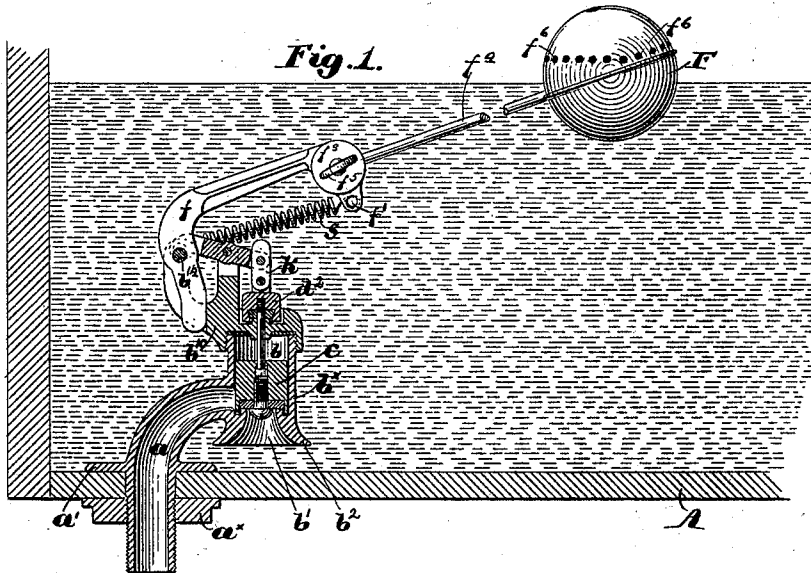
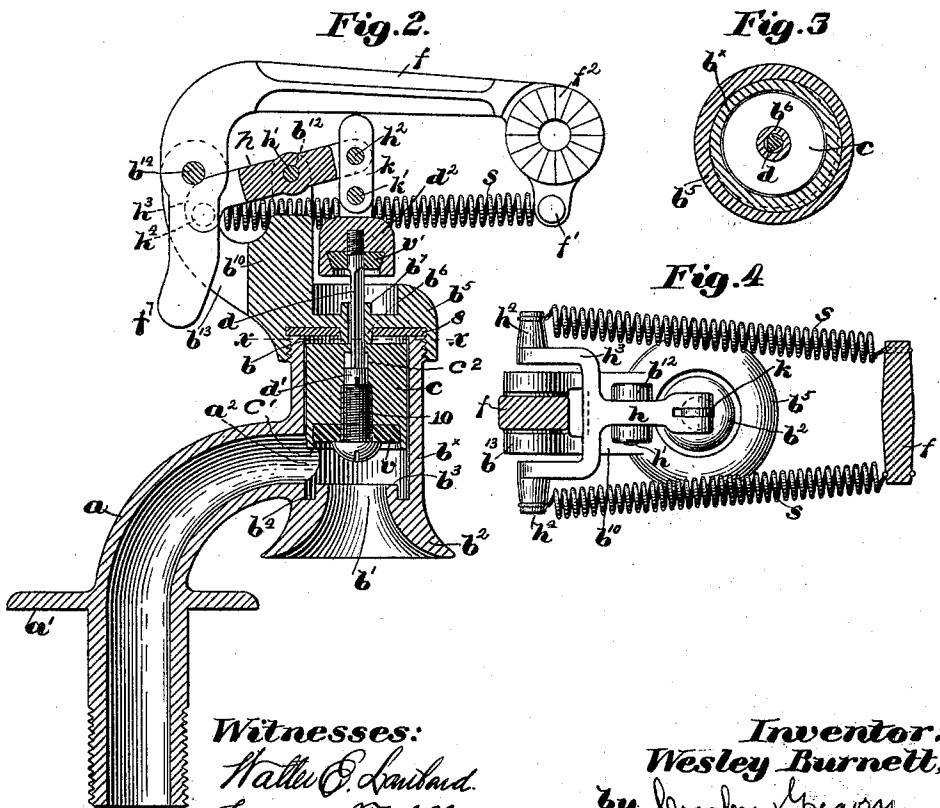


(No Model.)

W. BURNETT.
VALVE.

No. 606,404.

Patented June 28, 1898.



Witnesses:
Walter C. Lindard.
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Inventor:
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UNITED STATES PATENT OFFICE.

WESLEY BURNETT, OF CAMBRIDGE, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO THOMAS E. MORFORD, OF SAME PLACE.

VALVE.

SPECIFICATION forming part of Letters Patent No. 606,404, dated June 28, 1898.

Application filed September 4, 1897. Serial No. 650,575. (No model.)

To all whom it may concern:

Be it known that I, WESLEY BURNETT, of Cambridge, county of Middlesex, State of Massachusetts, have invented an Improvement in Valves, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

This invention relates particularly to that class of apparatus wherein the passage of fluid is governed by a main valve operated by fluid-pressure through a controlling-valve connected with the valve-chamber and which serves to release or confine the pressure in that part of the chamber.

The main objects of my invention are to improve the construction, operation, and effectiveness of such apparatus and to provide means for giving to the main valve a positive initial movement, whereby the certainty and rapidity of operation of the apparatus is greatly increased.

Other novel features of my invention will be hereinafter described, and particularly pointed out in the claims.

Figure 1 is a vertical section of a valve apparatus embodying my invention shown as applied to a tank and operated by a float, the valve being closed. Fig. 2 is an enlarged vertical sectional view of the valve apparatus, the float being omitted and with the valve open. Fig. 3 is a transverse sectional view through the valve-chamber on the line $x x$, Fig. 2; and Fig. 4 is a partial top or plan view of the apparatus.

Referring to the drawings, the supply pipe or inlet a is shown as provided with a flange a' to rest upon the bottom of a tank A, the pipe being held in place by a nut a^x and connected in the usual manner with the source of supply. The inlet-pipe opens into a valve-chamber b by an inlet-port a^2 , shown as located near the lower end of the chamber, the latter having a discharge-port b' at its lower end, preferably provided with a flaring or bell mouth b^2 .

Above and surrounding the discharge-port and adjacent the inlet a^2 is an annular valve-seat b^3 , surrounded by a recess b^4 , formed in the material of the chamber.

The shell or casing b^x incloses the parts of the valve and forms the chamber b , the said shell or casing being cylindrical in shape and closed at its upper end by a cover b^5 , herein shown as screwed thereon, an interposed gasket 8 maintaining the chamber tight. The said cover has a central hub b^6 extended above and below it and having a circular bore, forming an outlet for the upper part of the valve-chamber b , the outer end of said hub forming a seat b^7 for the controlling-valve.

A piston-valve c fits closely the walls of the valve-chamber b and closes the inlet-port a^2 when the main valve is shut, (see Fig. 1,) said piston-valve, however, being movable freely in said chamber and permitting a thin film of the fluid between it and the wall of the casing b^x . At its lower end the piston-valve is recessed to receive therein the main valve v , which is preferably a washer of leather or other suitable material, held tightly in place by a screw 10, and cooperating with the annular seat b^3 to close the discharge-port b' , as in Fig. 1.

The lower end of the piston-valve c projects beyond the main valve to form a ring c' , adapted to enter the recess b^4 and prevent cutting of the valve-washer v by the current when opening or closure is being effected.

The piston-valve is longitudinally bored at c^2 to receive therein the head d' of a triangular, or it may be fluted, stem d , extended up through and guided by the hub b^6 , said stem at its upper end being shown as threaded to enter a controlling-valve v' and its holder d^2 .

The valve v' is preferably a disk of leather or other suitable material, adapted to close the outlet of the valve-chamber b when on its seat b^7 , as in Fig. 1.

It will be noticed that the stem d has some longitudinal play in the piston-valve c , so that the latter and the controlling-valve have a limited independent movement, the holder d^2 entering a recess in the cover b^5 when the valve is closed.

The cover b^5 of the casing b^x has at one side thereof an upturned extension b^{10} , provided at its top with ears b^{12} and with an outwardly and upturned bifurcated arm b^{13} , in which arm is fulcrumed at b^{14} an actuating-lever f .

A rocker-arm h is pivotally mounted at h'

between the ears b^{12} , said arm being pivotally connected at h^2 with a link k , which in turn is jointed at k' to the holder or carrier d^2 for the controlling-valve v' . The rear end of the rocker-arm h is divided to form downturned branches h^3 , (see Fig. 4,) each having a lateral stud or projection h^4 , to which are attached the ends of coiled springs s . At their other ends the said springs are attached to a transverse pin f' on the free end of the lever f , said pin being dropped below the main body of the lever.

Referring to Fig. 2, it will be seen that the fulcrum h' of the rocker-arm h is above a line joining the centers of the pin f' and studs h^4 , so that the springs s , acting on its outer end below the fulcrum of the rocker-arm, raise its inner end, and thereby lift the controlling-valve v' from its seat. As the lever f is rocked on b^{14} toward the position shown in Fig. 1 the line of pull of the springs will approach and finally intersect the fulcrum h' of the rocker-arm h without moving the latter. Just as soon as the springs are carried beyond said fulcrum, however, by the continued movement of the actuating-lever f they will contract and will with a quick snap suddenly swing the rocker-arm, depressing its inner end and seating the controlling-valve v' . Such sudden and sharp descent of the said valve acts through the connection d to impart a positive initial movement to the piston-valve c , partially closing the inlet a^2 , while the controlling-valve has closed the outlet of the valve-chamber b above said piston-valve. The rapidly-increasing pressure of the fluid in said chamber above the piston-valve acts to depress the latter until the main valve v is seated, completely closing the discharge-port, while at the same time the piston-valve c closes the inlet a^2 . When the lever f is lowered from the position shown in Fig. 1 until the line of pull of the springs is carried below the fulcrum h' , the springs will contract and suddenly swing the rocker-arm h , elevating its inner end, and the controlling-valve is thereby suddenly raised, so that the outlet from the valve-chamber is opened above the piston-valve, and the latter is given a positive initial movement through the connection d to partially open the inlet a^2 . The reduction of pressure above and the increased pressure of the incoming fluid on the bottom of said piston-valve c then operate to rapidly complete the movement of the latter until the inlet and discharge ports are fully open, the movement of the piston-valve being finally arrested by the hub b^6 before the said valve reaches the top of the valve-chamber. This provides a clearance-space for the entrance of the fluid above the piston-valve when the controlling-valve is shut again.

A radially-notched face f^2 on the free end of the actuating-lever f is adapted to receive a similarly-notched enlargement f^3 (see Fig. 1) on a rod f^4 , having attached to its outer end a ball or float F , the lever and rod being

connected by a suitable clamping-screw f^5 , the cooperating notched portions permitting the rod to be set at an adjusted angle to the lever f . The float F rises and falls with the changing level of the fluid in the tank in well-known manner, and from the foregoing it will be seen that the gradual movement of the actuating-lever does not effect the operation of the valve. Just as soon, however, as the critical point is reached, when the level of the water is as high or as low as desired, the connections between the said lever and controlling-valve will operate to move the latter instantly, so that there is no very gradual or long-continued movement in opening and closing the main valve. The latter is promptly moved into fully open or shut position.

Pounding or hammering is prevented by the spring-controlled mechanism, which takes up the force of the blow.

The float is shown as provided with a series of perforations f^6 to permit the fluid to enter under certain conditions and by its weight depress the actuating-lever.

Suppose the valve to be open and that the springs s have become inoperative through breakage or displacement. Then the rise of the fluid in the tank would continue beyond the proper point without closing the valve and an overflow would be imminent. The actuating-lever f will be positively stopped by engagement of the depending end f^7 thereof with the extension b^{10} , however, and the rising fluid will enter the apertures f^6 in the float, which will then sink, depressing the lever until it engages the upper end of the link k , depressing it to move the controlling-valve to its seat, and consequently effecting closure of the main valve, whereby the entrance of fluid to the tank will be stopped before overflowing.

Having fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a valve apparatus, a valve-chamber provided with inlet and discharge ports at its lower end, an imperforate piston-valve movable in said chamber by fluid-pressure, to open and close the inlet, a connected main valve for the discharge-port, the chamber having an outlet above the piston-valve, a controlling-valve for said outlet located outside of the chamber, and a positive connection between the controlling and piston valves and passing through said outlet to effect positive initial movement of the piston-valve while permitting a limited relative movement of said valves, substantially as described.

2. In a valve apparatus, a valve-chamber having an outlet and provided with inlet and discharge ports, means actuated by fluid-pressure to govern the passage of a fluid from the inlet into the chamber and out by the discharge-port, and a controlling-valve for the outlet of said chamber, connected with and to impart a positive initial movement to said means, and having a limited movement inde-

pendent of said means, combined with a pivoted actuating-lever for said controlling-valve having an attached float at its outer end, a rocker-arm pivotally connected with the controlling-valve, and a spring connection between said lever and rocker-arm, to impart sudden throw to said rocker-arm and thereby effect quick movement of the valve when the actuating-lever is moved beyond a certain point, substantially as described.

3. In a valve apparatus, a valve-chamber provided with inlet and discharge ports, an imperforate piston-valve fitting the valve-chamber closely and adapted to open and close the inlet-port, a main valve carried by said piston-valve to open and close the discharge-port, an outlet leading from the valve-chamber above the piston-valve, a controlling-valve therefor located outside of the said chamber, connections between said valves and passing through the outlet to permit a limited movement of one relatively to the other, and a spring-operated actuator to effect rapid initial movement of the controlling-valve and start the piston-valve, substantially as described.

4. In a valve apparatus, the combination with a valve-chamber provided with a discharge-port, a superimposed valve-seat, an inlet-pipe entering said chamber above the discharge-port, an imperforate piston-valve fitting the valve-chamber closely and having an attached main valve to cooperate with the seat above the discharge-port, and an outlet leading from the valve-chamber above the piston, of an auxiliary controlling-valve for said outlet in axial alinement with the piston-valve, means to positively actuate it, and a positive connection between said controlling and piston valves, to effect positive initial movement of the latter through movement of the controlling-valve, the piston and main

valves being so arranged that as the latter moves to its seat the former gradually closes the inlet-pipe, substantially as described.

5. In a valve apparatus, a valve-chamber having an outlet and provided with inlet and discharge ports, means actuated by fluid-pressure to govern the passage of a fluid from the inlet into the chamber and out by the discharge-port, and a controlling-valve for the outlet of said chamber, connected with and to impart a positive initial movement to said means, an actuating-lever for the controlling-valve, having a perforated float attached to its outer end, spring connections between said lever and valve, and an auxiliary connection adapted to be positively engaged by the lever when depressed by fluid entering the float, to thereby close the valve, substantially as described.

6. In a valve apparatus, a valve-chamber having an outlet and provided with inlet and discharge ports, means actuated by fluid-pressure to govern the passage of a fluid from the inlet into the chamber and out by the discharge-port, and a controlling-valve for the outlet of said chamber, connected with and to impart a positive initial movement to said means, combined with a spring-operated actuator for the controlling-valve, to effect sudden and rapid movement thereof, and a controlling-float connected with said actuator and operative independent of the fluid-pressure in the valve, to move said actuator into operative position, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WESLEY BURNETT.

Witnesses:

THOS. E. MORFORD,
NELSON E. MANN.