May 5, 1931. C. F. BROWN 1,803,423

TANK VALVE

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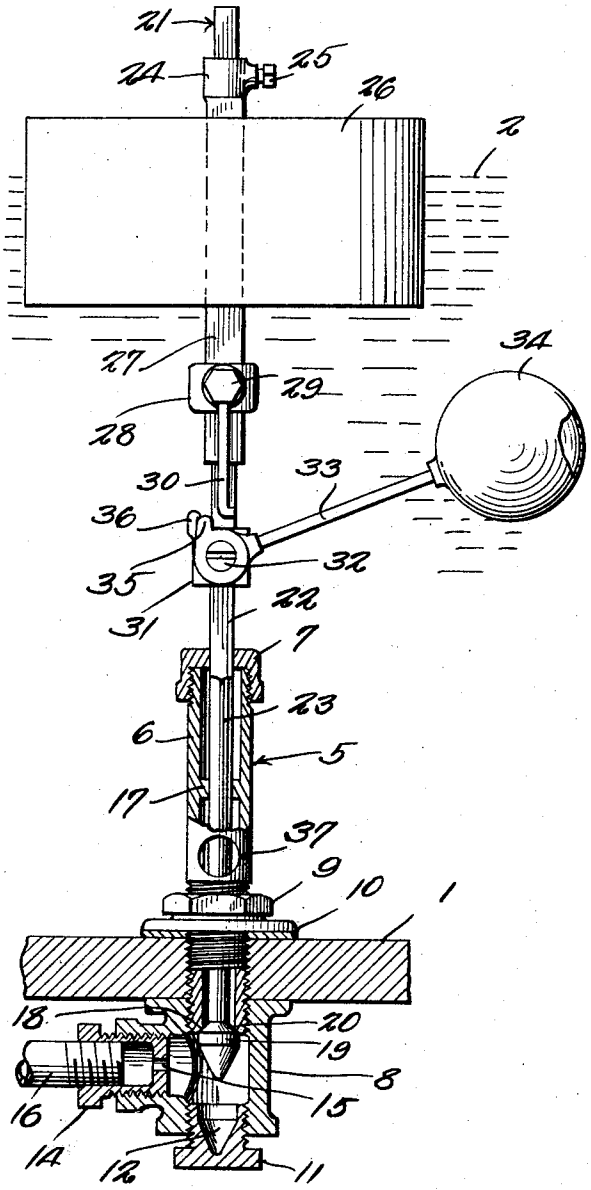



Fig. 1.

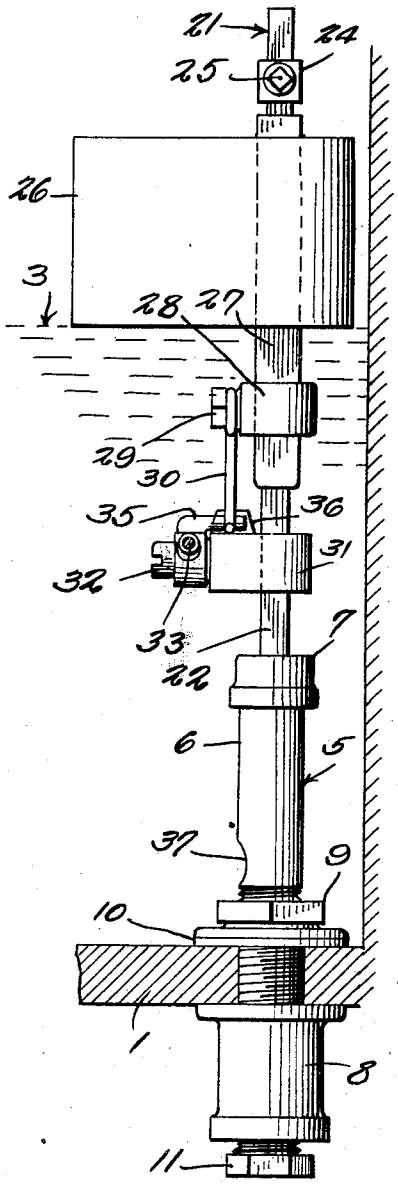



Fig. 2.

Inventor

Charles F. Brown

By C. A. Snow & Co.

Attorneys.

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Fig. 3.

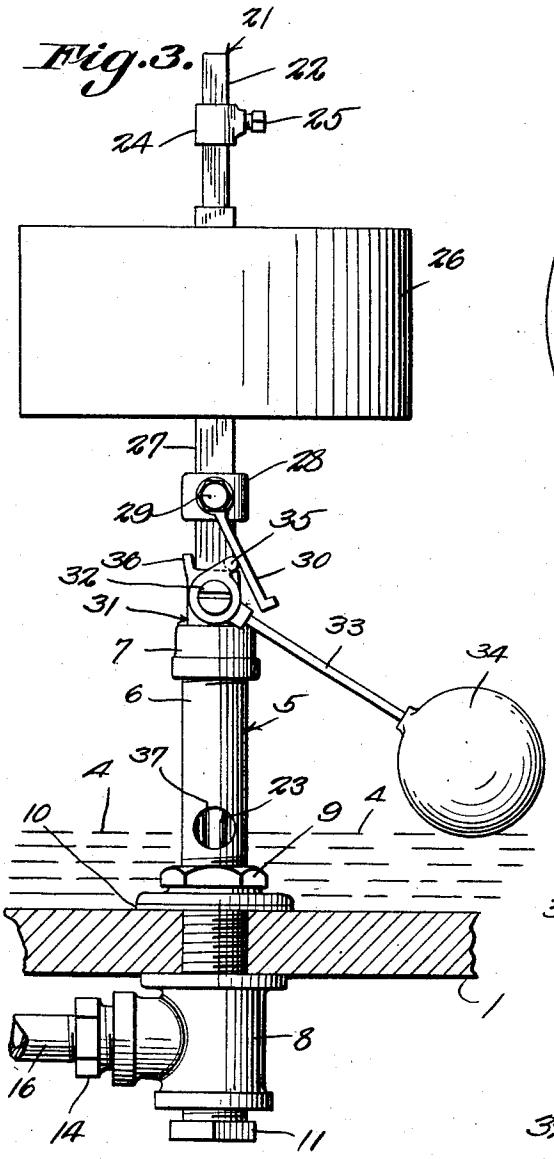



Fig. 4.

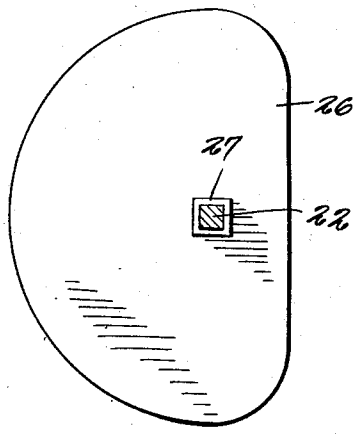



Fig. 5.

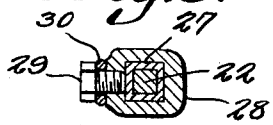



Fig. 6.

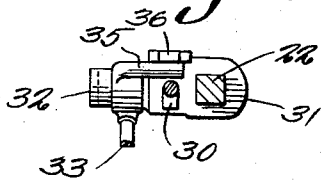
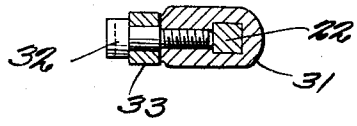



Fig. 7.




Inventor

Charles F. Brown

By C. A. Snow & Co.

Attorneys.

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# UNITED STATES PATENT OFFICE

CHARLES F. BROWN, OF BEAVER, PENNSYLVANIA

## TANK VALVE

Application filed October 15, 1930. Serial No. 488,979.

This invention aims to provide novel means for opening the valve which lets water into a flush tank used on water closets and elsewhere.

It is within the province of the disclosure to improve generally and to enhance the utility of devices of that type to which the invention appertains.

With the above and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed, may be made within the scope of what is claimed, without departing from the spirit of the invention.

In the accompanying drawings:

Figure 1 is an elevation showing the device as it will appear when the tank is full, parts being in section;

Figure 2 is an elevation at right angles to Figure 1, the water in the tank having fallen in level to an intermediate stage, parts being sectioned away;

Figure 3 is an elevation showing the parts as they will appear when the water is at a low level;

Figure 4 is a section showing the float in top plan;

Figure 5 is a section through the suspension member on the valve stem;

Figure 6 is a cross section, showing in top plan, the bracket that is mounted on the valve stem;

Figure 7 is a section through the bracket and valve stem.

The numeral 1 marks a flush tank of the kind used on water closets and elsewhere. The water in the tank is shown in Figure 1 by the numeral 2 and is at high level. In Figure 2, the numeral 3 marks the level of the water at an intermediate stage. In Figure 3, the numeral 4 shows the water at low level.

The bottom of the flush tank 1 carries a water inlet that is denoted generally by the numeral 5. The water inlet 5 is a composite structure. It comprises a tube 6 that extends downwardly through the bottom of the flush tank 1. The tube 6 has a side outlet hole 37 that communicates with the tank 1. The tube 6 is provided intermediate its ends with a transverse partition 17 that forms a guide for the valve stem hereinafter referred to. A cap 7 is threaded on the upper end of the tube 6.

A T-coupling 8 is threaded on the lower end of the tube 6 and engages the lower surface of the bottom of the flush tank 1. A nut 9 is threaded on the tube 6. A packing washer 10 is interposed between the nut 9 and the upper surface of the tank 1. The nut 9, the washer 10 and the coupling 8 hold the tube 6 vertically in the tank 1 and prevent leakage where the tube goes through the bottom of the tank. A foot 11 is threaded in the lower end of the coupling 8 and has a recess 12. A reducer 14 is threaded into the horizontal arm of the coupling 8 and is provided at its inner end with a small port 15. The pipe that supplies the water for the flush tank is designated by the numeral 16 and is threaded into the outer end of the reducer 14. There is a conical seat 18 in the lower end of the tube 6.

The numeral 19 marks the valve. The lower end of the valve 19 is so shaped that it can be received in the recess 12 of the foot 11. The valve 19 has a conical part 20 shaped to fit water-tight against the seat 18. The valve 19 is secured to the lower end of a valve stem which, as a whole, is designated by the numeral 21. The lower part of the stem 21 may be round, as shown at 23, but the upper part of the valve stem is of square or of other polygonal cross section, the upper portion of the stem being designated by the numeral 22. There is a stop 24 on the upper part 22 of the valve stem 21. The stop 24 can be adjusted lengthwise of the part 22 of the stem 21, because the stop is held in place by a set screw 25.

A main float 26 is mounted to slide vertically on the square part 22 of the valve stem 21. The float 26 has a tubular guide 27, receiving the square part 22 of the stem 21 and preventing the main float from rotating. The main float 26 can move up and down on

the valve stem, below the stop 24. The main float 26 is shown as being approximately semi-circular in top plan, but it might be of some other shape.

A suspension member 28 is secured by a set screw 29 to the guide 27 for adjustment longitudinally of the guide. The part 28 is called a suspension member because it carries a stop arm 30 mounted to swing in a vertical plane on the set screw 29 that holds the suspension member 28 on the guide 27.

A horizontal bracket 31 is attached by set screw 32 to the square part 22 of the valve stem 21 and is located below the suspension member 28.

A float lever 33 swings vertically on the set screw 32 that holds the bracket 31 on the valve stem. An auxiliary float 34 is attached to the outer end of the float lever 33. On the inner end of the float lever 33 there is a horizontal finger 35 adapted to engage an abutment 36 on the bracket 31.

When the tank is full, as shown at 2 in Figure 1, the guide 27 of the main float 26 engages the stop 24 on the valve stem 21 and raises the valve stem until the part 20 of the valve 19 engages with the seat 18 on the lower end of the tube 6 and stops the upward flow of water from the pipe 16 through the tube 6 and out of the hole 37. The lower end of the stop arm 30 is vertically spaced from the bracket 31, and the float 34 raises the arm 33 until the finger 35 is against the abutment 36.

When the flow of water out of the tank 1 is started by the usual tank mechanism (not shown) provided for that purpose, the first step in the operation of the device takes place as shown in Figure 2, the water falling to the level shown at 3 and the main float 26 sliding downwardly on the valve stem until the lower end of the stop arm 30 rests on the bracket 31.

The next step in the operation of the device is shown in Figure 3. The water moves downwardly to the point indicated by the numeral 4 and the float 34 swings downwardly, carrying the finger 35 away from the abutment 36. The finger 35 swings the movable stop 30 on its pivotal mounting 29, and as soon as the lower end of the movable mounting is clear of the bracket 31, the float 26 is transformed into a weight, which drops down suddenly, the lower end of the tubular guide 27 of the float hitting the bracket 31 a smart blow or rap. This carries the valve stem 21 down quickly, spacing the part 30 of the valve 19 from the seat 18 at the lower end of the tube 6, the valve moving into the recess 12 in the foot 11. Water now flows upwardly from the pipe 16, through the reducer 14 and its port 15, into the tube 6 and out of the hole 37, the water rising in the tank 1.

The reducer 14 is removable, and any given reducer, provided with a port 15 of a specified size, may be substituted for another reducer having a corresponding port of a different size. In this way, the operator or the manufacturer, can regulate the speed with which water flows from the pipe 16 and fills the tank 1.

The first step in the filling operation results in raising the auxiliary float 34 to the position of Figure 1, with the finger 35 against the abutment 36, the main float 26 rises a little, and the movable stop 31 swings to a vertical position against the finger 35 of the float level 33 as shown in Figure 2, the float 26 being elevated slightly.

Finally, the water reaches the main float 26 and raises it, the guide 27 of the main float engaging the stop 24 on the valve stem 21 and raising the valve stem until the valve 19 closes, as shown at Figure 1, the parts being restored to their original positions.

The device is simple in construction, and will remain in working condition with little attention. The general construction is such that when the float 26 moves downwardly, the valve 19 will be opened quickly.

Having thus described the invention, what is claimed is:

1. In a device of the class described, a tank having an inlet provided with a seat, a stem slidable in the inlet and carrying a valve that closes upwardly against the seat, a main float slidable on the stem, a first stop on the stem and limiting the upward sliding movement of the main float on the stem, a movable stop carried by the main float, the stem having a part with which the movable stop engages to limit the downward sliding movement of the main float, an auxiliary float, mechanism for mounting the auxiliary float movably on the stem, and means carried by said mechanism for disengaging the movable stop from said part of the stem, as the liquid in the tank recedes from beneath the auxiliary float, thereby transforming the main float into a weight which drops suddenly and strikes said part of the stem a blow that depresses the stem and opens the valve.

2. The device of claim 1, further characterized by this: that the mechanism for mounting the auxiliary float on the stem is carried by the said part which the movable stop engages, the said part and said mechanism having interengaging elements which co-operate to limit the upward movement of the auxiliary float.

3. The device of claim 1, further characterized by this: that the movable stop is a depending, pivoted arm, said mechanism embodying a lever carrying the auxiliary float, the lever being pivotally carried upon the stem, the lever being provided with a lateral finger which, as the auxiliary float moves downwardly, engages behind the arm

and swings it sidewise, clear of said part on the valve stem.

4. The device of claim 1, further characterized by the provision of a reducer in the inlet, below the valve, the reducer being removably mounted, so that it can be replaced by another of different size.

5. The device of claim 1, further characterized by this: that the inlet has a recess in its lower end, into which the valve retires as it opens and moves downwardly, thereby to dispose the valve out of the way of the water that flows upwardly into the tank, through the inlet.

6. The device of claim 1, further characterized by this: that the mechanism for mounting the auxiliary float on the stem is carried by the said part which the movable stop engages, said part being slidable for adjustment lengthwise of the stem, and means for holding it in adjusted positions lengthwise of the stem, means for mounting the movable stop for vertical adjustment on the main float, the first stop being vertically adjustable on the stem, and means for holding the first stop in adjusted position, longitudinally of the stem.

In testimony that I claim the foregoing as my own, I have hereunto affixed my signature.

CHARLES F. BROWN.