(No Model.)

# S. W. LEWIS.

## SIPHON.

No. 515,527. Patented Feb. 27, 1894.

Fig. 1.

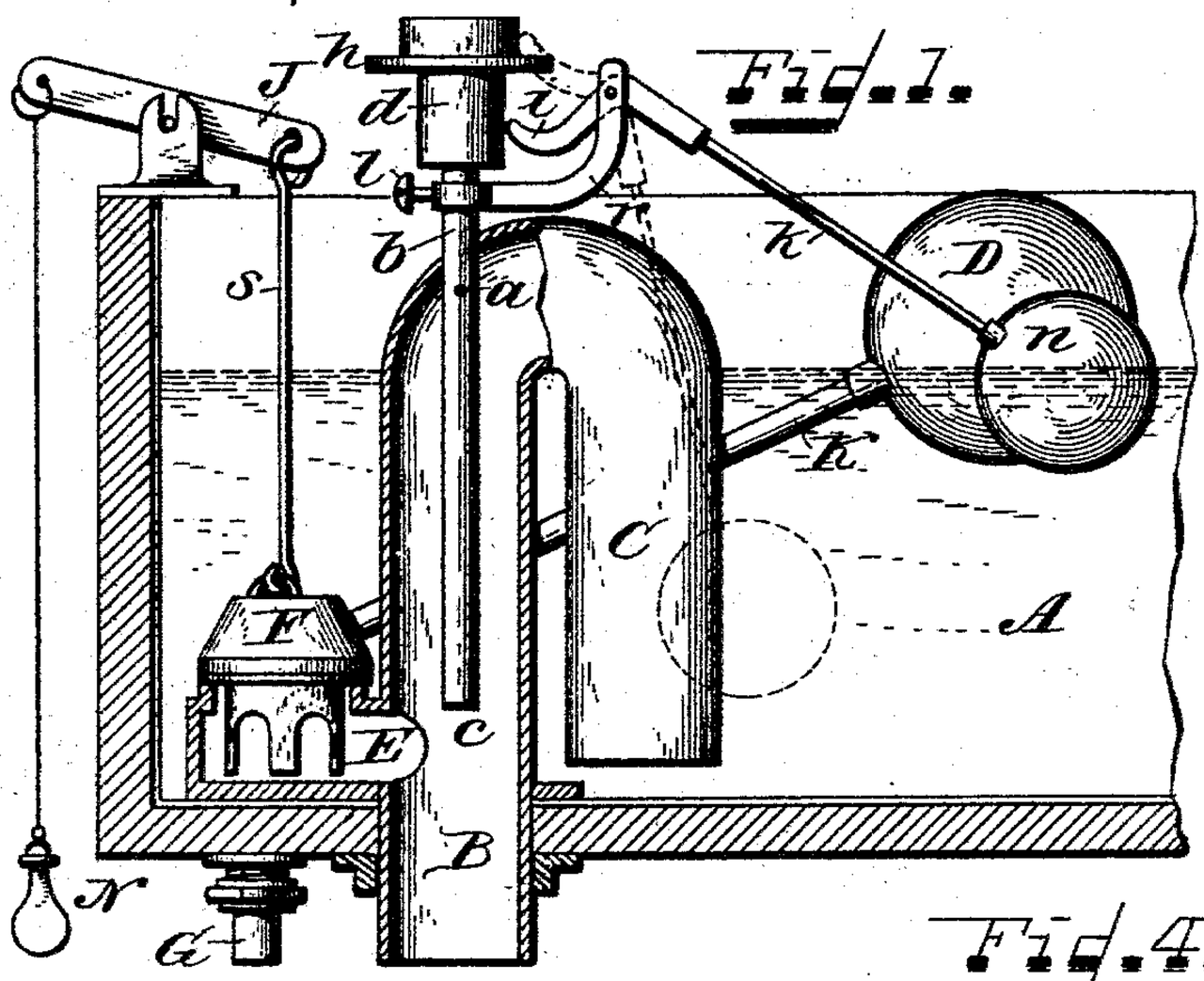



Fig. 2.

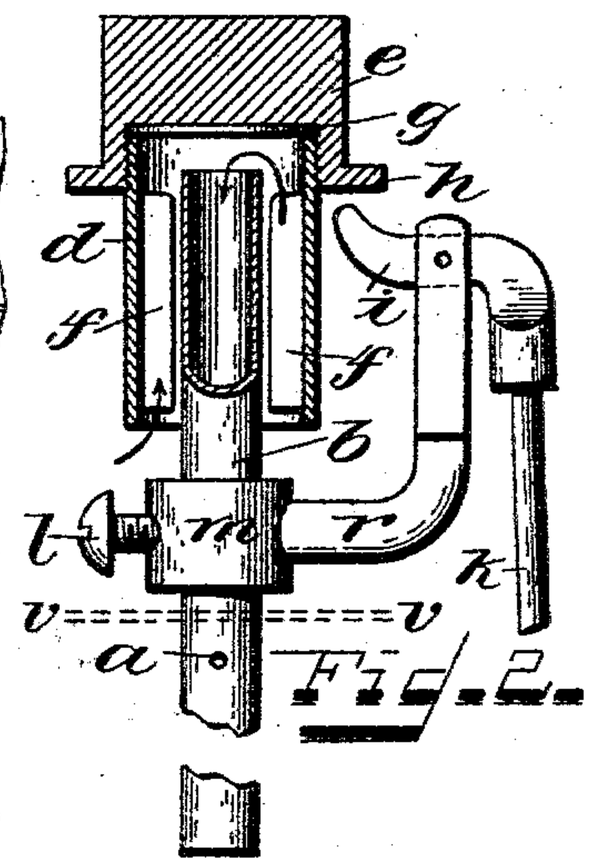



Fig. 3.

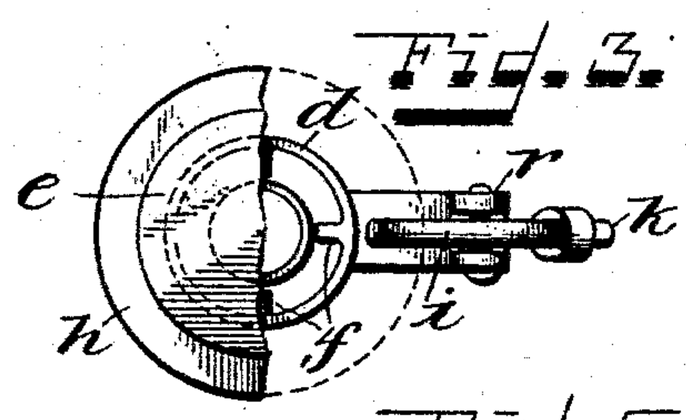



Fig. 4.

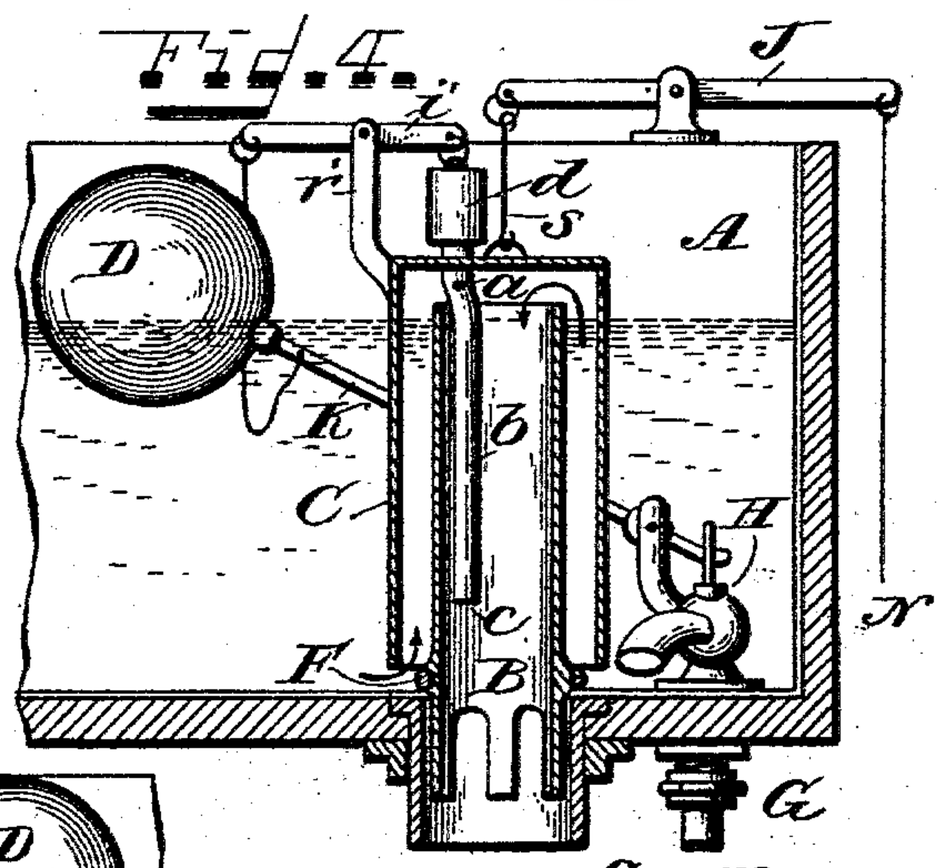



Fig. 5.

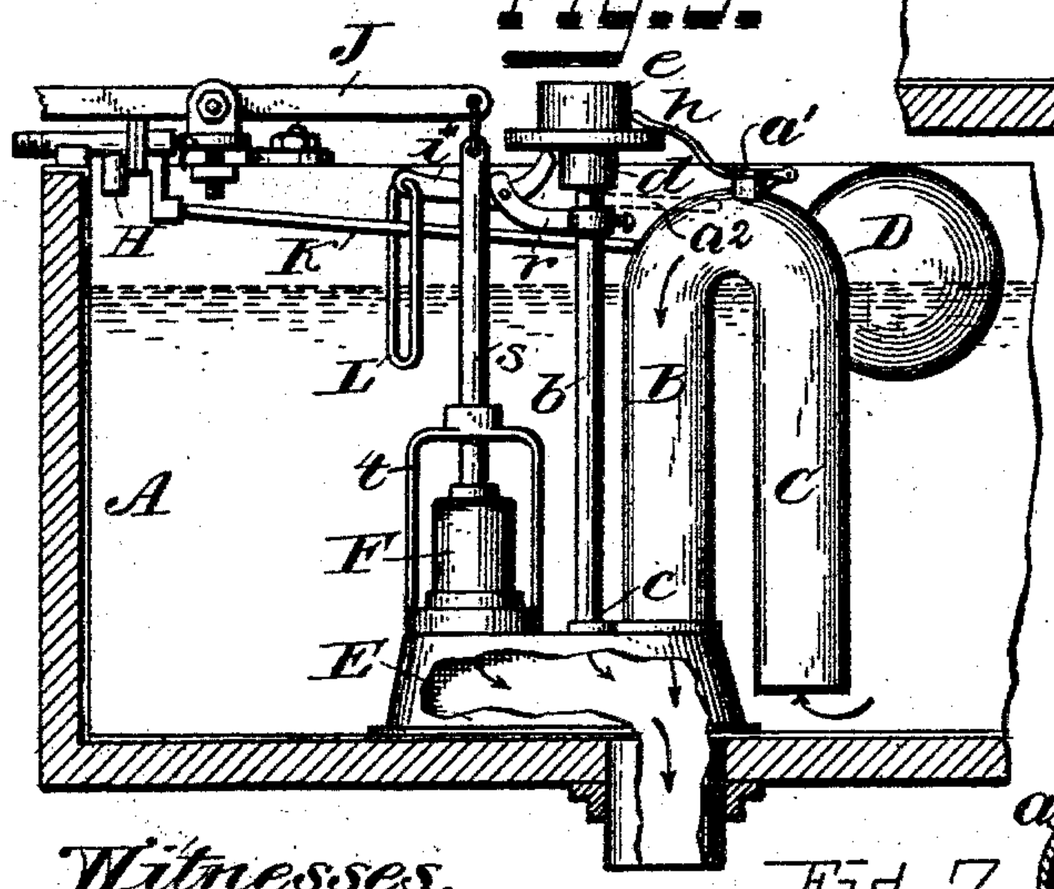



Fig. 6.

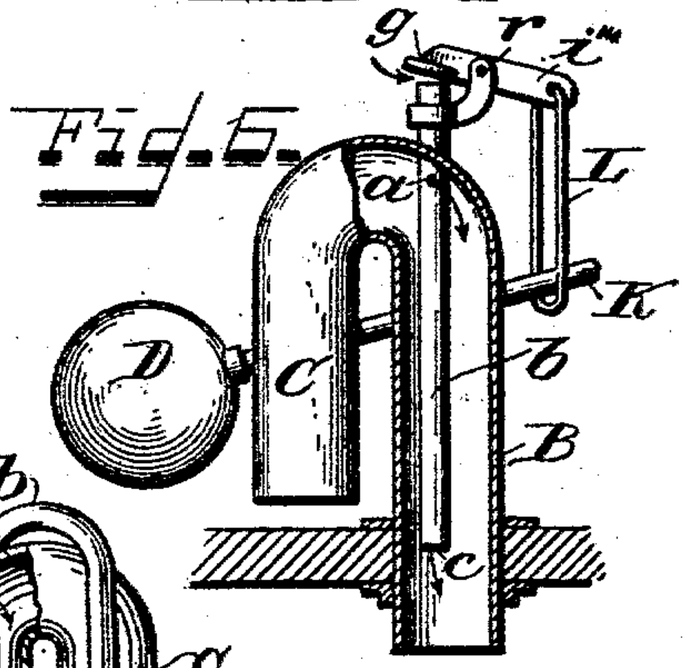
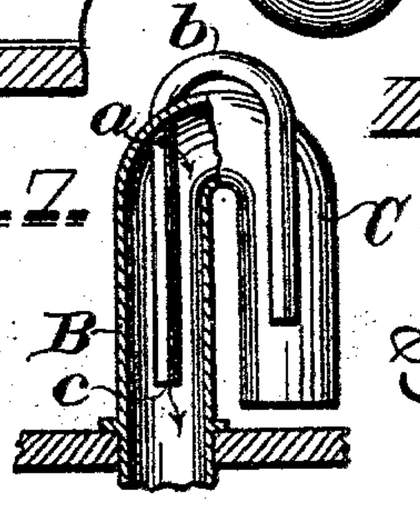



Fig. 7.

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# UNITED STATES PATENT OFFICE.

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## SIPHON.

SPECIFICATION forming part of Letters Patent No. 515,527, dated February 27, 1894.

Application filed May 5, 1893. Serial No. 473,167. (No model.)

*To all whom it may concern:*

Be it known that I, SAMUEL WALKER LEWIS, a citizen of the United States, residing at Brooklyn, Kings county, New York, have invented a new and useful Improvement in Siphons, of which the following is a specification.

My invention relates, and is applicable, to any siphon especially when used for flush tank discharge, my objects being to break the siphonic action without noise or affecting its force until broken; second, to prevent renewed action when the tank is rapidly filling from a high pressure supply, and finally the arrangement and combination of the device whereby as a distinct apparatus it can be applied to any siphon. I attain these objects by admitting air into the siphon through a tube or pipe which I will term a duct having an outlet in communication with the down leg of the siphon, a minute vent into the upper part of the siphon, and an inlet to the duct outside of the siphon, said inlet being normally closed by a seal or valve whereby air can be admitted simultaneously within both the top of the siphon and its down leg as hereinafter explained and set forth.

In the drawings Figure 1 is a sectional view of a tank with a curved siphon provided with my improvement operated by an independent float. Fig. 2 is an enlarged detail section of the air duct and its controlling valve adaptable to any siphon. Fig. 3, is a plan of Fig. 2. Fig. 4, is a section showing the device applied to a bell siphon and operated by the float and rod of the supply valve. Figs. 5, 6, and 7, illustrate modified applications of the invention.

The same letters of reference refer to identical parts throughout the several views.

In Figs. 1, 4 and 5, A is the cistern or tank, B the long down leg of the siphon, and C its short up leg. H is the supply valve, (sometimes termed the ball cock,) operated by the float D and rod K. J is the usual valve lever operated by its pull N and connected at *s* to the starting valve F which communicates with the down leg of the siphon through the chamber E. G is the connection to the source of supply.

The device is preferably composed of a tube or pipe *b* discharging into the down leg of the siphon. *c* is its lower discharge end, and *a* is a minute air vent within the top of the siphon, the inlet to the duct is on the outside of the siphon, and in Figs. 1, 2 and 3 said inlet is covered by the muffling cylinder *d*, within which are fin shaped bearings *f* by which the cylinder *d* is guided vertically upon the tube *b;* attention is also called to the annular flange *h* and weight *e*, the lower face of the latter forming a valve at *g* when closed upon the end of the duct *b*. Clamped to the duct at *m* is a bracketed fulcrum *r* adjustable by the set screw *l* and supporting the rod *k* with its trip lever *i* which latter is adapted to engage the flange *h* when the falling surface of the water or liquid lowers the float *n*.

The purpose of the hooded valve *d* shown in Figs. 1 to 5, is to muffle the sound caused by air drawn violently into the duct when the valve is first opened, and by the combination of valve *d* with the air duct *b*, adjustable fulcrum *m r* and trip lever *i k* illustrated by Fig. 2 a distinctive device is produced adaptable to any siphon, the apex of the siphon to which it is adjusted being indicated by dotted lines *v—v*.

In Fig. 4, the fulcrum *r'* is attached to the outer shell or short leg C of the siphon, one end of the lever *i'* being connected to the top of the muffling valve *d* and its other end being connected by a string or chain to the float and lever of the supply cock, the two members B C are connected so as to form an integral part which is lifted with all its attachments by the lever J when starting the siphonic action.

In Fig. 5, the air duct or tube *b* is located wholly outside of the siphon its open discharge end communicating with the down leg or base of the siphon through the chamber E, the inlet to the duct is covered by the hooded muffling valve *d* operated by the lever *i''* which is connected to the float rod K by the link L, a modified air vent and valve at the top of the siphon in combination with the duct *b c*, is shown at *a'*, and is opened and closed by engaging its lever with the flange *h* as shown, or in any convenient way, and if desired the vent *a'* can be carried down into the siphon by a short tubular extension; another modification of this or similar construction would be, instead of the valve

$a'$, a lateral vent through a branch arm from the tube $b$ to the upper part of the siphon as shown by dotted lines $a^2$.

In Fig. 6, the hooded valve $d$ is omitted to obtain a more simple device applicable where the minimum of noise is not essential, the outside end of the duct being closed by a simple valve on one end of the lever $i'''$ the other end of said lever being connected by a link L or other means to the float rod K.

In Fig. 7, the duct $b$ forms a simple auxiliary siphon provided with vents $a$ and $c$ inside the main siphon, the outside inlet end of the duct being submerged and thus sealed until the surrounding water falls low enough to permit the inflow of air.

The object of carrying the tube or duct $b$ so far down the siphon is to render the breaking process gradual or slow so as to provide an ample refill when used for flushing water closets or similar purposes, for lowering the end $c$ of the air duct lessens its effect upon the siphonic action, and a distinct and essential feature of the invention combined with the tube or duct $b$ $c$ is a minute air vent $a$ or $a'$ into the upper part of the siphon, preferably from the duct $b$ $c$ as in all the figures except Fig. 5, whereby air can, at the proper instant, be admitted to the siphon at any desired point above or near the level of its overflow simultaneous with the air discharge at $c$, which does not affect the first part of the siphon flow, for after the air inlet has been opened so long as the liquid or water fills the siphon C B all the air is drawn by the current through the outlet $c$, which being well down the long leg of the siphon, its effect at first is slight and gradual until the flow being diminished air can also enter at $a$ simultaneous with the continued air discharge at $c$, which completes the siphon breaking process so that when the level of the surrounding liquid or water falls to the mouth of the short leg C of the siphon the final stoppage is noiseless.

Another very important function of the air vent $a$ is to prevent re-siphoning caused by a high pressure supply filling the tank so rapidly that after first breaking the siphon and before the pipe leading from it has time to empty, the rising liquid submerges the mouth of the siphon and a vacuum caused by the continued flow from the lower part of the discharge pipe starts the siphonic action again and again indefinitely, which difficulty is wholly obviated by the vent $a$ $a'$ or $a^2$, for so long as an air inlet exists in the upper part of the siphon such renewed action cannot occur, and by adjusting the opening and closing of the inlet end of the duct by the mechanism described the vent $a$ feeds air at the proper instant and remains open as long as may be desired.

The operation of the device is as follows, taking Figs. 1, 4 or 7 for example: The siphon having been started by opening the discharge valve or by overflow (as in a periodic flush tank) or otherwise, the flow is uninterrupted and strong until the water or liquid has fallen so low that the inlet is opened and air enters at the outside end of the duct and is drawn by the current through the outlet $c$, which begins to check the siphon and gaining upon it gradually diminishes the flow in the siphon pipe so that air can also feed in at $a$ simultaneous with the continued discharge at $c$ when the flow quickly stops without the slightest noise. If the supply to the tank is from a high pressure it is only necessary to adjust the device whereby the air inlet will be opened when the water is at a higher level and thus remain open longer to give the discharge pipe time to empty, which will prevent re-siphoning.

The construction shown in Fig. 5 would break the siphon more quickly because air will enter the top the instant the valve $a'$ is opened, hence in this construction the lever of valve $a'$ should be bent up slightly so the flange $h$ will not engage it until the valve $d$ is fully open.

It is obvious that various modifications might be arranged for feeding air to the top of the siphon and at its base or within its down-leg simultaneously, hence I do not limit myself to the precise construction illustrated provided substantially the same results are obtained by similar means.

I claim as my invention—

1. A siphon provided with an inlet for air into its upper part and an inlet for air into its down leg, and means for opening and closing said inlets common to both, whereby air is admitted into both the upper and lower parts of the siphon, substantially as and for the purpose described.

2. A siphon provided with an air duct having its inlet end on the outside of the siphon and normally sealed, its outlet end in communication with the down leg of the siphon, and an intermediate vent for air into the upper part of the siphon, whereby when said inlet end is opened air will be admitted simultaneously to the lower and upper parts of the siphon, substantially as described.

3. A siphon provided with an air duct having its outlet end in communication with the down leg of the siphon its inlet end on the outside of the siphon, and an intermediate outlet from said duct for air into the upper part of the siphon, and a means for closing and opening said inlet end of the duct, whereby air is admitted simultaneously into the upper and lower parts of the siphon substantially as and for the purpose described.

4. A siphon provided with an air duct having its outlet end in communication with the down leg of the siphon, its inlet end on the outside of the siphon, and an intermediate outlet from said duct for air into the upper part of siphon, and a valve for closing and opening said inlet end of the duct, whereby air is admitted simultaneously into the upper and lower parts of the siphon, substantially as described.

5. An attachment for a siphon consisting of an air duct whose discharge end is extended down into the long leg of the siphon and having a minute air vent within the top of the siphon, the inlet to said air duct being on the outside of the siphon and covered and controlled by a valve with a hooded attachment surrounding said inlet and means for operating said valve, whereby air is admitted simultaneously to the lower and upper parts of the siphon, and the noise made by the air passing into the duct is muffled, all substantially as described.

6. As a device to be used in combination with a siphon, the duct *b* having discharge at *c* in the down leg of the siphon, vent *a* within the upper part of the siphon, and an inlet outside of the siphon closed and opened by a valve operated by a float whereby air can be admitted simultaneously into the lower and upper parts of the siphon substantially as described.

7. The combination with a siphon, of the air duct *b* having discharge *c* for the down leg of the siphon, an opening for air into the upper part of the siphon, hooded valve *d* covering and surrounding the inlet to said duct, trip lever *i* fulcrum *r* and means for operating said lever and valve, whereby air can be silently admitted simultaneously into the lower and upper parts of the siphon, substantially as described.

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Witnesses:
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