June 15, 1943. C. S. GARRATT, JR 2,322,123

FLUSH VALVE MECHANISM

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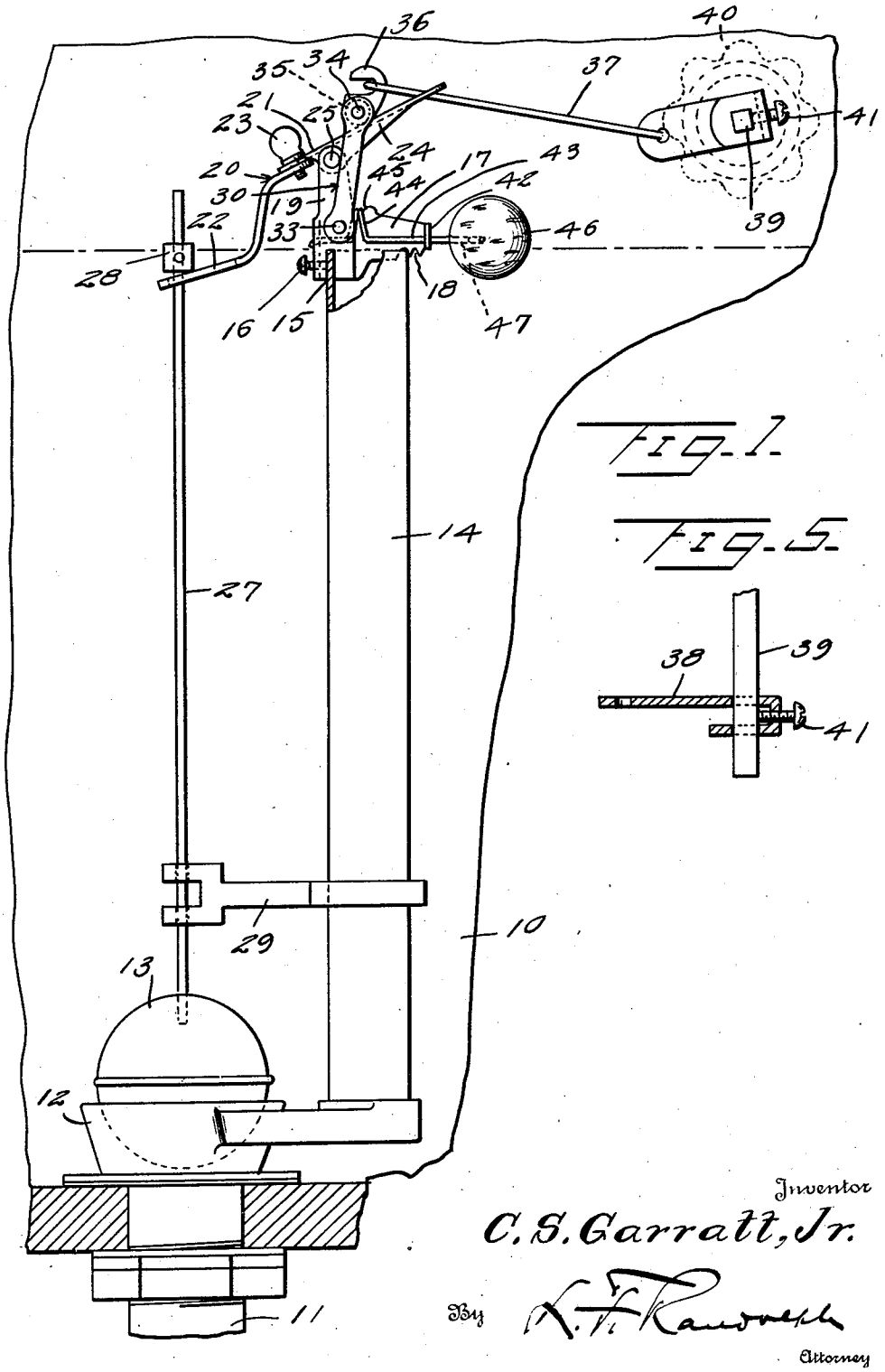


FIG. 1.

FIG. 5.

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FIG. 2.

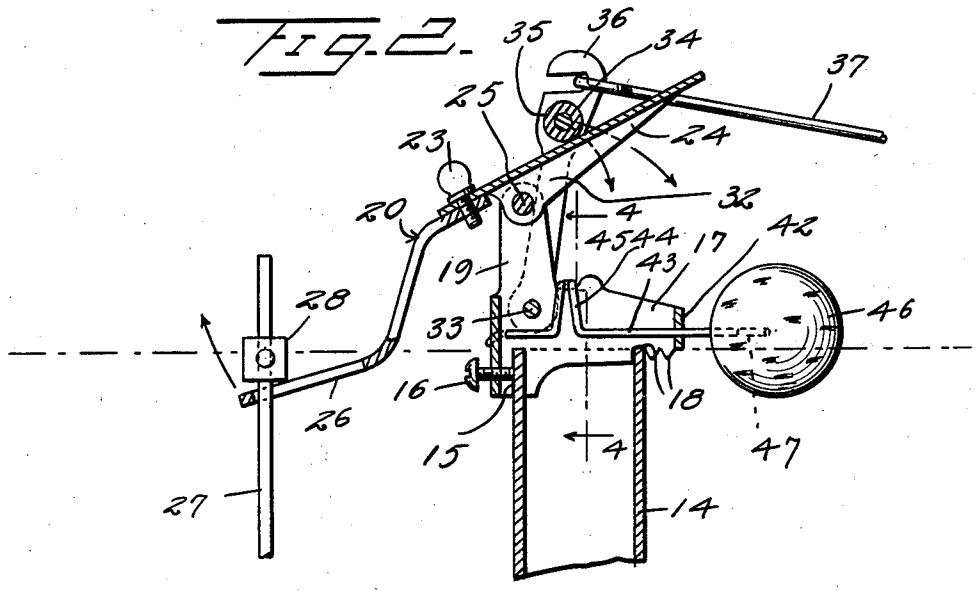


FIG. 3.

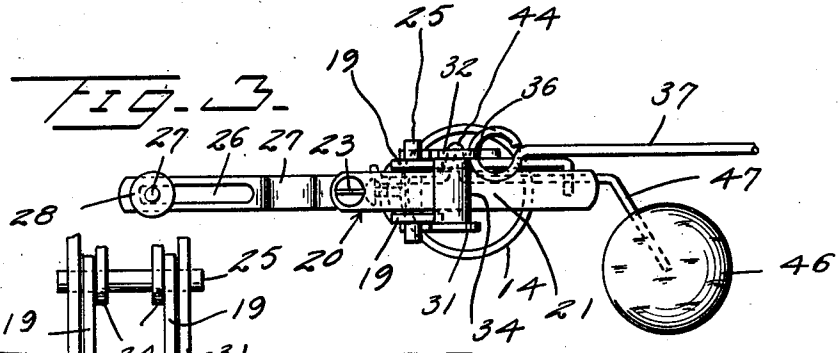
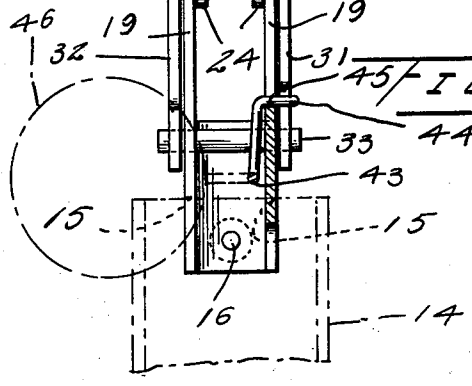


FIG. 4.



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UNITED STATES PATENT OFFICE

2,322,123

FLUSH VALVE MECHANISM

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Application June 26, 1942, Serial No. 448,646

3 Claims. (Cl. 4—67)

This invention relates to a flush valve mechanism and it aims primarily to provide a construction which will enable the material saving of water in the event of leakage.

It is further aimed to provide a structure which will effect a saving in the amount of material used as well as eliminate the employment of faulty operating parts as in existing construction, and provide one of less weight, and requiring less leverage to the end that the flushing operation will be easier, and the construction generally less likely to get out of order with minimum chance of undue wear.

I especially aim to provide a structure which is operable by a compound leverage effect and in which the lift on the tank ball is rectilinear or in a straight line.

Especially, it is aimed to provide a structure adapted to be mounted on the overflow tube, and which will operate automatically in the event of leakage to prevent flushing, so that the user will realize the existence of a leak and proceed to have it remedied.

Another aim of the invention is to so produce the structure that the lift arm for the ball will serve as a second guide arm for the lift rods of the ball.

The more specific objects and advantages will become apparent from a consideration of the description following taken in connection with accompanying drawings illustrating an operative embodiment.

In said drawings:

Figure 1 is a view showing the improvements primarily in elevation, within a fragmentary section of a flush tank;

Figure 2 is an enlarged view, primarily showing the parts of my invention in central vertical section;

Figure 3 is a plan view of the improved mechanism;

Figure 4 is a vertical section taken on the line 4—4 of Figure 2, and

Figure 5 is a detail, partly in section, of the actuating parts.

Referring specifically to the drawings wherein like reference characters designate like or similar parts, a fragment of a conventional flush tank is disclosed at 10, having an outlet pipe or conduit 11 leading therefrom to a hopper or the like to be flushed. A conventional suit 12 is provided at the inlet of the conduit 11 which is normally closed by a ball valve 13, adapted to be lifted from the seat. A conventional overflow tube 14 communicates with the seat 12 and the usual after-fill tube (not shown) is adapted for extension into the upper end of the over-flow tube 14 as usual. For the sake of clearness, and as it constitutes no part of the present invention, illustration of the water supply valve mechanism has been omitted.

In carrying out my invention, I provide a suitable bracket which is generally of U-shape in plan. This bracket is slotted at 14, in order to receive a portion of the upper edge of the over-flow tube 14 which latter is engaged by a binding screw 16 carried by the bracket. In addition, the bracket has a limb 17, whose under surface is notched as at 18, in order to engage the upper edge of tube 14 diametrically opposite the binding screw 16. The brackets 14 may be made in a size to fit one tube only but when they are provided with a plurality of the notches 18, they will fit a number of different size tubes to render the use thereof more universal.

Rising from opposite sides of the bracket 14 are laterally spaced uprights or bearings 19 between which a lift arm 20, for the ball valve 13, operates. This lift arm may be made in one piece for one size of mechanism or it may be made in sections 21 and 22, adjustably secured together by a screw 23. Section 21 has depending webs 24 to which a pin 25 extends and which is journaled in the bearings 19, pivotally mounting the lift arm. Section 22 has an elongated slot at 26 and a lift rod 27, attached to the ball valve 13, passes through such slot and above the same is equipped with an abutment 28, adjustably mounted thereon and affording a shoulder for engagement by section 22. Said rod 27 slides through the usual guide arm 29 which is attached to the over-flow tube. It will be noted that I use a single lift rod and that the same is straight. The lift arm at the section 22, serves as an additional guide arm and such section 22 may be swung laterally to vertically align it with the guide arm 29, through adjustment of the screw 23.

An actuating lever 30 is provided for the lift arm and it consists of side elements 31 and 32 connected together at their base by a pin 33 which is journaled in the bracket 14. Elements 31 and 32 are also connected by a pin or depressor 34 which forms a depressing surface for instance at a roller 35, for engagement with the adjacent inclined portion of the lift arm 20. Element 32 is extended upwardly and formed into a hook 36 which is engaged by any suitable mechanism for rocking or actuating the lever 30. When the ball valve 13 is seated, the angularity of the lift arm through its engagement with the roller 35, will maintain the elements 31 and 32

in contact with the extended ends of the pin 25 as best seen in Figures 1, 3 and 4.

As one means for operating lever 30 to effect a flushing action, I provide a link 37 detachably engaged with hook 36 and loosely connected to a suitable crank 38 adjustably mounted on a rod 39, adapted to be rocked by manual manipulation of a handle or knob as at 40. A set screw 41 may be carried by the crank 38 to bind it to the rod 39. It is obvious, that any suitable operating or actuating means may be employed in lieu of the parts disclosed, and connected in any suitable way to the actuating lever 30. Actuation for rocking of the rod 39 to rock the crank 38 and move the link 37 so that the actuating lever 30 will be moved to the right in Figure 1, with roller 35, depressing the actuating lever and causing the section 22 to rise and through its engagement with abutment 28, lift rod 27 and accordingly, the valve 13, unseating the latter and opening the seat 12 for a flushing operation.

In accordance with the invention, I provide a means which will be operated automatically through leaking water, to prevent actuation or movement of the actuating lever 30, upon rotation or rocking of the handle 40. This will apprise the user of the fact that there is a leak, so that the condition may be at once remedied. To this end, limb 17 has a lateral lug 42 in an opening of which as well as an opening in the bracket 14 above the screw 16, a rocker rod 43 is pivotally mounted to enable a hook shaped detent 44 bent into the rocker, to move into and out of a notch 45 in the upper surface of limb 17, directly behind and in the path of movement of actuating lever 30. When the detent 44 is engaged in the notch 45, the actuating lever 30 cannot be moved and accordingly the tank cannot be flushed. Normally, the detent 44 is disengaged from the notch 45 so that the tank may be freely flushed. The detent only engages the notch 45 in the event of a leak and rise of water to the over-flow level suggested by the dot-dash line in the drawings. Rocker 43 carries a cork or other suitable float 46, at one end, which is subject to the over-flowing water since it is carried by an angularly disposed terminal 47 on the rocker. As long as water moves to the over-flow level, it will raise the float 46 and rock the rod 43 to position the detent 44 in the notch 45. In this condition, the user is apprised of the fact that there is a leak. It will be realized, that such a leak may be due to various causes, for instance a faulty washer in the inlet valve mechanism to the tank and wear of parts which move within the tank. At the same time, the hand may be placed within the flush tank upon removing the lid, in order to temporarily displace the rocker 43 to enable a flushing operation through actuation of the handle or knob 40 for depression of the rocker or actuating lever 30.

It will be particularly noted that the single rod 27 displaces the use of an upper as well as a lower lift rod in connection with existing flush tank outlet valve mechanisms. At the same time, by sacrificing the advantages of the single lift rod, the two part lift rod of existing construction may be used in connection with the lift arm 20 and additional parts of my improvements.

It will also be clear, that the detent rocker 43 or equivalent lock mechanism may be employed with other constructions than that specifically illustrated and that various changes may be resorted to within the spirit and scope of the invention.

I claim as my invention:

1. A mechanism of the class described comprising an outlet valve, means to lift said valve, and mechanism operable to prevent operation of said means through rise of water above a predetermined level consisting of a rocker, a detent carried by the rocker and float means carried by the rocker to move the latter to dispose the detent means in the path of movement of the first mentioned means.

2. A mechanism of the class described having an outlet valve, a lift rod extending therefrom, a lift arm for said rod, means pivotally mounting said arm, and an actuating lever for the lift arm mounted by the last mentioned means and detent means movable into the path of actuation of the actuating lever through rise of water above a predetermined level, in combination with an over-flow tube mounting the first mentioned means, said first mentioned means being a bracket and a detent means being a rocker pivoted to the bracket and having a float.

3. A mechanism of the class described having an outlet valve, a lift rod extending therefrom, a lift arm for said rod, means pivotally mounting said arm, and an actuating lever for the lift arm mounted by the last mentioned means and detent means movable into the path of actuation of the actuating lever through rise of water above a predetermined level, in combination with an over-flow tube mounting the first mentioned means, said first mentioned means being a bracket and the detent means being a rocker pivoted to the bracket and having a float, said bracket being slotted for mounting on the top of said over-flow tube, and the bracket also having a notch engageable with said upper edge of the over-flow tube.

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