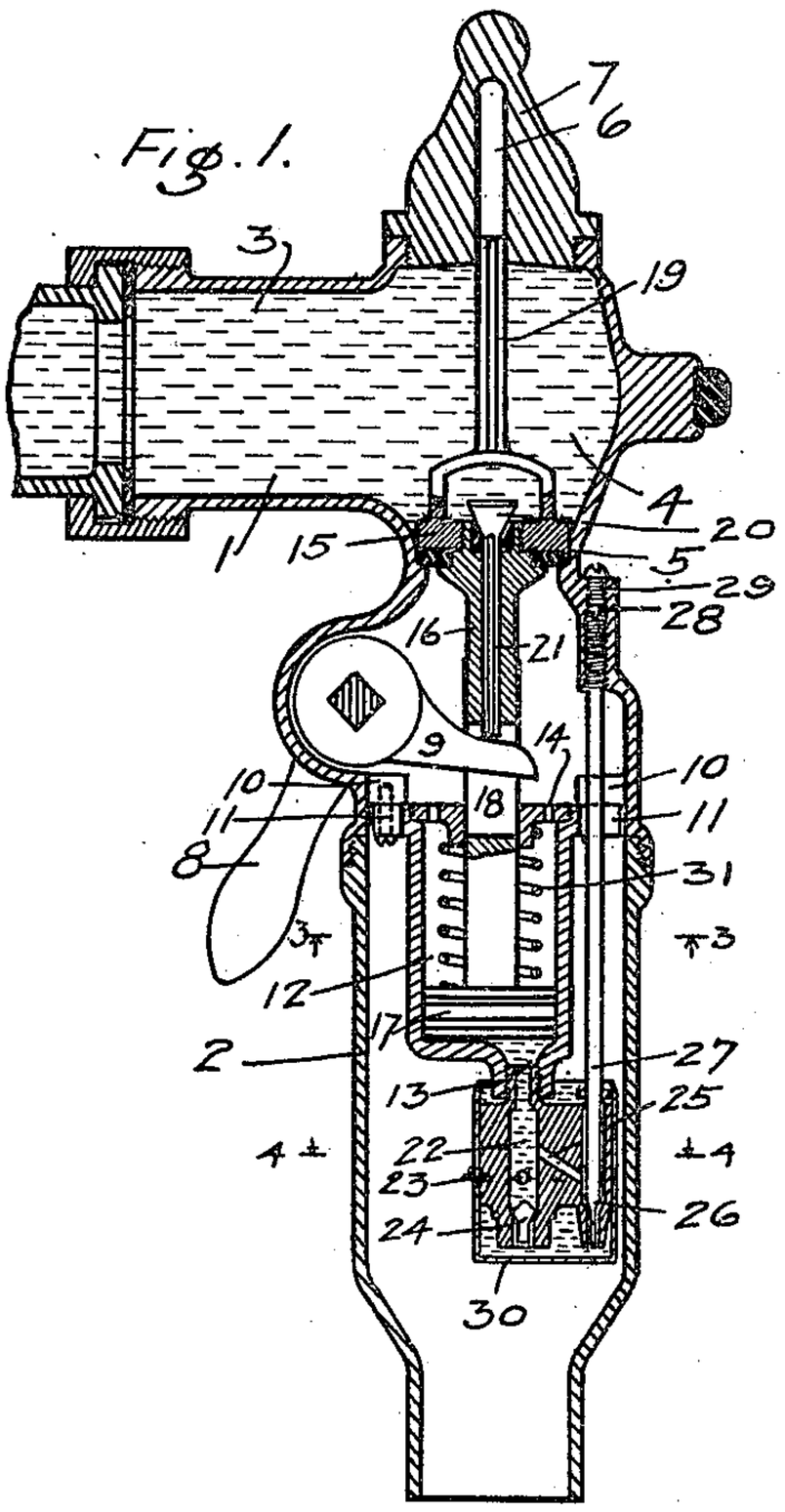
J. F. THORSK.

FLUSHOMETER.

APPLICATION FILED JUNE 3, 1909.

993,912. Patented May 30, 1911.

Fig. 1.



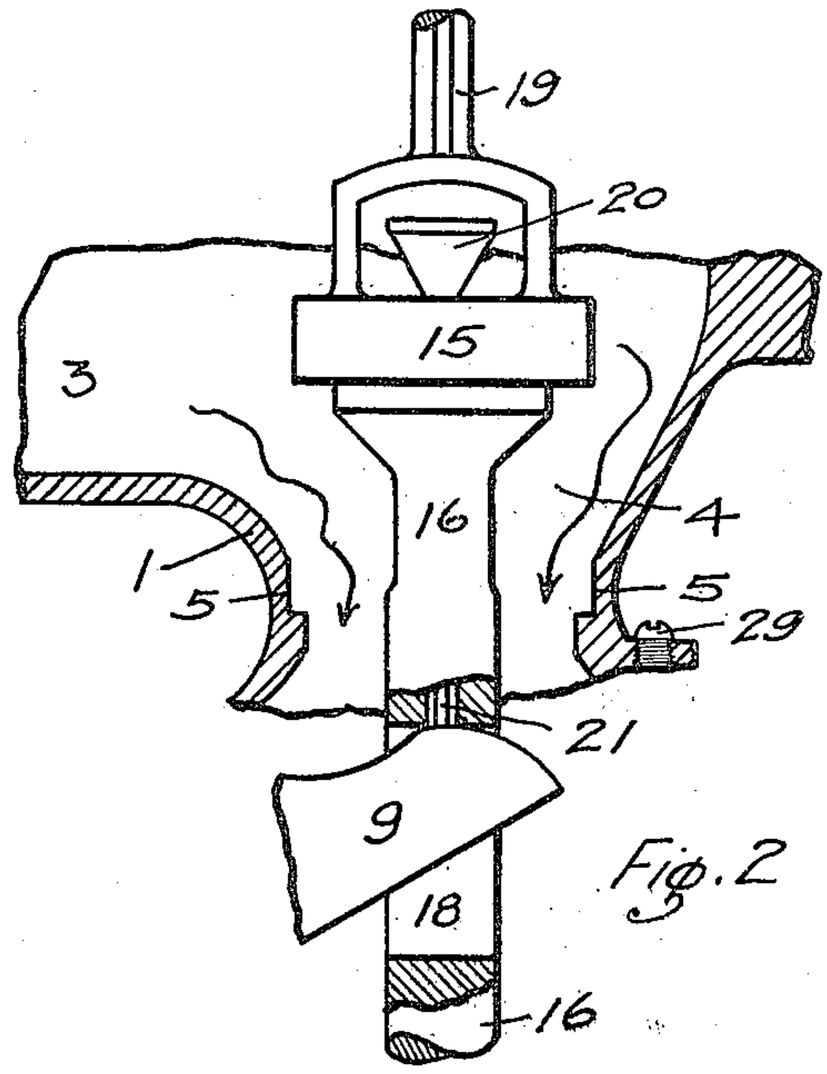


Fig. 2

Fig. 3

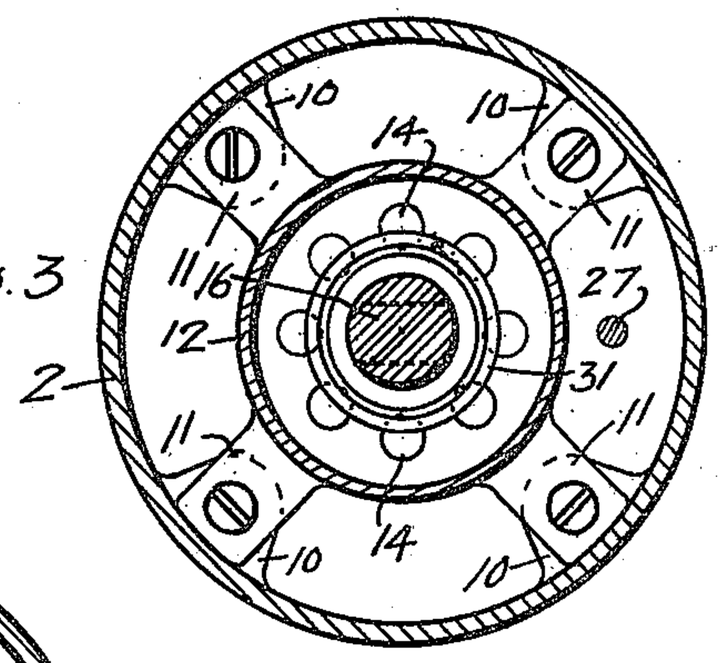
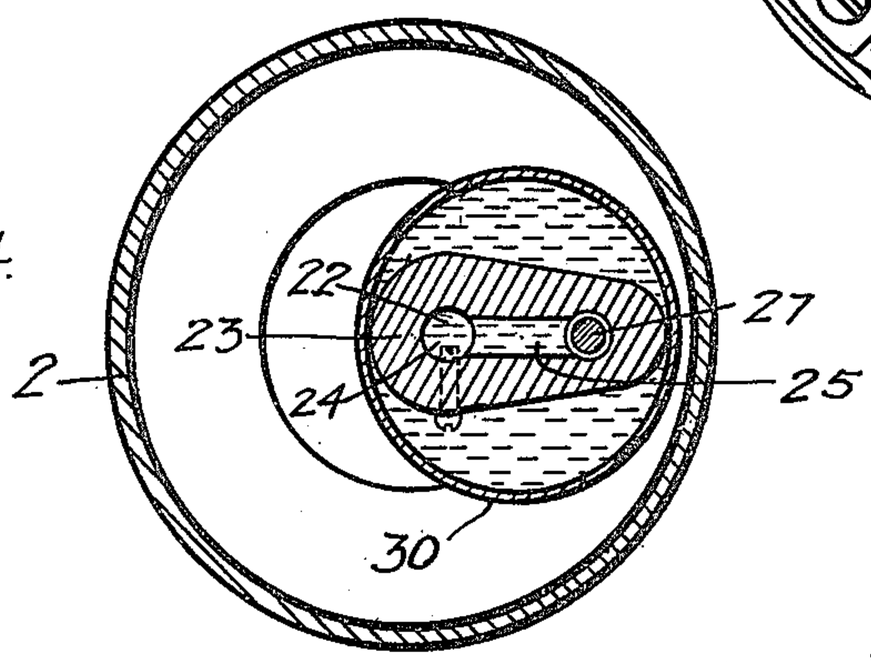


Fig. 4.



Witnesses

M. D. McNeil

B. V. Piercy.

Inventor

John F. Thorsk

By P. D. Elliott

Attorney

UNITED STATES PATENT OFFICE.

JOHN F. THORSK, OF TACOMA, WASHINGTON.

FLUSHOMETER.

993,912. Specification of Letters Patent. Patented May 30, 1911.

Application filed June 3, 1909. Serial No. 499,888.

To all whom it may concern:

Be it known that I, JOHN F. THORSK, a citizen of the United States of America, residing at Tacoma, in the county of Pierce and State of Washington, have invented certain new and useful Improvements in Flushometers, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to devices for automatically shutting off the flow of water in a pipe and is especially adapted for use in water closets. Its objects are to provide a device which will operate equally well under any pressure of water from a few pounds per square inch to one hundred and fifty pounds per square inch; which can be adjusted to control the rate of action of the parts to suit the pressure of the water and the circumstances of the case; which does not depend on the compression of air for its control; and in which a sufficient quantity of water is always held in the apparatus to insure is proper operation.

Other objects are to improve the construction and arrangements of the parts so that they are easy of access and so that they will not become clogged by dirty water. I attain these and other objects by the devices and mechanisms illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section of my improved flushometer showing the valve closed; Fig. 2 is a larger section showing a portion thereof with the valve opened; Fig. 3 is a horizontal cross-section on the line 3—3 in Fig. 1, looking upward; and Fig. 4 is a similar view on the line 4—4 in Fig. 1, looking downward.

Similar numerals of reference refer to similar parts throughout the several views.

This flushometer consists of a body formed in two parts; the upper part 1 comprising the frame for the entire mechanism to be mounted in or secured to, while the lower part 2 which is however secured to the part 1 comprises a sheath for the controlling mechanism. The part 1 is provided with a side extension 3 adapted to be secured to any suitable pipe from the water supply; and a valve chamber 4 whose axis is at right angles to that of the extension 3. The valve chamber has a valve seat 5 formed in its lower face and also a guide hole 6 in the cap 7 of the chamber 4. Below the valve seat 5 the part 1 enlarges to receive, at one side, the actuating lever stem which passes through the sides of the part 1 to the handle 8 and which carries a lever 9 within the said part 1. Four lugs 10 are formed on the inside of said part 1, below the said controlling lever 9, to which is secured the controlling apparatus by means of screws passing through the corresponding four lugs 11 (Fig. 3) therein. This controlling apparatus consists of a cylinder 12 closed at its lower end, except for a single entrance 13, but open at its upper end to the inside of the part 1 of the frame through the holes 14 formed in the cover thereof. This cylinder 12 has the same axis as has the valve seat 5 above.

A main valve 15 is seated on the valve seat 5 and has a stem 16 extending downward and secured to the piston 17, which fits closely in the cylinder 12. The stem 16 has a slot 18 adapted to receive the actuating lever 9 by means of which the said stem, together with the valve 15 and piston 17, is raised. A guide stem 19 extends upward from the valve 15, through the valve chamber 4 and into the guide hole 6 in the cap 7. The guide stem is preferably fluted so as to allow free motion thereof in the hole 6 in which it otherwise fits.

A relief valve 20 is mounted in the center of the main valve 15 and has its stem 21 extending downward through a suitable hole in the main stem 16 and projecting slightly into the slot 18 therein. The stem 21 is also fluted so that when the said valve 20 is raised the water may pass downward through the flutes thereof. When the operating lever 9 is turned it first opens the relief valve 20 and reduces the pressure on the upper side of the main valve 15 so that it can be opened by a further movement of the lever 9. This further movement of the lever 9 causes the main valve 15, stem 16, piston 17, and guide stem 19 to rise. The opening 13 at the lower end of the cylinder 12 connects directly with the main passage 22 formed in the lower extension piece 23. An inwardly acting check valve 24 is mounted in the otherwise open end of said passage 22 and admits water thereto but will not allow water to pass out therefrom. Another passage 25 connects with the passage 22 and has a conical valve seat formed in the lower end thereof in which the needle valve 26 acts to regulate the size of the outlet of the cylinder 12, passages 13, 22, and 25. The needle valve 26

is formed on a stem 27 which passes through a suitable stuffing box and which is screw threaded at its upper end so as to engage and be held by the screw threads in a suitable hole 28 in the part 1 of the frame. The hole 28 is preferably closed by means of a removable screw plug 29. The position of the stem 27 is regulated by taking out the plug 29 and turning the stem 27 in the hole 28 thus controlling the outlet passage 25. The stem 27 is continued down past the valve part 26 to a long point which is smaller than the orifice of the passage 25. The object of this extension of the needle valve is to provide an easy method of cleaning the said orifice from any dirt which might accumulate at this point.

A cup or receptacle 30 is removably secured to the piece 23. This cup 30 is closed at its lower end but is open at its upper end and is larger than said extension piece 23 to which it is attached, so that it will hold sufficient water to be drawn into the cylinder 12 when the piston 17 is raised. This cup so covers the piece 23 that no air has access to the cylinder or to the passages leading therefrom and so that they are at all times full of water.

A spring 31 is wound around the stem 16 within the cylinder 12 and between the cover thereof and the piston 17 to press down on the piston 17. If the water pressure is heavy then this spring may be omitted.

The action of the parts may be briefly stated as follows: The handle 8 is actuated to turn the stem and to raise the lever 9; this in turn engages the lower end of the relief valve stem 21 and raises the relief valve 20, thus reducing the pressure on the upper side of the main valve 15; then the lever 9 engages the stem 16 and opens the valve 15 allowing the water to flow freely therethrough; at the same time the piston 17 is raised and sucks water from the cup 30, past the check valve 24, and through the passages 25 and 22, into the cylinder 12. The flow of water through the pipes then fills the cup 30. Then, when the handle 8 is released, the spring 31 and the force of the flowing water force the valve 15, stem 16, and piston 17 downward; this action is resisted by the water below the piston 17 in the cylinder 12 and passages 22 and 25 and in the constricted portion of the latter passage where the needle valve 26 fills up a portion of said passage. The rate of the closing of the valve 15 will therefore depend on the water pressure and on the position of the needle valve in the outlet passage 25.

Having described my invention what I claim is:

In a flushometer, the combination of a body formed of two separable sections, the upper of said sections being adapted to be attached to a pressure water supply pipe and having a downward extension, and the lower section attached to the end of said downward extension and adapted to deliver the water; an upward-facing valve seat formed in the downward extension of said upper section; a main valve adapted to open upwardly against the water pressure and to engage said valve seat and having an upwardly extending stem; a guide cavity in said upper section adapted to receive and guide said stem; a relief valve within said main valve and adapted when opened to reduce the pressure thereon; a downwardly extending valve stem for said main valve and having a longitudinal passage therein extending through the valve downward to a transverse slot through the stem; a valve stem secured to said relief valve and extending downward through said passage and into said slot; a hand operated lever mounted below said main valve and extending into said slot to engage said relief valve stem to press it upward and to engage said main valve stem to raise said valve; a cylinder secured to said downward extension of the upper section and extending downward into said lower section and open at the top; a piston secured to said downwardly extending main valve stem and fitting said cylinder; an extension piece secured to the lower end of said cylinder and having a passage therethrough; a check-valve-controlled inlet to said passage in the extension piece; a needle-valve-controlled outlet from said passage in the extension piece; and an open removable cup surrounding said extension piece and adapted to hold water and to seal the cylinder against the entrance of air thereto.

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

JOHN F. THORSK.

Witnesses:
M. F. McNeil,
Earl E. Clark.