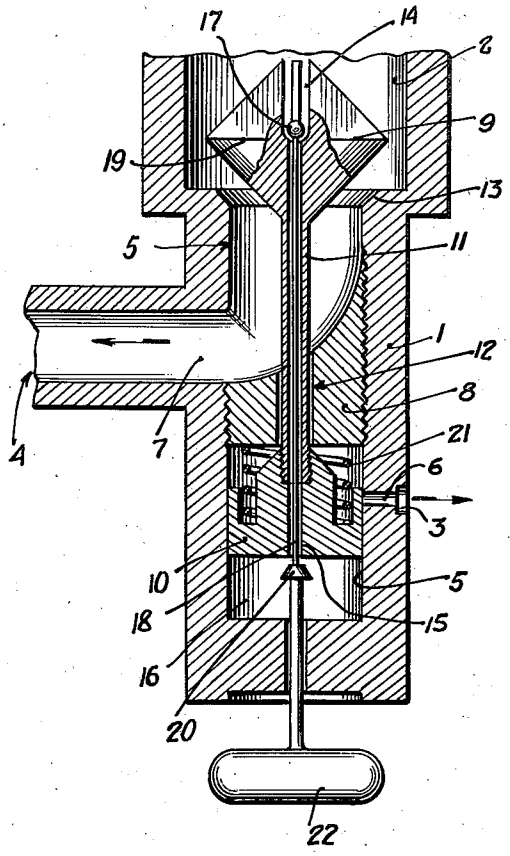
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THREE-WAY VALVE

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THREE-WAY VALVE

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4 Claims. (Cl. 137—144)

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The present invention relates to a three-way valve and more particularly to a valve of the type that is used in connection with hydraulic starters and similar devices.

In the operation of hydraulic jacks when used as an engine starter or the like, there is a sudden admission of a great amount of fluid under high pressure to the jack for the power stroke and at the same time the exhaust of fluid from the jack must proceed at a much slower rate.

It is an object of the present invention to provide a valve which will permit the admission of a great amount of fluid at one time, while being comparatively easy to operate at finger pressure.

The features of the valve, according to the present invention, may be gathered from the following description of one embodiment thereof which is illustrated in the accompanying drawing.

In the figure, 1 designates a valve casing in which there is provided a pressure supply port 2, a return port 3 and a third port 4; the latter serving alternatingly as a pressure supply and as a return port. There is provided a cylinder bore 5 within the casing 1 which is open at the end adjacent to the port 2 and also communicates by means of the passages 6 and 7 with the ports 3 and 4, respectively.

An inserted flow guiding member 8 is pre-set in the bore 5 adjacent passage 7 to assist in passing the large flow of fluid from port 2 to port 4, and prevent any unnecessary turbulence.

Flow of fluid through bore 5 is controlled by a movable poppet valve element 9 which co-acts with a valve seat 13, a piston-like portion 10 and a connecting rod 11, traversing a passage 12 in the center of member 8 and having an appreciably larger diameter than rod 12, and, therefore, permits the passage of fluid from the bore 5 to a chamber directly below the insert 8.

A chamber 14 is provided in head 9 which communicates with a passage 15 extending throughout head 9, and rod 11 extends through the portion 10 which is somewhat larger than the rod, so that chamber 14 communicates with space 16 at the end of bore 5 opposite port 2. A ball 17 engaging valve seat 19 controls communication through the passage 15.

A pin 18 loosely fitting in passage 15 engages ball 17 and push piece 20 which can be actuated from the outside by means of handle 22. A spring

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21 urges the movable valve element into the position in which head 9 is applied against seat 13.

In operation, when push piece 20 is actuated, rod 18 will lift ball 17 and fluid will enter space 16 through passage 15. If head 9 is given a larger effective cross sectional area than portion 10, the movable valve element can be lifted by a light finger pressure exerted on handle 22. Accordingly, fluid will pass from port 2 to port 4 while portion 10 is obstructing the passage 6.

If the finger pressure on handle 22 is released while the high pressure charge is being admitted the valve 9 will close. The rate of closing will be dependent upon the rate of exhaust of fluid from chamber 16 past the stem of member 20, 22.

When delivery of fluid to port 2 ceases, spring 21 will push portion 10 away from element 8 until head 9 is again applied against 13. In that position port 4 communicates with return port 3, permitting the fluid to be exhausted through a return line.

The foregoing description is not intended to limit the present invention which extends to all changes, modifications and equivalents within the scope of the appended claims.

What is claimed is:

1. A hydraulic valve comprised of a valve casing having a cylinder bore therein, a supply port at one end of said cylinder bore, a valve seat formed at the joining point of said supply port and said cylinder bore, a second port communicating with said bore slightly below the said valve seat, an insert in said bore below the said second port, a passage in said insert, a poppet valve to seat on the aforesaid valve seat, said poppet valve having an extension which passes through the said passage in said insert, a piston mounted in the said bore on the lower end of said extension, a passage through said piston and poppet valve, a rod mounted loosely in said passage through the piston and poppet valve, a ball valve in the head of said poppet valve at one end of said rod and an operating handle mounted to extend through the lower end of said casing and abut the lower end of said rod as means to release the ball valve, and as means to open said poppet valve after said ball valve has been opened.

2. A hydraulic valve according to claim 1 in which said insert is formed to guide the flow of

fluid to and from said port and to reduce the turbulence.

3. A hydraulic valve according to claim 1 in which a spring is mounted between the piston and said insert member to close said valve without manual pressure.

4. A hydraulic valve according to claim 1 in which a return port communicates with said bore at a point below the insert but above the said piston to provide means to pass the pressure retained in the valve to a return port.

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