D. J. EVANS.

FOUR WAY VALVE.

APPLICATION FILED MAY 10, 1915.

1,190,992. Patented July 11, 1916.

Fig. 4.

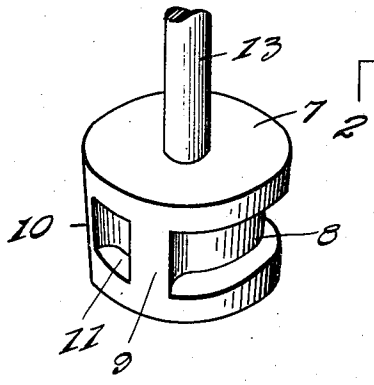
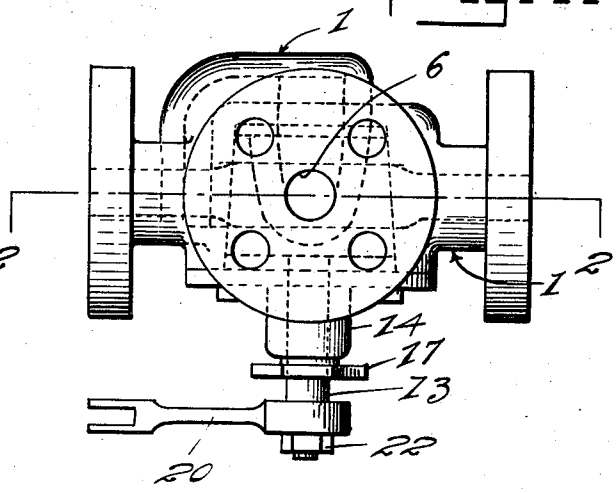


Fig. 1.



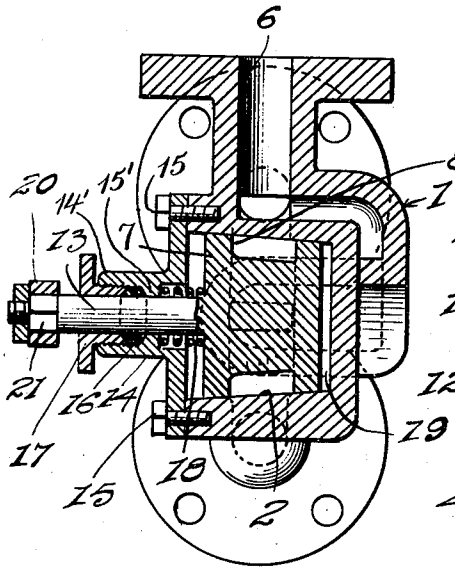


Fig. 3.

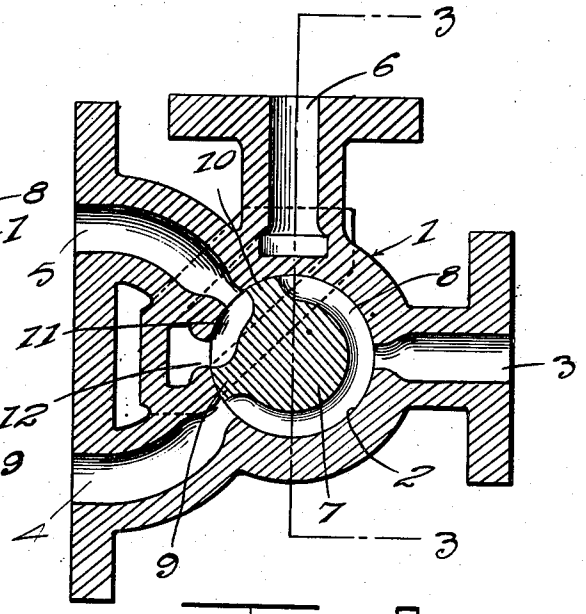


Fig. 2.

Witnesses

A. B. Beall.

J. R. Bowman.

Inventor

D. J. Evans.

By A. Laudrup & Co.,

Attorneys

UNITED STATES PATENT OFFICE.

DAVID J. EVANS, OF SHARON, PENNSYLVANIA.

FOUR-WAY VALVE.

1,190,992. Specification of Letters Patent. Patented July 11, 1916.

Application filed May 10, 1915. Serial No. 27,132.

To all whom it may concern:

Be it known that I, DAVID J. EVANS, a citizen of the United States, residing at Sharon, in the county of Mercer and State of Pennsylvania, have invented certain new and useful Improvements in Four-Way Valves; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to four-way valves adapted for supplying motive fluid to the opposite ends of the cylinder, and one of the principal objects of the invention is to provide a valve of comparatively simple construction, in which the stroke of the valve lever is short, and in which means are provided for taking up the wear of the valve in the valve casing automatically.

The foregoing and other objects may be attained by means of the construction illustrated in the accompanying drawing, in which—

Figure 1 is a top plan view of a four-way valve made in accordance with this invention, Fig. 2 is a vertical sectional view taken on the line 2—2 of Fig. 1, Fig. 3 is a sectional view taken on the line 3—3 of Fig. 2, and Fig. 4 is a detail perspective view of the valve head and stem, the latter being broken away.

Referring to the drawings by reference numerals, 1 designates the casing of my improved valve.

The casing 1 is fully open at its upper end, and closed at its lower end, and the side wall of the valve chamber thereof is formed to provide a tapered valve seat 2. An inlet port 3 and outlet ports 4 and 5 communicate with the valve chamber at a point between the upper and lower ends thereof, the inlet port being located at one side and the outlet ports at the opposite sides of the casing 1. The outlet ports 4 and 5 are approximately 90° apart and an exhaust port 6 which is located between the inlet port 3 and the outlet port 5 communicates with the valve chamber at a point between the outlet ports 4 and 5 through a by-pass 12.

A frusto-conical valve plug 7 is mounted in the valve chamber, the valve plug 7 being provided with a circumferential groove 8 which is located between the ends thereof, and which extends more than halfway around the same. A second circumferential groove 11 is formed in the valve plug 7 intermediate the ends of and shorter than the groove 8, relatively narrow walls 9 and 10 being thus left separating the ends of the grooves. The valve 7 is provided with a stem 13 which extends through a removable cap 14, which cap is secured to the open end of the valve casing 1 by lag screws 15. The cap 14 is provided with an upstanding neck 14′ which has an interiorly arranged flange 15′ which flange is located centrally of the ends of the neck. A suitable packing 16 is placed in the neck 14′ upon the upper face of the flange 15′, which packing surrounds the valve stem 13, and prevents leakage at that point, and an adjusting collar 17 is fitted in the upper end of the neck 14′ holding said packing in place. A coil spring 18 surrounds the valve stem and bears at one end against the valve head, while the opposite end bears against the under face of the flange in the neck 14′. The valve plug and seat are so proportioned that a space 19 is left below said plug to which the valve is urged by a spring 18 as wear of the coöperating parts takes place to always insure the proper seating of the valve. Connected to the upper end of the valve stem 13 is a lever 20, which lever is held connected therewith by means of a nut 22.

From the foregoing it will be obvious that the movement of the lever 21 will be of a very short throw to operate the valve head in the casing. The liquid passes in through the port 3 into the groove 8, and out through the port 4 into the cylinder, while liquid from the other end of the cylinder will return through the port 5, into the passage way 11 and the by-pass 12 and out through the exhaust port 6. When the valve is shifted to bring passage 8 in register with the port 5, the liquid will pass through the port 3, and out through the port 5, while the port 4 will then register with the passage 11 and the exhaust 6.

From the foregoing it will be obvious that a fourway valve made in accordance with this invention will require but slight movement of the operating lever to move the same, and will also take up wear of the valve head and valve seat, and it can be readily taken apart and assembled for use.

Various changes may be made in the de-

tails of construction without departing from the spirit and scope of the invention as defined in the claim.

What is claimed is:—

A four-way valve comprising a valve casing having a tapering seat therein, a removable cap inclosing said casing, an inlet port in said casing leading to the valve seat, a pair of discharge ports in said casing leading to said valve seat, located approximately 90° apart and situated in the opposite side of the valve casing from the inlet port, an exhaust port for said valve seat located between the discharge ports and communicating with a by-pass leading through the casing and terminating at a point between the inlet port and one of the discharge ports, a frusto-conical valve plug in said casing cooperating with said seat, said valve having a stem extending through said removable cap and surrounded by a helical spring, said valve having a circumferential groove intermediate its ends extending more than half-way thereabout and a second circumferential groove intermediate the ends of the first groove and shorter than said first groove, the valve plug and seat being so proportioned that a space is left below said plug into which the valve is urged by the spring as wear of the coöperating parts takes place so as to always insure the proper seating of the valve.

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

DAVID J. EVANS.

Witnesses:
S. S. GRIMM,
H. E. MCKAY.