F. H. Richards,

Steam Balanced Valve.

No. 52,609. Patented Feb. 13, 1866.

Fig. 1.

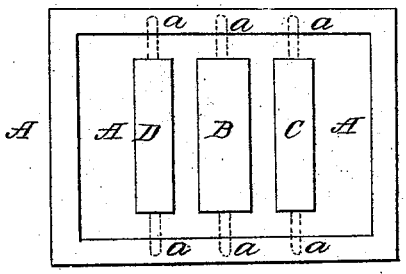


Fig. 2.

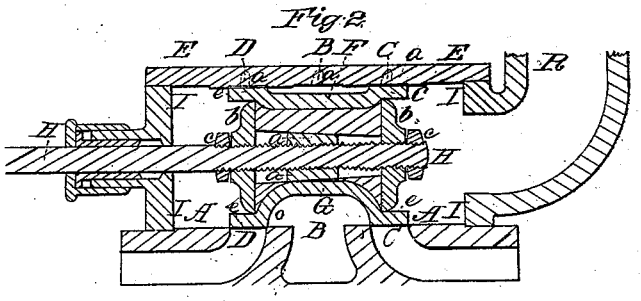
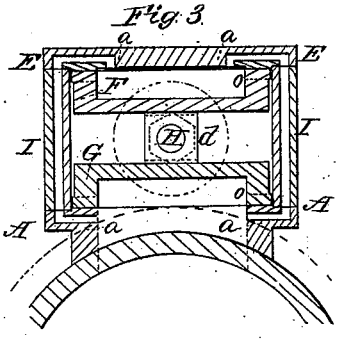


Fig. 3.



Witnesses

Mortimer G. Bradley

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FRANK H. RICHARDS, OF LANSINGBURG, NEW YORK.

IMPROVEMENT IN BALANCED SLIDE-VALVES.

Specification forming part of Letters Patent No. **52,609**, dated February 13, 1866.

To all whom it may concern:

Be it known that I, FRANK H. RICHARDS, of Lansingburg, in the county of Rensselaer and State of New York, have invented a new and useful Improvement on Equilibrium Slide-Valves for Steam-Engines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon—

Figure 1 being a plan of the valve-seat, Fig. 2 being a side section of the valve complete, Fig. 3 being an end section of the same.

A is a valve-seat having the ports or passages B C D cut in it, the port B communicating with the boiler, and the ports C and D communicating with the two ends of the cylinder.

E is a valve-seat opposite A and similar to it, having the ports *b c d*, corresponding to the ports B C D of the valve-seat A. The corresponding ports of the two valve-seats are connected with each other by means of the apertures *a a*, drilled through the side of the chest I.

G and F are valves sliding upon the valve-seats A and E. These valves are in the form of the common slide-valve, and their faces are equal.

As represented in the drawings, Fig. 2, the wings *e e* of the valves G and F cover the ports C *c* and D *d* communicating with the cylinder, consequently no steam is admitted to either end of the cylinder. Upon moving the valves F and G a communication is formed, by means of the recesses *o o* of the valves F and G, between the steam-ports B *b* and the ports C *c* or D *d*, communicating with the cylinder. By the same movement of the valves the ports communicating with the other end of the cylinder are uncovered and the exhaust-steam is admitted into the chest and conveyed, by means of the pipe K, to the atmosphere or condenser. Upon moving the valves in the opposite direction the same result ensues to the other end of cylinder.

The pressure of steam from the steam-ports B *b* being upon the under sides of the valves F and G, it will, unless counteracted, immediately drive them off their respective seats. This pressure is counteracted by the following device: The valves F and G are driven by means of the valve-rod H, which has the collars *b b*, with their set-nuts *c c* adjusted to the shoulders of the valves for that purpose.

Upon the valve-rod H, between the collars *b b*, is a nut, *d*, working easily upon it, and having two opposite sides beveled, the two sides together thus forming a wedge. The backs of the valves F and G are beveled to correspond with the beveled sides of the nut *d*, and the nut *d* is of such a thickness that when the valves F and G are close down upon their respective seats the beveled sides of the wedge-nut *d* shall be just in contact with the beveled surfaces upon the backs of the valves F and G.

The ports and surfaces of the valve-seats A and E being equal, and the pressure from their corresponding ports being equal, by means of the apertures *a a* connecting them, and the surfaces of the valves F and G being also equal, the pressure under the valves F and G will be equal and communicating with each other through the wedge-nut *d*. Between them their pressures will exactly balance each other and the valves will be in equilibrium.

Upon turning the valve-rod H the collars *b b*, being held tight by their set-nuts *c c*, will turn with it and still remain in contact with the shoulders of the valves F and G; but the wedge-nut *d*, working easily upon the valve-rod H, and being held by the two sides in contact with the backs of valves F and G, will not turn; consequently upon turning the rod H the wedge-nut *d* is pushed forward along the beveled backs of the valves F and G, and the valves are distended from each other and pressed down upon the valve-seats A and E.

If the valves are pressed too tightly upon their respective seats, by turning the rod in a contrary direction the wedge-nut *d* will be drawn back and the valves released. Thus by turning the rod H the valves may at any time be exactly adjusted to their respective seats.

I claim as my invention—

1. The arrangement of the two slide-valves F and G in the same chest, opposite each other, and having the pressure of the steam upon their under sides, as herein described, so that their respective pressures shall be mutually compensatory.

2. The wedge-nut *d*, operated as herein described, for adjusting the valves to their respective seats.

FRANK H. RICHARDS.

Witnesses:
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