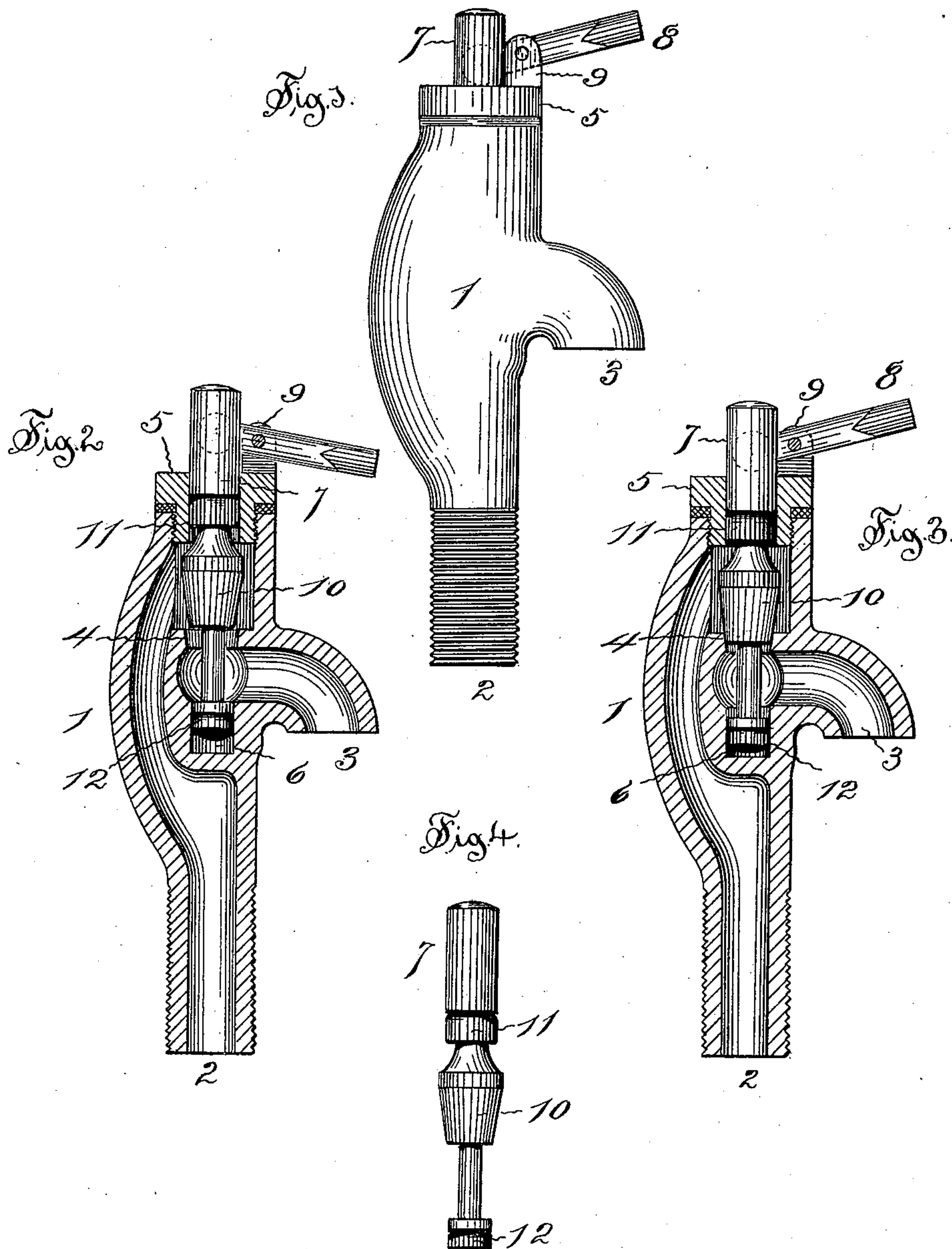


(No Model.)

O. H. JONES.
BALL COCK.

No. 564,249.

Patented July 21, 1896.



Witnesses
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UNITED STATES PATENT OFFICE.

OWEN H. JONES, OF HARTFORD, CONNECTICUT.

BALL-COCK.

SPECIFICATION forming part of Letters Patent No. 564,249, dated July 21, 1896.

Application filed July 25, 1895. Serial No. 557,164. (No model.)

To all whom it may concern:

Be it known that I, OWEN H. JONES, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Ball-Cocks, of which the following is a specification.

The invention relates to the class of ball-cocks provided for automatically supplying water to tanks and reservoirs, in which the valve is balanced and opens against and closes with the pressure of the flowing water.

The object of the invention is to produce a simple and cheap cock of this class having a valve so arranged and balanced that it will open against the pressure and close with the pressure easily with a small and light float, and that will move quickly for the first part of its travel in opening and closing, and then will move more slowly and surely for the remainder of its travel, thereby insuring a quick and ready opening, and a firm and tight closing without any noise or hammering.

To this end the invention resides in a ball-cock for flush-tanks, supply-tanks, and the like reservoirs having a shell with an inlet and outlet, a seat between the inlet and outlet, and a cylindrical chamber on the outlet side of the seat, and a reciprocating valve-spindle extending from the exterior through the shell and port, through the seat into the chamber on the outlet side of the seat, and bearing on the inlet side a balancing-packing open to the pressure exerted away from the seat to aid in opening the valve against the pressure of the water, also bearing on the inlet side a valve exposed to pressure toward the seat, so that it will be aided in closing and keeping shut by the pressure of the water, said spindle bearing on the outlet side of the seat a piston not exposed to the pressure, but operating in the chamber to retard the closing motion of the valve, as more particularly hereinafter pointed out.

Referring to the accompanying drawings, Figure 1 is a side view of a ball-cock embodying the invention. Fig. 2 is a central section of the same, showing the valve as open. Fig. 3 is a similar section showing the valve shut; and Fig. 4 is a detail view of the spindle with the valve, balancing-shoulder, and retarding-piston.

In the views, 1 indicates the shell, which is usually cast to shape in a single piece of brass or bronze metal, with an inlet 2 for receiving water from the supply-pipe, and outlet 3 for the escape of water into the tank or reservoir in which the cock is placed. The valve-seat 4 is formed between the inlet and outlet, and an opening is provided through the shell for the introduction of the valve, which opening is occupied by a perforated nut or cap 5, that, when screwed to place, is properly packed to prevent leakage. In the shell on the outlet or escape side of the valve-seat a cylindrical chamber 6 is formed in line with the perforation through the cap and the valve-seat. Supported by the perforation in the cap that is screwed into the end of the shell is a valve-spindle 7, which is adapted to be reciprocated by means of a float-lever 8. This float-lever is pivoted between ears or lugs 9, projecting from the perforated cap, and it may be connected with any ordinary float which will lift as the level of the water in the tank rises and drop when the level of the water lowers.

The valve-spindle extends from the exterior of the shell into the interior through the perforation in the threaded cap and through the port in the valve-seat into the cylindrical chamber formed on the escape side of the seat. This spindle in the shell on the inlet or pressure side of the seat bears a valve 10, that is adapted to close tightly against the seat or open therefrom as the spindle is reciprocated by the rise and fall of the float. The spindle also has on the inlet or pressure side of the seat a balancing-shoulder open to the water-pressure in a direction opposite to the direction of the water-pressure that tends to force the valve to its seat. In this instance the balancing-shoulder is formed by a cup-packing 11, arranged on the spindle so that the pressure will expand it against the walls of the perforation through the cap in a direction away from the seat. In the shell on the outlet or escape side of the seat, where there is no pressure, the spindle bears a suitably-packed piston 12, that fits the cylindrical chamber 6. In constructing these parts the cylindrical chamber is preferably made just about the size of the port through the valve-seat, so that the piston may be passed through the seat when the parts are being assembled,

while the opening through the cap is made slightly smaller in diameter than the port-opening through the seat, in order that the pressure of the water that is exerted on the balancing shoulder or packing will be less than the pressure of the water that will be exerted in the opposite direction on the valve tending to close it and hold it shut. This arrangement and location of the valve, balancing-packing, and retarding-piston insure the correct automatic working of the cock with a small and light float. The valve closes with the pressure of the flowing water, and this permits the use of a small float, for the water-pressure and suction of the outflowing water aids in drawing the valve to its seat and holding it there. The balancing-packing on the pressure side of the seat is arranged in such manner that the pressure of the water in the cock when the valve is closed is nearly as great tending to open the valve as it is tending to hold the valve closed, so that it does not require a heavy weight for opening the valve against the pressure of the water. With the valve closing with the pressure and the balancing-packing to aid in opening the valve against the pressure, the operation is easy and quick, but to overcome a too-sudden operation and prevent any possibility of hammering, the retarding-piston is provided on the outlet side of the seat, where there is no pressure. When the valve commences to operate, it will move quickly until the packing in the cylindrical chamber or dash-pot becomes expanded. Then the further action will be slower, but sure, as the cushioning medium (either air or water, whichever may leak past the packing into the chamber) that fills the chamber back of the piston flows in or out, the packing being somewhat loose or a fine vent being provided.

When the valve is closing, the water-pressure attempts to draw the valve to its seat quickly, for the balancing-shoulder, being made smaller than the opening through the port, retards the motion of the valve in closing but slightly, but the piston expands and prevents the water from dragging the valve to its seat with a sudden jerk, allowing it to seat only as rapidly as the cushioning medium escapes out of the chamber. This slow closing of the valve as it approaches the seat

allows the water to flow into the tank in such manner as to insure a sufficiently high level before the valve shuts tightly, so that the float will lift with a correct pressure to keep the valve tightly against its seat when it has reached there. As stated, the balancing-packing is made sufficiently smaller than the port through the seat so that the pressure will be exerted to close the seat and keep the seat closed, the retarding-piston offering no resistance to the action of the valve after it has once reached its seat, but the balancing-shoulder is sufficiently large to overcome some of the pressure and enable a light weight to open the valve against the pressure of the water in the cock when it is desired that the valve shall open, and this also aids in overcoming the slight suction of the piston in the piston-chamber as the valve rises; but on account of the arrangement of a cup-shaped packing this suction when the valve is lifted is very slight.

I claim as my invention—

A ball-cock having a shell with an inlet and outlet, a seat between the inlet and outlet and a chamber on the outlet side of the seat, and a spindle loosely extending from the exterior to the interior and through the port into the chamber, and bearing on the inlet side of the seat a balancing-shoulder and valve exposed to the water-pressure in opposite directions the area of the balancing-shoulder being slightly smaller than the area of the valve so that there is slightly greater pressure on the valve tending to close than on the shoulder tending to open the port, and bearing on the outlet side of the seat a retarding-piston that travels in the chamber as the valve and balancing-shoulder move, offering but little resistance to the closing of the valve on the start but generating pressure as it moves whereby the valve moves easily and quickly when commencing to close but more and more slowly as it closes and is prevented when nearly closed from sudden movement which would cause water-hammer, substantially as specified.

OWEN H. JONES.

Witnesses:

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