M. DAVIS.

VALVE.

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1,025,517. Patented May 7, 1912.

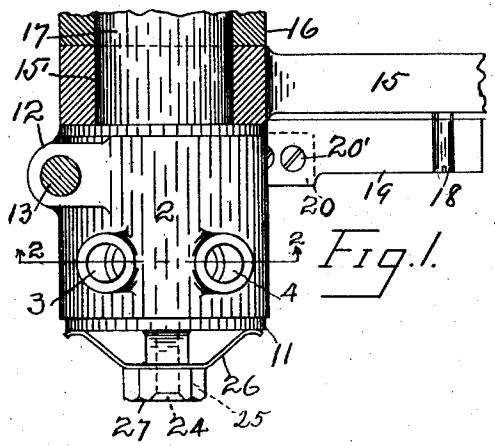

Fig. 1.

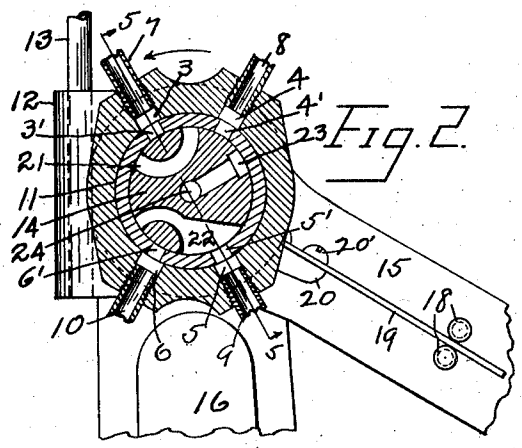

Fig. 2.

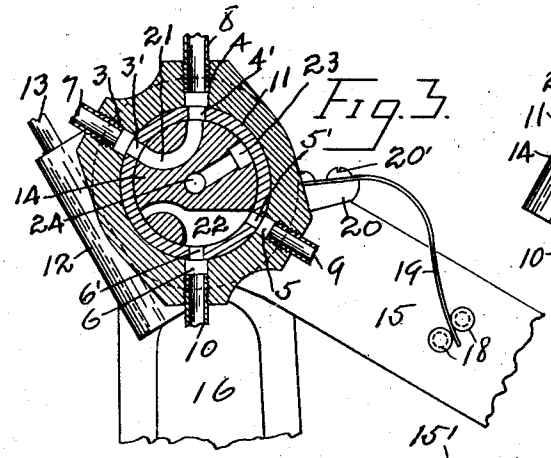

Fig. 3.

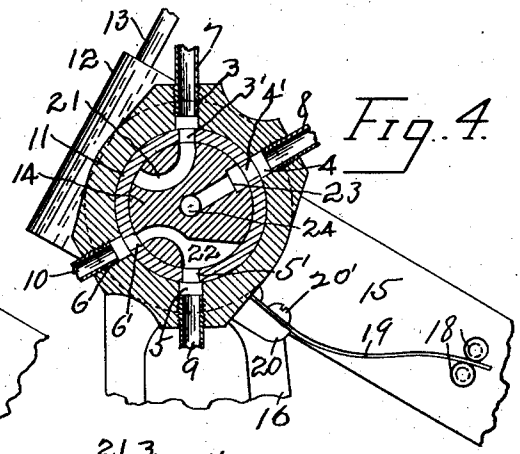

Fig. 4.

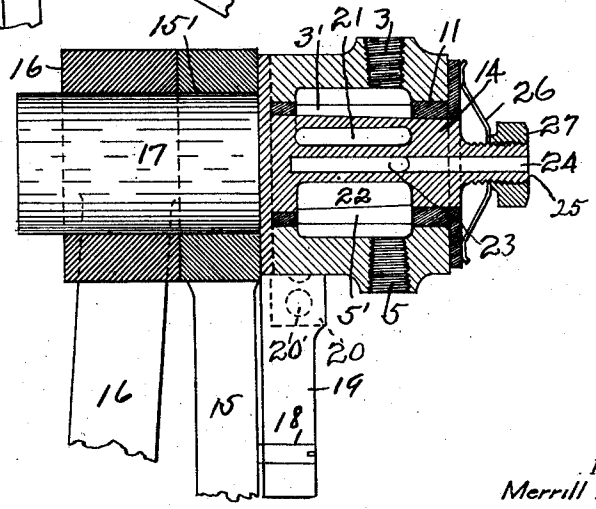

Fig. 5.

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VALVE.

1,025,517. Specification of Letters Patent. Patented May 7, 1912.

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To all whom it may concern:

Be it known that I, MERRILL DAVIS, a citizen of the United States, residing at Watertown, in the county of Jefferson and State of New York, have invented certain new and useful Improvements in Valves, of which the following is a specification.

This invention relates to improvements in valves, designed for use in connection with, and for controlling fluid pressure operated devices of various kinds, and has for its object to provide a novel, simple and convenient double acting valve, wherein the construction and arrangement of its parts are such that, two or more pressure elements, such as air and oil, pass through and are controlled by, the valve during the operation thereof.

A further object is to provide means for automatically governing and closing the valve in case of accident, or in case the operator fails or neglects to attend to or close the same. And a further object is to provide novel means for holding the movable parts in operative connection with, the stationary parts of the valve.

The following description sets forth in detail the various features and parts of the invention, while the accompanying drawing illustrates the construction, arrangement and operation of the same.

Figure 1 is a top plan view of the valve. Fig. 2 is a cross-section taken on line 2—2 of Fig. 1, showing the construction and arrangement of the various parts; also showing the several passages for the different pressure elements, all of said passages being closed. Fig. 3 is a similar view, showing the several pressure passages open. Fig. 4 is a similar view, showing the valve reversed for exhausting the air pressure through a central port; also showing the oil ports open for passage of the liquid. Fig. 5 is a central longitudinal section, taken on the line 5—5 of Fig. 2; showing generally the construction of the valve; also showing the valve operatively connected with parts of another device.

My improved valve consists of the following parts:

2 represents a hollow outer casing or shell, which is provided with threaded radial ports or holes 3, 4, 5 and 6, into which are screwed pipes 7, 8, 9, and 10, employed for conducting fluid pressure or liquid to and from the valve.

11 represents a bushing which is rigidly fitted into the casing 2, the said bushing having a number of longitudinal slots or ports 3′, 4′, 5′ and 6′, which communicate with the respective ports in the casing 2. The casing 2 is provided with a laterally projecting portion 12, which is bored out at right angles to the axis of the casing, to form a socket to receive one end of an operating handle or lever 13, by means of which the casing 2 may be manually operated.

14 represents the inner member or plug of the valve, which is made in the usual tapered form, and is preferably ground into the bushing 11, which is also tapered, so as to make a liquid and air tight fit.

In order to properly and fully describe the functions and operations of my improved valve, it is preferably shown connected to a working part 15, and is supported by a stationary part 16, of a hoist or other fluid pressure actuated device, the part 15 at certain intervals during the operation of the valve being capable of automatically closing the valve, for the purpose of preventing accident or waste. To this end, the inner member 14 is provided with a plain cylindrical hub 17, which is preferably driven tightly into a perforation 15′ of the lever 15, and then passes through the perforated end of the support 16, which is preferably stationary, which serves as a bearing in which the valve and the lever 15 rotate as a center or pivot. The other end of the lever 15 operatively connects with the hoisting mechanism to be operated (not shown) by which the lever is swung on its pivot. The lever 15 is provided with two pins 18, between which one end of a spring 19 is loosely held. The opposite end of the said spring is rigidly attached to a projecting lug 20 of the casing 2, by means of screws 20′. The spring should be strong enough, when under tension, to rotate the casing 2. As the casing 2 is arranged to be operated independently of the plug 14 and the lever 15, when the casing is rotated in either direction, by hand lever 13 the spring 19 will be bent, laterally (as shown in Figs. 3 and 4,) owing to its connection with the casing 2 and the pins 18 of the lever 15, thus giving it a certain amount of tension, which

exerts its power for turning the casing back to the first or closed position, unless the casing is held in the operated position by the manipulation of the hand-lever 13.

Assuming that the pipe 7 connects with some source of air pressure, which it conducts into the valve through the port 3, and that the pipe 8 conducts the air from the valve to a hoist or some other device to be operated, and that the pipes 9 and 10 are employed for conducting a liquid, as oil, to and from the said device, which liquid, for example, serves as a brake or governor for said hoist, by means of its being shifted or forced from one part of said device to another, the rotation of the casing 2 (in the direction indicated by the arrow) from the position shown in Fig. 2 to that shown in Fig. 3, allows the air pressure coming from the pipe 7 to pass through the ports 3 and 3′ into a curved passage 21 of the plug 14, thence out the opposite end of said passage through ports 4′ and 4 into the pipe 8, by which air is carried to the mechanism to be operated. At the same time the casing 2 is so rotated, the oil or liquid carried by pipe 9 (for instance) will flow into and through an irregularly-shaped by-pass or passage 22 of the plug 14, thence outwardly through ports 6′ and 6 into pipe 10, thereupon a movement will be set up in the lever 15, which will cause said lever to rotate or swing around its axis,—which coincides with the center of the valve,—in the same direction as the casing 2 had been rotated by the lever 13. The rotation of the lever 15, it will be understood, is always in after-time as compared with the rotation of the casing 2, the difference in the movements of the casing and lever 15, being controlled by the length of time required for the pressures, after leaving the valve, to actuate the said lever 15. Under this arrangement, however, if the casing 2 is allowed to become stationary in the position shown in Fig. 3, to which it had been rotated by the lever 13, the continuing movement of the lever 15 will, within a short time, through its connection with the inner member 14, shift or rotate the said member in the same direction as the casing had been rotated, and bring the casing and inner member again into the position shown in Fig. 2, which will close the valve against the passage of both the air and the oil. As soon as the valve is closed, in the manner last described, the lever 15 will cease its movement and the whole machinery come to rest, in which event all of the parts will remain inoperative until the casing 2 is again rotated in either direction. In order to prolong the operation of a hoist or other mechanism controlled by the said valve, the operator may, by slowly continuing the movement of the hand-lever 13 in the leftward or downward direction, so time the movement of the casing 2 to the movement of the lever 15, as to prevent the automatic closing of the valve by the said lever 15. In case the operator lets go, or for any reason loses control of the hand-lever 13 during the time the valve is open and supplying the pressures to the mechanism to be operated, either the lever 15, through its connection with the plug 14 or the spring 19, by reason of its connection with the casing 2, will effect the closing of the valve, and thereby stop, or render any mechanism controlled by the valve inoperative. In this way accidents resulting from carelessness or other failure on the part of the operator to maintain his control of the fluid pressure valve will be avoided.

To restore the valve to first position, ready to be operated again, the operator should lift the hand-lever 13, which will rotate the casing 2 in the reverse direction, as from that shown in Fig. 3 to the position shown in Fig. 2, which will close the valve and prevent communication through the several ports of the casing, thereby stopping the flow of both the air and the oil through the passages 21 and 22 of the plug 14. Should the valve be left in the last described position, the mechanism operated by the pressures will merely be stopped, but it will not be restored to its original position, because the air which has passed through the valve has not been exhausted. To exhaust the air pressure for permitting all the parts to be restored to first position ready for subsequent operation, the operator should move the hand-lever 13 still farther to the right, which will rotate the casing 2 from the position shown in Fig. 2 to that shown in Fig. 4, which will bring the ports 4—4′ directly opposite a radial passage 23, which extends from the outer surface of the plug 14 to the center of the plug, where it connects with a longitudinal port 24 which communicates with the atmosphere at the outer end of the plug 14. The shifting of the casing to the last position, allows the air pressure in the pipe 8 to pass through the passages 23 and 24 and become exhausted. The outer end of the port 24 is disposed in a reduced externally threaded hub 25, which projects beyond the casing 2 and the bushing 11. At the same time that the air is being exhausted through the port 24, the oil is allowed free circulation through the pipes 9 and 10 by reason of the ports 5′ and 6′ being held in communication with the by-pass 22. The exhausting of the air pressure will cause the lever 15 to move clockwise relatively to the casing 2 in a gradual manner until it reaches the relative position shown in Fig. 2. During the exhausting of the air pressure and the restoring of the lever 15 to first relative position, (Fig. 2) the operator should maintain his hold upon the hand-lever 13, or else

the spring 19, which, owing to the movement of the casing 2 from the position shown in Fig. 2 to that shown in Fig. 4, has been given considerable tension, will shift the casing back to the left, thus destroying the communication between the pipe 8 and the passage 23, and preventing the complete exhausting of the air pressure, which in turn will hinder the further movement of the lever 15 toward its lowest or starting position.

26 represents a four-point spring, which is employed for holding the casing 2 and its bushing 11 in operative engagement with the tapering portion of the plug 14. The spring 26 is perforated centrally for receiving the threaded hub 25 of the plug, and a nut 27 is employed for holding the said spring in place, and for giving it the desired tension. The tightening up of the nut 27 causes the points of the spring to exert a stronger pressure against the flange of the bushing 11 and thus maintains a pressure tight joint between the plug and the bushing.

Having thus described my invention what I claim as new, and desire to secure Letters Patent, is—

1. A valve, comprising a central body, having a plurality of passages and a cylindrical casing rotatably mounted on one end of said body, said casing having a plurality of inlet and outlet ports adapted to communicate with the said passages when the casing or body is rotated in either direction one relative to the other, means for manually operating said casing for opening and closing the valve, a support for said valve, and a lever rigidly connected to the opposite end of said body and adapted to automatically rotate said body for closing the valve.

2. A valve, comprising a central body, having a plurality of passages, and a cylindrical casing rotatably mounted on one end of said body, said casing having a plurality of inlet and outlet ports adapted to communicate with the said passages when the casing or body is rotated in either direction one relatively to the other, means for manually operating said casing for opening and closing the valve, a support for said valve, a lever rigidly connected to the opposite end of said body, and a spring connecting with said casing and also with said lever adapted to automatically rotate said casing for closing the valve when said means is released.

3. In combination, a rotatable central cylindrical body having one end tapered the other end comprising a plain cylinder, the tapered portion of said body provided with oppositely facing passages, and a radial exhaust passage communicating with the atmosphere by means of a central port, the outer end of said tapered portion having a threaded hub, a rotatable casing mounted on the tapered end of said body, said casing having a number of ports adapted to connect with said passages and said exhaust passage when either the body or the casing is rotated a measured distance one relative to the other, a hand-lever for rotating said casing, means for supporting said central body and a four-pointed spring carried by said hub for holding the casing engaged with the body.

4. In a valve, the combination with a central body provided with passages therethrough and a lever rigidly connected to and movable therewith, and a stationary part for pivotally supporting the body and said lever, of a rotatable casing fitted to one end of said body and having passages therethrough adapted to be brought into communication with the passages through the central body, a spring supported by said body for holding said casing in operative position on said body, a handle for rotating said casing for opening and closing the valve, automatic means for rotating the casing relative to the body or for rotating the body relative to the casing for closing the valve.

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

MERRILL DAVIS.

Witnesses:
CHAS. A. DUNHAM,
F. NORTON.