No. 867,653. PATENTED OCT. 8, 1907.

G. B. GAYLORD.

FLUSH VALVE.

APPLICATION FILED JULY 9, 1906.

Fig. 1

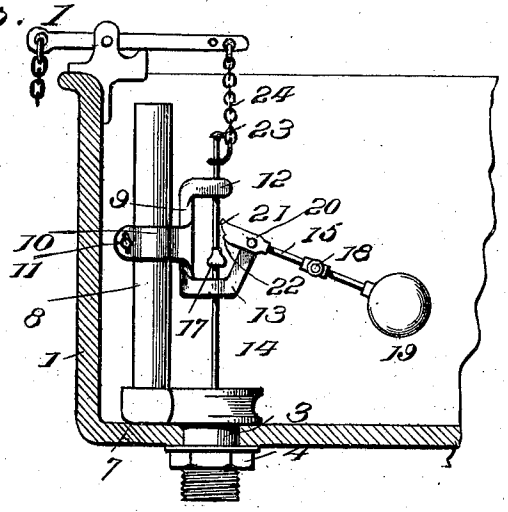


Fig. 2

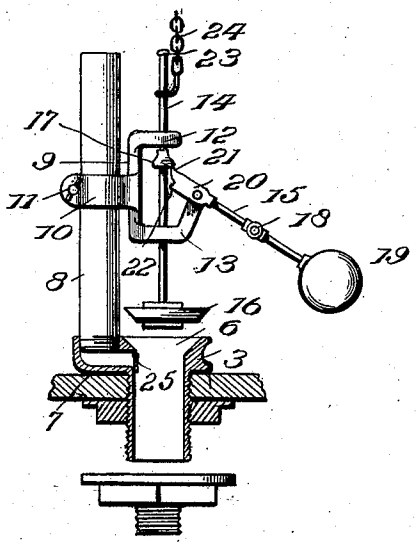
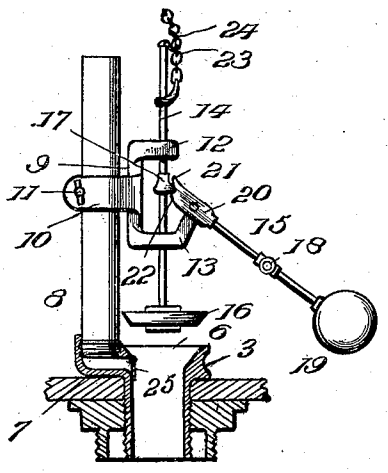


Fig. 3



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FLUSH-VALVE.

No. 867,653. Specification of Letters Patent. Patented Oct. 8, 1907.

Application filed July 9, 1906. Serial No. 325,369.

To all whom it may concern:

Be it known that I, GEORGE B. GAYLORD, a citizen of the United States, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Flush-Valves, of which the following is a specification.

This invention relates to certain improvements in valves for flushing water-closets and the like, and particularly to that class of closets operating by siphonic action.

In flushing apparatus of this type, a certain amount of water is needed to siphon the closet and then refill the closet bowl after the siphon has acted, and it is essential to the proper working of the apparatus, that the valve be under perfect control so that after the flushing is finished the refill is sure to follow. The usual flushing valve has no method of refilling the closet, the same being accomplished by means of a separate tube from the supply valve or ball cock, this method being unreliable and therefore unsatisfactory.

The primary object of my invention is to provide an improved slow-closing float actuated flushing valve of few and simple parts, in which the slow-closing action will be susceptible of regulation or variation and completely under control, and which will operate efficiently to produce a maximum number of flushings or siphonic actions with a predetermined or requisite amount of water in the sunply tank, with a sure refill of the closet bowl at the finish.

With this and other objects in view as will more fully appear as the description proceeds, the invention consists in the construction, arrangement, and combination of the parts hereinafter fully described and claimed.

For a full description of the invention and the merits thereof and also to acquire a knowledge of the details of construction of the means for effecting the result reference is to be had to the following description and accompanying drawings, in which:

Figure 1 is a vertical sectional view, with parts in side elevation, of a flushing tank with my invention applied thereto, the valve being in the closed position. Fig. 2 is a similar view of the valve and its concomitant parts, the valve being indicated in the position it assumes after it has been initially opened to its full extent. Fig. 3 is a similar view illustrating the relative position of the valve and a portion of the float-arm, after the former has started to close, as will be hereinafter more fully explained.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

Referring to the drawing, the numeral 1 designates a flush-tank to which the inlet or supply pipe (not shown) is operatively connected.

3 designates the body of the valve proper of my invention, said body being provided with a lock-nut 4 or its equivalent for securing it in the bottom of the tank 1, and being connected in any desired manner to the flush pipe leading to the closet bowl (not shown). The valve body 3 is formed with an upwardly facing seat 6 below which extends a lateral branch 7 supporting an upwardly extending overflow pipe 8 designed to prevent the tank from overflowing.

9 designates a two-armed bracket formed intermediate of its length with a clamping member 10 designed to encircle the pipe 8, which thus constitutes a support therefor, and being held by means of a clamping screw 11 at different elevations upon said supporting pipe, as may be found necessary according to different existing conditions. The bracket 9 embodies an upper arm 12 and a lower, angular arm 13, said arms being formed with coincident or alining openings for the reception of a valve stem 14 mounted to slide longitudinally therethrough. The lower arm 13 affords a bearing for a pivotally mounted float-arm 15 supported thereon intermediate of its ends.

The stem or rod 14 carries at its lower end a suitably packed valve 16 adapted to close upon the seat 6. The said stem also carries, between the two bracket-arms 12 and 13 a preferably inverted turbinate projection 17.

The float arm 15 is in the present instance composed of sections jointed together by means of serrated disks connected by a stud or screw as indicated at 18 so that the two sections may be held straight or in different angular positions with respect to each other. A float, such as the hollow sphere 19, is carried on the outer end of the said arm. The opposite or inner end of the float-arm 15, beyond its pivotal point of support on the lower bracket arm 13, is provided with a shoe 20 the outer edge of which corresponds approximately in outline to the projection 17 so as to produce an upwardly facing toe 21 merging downwardly with a gradual curve into a shouldered heel 22, as shown.

Above the bracket 9, the stem is formed with a knob 23, and a chain 24 works loosely on this portion of the stem, the said chain being fastened to the actuating lever of the tank. The upward independent movement of the chain 24 is limited by the knob 23.

When the tank is full, the position of the parts is substantially as indicated in Fig. 1, the float 19 being preferably partially or completely submerged. In the practical operation to flush the closet the stem 14 is pulled upwardly through the instrumentality of the chain 24 so as to raise the valve 16, such upward movement being limited by the contact of the projection 17 with the upper bracket arm 12, and in such upward movement the projection 17 will brush past the shoe 20, and the toe of the latter will engage the lower side of the said projection, and temporarily maintain the elevated position of the stem 14 and valve 16 to the full extent, allowing the full force of the water to be ex-

pended in thoroughly cleansing the closet-bowl. The relative positions just described are indicated in Fig. 2.

As the level of the water in the tank lowers, the float will not be affected until the water gets down under it, whereupon the float will follow the level down and the arm 15 will rock gradually and allow the stem 14 with its valve to move downwardly, the projection 17 sliding slowly and with uniform movement upon the curved edge of the shoe until the closet has been effectively flushed and the lower edge of the projection shall have brought up against the shoulder of the heel 22. (See Fig. 3). The projection will rest upon said shoulder and maintain the valve 16 in partially closed position for the purpose of permitting the closet to refill, and finally, as the level of the water in the tank reaches the plane of the valve seat 6, the heel 22 will release and permit the valve to immediately close. The flushing action ends and the refilling action (of the closet) begins when the projection 17, in the relative downward movement of the stem 14, reaches the heel 22 of the shoe.

It is well known that the elevation of the flush tank has considerable influence upon the time and the amount of water needed to start the siphonic action. Under some circumstances the plumber cannot position the tank in a room at the proper elevation, but with my invention, by means of the clamping screw 11, the elevation of the bracket 9 may be changed and the flushing action may be readily regulated by means of the angularly adjustable float arm 15. When the siphon begins its action and the water is siphoned out, if there is water enough left in the tank after the first siphonic action, the bowl will refill and with the continued supply through the flush pipe, another siphonic action will occur and this action will be duplicated as long as there is water enough in the tank to continue the siphonic action. Hence the importance of the vertically adjustable features of my invention is at once apparent, for more water is manifestly required to siphon when the tank is low than when it is high, and the adjustable feature of my valve holder is necessary to obtain the required siphonic action in the different elevations at which the tank may be placed.

From the foregoing description in connection with the accompanying drawings, it will be seen that I have provided a simple and efficient construction of flush valve for the tanks of water closets and the like, which will operate without the noise or "hammering" incidental to so many valves of this type, and which may be regulated or controlled to produce a maximum number of effective flushings with a given amount of water in the supply-tank.

On account of the perfect regulation that can be given this valve only one size is necessary to accomplish the same results usually requiring several sizes. By the provision of an increasing lock-nut, as shown in Fig. 3, and a decreasing lock-nut, as shown in Fig. 2, this valve will work equally well with different sized fixtures.

In the opening between the overflow pipe 8 and the valve seat underneath the valve is located a preferably light metal swinging partition 25 hung by its upper edge in a vertical position and permitted to swing outwardly under the valve seat, but prevented from swinging backward toward the overflow pipe. The object of this partition is to prevent any unpleasant noise when the valve is working. In case water should run through the overflow pipe, the pressure thereof would force this vertical swinging partition outwardly to a somewhat horizontal position permitting the water to escape through the flush valve to the closet. This invention is an improvement on what is called a "hush cap" placed at the top of the overflow pipe and requiring a small float to operate the same.

Having thus described the invention what is claimed as new is:

1. An apparatus of the character described comprising a valve body designed for attachment to a supply tank and provided with an upwardly facing valve seat and below the same with a lateral branch, an overflow pipe extending upwardly from said branch, a bracket provided with a clamping arm and a set screw therein, the arm being adapted to encircle the overflow pipe and arranged for adjustment vertically thereon, the bracket being provided with an upper and a lower arm formed with coincident apertures, a valve stem mounted to slide longitudinally through said apertures, a valve secured to the lower end of said stem and adapted to close on said valve seat, the stem being provided between the two arms of the bracket with an inverted turbinate projection, a float arm pivoted intermediate its ends on the lower bracket arm and carrying a float at its outer end, a shoe mounted upon the other end of said float arm, said shoe being formed with an upwardly facing toe and curved on its outer edge and formed also on such edge with a shouldered heel below the toe, the conformation of the outer edge of said shoe approximating the outline of the said projection and the shoe extending into the path of said projection, and means for raising said stem to open the valve, whereby the projection will brush past said toe and the latter will catch underneath the projection and hold the valve temporarily elevated to its full extent, and whereby also as the level of the water in the tank lowers below the float, the projection will slide downwardly and gradually on the outer edge of the shoe and be also temporarily supported at a lower elevation, with the valve, by the engagement of the projection with the heel portion.

2. An apparatus of the character described, comprising a valve body provided with a valve seat, a valve adapted to close on said seat, a stem secured to said valve, a bracket in which said stem is mounted to slide, the stem being provided with an inverted turbinate projection, means for supporting said bracket a float arm pivotally mounted on said bracket, and provided with a shoe arranged to project into the path of movement of the projection as the stem slides, said shoe conforming on its outer edge approximately to the shape of the said projection for the purpose specified, a float on the outer end of said float arm, and means for raising said stem.

3. An apparatus of the character described, comprising a valve body provided with a valve seat, a valve adapted to close on said seat, a stem secured to said valve and provided with a projection, means for supporting said stem so that it may slide and carry the valve to and from said seat, a rocking float arm provided at one end with a float and at its other end with a shoe said shoe being provided with a toe portion adapted to engage underneath the projection, said shoe being also formed with a heel underneath the toe portion and adapted to engage under said projection with the latter and the stem on which it is mounted in a lower plane than when engaged by the toe, a float secured to said arm, and means for moving said stem in a direction to carry the valve off the seat.

4. An apparatus of the character described, comprising a valve body provided with a valve seat, a valve adapted to close on said seat, a stem to which said valve is secured, said stem being provided with a projection, means for supporting said stem so as to allow it to slide to carry the valve towards and from the valve seat, means for moving said stem outwardly to carry the valve off the seat, and a rocking float arm, and means for supporting

the same, said float arm provided at one end with a float and provided at its other end with a shoe designed to project into the path of movement of the projection, said shoe being provided with an upper toe portion to engage the projection to hold the valve at one elevation and also formed with a lower heel portion arranged to automatically engage the projection to hold the valve in a lower plane.

5. An apparatus of the character described comprising a valve body provided with a valve seat, a valve adapted to close on said seat, a stem to which said valve is secured, said stem being provided with a projection, means for supporting said stem, and permitting the same to slide, a rocking float arm, means for supporting said arm, said means being vertically adjustable, the arm being provided at one end with a float and at its other end with a shoe adapted to project into the path of movement of the said projection on the stem, said shoe being formed with an upper toe and a lower heel portion each of which is arranged to engage the projection at different elevations for the purpose specified, and means for moving said stem outwardly to carry the valve off the seat.

6. In a device of the character described, the combination with a valve body, a valve mounted thereon, means for actuating the valve, and an overflow pipe communicating with the valve body below the valve, of a swinging partition controlling the communication between the overflow pipe and the valve body below the valve.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE B. GAYLORD. [L. S.]

Witnesses:

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R. W. GAYLORD.