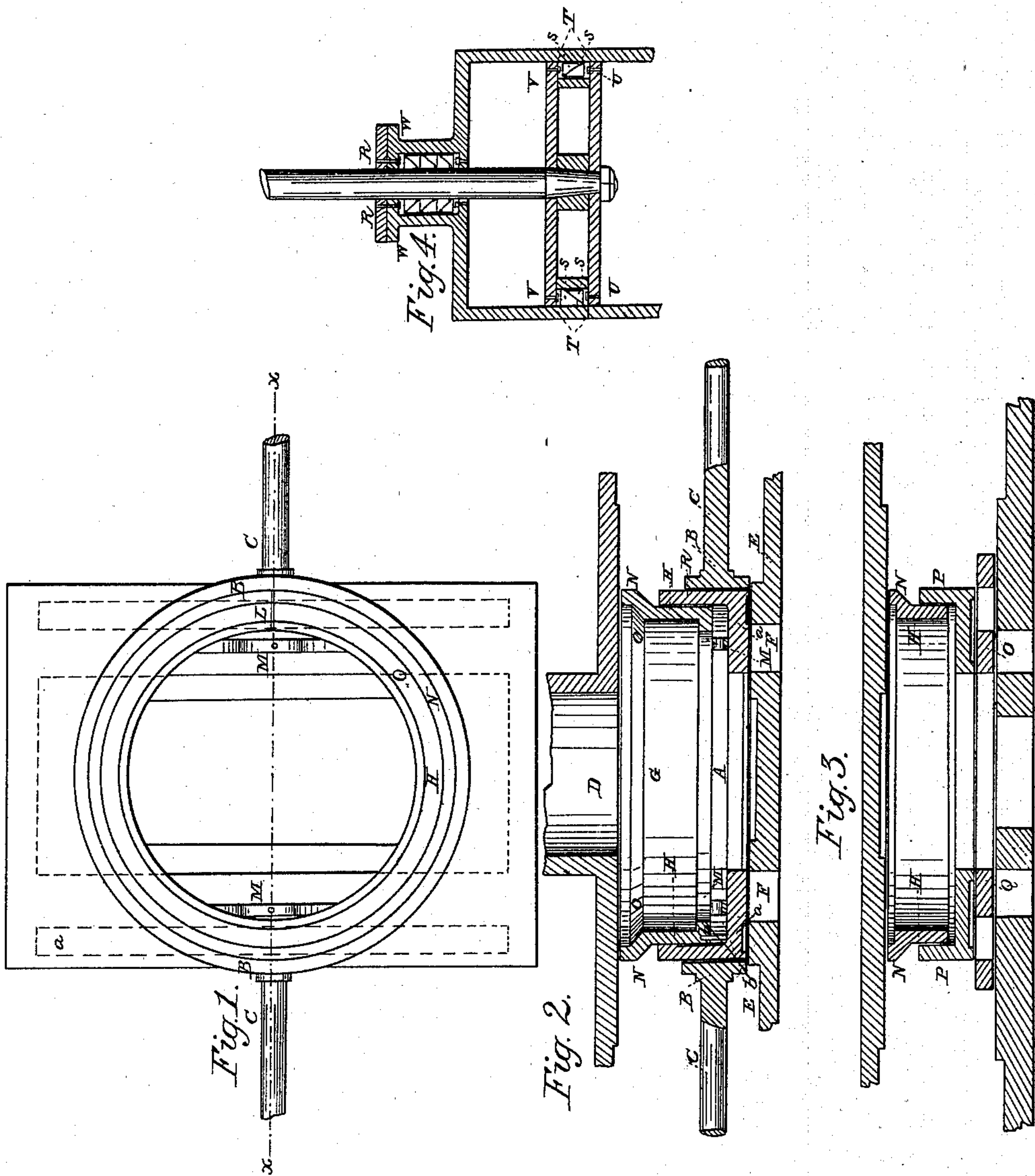


*Adams & Parsons.*

*Slide Valve.*

*N<sup>o</sup> 68,932.*

*Patented Sept. 17, 1867.*



*Witnesses:*

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# United States Patent Office.

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*Letters Patent No. 68,932, dated September 17, 1867; patented in England February 15, 1866.*

## IMPROVEMENT IN SLIDE-VALVES.

*The Schedule referred to in these Letters Patent and making part of the same.*

### TO ALL WHOM IT MAY CONCERN:

Be it known that we, THOMAS ADAMS and GEORGE JOHN PARSON, both of Adelphi, in the county of Middlesex, England, have invented a new and useful Improvement in Steam Engines; and we do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which our invention appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, and in which—

Figure 1 is a plan view of our slide-valve with the top plate or cover of the steam-chest off.

Figure 2 is a central vertical section of fig. 1 through the line *x x*, the valve being shown covering both steam-ports.

Figure 3 is a vertical sectional elevation of the valve constructed on a somewhat different plan, but involving the same method of producing an equilibrium of pressure.

Figure 4 shows a longitudinal section of a steam-cylinder with the piston and piston-rod packed upon the same plan of counteracting pressures or obtaining lateral pressure by forcing together wedge-shaped rings by pressure in opposite directions. The force exerted through the gland at *R R* is atmospheric pressure.

Similar letters of reference indicate corresponding parts in the several figures.

The object of this improvement is to so construct a valve that there shall be an equilibrium of pressure thereon, or so that the pressure on the upper side shall be balanced by the pressure on the under side of the valve to the extent of the surfaces exposed to such action; and it consists in inserting and fixing in the central part of the valve, between the two ends thereof, a ring constructed with a flange on its outer side over the top surface of the valve, the top side of the flange forming a fillet to work against the door of the valve-box, and of equal area with the bottom side of the flange. This ring is also constructed and fitted so as to admit of an equal area of steam space above and below its inner part. By the insertion of a ring so constructed the steam from the boiler will be caused to act simultaneously on the bottom of the flange, (thereby pressing the ring upward against the door of the valve-box,) and on the fillet or top of the flange of equal area, (thereby pressing the ring downward.) The steam from the boiler will thus be caused to act over an equal area between the door of the valve-box or the division-plate and the fillet or top of the flange, and between the bottom of the flange and the top of the valve, thereby balancing the pressure on the outer part of the ring. The recess or steam-space at the top of the inner part of the ring is equal in area to that at the bottom of the same, and the ring is balanced by the pressure of the exhaust steam acting equally therein.

*A* represents the valve; *C*, the valve-rod secured to the bridle *B*. The inlet-port of the steam-chest may be made in any proper place, either upon the top or sides. *E*, the cylinder face. *F F* are the steam-ports in the cylinder face. *G* is the exhaust through the door of the steam-chest. *H* is a ring inserted in the valve *A* for the purpose of effecting the required displacement of steam so as to cause a balance of steam pressure. This ring *H* is cast larger than the cavity in the valve *A*. A piece, of say one-sixteenth of an inch, is cut out of it. The ring is then drawn together at butt-joint, shown at *L*, fig. 1, and in that position bored and turned in the lathe to fit its place in the valve. A steady-pin, *b*, fig. 2, is used to keep the butt-joint in the centre line of motion. Two small springs *M M* are inserted between the ring and valve in order to keep it up to the door of the steam-chest while steam is off. The ring *H* is provided with a fillet, *N*, which works against the cover *D*, and the ring is recessed inside at *O*. The steam in the chest acts from the boiler simultaneously under the fillet or on the bottom of the flange, (thereby pressing the ring upward against the cover *D*,) and on the fillet or top of the flange of equal area, thereby pressing the ring downward. The steam being thus caused to act over an equal area between the cover *D* and the fillet or top of the flange, and between the bottom of the flange and the top of the valve, thereby balances the pressure upon the outer part of the ring, or, in other words, the steam being allowed to act under the fillet, and exerting its influence between the top side of the fillet and the cover, is held in an equilibrium of pressures. The ring *H* being recessed at *O*, the exhaust pressure of a high-pressure engine and the vacuum of a low-pressure engine act equally on the top and bottom sides, holding it in an equilibrium of pressure. The recesses *a a* in the face of the valve are for the purpose of maintaining the film of steam on the bars during high grades of expansion, also serving the purpose of lubrication by steam. Fig. 3 shows a valve constructed on the same principle as



the one described, but on a different plan. This principle of balancing the opposite surfaces which are exposed to the action of steam may also be employed with good effect in the construction of pistons and glands, as shown in red in fig. 4, described as follows: Two packing-rings S S are pressed outward against the inside of the cylinder by the pressure of steam in a vertical direction. T T are rings provided with recesses or steam-spaces U U, by which the amount of power pressing against such rings may be regulated according to the surface of such recesses. The amount of force on the outer surface of the rings S and the inner surface of the cylinder may be regulated by varying the angle of the rings S. Steam is admitted to the recesses U through small holes V V, but it may also be applied directly to the rings S, dispensing entirely with the rings T. The gland W is made substantially the same as the piston, except that the atmospheric air acts through the outer holes R, instead of steam.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

The slide-valve, constructed in such a manner that by the aid of a ring or rings, H, provided with a fillet, N, and recess, O, the pressure of the steam on the different parts of the surfaces will be balanced, all being made and operating as herein shown and described.

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