

Sept. 8, 1931.

H. F. STEVENS

1,821,992

VALVE

Filed June 2, 1930

2 Sheets-Sheet 1

Fig. 1.

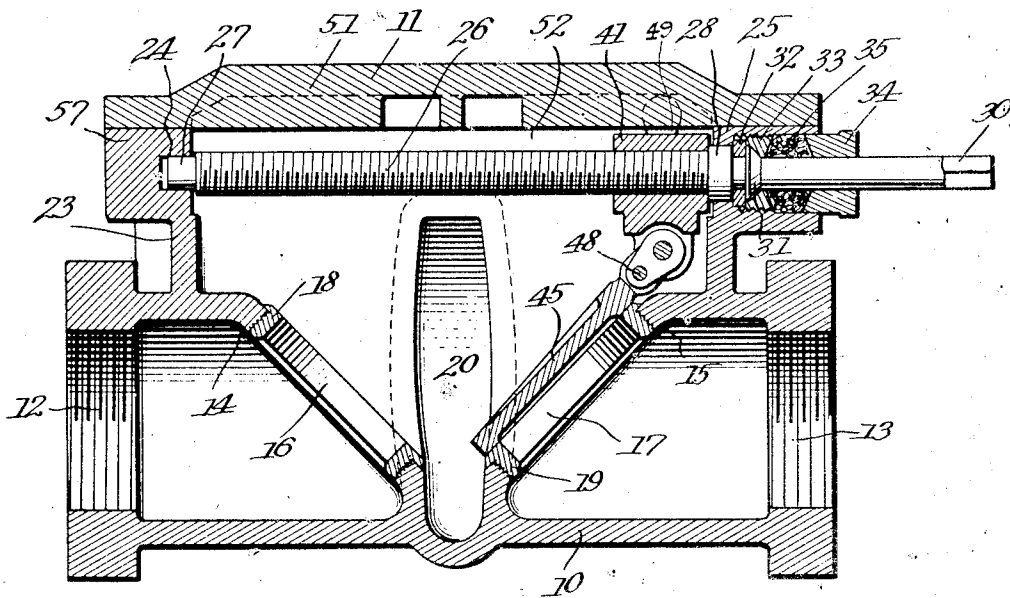
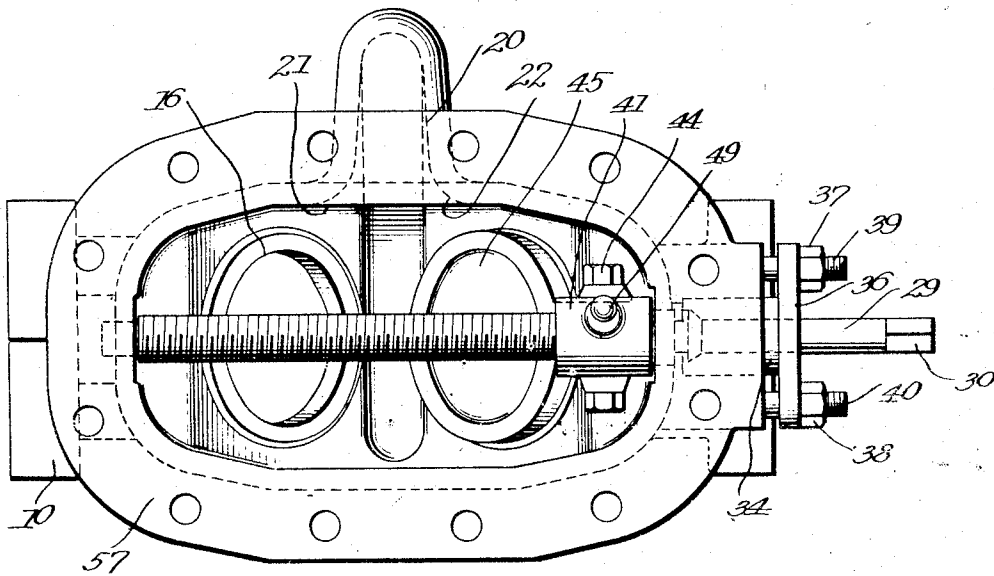


Fig. 2.

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Fig. 3.

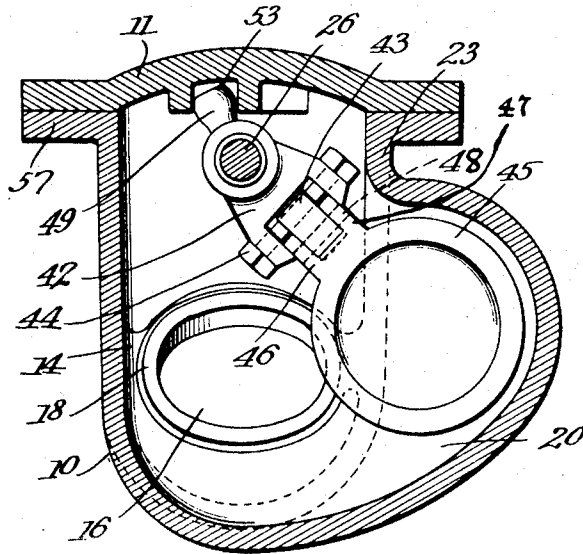
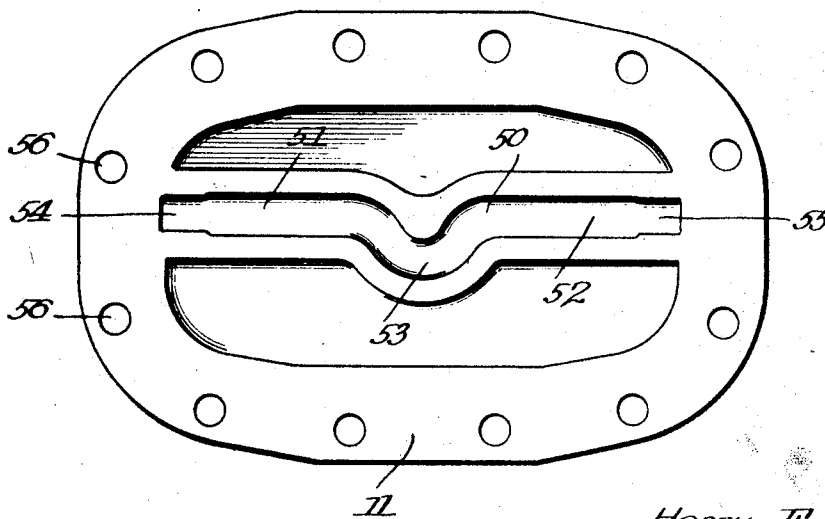


Fig. 4.



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UNITED STATES PATENT OFFICE

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VALVE

Application filed June 2, 1930. Serial No. 458,942.

The present invention relates to a check valve, preferably of the two-way type. According to the embodiment of the invention to be hereinafter described with reference to the attached drawings, the valve comprises a casing having a pair of opposed ports and a closure plate or flap adapted to travel between the ports to selectively cooperate with them, flow being permitted in one direction or the other.

As a further and important feature of the invention, means are provided to displace the flap laterally at a point intermediate the two ports so as to leave an unobstructed path between the latter and to permit flow in either direction.

Without going further into the general characteristics of the invention, I shall proceed to describe a preferred embodiment thereof, this embodiment being illustrative and by no means restrictive of the invention.

In the drawings:

Figure 1 is a plan view of the valve with the cover removed,

Figure 2 is a longitudinal axial section of the valve,

Figure 3 is a central transverse section of the valve, and

Figure 4 is a plan view of the inner side of the casing cover.

Referring to the drawings, the valve comprises a casing including a body 10 and a cover 11, the body is here shown being provided with coaxial openings 12 and 13 internally threaded to be engaged in a pipe line. Interior partitions 14 and 15 are inclined at about a 45° angle to the axis of openings 12 and 13 and in them are formed ports 16 and 17 provided with ring seats 18 and 19.

In use the valve will ordinarily occupy the position shown in Figure 2, that is, with the axis of openings 12 and 13 substantially on the horizontal and with seats 18 and 19 lying in upwardly divergent planes, and for convenience of description, the valve will be assumed to be in this position. It will be understood, however, that

the valve is capable of being otherwise disposed.

Intermediate the seats 18 and 19 the valve body is provided with a relatively narrow vertically elongated offset recess 20, the bounding margins 21 and 22 of the recess being curved in the manner shown in Figure 1. The valve body also has an upwardly extending neck portion 23 in which is journaled in bearings 24 and 25 a screw shaft 26, the axis of this shaft being coplanar with the intersecting axes of ports 16 and 17 and lying at right angles to a line bisecting the intersecting angle of the last named axes. In other words, the axis of shaft 26 as here shown is parallel to the axis of openings 12 and 13.

Shaft 26 has a reduced portion 27 engaged in bearing 24 and an expanded flange 28 engaged in bearing 25, the flange projecting inwardly of the casing somewhat beyond the bearing. Shaft 26 is also provided with a shank 29 projecting outwardly of the casing and provided with a squared end 30 adapted to be engaged by a wrench or hand wheel. Formed on shank 29 outwardly of and in spaced relation to flange 28 is a conical circumferential flange 31 and intermediate the two flanges is disposed a split ring 32 which is seated on the outer face of bearing 25, and held thereagainst by a ring nut 33 which also has an interior conical face complementary to and engaging over conical flange 31. Nut 33 is engaged in a bore coaxial with bearing 25 and within the bore between the conical outer face of nut 33 and a gland 34 is placed a packing 35; the gland having a yoke 36 engaged by nuts 37 and 38 on stud bolts 39 and 40.

Mounted on screw shaft 26 for reciprocating movement thereon is a traveler member or nut 41 provided with a knuckle 42 in which is engaged one end of a link 43 by means of a pivot bolt 44. A closure plate or flap 45 has a pair of ears 46 and 47 fitting closely in knuckle 42 between the walls of the latter and link 43, but free of bolt 44. The opposite end of link 43 is pivoted on a pin 48 parallel to bolt 44, the axes of both pivot elements lying in a plane

normally perpendicular to the plane of the axes of ports 16 and 17. On the upper side of nut 41 is formed or mounted a projection 49 having a substantially ball shaped extremity engaged in a groove 50 formed in the inside of the cover plate 11, the form of this groove being clearly shown in Figure 4. As will be seen from this figure, groove 50 comprises end portions 51 and 52 which are in alignment and are parallel to shaft 26. The groove also comprises an intermediate portion 53 which is laterally offset. The main portion of groove 50 is of somewhat greater width than the head of projection 49 in order to allow the latter to move freely therealong. The extremities of the groove, however, are somewhat constricted as at 54 and 55 so that its sides closely confine the projection to prevent oscillation of the latter about shaft 26. It will be noted that projection 49 is somewhat inclined to the vertical, Figure 1, in order that groove 50 may occupy a substantially balanced relation to the cover plate. The margins of the cover plate are provided with a plurality of apertures 56 adapted to register with apertures formed in a flange 57 of the body and to receive bolts to secure the parts together.

From the above it will be understood that by rotating shaft 26 nut 41 may be moved from one extremity of the shaft to the other. In the right hand position of the nut shown in Figure 2 it abuts the journal collar 25 and flap 45 is seated on ring 19. In this limit position of the nut projection 49 is in the constricted portion 55 of groove 50 so that accurate register of the flap is secured while the link connection of the flap to nut 41 cooperates in assuring a perfect seating. In this position of parts flow is permitted through opening 13 as an inlet, while reverse flow is prevented.

By proper rotation of shaft 26 nut 41 and therewith the flap may be moved to the left, Figure 2. However, when projection 49 enters the offset portion 53 of groove 50 the flap is swung to the right, as shown in Figure 3, into recess 20 so as to be out of the direct line of flow between the two ports. Flap 45 is freely pendant on nut 41 and is thus free to oscillate back and forth during the travel of the nut. The bounding margins 21 and 22 of the recess, however, are designed to cam the flap in between the walls of the recess, regardless of the angular position of the flap. Continued movement of the nut to the left, Figure 2, will bring projection 49 eventually into the constricted portion 54 wherein the flap is seated on ring 18, nut 41 abutting bearing 24.

It will be seen that I have provided an extremely simple and effective structure adapted to take care of a number of contingencies in flow control. Hereofore each of

the functions performed by the new valve has been performed by a separate instrumentality or a number of separate instrumentalities. For example, in practice it has been customary to provide entirely separate valves in order to effect two-way control and a by-pass line with the necessary control valves has been provided for the purpose of cutting the check valves out of the main line. According to the improved valve of the present invention, however, two-way stop control is provided for in a single casing, and if no such control is required, the valve is adapted to permit unimpaired flow.

While I have necessarily shown and described a specific embodiment of my invention, it is to be understood that I do not limit myself to structure except as determined in the following claims.

I claim:

1. In a valve, a casing, a port in said casing, a closure plate for cooperation with said port, and means for moving said plate toward and away from said port, comprising a rectilinearly movable member to which said plate is connected, an interior portion of said casing having a guide groove adapted to be engaged by a projection on said movable member, said groove having a portion parallel to the line of movement of said member to register the plate with the port as the former moves toward the latter and an offset portion to cause said member and therewith said plate to swing about said line of movement as an axis as the member moves away from the port.

2. In a valve, a casing, a port in said casing, a rotatable screw shaft journaled in said casing on a horizontal axis coplanar with the axis of the port, a nut on said shaft reciprocable thereby, and a closure plate for cooperation with said port and freely pivotally suspended from said nut on an axis perpendicular to the plane of the shaft and port axes to travel with said nut, said nut having a projection engaging a guide groove formed on an interior casing surface to guide said plate into register with said port.

3. In a valve, a casing, a port in said casing, a rotatable screw shaft journaled in said casing on an axis coplanar with the axis of the port, a nut on said shaft reciprocable thereby, and a closure plate for cooperation with said port and connected to said nut to travel therewith, said nut having a projection engaging a guide groove formed on an interior casing surface to guide said plate into register with said port, the terminal portion of the groove in the closing direction of the nut being constricted as compared to the adjacent portion of the groove to closely confine said projection.

4. In a valve, a casing, a port in said casing, a rotatable screw shaft journaled in said casing on an axis coplanar with the

axis of the port, a nut on said shaft reciprocable thereby, and a closure plate for cooperation with said port and connected to said nut to travel therewith, said nut having a projection engaging a guide groove formed on an interior casing surface to guide said plate into register with said port, said groove having an offset portion adapted to swing the nut and therewith the closure plate about the axis of said screw shaft as the nut moves in opening direction.

5. In a valve, a casing, a port in said casing, a rotatable screw shaft journaled in said casing on an axis coplanar with the axis of the port, a nut on said shaft reciprocable thereby, and a closure plate for cooperation with said port and connected to said nut to travel therewith, said nut having a projection engaging a guide groove formed in the casing interior, said groove having a portion parallel to the screw shaft to register the plate with the port as the former moves toward the latter and an offset portion to cause said nut and therewith said plate to swing about said shaft as the nut moves away from the port.

6. In a valve, a casing, a pair of opposed ports in said casing, the axes of said ports intersecting upwardly, a member reciprocable on a straight line above said ports coplanar with said axes and perpendicular to a line bisecting the intersecting angle of the latter, and a closure flap pivotally depending from said member for travel therewith and adapted to selectively cooperate with said ports.

7. In a valve, a casing, a pair of opposed ports in said casing, the axes of said ports intersecting upwardly, a member reciprocable on a line above said ports coplanar with said axes and perpendicular to a line bisecting the intersecting angle of the latter, a closure flap pivotally depending from said member for travel therewith and adapted to selectively cooperate with said ports, and means to swing said member and therewith said flap about said line as an axis as said member travels between said ports.

8. In a valve, a casing, a pair of opposed ports in said casing, the axes of said ports intersecting upwardly, a member reciprocable on a line above said ports coplanar with said axes and perpendicular to a line bisecting the intersecting angle of the latter, a closure flap pivotally depending from said member for travel therewith and adapted to selectively cooperate with said ports, and means engaging said member during its travel between said ports to swing said member and therewith said flap about said line as an axis.

9. In a valve, a casing, a pair of opposed ports in said casing, the axes of said ports intersecting upwardly, a screw shaft journaled in said casing above said ports, the

axis of said screw shaft being coplanar with the axes of said ports and perpendicular to a line bisecting the intersecting angle of the latter, a nut on said shaft and reciprocable thereby, and a closure flap pivotally depending from said nut for travel therewith and adapted to selectively cooperate with said ports.

10. In a valve, a casing, a pair of opposed ports in said casing, the axes of said ports intersecting upwardly, a screw shaft journaled in said casing above said ports, the axis of said screw shaft being coplanar with the axes of said ports and perpendicular to a line bisecting the intersecting angle of the latter, a nut on said shaft and reciprocable thereby, and a closure flap pivotally depending from said nut for travel therewith and adapted to selectively cooperate with said ports, the casing comprising a top portion having a guide groove formed on the inner side thereof and engaged by a projection on said nut to guide the flap into register with said ports.

11. In a valve, a casing, a pair of opposed ports in said casing, the axes of said ports intersecting upwardly, a screw shaft journaled in said casing above said ports, the axis of said screw shaft being coplanar with the axes of said ports and perpendicular to a line bisecting the intersecting angle of the latter, a nut on said shaft and reciprocable thereby, and a closure flap pivotally depending from said nut for travel therewith and adapted to selectively cooperate with said ports, the casing comprising a top portion having a guide groove formed on the inner side thereof and engaged by a projection on said nut to guide the flap into register with said ports, said groove having an intermediate offset portion to cause the flap to swing about the axis of said shaft out of the direct path between the two ports.

12. In a valve, a casing, a pair of opposed ports in said casing, the axes of said ports intersecting upwardly, a screw shaft journaled in said casing above said ports, the axis of said screw shaft being coplanar with the axes of said ports and perpendicular to a line bisecting the intersecting angle of the latter, a nut on said shaft and reciprocable thereby, and a closure flap pivotally depending from said nut for travel therewith and adapted to selectively cooperate with said ports, the casing comprising a top portion having a guide groove formed on the inner side thereof and engaged by a projection on said nut, said groove having end portions parallel to said shaft to guide the flap into register with said ports and an intermediate offset portion to cause the flap to swing about the axis of said shaft out of the direct path between the two ports.

13. In a valve, a casing, a port in said casing, a closure flap freely pendulous on an

axis extending transversely of the port and movable toward and away from said port, said flap being swingable out of register with the port, said casing having a relatively narrow recess adapted to receive said flap when it is swung, the bounding margins of the recess being shaped to cam the flap to position between the recess walls regardless of its angular position relative thereto.

10 14. In a valve, a casing, a port in said casing, a closure plate for cooperation with said port, means for moving said plate away from said port comprising a rectilinearly movable member engaged with the plate, and

15 means for swinging said plate about the line of movement of said member as an axis to move the plate out of overlying relation to the port, said plural means being operable in positively enforced reverse sequence

20 to seat the plate on the port.

In testimony whereof I have hereunto set my hand.

HARRY F. STEVENS.

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