

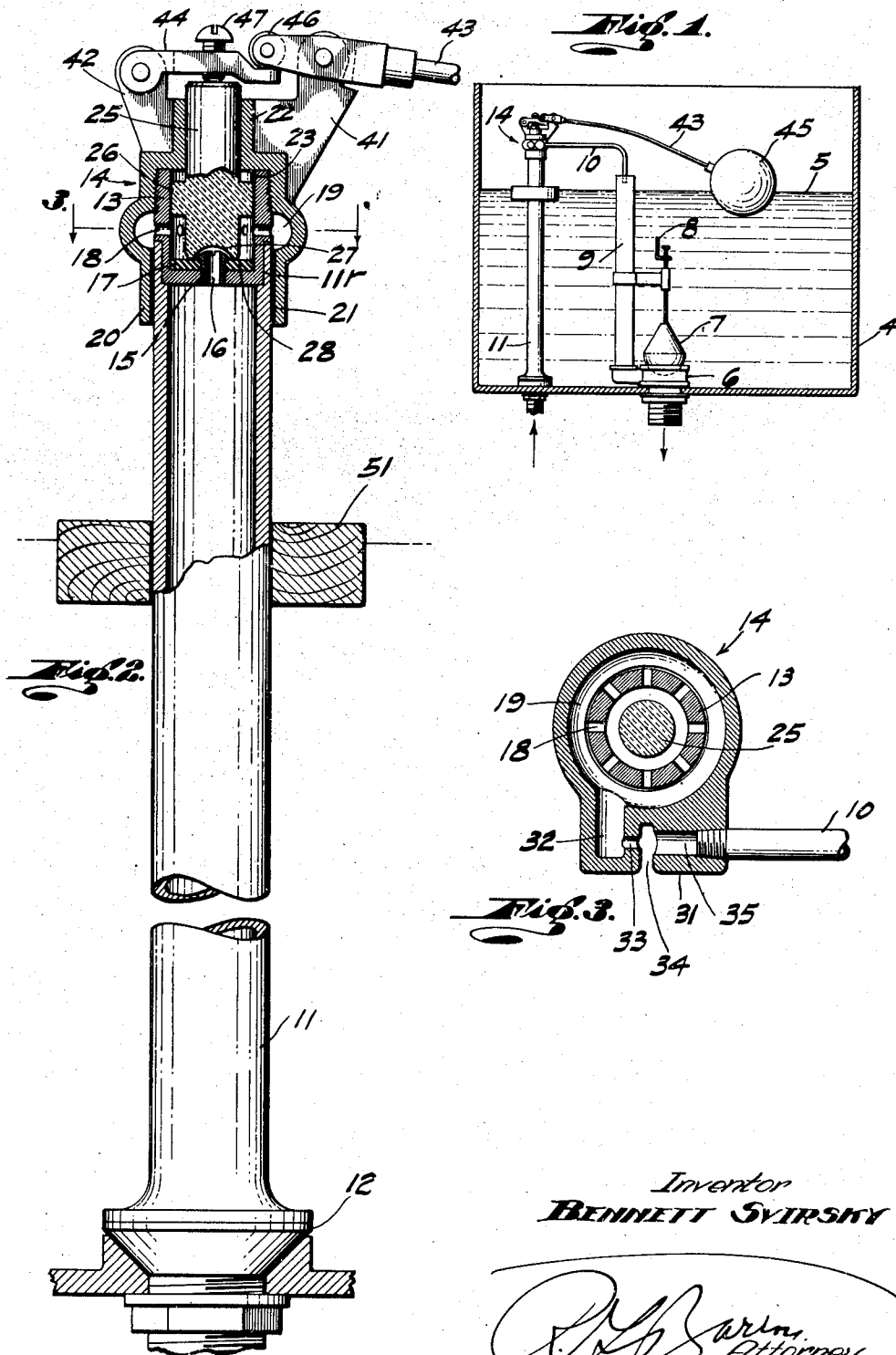
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WATER CONTROL FOR CLOSET TANKS

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WATER CONTROL FOR CLOSET TANKS

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4 Claims. (Cl. 137—104)

This invention relates to improved means for controlling water in closet tanks.

Important objects of the invention are: To provide an improved toilet storage tank and ball cock fixture combination; to provide improved means for silencing the water during its departure from the ball cock structure into the tank; to provide an improved ball cock fixture per se; to provide improved means for independently preventing anti-syphoning of the water in the storage tank through the re-fill tube or the ball cock valve structure into the main supply line and contaminating the same; to provide in a ball cock fixture an improved valve and valve seat structure; and to in general improve upon and reduce the number of parts entering into the combination of elements comprising the ball cock structure thereby not only increasing the efficiency of the device as a whole, but also rendering less costly the manufacture of the different elements and the labor involved in assembling them.

Other objects, advantages and features of invention will hereinafter appear.

Referring to the drawing wherein is shown a preferred embodiment of the invention as now reduced to practice:

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

Fig. 2 is an enlarged view partly in side elevation and partly in vertical midsection of the ball cock structure per se shown in Fig. 1, some portions being broken away in order to contract the view.

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.

Referring in detail to the briefly described views, 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, the mouth of said tube being located preferably above the highest level of the body of water in the tank.

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 with the floor of the tank by means of the gasket washer 12. Into the annular recess 11r located

in the discharge end of the pipe 11 is sweated the contracted lower end of the tubular valve cup 13, the outer diameter of said cup above said contraction 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 13 is provided with a threaded inlet port 15 in the transversely extending bottom portion thereof in axial alignment with the pipe 11 and into said port is screwed a tubular screw 16, by means of which the valve seat gasket washer 17 is secured to the bottom of the cup. In the wall of the cup 13 at a point slightly spaced above its point of sweating onto the pipe 11 is arranged a circumferentially spaced series of radially extending passages 18.

The cap structure 14 at a point adjacent its threaded union with the cup 13 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 space surrounded by the upper end of the valve cup 13. Within said valve cap is mounted a vertically slidable plunger valve 25, the upper part of which has a working fit within the tubular cap extension 14. The lower portion of the plunger valve 25 which remains within the valve cup 13 during the operation of the device has a diametrically enlarged part 26 which forms an annular extension or broad circumferential rib therearound, this enlarged part having a cylindrical face that has a working fit within the valve cup 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 a bevel 28, thus providing a definite circular edge for contacting with the valve washer 17 when the valve closes. The concave recess 27 extends into the end of the plunger a sufficient distance safely to clear the head of the tubular screws 16 when the plunger valve is in the seated position.

At one side, on a level with its annular chan-

nel 19, the tubular structure 14 is furnished with a lateral extension 31. A passage 32 extends from the channel 19 into said extension 31, this passage having a small outlet 33 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 alignment. With the opposite end of said passage 35 communicates the re-fill tube 10. This anti-siphon structure constitutes the subject matter of a copending application Serial No. 446,726, filed June 12, 1942.

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 are pivoted the anti-friction roller 46 which normally rests upon the free end of the lever 44. A regulating screw 47, carried by the mid-length portion of said lever 44 has its headed end directed upwardly and its lower end normally resting upon the top of the plunger valve 25.

Around the inlet pipe 5 is loosely fitted a float 51, by preference and as shown consisting of a thick round wooden washer or disk. This float is so positioned as to have the water issuing from the annular outlet channel 21 directed downwardly upon its upper surface, thus silencing the noise produced by the downward stream of water issuing from the annular passage 21. The buoyant body 51 rises and falls with the water level and its upper surface is always in the path of said downward stream. The force of this stream may slightly submerge said body at times. Said buoyant body will always function to cause said downward stream of water to merge in a noiseless manner with the body of water in the tank.

In the operation of the device the toilet tank 4 is flushed in the well known manner, at which time the valve controlling float means 45 drops as the body of water 5 in said tank is emptied through the discharge fitting 6. As the globular float 45 starts to fall the inlet means controlled by the plunger 25 is immediately opened and water from the supply pipe 11 starts flowing through the radial passages 18 into the passageway 19 and through the annular channel 21 into the tank. As the water leaves the annular channel 21 it is directed against the annular float 51 during the time the tank is emptying, and while the tank is filling the annular float rises, always maintaining a buoyant position, so that the water falling thereagainst will merge with the water in the tank without noise.

As a portion of the water flows through the channel 21 into the tank, other parts of the stream are directed through the lateral extension 31 through the reduced passage 33, across the gap 34 into the terminal passage 35 and thence through the re-fill tube 10 into the overflow pipe 9 for the well known purpose. The air gap 34 prevents water at any time from being syphoned through the re-fill tube into the main supply line.

The operation of the remaining structure, not specifically alluded to, will be readily understood from the preceding detailed description.

It should be understood that the present disclosure is for the purpose of illustration only and that this invention includes all modifications and equivalents which fall within the scope of the subject matter claimed.

What is claimed is:

1. The combination, with the flushing tank of a toilet and an upstanding supply pipe in said tank; of a float controlled inlet valve structure mounted upon said pipe, said structure including a tubular valve casing and a plunger valve vertically slidable therein to and from a position wherein its lower end engages a valve seat in said casing, an outer tubular member surrounding said valve casing and having an interior circumferential recess forming a channel therearound, said valve casing having outlet ports communicating with said channel and said outer tubular member having a skirt portion in a surrounding outwardly spaced relation to said pipe thus affording a downwardly directed annular outlet channel leading from the first recited channel, and a silencing means rising and falling with the water level in said tank surrounding said pipe in a position for the water issuing from said downwardly directed channel to strike against.

2. In a valve structure, an upstanding pipe having an internal shoulder adjacent to its upper end, a cup shaped member fitted within the upper part of said pipe and resting upon said shoulder, said member having a bottom aperture, a valve seat gasket washer overlying the bottom of said cup around said aperture, a tubular screw screwed into said aperture and having a head which retains said washer in place, a plunger valve vertically slidable within said cup to and from a position wherein it closes the inlet afforded by the aperture in the bottom of said cup, said plunger having a recess in its lower end to prevent the head of the screw from obstructing its approach to closed position, there being outlet means leading from said cup above the aforesaid gasket, and means to operate said plunger valve.

3. The subject matter of claim 2 and, the lower end portion of said plunger valve being diametrically contracted thereby providing around it an annular chamber within the cup which communicates with the aforesaid outlet means.

4. The combination, with the flushing tank of a toilet and an upstanding supply pipe in said tank; of a float controlled inlet valve structure mounted upon said pipe, said structure including a tubular valve casing and a plunger valve vertically slidable therein to and from a position wherein its lower end engages a valve seat therein, an outer tubular member surrounding said valve casing and having an interior circumferential recess forming a channel therearound, said valve casing having outlet ports communicating with said channel and said outer tubular member having a skirt portion in a surrounding outwardly spaced relation to said pipe thus affording a downwardly directed annular outlet channel leading from the first recited channel, and a silencing means surrounding said pipe in a position for the water issuing from said downwardly directed channel to strike against, said silencing means consisting of a buoyant body having an apertured portion loosely surrounding said pipe.

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