Aug. 23, 1960 D. V. McCONNOHIE 2,950,030

DISPENSER FOR HAIRDRESSING LIQUIDS

Filed June 23, 1958

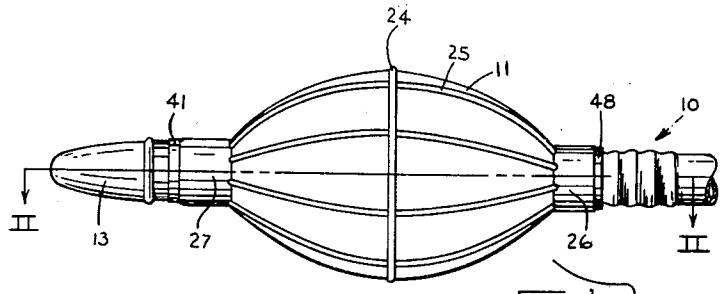


FIG. 1

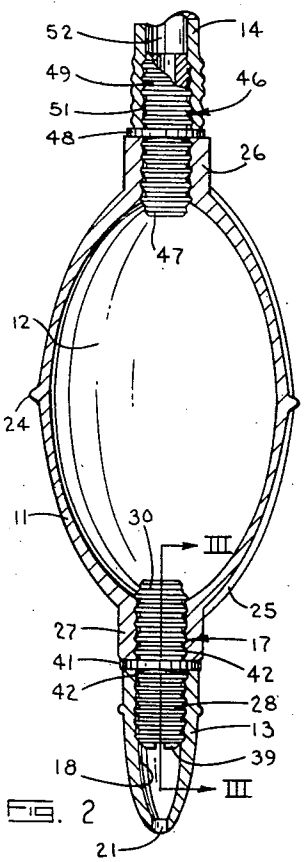


FIG. 2

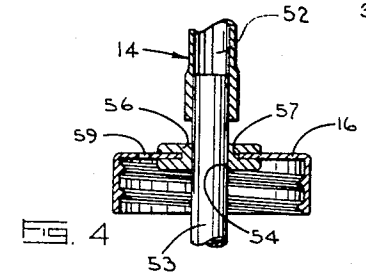


FIG. 4

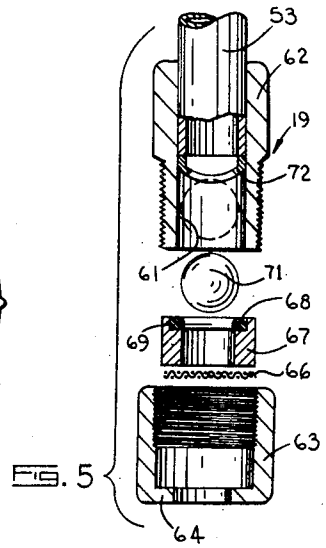


FIG. 5

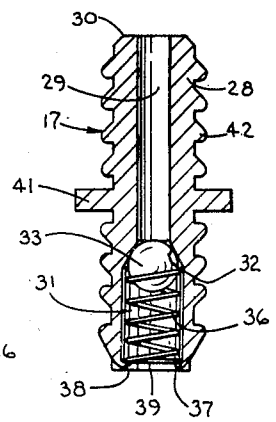
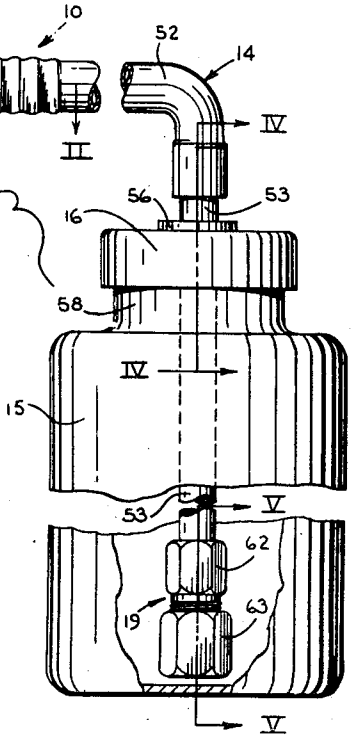


FIG. 3



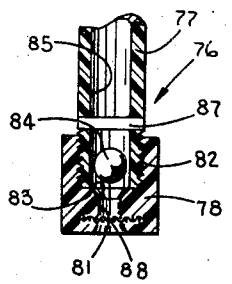


FIG. 6

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DISPENSER FOR HAIRDRESSING LIQUIDS

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1 Claim. (Cl. 222—189)

This invention relates in general to a device for dispensing hair-dressing liquids in controllable amounts and, more particularly, to a type thereof whereby a liquid soap solution can be removed from a container, raised substantially above the level of said container and then discharged with directional and quantitative control. This application is a continuation-in-part of my application Serial No. 611,690 filed September 24, 1956, and entitled "Dispenser for Hairdressing Liquids," now Patent No. 2,923,441, dated February 2, 1960.

It is well-known that the dispensing of certain hairdressing liquids, such as a soap solution used to shampoo hair, has in the past been inconvenient, inefficient and generally troublesome. Prior to my invention, it has been standard practice either to pour the liquid soap from a relatively small container into the palm of the hand and then apply it to the head, or to provide the container with a cap having a restrictive opening through which the liquid is expelled by applying a jerking motion of the container. Both of these methods have been unsatisfactory, particularly for use in beauty shops, because of the mess which they create, because of the inability to control accurately either the direction or quantity of the liquid which ultimately reaches the hair, and because they necessitate the frequent transfer of the liquid soap from the relatively large containers, in which it is delivered to the place of use, into much smaller containers, which can be conveniently handled by the operator. Furthermore, neither method is able to deposit the liquid soap close to the scalp.

Accordingly, a primary object of this invention is the provision of a liquid dispenser, whereby a hairdressing liquid, such as a soap solution, can be removed from a relatively large container, raised to a level considerably above said container and positively dispensed in controllable amounts at points spaced a substantial distance from said container, without creating the mess normally incident to such an operation, and whereby the solution can be dispensed in the most efficient and effective manner.

A further object of this invention is the provision of a dispenser, as aforesaid, which provides positive control over the direction of the dispensing of the liquid, without the use of power-driven equipment, and which can be arranged to control relatively accurately the amount of liquid dispensed.

A further object of this invention is the provision of a dispenser, as aforesaid, which is relatively inexpensive to fabricate, which is extremely easy to operate, which can be easily adapted to use with any conventional type of container, which is completely foolproof in operation, which can withstand rough treatment, which requires little or no adjustment, and which, under normal operating conditions, requires no maintenance.

A further object of this invention is the provision of a dispenser, as aforesaid, which includes a manually compressible and discharge controlling bulb which fits comfortably into the grip of an average, normal adult

hand and which is so constructed that it is easily compressed and yet contains ample resilience to return to its uncompressed or expanded condition, whereby it produces a substantial and reliable reduction in pressure.

Other objects and purposes of this invention will become apparent to persons familiar with this type of equipment upon reading the following specification and examining the accompanying drawings, in which:

Figure 1 is a broken, side elevational view of an apparatus embodying the invention.

Figure 2 is a sectional view substantially as taken along the line II—II of Figure 1 and rotated 90° counterclockwise.

Figure 3 is a sectional view taken along the line III—III of Figure 2.

Figure 4 is a sectional view taken along the line IV—IV of Figure 1.

Figure 5 is an exploded sectional view taken along the line V—V of Figure 1.

Figure 6 is a central cross sectional view of an alternate inlet valve assembly.

For convenience in description, the terms "inner," "outer" and derivatives thereof will have reference to the geometric center of the dispensing device of the invention and parts associated therewith. The terms "upper," "lower" and derivatives thereof will have reference to the dispensing device in its normal position of operation as shown in Figure 1. The terms "inlet" and "outlet" or "discharge," and words having a similar meaning, will have reference to the inlet and outlet ends respectively of the dispenser and parts thereof in relation to the direction of flow of liquid therethrough.

General description

In order to meet the objects and purposes set forth above, as well as others incidental thereto, I have provided a liquid dispenser **10** (Figure 1), comprised of a resiliently flexible shell or bulb **11** defining a pressure control chamber **12** connected to and communicating with a discharge nozzle **13** at one end and an inlet conduit **14** at the other end. Said conduit **14** is extendable into a container **15** through a closure member **16** which holds said conduit with respect to the container. A discharge check valve assembly **17** (Figure 2) is provided in the discharge passageway **18**, which extends from the chamber **12** through the discharge nozzle **13**. An inlet check valve assembly **19** (Figure 1) is preferably and operably associated with the inlet conduit **14** near its lower end, but may be spaced upwardly therefrom, if desired. Said check valve assemblies **17** and **19** are arranged to permit unidirectional flow of liquid through the inlet conduit **14**, the chamber **12**, the nozzle **13** and the orifice **21** (Figure 3) in response to successive compressions of the bulb **11** in a manner discussed in detail hereinafter.

Detailed construction

As shown particularly in Figures 1 and 2, the shell or bulb **11** is fabricated, as by molding, from a conventional, resiliently flexible material, such as rubber, in a somewhat elliptical shape, preferably having a circular cross section and being of a size which will fit comfortably within the grip of a normal, average adult hand. The material from which said bulb **11** is fabricated is sufficiently resistive to compression, as by manual squeezing, that it will tend to return to its normal shape, shown in Figures 1 and 2, with considerable force after it is released from such compression. The ribs **25** placed on, and integral with, the outer surface of the bulb **11** not only tend to provide additional resistance to such compression, but also provide gripping means on the bulb. It will become apparent hereinafter that the location as well as the existance of the lengthwise ribs

25 have a material, if not essential, effect upon the applicant's invention. The circular rib 24 is provided primarily for gripping purposes.

The opposite ends of the bulb 11 (Figure 2) are provided with integral, preferably coaxial, tubular extentions 26 and 27. The tubular outlet extension 27 snugly receives the inlet end 30 of the cylindrical valve body 28, which is part of the discharge check valve assembly 17. The valve body 28 (Figure 3) is preferably elongated and cylindrical in shape and has a coaxial valve passageway 29 extending therethrough. The outlet end 31 of the valve passageway 29 is of enlarged diameter, whereby a conical valve seat 32 is provided within the valve body 28. A spherical valve 33 is disposed within the passageway 29 so that it engages the valve seat 32 in a substantially conventional manner. Resilient means, such as the spiral valve spring 36, is disposed within the enlarged portion 31 of said passageway 29 and engages the valve 33. Said spring 36 is held under compression within said enlarged portion 31 between the valve 33 and means associated with the outlet end 39 of the valve body 28. In this particular embodiment, the outer end of said spring is held by hooks 37 and 38 which are formed by bending portions of the outlet end 39 of said valve body 28 radially inwardly toward each other.

The outer surface of the valve body 28 (Figures 2 and 3) has substantially midway between the axial ends thereof, an annular flange 41 which engages the outer end of the discharge extension 27 when the inlet end 30 of the valve body 28 is disposed within said discharge extension. The flange 41 also engages the inner end of the discharge nozzle 13 when the outlet end 39 of said valve body 28 is disposed within said nozzle. A plurality of spaced, gripping rings 42 encircle and are integral with said valve body 28 on both sides of the flange 41 for the purpose of preventing disengagement of said valve body 28 from its position within the discharge extension 27 and the nozzle 13. The valve spring 36 is preferably selected so that it will normally hold the valve 33 snugly against the valve seat 32 until the pressure within the chamber 12 is materially greater than the atmospheric pressure, thereby preventing accidental leakage on siphoning. A connector 46, which may be substantially identical in outside shape to the body 28 of the discharge check valve assembly 17, has an outlet end 47 which extends into the inlet extension 26 until it engages the integral flange 48 encircling the central portion of said connector. The inlet end 49 of the connector 46 is received into one end of the inlet conduit 14 until said conduit also engages the flange 48. A plurality of spaced, gripping rings 51 are integral with and encircle the connector 46 on both sides of the flange 48 for preventing accidental disengagement of the connector from the inlet extension 26 and the conduit 14.

The inlet conduit 14 is preferably, but not necessarily, comprised of an upper transparent and flexible tube 52 which extends from the connector 46 to a relatively rigid pipe 53 upon which it is sleeved. The pipe 53 is snugly and slidably received through the central opening 54 in a flexible and resilient grommet 56. Said grommet 56 is in turn snugly held within a central opening 57 in the top wall of the closure member 16 which may be designed for threaded engagement with the neck 58 of an appropriate container 15. A vent opening 59 may also be provided through said closure member 16.

The lower end of the pipe 53 is secured within the upper end of the passageway 61 through the upper sleeve 62 of the inlet check valve assembly 19. The lower end of said upper sleeve 62 is externally threaded for threaded engagement within the internally threaded upper end of the lower sleeve 63. The lower sleeve 63 has a radially inwardly extending flange 64 at its lower end against which screen 66 is firmly held by the hollow, cylindrical valve seat 67. The valve seat 67 is in turn urged against the screen 66 by the lower end of the upper sleeve 62 when said supper sleeve is threadedly engaged with the lower sleeve 63. In this particular embodiment, a resilient O-ring 68 is supported in a counterbore 69 in the upper end of the valve seat 67 for the purpose of snugly engaging a spherical valve 71. A valve retainer 72 is provided in the passageway 61 adjacent to the lower end of the pipe 53 for preventing the valve 71 from blocking the opening between the pipe 53 and the passageway 61. The valve 71 is caused to close the valve seat 67 by the force of gravity as well as the column of liquid which is eventually raised through the conduit 14.

Operation

As indicated by the foregoing description, operation of the dispensing device 10 is preceded by mounting the closure member 16 upon the container 15, so that the stiff pipe 53 of the inlet conduit 14 extends into the liquid disposed within the container 15. In this particular embodiment, the closure member 16 has a vent opening 59 and is threadedly engageable with the neck 58 of the container 15. Proper positioning of the pipe 53 with respect to the container 15 may be effected by sliding said pipe upwardly and downwardly through the opening 54 in the grommet 56. The dispensing device 10 is now ready for operation.

Operation of the dispenser 10 is accomplished by manually compressing and then releasing the bulb 11 until the liquid within the container 15 is moved upwardly through the inlet conduit 14 and discharged through the nozzle 13. Under normal circumstances, when the dispenser 10 is used for the first time in conjunction with a new container of liquid, it will be necessary to compress and release the bulb several times in succession before the liquid reaches the chamber 12 and can be discharged from the nozzle 13. During each compression and release of the bulb 11, the air within the chamber 12 and the unfilled adjacent portion of the inlet conduit 14 will be discharged through the nozzle 13 as the bulb is compressed. The discharge check valve assembly 17 is arranged (as shown in Figure 3) so that the pressure developed within the bulb 11 will move the valve 33 away from the seat 32 thereby compressing the valve spring 36 and permitting the air to escape through the nozzle. At the same time, the valve 71 in the inlet valve assembly 19 will be pressed by the air pressure created in the inlet conduit 14 against the valve seat 69, thereby preventing the escape of air through the inlet valve assembly. Inasmuch as the inlet valve assembly 19 will normally be in an upright position, gravity will act upon the valve 71 to assist in seating it upon the valve seat 69.

When the compressing force is released from the bulb 11, the resiliency of the bulb material, which is materially augmented by the distortion in the resilient ribs 25, will cause the bulb 11 to return to its normal expanded condition, as shown in Figure 2. In so doing, low pressure is created in the chamber 12 which immediately cooperates with the valve spring 36 in the discharge valve assembly 17 to urge the valve 33 snugly against the valve seat 32. Accordingly, and at about the same time, the relatively higher outside pressure will operate upon the surface of the liquid within the container 15 in a substantially conventional manner thereby driving such liquid through the inlet check valve assembly 19 and into the inlet conduit 14. That is, the liquid passes through the screen 66 and cylindrical valve seat 67 thereby unseating the valve 71 and moving it upwardly until it engages the valve retainer 72 thereby permitting the liquid to bypass the spherical valve and enter the conduit 14. The liquid will continue to rise in the conduit 14 until the bulb has returned to its normal expanded condition, at which time the spherical valve 71 will drop back into its seated position against the valve seat 67 due to the force of gravity operating not only upon the spherical valve 71 but also upon the liquid within the conduit 14 above the level of the liquid within the container.

Upon the next compression and release of the bulb 11,

the above detailed sequence of action involving first the discharge valve assembly **17** and then the inlet valve assembly **19** is repeated. After several such compressions and releases of the bulb **11**, depending upon the length and capacity of the inlet conduit **14** and the size of the control chamber **12**, the liquid in the container reaches the control chamber **12**. When the control chamber **12** is filled with liquid, the dispenser is ready for a measured application of the liquid therein. The force with which the liquid is expelled is controlled by the rate of compression, and therefore, can be varied from a penetrating stream to a dribble.

Control of the amount of liquid discharged from the chamber **12** with each compression of the bulb **11** can be effected by carefully selecting for a given service the size of the chamber **12**, and then substantially completely collapsing the bulb **11** with each operation thereof. Alternatively, the extent to which the bulb **11** is compressed can be manually controlled with reasonable accuracy after some experience, without completely collapsing the bulb.

It has been found that by providing the bulb **11** with spaced and integral ribs **25**, which extend lengthwise of its outer surface, the resistance of said bulb to compression is materially increased without increasing the wall thickness between said ribs. That is, the ribbed bulb **11** has a greater resistance to compression, particularly the initial portion, than does a smooth surfaced bulb containing the same total amount of material. Furthermore, the flexibility of the wall of the bulb **11** between said ribs is not materially affected by the presence of the ribs **25**. Thus, during the compression operation, the wall of the bulb **11** between said ribs **25** can be bent in a smaller radius of curvature and with less effort than is required to bend the wall of a smooth surfaced bulb having the same resistance to compression, and particularly the initial portion of such compression. Accordingly, it will be seen that the lengthwise ribs **25** cause the bulb **11** to produce a more efficient suction pressure with less effort, particularly as said bulb approaches its expanded condition after it has been compressed.

As mentioned above, appropriate selection of a valve spring **36** will prevent accidental unseating of the valve **33** and consequential leakage through the nozzle **13**, regardless of the elevation of the bulb **11** with respect to the container **15**. Due to the column of liquid within the inlet conduit **14**, the valve **71** in the inlet valve assembly **19** will remain snugly seated, under normal circumstances, as long as the bulb **11** is in its substantially expanded condition, thereby preventing the back up of the liquid from the conduit **14** into the container **15**. The anti-siphon feature in the discharge valve assembly **17** also prevents the return of the liquid to the container. Because the inlet valve assembly **19** remains in the liquid until it is very nearly exhausted from the container **15**, the tendency for the liquid to congeal within the inlet valve assembly **19** is greatly reduced, if not eliminated. Furthermore, the particular structure of the inlet valve assembly, including the screen **66**, prevents hair and other foreign materials from interfering with the operation of the dispensing device **10**.

After the container **15** has been emptied, the dispensing device **10** can be quickly removed from the container **15** and either placed on another full container or replaced upon the first container after it is refilled. After the dispensing device **10** is connected to the fresh supply of liquid, said liquid can again be moved up through the conduit **14** and into the chamber **12** in substantially the same manner as set forth above.

As shown in Figure 6, an alternate inlet valve assembly **76** may be provided by threading the lower end of the

relatively rigid pipe **77** which is preferably fabricated from plastic, but may be made of metal. A sleeve **78**, which is also preferably made of plastic, has a bore **81** and a threaded counterbore **82** which threadedly engages the pipe **77**. The shoulder between the bore **81** and counterbore **82** is beveled to provide a valve seat **83** with which the spherical valve **84** is engaged for blocking the bore **81**. The valve **84** is loosely movable within the lower end of the passageway **85** in the pipe **77** so that it can be bypassed by fluid when not seated. A retaining rod **87**, which extends diametrically through said rod near the lower end thereof, limits movement of said valve up said passageway **85** and away from said seat **83**. A screen **88** may be embedded in the lower flange-like end of the sleeve **78** during the molding process so that it crosses the bore **81**.

From the foregoing, it will be apparent that my invention can be characterized by other specific constructions. Thus, although particular, preferred embodiments of the invention have been disclosed in detail above for illustrative purposes, it will be understood that variations or modifications thereof, which lie within the scope of the appended claim, are fully contemplated.

I claim:

A device for dispensing hairdressing liquids from a container, comprising: a manually compressible, resiliently flexible shell defining a chamber, said shell being capable of fitting comfortably into the grasp of an average, normal adult hand; a discharge nozzle defining a short outlet passageway; a first check valve having a one-piece body extending into said chamber and supporting said nozzle, said body having a central opening communicating between said chamber and said passageway, and resilient means within said body urging said first valve closed, the sense of said first valve being such that, when it is closed, it releasably resists movement of fluid out of said chamber and positively opposes movement of fluid into said chamber; an elongated, flexible tube defining a relatively long and unobstructed inlet passageway communicating with said chamber; relatively stiff pipe means connected to said tube and extending into said container; means for holding said pipe means in a substantially upright position within said container; a second check valve mounted upon the lower end of said pipe mean, said second check valve including a sleeve threadably connected to the lower end of said pipe means, said sleeve having radially inward flange means at its end remote from said lower end, a circular valve seat coaxially disposed in said sleeve, a screen operatively positioned in said sleeve below said valve seat by said flange means, a valve operative within the lower end of said pipe means for selectively engaging said valve seat and thereby controlling communication between the container and said pipe means, and means in said pipe means for limiting movement of said valve away from said seat; the sense of said second valve being such that it is closed by gravity and thereby positively opposes movement of fluid through the inlet passageway away from said chamber; whereby compression of said bulb increases the pressure in said chamber and opens said first valve, and release of the compressed bulb decreases the pressure in said chamber which closes said first valve and opens said second valve.

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