

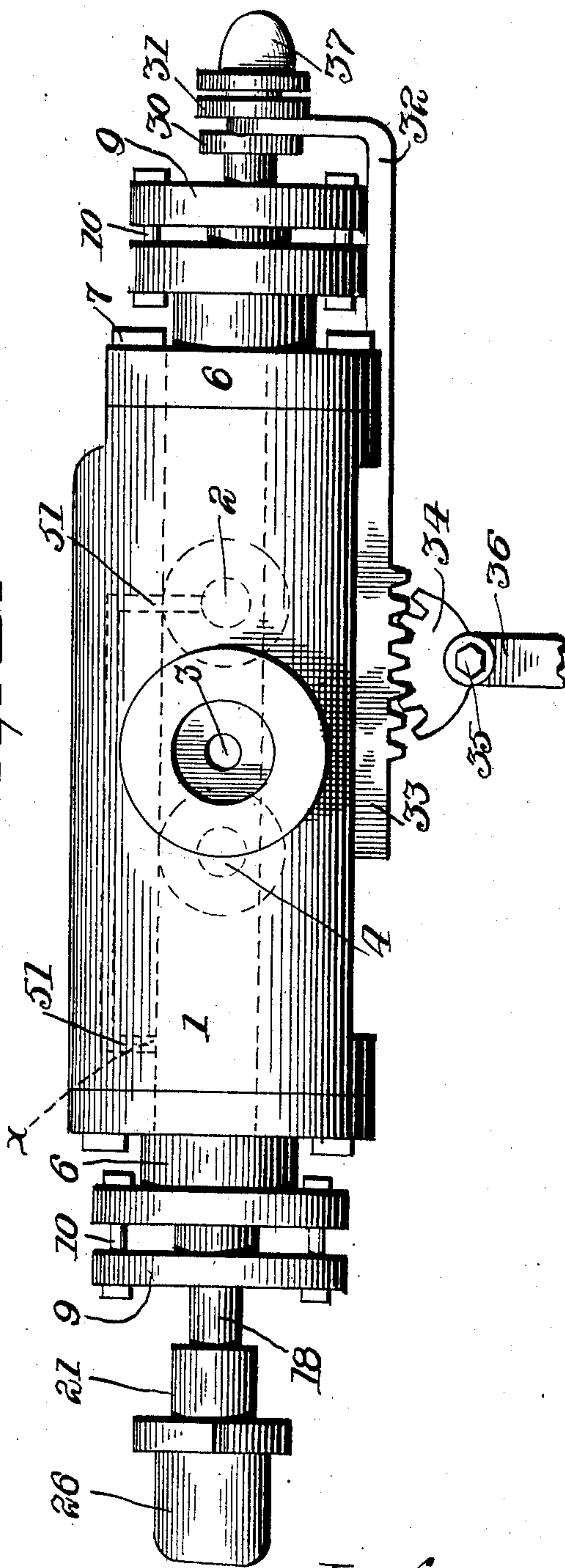
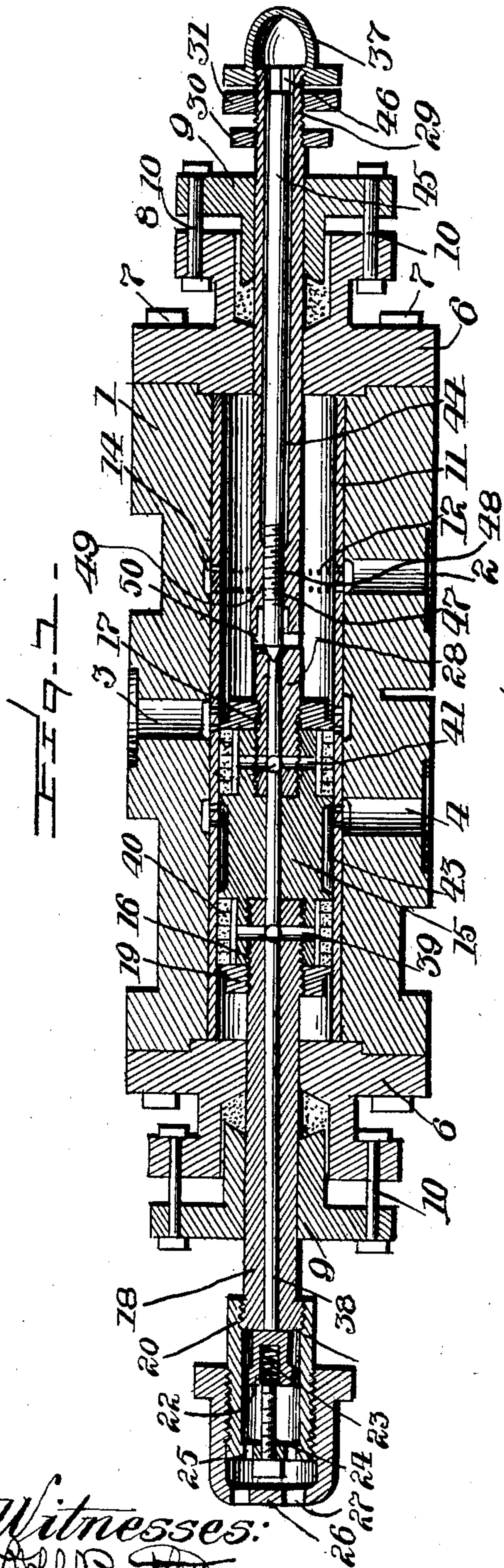
No. 711,121.

Patented Oct. 14, 1902.

D. W. PORTER.
HYDRAULIC BALANCED VALVE.

(Application filed Dec. 26, 1901.)

(No Model.)



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UNITED STATES PATENT OFFICE.

DAVID W. PORTER, OF SEWICKLEY, PENNSYLVANIA.

HYDRAULIC BALANCED VALVE.

SPECIFICATION forming part of Letters Patent No. 711,121, dated October 14, 1902.

Application filed December 26, 1901. Serial No. 87,241. (No model.)

To all whom it may concern:

Be it known that I, DAVID W. PORTER, a citizen of the United States of America, residing at Sewickley, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Hydraulic Balanced Valves, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to certain new and useful improvements in hydraulic valves, and relates more particularly to that class that operate under an extremely high pressure.

15 The object of the present invention is to provide a valve that will be balanced and easy to operate; furthermore, to provide novel means to expand the packing-rings automatically by the pressure in the valve-stem, and to provide novel means for the regulation of
20 the pressure in said valve-stem.

The invention also contemplates to provide a valve that will be extremely simple in construction, strong, durable, comparatively inexpensive to manufacture, and highly efficient in its use.

25 With the above and other objects in view the invention consists in the novel combination and arrangement of parts to be hereinafter more fully described, and specifically pointed out in the claims.

In describing the invention in detail reference is had to the accompanying drawings, forming a part of this specification, and wherein like numerals of reference indicate
35 like parts throughout both views, in which—

Figure 1 is a vertical longitudinal sectional view of my improved valve. Fig. 2 is a top plan view thereof.

40 In the drawings the reference-numeral 1 represents a cylindrical casing having formed therein an inlet-port 2, an outlet-port 3, and an exhaust-port 4. This cylindrical casing is provided with heads 6, which are secured by means of bolts 7 or other suitable securing
45 means, said heads forming stuffing-boxes 8, which are provided with glands 9, secured together by means of bolts 10.

50 The reference-numeral 11 represents a lining secured in the casing 1, this lining having formed therein a number of openings 12, said openings communicating with the annular

groove 14, formed in the casing 1, said annular groove encircling the lining 11.

The reference-numeral 15 represents a valve. Said valve at each end has formed
55 therein screw-threaded openings 16 and 17, the screw-threaded opening 16 receiving the section of the valve-stem 18, which is further secured thereto by means of the screw-threaded collar 19, arranged in the lining 11. The
60 end of said valve-stem 18 is screw-threaded, as shown at 20, to receive the valve-casing 21, in which is secured the regulating-valve 22, said regulating-valve being provided interiorly with a spring 23, operating against the
65 set-screw 24, the latter passing through the end of the casing 21, which casing has formed therein ports 25, and over said casing 21 is secured a cap 26, which is likewise provided
70 with ports 27. The said screw-threaded opening 17 is provided to receive the opposite section of the valve-stem 28, these valve-stems 18 and 28 extending through the heads, stuffing-boxes, and glands, and the end of the
75 valve-stem 28 is screw-threaded, as shown at 29, to receive the jam-nuts 30 31, between which is secured the arm 32, carrying the rack-bar 33, which is operated by the toothed segment 34, fulcrumed at 35, said toothed segment carrying an operating-lever 36. The
80 screw-threaded cap 37 is provided at the end of the valve-stem 28 to inclose the end of the same.

The reference-numeral 38 represents a central port extending through the valve-stem
85 18, which central port communicates with the ports 39, formed in the valve, which ports extend transversely to the port 38. The said ports 39 are formed of quadruple branches leading to and communicating with the pack-
90 ing-rings 40. The said port 38 extends centrally through the valve and also communicates with ports 41, which likewise communicate with the rear face of the rings. The valve 15 has a contracted portion forming a
95 space between the outer face of the valve and the inner wall of the lining 11, as shown at 43.

The reference-numeral 44 represents a central opening formed in the valve-stem 28,
100 said central opening having secured therein the rod 45, carrying the square end 46 and

screw-threads 47 at the opposite end of the rod, which engage interiorly-screw-threaded portion 48 of the contracted portion 49 of the valve-stem 28, the end of the rod 45 being adapted to close the central port and also close a transversely-extending port 50, formed in the valve-stem 28.

The reference-numeral 51 (see Fig. 2 of the drawings) indicates a by-path leading from the inlet 2 and communicating with the interior of the lining 11, said by-path terminating at the opposite side of the valve and indicated by x in Fig. 2 of the drawings.

The operation of my improved valve is as follows: The water or other fluid entering the inlet 2 will circulate around the annular opening 14 and thence through the small openings formed in the lining 11. The rod 45 will be regulated so as to slightly open port 50, allowing the water to enter the central opening of the valve and valve-stem, which will allow the pressure of the water to bear against the inner faces of the packing-rings, thereby expanding the same and pressing the rings normally against the inner walls of the lining 11. The pressure will also bear against the check-valve secured at the end of the valve-stem until such time when the valve will automatically open by reason of the excess of pressure and allowing the water to be discharged through the valve and cap. The water passing through the inlet-port 2 will also pass through the by-path 51 and enter the valve-casing at the point indicated by x in Fig. 2 of the drawings, thus obtaining an equalization of pressure above and below the valve, thereby balancing the same and permitting the valve to be easily operated from an opened to a closed position. The water passing through the inlet-port 2 into the lining will pass through the outlet-port 3 when the valve is in position as indicated in Fig. 1 of the drawings, the water passing through the small openings formed in the lining 11 into one of the annular ports 14 through outlet-port 3. When the valve is operated by means of the operating-lever 36, carrying the segmental gear 34, which communicates movement to the rack 33, carrying the arm 32, which operates the entire valve, together with the valve-stems, the valve is then operated, and the back pressure in the outlet-port 3 will force the water around the valve through the exit 4, as will be readily understood.

When it is desired to regulate the central port passing through the valve and valve-stems, the cap 37 is detached and a wrench or other suitable instrument secured to the square end 46 of the rod 45, which will permit the adjustment that will partially open or close the opening 50, leading to the central opening of the valve and valve-stems. In order to adjust the regulating or check valve at the end of the valve-stem 18, the cap is removed, and by the adjustment of the regulating-screw adjusting the tension of spring 23 the valve may be arranged to auto-

matically open or close at certain predetermined pressure.

The many advantages obtained by the use of my improved valve will be readily apparent from the foregoing description, taken in connection with the accompanying drawings.

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 a hydraulic balance-valve, the combination of a casing having formed therein an inlet, an outlet and an exhaust port, a lining having a series of small openings formed therein communicating with said ports, a valve, a valve-stem having formed therein a central port extending through the valve, a check-valve secured to the one end of the stem, and means to open and close the central port of said valve and valve-stem secured in the other end of said valve-stem, substantially as described.

2. In a hydraulic balance-valve, the combination of a casing having formed therein an inlet, an outlet and an exhaust port, a lining having a series of small openings formed therein communicating with said ports, a valve, a valve-stem having formed therein a central port extending through the valve, a check-valve secured to the one end of the stem, and a screw-threaded rod secured in the other end of said valve-stem for opening or closing the central port of said valve and valve-stem, substantially as described.

3. In a hydraulic valve, the combination of a casing having formed therein an inlet, an outlet and an exhaust port, a lining having a series of small openings formed therein communicating with said ports, a valve, a valve-stem having formed therein a central port extending through the valve, a check-valve secured to the one end of the stem, a screw-threaded rod secured in the other end of said valve-stem for opening and closing the central port of said valve and valve-stem, and means on said valve-stem whereby the same may be actuated to open and close said central port, substantially as described.

4. In a hydraulic balance-valve, the combination of a casing having formed therein an inlet, an outlet and an exhaust port, a lining having a series of small openings formed therein communicating with said ports, a valve, a valve-stem having formed therein a central port extending through the valve, a check-valve secured to the one end of the stem, a screw-threaded rod secured in the other end of said valve-stem for opening and closing the central port of said valve and valve-stem, an arm and cog-rack connected to said valve-stem, and an operating-lever engaging said cog-rack, substantially as described.

5. In a hydraulic balance-valve, the com-

5 bination of a casing having formed therein an inlet, an outlet and an exhaust port, a lining having a series of small openings formed therein communicating with said ports, a valve, a by-pass communicating with each side of said valve, a valve-stem having formed therein a central port extending through the valve, a check-valve secured to the one end of the stem, and means to open and close the central port of said valve and valve-stem secured in the other end of said valve-stem, substantially as described.

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

DAVID W. PORTER.

Witnesses:

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E. E. POTTER.