(No Model.)

C. BIRKERY.

BALL COCK.

No. 559,884. Patented May 12, 1896.

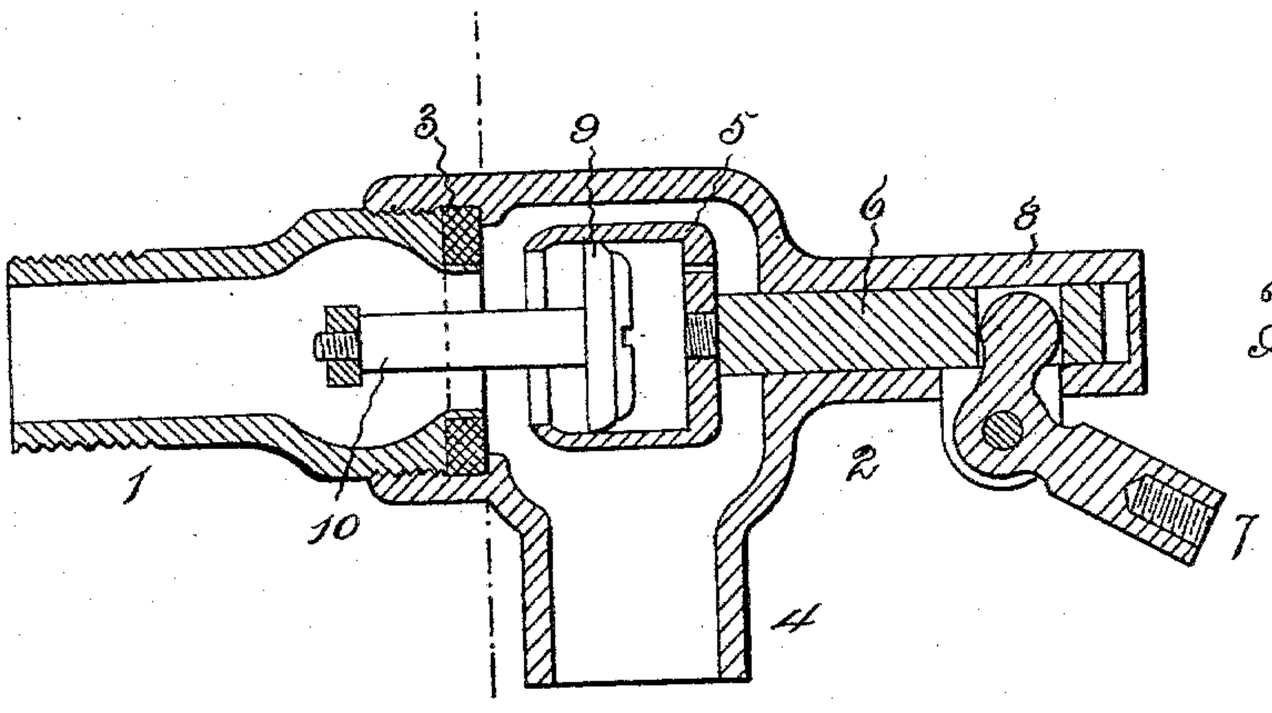


Fig. 1.

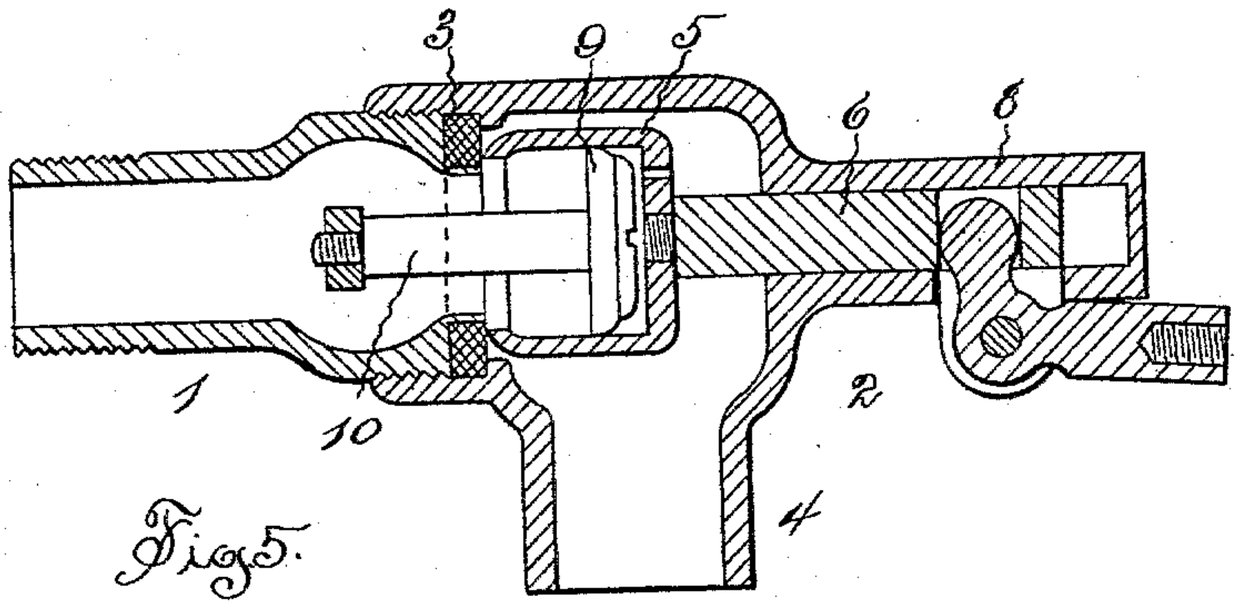


Fig. 2.

Fig. 5.

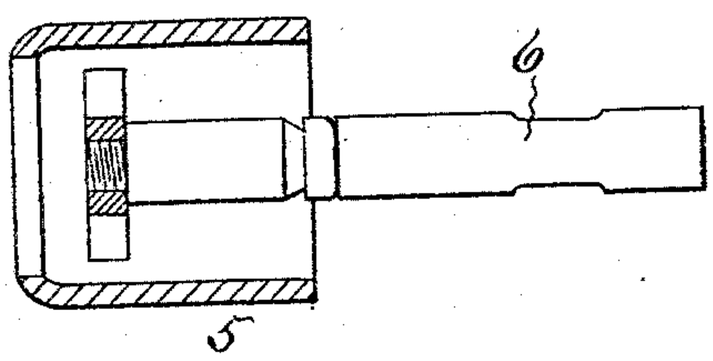


Fig. 3.

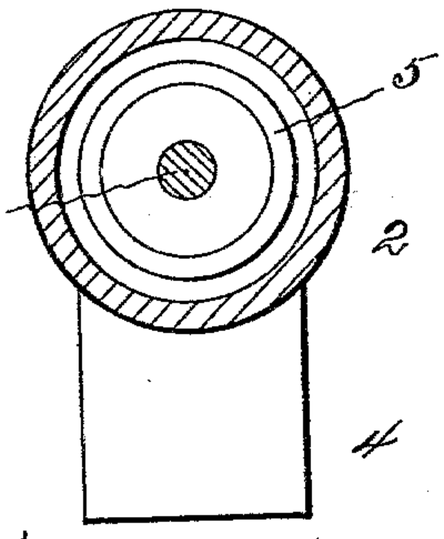
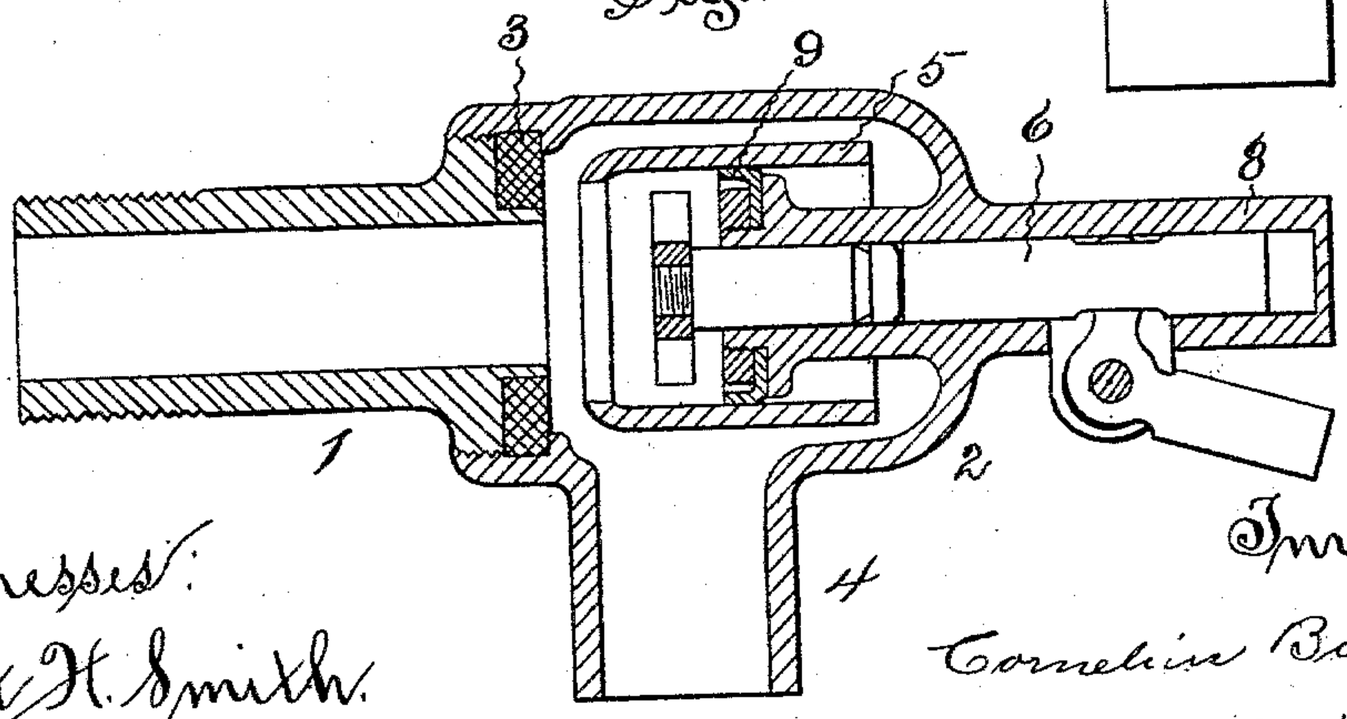


Fig. 4.



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UNITED STATES PATENT OFFICE.

CORNELIUS BIRKERY, OF HARTFORD, CONNECTICUT, ASSIGNOR TO THE BIRKERY MANUFACTURING COMPANY, OF SAME PLACE.

BALL-COCK.

SPECIFICATION forming part of Letters Patent No. 559,884, dated May 12, 1896.

Application filed May 23, 1895. Serial No. 550,399. (No model.)

To all whom it may concern:

Be it known that I, CORNELIUS BIRKERY, 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 cocks that are used in tanks and have a ball or float that drops and opens the valve when the level of the water in the tank is lowered and which lifts and closes the valve when the water-level in the tank rises.

The object of the invention is to provide a very simple and cheap cock of this class, which is so constructed that it will open and close easily, surely, and slowly without noise or singing and will require but a small float to cause it to open and close.

Referring to the accompanying drawings, Figure 1 is a longitudinal section of one form of the cock, showing the valve opened. Fig. 2 is a similar view of the same with the valve closed. Fig. 3 is a transverse section of the same on the plane denoted by the broken line of Fig. 1. Fig. 4 is a central longitudinal section of a modified form of the cock, and Fig. 5 is a detail view of the valve and stem of this latter form of cock.

In the form of cock illustrated in the views the shell is shown as formed in two parts 1 and 2, that are threaded and screwed together with a packing 3 between them. This packing can be so arranged that besides making a tight joint between the parts of the shell it affords a seat against which the valve closes for stopping the flow of water through the cock. It is preferred that shoulders be formed between the ends of the two parts where they are threaded, so as to clamp the packing between them when the parts are screwed together.

The shell at the inlet end of the cock is preferably threaded for attachment to the supply-pipe of the system to which it is to be connected, while the outlet is usually made through a bib 4, that is formed integral with the other part of the shell. The outlet part of the shell is so formed as to receive the extension or stem 6 of the valve 5 and also the float-lever 7. The float-lever 7 is usually an angle-lever with one end loosely engaging with the valve extension or stem and the other end adapted to be secured to the end of the rod that is attached to the operating-float.

The valve 5 is a cylindrical or tubular piece, and it has an interior diameter that is slightly larger than the diameter of the end portion of itself that comes in contact with and shuts against the valve-seat when the valve closes. The hollow valve is extended in the direction of its length, and this extension, usually in the form of a stem, is free to reciprocate in the hollow hub 8 when the valve-lever is oscillated. In the interior of the hollow valve is a suitably-packed piston-head 9, the packing of which is open to the pressure of the water exerted through the open seat end of the valve on one side as it comes from the port at the valve-seat. This piston-head is supported in a fixed position with its packing tightly fitting the interior of the valve, the support for the piston-head being a stem 10, that is connected with the shell. In the form shown in Fig. 1 the stem of the piston-head extends in line with the flowing water through the port and is secured to a spider or bar that passes from one side to the other of the interior of the shell on the pressure side of the port. The valve back of the piston-head is provided with a perforation or opening that vents the interior of the valve, so that there will be no pressure of air or water in the valve back of the piston-head to retard the movement of the valve.

In the form of cock shown in Fig. 4 the stem of the piston-head is extended in a line with the water flowing through the port, but in such a direction that it is attached to or connected with the end of the shell opposite from the inlet. In this latter form the stem that supports the piston-head is perforated and the stem or the extension of the valve passes through the piston-head and the perforated support, so that it may be connected with the float-lever.

Cocks constructed in this manner are simple, cheap, and durable. The valve is removable and consequently can be readily renewed by regrinding or by the substitution of a new valve should the old become too much worn. The valve-seat is also readily

renewable when it becomes worn, for the parts of the shell may be quickly removed and a new packing inserted between them.

A cock constructed in this manner can be operated without noise, for the inlet and outlet and the port are all large, so as to permit the passage of a large quantity of water. It can be operated without water-hammer, for the pressure of the outflowing water will not draw the valve suddenly to its seat when closing, and it can be operated and kept tightly closed with a small float, for the piston-head relieves the valve from the direct pressure of water tending to open it, while the pressure that is exerted on the valve by the water that attempts to go between the edges of the valve and its seat is counterbalanced by the pressure of the water in the interior of the valve which tends to hold it closed to its seat. As stated above, the interior of the tubular or cylindrical valve is made slightly larger in diameter than the end or edge portion of the valve that comes in contact with the seat when it is closed. Therefore, as the cross-sectional area of the space is greater in the interior than where the valve seats, this makes the pressure of the water exert itself in a direction toward the port, and thus when the valve is closed the pressure tends to aid in keeping the valve closed. The piston-head takes the pressure of the water that tends to directly force the valve open, while the pressure in the opposite direction is exerted upon the walls of the reduced portion of the interior of the valve, and this is in a direction toward the valve-seat. The proportion between the larger diameter of the interior of the hollow valve and the end portion of the valve that bears against the seat is such that the pressures are practically balanced, so that the valve will reciprocate easily with a small float and require much smaller power to keep it closed.

I claim as my invention—

1. A ball-cock consisting of a shell with an inlet and outlet and seat between the inlet and outlet, a reciprocating cylindrical valve with an annular seat edge movable within the shell on the outlet side of the seat and having an interior opening of larger diameter than the diameter of the port through the seat, with a vent at the back end of the cylinder, and a packing of larger diameter than the port through the seat fitting the opening in the valve, said packing being held connected with the shell against longitudinal movement, substantially as specified.

2. A ball-cock consisting of a shell with an inlet and outlet and seat between the inlet and outlet, a reciprocating hollow cylindrical valve with an open seat end, said valve having a stem that extends through the end of the shell on the same side of the seat as the valve, and a packing larger in diameter than the port through the seat fitting the opening in the valve, said packing being rigidly connected to the shell and exposed to pressure exerted through the open seat end of the valve only, substantially as specified.

3. A ball-cock consisting of a shell with an inlet and outlet and seat between the inlet and outlet, a reciprocating hollow cylindrical valve on the outlet side of the seat and having an open seat end, a packing larger in diameter than the port through the seat fitting the opening in the valve, said packing being exposed to pressure through the seat end of the valve only, and a stem that extends through the port in the seat and is connected with the interior of the shell on the pressure side of the seat and with the packing on the escape side of the seat, substantially as specified.

4. A ball-cock consisting of a shell with an inlet and outlet and seat between the inlet and outlet, a reciprocating hollow cylindrical valve on the outlet side of the seat, and a packing connected by a stem with the shell fitting the opening in the valve and exposed to pressure through the open seat end of the cylindrical valve, said valve having a stem that extends through the shell of the valve on the same side of the seat as the packing, substantially as specified.

5. A ball-cock consisting of a shell with an inlet and outlet and seat between the inlet and outlet, a reciprocating tubular valve with openings at both ends, said valve having a stem that extends through the end wall of the shell, a packing larger in diameter than the port through the seat fitting the interior of the valve, and a stem connecting the packing with the shell, substantially as specified.

CORNELIUS BIRKERY.

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