Feb. 9, 1971 B. F. REYNOLDS 3,561,016

WATER-SAVING ACCESSORY FOR TOILET FLUSH TANKS

Filed Nov. 7, 1969

FIG. 1

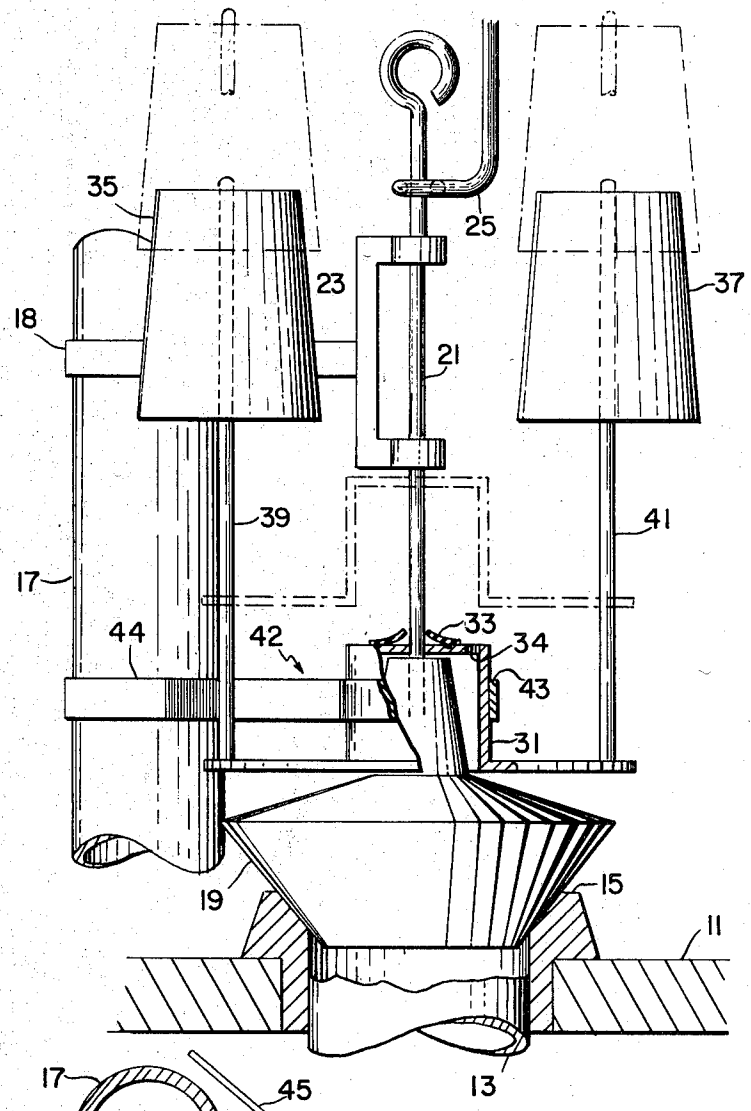
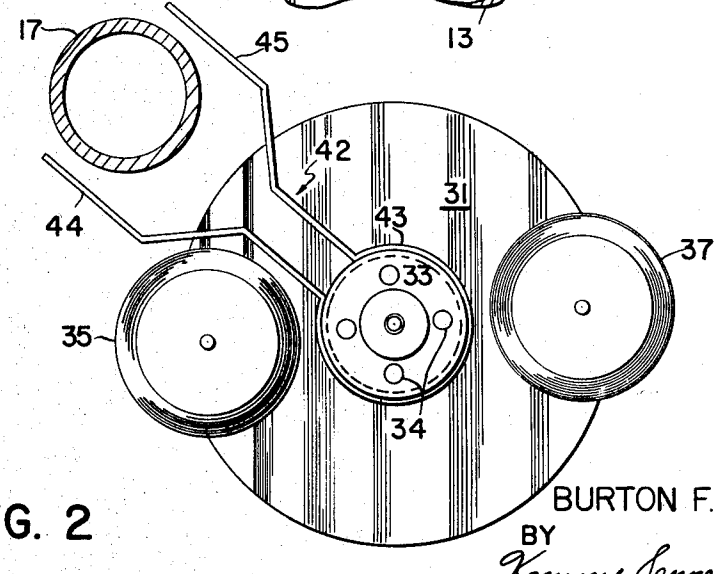


FIG. 2



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United States Patent Office 3,561,016 Patented Feb. 9, 1971

3,561,016

WATER-SAVING ACCESSORY FOR TOILET FLUSH TANKS

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Filed Nov. 7, 1969, Ser. No. 874,873
Int. Cl. E03d 1/22, 1/34, 5/02
U.S. Cl. 4—67 10 Claims

ABSTRACT OF THE DISCLOSURE

The flush tank accessory disclosed herein permits releasing either substantially all or a preselected portion of the water held in a toilet tank by means of a float which is held a predetermined distance above the valve member for selectively supporting that member. The falling water level within the tank will therefore reduce the support on the valve when the water level reaches the float thereby causing the valve to close unless it is manually held open throughout the emptying of the tank.

BACKGROUND OF THE INVENTION

This invention relates to flush tank control apparatus and more particularly to an accessory for a toilet flush tank which facilitates conserving of water.

In conventional flush tank construction, the tank is arranged to normally hold and release the maximum amount of water which may be needed for flushing under essentially all circumstances. However, in most situations this amount of water is excessive and a substantially smaller quantity would suffice. While various constructions have been proposed heretofore which would permit the release of different quantities of water from a toilet flush tank, these constructions have typically not been adaptable to standard toilet constructions. In other words, it was not possible to retrofit these constructions in existing installations.

Among the objects of the present invention may be noted the provision of apparatus for selectively releasing either substantially all or a preselected portion of a quantity of water held in a toilet flush tank; the provision of such apparatus which facilitates the conserving of water; the provision of such apparatus which may be readily applied to existing standard toilet installation; the provision of such apparatus which is reliable and which is relatively simple and inexpensive. Other objects and features will be in part apparent and in part pointed out hereinafter.

SUMMARY OF THE INVENTION

Briefly, apparatus according to this invention provides for the selective release of either substantially all or a preselected portion of a quantity of water held in a toilet flush tank, the tank having an outlet valve at the bottom thereof. A weighted valve member is provided for closing the valve thereby to contain water in the tank and a manually controllable lift element is attached substantially centrally to the valve member for lifting the member thereby to release water from the tank. A float is supported a predetermined distance above the valve member on a substantially rigid support which is offset relative to the lift element. Accordingly, the float will cease to support the valve member when the water level in the tank falls to the float level and the remaining water will be released only if the lift element is manually operated to hold the valve member in a raised position throughout the emptying of the tank.

BRIEF DESCRIPTION OF THE DRAWINGS

With reference to the drawings, FIG. 1 is an illustration in perspective view of a flush mechanism constructed in accordance with the principles of this invention; and

FIG. 2 is an illustration in plane view of the mechanism of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to FIG. 1, a conventional toilet flush tank is indicated generally at **11**. At the bottom of tank **11** is a conventional outlet pipe **13** provided with an outlet valve seat **15**. An overflow pipe **17** is provided which is in communication with the outlet pipe. A rubber water stop or ball valve **19** cooperates with seat **15** for closing the valve thereby to contain water in the tank. A water stop rod **21** is attached or mounted substantially centrally on the rubber ball valve **19** to provide a lift element for opening the valve. Stop rod **21** passes through a conventional guide **23** mounted on the overflow pipe **17** by means of a bracket **18**. In conventional manner, a lift rod **25** slidingly engages the upper end of the water stop rod **21**. Lift rod **25** can be raised by a manually operable lift lever (not shown) to raise the rubber valve member **19** from seat **15** and thereby open the flush valve.

In acordance with the present invention, the rubber ball valve of member **19** is weighted by means of a hat-shaped metal member **31**. The water stop rod **21** passes through the center of the metal member **31**, the member **31** being held against the rubber water stop by a friction washer or nut **33**. The upstanding portion of the hat shape is vented by holes **34** to prevent the trapping of air. While metal member **31** is illustrated as being a cylindrical section, it will be seen that this member may also be constructed in an elongate or elliptical configuration or may even be formed of a piece of flat metal strap bent into a hat-shaped contour to provide a cross-section similar to the cross-sectional contour of the member illustrated. If desired, the weighting of the ball valve or water stop may be integral therewith.

Buoyant support for the weighted valve member is provided by a pair of floats **35** and **37** which are held or mounted a predetermined distance above the valve member by means of a pair of support members **39** and **41**, respectively. The buoyancy of the floats is selected to substantially balance the weight of the member **31**. As is apparent from the drawing, the floats and their support member **31** without interfering with its vertical move- by means of which the valve member may be lifted. This offsetting permits the buoyant floats to clear the guide **23** and thereby permit normal operation of the standard flush valve structure while permitting the float elements to be mounted the desired predetermined distance above the valve member for purposes described in greater detail hereinafter. To prevent interference due to possible rotation of the metal member **31**, such rotation is prevented by means of a flat spring member **42** which is formed as illustrated in FIG. 2 so as to have a circular section **43** which resiliently engages and grasps the upstanding portion of the hat-shaped metal member **31** and a pair of arms **44** and **45** which project from the circular section **43** and pass on either side of the overflow pipe **17**. These arms are configured so as not to bear against the overflow pipe but merely to restrict rotation of the member **31** without interferring with its vertical movement. Thus, the accessory of the present invention is prevented from interfering with the standard toilet mechanism with which it is used.

Operation of this apparatus is substantially as follows. Assuming that the lift rod **25** is manually raised and then released in the usual or conventional mode of operation, water will be released from the tank in normal manner until the water level falls to the level of the floats **35** and **37**. At this point, the buoyancy of the floats will no longer

counteract the added weight of member **31** and the rubber ball valve member **19** will be biased to a closed position, thereby terminating the release of water from the tank substantially at that level.

If circumstances require that substantially the entire contents of the tank be released, this can be readily achieved by manually holding the member **19** in the raised position by means of the lifting elements **21** and **25**. It can thus be seen that the present apparatus permits the selective release of either substantially all or a preselected portion of the water held in the flush tank. As typically only the reduced portion of the water is required, it can be seen that a substantial savings of water is obtained on a long-term basis. With apparatus substantially as illustrated installed on a toilet flush tank of conventional or standard construction, a complete emptying of the tank released 3.36 gallons of water while a release of water controlled by the float apparatus of the present invention released only 1.92 gallons. Accordingly, a saving of 1.44 gallons or 42.8 percent was achieved.

In view of the foregoing, it may be seen that several objects of the present invention are achieved and other advantageous results have been attained.

As various changes could be made in the above construction without departing from the scope of the invention, it should be understood that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. Apparatus for selectively releasing either substantially all or a preselected portion of a quantity of water held in a toilet flush tank, said tank having an outlet valve at the bottom thereof, said apparatus comprising:

a weighted valve member for closing said valve thereby to contain water in the tank;

a manually controllable lift element attached substantially centrally to said valve member for lifting said member thereby to release water from the tank;

a float; and

a substantially rigid support member attached to and extending from said valve member for holding said float a predetermined distance above said valve member, said support being offset relative to said lift element, whereby said float will cease to support said valve member after the water level in the tank falls to the float level and the remaining water will be released only if the lift element is manually operated to hold said valve member in a raised position throughout the emptying of the tank.

2. Apparatus as set forth in claim **1** including means for preventing rotation of said float.

3. Apparatus for selectively releasing either substantially all or a preselected portion of a quantity of water held in the flush tank of a toilet having an outlet valve seat at the bottom of the tank and a manually liftable valve member for closing the valve thereby to contain water in the tank, said apparatus comprising:

a weight for said valve member and attached to said valve member;

a float; and

a substantially rigid support member attached to and extending from said weight for holding said float a predetermined distance above said weight, whereby said float will cease to support said weight after the water level in the tank falls to the float level and the remaining water will be released only if the valve member is manually operated throughout the emptying of the tank.

4. An accessory as set forth in claim **3** wherein said weight comprises a metallic member of generally hat-shaped cross-section.

5. Apparatus for selectively releasing either substantially all or a preselected portion of a quantity of water held in a toilet flush tank, said tank having an outlet valve at the bottom thereof, said apparatus comprising:

a weighted valve member for closing said valve thereby to contain water in the tank;

a manually controllable lift element attached substantially centrally to said valve member for lifting said member thereby to release water from the tank;

a float; and

attachment means for attaching said float to said valve member a predetermined distance above said valve member, said attachment means being offset relative to said lift element, whereby said float will support said valve member only when the water level in the tank is above the float level and the water remaining below the float level will be released only if the lift element is manually operated to hold said valve member in a raised position throughout the emptying of the tank.

6. An accessory for a standard toilet of the type including a flush tank, an outlet valve seat at the bottom of said tank through which water can flow from said tank to an outlet pipe, an upstanding overflow pipe in communication with said outlet pipe, a water stop for selectively closing said valve seat to close the outlet valve, and a water stop rod centrally attached to said stop, said rod passing slidingly through a guide mounted on said overflow pipe, said accessory comprising:

a weight adapted to be attached to said stop;

a pair of floats;

a pair of substantially rigid supports attached to and extending from said weight for holding said floats a predetermined distance above said weight on opposite sides of said stop rod; and

guide means extending laterally from said weight and adapted to slidingly engage said overflow pipe for preventing rotation of said floats and supports thereby to prevent interference between said accessory and said guide whereby said float will cease to support said weight when the water level in the tank falls to the float level and the remaining water will be released only if said stop is held in a lifted position throughout the emptying of the tank.

7. An accessory as set forth in claim **6** wherein said weight is of generally hat-shaped cross-section and attaches to said stop at the stop rod.

8. An accessory as set forth in claim **7** wherein said weight is generally a cylindrical section of hat-shaped cross-section adapted to fit over said stop.

9. An accessory as set forth in claim **8** including a friction nut adapted to engage said stop rod and hold said weight against said stop.

10. An accessory as set forth in claim **8** wherein said guide means comprises a section of flat metal stock formed to include a generally circular section adapted to resiliently engage the upstanding portion of said hat-shaped section and a pair of laterally projecting leg members adapted to pass on opposite sides of said overflow pipe.

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U.S. Cl. X.R.

4—56, 57

PO-1050
(5/69)

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,561,016 Dated February 9, 1971

Inventor(s) Burton F. Reynolds

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 2, line 46 reading

member 31 without interfering with its vertical move-

should read

members are offset with respect to the water stop rod 21

Signed and sealed this 3rd day of August 1971.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

WILLIAM E. SCHUYLER,
Commissioner of Pater