M. A. SLATTERY & W. F. DOCKERY.

BALL COCK.

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1,257,295. Patented Feb. 19, 1918.

Fig. 1.

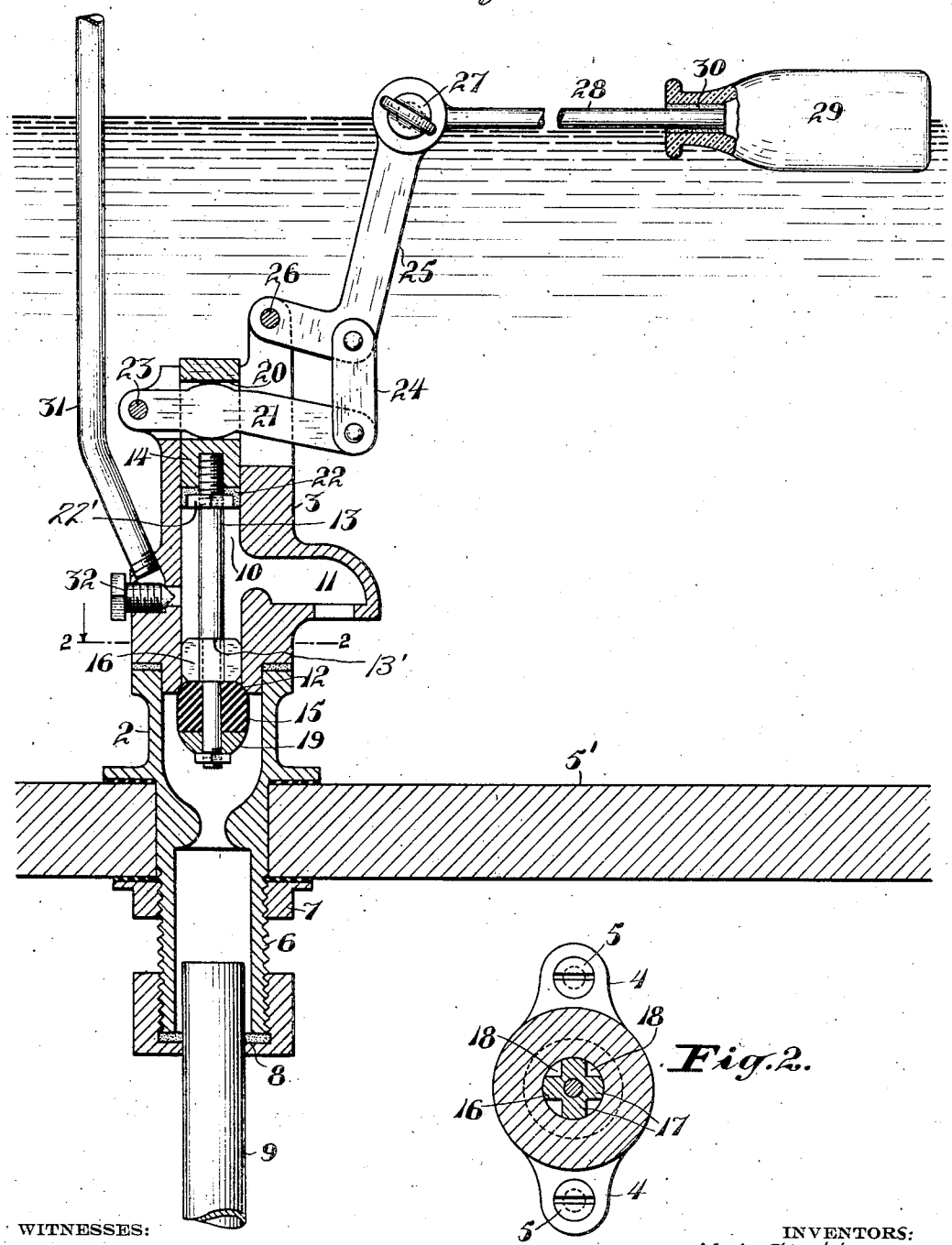


Fig. 2.

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MICHAEL A. SLATTERY AND WILLIAM F. DOCKERY, OF SAN FRANCISCO, CALIFORNIA.

BALL-COCK.

1,257,295. Specification of Letters Patent. Patented Feb. 19, 1918.

Application filed March 20, 1917. Serial No. 155,990.

To all whom it may concern:

Be it known that we, MICHAEL A. SLATTERY and WILLIAM F. DOCKERY, citizens of the United States, residing at the city and county of San Francisco and State of California, have invented new and useful Improvements in Ball-Cocks, of which the following is a specification.

This invention relates to a high pressure ball cock for use in connection with flushing tanks, cisterns, or any other container where refilling or control of the water to maintain a predetermined level is necessary.

One of the objects of the present invention is to provide a simple, substantial, cheaply manufactured ball cock, and particularly a novel form of valve mechanism which is held in closed position by the water pressure. Another object of the invention is to provide a compound float-actuated lever arrangement for slowly opening and closing the valve, thereby permitting flushing of the valve seat both while opening and closing and also preventing water hammer. Another object of the invention is to provide means for diffusing the water while entering through the valve to such an extent that the rushing and hissing sounds so often found annoying are prevented. Further objects will hereinafter appear.

The invention consists of the parts and the construction and combination of parts as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which—

Figure 1 is a vertical, longitudinal section through the valve.

Fig. 2 is a cross section on line 2—2 of Fig. 1.

Referring to the drawings in detail, it will be seen that the valve casing proper is made in two sections, such as indicated at 2 and 3, each section being provided with outwardly extending perforated lugs, as at 4, to permit the casing sections to be secured together by screws 5 or any other suitable means. The lower end of section 2 extends through the bottom of a tank shown at 5′ and is threaded, as as 6, to permit the insertion of packing gaskets and a nut 7; the usual sliding joint 8 being formed at the lower end to permit connection with a source of water supply under pressure through a pipe 9.

Extending through the upper casing section is a cylinder chamber 10, and communicating with said chamber is a discharge passage 11, through which water is permitted to enter the tank. Formed in the lower end of the cylinder chamber is a valve seat 12, and extending through the cylinder chamber is a rod 13, on the upper end of which is secured a piston 14, while the lower end supports a rubber valve 15 of the "Fuller" bib type. Secured on the rod, above the valve 15, and held by the latter against a shoulder 13′ on rod 13, is a guide member 16 which is provided with four outwardly extending arms 17, between which are formed small discharge openings 18. The outer ends of the arms contact with the inner wall of the cylinder chamber, thus forming a guide for the lower end of the rod and also insuring a positive seating of the valve 15 which is secured between the guide and a clamping nut 19.

The upper end of the piston 14 is slotted, as at 20, to permit a lever 21 to pass therethrough, while the lower end of the piston is provided with a cup leather 22 held on rod 13 by nut 22′ to prevent leakage around the piston and also to prevent chattering or vibration of the parts when the valve is opening or closing. The lever 21 is pivotally mounted in the upper casing section 3, as at 23, and its opposite end is connected, through a link 24, with a bell-crank lever 25 also pivotally mounted, as at 26, on the casing. Adjustably secured on the upper end of the bell-crank lever, by means of a thumb nut 27, is a horizontally disposed arm 28, on the outer end of which is secured a float 29. The float employed in the present instance is preferably small and constructed of glass to give the float more weight than usual. The object of employing a weighted float will hereinafter be described.

In actual practice, an ordinary bottle of small size is employed which is secured upon the arm 28 by extending it into the bottle neck and cementing it against removal, as

shown at 30. The upper valve casing is also provided with a refilling pipe 31 through which a part of the incoming water may escape and a set-screw 32, mounted below said pipe, is provided for the purpose of regulating the flow through the refilling pipe. This pipe may or may not be used and it is, therefore, possible to remove it entirely and plug the opening by means of the screw 32.

The valve or ball cock constructed as here shown is particularly adapted for use in connection with flushing tanks, cisterns and other containers where the refilling and control of water to maintain a certain or predetermined level is necessary. The discharging of the water from the tank decreases the level and, therefore, permits the float 29 to settle. This movement of the float is transmitted through the compound lever arrangement here shown, thereby depressing the piston 14, rod 13 and valve 15 a sufficient distance to free it with relation to the seat 12 and permitting the water from pipe 9 to enter the lower casing section and pass between the valve and its seat through the openings 18 formed in the guiding member and enter the cylinder chamber 10 from where it discharges through the passage 11 into the tank. A small amount of water, depending upon the position of the set-screw 32, is at the same time permitted to escape through the refilling pipe.

The refilling tube or pipe 31 is only used in connection with low-down water closet tanks and is removed where high water closet tanks are employed. The small passages 18 in the guiding member 16 diffuse the water to such an extent, when entering the cylinder and escaping through the passage 11, that the rushing and hissing sounds so often found annoying are entirely eliminated. The guiding member, together with the cup leather and upper piston 14 employed, prevents chattering and vibration, while the valve is opening or closing with relation to the seat and at the same time insures a positive guide for the valve under all conditions. The compound lever arrangement employed in the present instance is of considerable importance. It permits the valve to slowly open and close, thereby preventing water-hammer and it also permits the valve to be readily opened even though considerable pressure is exerted against the valve. The float 29 employed should, therefore, have considerable weight as it materially assists the compound lever to open the valve, particularly where high pressure water systems are employed. The whole pressure exerted against the valve when it is closed naturally necessitates a comparatively powerful lever movement to effect its opening. Leakage through the valve and a perfect seating are insured at all times as the valve is not only held against its seat by the float action but also by pressure exerted thereon.

A float employed as here shown might break while the valve is in the closed or opened position without creating any danger of overflowing. For instance, if the float should break against the bottom of the tank it can readily be seen that the high pressure of the inrushing water would immediately drive the valve against its seat, thus preventing refilling of the tank and at the same time giving a warning that the float has become detached or broken.

The formation of two separate casing sections, secured together by the screws 5, permits the insertion of a gasket between the casing sections and also permits the upper casing section supporting the float, compound levers and valve to be removed without disconnecting any of the parts. Heretofore it has been common practice to make the casing in one section and to thread the lower end of the casing to permit the valve to be screwed into the tank. This always necessitates the removal of the float and actuating levers as the tanks are so narrow that it is impossible to turn same while screwing in the valve. This involves considerable more time and work as it is not only necessary to remove the levers and float before the valve is inserted but it is also necessary to replace the same after the valve has been inserted. This is a complicated and tedious job as the tanks are so narrow and deep, thereby rendering it difficult to insert the pivot pins supporting the levers.

All these objections have been overcome in the present structure as the removal of the screws 5 permits the upper casing section to be lifted bodily without turning or disconnecting any of the connected parts.

The materials and finish of the several parts of the device are such as the experience and judgment of the manufacturer may dictate.

We wish it understood that various changes in form, proportions and minor details of construction may be resorted to within the scope of the appended claims and that we do not wish to limit ourselves to the specific design and construction here shown.

Having thus described our invention, what we claim and desire to secure by Letters Patent is—

A ball cock including a casing having an inlet and an outlet, a piston in the casing, a rod depending from the piston and having a shoulder, a guide member formed independent of the rod and being apertured to receive the rod and abutting said shoulder at one end of the member, said guide member having water diffusing passages, means to

operate the rod, a valve apertured to receive the rod and abutting the other end of said guide member, and means to hold said valve on the rod and thereby removably hold the guide member against the shoulder, said valve being formed of rubber so as to resiliently hold the guide member on the rod.

In testimony whereof we have hereunto set our hands in the presence of two subscribing witnesses.

MICHAEL A. SLATTERY.
WILLIAM F. DOCKERY.

Witnesses:
SELIMA SLATTERY,
HATTIE E. DOCKERY.