

No. 685,493.

Patented Oct. 29, 1901.

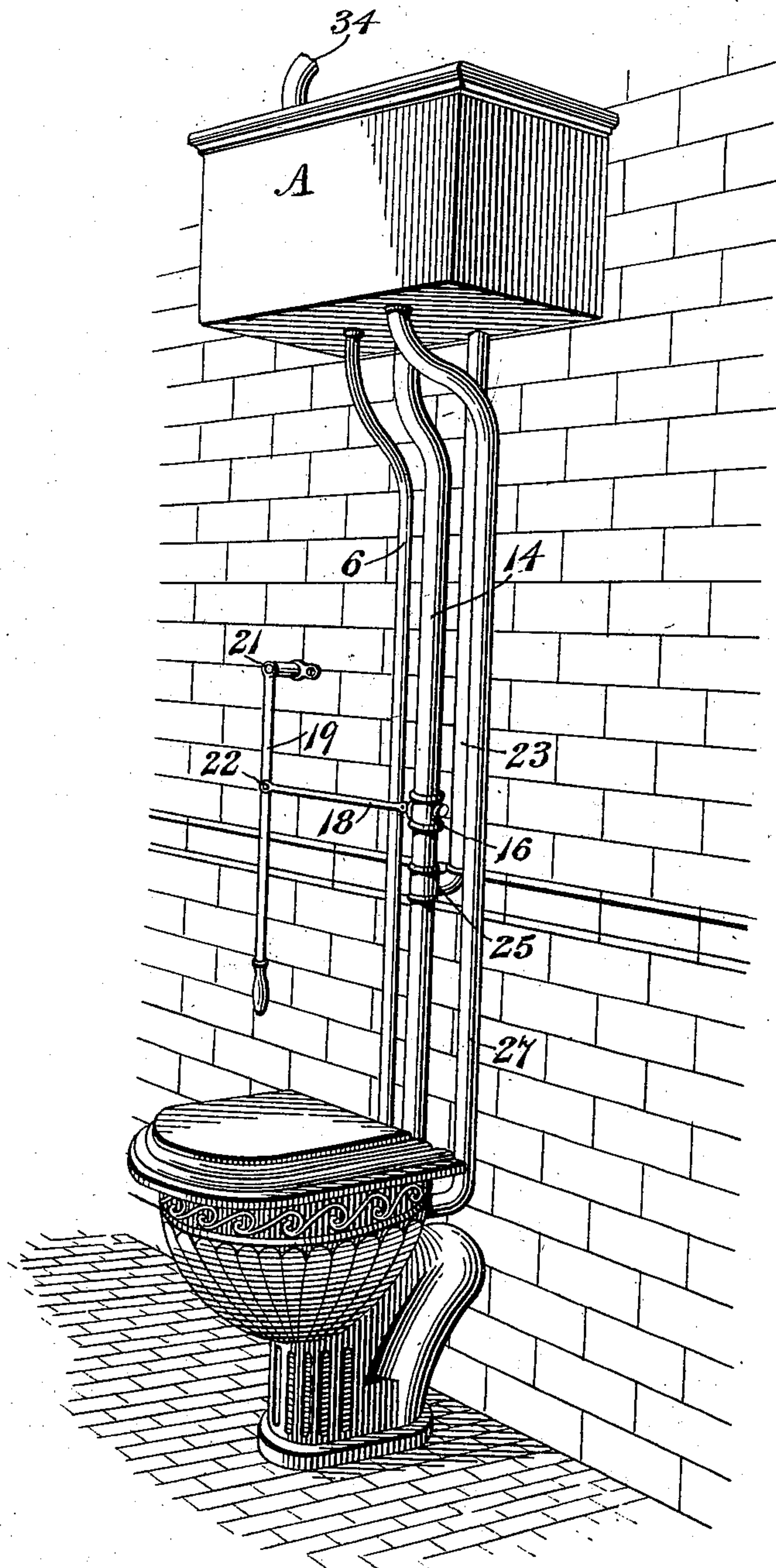
W. H. STILWELL.  
VENTILATION OF WATER CLOSETS.

(Application filed Feb. 10, 1900.)

(No Model.)

2 Sheets—Sheet 1.

*Fig. 1.*



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2 Sheets—Sheet 2.

Fig. 2.

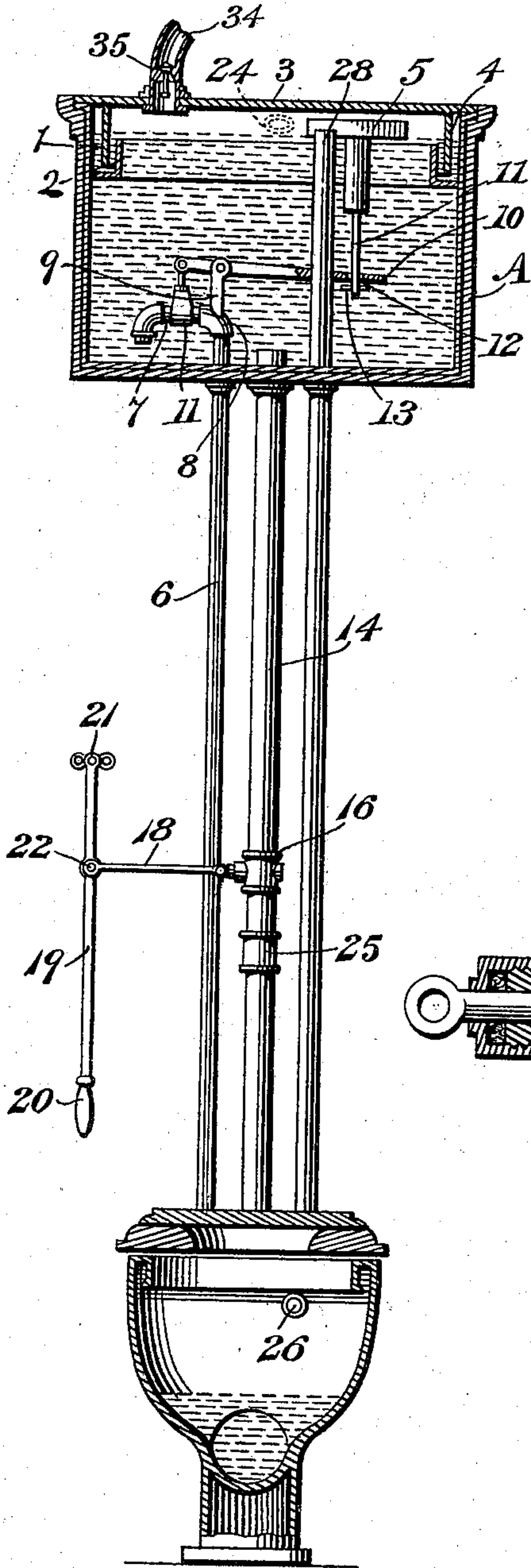


Fig. 6.

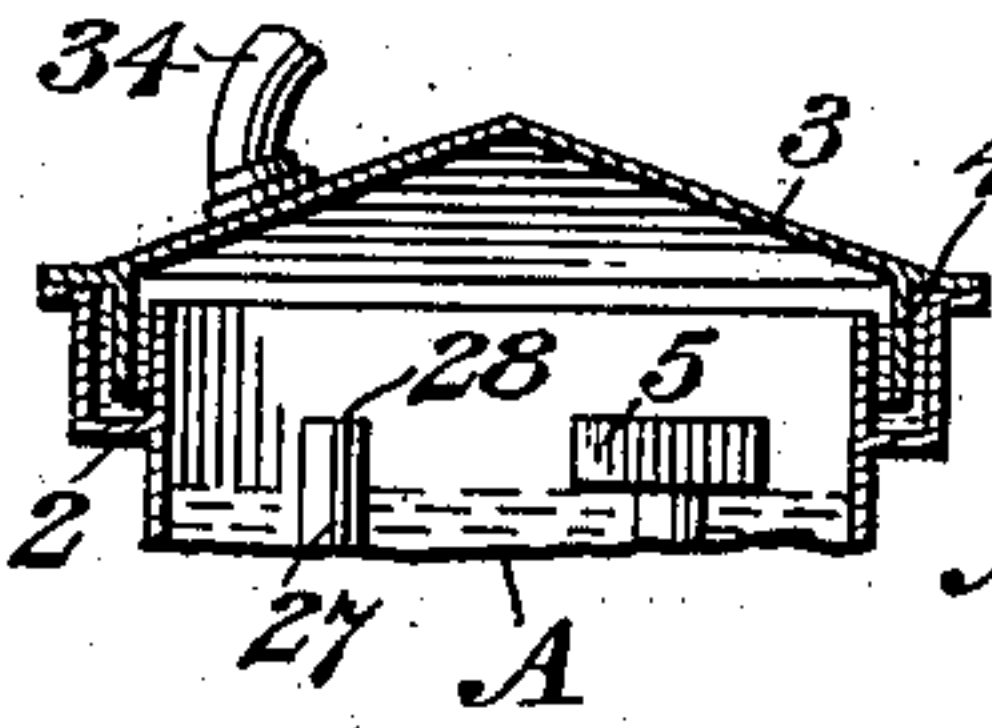


Fig. 4.

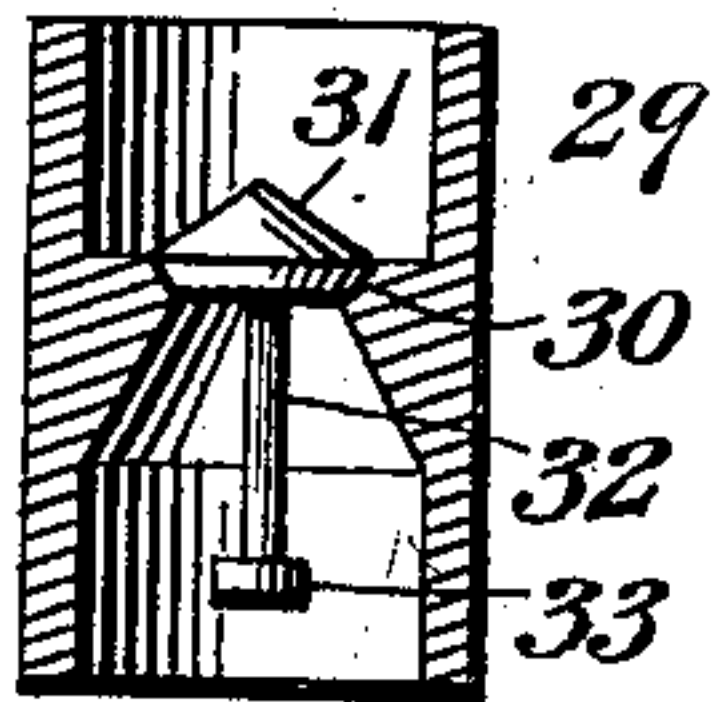


Fig. 5.

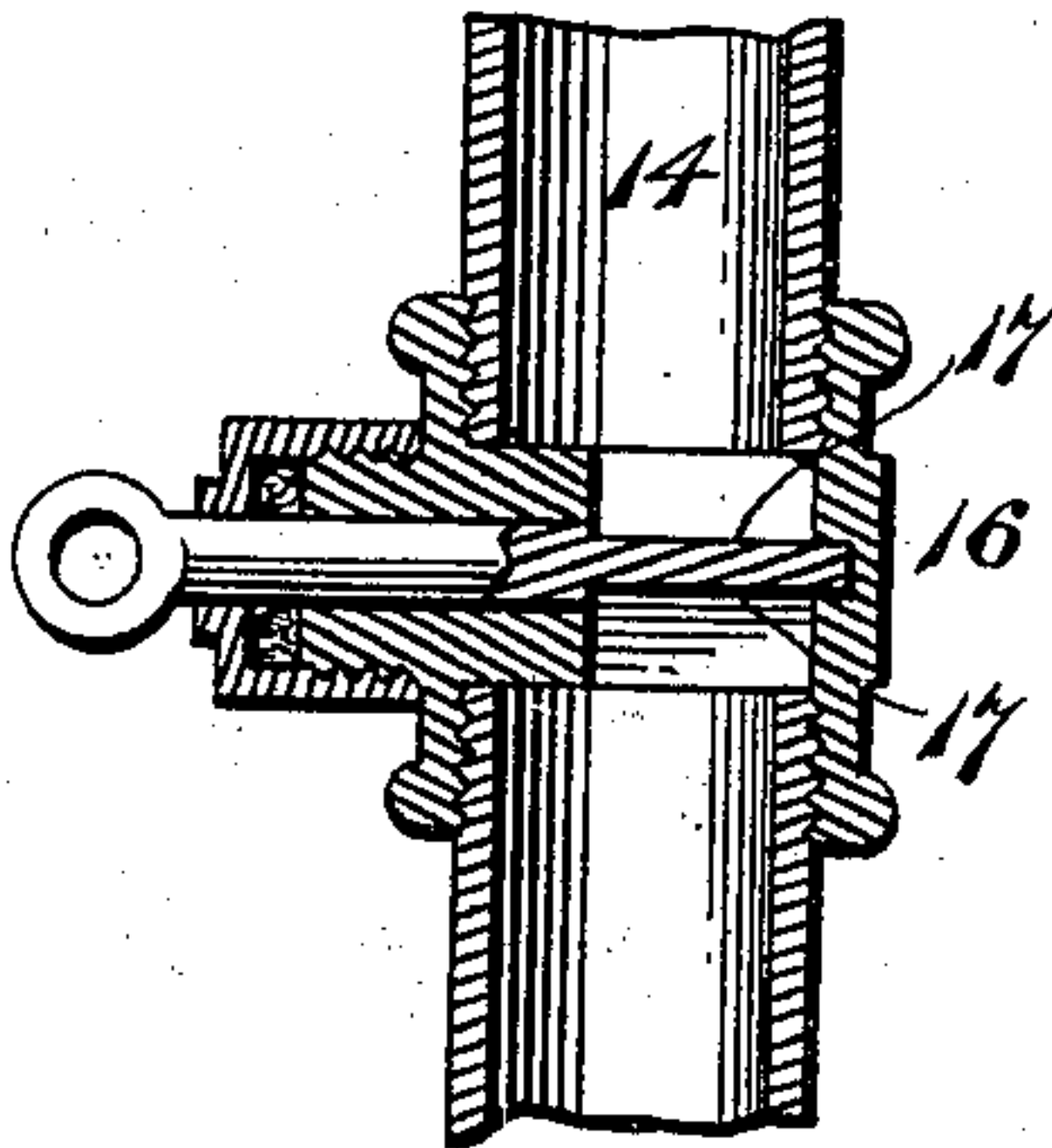
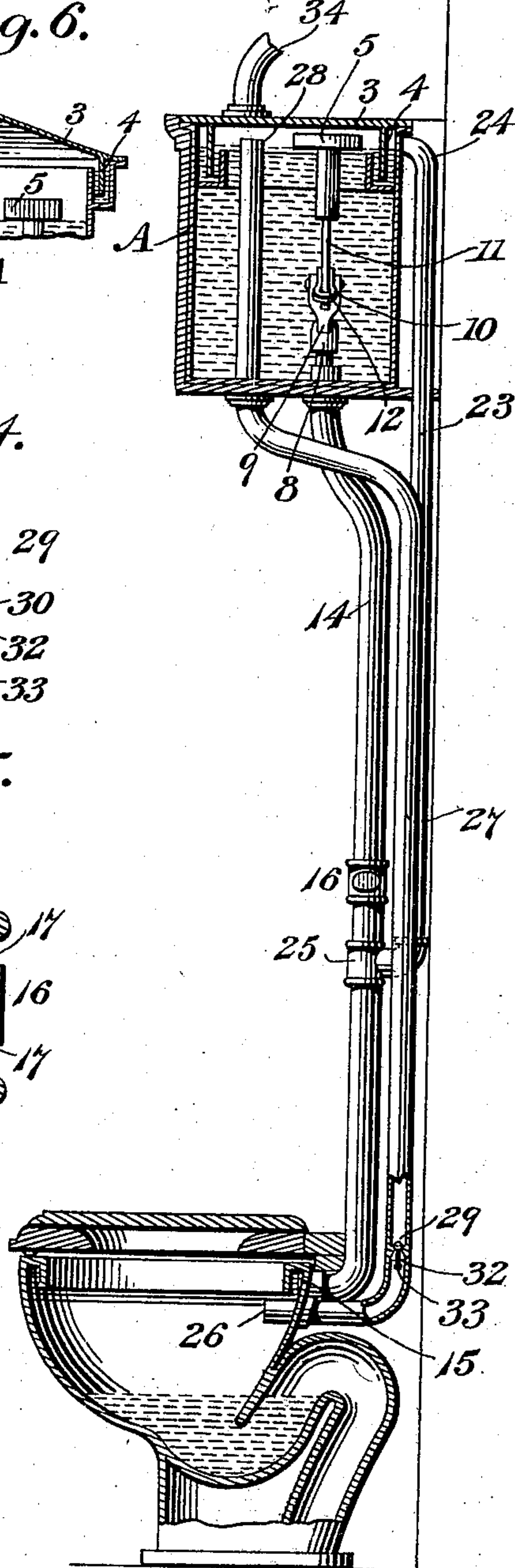


Fig. 3.



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1234



# UNITED STATES PATENT OFFICE.

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## VENTILATION OF WATER-CLOSETS.

SPECIFICATION forming part of Letters Patent No. 685,493, dated October 29, 1901.

Application filed February 10, 1900. Serial No. 4,799. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM H. STILWELL, a citizen of the United States of America, residing at Binghamton, in the county of Broome and State of New York, have invented a certain new and useful Improvement in the Ventilation of Water-Closets, of which the following is a specification.

My invention relates to an improvement in the ventilation of water-closets, and is more particularly applicable to those water-closets termed "washout," although it may be used with any sanitary water-closet in general use; and it has for its object the combination, with a simple, inexpensive, and durable appliance, of a better ventilation for the bowl proper beneath the seat than has hitherto been devised and the removal of all odors consequent upon the use of the water-closet as such, these odors being removed from the closet and carried out of the building in the improved manner herein described.

Heretofore devices have been furnished which provide a violent downflush into the bowl, which is intended to carry any offensive odors down the sewer-pipe or to draw them down into the lower siphon through the water in the trap and convey them away; but objections have arisen to this manner of endeavoring to eliminate the foul air and gases generated by the use of these devices, and my invention is designed as an improvement upon these and similar constructions.

My improvement consists in applying to a water-closet bowl provided with a cistern or tank for containing water and having suitable connections with the bowl, together with means for causing the downflow of water to the bowl, certain novel features of construction and combinations of parts, which will be more fully described hereinafter, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in perspective of my improved device applied to the bowl of an ordinary water-closet. Fig. 2 is a sectional view, in elevation, of my device, showing the pipe connections between the bowl and tank. Fig. 3 is another view, in side elevation, taken at right angles to Fig. 2. Figs. 4 and 5 are views of details, and Fig. 6 is a slight modification.

A represents the water-tank or cistern,

which can be made of copper, wood, or any suitable material and lined on the inside with some material impervious to water or air—as zinc, tin, or any suitable lining. This tank is usually of an oblong shape and contains about twelve gallons when filled. A trough or recess is constructed along the upper edge of this tank, one side of said trough or recess being formed by the side of the tank. The trough is angular in cross-section, but its inner wall or side 2 does not extend to a level with the top of the tank, thus allowing the water to flow into the trough and fill it when the water has risen above the level of said inner side. A lid or cover 3, easily removable for cleaning and repairing purposes, is provided with flanges 4, fits, and is secured on top of the tank, said flanges extending part way down into the trough, thus forming an air-tight joint. An ordinary feed-pipe 6, leading from any suitable source, supplies the tank with water when required. This feed-pipe enters the tank preferably through the bottom, its point of entry being suitably packed to prevent leakage. Any usual means for causing the flow of water to start and cease may be used; but I have devised an improved construction, as follows: A short arm 7, with a downturned mouth, is connected to the feed-pipe by an elbow 8. Suitably attached to this elbow is a standard 9, at the upper end of which a lever 10 is pivoted. A valve 11 is placed in the arm 7, the stem of which valve is pivoted in the shorter arm of the lever. A hollow float 5, T-shaped in cross-section and air-tight, is fastened to the end of a rod 11, the other end of which passes loosely through a hole 12 in the longer arm of the lever and is prevented from disengagement therefrom by a pin 13, passed transversely therethrough. As the water is exhausted from the tank the float, which is on the water-level, gradually descends, the rod passing through the hole in the long arm of the lever until the float rests on the lever-arm and causes it to rock downwardly by its weight, a corresponding rise of the opposite end of the lever, which is connected to the stem of the valve, being effected thereby, thus opening the valve and allowing the water to flow out of the mouth of the feed-pipe into the tank. As the water rises the float is raised on the water-level, drawing with



it the rod, and when the pin at the lower end of the rod comes in contact with the long arm of the lever it raises it and closes the valve, shutting off the water-supply. The advantage of this float over the round ball and chain float is that it possesses a quicker action in definitely opening and closing the valve governing the water-supply. In this construction the float sinks as the water-level is lowered, but it does not open the valve until it rests upon the lever-arm, at which time the valve is opened immediately to its widest extent. When the water rises in the tank, the float is raised, but the valve is not closed until the pin at the end of the rod comes in contact with the lever-arm. Obviously the tank is quickly filled by this method and the valve is positively operated to either close or open the water-supply and not actuated little by little, as in the valve-operating devices in common use.

A large flush-pipe or exhaust 14 extends up through the bottom of the tank a short distance and leads to the bowl of the closet just below the seat at 15. This pipe conducts the water from the tank to the closet and flushes the bowl. At a suitable distance between the tank and seat a valve or stop-cock 16 is placed in the pipe. This valve is of a peculiar construction and consists of a metal piece accurately fitting the bore of the pipe and slidable in suitable ways or grooves 17 in the interior of the pipe. It is provided with a stem extending through the thickness of the pipe, the point of ingress and egress being suitably packed to prevent leakage, and connected to this stem is an arm 18. A lever 19, provided with a handle 20, is suitably and conveniently pivoted at 21 to the wall or other stationary part of the building where the closet is set up. The arm 18 is pivoted to the lever at 22, part way between the ends of said lever. To cause the water to flush the bowl, the lever is actuated to withdraw the valve or stop-cock from the bore of the pipe, allowing the water to flow down from the tank and cleanse the bowl. When it is desired to stop the flow of water, the lever is actuated in the opposite direction, the stop-cock returned to its seat by means of the arm connected thereto, and the bore of the pipe is closed.

For the sake of safety an overflow-pipe 23 is placed with its mouth inserted through the wall of the tank and near its top at 24, and this overflow-pipe leads into the flush-pipe just below the stop-cock or valve at 25, thus providing for any exigency which may arise and absolutely precluding any damage which might result if the valve in the supply-pipe should for any unforeseen cause fail to shut off the flow of water.

Located just below the seat in the bowl is the mouth 26 of a vent-pipe 27, which extends upward through the bottom of the water-tank nearly to the top of the same and above the mouth of the overflow-pipe, so that its open end 28 may be above the water-level in the

tank. Just after leaving the bowl the vent-pipe is bent at an angle to its former direction, and above this angle formed in the pipe is placed a check-valve 29 of any preferred construction; but by preference I use one formed in the following manner: In the bore of the pipe an annular seat 30 is constructed, the interior edges of which are beveled in opposite directions to form a hollow concave seat upon which the valve rests, said valve consisting of an upper head 31, larger in circumference than the hole in its seat and similarly beveled, allowing it to fit the seat. A stem 32 connects this head with a smaller weighted lower head 33. This lower head always returns the valve to its seat after it has been lifted therefrom.

From the lid or cover of the tank a pipe 34 extends to a nearby hot flue, chimney, roof, or other convenient point, and this pipe is open at both ends, the lower end opening into the tank, which is air-tight, and the upper to any convenient point, as above stated. A check-valve 35 is located in this pipe, said check-valve being similar to the one in the lower vent-pipe, previously described, the purpose of which is to prevent the ingress of air to the tank.

The operation of my improvement may be briefly described as follows: The person using the closet takes his seat and pulls the stop-cock or valve 16 by means of the hand-lever 19 about a quarter of the way out. Immediately a gentle flow of water commences from the tank and continues for about two minutes, which is more than eight times as long as the ordinary violent downflush in common use lasts. This gentle flush is amply sufficient to carry away any deposit in the bowl and at the same time the egress of water from the air-tight tank causes a slight vacuum therein. Simultaneously the flow of water from the flush-pipe into the bowl creates a current of air which finds its exit by means of the vent-pipe, dislodging the check-valve 29 therein and, ascending, drawn by the vacuum above in the tank, as well as by the impetus given it by the flush from below, fills the emptying tank. The check-valve in the vent-pipe below prevents the return of the air and gases drawn from the bowl. In this way it will be seen that any odors in the bowl of the closet will be entirely carried away and drawn into the tank. Of course the water being exhausted from the tank allows the float to fall until it finally rests upon the lever 10 and by its weight causes the valve 11 to open, admitting a further supply of water. Now as soon as the lever-arm operating the stop-cock in the flush-pipe is closed the water commences to refill the tank, and thereby compresses the air and gases drawn from the bowl. This compression lasts until it can raise the check-valve 35 in the upper vent-pipe, whereupon the air is forced out through this pipe by the rise of the water and is carried out of the building. By this means a perfect vent is formed in a most



simple, easy, and inexpensive manner, which readily carries off any odors which may arise from the use of the closet and takes them entirely out of the building wherein the closet is situated. As soon as the upward pressure of air in the vent-pipe ceases the check-valve in the lower vent-pipe 27 is returned to its seat, thus preventing the return of the gases when the tank is being refilled; also, the moment the pressure from within the tank ceases to be greater than that from without the valve 35 in the upper vent-pipe 34 closes and prevents the ingress of air from without as the tank is being emptied by the flush-pipe.

It will also be noticed that the flush, unlike that in other closets now in use, is absolutely under control of the person using the closet, who may allow a gentle flow of water for about two minutes and may then open the stop-cock to its widest extent, causing a violent down-flush, which will completely cleanse the bowl, which will have been siphoned several times. This violent flush will of course create a furious current of air to rush up the vent-pipe, carrying with it any remaining odors in the bowl into the tank above; but this violent flush is not necessary ordinarily, as a gentle easy flush will accomplish the work quite as well. Another point of my invention is the fact that I can with my improved construction carry away the odors from the bowl directly, thus also utilizing any heat which may be generated by deposits therein, causing the odors to ascend with the current of air.

It is evident that slight changes other than those hereinbefore described may be resorted to without departing from the spirit and scope of my invention, and hence I do not wish to limit myself to the exact construction herein set forth; but,

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

1. The combination in a water-closet, with a bowl, of an air-tight tank, the upper edge of which is grooved or recessed, a lid or cover having flanges thereon, said flanges being received in the grooves, a supply-pipe provided with an automatic valve, a lever-and-float mechanism in connection with said valve for controlling the admission of water to the tank, an exhaust-pipe and an overflow-pipe leading from the groove or recess in the tank, to the exhaust-pipe.

2. The combination in a water-closet, with a bowl, of a tank provided with grooves or recesses in its upper edge, the inner wall of which is of less height than the outer, a lid or cover having flanges thereon, said flanges being receivable in the grooves, said grooves adapted to be constantly filled with water from the overflow of the tank, supply, exhaust and vent pipes and an overflow-pipe leading from the groove or recess of the tank.

3. The combination in a water-closet, with a bowl, of a tank provided with grooves or recesses in its upper edge, supply and exhaust

pipes for the tank, and vent-pipes from the bowl to the tank and from the tank to the outer air respectively, of an overflow-pipe leading from said groove.

4. In a water-closet, the combination with a bowl, of a tank provided with an automatically-replenished water seal, an overflow-pipe leading from the water seal, supply and exhaust pipes for the tank and vent-pipe leading from the bowl to the tank and from the tank to the outer air, respectively, said vent-pipes provided with valves, and operating means for said supply and exhaust pipes, substantially as described.

5. The combination with a bowl, of a tank provided with a water seal whereby the tank is rendered air-tight, an overflow-pipe leading from said water seal and normally above the level of the water in said seal, an exhaust-pipe leading from the tank to the bowl, a vent-pipe returning from the bowl to the tank, and having a check-valve therein, a second vent-pipe having a check-valve therein, a valve in the exhaust-pipe adapted to be opened and closed and when opened to permit water from the tank to flush the bowl whereby the exhaust of water creates a partial vacuum in the tank which causes an upward rush of air from the bowl through the vent-pipe into the tank to remove foul air from the bowl, said upward rush of air being accelerated by the downflush of water into the bowl which creates a current of air finding no escape except through the vent-pipe, the valve in the second vent-pipe preventing the inflow of air therethrough and permitting the foul air in the tank to escape as the tank is replenished with water after the flushing of the bowl, said influx of water compressing the air in the tank which forces the valve in the second vent-pipe off its seat, the valve in the first-named vent-pipe preventing the return of the air to the bowl.

6. In a water-closet, a bowl and tank, the bowl provided with a flush-pipe leading from the tank thereto, a gate-valve in the exhaust or flush pipe connected to a rod and controlling the downflush of water, and a handle for actuating said rod, a supply-pipe for the tank, an automatic gate-valve in the pipe governing said water-supply, a pivoted lever journaled to said gate-valve, the free end of which is loosely connected with a rod, a float on said rod, said float adapted to bear upon the free end of the lever to open the valve when the water has subsided in the tank, an overflow-pipe connected with the flush-pipe below the valve, its upper end extending to the tank, a groove around the upper edge of said tank, a lid for said tank, said lid having depending flanges adapted to fit in said groove, the overflow-pipe likewise connected with said groove, the inner wall of which is of less height than the outer, thus permitting its automatic filling with water from the tank and providing an air-tight joint for the tank, a vent-pipe leading from the bowl to the air-



tight tank, said vent-pipe provided with a valve to prevent the return of air forced thereinto, and a second vent-pipe leading from the tank, said second vent-pipe also  
5 provided with a valve to prevent the return of air forced thereinto.

In testimony whereof I have signed my

name to this specification in the presence of two subscribing witnesses.

W. H. STILWELL.

Witnesses:

JOHN F. PLAU,  
LEANDER DAVIS.