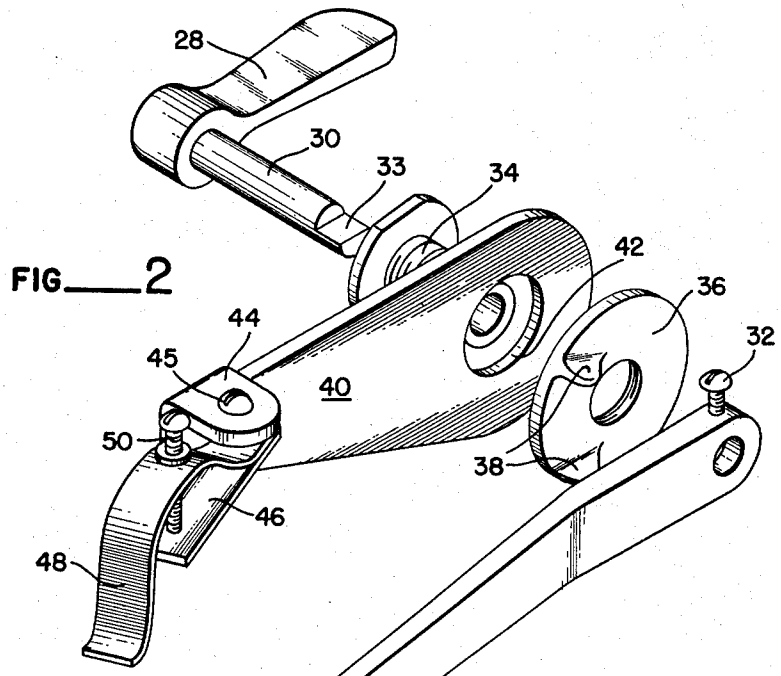
April 28, 1953 R. W. SKUTT ET AL 2,636,184

FLUSHING VALVE MECHANISM

Filed Feb. 12, 1951

FIG. 2



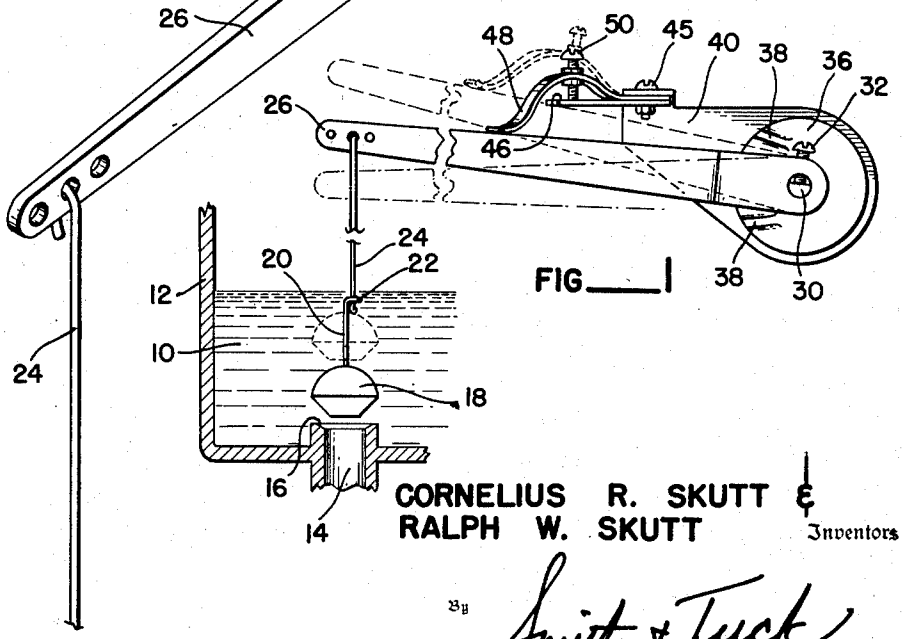


FIG. 1

CORNELIUS R. SKUTT &
RALPH W. SKUTT Inventors

By Smith & Tuck

Attorneys

Patented Apr. 28, 1953 2,636,184

UNITED STATES PATENT OFFICE

2,636,184

FLUSHING VALVE MECHANISM

Ralph W. Skutt and Cornelius R. Skutt,
Olympia, Wash.

Application February 12, 1951, Serial No. 210,546

5 Claims. (Cl. 4—67)

1

Our invention relates to water tanks for disposal bowls, and, more particularly, to a flushing valve mechanism for use in connection with toilet water tanks.

In many communities of the country there are occasions where the water supply is either inadequate or the cost is so high that conservation of water is a prime requisite. As is well known a wasteful practice occurs in the flushing of a toilet bowl which normally has a flow sufficient to handle the usual capacity of the bowl in respect to liquids and solids but that same flow is—and must—also be used to flush purely liquid contents. It has long been recognized that water can be conserved in the latter case by insuring that the flush tank be lowered by discharge of its contents only sufficiently to accommodate the flushing out of the liquids. The prior art is replete with examples of mechanisms that have previously been devised for such purpose but they are obviously accompanied in their showings by complexity of structure, alternativeness of operation requiring a predetermination on the part of the user of whether to give the tank a full flush or a partial flush, and the requirement that substantial portions of the prior mechanism be abandoned and new components supplied in order to adapt the flush tank for the "short flush" operation.

Having in mind these and other objections it has been among the important objects of our invention to provide a device that is easily and simply constructed and as easily and simply installed in a present day water tank to adapt it for selective flushing without requiring the replacement of the normally provided mechanism, or without changing its normal operation in any material respect as far as a full flush is concerned, and which can be attached to and incorporated in a toilet water flush tank by the lesser skilled home mechanics employing the tools usually available to such persons. More specifically it is included in our aims in this invention to provide a means which operates upon the usual ball valve lifter arm to, first, positively indicate to an operator that he has lifted said arm to a point where the water will flow without the valve floating and, second, permit the operator with the same motion and but slightly greater application of force to continue moving the manually operated crank in the same direction to produce a full flush of the tank, all without changing the present mechanism or its normal mode of operation.

These and other objects of the invention will

2

become apparent during the course of the following specification of our invention when taken in view of the accompanying drawings in which:

Figure 1 is a view in side elevation, partially schematic, showing the preferred construction and normal mode of operation of flush valve limiting means; and

Figure 2 is an exploded view in perspective showing the usual flush valve parts and the device of our invention as incorporated therein.

In the usual toilet water tank, a body of water 10 is contained within a tank 12 having a lower discharge outlet 14 which is provided with an upper valve seat 16 on which sits the buoyant valve ball 18 to contain the water body 10 within the tank. The tank is flushed by the raising of the valve ball 18 off the seat whereupon the water in the tank drains with a rush into the bowl to carry out the flushing operation. The valve ball 18 has an upstanding stem 20 which has a slip connection at 22 with lifting link 24 that in turn is connected on its upper end to the lifting lever 26. When the lifting lever raises the link 24 the buoyant ball 18 is raised off the seat on the discharge outlet and the ball tends to float while the water level recedes to a point where the ball is drawn back into position to close the outlet. This drawing back operation is performed by suction imparted by the outflowing water and, when seated the rubber valve ball 18 is held in place by the water pressure above it.

Raising of the lifter lever 26 is attained by means of crank arm 28, normally disposed externally of tank 12, and crank pin 30 that extends to internally of the tank where it is connected to lever 26 by means of set screw 32 bearing on recess 33. The crank pin 30 is journaled in flanged bushing 34 that is clamped in a suitable opening (not shown) in the water tank wall by means of the internal flange-nut 36, there being a threaded connection between the bushing and the nut. Nut 36 as shown has spaced apart stop bosses that lie on either side of the lifting lever in the assembly and limit its upward and downward travel. The mechanism shown is of the single action type in which the operating crank arm 28 is usually horizontal and is depressed by the operator to produce a lifting action to raise the rubber valve ball 18.

We have determined that, intermediate the normal lower or at rest position of the valve ball and its upper floating position which it assumes when a full flush is taking place, there is a point to which the valve ball may be raised at which some water will flow out of the outlet sufficient

to provide a short flush but at which point the valve will not float. For example a standard toilet water tank with which we have worked extensively is so arranged that the ball valve 18 may be raised to between three fourths and one inch without the valve floating and it is among the more pertinent aims of this invention to provide means for accommodating such a lifting action while at the same time with the same movement by the operator but to a slightly greater degree to accomplish a full flush as well if such is desired. The term "partial flush position" when used herein is defined as that position of valve ball 18 or lifting lever 26, whichever is appropriate in context, where there is flushing with a substantial body of water without the valve ball 18 floating. In other words, the suction on valve ball 18 due to the action of water passing through the outlet 14 is great enough in the partial flush position to overcome the tendency of valve ball 18 to float due to its buoyancy. Conversely, the term "full flush position," when used herein, is defined as that position of the valve ball 18 or lifting lever 26, where valve ball 18 floats and will not return to block outlet 14 until the water level in the tank 12 falls to the outlet.

Our means for accomplishing this is found in the drawings to comprise the finger arm 40 having an opening 42 that fits over the bushing 34 and may be clamped to the interior wall of the tank 12 by means of flange nut 36. While we have not shown such, it will be apparent that resilient washers may be interposed into the assembly to insure tight frictional contact between the parts and, further, that no undue pressures are applied about the tank wall opening as in the case of ceramic tanks.

The finger arm 40 extends from its axis outward in generally parallel direction to the lever 26 and has at its outer end an outstanding ear 44. To the ear is pivotally connected by bolt 45 the blade 46 which constitutes a shelf. Overlying blade 46 is the downwardly bowed spring blade 48 which is usually disposed in the path of the lifting lever 26. In the preferred form of the invention it is desirable in order to accommodate many makes of equipment that the tension and disposition of the spring blade 48 be varied and for that reason between shelf 46 and blade 48 is placed an adjusting screw 50 which, depending upon how far apart the blade and shelf are spread regulates the tension on the blade and its vertical location in the lever's path.

The operation of our device is very simple. As the user of the device depressed the crank handle 28 the lifting lever 26 rises within the tank until it contacts the blade 48. This contact is readily felt by the user and if he desires merely to briefly flush the toilet bowl he will hold the valve thus far opened until satisfactory flushing is accomplished. Should it be his desire to impart a full flush, the operator merely overrides the pressure of blade 48 at which time the valve ball will be raised to the upper dotted line position in Figure 1 where it floats until the tank water level has receded and suction on the ball draws it to the discharge outlet of the tank. The solid line showing of Figure 1 depicts the condition prevailing in the mechanism when a short flush is being carried out.

It will be apparent from the foregoing that we have provided a simple, efficient and extremely useful limiting means for flush tank valves of the floatable type. It should be equally apparent to those skilled in the art that variations and alterations may be made within that normal skill and without materially departing from the invention. We therefore intend to protect to ourselves by this patent those forms of devices which are the mechanical equivalents of our preferred form as fall within the spirit and scope of the invention as defined in the subjoined claims taken in view of the prior art.

Having thus described our invention and its operation, we claim:

1. In a flushing-water tank of the type wherein a vertically movable valve element normally closes the outlet and a lifting lever is provided within the tank for operating the valve element to displace it vertically from said outlet and a manually operable crank arm is disposed externally of the tank and connected by means of a crank pin with said lever to lift the same, the combination, comprising: a finger arm disposed in juxtaposed, side-by-side relationship to said lifting lever and means securing said finger arm in a fixed position in relation to said tank; a downwardly-biased, spring-pressed finger carried by said finger arm and located above said lifting lever in the path of travel of the same, said spring-pressed finger forming a resilient stop for said lifting lever and being positioned at such a level as to press against said lifting lever when it reaches a partial-flush position, said spring-pressed finger having sufficient resistance to further upward movement of said lifting lever to be discernible by feel of the operator upon manual movement of the crank arm externally of the tank, said spring-pressed lever being capable of being overcome by simple force applied to the crank arm by the operator to produce raising of the valve element to a full-flush position.

2. In a flushing-water tank of the type wherein a vertically movable valve element normally closes the outlet and a lifting lever is provided within the tank for operating the valve element to displace it vertically from said outlet and a manually operable crank arm is disposed externally of the tank and connected by means of a crank pin with said lever to left the same, the combination, comprising: a finger arm disposed in juxtaposed, side-by-side relationship to said lifting lever and means securing said finger arm in a fixed position in relation to said tank; a downwardly-bowed spring blade carried by said finger arm and located above said lifting lever in the path of travel of the same, said spring blade forming a resilient stop for said lifting lever and being positioned at such a level as to press against said lifting lever when it reaches a partial-flush position, said spring blade having sufficient resistance to further upward movement of said lifting lever as to be discernible by feel of the operator upon manual movement of the crank arm externally of the tank, said spring blade being capable of being overcome by simple force applied to the crank arm by the operator to produce raising of the valve element to a full-flush position.

3. In a flushing-water tank of the type wherein a vertically movable valve element normally closes the outlet and a lifting lever is provided within the tank for operating the valve element to displace it vertically from said outlet and a manually operable crank arm is disposed externally of the tank and connected by means of a crank pin with said lever to lift the same, the combination, comprising: a finger arm disposed

in juxtaposed, side-by-side relationship to said lifting lever and means securing said finger arm in a fixed position in relation to said tank; said finger arm having an outstanding shelf and a downwardly-bowed spring blade anchored at one end to said finger arm and overlying said shelf and having its other end located above said lifting lever in the path of travel of the same, screw means between said shelf and said spring blade for varying the tension on the latter, said spring blade forming a resilient stop for said lifting lever and being positioned at such a level as to press against said lifting lever when it reaches a partial-flush position, said spring blade having sufficient resistance to further upward movement of said lifting lever as to be discernible by feel of the operator upon manual movement of the crank arm externally of the tank, said spring blade being capable of being overcome by simple force applied to the crank arm by the operator to produce raising of the valve element to a full-flush position.

4. In a flushing-water tank of the type wherein a vertical movable valve element normally closes the outlet and a lifting lever is provided within the tank for operating the valve element to displace it vertically from said outlet and a manually operable crank arm is disposed externally of the tank and connected by means of a crank pin with said lever to lift the same, the combination, comprising: a finger arm disposed in juxtaposed, side-by-side relationship to said lifting lever and means securing said finger arm in a fixed position in relation to said tank; said finger arm having an ear outstanding toward said lifting lever; a base blade forming a shelf outstanding from said ear and over said lifting lever to form a stop for the same; a downwardly-bowed spring blade anchored at one end to said ear and overlying said shelf and having its other end portion located above said lifting lever in the path of travel of the same; and a screw element interposed between said base blade and said spring blade for varying the relative spacing of said blades and the tension of the spring blade, said spring blade forming a resilient stop for said lifting lever and being positioned at such a level as to press against the top of said lifting

lever when it reaches a partial-flush position, said spring blade having sufficient resistance to further upward movement of said lifting lever as to be discernible by feel of the operator upon manual movement of the crank arm externally of the tank, said spring blade being capable of being overcome by simple force applied to the crank arm by the operator to produce raising of the valve element to a full-flush position.

5. In a flushing-water tank assembly of the type wherein a single vertically movable valve element normally closes the only outlet of the tank and a manually operable crank assembly is provided for operating the valve element including a crank arm disposed externally of the tank and a lifting lever disposed within the tank and connected to said valve element to displace the valve element vertically upward from said outlet when said lifting lever is raised by means of manual operation of said crank arm, the improvement, comprising: a spring member having means securing one end of said spring member in a fixed position in relation to said tank, the other end of said spring member being positioned to be engaged by said crank assembly when said crank assembly has been moved to lift said valve element to a partial-flush position, said spring member being disposed to resist further movement of said crank assembly toward moving said valve element to a full-flush position and having sufficient resistance to be discernible by feel to a person operating said crank arm externally of said tank, the resistance of said spring member being capable of being overcome by additional force applied to the crank arm by said person, in the same direction as before, to produce raising of the valve element to a full-flush position.

RALPH W. SKUTT.
CORNELIUS R. SKUTT.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,992,381	Lyons	Feb. 26, 1935
2,001,390	Lester	May 14, 1935
2,106,916	Morkisch	Feb. 1, 1938