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LEVER MECHANISM FOR BALL COCKS

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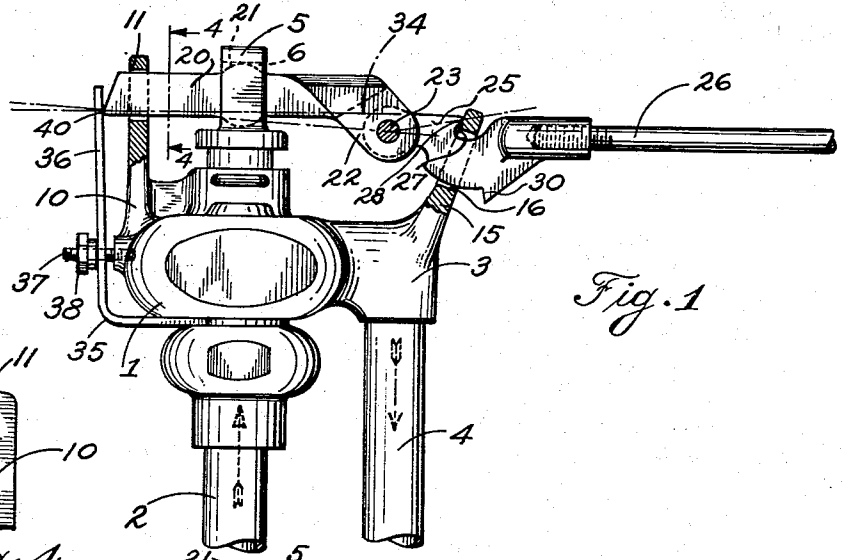


Fig. 1

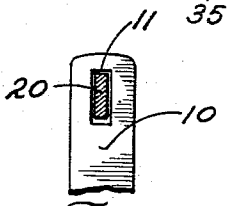


Fig. 4

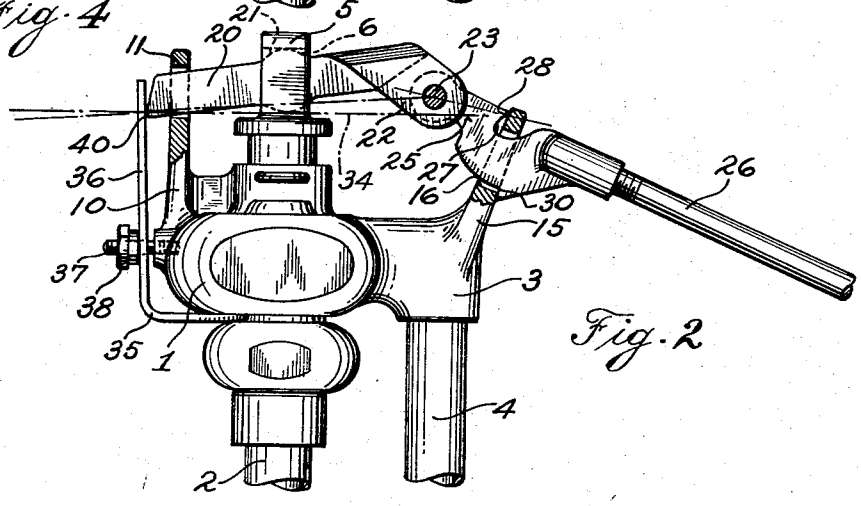


Fig. 2

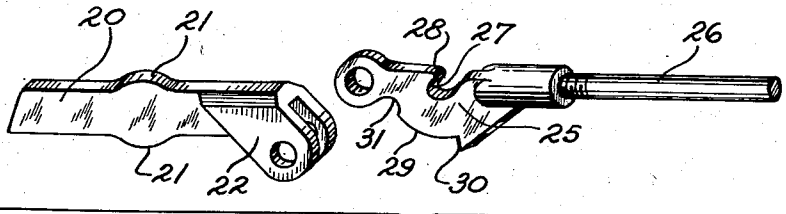


Fig. 3

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LEVER MECHANISM FOR BALL COCKS

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1

This invention relates to ball cock valves and is particularly concerned with a new lever mechanism for actuating the plug of such a valve.

Ball cock lever mechanism as constructed heretofore has been awkward, unsatisfactory and unnecessarily expensive in labor and material. Such mechanism has employed two or more pivot pins screw-threaded to legs on the valve body which legs were small in cross-sectional area and thus liable to bending and breakage. These legs were expensive because they had to be formed by coring or milling and were easily bent when being cleaned in the foundry. Also they had to be drilled and tapped for pivot pins and straightened whenever they had been bent during machining. Often the levers which were superimposed on the valve body were too high to fit under the cover of the tank. The drilling operation required drills of two diameters and thus each arm had to be separately supported so that the pressure of the drill would not bend the arms out of line.

The present invention aims to avoid these several disadvantages and achieves that object by providing lever mechanism in which the levers are movable loosely in the arms, are pivotally connected together at their adjacent ends by a single pin and may be disassembled from the valve by removing the pivot pin and sliding the levers out of their retaining slots in the arms.

The present invention will be better understood by those skilled in the art from the following description read in conjunction with the drawings in which:

Fig. 1 is a side elevational view, partly in section, of a ball cock valve embodying the present invention with the parts shown in valve closed position;

Fig. 2 is a view similar to Fig. 1 but with the parts shown in valve open position;

Fig. 3 is a perspective view in exploded position of the parts of the valve mechanism of Fig. 1; and

Fig. 4 is a cross-sectional view taken on line 4—4 of Fig. 1.

In the drawings, the valve body 1 is located at the upper end of an inlet pipe 2, has a forward extension 3 from which an outlet pipe 4 extends downwardly with its open end to be near the bottom of a flush tank. A valve plug 5 extends vertically down into the valve body and is provided with a gasket to engage a valve seat at the upper end of the inlet pipe 2. Plug 5 near its upper end is provided with a transverse opening 6 through which a lever may extend.

2

A rear column 10 extends upwardly from the rear side of valve body 1 and is provided with a rectangular slot 11 to receive the end of a lever. A front column 15 extends upwardly and forwardly from portion 3 of the valve body and is provided with a rectangular slot 16 extending therethrough which is to receive a lever.

The rectangular slots 11 and 16 may be very easily and accurately produced by punching in an ordinary punch press, the brass casting being registered in the press by a guide pin and stop to engage the previously machined bore and top surface that receives the valve plug 5.

A first flat lever 20 is provided near its midportion with opposite arc-shaped edges 21 to lie in and engage surfaces of the slot 6 in plug 5. Near its forward end this lever has downwardly and forwardly extending flanges 22 at its opposite sides. One of these flanges is drilled and the other is tapped to receive a pivot pin 23. A second flat lever 25 extends through opening 16 in front column 15, is provided with a hole near its rear end to receive the pivot pin 23 and is provided at its forward end with a threaded socket to receive float rod 26. The upper edge of the lever 25 is provided with a notch 27 adapted to engage the upper portion of the column 15, the said notch being also provided with a lip 28 to engage the rear side of the column under certain conditions. The lower edge of the lever 25 is provided with an arcuate portion 29 centered about the notch 27 and at such a distance from it as to prevent the disengagement of this notch from the rectangular slot 16 in the support column 15, while allowing the lever to pivot freely on the notch. At the forward end of this arcuate surface is a stop 30 adapted to engage the forward edge of the column 15, and thus limit the downward travel of the float arm and float. The opposite end of the arcuate surface is provided with a notch 31 wide enough to embrace the lower edge of the rectangular opening in column 15 when the lever 25 is rotated in a counterclockwise direction, and deep enough to permit the lever to drop down to disengage the notch 27 in the upper edge of the lever, which may then be cleared from the supporting column by removing the pivot pin 23 and rotating the lever in a clockwise direction about the notch 31.

If desired the above described lever mechanism may be equipped with means for quick closing of the valve. This means, as illustrated, comprises a leaf spring 35 which bears against

the rear side of the valve body 1, has an upwardly extending portion 36 which is adjustably positioned relative to the rear column 10 as by a screw 37 attached to the valve body and a nut 38 thereon and bearing against the portion 36 of the spring. Near its upper end spring 35 engages the rear end of lever 20 and serves to urge that lever forwardly.

It will be noted that when the valve is closed, as is the case with the parts disposed in the position shown in Fig. 1, the pivot pin 23 will lie slightly below a horizontal line 34 drawn through the point of engagement 40 of the rear end of lever 20 with spring 36 and the engagement of lip 28 with front column 15. In other words, lines drawn from point 40 to pivot pin 23 and another line drawn from pivot pin 23 to the point of engagement of lip 28 with front column 15 will form an obtuse angle with the apex pointing downwardly and located below the horizontal line 34. However, when the valve is open, as is shown in Fig. 2, those two lines will intersect above the horizontal line and will form an obtuse angle with the apex pointing upwardly. Thus the spring tends to exert force downwardly on the valve plug when the valve is closed and thus assists the float to overcome the pressure of the water in the inlet pipe which is tending to open the valve. Similarly, when the valve is open, the spring tends to urge the valve plug outwardly and to resist movement of the float to overcome the pressure of the incoming water and close the valve. This tendency to resist closing of the valve is changed into a tendency to assist in closing of the valve when the pivot 23 moves from above to below a horizontal line. This sudden change results in an acceleration of the valve closing movement of the plug and, hence, the valve is closed very quickly from the wide open to the completely closed position. Thus the valve may be maintained fully opened for a longer period and may be closed more quickly, both as compared with conventional lever mechanisms. As a result, the time required to fill the tank is shortened, there is no long drawn-out throttling of the water supply with the coincident creation of excessive noise.

Having thus described the present invention so that others skilled in the art may be able to understand and practice the same, I state that what I desire to secure by Letters Patent is defined in what is claimed.

What is claimed is:

1. Lever mechanism for a ball cock valve comprising a valve body having a forward hush pipe extension, a rear column extending upwardly from said body, a front column extending upwardly and forwardly from said extension, each of said columns being provided with a substantially rectangular hole near its upper end, a valve plug having an upward extension provided with a substantially rectangular hole, a first flat lever extending forwardly from the hole in the rear column through the hole in the plug and projecting downwardly at its front end, a second flat lever extending through the hole in the front column and carrying a float rod at its forward end, said second lever having a pivoting lip on its upper edge engageable with the rear side of said front column, and a pin pivotally connecting the adjacent ends of said levers.

2. Lever mechanism for a ball cock valve comprising a valve body having a forward hush pipe extension, a rear column extending upwardly from said body, a front column extending upwardly and forwardly from said extension, each of said columns being provided with a substantially rectangular hole near its upper end, a valve plug having an upward extension provided with a substantially rectangular hole, a first flat lever extending loosely through the holes in the rear column and in the plug and stopping short of the front column, a second flat lever extending loosely through the hole in the front column and having an arcuate lower edge provided with a stop to engage the forward side of said front column, and a removable pin pivotally connecting together the adjacent ends of said levers.

3. Lever mechanism for a ball cock valve comprising a valve body having a forward hush pipe extension, a rear column extending upwardly from said body, a front column extending upwardly and forwardly from said extension, each of said columns being provided with a substantially rectangular hole near its upper end, a valve plug having an upward extension provided with a substantially rectangular hole, a first flat lever extending through the holes in the rear column and plug and projecting downwardly at its forward end, a second flat lever extending from the forward end of the first lever through the hole in the front column and carrying a float rod at its forward end, said second lever having an arcuate lower edge movable in said front column, a pin pivotally connecting together the adjacent ends of said levers, and a spring pressing the first lever forwardly.

4. Lever mechanism for a ball cock valve comprising a valve body having a forward hush pipe extension, a rear column extending upwardly from said body, a front column extending upwardly and forwardly from said extension, each of said columns being provided with a substantially rectangular hole near its upper end, a valve plug having an upward extension provided with a substantially rectangular hole, a first flat lever extending through the holes in the rear column and in the plug and projecting downwardly at its forward end, a second flat lever extending from the forward end of the first lever through the hole in the front column and carrying a float rod at its forward end, said second lever having a pivoting notch in its upper edge, an arcuate lower edge opposite to said pivoting notch, a clearance notch at one end of said arcuate edge and a stop at the other end thereof, and a pin pivotally connecting the adjacent ends of said levers together.

5. Lever mechanism for a ball cock valve comprising a valve body having a forward hush pipe extension, a rear column extending upwardly from said body, a front column extending upwardly and forwardly from said extension, each of said columns being provided with a substantially rectangular hole near its upper end, a valve plug having an upward extension provided with a substantially rectangular hole, a first flat lever extending forwardly from the hole in the rear column through the hole in the plug and projecting downwardly at its front end, a second flat lever extending through the hole in the front column, having a lip engaging the rear side of said front column and carrying a float rod at its forward end, a pin pivotally connecting the adjacent ends of said levers, and a spring engaging the rear end of said first lever and urging the lever forwardly.

6. Lever mechanism for a ball cock valve comprising a valve body having a forward hush pipe

extension, a rear column extending upwardly from said body, a front column extending upwardly and forwardly from said extension, each of said columns being provided with a substantially rectangular hole near its upper end, a valve plug having an upward extension provided with a substantially rectangular hole, a first flat lever extending forwardly from the hole in the rear column through the hole in the plug and projecting downwardly at its front end, a second flat lever extending through the hole in the front column, having a lip engaging the rear side of said front column and carrying a float rod at its forward end, a pin pivotally connecting the adjacent ends of said levers slightly below a horizontal line drawn from the rear end of said first lever to said lip, and a spring engaging the rear

end of said first lever and urging the lever forwardly.

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