A. Aldrich.

Water Elevator.

No. 5,105. Patented May 8, 1847.

Fig. 3.

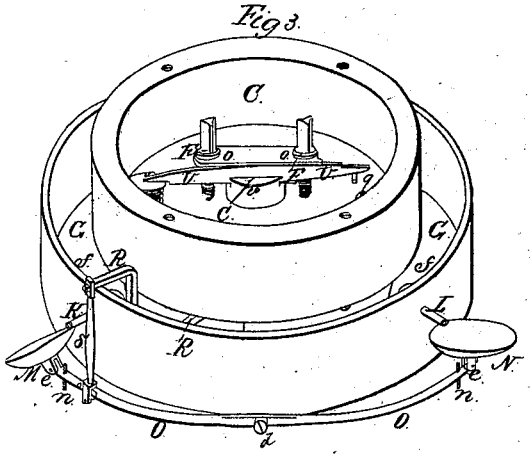


Fig. 1.

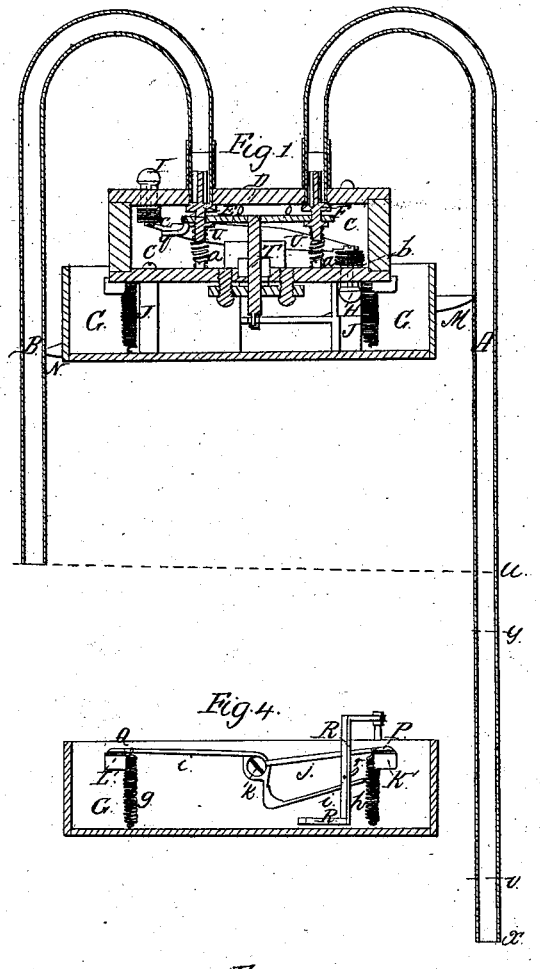


Fig. 2.

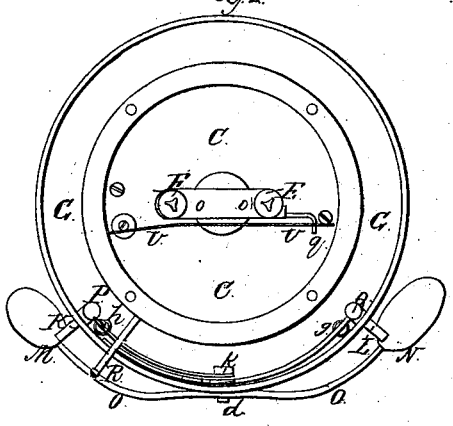
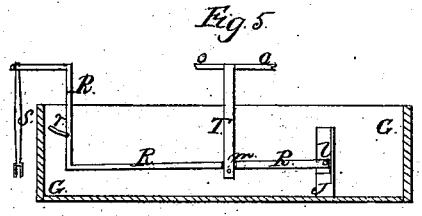


Fig. 4.

Fig. 5.



UNITED STATES PATENT OFFICE.

ASAHEL ALDRICH, OF DOUGLASS, MASSACHUSETTS.

SIPHON FOR ELEVATING WATER, &c.

Specification of Letters Patent No. 5,105, dated May 8, 1847.

To all whom it may concern:

Be it known that I, ASAHEL ALDRICH, of Douglass, in the county of Worcester and State of Massachusetts, have made a new and useful Improvement in Hydraulic Machinery, by which improvement what I denominate a "self-acting intermitting siphon" is made to raise and deliver a portion of water at the height of twenty or thirty feet above its source, so as to supply a quantity sufficient for ordinary domestic purposes; and I do hereby declare that the following is a full and exact description thereof.

The conditions necessary to the rendering of my apparatus effective are that the longer leg of the siphon should considerably exceed that of the shorter leg, the quantity of water that may be supplied by the machine being dependent on this extra length, and upon the diameter of the tube of the siphon. In the situation in which this apparatus is applied, the reservoir, or source from which the supply of water is obtained must therefore be sufficiently elevated above the opening of the longer leg to admit of its necessary extension; the end of this should be kept immersed in water.

In the accompanying drawing Figure 1, is a vertical section through the middle of the apparatus when ready for operation. Fig. 2, is a top view of it with the siphon, and a top plate through which said siphon is to pass, removed. These two figures may be considered as representing a machine of ordinary size, drawn on a scale of one eighth of an inch to the foot. Fig. 3, is a perspective view of the parts shown in Fig. 2, but drawn on a larger scale; Figs. 4 and 5, show certain parts in detail.

In each of these figures where the same parts are represented they are designated by the same letters of reference.

A Fig. 1, is the longer, and B the shorter, leg of the siphon. C, C, is what I will denominate the closed receiver. The legs A, and B, are attached at their upper ends to the top or cover D, of this receiver, which must be perfectly air tight.

E, and F, are valves that serve to close the upper ends of the siphon legs. These are borne up by springs *a*, *a*, and remain closed during the intermitting of the siphon; they are opened at the proper time in a manner to be presently described.

G is what I denominate the open receiver; and into this water is to be admitted from the closed receiver through a valve H, in the bottom of the closed receiver, which valve is to be opened at the proper time for its discharge, but is at other times kept closed by the spring *b*.

I is a valve in the cover D, of the closed receiver, opening outward and kept closed by a spring *c;* through this air is to be admitted when water is discharged from the receiver. The closed receiver rests upon, and is made fast to, a stout rim, or supports J, J.

It will be manifest under the arrangement shown in the section Fig. 1, that were the respective valves H and I, to be closed, and the two siphon valves E, and F, opened, and the two legs of the siphon, and the receiver C, to be filled with water, the operation would be the same with that of the common siphon, the receiver *c*, being a mere enlargement of the siphon tube in that part. It will also be manifest that were the two valves E, and F, closed and the lower ends of the legs A, and B to be allowed to dip into water, as no air could then enter them, the water which they contained would remain there, provided their length was no greater than is admitted by the pressure of the atmosphere; and if while so situated the valves H and I, were opened, air would enter at the former, and water would be discharged through the latter into the open reservoir. If the quantity of water so discharged be somewhat less than that which would be contained in that part of the longer leg of the siphon that extends below the shorter leg, the two valves H and I may be closed, and the two valves E and F may be opened, the siphon will again operate; in this case the air which has been admitted into the closed receiver will, of course, be equal to the volume of water that has been discharged from it, and this air will, owing to the direction of this current, first enter the discharging branch, having the longer leg A; this column of air having entered, it will be followed by one of water. Let the column of air in the leg A, be equal in length to *u*, *v*, the line *u*, being level with the termination of the shorter leg, and supposing the length of the longer leg to exceed that of the shorter by the distance *u*, *x*, the column of water in the longer leg will exceed that in the shorter by the distance between *v*, *x*, or *u*, *y*, and after this column of air has been

discharged, this discharge being due to the greater length of the column of water in the longer leg, the siphon will continue to operate, the closed receiver C, C, being again filled with water; and when this has taken place a portion of water may again be discharged into the open receiver, and so on continuously. It is this portion thus discharged, during the intermission of the siphon that is to give the supply required for family use, and that is, also to furnish the necessary power for opening and closing the respective valves. The arrangement of the apparatus for producing this latter effect I will now proceed to describe.

K, and L, (Figs. 2 and 3) are two spouts, or tubes through which water is to be discharged, alternately, from the open receiver G. This water is to run into two tilting dishes M, and N, that are sustained on the opposite ends of a vibrating lever of equal arms, O, O, having its fulcrum at *d*. The dishes M, and N, work on joint pins at *e*, *e*, so as to be capable of tilting, and are so balanced that when in their most elevated position they will remain on a level, but when the end of the lever to which they are attached is depressed they will tilt and pour out the water which they have received, and this running into a trough, or other receptacle, fixed for the purpose may be taken for use; *n*, *n*, are screw rods that may be raised or lowered to regulate the tilting of the dishes. The spouts K, and L, are, as has been stated, to discharge water alternately, and to cause them to do this, their inner openings, within the receiver G, G, must be alternately opened and closed by valves, and this may be effected in the following manner: P, and Q, (Fig. 2) are two valves that open and close the spouts. These are also shown in Fig. 4, which is a view of the inner side of a sectional part of the rim of the receiver G, G, say between the points *f*, *f*, of Fig. 3. K′, and L′, in Fig. 4, are the inner terminations of the spouts. The valves P, and Q, are held down by springs *g*, and *h*. The valve Q, is at the end of a lever *i*, *i*, and the valve P, at the end of the lever *j*, each of which levers has its fulcrum at K. How these valves are alternately opened will presently appear.

R, R, is a lever that is bent twice at right angles and that serves to regulate the opening and closing of the respective valves. The outer end of this lever is connected to a vertical rod S, that serves to vibrate it, as the lever O, O, vibrates; the rod S being jointed to said lever. Fig. 5 shows the lever R, R, with no more of its connections than are necessary to exemplify its action; *l*, is its fulcrum within the receiver G, G, and at *m*, it is jointed to a sliding rod T, that passes through a stuffing box; the operation and use of this sliding rod will be seen by referring to the section Fig. 1, where it is shown as carrying the cross-head *o*, *o*, that serves, when depressed, to open the siphon valves P F, which opening takes place when the siphon is to come into action after a period of intermission. The valves H, and I, are made to operate by means of a lever U, U, situated within the closed receiver C, C. This lever is seen in Figs. 1, 2 and 3; it works on a joint pin *p* (Fig. 3) at its middle, and its two ends bear upon the stems of the valves and overcome the force of the springs by which they are otherwise kept closed. The valves H and I, are to be opened at the same time that the valves of the siphon are closed, and the same cross-head *o*, *o*, operates the four valves. A finger *q*, proceeds from the cross-head, and passes under that end of the lever U, that is to open the valve I, and as this end is raised the other end will be depressed, and the two valves will be opened, simultaneously with the closing of the siphon valves.

The valves P, and Q, appertaining to the spouts K and L, are also opened by the lever R; this is effected by means of a pin *r*, (Figs. 4 and 5) that projects from said lever between the two levers *i* and *j*, Fig. 4; when the lever R, is raised the pin *r*, will be brought into contact with the lever *j*, having the valve P, at its end, which will be raised; and when the lever R, is depressed it will be brought into contact with the end *i′*, of the lever *i*, and the valve Q will be raised. These two valves it will be observed act independently, as one of them is to be closed during the whole of the time that the other is open.

Having thus fully described the manner in which I construct my apparatus for raising and supplying a portion of water by means of an intermitting siphon, at the height of a number of feet above its source, and having explained the operation of the respective parts thereof, what I claim therein as new and desire to secure by Letters Patent is—

The combining of the siphon with a closed receiver in such manner as that said receiver shall constitute an enlargement of the siphon at the height to which the water is to be raised; the longer and shorter legs of the siphon being so proportioned to each other as that the latter shall be capable of receiving within it a column of air from the closed receiver equal in volume to that which has been drawn therefrom, for the purpose and in the manner described, while said longer leg shall still contain a column of water more than sufficient to counterbalance the length of the column in the shorter leg; under which arrangement said column of air is discharged, and the closed receivers refilled preparatory to another intermission of the siphon for the discharge of water

therefrom; and, in combination therewith, the causing of the water which escapes from the closed receivers, operating by its gravity, to open and close the respective valves at the requisite periods for continuing the action of the apparatus; the whole arrangement and combination being the same in substance with that herein set forth. It is to be understood, however, that I do not intend by the foregoing claim, to limit myself in the construction of this apparatus to the precise form of the respective parts as herein described and represented, but to vary these as I may think proper, while the principle of action and the useful result thereby attained remain, in substance, unchanged.

ASAHEL ALDRICH.

Witnesses:

THOS. P. JONES,

LEM'L WILLIAMS.