

May 26, 1959

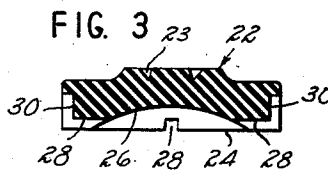
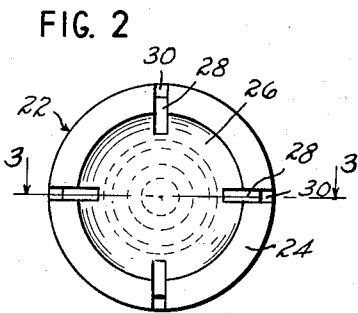
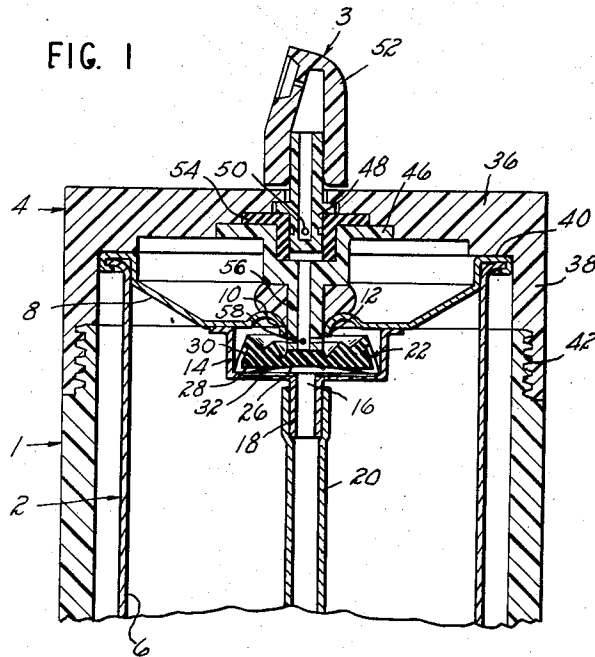
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2,888,173

REUSABLE PRESSURIZED DISPENSER

Filed Sept. 9, 1955

2 Sheets-Sheet 1



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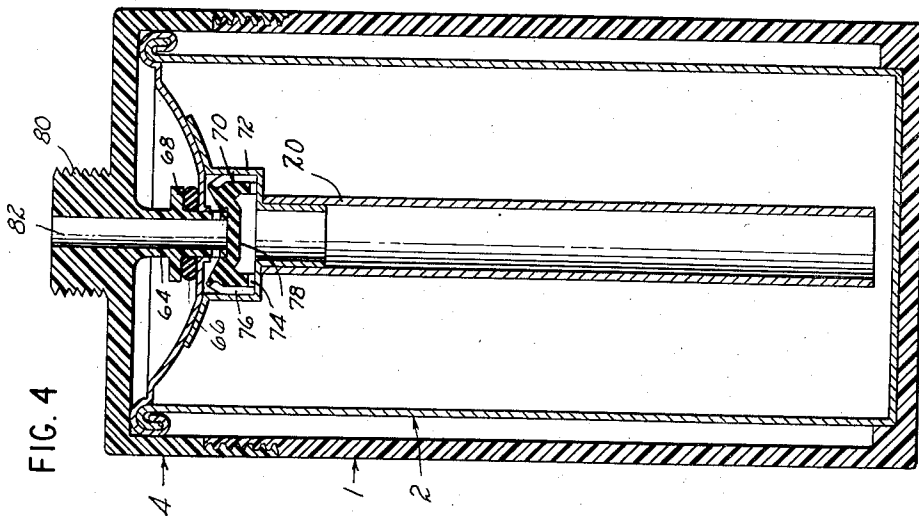
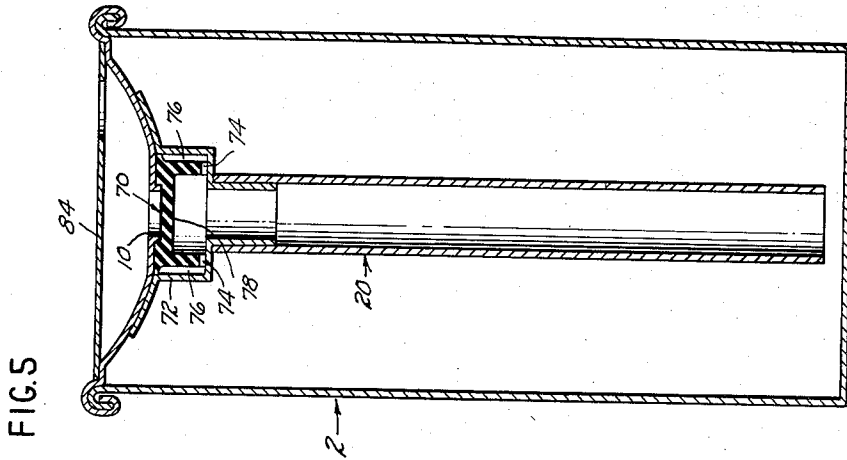
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**REUSABLE PRESSURIZED DISPENSER**

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Application September 9, 1955, Serial No. 533,346

10 Claims. (Cl. 222—183)

This invention relates to dispensing devices and more particularly to dispensers of the pressurized type, wherein the material to be dispensed is enclosed in a container together with a charge of pressurized gas which serves to expel the enclosed material under the control of a dispensing valve.

The use of dispensers of this type has heretofore been limited by considerations of cost arising from the fact that such dispensers are one-shot devices intended to be thrown away when empty. Because of their throw-away character, dispensers of this type heretofore have been economically practical, and then only to a limited degree, only when the cost of the parts of the dispenser is kept to a minimum. Since the dispensing valve in a device of this type represents a large fraction of its total cost, such valves in particular must be designed for minimum cost, which correspondingly limits their performance. The same considerations have heretofore made it uneconomical to market small unit quantities of a product in dispensers of this type, i.e., quantities of less than, say, six ounces, because the cost of the dispenser itself becomes too large in proportion to the value of such small quantities of product. Accordingly, a principal object of the present invention is to provide an improved dispensing apparatus of the pressurized type in which the dispensing valve portion of the dispenser is reusable whereby limitations as to cost of the dispensing valve heretofore encountered are avoided and thereby making economically feasible the use of dispensing valves of much higher quality, and correspondingly better performance than dispensing valves employed heretofore.

A further object of the invention is to provide a dispenser having a reusable outer container to which the dispensing valve portion of the dispenser is secured, the material to be dispensed and propellant being contained in an inner container which is replaceable, while the outer container and dispenser head may be used repeatedly over a long period of time.

Another object is to provide a dispenser which has all the advantages of self-pressurized dispensers of the prior art, but is economically feasible for dispensing small unit quantities of a product.

Another object is to provide dispensing apparatus of the self-pressurized type in which both filling of the container with the product to be dispensed and charging of the container with pressurized gas are substantially simplified and may be accomplished without refrigeration.

Other objects will be in part obvious and in part pointed out more in detail hereinafter.

The invention accordingly consists in the features of construction, combination of elements and arrangement of parts which will be exemplified in the construction hereafter set forth and the scope of the application of which will be indicated in the appended claims.

In the drawings:

Fig. 1 is a fragmentary vertical sectional view of one form of a dispenser constructed in accordance with the present invention;

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Fig. 2 is an enlarged bottom view of one element of the structure shown in Fig. 1;

Fig. 3 is a sectional view of the structure shown in Fig. 2 taken on the line 3—3 thereof;

Fig. 4 is a vertical sectional view of another form of the dispenser with the dispensing valve omitted; and

Fig. 5 is a vertical sectional view of the container which is utilized in the dispenser of Fig. 4.

Referring to the drawings, and particularly Fig. 1, a dispenser constructed in accordance with the invention includes three main parts, an outer container 1, an inner container 2 which is adapted to be filled with the product to be dispensed and charged with a pressurized gas propellant, and a separable cap or headpiece 4 for the outer container 1 carrying the dispensing valve 3.

The inner container 2 has side walls 6, a closed bottom, and a top 8 of sheet metal crimped to the side walls. In the center of the top is an opening or port 10 having a slight downturned lip 12 extending around its peripheral edge. Secured to the under side of the top beneath the port is a shallow cup-shaped valve holder 14 wider than opening 10 and having a bottom formed with a central aperture 16 and a depending nipple 18. Pressed onto the nipple is a depending siphon tube 20 which extends down to a point adjacent the bottom of the container.

The valve holder 14 contains a valve or seal 22 which serves as a closure for the opening 10. The valve consists of a disc or button-shaped piece of resilient material which is approximately the same diameter as the bottom of cup 14 and which is of such a thickness as to be normally slightly compressed between the bottom of the cup and lip 12 and surrounding portion of top 8, so as to form a seal with the top about the periphery of the opening 10. The upper surface of the valve has a circular groove 23 which mates with the lip 12 to enhance the effectiveness of the seal. The under side of the valve has a peripheral portion 24 which rests on the bottom of the cup and a downwardly concave central portion 26 which spans the aperture 16 and forms a space immediately above it. The valve also has a plurality of radial grooves 28 in its under side which extend outwardly from the concave portion 26 and connect to vertical grooves 30 in the side of the valve. As shown in the drawing, the vertical grooves 30 preferably terminate at their upper ends slightly short of the upper surface of the valve although this is not essential, particularly where greater flow is desired. The bottom of the valve cup also has radial grooves 32 extending from the lower ends of grooves 30 to the opening 16. With this arrangement, the valve 22 is normally held closed in effective sealing relation with the cover by both its own resilience and the pressure within the container, and thereby provides an effective closure for the container.

The cap 4 includes a body portion 36 dimensioned to fit over the top of the inner container 2 and formed with a depending flange 38 by which the cap is removably secured to the outer container 1. The cap is fastened to the outer container by means of a threaded connection 42 which permits the cap to be drawn down tightly onto the rim 40 of the top of the inner container.

The cap 4 carries a dispensing valve 3 comprising a cup-shaped casing 46 which fits into a recess in the under side of the cap body 36, a tubular valve stem 48 having side openings 50 in its lower end and which projects above the body through an opening therein, a combination nozzle and finger piece 52 on the top of the stem by which the stem may be tilted, and a valve seat 54 of resilient material which cooperates with openings 50 to control flow through the valve in accordance with tilting of the stem.

Depending from and integral with the casing 46 is a stiff tube 56 which communicates at its upper end with

the valve seat. The tube 56 is so dimensioned that when the cap is applied to the container, the lower end of the tube penetrates through the opening 10, engages the portion of valve 22 in registry therewith, and depresses the valve downwardly out of contact with the container top. When valve 22 is so depressed, it is distorted in the manner shown in Fig. 1, and a flow passage will be created from the top of siphon tube 20 to the tube 56 through the space formed by the concave portion 26, the grooves 28 and 30, the space between the side of valve and the side of the cup, and the space between the top of the valve and the overlying portion of the container top. The tube 52 has openings 53 at its lower end which communicate with the interior of the valve cup 14 when tube 56 penetrates the opening 10, and thus when the cap is applied to the container and opens the valve a flow passage is formed from the siphon tube all the way to the dispensing valve 3, thereby automatically conditioning the dispenser for operation under control of the dispensing valve. A gasket on the tube 56 is compressed between casing 46 and the container top to prevent leakage between the tube and opening 10.

Fig. 4 shows another form of the dispenser in which the cap is formed with a depending stiff tube 64 which is integral with the cap body, and is dimensioned like tube 56 so as to penetrate the opening in the container top when the cap is applied to the container. The tube carries a gasket 66 which is compressed between the container top and a boss 68 on the tube to prevent leakage around the opening. This avoids unsightliness and messiness when the cap is removed to replace the inner container and avoids contact of the material being dispensed with the interior of the cap and outer container which, in some cases, might be disadvantageous. The valve 70 in the valve cup 72 is of slightly different outline than the valve 22 shown in Figs. 1-3, but has concave central portion 78 permitting the valve to be depressed and grooves 74, 76 in the bottom and sides thereof which provide a flow passage to tube 64 when the valve is depressed, in exactly the same way as valve 22. An upstanding integral threaded neck 80 on the cap has a central bore 82 connected to the tube 64, and forms an adapter to which any desired type of dispensing valve may be connected.

When the container does not have a cap applied to it, as shown in Fig. 5 it may be conveniently fitted with a protective covering 84 of cardboard or the like to prevent inadvertent opening of its valve.

A dispenser constructed in accordance with the invention has several important advantages. The cap may be removed from the container at any time, and no loss of container pressure will result because the valve in the container will be automatically closed by both its own resilience and the pressure within the container. Moreover, the removable cap and the dispensing valve which it carries and the outer container may be used over and over again with a succession of inner containers; thus the dispensing valve may be of high quality capable of providing considerably better performance and dispensing a wider variety of products than valves economically feasible for dispensing the contents of but a single container. Also, the outer container may be formed of materials normally not usable in pressure containers and may be of a much more decorative character than would be practical in the usual non-reusable containers. The user need purchase only a single dispensing cap and outer container, since inner containers containing a variety of products can be used therewith whenever desired. Moreover, the container portion of the dispenser has a minimum number of parts, and hence may be fabricated at minimum cost. Therefore, since the containers are inexpensive and do not have to hold a quantity of material sufficient to bear the cost of a dispensing valve on each, the present invention makes feasible the pressurized packaging of products in conveniently small unit

quantities of the order of, say, two ounces, which is a particular advantage in the case of products not usually retailed in large quantities, or in the case of products susceptible to spoilage where purchase of a larger quantity might be wasteful. Additionally filling and pressurizing of containers constructed according to the invention is substantially simplified and may be carried out without the refrigeration heretofore required and after the top is crimped on the container by simply inserting into the opening in the top a fitting having, for example, a neck similar to the tube 64, and forcing into the container both the material to be dispensed and the pressurized gas propellant.

As many changes could be made in the above 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 said to fall therebetween.

I claim:

1. A dispenser comprising an outer container, a removable cap for the outer container containing a dispensing valve, means to secure the cap to the outer container by movement toward the container, an inner container removably mounted within the outer container for holding a quantity of material to be dispensed and a pressurized propellant, said inner container having a top wall provided with an aperture, a depending siphon tube in registry with the aperture, and a depressible second valve between the tube and aperture, said depressible second valve comprising a cup member secured to the top wall between the siphon tube and aperture, and a disc of resilient material in the cup normally engaging the said top wall in sealing relationship and having a concavity in its lower surface permitting the disc to be depressed away from sealing relationship with said top wall, a depending stiff member on the removable cap fixed relative thereto and being of a length sufficient to engage and open said second valve as the cap is being secured to the outer container, and means forming a passage through said stiff member providing a continuously open passage between said dispensing valve and said siphon tube as long as the cap and outer container are secured together.

2. A dispenser comprising an outer container, an inner container adapted to nest within the outer container for holding a quantity of material to be dispensed and a pressurized propellant, a top wall on said inner container having an aperture, a depending siphon tube in registry with the aperture, and a depressible valve between the tube and aperture constructed and arranged for movement toward and away from said aperture in a direction axially of said inner container and urged toward sealing engagement with said aperture by the pressure of the pressurized propellant within the inner container, a removable cap for the outer container containing a dispensing valve, and a depending stiff member on the removable cap fixed relative thereto and having an enlarged portion seating about the periphery of the aperture in the inner container and having a reduced portion received in said aperture in depressing engagement with the depressible valve, and means providing a continuously open passageway through said stiff member connecting said dispensing valve and said depressible valve.

3. In a dispenser having a detachable reusable cap provided with a dispensing valve and a downwardly projecting nipple fixed relative thereto and communicat-

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ing with the dispensing valve, a container adapted to hold material to be dispensed and pressurized propellant and having a top wall provided with an opening for receiving said nipple, a cup-shaped valve holder secured to the underside of the container top in alignment with said opening and having an aperture in the bottom thereof, a siphon tube depending from the valve holder in registry with said aperture, and an inwardly opening valve for controlling flow between the siphon tube and the opening in the container top, said valve comprising a depressible button of resilient material in said holder engaged between the bottom of the holder and the portion of said top surrounding said opening to seal said opening when said cap and dispenser are in disassembly and engageable by said nipple for movement of the button out of engagement with the portion of the top surrounding said opening as the cap is being moved into assembly with the dispenser.

4. In a dispenser having a detachable reusable cap provided with a dispensing valve and a downwardly projecting nipple fixed relative thereto and communicating with the dispensing valve, a container adapted to hold material to be dispensed and pressurized propellant and having a top wall provided with an opening for receiving said nipple, a cup-shaped valve holder secured to the underside of the container top in alignment with said opening and having an aperture in the bottom thereof, a siphon tube depending from the valve cup in registry with said aperture, and a depressible valve for controlling flow between the siphon tube and the opening in the container top including a button of resilient material in said cup extending between the bottom of the cup and the portion of said top surrounding said opening, said button being depressibly engageable by the nipple as the cap is being attached to the dispenser, said depressible valve having a downwardly concave portion on its underside spanning said central aperture and having passages arranged to connect said downwardly concave portion with the upper surface of said depressible valve when the upper surface is depressed away from said top by said nipple.

5. In a dispenser having a detachable reusable cap provided with a dispensing valve and a downwardly projecting nipple fixed relative thereto and communicating with the dispensing valve, a container adapted to hold material to be dispensed and pressurized propellant, a top wall on the container provided with a central opening having a downturned peripheral lip for receiving the nipple, a valve cup secured to the underside of the top in alignment with said central opening, said valve cup having a central aperture in the bottom thereof and a depending siphon tube in registry with the aperture, and a valve of resilient material in the cup compressed between the bottom of the cup and said peripheral lip, said valve having a downwardly concave portion on its underside spanning said central aperture and having vertical grooves in its side terminating at their upper ends short of the upper surface of the valve and connected at their lower ends to said concave portion, the central portion of said valve being depressingly engageable by said nipple on the cap as the cap is being attached to the dispenser to form a flow passage between said siphon tube and said central opening.

6. In a refillable and repressurizable container adapted to hold material to be dispensed and pressurized propellant and adapted to be used with a detachable cap having a depending stiff tube fixed relative thereto and a dispensing valve in communication with said stiff tube to form a self pressurized dispenser, a top on the container provided with a central opening in which said tube is receivable and having a peripheral downwardly extending lip, a shallow valve cup wider than said opening secured to the underside of the top in alignment with said opening, said cup having a central aperture and a depending nipple in the bottom thereof, a siphon tube

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depending from the nipple, and a valve enclosed in the cup comprising a resilient disc-shaped member having an upper surface provided with a groove arranged to mate in compressional engagement with said lip and having a lower surface provided with a central downwardly concave portion spanning said aperture and a peripheral portion in compressional engagement with the bottom of said cup, said valve having radial grooves in its lower surface extending outwardly from said concave portion and vertical grooves in its side connected to said radial grooves and terminating at their upper ends at points downwardly spaced from the upper surface of said valve, the upper surface of said valve being moved out of engagement with said container top by the depending tube on the cap as the cap is being attached to the container.

7. In a dispenser, a disposable and replaceable pressure container adapted to contain material to be dispensed and pressurized propellant, a top wall on the container provided with an opening, a valve cup secured to the underside of the top in alignment with said opening and having a central aperture in the bottom thereof, a depending siphon tube connected to the valve cup in alignment with said central aperture, a valve in said cup including a button of resilient material compressed between the bottom of the cup and the portion of the top surrounding said opening, said button having a downwardly concave portion on its underside spanning said central aperture, a reusable cap having a dispensing valve, means to removably apply the cap to the dispenser by movement toward the container and a depending stiff tube on the cap fixed relative thereto receivable in said opening and engageable with the central portion of said button to depress the button downwardly out of engagement with said container top as the cap is being applied to the container, said button having passages connecting said downwardly concave portion with said opening when the button is depressed to permit flow from said siphon tube to said opening, and ports in said tube in communication with the interior of the valve cup when the tube penetrates said opening.

8. In a dispenser, a disposable and replaceable pressure container adapted to contain material to be dispensed and pressurized propellant, a top wall on the container provided with an opening having a downwardly extending peripheral lip, a valve cup secured to the underside of the top in alignment with said opening and having a central aperture in the bottom thereof, a depending siphon tube connected to the valve cup in alignment with said central aperture, a valve enclosed in the cup comprising a resilient disc-shaped member having an upper surface in compressional engagement with said lip and having a lower surface provided with a central downwardly concave portion spanning said aperture and a peripheral portion in compressional engagement with the bottom of said cup, said member having radial grooves in the lower surface thereof extending outwardly from said concave portion and vertical grooves in the sides thereof connected to said radial grooves and terminating at their upper ends at points downwardly spaced from the upper surface of said member, whereby when said upper surface is displaced downwardly out of contact with said lip said grooves and said concave portion form a flow passage connecting said siphon tube to said opening, a reusable cap having a dispensing valve, means to apply the cap to the container by movement thereof toward the container, a depending stiff tube on the cap fixed relative thereto and communicating with said dispensing valve, said tube being receivable in said opening and engageable with said member to displace said member downwardly out of contact with said lip as the cap is being applied to the container, said stiff tube further having ports in the wall thereof registrable with the interior of the valve cup

when the tube penetrates the opening in the container top.

9. In a dispenser, a disposable and replaceable pressure container adapted to contain material to be dispensed and pressurized propellant, a top wall on the container provided with an opening, a valve cup secured to the underside of the top in alignment with said opening and having a central aperture in the bottom thereof, a depending siphon tube connected to the valve cup in alignment with said central aperture, a valve in said cup including a button of resilient material compressed between the bottom of the cup and the portion of the top surrounding said opening, said button having a downwardly concave portion on its underside spanning said central aperture, a reusable two-part separable outer shell dimensioned to enclose the container including a cap having a dispensing valve and arranged to fit over the container top, means to attach the cap to the outer shell by movement toward the shell, a stiff tube communicating with said dispensing valve depending from said cap and fixed relative thereto, said stiff tube being dimensioned to penetrate said opening and depress said button when the container is enclosed in the shell and as the cap is being attached to the shell, said button having passages connecting said concave portion with the upper surface of the button when the button is depressed to form a flow path from the siphon tube to the opening in the top through which the contents of the container may be expelled, and a circumferential gasket surrounding said stiff tube and engageable with the container top at a locus surrounding said opening.

10. A valve for use with a pressurized dispenser of the type having a top wall with an aperture therein comprising a cup-shaped valve support having a central aperture in the bottom thereof and adapted to be mounted on the underside of the dispenser top wall in alignment with said aperture, and a disc of resilient deformable material seated in said valve support with the sides thereof engaging the side wall of the valve support, said disc having a central recess in the bottom thereof registering with the aperture in the bottom of the valve support and a groove in the side thereof connected at one end to the recess in the disc bottom and arranged to be connected to the aperture in the top wall of the dispenser in response to movement of the center portion of the disc toward the bottom of said valve support and out of sealing engagement with the aperture in the dispenser top wall.

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