

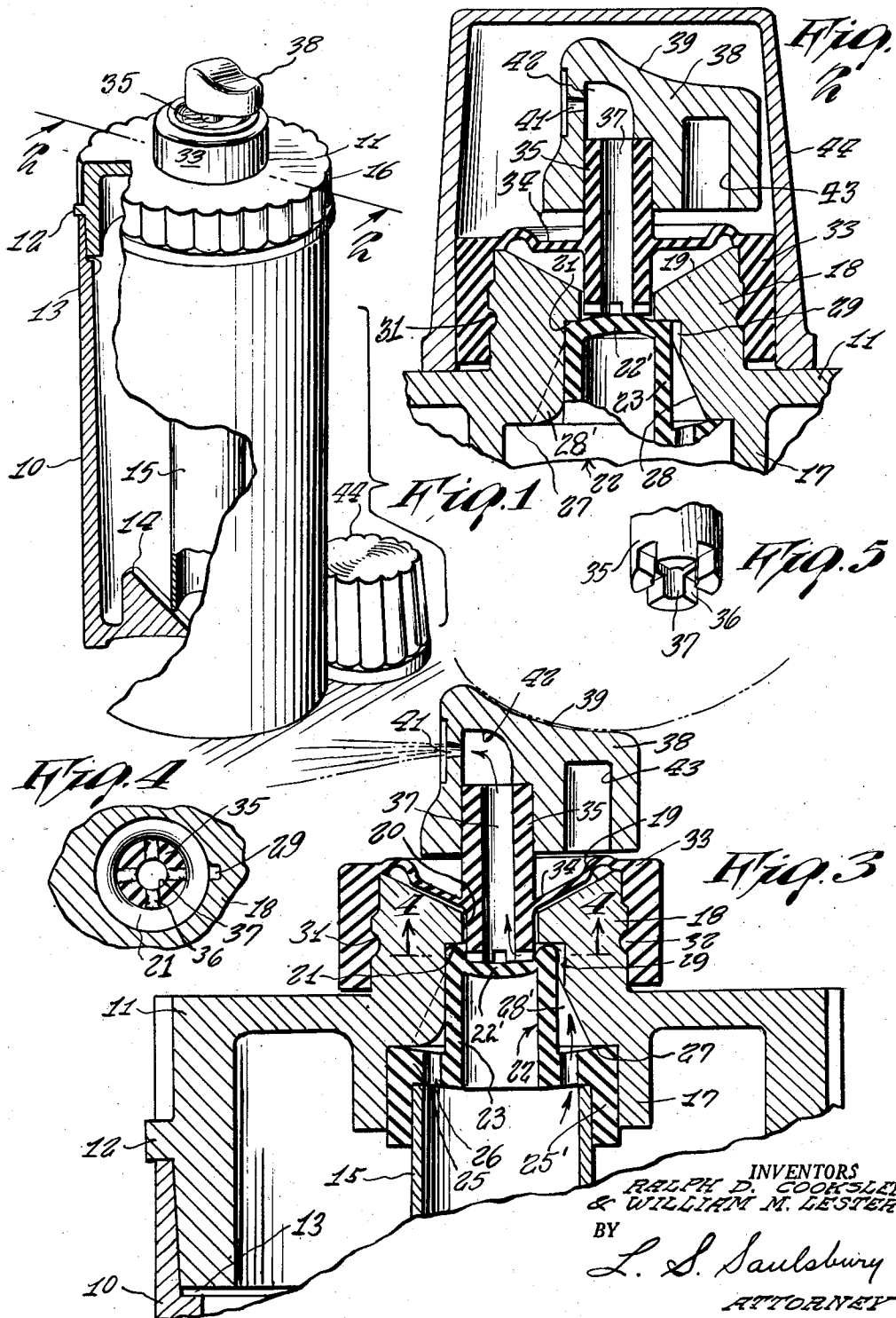
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FLEXIBLE DISPENSING HEAD FOR PRESSURIZED CONTAINERS

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## FLEXIBLE DISPENSING HEAD FOR PRESSURIZED CONTAINERS

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1 Claim. (Cl. 222—394)

This invention relates to pressurized containers and more particularly to a flexible dispensing head construction therefor.

It is the principal object of this invention to provide a dispensing head for a pressurized container which can be assembled merely by hand, press fitting the head upon the container nipple or top and which has a flexible diaphragm with a hollow stem thereon, which, when the head is depressed; mechanically opens the valve of the leaded container, and, by the slots in the lower end of the stem, meters the contents being dispensed.

It is another object of the invention to provide a dispensing head assembly for pressurized containers which can be readily tested and altered for the type of spray pattern desired, simply by having on hand dispensing heads with different size metering slots in their stems and press buttons, that sit upon the end of the stems with different size mixing chambers and discharge orifices, and snapping on or physically trying the different heads and press buttons until the desired spray pattern is obtained.

It is still another object of the invention to provide a pressurized container that has a springless valve with a diaphragm type dispensing head that will have a fast and sharp cut-off of the contents as the finger is removed from the head assembly.

It is a further object of the invention to provide a pressurized container nipple and dispensing head assembly wherein the container nipple has a depressed conical end face adapted to receive the diaphragm as the head is depressed to cause its stem to open the springless valve in the container nipple whereby the space about the discharge hole may be substantially closed as the contents are being dispensed so that the loss of the contents after the flow has been discontinued is kept to a minimum and wherein such slight amount of excess gas trapped under the diaphragm will be utilized on expanding to assist in the return of the diaphragm to its normal position.

It is a still further object of the invention to provide a pressurized container which has a soft touch valve and dispensing head assembly whereby to minimize finger fatigue.

It is still a further object of the invention to provide a dispensing head for a pressurized container which is formed of a single molded plastic piece and which has a diaphragm with an integral projection thereon that, upon being depressed, operates the valve of the pressurized container lying within the nipple thereof.

Still further objects of the invention are to provide a spray dispensing head for pressurized containers which is of simple construction, inexpensive to manufacture, may be made of plastic, has a minimum number of parts, easy to assemble upon the container, compact, durable, sanitary, of pleasing appearance, efficient and effective in use.

For other objects and a better understanding of the invention, reference may be had to the following detailed

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description taken in connection with the accompanying drawing, in which:

Figure 1 is a perspective and collective view of the plastic pressurized container having a dispensing head constructed according to one form of the present invention with portions of the container being broken away to show the internal parts of the container;

Fig. 2 is an enlarged fragmentary vertical sectional view of the top assembly and showing the flexible dispensing head and its relationship to the flexible two-way springless valve, the head being elevated and the valve being closed, the view being taken on line 2—2 of Fig. 1;

Fig. 3 is an enlarged fragmentary sectional view taken on the same line 2—2 of Fig. 1, but with the head and its stem depressed and the valve open and with arrows indicating the path of the contents upon being discharged from the container;

Fig. 4 is a fragmentary sectional view taken across the integral hollow stem of the head and on line 4—4 of Fig. 3;

Fig. 5 is a fragmentary perspective view looking from below and upon the lower end of the integral hollow stem of the dispensing head and showing the radial metering slots or openings for controlling the flow of the contents entering the stem and the discharge of the same to the atmosphere.

Referring now particularly to Figs. 1 to 5, 10 represents a plastic container body adapted to withstand internal pressure and which is closed at its upper end by a tight plastic top cap 11 having an annular shoulder flange 12 resting upon the upper edge of the container body 10. The top cap 11 in addition to being tight-fitted is preferably cemented in order to provide a hermetically sealed container that will withstand the internal pressure of the gas propellant. The upper end of the body 10 is recessed and shouldered as indicated at 13 to receive the cap.

The bottom of the container body 10 has centering projections 14 which are angularly-spaced from one another and support a rigid syphon tube 15 in an elevated position in order to permit the contents of the container to enter the lower end thereof. The top cap 11 is serrated about its periphery as indicated at 16 to provide a good grip upon the container and to render the bottle or container attractive and of pleasing appearance.

The top cap 11 has a central depending skirt portion 17 and an upwardly-extending neck or outwardly-extending nipple 18 that has a depressed conical top face 19 flaring outwardly from a central discharge opening 20 adjacent the lower end of which is an internal valve seat 21 from which the upper end 22' of a flexible two-way springless valve 22 normally bulges or balloons due to the pressure of the contents, as shown in Fig. 2, to hold the contents in the container. Depending from the upper seating end 22' of the valve 22 is a straight cylindrical wall 23 that maintains control of the seating end 22' when it is depressed from its seat 21. The valve is hollow and has an annular portion 25 with escape holes 26 therein. This flange portion is dished on its top surface and the upper end of rigid syphon tube 15 bears against its lower surface to hold the valve 22 within the sleeve portion 17 at the outer periphery of the flange 25 against a lower seat or annular shoulder 27 in the neck 18 of larger diameter than the seat 21, but concentric therewith. The flange 25 has a depending skirt portion 25' which surrounds the upper end of the syphon tube 15.

On a tapered and cylindrical internal neck wall 28 of the cap surrounding the cylindrical valve wall 23 are a plurality of angularly-spaced guide fins 28' which guide the upper end 22' of the valve 22, when it is depressed. A vertical recess 29 extends to the seat 21 at one side of the nipple wall to carry a portion of the contents

directly to the seat whereby to facilitate the depressing of the upper valve end 22' and to cause the valve end 22' to be peeled from its seat so that a quick breakaway and soft touch of the valve may be effected.

The nipple or neck portion 18 on the top cap 11 has a groove 31 on its outer periphery to receive an internal annular bead 32 of flexible dispensing head 33 in order that the head 33 will be locked as well as frictionally retained upon the nipple portion 18 and to prevent the head from being disengaged therefrom due to the pressure of the contents. The dispensing head 33 is formed of flexible plastic and has a flexible diaphragm 34 adapted to be depressed so that its bottom face will be pressed toward or engage the depressed conical surface 19 of the nipple 18 to close off the space therebetween at times when the contents of the container are being dispensed to thereby minimize the loss of the contents after the flow of the contents has been discontinued.

In the center of the diaphragm 34 is an integral hollow stem 35 that depends downwardly and protrudes outwardly therefrom. This stem 35 is relatively thick and rigid and has radially extending angularly-spaced metering slots 36 on its lower end so that any of the contents passing over the valve and under the seat 21 will be metered to a central hole 37 in the stem and upwardly therethrough. These slots 36 may be varied in size and number depending upon the nature of the contents and spray form which is desired. Several heads with different slots may be economically provided. The assembler may snap over the neck and physically try the different heads to get the desired spray pattern for the given contents to be dispensed.

The outwardly protruding end of the stem 35 is sufficiently long to accommodate a spray discharge press button 38 having a downwardly curved top surface 39 for receiving a thumb or finger by which the same is depressed. The press button sets upon and is tightly fitted to the end of the stem. The press button 38 has a side spray orifice 41 leading from a mixing chamber 42 with the central hole 37 of the stem 35. A lightening hole 43 extends into the press button 38 to reduce the weight and bulkiness of the press button 38.

The press button is small and thus press buttons with different size spray orifices and mixing chambers may be economically provided. By a change from one button to another, when taken with a change of one dispensing head for another, the package or container can be easily adapted for the different fluids to be dispensed and the spray pattern desired.

A decorative over-cap 44 can be fitted over the press button 38 and frictionally secured upon the dispensing head 33. This over-cap is a part of the package when purchased and may be retained therewith throughout its use. It prevents the accidental and inadvertent pressing of the button 38 and waste of the contents.

To dispense the contents, the over-cap 44 is removed, and the press button 38 is easily depressed with the forefinger while holding the package in the hand. This press button pushes down the stem 35 and the flexible diaphragm 34 of the dispensing head 33 so that the lower end of the stem 35 forces the upper end 22' of valve 22 from its seat 21 in the manner illustrated in Fig. 3, thereby permitting the contents to escape upwardly through the openings 26 of the valve, vertical recess 29, under the seat 21, through the radial metering slots 36, stem hole 37, press button chamber 42 and discharged from the button spray orifice 41. All this time there is little opportunity for the contents to accumulate under the diaphragm 34 in any great amount so as to

be later wasted, as the bottom face of the diaphragm will substantially close upon the conical face 19 of the nipple leaving little chamber space about the discharge opening 20 for the contents to accumulate.

Upon release of the press button 38, the diaphragm 34 is quickly returned to its initial position by the action of the internal pressure of the contents upon the valve and by the aid of small amounts of expanding propellant gas accumulated under the diaphragm so that the flow of the contents is quickly shut off and discontinued.

It should now be apparent that there has been provided a dispensing head for pressurized containers adapted for cooperation with the nipple portion of the top cap which is so formed and shaped as to permit easy deflection of the valve element to dispense the contents and a quick return of the head diaphragm to cause a sharp and quick cut off of the flow of the contents and wherein the contents are kept confined within a small space about the nipple portion so that there is little loss of the contents after release of the finger from the dispensing head.

It should also be apparent that there has been provided dispensing head parts for pressurized containers which are inexpensive to manufacture and which permit the use of heads with different size discharge slots and press buttons with different size mixing chambers and spray orifices so that the assembler can quickly try upon the container several until he gets the spray form desired.

While various changes may be made in the detailed construction, it shall be understood that such changes shall be within the spirit and scope of the present invention as defined by the appended claim.

What is claimed is:

In a pressurized container, a container assembly having an outwardly-extending nipple portion thereon, said nipple portion having a discharge opening and a seat adjacent the lower end of the discharge opening, a valve element operable in the nipple portion and normally retained against the seat by the pressure of the contents within the container, said nipple portion having a depressed conical outer end face flaring outwardly from the outer end of the discharge opening, a flexible dispensing head tightly fitted upon the nipple portion and having a depressible diaphragm overlying the conical end face, said diaphragm having an integral tubular projection depending into the discharge opening of the nipple portion and through which the contents is discharged, said tubular projection being engageable with the valve element to force the valve element from its seat, upon the dispensing head being depressed, said diaphragm normally lying away from the conical face of the nipple and seated upon the conical end face when depressed to minimize the space thereunder whereby to prevent the contents from collecting under the diaphragm when the container is used and the ultimate loss thereof.

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