

W. G. STEWART.
FLUSHING TANK.

APPLICATION FILED MAY 10, 1908.

Patented Oct. 3, 1911.

2 SHEETS—SHEET 1.

1,004,707.

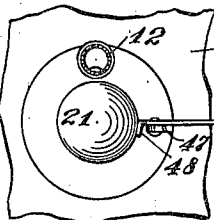
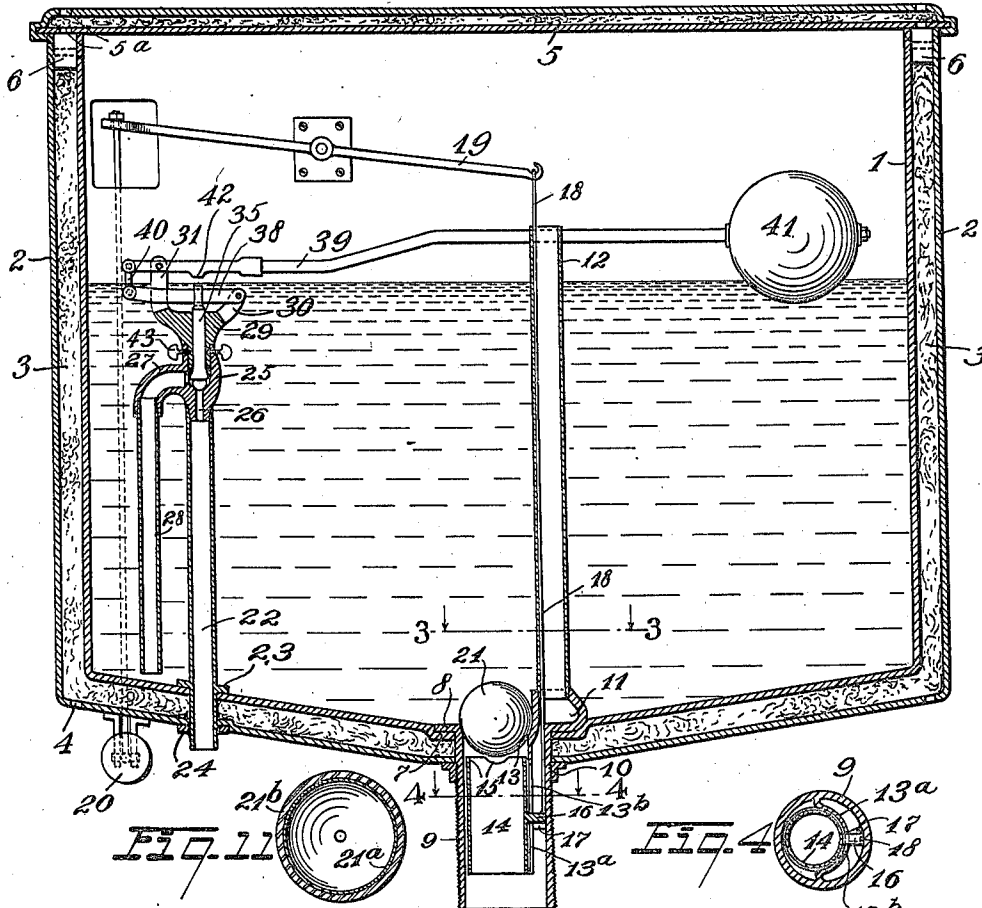


FIG. 6

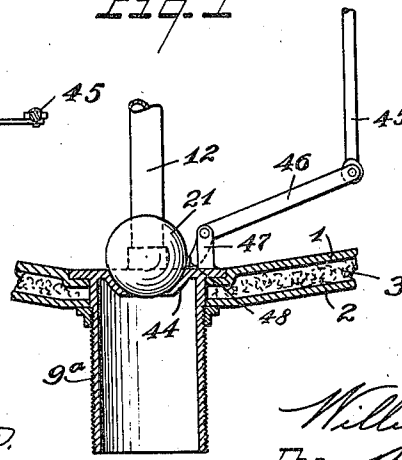


FIG. 5

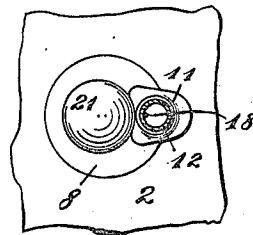


FIG. 3

Witnesses:
Nathan F. Fetter.
Foreman B. West.

Inventor.
William G. Stewart,
By Bates, Forts & Hull
Attys

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2 SHEETS—SHEET 2.

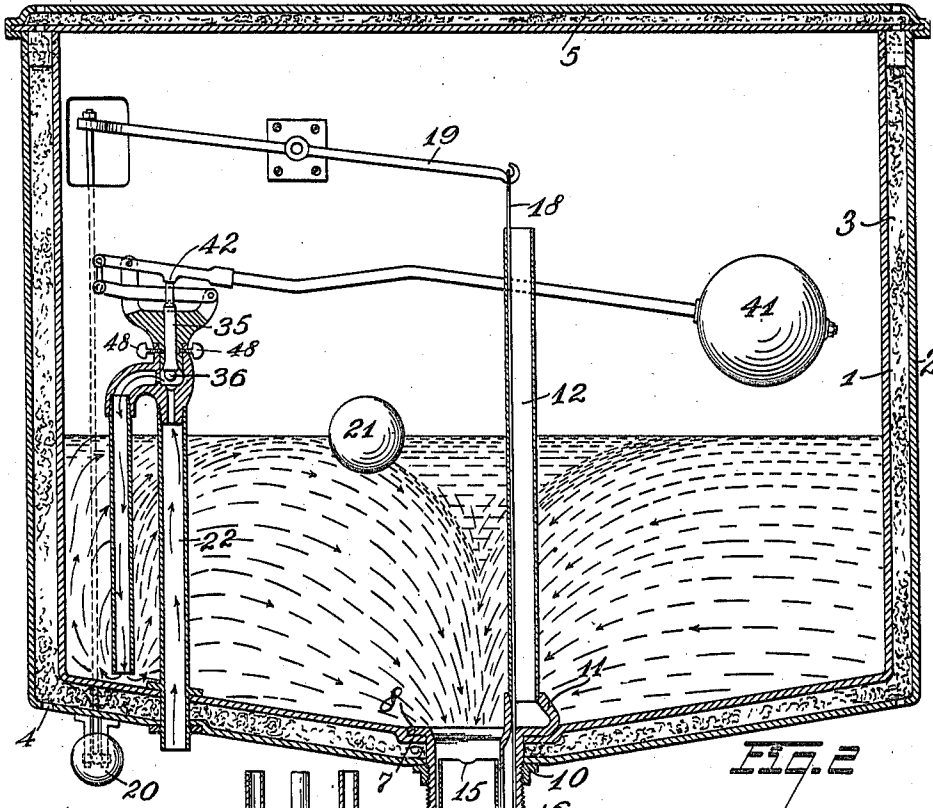


FIG. 2

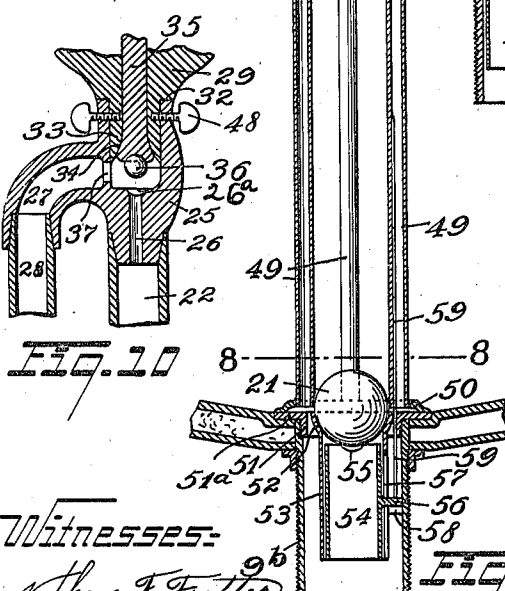


FIG. 10

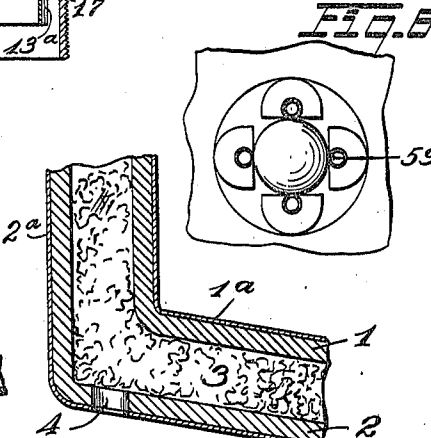


FIG. 9

Witnesses:
Mathew J. Butler.
Foreman West.

FIG. 7

Inventor:
William G. Stewart,
By Bates, Fouts & Hull,
Attys

UNITED STATES PATENT OFFICE.

WILLIAM G. STEWART, OF CLEVELAND, OHIO.

FLUSHING-TANK.

1,004,707.

Specification of Letters Patent.

Patented Oct. 3, 1911.

Application filed May 10, 1909. Serial No. 495,049.

To all whom it may concern:

Be it known that I, WILLIAM G. STEWART, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Flushing-Tanks, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to flushing tanks of the type used in connection with closets and has for its object generally to provide an improved construction of flushing valve and means for operating the same; also to provide an improved construction of valve controlling the inlet through which water is supplied to the tank.

With the above general objects in view, the invention may be defined further as consisting of the combinations of elements embodied in the claims hereto annexed and illustrated in the drawings forming a part hereof wherein—

Figure 1 represents a sectional view taken through a tank constructed in accordance with my invention, the parts being shown in the positions which they occupy when the flushing apparatus is in its normal position; Fig. 2 represents a similar view showing the positions which the parts occupy during a flushing operation; Figs. 3 and 4 represent sectional details corresponding to the lines 3—3 and 4—4 respectively of Fig. 1; Fig. 5 is a sectional detail representing a modification of the flushing valve and the operating means therefor shown in the preceding figures; Fig. 6 is a view similar to Fig. 3 of such modified form; Fig. 7 is a sectional view of a flushing-valve arrangement similar to that shown in Figs. 1 and 2, showing the same applied to a somewhat modified construction of tank. Fig. 8 is a sectional view corresponding to the line 8—8, Fig. 7; Fig. 9 is a sectional detail of a corner of the tank; Fig. 10 is an enlarged sectional detail of the inlet valve fitting; and Fig. 11 is a sectional detail of the flushing valve.

Describing the parts by reference characters, 1 and 2 denote the inner and outer walls, respectively, of a tank constructed in accordance with my invention. These walls are preferably of metal, as pressed steel. The inner wall has applied to the inner surface thereof a lining 1^a of enamel and the

wall 2 has applied to the outer surface thereof a covering 2^a of enamel. These walls are spaced apart and the chamber formed therebetween is filled with absorbent material 3. This material absorbs any moisture which may be deposited on the outer and inner surfaces of the walls 1 and 2 respectively.

In order to permit the absorbent material to dry, a suitable number of openings 4 are provided, preferably directly beneath the vertical space formed between the walls 1 and 2. A double-walled cover 5 is provided for the tank. Such cover may be also provided with suitable apertures 5^a adapted to register with the aforesaid space or chamber. The upper ends of the walls 1 and 2 will be spaced by means of spacing blocks 6 inserted therebetween. The bottoms of the inner and outer tank walls are inclined downwardly toward the central portions thereof and are there provided with registering openings. The opening in the bottom of the inner tank wall is countersunk, as shown at 7, forming an annular recess for a flange 8 on the upper end of a nipple 9. This nipple extends through the aperture in the bottom of the outer tank wall and is provided with a thread by means of which and a nut 10 (which is adapted to bear against the lower surface of the outer wall) the nipple is retained in place and the two tank walls held in proper relation to each other. At one side the flange 8 has formed therewith a chamber 11, said chamber projecting upwardly above said flange and receiving the lower end of the overflow pipe 12, which may be threaded into said chamber. The inner wall of the chamber, designated at 13, is concave and is of such curvature as to form part of the seat for the ball valve which I employ. The wall 13, below the valve seating portion thereof, is provided with a skirt 13^a which forms part of a guide for a valve dislodging sleeve 14. The sleeve 14 is mounted between the wall 13^a and the opposite wall of the nipple 9. The upper end of this sleeve is provided with notches 15. 16 denotes a lug projecting outwardly from the sleeve 14 and 17 a lug projecting inwardly from the wall of the nipple 9 and forming a seat for the former lug. The lug 16 is connected by means of a rod 18 with a lever 19, the opposite end of which is connected to the operating handle 20, by

means of which the tank is put into flushing operation.

21 denotes a valve in the shape of a ball, which is adapted to seat upon the rounded inner edge of the nipple 9 and the coacting portion of the wall 13 and thus cut off communication between the tank and the flushing pipe, which will be connected to the nipple 9. The ball 21 is hollow and is adapted to float upon the water contained in the tank except when on its seat, where it is normally held by the unbalanced pressure of the water on the top of the same. This ball is preferably made of an inner shell 21^a of copper or similar metal covered with rubber or other yielding material, shown at 21^b.

22 denotes the inlet connection through which water is supplied to the tank. This connection is provided with an inclined flange 23 adapted to bear against the bottom of the inner tank wall and form a tight joint therewith, also with a nut 24, which is adapted to be threaded on said connection and engage a suitable recess in the bottom of the outer wall to clamp the connection firmly in place.

25 denotes a valve fitting which is applied to the upper end of the connection 22. This fitting is preferably a casting having a vertical passageway 26 communicating with the bore of the connection 22 and with a chamber formed in the fitting, said chamber communicating with a lateral branch 27, to which there is fitted the downwardly-extending discharge pipe 28. The upper end of the fitting 25 is preferably formed with a smooth interior of uniform diameter for the reception of the member which carries the valve seating plunger and the float for operating same. This member is denoted at 29 and comprises a yoke having forked arms 30 and 31, the intermediate portion having a shoulder 32 adapted to rest upon the upper end of the fitting 25. Below said shoulder there extends a neck 33, which is adapted to fit snugly the upper end of the fitting 25. The body of the member 29 is provided with a central vertical bore and the lower end of said bore is expanded, as shown at 34, to form a seat for the flaring outer surface of the lower end of the valve seating member or plunger 35. The lower end of this member or plunger is provided with a concave seat adapted to engage the upper surface of the ball-valve 36. Between the chamber formed above the passageway 26 and the branch 27 there is interposed a slotted disk 37, which, while permitting the flow of water therethrough will serve to retain the ball in its chamber. The arms 30 and 31 are forked and the latter arm projects considerably above the former.

38 denotes a lever which is pivoted at one end between the forks 30 and has its other

end projecting through the forks 31 and its intermediate portion projecting through the upper end of the valve seating member 35.

39 denotes a float lever. This lever is pivoted intermediate of its ends to the forks 31 and is connected to the end of lever 38 by means of a link 40.

41 denotes the float carried by the lever 39. This lever is provided with a projection 42, which is adapted to engage the upper end of the valve-seating member 35 under conditions to be described hereinafter. The member 29 is secured in place in the upper end of the fitting 25 by means of screws 43, which extend through the upper end of the fitting and into the neck 33.

With the parts arranged as described, the operation will be as follows: The handle 20 is operated to lift the sleeve 14, and this sleeve engages the ball 21 and lifts the same from its seat. The notches 15 allow the water to flow beneath the ball 21 and equalize the pressure on both sides thereof. The ball, being lighter than the water, then floats around freely in the tank while the water is flowing therefrom. As the seat for the valve is located at the lowest point of the tank, the ball is carried automatically to its seat when the tank is emptied. The unbalanced pressure of the water on top of the ball holds it firmly to the seat during the filling operation and until the next flushing operation occurs. It will be apparent that, as the ball floats about in the tank every time that the tank is flushed, the ball will not present the same seating surface twice in succession to the seat formed at the upper end of the nipple 9. It follows, therefore, that by the construction of ball-valve and seat and the manner of operating the ball valve, the life of the valve is greatly increased. By making the ball of metal covered with rubber an efficient seat engaging surface is provided, the ball will not be liable to collapse and its life will be greatly prolonged as compared with ordinary rubber valves.

As the water flows out of the tank, it sweeps down the inclined bottom of the same and effectually cleanses and removes all sediment from the bottom, this action being facilitated by the absence of projections tending to accumulate sediment. The accumulation of sediment in tanks of ordinary construction, wherein the flushing connections project considerably above the bottom, is unsanitary, and is the cause of leakage and deterioration in such tanks. As the level of the water falls, the float 41 drops, lifting the valve closing member 35 to its seat 34 at the bottom of the neck 33. The incoming water lifts the ball 36 from its seat and whirls it around in its chamber. The float descends until the projection 42 engages the top of the member 35, in which

position the parts will remain until the incoming water lifts the float, thereby carrying the ball 36 to its seat 26^a at the top of the passageway 26. It will be understood, of course, that the chamber will be of insufficient width to permit the ball to pass between the lower end of the member 35 and the chamber wall.

In Figs. 5 and 6, I have shown a modification of the means for unseating the ball valve 21. In this modification, the upper end of the nipple 9^a is provided with an extended inwardly projecting seat 44 for the valve. The means for flushing the tank comprises a rod 45, connected at its lower end to a lever 46, which is pivoted to a lug 47 projecting upwardly from the flange on top of the nipple 9^a. The opposite arm of the lever 46 is provided with a projection 48, which is adapted to bear against the ball 21 at a point below the center. It will be apparent that, by depressing the rod 45, the ball 21 will be thrown from its seat and the tank will be flushed in the manner described hereinbefore.

In Figs. 7 and 8, there is shown a flushing arrangement which differs from that shown in Figs. 1 to 4 inclusive, mainly in the adaptation of the flushing arrangement shown in the former figures to another construction of tank. In Figs. 7 and 8, my invention is applied to a tank having a plurality of overflow pipes 49, and four such pipes are shown grouped around a common discharge outlet. The lower ends of these pipes are threaded into a chamber 50. This chamber is provided with a short wall 51, which depends from the flange 51^a and is threaded into the upper end of the nipple 9^b. 52 denotes a concave seat for the ball 21 and forming part of a depending sleeve 53 between which and the wall 51 the overflow water from the pipes 49 may be discharged. The lower end of sleeve 53 forms a guide for the ball dislodging member 54. This member is similar to the member 14 and is provided with notches 55 in the upper end thereof and with a lug 56 projecting through a slot 57 in the sleeve 53 and adapted to rest upon a lug 58 projecting inwardly from the nipple 9^b. The lug 56 is connected by means of a rod 59 with the operating lever, and said rod is preferably extended through one of the pipes 49. The pipes 49 form a cage in which the ball 21 is retained when unseated by the lifting of 54. This cage, however, does not interfere with the rotary movement of the ball, and in operation a new surface of the ball will be presented to its seat after each flushing operation.

From the foregoing description, the advantages of my invention will be clear. The construction of double-walled tank with absorbent material and ventilating apertures prevents the dripping of the metal tank by

condensation thereon and provides means whereby such condensation may be gradually evaporated. The construction of the inner wall of the tank, including the enamel lining, provides means whereby the tank may be kept clear from sediment and the operation of the ball in seeking its seat will not be impeded. Furthermore, the construction of the valve and the cooperating parts for flushing the tank greatly lengthens the life of such valve, as is the case with the inlet valve and its cooperating parts. Furthermore, the provision of a valve seat for the lower end of the operating member 35 against the lower end of the neck 33 prevents water which enters through the connection 22 from being ejected forcibly or otherwise through the space provided between said member and its guide.

Having thus described my invention, I claim:

1. The combination of a tank having an outlet connection extending from the bottom thereof and provided with a seat, a valve adapted to float in the liquid contained in said tank and to engage said seat, a member reciprocable within said connection and adapted to engage the lower portion of the valve to unseat the same, an overflow tube communicating with said connection and partially overhanging the same, an operating lever, and a connection extending from said lever through said tube and into the outlet connection and having its lower end operatively connected to the reciprocable member.

2. The combination of a tank having an outlet connection extending from the bottom thereof and provided with a seat, a valve adapted to float in the liquid in said tank and to engage said seat, a sleeve reciprocably supported within said connection and having a lateral projection, a seat for said projection carried by the outlet connection, an overflow pipe communicating with the outlet connection at the side thereof which is provided with said seat, and an operating device for the sleeve extending through said tube and secured to the lateral projection of said sleeve.

3. The combination of a tank having an outlet connection extending from the bottom thereof, a plurality of upwardly projecting overflow pipes communicating with said connection, a valve seat in said connection arranged within the group of overflow pipes, a valve adapted to float in the liquid in the tank and arranged within the group of pipes, an unseating member within said connection below said valve, and an operating device for said member extending through one of said pipes.

4. The combination of a flushing tank having an outlet connection in the bottom thereof and a plurality of upwardly pro-

jecting overflow pipes communicating with
said connection, a valve seat within said
connection and arranged within the group
of overflow pipes and provided with a
5 downwardly extending sleeve having a ver-
tical slot in the wall thereof, a valve within
said pipes and adapted to float in the liquid
in the tank, an unseating member mounted
within said sleeve and provided with a pro-
10 jection extending through said slot, and an

operating device connected with said pro-
jection and extending through one of said
pipes.

In testimony whereof, I hereunto affix my
signature in the presence of two witnesses. 15

WILLIAM G. STEWART.

Witnesses:

J. B. HULL,

BRENNAN B. WEST.