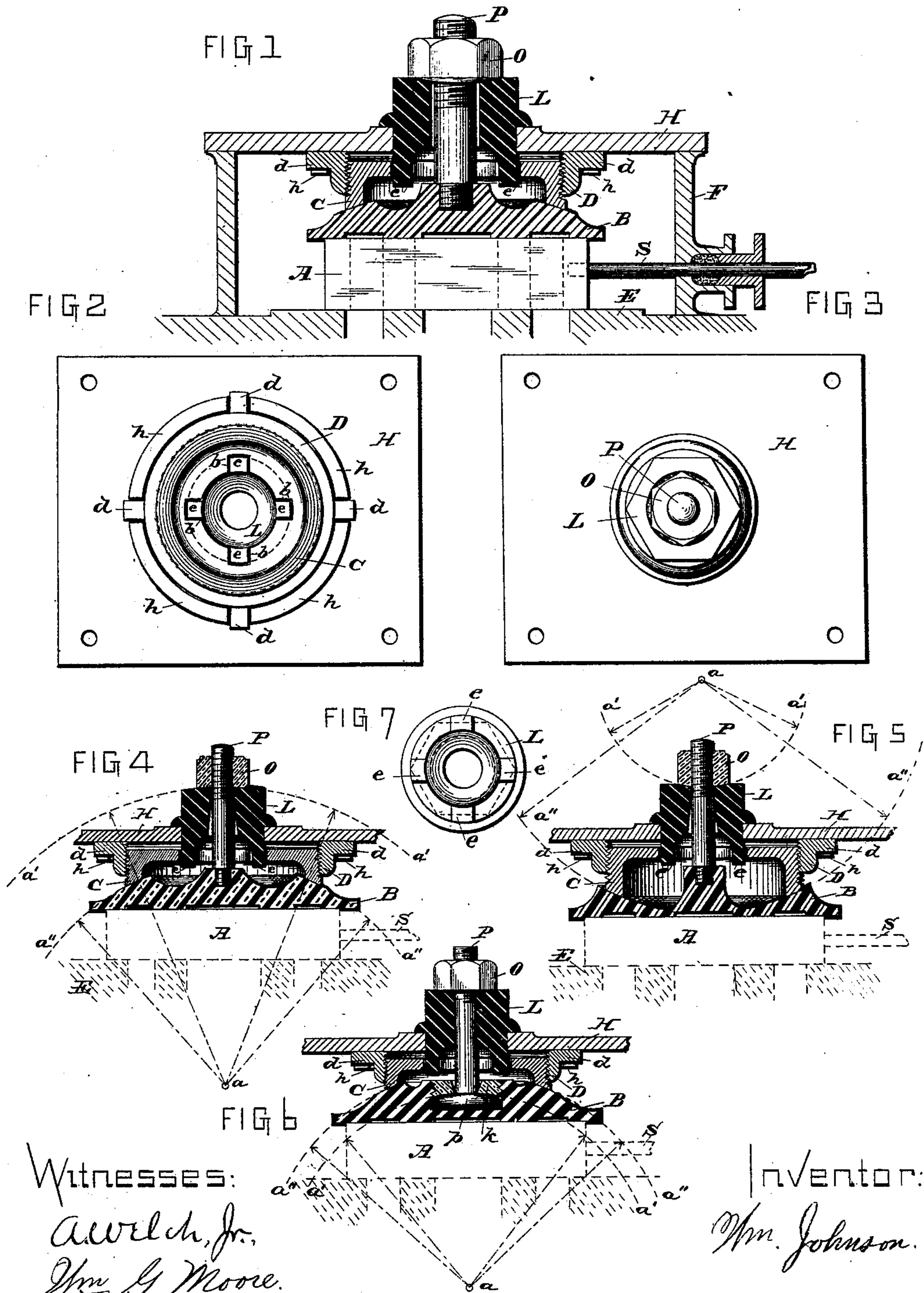


(No Model.)

W. JOHNSON.
Balanced Valve.

No. 234,040.

Patented Nov. 2, 1880.



UNITED STATES PATENT OFFICE.

WILLIAM JOHNSON, OF LAMBERTVILLE, NEW JERSEY.

BALANCED VALVE.

SPECIFICATION forming part of Letters Patent No. 234,040, dated November 2, 1880.

Application filed August 16, 1880. (No model.)

To all whom it may concern:

Be it known that I, WM. JOHNSON, a citizen of the United States, residing at Lambertville, in the county of Hunterdon and State of New Jersey, have invented certain new and useful Improvements in Balancing Valves for Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters or figures of reference marked thereon, which form a part of this specification.

The object of my invention is to balance the valves of engines, whereby the loss from friction is greatly diminished, the construction being hereinafter more fully described.

In the accompanying drawings, Figures 1, 4, 5, and 6 show my invention, the latter of these three figures simply showing the ball-and-socket joints struck from a common center. Fig. 2 is a plan view, showing the inside of chest-cover, with the balance-plate removed. Fig. 3 is a plan view, showing the outside of chest-cover with the adjusting parts. Fig. 7 is a plan view of the inner end of the adjusting nut-block.

Similar letters refer to similar parts throughout the several views.

A is the valve controlling the action of the steam against the piston of the engine in the usual manner. S is the rod by which the valve is moved.

B is a valve balance-plate, between the face of which and the valve-seat E the valve has its motion.

C is an adjustable screw-plate or ring, with slots or recesses *b*, having a concave portion or edge made to fit the portion of a sphere formed upon the back of the valve balance-plate B, making a ball-and-socket joint therewith.

D is the nut or box for the adjustable screw-plate or ring C, and which presses against the chest-cover H as an abutment therefor, said nut or box being held from turning by means of the lugs *d*, attached thereto, and which fit into recesses formed by projections *h* on the inner side of cover H.

L is an adjusting nut-block passing freely

through and supported by a flange by cover H, the inner end of said adjusting-block L having prongs or projections *e*, which fit slots or recesses *b*, formed in ring C, by means of which the said ring is revolved and made to press against plate B, the outer end of said block L being turned to an arc or portion of a sphere having a common center with that formed upon plate B, and is also adapted to be turned or revolved with a wrench.

P is a screw or bolt, provided with nut O, by which the parts are held firmly in position when adjusted, said nut O being dished or made concave to fit the spherical portion of block L, and forming a ball-and-socket joint therewith.

The operation consists in the adjustment of the valve balance-plate in such manner that the valve shall have a free-and-easy but steam-tight movement between the balance-plate and valve-seat, and is as follows: When the valve is in a central position upon the valve-seat the nut O is loosened upon the screw-bolt and the adjusting-block L is revolved, by means of which the plate B is adjusted to valve A through the intermediate mechanism. When the adjustment is made the nut O is tightened and the adjustment secured.

I am aware that a plate has been suspended by a ball-joint from a piston in the chest, and also by two rods, the nuts of which form ball-and-socket joints; but with neither of these constructions does my device conflict. I therefore do not claim the same; but

What I do claim as my invention, and wish to secure by Letters Patent, is—

1. As a means for balancing the valves of engines, a balance-plate formed in one piece and connected with the chest-cover by a ball-and-socket joint, as and for the purpose set forth.

2. As a means for balancing the valves of engines, a balancing-plate suspended from the chest by a ball-and-socket joint, the outer surface of said plate being also adapted to form an additional ball-joint with a ring on the inner side of the chest, as and for the purpose set forth.

3. As a means for balancing the valves of engines, a balancing-plate whose upper or outer surface is adapted to form a ball-and-socket

joint with a ring on the inner side of the chest, as and for the purpose set forth.

4. As a means for balancing the valves of engines, a balancing-plate whose upper or outer surface is adapted to form a ball-and-socket joint with an adjustable ring on the inner side of the chest, as and for the purpose set forth.

5. As a means for balancing the valves of engines, a balancing-plate whose upper or outer surface is adapted to form a ball-and-socket joint with an adjustable ring on the inner side of the chest, the said adjustment of the ring being made from the exterior of the chest, as and for the purpose set forth.

6. As a means for balancing the valves of engines, a plate connected with the chest-cover by a ball-and-socket joint, and adjusted and set to the valve from the exterior by two nuts, the uppermost of said nuts acting as a set-nut when the parts are adjusted.

7. As a means for balancing the valves of engines, a plate suspended from the chest above the valve by a ball-and-socket joint, and provided with suitable means, substantially as described, for holding the plate in any adjusted position, as and for the purpose set forth.

8. As a means for balancing the valves of engines, a plate suspended from the chest above the valve by a ball-and-socket joint, and provided with suitable means, substantially as described, whereby the plate is adjusted to the valve, the said adjustment being made from the exterior of the chest, as and for the purpose set forth.

9. As a means for balancing the valves of engines, a plate suspended by a ball-and-socket joint, the upper or outer surface of said plate being adapted to form a ball-and-socket joint with an adjustable ring on the inner side of the chest, as and for the purpose set forth.

10. As a means for balancing the valves of engines, a plate suspended from the chest by a ball-and-socket joint, in combination with an adjustable screw-threaded ring on the inner

side of the chest, the said ring forming a ball-and-socket joint with the upper or outer surface of the suspended plate, as and for the purpose set forth.

11. As a means for balancing the valves of engines, a plate suspended from the chest by a ball-and-socket joint, in combination with a screw-threaded ring on the inner side of the chest, which is adapted to be adjusted from the exterior of the chest by suitable means to the upper or outer face of the suspended plate, as and for the purpose set forth.

12. As a means for balancing the valves of engines, the chest-cover provided with lugs upon one side to prevent the turning of a screw-threaded ring, in combination with an inner adjustable screw-threaded ring, which bears upon the upper or outer surface of a plate suspended from said chest-cover, as and for the purpose set forth.

13. As a means for balancing the valves of engines, a balancing-plate suspended from the chest-cover by a nut which is constructed to form a ball-and-socket joint, and an inner adjustable ring which bears and forms with a balancing-plate an additional ball-and-socket joint, the adjustment of the ring and plate being made from the exterior of the chest and held in their adjusted positions by a set-nut on the exterior, as and for the purpose set forth.

14. As a means for balancing the valves of engines, a balancing-plate suspended by a ball-joint, the upper or outer surface of said plate adapted to form an additional ball-and-socket joint with a ring within the chest, the arcs upon which both joints are formed being struck from a common center, as and for the purpose set forth.

In testimony whereof I have affixed my signature in presence of two witnesses.

WM. JOHNSON.

Witnesses:

WM. WELCH,
W. F. HERR.