

[54] **TOILET FLUSH TANK APPARATUS**

[76] Inventor: **Harry W. Longdin**, 1111 Bright St.,
Jonesboro, Ga. 30236

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[51] Int. Cl.² **E03D 1/34; E03D 5/10; E03D 1/22**

[58] Field of Search **4/67 R, 67 A, 57 R, 58,**
4/60, 56, 34, 62, 52

[56]

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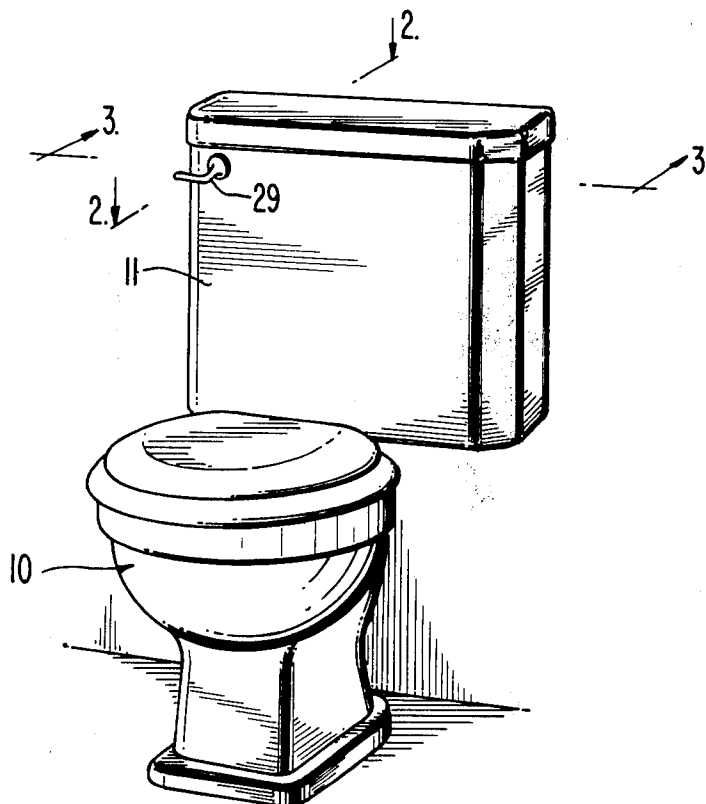
Primary Examiner—Henry K. Artis
Attorney, Agent, or Firm—D. Paul Weaver

[57]

ABSTRACT

A pair of flush valve balls or elements with integral overflow tubes are mounted in vertically guided stacked relation on a common fixed upstanding guide pipe in the flush tank whose bore may receive trap re-fill water. The lower overflow tube forms a seat for the upper flush valve element. A single tank mounted operating handle with relatively movable spring-connected lever extensions independently operates the two valve elements through flexible connections to allow a partial flush or a full flush of the associated fixture in the interest of saving water.

6 Claims, 9 Drawing Figures



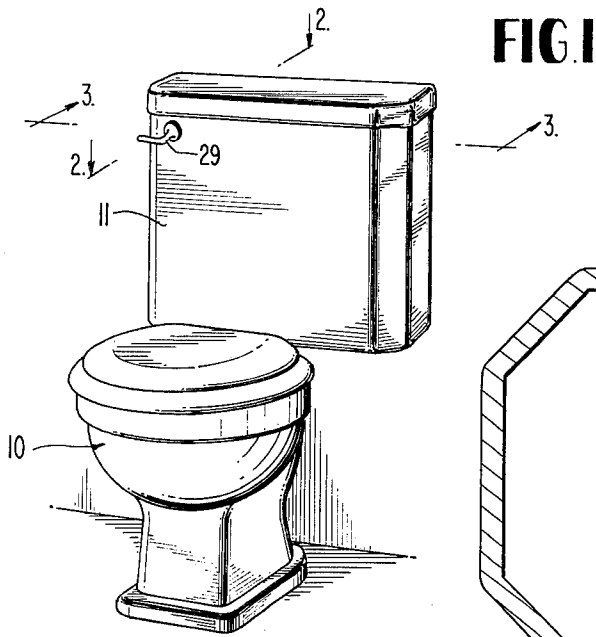
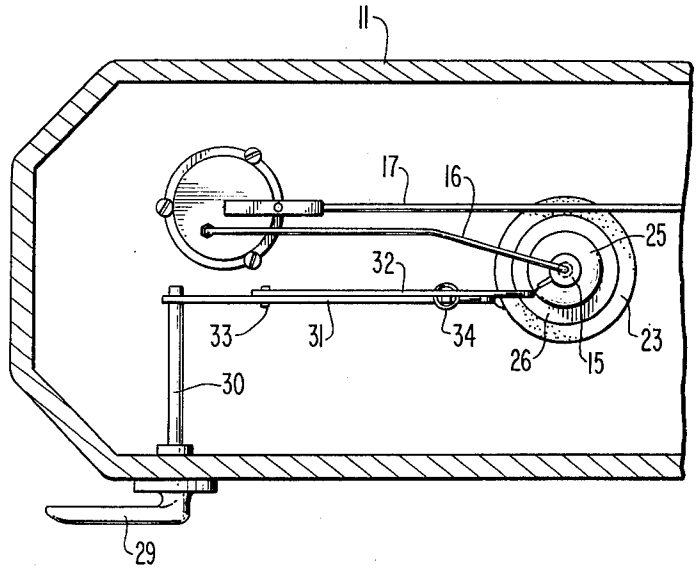
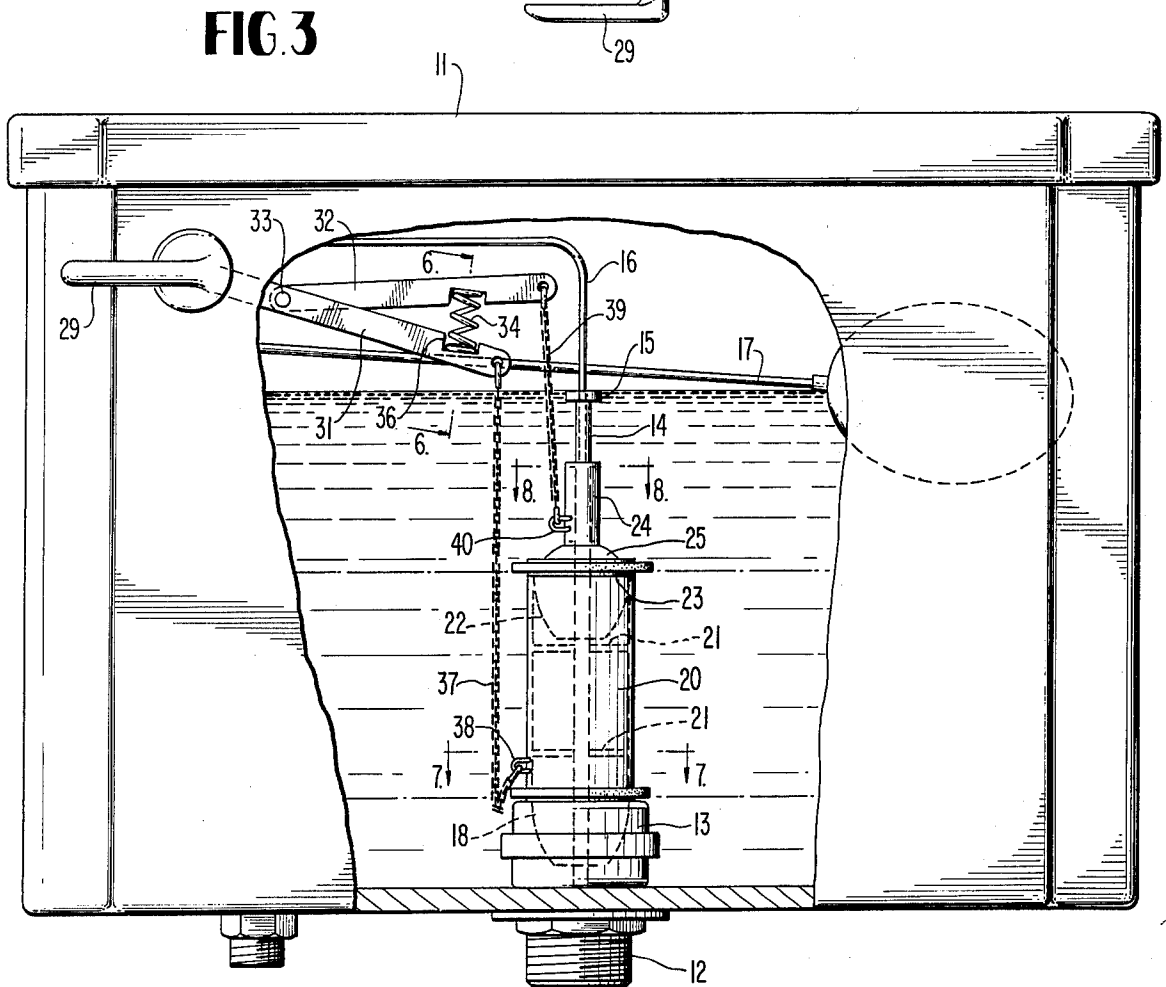


FIG. 5

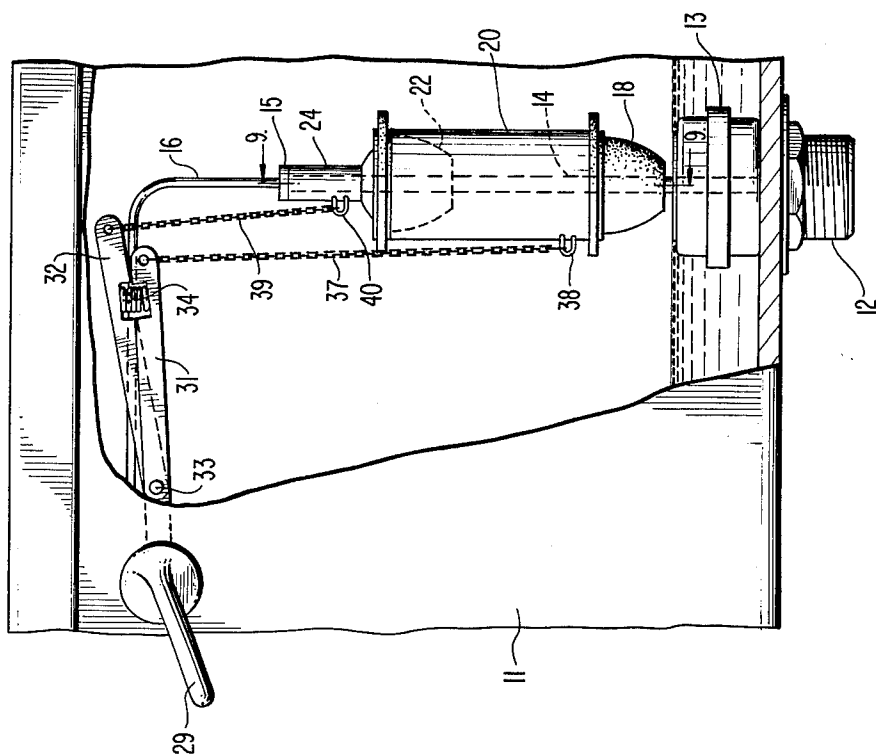


FIG. 4

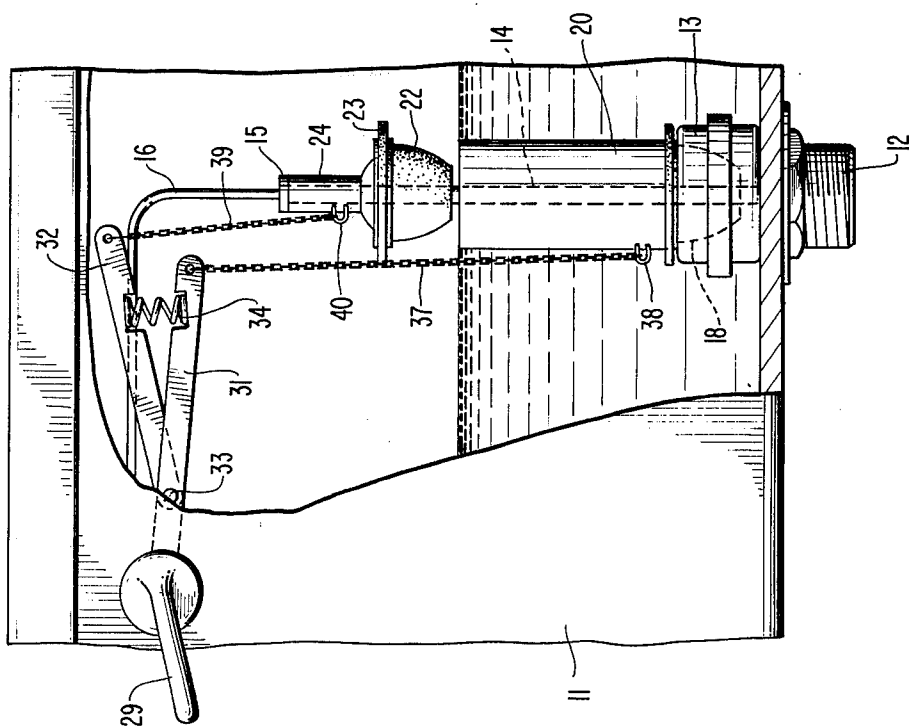


FIG. 6

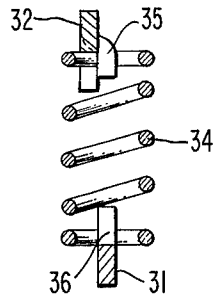


FIG. 7

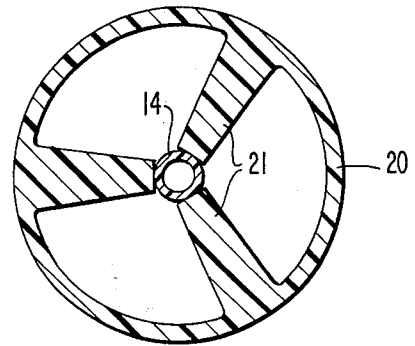


FIG. 8

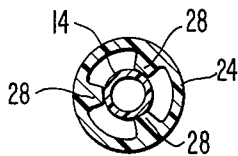
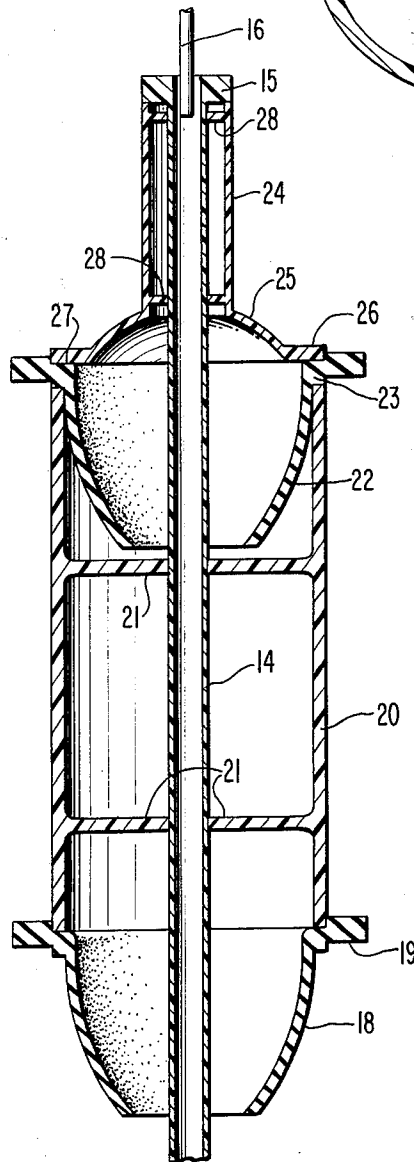


FIG. 9



TOILET FLUSH TANK APPARATUS

BACKGROUND OF THE INVENTION

The prior patented art contains a number of proposals relating to partial and full flush apparatuses, for toilet flush tanks, in the interest of economizing on the use of water. Some examples of the patented prior art are shown in U.S. Pat. Nos. 1,963,211; 3,186,007; 3,758,893 and 3,795,016. Devices of this character, while desirable, have never been universally adopted because of the extra expense involved in manufacturing the highly competitive flushing equipment necessary in all homes and other buildings. Nevertheless, there is an ever-increasing desirability and need for saving water, and it is therefore the object of this invention to improve upon the prior art by the provision of a selectively operable partial and complete flush tank emptying apparatus which is more economical to manufacture and install, requires fewer parts which lend themselves for the most part to manufacturing from low cost plastics and which is reliable and efficient in operation as well as being long lasting and durable.

These and other objects of the invention will become apparent during the course of the following detailed description.

BRIEF DESCRIPTION OF DRAWING FIGURES

FIG. 1 is a perspective view of a toilet fixture employing the invention.

FIG. 2 is an enlarged fragmentary horizontal section taken on line 2—2 of FIG. 1.

FIG. 3 is an enlarged fragmentary vertical section partly in elevation, taken on line 3—3 of FIG. 1.

FIGS. 4 and 5 are fragmentary elevational views of the improved flushing apparatus showing the same in operation to provide a partial and a full emptying of the flush tank, respectively.

FIG. 6 is an enlarged fragmentary vertical section taken on line 6—6 of FIG. 3.

FIG. 7 is an enlarged fragmentary horizontal section taken on line 7—7 of FIG. 3.

FIG. 8 is a similar section taken on line 8—8 of FIG. 3.

FIG. 9 is an enlarged vertical section taken on line 9—9 of FIG. 5.

DETAILED DESCRIPTION

Referring to the drawings in detail, wherein like numerals designate like parts, the numeral 10 designates a conventional toilet fixture having a flush tank 11 containing the apparatus which comprises the invention.

The usual spud 12, or threaded coupling, on the bottom wall of the tank 11 is adapted for connection with the inlet to the fixture 10 in the usual manner and is secured to any conventional flush valve seat 13 immediately above the tank bottom wall.

The improved flushing apparatus comprises an upstanding vertical guide tube 14 which may be formed of metal or plastic arranged centrally of the fitting 12 and having its lower end suitably fixedly secured either to the fitting or the seating element 13 thereabove. The vertical tube 14 extends to a substantial height in the upper part of the tank 11 and terminates at its top with an enlarged integral head 15 forming a stop element whose function will be described. The top of the tubular guide 14 is open to receive the customary tube 16 which supplies water during the emptying of the tank

to refill the trap seal in the toilet fixture 10. This tube receives water from a conventional inlet valve, whose operation is regulated by a float 17 in a well known manner.

A first and lowermost tapered flush ball or valve element 18 formed of rubber or rubber-like plastic is adapted to seat sealingly against the stationary seat 13 when closed to prevent the discharge of water from the tank 11. The top of valve element 18 is recessed at 19 to receive the lower end of a cylindrical upwardly extending overflow pipe 20 also formed of plastic. The lower end of the overflow pipe 20 is fixedly secured in the recess 19 so as to be integrated with the valve element 18. The assembly composed of elements 18 and 20 is freely movable vertically on the guide tube 14 and is guided thereon by a plurality, such as three equidistantly spaced guide fingers 21 which project inwardly from the side wall of overflow pipe 20 and formed integral therewith. For stability, FIG. 9, the radial guide fingers 21 are provided in two vertically spaced groups on the overflow pipe 20.

A second and uppermost flush valve element 22, similar to the element 18, is adapted when closed to snugly enter the bore of overflow pipe 20 at the top thereof, the overflow pipe forming a valve seat for the element 22. The valve element 22 has a flange 23 which engages the top end of overflow pipe 20 when seated to prevent the entrance of tank water into the overflow pipe 20. A reduced diameter plastic coaxial upper overflow pipe section 24 extends above upper valve element 22 and is integrally connected therewith by a lower end convex enlargement 25 having a marginal flange 26 secured within a recess 27 in the top face of flange 23 so as to form a fluid tight connection between the elements 23 and 26.

The overflow pipe section 24 is provided near its upper and lower ends with integral guide fingers 28 similar in construction and purpose to the larger guide fingers 21, previously described. The smaller guide fingers 28 slidably engage the fixed guide tube 14 during vertical movement of the upper flush valve assembly composed of parts 22 and 24 therealong. Upward displacement of the overflow pipe section 24 during operation is limited by the stop element 15 at the top of guide 14 which is engaged by the upper end of the movable overflow pipe section 24 carrying upper valve element 22.

It is now apparent that the two flush valve assemblies which allow a complete or partial flushing of the fixture 10, as desired, are arranged coaxially in vertically stacked relation on the single vertical guide tube 14 common to both.

The apparatus also embodies a common operating handle 29 at the customary location on the tank 11, this handle having a shaft extension 30 extending inside of the flush tank and the shaft extension carrying a first elongated operating lever 31 which extends to a position near one side of the vertical guide tube 14, as shown in FIG. 3. The lever extension 31 is rigid with shaft extension 30 to be raised and lowered responsive to operation of the pivoted handle 29.

A companion lever 32 has its rear end pivoted at 33 to the primary lever 31 in side-by-side scissors-like relationship and the lever 32 extends somewhat forwardly of the lever extension 31, FIG. 3, so as to be above the smaller diameter overflow pipe section 24. The two lever elements 31 and 32 are biased apart by a com-

pression spring 34 whose topmost coil may be clinched to the lever 32 as by a lug 35, FIG. 6, on the lever 32, the lower coil of the spring held in a seating recess 36 in the primary lever 31 for stability.

The primary lever 31 has its forward end connected to the lower overflow pipe section 20 by a chain 37, or similar flexible means, and the lower end of the chain is attached to an eyelet 38 carried at the side of the lower overflow pipe section. Similarly, a somewhat shorter chain 39 interconnects the forward end of lever 32 with an eyelet 40 or the like attached to the side of upper overflow pipe section 24 integral with upper flush valve element 22.

During operation, if it is desired to provide a half flush or partial flush in the fixture 10, the handle 29 is depressed sufficiently to render the chain 39 taut and lift only the upper flush valve element 22 from its seat on the lower overflow pipe section 20, as shown in FIG. 4. This allows only the water in the tank 11 above the top of overflow pipe section 20 to discharge into the fixture 10 by flowing through elements 20 and 18. The spring 34 is sufficiently stiff to cause elevation of lever 32 with lever 31 at this time for raising the assembly composed of elements 22 and 24. This assembly will elevate until the top of element 24 engages the positive stop 15.

If a full flush or complete emptying of the flush tank is desired, a further depression of handle 29 will effect the raising and unseating of the lower flush valve element 18 as depicted in FIG. 5 so that the remaining tank water can discharge through the seat 13 and fitting 12. At this time, the lever 32 cannot move higher because the chain 29 is taut and the top of overflow pipe 24 is in contact with the stop 15. Consequently, the further depression of handle 29 will compress spring 34, FIG. 5, allowing primary lever 31 to swing upwardly until chain 37 becomes taut and elevates the assembly composed of elements 18 and 20.

The full and regular flushing of the fixture 10 can also be accomplished in the first instance, if desired, by pushing the handle 29 all the way down instead of part way down, and both valves elements 18 and 22 will be raised as depicted in FIG. 5. When the handle 29 is released, the parts will return to their normal positions in FIG. 3 with both valves closed by the action of gravity and the force of spring 34. Preferably, there is little slack in the chain 39 when both valves are closed, FIG. 3, so that depression of handle 29 will immediately begin lifting upper valve 22 while the other chain 37 is still slack.

It is to be understood that the form of the invention herewith shown and described is to be taken as a preferred example of the same, and that various changes in the shape, size and arrangement of parts may be resorted to, without departing from the spirit of the invention or scope of the subjoined claims.

I claim:

1. A flushing apparatus comprising an upstanding fixed guide member adapted to be secured to the bottom of a flush tank at the discharge opening means thereof, the guide member having a head on its upper end forming a stop, first and second flush valve assemblies arranged in stacked relationship on the guide member and each having internal guide fingers slidably contacting the guide member, each valve assembly having a lowermost valve element and an attached upwardly extending overflow pipe section, said fingers formed integral with said overflow pipe sections and projecting radially inwardly of their side walls, the valve element of the lower assembly adapted for seating on a seating means near the bottom of a flush tank, the top of the lower overflow pipe section forming a seat for the upper valve element of the upper assembly, a common operating handle for the apparatus adapted for pivotal mounting on a flush tank, a first lever secured to the handle and extending above said lower assembly, a first flexible element interconnecting the first lever and the lower valve assembly, a second lever pivoted to the first lever and extending above the second valve assembly, a second flexible element interconnecting the second lever and second valve assembly, and a spring interconnecting the first and second levers yieldingly, whereby depression of the handle by a user of the apparatus will first unseat the upper valve assembly to partially empty a tank and further depression of the handle while the upper valve assembly is engaged with said stop will unseat the lower valve assembly to complete emptying of a tank.

2. The apparatus of claim 1, and the guide member being tubular with its bore adapted to receive trap seal make-up water at the top of the guide member.

3. The apparatus of claim 1, and the first and second flush valve assemblies each having a lower end tapered bulbous rubber-like valve element which is hollow, the overflow pipe section of the lower valve assembly being considerably larger in diameter than the overflow pipe section of the upper valve assembly, and both overflow pipe sections being integrally attached to the associated valve elements of said assemblies.

4. The apparatus of claim 1, and said first and second levers pivoted in scissors-like relationship, and said spring comprising a coiled compression spring between said levers and biasing them yieldingly into separated positions.

5. The apparatus of claim 4, and said first and second flexible elements consisting of chains, and attachment elements for the lower ends of the chains secured to the sides of said overflow pipe sections near the lower ends of said sections.

6. The apparatus of claim 1, wherein said guide member and said first and second flush valve assemblies are formed of plastic.

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