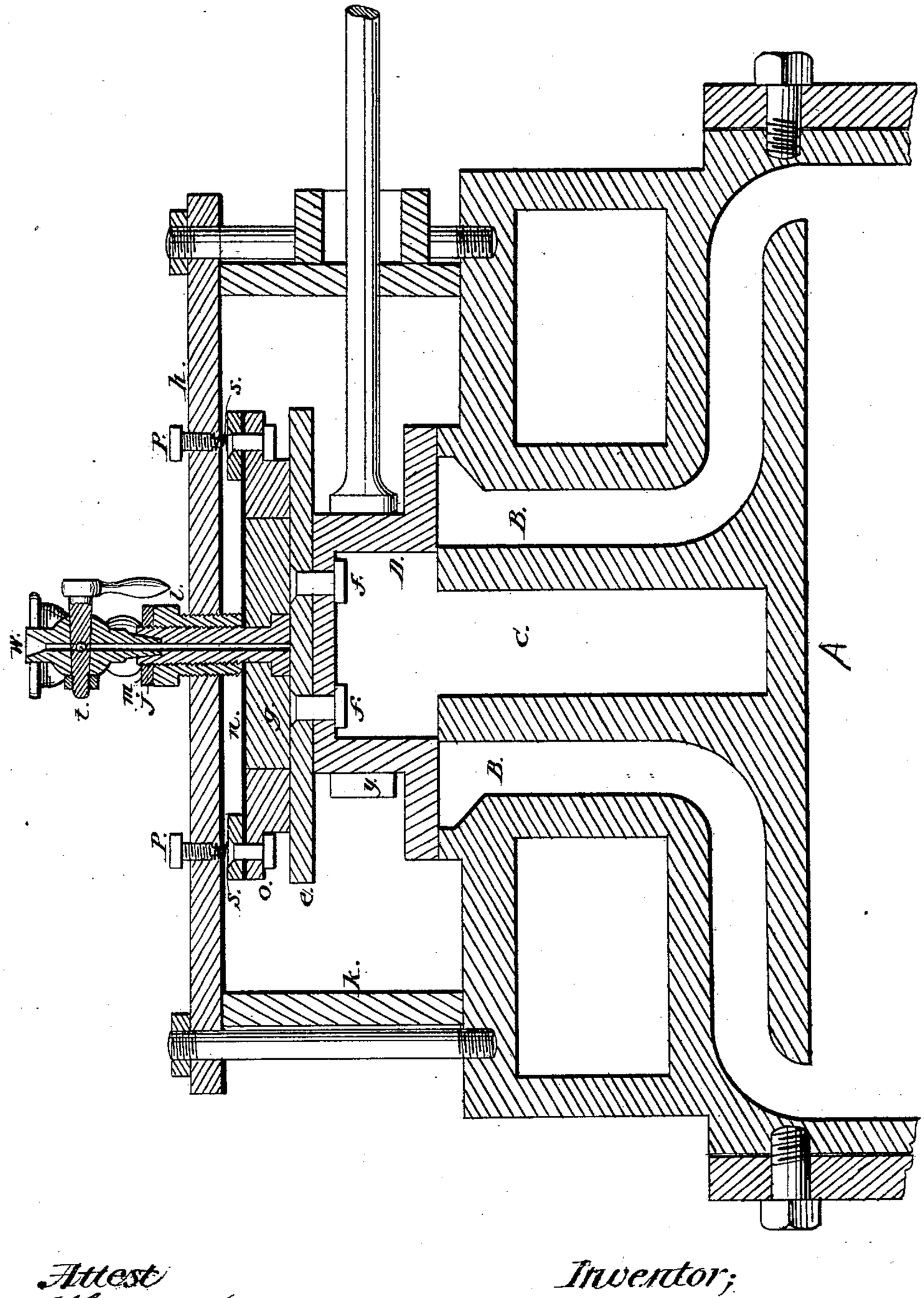
J. F. WALLACE.

Balanced Slide-Valves for Steam-Engines.

No. 143,043. Patented September 23, 1873.



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UNITED STATES PATENT OFFICE.

JOHN F. WALLACE, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN BALANCED SLIDE-VALVES FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. **143,043**, dated September 23, 1873; application filed June 12, 1873.

To all whom it may concern:.

Be it known that I, JOHN F. WALLACE, of the city of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a certain new and useful Improvement in Slide-Valves; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing and to the letters of reference marked thereon.

My invention consists in lengthening the slide-valve, and enlarging the upper end of the receiving-ports of the cylinder, and reducing the bearings of the valve-seat so that they will wear equally, and thereby prevent the valve from becoming rounded on its face. My invention also consists in the use of a flexible packing-plate in combination with a suspended plate for relieving the upper surface of the valve from undue pressure of the steam.

To enable others skilled in the art to make and use my invention, I will proceed to describe more fully its construction and operation.

In the accompanying drawing, which forms part of my specification, A represents the steam-cylinder. B represents the receiving or steam ports, and C represents the exhaust-port. The upper ends of the receiving-ports B are enlarged for the purpose of reducing the bearings of the valve D, and it is lengthened so that its bearings will cover the outer bearings of its seat and the steam-ports B. By this construction of the valve, its seat, and the enlarging of the upper end of the steam-ports, the wear of the valve and of its seat will be uniform, thus preventing the rounding of the face of the valve, which is a difficulty common to slide-valves of locomotive-engines, and also of other engines, in which the slide-valve has a rapid motion. The valve D is provided with an upper face, *e*, which is secured to the top of the valve D through the medium of bolts *f*. Above this upper face is suspended, to the lid *h* of the steam-chest *k*, through the medium of two or more bolts, a plate, *g*, which is sometimes called "balancing-plate." The bolts *j* are provided with screw-threads and pass through a jam-nut, *l*, provided with corresponding screw-threads. The outer walls of the jam-nuts are also provided with screw-threads which conform to screw-threads of the lid *h*, into which it is screwed. The bolts *j* are prevented from turning by means of the plate *m*, which has in each end a recess which is fitted to the upper ends of the bolts *j*. The recessed ends of the plate *m* rest upon the jam-nut *l*. Above the balancing-plate *g* is placed a thin plate, *n*, of sheet-copper, to the outer edge of which is secured a metal ring, *o*, which is used as a packing for the balancing-plate *g*. The copper plate *n* is provided with openings for the bolts *j*, and the lower ends of the jam-nuts *l* hold the plate *n* down upon the balancing-plate *g* and pack the joints around the bolts *j*. The set-screws P, in combination with the spiral springs *s*, are used for the purpose of preventing the packing-rings from jarring or vibrating on the upper face of the valve D. One of the bolts, *j*, is provided with an opening, *w*, through it, and in the upper end is placed a stop-cock, *t*, and to this may be attached a pipe leading into the stack of the locomotive. The object of this stop-cock and opening through the bolt is to carry off steam in case there should be a leakage of it under the balancing-plate *g*. *y* represents the valve-yoke, which is constructed in the ordinary manner. The balancing-plate can be adjusted with relation to the top surface of the valve through the medium of the bolts *j* and jam-nuts *l*, the operation of which will be readily understood by the skillful mechanic.

The advantages of my improvement in slide-valves are briefly stated, as follows: First, the tendency of the valve to wear rounding on its face, and thereby leak steam, is avoided by lengthening the valve and diminishing its seat by enlarging the upper ends of the steam-ports. Second, the upper surface of the valve is relieved from undue pressure of steam through the medium of the balancing-plate, flexible plate of copper, and packing-ring. Third, the balancing-plate is perfectly packed through the medium of the packing-ring, thereby increasing the efficiency of the balancing-plate. Fourth, the tendency of the packing-ring to vibrate is obviated by means of the set-screws and spiral springs used in combination with them. Fifth, the valve is relieved from friction by increasing its length and diminishing its seat. Sixth, the valve is nearly balanced by means of the balancing-plate, thereby enabling the engineer to handle it with ease and

facility, which is a great consideration in slide-valves of locomotive-engines. Seventh, the balancing-plate can be adjusted without removing the lid of the steam-chest, and such adjustment can be accomplished with ease and facility. Eighth, in case the balancing device should become impaired, so as to leak steam, the steam under the balancing-plate can be carried off through the hollow bolt and stop-cock into the locomotive-stack. Ninth, in the event of the balancing-plate and packing-ring becoming inoperative, the valve can be used as the ordinary slide-valve without stopping the engine to make repairs, which is a great advantage when the locomotive and its train are under way on the road.

Having thus described my improvement, what I claim as of my invention is—

1. The combination of the lengthened valve D with the valve-seat, having the steam-ports enlarged in it their entire width, substantially as herein described, and for the purpose set forth.

2. The combination of the balancing-plate *g*, packing-ring *o*, flexible plate *n*, bolts *j*, and jam-nuts *l* with the slide-valve D, substantially as herein described, and for the purpose set forth.

3. The combination of the set-screws P and springs *s* with the packing-ring *o* and flexible plate *n*, substantially as herein described, and for the purpose set forth.

4. The bolt *j*, provided with an opening, *w*, through it, in combination with the stop-cock *t*, balancing-plate *g*, and packing-ring *o*, substantially as herein described, and for the purpose set forth.

JOHN F. WALLACE.

Witnesses:
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