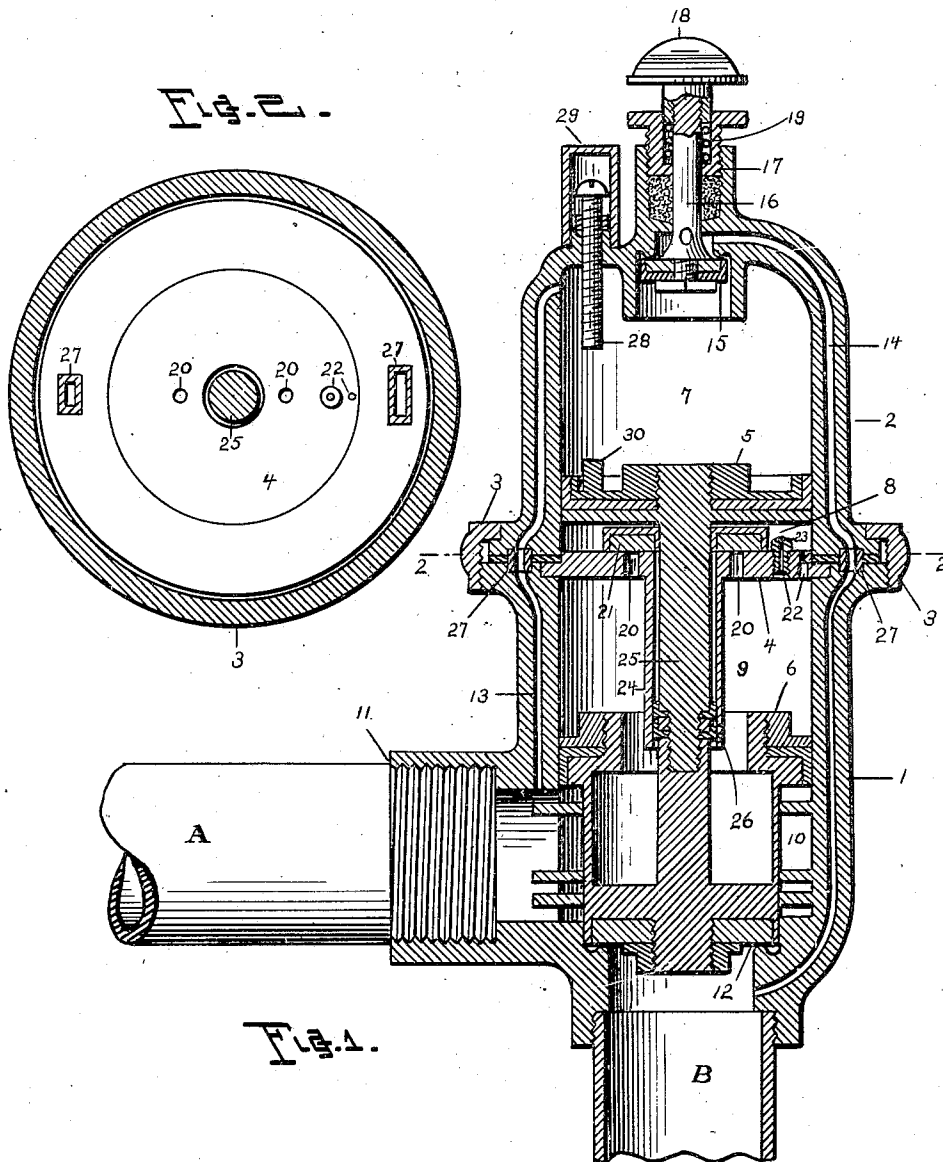


D. E. GULICK.
 FLUSHING VALVE.
 APPLICATION FILED MAR. 16, 1918.

1,297,836.

Patented Mar. 18, 1919.
 3 SHEETS—SHEET 1.

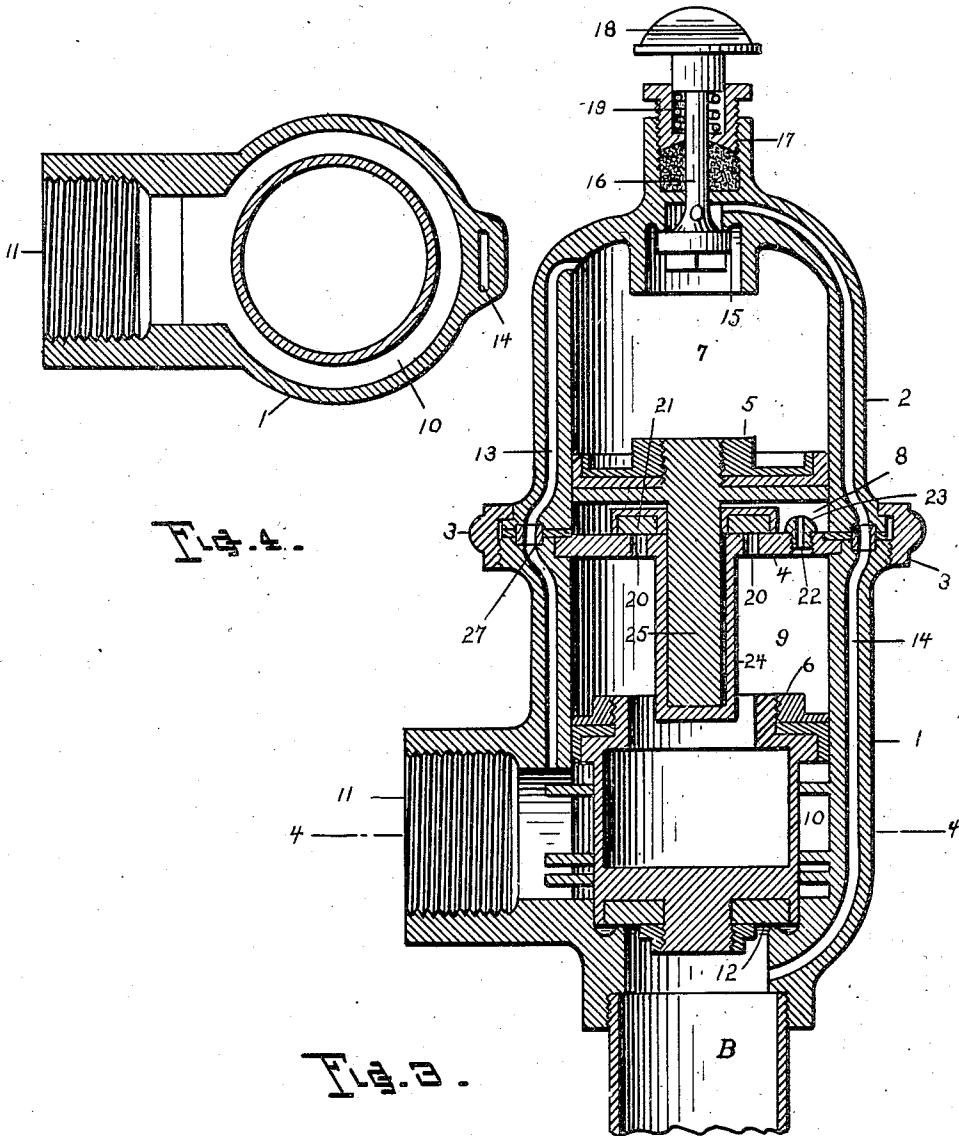


Inventor
 D. E. Gulick
 by A. S. Paré
 Attorney

D. E. GULICK.
 FLUSHING VALVE.
 APPLICATION FILED MAR. 16, 1918.

1,297,836.

Patented Mar. 18, 1919.
 3 SHEETS—SHEET 2.



Inventor
 D. E. Gulick
 per A. S. Pare
 Attorney

D. E. GULICK.
 FLUSHING VALVE.
 APPLICATION FILED MAR. 16, 1918.

1,297,836.

Patented Mar. 18, 1919.
 3 SHEETS—SHEET 3.

Fig. 5.

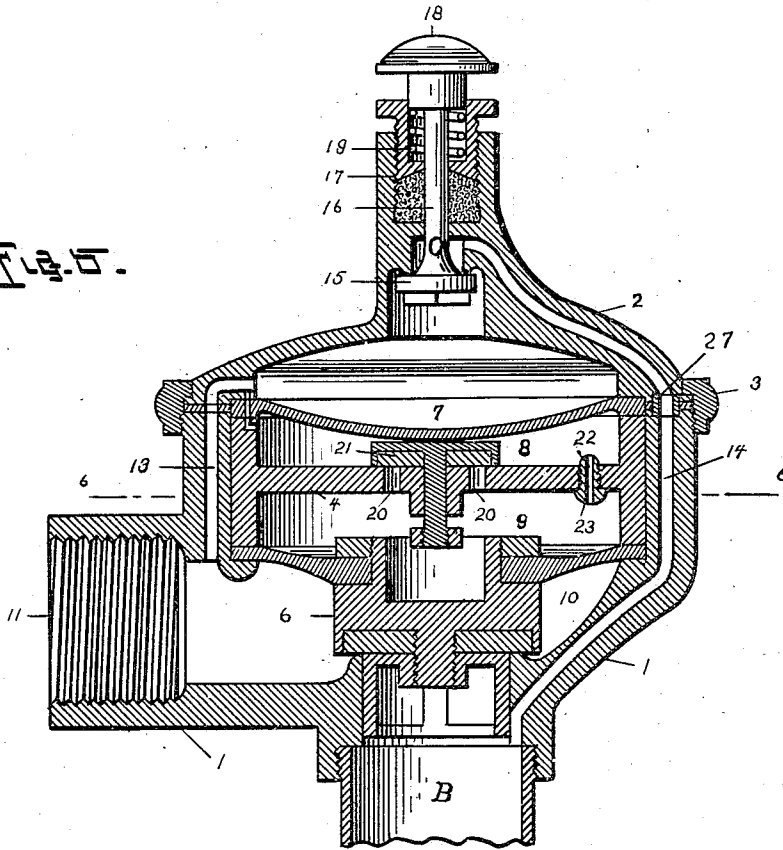
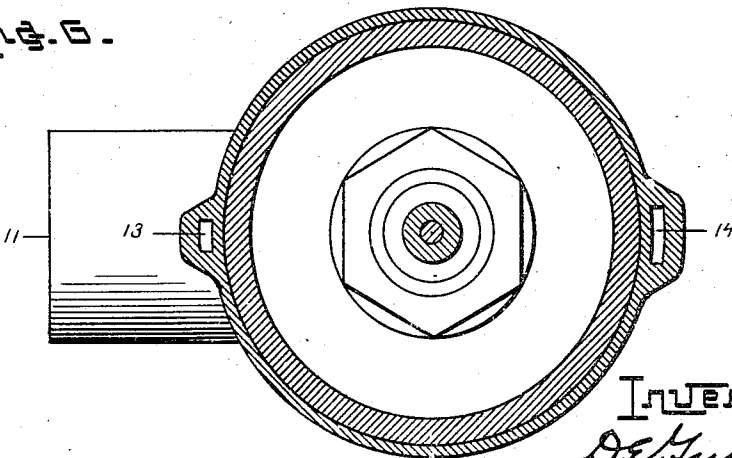


Fig. 6.



Inventor
 D. E. Gulick
 By A. S. Paré
 Attorney

UNITED STATES PATENT OFFICE.

DAVID E. GULICK, OF SAN FRANCISCO, CALIFORNIA.

FLUSHING-VALVE.

1,297,836.

Specification of Letters Patent.

Patented Mar. 18, 1919.

Application filed March 16, 1918. Serial No. 222,898.

To all whom it may concern:

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

This invention relates to flushing devices, and its object is to produce such a device which shall be slow closing and noiseless, and also simple in construction and certain in operation.

In carrying out the invention I construct a casing which is divided at some convenient point into two main chambers by a fixed diaphragm. Each of these main chambers is further divided into two sub-chambers by pistons, or movable diaphragms, and the outlets therefrom, into the discharge, are controlled by valves.

Two of the sub-chambers of the device are connected by an open passage way, and the other two sub-chambers are also connected by a passage way, the last mentioned passage way being controlled by a valve, and the last mentioned sub-chambers are further connected by one or more open passage ways or adjustable leak passages.

The initiating valve is opened by hand, or otherwise, but all the other operations, including its closing, are automatic.

In the accompanying three sheets of drawing I have illustrated my invention.

Figure 1 is a longitudinal section showing the most approved form of the apparatus.

Fig. 2 is a cross section taken at the line 2, 2, of Fig. 1.

Fig. 3 is a longitudinal section showing the apparatus modified to the extent that the two movable diaphragms or pistons, are not connected.

Fig. 4 is a cross section taken on the line 4, 4, of Fig. 3, and is equally a section at the analogous point of Fig. 1.

Fig. 5 is a longitudinal section, showing the apparatus with flexible diaphragms instead of sliding diaphragms, or pistons.

Fig. 6 is a cross section taken on the line 6, 6, of Fig. 5.

In the drawing; 1 and 2 are the two parts of the casing, which may be connected by the union joint at 3, or otherwise. At the junction of the parts 1 and 2, is inserted the partition 4, which divides the interior of the shell or casing into two parts or main cham-

bers, 7 and 9. 5 is a piston diaphragm in the chamber 7 of part 2, of the casing, and 6 is a piston in the chamber 9 of part 1 of the casing. The piston 6 has a chamber which opens through the head of the piston into the chamber 9, and said head works under the partition 4, so that fluid may pass from the duct or ducts 20, into or against the piston head for facilitating the return movement of the piston to its seat. These pistons or members divide the main chambers of the casing, into sub-chambers 8, and 10. The chambers 7 and 8 being above the fixed partition 4, and the chambers 9 and 10 being below the same. The service pipe A is connected to the device at 11, and admits water directly into the sub-chamber 10, whence, if the valve 12 is open the water passes to the discharge outlet B. It will be observed that the valve 12 is connected directly to piston 6, and in the form of the device shown in Figs. 1 and 2, also to piston 5, by means to be hereinafter described. Thus the valve 12 is operated by the movement of the pistons to which it is connected.

There is one or more passages as 13, connecting the chambers 7 and 10, so that the pressures are equalized in those chambers, when the device is at rest. Also there is a passage 14, connecting the chamber 7 with the discharge outlet B. This passage 14 is slightly larger than passage 13, so that when both are open the exhaust from chamber 7 will be greater than the supply.

Passage 14 is controlled by a valve 15, which may be termed the initiating valve. This valve has a stem 16; extending through a stuffing box 17, and terminating in a hand button 18; by pressure upon which it is opened. A spiral spring 19 automatically closes valve 15 when released.

In the fixed partition 4, are passages or ducts 20 which are closed by a valve 21 against the flow of water from the sub-chamber 8 to the chamber 9, but permit such flow from the chamber 9 to the sub-chamber 8. Leak passages 22 in the partition 4 are partly closed by screw plugs 23 having orifices therethrough, so that the rapidity of leak may be adjusted by simply changing the plug for one with a different sized orifice.

The operation of the parts thus far described, is as follows: A pressure upon button 18 opens valve 15, and water in the

chamber 7 flows through passage 14 to the discharge B, thus reducing the pressure in that chamber. The piston 5 then moves upward under the pressure of water in the chamber 9 flowing through the passages 20 in the fixed partition 4, and the pressure in both those chambers is reduced. Accordingly piston 6 moves upward, and valve 12 is opened, permitting water to pass from the service pipe A to the discharge outlet B.

Immediately upon closing of the valve 15 by the spring 19, the pressure is removed from button 18, and thereby closes the outflow from the chamber 7. The water flowing into said chamber through passage 13 restores the pressure therein to its normal, and the piston 5 moves downward under that influence, closing valve 12 and shutting off the outflow. The downward movement of piston 5 drives the water from the chamber 8 into the sub-chamber 9, where it acts upon piston 6 for the closing of valve 12. The motion of the water from the sub-chamber 8 to the chamber 9 is slow, owing to its taking place through the leak orifices 22, the passages 20 being closed by valve 21, and therefore the closing of valve 12 is a gradual closing thus giving a complete flushing of the fixture to which the device is applied.

In order that the stem which, in Figs. 1 and 2, connects pistons 5 and 6 may not pass water from one chamber to the other, I construct the fixed partition 4 with a sleeve 24 surrounding said stem 25, and apply cup-leathers 26, or other form of packing, thereto.

To insure the proper register of the passages 13 and 14, in the two parts 1 and 2 of the casing, dowels, as 27, may be applied. To control the upward movement of piston 5, a set screw 28 provided with a jam nut and a protecting hood 29, may be applied, as shown in Fig. 1 and the piston 5 may be provided with a stud or lug 30 to contact said screw.

As flexible and sliding diaphragms are well known substitutes for each other, I have shown the former in Figs. 5 and 6. They need not be further described, as their action is identical, and well understood.

In the modification shown in Figs. 3 and 4, the valve 12 is connected only to the piston 6, and not to piston 5. As shown in Fig. 1 the pressure of water in the chamber 9 is depended upon to close that valve without aid from that in the chamber 7. This will be readily understood from the foregoing by any competent mechanic and need not be further described.

While I have referred to the upper and lower parts of the casing and other parts, it will be understood that this refers only to the position of the device in the drawing, as it may be set for practical use in any convenient position.

It will be observed that the small bypasses are entirely inclosed and protected, and cannot be tampered with, thus making the valve necessarily positive in its closing.

In setting up the device for operation the subchamber 8 and the chamber 9 are filled with water or other liquid. Any loss from leakage out of said chambers will be supplied by leakage into them.

Having thus described my invention, and an embodiment of it, in full, clear and exact terms required by law, and knowing that it comprises novel, useful and valuable improvements in the art to which it pertains, I here state that I do not wish to be limited to the precise construction and arrangements of the several parts, as herein set forth, as the same may be variously modified by a skilled mechanic without departing from the spirit of the invention.

What I claim and desire to secure by Letters Patent of the United States, is the following, to-wit:—

1. A flushing device comprising a casing having an initiating valve and a passage in the wall of the casing connecting said valve with the outlet of the casing, a partition fixed within the casing and dividing the casing into two chambers one of which is connected with the inlet of the casing by a wall passage, said partition having water ducts, and a valve supported by the partition for opening and closing the ducts.

2. A flushing device comprising a casing having an initiating valve and a passage connecting the valve opening with the outlet of the casing, a partition having ducts and dividing the casing into two chambers one of which is connected with the inlet of the casing by a passage, a valve loosely mounted on the partition for opening and closing the ducts and having a stem projecting through the partition, and means movable in each chamber by fluid pressure and coöperating with the partition valve in a flushing operation.

3. In a flushing device, a two-part casing, a partition dividing the casing into two piston chambers one of which has an initiating valve opening, a piston seat in the other chamber, said casing parts having a pair of alined channels, one channel of each pair forming a fluid passage extending from under the seat to the valve opening, and the other channel of each pair forming a fluid passage extending from above the seat into the valved chamber below the valve, and means for connecting the casing parts.

4. In a flushing device, a casing, a passage partition dividing the casing into a lower chamber and an upper chamber provided with an initiating valve, a member movable in the upper chamber by fluid pressure and forming a sub-chamber above the partition, a valve supported by the partition

and operated in the sub-chamber, and a member movable in the lower chamber and forming a sub-chamber in said lower chamber, said valves and said members cooperating under fluid pressure in a flushing operation.

5. In a flushing device, a casing, a partition having ducts and dividing the casing into an upper chamber and a lower chamber, a piston in the upper chamber, a valve loosely mounted on the partition and working a sub-chamber between the piston and the partition, a piston in the lower chamber and forming a sub-chamber for the inlet and the outlet of the casing.

6. In a flushing device, a casing, a partition having ducts and dividing the casing into two chambers, a fluid operated piston in one of the chambers, a valve mounted on the partition and working between the partition and the piston, and a fluid operated piston in the other chamber and having a chambered head opposite the ducts and forming a valve for the inlet and the outlet of the casing.

7. A flushing device comprising a casing having an initiating valve and a passage connecting such valve opening with the outlet of the casing, a partition fixed within the casing and dividing it into two chambers one of which is connected with the inlet of the casing by a passage, said chambers being connected by a fluid passage, and a check valve for opening and closing the latter passage in a flushing operation.

8. A flushing device comprising a casing

having an initiating valve and a passage connecting the valve opening with the outlet of the casing, a partition dividing the casing into two chambers connected by a fluid passage, one of the chambers being connected with the inlet of the casing by a passage, a check valve permitting a one way flow through said fluid passage, and means movable in each chamber by fluid pressure and cooperating with the check valve in a flushing operation.

9. In a flushing device, a chamber, a partition fixed in the chamber, and a motor on each side of the partition and adapted to alternately force liquid from one side to the other of the partition in a flushing operation.

10. In a flushing device, a casing, a partition dividing the casing into a lower chamber and an upper chamber provided with an initiating valve, a member movable in the upper chamber by fluid pressure and forming a sub-chamber, a check valve operated in the sub-chamber, and a member movable in the lower chamber and forming a sub-chamber under the partition, said valves and said members cooperating under fluid pressure in a flushing operation.

In testimony, that I claim the foregoing I have hereto set my hand in the presence of two witnesses, this 6th day of May 1917.

DAVID E. GULICK.

Witnesses:

FLORENCE L. WOLFE,
D. B. RICHARDS.