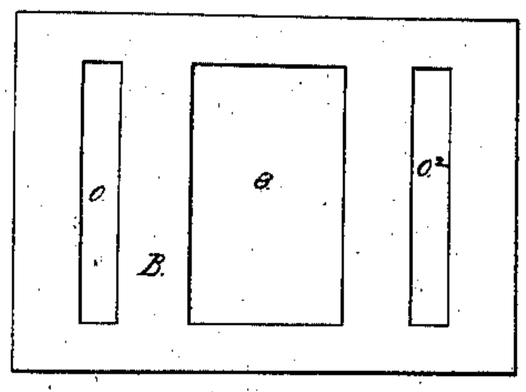
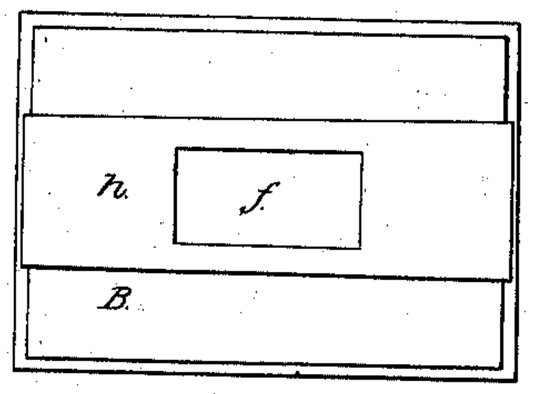


Fig: 6.



Witnesses:
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E. H. Benham

Inventor:
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UNITED STATES PATENT OFFICE.

WILLIAM JOSLIN, OF CLEVELAND, OHIO.

IMPROVEMENT IN BALANCED VALVES FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. 42,293, dated April 12, 1864.

To all whom it may concern:

Be it known that I, WM. JOSLIN, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new and useful Improvement in the Slide-Valve for Steam-Engines; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making part of this specification.

The nature of my invention consists of an improvement (on my application for Letters Patent, examined and allowed the 16th day of December, 1863, or thereabout) in relieving the slide-valve of the steam-pressure, and working the valve steam-tight without a steam-tight box or chest by means of steam-pressure.

Figure 1 is a side elevation taken through the center. Fig. 2 is an end elevation taken through the center. Fig. 3 is a top view of the cylinder-face or valve-seat, showing steam and exhaust ports. Fig. 4 is an inside view of the adjustable top plate, flexible diaphragm, and self-adjustable valve plate. Fig. 5 is a bottom view of the side valve, showing steamways and exhaust-cavity. Fig. 6 is a top view of the slide-valve, showing steam-entrance.

A in Fig. 1 is the cylinder-face or valve seat.

a a^2 are steam ports leading into the cylinder. The cylinder is not shown in the drawings.

b is the escape or exhaust port.

B is the slide-valve, made to work steam-tight on the sides, ends, and top.

o o^2 are steamways which allow steam to pass into the cylinder when they come in conjunction with the steam-ports *a* a^2 in the cylin ler face or valve-seat.

e is the exhaust-cavity, which allows the steam to escape when moved over the steam-port *a* or a^2. The bottom of the valve B is ground steam-tight upon the cylinder-face or valve-seat.

C is a self-adjusting valve-plate ground steam-tight upon the top of the valve.

f is a steamway through the top of the valve.

k is a steamway through the self-adjusting valve-plate C.

D is the flexible diaphragm, fastened steam-tight to the upper side of the self-adjusting valve-plate C, with a steamway the same size as in the plate C.

E is the adjustable top plate, with the steamway F through the center, and the steam-space *j* j^2 between the flexible diaphragm and upper port of the plate E. The flexible diaphragm D is fastened steam-tight to the under side of the plate E, as shown in Fig. 4.

G G^2 are bolts fastened firmly in the corners of the cylinder-face at right angles therewith, similar to the common steam-chest bolt. *x* x^2 are nuts working in screw-threads on the bolts G G^2. The plate E has four corner holes, through which the four corner bolts pass. The nut x^2 works on the under side of the plate E, and the nut *x* on the upper side of the plate E. By means of the bolts and nuts the plate F is readily adjusted in relation to the cylinder-face or valve-seat A, slide-valve B, self-adjusting valve-plate C, and flexible diaphragm D, and held firmly by screwing the nuts against the top and bottom of the plate E.

When steam is allowed to pass from the boiler by means of a steam-pipe through the steam-entrance F, the steam-space *j* j^2, steamway *k*, and steamway *f*, the valve B becomes filled. If the steamways *o* o^2 are equal in area to the steamway *f*, the steam will not press the valve down against the cylinder-face or valve-seat, or up against the valve-plate C. The valve will therefore move very free, but if the steamway *f* is made larger than the steamways *o* o^2 then the steam will press the valve down against the valve-seat in proportion to the excess of area in the steamway *f*. By this means the steam a pressure can be made to equalize the exhaust-pressure, and the valve made to work steam-tight upon the cylinder-face or valve-seat, and by means of the flexible diaphragm the valve B works steam-tight under the valve-plate C. The steam-space *j* j^2 causes the flexible diaphragm to press the valve-plate C down against the valve B. The steam-pressure is easily effected more or less by adjusting the plate E by means of the bolts and nuts above mentioned. If the valve is not perfect—that is to say, if one side or one end is thinner than the other—the valve-plate C readily adjusts itself to the imperfection of the valve by means of the flexible diaphragm. It may, in fact, be advantageous in an upright or vertical engine to have the

lower end of the slide-valve a little thinner or wedge like. It would act as a counter-balance to a heavy valve for a large engine, the inclination of the wedged-shaped valve being made so as to equalize the weight of the valve, as it descended and ascended between the cylinder-face or valve-seat and self adjusting valve-plate.

After thus describing my invention, what I wish to secure by Letters Patent is—

1. The combination of the flexible diaphragm D and valve-plate C with the valve B, as above described

2. Working the slide-valve steam-tight on its upper and lower surfaces by means of steam-pressure without a steam-tight box or chest, as herein set forth.

WM. JOSLIN.

Witnesses:
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