G. W. HALL.

BALANCED-VALVE AND CUT-OFF.

No. 171,125. Patented Dec. 14, 1875.

Fig. 1

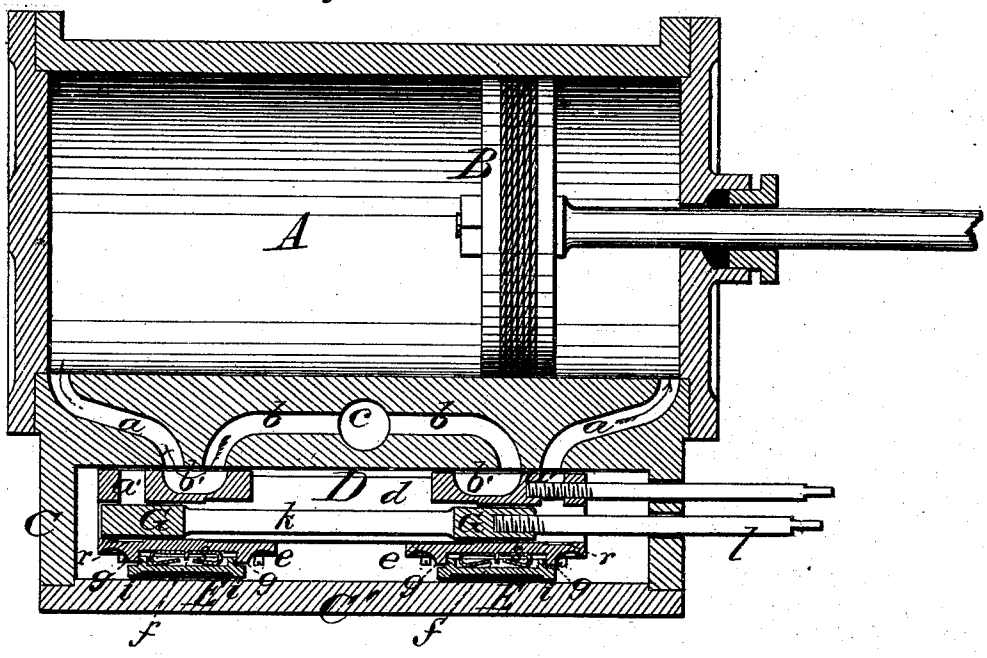


Fig. 2

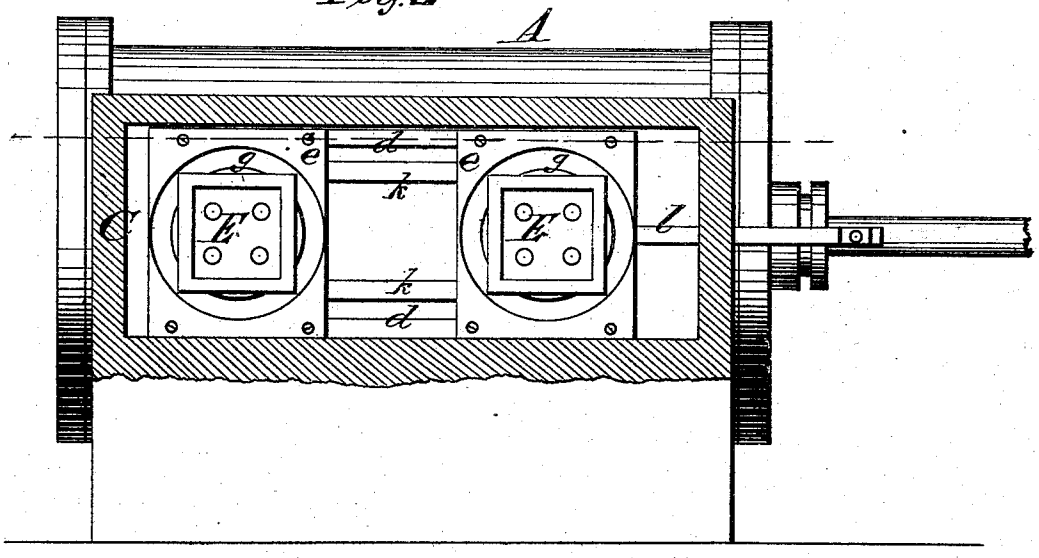


Fig. 3

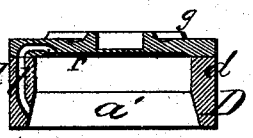
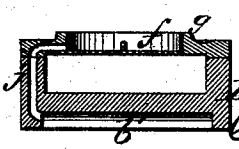


Fig. 4



WITNESSES

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UNITED STATES PATENT OFFICE

GORDON W. HALL, OF HAVANA, NEW YORK, ASSIGNOR OF ONE-HALF HIS RIGHT TO ALBERT O. WHITTEMORE, OF SAME PLACE.

IMPROVEMENT IN BALANCED VALVES AND CUT-OFFS.

Specification forming part of Letters Patent No. **171,125**, dated December 14, 1875; application filed October 16, 1875.

To all whom it may concern:

Be it known that I, GORDON W. HALL, of Havana, in the county of Schuyler and State of New York, have invented a new and valuable Improvement in Balance-Valves and Cut-Offs for Steam-Engines; and I 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 longitudinal vertical section of my engine-valve, and Fig. 2 is a horizontal sectional view through the steam-chest. Figs. 3 and 4 are sectional views of the slide-valve.

This invention has relation to slide-valves for steam-engines wherein it is desired to so balance the valves that they will not work hard on their seats.

The nature of my invention consists in combining, with the valve, an adjustable cut-off, which is to be controlled by the governor of the engine, and which is provided with false ports for the purpose of balancing the pressure on the said cut-off, said false ports being vented, through the ribs or side bars on the main valve, into the steam-ports through this valve, as will be understood from the following description.

In the annexed drawings, A designates a steam-cylinder, in which works a piston, B, and C designates a steam-chest, which is constructed with ports *a a* at its ends, and exhaust-passages *b b*, leading to an outlet, *c*. Inside of the chest C is a slide-valve, D, known as the double **D**-valve, for the reason that it is constructed with two ports, *a' a'*, and two exhaust-chambers, *b' b'*, separated by by a space, as shown in Fig. 1. The frame of the valve D is rectangular, and the two longitudinal sides or ribs *d d* have secured upon them two rectangular plates, *e e*, in the top surfaces of which annular recesses *f* are made, which are surrounded by annular raised flanges *g*. E E designate two rectangular valve-backs, which are constructed with central depressions that leave ribs for bearing against the cover C' of the steam-chest, and are held against this cover by means of springs *s*. The valve-backs E are perforated, and annular ribs *i* are formed on them, which are received and properly packed within the annular flanges *g*. Any steam which may enter the recesses *f* will escape through vents *j* into the exhaust-chambers *b'*. By these means I balance the main valve and allow the leakage from the chambers or recesses *f* to escape freely into the exhaust-ports. G G designate two cut-off valves, which are connected together by means of side bars *k*, and which have attached to them a rod, *l*, that passes through one end of the steam-chest C, and is suitably connected to a governor, which controls the movements of said cut-off valves. These two valves are applied between the inlet and exhaust ports of the vaive D and the two plates or valve-backs E E, and are designed for covering the ports *a' a'* more or less, according to the amount of steam it is desired to admit into the cylinder A at different times.

In order that the pressure of steam in the chest C shall not cause the cut-off valves to work hard on their seats on valve D the plates E have false ports *r* in them, which receive steam from the interior of the cylinder A through vents *t*.

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

The connected cut-off valves G G, combined with valve D and with false ports *r r* and vents *t*, substantially as described.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two subscribing witnesses.

GORDON W. HALL.

Witnesses:

M. T. BRODRICK,

A. O. WHITTEMORE.