

Aug. 3, 1943.

T. S. RIGBY

2,325,920

SYPHON

Filed Sept. 4, 1940

2 Sheets-Sheet 1

Fig. 1.

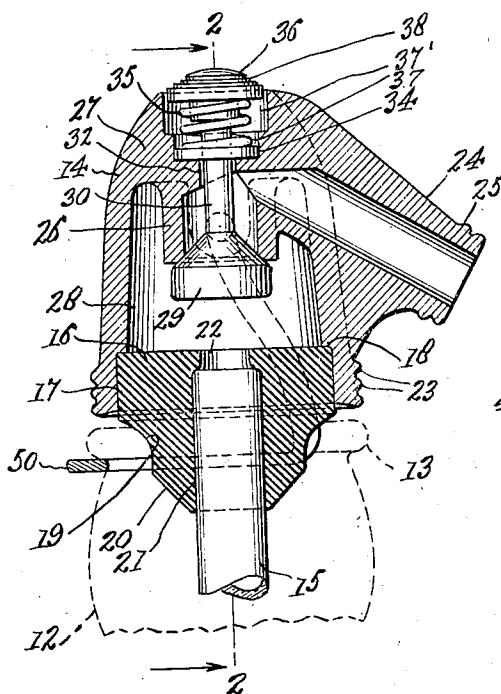


Fig. 2.

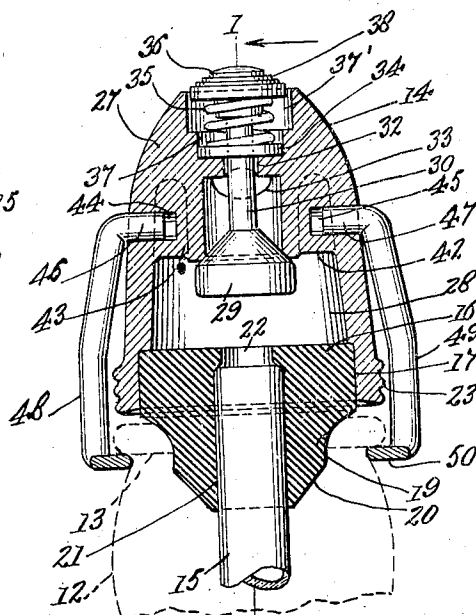


Fig. 3.

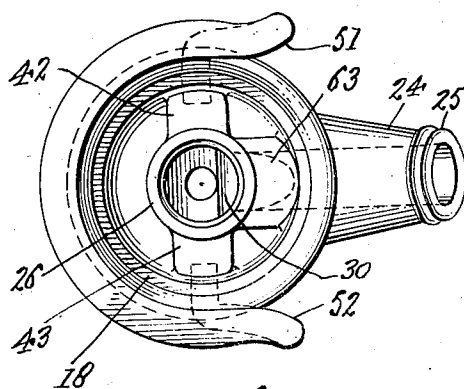


Fig. 4.

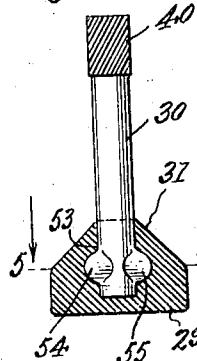


Fig. 5.

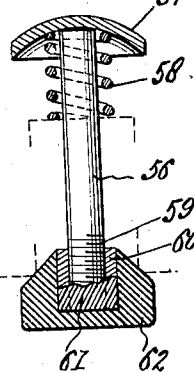


Fig. 6.

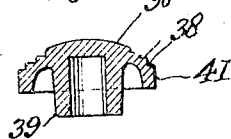
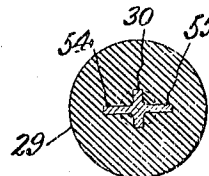


Fig. 5.



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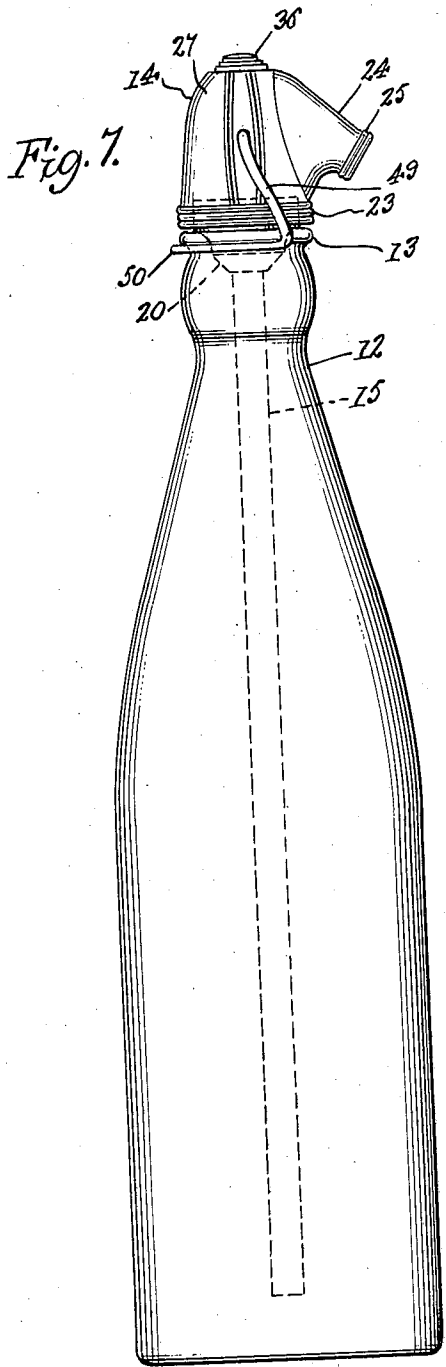
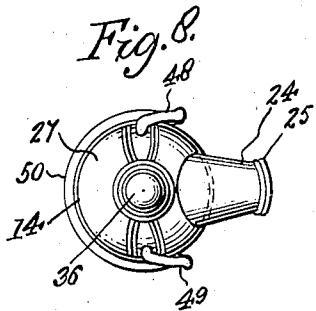
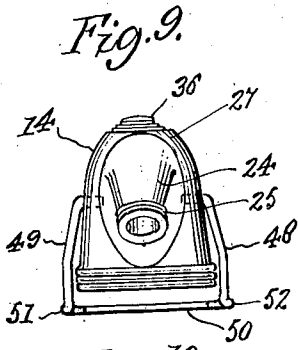
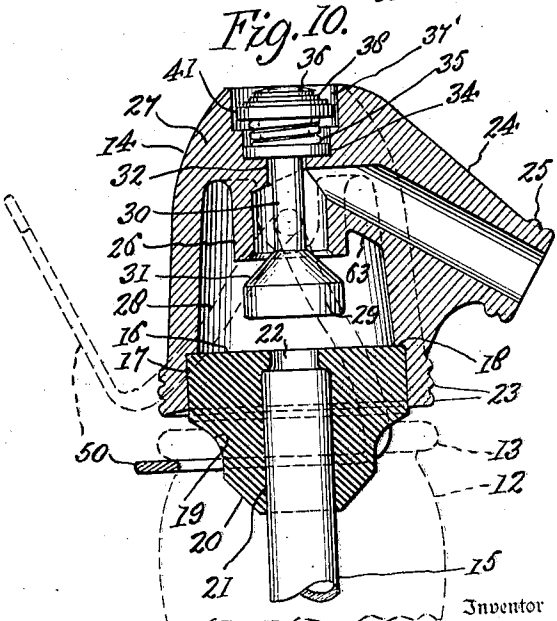
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UNITED STATES PATENT OFFICE

2,325,920

SIPHON

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Company, a corporation of Connecticut

Application September 4, 1940, Serial No. 355,399

3 Claims. (Cl. 215-5)

The present invention relates to improvements in siphons and more particularly to that class of siphon which is mounted upon the neck of a bottle containing carbonated water, soda or the like for the purpose of maintaining the gas pressure in said bottle or container and having an automatically closable valve assembly subject to manual opening whenever the contents of said bottle is to be dispensed or decanted; particularly are siphons of this type used in connection with the delivery of carbonated liquid under pressure for use in mixing such beverages as whisky and soda.

Among others, the important objects of the invention are to simplify the construction, both interior and exterior, of such siphon devices and to promote the economical and expeditious manufacture of the same, to enable the quick and economical assembly of the separately manufactured parts, to promote ready mounting of the device upon the bottle neck, the effective seal of the container against the escape of the gas, and in general to improve the use of the device particularly in the act of opening the valve to dispense the contents.

Other objects of the invention are to improve the appearance of siphon devices as fitments for modern commercial bottles, to provide improved valve assemblies for the same, to improve the devices for binding these fitments upon the bottle neck, and to so construct and arrange the external contours of the siphon head as to lead the hand and the fingers imperceptibly and guidingly to the button or head which operates the valve assembly and to enable the depressing of said head or button in a facile and quick manner.

An important object of the invention is to so construct and arrange the interior of the siphon head as to provide in a structure of requisite lightness and sufficient strength the various internal parts to receive and cooperate with the valve assembly and nozzle and to enable sockets to be formed in the head for the trunnions of the fastening bail.

A still further object of the invention is in the siphon tube and its yieldable head with its improved method of mounting.

With the foregoing and other objects in view, the invention will be hereinafter more fully described and more particularly pointed out in the appended claims.

In the drawings, in which like parts are denoted by the same reference characters throughout the several views.

Figure 1 is a central vertical section taken

through the improved siphon on line 1-1 in Figure 2, with parts broken away.

Figure 2 is a similar view taken at right angles to Figure 1 on the line 2-2 of Figure 1.

Figure 3 is a bottom plan view of the improved siphon head with all parts removed therefrom except the swinging fastening bail.

Figure 4 is an enlarged side elevation of the improved valve stem with the improved valve shown in section.

Figure 5 is a horizontal section taken on the line 5-5 in Figure 4.

Figure 6 is a vertical section through a preferred form of valve button for operating cap.

Figure 7 is a side elevation of the improved device shown as applied to a bottle.

Figure 8 is a top plan view of the siphon device.

Figure 9 is a front elevation of the same.

Figure 10 is a vertical section similar to Figure 1, but with the valve in the open position, and

Figure 11 is a vertical section through a modified form of valve assembly.

Referring more particularly to the drawings 12 designates a bottle or container having an outwardly projecting rim or lip at its upper end and 14 represents generally the siphon head carried upon the container and supporting the various parts for dispensing the contents which are usually soda or carbonated water, that is a liquid under carbonic acid or other gas pressure.

At 15 is represented the siphon tube carried by a block 16 of rubber or other suitable compressible material and projecting down into the bottle with its lower portion near to the bottom of said bottle.

As shown more particularly in Figures 1 and 2 the rubber block has a cylindrical external conformation complementary to a cylinder 17 formed in the lower wider base portion of the siphon head 14. This cylinder opens out through the lower base portion of the siphon head 14. At its upper end the cylinder 17 ends abruptly against a shoulder 18, which confines the upper end of the block 16 and arrests the upward or inward motion of block 16 into the lower open end of siphon head 14.

Normally the block 16 will have, when uncompressed, a greater external diameter than the internal diameter of cylinder 17. In order to insert block 16 into cylinder 17 the block must be slightly compressed, and in this compressed condition forced into the cylindrical opening 17 and against the shoulder 18.

Below the cylindrical part of block 16 is the

annular seat 19 conforming generally to the form of the interior mouth of the container 12 into which it accurately and sealingly fits. Below the seat 19 the shank of the block 6 extends into the bottle mouth and may be beveled off as indicated at 20, the bevel running generally from the seat 19 to the siphon tube 15. This siphon tube 15 is forced up through a central opening 21 in the block 16, such central opening 21 being normally initially smaller than the external diameter of the tube 15, whereby the rubber of the block 16 will have to be expanded or crowded out along the line of the opening 21 to admit the tube 15 which is thereupon tightly embraced by the reaction of the inherently resilient rubber of the block 16, causing such block to tightly embrace and sustain the tube 15. This tube 15 is urged upwardly in block 16 to a point where the upper end of the tube 15 terminates short of the open upper end of the opening 21. This leaves a narrow neck 22 of rubber or other resilient material of which the block 16 is made protruding inwardly of the tube 15 to overlap the upper end of such tube substantially the thickness of the wall of the tube 15 so that the narrow free neck 22 does not encroach upon the cross sectional area of the tube 15 in any manner to impede or obstruct the flow of the contents of the bottle through such tube 15 and opening 21 into the hollow chamber of the head 14. At the same time the narrow free neck 22 marks a zone transversely completely across the upper part of block 16 where the rubber is not crowded out by the presence of tube 15. For this reason the outer upper edge of block 16 within the confines of the free lip 22 may be more easily compressed inwardly, and the rubber generally in this upper zone of the block 16 is more amenable to contraction. This zone forms the leading edge of the block 16 when inserted in the cylinder 17 and the freedom of this zone is therefore of importance in facilitating the insertion of such leading edge of the block 16 into the cylinder 17. Once the leading edge is worked into the lower part of cylinder 17 the remainder of the cylindrical portion of the block 16 may be crowded radially inward against tube 15 by a camming incident to the thrust of the block 16 upwardly into the siphon head. The radial crowding of the block rubber concentrically outward of tube 15 increases the resilient action for binding the block 16 in the siphon head. A strong binding action of block 16 both upon the siphon head and upon the tube 15 is important as the block 16 is depended upon to support the tube 15.

Externally of the cylinder 16 the siphon head 14 is formed with a number of annular beads 23 which serve as grips for the fingers at the end portion of the head in the act of mounting the fitting upon the neck 12 of the bottle or other container.

Externally the head 14 is generally cylindrical and tapers upwardly to a rounded dome. Laterally from the head 14 projects the discharge nozzle 24. This nozzle as shown in Figure 1 is open at its lower end where it is also provided with external annular beads 25 for marking off the extremity and providing purchase or holds for the fingers of the user.

At its inner end the nozzle 24 communicates with the upper end of a barrel 26. This barrel is of smaller external diameter than the internal diameter of the hollow head 14. Barrel 26 depends at its upper end from the solid formation 27 of the dome. At its lower end it opens freely into the internal chamber 28 of the siphon head

and is spaced at such lower end an appreciable distance above the upper end of the rubber block 16 to afford ample opportunity for the valve 29 to reciprocate vertically.

The valve 29 is supported upon a stem 30 and has a beveled upper face 31 for seating against the lower end of the barrel 26, the valve 29 being preferably of a block of rubber so that its bevel face seats tightly against the sharp annular corner at the inner lower edge of the barrel 26. The valve stem 30 reciprocates through an opening 32 in a septum or diaphragm 33 formed in the solid part 27 at the upper end of the barrel 26. The upper end of the septum 33 forms a seat for a rubber or other resilient or flexible washer 34, through which the valve stem 30 also projects and moves but in a tight sealing manner. A coil spring 35 is wound about the valve stem 30 and abuts at its lower end against the washer 34 and at its upper end against the under side of a cap or operating button 36 shown more particularly in Figure 6. A cavity of differential diameters 37 and 37' receives the upper end of the valve assembly, the washer 34 fitting snugly in the lower part 37 while the wider cap 36 moves freely up and down in the upper larger part 37'.

As shown in Figure 6 the cap 36 is formed with a stepped or terraced outer marginal conformation 38, which contributes with the upper rounding dome wall to the symmetrical appearance of the dome, the highest point of which is the intermediate part of the cap 36. The steps 38 are arranged in an ascending order from the outer rim up to the high dome so that by the movement of the fingers upwardly along the round dome such fingers are guided toward the steps and by the steps to the dome and in the act of movement across the top of the cavity 37, 37' the fingers will necessarily depress the cap or the operating button and thus compress the spring 35 to open the valve 29.

In Figure 6 the cap is shown to have a cylindrical restricted depending flange 39 which is forced by drive fit over the knurled upper section 40 of the valve stem 30 as shown in Figure 4. The marginal part 41 shown in Figure 6 is of sufficient area to form a guiding surface or apron along the rim of the operating button or cap 36, contributing together with the smooth wall 37' for this purpose.

As shown more particularly in Figure 3 diametrically opposed webs 42 and 43 are made in one piece with the material of the head 14 across the interior space of such head lying between the head and the barrel 26. As shown in Figure 2 these webs 42 and 43 join integrally with the head formation 27 and they extend down approximately to the lower edge of the barrel 26. Thus these webs reinforce and strengthen the barrel 26 throughout substantially its entire axial length on diametrically opposite sides thereof. Moreover these webs 42 and 43 serve an additional function in that they provide sockets 44 and 45 for the intumed trunnions 46 and 47 of the attaching bail, the depending arms of which are represented at 48 and 49. At their lower ends these arms support the substantially semi-circular flattened bail member 50 which is adapted to extend beneath the external lip 13 of the container 12. The bail is preferably made from a single piece of round bar wire or steel bar construction possessing some inherent resiliency. It is bent and flattened out at its intermediate part to provide the bail member 50 while the ends

of the wire or rod are shaped to provide the arms and the trunnions. It will be noted from Figures 1 and 2 particularly that the bail member 50 is flattened in a horizontal sense. Due to this flat vertical cross section as compared with the horizontal cross section the bail member 50 will be subject to vertical distortion. This ability is enhanced by the support of the bail member 50 solely at its ends by the arms 48 and 49. Because the bail member is substantially semi-circular and because of its lack of support throughout its entire arc and because of the flatwise construction and inherent resiliency it will yield or distort opposed by such resiliency thus causing the bail member to bind very tightly beneath the lip 13. As shown in Figure 1 the trunnions lie in line with the vertical axis of the siphon head but the arms 48 and 49 are bent so as to move to the right of this vertical axis line. As shown in Figure 3 the curved arms 48 and 49 joint with outwardly flared parts 51 and 52 which form the leading edges of the bail and which in the downward swinging movement of the bail first encounter the neck of the bottle 12. These flaring jaws thus guide the semi-circular bail on to the neck and beneath lip 13. In Figure 1 the bail is shown as in home position. Without the presence of the lip 13 the bail member 50 would incline from the lower ends of the arms upwardly to the left but as the bail member slips under the neck it is caused to tilt down springingly about the lower ends of the arms and thus put the bail member and the arms under tension which tension serves to retain the bail member in its fastening position and causes the bail member to draw the head 14 down tightly upon the block 16 thus compressing the block as to its seat 19 upon the neck of the bottle. This act also tends to jam the leading edge of block 16 against shoulder 13 forming a tight sealing fit at this point.

Referring more particularly to Figure 4, the block of rubber forming valve 29 is formed with a socket 53 open at its top but closed at its bottom and adapted to tightly hug the lower end of valve stem 30 over which it is removably mounted.

As shown in Figures 4 and 5 the lower part of cross-sectionally rounded valve stem 30 is squeezed out into a cruciform construction (Figure 5) so that projecting flanges 54 and 55 extend in opposite directions and are wider in their combined diametric length than the original diameter of valve stem 30 so as to project narrow parts into and embed themselves into the rubber of the valve body 29 thus interposing large surfaces against the casual rotation of the valve body 29 with respect to valve stem 30 and offering wide and large obstacles to the accidental movement of the valve body 29 downwardly or off the valve stem 30.

Referring more particularly to Figure 11, a modified form of valve assembly is shown consisting of the stem 56 to the upper end of which is welded or otherwise affixed the concavo-convex cap 57 beneath which engages the coil spring 58. The valve stem 56 is threaded at its lower end 59 in order that there may be run thereon an internally threaded sleeve 60 the outer surface 61 of which is knurled to receive the rubber valve body 62. The rubber of the valve body 62 will tightly embrace the knurlings of the sleeve 60.

In the use of the device, the coil spring 35 reacting against washer 34 and septum 33 will

tend to lift the operating button or cap 36, thus lifting with it the valve stem 30 and the valve 29, closing the latter against its seat at the bottom of the barrel 26. This condition obtains automatically at all times. With the device in place on a bottle as shown in Figures 1, 2 and 7, leakage of gas will be completely prevented by the rubber block 16 and by this closed position of the valve 29. Obviously by the arrangements shown in Figures 4 and 11 the rubber valve bodies 29 and 62 may be removed and renewed whenever necessary. In the same manner the block 16 may be renewed when required.

With the parts in place the user may simply depress the button or operating member 36 downwardly against the action of the convolutions of the spring 35 thus lowering the valve 29 from its seat and allowing the gas to force the liquid up through the tube 15 into the chamber 28 and out the barrel 26 and nozzle 24. As soon as the pressure is released from the button or operating member 36 the helices of spring 35 will expand upwardly and automatically close the valve 29.

A hollow web 63 integral with the material of the head 14 extends at right angles from the barrel 26 over to the head wall in and about the opening of the delivery spout 24. This web joins the solid formation 27 at the top of the web and at the bottom, as shown in Figure 1, such web slopes down in the general direction of the diagonal spout 24. The head 14 may be of Bakelite, or of any of the new synthetic resins or other compositions such as to enable it to be molded cheaply. In view of this the internal arrangement of the head 14 is adaptable to molding and at the same time is calculated to produce strength in a molded article from a plastic of this kind.

The peculiar formation of the three webs extending in spaced annular relation to one another and extending at approximately 90 degrees apart at one side of the circle of the siphon head and at 180 degrees at the other side provides a siphon head that is substantially hollow and of light weight and economical construction while the requisite strength and reinforcement is imparted through the solid dome head and from the side walls through the webs to the barrel to preserve the alignment of the barrel in its relation to the reciprocating valve; although slight misalignment is compensated for by the large rubber body of the valve 29. In other words the bulk of the valve permits it to accommodate itself to seats, the positions of which vary somewhat in manufacture. The spaces between the webs accommodate the liquid in sufficient volume to insure steady heavy flow through the nozzle or discharge spout.

It is obvious that the embodiment or embodiments of the invention illustrated in the drawings are susceptible of variation and are not to be regarded as restrictive, the invention being limited only by the scope of the following claims:

I claim:

1. An improved siphon for containers comprising a substantially hollow siphon head, a barrel therein, webs extending from said head inwardly to said barrel, one of said webs being hollow and communicating with the upper portion of said barrel an external siphon nozzle on said head communicating with said hollow web, a valve movably mounted in said head and closable against the lower rim of said barrel, means bias-

ing said valve to closed position, and operating means for opening said valve.

2. An improved siphon for containers comprising a siphon head of substantially hollow construction having an external rounded upwardly tapering dome formation with a cavity in the dome portion, a barrel within said head depending from said dome portion and in substantial alignment with said cavity, diametrically opposed webs extending from the dome portion to substantially the lower part of said barrel and from said barrel outwardly to the inner wall of said hollow head, a third web extending from said barrel to the internal wall of the hollow head and being disposed at substantially right angles to the diametric line passing through the first mentioned webs, said third web being in communication with the interior of the barrel, a spout externally of the head communicating with the hollow web, a large resilient valve having a beveled seat moving toward and from the lower edge of said barrel, a stem carrying said valve, an operating button on the upper end of said stem movable up and down in said cavity, and spring means in said cavity for normally lifting said head and valve and exposing the button for operation upon the exterior of said dome.

3. An improved siphon for containers comprising a siphon head of generally hollow form open at its lower end and having a wall extending about said opening, said head having a cavity in its top, a barrel depending from the

top of said head and having a diameter substantially less than the inner diameter of said head, said barrel being substantially concentrically disposed within said head and terminating at a point spaced a substantial distance above the open lower end of the head to provide an annular space about the barrel communicating with a large open space below the barrel, reinforcing webs disposed in the annular space about the barrel and connecting the barrel with the inner sides of the head, a spout carried by said head and extending laterally of said head, said spout having an opening connecting its outer end with the interior of the barrel through one of said reinforcing webs, a valve stem extending from the cavity in the head through the interior of the barrel, a valve carried by the lower end of said stem, an enlargement carried by the top of the stem and movable in said cavity to move the valve to open and close the bottom of the barrel, means biasing said valve to its closed position, a resilient block disposed in the open lower end of the head to close said head, said block having a bore extending therethrough and said block being spaced a substantial distance below the bottom of the barrel and the valve to permit operation of said valve and to provide a chamber below and around said barrel, a siphon tube secured in said bore and adapted to extend into said container, and means to secure the head to the container with the resilient block extending into the container.

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