W. H. BOWMAN.

FLUSHOMETER.

APPLICATION FILED JUNE 9, 1910.

988,623. Patented Apr. 4, 1911.

FIG. 1.

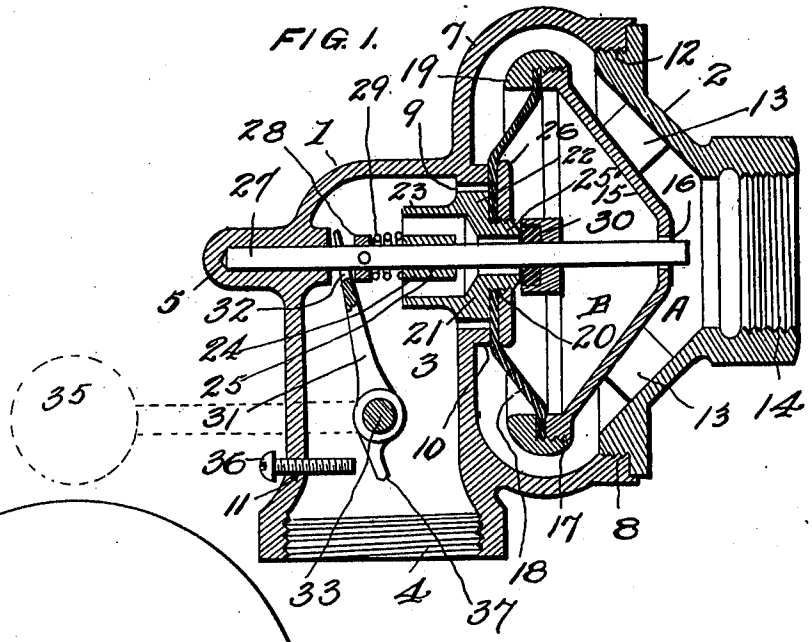

FIG. 3.

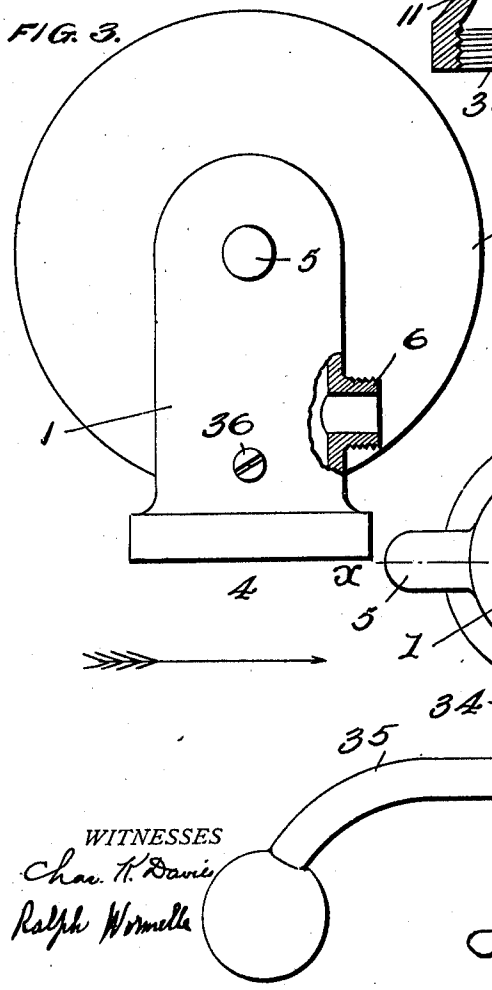

FIG. 2.

WITNESSES

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FLUSHOMETER.

988,623. Specification of Letters Patent. Patented Apr. 4, 1911.

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To all whom it may concern:

Be it known that I, WALTER H. BOWMAN, a citizen of the United States, residing at Dover, in the county of Strafford and State of New Hampshire, have invented certain new and useful Improvements in Flushometers, of which the following is a specification.

The object of my invention is the provision of an effective valve mechanism for use in flushing bowls and closets, and for other purposes, which, when positively started into operation, will discharge a predetermined quantity of fluid and then automatically close; said mechanism to be adapted for freely discharging at the outlet all the fluid which can pass at the delivery inlet.

A further object is the provision of means for regulating or varying the quantity of fluid discharged.

A further object is the provision of mechanism which will be of very simple construction, relatively cheap in first cost, light in weight, not liable to become deranged or clogged and hence inoperative, and which shall effectively and with certainty perform the desired functions.

With these ends in view, my invention consists in certain novelties of construction and combinations and arrangements of parts substantially as herein set forth and claimed.

The accompanying drawing illustrates an example of the physical embodiment of the invention constructed according to the best mode I have so far devised for the practical application of the principle.

Figure 1 is a view in central section taken on line *x*—*x* of Fig. 2 of the complete device. Fig. 2 is a top plan view. Fig. 3 is an end view in elevation looking in the direction of the arrow, the operating handle being omitted.

Referring to the several figures, the body of the flushometer comprises two castings 1 and 2 of any suitable material. The casting 1 has a cylindrical discharge chamber 3 with an outlet 4 threaded to receive a threaded pipe which is in communication with a bowl or vessel to be flushed, a bearing or seat 5 closed at one end for a valve stem, an opening 6 in the wall with a bearing for a rotary operating rod, a hollow cylindrical portion 7 with a threaded edge 8, a circular discharge outlet 9 provided with a circular flange 10 constituting a valve seat, and a hole 11 to receive a screw.

The casting 2, which may be called the cover, is of a truncated conical shape having threads 12 at the edge to engage the threaded edge 8, spacing pieces 13 on its inner surface, and an interiorly threaded delivery inlet 14 to receive the threaded end of a water supply pipe.

The inclosed space between the discharge outlet 9 and the delivery inlet 14 constitutes the delivery chamber A and within it is located a valve chamber B formed by a casting 15 of a conical shape with a central hole 16 for a valve stem, and a threaded edge 17, the exterior surface of the conical shaped body or disk bearing against the spacing pieces 13 or, if preferred, cast integral with them and the casting 2, and a flexible diaphragm 18 of leather or other suitable material with its outer circumferential edge clamped to the outer edge of the conical casing 15 by a threaded collar or ring 19 engaging with threaded edge 17, as shown.

The number 20 designates a hole through the center of the flexible diaphragm; 21, a hollow casting with a disk 22 slightly smaller in diameter than the diameter of the discharge outlet 9, a portion 23 of somewhat less diameter than the disk 22, a spider 24 with a hole 25 for the valve stem, and a threaded stem 25′ passed through the opening in the diaphragm, the end thereof constituting a seat for a valve; 26, a threaded disk clamping the edge of the diaphragm about the central opening therein against the disk 22; 27, a valve stem; 28, a collar fixed on the valve stem; 29, a spring bearing against the spider 24 and the collar; 30, a valve in the chamber B and fixed to the valve stem; 31, an operating lever having a hole at one end and a fork 32 at the other end straddling the valve stem; 33, an operating rod within the hole at one end of the lever and passed through the opening 6 in the wall of the casting; 34, a stuffing box; 35, a weighted operating handle actuated by gravity; and 36 is a set-screw adjustable relative to the end 37 of the lever to limit its travel and the longitudinal movement of the valve stem.

It will be observed that the valve stem has two bearings, one end being movable in the bearing or seat 5 and the other end movable within the hole 16 in the casting 15, the hole being slightly larger than the diameter of the valve stem so water can pass from the chamber A to the chamber

B. Further, that the casting 21 can move relative to the valve stem and that the spring 29 normally holds the valve 30 against the end of the stem 25′ which constitutes a seat for the valve.

The parts occupying the relative positions shown in Fig. 1 and the chambers A and B being filled with water, the diaphragm obviously closes the discharge outlet. By raising the weighted handle the valve stem is moved longitudinally and the valve 30 unseated, allowing water from the chamber B to pass through the hollow casting 21 to the discharge chamber. When sufficient water has been discharged, the water in chamber A pressing on the diaphragm moves it rearwardly and opens the discharge outlet, allowing water to pass freely to the bowl to be flushed. When the operating handle is released the valve stem moves under the action of the spring and seats the valve 30. Water passing through hole 16 gradually fills chamber B and moves the diaphragm to its seat, closing the discharge outlet. As the hollow casting moves with the diaphragm the smaller end 23 partly closes the discharge outlet and allows sufficient water to pass to refill the flushed bowl or other vessel.

By the adjustment of the set-screw the travel of the lever and valve stem is regulated and thus the quantity of water which can pass the discharge outlet is controlled, as is obvious.

One important feature of the operation of the device is the continuous movement of the valve stem in the feed hole or opening 16 which prevents the feed opening around the stem becoming clogged by dirty water or foreign substances or through the corrosion of the metallic surfaces.

From the foregoing description taken in connection with the drawing it is clear that I have produced a valve mechanism which fulfils all the conditions set forth as the end and purpose of my invention.

What I claim is:—

1. A valve mechanism having an outlet, a delivery chamber with an inlet, a discharge outlet from the delivery chamber, a valve chamber within the delivery chamber one of the inclosing walls of which consists of a flexible diaphragm, which diaphragm is adapted to close the discharge outlet, an element with a passage therethrough movable with the diaphragm, a valve stem, a valve carried by the valve stem and adapted to close the passage through the said element movable with the diaphragm, and means for moving the valve stem and unseating the valve so fluid can pass from the valve chamber through the element movable with the diaphragm; there being an opening from the delivery chamber to the interior of the valve chamber for the passage of fluid from the former to the latter, and the valve stem being located within said opening whereby its movements will dislodge any foreign matter which may become lodged in said opening.

2. A valve mechanism having an outlet, a delivery chamber with an inlet, a discharge outlet from the delivery chamber, a valve chamber within the delivery chamber one of the inclosing walls of which consists of a flexible diaphragm, which diaphragm is adapted to close the discharge outlet, a hollow casting secured to and movable with the diaphragm, said casting having an extension 23 of smaller area than the area of the discharge outlet 9 so as in operation to gradually close the outlet and provide for the refill, a valve stem loosely engaging its bearings, a valve carried by the valve stem and adapted to close the passage through the said element movable with the diaphragm, means for moving the valve stem and unseating the valve so fluid can pass from the valve chamber through the element movable with the diaphragm, and means for positively moving the valve to its seat and closing the said passage; there being an opening from the delivery chamber to the interior of the valve chamber for the passage of fluid from the former to the latter, and the valve stem being located and movable within said opening.

3. A valve mechanism having an outlet, a delivery chamber with an inlet, a discharge outlet from the delivery chamber, a valve chamber within the delivery chamber one of the inclosing walls of which consists of a flexible diaphragm, which diaphragm is adapted to close the discharge outlet, an element with a passage therethrough movable with the diaphragm, a valve stem, a valve carried by the valve stem and adapted to close the passage through the said element movable with the diaphragm, and means consisting of a lever and an operating handle for moving the valve stem and unseating the valve so fluid can pass from the valve chamber through the element movable with the diaphragm; there being an opening from the delivery chamber to the interior of the valve chamber for the passage of fluid from the former to the latter, and the said valve stem loosely engaging its bearings, being movable independently of the said lever and one end located within the said opening to the valve chamber.

4. A valve mechanism having an outlet, a delivery chamber with an inlet, a discharge outlet from the delivery chamber, a valve chamber within the delivery chamber one of the inclosing walls of which consists of a flexible diaphragm, which diaphragm is adapted to close the discharge outlet, an element with a passage therethrough movable with the diaphragm, a valve stem, a valve

carried by the valve stem and adapted to close the passage through the said element movable with the diaphragm, means for moving the valve stem and unseating the valve so fluid can pass from the valve chamber through the element movable with the diaphragm, and a spring located upon the stem within the discharge chamber and bearing at one end against a washer on the stem and at the other end against the element movable with the diaphragm for reseating the valve and closing the said passage; said valve stem loosely engaging its bearings and being movable in one direction independently of the movement of the means for operating the same and unseating the valve, there being an opening from the delivery chamber to the interior of the valve chamber for the passage of fluid from the former to the latter, and the valve stem being located and movable within said opening.

5. A valve mechanism comprising two castings 1 and 2 united and forming a discharge chamber and a delivery chamber with a discharge outlet between the two, a valve chamber within the delivery chamber one of the inclosing walls of which consists of a flexible diaphragm, which diaphragm is adapted to close the discharge outlet, an element with a passage therethrough movable with the diaphragm, a valve stem, a valve carried by the valve stem and adapted to close the passage through the said element movable with the diaphragm, and means for moving the valve stem and unseating the valve so fluid can pass from the valve chamber through the element movable with the diaphragm; there being an opening from the delivery chamber to the interior of the valve chamber for the passage of fluid from the former to the latter, the means for moving the valve stem and valve being partly located within the discharge chamber, and one end of the valve stem being movably located within the opening from the delivery chamber to the valve chamber.

6. A valve mechanism having an outlet, a delivery chamber with an inlet, a discharge outlet from the delivery chamber, a valve chamber in the delivery chamber one of the inclosing walls of which consists of a flexible diaphragm, which diaphragm is adapted to close the discharge outlet, an element with a passage therethrough movable with the diaphragm, a valve stem, a valve carried by the valve stem and adapted to close the passage through the said element movable with the diaphragm, means for moving the valve stem and unseating the valve so fluid can pass from the valve chamber through the element movable with the diaphragm, and means for regulating the travel of the valve stem in unseating the valve; there being an opening from the delivery chamber to the interior of the valve chamber for the passage of fluid from the former to the latter, and means in operative connection with a movable element of the valve for preventing the stoppage of said opening by foreign matter in the fluid.

7. A valve mechanism having a discharge chamber with an outlet, a delivery chamber with an inlet, a discharge outlet between the discharge chamber and the delivery chamber, a valve chamber within the delivery chamber inclosed by a disk and a flexible diaphragm, a hollow casting secured to and movable with the diaphragm, a valve stem passed through the hollow casting and a hole in the said disk, a valve upon the valve stem adapted to close the opening through the hollow casting, and means for reciprocating the valve stem and moving the valve from its seat; there being an opening between the said valve stem and the wall bounding the hole in the said disk so fluid can pass from the delivery chamber to the valve chamber.

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

WALTER H. BOWMAN.

Witnesses:
RALPH S. MARSH,
ALICE E. MOULTON.