

H. F. COLVIN.

Balanced Slide-Valves.

No. 134,254.

Patented Dec. 24, 1872.

Fig. 1.

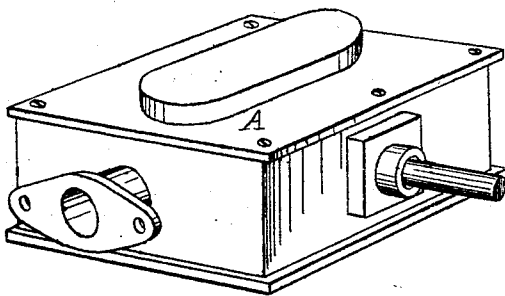


Fig. 2.

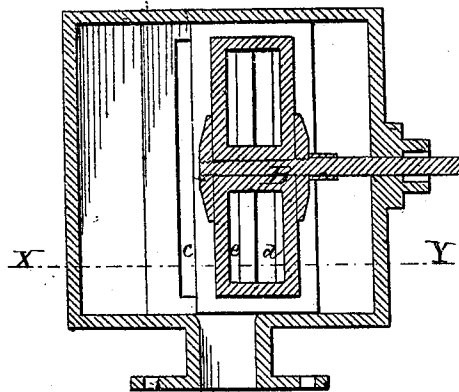


Fig. 3.

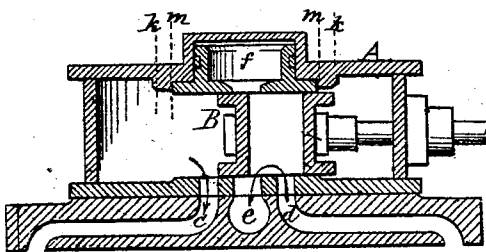


Fig. 4.

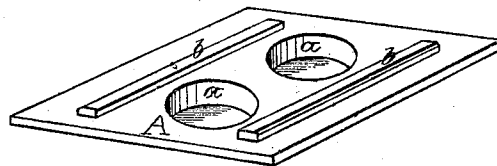


Fig. 5.

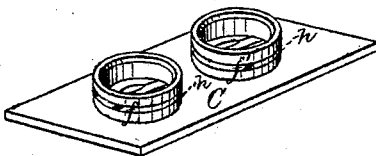


Fig. 6.

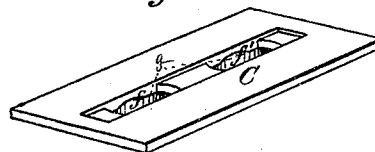
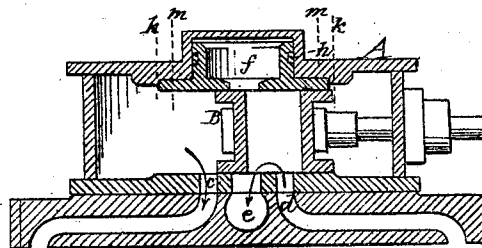


Fig. 7.



Witnesses
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Geo. F. Heng-

Inventor.
Henry F. Colvin,
By [Signature] Attorney.

UNITED STATES PATENT OFFICE.

HENRY F. COLVIN, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR OF ONE-HALF HIS RIGHT TO JOHN B. CAMPBELL, OF SAME PLACE.

IMPROVEMENT IN BALANCED SLIDE-VALVES.

Specification forming part of Letters Patent No. 134,254, dated December 24, 1872.

To all whom it may concern:

Be it known that I, HENRY F. COLVIN, of the city and county of Providence, in the State of Rhode Island, have invented certain new and useful Improvements in Slide-Valves and Balance-Plates for Steam-Engines.

My invention relates particularly to that class of valves which are combined with balance-plates; and consists partially in a novel construction and arrangement of the plate and valve, whereby a more uniform and equal wear of the coincident faces of the valve and plate is attained than has heretofore been accomplished; and I do hereby declare that the following specification, taken in connection with the drawing furnished and forming a part of the same, is a clear and true description of a slide-valve embodying the separate and combined features of my invention.

Referring to the drawing, Figure 1 represents, in perspective, a steam-chest containing a valve and balance-plate with my improvements. Fig. 2 represents the same in horizontal section on the plane of the axis of the valve-rod. Fig. 3 represents the same in longitudinal vertical section on line X Y, Fig. 2, as if in proper relation to the steam-ports of a cylinder. Fig. 4 represents the steam-chest cover removed and with its inner side shown. Fig. 5 represents, in perspective, a top view of the balance-plate detached from the cover. Fig. 6 represents the under side of the balance-plate. Fig. 7 represents, in section, a balance-plate as heretofore constructed and arranged.

A denotes the steam-chest cover. It is secured to the chest in the usual manner, but is provided with a raised center, within which are, in this instance, two circular chambers, *a*, open to the under side of the cover. On its under side are two parallel ribs, *b*, cast with the cover. B denotes the slide-valve, which is of ordinary construction, and is provided with channeled passages at the end through which steam maintains an equilibrium of pressure on both sides of the valve. Like all valves of its class, it exhausts through its interior. In Fig. 3 it is shown in proper relation with the steam-ports *c* and *d* and the exhaust-port *e* of a cylinder. C denotes the balance-plate, which is fitted accurately at its sides between

the ribs *b* on the under side of the steam-chest cover and at the ends between the inner adjacent walls of the steam-chest, so that it is incapable of any undue lateral or longitudinal movement, but free to move to and from the under side of the steam-chest. It is provided on its back side with two annular pistons, *f* and *f'*, which are cast with the plate and turned off so as to enter the circular chambers *a* in the steam-chest cover. A steam-tight joint between the pistons and the walls of the chambers *a* is secured by metallic segmental packing *h* arranged in a manner well known. A longitudinal port, *g*, is cut through the balance-plate, through which the exhaust steam (which at all times occupies the interior of the valve) can enter, and by its pressure induce proper contact between the plate and the valve, and in a measure compensate for the pressure of the steam within the cylinder upon the opposite faces of the valve while traversing the steam-ports.

As heretofore constructed the balance-plates have either been so proportioned to the width of the valve in the line of its rod, and to the extent of its traversing movement, and so arranged, with relation to the valve, that the valve, when operated with its greatest movement, could not lap or "wipe" the edges of the plate, or, at the most, so that the valve could only wipe said edges when operated with its greatest movement, and could not do so when it was made to cut off at fractional parts of the stroke. One of this kind is represented in Fig. 7. Inasmuch as in locomotive-engines, for instance, the valve is for the greater part of the time operated with a very limited movement, that portion of the balance-plate which receives the least frictional contact with the valve remains comparatively unworn, which causes a shoulder to appear with an edge more or less abrupt. As these shoulders occur those edges of the face of the valve which come in contact therewith are, of course, worn in a corresponding degree, necessitating for the proper working of the valve the frequent removal of it and the balance-plate, for the purpose of planing or filing down their coincident faces.

By my invention a uniform degree of wear is secured on the balance-plate and the adja-

cent face of the valve. As will be seen in Figs. 3 and 7, the dotted lines *k k* exhibit the limits within and bordering on which the valve moves when it is so worked as to admit the maximum quantity of steam. The dotted lines *m m*, in both figures, denote the limits within and bordering on which the valve moves when so worked as to admit the minimum quantity of steam. In Fig. 3, as per my improvement, the dotted lines are wholly beyond the adjacent edges of the balance-plate, and, therefore, the coincident faces of the plate and valve are worn away evenly. In Fig. 7, as formerly constructed and arranged, the dotted lines *k k* represent the outer limits, traversing between which the valve laps or wipes the edges of the balance-plate. When, however, the valve traverses between the limits *m m*, the adjacent edges of the balance-plate are not lapped, and hence the uneven wear of its surface and the adjacent edges of the face of the valve.

In practice I prefer to construct the balance-

plate with a traverse surface equal in extent to, say, the width of the valve, in the line of its rod, plus seven-eighths of the extent of the minimum movement at which it is to be operated.

Having thus described my invention, it is to be distinctly understood that I make no claim, broadly, to the balance-plate; but

I do claim as new and desire to secure by Letters Patent—

The combination, within the steam-chest, of a slide-valve and balance-plate, constructed and arranged substantially as described, whereby the edges of the balance-plate will be lapped alternately by the sliding valve, whether it is operated at its minimum or at its maximum length of stroke, as and for the purposes specified.

HENRY F. COLVIN.

Witnesses:

CHARLES SELDEN,
HENRY MARTIN.