Feb. 11, 1958 R. H. ZINKIL ET AL 2,822,552

DISCHARGE VALVES FOR FLUSH TANKS

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Fig. 1.

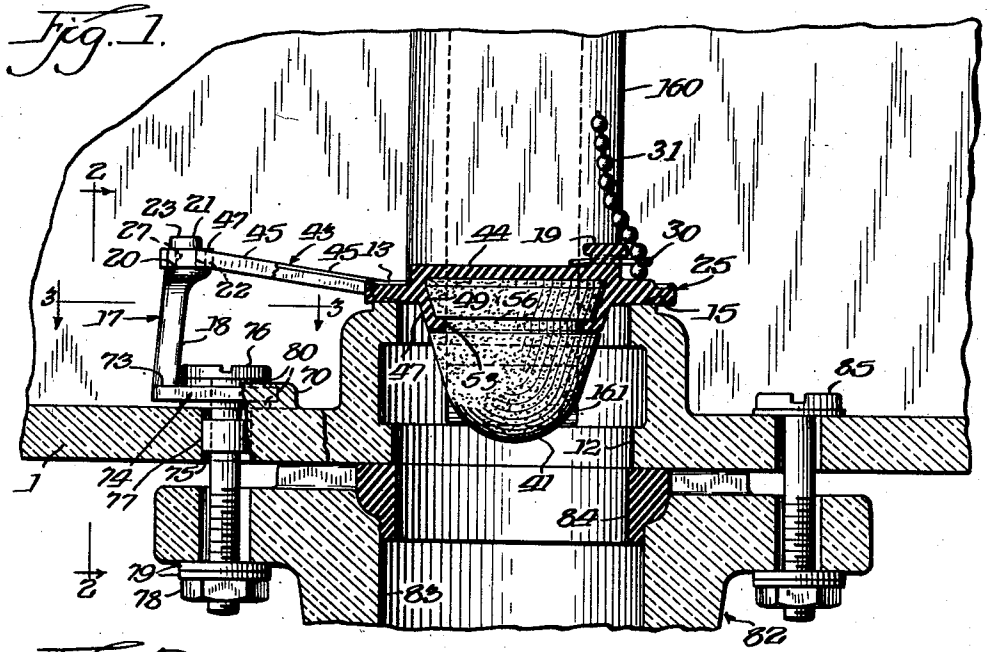


Fig. 2.

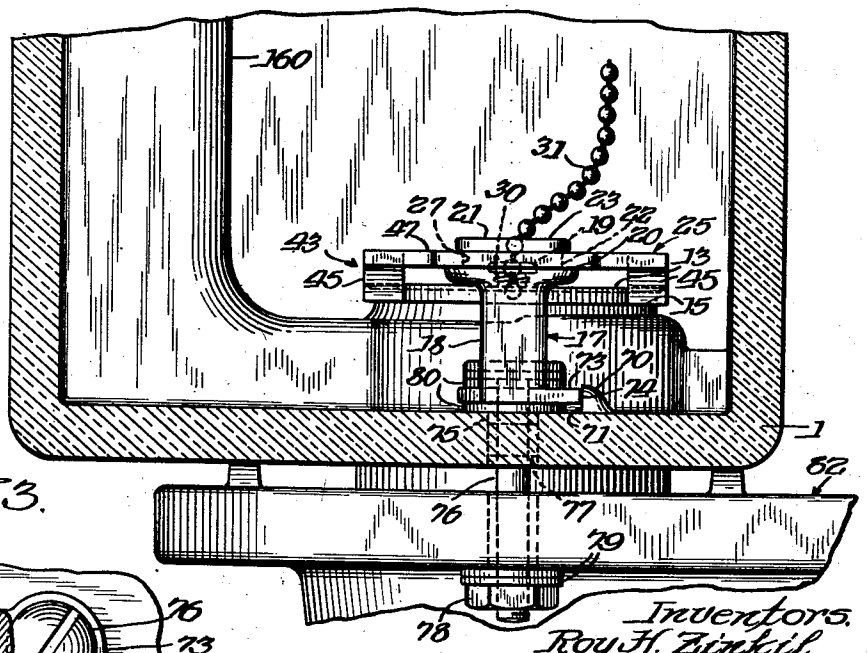
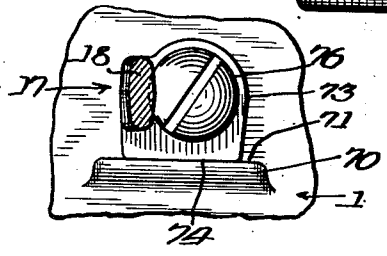


Fig. 3.



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DISCHARGE VALVES FOR FLUSH TANKS

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Application September 14, 1954, Serial No. 455,842

6 Claims. (Cl. 4—57)

This invention relates to valves, particularly discharge valves for flush tanks or the like and further constitutes modification and improvement over the constructions of co-pending application Serial No. 397,456, filed December 10, 1953, now Patent No. 2,774,972, dated Dec. 25, 1956.

In the latter form of the above noted co-pending application, an integral ceramic or china seat and upwardly extending attachment means for the flapper type closure member were disclosed. The instant invention relates to the novel construction of attachment means being of metal, plastic, or other suitable material and securing the same to the floor of the tank in the proper position for attachment of the closure. As will hereinafter become clear, because of the nature of attachment of the closure member which must be mounted and maintained in aligned relation with respect to the valve seat for proper functioning, the attachment means which in this case is a separate member must be sepcefically located and properly secured to maintain the positioning of the closure member.

It is accordingly one of the objects of the invention to construct the tank and mounting member so as to afford positive positioning of the latter and in turn the closure member non-rotatively attached thereto.

It is a further object to form the tank and mounting member with matching surfaces which in cooperation with an aperture in the tank and a centering element provide for properly positioned fixed securement of the attachment post against any relative shifting or rotation.

Other objects and advantages will be more apparent and better appreciated by proceeding with the specification read in light of the accompanying drawings, in which:

Fig. 1 is an assembly view of a flush tank discharge valve combination of the present invention showing a portion of a closet to which it is attached.

Fig. 2 is an end elevation of the same viewed from the left.

Fig. 3 is a section taken on lines 3—3 of Fig. 1.

Referring more particularly to the drawings (Fig. 1), the numeral 1 designates a fragmentary portion of a flush tank provided with an integral china seat 15 and integral overflow means 160 having fluid communication with the outlet port 12 through the valve seat at 161.

Arranged for flat seating engagement with the top of the valve seat is a closure member generally designated 25 comprising a closure portion 13 having a float element 41 suitably retained therewithin and an extending portion 43 for attachment of the closure member for swinging movement into open and closed positions.

As for the details of the closure portion and of the means of securing the depending float element, this construction forms the subject matter of co-pending application Serial No. 431,435, filed May 21, 1954, now Patent No. 2,756,437, dated July 31, 1956. Therein, the float element is preferably constructed of a single piece or body

of lightweight, inherently impervious, sealed cellular material, such as foam polystyrene or polyethylene. The use of this type of float construction is specifically treated in co-pending application Serial No. 401,849, filed January 4, 1954. The float element is preferably grooved at 56 and received within a pocket 49 formed by the offset portion 44 of the closure portion at the top and a depending tapered skirt portion 47, which is inwardly turned or flanged at the bottom at 53 so as to extend within the groove 56 of the float element. The latter element is therefore securely retained within the pocket so formed and may be easily removed if desired.

The upwardly projecting portion 19 is provided adjacent the front of the closure portion for attachment of the closure to a flexible chain 31 through a wire clip 30 for raising of the closure member from the seated condition by means of the usual actuating lever and handle not shown.

The extending portion 43 of the closure member preferably comprises a pair of arms 45 and a crosspiece 47 which is recessed or apertured at 27 for mounting on the attachment means 17. This attachment means which in this case is a separate member is formed at the top identically to that of the Fig. 20 and also Fig. 1 forms of co-pending application Serial No. 397,456, now Patent No. 2,774,972, above noted. Briefly, the top of the attachment member is formed into an upwardly facing horizontally disposed flat surface 20 from which extends a vertical post or button formation 21 comprising a stem portion 22 and an integrally formed enlargement or head 23 arranged to extend partly over the top of the engaged portion of the flapper member for substantially snug reception between this enlargement and the said surface 20. The flapper member, except for the float element, is constructed of rubber or the like and is therefore flexible and resilient and may be buttoned on over the enlargement 23 in mounting. The aperture 27 is elongated laterally or at right angles to the longitudinal axis of the closure member as is the post 21 and surface 20, for the purpose of preventing rotation and sidewise movement of the closure member about its point of attachment, thus insuring proper alignment and positioning of the closure for the desired predetermined seating engagement with the valve seat 15.

As previously stated, the attachment means in this application comprises a separate member generally designated 17 which is constructed of metal, plastic, or other suitable material and which is adapted to be secured to the floor of the tank for suitable positioning of the closure member. In order to maintain the positioning of the latter member, it is necessary that the attachment member be positively located and prevented from changing its position by movement in any way. The axial alignment of the closure and lateral disposition of the elongated upper portion of the attachment member and recessed portion of the closure are secured by special alignment means between the attachment member and tank.

This alignment or positioning is preferably effected by providing a raised portion or lug 70 formed integrally with the floor of the tank which presents a preferably flat vertical inwardly facing surface 71. The base 73 of the attachment member is provided with a matching flat surface 74 on one side for substantially continuous, snug, abutting contact with the inwardly facing surface 71 of the lug. The lug with said flat surface therefore serves as a guide or locating means for assembling the attachment member in the proper position for the predetermined alignment of the closure member, and, in addition, it forms a structure against which the attachment member bears in fixed immovable relation for prevention of either shifting or rotation in any direction. It is obvious in

connection with this arrangement that the bolt hole 75 in the bottom of the tank must be properly located with respect to the alignment and bearing surface 71 and that both of these must also be accurately positioned and aligned with respect to the ported valve seat 15.

In the construction illustrated, although this is not the only way of carrying out the desired alignment and position of the attachment means and closure, the lug 70 and flat surface 71 thereof run parallel to a line through the center of the bolt hole and opening or port 13 through the valve seat. The bearing surface 74 of the attachment member in this construction therefore runs at right angles to the long axis of the elongated upwardly extending portion 18 thereof and to the elongated surface 20 and post or button formation 21 at the top thereof, or parallel to the short axis thereof. It is also important in connecting the attachment member to the floor of the tank that the bolt 76 be centered in the opening 75 in the floor of the tank 1 and that any play and looseness within the opening be prevented by the use of rubber centering or positioning element 77 slipped onto the shank of the bolt before being drawn up into tight relation by the nut 78 bearing on the washers 79 thereabove. Rubber washers 80 are employed at the top to prevent leakage of tank water through the bolt hole.

As evidenced from the drawing, the means for securing the attachment member to the tank also serves as a coupling means for connecting the tank and closet in close coupled relation. This represents a highly efficient arrangement which is particularly suitable where an integral china seat is employed as in the present instance. In this case, the outlet opening 13 discharges directly into the inlet opening 83 in the top of the closet 82 without the need of a pipe being connected to the bottom of the tank. An annular rubber gasket 84 is interposed between the tank and closet for fluid tight connection between these two members. The coupling is completed by the use of a bolt 85 on the opposite side of the tank closet combination.

If desired, an alternate construction may be employed in which the attachment or positioning member for the flapper valve member is a continuous, substantially straight piece extending on down through the floor of the tank and which is threaded at the lower end to serve the additional function of a stud or bolt for connection not only of the attachment means to the tank, but also of the tank and closet together in the close coupled relation. In this case, the combined member would include a flange portion at the suitable location which would contain the equivalent of the flat surface 74 for flat abutting contact with the equivalent of the positioning surface 71 of the lug 70, presently shown.

Thus, it is apparent that a novel arrangement has been provided in which a separate, removable valve closure attachment means can be mounted within the tank in a fixed, predetermined relation with respect to the valve seat 15 for preservation of the critical alignment and positioning of the closure member provided by the upper part of the atttachment means and elongated recess of the closure. This means of securing the attachment means to the tank in combination with coupling the tank and closet in close coupled relation by the same securing means provides a most desirable and efficient arrangement.

Although an integral china seat has been illustrated and described, the outlet opening and surrounding seat surface of the tank may, of course, be through and on a separate ported seat member, if desired.

It should be understood that the invention may take other forms and vary as to detail without departing from the spirit of the same, and therefore, should be limited only by the depending claims.

We claim:

1. In combination with a flush tank or the like provided with an outlet opening and a seat surface around the opening at the inner end thereof, a valve closure engageable with the seat surface in the closed valve position, said valve closure including integral means extending therefrom, means attaching said valve closure to said tank for non-pivotal swinging movement into the open and closed positions, said attachment means comprising a separate attachment member having post means projecting through said integral extending means of the closure, said post means extending substantially in the plane of the swinging movement of the closure, said integral extending means being flexible in the direction of the swinging movement of the closure and being apertured for the projection of the post means therethrough, said post means being provided with enlarged means extending partly over and retaining said integral extending means of the closure thereon when the closure is in attached relation, said post means being elongated in transverse section and the integral extending means of the valve closure being correspondingly apertured whereby to substantially prevent any sidewise pivotal rotation of the closure about its attachment in a direction normal to the swinging movement of the closure, said attachment member being separate and removed from the portion of the tank having the seat surface and outlet opening therethrough, said attachment means including single means extending from the attachment member for securing the same to the tank at a point removed from the above portion of the tank in position for substantially predetermined seating engagement of the valve closure with the seat surface, said tank and attachment member having matched surfaces interengageable in only a single position of the attachment member to prevent substantial rotation of the latter relative to the tank and provide the predetermined seating engagement of the valve closure in cooperation with the non-pivotal mounting of the closure on said post means.

2. In combination with a flush tank or the like provided with an outlet opening and a seat surface around the opening at the inner end thereof, a valve closure engageable with the seat surface in the closed valve position, said valve closure including integral extending means, means attaching said valve closure to the tank for non-pivotal swinging movement into the open and closed positions, said attachment means comprising a separate attachment member having post means projecting through said extending means of the closure and receiving the same in substantially non-pivotal relation thereabout in a direction normal to the swinging movement of the closure, said post means extending substantially in the plane of the swinging movement of the closure, said extending means being highly flexible in the direction of the swinging movement of the closure and being apertured for projection of the post means therethrough, said attachment member being separate and removed from the portion of the tank having the seat surface and outlet opening therethrough, said attachment means including single means extending from the attachment member for securing the same to the tank at a point removed from the above portion of the tank in position for substantially predetermined seating engagement of the valve closure with the seat surface, said tank and attachment member having matched surfaces interengageable in only a single position of the attachment member to prevent substantial rotation of the latter relative to the tank and provide the predetermined seating engagement of the valve closure in cooperation with the non-pivotal mounting of the closure on said attachment member.

3. The subject matter of claim 2, said matched surfaces of the tank and attachment member being a single surface on each of said tank and attachment member.

4. In combination with a flush tank or the like provided with an outlet opening and a seat surface around the opening at the inner end thereof, a valve closure engageable with the seat surface in the closed valve position, said valve closure including extending means, means attaching said valve closure to the tank for non-pivotal

swinging movement into the open and closed positions, said attachment means comprising a separate attachment member having post means projecting through said extending means of the closure and receiving the same in substantially non-pivotal relation thereabout in a direction normal to the swinging movement of the closure, said post means extending substantially in the plane of the swinging movement of the closure, said extending means being highly flexible in the direction of the swinging movement of the closure and being apertured for the projection of the post means therethrough, said attachment member being separate and removed from the portion of the tank having the seat surface and outlet opening therethrough, said attachment means including single means extending from the attachment member for securing the same to the tank at a point removed from the above portion of the tank in position for substantially predetermined seating engagement of the valve closure with the seat surface, said tank and attachment member having matched interengageable surfaces engaging in a predetermined position of the attachment member relative to the seat surface for preventing rotation of the attachment member and establishing said seating engagement of the valve closure in cooperation with the non-pivotal mounting of the closure on said post means.

5. In combination with a flush tank or the like provided with an outlet opening and a seat surface around the opening at the inner end thereof, a valve closure engageable with the seat surface in the closed valve position, means attaching said valve closure to the tank for swinging movement into the open and closed positions, the latter means comprising a separate extending attachment member engaging the valve closure in substantially non-pivotal relation in a direction normal to the swinging movement thereof, said attachment member being separate and removed from the portion of the tank having the seat surface and outlet opening therethrough, said attachment means including single means depending from the attachment member for securing the same to the floor of the tank at a point removed from the above portion of the tank in position for substantially predetermined seating engagement of the valve closure with the seat surface, said tank and attachment member having upwardly extending matched surfaces interengageable in only a single position of the attachment member to prevent substantial rotation of the latter relative to the tank and provide the predetermined seating engagement of the valve closure in cooperation with the non-pivotal mounting of the closure on said attachment member.

6. In combination with a flush tank or the like provided with an outlet opening and a seat surface around the opening at the inner end thereof, a valve closure engageable with the seat surface in the closed valve position, means attaching said valve closure to the tank for swinging movement into the open and closed positions, the latter means comprising a separate extending attachment member engaging the valve closure in substantially non-pivotal relation in a direction normal to the swinging movement thereof, said attachment member being separate and removed from the portion of the tank having the seat surface and outlet opening therethrough, said attachment means including single means depending from the attachment member for securing the same to the floor of the tank at a point removed from the above portion of the tank in position for substantially predetermined seating engagement of the valve closure with the seat surface, said tank and attachment member having upwardly extending matched surfaces interengageable in only a single position of the attachment member to prevent substantial rotation of the latter relative to the tank and provide the predetermined seating engagement of the valve closure in cooperation with the non-pivotal mounting of the closure on said attachment member, said matched surfaces of the tank and attachment member being a single surface on each of said tank and attachment member.

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