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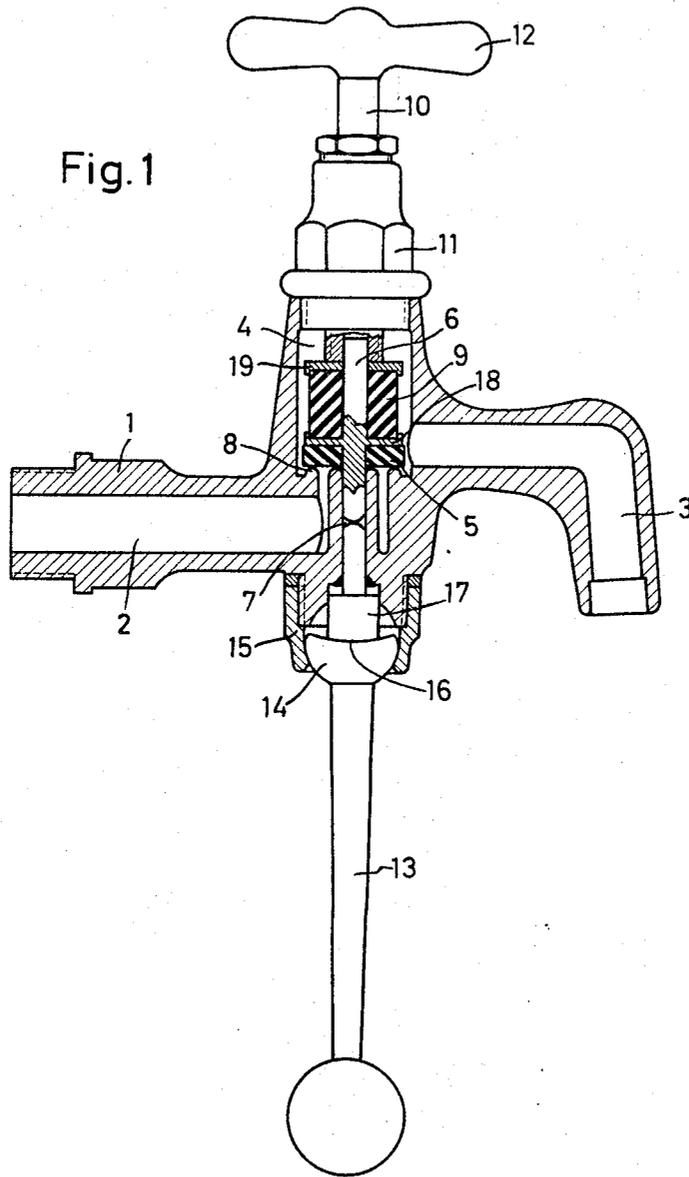
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3,383,087

FLUID DISCHARGE VALVE

Filed May 28, 1965

2 Sheets-Sheet 1



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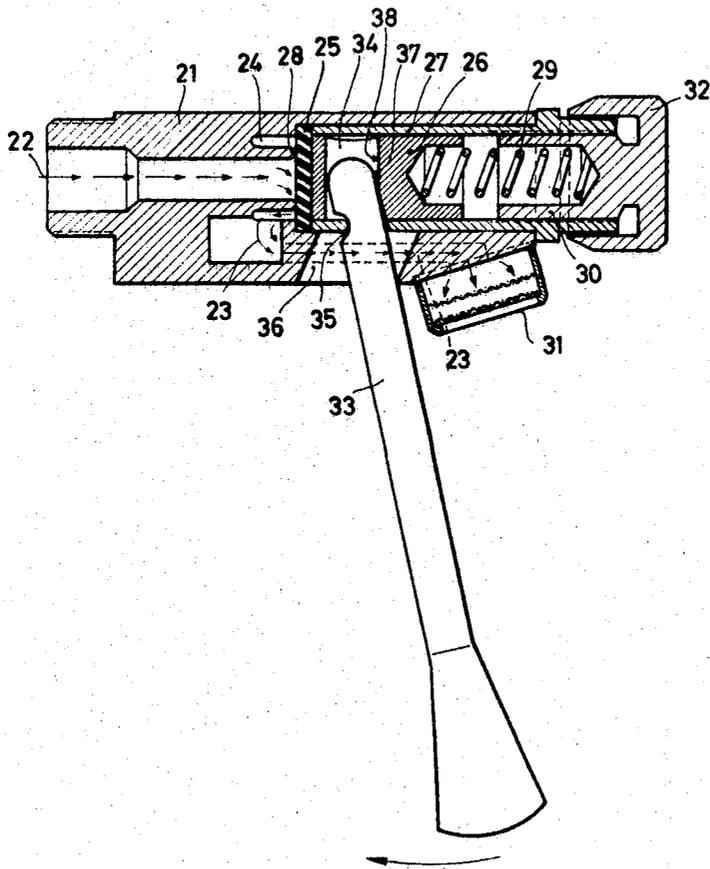
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Fig. 2



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FLUID DISCHARGE VALVE
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ABSTRACT OF THE DISCLOSURE

Fluid discharge valves for drawing water and the like, including a rocking lever actuator and a rotating handle actuator, both operative upon the same valve element and spring means interposed between the valve element and the rotating handle actuator to control the closure bias on the valve element.

This invention relates to a valve, and particularly to a discharge valve for water conduits, having a valve closure piece which is urged onto the valve seat by spring pressure against the direction of current, and two actuating devices which, independently of each other, act to open the closure piece. One of its actuating devices is for manual adjustment of the valve, and the other for mechanical control of the valve. Since its closure piece is pressed onto the valve seat against the direction of current, violent slamming of the closure piece is avoided and thereby harmful water hammer is avoided in the conduit.

The object of the invention is to provide such a valve which is particularly suitable for use as a discharge valve for water conduits, which may be actuated or opened manually as well as by pressure of a container which is to be filled, without substantial use of force, and in which the resilient force employed at any given time for urging the closure piece onto the seat may be easily adapted to the prevailing pressure of the flowing medium. This is achieved in accordance with the invention in that the resilient part acting as the closing spring between the closure piece and the actuating device which consists of a lead screw having a control grip and projecting from the valve housing, and which acts from the discharge side, is in the form of a rocking lever projecting downwardly from the housing.

Thus the discharge valve in accordance with the invention may be actuated in conventional manner manually by rotating the lead screw by its handle; but on the other hand, it may also be opened by urging a container against the rocking lever. After removal of the container from the rocking lever, the latter returns to its starting position whereby the valve is again closed under the action of the spring tension acting on the closure piece.

Discharge valves for water conduits which are actuated by lead screws with a handle and whose closure piece is urged onto the valve seat against the direction of current, have long been known. However, they lack a second actuating device for the closure piece which permits opening of the discharge valve also by a, say, horizontal pressure of a container. On the other hand, water discharge valves are also known which have actuating devices for the closure piece in the form of rocker levers. In one of such known valves, the rocker lever is in the form of a pusher. It projects substantially horizontally from the valve housing and may therefore be actuated only by hand, similarly to the valve spindle of known discharge valves with control grips. Another known water discharge valve has the rocker lever for actuating the closure piece projected substantially vertically downward-

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ly out of the valve housing, so that it may be swung to open the valve as a result of substantially horizontal pressure of a container. This valve however lacks a second actuating device in the form of a lead screw having a handle, so that this valve cannot also be manually opened and closed in conventional manner. With the water discharge valve in accordance with the invention, both manual actuation and actuation by pressure of a container which is to be filled are possible without substantial effort.

Further details and advantages of the invention will result from the following description of the embodiments illustrated in the drawings.

In the drawings:

FIG. 1 is an embodiment in vertical section with a vertical lead screw;

FIG. 2 is a further embodiment in vertical section with a horizontal lead screw.

In the embodiment shown in FIG. 1, the valve housing 1 has an inlet compartment 2 and an outlet compartment 3, for the water which is to be taken from the conduit. Between them, there is an enlarged chamber 4 in which the closure piece 5 is movably disposed. This closure piece sits on a guide rod 6 which extends into a bore 7 of the valve housing 1 and reciprocates together with the closure piece secured thereto. The valve seat 8 is formed by an edge of the chamber 4 at the mouth of the water conduit 2.

The closure piece 5 is positioned adjacent a resilient part 9 which also sits on the guide rod 6. The upper end of said resilient piece 9 disposed opposite the closure piece 5 is connected to the spindle 10 which is supported in a nut body 11 screwed to the valve housing 1 and may be screwed to and fro therein. The end of the lead screw disposed outside the valve housing is provided with a handle 12. The closure piece 5 may be urged onto the valve seat 8 by turning forward and backward, the resilient part 9 being compressed so that its spring tension corresponds at least to the water pressure in the conduit 2 acting against this force.

A rocking lever 13 projects downwardly from the valve housing 1 and its shaft, disposed in the valve housing, is equipped with a ball cup-like enlargement 14. This enlargement is supported in a correspondingly shaped bearing cup 15 in the valve housing and is tiltable by swinging out the rocking lever. A push rod 17 sits on the concave inside 16 of the ball cup-like enlargement of the lever end and projects into the bore 7 of the valve housing in which the guide rod is movable up and down and carries the closure piece 5.

By swinging the rocking lever 13 which projects downwardly from the valve housing 1, the push rod 17 is raised and simultaneously the push rod moves the guide rod 6, and thereby the closure piece secured thereto, upwardly while further compressing the resilient part 9. Thereby the closure piece which is connected to the guide rod is lifted off the valve seat 8, thus ensuring flow of water from the conduit 2 into the valve chamber 4 and thence into the discharge conduit 3. The valve is open.

Swinging-out of the rocking lever 13 may be accomplished by hand or by pressure of a container which has been brought underneath the outlet of the valve and is to be filled with water. When the rocking lever is released, the resilient part 9 again urges the guide rod 6 downward until the closure piece 5 comes to sit on the valve seat 8 and closes the valve. This returns the push rod 17 and the rocking lever 13 also into their starting position.

The resilient part 9 is inserted between two pressure plates 18 and 19, the lower plate 18 being secured to the guide rod 6, while the upper plate 19 sits on the spindle 10 and is moved up and down on the guide rod 6 when the spindle is rotated, causing tensioning and relaxing, respectively, of the resilient part. By screwing the spindle 10 sufficiently high, the resilient part 9 can be relaxed so that the water pressure prevailing in the feed conduit lifts the closure piece from the valve seat even without actuation of the guide rod 6 by the push rod 17, by means of the rocking lever 13. Thus, the valve illustrated by way of example may be opened and closed in conventional manner by unscrewing or screwing-tight of the lead screw without having to use the rocking lever.

Since it is sufficient for the spring tension of the resilient part 9 to be only insignificantly greater than that of the counteracting water pressure, extraordinarily easy actuation of the valve is possible with the least effort. Further, the length of the rocking lever 13 ensures a lever-like transmission of the oscillating force.

In the embodiment illustrated in FIG. 2, the valve housing 21 which is provided with an inlet conduit 22 and a discharge conduit 23 contains a fixed cylindrical sleeve 27 by which the membrane 25 serving as the closure device is inserted in the enlarged chamber 24 of the housing 21. The membrane is urged against the annular valve seat 28 by a piston 26 which is axially displaceable in the cylinder sleeve 27, thus closing the feed conduit 22 against the discharge conduit 23. The required pressure of the piston 26 is generated by a resilient element in the form of a helical spring 29 which is supported on the one hand against the piston in a recess thereof and, on the other hand, against a lead screw 30 which has a bore for receiving the spring and may be screwed with an outside screw thread on the inner thread of the sleeve 27 which projects slightly from the valve housing 21. For easy screwing and unscrewing of the spindle 30 in the sleeve 27, the spindle is provided on its outer end with a control grip 32.

The piston 26 has a further recess 34, a rocking lever 33 engaging therein with its inner end. This rocking lever is swingably supported in a bore 35 of the sleeve 27 and emerges downwardly out of the housing 21 through a slit 36 in said housing. The discharge conduit 23 skirts this slit laterally.

By suitable screwing and unscrewing of the spindle 30 by means of the control grip 32, pressure of the piston 26 on the membrane 25 in the direction opposite to that of the force exerted by the water pressure may be increased or decreased or cancelled, whereby the water flow valve may be adjusted in conventional manner. In addition to such adjustment by means of the control grip 32, however, it is possible to open the valve by means of the rocking lever 33 in that the rocking lever is oscillated about its fulcrum in the direction of the arrow, in the aperture 35 of the sleeve 27. This urges the surface 37 of the rocking lever against the surface 38 of the recess 34 in the piston 26, thereby lifting the piston from the membrane 25 against the force of the helical spring 29. The water pressure in the feed conduit 32 which acts in the opening direction, lifts the membrane 25 from the valve seat 28 and water is thereby caused to emerge from the valve through the discharge conduit 23 leading to the spout 31.

The discharge valve for water conduits in accordance with the invention ensures still further considerable advantages. As explained in the introduction, an important advantage consists in that in order to actuate the valve, it is no longer necessary to manually turn a control grip to and fro. The valve is opened by pressing the container which is to be filled, for example, saucepan, drinking glass, cup, and the like, against the rocking lever. This makes it possible to hold the container with both hands during filling. This is of considerable importance particularly in the case of large pots or the like with two oppositely disposed lateral handles which cannot con-

veniently be held with one hand, at least not when they are nearly filled with water. Neither is a manual operation necessary for closing the valve, since release of the rocking lever by the container automatically returns the closure piece into its closing position.

A further important advantage of the discharge valve described above resides in that it ensures considerable economy of water. As soon as the container is removed from the rocking lever after having been sufficiently filled, the valve is immediately closed automatically. Also when washing hands or body, there is considerable economy of water, since water only flows from the valve so long as the hands touch the rocking lever. After washing the hands it is thus no longer necessary, as heretofore, to touch the tap with the cleaned hands, thus also ensuring better hygiene.

I claim:

1. In a valve of the class described, housing means defining a passageway for the flow of fluid therethrough, a valve seat and a closure member in said passageway, said closure member being adapted to cooperate with said seat to close said passageway, a first actuating member adjustable to fixed positions on said housing and operable from the discharge side of said seat for controlling the position of said closure member relatively to said seat, biasing means positioned between said actuating member and said closure member, and a second actuating member freely movable on said housing and connected to said closure member for pressing same against said biasing means and out of contact with said seat, said second actuating member extending substantially in the direction of discharge of said passageway whereby smooth and convenient actuation of said valve may be obtained by pressure on said second actuating member from an object receiving the valve discharge.

2. In a valve of the class described, housing means defining a passageway for the flow of fluid therethrough, a valve seat and a closure member in said passageway, said closure member being adapted to cooperate with said seat to close said passageway against the direction of flow, a first actuating member comprising a lead screw operable from the discharge side of said seat for controlling the position of said closure member relatively to said seat, resilient means positioned between said actuating member and said closure member, and a second actuating member comprising a rocker arm operable from the inlet side of said seat independently of said first actuating member to press said closure member against said resilient means and out of contact with said seat, said rocker arm extending substantially in the direction of discharge of said passageway whereby said valve may be smoothly and easily operated by pressing an object receiving said discharge against said rocker arm.

3. In a valve of the class described, means defining a passageway for the flow of fluid therethrough, a valve seat and a closure member in said passageway, said closure member being adapted to cooperate with said seat to close said passageway, a first actuating member comprising a lead screw operable from the discharge side of said seat for controlling the position of said closure member relatively to said seat, piston means between said closure member and said lead screw, spring means urging said piston towards a valve closing position on said seat and said closure member, said closure member being positioned between said piston and said seat, and a second actuating member comprising a rocker arm operable to press said piston against said spring means and out of contact with said closure member.

4. A valve according to claim 3, wherein said piston means has a recess and said rocker arm engages said piston means in its recess, whereby when swung in one direction, said arm displaces said piston means in valve opening direction.

5. In a valve of the class described, a housing, a passageway in said housing for the flow of fluid therethrough,

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a valve seat and a closure member in said passageway, said closure member being adapted to cooperate with said seat to close said passageway, a first actuating member operable from the discharge side of said seat for controlling the position of said closure member relatively to said seat, resilient means positioned between said actuating member and said closure member, a reciprocable guide rod, said closure member and resilient means being supported on said guide rod, a rocker arm operable through said guide rod to press said closure member against said resilient means and out of contact with said seat and a push rod positioned between said rocker arm and guide rod whereby said rocker arm is effective to displace said push rod and thus said guide rod to shift said closure member against the face of said resilient means.

6. A valve according to claim 5, wherein the rocker arm has a ball cup extension supported within the housing, the concave surface of said cup extension engaging said push rod, and a bearing cup formed in the housing for tiltably supporting said rocker arm extension.

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