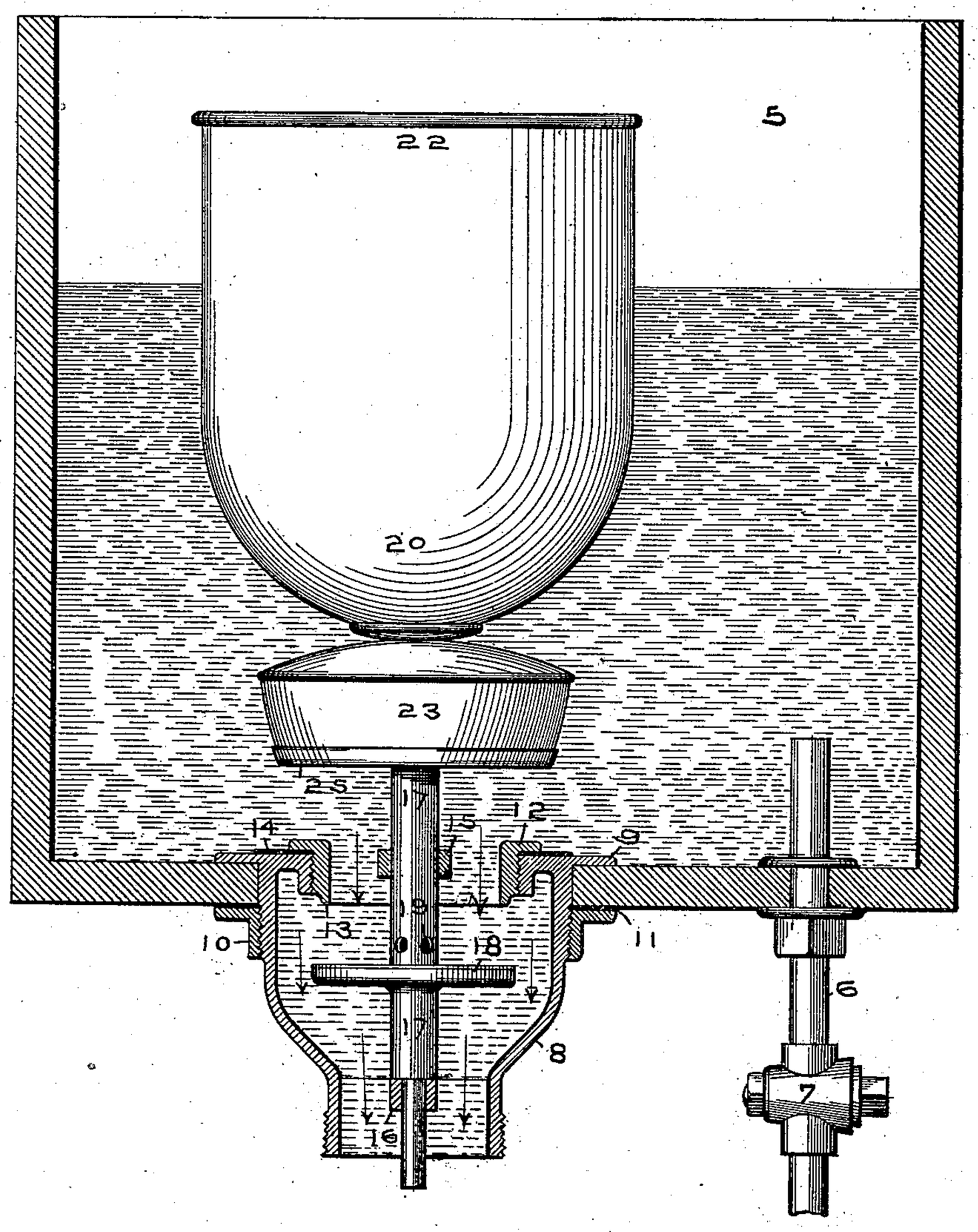
(No Model.) 2 Sheets—Sheet 1.

P. WHITE.

AUTOMATIC FLUSHING TANK VALVE.

No. 548,685. Patented Oct. 29, 1895.

Fig. 1.



Attest;

H. S. Neal.

E. E. Vernell.

Inventor;

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By his Attys.

Fowler & Fowler

(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

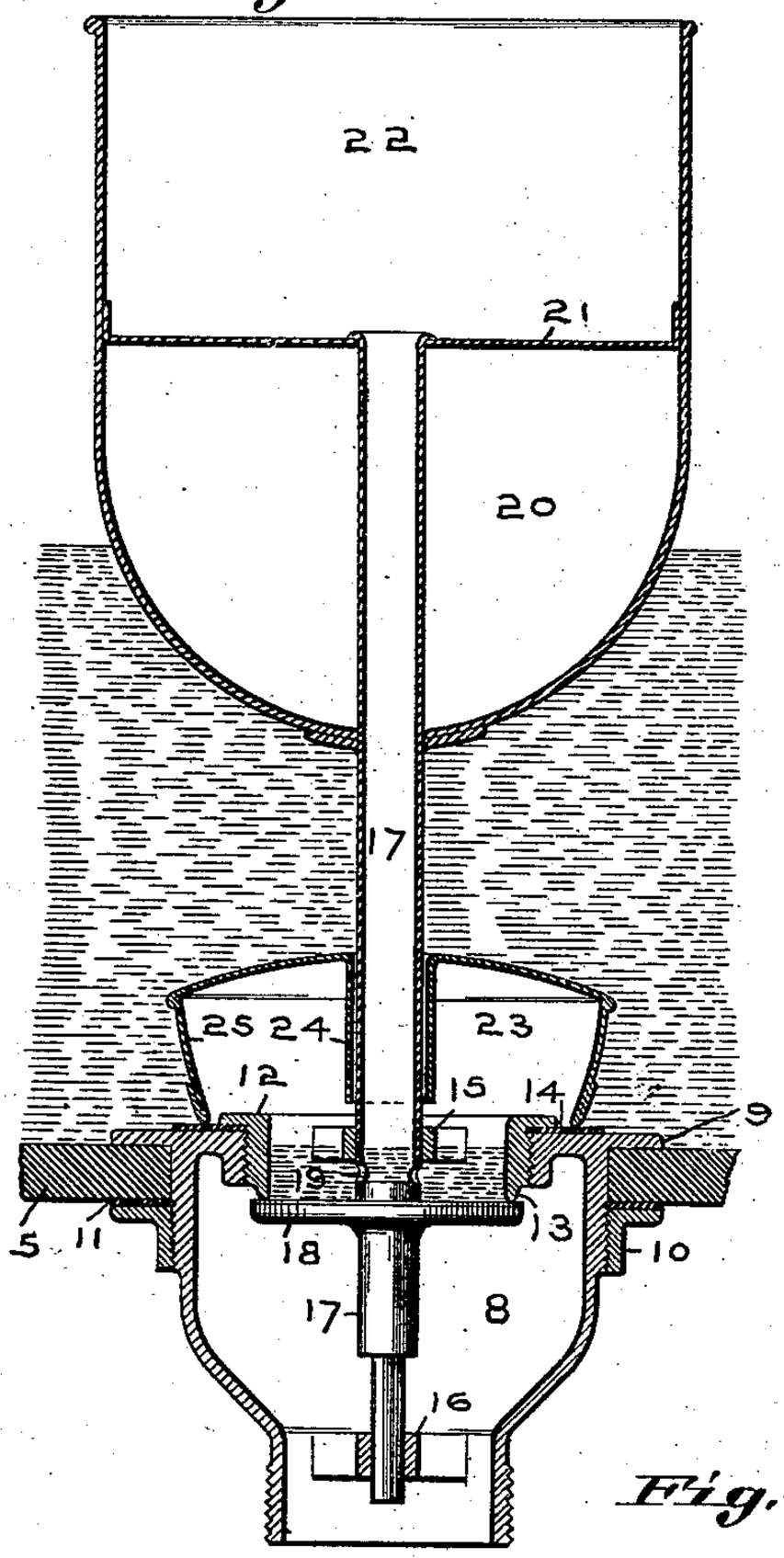


Fig. 3.

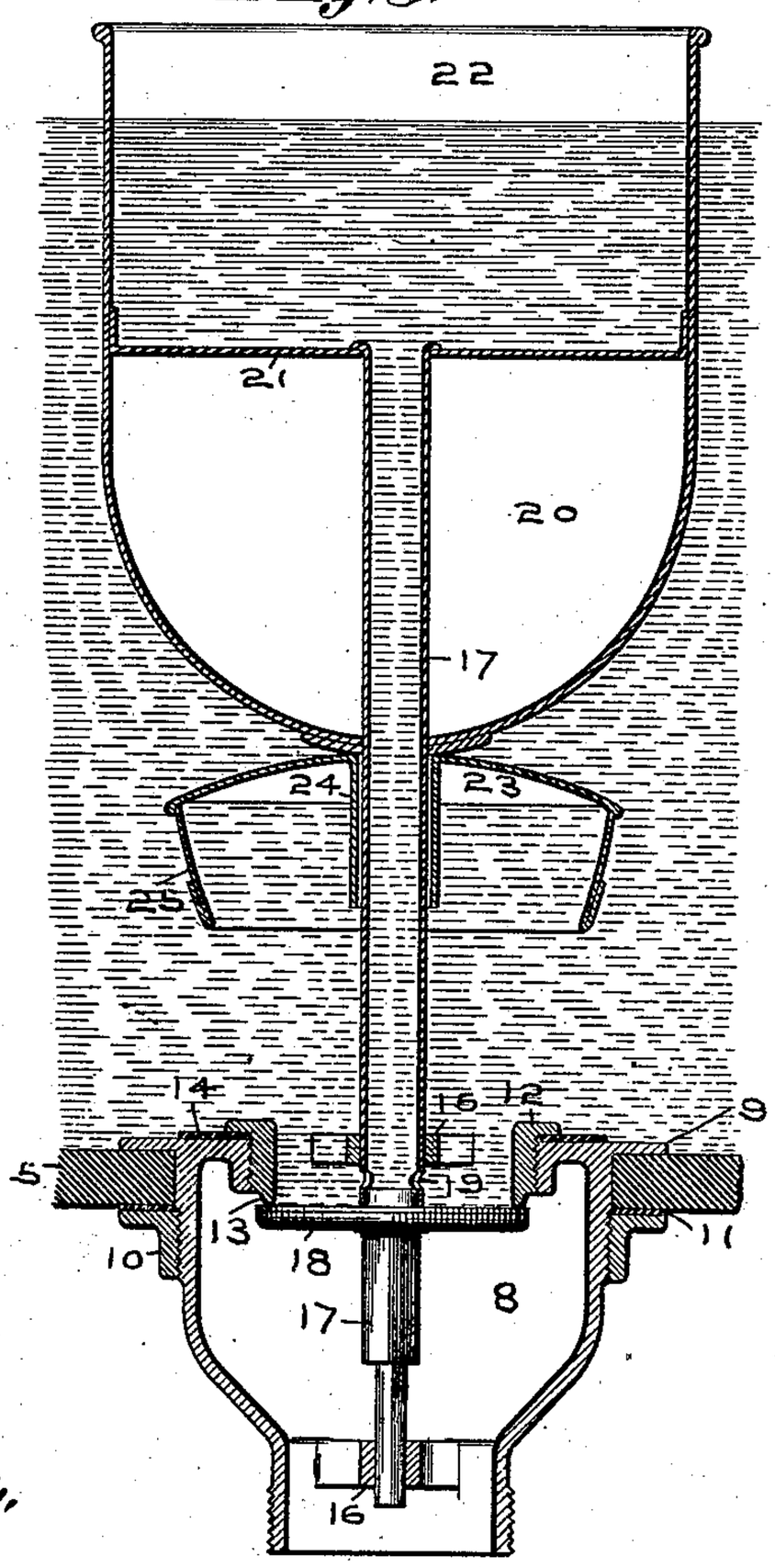
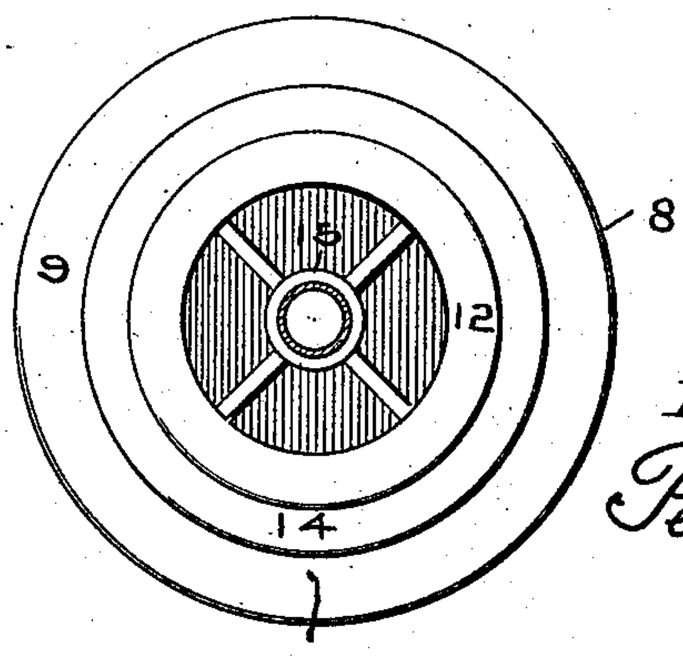


Fig. 4.



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Inventor,

Peter White,

By his Atty's.

Fowler & Fowler

UNITED STATES PATENT OFFICE.

PETER WHITE, OF ST. LOUIS, MISSOURI.

AUTOMATIC FLUSHING-TANK VALVE.

SPECIFICATION forming part of Letters Patent No. 548,685, dated October 29, 1895.

Application filed July 23, 1894. Serial No. 518,321. (No model.)

To all whom it may concern:

Be it known that I, PETER WHITE, a citizen of the United States, residing at the city of St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Automatic Flushing-Tank Valves, of which the following is such a full, clear, and exact description as will enable any one skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to a new and useful automatic flushing float-valve which is particularly adapted for use in connection with flushing-tanks for water-closets and where such closets are either single or in series and with a separate basin for each closet or a single basin for the series. It is, however, more advantageously used with the latter, where it is desirable that the closets be flushed at regular intervals. The valve which I have shown in the drawings, and which is the preferred form at this time, is of a double-float construction—that is, there is a main valve seating on the outside of the outlet-opening of the flushing-tank and a float is carried on the upper end of its stem, which in this case is hollow. Above the float is a water-chamber which opens into the end of the stem, and there are also perforations in such stem near its lower end. A bell-float is carried loosely on the stem of such main valve and seats above such main valve. The bell-float is returned after each operation to its normal position and closed by the falling of the water-level in the tank.

In the drawings, Figure 1 is a cross-sectional view through a flushing-tank, showing the inlet-pipe and also an outlet with one of my float-valves therein in elevation. Fig. 2 is a similar view, a part only of the tank being shown and the valve and floats being in section and closed. Fig. 3 is a similar view showing the main valve closed, but with the bell-float raised and the main valve about to open. Fig. 4 is a plan view of the water-outlet of the tank, the main-valve stem being in section.

In all of the views the same marks of reference refer to the same parts.

In detail, 5 represents a flushing-tank of any suitable size or shape, which may be supported above one or more water-closets in the ordinary way. If there were a number of closets and the basin or bowl of each was separate, there would be a pipe leading to each basin or bowl from the main outlet-pipe; but if there was one basin for the row or series of closets the main outlet-pipe would lead direct to one end of the basin and would flush the entire basin and all the closets at each operation. This latter plan is preferable.

6 is the inlet-pipe into the flushing-tank, and is connected with the tank in any desired way, 7 being a cock or regulating-valve connected to such pipe to regulate the flow of water into the flushing-tank 5.

8 is an outlet shell or coupling between the flushing-tank and outlet-pipe, the latter screwing on the lower end of the shell. The upper end of the shell has an outer annular flange 9, which is of larger diameter than the opening through which the shell passes and bears against the inside of the bottom of the flushing-tank while the shell is held securely in place by a ring 10, which screws on the outside of the shell below the flushing-tank, an annular washer 11 being interposed between the two to prevent leakage.

12 is a flanged ring which screws into the open top of the shell within the tank and forms a valve-seat 13 below and in the shell 8.

14 is an annular washer which is interposed between the flange of the ring 12 and the top of the shell 8 to prevent leakage, and, extending beyond such flange, it also forms a valve-seat.

Centrally within the ring 12 and supported by radiating arms from such ring is a collar or guide 15, and a similar, but smaller, guide 16 is formed in the lower end of the shell 8. These guide and support the valve-stem 17, which carries the main valve 18, which is adapted to seat on the valve-seat 13 on the under side of the ring 12. The lower end of the valve-stem 17 is reduced in size where it works through the guides 16, and the downward movement of the stem 17 is thus limited.

The valve-stem 17 is hollow above the valve 18 and extends up a suitable distance and has an open top. Perforations 19 are formed in the stem just above the valve 18. On the upper end of the valve-stem is formed a main float 20, whose top is on a line with the upper

end of the valve-stem 17 and whose bottom is semispherical in form. The outer walls of the float 20 extend up above the end of the hollow valve-stem 17 and the partition 21, which forms the top of the main float, and form a water chamber or receptacle 22, which has an open top and into which the hollow valve-stem 17 opens.

Below the main float 20 is a bell-float 23, which has a rounded top with a central perforation and a depending sleeve 24 around the edge of the same, the sleeve working loosely on the hollow valve-stem 17.

25 is an outer depending rim or flange which is deflected slightly inward. The lower edge of such flange is adapted to seat on the valve-seat formed by the washer 14, which extends beyond the edges of the flange of the ring 12, as before stated.

The operation of the float-valve is as follows: Supposing the several parts to be in the positions shown in Fig. 2, where a flushing discharge has just been made and the water-chamber in the top of the main float is empty, the buoyancy of the float will hold the main valve closed. The bell-float is held to the valve-seat 14 by the water-pressure on its top, but water in the flushing-tank will seep or run slowly into the bell-float through the space between the valve-stem 17 and the sleeve 24, and will rise in the bell-float until it reaches the lower end of the sleeve, when the air in the bell-float will be imprisoned in the float, and as the water continues to slowly enter the bell-float the air will be compressed within such float. The hollow valve-stem 17 being perforated just above the main valve 18 and these perforations being within the bell-float, the water in such float will pass into the hollow valve-stem through said perforations, and will gradually ascend the same, filling it, and finally entering the water-chamber above. When the water-level in the tank and the hollow stem 17 becomes the same, the bell-float will be raised from its seat, as shown in Fig. 3. When the water-chamber 22 becomes sufficiently loaded so as to overcome the buoyancy of the float, the main valve 18 will open and the water will rush out through the open main valve to the closets below until the water in the tank is low enough to allow the bell-float to seat on the seat 14. At this time the level of the water is comparatively low in the flushing-tank, and the main valve is still open, with the enlarged part of the valve-stem 17 resting on the lower guide, so that the water will pass out of the water-chamber 22 and the hollow valve-stem 17 through the perforations 19. This escape of water being slow on account of the smallness of the perforations 19, it will give an after-wash to the closets after the first or main flush from the tanks. As the entrance of water into the flushing-tank through the supply-pipe 6 is continuous, the water in the tank will in a little while reach the main float and lift it, closing the main valve 18 and bringing the parts of the valve back to their normal positions, (shown in Fig. 2,) when the operation just described will be repeated. Should the level of the water rise in the tank faster than it does in the hollow valve-stem 17, *via* the space between the stem 24 and the stem 17, the water will eventually flow over the top of chamber 22 into the hollow stem 17, and thus lift the bell-float from its seat when the water in the tank and hollow stem 17 is at the same level.

The water-supply into the flushing-tank is regulated through the cock or valve 6, so that the flushing-valve may be made to operate at shorter or longer intervals apart.

It will be seen that the valve herein shown and described is positive and automatic in action, the bell-float being held positively seated. The main valve cannot be seated until the tank empties, or nearly so, and the bell-float reseats itself and cuts off the tank-pressure from the main valve. It is possible to have the bell-float work so closely on the main-valve stem that after the main valve is unseated and the bell-float seated such bell-float would remain seated while the water in the tank rose to a level with the top of the water-chamber 22 and overflowed into such chamber through the hollow valve-stem 17 to beneath the bell-float until the water therein had reached the same level with that in the tank, when the bell-float would rise, and afterward the main valve would be opened by the overloading of its float with water.

If the valve or float is properly weighted, so that it is just light enough to be a float, then it will be lifted at the time stated. If the float is made still lighter, it will lift before the water in the stem reaches the level of the water in the tank, and if it be made too heavy the apparatus will not operate properly.

The bell-float and main valve seating vertically without friction, the valves and their seats will not wear and therefore leaks will not occur. The device is simple, has few parts to get out of order, and is noiseless, the valves thereof seating lightly and with but little friction.

One of the advantages of the device is that it gives the greatest available power to a stream of water from a non-pressure tank, as the full head of the column of falling water is utilized by means of this invention, which, of course, is not true of the ordinary automatic siphon discharges from tanks.

The valve mechanism herein set forth may be employed to advantage with tanks on the top of buildings, which tanks are connected with automatic sprinklers for extinguishing fires and discharge the water when the air-pressure is removed from the outlet-pipe in a well-understood way.

Having fully described and set forth my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. The combination to form an automatic discharge valve mechanism for a tank, of a

main valve controlling the discharge from the tank, a float for said main valve, and a float valve opening and closing the opening through the main valve seat after the main valve closes and opens respectively.

2. The combination to form an automatic discharge valve mechanism for a tank, of a main valve controlling the discharge from the tank, a float for said main valve and adapted to be loaded with water as the water in the tank rises, and a bell-float playing on the stem of the main valve and seating over the main valve after it opens, and unseating after the main valve closes.

3. The combination with the discharge valve of a tank, of a float opening said valve when sufficiently loaded with water, and a bell-float seating over the discharge opening of the tank, closing the same when a low level of water is reached in such tank and remaining seated until after the discharge valve is re-seated and the buoyancy of its float sufficient to hold it closed.

4. In an automatic flushing tank valve, the combination of a main valve carried on a hollow stem whose lower end is closed, such valve seating in the bottom of a flushing tank, a float and a water-chamber carried on the upper end of such stem, said stem opening into such water-chamber, openings in said stem above the main valve, and a bell-float working loosely on the main valve stem and seating above such main valve, such bell-float permitting the closing of the main valve.

5. In an automatic flushing tank-valve, the combination of a shell forming an outlet from a tank, a double valve seat in the top of such shell, a hollow vertical valve stem carried in guides in such shell, a valve on the lower end of such stem adapted to seat on the lower valve seat, a float and a water-chamber formed on the upper end of the valve stem, the upper end of such valve stem opening into said water-chamber, openings in the lower end of said stem, and a bell-float carried loosely on the valve stem and seating on the upper valve seat above the openings in such valve stem.

6. In an automatic flushing tank valve, the combination of a double valve seat in the outlet of a tank, a main valve carried on the lower end of a hollow vertical stem and adapted to seat on the lower valve seat, a bell-float provided with a central opening having a depending sleeve working loosely on said stem, such valve adapted to seat on the upper valve seat, a float formed on the upper end of the valve stem, an open water-chamber above the upper end of the valve stem opening into the water chamber, and openings in the valve stem below the bell-float.

7. In an automatic flushing tank-valve, the combination of a shell forming an outlet from a tank, a ring in the top of such shell, forming a valve seat within the shell, an upper valve seat within the tank held by such ring, guides formed in the said shell and ring, a vertical valve stem working in such guides, and carrying a main valve thereon, which seats on the lower valve seat, said stem being hollow above such valve, a bell-float carried loosely on the stem above the main valve and seating on the upper valve seat, a float and a water-chamber carried on the upper end of said valve stem, such water-chamber opening into such stem, and perforations in the lower end of such stem above the main valve.

In testimony whereof I have hereunto set my hand and seal, this 20th day of July, 1894, in the presence of the two subscribing witnesses.

PETER WHITE. [L. S.]

Witnesses:
A. C. FOWLER,
J. F. WESTON.