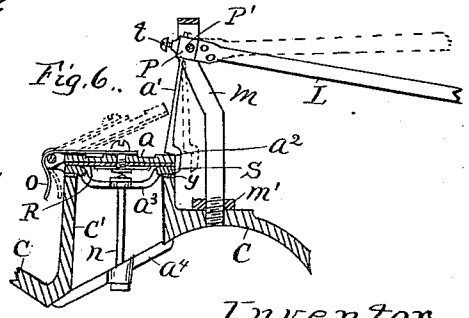
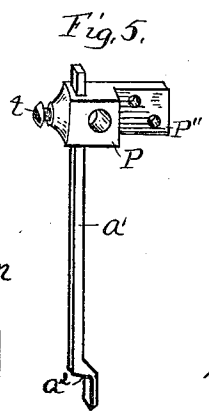
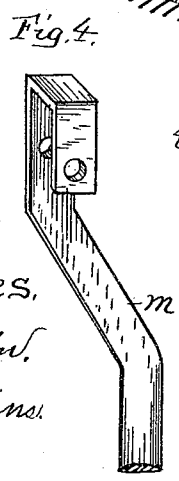
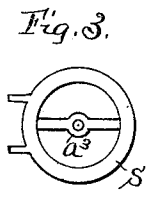
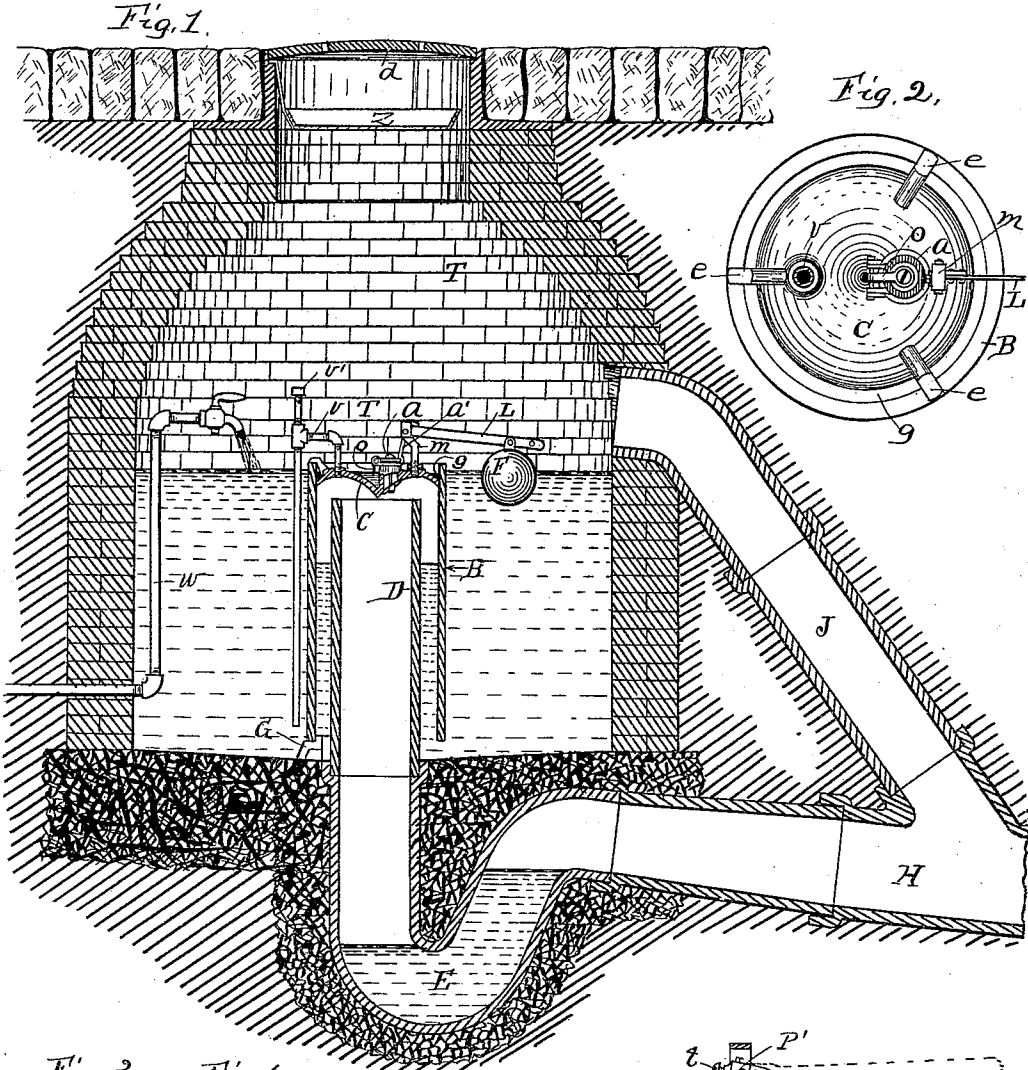


(No Model.)

O. MULVEY.  
FLUSH TANK SIPHON.

No. 443,783.

Patented Dec. 30, 1890.



Witnesses,  
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# UNITED STATES PATENT OFFICE.

OLIVER MULVEY, OF WICHITA, KANSAS.

## FLUSH-TANK SIPHON.

SPECIFICATION forming part of Letters Patent No. 443,783, dated December 30, 1890.

Application filed July 11, 1890. Serial No. 358,442. (No model.)

*To all whom it may concern:*

Be it known that I, OLIVER MULVEY, a citizen of the United States of America, residing at Wichita, in the county of Sedgwick and State of Kansas, have invented certain new and useful Improvements in Flush-Tank Siphons, of which the following is a specification, reference being had therein to the accompanying drawings and the letters of reference thereon, forming a part of this specification, in which—

Figure 1 is a vertical cross-sectional elevation of the tank and siphon mechanism. Fig. 2 is a top plan of the intake-leg, head-plate, and valve of the siphon. Fig. 3 is a top plan of the said valve-seat. Fig. 4 is a detail perspective view of the upper portion of the lever-fulcrum post of the siphon head-plate. Fig. 5 is a perspective view of the pivotal head-block and valve-holding arm held therein, being a part of the siphon-lever mechanism; and Fig. 6 is a vertical cross-sectional view of the siphon-valve and its seat and packing and a side plan of the lever and holding-arm mechanism.

This invention relates to certain improvements in flush-tank siphons for use in flushing sewers and like places, and is of the class which are arranged beneath the ground surface; and it consists in the construction and arrangement and operation of the parts constituting the siphon, which improvements are fully set forth and explained in the following specification and claims.

Referring to the drawings, T represents the tank, constructed with brick walls circular in horizontal section and its upper portion in form as a dome, with a central opening commonly known as the "man-hole," which is fitted with a surface covering-plate *d*, below which is removably suspended a dirt-catching pan Z, which pan prevents dirt which finds its way into the man-hole from falling upon the siphon below. In constructing the tank the earth is excavated the required depth and partially filled with a coarse concrete material, which when set forms a firm base or foundation for the support of the tank-walls.

W represents a water-pipe leading from some convenient supply into the tank, and is provided with a faucet, which is accessible within the tank, for the purpose of supplying

the tank with water, the faucet being especially for the purpose of stopping the flow of water at times when so desired, and for regulating the flow into the tank at other times.

E represents the siphon-trap, and is arranged seated in the concrete filling below the tank-bottom, and is arranged with its receiving end in communication and closely sealed with the siphon discharge-leg D, which is arranged centrally within the tank in an upright position, extending from the tank-bottom upwardly and with its discharge end in communication with the pipe H leading to the sewer.

B represents the intaking-leg of the siphon, arranged in a vertical position encircling the discharge-leg D, seated upon benches G, one of which is shown in Fig. 1, preferably three benches being used, which support it a little above the tank-bottom, and is of sufficient height to extend a short distance above the discharge-leg D, as shown.

*c* represents the head-plate of the siphon intaking-leg, and is conically formed, its cone depending centrally over the siphon discharge-leg, and is provided with the three radial arms *e*, as shown, which when the plate is seated in the top of the intaking-leg rest upon the leg and support the plate a little below the upper end of the leg, and is sealed to be an air and water tight fit into the leg by means of some plastic material or cement, as shown at *g* in Figs. 1 and 2. The dome is provided with an opening *c'* adjacent to its center portion, which is provided with an upwardly-extending neck, forming upon it a bearing for the valve-seat S, which valve-seat is seated upon a rubber packing-ring *y* (see Fig. 6) and held firmly in position by means of the bolt *n*, which is arranged through central perforations, respectively, of the depending bridge-bar *a*<sup>3</sup> of the valve-seat and a similar bar *a*<sup>4</sup> across the lower end of opening *c'*, as shown in Fig. 6. The valve-seat is provided with a pair of ear-lugs for the purpose of pivotally connecting the valve, and *a* represents the valve provided with a corresponding pair of lugs pivotally connected with those of the seat by means of a bolt or pin. The valve is arranged to close down upon its seat, and to insure a perfect air-tight fit it is provided with a rubber packing R,

held in the usual way, and to prevent it opening beyond a point where it would not close by gravity it is provided with a stop *o*, arranged to engage the neck of opening *c'* when the valve is open its full capacity, said stop being of bendable metal, which adapts it to be changed in form to regulate the distance the valve may open, and may be detached or bent up should it become necessary to open the valve wider than its capacity.

I prefer in constructing the siphon to make the valve-seat and valve and all immediate attachments thereto of a non-corrosive metal to at all times insure a perfect working.

*m* represents a post screw-threaded at its lower end and turned into a corresponding hole in plate *c* adjacent the valve and held by a lock-nut *m'*, and is formed at its upper end with a double bearing, as shown in Fig. 4, by means of which the valve-lever mechanism is fulcrumed, which lever mechanism consists of the head-block *P*, provided with a cross-hole, and is held into its pivotal position by means of a bolt *P'*, arranged through the bearings of the post and said cross-hole of the block, and it is further provided with a laterally-extending wing *P''*, to which is attached by means of rivets the lever *L*, which pivotally bears on its end portion the float or bulb *F*. The lever is provided with the depending arm *a'*, seated therein in a vertical mortise and held by means of a set-screw *t*, which screw may be loosened and the arm adjusted to suit its position. The arm *a'* is offset at its lower end portion to form the shoulder *a<sup>2</sup>*, which shoulder is adapted to be moved over the valve to hold the valve seated, and by reason of the inclined form of the shoulder the valve will be forced down to a close fit and there held by the arm. The depending portion of the arm below the shoulder acts as a stop to prevent too great movement of the shoulder over the valve to cause it to bind too close. By reason of the arm *a'* being connected with the lever *L* through the medium of block *P*, the said arm will be moved whenever the lever is either raised or lowered.

*V* represents a vent-pipe fixed in the plate *e*, opening into the upper portion of the intaking-leg *B*, and is arranged depending at the side of the leg *B* to a point near its base, and is provided at its upper portion or end with a screw-cap *V'*, which may be removed when necessary to permit the passage of air into the intaking-leg when the tank is supplied with water.

*J* is a pipe leading from pipe *H* at a point beyond the trap *E* up into the tank above the water-level, and is for the purpose of a vent and inspection pipe common in flush-tanks.

In operation, when the water is low in the tank, there is no pressure of air in the siphon. Therefore valve *a* will readily close by gravity, and the arm *a'* is then brought so its shoulder *a<sup>2</sup>* will rest upon the valve, where it will be held by the weight of lever *L* and its float *F*, and in such position the only air exit or inlet is

through pipe *V* taking air from the lower part of the tank to supply the upper portion of the intaking-leg, should it not be otherwise supplied. The faucet of supply-pipe *W* is then turned to permit the flow of water into the tank. As it enters and rises in the tank, the lower portion of the intaking-leg becomes submerged and thereby sealed, as likewise does the vent-pipe *V*, and as the water rises in the tank it will enter and rise in the annular chamber within the intaking-leg and about the discharge-leg, but, however, not as rapidly as the water in the tank, for the reason that the air confined in the upper portion of the intaking-leg and in the discharge-leg, which is sealed by means of the water in the trap *E*, acts as a resistance to the rising of the water therein; but owing to the pressure being brought to bear upon the water thus entering the siphon the air therein will become compressed, forcibly holding the water from rising to overflow into the discharge-leg, and holding the water in the trap below forcibly compressed, hence of unequal surface-level, as shown. When the water has risen in the tank to a point about equal with the upper end of the intaking-leg, it will have engaged the float *F* of lever *L* and raised the lever, which action will in turn move arm *a'* from its engagement with valve *a*, when the action of the compressed air within the intaking-leg will force open the valve and permit the escape of such confined air, which will at once permit the water in the annular chamber in the siphon to rise and flow into the discharge-leg, which is of less height than the outer water-surface level at such time, and thus the siphon is set into action, and immediately after the water has thus commenced its discharge the valve will, by means of its own weight, close, and as the water in the tank lowers the float and lever likewise lower until the arm *a'* is again shouldered upon the valve. When the siphon is thus started into action, it will continue until the water in the tank is lowered to break the seal at the base of the intaking-leg when the action ceases, leaving trap *E* filled with water, and as the water in the tank is drawn off to unseal the lower end of the vent-pipe *V* the air will rush up through the pipe and supply a fresh quantity into the siphon for another like operation. The time intervening between operations of the siphon depends upon the water-supply. If the supply-stream is small and slow running, the operations will be less often than when the stream is larger and more rapid, and thus the rapidity of the operation of the siphon is regulated by the water-supply.

I desire to state that when the water in the tank is drawn off by the action of the siphon to a point near the base of the intaking-leg the air from the tank will pass with the water into the annular chamber of the siphon, thus intermingling the air and water, which will destroy the action of the siphon and cause the water still in said annular cham-

ber to fall and thus replace sufficient water in the tank to seal the lower portion of the intaking-leg, and thus at all times the base of the intaking-leg is sealed; also, the vent-pipe V is of such length as to become unsealed by the drawing off of the water in the tank immediately before the action of the siphon ceases, and at once upon being unsealed commences supplying a fresh supply of air into the siphon and continues to thus supply the air after the ceasing of action of the siphon until the supply is complete, when the said vent-pipe will again become sealed by the inflowing water into the tank and prevent the escape of the confined air. I further desire to state that the siphon as I have described is adapted for flush-tanks, other than those of the class arranged beneath the earth surface. Therefore I do not desire to confine this invention strictly to the class of underground siphons.

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

1. The combination, with the tank, its supply and exit pipes, and the trap E, of the siphon comprising the discharge-leg in communication with the trap, the intaking-leg supported on benches off the tank-bottom and encircling and extending above the discharge-leg, the head-plate C, provided with the supporting radial arms and seated into and sealed in the upper end of the intaking-leg above the discharge-leg, the valve seated upon and arranged to close the opening through the plate, the post for fulcruming the lever mechanism, the lever L and float F thereof, the shouldered arm connected with the lever through the medium of the pivoted head-block and adapted to hold the valve closed, and the vent-pipe V, substantially as and for the purpose set forth.

2. The siphon described, consisting of the combination of the discharge and intaking legs, the head-plate c, fitted and sealed in the upper end of the intaking-leg above the

discharge-leg and provided with valve *a* and the post *m*, the fulcrumed lever L and its float F and the shouldered arm *a'* for holding the valve closed, the vent-pipe V, and the trap E, substantially as set forth.

3. In the siphon for flushing sewers, the combination, with the discharge and intaking legs arranged forming an annular chamber between them in communication with the flush-tank, of the head-cap *c*, arranged closing the upper end of the chamber and provided with a valve adapted to be held closed to confine the air in the siphon, the lever, float, and arm mechanism for holding the valve closed during the rising of water in the tank and for releasing the valve, thereby permitting it to open from the influence of the compressed air in the siphon when the water in the tank has reached its proper level, and the water-sealed trap E for preventing the downward escape of air during the charging of the tank, substantially as described, for the purpose specified.

4. In the siphon described, the combination of the valve *a*, provided with the stop *o*, and the arm *a'*, actuated to hold or release the valve by means of the lever and float mechanism connected with the arm, substantially as and for the purpose set forth.

5. The combination, with the outwardly-opening valve *a*, of the adjustable arm *a'*, having the shoulder *a<sup>2</sup>* for holding the valve closed down upon its seat, the pivotal head-block P for supporting the arm, and the lever and float for actuating the arm, substantially as and for the purpose specified.

6. In the siphon described, the combination, with the intaking and discharge legs and the head-plate *c*, of the vent-pipe V, provided with the upwardly-extending portion and the removable cap V', substantially as and for the purpose specified.

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