United States Patent [19]

Cook

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[54] **TOILET FLUSH APPARATUS**

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[52] **U.S. Cl.** ..... **4/57 R**, 4/37, 4/56

[51] **Int. Cl.** **E03d 1/34**, E03d 1/14

[58] **Field of Search** ..... 4/57 R, 56, 37, 67 A

[56] **References Cited**

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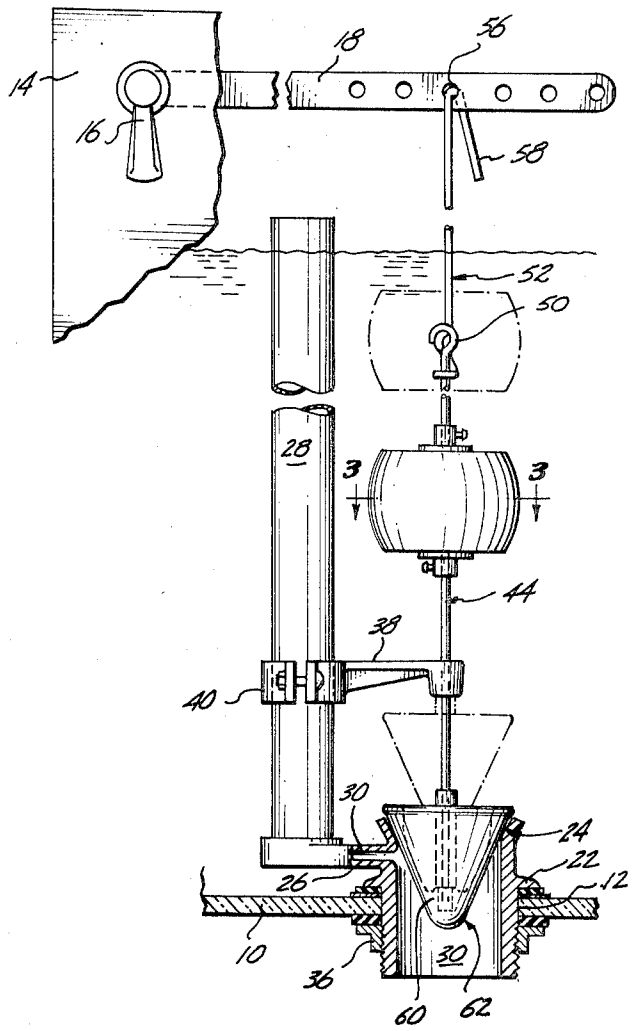
Primary Examiner—John W. Huckert

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[57] **ABSTRACT**

Apparatus for controlling the retention and selectively controlling the full or partial discharge of water from a toilet tank is disclosed wherein there is a non-buoyant valve cup associated with the usual discharge outlet seat and buoyancy is provided by a float adjustably located in spaced relation above said valve cup.

2 Claims, 4 Drawing Figures



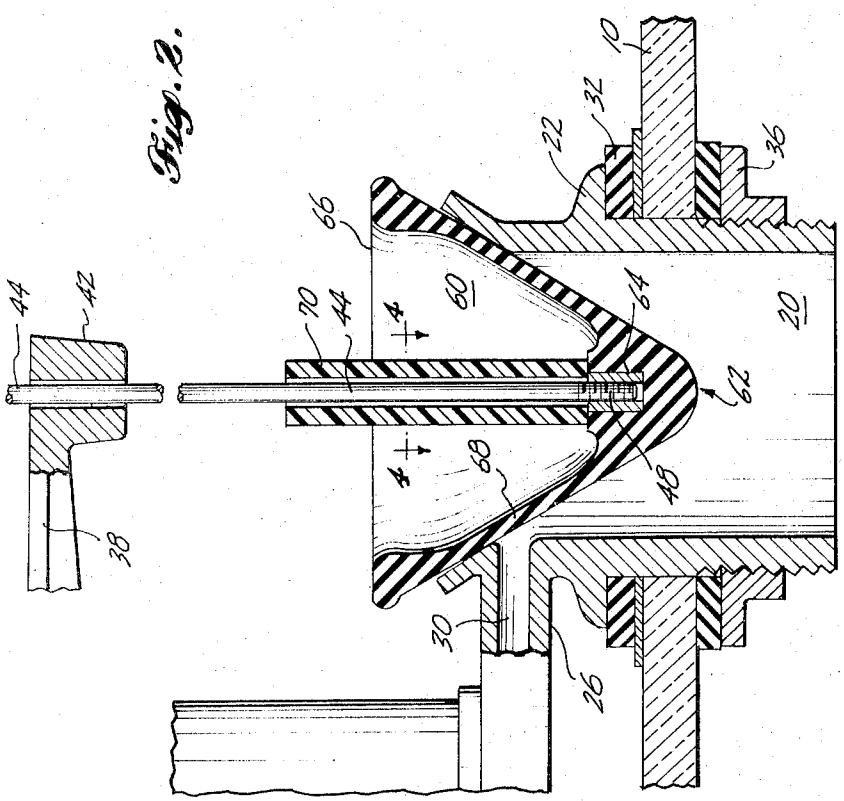


Fig. 2.

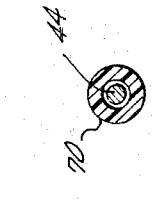


Fig. 4.

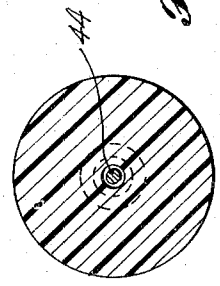


Fig. 3.

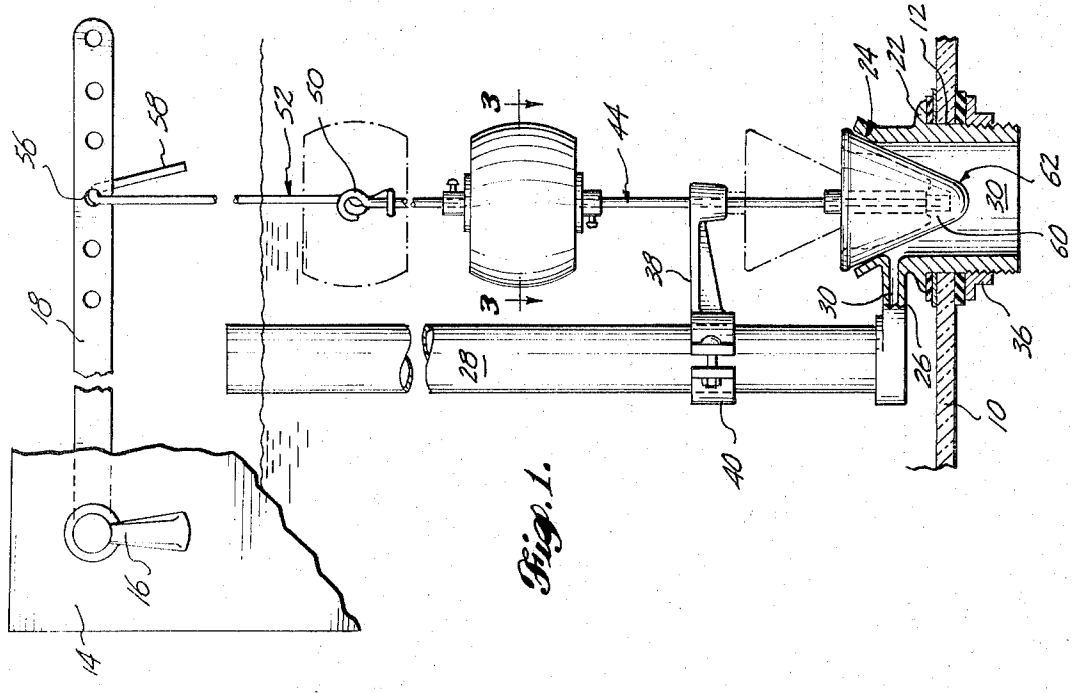


Fig. 1.

TOILET FLUSH APPARATUS

BACKGROUND OF THE INVENTION

1. Field of Invention

This invention relates to flush control apparatus for toilet tanks and, more specifically, to a non-buoyant valve cup which is separately buoyed while unseated to provide a user with the choice of fully or partially discharging the water from the tank.

2. Description of the Prior Art

The desirability of conserving water is rapidly becoming a must in many parts of the country and during certain seasons. In order to meet the ever increasing population demands it has been proposed to decrease the quanitity of water used during certain flushings of toilets. Quite often a full flush is not required yet most toilet tanks do not permit less than a full flush. Consequently excessive water wastage occurs.

It has previously been known to arrange the toilet flush apparatus so that user may selectively obtain a partial or full flush. Various systems are disclosed in the following U.S. Pat. Nos.:

Wuster	3,509,395
White	2,532,977
Brasher	2,879,521
Robertson	2,214,439
Rath	1,474,288
Easley	2,237,294
Blaun	2,767,043
Patterson	1,963,211
Weisz	3,538,519

The conventional prior practice has almost invariably been to employ a self-buoyant valve closure element for the outlet seat of the tank. When such are raised off the seat they float until the water level drops and the friction of outflowing water and suction pulls them down into seating relation to terminate outflow.

However, there appears to remain a need for a toilet flush apparatus which is inexpensive, easily installed, and serviceable repeatedly over a long period of time with practically no attention. It is therefore the main object of this invention to provide a mechanism or apparatus which meets those needs and in which there is wide choice as to the amounts of initial flow and residual water in the tank is available.

SUMMARY OF THE INVENTION

Having in mind the foregoing, there is provided here a flush control apparatus which affords the choice between a single partial flush of water from a toilet tank and two closely sequential flushes using substantially the full contents of such tank. The invention is applicable to toilet tanks of the conventional, widely used type in which there is a discharge outlet seat at or near the tank floor and a standpipe is located adjacent thereto to accomodate overflow and to provide a support for certain components of the flush controlling valve cup which is, without restriction, upwardly open to the body of water in the tank. Raising the cup from the seat initiates flushing. The cup in a filled tank supports a column of water which tends to firmly press the cup downward onto the outlet seat. A lift stem has a threaded lower end which is seated in a threaded socket at the axis of the bottom of the cup. A guide arm standing to the side of the standpipe has a passage axially aligned with the valve cup and the lift stem is slideably mounted therein. Means operable to limit upward movement of the valve cup is disposed between the cup and the guide arm. When the valve cup is unseated, it is initially buoyed in the water by a float, located above the guide arm, and mounted on the lift stem, so long as the latter is beneath the tank water level. As the water level falls the float descends lowering the valve into closing engagement with the outlet seat. Conventional, manually operable lifter means are loosely associated with the upper end of the lifter stem to facilitate raising the valve cup. Preferably the valve cup is formed of rubber, natural or synthetic, or of rubberlike plastic compounds providing flexibility and resilence, durability, and effective operability in closing the outlet seat. It will be seen from the following description of a preferred embodiment of the invention that the needs mentioned and the primary and other objects herein are fully accomodated.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is an elevational view of toilet flush apparatus according to this invention with related portions of a toilet tank shown for reference purposes;

FIG. 2 is an enlarged sectional view of the valve cup engaged in closing position in an outlet seat;

FIG. 3 is a cross sectional view on line 3—3 of FIG. 2; and

FIG. 4 is a cross-sectional view on line 4—4 of FIG. 2.

DESCRIPTION OF THE PREFERRED EMBODIMENT

A conventional toilet tank has a bottom wall **10** provided with an opening **12**, a tank wall **14** in the upper portions of which is mounted rotary handle **16** attached to actuator arm **18** within the tank. The water outlet structure at opening **12** comprises flanged discharge pipe **20** which connects between tank bottom **10** and a toilet by means of a conduit (not shown). Commonly pipe **20** includes flange **22**, outlet seat **24**, and hollow lateral arm **26** which supports the standpipe **28**. Overflowing water entering the upper end of standpipe **28** flows through passage **30** in arm **26** and enters pipe **20** below seat **24**. Pipe **30** rests on flange **22** atop gasket **32** and with a lower gasket and nut **36** is secured leakproof in opening **12**. Guide arm **38** is mounted on standpipe **28** by clamp **40** and includes a head **42** for lifter stem **44**.

Lifter stem **44** reciprocates vertically in a guide opening of head **42** and includes a lower threaded end **48** and the upper eye **50**. A lifter link **52** has a loop encircling stem **44** beneath eye **50** and is engaged in hole **56** of arm by means of hook **58**.

The valve cup **60**, shown in FIGS. **1** and **2**, is unrestrictedly open upward to the body of water in the toilet tank. Preferably cup **60** is molded of natural or synthetic rubber or of like plastic materials which supply resilience and flexibility. Its shape is desirably conical, having angularity in the range of **50'** to **60'**, with a rounded solid nose **62** in which is provided threaded axial socket **64** that receives the threaded lower end of link **44**. The rim **66** of cup **60** is preferably somewhat thicker and stiffer than the intervening wall **68**, the external surfaces of which mates with seat **24** to seal the outlet through pipe **20**.

Means is provided to limit or restrict upward travel of the valve cup to a predetermined degree or distance

from seat. In the preferred such means comprises a sleeve **70** surrounding the lower end of rod **44** and resting on the bottom of cup **60.** As the cup is raised sleeve **70** comes into contact with head **42** and prevents raising the cup valve **60** relative the seat **24.**

What is claimed is:

1. For use with a toilet tank of the type having a discharge outlet seat near the floor of the tank and a standpipe adjacent thereto, flush control apparatus, comprising:

an inverted conical valve cup unrestrictedly open upward to a body of water in said tank, said cup being devoid of buoyancy and having an annular resilient wall intervening between its nose and its rim for engagement with said outlet seat to control discharge and retention of water from said tank whereby, when said tank is charged with water, a column thereof is borne by said valve cup and its annular resilient wall to press the same to said outlet seat;

a lift stem having a threaded lower end;

said valve cup having a threaded socket, axially located within the nose of said cup and adapted to receive said lift stem;

a lift stem guide arm supported from said standpipe in spaced relation above said outlet seat and said valve cup;

a spacer bushing about said lift stem between said valve cup and said guide arm operable to limit upward travel of said valve cup to a predetermined degree;

a float fixed on said lift stem above said guide arm having sufficient buoyancy when said valve cup is displaced from said seat and said float is submerged to support said valve cup above said seat; and

manually operable lifter means associated with the upper end of said lift stem for freeing said valve cup from said seat and to initiate the discharge of water from the toilet tank.

2. The structure of claim **1** in which the valve cup rim is thickened and stiffer than the annular resilient wall.

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