

No. 627,448.

Patented June 20, 1899.

G. J. THOMAS.
VALVE.

(Application filed Feb. 21, 1898.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

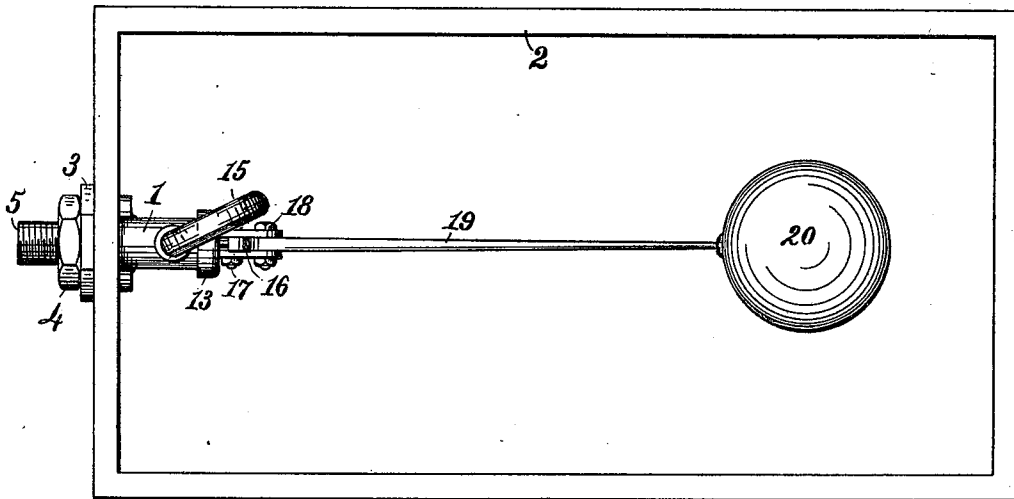
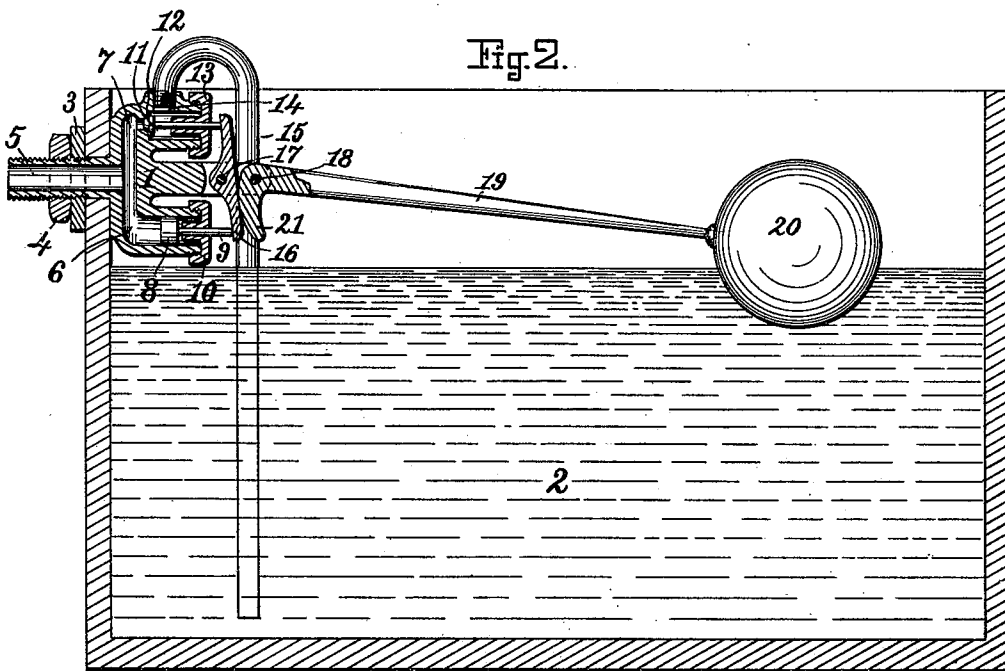


Fig. 2.



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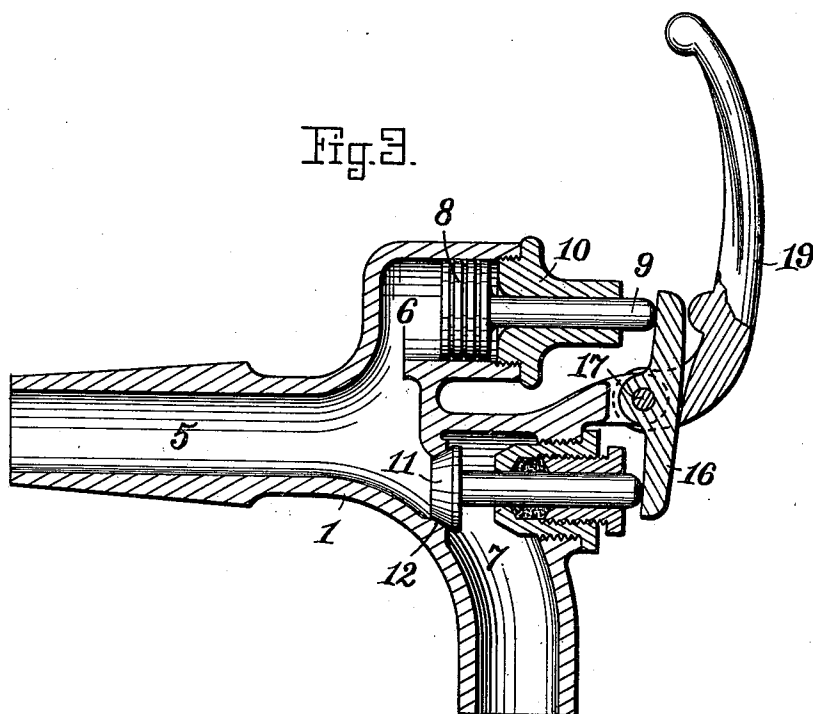
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UNITED STATES PATENT OFFICE.

GEORGE J. THOMAS, OF NEWTON, MASSACHUSETTS.

VALVE.

SPECIFICATION forming part of Letters Patent No. 627,448, dated June 20, 1899.

Application filed February 21, 1898. Serial No. 671,060. (No model.)

To all whom it may concern:

Be it known that I, GEORGE J. THOMAS, of Newton, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Valves, of which the following, taken in connection with the accompanying drawings, is a specification.

This invention relates to improvements in valves, but more especially supply-valves used in cisterns, for water-closets, and for similar purposes; and it has for its object to provide novel means whereby the valve is kept upon its seat and closed by the pressure of the water in the supply-pipe, and the ball or other float is used only to open said valve when the water in the cistern is lowered, thereby only requiring a small float to accomplish the result.

The invention consists in providing the casing of the valve with two passages, one containing the valve and the other containing a movable septum, the valve and the movable septum acting in opposition to each other upon a lever preferably fulcrumed to the casing and by this means normally holding said valve upon its seat and the outlet closed. The ball-float is mounted upon a float-rod pivotally connected to the valve-casing, and said rod has an arm which engages the said lever when the water in the cistern and the ball or float is lowered, thereby causing a pressure to be exerted upon the lever in opposition to the pressure exerted by the movable septum in the casing, the combined pressure of the water in the supply-pipe against the valve and that of the float against the lever being such as to overcome the pressure of the movable septum against said lever, so that the valve will be opened by the pressure upon it.

The invention is carried out substantially as illustrated in the accompanying drawings, changes therein within the scope of mechanical skill being admissible without departing from the spirit of the invention.

On the drawings, Figure 1 represents a plan view of a cistern provided with the improved supply-valve. Fig. 2 represents a longitudinal section of the cistern and supply-valve. Fig. 3 represents a longitudinal section of my invention arranged as valve to a faucet.

Similar characters of reference refer to similar parts wherever they occur on the different parts of the drawings.

The casing 1 of the supply-valve is preferably provided with a screw-threaded tubular portion which is inserted through a perforation in the side wall of the cistern 2 and by means of which the casing is securely held in proper position within the cistern, a nut 3 and jam-nut 4 being screwed upon said tubular portion outside the casing. The supply-pipe is coupled to this tubular portion by means of a suitable separable coupling or otherwise, but in such a manner as to be in free open communication with the inlet 5 within the tubular portion of the casing. The supply-pipe and the manner of coupling it to the valve-casing have not been shown on the drawings, as their construction is too well known to need any illustration or particular description.

Within the casing the inlet 5 is separated into two branches 6 and 7, which are in part parallel to each other. Within the branch 6 is located the movable septum 8, which is free to reciprocate within the part of said branch passage that is parallel to the branch 7. This movable septum is provided with a stem 9, which projects through a cap 10, covering the end of the branch 6. If so desired, this cap may be provided with a suitable stuffing-box or gland for said stem 9; but I prefer to dispense with such and to allow any water which passes the movable septum to have free exit from the casing, so as not to create a back pressure on the movable septum by water confined within the outer end of the branch 6. Within the branch passage 7 is located a valve-seat 11 for the valve 12, which valve has a stem passing through a perforation in the cap 13, covering the end of the branch passage 7. This valve is so arranged that the pressure of the water within the passage 7 will tend to hold the valve raised from its seat.

The casing 1 is provided with an outlet 14, which communicates with the passage 7 outside of the valve-seat, and a pipe 15, connected to said outlet, leads the water flowing from said outlet downward into the bottom of the cistern. The casing is provided with an ear or projection, and a lever 16 is fulcrumed at 17 to said ear in such a manner that the stem on the movable septum and the valve-stem rest against the opposite ends of

said lever in such a manner that the pressure of the water upon the movable septum tends to turn said lever in one direction upon its fulcrum, while the pressure of the water upon the valve tends to turn said lever in the opposite direction. The area of the movable septum is larger than the area of the valve, and consequently the pressure of the stem on the movable septum against the lever 16 is such that it overcomes the pressure of the valve-stem against said lever, and therefore the valve will be forced upon its seat and close the branch passage by the increased pressure of the piston. It will be understood that the same result could be obtained by increasing the length of the arm of the lever acted upon by the movable septum over that acted upon by the valve, and also the area of the movable septum and the length of the arm of the lever acted upon thereby might be increased over the area of the valve and the length of the arm of the lever acted upon thereby and the same result be accomplished.

From the above description it will be seen that the valve is normally held upon its seat and closed independent of the level of the water in the cistern.

Upon the ear on the valve-casing, at 18, is fulcrumed the float-lever 19, and upon the free end of this lever is mounted a suitable float, preferably in the form of the usual hollow ball 20. The float-lever 19 has an arm 21, which projects downward against the arm of the lever 16, which is acted upon by the movable septum, but on the opposite side of said arm. Thus the arm on the float-lever acts upon the lever 16 in opposition to the movable septum, and said arm is caused to act on said lever when the float 20 moves downward with the level of the water in the cistern.

The increased pressure brought to bear upon the lever 16 in opposition to the pressure of the movable septum upon said lever will turn said lever on its fulcrum and allow the pressure of the water in the branch passage 7 to force the valve 12 from its seat and discharge water through the outlet 14 and pipe 15 into the cistern until the level of the water in the cistern has been raised to its normal position, when the pressure of the arm 21 will be removed from the lever 16, and thereby allow the movable septum to turn said lever on its fulcrum, so as to close the valve.

By having the valve-stem and the stem on the movable septum act upon a lever which is separated from the float-lever said float-lever, with its attached float, may be disconnected from the valve-casing for repairs without water escaping from the pipe and without removing the valve, as the valve will remain closed without said float or float-lever. A smaller float can be used, and therefore there is more room in the cistern for the operation of other devices to be contained therein, and the valve will be more sensitive and operate more easily.

It often happens that the float of supply-valves now in common use becomes detached from the float-rod, and as these valves are kept closed only by the buoyancy of the float when the cistern is sufficiently full it will be seen that in such a case there is nothing left to close the valve when the float is disconnected. Therefore the water will continue to flow and overflow the cistern, which in many cases causes great damage. By the use of my improved valve, which is kept closed independent of the float and in which the combined weight of the float and float-rod is required to cause the valve to open, it will be seen that there is no danger of the cistern being overflowed by the disconnection of the float from the float-rod, as the valve will be immediately closed by the pressure of the water.

This my improved valve is not only applicable to supply-valves for cisterns to be operated by the action of a float upon a float-rod or by equivalent and well-known mechanism, but is also applicable as a valve for a faucet and in many other places where a self-closing valve is desired. I have illustrated an application of my invention to a faucet in Fig. 3. In this construction of my invention the relative positions of the passages 6 and 7 are preferably the reverse from those shown in Figs. 1 and 2. The delivery-pipe 15 is dispensed with, and the branch passage 7 is provided with an open mouth through which the water is discharged. The lever 19 is not provided with a float, but extends upward and is so shaped at its upper end as to be convenient to be operated by hand in order to remove the influence of the pressure of water upon the movable septum 8 from the valve 12 and to allow the pressure of the water on the valve to open the valve and cause water to flow from the faucet.

If it is desired to draw water from the faucet, the upper end of the lever 19 is forced backward against the influence of the pressure of the liquid on the movable septum, and this movement will remove the influence of the pressure of the movable septum from the valve.

I am aware that supply-valves for cisterns have been made with a valve and a movable septum pressing directly against the float-lever in opposition to each other by the action of water in the supply-pipe and that several arrangements of such a device have been patented by others. I do not wish to claim such as my invention.

Having thus fully described the nature, construction, and the operation of my invention, I wish to secure by Letters Patent and claim—

1. In a supply-valve for cisterns, a casing, a lever pivotally mounted thereon, a valve pressed against said lever by the pressure of water in the supply-pipe, a movable septum of greater area than the valve pressed against said lever by the pressure of water in the supply-pipe and in opposition to said valve, and

a float-lever with its attached float pivotally mounted upon said casing independent of the other lever, and an arm on the float-lever pressed against the other lever in opposition to said movable septum, for the purpose set forth.

2. In a supply-valve for cisterns, a casing having inlet-passage, two branch passages connected with said inlet, and a valve-seat in one of said branch passages, a valve in the branch passage having the valve-seat, a movable septum in the other branch passage, said valve and movable septum being pressed outward by the pressure of the water in said passages, a lever pivotally mounted on said casing and acted upon by said valve and movable septum in opposition to each other so as to normally hold said valve upon its seat, a float-lever with its attached float pivotally mounted upon said casing independent of the valve and movable septum-operated lever, and acting against said lever in opposition to the movable septum when the level of the

water in the cistern is lowered and the float moves downward, in order to raise said valve from its seat, for the purpose set forth.

3. In a valve, a casing, a lever pivotally mounted thereon, a valve pressed against said lever by the pressure of the water in the casing, a movable septum also pressed against said lever in opposition to the valve by the pressure of the water in the casing, and a second lever pivotally mounted upon the casing independent of the first lever to remove the pressure of the movable septum from the valve and allow the valve to be opened by the pressure upon it, for the purpose set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 25th day of October, A. D. 1897.

GEORGE J. THOMAS.

Witnesses:

HENRY CHADBURN,
DANIEL CEDERBERG.