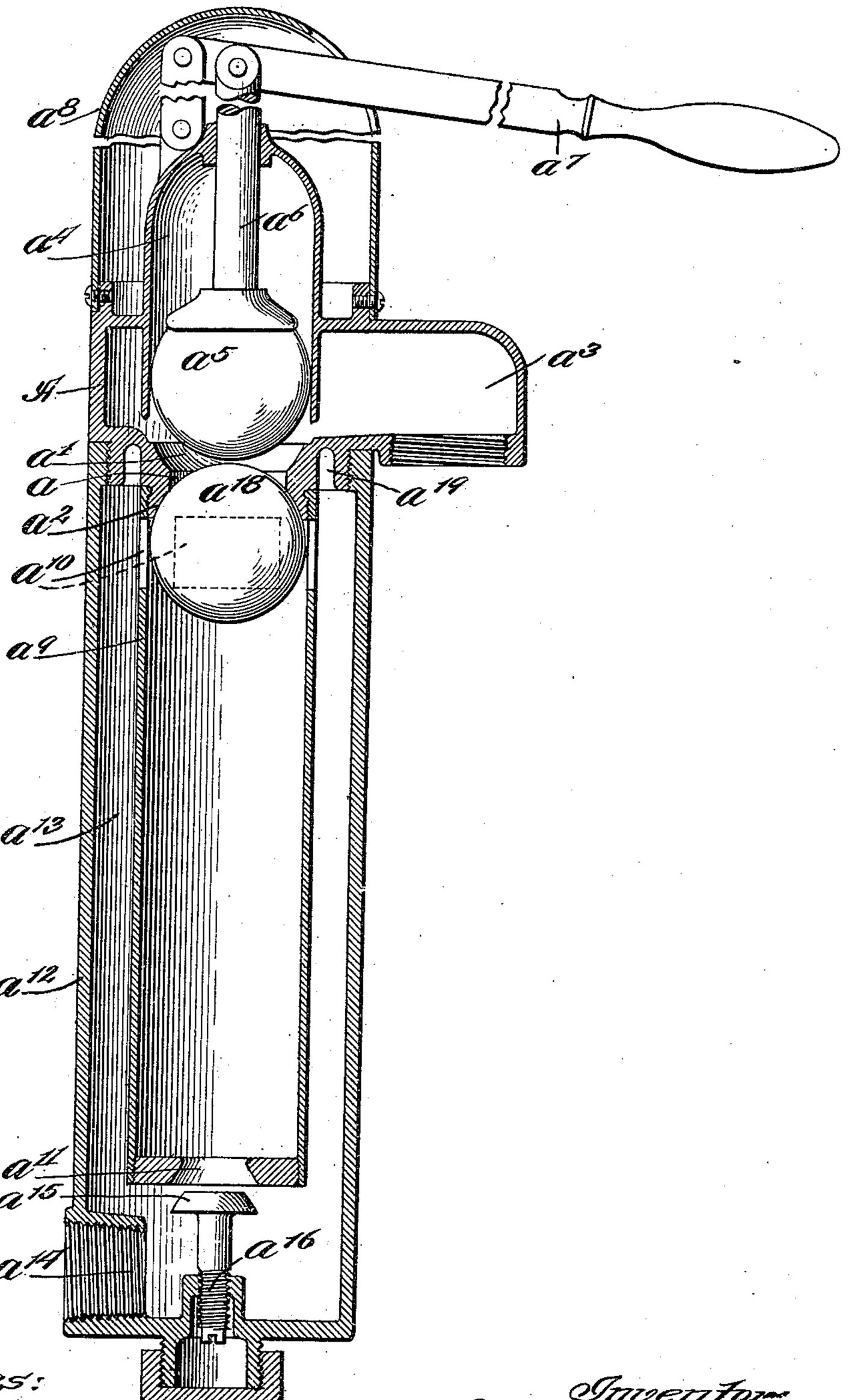
A. DUFTY.

AUTOMATIC FLUSHOMETER VALVE.

APPLICATION FILED DEC. 20, 1909.

990,530. Patented Apr. 25, 1911.



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UNITED STATES PATENT OFFICE.

ARTHUR DUFTY, OF LA FAYETTE, INDIANA, ASSIGNOR OF ONE-HALF TO FRANK L. NAPIER, OF ST. JOSEPH, MICHIGAN.

AUTOMATIC FLUSHOMETER-VALVE.

990,530. Specification of Letters Patent. Patented Apr. 25, 1911.

Application filed December 20, 1909. Serial No. 534,011.

To all whom it may concern:

Be it known that I, ARTHUR DUFTY, a citizen of the United States of America, and resident of La Fayette, Tippecanoe county, Indiana, have invented a certain new and useful Improvement in Automatic Flushometer-Valves, of which the following is a specification.

My invention relates to valves for measuring off a certain predetermined quantity of liquid. For example, in the flushing of closets, automatic valves are often used in place of the usual tank and siphon. Valves of this kind are sometimes called flushometer valves.

My invention contemplates a flushometer valve in which a ball is normally seated against the opening through which the water must pass, and in which means are provided for displacing the ball when a discharge is desired, the said ball, although of greater specific gravity than the water, being held normally seated by the pressure of the water, and the return of the ball to normal position, after falling to the bottom of its chamber, being slow enough, with any given pressure, to permit the desired quantity of water to escape before the opening is again closed.

Thus constructed, the object of my invention is to insure greater accuracy and certainty of operation than was heretofore possible in the use of devices of this kind.

In the accompanying drawings, the single figure is a vertical section of a valve of this kind involving the principles of my invention.

As thus illustrated, the cylindric valve casing A has an interior central opening a, a valve seat a' at the upper end thereof, and a similar valve seat a^2 at its lower end. An outlet a^3 leads from the interior of said valve seat. The top of said valve casing A has a dome-shaped chamber a^4 that is open at its bottom, and that contains the ball a^5. This ball is secured to the lower end of the rod a^6 which is suitably connected with an operating lever or other member a^7. A dome or cap a^8 covers the inner connections of said lever, as well as the top of the valve casing. The ball a^5 is adapted to rest against the upper valve seat a', when the lever a^7 is depressed. At such time no water can pass from the opening a to the outlet a^3. The upper end of the tube a^9 is secured to the lower end of the valve casing, has the upper openings a^{10} in the sides thereof, and the lower or bottom opening a^{11}, which openings are all inlets through which the water enters the tube during a discharge. The tube a^{12} is of greater diameter than the tube a^9, and has its upper end secured to the bottom of the valve casing A. The tube a^9 is arranged within the tube a^{12}, with space a^{13} between, and the outer tube a^{12} has a bottom inlet a^{14} which is threaded to receive the main water pipe. A throttle-valve a^{15} has a threaded stem a^{16} which is mounted in the bottom of the tube a^{12}, and which has a slotted lower end adapted to be engaged by a screw driver or other tool. A cap a^{17} covers the lower end of said stem a^{16}, whereby it is less liable to be tampered with. The valve a^{15} regulates the flow of water through the opening a^{11} and into the tube a^9. A ball a^{18} is adapted to rest against the valve seat a^2, and is of only slightly less diameter than the interior of the tube a^9. The ball a^{18} is of greater specific gravity than the water, whereby the said ball will fall by gravity in the tube a^9 while the water therein is not moving, and while the ball a^5 closes the opening a.

When the lever a^7 is depressed, the ball a^5 displaces the ball a^{18} and closes the opening a. The ball a^{18} then falls to the bottom of the tube a^9, but starts to rise again as soon as the ball a^5 is released from the seat a'. The upward flow of water in the tube a^9 carries the ball a^{18} upward, and during this time the water passes upwardly in the tube a^{12}, through the openings a^{10} and a, and escapes through the outlet a^3. The ball, of course, being heavier than the water, does not rise as fast as the water flows, and hence a considerable discharge will take place before the ball reaches the seat a^2. The flow of water then ceases, and the pressure holds the ball a^{18} against the seat a^2, thus holding the water in check until the lever is again depressed. The volume of water discharged is determined by the valve a^{15}. After this valve is set for a certain quantity of water, then the same quantity will always be discharged, regardless of variations in the pressure. The annular recess a^{19} at the top of the chamber a^{13}, formed in the bottom of the valve casing, acts as an air cushion to prevent chugging when the water is cut off by the lower ball.

If desired, any suitable means, such as a spring or other similar device, can be used for keeping the ball a^5 normally raised, as shown in the drawings. The tube a^{12} constitutes the main supply passage or tube, whereas the inner tube a^9 constitutes an auxiliary passage or by-pass tube, both of said tubes leading to the passage a through which all of the liquid must pass in order to escape. My invention, therefore, contemplates the use of a gravity member in a by-pass tube or passage for the liquid. The upper ball may be of either greater or less specific gravity than the water, or other liquid, and may be either fixed or loose. The shoulder on the rod a^6 serves to prevent leakage through the top of the valve casing, around the rod, during a discharge.

What I claim as my invention is:

1. In a valve, an outlet, a main supply passage, an auxiliary passage having connection at its top and bottom with said main passage, oppositely disposed valve seats at the top of said auxiliary passage and adjacent to the upper connection between the two passages, a normally seated gravity valve in said auxiliary passage adapted to move freely therein, and to entirely close the flow of liquid to the outlet, a second valve adapted to displace the gravity valve and to also close the flow of liquid to the outlet to allow of the descent of the gravity valve, and means for regulating the speed of the rise of said gravity valve.

2. In a valve, an outlet, a main supply passage, an auxiliary passage having connection at its top and bottom with said main passage, oppositely disposed valve seats at the top of said auxiliary passage and adjacent to the upper connection between the two passages, a normally seated gravity valve in said auxiliary passage adapted to move freely therein, and to entirely close the flow of liquid to the outlet, a second valve adapted to displace the gravity valve and to also close the flow of liquid to the outlet to allow of the descent of the gravity valve, means for closing and opening said second valve, and means for regulating the speed of the rise of said gravity valve.

Signed by me at West La Fayette, Indiana, this 17th day of December, 1909.

ARTHUR DUFTY.

Witnesses:
JOE SLATER,
W. H. GUNKLE.