

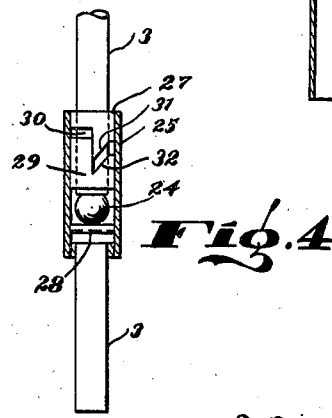
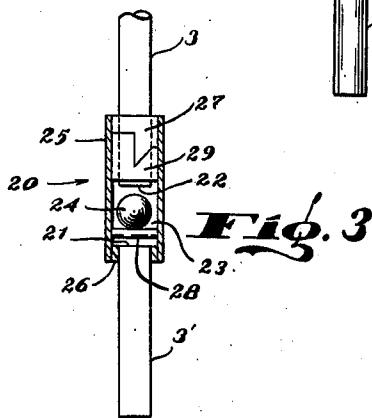
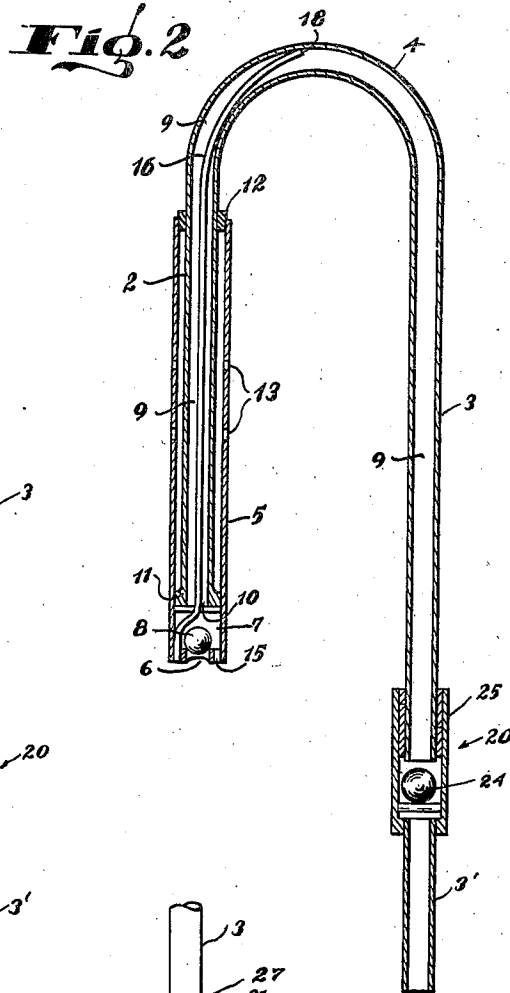
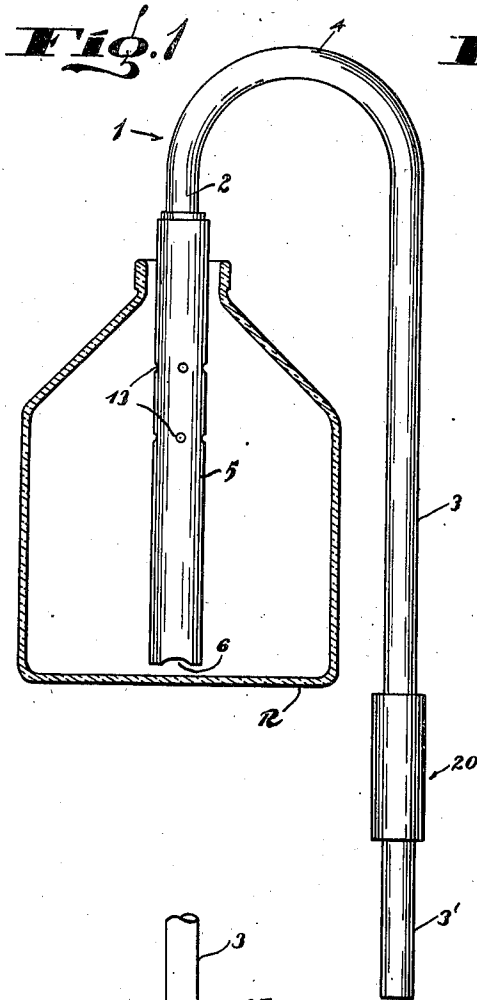
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SIPHON ASSEMBLY

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SIPHON ASSEMBLY

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8 Claims. (Cl. 137-20)

The invention relates to a siphon assembly especially adapted for discharging acids and corrosive liquids from a receptacle, though useful for other purposes.

The essential object of the invention is to provide a siphon assembly by which acids and corrosive liquids may be safely and efficiently withdrawn from a drum or carboy within which the liquid is contained.

Further objects include any or all of the following:

A self-priming siphon, and this without the development of pressure within the receptacle within which the liquid to be siphoned is contained;

One that may be made entirely of material unaffected by the acid or corrosive siphoned; one rugged and not easily broken; no danger of over priming; efficient outlet control.

The invention can best be seen and understood by reference to the drawing in which—

Fig. 1 shows the siphon assembly in side elevation; the receptacle for containing the liquid to be siphoned being shown in vertical cross section.

Fig. 2 is a vertical cross section of the siphon assembly.

Fig. 3 is a view mainly in cross vertical section of the outlet control valve, the valve being shown open.

Fig. 4 is the same as Fig. 3 excepting that the valve is shown closed.

Referring to the drawing: 1 represents the siphon having an inlet branch 2, an outlet branch 3, and a head 4 connecting the two branches, the siphon having the general form of an inverted U. R is the receptacle containing the liquid to be siphoned.

5 represents a casing within which the inlet branch 2 of the siphon is reciprocable. The casing is adaptable to be immersed in the liquid to be siphoned, with downward extension to the bottom of the receptacle, and with upward extension to a point outside the receptacle, so that it may be held manually in place. The casing has at the bottom an inlet opening 6 into the chamber 7 thereof. The inlet opening 6 is controlled by an inwardly opening valve 8 suitably engaged. The chamber 7 of the casing is in open communication with the interior or chamber 9 of the siphon through the open end 10 of its inlet branch. The inlet branch 2 has a slidably fit within the casing, or, more preferably, a packing 11 is borne by the lower end of the inlet branch 2 to lie interposed between it and the casing; while the top end of the casing is provided with

an inside sleeve 12 which acts as a guide for the branch during its reciprocation. The casing is also provided with openings 13 for escape of any liquid which may pass by the packing 11, and thus safeguard any escape of liquid from around the top end of the casing. The liquid thus escaping runs back into the receptacle. The bottom of the casing is also provided with a vent 15, of relatively small bore, from out of its chamber 7. This vent passes through the wall of the casing with outlet through the lower end thereof into the receptacle.

Located within the siphon is an air vent 16. This vent is preferably a small tube, of any suitable material which enables it to possess a certain rigidity for maintaining its form, coupled with flexibility, for permitting of its bending. The tube extends downwardly through the inlet branch 2 of the siphon through the open end 10 of the branch to outlet into the liquid within which the casing is immersed below the level of the liquid. The lower end of the air vent, or tube 16, preferably passes through the wall to the lower end of the casing and is there affixed to the casing. The length, or extension, of the tube is such that when the siphon, or inlet branch 2 of the siphon, is at the bottom of its downward stroke during the reciprocation thereof, the top inlet end 18 of the tube will then lie contained within the head 4 of the siphon at the very top of its chamber 7.

The outlet branch 3 of the siphon is provided at its end with a valve 20 for controlling its opening and closure.

For obtaining valvular control of the outlet of the siphon the outlet branch 3 is split, being provided with an extension 3¹. The open end 21 of this extension is spaced from the open end 22 of the main branch 3, and this in amount sufficient to form a valve chamber 23 containing a ball valve 24. This valve has opening or closure with relation to the end 22 of the branch. The extension 3¹ bears a tubular casing 25 of sufficient length to form the valve chamber 23, and lap on to the end of the main branch 3. The casing is provided at its lower end with a bushing 26 between it and the branch extension 3¹, and by which it is secured to this extension. At its upper end the casing is provided with a bushing 27 between it and the main branch 3. This bushing is fitted to turn upon the branch so that the casing, and branch extension affixed to it, may be movable or be turned with relation to the main branch. Affixed to the casing, and extending transversely through the lower end por-

tion of the valve chamber 23, is a pin 23 upon which the valve 24 normally rests when open, and from which position the valve is moved to engage the end 22 of the branch, forming a valve seat for the valve when closed. The valve is closed and maintained in a closed position either by turning the casing on the branch 3, or it may be closed by a straight upward longitudinal movement of the casing on the branch, and the casing then turned for maintaining the valve in its closed position. For obtaining these operations the end of the branch 3 within the valve chamber has affixed to it a sleeve 29. This sleeve lies in opposing relation to the bushing 27 on the casing. When the valve 24 is open the normal position of the bushing 27 and sleeve 29 is as shown in Fig. 3. The bushing and sleeve are so fashioned that when thus normally positioned the casing may be moved longitudinally upward on the branch 3 by a simple upward thrust movement. The upward movement of the casing, which is borne by the lower branch 3¹, will then move the valve 24 into a closed position as shown in Fig. 4, the bushing and sleeve then being separated by a space 30. The bushing and sleeve have bevelled edges 31 and 32, respectively. After the valve has been moved to a closed position as shown in Fig. 4 it may be maintained in such position simply by turning the casing 25 in a clockwise direction when the edge 31 on the sleeve 27, borne by the casing, will engage the edge 32 on the sleeve, borne by the branch 3, such engagement acting to maintain the valve in its closed position. On the other hand, the valve 24 may be closed from its open position as shown in Fig. 3, simply by turning the casing 25 in a clockwise direction, when the edge 31 will engage and ride upon the edge 32, closing the valve, and maintaining it in a closed position. The opening of the valve is by turning the casing 25 in a reverse or anti-clockwise direction.

The general operation of the siphon assembly is as follows:

Assuming the casing with contained inward branch of the siphon has been placed within the receptacle containing the liquid to be siphoned, resting on the bottom, and held in place by grasping the top of the casing. Assuming, also, that the outlet valve 20 is closed. Thereupon, upon reciprocating the siphon, its inlet branch 2 will be moved up and down within the casing in the manner of a plunger. As the branch moves upwardly, liquid will be drawn from its container to enter the chamber 7 of the casing by the partial vacuum, or suction, attending the raising of the branch 2, or plunger, the valve 8 controlling the inlet 6 to the casing having then been drawn open.

As the branch, or plunger, is reversely moved downward through the chamber of the casing liquid therein will enter the branch 2 through its open end 10 and fill the branch with a depth greater than the depth of the liquid within the casing preceding the downward movement of the branch, or plunger, due to the displacement of the liquid within the casing by the branch, or plunger. The operation continues as the branch, or plunger, is further reciprocated, and liquid will be drawn to pass over through the head 4 into the branch 3 to fill the chamber of the siphon. During this operation no liquid will flow back from out of the chamber of the siphon into the liquid container during the upward movement stroke of the branch 2, or plunger, when the valve 8 is opened, due to the suctional draft,

and the fact that the chamber of the siphon and casing is sealed from the atmosphere. The liquid entering the chamber of the siphon, however, will tend to cause a slight compression of the air therein, which is vented from out of the chamber of the siphon through the air vent 16 into the liquid container from which it escapes by ebullition. In this connection it will be observed that, while the top end of the tube will lie contained within the inlet branch 2 of the siphon during the upward stroke of this branch, in its reciprocation, yet upon the downward stroke when the liquid is entering the chamber of the siphon for priming it, and especially at the end of its downward stroke, when any air within the chamber of the siphon is most highly compressed, the open top end 18 of the air vent, or tube 16, will then lie contained within the head 4 of the siphon, as shown in Fig. 2, or at the very highest point of the chamber of the siphon, thus ensuring that all air can pass out of this chamber. The operation is continued until all of the air has been driven out of the chamber of the siphon, and both its branches and head have become filled with liquid, when the siphon becomes primed and ready for the siphoning which will take place on opening the valve 20 that controls the escape of liquid from the outlet branch.

After siphoning of the liquid has been completed from out of the receptacle in which it is contained then any liquid that may remain in the casing will outdrain through its vent 15.

If any liquid escapes by the packing 11, and rises within the casing between it and the branch 2, this liquid will escape through the openings 13 and flow back into the receptacle.

If the reciprocation of the branch 2 is continued after the chamber of the siphon has been filled with liquid, and the siphon primed, there is no danger from over priming as excess liquid will escape through the tube 16 and flow back into the liquid container.

Though the vent 15 is open at all times, this will not interfere with the priming operation due to the small bore of this vent.

I claim:

1. A siphon assembly comprising a siphon having inlet and outlet branches and a head connecting the two branches, a valve controlling the opening and closure of the outlet branch of the siphon, a casing adaptable to be immersed in the liquid to be siphoned and within which casing said inlet branch of the siphon is reciprocable, said casing having an inlet opening to the liquid in which the casing is immersed and an outlet opening into the chamber of the siphon, a valve controlling said inlet opening, whereby upon the closure of said outlet valve and upon the reciprocation of the inlet branch of the siphon within said casing the liquid to be siphoned will be drawn into said casing to enter the chamber of the siphon and fill the same, priming the siphon, when air contained therein and compressed by the entering liquid has been expelled from the chamber of the siphon, and means whereby air compressed within the chamber of the siphon by the entering liquid may vent from out of the head of the siphon.

2. A siphon assembly comprising a siphon having inlet and outlet branches and a head connecting the two branches, a valve controlling the opening and closure of the outlet branch of the siphon, a casing adaptable to be immersed in the liquid to be siphoned and within which

casing said inlet branch of the siphon is reciprocable, said casing having an inlet opening to the liquid in which the casing is immersed and an outlet opening into the chamber of the siphon, a valve controlling said inlet opening, whereby upon the closure of said outlet valve and upon the reciprocation of the inlet branch of the siphon within said casing the liquid to be siphoned will be drawn into said casing to enter the chamber of the siphon and fill the same, priming the siphon, when air contained therein and compressed by the entering liquid has been expelled from the chamber of the siphon, and means whereby the chamber of the siphon may be sealed from atmospheric pressure, and air compressed within the chamber of the siphon by the entering liquid be vented from out of the head of the siphon.

3. A siphon assembly comprising a siphon having inlet and outlet branches and a head connecting the two branches, a valve controlling the opening and closure of the outlet branch of the siphon, a casing adaptable to be immersed in the liquid to be siphoned and within which casing said inlet branch of the siphon is reciprocable, said casing having an inlet opening to the liquid in which the casing is immersed and an outlet opening into the chamber of the siphon, a valve controlling said inlet opening, whereby upon the closure of said outlet valve and upon the reciprocation of the inlet branch of the siphon within said casing the liquid to be siphoned will be drawn into said casing to enter the chamber of the siphon and fill the same, priming the siphon, when air contained therein and compressed by the entering liquid has been expelled from the chamber of the siphon, and means whereby air compressed within the chamber of the siphon by the entering liquid may vent from out of the head of the siphon into a liquid below the level of said liquid.

4. A siphon assembly comprising a siphon having inlet and outlet branches and a head connecting the two branches, a valve controlling the opening and closure of the outlet branch of the siphon, a casing adaptable to be immersed in the liquid to be siphoned and within which casing said inlet branch of the siphon is reciprocable, said casing having an inlet opening to the liquid in which the casing is immersed and an outlet opening into the chamber of the siphon, a valve controlling said inlet opening, whereby upon the closure of said outlet valve and upon the reciprocation of the inlet branch of the siphon within said casing the liquid to be siphoned may be drawn into said casing to enter the chamber of the siphon and fill the same, priming the siphon, when air contained therein and compressed by the entering liquid has been expelled from the chamber of the siphon, and means whereby air compressed within the chamber of the siphon by the entering liquid may vent from out of the head of the siphon into the liquid to be siphoned, with entry below the level of said liquid.

5. A siphon assembly comprising a siphon having inlet and outlet branches and a head connecting the two branches, a valve controlling the opening and closure of the outlet branch of the siphon, a casing adaptable to be immersed in the liquid to be siphoned and within which casing said inlet branch of the siphon is reciprocable, said casing having an inlet opening to the liquid in which the casing is immersed and an

outlet opening into the chamber of the siphon, a valve controlling said inlet opening, whereby upon the closure of said outlet valve and upon the reciprocation of the inlet branch of the siphon within said casing the liquid to be siphoned will be drawn into said casing to enter the chamber of the siphon and fill the same, priming the siphon, when air contained therein and compressed by the entering liquid has been expelled from the chamber of the siphon, and means whereby air compressed into the chamber of the siphon by the entering liquid may vent through the inlet branch of the siphon and casing into the liquid to be siphoned, within which the casing is immersed.

6. A siphon assembly comprising a siphon having inlet and outlet branches and a head connecting the two branches, a valve controlling the opening and closure of the outlet branch of the siphon, a casing adaptable to be immersed in the liquid to be siphoned and within which casing said inlet branch of the siphon is reciprocable, said casing having an inlet opening to the liquid in which the casing is immersed and an outlet opening into the chamber of the siphon, a valve controlling said inlet opening, whereby upon the closure of said outlet valve and upon the reciprocation of the inlet branch of the siphon within said casing the liquid to be siphoned will be drawn into said casing to enter the chamber of the siphon and fill the same, priming the siphon, when air contained therein and compressed by the entering liquid has been expelled from the chamber of the siphon, and a vent comprising a pipe contained within said inlet branch and fixed to said casing with outlet therethrough, and with top extension into the head of the siphon when the inlet branch is at the end of its downward stroke during its reciprocation.

7. A siphon assembly comprising a siphon having inlet and outlet branches and a head connecting the two branches, a valve controlling the opening and closure of the outlet branch of the siphon, a casing adaptable to be immersed in the liquid to be siphoned and within which casing said inlet branch of the siphon is reciprocable, said casing having an inlet opening to the liquid in which the casing is immersed, an outlet opening into the chamber of the siphon, and a vent passage from out of the chamber of the casing into the liquid in which the casing is immersed, a valve controlling said inlet opening, whereby upon the closure of said outlet valve and upon the reciprocation of the inlet branch of the siphon within said casing the liquid to be siphoned will be drawn into said casing to enter the chamber of the siphon and fill the same, priming the siphon, when air contained therein and compressed by the entering liquid has been expelled from the chamber of the siphon, and means whereby air compressed within the chamber of the siphon by the entering liquid may vent from out of the head of the siphon.

8. In a siphon assembly as in claim 1, a packing borne by the inlet branch at the lower end thereof between it and the casing, said casing having an opening through the side thereof below the top of the casing whereby liquid escaping by said packing may be returned through said opening in the casing to the liquid within which the casing is immersed.

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