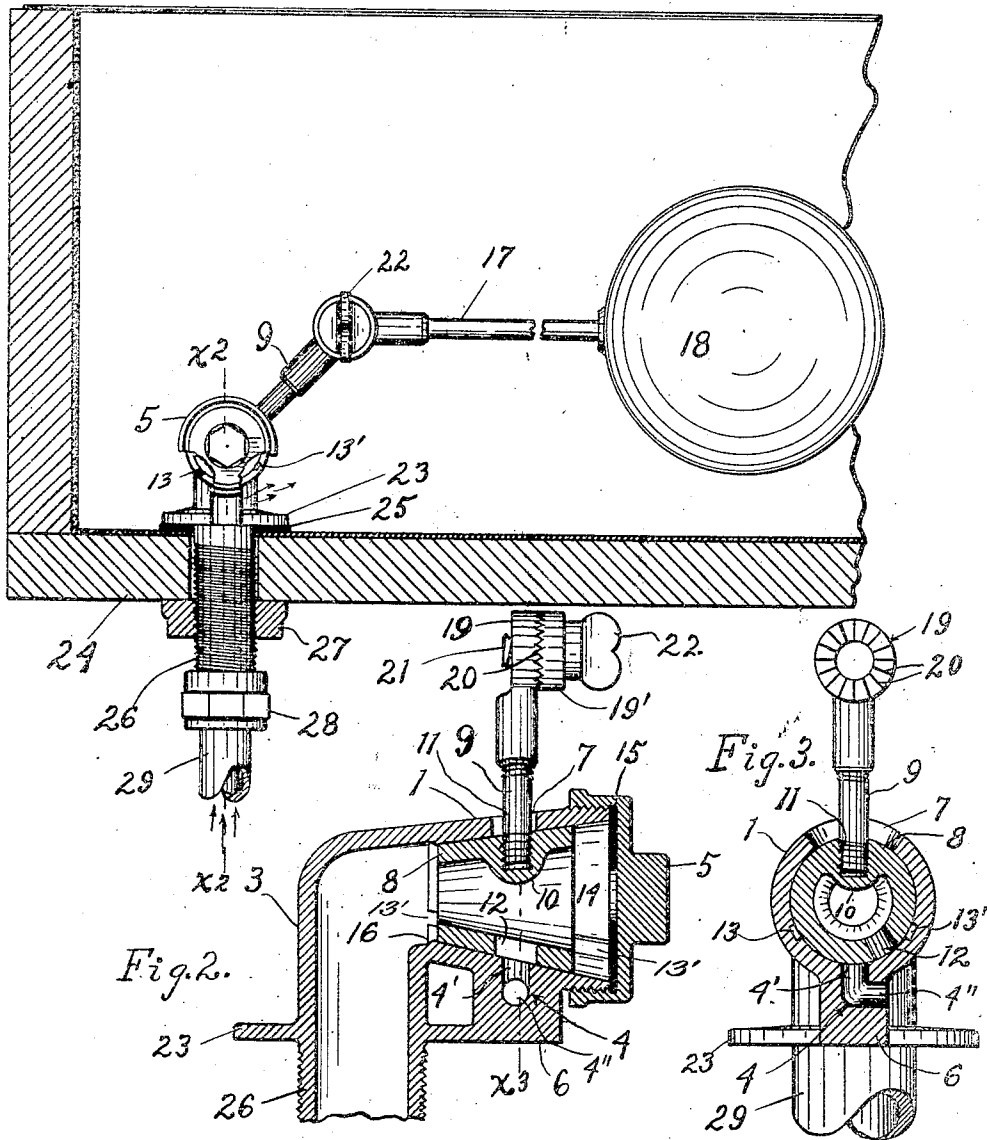


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 BALL COCK VALVE AND OPERATING MEANS THEREFOR.
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948,519.

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Fig. 1.



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UNITED STATES PATENT OFFICE.

SPENCER G. NEAL AND JOSEPH M. CHILDRESS, OF LOS ANGELES, CALIFORNIA, ASSIGNORS TO CALIFORNIA VALVE AND AIR BRAKE COMPANY, OF PALMS, CALIFORNIA, A CORPORATION OF CALIFORNIA.

BALL-COCK VALVE AND OPERATING MEANS THEREFOR.

948,519.

Specification of Letters Patent.

Patented Feb. 8, 1910.

Application filed March 20, 1908. Serial No. 422,371.

To all whom it may concern:

Be it known that we, SPENCER G. NEAL and JOSEPH M. CHILDRESS, both citizens of the United States, and residents of the city of Los Angeles, State of California, have invented a new and useful Ball-Cock Valve and Operating Means Therefor, of which the following is a specification.

Objects of our invention are; to provide a valve having improved means for dispensing with all parts which wear out in a short time in comparison to metal, such as stuffing boxes, cup leathers, gaskets, rubber washers or other devices heretofore in general use to prevent fluid leaking past the working parts of valves applied to the uses for which our valve is intended.

Another object is to provide means whereby the pressure of the fluid will hold the valve firmly to its seat without a spring, nut, or other device being used to seat the valve.

Another object is to provide improved means for equalizing the pressure upon the valve plug in such a manner that it moves with but little friction.

A valve constructed according to the principles of this invention is particularly adapted for controlling the inlet to a toilet flushing box or other tank having a float-operated valve; but it is to be understood that our valve is adapted to many other uses, being especially suited for use wherever an easily operated valve is desired.

Referring to the accompanying drawings which illustrate the invention: Figure 1 is a side elevation, partly in section, showing the valve in working position and open in a flushing box, a fragment of which is shown in section. Fig. 2 is a vertical mid-section on line X² of Fig. 1, also showing the valve open. Fig. 3 is a cross-section on line X³ of Fig. 2, the valve being shown closed. Figs. 2 and 3 are on a larger scale than Fig. 1.

Referring in detail to the drawings,—The valve casing consists of an expanded portion 1 containing a frusto-conical seat 2, an inlet 3, lateral outlet port 4 and closure 5 desirably consisting of an internally threaded cap screwing onto the large end of the valve casing. The valve casing is provided with a downward extension 6 through which extends outlet 4, said outlet having a

downwardly extending portion 4' and a horizontal portion 4''.

7 is a transverse slot through the upper wall of the frusto-conical valve casing to provide for the operation of the valve plug 8 by means of arm 9 extending radially therefrom. The side of said slot 7 nearest the small end of the plug is, as shown, spaced away from the operating arm 9 to prevent the wear of the plug upon its seat from interfering with the movements of said operating arm.

An internal swell or boss 10 depends from the upper wall of the hollow frusto-conical plug 8 to provide room for a threaded socket 11 of sufficient depth to form a secure hold for the lower threaded end of arm 9 and make it unnecessary to extend the stem into the fluid when the pressure might cause leakage around the threads of the stem.

12 is a port through the lower side of plug 8, said port preferably being a slot extending longitudinally of the plug. As best shown in Fig. 3, ports 4 and 12 are moved into and out of register by the oscillation of arm 9 in slot 7.

13, 13' are balancing recesses for admitting hydraulic pressure to the sides of the plug in order to lessen friction by partially offsetting the tendency of the plug to bear heavily on its seat by reason of the end pressure being greatest at the large end of the valve plug where greater surface is exposed to pressure. It will be observed that these recesses 13 and 13' are at all times in communication with the supply and that their number and area and length will be determined by the pressure of the supply source, the greater the pressure the greater will be the combined area of these recesses to relieve the valve of sufficient pressure to permit it to work freely and yet tightly. The balancing recesses 13 and 13' are located at the under side of the valve-plug, that is at the side opposite the operating arm 9, because in that position they offset the weight of the arm and its attached parts. Said balancing recesses are formed in the wall of the casing rather than in the wall of the plug, so that the rotation of the plug cannot bring the grooves near to any of the openings in the casing. Said grooves 13, 13' should each be approximately midway between openings 4 and communicating with

the inlet at the small end of the plug 8. A clearance 14 is necessarily provided at the outer end of the plug to prevent cap 5 from screwing down thereon. Said clearance at all times communicates with inlet 3 through the open-ended plug 8.

15 15 is a gasket to provide a fluid-tight fitting for cap 5.

16 is a counter bore opposite the small end of the plug, so that the plug may freely move inwardly to automatically take up wear thereof upon its seat.

When used in combination with flushing apparatus as shown in Fig. 1, stem 9 is provided with an extension 17, carrying float 18. Arm 9 and extension 17 are each provided with adjustable coupling heads 19, 19' having faces with interlocking serrations 20 as shown.

20 21 is a threaded locking bolt having a winged head 22. Said bolt serves to clamp heads, 19, 19' together, with arms 9 and 17 adjusted to various angles to each other thereby to adjust the height of water which will cause the float to close the valve.

23 is a base flange resting on the upper side of the bottom of tank 24 and 25 is a gasket under said flange.

26 is an externally threaded stem forming a downward extension of inlet 3.

27 is a lock nut to hold the parts firmly in place and form a fluid-tight fitting around gasket 25.

28 is a union for connecting onto service pipe 29.

While we have described and illustrated what we at present consider the best embodiment of our invention, it is to be understood that we do not limit ourselves to the exact construction set forth, but that variations such as come within the scope of the appended claims, may be made without departing from the spirit of the invention.

It will be observed that a feature of importance in our valve is that the operating stem or arm is so connected to the valve that stuffing-boxes and packings are rendered unnecessary. This is accomplished by so constructing and mounting the valve that the operating arm may be connected to the valve at a point between the forward and rear ends of its seating surface and having the arm work through a transverse slot in the casing, whereby the valve itself forms a water-tight closure for the opening through which the operating stem or arm works. In this form of valve it is preferred not only that the valve shall be hollow and that the outlet shall be from the inside of the valve outwardly, but also that the supply shall at all times have free communication with the larger end of the valve and valve chamber whereby the pressure of the supply shall be utilized to hold the valve to its seat thus closing not only the outlet

but also the slot in which the operating arm works. A further advantage of extending the operating arm 9 through a slot in the side wall of the casing and attaching it to the side of the plug (preferably about midway its length) is that all tendency of the plug during its rotation to assume a diagonal position within its conical seat is avoided, whereby the wear of the plug and the seat will be uniform and the symmetry of the frusto-cone preserved.

We claim:

1. A valve casing having an internal frusto-conical seat, a plug seated in said seat, there being a clearance at the small end of said seat to provide for taking up the wear of the plug upon its seat, and a radial operating arm for said plug, there being an operating opening through the seat for said arm, the side of said operating opening nearest the small end of the plug being spaced away from said operating arm to prevent the wear of the plug upon its seat from interfering with the movement of said operating arm.

2. The combination, with a flushing tank of a valve casing having a chamber with an opening in the upper side thereof, a hollow plug in said chamber at all times closing said opening, a bent arm extending from said plug through said opening and a float carried by said arm, there being recesses beneath said plug to admit hydraulic pressure to offset the weight of said arm.

3. A valve casing having an internal frusto-conical seat; and a frusto-conical hollow open-ended plug seated in said seat, there being an open space at the small end of said plug, said plug being held to its seat wholly by fluid pressure; and a radial operating arm for said plug, there being an operating opening through the seat for said arm, the side of said operating opening nearest the small end of the plug being spaced away from said operating arm to prevent wear of the plug upon its seat from interfering with the movements of said operating arm.

4. The combination, with a flushing tank of a valve casing having a chamber with an opening in the upper side thereof, a hollow plug in said chamber at all times closing said opening, an arm extending from said plug through said opening, there being recesses beneath said plug to admit hydraulic pressure to offset the weight of said arm.

In testimony whereof we have hereunto signed our names in the presence of two subscribing witnesses at Los Angeles, California, this 14th day of March, 1908.

SPENCER G. NEAL.
JOSEPH M. CHILDRESS.

Witnesses:

ALBERT H. MERRILL,
FLORA H. FOSS.