Oct. 29, 1957 R. H. ZINKIL 2,810,915

DISCHARGE VALVE FOR FLUSH TANKS

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Fig. 1.

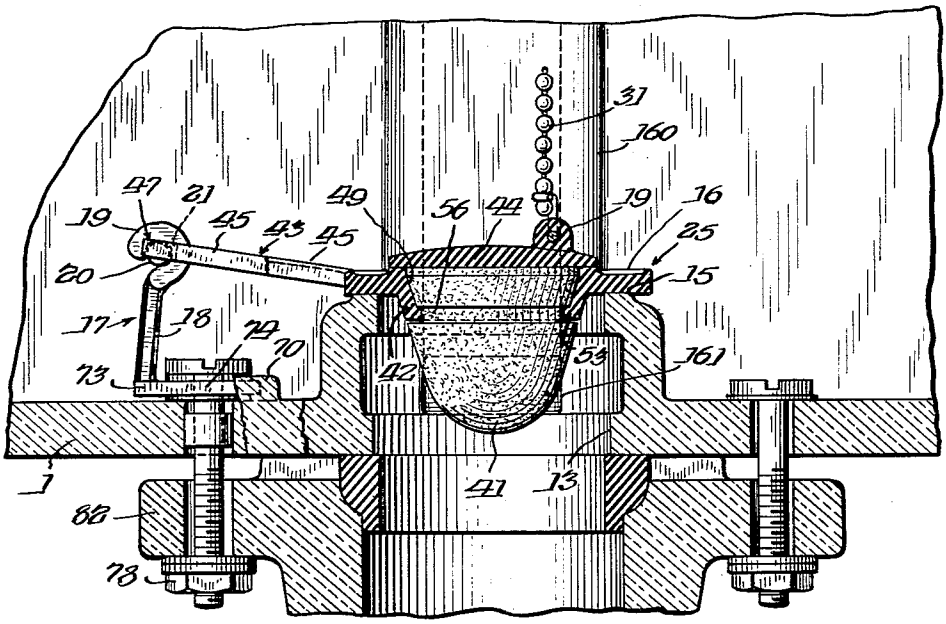
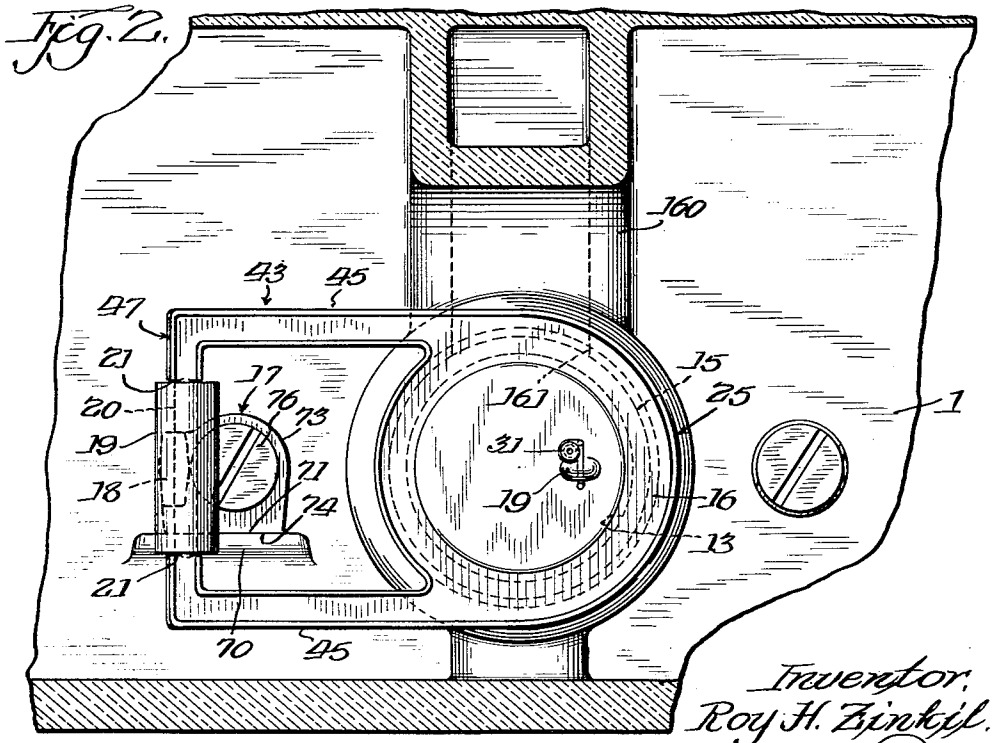


Fig. 2.



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DISCHARGE VALVE FOR FLUSH TANKS

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5 Claims. (Cl. 4—57)

This invention relates to outlet valves, particularly discharge valves for use with flush tanks or the like. Further, it constitutes a modification and improvement over the construction of co-pending applications Ser. Nos. 344,506, filed March 25, 1953, which issued as Patent No. 2,763,872, September 25, 1956; 397,456, filed December 10, 1953, which issued as Patent No. 2,774,972, December 25, 1956; and 455,842, filed September 14, 1954.

It will be noted upon reference thereto that instead of the rigid button-on arrangement of the latter two applications and clamped arrangement of the first named, the present invention provides for free moving pivotal engagement between the closure member and mounting post or equivalent structure. More particularly, the post or similar structure is formed into an open hinge portion adapted to removably receive a cooperating portion of the flapper member for free pivotal movement of the latter. This construction therefore affords a simplified mounting for the flapper valve providing for greater freedom of action thereof. Such freedom of action is not only important from the standpoint of easier valve actuation, but it eliminates the torsional and bending forces which tend to cause premature closing of valves with non-pivotal mounting. Elimination of these forces allows more water to discharge from the tank and also insures better flushing action.

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

Fig. 1 is a fragmentary sectional assembly view of a preferred form of the invention.

Fig. 2 is a top plan view of the same.

Referring in detail to the drawing, the numeral 1 refers to the outlet or discharge portion of a flush tank for a toilet bowl or the like, shown fragmentarily, said portion being provided with an outlet opening 13 and including a seat surface 15 around the opening at the upper or inner end thereof and overflow means 160 in fluid communication with the outlet opening 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 16 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 copending application Serial No. 431,435, filed May 21, 1954 which issued as Patent No. 2,756,437, 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 is received within the pocket 49 formed by the offset portion 44 of the closure portion at the top and a dependent tapered skirt portion 42, 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.

An upwardly projecting portion 19 is provided adjacent the front of the closure portion for attachment of the closure to a flexible chain 31 for raising the closure member from the seated condition by means of the usual tank actuating lever and handle (not shown).

The extending portion 43 of the closure member preferably comprises a pair of arms 45 and a connecting cross-piece 47 for mounting on the attachment means 17. The latter attachment means is preferably a separate member secured to the floor of the flush tank and more particularly to the outlet portion 1 thereof. The lower part of the member may be constructed like that of the similar member in application Serial No. 455,842, noted above. Briefly, it may consist of a base portion 73 having the flat surface 74 for matching engagement with the inwardly facing flat surface 71 of the raised portion or lug 70 formed integrally with the floor of the tank. The attachment member is secured to the floor of the tank by means of a bolt 76 preferably, but not necessarily, passing through an aperture in the base portion, the said bolt also preferably extending through the upper flange of a closet 82 for attachment of the latter to the flush tank in close coupled relation. A nut 78 is of course positioned on the lower end of the bolt for the usual tightening of the assembly.

Rising from the base portion of the attachment member is a post portion 18 formed at the top into a rearwardly facing hook 19 of smooth circular inner diameter forming a bearing for a circular portion 20 of the cross piece 47 of the closure member. It should be evident that the closure member is free to pivot within the hook formation in free swinging movement. In the drawing, a single centrally positioned bearing is presented, being received within the reduced portion 20 of the crossbar of the closure member and between shoulders 21 for lateral positioning of the closure member for proper valve operation. If desired, however, the post may be bifurcated, preferably near the top, to present a pair of spaced hook or bearing portions similar to the single one described, which may be received in either a single reduced circular portion of the crossbar of the closure member somewhat longer than that shown in Fig. 2 or a pair of spaced reduced circular portions. Of course, the crossbar may be entirely circular across its entire extent, if desired.

It should be noted that the hook portion extends around the greater part of the circular portion 20 of the crossbar, while it is open at the bottom side. In mounting the closure member, therefore, it is simply necessary to place the circular portion of the cross piece 47 under the opening of the hook portion and apply upward pressure thereto to either squeeze or deform the same through the restricted opening of the hook into a circular center thereof. Or, the cross piece 47 may be constructed of relatively undeformable hard rubber in which case the hook portion which should be constructed of resilient material would be deflected or forced outwardly for passage of the cross piece within the hook. The open botttom of the hook also provides a convenient self-cleaning or wiping action in connection with the pivotal movement of the closure member whereby foreign matter may be easily discharged through the opening and keeping the engaging surfaces clean. Also, inasmuch as the hinge connection between the post and closure member is submerged, free, unbinding movement is therefore provided as a result of water lubrication occurring between the moving parts.

It should be evident that the proper position of the

closure member is maintained by this construction for proper valve operation as was the objective in the co-pending application Serial No. 455,842, referred to above; also, the member may be easily removed from the attached member by downward pressure on the crossbar 47 to remove it from hook portion. The attachment member may be constructed of metal, plastic or other suitable material, preferably having a certain degree of resiliency should a hard rubber cross arm 47 be employed so as to permit the deformation of the hook portion.

Although the invention has been applied in the foregoing description and the drawing to a flush tank having an integral ceramic seat and overflow means where a positioning post or other suitable means rises from the floor of the tank, the present invention may, of course, also be applied to tanks in which the seat surface is on a separate ported seat member through which the fluid actually discharges. Where a conventional seat member is employed, such as illustrated in co-pending application Serial No. 397,456, Patent No. 2,774,972, previously noted, the post may be formed integrally with the seat member as therein suggested or, the post or similar structure can be arranged for attachment to the overflow tube extending from the seat member, as suggested by co-pending application Serial No. 344,506, Patent No. 2,763,872, also noted above.

The details of the present invention and also its specific mode of attachment or connection to the flush tank, ported seat member or the overflow means are therefore not to be limited except by the terms of the appended claims, construed within the broad spirit of the invention.

I claim:

1. In combination with a tank or the like having a portion provided with an outlet and including a seat surface around the outlet, said portion of the tank including overflow means, a valve closure within said tank engageable with the seat surface in the closed valve position, said valve closure including extending means, means extending from the aforesaid portion of the tank for support of said valve closure in pivotal movement into the open and closed positions, one of said support means and extending means of the closure having hook shaped means partially open at one side, the other of said support means and said extending means of the closure having means receivable within said hook shaped means for the pivotal movement of the valve closure and being insertable within said hook shaped means from the said open side thereof at least one of said hook-shaped means and means receivable within said hook-shaped means being yielding and resilient for the insertion of the latter receivable means within the hook-shaped means.

2. In combination with a tank or the like having a portion provided with an outlet and including a seat surface around the outlet, said portion of the tank including overflow means, a valve closure within said tank engageable with the said seat surface in the closed valve position, said valve closure having extending means in turn including transversely extending means of substantially circular cross section, means for attaching said valve closure to the aforesaid portion of the tank for pivotal movement into the open and closed positions, said latter attachment means having hook shaped means at least partially open at one side thereof and of circular inner configuration over substantially the entire portion of the inside of the hook for pivotal bearing reception of said transversely extending means of the closure for the pivotal movement of the latter into the open and closed positions, said transversely extending means of the closure member being insertable within said hook means from the open side thereof for mounting of the said valve closure in operative position at least one of said hook-shaped means and transversely extending means of substantially circular cross section being yieldable and resilient for the insertion of the latter means within the hook-shaped means.

3. The subject matter of claim 2, said extending means of the valve closure being provided with shoulder means adjacent the said transversely extending means thereof for retaining the valve closure laterally in operative position.

4. In combination with a flush tank or the like having a portion provided with an outlet and including a seat surface around the outlet and overflow means, a valve closure within said tank engageable with the said seat surface in the closed valve position, said valve closure having a spanning closure portion for overlying substantially flat seating engagement with said seat surface, said valve closure having integrally formed spaced arms and means extending laterally therebetween to connect the arms, said laterally extending means comprising means of substantially circular cross section, means for attaching said valve closure to the aforesaid portion of the tank for pivotal movement into the open and closed positions, said latter attachment means having hook shaped means at least partially open at one side thereof, said hook-shaped means being of circular inner configuration over substantially the entire portion of the inside of the hook for pivotal bearing reception of said means of substantially circular cross section of the valve closure for the pivotal movement of the latter into the open and closed positions, said means of substantially circular cross section being insertable within said hook shaped means from the open side thereof for mounting of the valve closure in operative position at least one of said hook-shaped means and said means of circular cross section of the laterally extending means being yieldable and resilient for the insertion of the latter means within the hook-shaped means.

5. The subject matter of claim 4, said means of substantially circular cross section of the valve closure being cylindrical, said valve closure being provided with shoulder means adjacent the circular cross section thereof effective to retain the valve closure laterally in operative position.

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