

April 16, 1935.

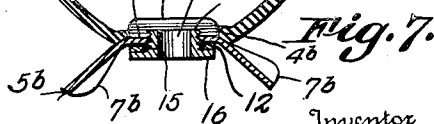
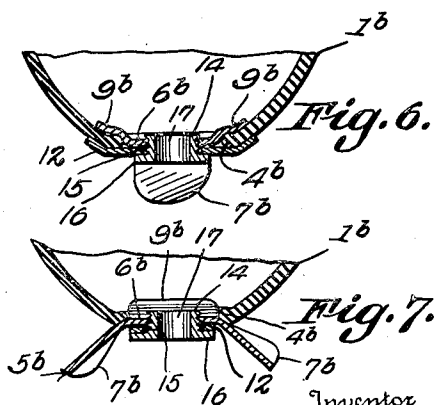
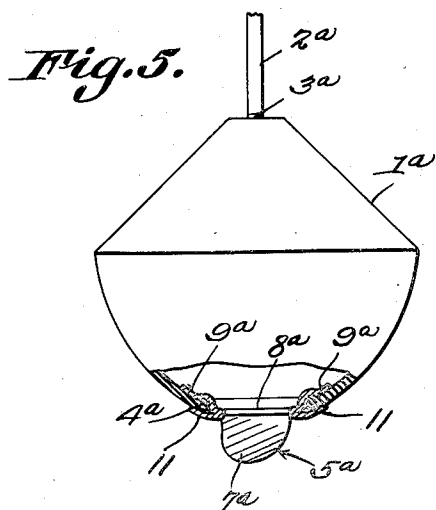
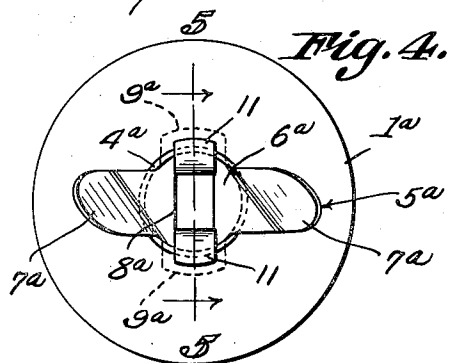
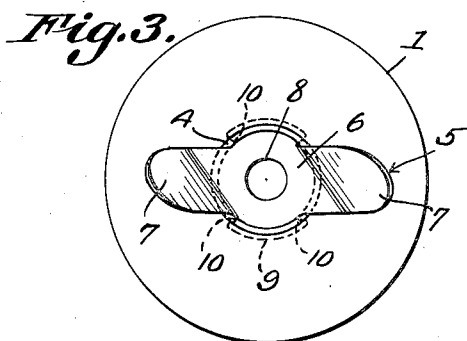
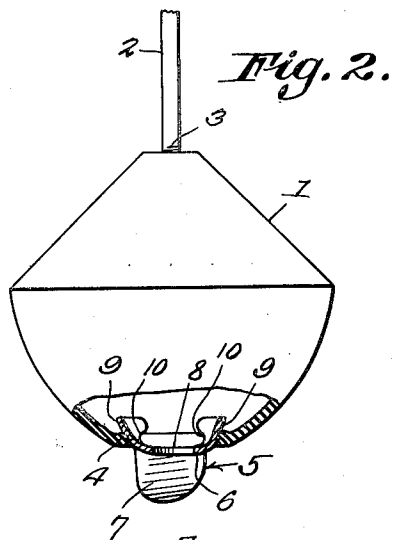
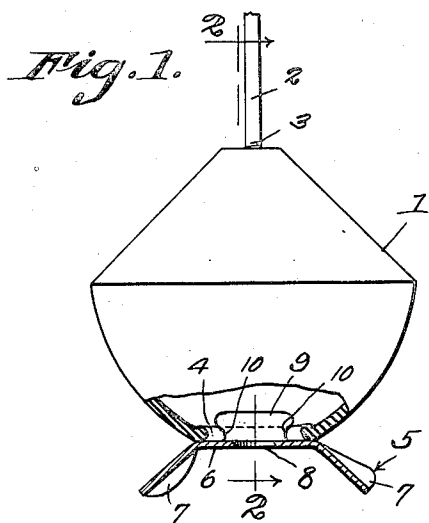
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1,997,728

VALVE OR BULB FOR FLUSH TANKS

Filed Sept. 13, 1934

2 Sheets-Sheet 1



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VALVE OR BULB FOR FLUSH TANKS

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2 Sheets-Sheet 2

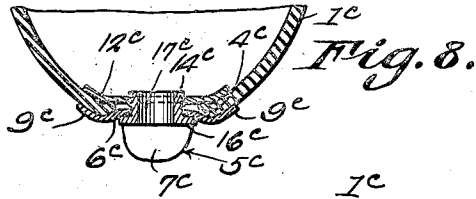


Fig. 8.

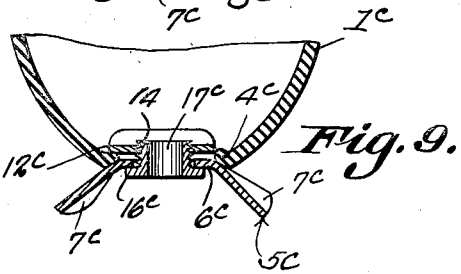


Fig. 9.

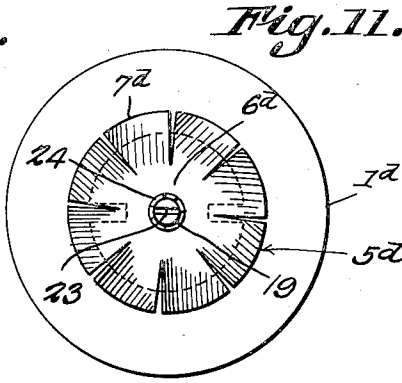


Fig. 11.

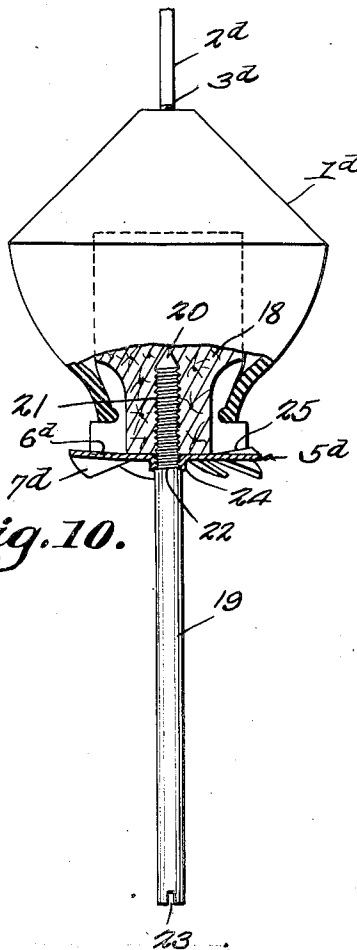


Fig. 10.

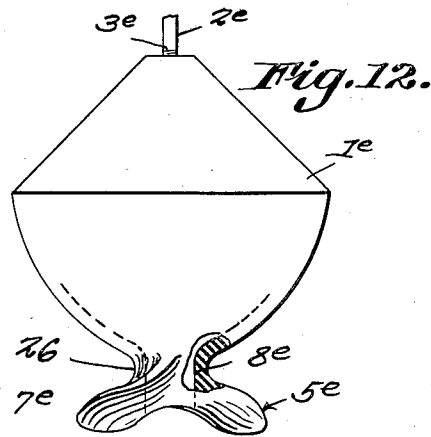


Fig. 12.

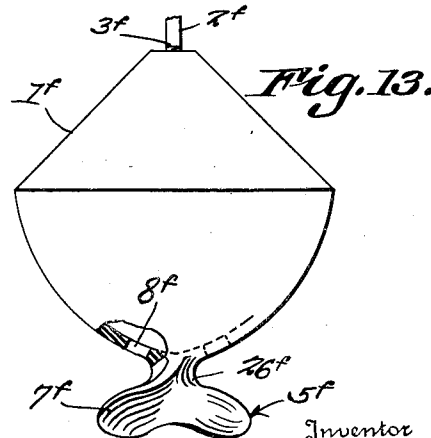


Fig. 13.

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UNITED STATES PATENT OFFICE

1,997,728

VALVE OR BULB FOR FLUSH TANKS

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Application September 13, 1934, Serial No. 743,886

8 Claims. (Cl. 4—56)

The device described and claimed is an outlet valve or bulb of the kind used on the flush tanks of water closets.

The invention aims to provide a means for imparting rotation to the valve or bulb, during its descent toward the valve seat, as the level of the water drops.

There are several reasons why the valve should rotate, as aforesaid. Among those reasons are the following:

1. To create a vortex in the water in the tank, which will aid in a proper seating of the valve.
2. To cause the valve to wipe itself and the seat free from slime and the like, as the valve comes into contact with the seat.
3. To eliminate noise.
4. To keep the valve or bulb screwed on the threaded guiding rod which is assembled with the top of the valve.

So far as objects 1, 2 and 3, above, are concerned, it will not do to have the valve begin to rotate so soon as the level of the water in the flush tank begins to drop, and to have the valve continue to rotate until the valve seats. Stated more broadly, it will not answer to have the valve rotate for too long a period. This is so, because, if the valve begins to rotate too long before it seats, the eye of the stem at the top of the valve may strike the trip wire which raises the valve, especially if, as is often the case, the trip wire does not hang exactly vertical, a wobbling motion being imparted to the valve and thereby some of the objects hereinbefore set forth will be defeated. The device embodies structural features whereby the valve is prevented from rotating for too long a time before it seats.

It is within the province of the disclosure to improve generally and to enhance the utility of devices of that type to which the invention appertains.

With the above and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement 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 what is claimed, without departing from the spirit of the invention.

In the accompanying drawings:

Fig. 1 shows, in side elevation, a device constructed in accordance with the invention, parts being broken away, and parts being shown in section;

Fig. 2 is an elevation of the device shown in

Fig. 1, viewed at right angles to the showing of Fig. 1, parts being broken away, and parts being in section, the view being taken, to some extent, on the line 2—2 of Fig. 1;

Fig. 3 is a bottom plan of the device depicted in Fig. 1;

Fig. 4 is a bottom plan showing a modification in the invention;

Fig. 5 is a section on the line 5—5 of Fig. 4, most of the bulb or valve being left in elevation;

Fig. 6 is a fragmental sectional view showing a modification;

Fig. 7 is a section taken at right angles to the cutting plane in Fig. 6;

Fig. 8 is a sectional view showing a further modification;

Fig. 9 is a section of the structure shown in Fig. 8, the cutting plane in Fig. 9 being at right angles to the cutting plane in Fig. 8;

Fig. 10 is a side elevation showing another modification of the invention, parts being broken away, and parts being shown in section;

Fig. 11 is a bottom plan of the device delineated in Fig. 10;

Fig. 12 is a side elevation showing a further modification, parts being broken away, and parts appearing in section;

Fig. 13 is a side elevation showing a further modification, parts being broken away and parts appearing in section.

Referring to the form shown in Figs. 1, 2 and 3, the numeral 1 marks a valve or bulb, generally made of rubber, adapted to float for a time, and then to seat in the flush tank of a water closet. At 2 there appears the usual guiding stem. The stem 2 is detachably connected with the valve 1 by threads 3 on the stem, the threads engaging the valve. There is an opening 4 in the bottom of the valve 1.

The invention comprises a rotator, denoted generally by the numeral 5. The rotator 5 may be made of metal or any other suitable substance having the necessary strength and rigidity. The rotator 5 includes a central body 6. Any desired number of oppositely-disposed blades 7 project outwardly from the edge of the body 6. The blades 7 are inclined longitudinally, away from the valve 1, as Fig. 1 will show. The pitch of the blades 7 is opposite to the threads 3 of the stem 2, whereby when the valve 1 is rotated, by the impeller 5, as hereinafter described, the valve will not be threaded off the stem 2.

The body 6 of the rotator 5 rests against the lower surface of the valve 1. The body 6 of the

rotator 5 is provided with an opening 8, communicating with the inside of the hollow valve 1. The body 6 of the rotator 5 is supplied with arms 9, which extend upwardly and outwardly through the opening 4 in the bottom of the valve 1. In the edges of the arms 9 there are notches or seats 10. The valve 1, about the opening 8, is engaged in the seats 10. All that is required, in order to assemble the rotator 5 with the valve 1, is to push the arms 9 upwardly through the opening 4 in the bottom of the valve, whereupon the lower part of the valve will engage in the seats 10 in the arms 9 resiliently, thereby holding the rotator 5 in place on the valve 1.

The diameter of the rotator 5 is greater than its height. The valve 1, therefore, does not begin to rotate so soon as the level of the water in the flush tank begins to drop. This is a desirable feature, because if the valve 1 starts to rotate so soon as the level of the water in the flush tank begins to drop, the valve will be rotated for too long a period. If the valve 1 is rotated for too long a period, the valve, due to possible interference between the stem of the valve and the lifting wire, as hereinbefore explained, will begin to wobble, and thus defeat some of the objects of the invention. In the device shown, the valve 1 does not start to rotate so soon as the level of the water begins to fall. Water runs out for a considerable period of time before the valve begins to rotate, but, ultimately, the rotator 5 reaches the place where the water flows through the restricted area represented by the cross section of the outlet pipe, and then the momentum of the outwardly flowing water brings the rotator into action and causes the valve to rotate.

The construction is such that a vortex is created in the water in the flush tank, and by the operation of the vortex the valve 1 is centered and is caused to seat accurately. The valve 1, because it is rotated, wipes the valve seat clean of slime and the like, and the valve itself is kept clean. Noise is reduced or eliminated as the valve 1 seats. The valve 1 is threaded the more tightly on the stem 2, as the valve rotates, and is not unscrewed from the stem 1, due to the rotation of the valve.

In Figs. 4 and 5, parts hereinbefore described have been designated by numerals previously used, with the suffix "a". In this form, the opening 8a in the body 6a of the rotator 5a may be rectangular. The material freed in the forming of the opening 8a is turned outwardly to form fingers 11, which engage the outer surface of the valve 1 and aid in holding the rotator 5 in place in the valve.

In Figs. 6 and 7, parts hereinbefore described have been designated by numerals previously used, with the suffix "b". In this form of the invention, the fingers 11 of Fig. 4 are replaced by a cross piece 12, engaging the outside of the valve 1b. A tubular retainer 14 extends through an opening 15 in the intermediate portion of the cross piece 12, the retainer being threaded into the central body 6b of the rotator 5b. The retainer 14 has a flange 16 on its outer end, and this flange engages the cross piece 12. The edge of the valve 1b, about the opening 4b, is clamped between the arms 9b and the cross piece 12, when the retainer 14 is threaded into the body 6b of the rotator 5b. In Figs 6 and 7, the opening 8 of Fig. 1 is replaced in function by the bore 17 of the retainer 14.

In the form shown in Figs. 8 and 9, parts hereinbefore described have been designated by

numerals previously used, with the suffix "c". In Figs. 8 and 9, the cross piece 12c is disposed inside the valve 1c, whereas the cross piece 12 of Figs 6 and 7 is disposed outside of the valve 1b. In Figs 8 and 9, the arms 9c of the body 6c of the rotator 5c engage the outside of the valve 1c. The retainer 14c passes through the body 6c of the rotator 5c and is threaded into the intermediate portion of the cross piece 12c, the flange 16c of the retainer 14c engaging the body 6c of the rotator.

In Figs. 10 and 11, parts hereinbefore described have been designated by numerals previously used, with the suffix "d". The description of this form of the invention may be shortened somewhat, because many parts are shown in my Patent No. 1,975,421 issued on October 2, 1934. In the bottom of the valve 1d is mounted a float 18, adding buoyant stability to the valve, and generally made of cork. The numeral 19 marks a metal stem, assembled with the float 18 and depending therefrom. The parts mentioned are shown broadly in my patent above alluded to.

In the present invention, the stem 19 has a point 20 which enables the stem to enter the float 18 readily. The stem 19 has threads 21 adapted to engage the float 18. Where the threads 21 stop, a shoulder 22 is formed. In its lower end, the stem 19 is provided with a screw driver kerf 23, by which the pointed end of the stem may be mounted readily in the float 18.

The rotator 5d is in the form of a full disk, as shown in Fig. 11, and has a short central neck 24. Before the threaded end of the stem 19 is engaged with the float 18, the rotator 5d is threaded down on the stem 19 until the neck 24 of the rotator is engaged with the shoulder 22 on the stem. Then the stem is threaded into the float 18, and the body 6d of the rotator 5d comes into abutment with the lower end of the float 18. The upper edges of the blades 7d of the rotator 5d dig into the lower end of the float 18, when the rotator 5d and the stem 19 are rotated, to assemble the stem with the float, and, thus, the rotator 5d is prevented positively from turning with respect to the float 18, in addition to the frictional hold which the rotator has on the lower end of the float. The float 18 is fixed in the valve 1d.

In Fig. 12, parts hereinbefore described have been designated by numerals previously used, with the suffix "e". In this form of the invention, the rotator 5e is formed integrally with the body 1e, the rotator being connected to the body by a short neck 26, in which the opening 8e is located.

In Fig. 13, parts hereinbefore described have been designated by numerals previously used, with the suffix "f". This form of the invention is constructed like the form shown in Fig. 12, aside from the fact that the opening 8f is located in the lower part of the valve 1f, rather than in the neck 26, as shown in Fig. 12.

Having thus described the invention, what is claimed is:

1. In a device for use in the flush tanks of water closets and the like, a buoyant valve and a propeller-like valve-rotator carried by the lower end of the valve, the valve rotator being exposed to the liquid in the tank and being of such dimensions as to impart rotation to the valve from the outflowing liquid, the rotator constituting the sole means for imparting rotation to the valve.

2. In a device for use in the flush tanks of

water closets and the like, a bouyant valve and a propeller-like valve-rotator carried by the lower end of the valve, the rotator being located close to the lower end of the valve, the diameter 5 of the rotator being greater than its height, whereby the valve will float for a time, without rotation, as the liquid leaves the tank, and then rotate, when the valve has been lowered enough so that the rotator is subject to the out-flowing liquid.

10 3. A rotator for the outlet valves of the flush tanks of water closets and the like, comprising a central body provided with peripheral, transversely inclined blades, and means associated 15 with the body for holding the rotator on the lower end of an outlet valve, said means being exposed to the liquid in the tank and being of such dimensions as to impart rotation to the valve from the outflowing liquid, said means constituting the sole mechanism for imparting rotation to the valve.

20 4. A rotator for the outlet valves of the flush tanks of water closets and the like, comprising a central body provided with peripheral, transversely inclined blades, and means associated 25 with the body for holding the rotator on the lower end of an outlet valve, said means comprising outwardly extended arms on the body.

30 5. A rotator for the outlet valves of the flush tanks of water closets and the like, comprising a central body provided with peripheral, transversely inclined blades, and means associated with the body for holding the rotator on the lower end of an outlet valve, said means comprising outwardly extended arms on the body, 35

the arms being provided in their edges with seats for engagement with the valve.

6. A rotator for the outlet valves of the flush tanks of water closets and the like, comprising a central body provided with peripheral, transversely inclined blades, and means associated 5 with the body for holding the rotator on the lower end of an outlet valve, said means comprising outwardly extended arms on the body, a cross piece, and a retainer connecting the 10 body with the cross piece, the retainer constituting means for binding a portion of an outlet valve between the arms and the cross piece.

7. A rotator for the outlet valves of the flush tanks of water closets and the like, comprising 15 a central body provided with peripheral, transversely inclined blades, and means assembled with the body for holding the rotator on the lower end of an outlet valve, said means embodying cooperating members, one of which is fixed 20 with respect to the rotator, and the other of which is movable with respect to the rotator and means for binding said members together to cause them to grip the wall of an outlet valve 25 between them.

8. A device of the class described, constructed as set forth in claim 1, and further characterized by the fact that the valve-rotator and the lower end of the valve are connected together in 30 one piece and made of the same material whereby neither of the parts specified will work the deterioration of the other by individual corrosion.

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