

P. WHITE.
WATER CLOSET CISTERN.

No. 506,757.

Patented Oct. 17, 1893.

Fig. I.

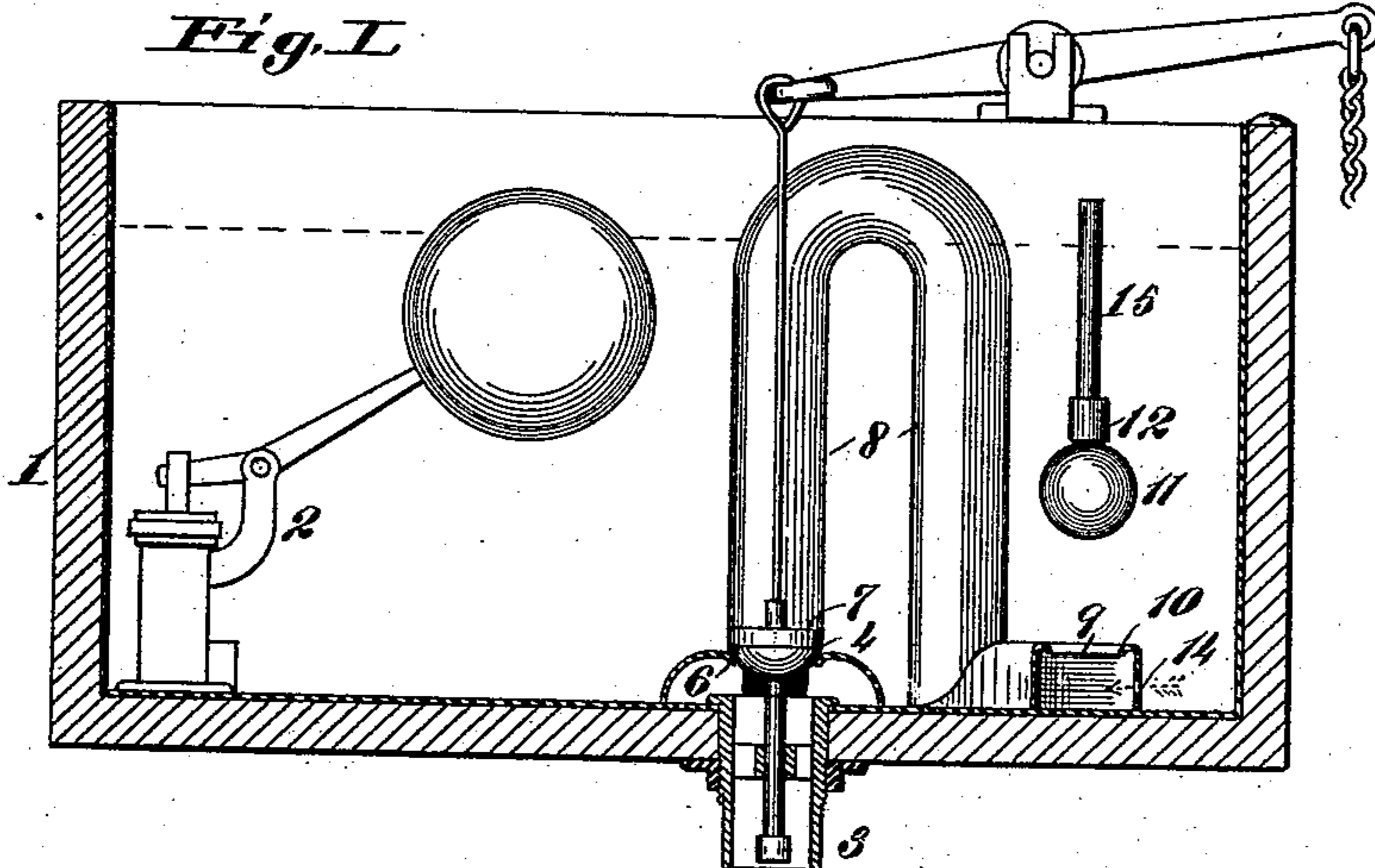


Fig. II.

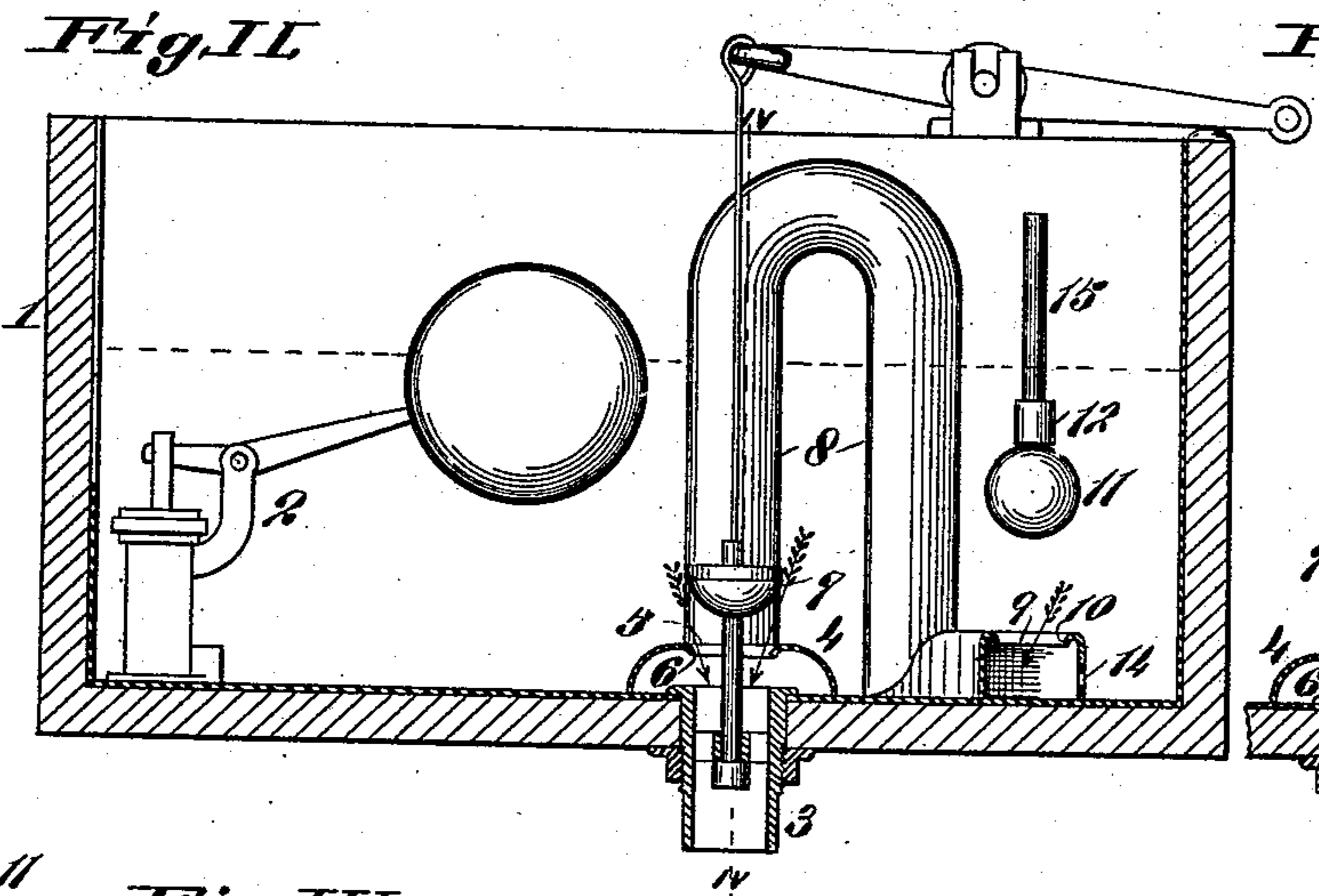


Fig. IV.

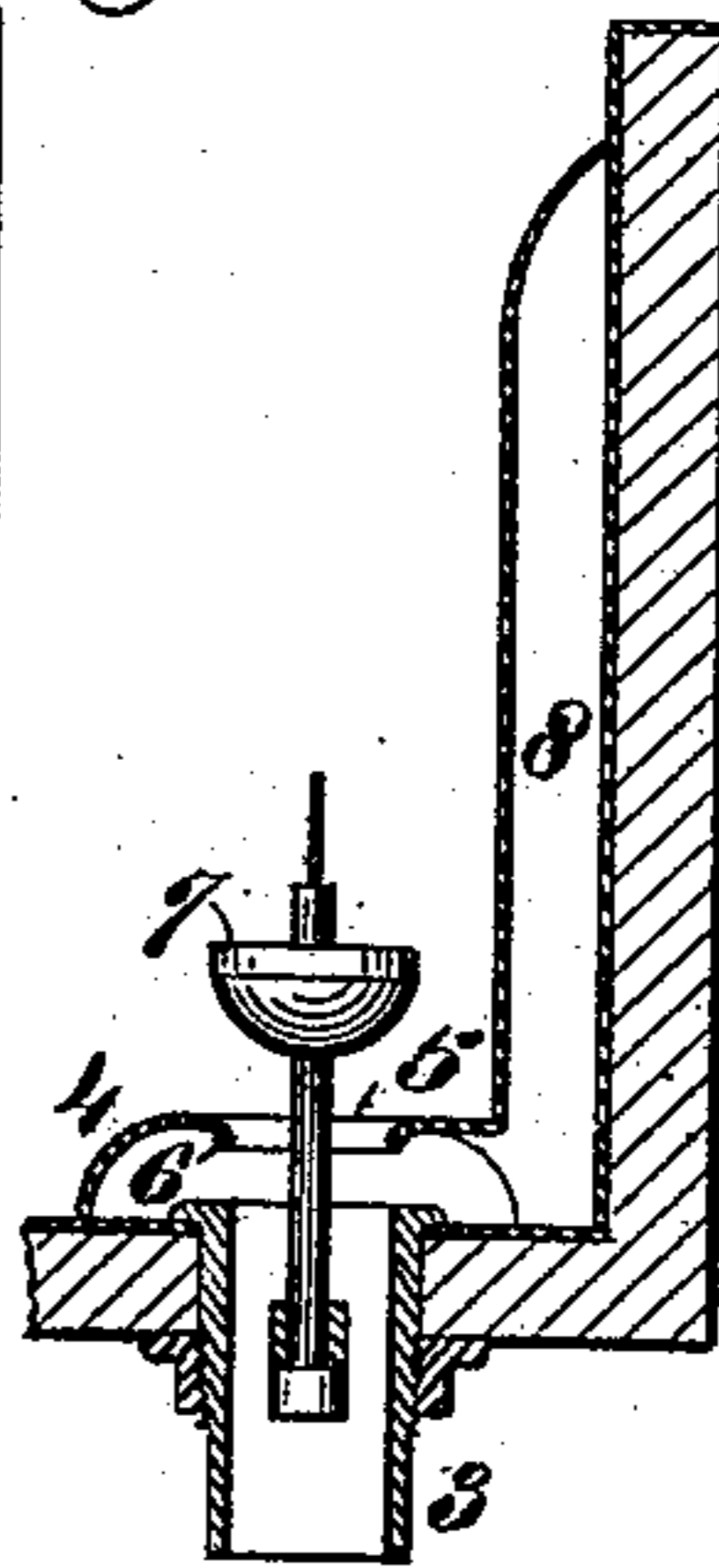


Fig. VI.

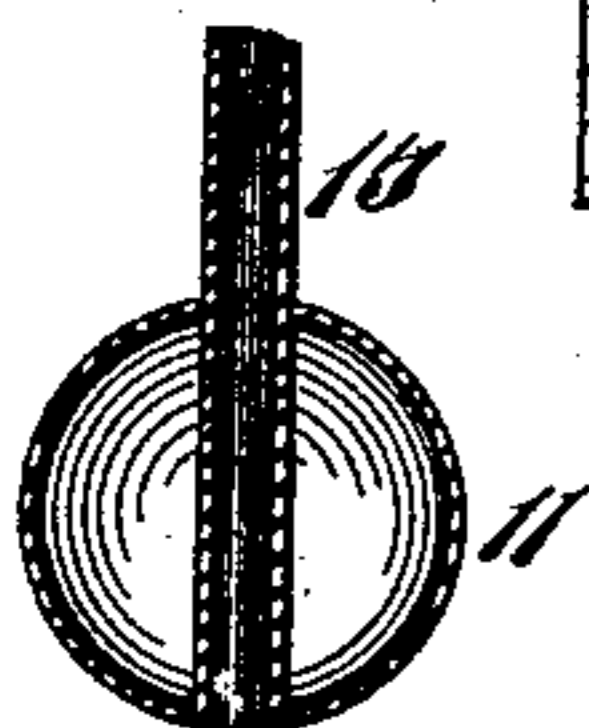


Fig. III.

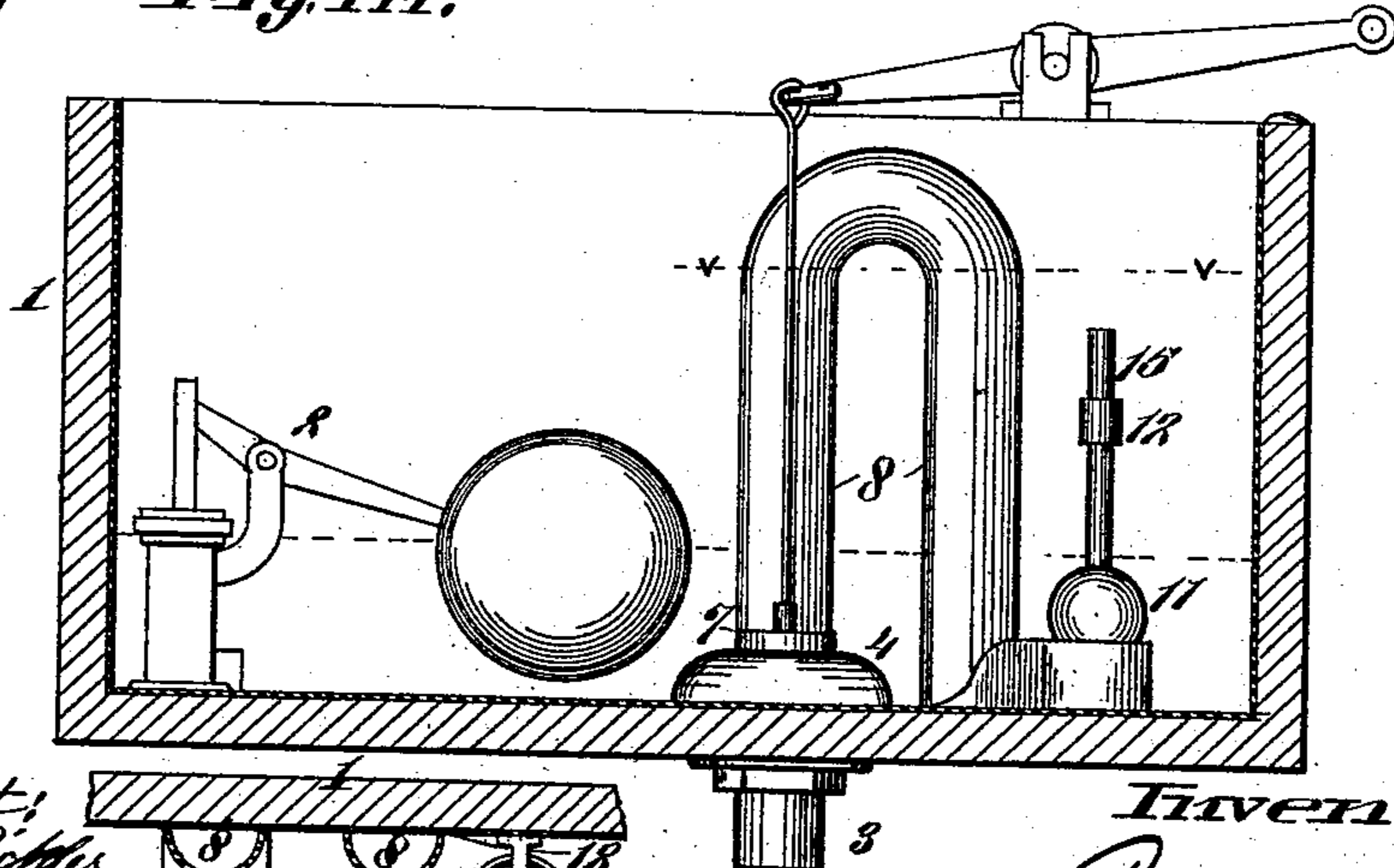
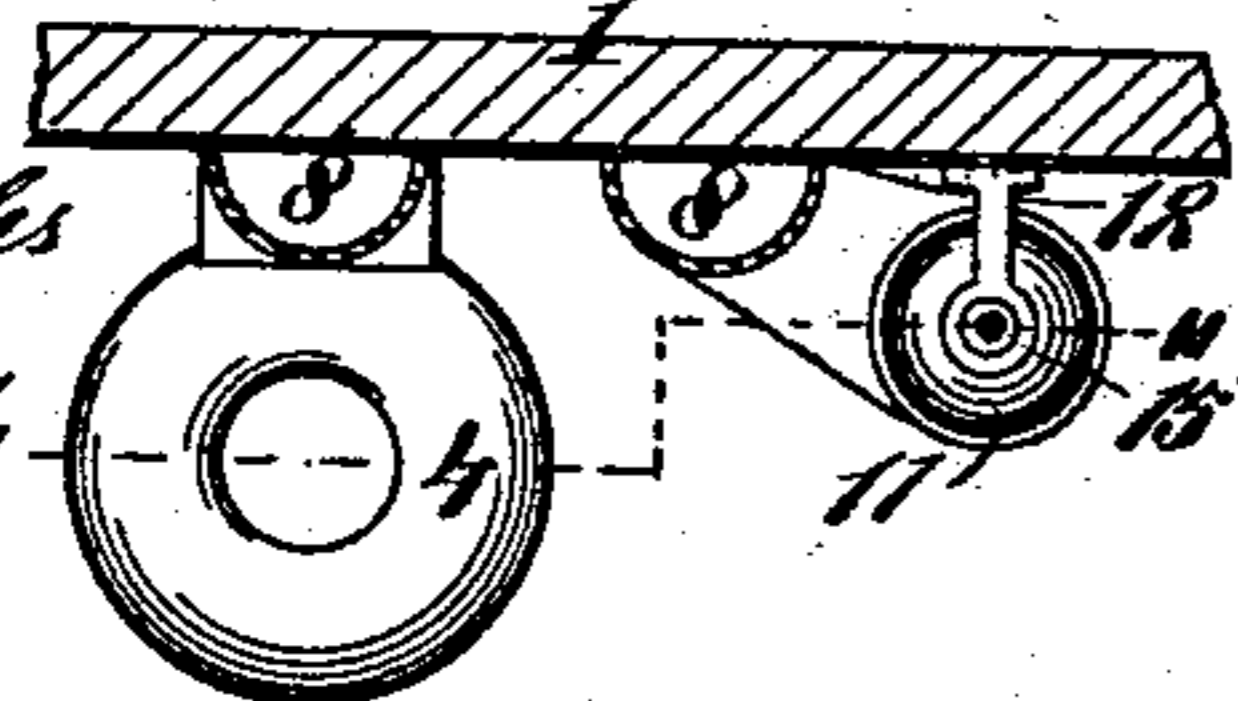


Fig. V.



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Attest:
Charles Pickles
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(No Model.)

2 Sheets—Sheet 2.

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Fig. VII.

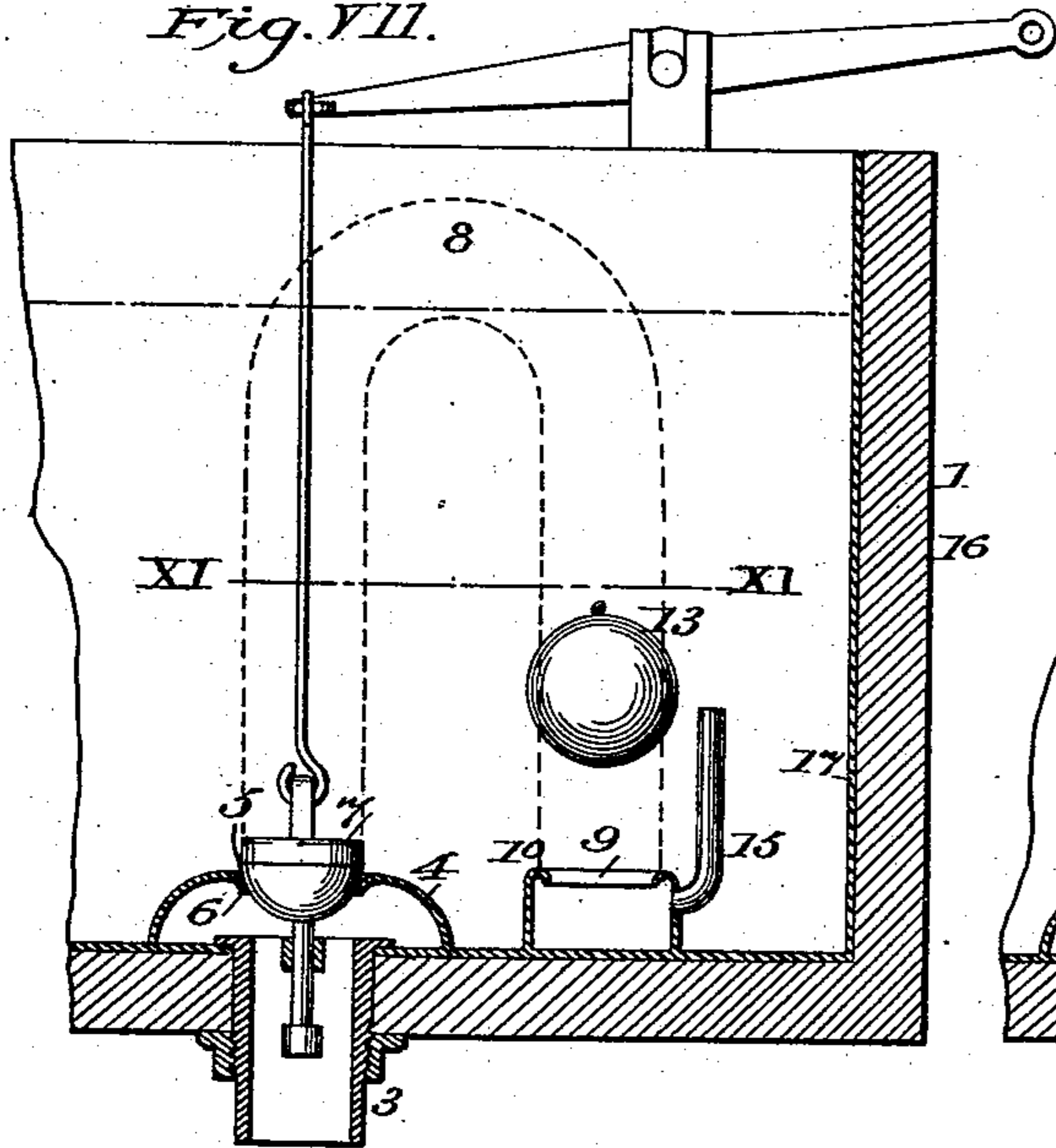


Fig. VIII.

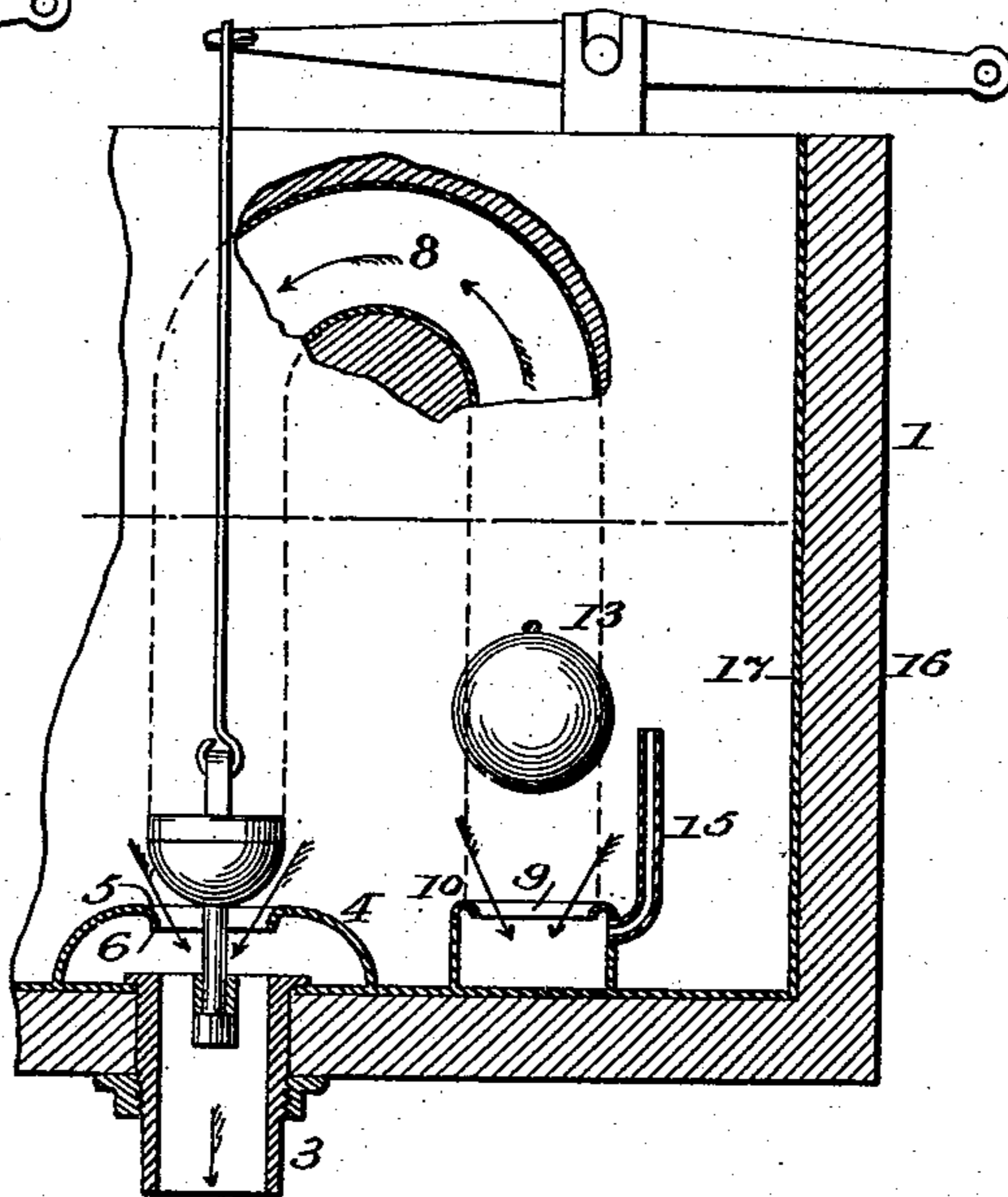


Fig. IX.

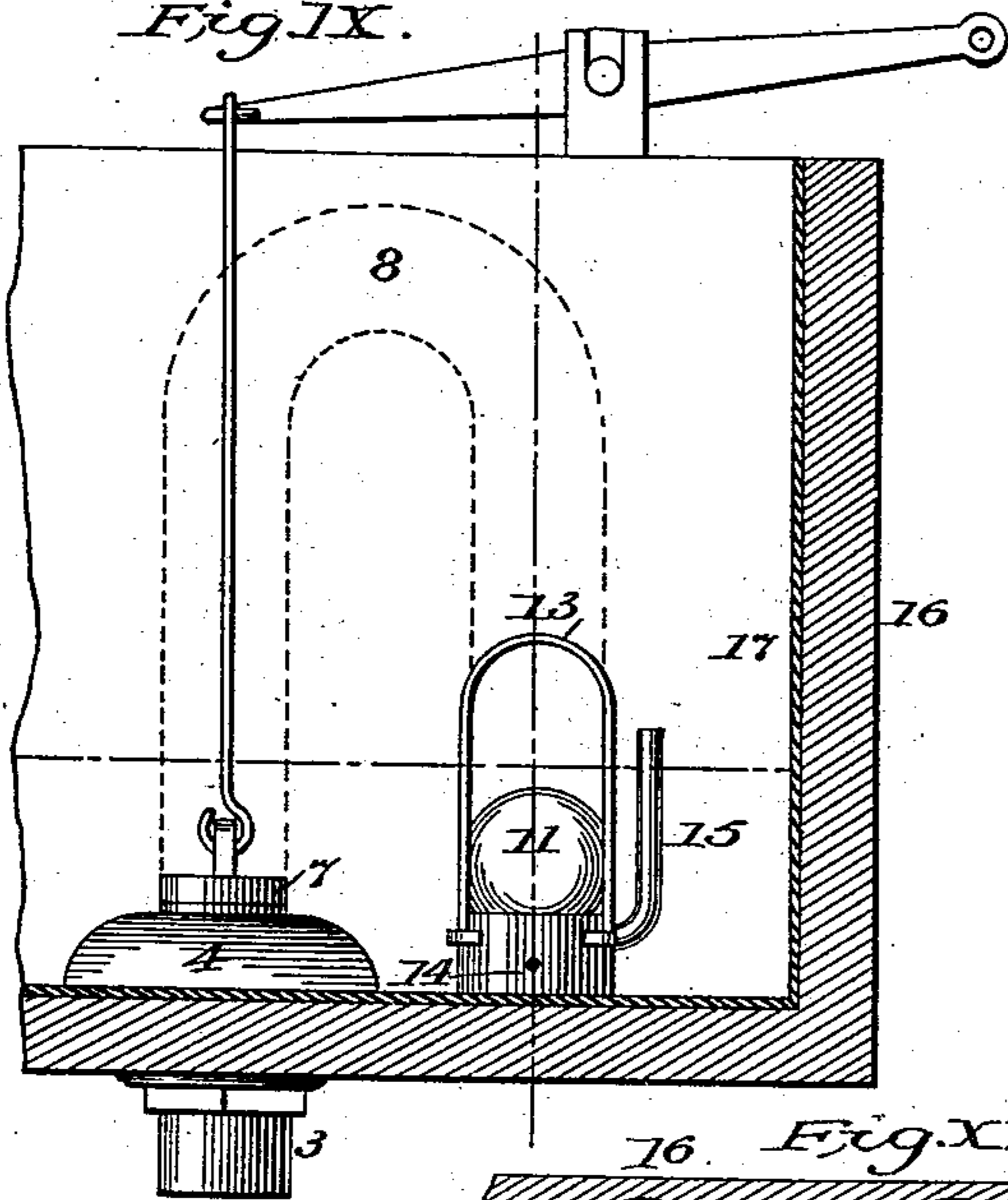


Fig. X.

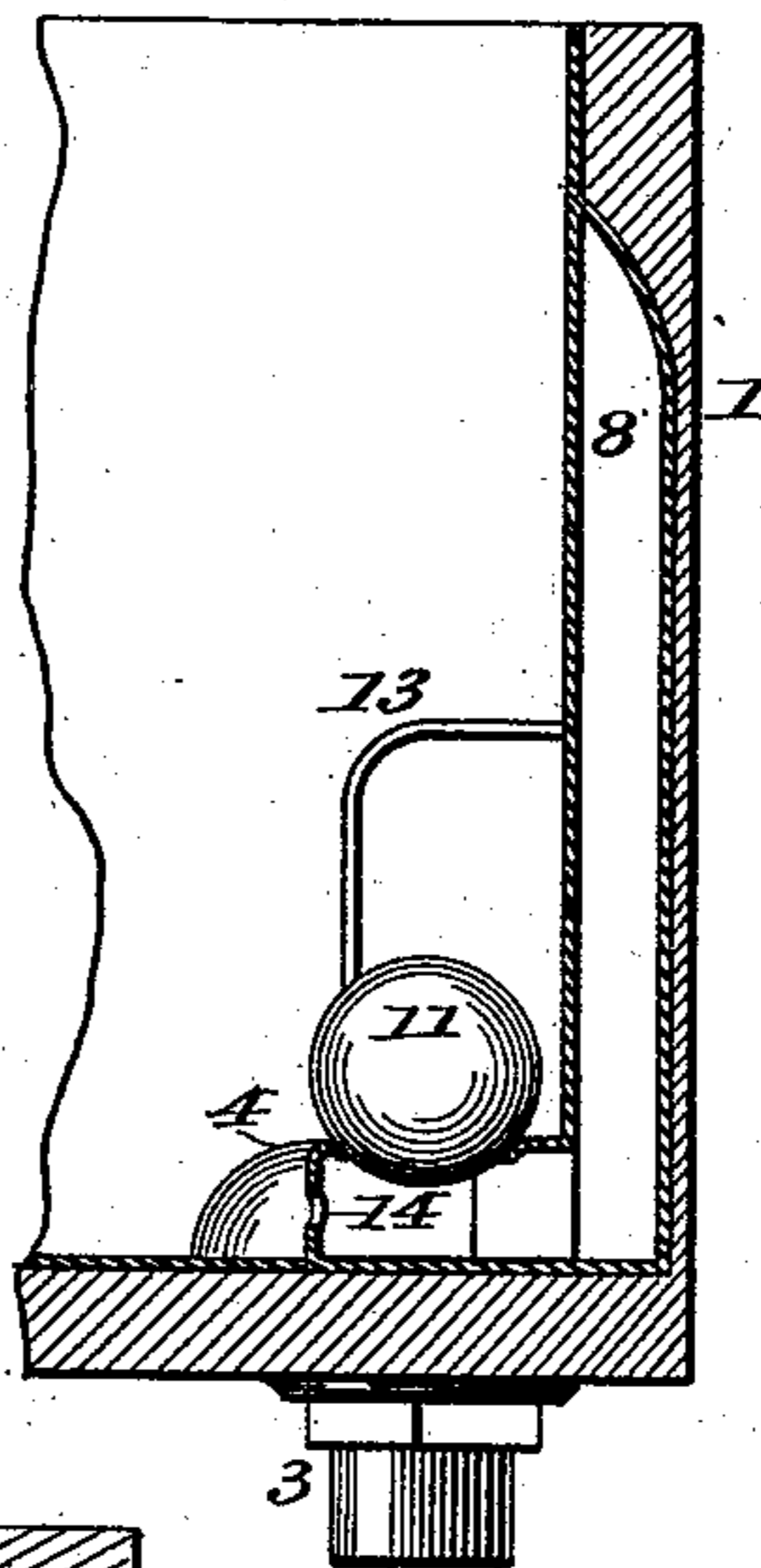
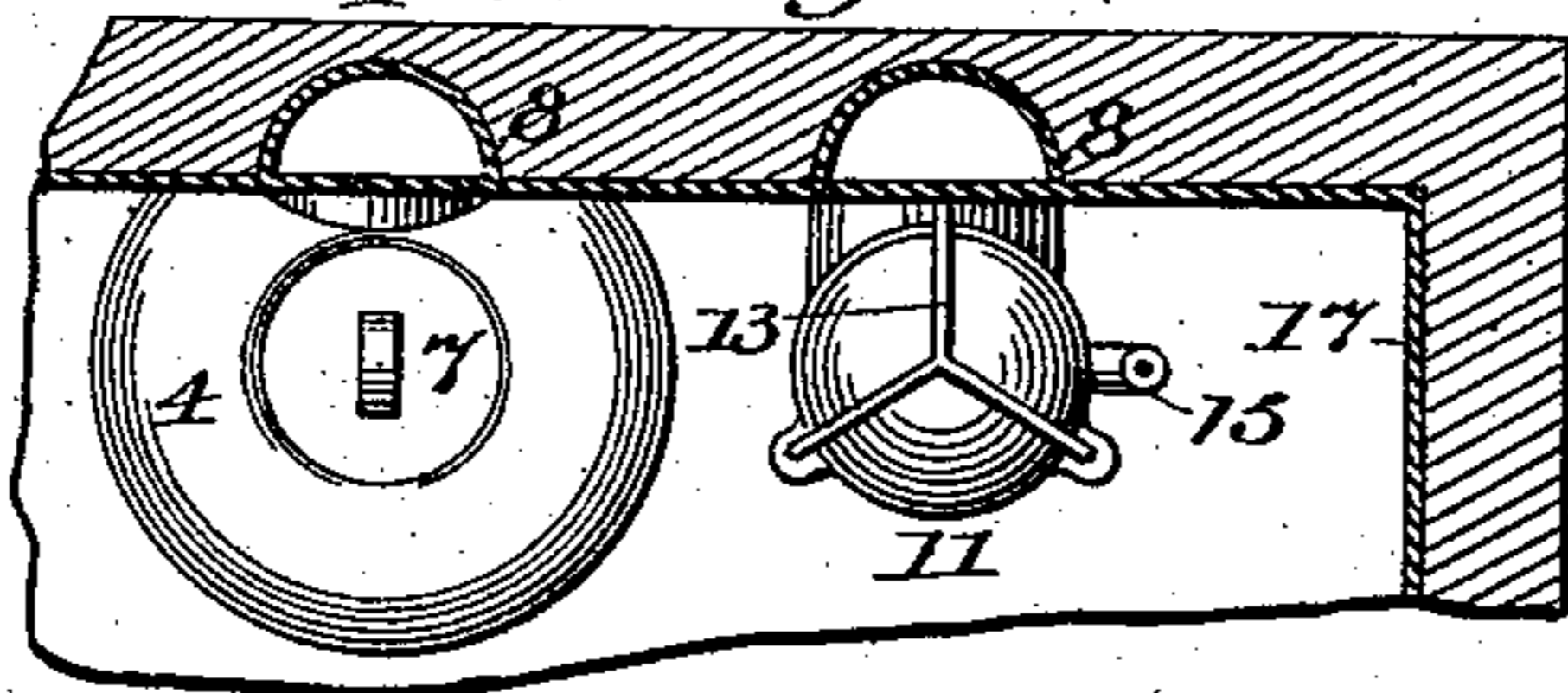


Fig. XI.



Witnesses.
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UNITED STATES PATENT OFFICE.

PETER WHITE, OF ST. LOUIS, MISSOURI.

WATER-CLOSET CISTERN.

SPECIFICATION forming part of Letters Patent No. 506,757, dated October 17, 1893.

Application filed March 22, 1892. Serial No. 426,023. (No model.)

To all whom it may concern:

Be it known that I, PETER WHITE, a citizen of the United States, residing in the city of St. Louis, State of Missouri, have invented certain new and useful Improvements in Water-Closets, of which the following is a specification.

My invention relates to improvements in water-closets, and has for its principal objects to provide a tank whose action is comparatively noiseless and automatic, to secure a proper afterwash, to have the outlet pipe always sealed against the escape of gases and to have the parts exposed as little as possible, and, generally, to improve the mechanical construction of the tank.

To these ends, my invention consists in the construction and arrangement of parts hereinafter specified.

In the accompanying drawings, forming part of this specification, Figure I is a longitudinal vertical section of the tank along the line I—I of Fig. V, showing the normal positions of the parts when the tank is filled. Fig. II is a like view showing the starting valve raised. Fig. III is a like view showing the interior parts in elevation in their positions when the supply of water to the siphon is cut off. Fig. IV is a partial transverse vertical section along the line IV—IV of Fig. II. Fig. V is a partial horizontal section on the line V—V of Fig. III, and Fig. VI is a vertical section through the float. Figs. VII, VIII, IX, X and XI, correspond respectively to Figs. I, II, III, IV, and V, being views of a preferred construction in which the air-tube is fixed, instead of being carried by the float, and in which the siphon conduit is formed in the side of the tank.

The tank, 1, is supplied with water by the supply pipe, controlled by the ordinary automatic ball-cock, 2. An outlet pipe 3, is connected to the lower portion of said tank, its upper end preferably passing through the bottom and open to the inside of the tank. A hemispherical plate or raised collar 4 is secured at its edge to the inside of the tank around the open end of said outlet pipe. Said plate or collar, 4, has an opening, 5, therein, the edge of which is shaped to form a valve seat, 6, and a valve, 7, normally rests thereon,

closing said opening and separating the end of the outlet pipe from the main body of the tank. This valve, 7, is provided with any suitable connection for operating it from the closet, as for instance, with the connecting rod, lever and chain shown in the drawings. One end of a looped conduit or pipe, 8, is connected to the hemispherical plate or collar, 4, a corresponding hole being provided in said collar at the place of connection. The end of the looped conduit may be connected directly to the outlet pipe below the valve, in which case the raised collar is dispensed with and the open end of the outlet pipe forms the valve seat, the main function of said collar being to provide a seat for the valve. The lower inside portion of the top of the loop is in the water line, that is, level with the water at the point of cut-off, and the other end of the loop is near the bottom of the tank. This end of the loop is preferably horizontal and is provided with an opening, 9, in its upper side. The edge of this opening is arranged to form a valve seat, 10, and a float, 11, constituting a valve, or a valve operated by a float, is arranged to fit thereon and close said opening when the level of the water falls to a predetermined point. The float is preferably a hollow ball of some soft material such as rubber, so that its contact with the valve seat will be comparatively noiseless and its fitting insured. This float is provided with a bracket guide, 12, or a cage, 13, within which it is free to move but which serves to direct it to the valve seat. A small opening, 14, is made near the end of the loop in such a position that the float valve does not close it. A tube, 15, of small bore open at both ends is arranged in such a way that when the float valve is on its seat it reaches from the space beneath the valve to a point above the water-line and thus furnishes a communication from the open air to the under side of said float when the float is on the valve seat. In Figs. I to VI inclusive, this tube passes through and is carried by the float; in Figs. VII to XI inclusive, the tube is fixed at its lower end to the lower end of the loop beneath the valve seat. The height to which the tube extends when it passes through the float is immaterial, provided it

is high enough to have its upper end open to the air, when the float reaches its seat. When the small tube is connected to the lower end of the loop, its upper end should be of such height as to remain under water until the float reaches the valve seat and should then be exposed to the air. Instead of connecting the air-tube or vent below the valve seat, it may be connected at any other point in the loop, or the air-tube may be replaced with a mere hole in the loop at the same level as the open end of the tube would have been, but this construction is liable to cause noise.

The operation is as follows: The tank being filled with water up to the bend of the loop, a pull on the chain raises the valve from its seat and the water in the tank runs directly into the outlet pipe. When the valve drops to its seat, the direct connection from the tank to the outlet pipe is closed, but the flow of water down the outlet pipe establishes a siphonic action through the loop. This action once begun continues until the float valve falls with the level of the water nearly to the valve seat. When the ball float reaches nearly to the seat, the current causes it to move quickly against its seat. The supply of water is thus cut off at the main inlet but the small opening still admits water. The water already in the longer leg of the siphon and that in the shorter leg displaced by the water admitted through the small opening, runs down the outlet pipe at a reduced velocity. The reduction in velocity is due to the pressure on the water column in the shorter leg being spent in holding the float against its seat. The volume and duration of this last flow or afterwash are determined by the size of the small opening and the height of the fixed air-tube or vent and its velocity being slow insures a supply of water in the basin below, whereas the momentum of a rapid flow is liable to carry all the water over the edge of the bowl or dish. The opening in the tube is so small that it requires an appreciable time to produce its effect, but when sufficient air is admitted beneath the float, the float rises of its own buoyancy from its seat and the water in the short leg of the siphon runs back into the tank. By this operation, there is no sudden admission of air to the siphon and consequently the noise and back action or re-siphoning, of the water in the longer leg of the siphon running back after the column is broken, are avoided. The mouth of the outlet pipe is always under water, so that a water seal is thereby made, to prevent the escape of gases from the outlet pipe; and the siphon acts also as an overflow pipe in case the ball cock fails to cut off the supply. When the tank is made of wood, 16, with a metallic lining 17, it is preferable to form the loop channel in the wooden side behind the lining by grooving or channeling the wood as shown in Figs. VII to XI inclusive. This construction leaves the interior

of the tank freer from obstruction and gives the loop a location where it is less liable to injury.

What I claim as new, and desire to secure by Letters Patent, is—

1. A tank provided with an outlet pipe, an upwardly extending looped conduit open at one end to the outlet pipe and at the other end having an opening into the tank and a valve for said opening, said conduit also having a vent below the normal water line and at a predetermined distance above said opening, substantially as described.

2. A tank provided with an outlet pipe, an upwardly extending looped conduit open at one end to the outlet pipe and at the other end having an opening into the tank, a valve for said opening and a small tube below the normal water line reaching from the space in this end portion of said looped conduit a predetermined distance above said opening, substantially as described.

3. A tank provided with an outlet pipe, an upwardly extending looped conduit connected thereto at one end, and having an opening into the tank at the other end, a float valve for said opening and a small tube entirely below the normal water line and connected to said conduit near said opening and extending a predetermined distance upward.

4. A tank provided with an outlet pipe, an upwardly extending looped conduit connected thereto at one end and having openings into the tank at the other end, a valve for one of said openings and a small tube entirely below the normal water line reaching from the space in the conduit near said opening a predetermined distance above said openings, substantially as described.

5. A tank provided with an outlet pipe connected to the lower part thereof, a raised collar around said outlet pipe and connected at its edge to the inside of said tank and having an opening therein, a valve for said opening and an upwardly extending looped conduit formed behind the lining of said tank open at one end to the space under said collar and open at its other end to the interior of said tank.

6. A tank provided with an outlet pipe connected to the bottom thereof, a raised collar above said outlet pipe and connected at its edge to the bottom of said tank and having two openings therein, a valve fitting one of said openings, and an upwardly extending looped conduit formed behind the lining of said tank connected at one end to the collar at the second opening and open at its other end to said tank.

7. A tank provided with a lining, and having a portion of its side under said lining grooved or channeled to form a looped conduit, said conduit being open at one end to the outlet pipe and at the other end to the inside of the tank.

8. A tank provided with an outlet pipe con-

5 nected to the lower part thereof, a raised collar around said outlet pipe and connected at its edge to the inside of said tank and having an opening therein, a valve for said opening and an upwardly extending looped conduit open at one end to the space under said collar and having an opening at its other end to the interior part of the tank, a float valve for said

opening and a small tube below the normal water line reaching from the space in the end of said conduit a predetermined distance upward.

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Witnesses:

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