G. A. HAWORTH.

Balanced Valve for Steam-Engines.

No. 200,718. Patented Feb. 26, 1878.

Fig. 1.

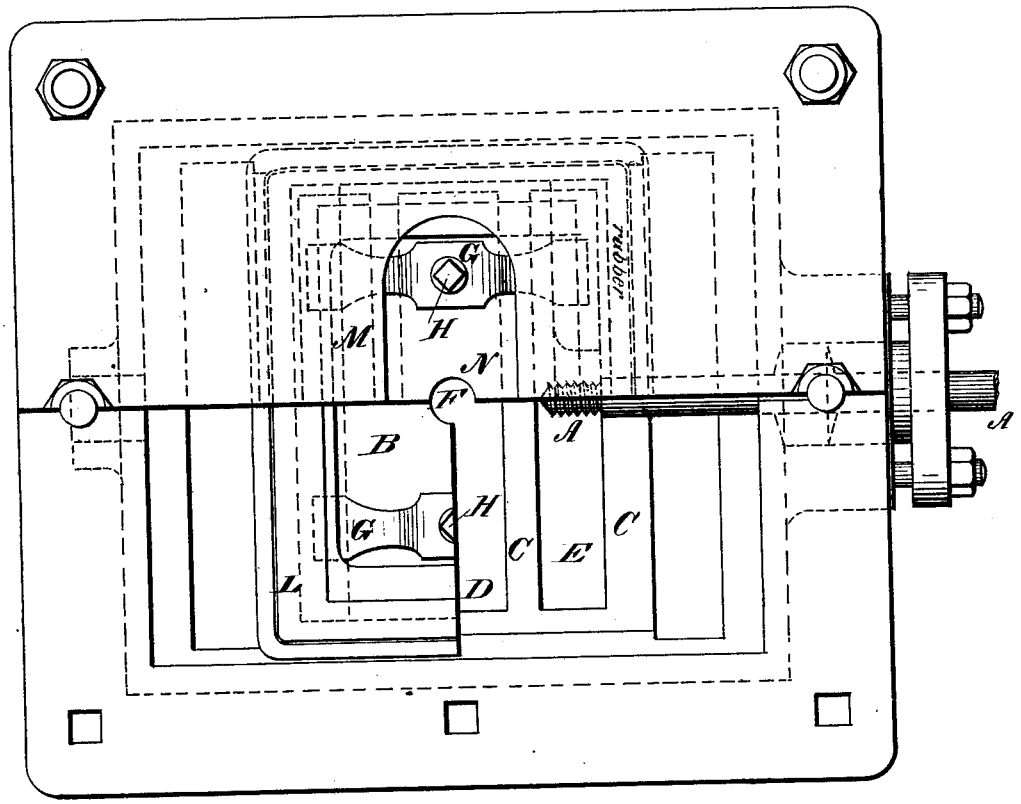
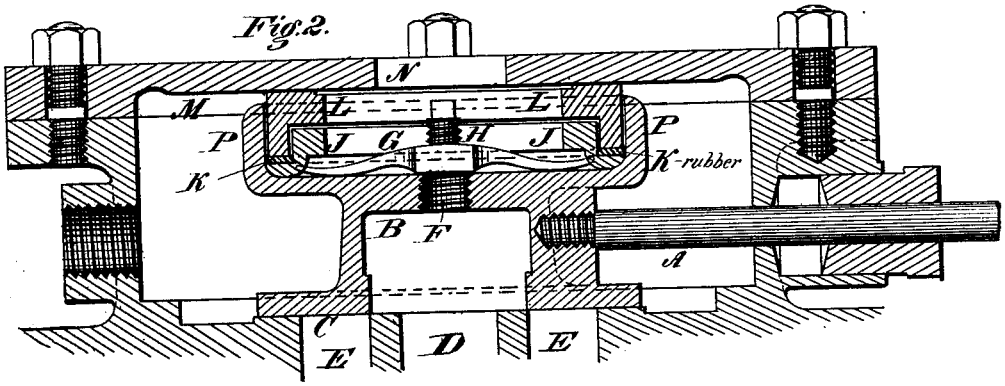


Fig. 2.



Witnesses:

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UNITED STATES PATENT OFFICE.

GEORGE A. HAWORTH, OF LIVERPOOL, ENGLAND.

IMPROVEMENT IN BALANCED VALVES FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. **200,718**, dated February 26, 1878; application filed February 6, 1878.

To all whom it may concern:

Be it known that I, GEORGE AMBROSE HAWORTH, of Liverpool, in the county of Lancaster, in the Kingdom of England, have invented new and useful Improvements in Slide-Valves for Steam-Engines, which improvements are fully set forth in the accompanying specification, reference being had to the accompanying drawings.

The object of this invention is to produce a slide-valve which will reduce the friction on the valve-seating and valve-face to a minimum, and yet will allow of a considerable amount of wear without leakage.

It is best described by aid of the accompanying drawings, in which Figure 1 shows four quarter views of plan of valve and valve-chest, the two upper quarters showing the back of the chest—the lower quarters, first, the same with valve-chest cover removed, and, secondly, with the cover and valve both removed, showing valve-seat and ports. Fig. 2 is a cross-section.

In the drawings, A is the valve-spindle, attached to the valve in any convenient manner; B, the slide-valve; C, valve-face; D, exhaust-port; E, steam-ports; F, tapped hole, made for convenience and filled with plug when in use; G G, springs held to valve by adjustable screws H H, keeping ring J and packing of india-rubber K against equilibrium-ring L. This latter works against the smooth face of the back plate M of steam-chest, both surfaces being accurately planed or worked up true.

The back portion P of the valve is brought up square, and forms a sort of box, planed on its sides to accurately fit the sides of equilibrium-ring L; or the two may be cylindrical, and bored or turned.

To keep the ring L tight up to its face, springs G and ring J are used. These have a constant tendency to keep the ring L against its face, while, by placing the india-rubber packing K between the ring J and the equilibrium-ring L, all chance of steam forcing its way between ring L and box P are removed.

By means of the orifice N, continually open to the atmosphere, any trifling leakage between ring L and its seat escapes. The screws H H can be adjusted without the removal of the steam-chest cover.

I am aware that the use of an equilibrium-ring on the back of a valve, in combination with an intermediate packing and springs and adjusting-screws, is old, and I make no claim thereto.

I claim as my invention—

In combination with the steam-chest having the opening N in its back, the slide-valve B, provided with the back flange P, equilibrium-ring L, ring-packing J, springs G G, bearing under the equilibrium-ring, and screws H H, mounted in the springs and exposed on the back, as shown.

GEO. A. HAWORTH.

Witnesses:

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