April 8, 1952 O. E. SOUTHWICK 2,591,975

TOILET FLUSH TANK REFILL DEVICE

Filed Sept. 9, 1950

Fig. 1

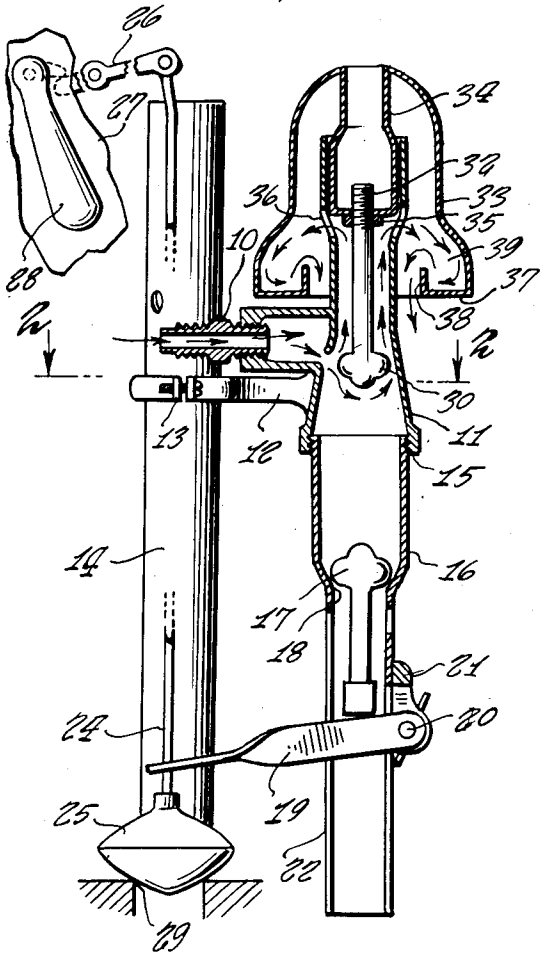


Fig. 4

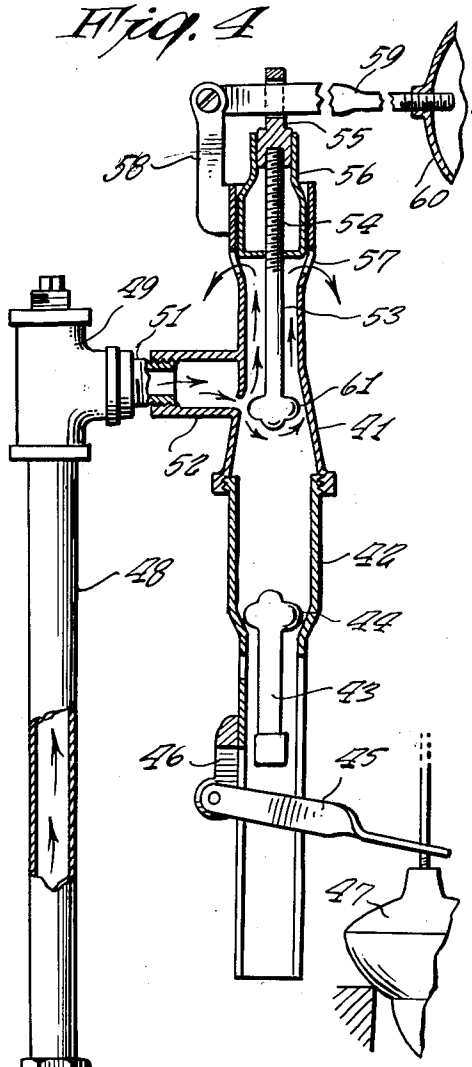


Fig. 2

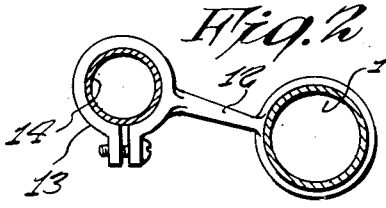
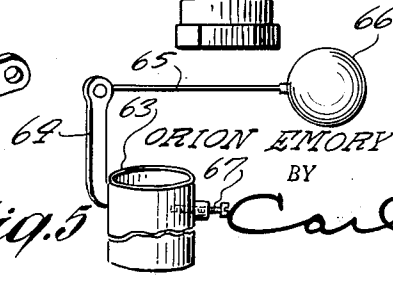


Fig. 3



Fig. 5



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Patented Apr. 8, 1952

2,591,975

UNITED STATES PATENT OFFICE

2,591,975

TOILET FLUSH TANK REFILL DEVICE

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Application September 9, 1950, Serial No. 184,078

5 Claims. (Cl. 4—41)

1

This invention relates to flush tank refill devices.

It is an object of the present invention to provide a flush tank refill device to eliminate the need for the long arm and large float and to provide a float arrangement which will not become water-logged as a result of leakage of the float.

It is another object of the present invention to provide a flush tank shut-off valve device which will not make a sizzling noise before shutting off and which will not admit more water to the toilet tank than will flow out of the overflow pipe.

Other objects of the present invention are to provide a flush tank refill device which is of simple construction, inexpensive to manufacture, has fewer working parts than the ordinary arrangement, free from corrosion of valve seats causing the diminished flow of water, compact, easy to install, easy to adjust, has long life and efficient in operation.

For other objects and for a better understanding of the invention, reference may be had to the following detailed description taken in connection with the accompanying drawing, in which

Fig. 1 is a vertical sectional view of the flush tank refill device constructed according to one form of the invention.

Fig. 2 is a transverse sectional view taken on line 2—2 of Fig. 1.

Fig. 3 is a perspective view of the manually operated valve guide lift arm for initiating the flow of water to the tank after the flushing operation.

Fig. 4 is a fragmentary longitudinal sectional view of the flush tank refill device constructed according to another form of the invention.

Fig. 5 is a fragmentary perspective view of a still further form of the invention utilizing different float arrangement.

Referring now to Figs. 1, 2 and 3, 10 represents a nipple to which a water supply pipe is connected. Secured to this nipple is a valve casing 11. This casing is supported within the flush tank by a bracket 12 clamped, as indicated at 13, to a drain pipe 14. The lower end of the casing 11 is internally threaded, as indicated at 15, and has a second valve casing 16 threaded thereto. This casing 16 has a valve element 17 that will be normally supported on valve seat 18. This valve element is weighted and the lower end thereof engages with an operating arm 19 which is secured by a pivot pin 20 on bracket 21. The bracket 21 is mounted on the side of the valve casing 16 and the operating arm 19 is worked up

2

and down in a vertical slot 22. When the valve element 17 is lifted, water from the casing 11 will pass downwardly over the seat 18 and into the flush tank to refill the same. The arm 19 has a slot 23 through which extends an operating rod 24 of the flush tank valve 25. The upper end of the rod 24 is connected to an operating arm 26 that is pivoted upon flush tank casing 27 and which is operated by a handle 28 lying on the exterior of the flush tank. In the bottom of the flush tank is a valve seat 29 on which the flush valve 25 normally rests.

As the valve element 17 is lifted, there will be a large flow of water tending to refill the tank, but this flow will be discontinued when the handle 28 is released and will continue upwardly through the casing 11 past a valve element 30 which is adjustably connected, as indicated at 32, upon a float bell 33. The element 30 is fixed in its adjusted position upon the depending central portion 34 of the bell 33 by a lock nut 35.

In the casing 11 are openings 36 through which the water may pass upon being elevated in the casing 11 and past the valve element 30.

The bell float 33 has radially inwardly extending flange 37 that is turned up at 38. A chamber 39 is provided for collecting the water and to weight the bell to some extent. This bell will accordingly silence the inward flow of water as the water will not strike the top surface of the water with force but will merely drain over the bent up ledge 38 and into the tank. As the water is elevated sufficiently, the bell float will receive and collect air and will be elevated on the water surface to cause the valve element 30 to be lifted onto its seat whereby to shut off the total flow of water to the flush tank. At this time, the valve element 17 will have been lowered and closed.

In the form of the invention shown in Fig. 4, there is provided similar valve casings 41 and 42 which are connected together. In the lower casing 42 is valve element 43 which engages its seat 44 upon being released by its operating arm 45. The operating arm is connected by bracket 46 to the side of the casing 42. The flush valve 47 lifts the arm 45 and this arm 45 in turn lifts the valve element 43 to permit the initial flow of water into the flush tank.

Extending upwardly through the bottom of the flush tank is a water supply pipe 48 which has a T-fitting 49 at its upper end that is connected through a nipple 51 with the laterally extending portion 52 of the casing 41. The valve element 53 therein has a long stem 54 which is threaded and connects with a top operating member 55.

A slide casing **56** fits into the upper end of the casing **41** to prevent leakage out of the top thereof. A plurality of holes **57** permits the escape of the water from the top of the casing **41**.

On the top of the casing **41** is a bracket **58** that has a float arm **59** pivoted thereto. This float arm carries a float **60**. The float arm extends through the operating lug or member **55** and as the float is raised the valve element **53** will be lifted so that its head **61** engages with the seat in the casing **41** to close off finally the flow of water to the flush tank. The initial flow of water to the flush tank is started past valve **43** and continues past **61** until the float **60** operates to close it.

In Fig. 5, there is shown a sleeve **63** which can be placed over the upper casing **11** with the valve element **53** shown in Fig. 4 so as to extend downwardly over the openings **36** for the purpose of directing the flow of water leaving openings **36** in Fig. 1 and downwardly. This sleeve **63** has an upstanding bracket **64** to which is pivotally connected a float arm **65** having float **66**. This float **66** would pass through the member **55**, as shown in Fig. 4. A set screw **67** will secure the sleeve **63** upon the casing **11**. A lock nut holds the set screw in its securing position.

In the form of the invention shown in Fig. 1, the valve can be adapted to different water pressures by adjusting the bell float **33** relative to the valve element **30**. The water pressure acting upon the head of the valve element **30** will help to keep the valve open when it is down or to keep it closed when it is raised. In Fig. 1, when the water level reaches the bottom of the bell float **33**, air will be trapped in the top thereof and the bell float **33** will be lifted. The bell float **33** is transformed from a dead weight to a float. The water pressure within the casing **11** combined with the float actions will shut off the valve. When the tank valve element **25** is again lifted, the valve element **30** will be lowered in the casing **11**.

It will be apparent that there has been provided a flush tank refill device which has few working parts, is compact, eliminates the long arm and large float, that the valve seats are such that sticking of the valve elements upon them is not effected, provides a float which will not become water-logged or leak, eliminates the noise at the time of the final shutting off of the valve and keeps down the amount of overflow into the overflow pipe.

While various changes may be made in the detail construction, it shall be understood that such changes shall be within the spirit and scope of the present invention as defined by the appended claims.

Having thus set forth and disclosed the nature of my invention, what is claimed is:

1. A refill device for toilet flush tanks comprising an upper casing part, a water inlet extending laterally therefrom, a valve element upward in the said casing part, float means connected to the valve element to operate the same, a depending lower casing part secured to the lower end of the upper casing part, a valve element operable in said depending casing part, a flush tank valve operating arm means extendable from the lower casing part and adapted to engage with the flush tank valve to open the valve element initially in the depending casing part.

2. A refill device for toilet flush tanks comprising an upper casing part, a water inlet extending laterally therefrom, a valve element upward in the said casing part, float means connected to the valve element to operate the same, a depending lower casing part secured to the lower end of the upper casing part, a valve element operable in said depending casing part, a flush tank valve operating arm means extendable from the lower casing part and adapted to engage with the flush tank valve to open the valve element initially in the depending casing part, said float means comprising a bell shaped element adapted to extend downwardly over the top of the upper casing part, said upper casing part having outlet holes lying above the lower edge of the bell shaped part, said bell shaped part having a central depending portion fitting the end of the upper casing part tc close the same and to serve as a guide for the valve element.

3. A refill device for flush tanks as defined in claim 2 and said float bell part having a radially inwardly extending flange with an upstanding circumferential lip whereby to permit the collection of water in the side of the bell float and prevent the noise of water under pressure striking the water surface.

4. A refill device for toilet flush tanks as defined in claim 1 and said float means comprising a sleeve adapted to fit the upper part of the upper casing, means for securing said sleeve thereupon against axial displacement relative thereto, a bracket portion extending upwardly from the sleeve, a float arm with a float thereon pivotally connected to the bracket arm, said upper casing valve element being threaded upon its upper end, a member carried by the float arm and threaded on the valve element, guide means connected to said member and slidable in the upper casing part.

5. The refill device, as set forth in claim 2, which includes an operating rod supporting said flush tank valve, and said operating arm means comprise an arm pivoted to the depending lower casing part and having a slot through which said operating rod extends.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,997,401	Barce	Apr. 9, 1935
2,131,765	Teahen	Oct. 4, 1938
2,341,116	Owens	Feb. 8, 1944
2,527,909	Bowers	Oct. 31, 1950
2,534,524	Molloy	Dec. 19, 1950