Oct. 5, 1954 E. H. QUEBBEMAN 2,690,567

FLUSH MECHANISM

Filed Sept. 30, 1952 2 Sheets-Sheet 1

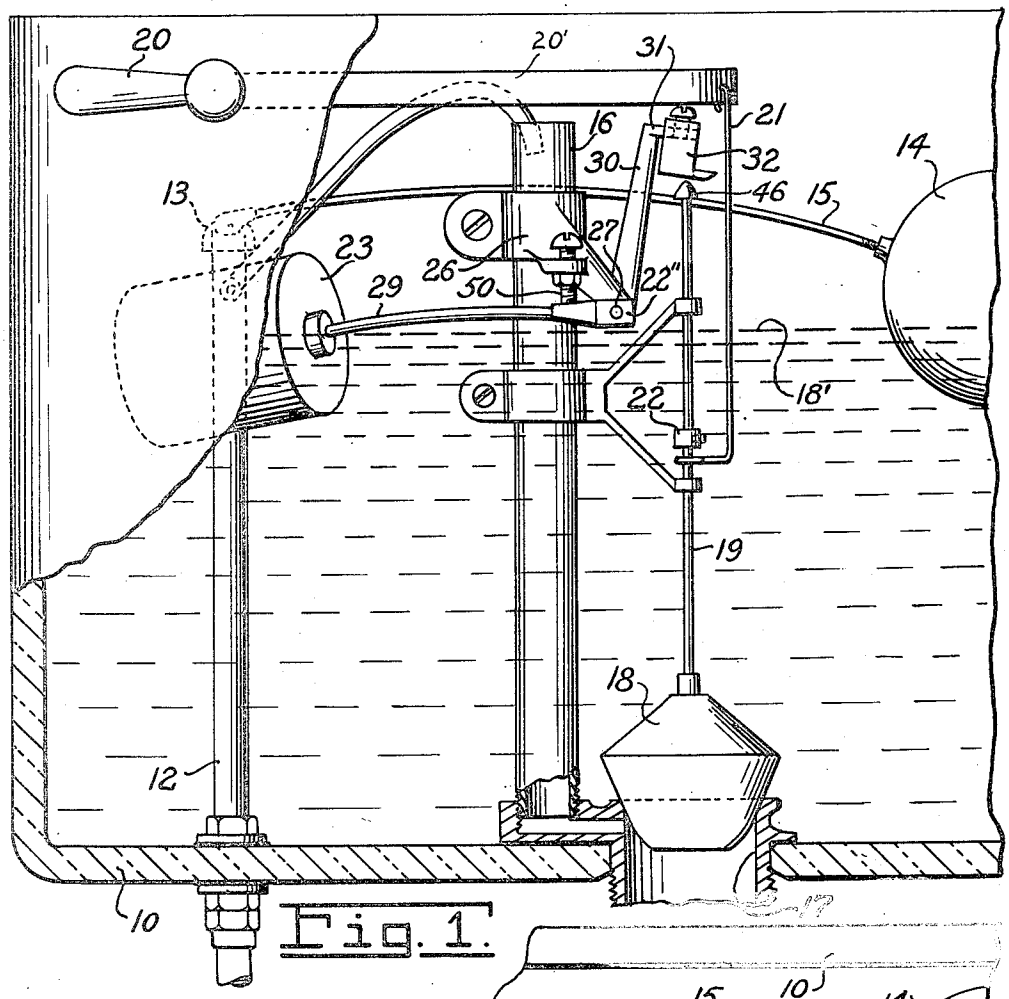


Fig. 1.

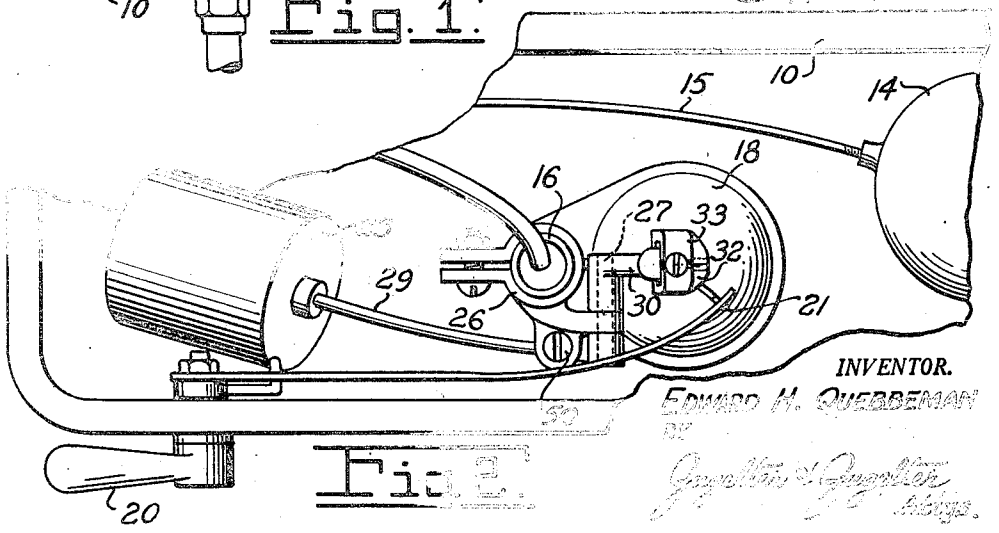


Fig. 2.

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Filed Sept. 30, 1952 2 Sheets-Sheet 2

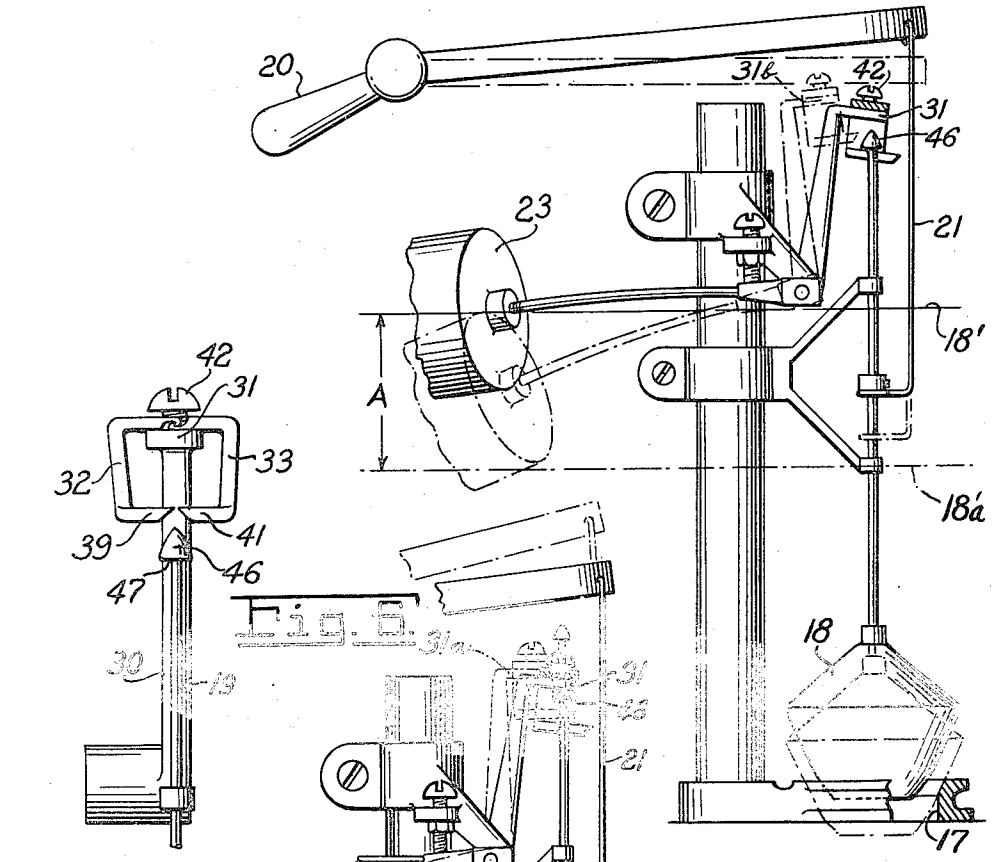


Fig. 3.

Fig. 4.

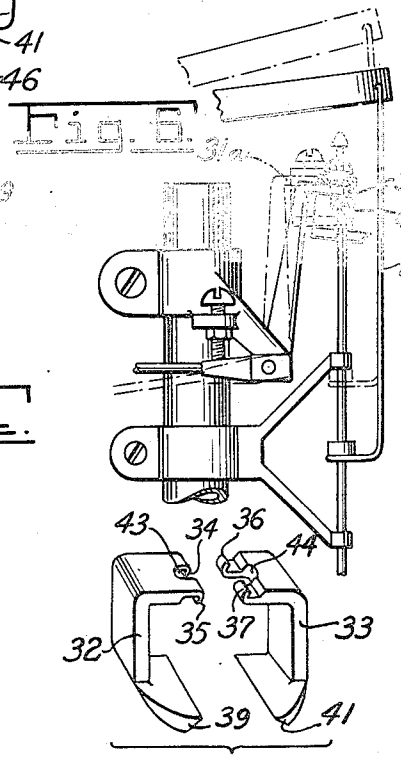


Fig. 5.

Fig. 6.

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FLUSH MECHANISM

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3 Claims. (Cl. 4—53)

1

This invention relates to flush mechanism for a toilet tank and more particularly to mechanism whereby either partial or full flushes of the tank may be effected at will.

An object of this invention is to provide flush control mechanism for a toilet tank which permits the discharge of a predetermined portion of the water from the tank for use in a partial flush.

A further object of this invention is to provide such mechanism which is selectively operable to release either a portion of the water in the toilet tank when a partial flush is desired or substantially all the water when full flush is required.

Another object of this invention is to provide mechanism for holding the flush valve of a toilet tank a short distance off its seat for a short interval to effect a partial flush, the flush valve being released to closed position when the partial flush has been completed.

The above and other objects and features of this invention will in part be obvious and will in part be apparent from the following detailed description, and the drawings, in which:

Figure 1 is a view in side elevation, partly broken away and in section, of a portion of a toilet tank containing flush control mechanism constructed in accordance with an embodiment of this invention;

Fig. 2 is a plan view of the tank illustrated in Fig. 1;

Fig. 3 is a view in side elevation of the flush mechanism, the flush valve being shown partially elevated, the valve and valve stem holding mechanism being shown in dot-dash lines in the position assumed at the end of a partial flush;

Fig. 4 is a fragmentary view in side elevation showing details of the valve stem holding mechanism of the device illustrated in Figs. 1, 2 and 3;

Fig. 5 is a perspective view showing details of construction of the jaw members, the jaw members being shown removed from the device; and

Fig. 6 is a fragmentary view in side elevation of the valve stem stopping and holding mechanism, the mechanism being shown in full lines in valve stem stopping position and in dot-dash lines in stem released position.

In the following detailed description, and the drawings, like reference characters indicate like parts.

In the drawings a flush tank 10 is shown that is provided with a water supply pipe 12 having a valve 13 actuated by a float 14 carried by a valve actuating lever arm 15 and an overflow pipe 16. The tank is also provided with a flush valve comprising a seat 17 and a so-called ball valve 18 that is provided with a stem 19. When

2

the valve 18 is seated, water normally is at a level 18' in the tank. The ball valve may be unseated by a hand lever 20. Hand lever 20 actuates a stem lifting lever 20' that is connected to the ball valve stem by a link 21 having a loop through which the stem passes. A collar 22 on the stem is engaged by the loop when the link is raised by the hand lever.

In the usual flush tank, the ball valve is raised to a full flush position by the hand lever. In that position the contents of the tank discharge before the ball valve reseats on the valve seat.

To provide for partial as well as full flushes of the tank, a stop and latch mechanism 22' is provided and operated by a float 23. By that mechanism the ball valve can only be raised a limited distance by the hand lever 20 until the water level has dropped a predetermined amount in the tank. When the water level has dropped that amount the latch and stop mechanism will have been moved out of the path of the ball valve stem so that it can be lifted by the hand lever to the full flush position.

The float operated stop and latch mechanism is mounted on overflow pipe 16 and is supported by a split clamp bracket 26 attached to overflow pipe 16. The bracket supports a pin 27 to which the float arm 28 and a lever arm 30 are attached so that float arm 28 and lever arm 30 swing together. The lever arm 30 is provided with a stop 31, shown as being a flange integral with the top of the arm, and a pair of jaws 32 and 33. The jaws are suspended from the flange 31 and are located directly above the ball valve stem 19 when the level of water in the tank is at 18', as shown in Fig. 3. The details or form of the jaws is shown in Fig. 5. As there illustrated, each jaw is approximately channel shape. The flanges at the upper ends are formed with complementary hooks 34, 35, 36, and 37 that interlock. The lower flanges are more angular and are formed with beveled edges 39 and 41 that form a V groove facing the top of the valve stem 19 when the jaws are closed.

The jaws are placed on top of flange 31 with the hooks interlocked and held in place by a screw 42 (Fig. 4) that passes through openings 43 and 44 (Fig. 5) in the top flanges of the jaws.

The top of the valve stem 19 is provided with a cone point 46 (Fig. 4) having a flat base 47 so that, when the valve stem is raised, the cone point can pass between beveled edges 39 and 41 to swing the jaws apart. When the cone point passes the beveled edges of the jaws, the jaws swing together to support the stem at the flat base 47 of the cone point.

Stop flange 31 swings with lever arm 30 from

a position shown in full lines to a position shown in dot-dash lines at 31*a* in Fig. 6 and to a position shown in dot-dash lines at 31*b* in Fig. 3. When the stop plate is in the full line position, and valve stem 19 is raised, cone point 46 engages the stop flange 31 to limit the height to which the valve stem can be raised. However, when the stop plate is at the dot-dash line position 31*a* at Fig. 6, the stem can be raised fully to the dot-dash line position of Fig. 6.

If the valve stem is raised against stop flange 31 and then released, the valve stem and ball valve are drawn downwardly by the suction at discharge opening 17, but valve cone 46 is caught by the jaws 32 and 33 to suspend the valve ball 18 above the discharge opening, as shown in full line in Fig. 3.

While the ball valve is suspended from the jaws, the water level in the tank falls. When the level has fallen a predetermined amount from level 18' to level 18'*a* (Fig. 3), float 23 and lever arm 30 swing from the full line positions to the dot-dash line positions of Fig. 3, and the jaws disengage the cone point to release the valve stem, whereupon the valve stem and ball valve descend as the flow of water through seat 17 pulls the ball valve down until the ball seats on valve seat 17.

When the tank is filled again, lever arm 30 swings to the right as shown in Fig. 3 as the float rises until float arm 29 engages an adjustable stop 50 which limits counterclockwise swinging so that stop flange 31 is above the valve stem when the tank is full.

If the lever 20' is raised to raise cone point 46 against stop flange 31, and then is held in raised position by holding handle 20 in stem raised position until a predetermined small amount of the water is discharged from the tank and the jaw carrying lever arm 30 and the jaw members swing from the position shown in full lines in Fig. 6 to the position shown in dot-dash lines in Fig. 6, the cone then can be advanced past stop flange 31 and the valve stem and valve ball can be raised to bring the valve ball free of the suction at opening 17 to permit a full flush of the toilet tank.

If lever 20' is raised and immediately released, valve stem 19 is raised only until cone point 46 engages stop plate 31, and only a predetermined portion of the water in the tank is released. If, on the other hand, lever 20' is raised and held until the jaws have swung to the position shown in dot-dash lines in Fig. 6, the valve stem and valve are then fully raised and a full flush results.

The mechanism illustrated in the drawings and described above is subject to structural modification without departing from the scope of the appended claims.

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

1. Control mechanism for a flush valve of a toilet tank which comprises an elongated upright stem attached to the valve, means for raising the valve stem to raise the valve, a crank having two arms, jaws connected to one of the crank arms and swingable with the crank into the path of the valve stem to hold the valve spaced a short distance above its seat, a float attached to the other arm of the crank and adapted to swing the jaws into valve engageable position when the level of water in the tank is at a predetermined full level, a stop for limiting rise of the valve stem when the tank is full, and means for releasing the stop when the water in the tank is at a second predetermined level below full, whereby, when

the tank is full and the valve stem and valve are raised against the stop and then released, the jaws hold the valve free of its seat until the jaws swing out of valve engageable position, whereupon the valve is released to close the valve after only a portion of the water in the tank is released for flushing and when the valve is raised beyond the stop as the water falls to the predetermined level, the valve can come free of the stop and rise to a position at which substantially all the water in the tank is released.

2. A flushing device for a toilet tank having an upwardly facing drain opening which comprises a valve for closing said drain opening, a valve stem attached to and extending upwardly from said valve, means for guiding said valve stem for vertical reciprocation, a crank having two arms, jaws connected to one arm of the crank and swingable therewith into the path of the valve stem and engageable with the valve stem when the valve is raised a short distance from its seat to hold the valve in raised position, a float attached to the other arm of said crank for swinging the jaws to valve stem engageable position when the tank is full and to a released position when the level of water falls to a predetermined level below full, means for raising the valve stem and valve to permit water to flow from the tank through the opening, a stop limiting the height to which the valve can be raised when the tank is full, so that, when the valve raising means is released after being raised to engage the stop, the valve stem is engaged by the jaws to support the valve closely spaced above the drain opening, and, when the jaws are released, the valve closes the opening after only a portion of the water in the tank is released, and means for releasing the stop when the level of water falls to a second predetermined level, whereby, when the valve raising means is actuated after release of the stop, the valve stem and valve can be raised to a higher position where the valve remains free from the suction of the drain opening until the tank is substantially empty.

3. In a flush tank provided with a float-actuated valve for controlling the water level in the tank, a flush valve provided with a lift stem for controlling the discharge of water from the tank and a lever connected to the lift stem for raising the flush valve, the improvement that comprises a lever having a pair of jaws disposed to engage the stem when it has been raised to a position corresponding to partial flush position, a stop mounted on the lever above said jaws which limits upward movement of the lift stem and flush valve to a predetermined height, and a float connected to said lever for actuating said jaws to a position in which the flush valve stem is released therefrom when the water level in the tank has been lowered a predetermined amount, said stop being actuated out of the path of travel of the lift stem when the stem has been released by the jaws, whereby the flush valve may be either re-seated or elevated to full flush position when the water level in the tank has been lowered said predetermined amount.

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