No. 638,740. Patented Dec. 12, 1899.

J. T. MORRISON.

AUTOMATIC TANK VALVE.

(Application filed Feb. 17, 1899.)

(No Model.)

Fig. 1.

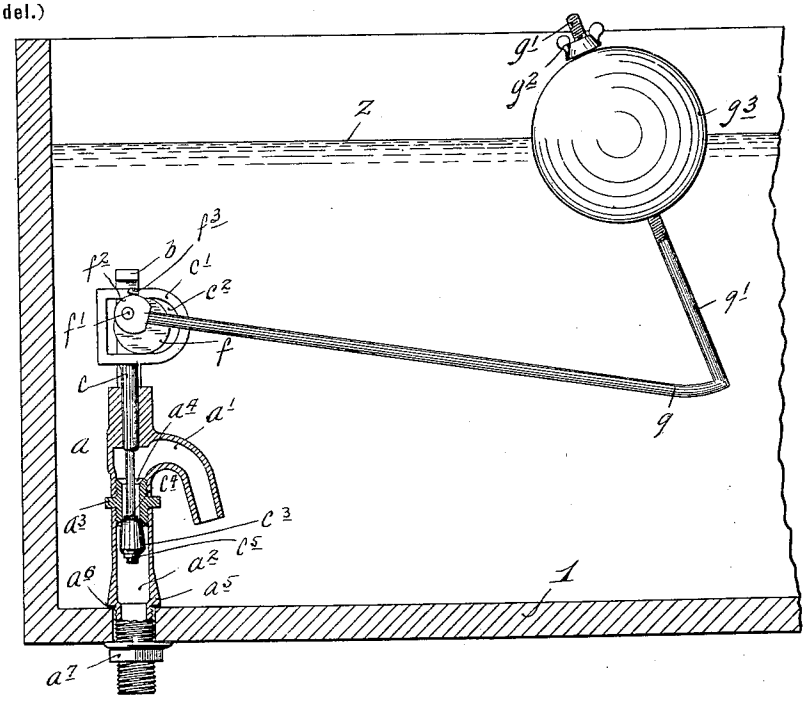


Fig. 2.

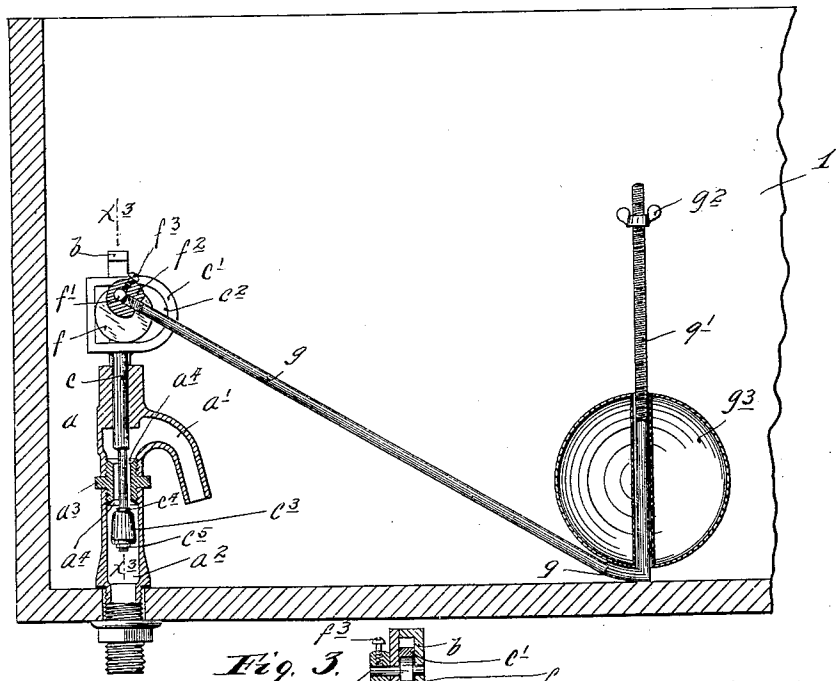
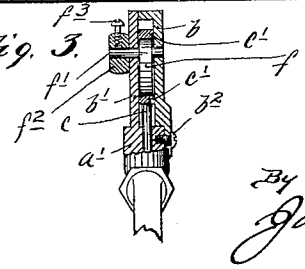


Fig. 3.



Witnesses.

Harry Kilgore

F. D. Merchant.

Inventor.

John T. Morrison.

By his Attorney.

Jas F. Williamson

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOHN T. MORRISON, OF MINNEAPOLIS, MINNESOTA.

AUTOMATIC TANK-VALVE.

SPECIFICATION forming part of Letters Patent No. 638,740, dated December 12, 1899.

Application filed February 17, 1899. Serial No. 705,761. (No model.)

To all whom it may concern:

Be it known that I, JOHN T. MORRISON, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Automatic Tank-Valves; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has for its object to provide an automatic tank-valve of improved construction; and it relates particularly to that type of automatic valve which is operated by a float to control an intermittent flow of water into a flushing-tank.

The invention consists of the novel devices and combinations of devices hereinafter described, and defined in the claims.

The preferred form of the invention is illustrated in the accompanying drawings, wherein like characters indicate like parts throughout the several views.

Figure 1 is a view principally in vertical transverse section, but with some parts shown in full, illustrating my improved valve mechanism applied to an ordinary flushing-tank, some parts of said tank being broken away. Fig. 2 is a similar view to Fig. 1, but illustrates different positions of the parts; and Fig. 3 is a view, partly in side elevation and partly in vertical section, on the line x^3 x^3 of Fig. 2.

The numeral 1 indicates an ordinary flushing-tank adapted normally to contain a body of water z, the normal level of which is indicated in Fig. 1. My improved valve mechanism controls the supply of water to this tank, and in its preferred form the valve involves a faucet-like or tubular body, (indicated as an entirety by the character a,) being composed of two sections a' and a^2 and an interposed thimble-like valve-seat a^3. In this preferred construction the valve-seat a^3 has screw-threaded ends which work in corresponding internal threads in the adjacent ends of the sections a' and a^2, and it is here very important to note that the said valve-seat has valve engaging or seating surfaces a^4 at each end, thus adapting it to be reversed end for end for a purpose to be hereinafter more thoroughly considered. The faucet-section a^2 has a shoulder a^5, which engages a packing ring or washer a^6 to form a water-tight joint with the bottom of the tank 1, and the lower portion of this section a^5 depends through the bottom of the tank 1 and is provided with screw-threads, on which a nut a^7 works to clamp the same in working position. The lower end of the section a^2 is in communication through suitable connections (not shown) with a water-main or other suitable source of water-supply.

Rising from the upper portion of the section a' is a yoke-like bracket or support b b', the side b, as shown, being removably held in place by a screw b^2.

A valve-stem c is mounted to reciprocate vertically in a suitable seat formed in the upper portion of the faucet-section a', with its depending lower end working axially through the valve-seat thimble a^3 without engagement therewith. At its upper end and between the sides of the bracket b b' the valve-stem c is formed with an eccentric-strap or flattened head c', in which a transversely-extended seat c^2, having parallel upper and lower edges, is cut or formed. The rear wall of said eccentric-seat is made straight, and thus serves as a stop for the eccentric to prevent undue turning thereof as the valve opens, as will be clearly apparent from Fig. 2. At its lower end the valve-stem c is provided with a valve-head or ball c^3, which is preferably of rubber and which, as shown, is clamped between a shoulder c^4 and a nut c^5 on the said stem. It is very important to here note that in virtue of the above construction the valve-head c^3 is so disposed that it will be closed by the pressure of the water flowing or tending to flow into the tank.

Working within the seat c^2 in the head or eccentric-strap of the valve-stem is an eccentric f, which is rigid on a shaft or pin f', mounted in the sides of the bracket b b'. This shaft f' is provided with a hub or collar f^2, that is adjustably secured thereto, as shown, by means of a set-screw f^3.

Rigidly secured to and projecting from the hub or collar f^2 is an arm g, the outer end of which is turned upward to form a stem-section g', the upper end of which is screw-threaded and is provided with a nut g^2.

Working on the stem g', below the nut g^2, is an air bulb or float g^3, which is free to move up and down between the said nut g^2 and the end of the arm g.

The operation of the valve mechanism above described is substantially as follows: Normally the tank 1 is partially filled with water—for example, as illustrated in Fig. 1—and under this condition the float g will be raised and will hold the valve-head c^3 in its closed position, tightly pressed against the coöperating seating-surface a^4 of the valve-seat thimble or section a^3. In this closed position the pressure of the water in the faucet-section a^2 will coöperate to hold the valve c^3 in its closed position. When the water is drawn off from the tank 1, as by means of a flushing-valve, (not shown,) the float g^3 will begin to lower as the level of the water lowers; but the valve-head c^3 will be held closed by the pressure of the water against it until the said float falls against the free end of the arm g, and then the said valve-head c^3 will be quickly moved into its open position, as indicated in Fig. 2. As is obvious, when the valve-head c^3 is in its open position water may readily flow into the tank 1 through the faucet a and the tank will be again charged with water. The initial upward movement of the float g^3 will move it on the stem g' until it is brought into engagement with the nut g^2, and then the further upward movement of the float will raise the arm g and move the valve-head c^3 back into its closed position. Thus it will be seen that the valve-head c^3 is moved into its open position by the final portion of the float's downward movement and will be moved into its closed position by the final portion of the said float's upward movement. Furthermore, it is important to note that by adjusting the nut g^2 on the screw-threaded stem g' the valve may be set to close at any desired altitude of the column of water z. The eccentric f always keeps engagement with the seat c^2 in the head of the stem c, and thus positively forces the valve c^3 in both directions in which it moves it and at all times keeps the said valve-head from jumping or vibrating. By adjusting the hub or collar f^2 on a shaft f' the valve-head c^3 may be set for any desired clearance with the coöperating surface a^4 when opened.

It is a well-known fact that the action of the water and the small particles of sand or dirt usually carried thereby in passing under high pressure between the open valve-head and its seat will in time cut and wear the coöperating surface of the valve-seat, thus in time often rendering the same useless. As one feature of my present invention, which feature has been already noted, I make the valve-seat or thimble-section a^3 reversible end for end, and thereby double the length of the life of the same. However, with the arrangement whereby the valve-head or valve proper closes with the pressure of the water which passes through the faucet or valve device, the valve being more quickly and positively closed, less wear is put upon the valve-seat than has been the case in prior constructions, wherein the valve is caused to close against the pressure of the inflowing water.

It will of course be understood that my invention above described is capable of many modifications in the details of its construction.

What I claim, and desire to secure by Letters Patent of the United States, is as follows:

1. The combination with the tank, of an inlet-valve casing provided with the yoke-like guide-bracket, having one of its sides removable, the valve in said casing having the strap on the protruding part of step guided by the yoke-like bracket, a float in said tank provided with an eccentric working within the strap, said strap having a straight portion to form a stop for the eccentric.

2. The combination with the tank, of an inlet-valve casing extended upward beyond the outlet-opening therefrom, a valve in said casing, and means to control said valve comprising a lever g having an upturned arm, a float freely sliding on the upturned arm of said lever, means on said arm to adjust the extent of upward travel of the float, and connections between the opposite end of the said angle-lever and the valve.

3. The combination of a tank, of an inlet-valve casing extended upward beyond the outlet-opening, a valve in said casing having a stem extending upward therefrom and formed with an eccentric-seat, one of the walls of which acts as a stop to prevent undue turning of the eccentric, an arm secured to said eccentric and a float operative by the water in the tank to move the eccentric.

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

JOHN T. MORRISON.

Witnesses:
M. M. McGRORY,
F. D. MERCHANT.