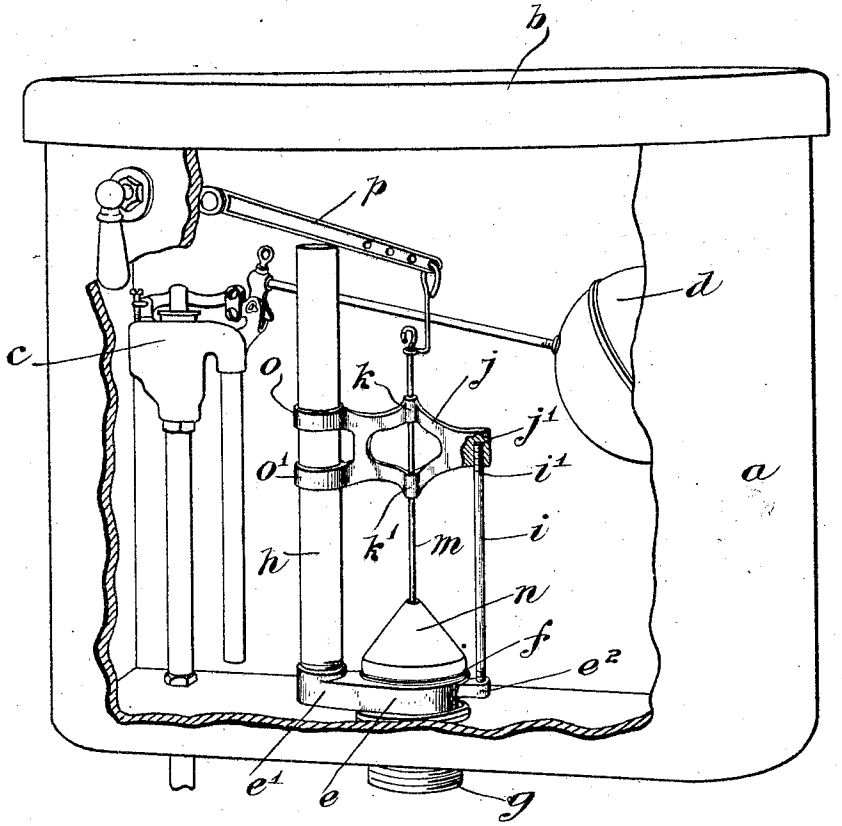
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VALVE FOR LOW DOWN FLUSH TANKS

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VALVE FOR LOW-DOWN FLUSH TANKS.

Application filed June 18, 1924. Serial No. 720,746.

To all whom it may concern:

Be it known that I, ARNOLD M. BEHRER, a citizen of the United States, residing at Queens, in the borough of Queens, city of New York, county of Queens, and State of New York, have invented certain new and useful Improvements in Valves for Low-Down Flush Tanks, of which the following is a specification, reference being had therein to the accompanying drawings, which form a part thereof.

My invention relates to a valve for low down flush tanks, and more particularly to the flush valve construction.

Heretofore in valves for low down flush tanks the construction has been such that the proper flushing of the bowl has been a serious problem owing to the inability of the workman to so set the different portions of the valve when installing it in the tank, as to ensure the proper timing in the seating of the buoyant valve block with relation to the discharge port, as well as to structural characteristics in the valve mechanism itself resulting in the frequent improper seating of the valve and the continued flow of water from the tank while the filling valve is open, causing objectionable noises and wastage of water. In many instances in order to avoid such objectionable features of the valve mechanism for low down flush tanks, the use of such tanks is dispensed with, and the more inaccessible but more reliable high up tanks are used in their stead since with these high up tanks, it is possible to use a siphon discharge by reason of the increased fall of the water when flushing the bowl, which valve is more reliable and more silent, than the ordinary valves used in low down flush tanks.

A valve constructed in accordance with my present invention is so constructed that a workman is not required to adjust any part of the mechanism when installing it in a tank, the relation of these parts being determined during the assembling of the mechanism in the factory, and being so constructed and proportioned as to be suitable for use in any tank, irrespective of the dimensions or capacity of the tank. In fact the construction is such that not only is adjustment of any of the parts unnecessary, but such adjustment is impossible, so that the mechanism cannot be tampered with by a workman, nor so modified as to in any way destroy the standard adjustment determined while assembling the mechanism in the factory.

The stem of the buoyant valve is so mounted as to always center said valve block with relation to the outlet port and to prevent any movement thereof except axially of said port. The bearings for said stem are so constructed and arranged as to thus define the movements of the valve block and at the same time, afford a minimum of bearing surface for the valve stem and reduce to a minimum, likelihood of the binding of said stem.

The member having the bearings therein is supported at a fixed distance from the fitting having the outlet port therein, so that when the valve is tripped, the buoyant valve block will of necessity pass without the range of the suction within the tank about the discharge port for a sufficient interval to prevent the premature seating of the block, said block coming within the influence of this suction only after a considerable volume of water within the tank has flowed through the outlet and when the effect of the suction has been modified owing to the fact that the valve block is supported on the surface of the water remaining within the tank. In this manner a sufficiently slow closing of the valve is assured to cause a substantially complete rapid emptying of the tank with each actuation of the valve.

The manner of supporting the bearing fitting for the valve block is such that the overflow pipe may be made of hard vulcanized rubber, if desired, there being a fairly free sliding fit between this fitting and said pipe so that the pipe cannot be used to change the normal setting of the bearing fitting and yet will resist any attempts to change this setting by bending the standard supporting this fitting.

The various parts of the valve mechanism are made of non-corrosive metal such as bronze or Monel metal, thus ensuring not only long life in the mechanism, but a continued smooth operation thereof.

The invention consists primarily in a valve for low down flush tanks embodying therein a fitting having a discharge port therethrough, a nipple extending from, extensions upon different radii of, said port, one of said extensions having an opening extending therethrough and communicating with said nipple, an overflow pipe carried by said last named extension, a standard

secured to said other extension, a bearing fitting, means whereby said bearing fitting is non-adjustably supported from said standard, said bearing fitting having a plurality of spaced alined narrow bearings therein in axial alinement with said port, and means thereon encircling but unconnected with said overflow pipe, a valve stem slidably mounted in said bearings, a buoyant valve carried by said stem, and actuating means for said stem; and in such other novel features of construction and combination of parts as are hereinafter set forth and described, and more particularly pointed out in the claims hereto appended.

In the embodiment of the invention shown in the accompanying drawing, which is a perspective view of a tank having therein a valve mechanism embodying the invention, *a* represents the tank proper, *b* the cover therefor, *c* a valve controlled filling mechanism for the tank, and *d* the ordinary float, actuating the valve for said filling mechanism. This construction and arrangement is common to many kinds of flush tanks, and forms no part of my present invention.

The valve mechanism mounted within this tank consists of a fitting *e* having an outlet port at *f* and an exteriorly screw-threaded nipple at *g* for making the union with the bowl. The fitting *e* has two extensions e' and e^2 at different radii of the port *f*, one of these fittings as e' having an opening therethrough communicating with the nipple *g* and having secured thereto the usual overflow pipe *h* preferably made of hard vulcanized rubber.

Secured to the other extension e^2 is a standard *i* parallel with the axis of the port *f*, and of a height to permit the buoyant valve block when unseated by the valve actuating mechanism to rise in the water to a height which will bring it without the suction created about and above the port *f*, until the valve block is brought close to said fitting *e* as a result of the rapid lowering of the level of the water in the tank. The fitting *e* is preferably made of bronze, as is also the standard *i*, which is preferably formed of a solid rod.

Supported from the standard *i* is a bearing fitting *j* having an interiorly screw-threaded socket j' adapted to receive the screw-threaded end i' of the standard *i*. The fitting *j* is cored out centrally thereof as shown in the drawing, to provide two alined narrow bearings *k*—k' adapted to receive the valve stem *m* for the buoyant valve block *n*. The centers of both bearings *k*—k' are alined with the axis of the port *f*, the spacing apart of these bearings not only having the effect of reducing the bearing surface for the stem *m*, but engaging said stem at widely diverging points so as to preclude any lateral deflection of the stem, and limit the movement of the valve block *n* to a path in vertical alinement with the port *f*. By this construction the valve block is always accurately centered with relation to the port *f*, and a positive accurate seating thereof is assured after each actuation of the valve.

In the event of wear upon the valve block *n*, which is the only portion of the mechanism which is subject to material wear even after long continued use, repairs may be effected by removing this valve block from said stem and substituting a new valve block therefor.

The valve block *n* is preferably made of soft vulcanized rubber, although other materials may be used, and the stem *m* is preferably made of Monel or other non-corrosive metal. The fitting *j* is preferably made of bronze.

The standard *i* is secured to the extension e^2 in the factory, and the fitting *j* is also secured to said standard in the factory, these parts being so secured that it is impossible for a workman to move the fitting *j* toward the fitting *e*.

To prevent the accidental or intentional bending of the standard *i* by pressure applied to the fitting *j*, at a point remote from said standard, I provide said fitting with two narrow collars *o*—o' adapted to encircle the overflow pipe *h*, no means, however, being provided by which said collars are secured to the said pipe in any manner whatsoever, thus avoiding likelihood of the crushing of the pipe by an improper setting of an adjustable member for securing said fitting to said pipe.

By spacing the collars apart as shown and described, said collars may have a loose fit with the overflow pipe and still act to prevent any bending of the standard *i* in a manner to throw the bearings *k*—k' out of alinement with the axis of the port *f*. This manner of utilizing the overflow pipe as a stay for ensuring the proper positioning of the fitting *j*, also facilitates the assembling of the valve mechanism, since the said pipe may be slipped through the collars *o*—o' after the standard *i* has been properly secured to the fitting *e* and the fitting *j* secured to said standard *i* in a manner to establish the proper permanent relation between the lowermost bearing k' and the port *f*.

The actuating means for the valve is shown as the ordinary lever and handle mechanism *p*.

The operation of the herein described mechanism is substantially as follows:—

When the lever mechanism *p* is actuated, the buoyant valve block *n* is raised from its seat upon the fitting *e* by means of its stem *m* in a true right line, but to an extent which will either cause it to be brought close to the

bearing k' by the action of the lever p, or as a result of its floating in the water in the tank. In either instance it will be initially moved away from the fitting e sufficiently to bring it without the range of the suction caused by the water flowing through the port communicating with the nipple g, and thus prevent its being prematurely seated, without properly draining the tank and flushing the bowl.

As the level of the water in the tank becomes lower the buoyant valve block will be supported at the surface of this water, but there will be no movement of the valve block, until it descends in a right line as the level of the water becomes still lower. When the tank is substantially empty, the valve block will be brought within the range of a light suction at the discharge port of the tank, and will seat properly upon the seat formed on the fitting e, the suction below the valve retaining the block upon the seat.

The spacing of the bearings k—k' one above the other in vertical alinement, will permit that free sliding fit between the stem m and the fitting j necessary to the free movement of the valve block, while at the same time preventing any material side deflection of the block or the stem, or any frictional binding of the latter.

The use of collars o—o' encircling the overflow pipe h, but not being secured thereto in any way, serves effectively to preserve the proper alinement of the bearings k—k' with the axis of the discharge port and of the valve block n, and prevent any bending of the standard i by a workman when installing the valve in a tank; since a downward pressure upon the fitting j adjacent the collars o—o' will cause the upper collar to bind upon the right side of the overflow pipe and the lower collar to bind upon the left side of said pipe. An upward pressure upon said fitting will reverse the binding of these collars. By thus limiting the movement which may be imparted to the fitting j, the elasticity inherent to the standard i can be depended upon to restore the fitting j to its normal horizontal position even though pressure may have been applied therein in the manner described, since the quantity of movement of the standard will not be such as to strain it beyond its elastic limit.

By this construction, the desired permanency in relation to different parts is secured, and the overflow pipe may be made of hard rubber, since under no circumstances can it be subjected to crushing stresses. In fact in the embodiment of the invention shown, the fitting j is supported entirely by the standard i.

The few number of parts, and their construction, permits the valve to be made of high-grade non-corrosive metal, which will ensure ease and certainty in its operation over a long period of use, and yet the cost of production of such a valve is materially less than valves on the market not having the same reliability in action.

None of the parts entering into the valve can become disarranged either when installing or while in use, and under no circumstances can the valve stem m be so bound, or the valve block n become so deflected as to prevent a proper seating of the valve when the maximum volume of water within the tank, as determined by the setting of the float d, has been discharged through the port in the fitting e.

The positioning of the extensions e' and e^2 at diametrically opposite points of the valve seat as shown in the drawings, is merely a matter of convenience for reducing the width of the fitting e and affording ample space for the stem of the float d. If desired, one of these extensions may be placed toward either side of said valve without varying the operative effects secured in preventing not only a bending of the standard i, but any such rotary movement of the fitting or bridge j about said standard as will move the axis of the bearings k—k' out of alinement with the axis of the valve seat.

Having described the invention, what I claim as new and desire to have protected by Letters Patent, is:—

1. A valve for low down flush tanks embodying therein a fitting having a discharge port therethrough, a nipple extending from, and extensions upon different radii of, said port, one of said extensions having an opening extending therethrough and communicating with said nipple, an overflow pipe carried by said last named extension, a standard secured to said other extension, a bearing fitting, means whereby said bearing fitting is non-adjustably supported from said standard, said bearing fitting having a plurality of spaced alined narrow bearings therein in axial alinement with said port, and means thereon encircling but unconnected with said overflow pipe, a valve stem slidably mounted in said bearings, a buoyant valve carried by said stem, and actuating means for said stem.

2. A valve for low down flush tanks embodying therein a fitting having a discharge port therethrough, a nipple extending from, and extensions upon different radii of, said port, one of said extensions having an opening extending therethrough and communicating with said nipple, an overflow pipe carried by said last named extension, a standard secured to said other extension, a bearing fitting, means whereby said bearing fitting is non-adjustably supported from said standard, said bearing fitting having a plurality of spaced alined narrow bearings

therein in axial alinement with said port, and spaced narrow collars thereon encircling said overflow pipe but unconnected therewith, whereby bending of said standard or lateral deflection of said bearing fitting is prevented and said pipe is relieved from any crushing stresses, a valve stem slidably mounted in said bearings, a buoyant valve carried by said stem, and actuating means for said stem.

3. A valve for low down flush tanks embodying therein a fitting having a discharge port therethrough, a nipple extending from, and extensions upon opposite sides of, said port, said extensions being diametrically opposite each other, and one of said extensions having an opening extending therethrough and communicating with said nipple, an overflow pipe carried by said last named extension, a solid metallic standard secured to the other extension, a bearing fitting, means whereby said bearing fitting is non-adjustably supported from said standard said bearing fitting having a plurality of spaced alined narrow bearings therein in axial alinement with said port, means upon said bearing fitting co-operating but unconnected with said overflow pipe to prevent such movement of said bearing fitting as would bring said bearings out of alinement with the axis of said port, a valve stem slidably mounted in said bearings, a buoyant valve carried by said stem, and actuating means operative upon said stem, said fitting, said standard, said bearing fitting and said stem all being formed of substantially non-corrosive metal.

4. A valve for low down flush tanks embodying therein a fitting having a discharge port therethrough, a nipple extending from, and extensions upon opposite sides of, said port, said extensions being diametrically opposite each other, and one of said extensions having an opening extending therethrough and communicating with said nipple, an overflow pipe carried by said last named extension, a solid metallic standard secured to the other extension, a bearing fitting, means whereby said bearing fitting is non-adjustably supported from said standard, said bearing fitting having a plurality of spaced alined narrow bearings therein in axial alinement with said port, a plurality of vertically spaced narrow collars upon said bearing fitting and encircling but unconnected with said overflow pipe to prevent such movement of said bearing fitting as would bring said bearings out of alinement with the axis of said port, a valve stem slidably mounted in said bearings, a buoyant valve carried by said stem, and actuating means operative upon said stem, said fitting, said standard, said bearing fitting and said stem all being formed of substantially non-corrosive metal.

In witness whereof I have hereunto affixed my signature this 14th day of June, 1924.

ARNOLD M. BEHRER.