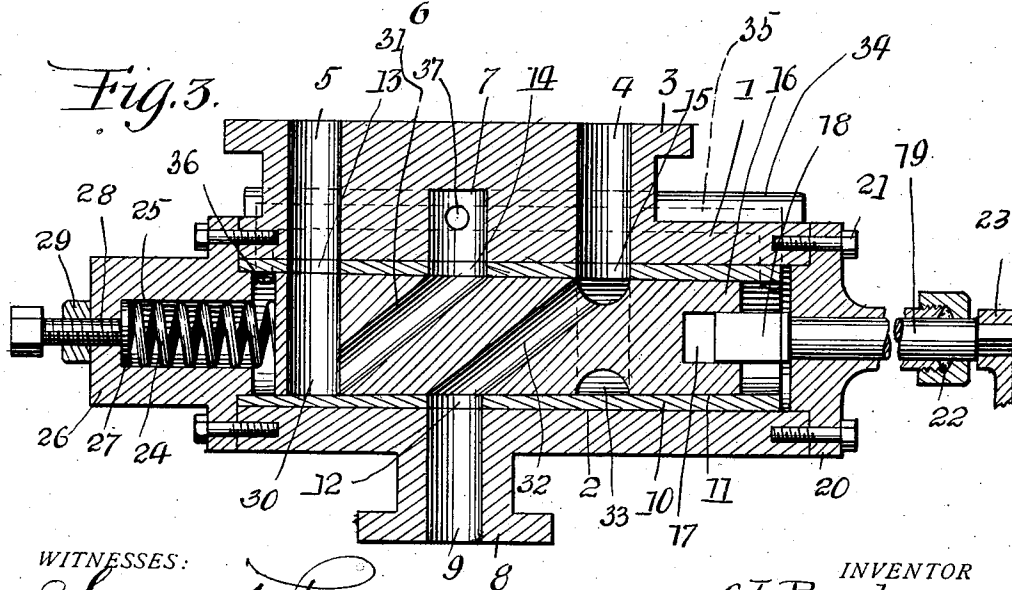
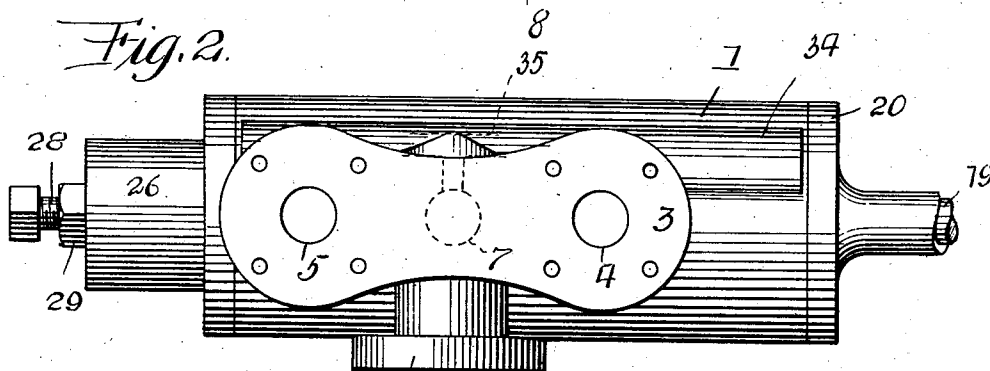
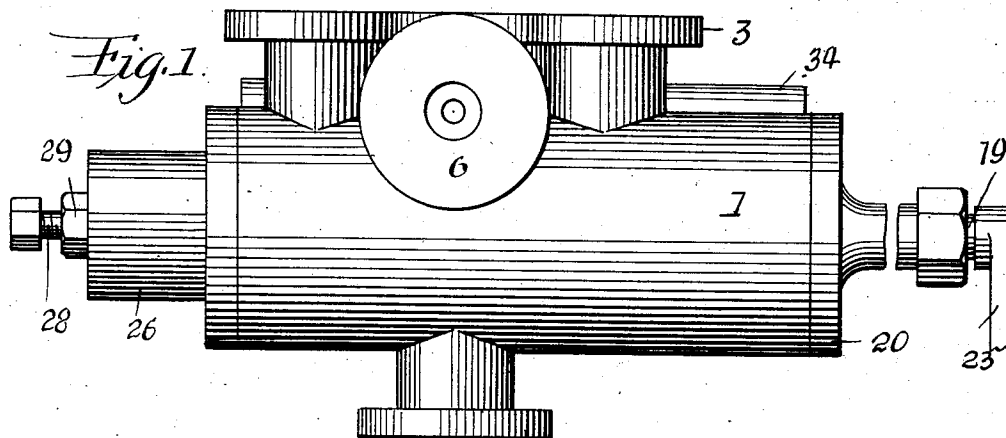


C. L. POWELSEN.
HYDRAULIC VALVE.
APPLICATION FILED MAY 19, 1911.

1,024,909.

Patented Apr. 30, 1912.



WITNESSES:

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CHARLES LOUIS POWELSEN, OF SHARON, PENNSYLVANIA.

HYDRAULIC VALVE.

1,024,909.

Specification of Letters Patent.

Patented Apr. 30, 1912.

Application filed May 19, 1911. Serial No. 628,233.

To all whom it may concern:

Be it known that I, CHARLES LOUIS POWELSEN, a citizen of the United States of America, residing at Sharon, in the county of Mercer and State of Pennsylvania, have invented certain new and useful Improvements in Hydraulic Valves, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to valves, and my invention aims to provide a valve that can be advantageously used for various purposes, for instance, as a hydraulic valve for controlling the hoisting and manipulation of various devices, and as a controlling valve in any connection to which the same may be adapted or applicable.

The invention further aims to provide a valve somewhat similar to that disclosed in my companion application Serial Number 628,232 in connection with which air, steam, water or oil can be used and a supply or exhaust easily controlled. To this end I have devised a rotary three-way valve which is furnished with a tension device somewhat similar to that disclosed in my companion application, and the action of the valve is very similar, with the exception that provision is made in this device for simultaneously exhausting a cylinder when supplying fluid to either end thereof to move a piston or plunger. An important advantage of this type of valve is the perfect control of the piston or plunger, as is necessary in the manipulation of rolling mill tables, furnace doors and elevators.

The invention will be hereinafter specifically described and then claimed, and reference will now be had to the drawing, wherein there is illustrated a preferred embodiment of the invention, but it is to be understood that the structural elements thereof are susceptible to such changes as fall within the scope of the appended claims.

In the drawing:—Figure 1 is a side elevation of the valve, Fig. 2 is a plan of the same, and Fig. 3 is a longitudinal sectional view.

A valve in accordance with this invention comprises a cylindrical valve body 1 having a longitudinal bore 2 formed therein extending from end to end of the body thereof provided with a longitudinal enlargement 3 having vertical outlet ports 4

and 5 formed therein adjacent to the ends thereof and in communication with the bore 2. The enlargement 3 has a connection 6 upon one side thereof and this connection and the enlargement 3 have an exhaust port 7 in communication with the bore 2.

The underside of the valve body 1 has a connection 8 provided with an inlet port 9 in communication with the bore 2. Mounted in the bore 2 is a bushing 10 approximately the same length as the body of the valve, and said bushing is provided with a tapering seat 11 and with ports 12, 13, 14 and 15. The port 12 registers with the inlet port 9, the ports 13 and 15 with the ports 5 and 4 respectively, and the port 14 with the port 7. Rotatably fitted in the seat 11 of the bushing 10 is a plug valve 16 having one end thereof provided with a rectangular socket 17 which receives a head 18, carried by a valve stem 19. The valve stem 19 is rotatably mounted in a cap 20 fitted in the end of the bore 2 and suitably connected to the end of the valve body 1, as at 21. The cap 20 has a stuffing box 22 surrounding the valve stem 19 and this stem has the end thereof provided with a lever or hand wheel 23. Engaging the opposite end of the plug valve 16 is a coiled compression spring 24 arranged in a socket 25 provided therefor in a cap 26 secured to the end of the valve body 1 in the same manner as the cap 20. The outer convolution of the spring 24 bears against a head 27 moved by a set screw 28 adjustably mounted in the end of the cap 26, said set screw being held in an adjusted position by a jam-nut 29. The plug valve 16 is provided with a transverse port 30 normally in communication with the ports 5 and 13, the said port 30 being located adjacent to that end of the plug valve pressed by the spring 24. The port 30 is in communication with an angularly disposed port 31 formed in the plug valve 16, and having one end thereof alternately communicating with the ports 14 and 12. The plug valve 16 also has an angularly disposed port 32 and one end of this port is in communication with an annular groove 33 provided therefor in the plug 16, while the opposite end of the port 32 is adapted to alternately communicate with the ports 12 and 14. The annular groove 33 of the plug valve 16 communicates with the port 15, for a purpose that will presently appear. The top of the valve

body 1 at the opposite side of the enlargement 3 from that of the connection 6 is provided with a longitudinal rib 34 having an equalizing port 35 formed therein. The ends of the port 35 are in communication with the bore or seat of the bushing 10, at the ends thereof, said bushing having ports 36 communicating with the port 35. The port 35 intermediate the ends thereof communicates with the exhaust port 7 through the medium of a passage 37. With the plug valve 16 in the position shown in Fig. 3 of the drawings, fluid entering through port 9 passes to ports 12, 32, the groove 33 and ports 15 and 4 to a cylinder (not shown). Fluid from the cylinder will exhaust through ports 5, 13, 30, 31 and 7, a portion of the exhaust passing through ports 37, 35 and 36 to the ends of the plug valve within the bushing 10.

When the plug valve is rotated a half revolution, fluid passing through ports 9 and 12 enters ports 31, 30, 13 and 5, and exhausting through ports 4 and 15 enters the groove 33, ports 32, 14 and 7, besides entering the equalizing port.

It is apparent from the foregoing that the valve is equally balanced and consequently can be easily operated.

One advantage of the valve is that it can be completely shut-off by a quarter rotation of the plug valve, and another advantage is that no leather or other material is used for packing and that the valve is non-leakable irrespective of the pressure of the fluid such as air, steam, water or oil passing through the valve.

What I claim is:—

1. A valve comprising a valve body having a longitudinal bore formed therein, a bushing arranged in the bore of said valve body and having a tapering seat, said valve body and said bushing having outlet ports, an inlet port and an exhaust port formed therein, a plug valve rotatably fitted in the seat of said bushing, said plug valve having an annular groove formed therein in communication with one of said outlet ports, said plug having an angularly disposed port formed therein communicating with said annular groove and adapted to alternately communicate with said inlet port and said exhaust port, said plug having a transverse port formed therein adapted to communicate with the other of said outlet ports and a second angularly-disposed port communicating with said transverse port and adapted to alternately communicate with said inlet port and said exhaust port.

2. A valve comprising a valve body having a longitudinal bore formed therein, a bushing arranged in the bore of said valve body and having a tapering seat, said valve body and said bushing having outlet ports, an inlet port and an exhaust port formed

therein, a plug valve rotatably fitted in the seat of said bushing, said plug valve having an annular groove formed therein in communication with one of said outlet ports, said plug having an angularly disposed port formed therein communicating with said annular groove and adapted to alternately communicate with said inlet port and said exhaust port, said plug having a transverse port formed therein adapted to communicate with the other of said outlet ports and a second angularly-disposed port communicating with said transverse port and adapted to alternately communicate with said inlet port and said exhaust port, caps carried by the ends of said valve body, a tension device carried by one of said caps and adapted to hold said plug seated in said bushing, and a valve stem carried by the other of said caps adapted to rotate said plug in said bushing.

3. A valve comprising a valve body having a longitudinal bore formed therein, a bushing arranged in the bore of said valve body and having a tapering seat, said valve body and said bushing having outlet ports, an inlet port and an exhaust port formed therein, a plug valve rotatably fitted in the seat of said bushing, said plug valve having an annular groove formed therein in communication with one of said outlet ports, said plug having an angularly disposed port formed therein communicating with said annular groove and adapted to alternately communicate with said inlet port and said exhaust port, said plug having a transverse port formed therein adapted to communicate with the other of said outlet ports and a second angularly-disposed port communicating with said transverse port and adapted to alternately communicate with said inlet port and said exhaust port, caps carried by the ends of said valve body, a tension device carried by one of said caps and adapted to hold said plug seated in said bushing, a valve stem carried by the other of said caps adapted to rotate said plug in said bushing, a longitudinal rib carried by said valve body and having an equalizing port formed therein in communication with said exhaust port and with the ends of said bushing, substantially as described.

4. In a valve, a hollow valve body provided with a tapering valve seat, said valve body and valve seat having outlet ports, an inlet port and an exhaust port, a plug valve rotatably fitted in the tapering valve seat, said plug valve having an annular groove in communication with one of said outlet ports, said valve further having an angularly-disposed port communicating at one end with said annular groove and adapted to alternately communicate at its other end with said inlet port and said exhaust port, a transverse port in said valve adjacent one

end adapted to communicate at one end with the other of said outlet ports, a second angularly-disposed port in the valve, said last named angularly-disposed port communicating with the other end of said transverse port and adapted to alternately communicate with said inlet port and said exhaust port.

5. In a valve, a valve body having a longitudinal bore provided with a valve seat, said valve body and seat having outlet ports, an inlet port, and an exhaust port, a valve rotatably fitted to the valve seat of said body, said valve having an annular groove in communication with one of said outlet ports, said valve further having an angularly-disposed port communicating at one end with said annular groove and adapted to alternately communicate at its other end with said inlet port and said exhaust port, a transverse port in said valve adjacent one end adapted to communicate at one end with the other of said outlet ports, a second angularly-disposed port in the valve, said last-named angularly-disposed port communicating with the other end of said transverse port and adapted to alternately communicate with said inlet port and said exhaust port.

6. In a valve, a valve body having a longitudinal bore provided with a valve seat, said valve body and seat having outlet ports, an inlet port, and an exhaust port, a valve rotatably fitted to the valve seat of said body, said valve having an annular groove in communication with one of said outlet ports, said valve further having an angularly-disposed port communicating at one end with said annular groove and adapted to alternately communicate at its other end with said inlet port and said exhaust port, a transverse port in said valve adjacent one end adapted to communicate at one end with the other of said outlet ports, a second angularly-disposed port in the valve, said last-named angularly-disposed port communicating with the other end of said transverse port and adapted to alternately communicate with said inlet port and said exhaust port, and an equalizing port in the

valve body in communication at its ends with the ends of the bore in the valve body, said equalizing port intermediate its ends in communication with said exhaust port.

7. In a valve, a valve body having a longitudinal bore, said valve body having outlet ports, an inlet port, and an exhaust port, a valve rotatably-mounted in the bore of the valve body, means connected to one end of said valve body for rotating the valve, means engaging the other end of the valve body for yieldingly holding the same seated, a transverse port and two angularly-disposed ports through said valve, said transverse port coacting with one of the outlet ports and with the exhaust port, and the two angularly-disposed ports coacting with the inlet port, the outlet ports and the exhaust port, and an equalizing port in the valve body in communication with both ends of the bore in the valve body and with said exhaust port.

8. In a valve, a valve body having a longitudinal bore, said valve body having outlet ports, an inlet port, and an exhaust port, a valve rotatably-mounted in said bore, ports in said valve co-acting with the ports in the valve body, and an equalizing port in the valve body communicating with opposite ends of the bore in said body and with the exhaust port of the body.

9. In a valve, a valve body having a longitudinal bore, said valve body provided with outlet ports, an inlet port, and an exhaust port, a valve mounted for rotation in the valve body and provided with ports co-acting with those in the valve body for simultaneously admitting fluid to and exhausting fluid from a cylinder, and an equalizing port in communication with the exhaust port and the bore of the valve body whereby the exhausted fluid is utilized for balancing the pressure on both ends of the rotary valve.

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

CHARLES LOUIS POWELSEN.

Witnesses:

KARL H. BUTLER,

MAX H. SROLOVITZ.

Correction in Letters Patent No. 1,024,909.

Affidavit having been filed showing that the name of the patentee in Letters Patent No. 1,024,909, granted April 30, 1912, for an improvement in "Hydraulic Valves," should have been written and printed *Charles Louis Powelson* instead of "Charles Louis Powelsen," it is hereby certified that the proper correction has been made in the files and records pertaining to the case in the Patent Office and should be read in the said Letters Patent that the same may conform thereto.

Signed and sealed this 16th day of July, A. D., 1912.

[SEAL.]

C. C. BILLINGS,

Acting Commissioner of Patents.