May 22, 1945. B. SVIRSKY 2,376,402

WATER CONTROL FOR TOILET TANKS

Filed Oct. 19, 1942

Fig. 2.

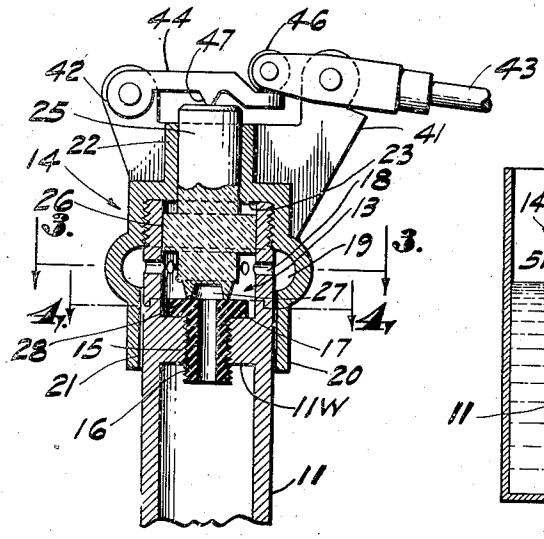


Fig. 1.

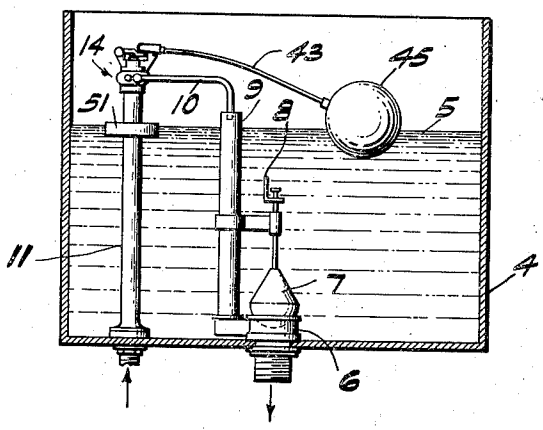


Fig. 4.

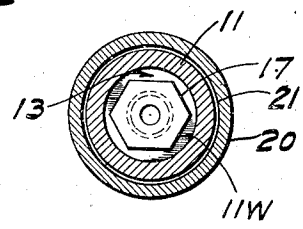


Fig. 3

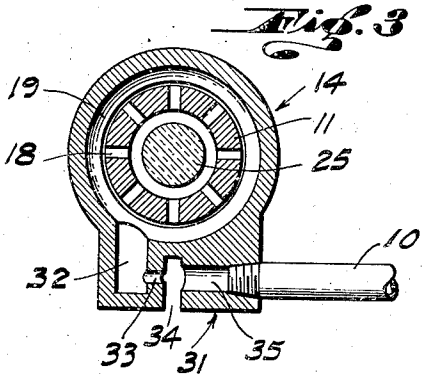
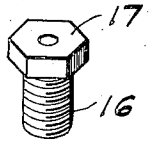


Fig. 5.



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Patented May 22, 1945

2,376,402

UNITED STATES PATENT OFFICE

2,376,402

WATER CONTROL FOR TOILET TANKS

Bennett Svirsky, Glendale, Calif.

Application October 19, 1942, Serial No. 462,572

2 Claims. (Cl. 137—104)

This invention relates to a valve water control for toilet tanks.

An important object of the invention is to reduce the number of parts heretofore required in structures of the kind to which the invention pertains while in no wise detracting from efficiency of operation, but on the contrary rendering the device of a more durable character and less apt to get out of order when subjected to a long continued use. In these particulars the present invention is an improvement upon the water control for closet tanks described and claimed in my application Serial No. 431,017, filed February 16, 1942, of which this is a continuation-in-part and which issued as U. S. Patent No. 2,299,707 on October 20, 1942.

In the present invention one specific improvement pertains to the provision, in combination with the structure with which it cooperates; of a simplified one-piece valve seat member which can be manufactured at a low cost and which can with ease be removed after becoming worn and then as easily replaced with a new part duplicating (except for wear) the part removed.

Another object of the invention is to provide, as an article of manufacture a headed, tubular, externally screwthreaded valve seat member which may be used in a variety of valve structures.

With the foregoing and other objects in view, the invention resides in the novel arrangement and combination of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed may be made within the scope of that which is claimed without departing from the spirit of the invention.

Referring to the drawing wherein is shown a preferred embodiment of the invention,

Fig. 1 is a cross section of a toilet tank showing the installed device in a position for flushing,

Fig. 2 is an enlarged fragmentary view partly in side elevation and partly in vertical mid-section of the upper portion of the ball cock structure per se shown in Fig. 1,

Fig. 3 is a transverse section taken on line 3—3 of Fig. 2, a portion of the re-fill tube being included in the view,

Fig. 4 is a transverse section taken on line 4—4 of Fig. 2, and, Fig. 5 is a perspective view of the combined screw and washer gasket per se.

Referring in detail to the drawing, the numeral 4 indicates a toilet tank containing a body of water 5 which is discharged through the fixture 6 in a direction indicated by the arrow when the valve 7 is operated by means of a conventional trip lever through the medium of the lift 8 in the well known manner. An overflow pipe 9 connects with the fixture 6 at a lower level than the seat of the valve 7 and into the mouth of said pipe is directed the free end of the re-fill tube 10.

A pressure source of water supply communicates with the tank 4, it being connected to the inlet pipe 11 and the latter pipe being sealed in relation to the floor of the tank. The discharge end portion of the pipe 11 is shaped to form a tubular valve cup containing a chamber 13 by providing an internal transverse wall 11*w* at a point spaced subjacent to the mouth of the pipe 11, the outer diameter of said cup above said transverse wall being the same as that of the pipe 11 and the upper part of said cup being externally screwthreaded and having screwed thereonto the tubular cap structure 14.

The valve cup chamber 13 is provided with a threaded inlet port 15 in the transversely extending bottom portion thereof in axial alinement with the pipe 11 and into said port is screwed downwardly the tubular portion 16 of the combined screw and gasket washer, by means of which the valve seat gasket washer 17, the head of the screw, is secured to the bottom of the cup chamber. In the wall of said cup at a point slightly spaced above the transverse wall 11*w* is arranged a circumferentially spaced series of radially extending passages 18.

The cap structure 14, subjacent to its threaded portion is outwardly bulged thereby providing a semi-circularly shaped, circumferential passageway 19 into which the water discharges from the passages 18 and below said passageway said bulge terminates in a downwardly directed skirt 20 the inner periphery of which is slightly spaced away from the external periphery of the pipe 11 thereby providing an annular channel 21 through which the water flows from the passageway 19 into the tank.

The upper part of the cap structure 14 is diametrically contracted to form an axial tubular extension 22 and also to form a downwardly facing annular shoulder 23 which overhangs the valve cup chamber 13. Within said cap structure is mounted a vertically slidable plunger valve 25, the upper part of which has a working fit within the tubular extension 22. The lower portion of the plunger valve 25 which remains within the valve cup chamber 13 during the operation of the device has a diametrically enlarged part 26 which forms an annular extension or broad circumfer-

ential rib therearound, this enlarged part having a cylindrical face that has a working fit within the valve cup chamber 13. During the operation of the device the enlarged part 26 always remains above the passages 18.

The lower end of the plunger valve 25 has a central concavity 27 and around said concavity an annular lip 28, thus providing a definite circular valve edge for contacting with the valve seat member 17 when the valve closes. Said lip is externally tapered in a downward direction and hence the upwardly issuing stream is not directed horizontally away from said lip but is directed obliquely upward therefrom against the lower surface of the enlarged portion 26 to retard the valve 25 as it approaches its seated position. This causes a quick snappy action as the valve completes its closing movement.

At one side, on a level with its annular channel 19, the tubular structure 14 is furnished with a lateral extension 31. A horizontally directed passage 32 extends from the channel 19 into said extension 31, this passage having a contracted outlet 33 leading laterally from its outer end portion to discharge the water horizontally across an anti-syphoning gap 34 into a larger, horizontal passage 35 with which said outlet 33 is in axial alinement. With the opposite end of said passage 35 communicates the re-fill tube 10. Since this anti-syphon structure constitutes the subject matter of my copending application, Serial No. 446,726; filed June 12, 1942, of which this application is a continuation-in-part and which issued as Patent No. 2,302,274, on November 17, 1942, further description thereof is unnecessary.

The upper part of the tubular cap structure is provided with conventional oppositely disposed extensions 41 and 42 to which are respectively pivoted the float rod 43 and lever 44, the pivoted portions of said rod and lever being bifurcated so as to straddle the upper portions of said two extensions. The rod structure 43 carries a float 45 on one end and at its opposite end has bifurcations between which is pivoted the anti-friction roller 46 which normally rests upon the free end of the lever 44. Said lever has at its midlength a downwardly directed pointed boss 47 normally resting upon the top of the plunger valve 25.

Describing in further detail the tubular valve seat member 17 and its relation to the parts with which it cooperates, in Figs. 4 and 5 said member is shown provided with a polygonal head in order that a suitable wrench may be applied to it during the screwing of the member into or out of the threaded bore provided for it in the part 11*w*. In providing for the external application of the wrench to said head it is necessary to make the head small enough to leave a space therearound within the vertical wall of the cup, as shown in Figs. 2 and 4. However, the axial passage through the member 17 may be polygonally shaped or otherwise cross-sectionally contoured to receive a properly shaped wrench, in which case this member may be provided with a circular head as large in diameter as the internal diameter of the cup. Said member 17 should be made of hard rubber or of some composition of a like moldable nature. This structure provides for a more rapid and convenient assembling and disassembling of the gasket portion of the valve, than would be possible if the gasket and its attaching element were made in separate pieces.

In the operation of the device, when the valve is open the stream of liquid passing through the pipe 11 strikes against that end of the gasketless plunger 25 which is contactable with the head 17 of the combined gasket and valve seat member, instead of striking against a gasket of any kind and wearing out the material thereof.

The operation of the device is not herein described in further detail as it will in the main be readily understood by those skilled in the art to which the invention pertains, and features thereof not already well known, are described in my Patent No. 2,302,274, already herein referred to.

What is claimed is:

1. In a valve structure, an upstanding pipe having an internal cross wall in a downwardly spaced relation to its upper end thereby producing a cup which surrounds a chamber superjacent to said cross wall, a valve seat member comprising a combined screw and gasket washer, the head of said screw consisting of gasket material resting upon said cross wall, there being an axial inlet passage through said cross wall and valve seat member, a gasketless plunger valve vertically slidable within said cup to and from a position wherein it closes said passage, there being outlet means leading from said cup above said valve seat member, and means to operate said plunger valve, said plunger valve having a contracted lower end portion provided with a central recess surrounded by an annular lip which is externally tapered in a downward direction to direct the issuing stream obliquely upward against the surrounding lower end portion of said plunger valve.

2. In a valve structure, an upstanding pipe having an internal cross wall in a downwardly spaced relation to its upper end, thereby producing a cup which surrounds a chamber superjacent to said cross wall, a valve seat member resting upon said cross wall, there being an axial inlet passage through said cross wall and valve seat member, a plunger valve vertically slidable within said cup to and from a position wherein it closes said passage, there being outlet means leading from said cup above said valve seat member, and means to operate said plunger valve, said plunger valve having a contracted lower end portion provided with a central recess surrounded by an annular lip which is externally tapered in a downward direction to direct the issuing stream obliquely upward against the surrounding lower end portion of said plunger valve.

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