May 15, 1956 J. A. STUART, JR 2,745,109

VALVE ASSEMBLY FOR FLUSH TANKS

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Fig. 1.

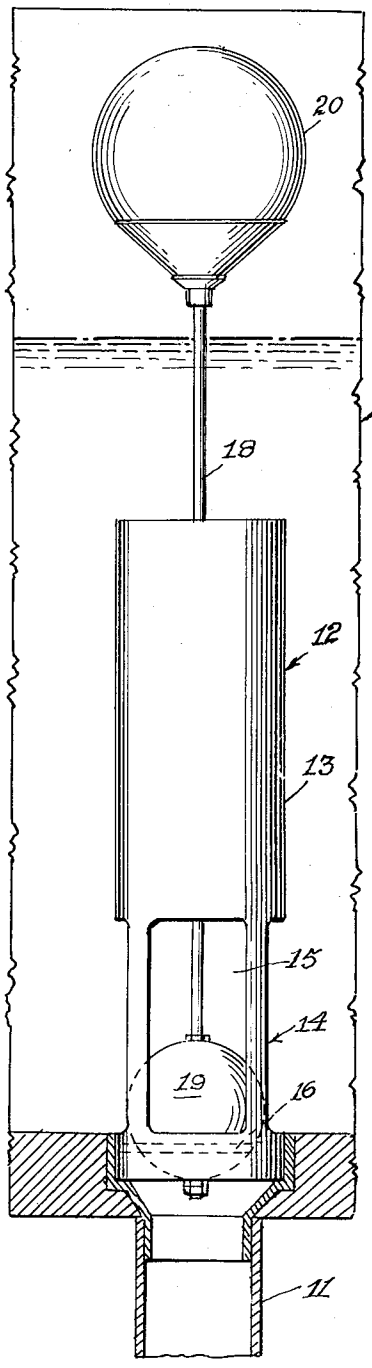


Fig. 2.

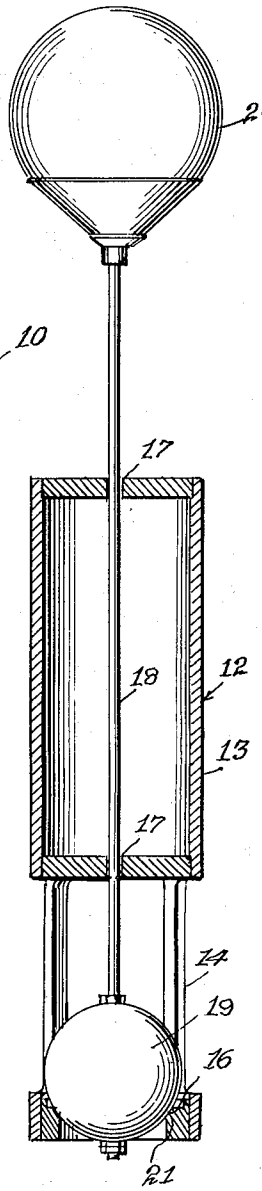
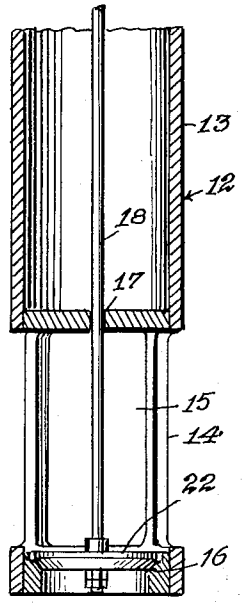


Fig. 3.



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VALVE ASSEMBLY FOR FLUSH TANKS

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6 Claims. (Cl. 4—56)

This invention relates to a valve assembly for flush tanks and the like and more particularly a valve assembly which is automatically operative at predetermined intervals to allow the water to flow from the flush tank and flush the means with which it is operative.

The advantages of having an automatically operable valve assembly to operate the discharge of water from a container have long been recognized. For example, the advantageous use of the same in public lavatories is obvious. Heretofore, however, such automatically operative valve assemblies have been expensive to produce containing many mechanical parts, and have been difficult to assemble and maintain.

It is an object of the present invention to provide an automatically operative valve assembly for flush tanks which will allow the discharge of water at predetermined intervals.

It is a further object of the present invention to provide a valve assembly for flush tanks which comprises a unitary assembly which is easy to install and maintain.

It is a further object of the present invention to provide a valve assembly for flush tanks which is simple to operate and construct.

It is still a further object of the present invention to provide a valve assembly for flush tanks having all the desired advantages but which is nevertheless inexpensive to manufacture.

Other objects and advantages of the present invention will appear in greater detail in the following specification taken in conjunction with the accompanying drawings, in which:

Fig. 1 is an elevational view of the valve assembly in accordance with the present invention in a broken-away portion of a conventional flush tank;

Fig. 2 is a vertical section taken through a portion of Fig. 1; and

Fig. 3 is a fragmentary vertical sectional view of a modified form of the present invention.

Referring to the drawings, there is shown by way of example, a portion of a closet flush tank **10** having an outflow pipe **11** with the unitary flush valve assembly **12** of the present invention within said flush tank and in communication with said outflow pipe **11**. While for clarity the description of the valve assembly of the present invention is set forth in connection with a closet flush tank, it will be understood that the valve assembly will be operable in any place where automatic discharge of water at predetermined intervals is desired, as for example, bathtubs and the like.

The valve assembly **12** comprises a cylindrical body portion **13** preferably circular in cross section. At the lower end of said cylindrical body **13** there is provided an outlet **14** comprising a multiplicity of lateral ports **15** and a seat **16**. The cylindrical body **13**, which is shown as being hollow, has apertures **17** centrally disposed at each end thereof to form a bearing for rod **18** which extends through the said apertures **17**. Secured to the lower end of the rod by means of a threaded connection or any other suitable means is a valve member **19** preferably globular and constructed of resilient material such as rubber. While this construction is shown as preferential, any other suitable shape or material may be utilized for the valve member **19**. The valve member **19** is adapted to rest in the seat **16** to close the same whereby, as shown, when the valve assembly is inoperative, water will not escape from the flush tank. The rod **18** is provided at its upper end with a float **20** secured by means of a threaded connection or by any other suitable means to the rod **18**. The rod **18** has guided up-and-down movement with respect to the cylindrical body **13** through the bearing apertures **17**. The rod **18** is sufficiently long so that when the valve member **19** is on the seat **16**, a portion of the rod projects above the upper end of the body **13**, as shown. It will be understood that the seat **16** is beveled, as at **21**, to accommodate the valve member **19** and provide a fluid-tight seal when the valve member rests in the seat **16**. The parts described above are assembled into a unit which is then fixed in functioning position upright in the tank **10** with the outlet **14** in communication with the outflow pipe **11** and the ports **15** of the outlet in communication with the interior of the tank. When the level of the water or other liquid in the tank is below the float **20**, the valve member **19** under the action of gravity will engage the seat **16** and thus prevent the outflow of liquid from the tank through the outlet **14**, as shown in Fig. 1. When the liquid entering the tank reaches the level to buoy the float **20** and raise the same, the valve member **19** through the intervention of the rod **18** will be moved out of engagement with the seat **16** allowing a quantity of the liquid to flow out of the tank through the outlet **14** into the pipe **11**. It will be understood that during this discharge, the lateral ports **15** permit substantial quantities of water to flow to the pipe **11**, there being no barrier presented to the discharge of the water when the valve assembly **19** is raised as aforesaid. When a sufficient amount of the water is discharged, the valve member **19** under the action of gravity will return to its position seated in the seat **16** preventing further discharge of the water within the tank. It will be understood that at periodic intervals discharge of the water may be determined by the rate at which the water is allowed to flow into the tank by any suitable means, to raise the water level until the float **20** is buoyed.

In the modification shown in Fig. 3, a beveled disk **22** is provided at the end of the rod **18** adapted to rest in the seat **16** to provide a fluid-tight seal. The action of the valve assembly of this construction is similar to the action of the float shown in Figs. 1 and 2; viz., when the water is at a level to buoy the float **20**, the beveled disk **22** will move upwardly to permit the discharge of the water from the tank and thereafter under the action of gravity, will return to the position shown in Fig. 3 wherein the beveled disk **22** rests in the seat **16**. While the invention has been described and shown in definite shapes for exemplary purposes, as for example, the valve member **19** comprising a rubber ball, it will be understood that other shapes may be utilized to accomplish the same result using the principle set forth in this description.

Variations and modifications may be made without departing from the spirit of the invention or the scope of the appended claims.

I claim:

1. A unitary flush valve assembly comprising an elongate, upright body having a liquid outlet on the lower end thereof and a seat surrounding said outlet, a valve member which cooperates with said seat to control the outflow of liquid through said outlet, a rod extending through the body, means on said body which guides said rod for up and down movement, said valve member being rigidly

joined to the lower end of the rod for movement with the rod, and a float comprising a vessel having a closed bottom, rigidly joined to the upper end of the rod and responsive only to the rise and fall of the liquid to cause up and down movement of said rod and a corresponding movement of said valve member with respect to the seat to open and close said outlet, the weight of the rod, valve, and float and the buoyancy of the float being so related that when the assembly is immersed in a body of water the float will overcome the total weight of the valve, rod and float and also the downward pressure of water on the valve, thereby to raise the valve and open the said outlet.

2. A unitary flush valve assembly as set forth in claim 1, wherein said valve member consists of a beveled disk and said seat is beveled to receive the disk.

3. A unitary flush valve assembly as set forth in claim 1, wherein said rod projects above said body and the float extends above the upper end of the rod.

4. A unitary flush valve assembly comprising an elongate, upright body having a liquid outlet on the lower end thereof, having one or more laterally opening ports, and a seat surrounding the lower end of said laterally opening ports, a valve member which cooperates with said seat to control the outflow of liquid through said outlet, a rod extending through the body, means on said body which guides said rod for up and down movement, said valve member being rigidly joined to the lower end of the rod for movement with the rod, and a float comprising a vessel having a closed bottom, rigidly joined to the upper end of the rod responsive only to the rise and fall of the liquid to cause up and down movement of said rod and a corresponding movement of said valve member with respect to the seat to open and close said outlet, the weight of the rod, valve, and float and the buoyancy of the float being so related that when the assembly is immersed in a body of water the float will overcome the total weight of the valve, rod and float and also the downward pressure of water on the valve, thereby to raise the valve and open the said outlet.

5. A unitary flush valve assembly comprising an elongate, upright body having a liquid outlet on the lower end thereof, and a seat surrounding said outlet, a globular valve member which cooperates with said seat to control the outflow of liquid through said outlet, a rod extending through the body, means on said body which guides said rod for up and down movement, said valve member being rigidly joined to the lower end of the rod for movement with the rod, and a float comprising a vessel having a closed bottom, rigidly joined to the upper end of the rod responsive only to the rise and fall of the liquid to cause up and down movement of said rod and a corresponding movement of said valve member with respect to the seat to open and close said outlet, the weight of the rod, valve, and float and the buoyancy of the float being so related that when the assembly is immersed in a body of water the float will overcome the total weight of the valve, rod and float and also the downward pressure of water on the valve, thereby to raise the valve and open the said outlet.

6. A unitary flush valve assembly comprising an elongate, upright body having a liquid outlet on the lower end thereof, and a seat surrounding said outlet, a globular valve member of resilient material which cooperates with said seat to control the outflow of liquid through said outlet, a rod extending through the body, means on said body which guides said rod for up and down movement, said valve member being rigidly joined to the lower end of the rod for movement with the rod, and a float comprising a vessel having a closed bottom, rigidly joined to the upper end of the rod responsive only to the rise and fall of the liquid to cause up and down movement of said rod and a corresponding movement of said valve member with respect to the seat to open and close said outlet, the weight of the rod, valve, and float and the buoyancy of the float being so related that when the assembly is immersed in a body of water the float will overcome the total weight of the valve, rod and float and also the downward pressure of water on the valve, thereby to raise the valve and open the said outlet.

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