

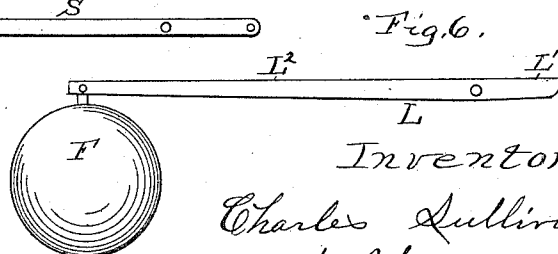
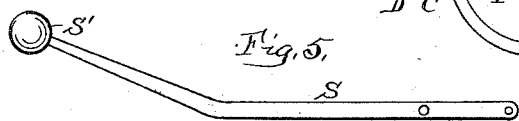
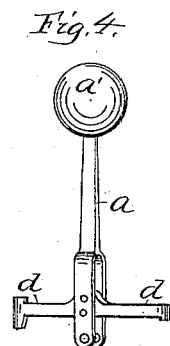
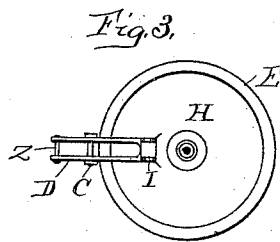
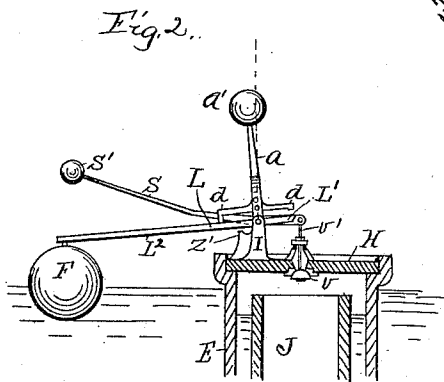
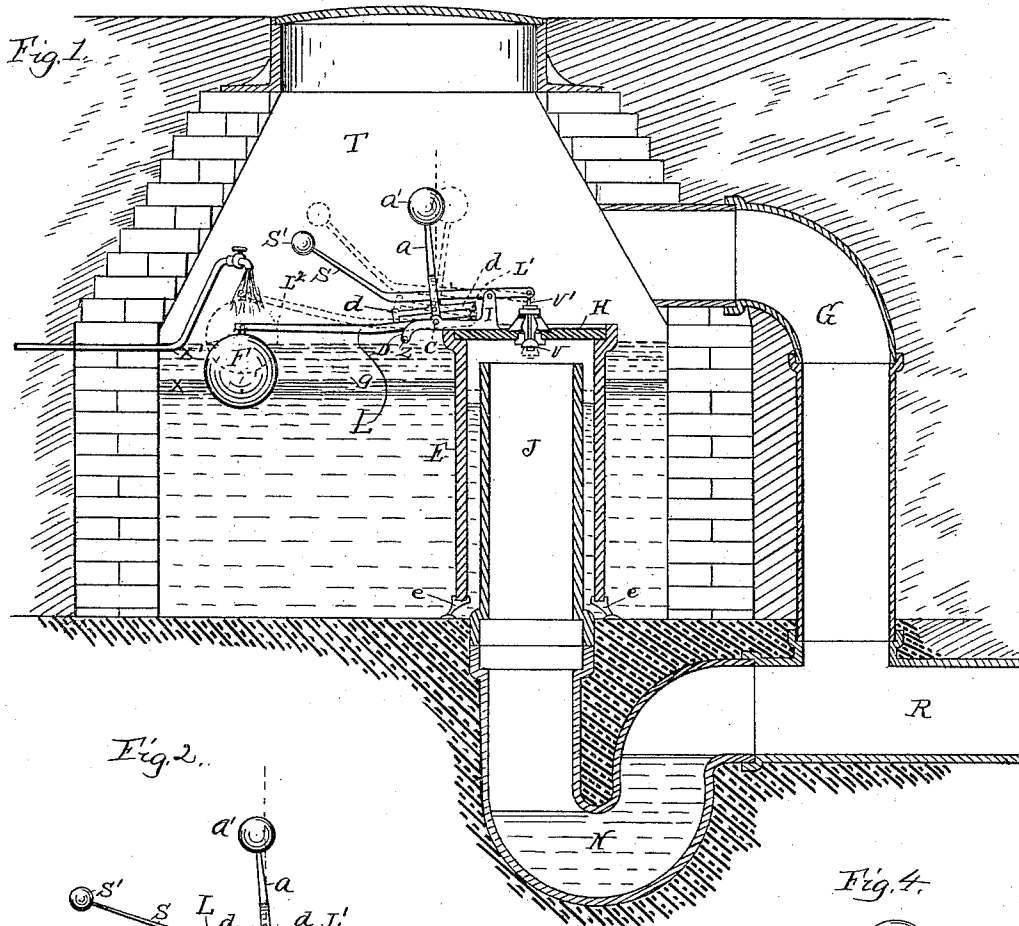
(No Model.)

C. SULLIVAN.

VALVE OPERATING MECHANISM FOR FLUSHING SIPHONS.

No. 449,390.

Patented Mar. 31, 1891.



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UNITED STATES PATENT OFFICE.

CHARLES SULLIVAN, OF WICHITA, KANSAS.

VALVE-OPERATING MECHANISM FOR FLUSHING SIPHONS.

SPECIFICATION forming part of Letters Patent No. 449,390, dated March 31, 1891.

Application filed December 2, 1890. Serial No. 373,309. (No model.)

To all whom it may concern:

Be it known that I, CHARLES SULLIVAN, 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 Valve-Operating Mechanism for Flushing 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 sectional elevation of a flush-tank provided with a siphon having my invention applied thereto. Fig. 2 is a similar view of the upper portion of the siphon having my invention applied thereto, showing a slight difference in the arrangement of parts from that shown in Fig. 1. Fig. 3 is a top plan view of the head of the siphon. Fig. 4 is a detail perspective view of the weighted pivoted standard and cross trip-bar of the valve-opening mechanism of my invention. Fig. 5 is a side view of the valve-lever. Fig. 6 is a similar view of the float-lever.

This invention relates to flush-tanks of the class employed for flushing the sewers of a city and like places; and it consists in the mechanism for actuating the air-valve at the top of the siphon to regulate the action of the siphon, which improvements are fully set forth and explained in the following specification and claims.

Referring to the drawings, T represents a flush-tank of the usual construction, located beneath the surface of the ground and provided with the usual man-hole and head covering its entrance. The intaking-leg of the flushing-siphon is formed by a vertical tube E, mounted on feet or standards *e* a little off the tank-floor and having the head-plate H. The discharge-leg J extends upward within the leg E, and leading below the tank-floor connects with the trap N. The sewer-pipe connection R leads from the said trap, and the vent-pipe G provides a communication between the upper portion of the tank and the sewer-pipe R. The water-supply faucet *g* leads by its pipe from some water-supply into the tank above high-water line.

I is a standard on the head-plate H, located to one side from the center of said plate and

terminating with a pair of oppositely-perforated ear-lugs.

In Fig. 1, D represents a pair of parallel arms extending from the plate H on a line radiating from the center of said plate. The plate H is perforated at or near its center, and V represents a valve seated in the under side of the plate H, closing the said perforation, and provided with a stem V', leading up through the aperture of the plate.

S is a lever fulcrumed to the standard I between its ear-lugs and pivotally connected at one end with the valve-stem V' and bearing on its other end a weight S', so that when the lever is not engaged said weight will bear down and hold the valve up, seated, as shown in full lines in Fig. 1.

L is the float-lever, fulcrumed between the arms D by a cross pin or bolt *c*, with its shorter free end L' between said arms and extending toward the standard I, and provided at its other end L² with a float F, adapted for actuating it by the rising and falling of water in the tank, and as a means of preventing said lever from dropping too low at its outer end I provide a stop or rest consisting of a cross pin or bar Z at the terminal of the arms D.

a is an upright standard forked at its lower portion to strike the levers S and L and pivotally supported between the arms D by means of the pin or bolt *c*, and it has fixed at right angles thereto between its forks the trip-bar *d*, arranged parallel with and between the two levers S and L. The standard *a* is further provided at its free or upper end with the weight *a'*. When the outer end L² of the lever L is lowered, its inner end L' will engage the inner end of the said trip-bar and raise it, which will cause the standard *a* to be tilted, thereby moving the weight *a'* outward beyond a vertical line from the point of pivoting said standard, and in such position the outer end of said trip-bar will rest upon the outer portion L² of the lever L, as shown by the full lines, and will not at such time engage the valve-lever S. Such position of parts takes place automatically when the water in the tank is siphoned off or is low; but when the water rises in the tank and reaches the float said float will be raised by the water,

and thus will raise the outer portion L^2 of the lever L, which will raise with it the outer end of the trip-bar d , and said parts are so constructed and regulated that when the water has risen in the tank to a sufficient height to cause the siphon to properly operate, the standard a will be brought to such a position by this lever action that it will by its own overbalanced weight quickly tilt in the reverse direction to the position shown by the dotted lines, and thus will cause the outer end of its trip-bar to strike the under side of the free end of the lever S, and by reason of the standard weight a' being much heavier than the valve-lever weight said lever will be quickly raised, as also shown by the dotted lines, and thus caused to as quickly lower the valve V, and thereby permit the escape of the air, which has been confined and compressed in the upper part of the siphon by reason of being prevented from escape below by the water-seal of the trap N, and above by the accumulating water in the tank, which flows under and up into the intaking-leg about the discharge-leg, thereby sealing such chamber so as to prevent the escape of air in that direction, the air-chamber within the discharge-leg above the trap N and within the upper portion of the intaking-leg being so proportioned with relation to the water-pressure that the air confined therein is capable of preventing the water within the intaking-leg from rising as high as the water in the tank or even high enough to overflow into the discharge-leg. The instant said valve V is opened the confined air is permitted to escape through the valve-port, when the pressure of the water in the tank will cause the water within the leg to rise to the level of the outer volume, and thus rise high enough to overflow the discharge-leg, and the quantity of water which will thus overflow is sufficient to fill the discharge-leg, and as it falls its downward suction will start the siphon into action, and the siphon will continue to act until the water is sufficiently lowered in the tank to break the seal at the base of the intaking-leg. As the water falls within the tank by such siphon action the float is lowered, and by such lowering the lever L is operated to tilt the standard a , as before described, to be disengaged from the valve-lever S, so its weight S' may close the valve and await the refilling of the tank in readiness for another like siphon action. All of this operation is automatic, and the time between such siphon-actions is regulated by the quantity of water permitted to enter the tank in a given time.

X represents the water-line just after the water in the tank has risen high enough to commence raising the float F, and X' the high-water line, at which point the trip-bar d will be sufficiently raised to cause it to tilt the standard a , and thus open the valve V, as described.

In Fig. 2 the mechanism is the same, except in the following respects: The lever L is ful-

crumed to the standard I on the same bearings with the lever S, as is also the tilting standard a , and a laterally-projecting shoulder Z' replaces the lever-stop Q. (Shown in Fig. 1.) The float-lever action is the same on the trip-bar d ; but said bar is located above the valve-lever, and, instead of giving an upstroke to said lever beyond its point of pivot, it gives a downstroke to said lever immediately above the valve-stem connection, which produces the same result by the same movement of parts as that shown in Fig. 1.

The reason I have shown the two arrangements of the trip-bar is that in Fig. 1 the weight a' of standard a is considerably lower than that part in Fig. 2, and is adapted to work in shallow tanks, while that in Fig. 2 is not, by reason of interference with the tank masonry or covering; but I prefer to use that shown in Fig. 2, as but a single pivot is necessary in attaching the levers L and S and the standard a , and the float F is brought nearer the siphon, and will therefore work in a tank of less diameter than that shown in Fig. 1.

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 g R, and the trap N, of the siphon comprising the discharge-leg in communication with the trap, the intaking-leg supported on standards off the tank-bottom and encircling and extending above the discharge-leg, the head-plate H, provided with the central aperture and with the standard I to one side from said aperture and being seated into and sealed in the upper end of the intaking-leg above the discharge-leg, the valve V, seated into and adapted to close said aperture at the under side of said head-plate and provided with the stem V' , extending up through said aperture above the plate, the weighted lever S, fulcrumed to said plate-standard and pivotally connected with the valve-stem for holding the valve seated, the lever L, likewise fulcrumed to said plate-standard and provided with the portion L' , overreaching the plate H and having the float F at its opposite end, the stop for arresting the downward movement of the outer end of said lever, and the weighted upright pivoted standard a , having a cross trip-bar d arranged parallel with and above said float-lever, adapted to be operated by said lever to tilt said weighted standard, thereby causing said trip-bar to engage and operate the valve-lever to lower the valve, substantially as set forth.

2. The siphon described, comprising, in combination, the discharge and intaking legs and the head-plate H, the latter provided with the air port or central aperture and with pivotal bearings to one side of said port for supporting the valve-actuating mechanism and seated into and sealed in the upper end of the intaking-leg above the discharge-leg, the valve seated in said port at the under side of the head-plate and provided with the stem

extending up through the plate, the weighted lever S, fulcrumed to said plate and pivotally connecting the valve-stem, the float-lever fulcrumed to said plate, the pivoted weighted standard a, provided with the cross trip-bar d, adapted to be operated by the float-lever to tilt the pivoted weighted standard, and thereby cause said trip-bar to strike the valve-lever and open the valve and the trap N, and the exit-pipe R and vent-pipe G, substantially as set forth.

3. In a flushing device for sewers, the combination, with the intaking and discharge legs and the head-plate of the siphon thereof, of the valve seated to close a central aperture of said plate, a lever connected with the valve at one end and weighted at its opposite end and fulcrumed between said connection and weight, a float-lever adjacent the valve-lever and provided with the float at its outer end, and a pivoted weighted standard provided with a cross trip-bar arranged above the float-lever and adapted to be operated to tilt the weighted standard by said float-lever, and to strike and operate the valve-lever to open the valve when said weighted standard tilts in one direction and to disengage said lever so the weight thereof may close the valve when the said standard tilts in the opposite direction, wherein said valve-actuating mechanism is automatically operated by the rising and falling of water in the tank, substantially as set forth.

4. In a flushing-siphon for sewers, the combination, with the intaking and discharge legs

and the head-plate of the intaking-leg, the latter provided with a central aperture and a valve seated therein with a stem extending up through the plate, of the valve-actuating mechanism consisting of the valve-lever S, weighted at its free end and connected with the valve-stem at its opposite end, the float-lever provided with the float at its outer end, and the weighted pivoted tilting standard provided with the cross trip-bar adapted to be engaged and operated by the float-lever and to engage and operate the valve-lever to open the valve by the tilting of said weighted standard, arranged in the manner substantially as set forth.

5. In a siphon of a sewer-flushing tank, the air-valve-actuating mechanism consisting of a lever connected with the valve and weighted to hold the valve closed, a float-lever independent from said valve-lever, and a tilting standard weighted at its free end and provided with a cross trip-bar against which the float-lever may bear to tilt the weighted standard, wherein the tilting of said standard in one direction causes the trip-bar to strike and operate the valve-lever to open the valve and the tilting in the opposite direction causes the said bar to disengage the valve-lever and permit its weight to close the valve, substantially as and for the purpose set forth.

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