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D. E. GULICK

WATER FLUSHING DEVICE

Filed Nov. 1, 1918

Fig. 1.

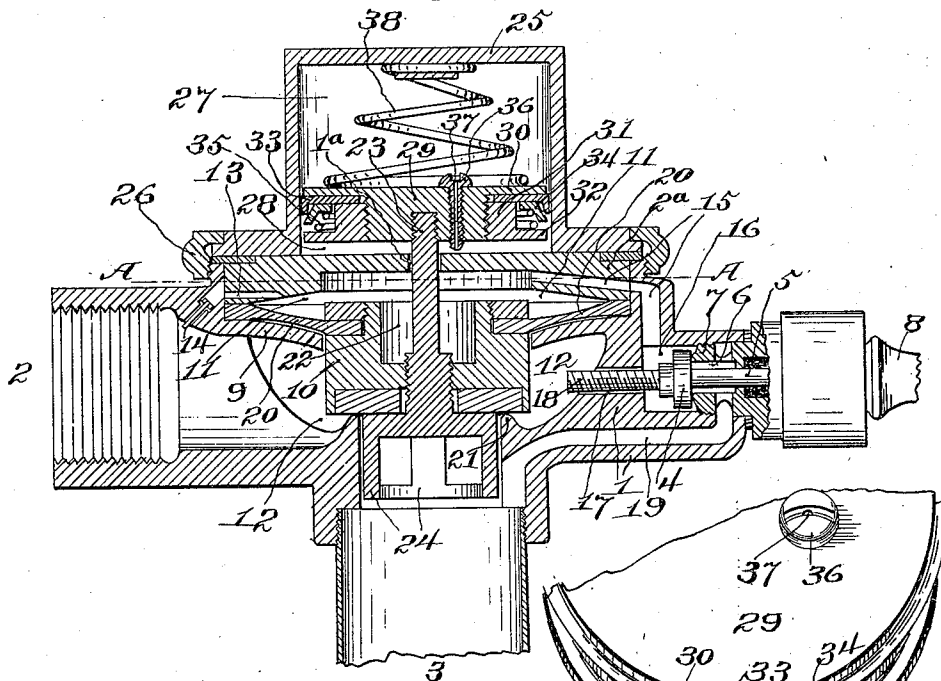


Fig. 2.

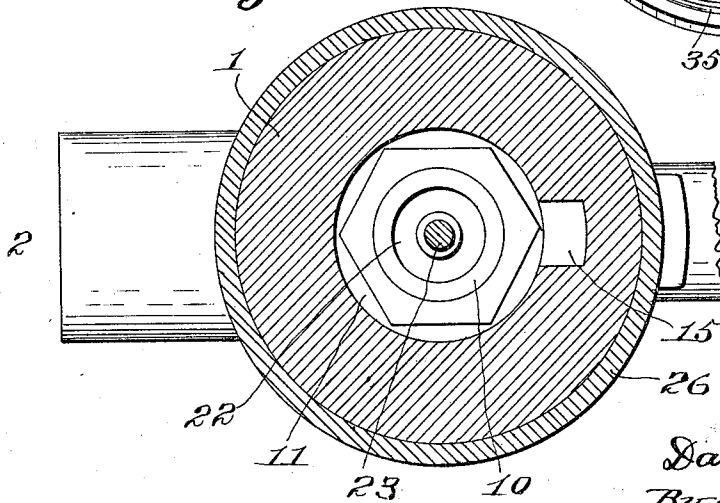


Fig. 3.

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DAVID E. GULICK, OF SAN FRANCISCO, CALIFORNIA.

WATER-FLUSHING DEVICE.

Application filed November 1, 1918. Serial No. 260,690.

To all whom it may concern:

Be it known that I, DAVID E. GULICK, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Water-Flushing Devices, of which the following is a specification.

This invention relates to water flushing devices, and pertains especially to improvements therein.

This application embodies certain features shown and described in my application for a flushing valve, filed March 11, 1918, Serial No. 231,011, and only such features as are not claimed in said application will be claimed herein.

The object of this invention is to provide a water flushing device of such novel and peculiar construction and arrangement of parts as to afford advantageous construction and operation to avoid waste of water, and to utilize the water pressure for operating a motor valve and a piston in unison so that the piston will act as a check in closing movement of the valve.

In the accompanying drawings forming part of this application:

Fig. 1 is a central sectional view.

Fig. 2 is a cross section taken on the dotted line A—A, Fig. 1.

Fig. 3 is a detail sectional elevation of part of the check piston.

The same reference characters denote the same parts in the drawings.

In carrying out my invention I employ a main body or casing 1, having a water supply inlet 2, and outlet 3, and an initiating relief valve 4 having a stem member 5 working through a water passage 6 in the valve seat 7. The stem member 5 cooperates with a handle 8 for operating the valve 4. The body 1 has an annular inner web 9 having a central opening for a motor or main valve 10, which, together with a diaphragm 20, divides the body into two chambers 11 and 12, which are connected by a by-pass 13, controlled by a pin 14, for permitting water to pass therethrough. The web may be omitted without affecting the operation. A water passage 15 connects the upper chamber 11 with the relief valve chamber 16, which is connected with the lower chamber 12 by a passage 17 through which a stem member 18 of the relief valve 4 works for preventing this passage becoming choked or

clogged. The relief valve controls communication between said passages 15, 17 and 6, and the latter passage is connected with the outlet 3 by a water passage 19. The motor valve 10 is suspended by means of the flexible diaphragm 20 which allows the motor valve to close on a seat 21 within the body 1, and above the outlet 3 and the discharge end of the passage 19, and which permits the motor to move upwardly in opening movement. The motor valve 10 overhangs the seat 21 so as to be raised by water pressure in the chamber 12, and said valve has a chamber 22 for deposit of dirt or other foreign matter as may be contained in the water. The motor is attached to a rod 23 extending through an opening 1^a in the top wall of the body 1, and is provided with a guide tail 24 working through the valve seat 21.

A cylindrical casing 25 is secured upon the body 1 by a coupling ring 26 so that the top wall of the body forms a partition 2^a, and this casing is divided into two variable chambers 27 and 28 by means of a movable division embodying a specially constructed check valve piston which comprises a main screw threaded member 29 having an annular flange 30, nut member 34 having an annular flange 32, a gasket 33 clamped between the inner face of the nut and the flange 30 and a cup-shaped gasket 34 held against the gasket 33 by a spiral spring 35 seated on the flange 32 so as to force the overhanging part of the gaskets 33 and 34 outwardly with the piston lowered, and to permit said overhanging part to contract or recede with the piston raised, and thereby allow water to pass from the upper chamber 27 around the piston and into the lower chamber 28. The piston has a screw 36 extending therethrough, and the screw is provided with a water duct 37 to facilitate the operation of the piston. The piston is attached to the upper end of the rod 23 so as to offset the piston from the top of the body 1 which forms the bottom or base of the chamber 28, and thereby prevents the piston from engaging said bottom when the motor or main valve is seated. In order to insure the seating of the main valve, or motor under low water pressure, or no pressure at all, a spiral spring 38 may intervene the top of the chamber 27 and the piston 29.

In operation, the initiating valve 4 being opened relieves the pressure in the chamber

11 and allows the pressure in chamber 12 to lift the main valve or motor and the piston for opening the discharge 3, forcing the water from the chamber 11 through the passage 15, thence through the passage 6 to the outlet 3 by way of the passage 19. When the valve 4 is closed water passes through the by-pass 17 by way of the passage 15 into the chamber 11, and through the rod opening 1^a into the chamber 28, thence through the duct 37 into the chamber 27, thereby forcing the piston downwardly and closing the main valve.

Obviously, the piston acts as a check because it can move downwardly only as fast as the water is forced from the chamber 28 through or by the piston into the chamber 27. It will be observed that the water in the chambers 27 and 28 is forced from one side to the other of the piston, and any loss of leakage from these chambers will be replaced by leakage into them from the chamber 11. It will also be observed that an equal pressure in all the chambers is maintained during the operation of the device; that is to say, the pressure in any one chamber is equal to the pressure in any other of the chambers. The by-pass 13 may be dispensed with, as it is only provided as a precaution in the event of the passage leading to the chamber 11 becoming obstructed or closed. The spring 38 may also be dispensed with, for the reason that it is not necessary when there is the usual or reasonable water pressure for operating the piston.

I do not wish to be understood as limiting my invention in size, shape and material, to the exact shape or construction of the various parts, or to the application thereof, and, while I have shown and described the device as for upper and lower and top and bottom parts, the device may be given different positions in practical application, but reserve the right to use equivalents of the parts shown and to make such changes and variations in the manufacture of the device as may come within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A flushing device including a casing with an inlet and a discharge outlet, two movable divisions and a fixed partition dividing the casing into four subchambers, each subchamber connected to the adjoining subchamber by normally open fluid passage means; a main valve to control the discharge outlet; a water passage connecting one of the intermediate subchambers with the outlet; a valve to control said water passage, and means for renewing a portion of the controlling fluid during each flushing operation.

2. A flushing device comprising two main

chambers, one of said chambers having a main inlet, and a main discharge outlet, a valve to control the main discharge outlet, a movable division in the other main chamber and means for the admission of liquid to said chamber without the simultaneous discharge of liquid therefrom during the closing movements of the main valve.

3. A flushing device comprising a casing having two main chambers, normally open passage means connecting said chambers, a movable division in each main chamber dividing said chambers into subchambers and relatively small normally open passage means connecting each subchamber to the adjoining chamber.

4. In a water flushing device a main body, an annular inner web member having a central opening and dividing the body into a pair of chambers, a flexible diaphragm in one of the chambers of said pair, a motor valve suspended by the diaphragm and working through said opening, a passage from the other of said chamber, a passage into the diaphragm chamber, a valve chamber at the intersection of said passages, a discharge passage connected with the valve chamber, and an inwardly opening initiating valve in the valve chamber and having a stem working through one of said passages.

5. A water flushing device comprising a main valve, a main chamber with inlet and an outlet, a partition dividing the main chamber into an inlet chamber and a piston chamber, open passage means connecting these two chambers, a flexible diaphragm in one of the two chambers, a by-pass connecting one of the two chambers with the outlet of the main chamber, a valve controlling the by-pass, a piston in the other of the two chambers, and means connecting the piston with the flexible diaphragm, said piston permitting free movement of the diaphragm in one direction and checking the movement thereof in the opposite direction.

6. In a water flushing device, a flexible diaphragm clamped at its periphery by an annular disk recessed on its under side to form a backing for the flexible diaphragm and its central clamping member, passage means forming communication between the chambers above and below the flexible diaphragm, a stem attached to an inwardly opening initiating valve and in the aforesaid passage means to prevent clogging of said passage, a piston chamber mounted on the annular disk and having a water passage thereinto through the central portion of the disk, a piston working in the piston chamber and expansible means including a non-flexible member, a flexible member, a cushion member, and threaded means for securing the two last mentioned members in the piston for engaging the wall of the chamber during the movement of the piston in one

direction and affording passage between said wall and the piston during the movement of the piston in the opposite direction, a main valve suspended by the flexible diaphragm and an annular web member on the under-
5 side of the flexible diaphragm and having an opening closely fitting the said main valve to prevent foreign matter such as sand from coming into contact with and causing a wearing and cutting effect on the
10 said flexible diaphragm.

In witness whereof I hereunto set my hand in the presence of two witnesses.

DAVID E. GULICK.

Witnesses:

RALPH E. NICHOLAS,
FREMONT S. DUNN.