March 28, 1944. L. T. WARD 2,345,081

SYPHON CONSTRUCTION

Filed July 29, 1940 2 Sheets-Sheet 1

Fig. 1.

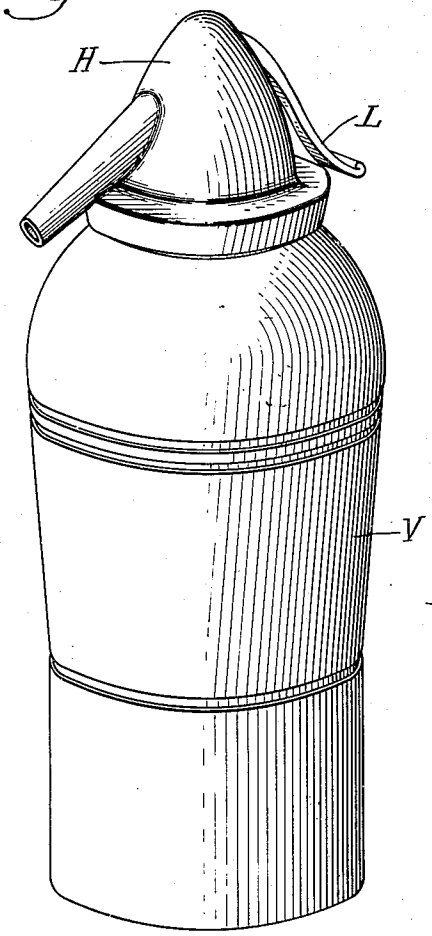


Fig. 2.

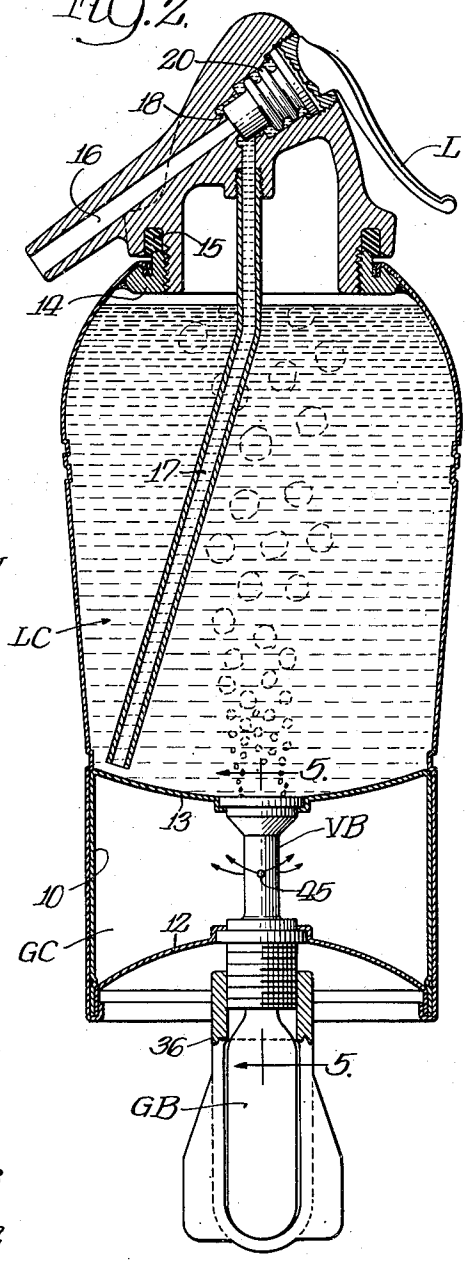
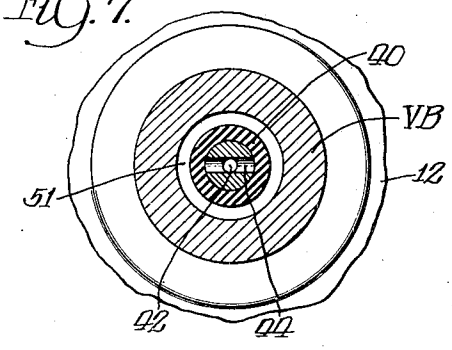


Fig. 7.



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SYPHON CONSTRUCTION

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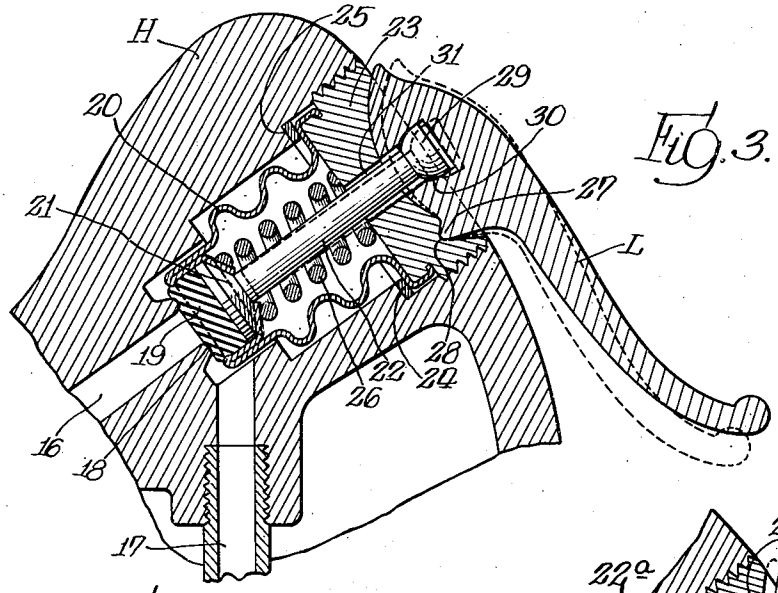

Fig. 3.

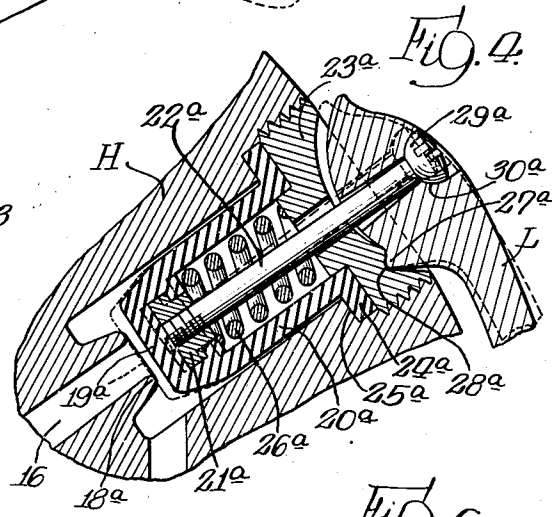

Fig. 4.

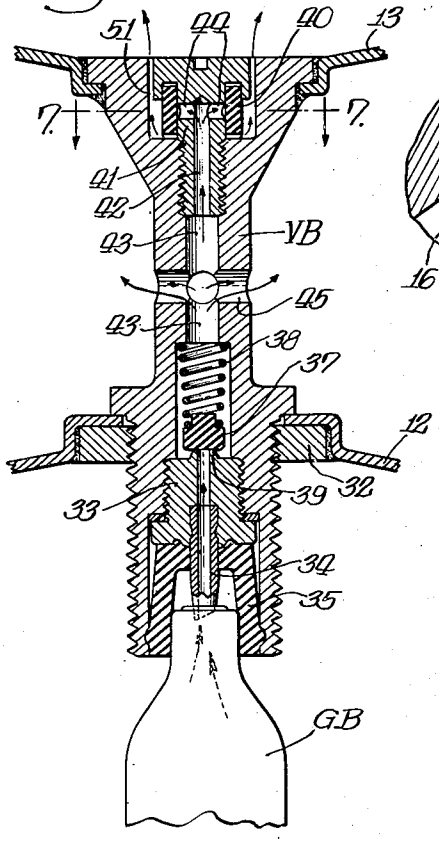

Fig. 5.

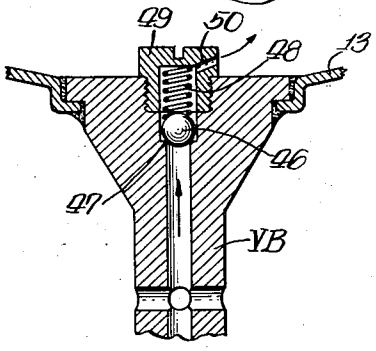

Fig. 6.

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Patented Mar. 28, 1944

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UNITED STATES PATENT OFFICE

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SIPHON CONSTRUCTION

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Application July 29, 1940, Serial No. 348,239

7 Claims. (Cl. 225—18)

My present invention has to do with a siphon construction wherein the liquid chamber of the siphon may be readily filled completely with water or the like upon removal of the head of the siphon, and thereafter gas may be introduced into a separate gas chamber, subsequent dispensation of the liquid being readily effected by a valve of simple and positive sealing type.

One object of the invention is to provide a siphon construction which may be readily and economically manufactured in quantity production.

Another object is to provide a siphon construction so designed that the impact of dispensation may be carried by a gas chamber of substantially rugged construction whereas the liquid chamber may be formed of lighter material as it does not have to stand the impact of operation.

Another object is to provide a novel arrangement of gas chamber separated from the liquid chamber and adapted to initially receive gas from the charging bulb and serve as a space reserved for gas when the liquid chamber is completely filled with liquid.

Still a further object is to provide means for controlling the gas in the form of a tie member running completely through the gas chamber and having a pair of check valves, a piercing pin and means of communication with the gas chamber intermediate the check valves.

Still another object is to provide a control valve structure having an efficient bellows or rubber sleeve type of sealing connection with the valve plug and the head of the siphon vase.

With these and other objects in view, my invention with respect to its features which I believe to be novel and patentable will be pointed out in the claims appended hereto. For a better detailed understanding of the invention, and further objects relating to details of economy of my invention, reference is made to the following description and to the accompanying drawings wherein such further objects will definitely appear, and in which

Figure 1 is a perspective view of a siphon construction embodying my invention;

Figure 2 is a vertical sectional view therethrough showing a gas bulb and a bulb holder associated therewith;

Figure 3 is an enlarged sectional view in greater detail of the control valve in the head of the siphon;

Figure 4 is a similar sectional view of a modified form of control valve;

Figure 5 is an enlarged sectional view on the line 5—5 of Figure 2 showing the piercing pin for the gas bulb and the check valves of my construction;

Figure 6 is a sectional view similar to the upper portion of Figure 5 showing a modified construction for one of the valves, and

Figure 7 is a sectional view on the line 7—7 of Figure 5.

On the accompanying drawings, I have used the reference character V to indicate a siphon vase and H the head thereof. The vase V may be made of somewhat lighter sheet metal than usual in siphon constructions as it has a separate gas chamber therein consisting of a cylindrical wall 10, a convex bottom wall 12 and a convex top wall 13. The space in the gas chamber is indicated at GC. Above the gas chamber GC a liquid chamber LC is provided, with the wall 13 forming a concave bottom for the liquid chamber.

The vase V has a threaded collar 14 at its upper end into which the head H is screwed, with a gasket 15 interposed between the vase and the head to effect a liquid and gas tight seal between the two. The head H includes a spout 16 and has a siphon tube 17 depending into the liquid chamber LC with its lower end terminating adjacent the liquid chamber bottom 13, as illustrated.

The head H has a valve seat 18 located between the spout 16 and the siphon tube 17. A valve plug 19 in the form of a disc of suitable composition is provided for seating against the seat 18. The valve plug 19 is connected with one end of a bellows 20 and a valve stem head 21 of a valve stem 22. The other end of the bellows 20 is connected with a closure member 23 for the head H, which closure member is screw-threaded into the head. A gasket 24 is positioned against a shoulder 25 of the head H to effect a liquid and gas tight seal between the bellows 20 and the head H.

A spring 26 is enclosed within the bellows 20 and presses against the closure member 23 and the valve stem head 21 to normally seat the valve plug 19. For unseating the valve plug, I provide a lever L having a projection 27 seated at 28 in the closure member 23. The seat at 28 provides a pivotal mounting for the lever L and the lever, in turn, is operatively connected with the valve stem 22 by means of a semi ball shaped head 29 thereof coacting with a globular seat 30 in the lever L. The closure member 23 serves as a guide for the stem 22, the closure member having a perforation 31 for this purpose.

In Figure 4, I show a modified construction wherein the valve seat 18a has seated thereagainst one end of a flexible sleeve 20a of rubber or the like, such end being indicated at 19a. The sleeve 20a has a flange 24a retained in sealing engagement with a shoulder 25a of the head H by the closure member 23a. The lever L of Figure 4 is similar to that shown in Figure 3 and bears the same reference numerals with the addition of "a". The stem 22a in Figure 4 has a head 21a embedded in the valve plug portion 19a of the sleeve 20a.

Referring to Figure 5, a valve body or tie member VB spans the distance between the gas chamber walls 12 and 13 and has a nut 32 on its lower threaded end to retain it in position, the joints being suitably soldered to prevent leakage. Within the valve body VB a plug 33 is mounted and carries a hollow piercing pin 34. A sealing sleeve 35 of rubber or the like is adapted to coact with the neck of a gas bulb GB to prevent leakage of the gas after the piercing pin has perforated the gas bulb. The gas bulb may be associated with the piercing pin in the usual manner by placing the gas bulb in a holder 36 and screwing the holder into position on the threaded lower end of the valve body VB.

Within the valve body VB a first check valve 37 is normally seated by a spring 38 against a valve seat 39 of the plug 33. A second check valve consists of a sleeve 40 of rubber or the like surrounding a stud 41. The stud 41 has a bore 42 communicating with a bore 43 in the valve body VB and provided with lateral openings 44 terminating at the inner surface of the sleeve 40. The passageway 43 has lateral openings 45 communicating with the gas chamber GC.

In Figure 6, I show a modified construction replacing the parts 40, 41, 42 and 44. The check valve in this instance comprises a ball 46 seated against a seat 47 of the valve body VB by a spring 48 contained in a plug 49. A lateral passageway 50 leads from the interior of the plug 49 to the liquid chamber LC.

Practical operation

In the operation of my siphon construction, the head H may be removed by unscrewing it from the vase V and the liquid chamber LC substantially completely filled with liquid, such as water. The head H is then screwed tightly into position to prevent any leakage past the gasket 15. The gas bulb GB may then be placed in the holder 36 and the holder screwed into position on the valve body VB, which will force the gas bulb against the piercing pin 34 to the position of Figure 5 for perforating the bulb and permitting the compressed gas therefrom to pass through the piercing pin to the check valve 37. The gas will lift the valve and flow through the passageway 43, part of it going through the lateral openings 45 into the gas chamber GC, and part of it expanding the sleeve valve 40 and passing downwardly along the outer surface of the stud 41 and then up through the recess 51 of the valve body VB, as indicated by the arrows, whereupon it bubbles up through the liquid in the liquid chamber, thus aerating or charging it, as the case may be. For instance, when the gas in the bulb GB is CO_2, it will carbonate water in the liquid chamber. In either event the gas will enter the head H and tend to displace the liquid through the siphon tube 17. When the gas bulb GB has been exhausted of its contents, it and the holder 36 may be removed, with assurance that the gas will not escape because it is held by the first check valve 37.

Subsequently, when the lever L is pressed to the dotted position of Figure 3 or the full line position of Figure 4, the valve plug 19 or 19a will be separated from its seat 18 or 18a, thus permitting the displacing of the liquid through the spout 16. This will enlarge the gas space within the head H and the top of the vase V and permit further gas to enter from the gas chamber GC, thus producing further aeration or charging of the liquid each time the valve is opened for dispensing the liquid.

By designing the present siphon so that a separate gas chamber is provided below the liquid chamber, the liquid chamber may be filled to the top, thus giving uniform aeration charging or dispensing pressure without danger of over-filling. As the liquid is dispensed, the tubular check valve 40 or the check valve 46 of Figure 6 will permit further entrance of gas to the liquid chamber and prevent any subsequent return of liquid to the gas chamber. Such movement of gas of course obtains until the pressures within the liquid chamber and the gas chamber are balanced with relation to each other.

By providing a separate gas compression chamber to withstand the charging pressure, the rest of the siphon construction need not be built so heavily. When the gas bulb is discharged the impact is imparted to the compression chamber. Because of a definite relation between the size of the gas compression chamber and the size of the liquid or aerating chamber, a more uniform quality of aeration may be secured, and dangers of overfilling are entirely eliminated. The device, of course, may be used for dispensing any liquid, such as paint, insecticide, fire extinguishing fluid, lubricant, etc., when it is desirable to either dispense or to dispense and aerate or charge the liquid with a suitable gas.

As many changes could be made in the foregoing construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense. It is also to be understood that the language used in the following claims is intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention which, as a matter of language, might be considered as falling therebetween.

I claim as my invention:

1. In a siphon vase construction, a vase having a partition therein dividing the vase into a liquid chamber and a gas chamber, said gas chamber being located below said partition and said liquid chamber being located above it, means for introducing gas to said gas chamber from a compressed gas bulb, a first check valve between said means and said gas chamber, a second check valve between said gas chamber and said liquid chamber, said second gas valve comprising a hollow headed stud extending from said gas chamber and having an opening therein communicating with the gas chamber, and a sleeve of rubber or the like surrounding said stud and retained thereon by the head of the stud.

2. In a siphon vase construction, a vase having a liquid chamber and a gas chamber therein, means for introducing gas to said gas chamber, a

first check valve between said means and said gas chamber, a second check valve between said gas chamber and said liquid chamber, said second gas valve comprising a hollow headed stud extending from said gas chamber and having an opening therein communicating with the gas chamber, and a sleeve of rubber or the like surrounding said stud and retained thereon by the head of the stud, said head having an annular groove receiving one end of said sleeve.

3. In a siphon vase construction, a vase, a liquid chamber and a gas chamber therein, said gas chamber being located below said liquid chamber, a tie rod for the upper and lower walls of said gas chamber and having means on its lower end for communicating with a compressed gas bulb and at its upper end for communicating with said liquid chamber, said tie rod including a check valve between the bulb and the intermediate portion of the tie rod, openings at said intermediate portion communicating with said gas chamber, and a second check valve in said tie rod between said openings and said liquid chamber, a removable head for said vase and opening toward said liquid chamber

4. A siphon vase construction comprising a vase, a liquid chamber and a gas chamber therein, means for introducing gas to said gas chamber and to said liquid chamber comprising a valve body member extending completely through said gas chamber and serving as a tie means for the upper and lower walls thereof, said valve body member having a piercing pin and being threaded for engagement with a bulb holder operable to connect a bulb in gas-tight relation to said piercing pin and to effect piercing of the bulb by said pin, said valve body member including a passageway therethrough with a pair of check valves in said passageway both opening away from said bulb and toward said liquid chamber, said valve body member having an opening intermediate said check valves communicating with said gas chamber.

5. A siphon vase construction comprising a vase, a liquid chamber and a gas chamber therein, said chambers having peripheral side walls, said liquid chamber having a concave bottom wall constituting a convex top wall for said gas chamber, said gas chamber having a convex bottom wall, a fitting at the center of said bottom and top walls and tying them together, said fitting having a hollow piercing pin for coacting with a compressed gas bulb and having its interior communicating at the lower end with said piercing pin, intermediate its ends with said gas chamber and at its top with said liquid chamber.

6. A siphon vase construction comprising a cylindrical wall closed at its top and having separate liquid and gas chambers therein, a casing for said gas chamber within said cylindrical wall, said casing constituting a bottom for said cylindrical wall, said cylindrical wall around its bottom marginal edge being bent to a retaining position relative to said casing, means for introducing gas to said gas chamber, a first check valve between said means and said gas chamber and a second check valve between said gas chamber and said liquid chamber, said check valves opening toward the gas and liquid chambers respectively.

7. In a siphon vase construction, a vase having a liquid chamber and a gas chamber therein, said gas chamber being located below said liquid chamber, means comprising a tie fitting for the top and bottom of said gas chamber for introducing gas to said gas chamber while it is permanently connected with said liquid chamber, a first check valve between said gas introducing means and said gas chamber, and a second check valve between said gas chamber and said liquid chamber, permitting the pressures in said gas chamber and said liquid chamber to be substantially equalized and preventing reverse flow of gas from said liquid chamber to said gas chamber, said check valves being located in said tie fitting.

LAWRENCE T. WARD.