July 24, 1951 W. J. BUFORD 2,561,337

SAFETY FLUSH VALVE

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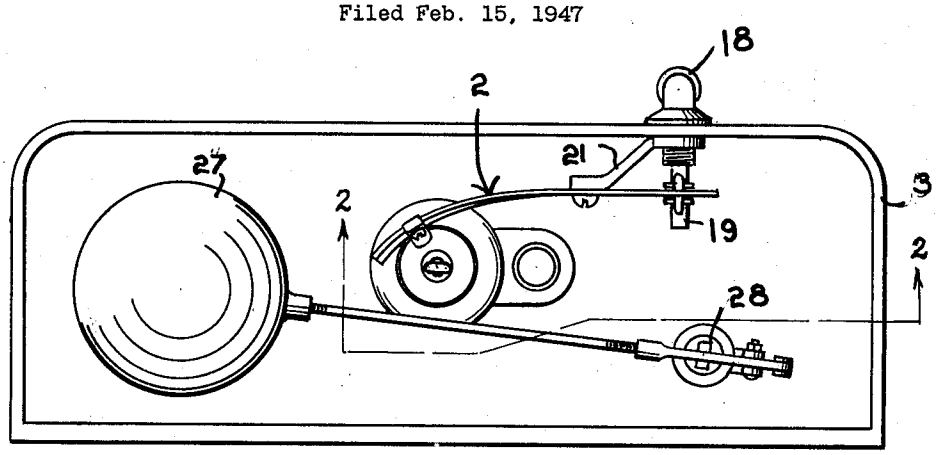


Fig. 1.

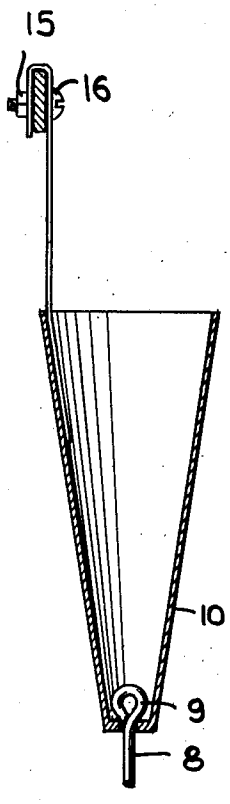


Fig. 3.

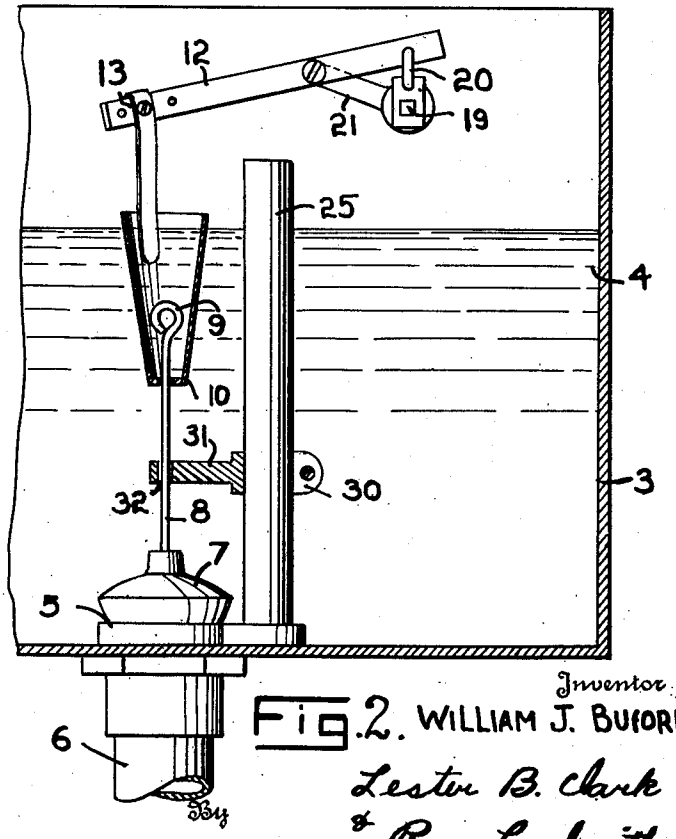


Fig. 2.

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SAFETY FLUSH VALVE

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1 Claim. (Cl. 4—57)

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The invention relates to a valve assembly, and in particular to a non-sticking valve assembly operable to open and close an outlet in a container.

An object of the invention is to provide a valve assembly which is constructed so as to eliminate sticking of the operating mechanism.

A further object of the invention is to provide in a valve assembly, a housing member constructed to provide a minimum of frictional contact between such housing and a slidable valve stem fitting therein.

Another object of the invention is to provide a valve assembly for opening and closing an outlet in a container, which assembly includes a frusto-conical shaped housing member arranged to slidably fit the valve stem of the valve in the assembly so that a minimum of frictional contact is provided between the housing and the valve stem.

Another object of the invention is to provide a container with a valve assembly therein for opening and closing an outlet in the container, said valve assembly operating to close the outlet as the level of the fluid in the container reaches the bottom thereof.

A still further object of the invention is to provide a container with a valve assembly therein for opening and closing an outlet in the container, said valve assembly operating to close the outlet as the level of the fluid in the container reaches the bottom thereof, and a float in said container arranged to allow the refilling of the container with a fluid to a predetermined point after the valve assembly has been actuated to open the outlet to discharge the fluid from the container.

Another object of the invention is to provide a valve lift element of novel construction and suitable for installation in new equipment or for replacement in equipment already installed.

Other and further objects of the invention will become readily apparent with a consideration of the following description and accompanying drawings wherein:

Fig. 1 is a top plan view of a container showing a valve assembly positioned therein;

Fig. 2 is a partial elevation of Fig. 1 on line 2—2 thereof; and

Fig. 3 shows the preferred embodiment of the housing member which is arranged to telescopically fit the valve stem of the valve in the valve assembly.

In valve assemblies such as those used in the closet tanks of present day toilets, a great deal of trouble has been encountered which is caused

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by the sticking of the valve after flushing the toilet, or by the valve seating improperly which is usually caused by the bulb stem and lift rod or mechanism becoming tangled or caught. It has been necessary heretofore to shake the handle of the actuating mechanism of the valve assembly to disengage the stuck valve so that it can reseat so as to close the opening in the container which discharges the liquid into the bowl.

The present invention is directed to a valve assembly and in particular to a conical shaped lift housing member constructed to overcome this and other difficulties encountered in the present day valve assemblies such as those used in closet tanks of toilets.

In Fig. 1 the valve assembly 2 is shown positioned in a container or closet tank 3 which is filled with a fluid 4. An outlet 5 is provided in the bottom thereof which serves to drain the water from the tank 3 to the conduit 6 connected thereto which carries the fluid 4 to the point of use. A valve 7 arranged to normally cover the outlet 5 is provided with an upwardly extending valve stem 8 which has an enlarged end 9 thereon. Telescopically fitting around this stem is a housing member 10 which is connected to a lever 12 at 13 by suitable means such as the nut 15 and screw 16.

A handle or actuating lever 18 is preferably mounted on the exterior of the tank 3 and is provided with a spindle 19 which extends into the tank and is connected to the lever 12 by the saddle bar 20. A support arm 21, mounted on the spindle 19 in the tank 3, is connected to the lever 12 somewhat forward of the saddle bar 20 so that when the handle 18 is turned in a counter-clockwise direction, the lever 12 will be moved upwardly. As the lever moves upwardly the housing member 10 slides along the valve stem 8 and engages the enlarged end 9 thereof. It seems obvious that continued upward movement will lift the bulb valve 7 off the outlet 5. The fluid 4 then drains from the tank 3 through the conduit 6.

An overflow tube 25, draining into the conduit 6, is arranged in the container 3 to limit the fluid level 4 therein. A float valve 27 is pivoted at 28 in the tank 3 and is arranged to open a valve at a predetermined time to flow a fresh supply of fluid into the container 3 after the valve 7 has reseated on the opening 5 of the conduit 6.

As the fluid level rises in the container 3, the float 27 will move upwardly and upon reaching a predetermined fluid level the float closes

the fluid inlet. A brace 30, positioned on the overflow tube 25, is provided with an arm 31 with an opening 32 therethrough, through which the stem 8 is arranged to slide during operation. This brace serves to retain the valve 7 in a position directly above the opening 5 when the valve has been lifted off of the openings so that it can move directly back down on to the opening 5 as the last portion of the fluid 4 leaves the container 3.

The housing member 10 may be of any suitable shape and size, but is preferably of a hollow inverted frusto-conical construction as shown so that as the valve 7 moves downwardly with the fluid 4 while draining through the opening 5, the frictional contact of the enlarged end 9 of stem 8 with the housing member is reduced because of the inclination of the surface of the member 10.

Fig. 3 is an enlarged detail sectional view of the housing member 10 showing the stem 8 positioned therein with the enlarged end 9 thereof engaging the bottom of the housing member 10.

While it is believed that the foregoing amply defines the invention, by way of summary and further description it is assumed that the closet tank 3 is partly filled with a fluid 4 as shown in Fig. 2. When it is desired to discharge the fluid from the container, to a point of use such as a bowl of a toilet, the handle 18 is rotated in a counter-clockwise direction so that the housing member 10 moves upwardly along the valve stem 8 and engages the enlarged end 9 thereof whereby valve 7 is lifted off the outlet 5. This permits the fluid to drain out through opening 5 into the conduit 6. It seems obvious that as the fluid level decreases in the container, the valve 7 will be of a construction so that it preferably floats downwardly on top of the fluid 4 and reseats on the opening 5. The float 27 will then be at its lowermost position in the tank and is so constructed that when in this lowermost position a fluid inlet to the tank 3 is open whereby

a fresh charge of fluid is brought into the tank. As the tank 3 fills up, the float 27 will move upwardly in the container also. When the level has reached a predetermined point in the container, the position of the float will be such that the fluid inlet is closed. The container is then ready for reuse.

Broadly the invention contemplates a valve assembly including a housing member arranged to slidably engage the valve stem of the valve in the assembly so that a minimum of frictional contact is provided between the housing and the valve stem thereby eliminating sticking of the valve assembly during operation.

The invention claimed is:

A flush valve assembly including, a valve seat, a bulb valve to cooperate therewith, a stem projecting upwardly therefrom, said stem having an enlarged upper end spaced from said bulb valve, a brace having a vertical opening therein in alignment with said valve seat and in which said stem is longitudinally slidable, an open ended housing slidably telescoping said stem between said bulb valve and said enlarged end, and an operating member secured to said housing for sliding said housing along said stem to abut said enlarged end and raise said flush bulb from said seat, said housing having downwardly and inwardly tapered and converging side walls to facilitate downward sliding movement of said enlarged end of said stem to reseat said valve on said seat.

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