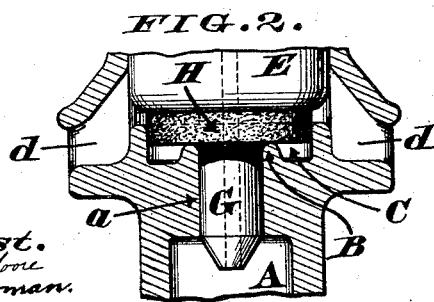
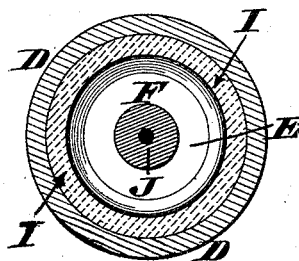
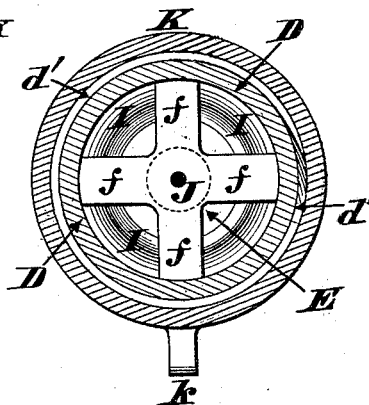
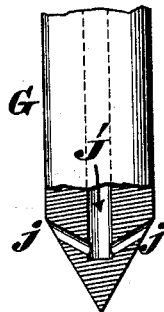
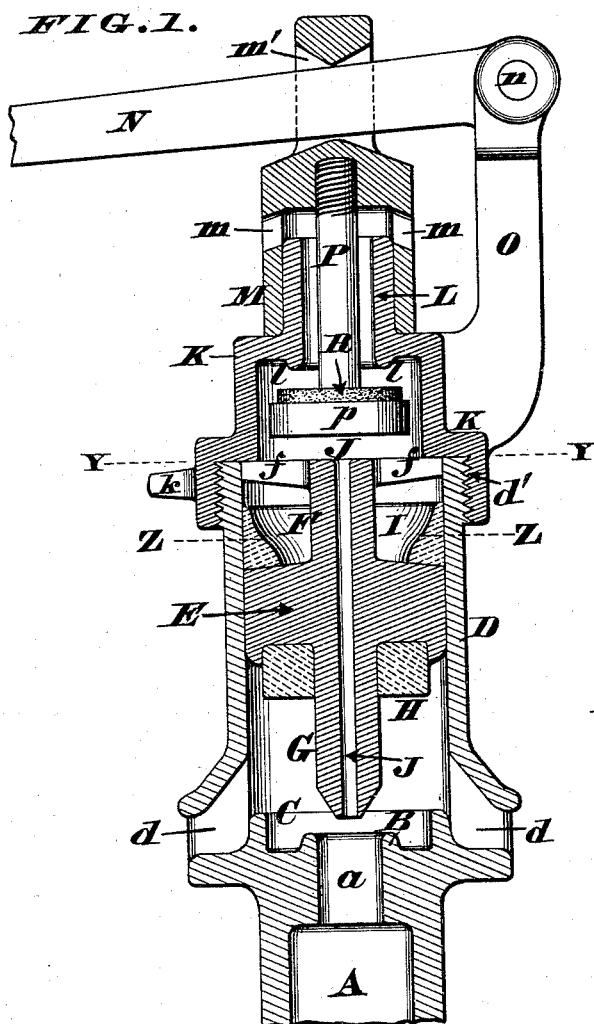


J. McNEIL.  
BALL COCK.

Patented Aug. 4, 1891.



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# UNITED STATES PATENT OFFICE.

JOHN MCNEIL, OF CINCINNATI, OHIO.

## BALL-COCK.

SPECIFICATION forming part of Letters Patent No. 457,005, dated August 4, 1891.

Application filed March 7, 1891. Serial No. 384,116. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN MCNEIL, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, 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, reference being had to the annexed drawings, which form part of this specification.

My invention comprises certain new and useful improvements in those ball-cocks having valves whose closure is initiated by the action of floats and completed by the pressure of water against the heads of plungers to which said valves are applied, the details of these various improvements being hereinafter more fully described, and then pointed out in the claims.

In the annexed drawings, Figure 1 is an axial section of my improved ball-cock, the valve of the same being raised from off its seat. Fig. 2 is a section of a sufficient portion of the cock to permit said valve being shown in its closed position. Fig. 3 is an enlarged sectional elevation of the preferred form of plug at the lower end of the plunger. Figs. 4 and 5 are horizontal sections of the cock, taken, respectively, at the lines Y Y and Z Z of Fig. 1.

The inlet A of the cock may be suitably coupled either to a horizontal or vertical service-pipe, according to the peculiar location of the tank or cistern to which the cock is applied, and said inlet has preferably a contracted channel *a*, whose upper end terminates with a raised seat B, the latter being situated centrally within a shallow counterbore C. This counterbore is arranged at the bottom of a cylinder D, is somewhat less in diameter than the latter, and is surrounded by a series of outlets *d d*. Cylinder D is traversed by a reciprocating plunger E, having at top a short neck F and at bottom a cylindrical plug G, adapted to telescope tightly within the contracted channel or passage *a*. Fitted in the lower end of this plunger and surrounding the upper portion of plug G is an annular valve H, of leather or india-rubber or other suitable material, which valve is adapted to fit snugly within the counterbore C when the cock is closed. Radiating from

the upper part of neck F are lugs *f*, that assist in guiding the plunger, a packing-ring I being applied between said lugs and plunger, which packing is much thinner at top than at bottom, so as to be readily expanded by any pressure of water within the upper portion of cylinder D, the water being admitted through a longitudinal channel J. This channel preferably occupies an axial position within the cock and passes completely through plunger E, neck F, and plug G.

*d'* is a screw-thread at the upper end of cylinder D to permit the engagement of a cap K, having a lug *k*, wherewith it is readily turned, a tubular extension L projecting from the upper part of this cap, and a seat *l* being provided at the lower end of this tube. The extension L is cylindrical and is surrounded by a sleeve M, capable of having a slight longitudinal play and provided with one or more discharge-ports *m*. Furthermore, this sleeve is slotted at *m'* to admit a lever N, one end of which is pivoted at *n* to a standard O, projecting from the cap K, while the other or free end of said lever is provided with any approved form of float. Projecting from this sleeve M is a stem P, of less diameter than the tubular extension L and carrying a disk *p*, to which is secured a valve R, adapted at the proper moment to close against the seat *l*.

From the above description it is evident that when the various parts of the cock are in the position seen in Fig. 1 plunger E is arrested in its upward movement by contact with cap K, thus permitting water to ascend the inlet A, pass through the channel *a*, and escape at the outlets *d*, so as to fill the tank or cistern or other receptacle. It is also evident that a limited flow of water will now pass up the channel J of the plunger, then ascend the tubular extension L, and finally be discharged at the ports *m*, the contact of sleeve M with cap K serving to maintain the valve R at the proper distance from the upper seat *l*. This limited flow of water will have no effect on the operative parts of the cock until the water in the tank reaches a certain predetermined level, at which moment the float will elevate the free end of lever N, and thereby raise the valve R and bring it in contact with said seat *l*. This simple act shuts off the discharge from the

upper part of the cock and causes a pressure or "head" of water to accumulate in the space between the plunger E and cap K, the result of which pressure is, first, to expand the yielding packing I, and, second, to initiate the descent of said plunger and cause the tapering end of its plug G to enter the contracted channel *a*. Consequently the annular portion of valve H, surrounding said plug, is now relieved from the positive pressure of water, while the entire area of the upper end of the plunger is subjected to this pressure, and as a natural result said plunger is forced down until arrested by contact of said valve with the seat B, as seen in Fig. 2. This automatic closure of the valve is very prompt and effective, but is accomplished without producing any violent ram or concussion, because the descending valve gradually imprisons a limited quantity of water within the counterbore C. Again, this quick but cushioned closure of the main valve prevents the disagreeable hissing or singing noise incidental to the water-supply being shut off from the ordinary forms of ball-cocks. When the water in the tank falls to a certain level, the float opens the upper or secondary valve R, and then the cock again operates in the previously-described manner.

It will be noticed the packing I simply rests upon the plunger E, and is not compressed against the same by a nut or other clamping device, which arrangement exposes the entire inner surface of said packing to the action of the water and affords a freedom of expansion that could not be obtained by any other construction.

In the preferred form of my invention (seen in Fig. 3) the plug G has a longitudinal channel J', closed at its lower end and provided with a series of lateral branches *j j*, which incline inwardly from the tapering portion of said plug. These inclined branches prevent sand and grit flowing directly into the channel J' and thereby clogging up the operative parts of the cock.

Finally, in this specification, where it is stated that "the plug G telescopes tightly within the channel *a*," the expression is not to be construed as meaning such a very tight fit as would require considerable power to operate the plunger; but it simply means that said plug should fit so accurately as to cut off any passage of water around it the instant the plug enters said channel.

I claim as my invention—

1. The combination, in a ball-cock, of a cylinder having an inlet, an outlet, a secondary valve operated by a float, a discharge-port controlled by said secondary valve, and a reciprocating plunger playing within said cylinder, which plunger is provided with a longitudinal channel, a main valve, and a plug of less diameter than said plunger and tightly fitting within said inlet, whereby the telescoping of said plug within said inlet cuts off the effective pressure from a portion of the under surface of said plunger and causes an excess of pressure to accumulate upon its upper surface when said secondary valve is closed, substantially as described.

2. The combination, in a ball-cock, of a cylinder D, having an inlet *a*, raised seat B, counterbore C, outlets *d d*, seat *l*, discharge-port *m*, float-lever N, secondary valve R, operated by said lever, and a reciprocating plunger E, playing within said cylinder, which plunger is provided with a longitudinal channel J, a main valve H, and a plug G, of less diameter than said plunger and tightly fitting within said inlet, which plug telescopes within said inlet *a* when said secondary valve R is closed against its seat *l*, all as herein described, and for the purpose stated.

3. The combination, in a ball-cock of the class specified, of the cylinder-cap K, having a tubular extension L and seat *l*, and the reciprocating sleeve M, ported at *m*, coupled to a float-lever N, and carrying a secondary valve R, which closes against said seat when said lever is raised, as herein described.

4. The combination of ball-cock plunger E, neck F, radial lugs *f*, and yielding packing I, which packing is thinner at top than at bottom and is loosely inserted between the head of said plunger and these lugs *f*, whereby its entire inner surface is exposed to the action of water, for the purpose described.

5. A ball-cock plunger E, having a plug G, tapered at its entering end and provided with a main channel J', closed at bottom and furnished with inclined branches *j j*, that slope in an opposite direction to the sides of said tapering end, all as herein described, and for the purpose stated.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN MCNEIL.

Witnesses:

JAMES H. LAYMAN,  
SAMUEL M. QUINN.