No. 897,117. PATENTED AUG. 25, 1908.

W. H. LUDEWIG.

FLUSHING TANK VALVE MECHANISM.

APPLICATION FILED SEPT. 24, 1907. 2 SHEETS—SHEET 1.

Fig. 1.

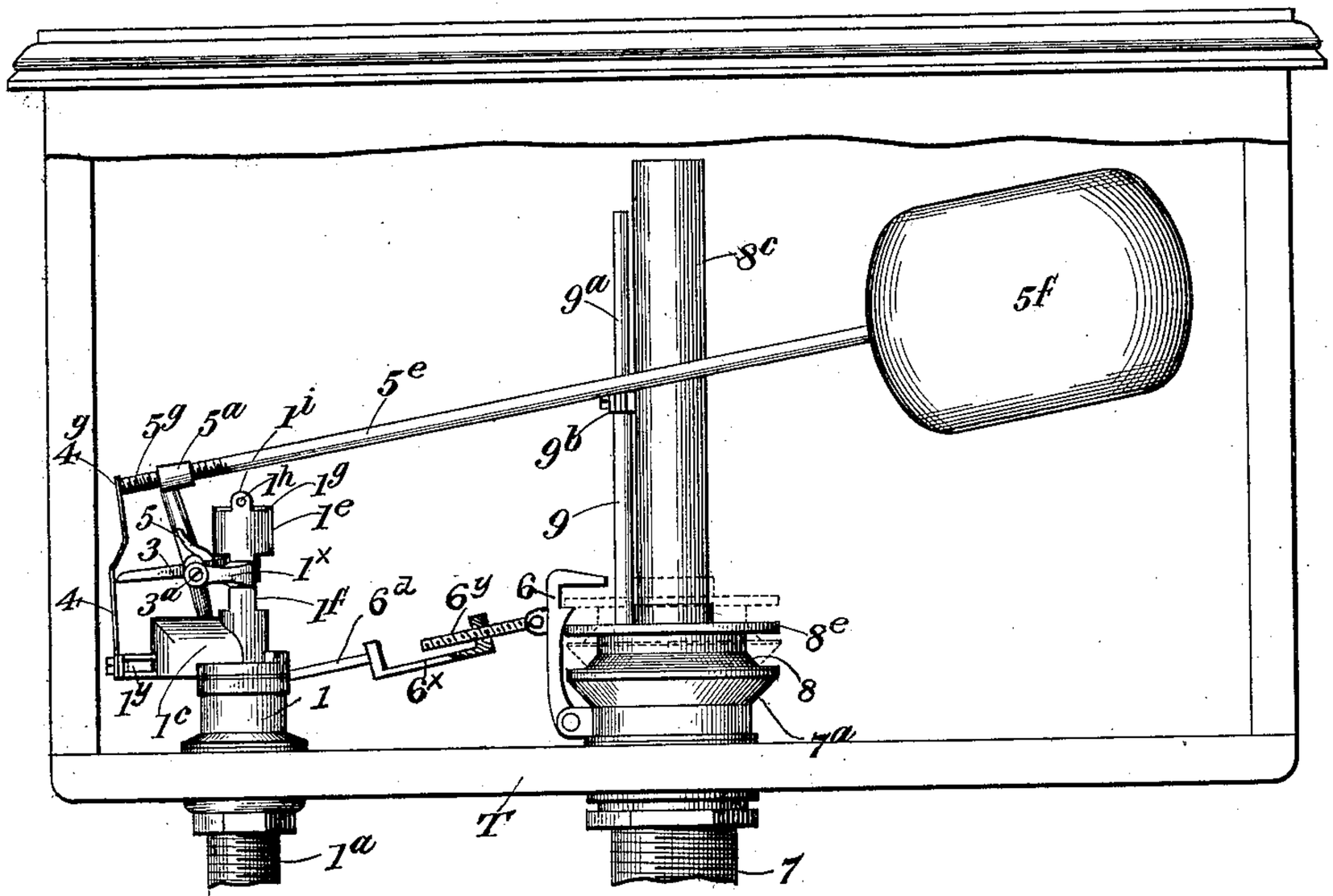


Fig. 3.

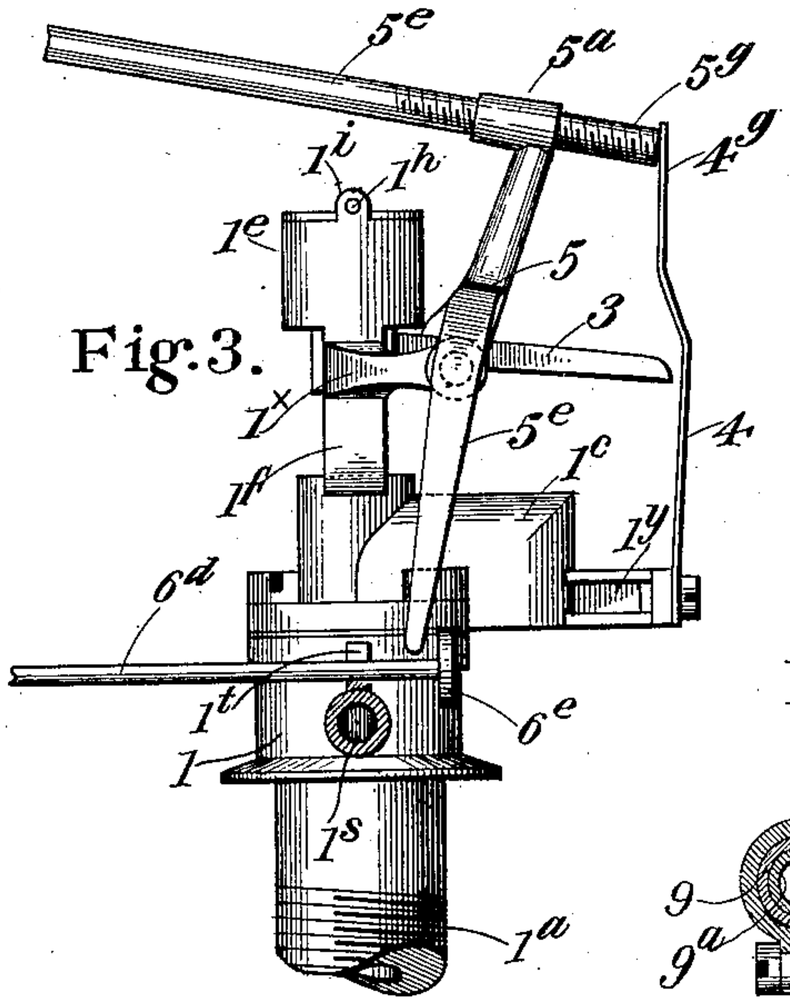


Fig. 4.

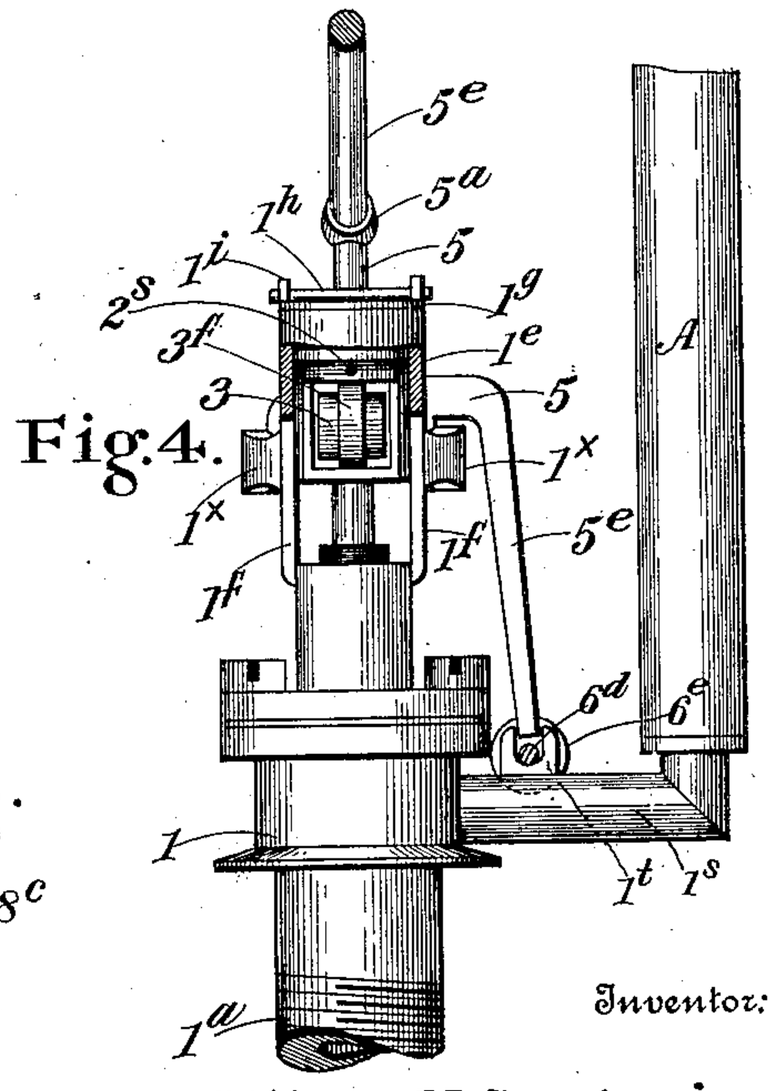
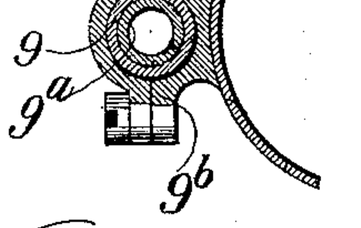


Fig. 8.



Witnesses

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FLUSHING TANK VALVE MECHANISM.

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2 SHEETS—SHEET 2.

Fig. 2.

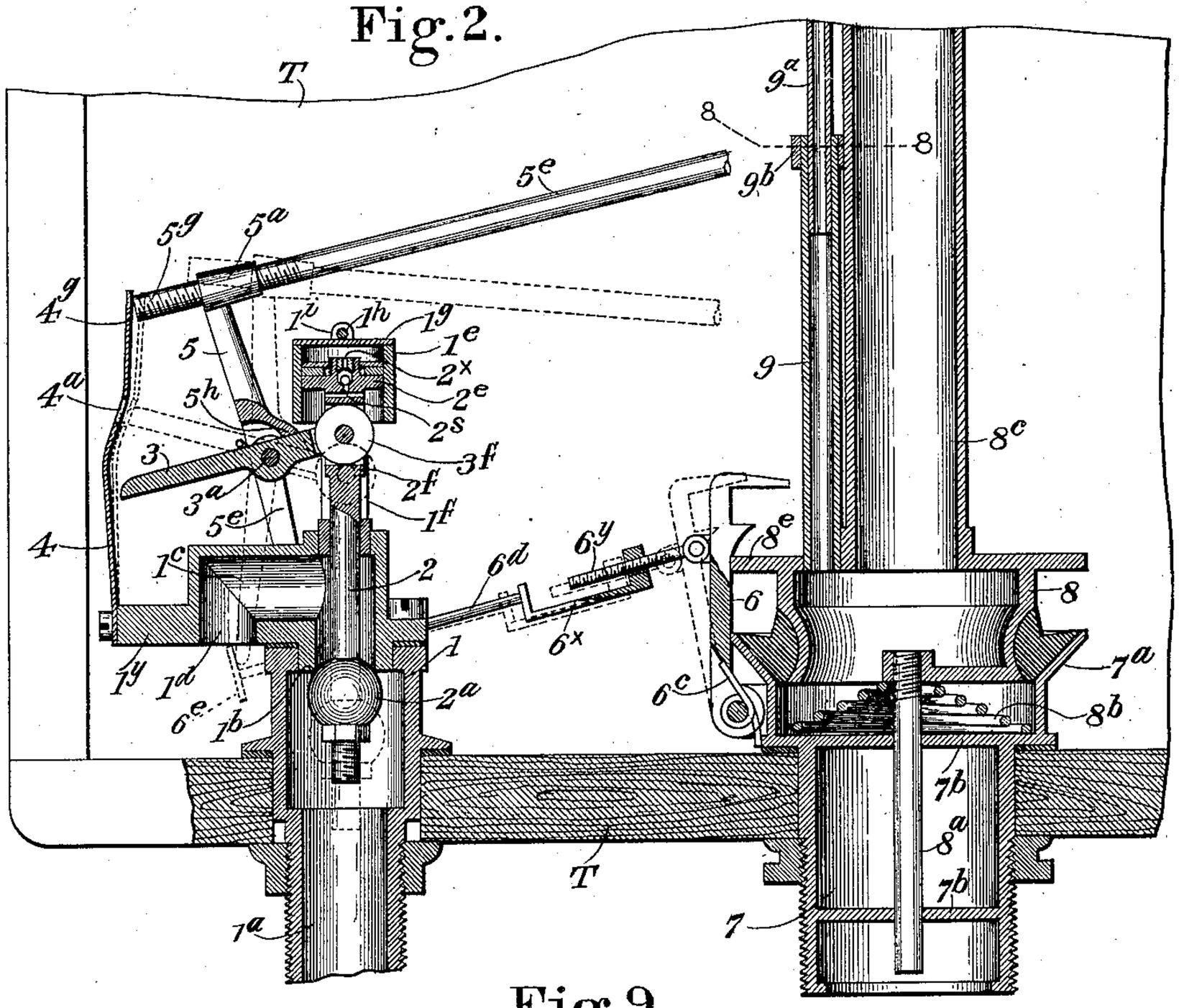


Fig. 9.

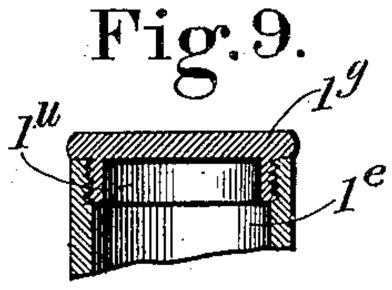


Fig. 5.

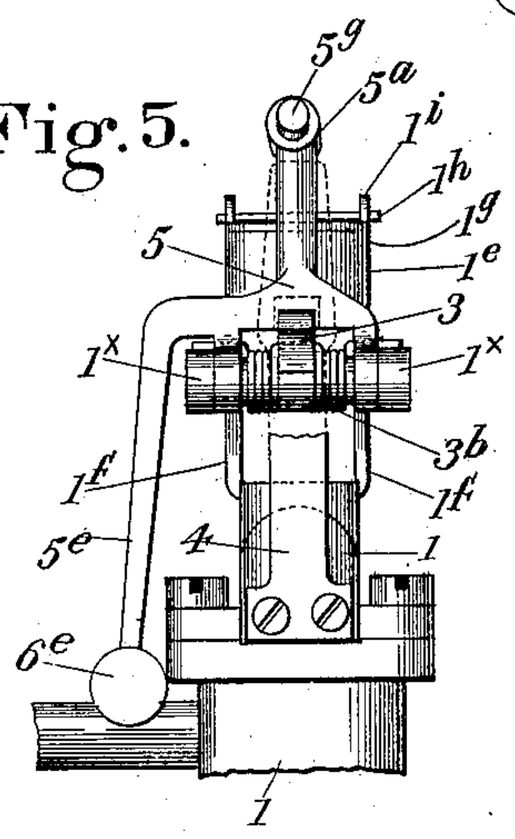


Fig. 6.

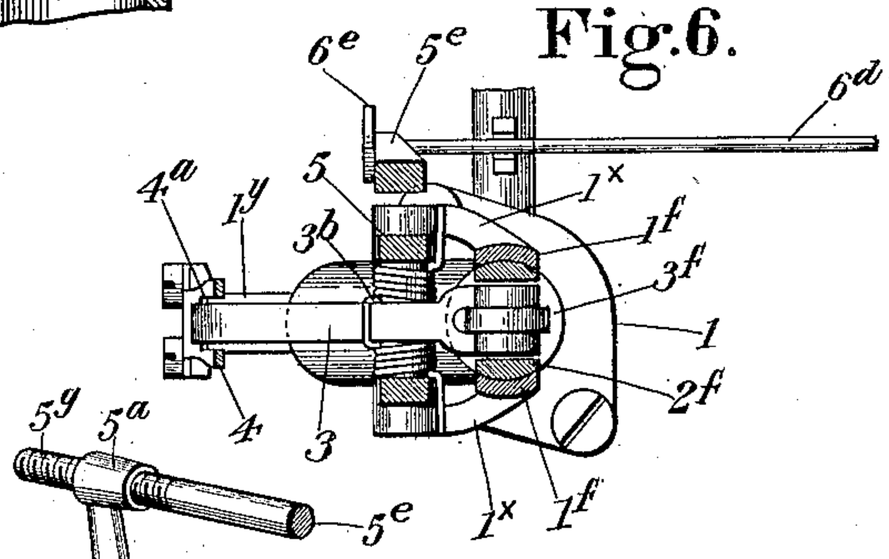
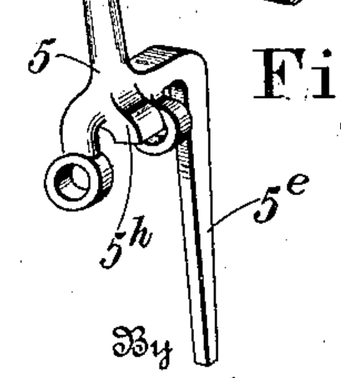


Fig. 7.



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UNITED STATES PATENT OFFICE.

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FLUSHING-TANK VALVE MECHANISM.

No. 897,117. Specification of Letters Patent. Patented Aug. 25, 1908.

Application filed September 24, 1907. Serial No. 394,287.

To all whom it may concern:

Be it known that I, WILLIAM H. LUDEWIG, of Rock Island, in the county of Rock Island and State of Illinois, have invented certain new and useful Improvements in Flushing-Tank Valve Mechanism; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form part of this specification.

This invention is an improvement in flushing tank valve mechanism, and its objects are to provide a simple and effective construction of the inlet and outlet valve controlling mechanism so that the inlet valve will be opened by the descent of the float, and will be locked in open position until the float rises to the desired point,—whereupon the inlet valve will be released and closed. The closing of the inlet valve will be cushioned in a manner to prevent pounding or jarring thereof. Also the outlet valve, which can be opened in the well known manner, will be locked open until the float descends sufficiently to open the inlet valve, whereupon the outlet valve will be automatically released and closed; also to provide means whereby the water seal may be replenished after the outlet valve is closed.

The invention in particular is an improvement upon the valves shown in my Patent No. 846,221 dated March 5, 1907.

The following description of the improvements as illustrated in the accompanying drawings, will impart a clear understanding of the invention, and the claims set forth the particular parts and features thereof for which protection is desired.

In said drawings—Figure 1 is a side elevation of the complete devices, within a tank. Fig. 2 is an enlarged vertical section through the same. Fig. 3 is a view of the opposite side of the inlet valve mechanism shown in Fig. 1, enlarged. Fig. 4 is a front view of the inlet valve mechanism shown in Fig. 3, partly broken away. Fig. 5 is a rear view of the inlet valve mechanism, partly broken away. Fig. 6 is a horizontal cross sectional view of the inlet valve mechanism. Fig. 7 is a detail view of the casting 5. Fig. 8 is a detail sectional view of the water-seal replenishing pipe on line 8—8 Fig. 2. Fig. 9 is a detail.

T designates an ordinary tank, within which the inlet and outlet valves and their operating mechanisms are located.

The inlet valve comprises a casing 1; having a tubular stem 1^a extending through the bottom of tank to be attached to the water supply pipe (not shown). The casing has a valve seat 1^b, and a chamber 1^c above and extending to one side of the seat, said chamber having an outlet 1^d in its lower side, so as to discharge water downwardly into the tank.

The valve casing is preferably made as shown in two parts, separable just above the plane of the seat, so as to facilitate access to the valve substantially as described in my said patent.

The valve 2^a is attached to the valve-rod 2, below the seat, and is arranged to close with the flow of water, and open against the water pressure. The valve-rod 2 is connected at its upper end to one end of a lever 3 which is fulcrumed on a pin 3^a supported in arms 1^x projecting from uprights 1^f formed on and rising from the upper part of the valve-casing as shown. The rear end of said lever 3 is adapted to engage a notch 4^a in a catch 4, preferably a spring plate, attached at its lower end to an extension 1^y of the valve casing as shown. The catch 4 and lever 3 are so adjusted that when the valve stem is depressed to fully open the valve, the free end of lever 3 is caught by the catch, and upheld, as shown in dotted lines Fig. 2; thus holding the valve open until the catch is disengaged from the lever as hereinafter explained. A spring 3^b is connected with lever 3 in such manner that when the catch 4 is disengaged therefrom the spring causes the lever to close the valve.

In order to cushion the closing movement of the valve and prevent pounding or jarring thereof, a cylinder 1^e is arranged above the upper end of the valve stem 2, said cylinder being attached to the uprights 1^f. The cylinder, uprights and casing are preferably formed integrally.

Within the cylinder 1^e is a plunger 2^e which is attached to the upper end of the valve stem 2 by a yoke 2^f. This yoke preferably loosely embraces the end of lever 3, and said end is bifurcated and carries a roller 3^f which is adapted to engage the upper or under wall of the yoke 2^f, and forms a loose pivotal frictionless connection between the lever 3 and the valve stem. The upper end of cylinder 1^e is closed by a plate 1^g which may be secured in position in any suitable way; as shown in Figs. 1 to 5 it is fastened by

a pin 1^h transfixing ears 1^i on the cylinder. As shown in Fig. 9 plate 1^g is provided with a threaded flange 1^c engaging internal threads in the upper end of cylinder 1^e.

The plunger 2^e and cylinder 1^e constitute a dash-pot, and will ease the closing movement of the valve. In the plunger 2^e may be formed a small port 2^s which will allow water to gradually enter or leave the cylinder and thus insure the steady opening and closing movements of the valves. The inner end of port 2^s may be provided with a ball valve (as shown in Fig. 2) which is retained in place by a removable screw-cap 2^x having a perforation for the passage of water, this construction enables the water to enter the cylinder more readily than it leaves it, and the valve to open more quickly than it closes.

Pivoted upon the pin 3^a beside lever 3 is a casting 5 which can rock on the pin independently of the lever 3, and has an eye 5^a on its upper end through which passes the float-rod 5^e, said rod carrying an ordinary ball-float 5^f on its free end. Preferably the rod 5^e has a threaded engagement with eye 5^a, and the extremity of this threaded portion 5^g is adapted, when the float rises to desired height, to contact with the upper part 4^g of catch 4, and move it back sufficiently to cause the catch to release lever 3 (see Figs. 1, 2, 3). But when the float drops, extension 5^g is withdrawn from the catch, as indicated in dotted lines in Fig. 2, and allows the catch to move inward into position to engage lever 3 and lock the valve open, (see Fig. 2).

The casting 5 is provided with a lug 5^h which when the float descends engages the inner part of lever 3 and depresses it thereby causing said lever to depress the valve stem and open the inlet valve which is held open by the catch 4 until the latter is disengaged from lever 3 by the float-rod extension 5^g.

The outlet valve comprises a tubular part 7 extending through the bottom of the tank, and having a valve seat 7^a on its upper end,—and provided with cross bars 7^b, 7^b, guiding the stem 8^a of the valve 8, which is adapted to rest upon the seat 7^a, and close the outlet. The closing of valve 8 may be cushioned by a spring 8^b. Said valve 8 is connected to the lower end of an overflow tube 8^c which, when the valve is closed, prevents overflowing of the tank. The valve 8 is provided with an annular flange 8^e adapted to be engaged by the catch 6, when the valve is raised (see dotted lines Fig. 1) said catch being pivoted to the upper part of casting 7, and normally pressed inward toward the tube by a spring 6^c.

The casting 5 has a depending finger 5^e at one side, which is adapted to release the outlet valve 8, when the float descends, (the outlet valve having been previously opened); said finger 5^e then engaging a disk 6^e on a rod 6^d connected to a catch 6 which engages the outlet valve when the latter is raised and holds it open.

When the outlet valve is closed, disk 6^e is drawn into position to be engaged by the finger 5^e when the casting 5 is rocked by the descent of the float; and catch 6 is thus caused to release the outlet valve at the proper time, substantially as described in my said patent.

In order to provide for replenishing the water seal in the bowl after the outlet valve is closed, I have provided the outlet valve with a small pipe 9 beside tube 8^c, said tube opening into tubular part 7 through the outlet valve 8, see Figs. 1, 2 and 8. Said pipe 9 is adjustable to extend to any desired height above the valve 8, corresponding to the depth of water desired in the tank,—but terminates below the end of the overflow-tube 8^c. The pipe 9 is of smaller diameter or capacity than the inlet valve, consequently the inlet valve will momentarily continue to admit water after the level rises above pipe 9; and after the inlet valve closes, water can escape through pipe 9 into the bowl (not shown), thus replenishing the seal, until the water descends to the level of the upper end of said pipe.

As shown the pipe 9 is made in two sections, the upper section 9^a telescoping into the lower section 9, this enables the height of the pipe to be adjusted to give any desired depth of water in the tank. The telescopic sections may be secured in any adjusted position by tightening the split clamp ring 9^b on the upper end of the lower section.

In order to prevent pounding in the pipes when the inlet valve is closed the lower part of the valve casing has a lateral tubular elbow 1^s to which is connected a cylinder A adapted to contain air to cushion the sudden check of the flow of water. This can be used in addition to the dash-pot and plunger. The elbow 1^s also forms a support for the rod 6^d, being provided with a notched guide-lug 1^t for said rod, see Figs. 3 and 4.

In this invention I have simplified the tripping mechanism for the inlet valve by making the float-rod serve as the tripping device, and the point of tripping can be easily regulated by turning the float-rod to cause its end 5^g to project more or less from sleeve 5^a. The check mechanism for the inlet valve is substantially a part of the valve casing and valve rod and operates directly in line with the valve. And the water-seal replenishing device or pipe 9 attached to the outlet valve in connection with the adjustable inlet valve, affords a substantially perfect means for regulating the normal water level in the tank.

Having described my invention what I claim as new and desire to secure by Letters Patent is:

1. In an inlet valve, the combination of a

casing provided with a valve seat and an outlet, a valve, a valve rod, an oscillating lever having one end engaged with the valve rod, a spring for closing said valve, a cushioning device, and an arm engaging said lever and connected to said cushioning device for the purpose described.

2. In an inlet valve, the combination of a casing provided with a valve seat, and a discharge outlet, a valve, a valve rod, an oscillating lever having one end engaged with the valve rod, a spring connected to the other end of said lever for closing said valve, a cylinder, a plunger therein, and an arm engaging said lever and connected to said plunger for the purpose specified.

3. In a tank inlet valve, the combination of a casing having a valve seat and an extension above the valve seat provided with a downwardly opening outlet, a valve below the seat, a valve rod extending through the casing, an oscillating lever pivotally connected at one end to said stem, and a spring engaging the lever for closing said valve; with a float-controlled means adapted to engage the lever and open the valve, a catch for locking the valve in open position, and float-controlled means for disengaging the catch.

4. In an inlet valve for tanks, the combination of a valve casing having a valve seat, a lateral extension above the valve seat having a downwardly directed outlet for the water, a valve, a valve stem, an oscillating lever having one end connected to the outer end of the valve stem, and a spring engaging the lever for closing the valve; with a float-actuated casting pivoted beside the lever and adapted to engage the lever and open the valve when the float drops, a catch for locking the valve in open position, and devices on said casting for disengaging the catch when the float rises.

5. In an inlet valve, the combination of a casing provided with a valve seat, and an outlet, a valve, a valve rod, an oscillating lever having one end engaged with the valve rod, a spring for closing said valve, a cushioning device, and an arm connecting said lever with said cushioning device; with a float-controlled device adapted to engage said lever and open the valve when the float descends, a catch for locking said lever to hold the valve open, and float-controlled devices adapted to disengage the catch from the lever when the float rises.

6. In an inlet valve, the combination of a casing provided with a valve seat, and a discharge outlet, a valve, a valve rod, an oscillating lever having one end engaged with the valve rod, a spring connected to the said lever for closing said valve, a cylinder, a plunger therein, and an arm connecting said lever with said plunger; with a float-controlled casting pivoted beside the lever and adapted to engage said lever and open the valve when the float descends, a catch for locking said lever to hold the valve open, and devices on said casting adapted to disengage the catch from the lever when the float rises.

7. In combination a valve, a pivoted lever connected to the valve stem, a catch for locking said lever when the valve is open, and a pivoted float-rod having its inner end adjusted and adapted to directly engage the catch and disengage it from the lever when the float rises.

8. In combination an inlet valve, a catch for locking the valve in open position, a casting pivoted beside the valve, and a float-rod attached to said casting and having its inner end adjusted and adapted to directly contact with and disengage the catch from the valve when the float rises; and devices for opening the valve when the float descends.

9. In combination an inlet valve, a pivoted lever connected with the valve stem, a catch engaging said lever for locking the valve in open position, a casting pivoted beside the lever, and a float-rod attached to said casting and having its inner end adjusted and adapted to engage with the catch and disengage it from the lever when the float rises; said casting engaging the lever and opening the valve when the float descends.

10. In combination a valve casing, an inlet valve, a valve stem, an oscillating lever connected at one end with said stem; a spring-catch-plate engaging the other end of the lever to lock it when the valve is in open position, a casting pivoted beside the lever, a float, and a float-rod adjustably connected with said casting, said float-rod having its inner end adjusted and adapted to directly engage the catch and release the valve when the float rises, and said casting opening the valve when the float descends, substantially as described.

11. In a flushing tank valve, the combination of an inlet valve, its stem having a yoke on its upper end, an oscillating lever pivoted beside the stem and having one end engaging the yoke; a catch adapted to engage the free end of the lever; a float, a float-rod having its inner end adjusted and adapted to directly engage the catch and disengage it from the lever when the float ascends; and means for opening the valve when the float descends.

12. In a flushing tank valve, the combination of an inlet valve, the valve stem having a yoke on its upper end, an oscillating lever having one end engaging the yoke; a catch adapted to engage the free end of the lever; a casting pivoted beside the lever, a float, a float-rod adjustably connected to the casting, the extremity of the rod being adjusted and adapted to directly engage the catch and disengage it from the lever when the float as-

cends; and means on said casting for engaging said lever and opening the valve when the float descends.

13. In combination an inlet valve, its stem, a cylinder connected to the valve casing in axial alinement with the stem, a plunger in said cylinder connected with said stem, an oscillating lever beside the stem having one end loosely engaged therewith intermediate the valve and cylinder, a float, and means to open the valve when the float descends; with means for locking the valve in open position, and means for releasing the locking device when the float rises.

14. In combination a valve casing, a valve therein, a cylinder adjacent the casing in axial alinement with the valve, a plunger in the cylinder, a valve rod connected to said valve and to said plunger; an oscillating lever pivoted beside the valve rod and having one end loosely engaged with said rod; a catch adapted to engage the other end of said lever; a float, and a float-rod adapted to disengage the catch from the lever when the float rises, and to depress the lever and open the valve when the float descends, substantially as described.

15. In combination a valve casing, an outwardly closing valve therein, a cylinder adjacent the casing in axial alinement with the valve, a plunger in the cylinder, a valve rod connected to said valve and to said plunger; an oscillating lever pivoted beside the valve rod and having one end loosely engaged with said rod; a catch adapted to engage the other end of said lever, a casting pivoted beside said lever, a float-rod connected with said casting and adapted to disengage the catch from the lever when the float rises, and to cause the casting to depress the lever and open the valve when the float descends, substantially as described.

In testimony that I claim the foregoing as my own, I affix my signature in presence of two witnesses.

WILLIAM H. LUDEWIG.

Witnesses:
ROBERT R. REYNOLDS,
LOUIS V. ECKHART