

W. N. LONG.

TANK VALVE.

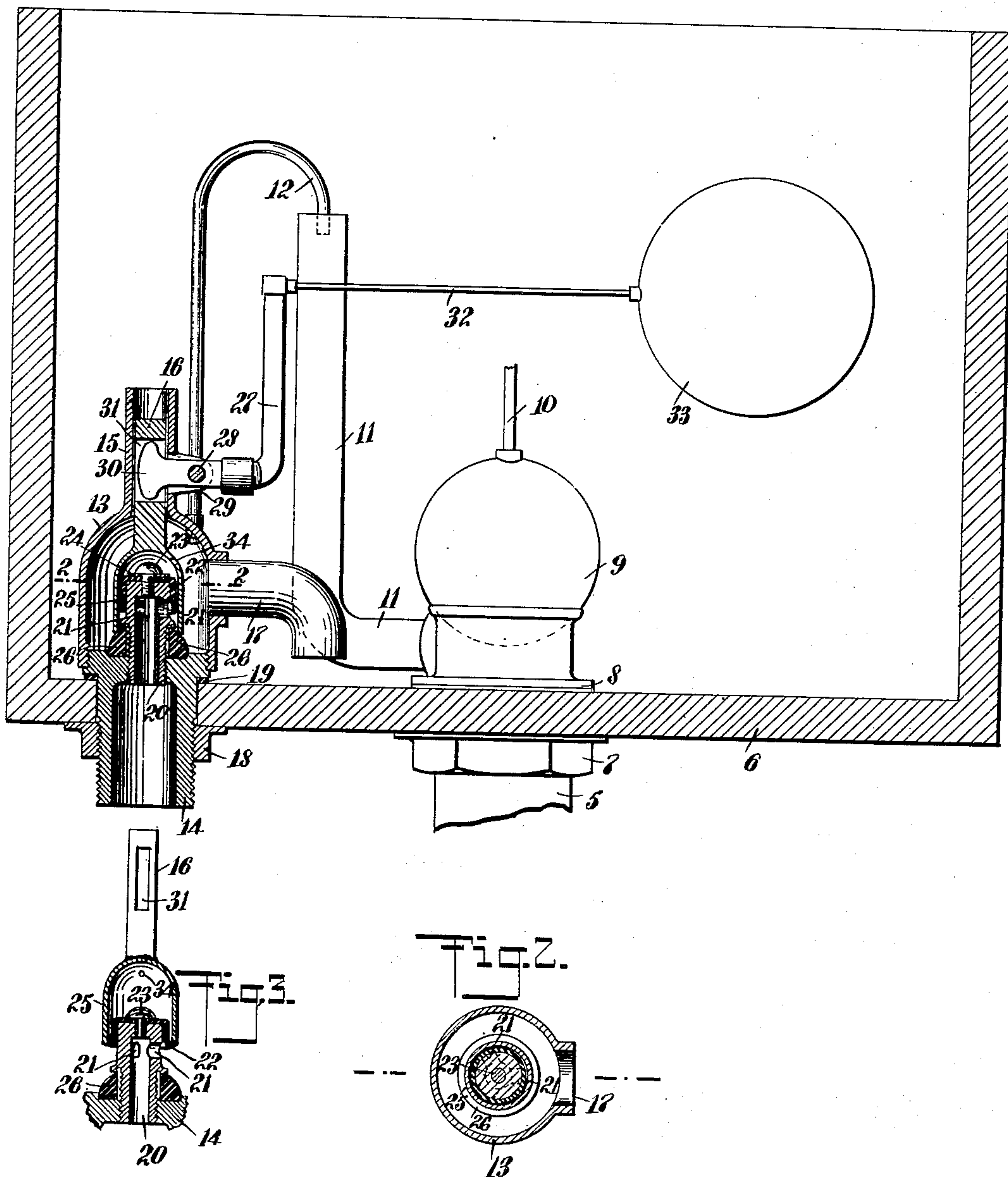
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968,963.

Patented Aug. 30, 1910.

2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

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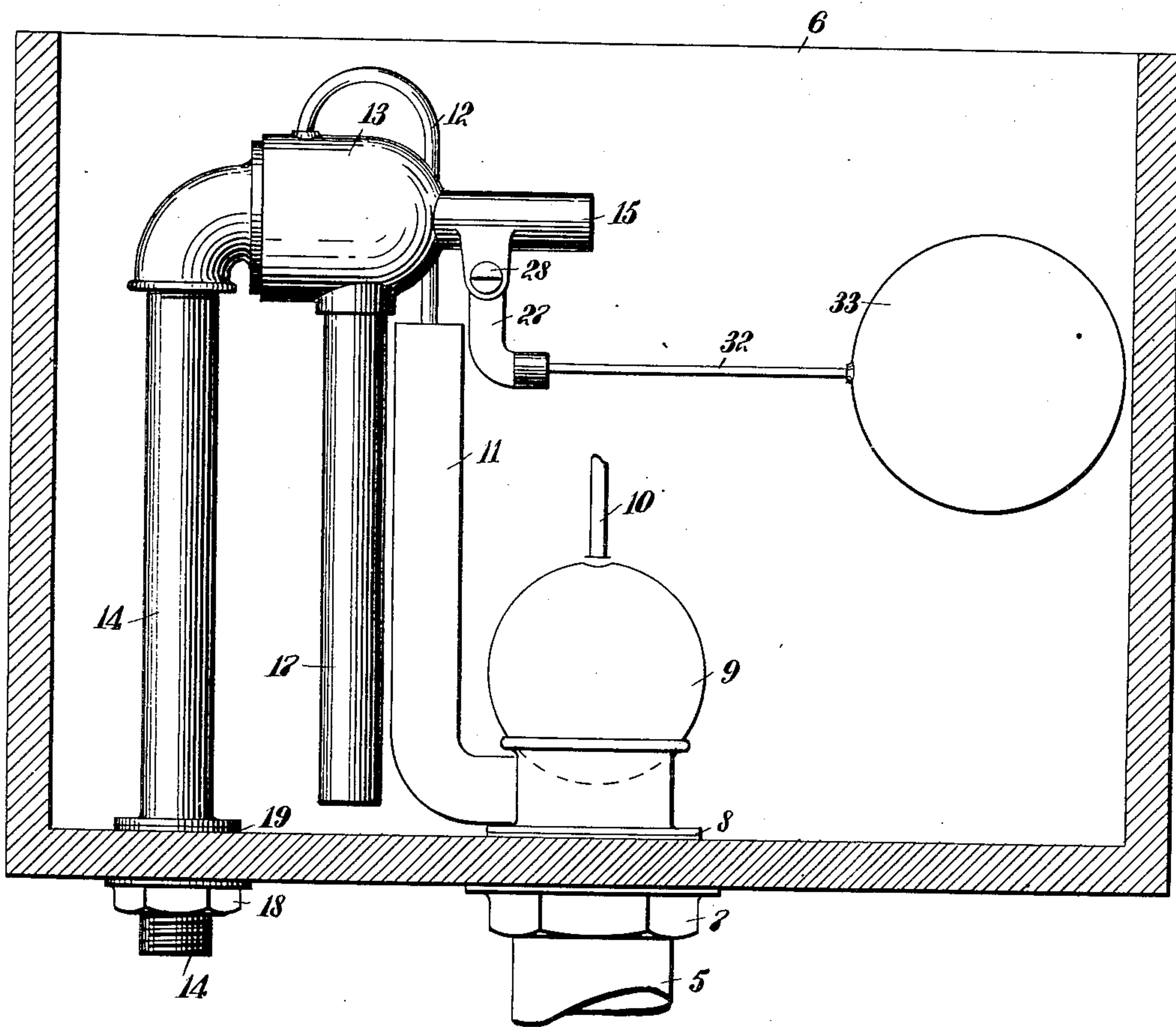


Fig. 4.

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WILLIAM N. LONG, OF EUGENE, OREGON.

TANK-VALVE.

968,963.

Specification of Letters Patent.

Patented Aug. 30, 1910.

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To all whom it may concern:

Be it known that I, WILLIAM N. LONG, a citizen of the United States, and a resident of Eugene, in the county of Lane and State of Oregon, have invented a new and Improved Tank-Valve, of which the following is a full, clear, and exact description.

Among the principal objects which the present invention has in view are: to provide a casing for the valve operating parts to protect the same from adhesions or the introduction of foreign matter and to guide the valve in its operation; to provide a casing whereby the trap refilling may be carried forward after the flushing operation has been completed; to provide a valve construction wherein chattering, vibration, or the sound of the rushing of water is avoided; to provide a containing chamber wherein the pressure on the valve parts is equalized, permitting the valve to work quietly under high pressure; and to provide a construction which is simplified, efficient and durable.

One embodiment of the present invention is disclosed in the construction illustrated in the accompanying drawings, wherein—

Figure 1 is a vertical section of a flushing tank and valve constructed in accordance with the present invention; Fig. 2 is a horizontal section of the valve taken on the line 2—2 of Fig. 1; Fig. 3 is a vertical section of the valve plug, expansible packing and valve, in the delivering position of the same; and Fig. 4 is a side elevation of a modified form of the invention as applied to a low tank, wherein the ball cock is elevated.

The construction illustrated in the present drawings is similar in many respects to that disclosed by me in patent granted to me on the 9th day of February, 1909, bearing the Number 912,009. The particular adaptation of the present improved construction is to that class of water closets wherein the fall of the exhaust pipes is sufficient to carry off by the rush or siphon, the water which should remain in the bowl trap. In the present instance, the flushing pipe 5 is suitably connected to the flushing tank 6 by means of the nut 7 and the flange 8. The upper extension of the flange 8 provides a seat for the ball valve 9 which is connected by means of a rod 10 to the chain or other operating device for the flushing valve. Interposed between the seat at the upper end of the flange 8 and the bottom of the tank 6 is an inlet pipe 11. The inlet pipe 11 is ex-

tended to above the water level of the tank 6 and is open-ended. In this position it serves as an overflow pipe whereby, in the event of leakage of the valve or other accident, the in-rush of water into the tank 6 is carried off through the flushing pipe 5. Under normal conditions, the upper end of the pipe 11 stands above the water level in the tank 6. Emptying into the same is a small delivery pipe 12 which is extended upward from the casing 13. The casing 13 is screw-threaded at the lower end to engage the plug 14 and is provided at the upper end with a straight, cylindrical neck 15 to constitute a guide for the valve stem 16. The casing 13 forms a chamber to receive the in-rushing water of the supply system and is of any suitable dimension. It is provided with an outlet pipe 17 extended preferably from the side, as shown in Fig. 1 of the drawings. The construction is not limited however, to a delivery of this character though such delivery is for many reasons preferred.

The pipe 17 is so placed as to deliver the in-rushing water into the tank close to the bottom thereof and preferably addressed against the same. The leading motive in thus introducing the supply water into the tank at the lowest point therein, and preferably below the exhaust level in the tank, is to avoid the noise of the in-rushing water. When thus introduced below the water contained in the tank this in-rush is thereby muffled. The plug 14 is suitably secured to the tank 6 by means of the packing nut 18. The joint of the plug within the tank is closed by a suitable gasket 19. The plug 14 is provided at the upper end with a partially closed wall which is perforated to receive the threaded contracted plug 20. The plug 20 is closed at the end in direct line with the barrel of the said plug and is provided with the lateral openings 21—21. The openings 21—21 are partially closed by a flexible packing 22 which is folded over the end of the plug 20, the depended sides thereof extending over the openings 21. The packing 22 is held in position upon the plug 20 by a screw 23 under which is placed a washer 24. The valve 25 which is rigidly connected to the stem 16 is an inverted cup-shaped chamber adapted to infold said plug 20 and the packing 22. The lower end of the valve 25 rests upon a conical valve seat which is formed on the side of the plug 20 or secured thereto by screw-threaded en-

gagement as shown in Fig. 1 of the drawings. As shown in the drawings, the seat 26 is formed from hard rubber.

The valve 25 is raised and lowered by means of a lever 27 which is pivoted at 28 in ears 29 set out from the side of the neck 15 of the casing 13. The lever 27 is provided with a rocking head 30 adapted to extend within a slot 31 formed in the stem 16. The ends of the head 30 are adapted to impinge upon the structural parts of the end of the slot 31. To the lever 27 is fixedly attached by means of a suspension rod 32, the float 33. The float 33 is that commonly used in flushing tanks of the character described.

With a flushing tank of the character herein described and shown in the accompanying drawings installed, the operation is as follows: With a pull of the flushing chain, the ball 9 is lifted from the seat, permitting the water to rush from the tank downward through the flushing pipe 5. If the ball 9 is maintained in the raised position, the tank will be exhausted of water to a level with the top of the flange 8, which, as heretofore mentioned, is below the end of the pipe 17 by means of which the supply is introduced into the tank 6. With the fall of the water in the tank, the float 33 is carried downward. Being unsupported by the water, the weight of the float is exerted upon the lever 27 and upon the shortened end carrying the head 30, to forcibly raise the valve 25 by pressing upward on the stem 16. The valve stem 16 is guided in its rise within the neck 15 so that the valve 25 rises evenly off of the seat 26. As the valve 25 rises the packing 22 is permitted to extend from the opening 21, and the water from the supply pipe 14 is permitted to rush into the chamber of the casing 13. The action of the valve 25 is not impeded by any suction between the top of the said valve and the packing 22 as a small passage 34 is provided in the upper end of the chamber formed by the cup of the valve 25. The water rushing into the chamber of the casing 13 is carried from thence through the pipe 17 into the tank 6 and below the low water level therein, thereby avoiding any rushing sound of the supply of water. The proportions between the pipes 17 and 5 are such that the tank 6 would be quickly exhausted. When however, the valve 9 is reseated the supply from the pipes 14 and 17 will soon fill the tank, gradually raising the float 33 and thereby gradually depressing the valve 25. The valve 25 in this depression gradually folds the packing 22 downward over the openings 21, cutting off the supply of water until with the resumption of the full floating position of the float 33 and the seating of the valve 25, the openings 21 are completely closed.

With the rush of water through the flush

pipe 5 there often happens that the rush of the said water partially or wholly evacuates the trap provided for the toilet bowl, and for the perfect operation of a system constructed after this manner it is desirable that the trap should be filled subsequent to the operation of flushing. It is for this purpose that I have provided the small pipe 12 and the inlet pipe 11. When the valve 9 is closed, considerable time is consumed before the tank 6 is sufficiently filled to raise the float 33 to close the valve 25. During this time the pressure within the chamber of the casing 13 is sufficient to raise the column of water over the pipe 12 to be delivered thereby in the open pipe 11. The pipe 11 being opened, the delivery pressure on the pipe 14 is not transmitted to the pipe 11. The supply through the pipe 12 being restricted, the water delivered through the pipe 11 and by it down the pipe 5, is quiet in its action, thereby supplying the needed water to the bowl to refill the same and to completely fill the trap connected therewith.

Having thus described my invention, I claim as new, and desire to secure by Letters Patent:—

1. A tank valve comprising a supply pipe provided with laterally extended end openings, an expansible cover for said openings, a cup-shaped plunger adapted to extend over said end to close the said cover upon the said openings, fixed guides to control the operation of said plunger, and suitable operating mechanism to raise and lower said plunger.

2. A tank valve comprising a supply pipe having a closed end and laterally extended openings therefrom, an expansible cover for said openings, a plunger having an inverted cup-shaped end adapted to infold said end of the supply pipe to depress the said cover upon the said lateral openings thereof, a cone-shaped seat mounted upon said end of said supply pipe and adapted to receive the said cup-shaped end of said plunger, a casing for the end of said supply pipe and said plunger adapted to form a chamber to receive the water from the said supply pipe and provided with a delivery opening therefor, suitable guides to control the operation of said plunger, and suitable mechanism for raising and lowering said plunger.

3. A tank valve comprising a supply pipe having a closed end and laterally extended openings therefrom, an expansible cover for said openings, a plunger having an inverted cup-shaped end adapted to infold said end of the supply pipe to depress the said cover upon the said lateral openings thereof, a cone-shaped seat mounted upon said end of said supply pipe and adapted to receive the said cup-shaped end of said plunger, a casing for the end of said supply pipe and said plunger adapted to form a chamber

to receive the water from the said supply pipe and provided with a delivery opening therefor, suitable guides to control the operation of said plunger, suitable mechanism for raising and lowering said plunger, and an auxiliary delivery pipe extended from said chamber and adapted to deliver water therefrom into the flushing tank after the flushing supply has been discontinued therefrom.

10 4. A tank valve comprising a flushing tank provided with a flushing pipe and means for operating the same, a water supply pipe the end whereof is extended into said tank, a plug adapted to be secured in the end of said supply pipe having lateral openings for the delivery of water therefrom, an expansible cover for said openings secured to said plug and adapted to partially close the said openings, a plunger having a cup-shaped end adapted to inclose the said cover and said plug to depress the cover over the openings therein, a seat for

the said cup-shaped end, a casing inclosing the said plunger and seat and adapted to receive the water from the said supply pipe 25 and plug and to deliver the same below the low water level of said tank, suitable guides for said plunger, a mechanism for raising and lowering said plunger embodying a float adapted to follow the water level in said tank, a branch pipe extended from said flushing pipe below the means for operating the same and extended above the normal water level of said tank, and an open-ended return pipe extended from within said casing to deliver water into the said branch pipe. 30

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM N. LONG.

Witnesses:

ARCHIE W. LIVERMORE,
IRA TRIPP.