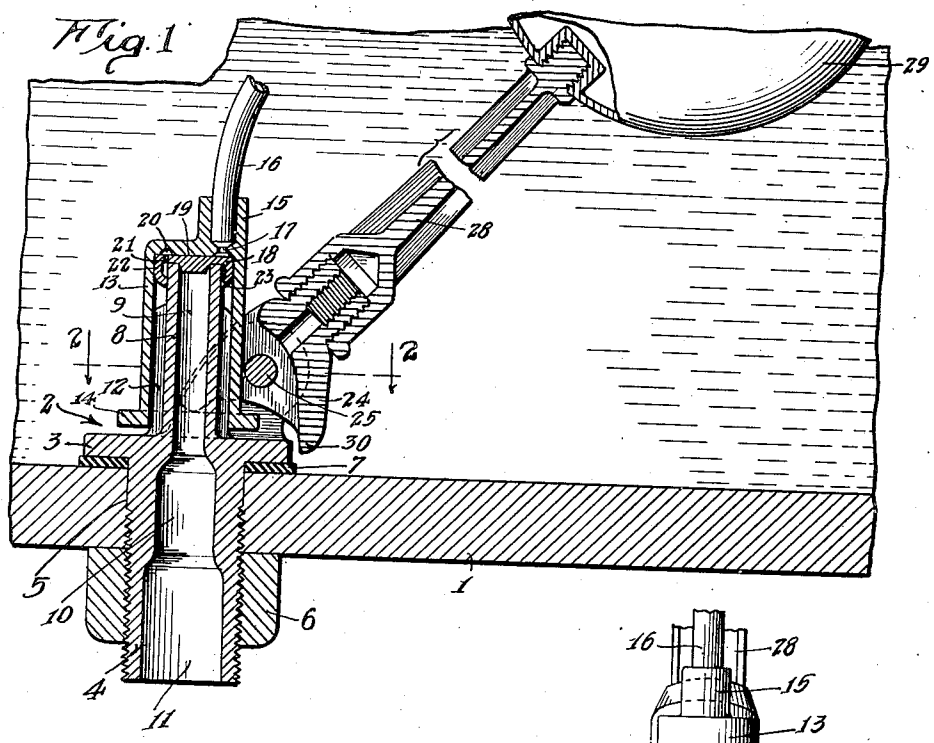
Jan. 23, 1945. H. B. LEWIS ET AL 2,367,951

BALL COCK

Filed May 21, 1943

Fig. 1



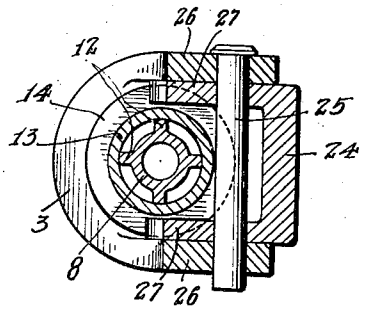


Fig. 2

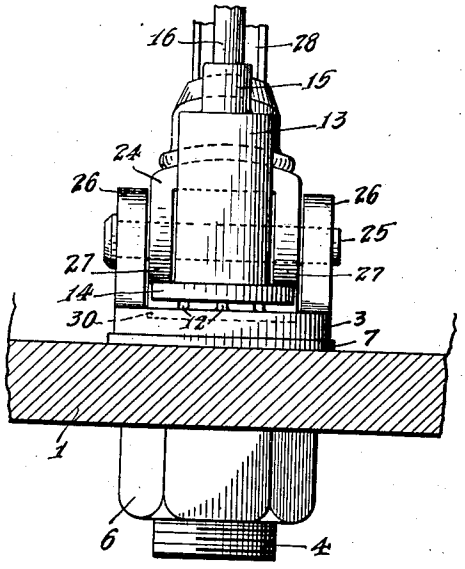


Fig. 3

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Patented Jan. 23, 1945 2,367,951

UNITED STATES PATENT OFFICE

2,367,951

BALL COCK

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Application May 21, 1943, Serial No. 487,906

6 Claims. (Cl. 137—104)

This invention relates to float actuated valves and more particularly to a "ball cock" adapted for controlling the admission of water to a flush tank utilized for flushing a toilet.

It is an object of this invention to produce a ball cock applicable for use in water tanks for controlling the admission of water to a flush tank for flushing toilets and which includes anti-siphoning means.

It is another object of this invention to provide a ball cock controlling the admission of water to a flush tank which is of such design as to be susceptible of manufacture from non-critical materials as, for example, plastics and the like.

Another object of this invention is to provide a ball cock controlling the admission of water to a flush tank which includes an admission tube, a cap member slidably mounted over the tube having at its lower end an actuating flange and a forked actuating member adapted to engage the flange on diametrically opposed points for actuating the cap with reference to the tube.

Other objects and advantages of this invention it is believed will be apparent from the following detailed description of a preferred embodiment thereof as illustrated in the accompanying drawing.

In the drawing:

Figure 1 is a sectional elevation of a ball cock embodying my invention illustrating the same as adapted to a fragment of a flush tank.

Figure 2 is a sectional view taken substantially on the line 2—2 of Figure 1.

Figure 3 is a side elevation of the ball cock embodied in my invention, the view being from left to right as the ball cock is viewed in Figure 1.

In the preferred embodiment of our invention as illustrated in the accompanying drawing, 1 indicates a fragment of a flush tank to which the body 2 of the ball cock is secured. The body 2 includes a supporting flange 3 adapted to be sealed against the bottom of the tank 1 and from which there is extended a shank 4 which extends through the aperture 5 of the tank 1. Threaded to the shank 4 is a nut 6 which presses a washer or gasket 7 against the surface of the tank 1 to maintain a fluid-tight connection. The shank 4 extends beyond the nut 6 and provides the means for coupling the flush valve to the water supply line. The body 2 is formed also with an upstanding tube 8 which extends upwardly from the flange 3 within the interior of the tank 1.

The axial passage through the tube 8, flange 3 and shank 4 is of downwardly increasing size as indicated at 9, 10 and 11, to provide a core section which permits the easy withdrawal of the core. This permits the body of the ball cock to be easily cast of plastics or other suitable material eliminating the use of critical brass in its construction.

The exterior of the tube 8 is formed with longitudinally extending guides 12 which extend radially outward from the tube and provide guide members for guiding the cylindrical valve cap 13.

The valve cap 13 may likewise be cast of similar non-critical materials and is cast to provide an annular flange 14 at its lower end and an anti-siphon branch 15 at its upper end. The branch 15 is cored to receive an anti-siphon conduit and filling tube 16 which extends upward in the tank 1 above the overflow stand pipe in the water tank. The coring of the branch 15 terminates through a port 17 into the interior of the cap 13 above the closure valve 18. The closure valve 18 is of cup construction and is suitably secured to the upper wall 19 of the cap 13. An annular recess 20 is formed in the upper wall 19 above the valve member 18 and a port 21 is formed through the upper or horizontal branch of the valve member 18 providing communication with the annular recess 20.

The valve member 18 has a downwardly extending cup skirt 22 which is turned inwardly at its lower end 23 to engage the outer periphery of the tube 8. Means are provided for actuating the cap 13 to and from closing position, which means as herein illustrated includes a fork 24 which is pivotally mounted on a rod 25. The rod 25 is secured in position between the ears 26 cast to extend upwardly from the flange 3 of the body 2. The fork 24 has a pair of bearing feet 27 which are adapted to engage the upper surface of the actuating flange 14 of the cap 13. The feet 27 engage this flange on diametrically opposed points.

Carried by the fork 24 is a rod 28 to the free end of which is secured an ordinary float ball 29 of any suitable or desirable construction. The float ball 29 as illustrated in Figure 1 is broken away but, as is well understood in this art, is a complete fluid-tight ball so that it will float partially submerged in the water in the flush tank 1.

The mode of operation of the ball cock embodying our invention is: Assuming the flush tank 1 filled with water, the flush tank discharge valve (not shown but of any suitable construction) is opened to empty the tank 1, permitting the float

ball 29 to drop, lifting the pressure feet 27 away from the flange 14. The pressure of the water from the supply line, acting against the cap 13, raises the cap 13, admitting water over the top of the tube 8, past the flexible skirt 22 and downwardly between tube 8 and cap 13, into the tank 1. When the tank is full, the float ball 29 is raised to the surface of the water and the feet 27, bearing on the flange 14, return the cap 13 to position to engage the valve member 18 with the end of the tube 8 stopping further inflow of water. The fork 24 has a foot 30 which limits the downward movement of the ball 29 by engagement with the flange 2, so that the cap 13 can not be lifted off from the tube 8.

In the event of the development of a vacuum in the water supply line connected with the passage 11, back-siphoning of water from the tank 1 is prevented, even though the ball 29 may be in a lowered position in the tank 1 because the lower end 23 of the skirt 22 prevents water from reaching the valve as the vent provided through the port 21 breaks the vacuum by allowing air to pass into supply line 11 through vent and filling tube 16, passage-way 17, and recessed groove 20. The vent and filling tube 16 also serves in the filling of the toilet bowl. As is well understood in this art, when the toilet is flushed, the tank ball (not shown) drops into a valve seat at the bottom of the tank, and cuts off the flow of water to the bowl. The siphon action of the trap often draws so much water out of the bowl that the water seal in the trap is broken. The tube 16 then provides the means for admitting water into the bowl to refill the trap, the water passing up through the tube 8 and through the port 21, annular recess 20, and port 17, into and through the filling and vent tube 16, while the main stream of water is filling the tank 1 as described in the preceding paragraph.

It will be observed that the distance of movement of the valve 18 upward from the end of the tube 8 is controlled by the limiting foot 30 of the fork 24, so that the cup 22 can not pass off from the end of the tube 8. As the cup is formed of flexible rubber or like material, it will flex to permit and restrict flow as hereinabove defined.

Having fully described our invention, it is to be understood that we do not wish to be limited to the details herein set forth, but our invention is of the full scope of the appended claims.

We claim:

1. In a ball cock, the combination of a body having a tubular extension, a cap member adapted to slide longitudinally of the tubular extension, guide members interposed between the cap and the tube, a cup valve member carried by the cap in position to engage the end of the tube, the cap member having an anti-siphon connection, an anti-siphon tube connected with the connection, port means connecting the tube with the interior of the valve cup member, and the valve cup member having an inwardly turned edge adapted to be engaged on the periphery of the tube under the force of fluid within the fluid passage between the cap and the tube.

2. In a ball cock member, the combination of a body having a tubular extension extending therefrom, a closure cap fitted over the tube and adapted to move longitudinally with relation thereto, guide members between the cap and the tube for guiding the cap, a cup valve member carried by the cap to engage the end and the adjacent sides of the tube, anti-siphon means connected with the cap member and being vented through said cup valve member into the interior thereof, and means for actuating the cap member, said means including means for limiting the extent of travel of the cap member along the tube.

3. In a device of the class described, the combination of a body having a tubular extension, a cap member adapted to slide longitudinally of the tube extension, guide members interposed between the cap and the tube, a cup valve member carried by the cap in position to engage the end of the tube, an anti-siphon tube extending from said cap member, port means connecting the tube with the interior of the cup valve member and with the space between the cap and the tubular extension, and the valve cup member having an inwardly turned edge adapted to engage the periphery of the tubular extension to seal said tubular extension against back flow of fluids through the passageway between said cap member and the exterior of said tubular extension.

4. In a device of the class described: a body structure adapted to be connected with a water supply line and including an upright discharge tube and journal elements forming a fulcrum axis located at one side of said discharge tube; a cap fitting over said discharge tube, movable up and down thereon, and defining therewith a downwardly opening annular discharge passage, said cap including a bottom flange; a float-actuated operating lever journaled by said journal elements, said lever including a pair of feet movable as said float is elevated to engage said bottom flange and depress said cap on said discharge tube, and a stop element engageable with said body structure as said float is lowered to limit through said feet the raising of said cap member; and a dual valve element within said cap adapted to seal against the end of said discharge tube and against the side walls thereof, said valve element including anti-siphon ports between its sealing connections with said discharge tube.

5. In a valve structure: a discharge tube; a cap fitting over and movable up and down on said discharge tube and forming therewith an annular discharge passage; and a dual valve element within said cap including a first seal means adapted to seal against the end of the discharge tube and a second seal means adapted to close said annular discharge passage against back flow therethrough; and anti-siphon ports between said first and second seal means.

6. A valve structure adapted to normally occupy a submerged position in the liquid discharged therefrom, comprising: a discharge tube; a cap fitting over and movable up and down on said discharge tube and forming therewith an annular discharge passage; and a dual valve element within said cap including a first seal means adapted to seal against the end of the discharge tube and a second seal means adapted to close said annular discharge passage against back flow therethrough; anti-siphon ports between said first and second seal means; and a vent tube communicating with said anti-siphon ports and adapted to extend above the level of the liquid in which the valve structure is submerged.

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