No. 61,441. PATENTED JAN. 22, 1867.

I. V. LYNN & G. T. SNOWDEN.

BALANCE SLIDE VALVE.

Fig: 1

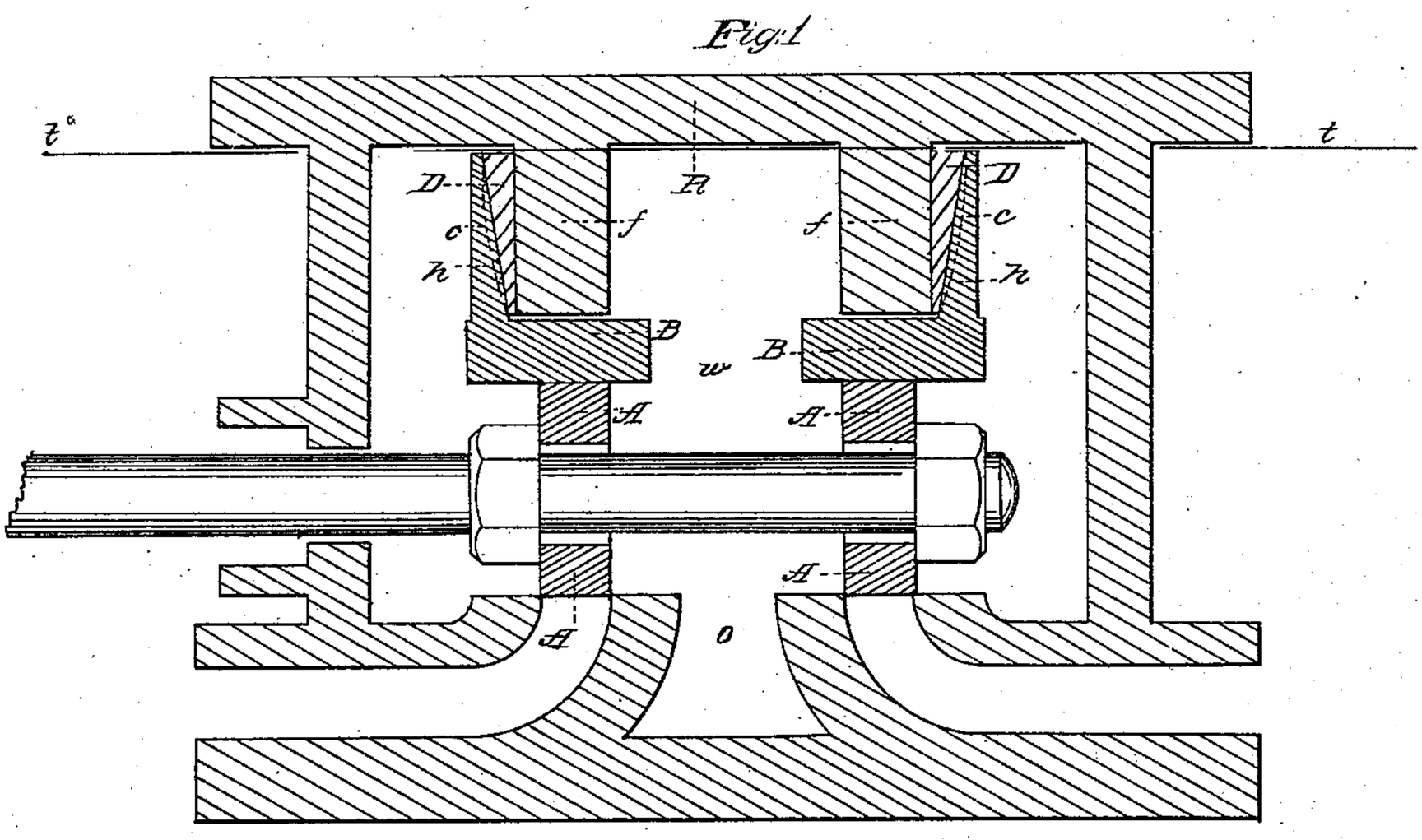


Fig 2

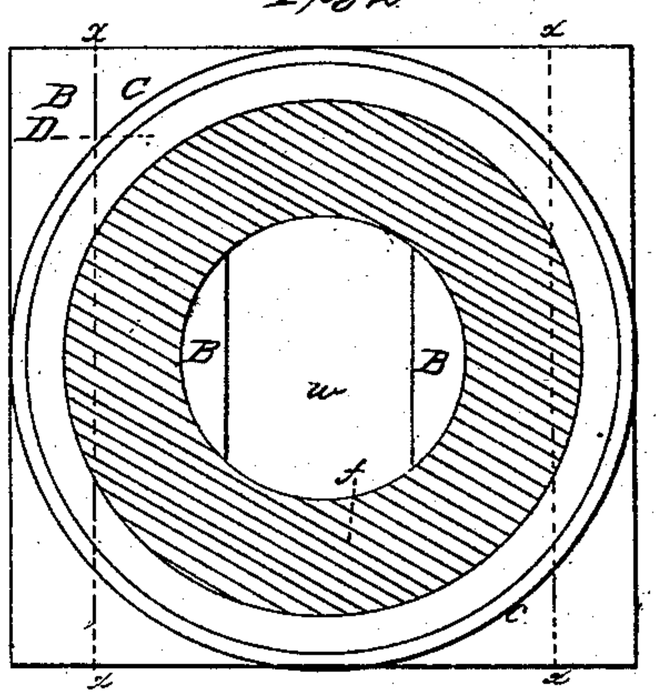
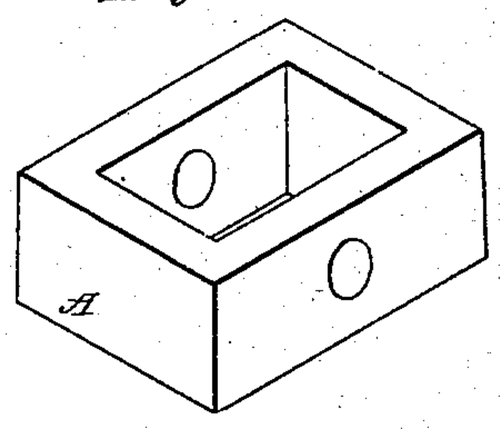


Fig: 3.



Witnesses

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Letters Patent No. 61,441, *dated January* 22, 1867.

IMPROVEMENT IN BALANCE SLIDE-VALVES.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that we, GEORGE T. SNOWDEN and ISAAC V. LYNN, of the city of Pittsburg, county of Allegheny, and State of Pennsylvania, have invented certain new and useful improvements in "Balance Slide-Valves" for steam engines; and we do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings and the letters of reference marked thereon.

The nature of our invention consists in relieving the sliding-valves of steam engines from the pressure of steam upon the back of the valve by means of the mechanism hereinafter described.

To enable others skilled in the art to make and use our invention, we will proceed to describe its construction and operation. In the accompanying drawings—

Figure 1 is a longitudinal section of our improved valve.

Figure 2 is a top view of the valve and its connections, cut through the line *t*, fig. 1.

Figure 3 is a perspective view of an ordinary skeleton-valve, A, by itself.

The manner in which we construct our valve is as follows: (as the valve-seat and its openings, the steam chest, and manner of connecting the valve-rod to the valve, are of the ordinary construction, and are well known to the skillful mechanic, it is therefore unnecessary to describe the same; we will therefore confine the description to our improvement and its necessary connections with the valve.)

The valve A, fig. 1, may be made in form as shown in fig. 3, or made as the ordinary valve, with the back faced off true, upon which rests the plate B, said plate having upon its upper side the short cylinder C; upon the under side of the steam-chest cover, R, is formed the short cylinder *f*, which projects down into the cylinder C, upon the plate B, and between the two cylinders is interposed the tapering packing-ring D, for the purpose of making steam-tight joints between the parts. In fig. 2 the valve is shown by the dotted lines *x*, and it will be seen that there will be a downward pressure upon the valve equal to the pressure of steam upon the area of surface indicated by the points marked X, which should in all cases be equal to the sum of the areas of the receiving openings, so that when steam is admitted into the cylinder by moving the valve, the valve will not be lifted from its seat by the pressure which then comes beneath it; and as there are two points in each revolution when both receiving openings are covered by the valve, and both ends of the cylinder full of steam (viz, just at the point of receiving and exhausting, which occur at the same time,) it will be seen that there is an upward pressure at these points equal to the pressure of steam upon the area of the receiving openings, and which should be counterbalanced by an equal pressure from above in order to keep the valve upon its seat; it will, therefore, be found necessary in practice to make the area of surface indicated by the points X equal to the area contained in both receiving openings, as above mentioned. By reference to figs. 1 and 2 it will be seen that there is an opening, *w*, made through the plate B, for the purpose of conducting into the exhaust opening *o*, any steam that may leak through the joints between the cylinders C and *f*, and may be large or small, as may seem best in the judgment of the mechanic. If an ordinary valve, closed on the back, is used, instead of the skeleton-valve shown in figs. 1 and 3, the steam which may leak through the joints may be taken down through said valve by drilling one or two small holes in it, which may be stopped up in case any of the parts above the valve become inoperative, in which event the parts can be removed and the valve used as an ordinary valve until such parts can be repaired. The packing-ring D, shown in fig. 1, may either be made straight on the outside or convex, as shown by the dotted lines *h*, to allow the plate B to adjust itself upon the valve A, in case the steam-chest cover R should be screwed down more on one side than the other; we therefore do not confine ourselves to any one of the methods, for either may be used as circumstances may require.

In using our improved valve, steam is admitted into the steam chest, and from thence to and from the cylinder in the usual manner by the movement of the valve A, said valve requiring less power to move it than is usually employed where the full pressure of steam comes upon the back of the valve.

Having thus described the nature, construction, and operation of our improvement in balance slide-valves, what we claim as of our invention, is—

The packing-ring D, or its equivalent, when used in combination with the cylinders *f* and C, plate B, and valve A, constructed, arranged, and operating substantially as herein described, and for the purpose set forth.

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Witnesses:
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