No. 703,805. Patented July 1, 1902.

A. W. MURRAY.

BALL COCK.

(Application filed Feb. 14, 1901.)

(No Model.)

Fig. 1.

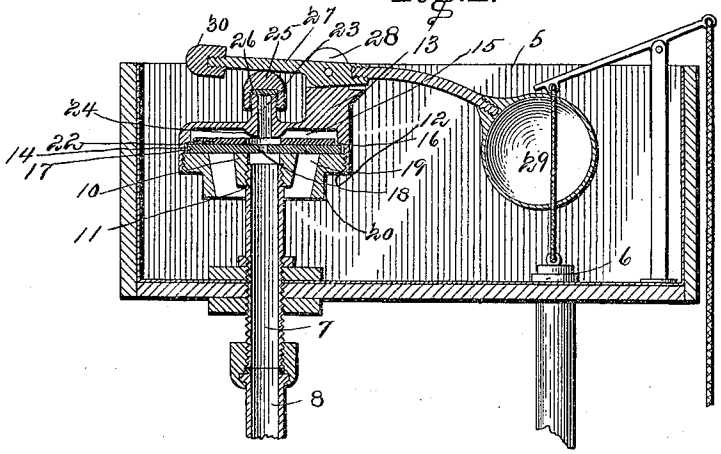


Fig. 2.

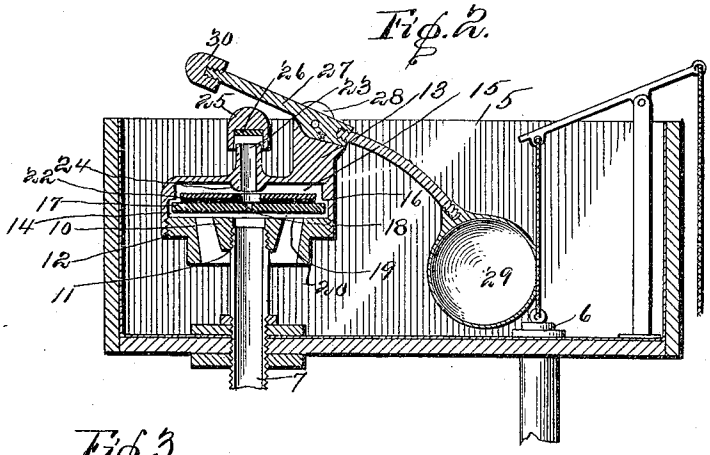


Fig. 3.

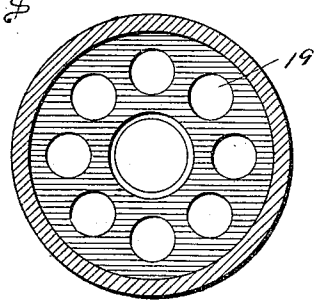
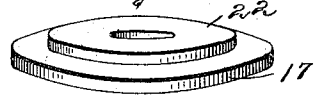


Fig. 4.



Witnesses
E. A. Ryan.
H. E. Clarke

Inventor
A. W. Murray
By Chandlee & Chandlee
Attorneys

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UNITED STATES PATENT OFFICE.

ALEXANDER WILCOXSON MURRAY, OF CHICAGO, ILLINOIS.

BALL-COCK.

SPECIFICATION forming part of Letters Patent No. 703,805, dated July 1, 1902.

Application filed February 14, 1901. Serial No. 47,260. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER WILCOXSON MURRAY, a citizen of the United States, residing at Chicago, in the county of Cook, State of Illinois, have invented certain new and useful Improvements in Ball-Cocks; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to float-valves such as are used in connection with the flushing-tanks of water-closets and in similar places; and the object of the invention is to provide a simple and efficient construction wherein when the outlet of the tank is opened and the water escapes the float will drop to open the valve for the supply-pipe and when the tank has been filled to a predetermined height the float will operate to close the valve, and thus cut off the water-supply.

A further object of the invention is to provide a construction wherein the main valve will be operated by hydrostatic pressure, controlled by a supplemental valve, which is in turn operated by the float.

An additional object of the invention is to provide for such delicate balance of the parts as will insure an efficient operation thereof, other objects and advantages of the invention being evident from the following description.

In the drawings forming a portion of this specification, and in which like numerals of reference indicate similar parts in the several views, Figure 1 is a sectional view showing a portion of a tank equipped with the present valve, the valve being shown in closed position. Fig. 2 is a view similar to Fig. 1 and showing the valve in open position. Fig. 3 is a section on line 3 3 of Fig. 1. Fig. 4 is a perspective view of the two washers.

Referring now to the drawings, 5 represents a tank equipped with a common form of flush-pipe having the usual tubular closure 6, attached to an operating-lever, through the medium of which it is raised from its seat to permit of flushing and is lowered to return to its seat, this apparatus forming no part of the present invention and being well known to those skilled in the art. Disposed within the tank and having its lower end passed through the bottom thereof is a stand-pipe 7, which has the usual supply-pipe 8 connected with its lower end, and upon the upper end of this stand-pipe and within the tank is disposed the float-valve of the present invention. The valve includes a casing, comprising a cap 10 of annular form and having a central threaded opening 11, through the medium of which said cap is screwed upon the upper end of the stand-pipe, and engaged with the peripheral threads 12 of the cap is the hollow body 13 of the casing, which incloses the valve-chamber. The valve-chamber includes a lower enlarged portion 14 and an upper contracted portion 15, resulting in the formation of a shoulder 16, and in the lower portion of the valve-chamber and between the upper face of the cap 10 and the shoulder 16 there is disposed a disk-shaped valve 17, having a central perforation 18 for the purpose hereinafter described, this valve being, in effect, a washer. The valve 17 has a slight vertical play between the upper face of the head and the shoulder and in its normal position rests upon the head and closes an annular series of ports 19, which are formed through the head and which converge downwardly, so as to discharge against the stand-pipe below the head. To insure this discharge, a flange 20 depends from the head exterior to the line of the ports, and the water is thus prevented from making the noise that is incident to the usual discharge into the body of water in the tank. Upon the valve 17 is disposed a washer 22, of metal or other material of greater specific gravity than the liquid to be controlled, and which washer acts to cause the valve to sink to its seat over the outlet-ports when the pressure at both sides of the valve has become equalized.

Extending upwardly from the central portion of the body 13 of the valve-casing is a tubular extension 23, at the lower end of which is formed a flange 24, which projects into the valve-chamber and which flange, in connection with the top of the valve-casing and the outer wall thereof, forms an air-cushion which prevents pounding of the valve and washer against the top of the casing when they are suddenly raised and also serves the purpose of preventing pounding in the service-pipes when the water is cut off suddenly

at a spigot. Upon the upper end of the tubular extension 23 is disposed a cap 25, in which is a washer 26, which acts to seat the upper end of the extension when the cap is in place.

To hold the cap 25 in position to close the extension when the tank is full and to release the cap and permit it to rise when the tank is emptied, a float-lever 27 is provided and is pivoted in an upright 28 upon the body 13 of the valve-casing. One end of this lever extends over the cap for engagement therewith to press it to its seat and is operated by a float 29, fixed to the opposite end of the lever. In order that the float may be required to overcome only the resistance of the cap to movement and no dead-weight, a counterbalance 30 in the form of a weight is screwed onto the threaded end of the lever opposite to the float thereof, and this weight is adjusted so that the lever will balance evenly. With this construction it will be seen that when the tank is full the float is raised and the cap 25 is held down against the extension 23 to close it. The pressure of water in the stand-pipe against the under side of the valve is then equalized by the downward pressure of an equal column of water above the valve; but the upper surface of the valve exposed to pressure is greater than the lower surface exposed to pressure, and hence the washer will be held firmly against the upper face of the head to cover the ports therethrough and prevent egress of water. If now the tank be emptied or a sufficient amount of water be drawn therefrom to cause the float to drop, the end of the float-lever will be raised from the cap, when the hydrostatic pressure within the valve-casing will raise the cap from the extension 23 and water will flow through said extension. This flow of water through the extension will of course reduce the pressure upon the top of the valve practically to zero, while the pressure on that portion of the valve projecting over the upper end of the stand-pipe will be sufficient to raise the valve from its seat and expose the ports through the head or cap 10, when the water from the stand-pipe will be discharged from said ports and against the outer face of the stand-pipe in the manner above described. As soon as the water in the tank reaches that level where the lever is moved to reëngage the cap and move it to its seat the hydrostatic pressure on the upper face of the valve will again become in excess of the pressure on that portion of the lower side that projects over the stand-pipe and the valve will be forced downwardly to close the ports.

It will be understood that in practice the central opening through the valve may be varied in diameter to correspond to different pressures in the supply-pipe and different specific gravities of liquids to be controlled and that various modifications of the specific construction shown may be made and any suitable materials and proportions may be used without departing from the spirit of the invention.

What is claimed is—

In a device of the class described, the combination of an inlet-pipe having a threaded upper end, the cylindrical cap having a central threaded perforation into which the pipe is screwed, said pipe having an annular series of perforations surrounding the central perforation and having its outer face threaded, the hollow cylindrical body screwed upon the cap, said body being reduced in interior diameter to form shoulders, the disk-shaped valve disposed between the shoulders and the cap and covering the annular series of perforations, said valve having a central perforation communicating with and of lesser diameter than the pipe, the ring disposed between the top of the cylindrical body and the washer and resting loosely upon the latter, the reduced tubular extension over the top of the body portion and communicating with the interior thereof, and the float-lever pivoted upon the upper end of the body and having a valve disposed to rest upon the upper end of the tubular extension to close it.

In testimony whereof I hereunto sign my name, in the presence of two subscribing witnesses, on the 2d day of January, 1901.

ALEXANDER WILCOXSON MURRAY.

Witnesses:
JOHN SALMON,
WALTER B. CREIGHTON.