A. W. SCHREINER.

SIPHON.

APPLICATION FILED JUNE 21, 1919.

1,382,600.

Patented June 21, 1921.

2 SHEETS—SHEET 1.

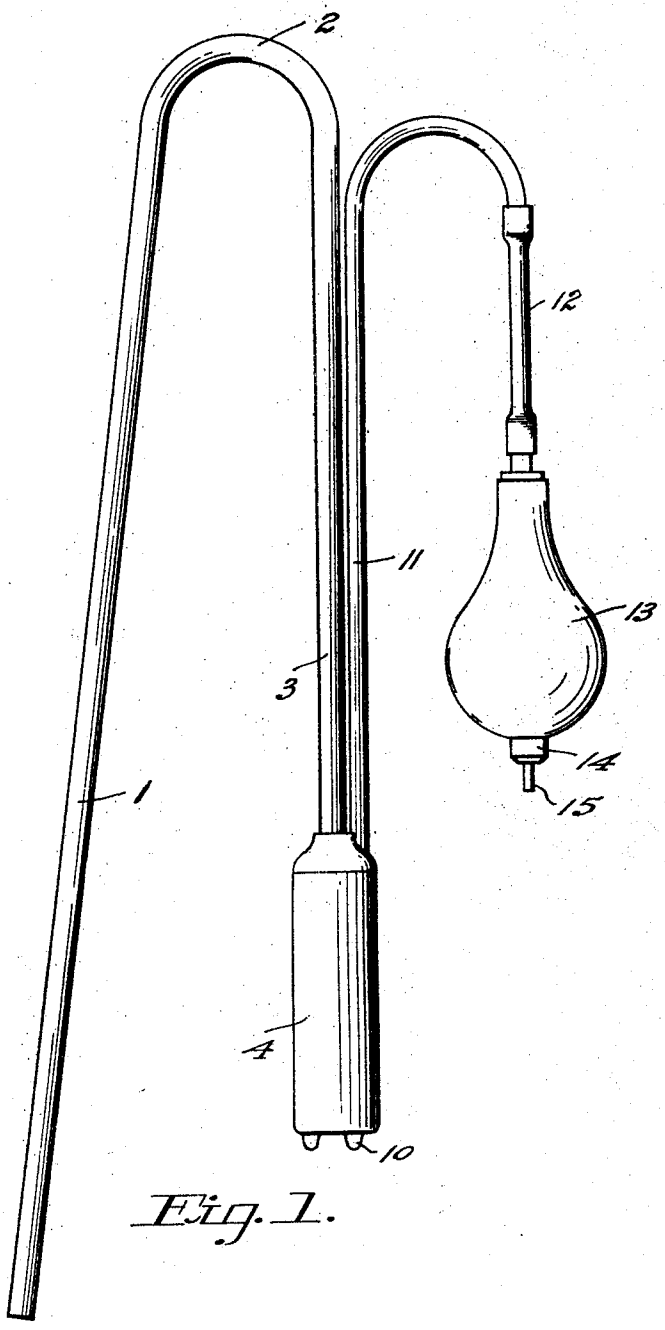
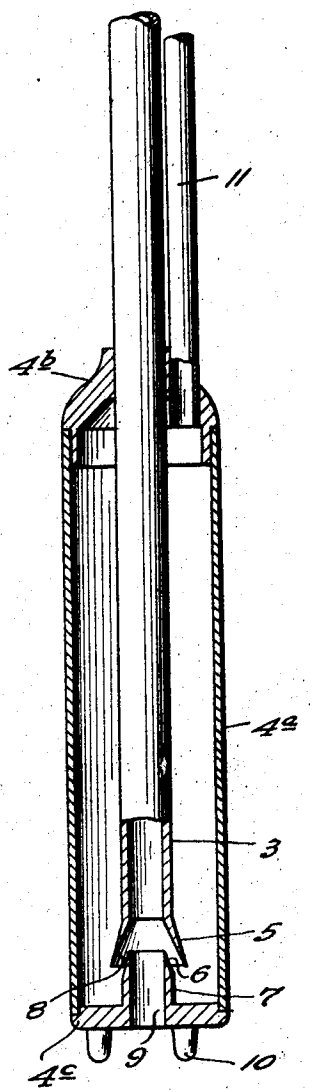


Fig. 1.

Fig. 2.



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Fig. 3.

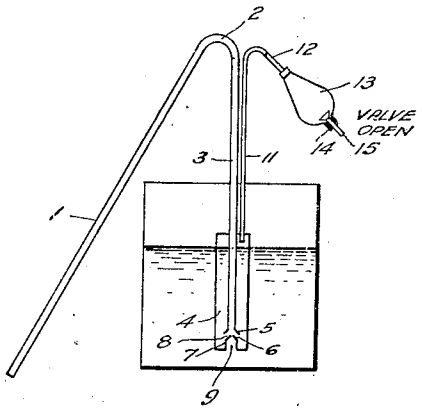


Fig. 4.

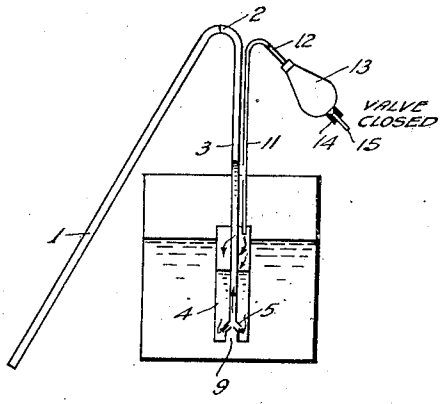


Fig. 5.

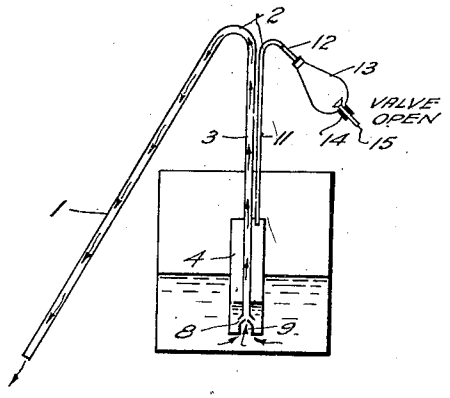
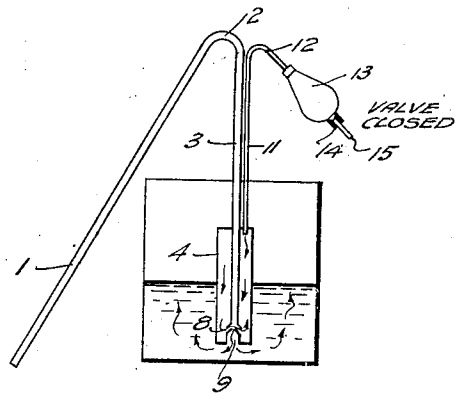


Fig. 6.



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UNITED STATES PATENT OFFICE.

ARTHUR W. SCHREINER, OF BROOKLYN, NEW YORK, ASSIGNOR TO STANDARD SCIENTIFIC COMPANY, OF NEW YORK, N. Y.

SIPHON.

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To all whom it may concern:

Be it known that I, ARTHUR W. SCHREINER, a citizen of the United States of America, residing at Brooklyn, in the county of Kings and the State of New York, have invented certain new and useful Improvements in Siphons, of which the following is a specification.

My invention relates to a new and useful siphoning device for the lifting of liquids from containers, carboys and the like to a point of discharge where the flow may be controlled.

The principal object of my invention is to facilitate the handling of heavy and viscous liquids, such as acids and oils, without elaborate pressure systems or the use of permanent equipment. This is best demonstrated by the problem of emptying or extracting at intervals, acids from the carboy for use in the chemical laboratory. The present method consists either of mechanical tilting devices or of air pressure control comprising the use of such permanent equipment as pumps and piping systems. Both of these methods are entirely inaccurate and in the case of strong acids dangerous.

A further object of my invention is to provide a self-contained unit of the class described which is entirely portable, positive in action, and entirely controlled by the operator who may be extracting the liquid from the container.

A specific feature is the semi-automatic starting means which permits the container to be in its normal erect position, which thereby eliminates all danger of spilling the liquid.

Another feature peculiar to the same mechanism is the method of stopping the flow.

The many features of operation and construction can be more clearly pointed out by reference to the accompanying drawings, in which:

Figure 1 is a side elevation of the siphoning device.

Fig. 2 is a sectional view taken longitudinally through the starting chamber.

Figs. 3, 4, 5, and 6, show consecutive operations in the cycle from starting to stopping.

In the drawings, 1 denotes the long leg of a simple siphon tube which extends upward to the bend 2, preferably formed integral therewith. Adjoining the bend 2 is the short leg of the siphon 3, which extending downward enters the starting chamber 4. The open end 5 of short leg 3 is flared to form a wide opening for receiving the liquid, and also to overhang the beveled edge 6 of a short tube 7 leading from the bottom of the starting chamber 4. This forms an annular orifice 8 between the tube 7 and the end 5 of the short leg 3 of the siphon. The purpose of this orifice is more particularly pointed out in the operation.

The starting chamber 4 surrounding the end of the short leg 3 is preferably tubular in shape, having a side wall 4^a. The upper end of the chamber is closed by a head 4^b, through which passes the tube 3, the same being tightly joined to prevent the escape of air under pressure, and also to hold the tube 3 and the chamber 4 in relative position. The other end of the chamber is closed by a head 4^c having an orifice 9 therein and adjoining the short tube 7. This tube 7 may be formed integrally with the head 4^c. In order to elevate the head 4^c slightly from the bottom of the fluid container, and thereby prevent the possible closure of the orifice 9, short legs 10 are preferably formed integral with the head 4^c, projecting downward and surrounding the orifice.

If this arrangement as thus far described be immersed in the liquid it is evident that the chamber 4 would fill with liquid to the hydrostatic level, by a flow through the orifices 9 and 8. The short leg of the siphon 3 would likewise fill to the same level. Now to start the siphon air pressure is applied to the surface of the liquid in the chamber 4. A tube 11 enters the head 4^b and extending upward along the leg 3 connects at its upper end to a flexible tube 12, which in turn attaches to a rubber air compression bulb 13. The bulb 13 is provided with the ordinary check valve 14 having an outwardly extending pin 15 which may be manually operated to release the pressure.

Upon squeezing the bulb 13 the valve 14 closes and the air pressure is exerted on the surface of the liquid in the chamber 4, whereupon the liquid is directed by the flared and tapered walls of orifice 8 in an upward direction directly into the tube 3. The liquid in short tube 7 has sufficient inertia to temporarily act as a rigid plug to prevent serious escape of the liquid through the orifice 9 in head 4^c. Once the liquid is forced to form a

column in the short leg 3 and to extend to such a height as the bend 2, the siphoning action is begun. As the long leg of the siphon 1 fills and empties the tube 3 must draw from the reservoir through the orifices 8 and 9. When the liquid in the chamber begins to be exhausted the entire supply comes through the orifice 9 from the carboy or container.

This siphoning action will continue until the supply is exhausted or the siphon column is broken. The bulb 13 and the orifice 8 provide a novel means for breaking this column. After the siphoning action is begun the bulb 13 is released from pressure and immediately through the valve 14 fills with air; now if this be again depressed while the siphon column is formed, the air rushes into the chamber 4 and is normally trapped at the orifice 8. If the pressure be such as to overpower the liquid column and break through the orifices 8 and 9 it may escape through the free liquid in the carboy to atmospheric pressure. In doing this the liquid column is destroyed at orifice 8 and the siphoning action stops. Any residual air pressure in the starting chamber and bulb 13 will be destroyed by the opening of the valve 14 when the pressure is released from the bulb, whereupon the chamber will refill and the cycle may be begun again.

The fact that the liquid acts itself as the valving agent is important as the valves commonly used in heavy fluids become stuck in a short period.

In operation, the starting chamber 4 is immersed in the liquid, the air valve 14 is open and the chamber fills to the hydrostatic level. See Fig. 3. The bulb is then squeezed, the valve 14 automatically closes, and the air pressure is exerted on the surface of the liquid in chamber 4. This pressure forces the liquid in the chamber against the baffling walls of annular orifice 8, whereupon the liquid is deflected upward into the short leg of the siphon 3. This pressure and liquid are of such amount as to completely fill the leg 3 and to cause an overflow to the long leg 1. Meanwhile the liquid in orifice 9 has temporarily acted as a liquid plug to prevent liquid leakage in this direction, and then suddenly acts as a source of supply conducting the liquid from the carboy into the siphon. The flow is then continuous until the supply is exhausted or the column is broken. For this condition see Fig. 4 and Fig. 5. To stop the action the bulb 13 is again squeezed whereupon the air pressure is exerted directly on the column exposed at the annular orifice 8, which breaks the column to escape to orifice 9 and thence bubbles through the liquid in the carboy to atmospheric pressure, see Fig. 6. The cycle may be indefinitely repeated to exhaustion of the liquid in the carboy.

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

1. In a siphoning device, a siphon tube having a flared intake end, a starting chamber, housing and adapted to be immersed with the said intake end; an inwardly projecting nozzle mounted in the said starting chamber and having its innermost end formed to coact with the flared end of the intake tube, to form an injecting port adapted to receive liquid from the said chamber, and means to force the liquid against the baffling walls of the said injecting port, substantially as described.

2. A starting attachment for hydraulic siphons, comprising a chamber adapted to house and to be immersed with the intake end of the said siphon, a feed nozzle surrounding a port in the said chamber and beveled at its innermost end to form a deflecting wall adapted to direct the liquid in the said chamber into the intake end of the siphon tube, the said nozzle being so disposed as to form a continuous fluid path from the port in the wall of the chamber to the siphon tube; and means to force the liquid against the said deflecting wall.

ARTHUR W. SCHREINER.