F. W. BASSETT & W. A. HUNTER, Jr.

FLUSHING DEVICE.

APPLICATION FILED APR. 12, 1909.

956,875

Patented May 3, 1910

Fig. 1.

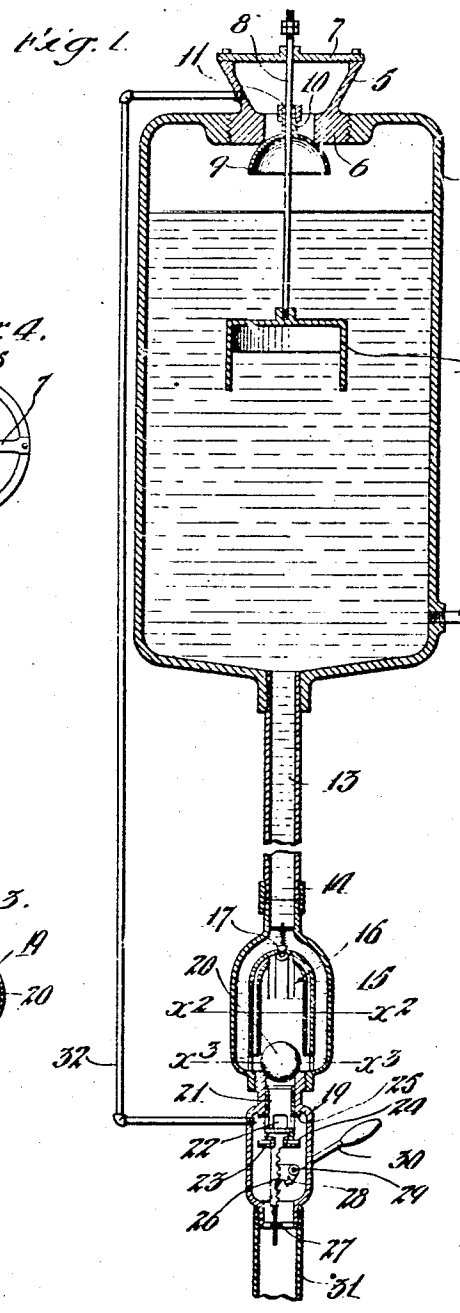


Fig. 5.

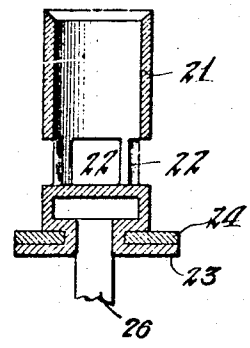


Fig. 4.

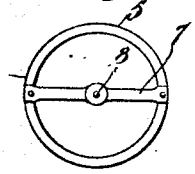


Fig. 3.

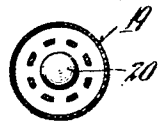
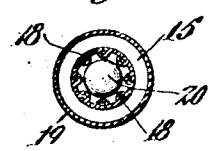


Fig. 2.



Witnesses:
Louise W. Gratz.
Frank Latcham

Inventors
Foster W. Bassett.
William A. Hunter Jr.
by Pannell Lowell Hackley
atty

UNITED STATES PATENT OFFICE.

FOSTER W. BASSETT AND WILLIAM A. HUNTER, JR., OF LOS ANGELES, CALIFORNIA.

FLUSHING DEVICE.

956,875. Specification of Letters Patent. Patented May 3, 1910.

Application filed April 12, 1909. Serial No. 489,535.

To all whom it may concern:

Be it known that we, FOSTER W. BASSETT and WILLIAM A. HUNTER, Jr., both citizens of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Flushing Device, of which the following is a specification.

This invention relates to flushing devices, and the object of the invention is to provide a flushing device which may be connected direct to the service pipe supplying water under pressure and which may be operated to permit the discharge of water from the device without shutting off the source of supply from the delivery pipe which supplies the water under pressure.

The device is distinguished from flushing devices of the ordinary type which employ a receiving tank and which shut off the supply of water to the said tank when the latter has been filled.

The present device includes a tank, but such tank is always in communication with the supply pipe, and the water in the tank is thus always under the pressure of that in the supply pipe.

Referring to the drawings: Figure 1 is a vertical longitudinal section through the device. Fig. 2 is a cross section on line x^2—x^2 Fig. 1. Fig. 3 is a section on line x^3—x^3 Fig. 1. Fig. 4 is a plan view of the upper end of the tank. Fig. 5 is an enlarged, vertical, longitudinal section of one of the parts.

1 designates a tank or intermediate chamber to which water is admitted under pressure from a supply pipe 2, the latter being in connection with the usual service pipe. A check valve 3 is arranged in the pipe 2 and a hand valve 4 is also provided.

The tank 1 at its upper end is provided with a cup 5 which has a flange 6 screwed into the head of the tank 1. A cross bar 7 extends across the top of the cup 5 and forms a guide for a valve stem 8, the latter being slidable therein. The cup 5 is always open to the atmosphere, but is normally closed from communication with the tank 1 by means of an air valve 9 which is preferably hemi-spherical as shown and which seats against the flange 6. The valve 9 has a stem 10 which is frictionally mounted on the stem 8, the amount of friction being regulated by nut 11, whereby the valve 9 can be adjusted along the stem 8. At the lower end of the valve stem 8 is an inverted cup 12 which acts as a float to operate the valve stem 8 and valve 9, as will be explained. The valve stem 8 is sufficiently long to permit the valve 12 to be adjusted into the lower part of the tank, or into the upper part of the tank. The latter adjustment is shown in Fig. 1 and when so adjusted the air valve 9 will open very early in the flushing operation so that the tank operates nearly like a gravity tank in that its interior becomes open to the atmosphere quickly and remains open during nearly the whole of the flushing operation. When the valve 12 is adjusted to the lower part of the tank, the tank acts substantially as a pressure tank during the greater part of the flushing operation, in that the tank does not become open to the atmosphere until nearly all of its water has escaped and the valve 12 has dropped to open air valve 9.

A pipe 13 leads from the lower end of the tank 1 and is connected by a union 14 with an annular water chamber 15 which surrounds a central valve chamber 16, the lower part of the valve chamber 16 being in permanent communication with the water chamber 15. The upper part of the central valve chamber 16 is normally cut off from communication with the water chamber 15 and pipe 13 by a valve 17 which is yieldingly pressed down against its seat. Extending longitudinally of the walls of the central valve chamber 16 is a series of passages 18 (see Figs. 1 and 2), the upper ends of which lie in a circle immediately below the valve 17 and the lower ends of the passages 18 opening at the bottom of the central valve chamber 16.

Screwed to the lower end of the water chamber 15 is the valve operating device which comprises a casing 19, there being a ball valve 20 normally seated at the upper end thereof and shutting off communication between the casing 19 and the valve chamber 16 and water chamber 15. A sleeve 21 is slidable in the casing 19 and a series of openings 22 are formed therein which are adapted to permit water to flow therethrough into the lower part of the casing when the sleeve 21 is in its lower position. The sleeve 21 at its lower end has a flange 23 above which the sleeve is grooved to receive a ring 24 which strikes against an internal depending flange 25 in the casing 19 to stop the upward movement of the sleeve 21. A rack 26 is

connected at its upper end to the sleeve 21 and at its lower end is guided in a spider 27, the rack 26 being operated by a segmental gear 28 on a shaft 29 which extends through the casing 19 and is equipped with a handle 30. A pipe 31 leads from the lower end of the casing 19 and discharges the water to a basin or other place to be flushed. A small pipe 32 is connected at its upper end with the cup 5 and at its lower end the pipe 32 passes through the wall of the casing 19 and through the flange 25 and serves to admit air through one of the openings 22 into the interior of the sleeve 21.

In operation the parts normally stand as shown in Fig. 1 and when it is desired to operate the device the handle 30 is depressed, thereby lifting the sleeve 21 and shutting the openings 22, the sleeve 21 being thus raised the cushioning ring 24 strikes the lower edge of flange 25, whereupon further upward movement of the sleeve is arrested and the handle 30 is then released. As the sleeve 21 thus raises, it lifts the ball valve 20, unseating the latter from the upper end of the casing 19, whereupon water from the water chamber 15 enters past the ball valve 20 and flows into the interior of the sleeve 21 and as the openings 22 are closed the water can not escape therefrom and the weight of the water together with the force of its impact against the imperforate bottom of the sleeve 21 moves down the sleeve 21 until the openings 22 are below the flange 25, whereupon water from the water chamber 15 flows down therefrom, past the valve 20, into and through the sleeve 21 and out through the openings 22 into the casing 19 and thence to the pipe 31; during this flow of water the ball valve 20 which has been mechanically lifted by the sleeve 21 is held up from its seat after the sleeve 21 has lowered by floating within the central valve chamber 16, its flotation therein being assisted by a partial vacuum formed within the upper part of the chamber 16, which vacuum is caused by air being sucked out through the air passages 18 by the water in flowing across the lower ends of passages 18 in flowing from the water chamber 15 into the casing 19. As water continues to flow out in this manner, this suction, however, gradually weakens owing to equalization of pressure at the bottom of the central chamber 16 and the ball 20 gradually falls into its seat again upon the upper end of the casing 19, thereby shutting off further flow of water. The ball is kept unseated, however, for a sufficient time to enable the proper amount of water to pass out for the purpose of flushing, the parts being so designed that practically the entire amount of water within the tank 12 is discharged before the valve 20 seats. It will be noted that while the valve 20 is lifted and the water is discharging, that the water under pressure from the delivery pipe 2 will flow into the tank 1, but owing to the greater size of the pipe 13 leading from the tank 1, the water is discharged faster than it accumulates therein and this outward movement of water from the tank 1 is facilitated by the opening of air valve 9, which is opened by movement of float 12, the latter moving down with the outflowing water from the tank and as valve 9 thus opens it permits air to enter the upper part of tank 1, thereby relieving any vacuum therein which otherwise would form and interfere with the free outward movement of water within the tank. As soon as the valve 20 closes, the water accumulates in the tank 1 and lifts the float 12, thereby closing the valve 9. The float 12 is made in the form of an inverted cup, so that the water in filling in the tank 1 will seal the lower portion of the cup-like valve 12 and act to form an air chamber within the valve 12 and compress air therein to buoy or float the valve 12. The pipe 32 admits air to the interior of the sleeve 21, so that after the valve 20 has seated, the water which is within the sleeve can readily flow out without becoming air bound.

The purpose of the valve 17 is to permit air to escape from the central valve chamber as the valve 20 is lifted. The diameter of the valve 20 is nearly equal to that of the valve chamber 16 and when it is lifted, were it not for the valve chamber 16 it would compress the air in the chamber which would nullify the effect of the suction which is formed by air passing out through the air passages 18.

What we claim is:

1. In a flushing apparatus, an annular water chamber, a casing connected with the lower end thereof, a central valve chamber surrounded by the annular water chamber, a valve normally closing communication between the water chamber and said casing, a tank for supplying water to the water chamber, means for elevating said valve into the central valve chamber to permit water to flow from the water chamber into the said casing, and means for producing a partial vacuum in the central valve chamber to hold said valve from its seat.

2. In a flushing apparatus, an annular water chamber, a casing connected with the lower end thereof, a central valve chamber surrounded by the annular water chamber, a valve normally closing communication between the water chamber and said casing, a tank for supplying water to the water chamber, means for elevating said valve into the central valve chamber to permit water to flow from the water chamber into the said casing, means for producing a partial vacuum in the central valve chamber to hold said valve from its seat, said tank being closed, means for supplying water thereto

under pressure, and means for admitting air to said tank as the water flows from said tank into said water chamber.

3. In a flushing apparatus, an annular water chamber, a casing connected with the lower end thereof, a central valve chamber surrounded by the annular water chamber, a valve normally closing communication between the water chamber and said casing, a tank for supplying water to the water chamber, means for elevating said valve into the central valve chamber to permit water to flow from the water chamber into the said casing, means for producing a partial vacuum in the central valve chamber to hold said valve from its seat, said tank being closed, means for supplying water thereto under pressure, means for admitting air to said tank as the water flows from said tank into said water chamber, and means for admitting air to said casing below said valve.

4. In a flushing device, a central valve chamber, an annular water chamber surrounding the valve chamber, a series of longitudinal air passages extending along the wall of said valve chamber, the upper ends of the air passages being in communication with the upper part of the valve chamber, the lower ends of said air passages extending to the bottom of the valve chamber, a casing at the lower end of the water chamber, a valve normally closing communication between said casing and said water chamber, means for mechanically lifting said valve into the central valve chamber to permit water to flow from the water chamber into the casing and produce a suction through the air passages tending to hold said valve elevated in the central valve chamber.

5. In a flushing device, a central valve chamber, an annular water chamber surrounding the valve chamber, a series of longitudinal air passages extending along the wall of said valve chamber, the upper ends of the air passages being in communication with the upper part of the valve chamber, the lower ends of said air passages extending to the bottom of the valve chamber, a casing at the lower end of the water chamber, a valve normally closing communication between said casing and said water chamber, means for mechanically lifting said valve into the central valve chamber to permit water to flow from the water chamber into the casing and produce a suction through the air passages tending to hold said valve elevated in the central valve chamber, a closed tank for delivering water to the water chamber, means for supplying water under pressure to said tank, a guide at the upper end of said tank, a valve stem slidable in said guide, an air valve frictionally slidable on said stem and normally closing an air opening in said tank, and a float valve carried on said valve stem for operating the latter.

6. In a flushing device, a central valve chamber, an annular water chamber surrounding the valve chamber, a series of longitudinal air passages extending along the wall of said valve chamber, the upper ends of the air passages being in communication with the upper part of the valve chamber, the lower ends of said air passages extending to the bottom of the valve chamber, a casing at the lower end of the water chamber, a valve normally closing communication between said casing and said water chamber, means for mechanically lifting said valve into the central valve chamber to permit water to flow from the water chamber into the casing and produce a suction through the air passages tending to hold said valve elevated in the central valve chamber, and a spring pressed valve at the upper end of the central valve chamber.

7. In a flushing device, a central valve chamber, an annular water chamber surrounding the valve chamber, a series of air passages extending longitudinally of the valve chamber with their upper ends in communication with the upper end of the valve chamber, a casing at the lower end of the water chamber, a ball valve seated at the upper end of the casing, a sleeve slidable in the casing, the sleeve having openings in its side wall which are closed by the casing when the sleeve is in its lower position, and means for lifting the said sleeve to elevate the ball valve.

8. In a flushing device, a central valve chamber, an annular water chamber surrounding the valve chamber, a series of air passages extending longitudinally of the valve chamber with their upper ends in communication with the upper end of the valve chamber, a casing at the lower end of the water chamber, a ball valve seated at the upper end of the casing, a sleeve slidable in the casing, the sleeve having openings in its side wall which are closed by the casing when the sleeve is in its lower position, said sleeve having an imperforate bottom to retain water therein when said sleeve is in raised position and cause the water to depress said sleeve.

9. In a flushing device, a central valve chamber, an annular water chamber surrounding the valve chamber, a series of air passages extending longitudinally of the valve chamber with their upper ends in communication with the upper end of the valve chamber, a casing at the lower end of the water chamber, a ball valve seated at the upper end of the casing, a sleeve slidable in the casing, the sleeve having openings in its side wall which are closed by the casing when the sleeve is in its lower position, said sleeve having an imperforate bottom to re-

tain water therein when said sleeve is in raised position and cause the water to depress said sleeve, a rack screwed to the lower end of the sleeve, a segmental gear meshing with the rack, and a handle for operating the segmental gear.

10. In a flushing device, a central valve chamber, an annular water chamber surrounding the valve chamber, a series of air passages extending longitudinally of the valve chamber with their upper ends in communication with the upper end of the valve chamber, a casing at the lower end of the water chamber, a ball valve seated at the upper end of the casing, a sleeve slidable in the casing, the sleeve having openings in its side wall which are closed by the casing when the sleeve is in its lower position, said sleeve having an imperforate bottom to retain water therein when said sleeve is in raised position and cause the water to depress said sleeve, said casing having an internal depending flange, said sleeve having at its lower end a flange and provided with a groove, a cushioning ring above said flange in said groove and adapted to strike against the lower edge of said depending flange to limit the upward movement of the sleeve.

In testimony whereof, we have hereunto set our hands at Los Angeles, California, this 7th day of April 1909.

FOSTER W. BASSETT.
WILLIAM A. HUNTER, JR.

In presence of—
ARTHUR P. KNIGHT,
FRANK L. A. GRAHAM.