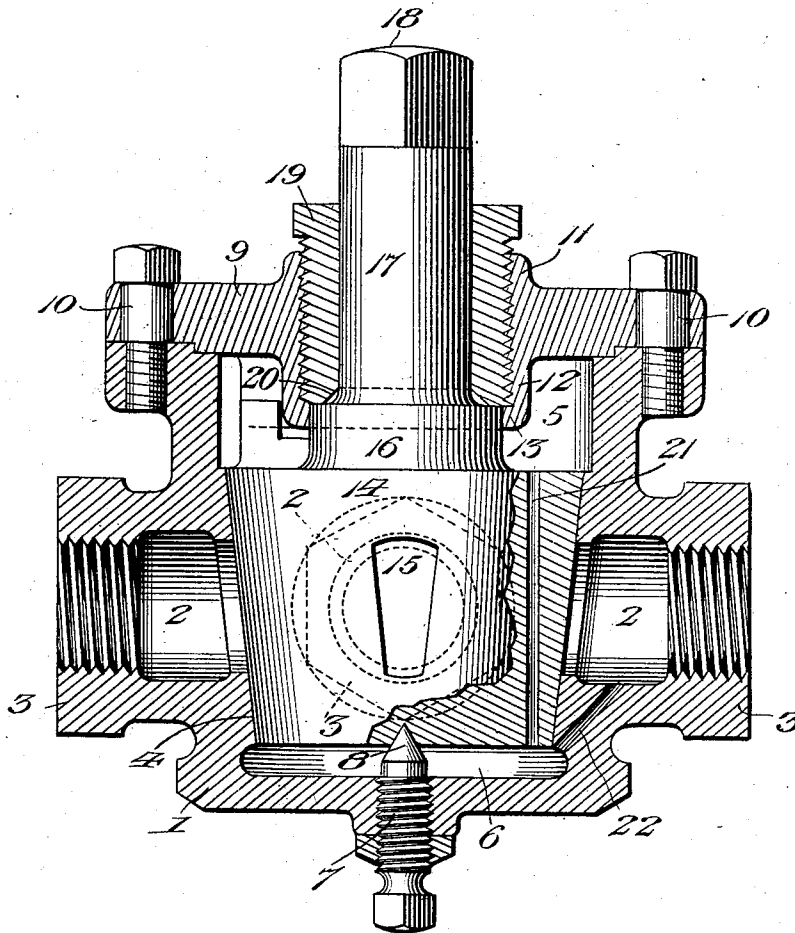


No. 749,005.

PATENTED JAN. 5, 1904.

W. G. WARD.
HYDRAULIC VALVE.
APPLICATION FILED FEB. 18, 1903.

NO MODEL.



WITNESSES:

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UNITED STATES PATENT OFFICE.

WILLIAM G. WARD, OF BRADDOCK, PENNSYLVANIA.

HYDRAULIC VALVE.

SPECIFICATION forming part of Letters Patent No. 749,005, dated January 5, 1904.

Application filed February 18, 1903. Serial No. 143,940. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM G. WARD, a citizen of the United States, residing at Braddock, in the county of Allegheny and State of Pennsylvania, have invented new and useful Improvements in Hydraulic Valves, of which the following is a specification.

This invention relates to a hydraulic valve of the four-way type; and the object of the same is to provide simple and effective means for preventing leakage through any part of the valve and also to equalize the pressure above and below the valve-plug to prevent any tendency of raising the latter from its seat and escape of the fluid from contiguous conduits or pipes in connection with the valves which it is desired shall remain closed.

The invention consists in the construction and arrangement of the several parts, which will be more fully hereinafter described and claimed.

The drawing represents a transverse vertical section through a four-way valve embodying the features of the invention, and therein the numeral 1 designates a casing or shell of suitable form having opposite ports 2, communicating with screw-threaded bores through tap collars or flanges 3. It will be understood that the fourth port and tap collar or flange will be in diametric alignment with that shown by dotted lines, and all the ports communicate with an inverted conical valve-chamber 4, communicating with upper and lower pressure-equalizing chambers 5 and 6, the upper chamber 5 continuing to the top of the casing or shell 1 and the lower chamber 6 having a limited vertical extent, but greater in diameter than the lower terminal of the valve-chamber 4. Extending upwardly through the center of the casing or shell 1 and the chamber 6 is a centering-screw 7, having an upper conical terminal 8. On the upper end of the casing or shell 1 and closing over the chamber 5 a cap 9 is preferably mounted and held secure by screw-bolts 10 of usual construction. The center of the cap 9 is formed with a gland-seat 11, which is interiorly screw-threaded and has a lower depending annular flange 12 with an inturned terminal 13, the latter decreasing the diameter of the opening through the seat.

An inverted conical plug-valve 14 is rota-

tably mounted in the valve-chamber 4 and extends equally in a vertical direction with the vertical extent of said chamber, the bottom of the said valve forming the upper wall of the lower pressure-relief chamber 6 and the top of the valve the bottom wall for the upper pressure-relief chamber 5. The valve 14 has a central port 15 therethrough, and rising from the center of the top of the valve is a collar 16, having a diameter precisely equal to the opening through the inturned terminal 13 of the flange 12. Rising from the center of the collar 16 is a stem 17 of less diameter than said collar and provided with an upper angular head 18 for the application of a hand-wheel or analogous turning device. Fitted around the stem 17 and projected downwardly into the seat 11 is a gland 19, which always has its lower end firmly bearing on the upper edge of the collar 16, the lower end of the gland being cut away, as at 20, to permit it to firmly contact with the upper edge of the said collar. When the valve 14 is fully seated and held in place by the gland 19, the inturned terminal 13 of the flange 12 bears against the upper portion of the collar 16 and leakage of fluid through the gland is prevented by the disposition of the inturned terminal of the flange 12, as stated. It will be seen that the screw-threaded bore of the gland-seat 11 terminates above or on a level with the upper edge of the collar 16, and hence a tight joint can be established between the inner edge of the flange 13 and the collar 16. The bottom portion of the valve 14 at the center is engaged by the upper conical end 8 of the centering-screw 7 to prevent the valve from becoming laterally displaced.

Extending vertically through the valve 14 is a port 21, which serves as a means of communication between the chambers 5 and 6. Between one of the ports 2 and the chamber 6 communication is established by a port 22, formed in the lower portion of the valve-casing.

The valve set forth is constructed to compensate for any inequality of pressure, and it is obvious that without the restricting and equalizing means set forth a great pressure would have a tendency to lift the valve from its seat and cause it to leak or permit the fluid to pass through ports desired to be shut

off and so remain until the valve is turned to regularly place them in communication. It will also be understood that through excessive pressure a portion of the liquid would
5 be forced into the chamber 6 and also into the chamber 5 and an equalization of pressure in both chambers against the upper and lower ends of the valve-plug will be immediately set up through the port 21, and thereby
10 the said valve-plug will be held firmly to its seat and strain on the valve avoided. Furthermore, in the event of excessive pressure a relief is established through the port 22, and any tendency toward leakage at any
15 point is thus obviated and at the same time the pressure against both ends of the valve is uniformly maintained.

Within the chamber 5 are suitable means for limiting the rotation of the valve in opposite directions, whereby it may be readily
20 ascertained whether the valve-plug is in proper position relative to the several ports 2.

Having thus fully described the invention, what is claimed as new is—

25 In a valve, the combination of a casing having oppositely-disposed ports adapted to be placed into communication and leading to a central valve-chamber, upper and lower pres-

sure-equalizing chambers normally communicating with the said valve-chamber, the
30 lower equalizing-chamber having a port extending therefrom to one of the ports of the casing, a cap on the upper end of the casing having a central gland-seat, the latter having a depending flange with an inturned terminal,
35 a plug-valve rotatably mounted in the valve-chamber and having a transverse port through the center thereof and a vertical port therethrough at one side of the center to establish communication between the upper
40 and lower pressure-equalizing chambers, the said valve having a collar rising from the center of the upper end thereof and closely held against the inturned lower terminal of the flange of the gland-seat, a stem also rising
45 from the said collar, and a gland fitted in the said gland-seat and having its lower end bearing against the upper edge of the valve-collar above the inturned terminal of the depending flange of the gland-seat.
50

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

WILLIAM G. WARD.

Witnesses:

J. M. CLIFFORD,
J. D. JOHNSON.