

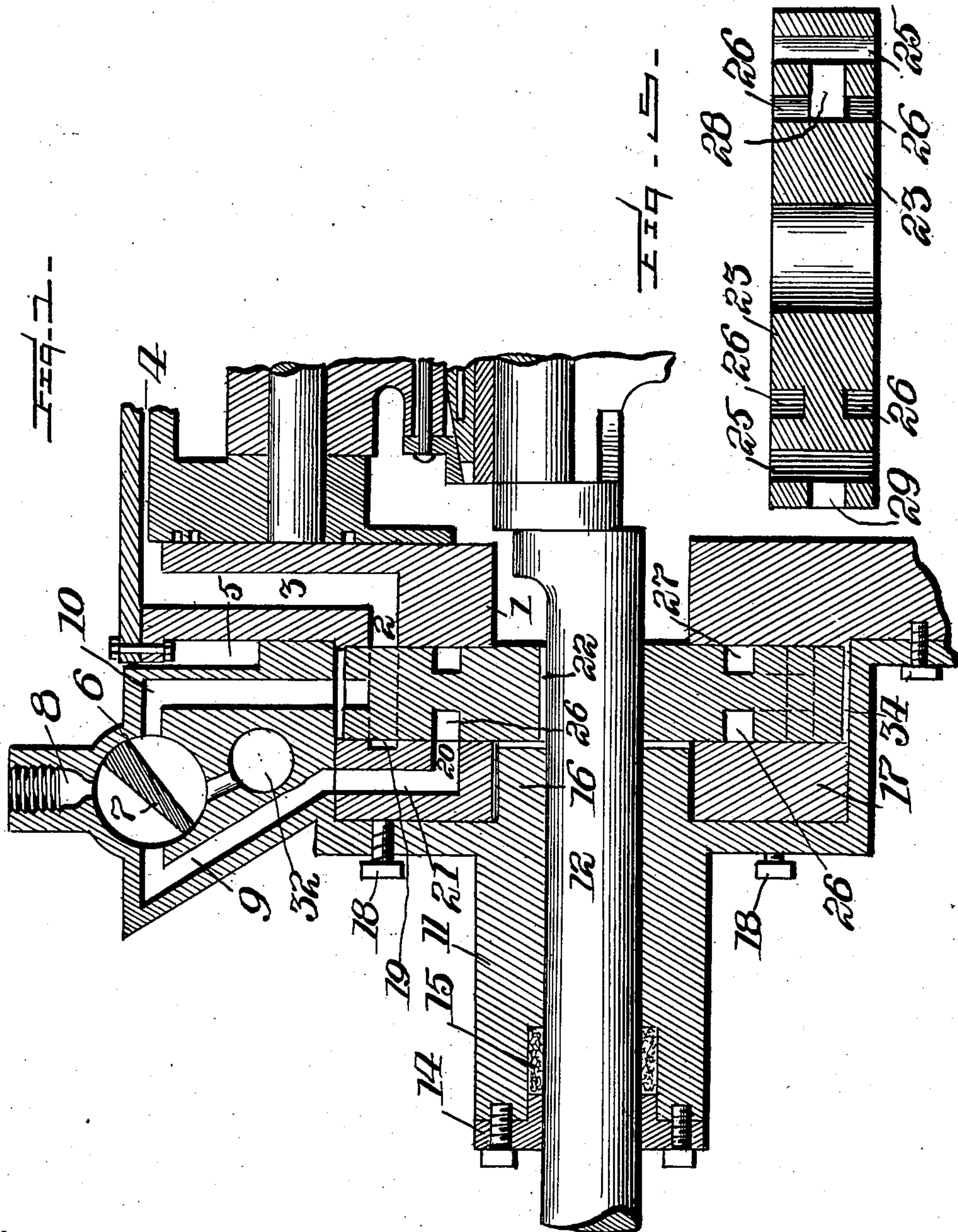
No. 728,808.

PATENTED MAY 19, 1903.

J. PEARCE.
ADJUSTABLE ROTARY VALVE.
APPLICATION FILED MAY 12, 1902.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses:
L. A. Butler,
E. E. Potter.

Inventor:
Josiah Pearce
By H. C. Everett
Attorneys.

No. 728,808.

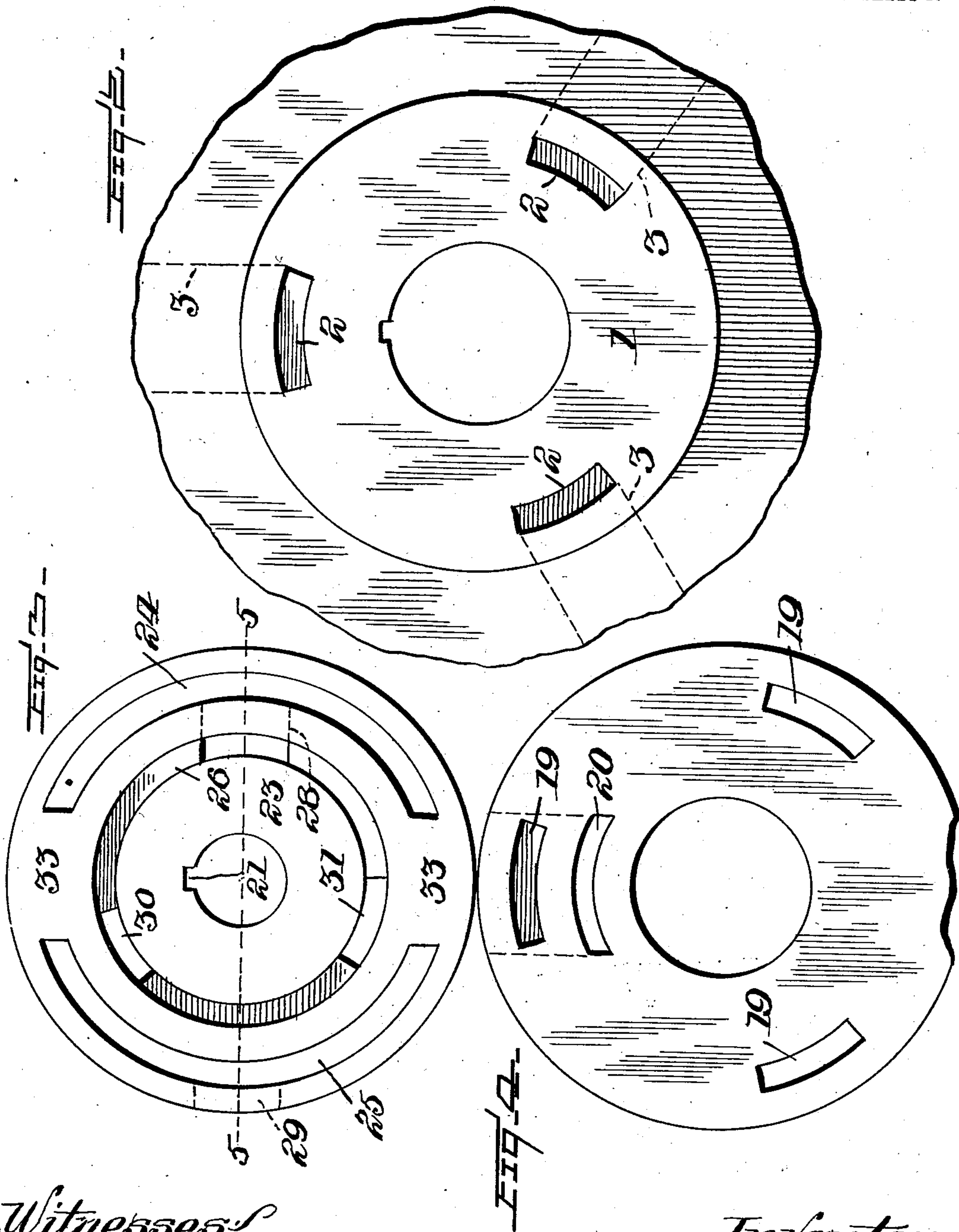
PATENTED MAY 19, 1903.

J. PEARCE.
ADJUSTABLE ROTARY VALVE.

APPLICATION FILED MAY 12, 1902.

NO MODEL.

2 SHEETS—SHEET 2.



Witnesses:
J. H. Butler
E. E. Potter

Inventor:
Josiah Pearce
By *W. H. H. H.*
Attorneys

UNITED STATES PATENT OFFICE.

JOSIAH PEARCE, OF SWISSVALE, PENNSYLVANIA, ASSIGNOR TO PEARCE ENGINE COMPANY, OF PITTSBURG, PENNSYLVANIA.

ADJUSTABLE ROTARY VALVE.

SPECIFICATION forming part of Letters Patent No. 728,808, dated May 19, 1903.

Application filed May 12, 1902. Serial No. 106,904. (No model.)

To all whom it may concern:

Be it known that I, JOSIAH PEARCE, a citizen of the United States of America, residing at Swissvale, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Reversible Adjustable Rotary Balance-Valves, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain new and useful improvements in reversible adjustable rotary balance-valves, the object of the invention being to perfectly balance the valve from all sides thereof and at the same time have a valve practically steam-tight.

In my pending application for improvements in reversible adjustable rotary balance-valves, filed January 18, 1902, Serial No. 90,238, I have illustrated the form of balance-valve particularly adapted for use in connection with rotary engines. In the present invention the valve is particularly adapted for use in connection with what is known as "stationary" engines. In the present construction I provide means for permitting the steam to pass from either side of the valve through the same, so that the pressure of the steam will be equal on all sides of the valve. I accomplish this by a simple and effective construction which will be hereinafter fully described in detail, and in describing the same reference will be had to the accompanying drawings, forming a part of this specification, and wherein like numerals of reference indicate like parts throughout the several views, in which—

Figure 1 is a central vertical sectional view of my improved valve, showing the same in position on the engine, the latter being partly broken away. Fig. 2 is a plan or face view of one side of the cylinder. Fig. 3 is a detail plan view of the rotary valve. Fig. 4 is a like view of the adjusting-plate. Fig. 5 is a central horizontal view taken on the line 5 5 of Fig. 3.

In the present illustration of my invention I have shown the same constructed to conform to an engine employing two or more cylinders. To this end the side 1 of the cylinder-wall is provided with ports 2, arranged at

suitable intervals, which receive the steam and feed the same through passages 3 into the cylinder 4. Secured to this side of the cylinder is a valve-casing 5, which incloses both the adjusting-plate and the rotary valve. This casing may be made in one piece, as shown in the present illustration, if desired, or the upper portion thereof, which forms the casing 6 for the reversing-valve 7, may be made separate and bolted or otherwise secured to the other portion of the casing. The upper face of the casing is provided at its upper end with an inlet-port 8, through which steam is fed when the valve 7 is in the position shown in Fig. 1 to the steam-passage 9 in the casing 6. When, however, the valve 7 is set so as to close passage 9 and open passage 10, the steam will be fed from passage 8 to said passage 10 instead of through passage 9.

The casing 5 is preferably constructed with an integral extension 11, in which a shaft 12 is journaled, this extension having a gland 14 secured to the outer end thereof in order that the packing 15 may be adjusted as desired. On the inner or hub end 16 of the extension 11 the adjusting-plate 17 is mounted and is adjusted toward the rotary valve by set-screws 18 or other approved means operating through the outer wall of the casing 5. This adjusting-plate 17 is provided on its inner face with steam-pockets 19 for a purpose as will presently appear. This adjusting-plate 17 is also provided with a port 20 and steam-passage 21, the latter communicating with the steam-passage 9.

Mounted between the cylinder-wall 1 and the adjusting-plate 17 and secured to the shaft 12 by a key 22, so as to revolve with said shaft, is the rotary valve 23. This rotary valve is provided with ports 24 25, extending entirely through the same, one of which is the inlet-port and the other the exhaust-port when the engine is running in one direction, and vice versa. This rotary valve is provided on opposite faces with annular grooves 26 27, the former of which is in communication with port 24 through passage 28. The rotary valve 23 is also provided with a port 29 in its periphery which communicates with the port 25 and acts as the exhaust when the

engine is running in one direction and the inlet when running in the opposite direction. I may, if desired, provide the rotary valve with ports 30 31 in order to permit the steam to pass through the valve more rapidly and making a perfect balance. It will be observed that these two ports 30 31 are not absolutely essential to the operation of the valve, as the steam will pass through port 26 whether the ports 30 31 are provided or not.

In operation we will assume that the valve 7 is in the position shown in Fig. 1 of the drawings. The steam entering through inlet 8 passes through passages 9 21 into port 20 and into annular groove 26 through port 28 into port 24 and is fed through one or more of the ports 2 and passage-ways 3 into the cylinder 4. The steam will be exhausted through another of the ports 2 into port 25, port 29, and passage-way 10 through exhaust-pipe 32. If, however, the valve is reversed from the position shown in Fig. 1, so as to close the passage 9 to the inlet and open the same to the exhaust, then the passage 10 acts as the inlet and steam passes through port 29 into port 25 through one or more of the ports 2 and passages 3 to the cylinder 4, and the exhaust is through port 24, port 28, and groove 26 to port 20, passage-ways 21 and 9, to the exhaust-pipe 32. The ports 24 25 are segment-shaped, extending entirely through the member 23. As there must of necessity be a dividing-wall 33 between the ends of the two ports, it is for this reason I provide the pockets 19. These pockets 19 are also segment-shaped and in length almost equal to the distance between the ends of the ports 24 25. These pockets receive the live steam, and thus enable me to have a perfect balance when the dividing-wall 33 is passing over ports 2, since the same amount of steam is on both sides of the valve. When steam is being admitted through passage-way 10, it entirely fills the passage 34, surrounding the valve 23, giving a continuous supply of live steam, and when steam is admitted through passage-way 9 a continuous supply of live steam is in the groove 26, and the passage 34 is open to the exhaust. The plate or stationary member 17, it will be observed, is adjustable, and the same may therefore be perfectly positioned against the face of the rotary valve when assembling the valve. In practice the adjusting-plate is frictionally held in the casing, and, if desired, it may be splined on the hub 16, though in practice it has been found that the frictional contact of its periphery is sufficient to hold the same securely in position.

It will be noted that various changes may be made in the details of construction without departing from the general spirit of my invention.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In combination with a valve-casing having inlet and exhaust ports, a rotary valve

provided with ports extending therethrough and having recesses in its side faces, passage-ways establishing communication between said ports and recesses, and an adjusting-plate having a port extending therethrough and provided in its one face with pockets, substantially as described.

2. In combination with a valve-casing having inlet and exhaust ports, a rotary valve, segment-shaped inlet and outlet ports extending through said valve, annular grooves in the face of said valve, a passage establishing communication between one of said grooves and one of the said ports, a port in the periphery of said valve communicating with the other of said segment-shaped ports, and a plate provided with ports extending therethrough, substantially as described.

3. The combination with a casing having inlet and outlet ports, and a reversing-valve controlling said ports, of a rotary valve having ports extending therethrough, recesses in the faces of said valves, a passage-way establishing communication between one of said ports and recesses a port in the periphery of the valve communicating with the other of the ports in the valve, an adjusting-plate, ports in said plate, and pockets in one face of said plate, as and for the purpose described.

4. The combination with a casing having inlet and exhaust ports and a reversing-valve controlling said ports, of a rotary valve, segment-shaped ports extending through said valve and separated at their ends by a dividing-wall, ports and passage-ways establishing communication between the ports in the valve and the inlet and exhaust ports, and a plate having a port, and pockets in said plate, substantially as described.

5. In combination with a valve-casing having inlet and exhaust ports, a rotary valve, segment-shaped ports extending through said valve, and an adjusting-plate having a port, and pockets in said plate, as and for the purpose described.

6. A reversible rotary balance-valve, segment-shaped ports extending through said valve with partition-walls dividing said ports, annular grooves in the faces of said valve, a passage-way establishing communication between one of the segment-shaped ports and said grooves, and a port in the periphery of the valve communicating with the other of said segment-shaped ports, substantially as described.

7. In a balance-valve, a rotary valve-body, ports extending through said valve-body, annular grooves in the faces of said body, a passage-way establishing communication between one of the ports and said grooves, a port 29 establishing communication with the other of said ports, combined with an adjusting-plate having a port and pockets in said plate, as and for the purpose described.

8. In a reversible balance-valve, a rotary valve-body ports extending through said body and separated by partition-walls, grooves in

the faces of the valve-body, a passage-way establishing communication between the grooves and one of the ports, a port 29 communicating with the other of the ports extending through the valve, combined with a plate, a port in said plate, and pockets in one face of the plate, as and for the purpose described.

In testimony whereof I affix my signature in the presence of two witnesses.

JOSIAH PEARCE.

Witnesses:

JOHN NOLAND,
A. M. WILSON.