

No. 693,484.

Patented Feb. 18, 1902.

R. L. AMBROSE.
VALVE BALANCING DEVICE.

(Application filed Mar. 11, 1901.)

(No Model.)

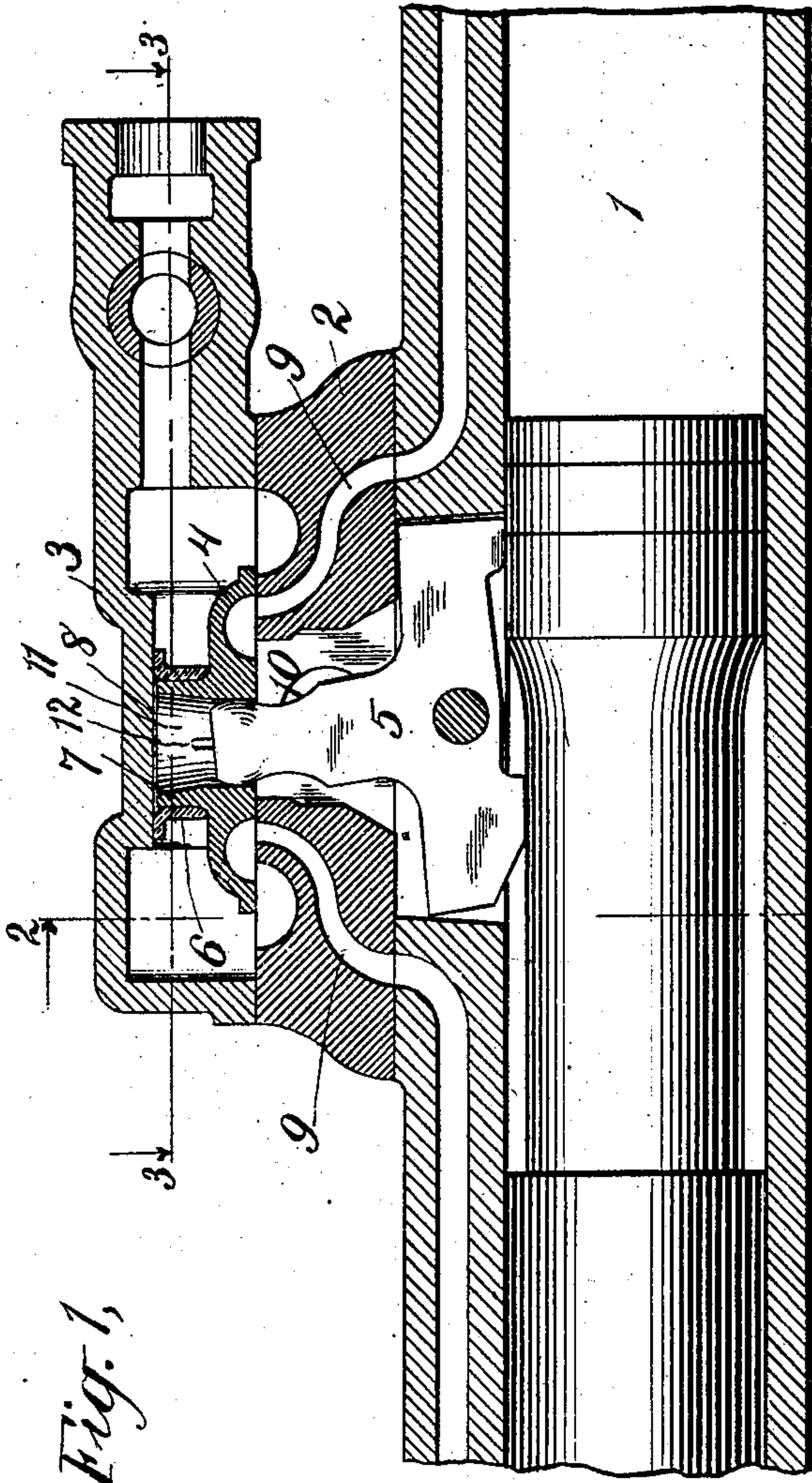


Fig. 1,

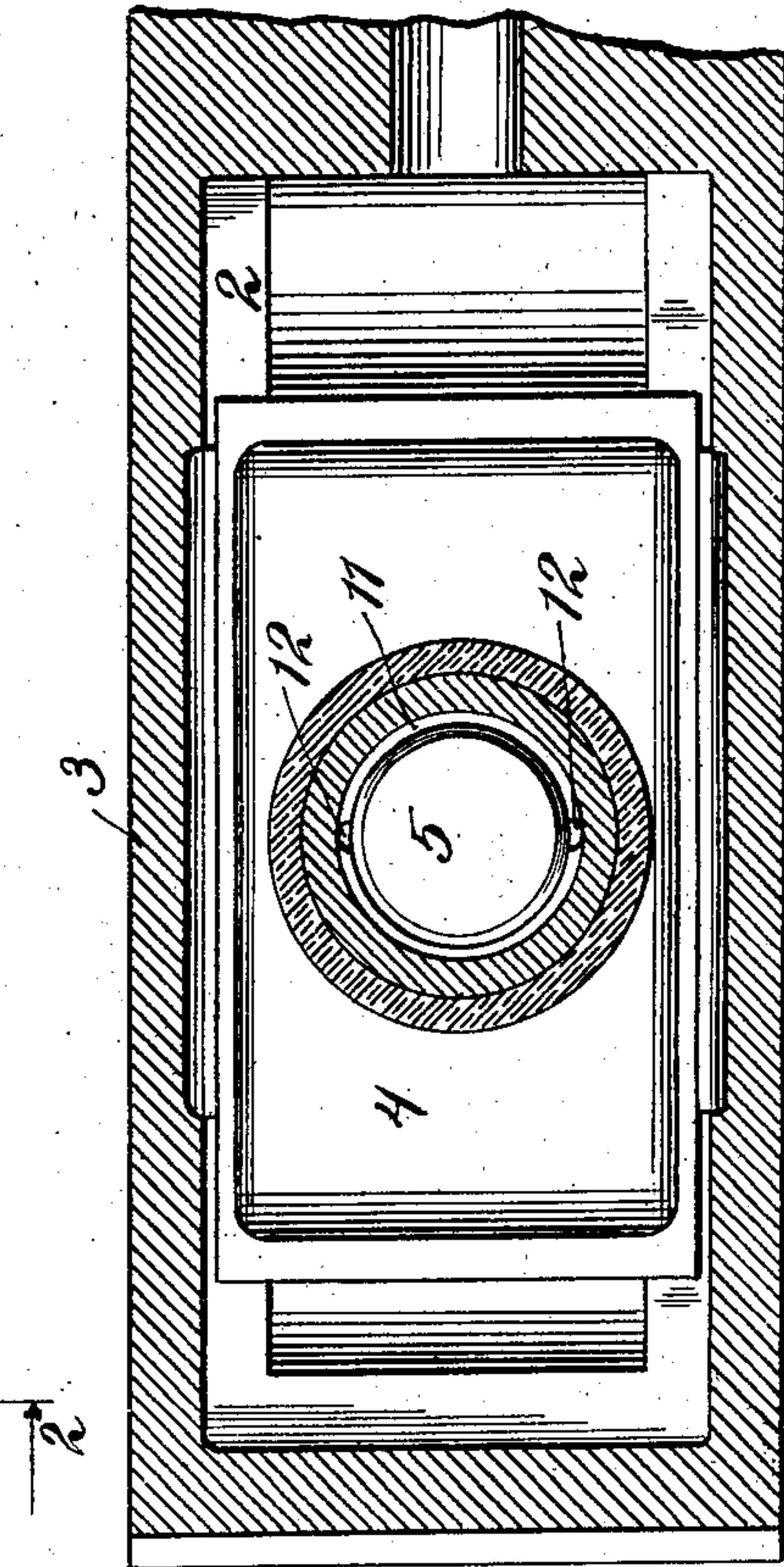


Fig. 2,

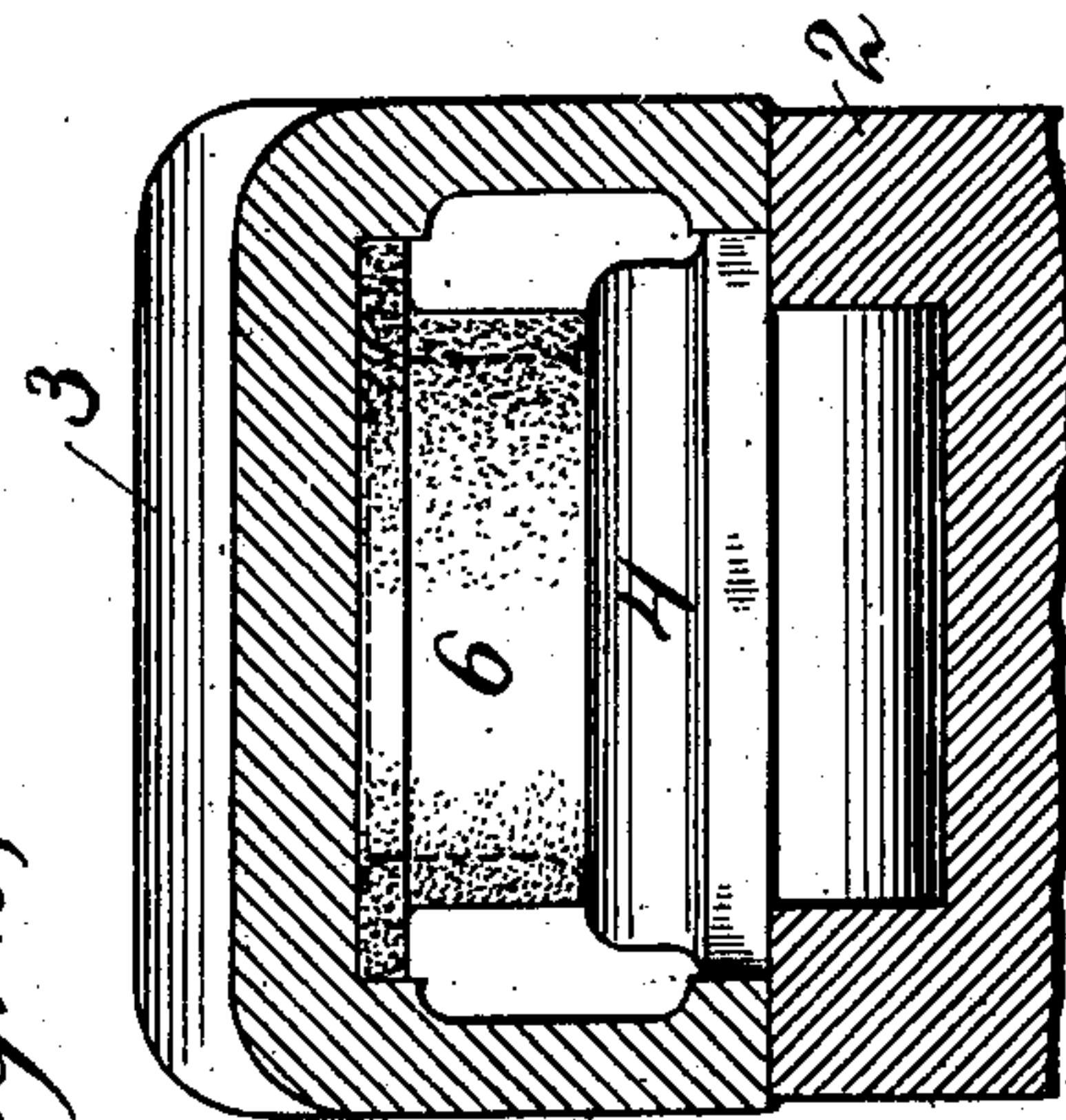


Fig. 3,

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ROBERT L. AMBROSE, OF TARRYTOWN, NEW YORK, ASSIGNOR TO RAND
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VALVE-BALANCING DEVICE.

SPECIFICATION forming part of Letters Patent No. 693,484, dated February 18, 1902.

Application filed March 11, 1901. Serial No. 50,596. (No model.)

To all whom it may concern:

Be it known that I, ROBERT L. AMBROSE, a citizen of the United States of America, and a resident of Tarrytown, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Valve-Balancing Devices, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

My invention relates to improvements in valve-balancing devices, and particularly to means for balancing or partially balancing valves against fluid-pressure when employed in connection with rock-drilling machinery.

The objects of my invention are to save wear and tear of the valve and its seat and of the valve-operating mechanism and, further, to save the waste of motive fluid which necessarily occurs when the valve or its seat is permitted to become worn.

I will now proceed to describe a valve-balancing device embodying my invention and will then point out the novel features in the claims.

In the drawings which form a part of this specification, Figure 1 is a central longitudinal sectional elevation of a portion of a rock-drill provided with a valve and a valve-balancing device embodying my invention. Fig. 2 is a transverse sectional elevation of the same. Fig. 3 is a view in horizontal section of the same, the plane of section being taken upon the line 3 3 of Fig. 1.

Reference character 1 designates a portion of the cylinder of a rock-drill, 2 the valve-seat thereof, and 3 a valve-chest inclosing the valve-chamber. A valve 4 is provided which is of the reciprocating slide-valve type, and reciprocating movement is transmitted to the said valve by a rocker or tappet 5, which is operated by contact with shouldered portions of the piston. The valve carries a pressure-balancing member, which is mounted thereon in such a manner as to be movable in a direction transverse of the reciprocating movement of the said valve. The pressure-balancing member in this instance comprises a ring 6, which is mounted upon a laterally-extending boss 7 upon the valve and is free to

move thereon in the direction before stated. The term "ring" as applied to this member is not intended to limit the same to a cylindrical ring, although such is the form thereof shown in the drawings. The ring may equally be rectangular or polygonal in form, provided it still retains its ring-like form, in that it has an orifice centrally therethrough. The ring in its preferred form is flexible and preferably will be of fibrous material, such as leather. It may, however, be of metal, if desired, or may be of any other suitable material. The outer face of the said member or ring is preferably flanged, as shown, and arranged to bear against and slide upon a fixed bearing 8, provided within the valve-chamber and opposite the valve-seat. The diameter of the ring, and hence the surface covered thereby, is proportionate to the area of the ports in the valve-seat. Such ports comprise two distributing-ports 9 9 and a central exhaust-port 10. The valve has a central orifice 11 therethrough, which communicates always with the said exhaust-port 10. The upper end of the rocker or tappet is fitted into the inner end of the valve-orifice 11, and grooves 12 12 are made in the walls of the orifice or in the sides of the tappet to prevent free communication being closed thereby. In the provision of a valve-balancing member which prevents fluid-pressure from acting upon portions of the valve opposite any of the said ports I balance the valve against pressure to just such extent.

I may, if desired, construct the valve-balancing member of such size as to practically completely balance the valve against all fluid-pressure.

In practice when such valve-balancing member is employed in combination with other elements in a rock-drill I but partially balance the said valve in order that the slight remaining pressure may operate to hold the valve against accidental movement due to its own weight at such times as the drill is not in a horizontal position and the valve is not being held or positively actuated by the piston. Such balancing of the valve against fluid-pressure will save considerable wear between the valve and its seat and, further, save

wear of the rocker and parts in contact therewith. The saving of wear between the valve and its seat is particularly valuable in that when wear occurs a large quantity of motive
 5 fluid is wasted by leakage. With the excessive fluid-pressure removed from the back of the valve the wear will be very much reduced. By mounting the pressure-balancing member in this manner upon the valve, so that it is
 10 movable thereon in a direction at right angles to the reciprocating movement of the valve, I provide an automatic compensation for what wear does occur either between the valve and its seat or between the pressure-
 15 balancing member and its seat. Such wear being automatically compensated for, the device will not require constant attention after it has been in use a short time.

I have shown and described the valve-balancing device in combination with a rock-drill; but it will be understood that it may be employed in other combinations. It is also obvious that various modifications in the form and construction of the device may be
 25 resorted to within the spirit and scope of my invention, and hence I only claim the precise details of construction and combination of parts herein set forth.

What I claim is—

30 1. The combination with a valve-chest having ports therein, and a reciprocating slide-valve controlling said ports, said slide-valve having a laterally-extending boss, and having a lateral orifice extending therethrough
 35 and through the said boss, of a non-metallic flexible flanged ring, mounted on said boss, said ring free to move on said boss in a direc-

tion transverse of the reciprocating movement of said valve.

2. The combination with a valve-chest hav- 40 ing ports therein, a valve-seat and a fixed bearing-surface opposite said valve-seat, of a reciprocating slide-valve in engagement with the said seat, and controlling said ports, said valve having a laterally-extending boss and 45 having a lateral orifice extending therethrough and through the said boss, and a non-metallic flexible flanged ring mounted on said boss, said ring free to move on said boss in a direction transverse of the reciprocating move- 50 ment of said valve, and the flanged portion of said ring adapted to bear against and slide upon said fixed bearing.

3. In a rock-drill, the combination with a cylinder and a piston therein, of a valve-chest 55 having ports, a reciprocating slide-valve controlling said ports, said slide-valve having a laterally-extending boss, and having a lateral orifice extending therethrough and through 60 said boss, a rocker or tappet adapted to engage, and be operated by, said piston, and having one arm thereof fitted to the said lateral orifice in the said valve, there being a port or passage provided between the side of the said rocker-arm and the inner wall of the 65 said orifice to which the rocker-arm is fitted, and a pressure-balancing ring mounted upon the said boss, said ring free to move on said boss in a direction transverse of the reciprocating movement of said valve.

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Witnesses:

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