

Dec. 16, 1952

F. G. LODES
SPRAY DISPENSER

2,621,973

Filed Aug. 3, 1949

2 SHEETS—SHEET 1

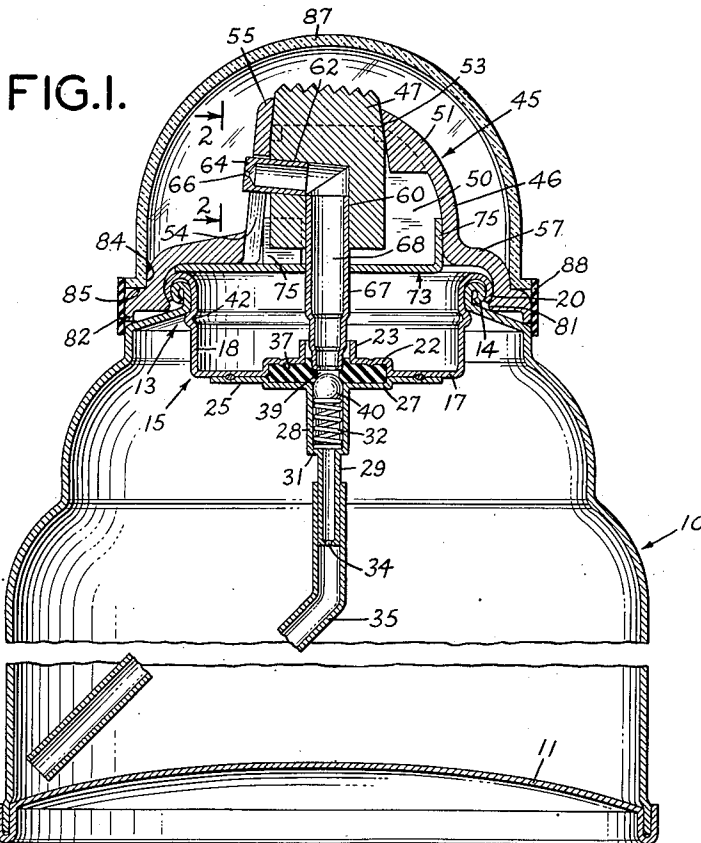


FIG. 3.

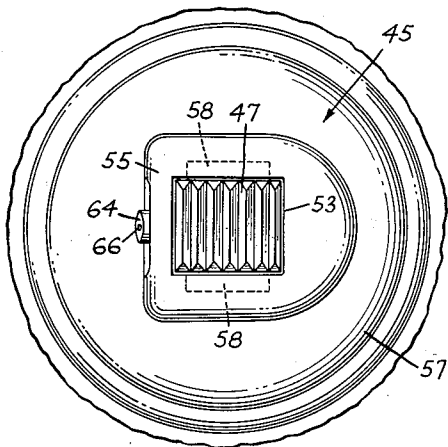
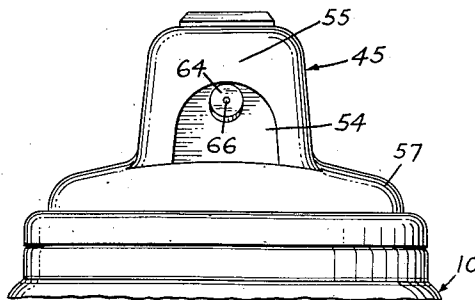


FIG. 2.



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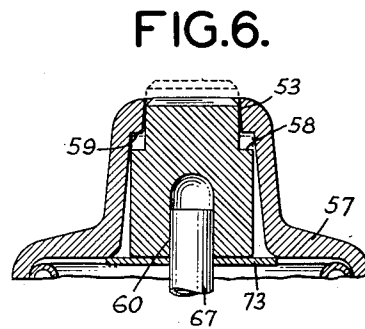
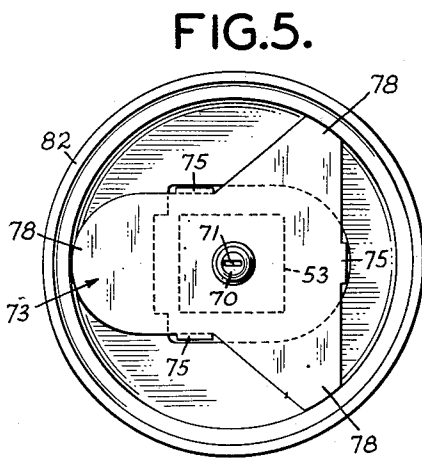
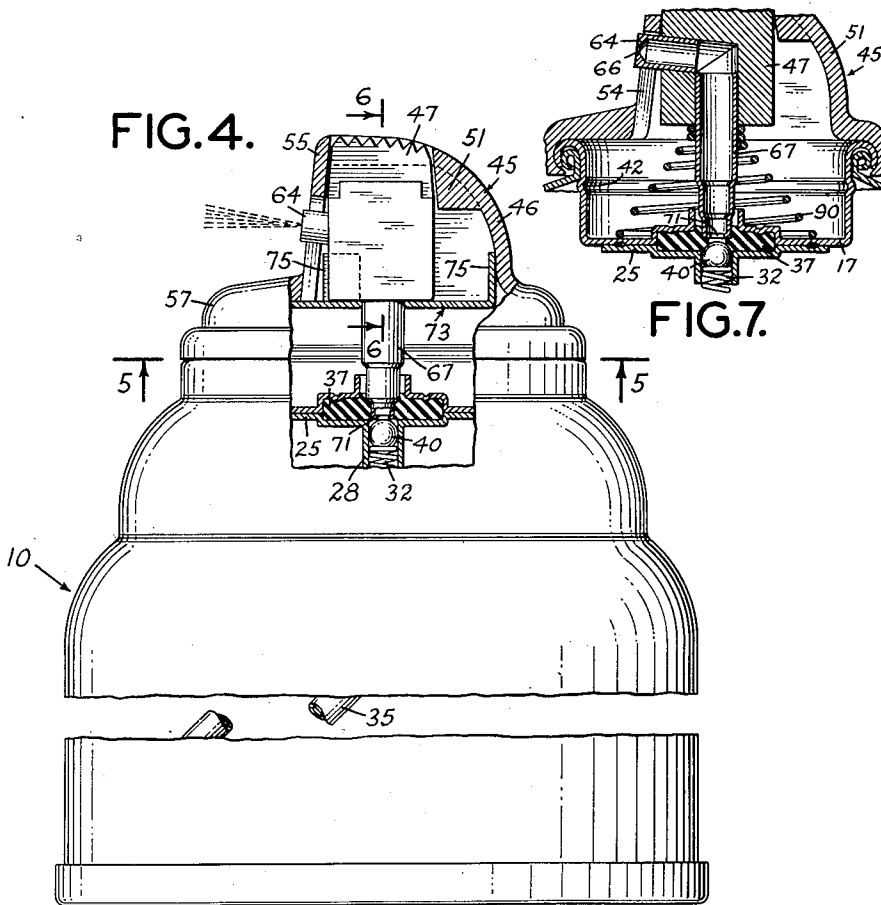
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2 SHEETS—SHEET 2



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UNITED STATES PATENT OFFICE

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SPRAY DISPENSER

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3 Claims. (Cl. 299-95)

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This invention relates to apparatus for dispensing material, and is more particularly directed to improvements in apparatus for dispensing material in spray or aerosol form.

The invention and the objects and advantages thereof may be understood from the following description taken in connection with the accompanying drawing, in which

Fig. 1 is an enlarged broken vertical section of the improved dispenser;

Fig. 2 is an elevation of a cover cap taken on the line 2-2 of Fig. 1;

Fig. 3 is a broken top plan view;

Fig. 4 is a broken vertical section, similar to Fig. 1, showing the parts in spray dispensing position;

Fig. 5 is a bottom plan view of the cover cap taken on the line 5-5 of Fig. 4;

Fig. 6 is a vertical section of a detail taken on the line 6-6 of Fig. 4;

Fig. 7 is a vertical section, similar to Fig. 1, showing a preferred modification.

Referring to Fig. 1 of the drawing, the dispenser of the invention includes a spray or aerosol material container 10 provided with a crimped-on bottom 11 and having in the top wall thereof a circular opening, indicated at 13, which is formed with an upwardly, outwardly, downwardly and inwardly rolled bead 14 affording an upstanding flange. The container proper, the bottom and the top bead thereof may be made of any material, e. g. metal, suitable to withstand the internal pressure exerted by the particular liquid but normally gaseous dispersant utilized as the propellant in the spray or aerosol composition placed in the container.

The top of the container is closed off by a plate or a cup-like insert indicated generally at 15. This cup comprises a circular disk 17 having an integrally formed vertically disposed cylindrical section 18 terminating in an outwardly, downwardly and inwardly turned flange 20. During manufacture, disk 17 is stamped and centrally cut to form an upwardly projecting annulus portion 22, and a short upwardly projecting, slightly outwardly flaring, open-top guide sleeve 23. A second disk 25 is stamped, drawn or otherwise worked to form a downwardly projecting annulus portion 27 integrally formed with depending cylindrical sections 28 and 29. As shown in Fig. 1, section 28 is of appreciably larger inside diameter than is section 29, the two sections being connected by a horizontally disposed annular shoulder 31 which constitutes a seat for a coil spring 32. The lower

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end of section 29 terminates in a circular wall provided with a flow restricting orifice 34. Section 29 is adapted to telescope into the upper end of a flexible dip tube 35 which, as indicated in Fig. 1, extends to approximately the bottom of the container.

As clearly shown in the drawing, the oppositely disposed annular portions 22 and 27 constitute an annular chamber which, when disk 15 and disk 25 are permanently attached to each other e. g. by spot welds, is adapted to receive and retain a disk of packing 37 which may be made of any suitable material such as natural or synthetic rubber or nylon, etc. Packing 37 has a centrally located circular opening 39 affording a valve port, and the lower periphery of such opening provides a seat for the ball valve 40 which, by the pressure of spring 32, normally maintains the valve port closed. After filling the container and on assembling the apparatus, the cup 15 and the associated parts above described are inserted in the opening in the top of the container, the vertical wall 18 of the cup is circumferentially and outwardly crimped as shown at 42, and the downwardly directed portion of cup flange 20 is turned inwardly under container bead 14, this arrangement effecting peripheral attachment of the cup 15 to the top of the container in gas-tight relation.

A feature of the invention comprises a closure cap indicated generally by 45 and shown in section in Fig. 1 and in elevation and in plan in Figs. 2 and 3 respectively. The cap comprises a body 46 and a finger pressure push button 47 which, in association with the cap body, provides means for operating the valve and effecting discharge of spray or aerosol material to the atmosphere.

The cap body 46, which may be an integrally formed molding or stamping, is of the general configuration and structure shown in the several views of the drawing. The body comprises an internal chamber 50, a button guide block 51, a rectangular button opening 53 in the top surface, a spray or aerosol discharge nozzle window 54 in side wall 55, and an annular relatively horizontally disposed flange 57. Side 55 is substantially planar, and is preferably sloped slightly rearwardly from the vertical as shown in Figs. 1 and 4. The inner smooth surface of side 55 furnishes a bearing surface for the up and down movement of button 47, and block 51 forms a rear thrust support and guide for the button. The lower portion of the latter is substantially square in horizontal cross-section

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and is provided with oppositely disposed inwardly projecting shoulders 58 (Fig. 6) which are shaped to conform with corresponding reversely directed shoulders 59 which are formed integrally on the cap body and act as an up-stop for the button. The length of the push button above shoulders 58 is such that, when the button is in its uppermost position as shown in Fig. 1, the knurled top surface of the button projects above the surface of the cap body to an extent convenient for finger pressure.

The push button is provided internally with a vertical bore 60 and a connecting bore 62, of slightly smaller diameter, which lies in the same vertical plane as bore 60, and is axially disposed in a slightly upwardly direction. A cylindrical nozzle 64 having a discharge orifice 66 is set into the bore 62 of the button in such a way that the outer end of the nozzle projects preferably just beyond the outer face of the cap side 55. A spindle or plunger 67 having an interior longitudinal channel 68 is set into vertical bore 60. The spindle tapers towards its lower end and terminates in a circular wall 70 which is provided with a preferably rectangular cut-out or slot 71, both as shown in Fig. 5.

In the modification of Figs. 1-6, the cap assembly includes as one element thereof a flat disk-like inset 73 of the plan configuration indicated in Fig. 5. As shown in Figs. 1 and 5, this inset is provided with three upstanding fingers 75 which, in the assembled position, project upwardly into and contact the walls of the lower portions of cap chamber 50 with sufficient friction to hold inset 73, and cap 45 in unitary engagement in the position of Fig. 1. The inset is bored with a central opening of a diameter just large enough to permit free movement of spindle 67. To assemble the cap unit, nozzle 64 and spindle 67 are wedged in place in the button in the position of Fig. 1. Spindle 67 is then stuck through the center opening of inset 73, and the button and inset placed in the body chamber 50, the inset being forced inwardly against the friction of fingers 75 until the upper face of inset 73 is in engagement with the under surface of the body attaching flange 54 at three points approximating 78 as shown in Fig. 5. The cap body, push button, inset, spindle and nozzle assembly are then ready for placement as a unit on the container.

In accordance with another feature of the invention, the cap body 45 is provided adjacent its lower periphery with an annular inwardly projecting rib 81 which is shaped to engage the downwardly and inwardly turned exterior portion of the flange 20. The cap body may be made of any suitable material, but is preferably a molded plastic such as polyethylene. Whatever particular material is used, such material is so chosen as to provide a cap body which is rigid but yet sufficiently resilient about its lower peripheral section so that the cap body by moderate hand-pressure may be forced down onto and engage flange 20 with a tight, snap-on fit. The lower rim of the cap body may be provided with a short depending flange 82 which just lightly contacts the surface of the container so as to afford a clean line appearance. As another feature of a preferred embodiment, the outer or lower surface of the cap body may be formed with coating slightly indented channel 84 and an associated shoulder 85, thus making provision for snap-on attachment of a hemispherical dome 87, e. g. of transparent material, which prevents application of unintentional pressure to the push but-

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ton. Further, dome, cap body and container may be circumferentially tape-sealed, as indicated at 88, for shipping and merchandizing purposes.

In the position of the parts as shown in Fig. 1 the apparatus is inoperative, i. e. valve 40 is thrust tightly against the packing 37, and button 47 and spindle 67 are held in their uppermost positions partly by the upthrust of the packing material on the tapered lower end of spindle 67, and partly by spring 32. Fig. 4 shows the parts in operative position. Button 47 has been pushed down by finger pressure to such an extent that the upper edges of the knurlings are coextensive with the upper surface line of cap body 45. The distance of permissible downthrust of the push button is equal to the distance between the upper face of inset 73 and the lower surface of button 47 as shown in Fig. 1. This downthrust distance is sufficient to effect contact of the lower end of the spindle with the ball 27 and push the latter downwardly completely out of contact with the packing 37. In this manner the valve port 39 is opened, and through dip tube 35, flow restricting orifice 34, slot 71, channel 68, and the nozzle orifice 66, the interior of the container is placed in communication with the atmosphere. Thus, it will be noted from Figs. 1 and 4 that inset 73, in addition to functioning as a spindle guide, acts as a stop for downthrust of button 47.

In the particular modification of Figs. 1 and 6, the inside diameter of discharge orifice 66 may be approximately 0.013 inch, while the inside diameter of flow restricting orifice 34 is preferably larger than that of discharge orifice 66 and may be approximately 0.015 or 0.016 inch. It will be observed from the drawing that the diameter of channel 68 in spindle 67 and the similar inside diameter of nozzle 64 are each many times the diameter of either orifices 34 or 66, and in the present embodiment the diameter of enlarged upper end of channel 68 may be about 0.12 inch. Further, the lineal distance between port 39 and discharge orifice 66 is relatively great. This arrangement, of a small diameter discharge orifice, a larger diameter flow restricting orifice, and an intermediate expansion chamber of substantial length and having a diameter many times that of either orifice, effects delivery to the atmosphere of a very satisfactorily dispersed aerosol.

In the preferred modification of Fig. 7, there is placed intermediate the upper surface of disk 17 and the under surface of button 47 a coil spring 90 the upper two or three coils of which snugly grip spindle 67. This arrangement is particularly desirable to facilitate ready attachment of the cap body, button and spindle assembly to the container after cap 15 has been crimped in place. Further, when in use, on release of finger pressure from the button, spring 90 shifts the button against its upthrust stops, and hence none of the expansive property of ball valve closing spring 32 is needed to raise the push button to its inoperative position.

In the appended claims, the term "spray" is intended to include a spray in the common accepted sense and a dispersion in aerosol form.

I claim:

1. Apparatus for dispensing material as a spray comprising a container adapted to hold said material in liquid form under pressure and having an opening in the top wall formed with an outwardly rolled bead, a closure plate peripherally attached to said bead in gas-tight relation by an outwardly and downwardly turned flange substantially enveloping said bead, a valve port in said plate communicating with the interior of

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said container, a valve and means for normally seating said valve in said port, a unitary closure cap comprising a cap body and a basal relatively horizontally disposed annulus; said annulus overlying the outwardly turned portion of the closure plate flange and having a depending rim and an associated inwardly projecting rib shaped to conform with the exterior of said flange, said annulus, rim and rib being made of material which is rigid but sufficiently resilient to effect tight snap-on engagement with said flange; said cap body projecting upwardly from said annulus and being formed to provide a button guide including an upstanding wall provided with a spray discharge window, a finger pressure button slidable in said guide, a bore in said button for passage of spray material, a nozzle set into one end of said bore and communicating through said window with the atmosphere, a spindle set vertically into the other end of said bore and having an interior longitudinal channel, said spindle projecting downwardly from said button and engaging said valve and being adapted, on in-thrust of said button, to axially move said spindle to open said valve and to place said port, channel and nozzle in spray material communication.

2. Apparatus for dispensing material as a spray comprising a container adapted to hold said material in liquid form under pressure and having an opening in the top wall formed with an outwardly rolled bead, a closure plate peripherally attached to said bead in gas-tight relation by an outwardly and downwardly turned flange substantially enveloping said bead, a valve port in said plate communicating with the interior of said container, a valve and means for normally seating said valve in said port, a unitary closure cap comprising a cap body and a basal relatively horizontally disposed annulus, said annulus overlying the outwardly turned portion of the closure plate flange and having a depending rim and an associated inwardly projecting rib shaped to conform with the exterior of said flange, said annulus, rib and rim being made of material which is rigid but sufficiently resilient to effect tight snap-on engagement with said flange, said cap body projecting upwardly from said annulus and being formed to provide a button guide including an upstanding wall provided with a spray discharge window, a finger pressure button slidable in said guide, a nozzle carried by said button and communicating through said window with the atmosphere, a spindle carried by said button and having an interior longitudinal channel communicating with said nozzle, said spindle projecting downwardly from said button and engaging said valve and being adapted, on in-thrust of said button, to axially move said spindle to open said valve and to place said port, channel and nozzle in spray material communication.

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3. Apparatus for dispensing material as a spray comprising a container adapted to hold said material in liquid form under pressure and having an opening in the top wall formed with an outwardly rolled bead, a closure plate peripherally attached to said bead in gas-tight relation by an outwardly and downwardly turned flange substantially enveloping said bead, a valve port in said plate communicating with the interior of said container, a valve and means for normally seating said valve in said port, a unitary closure cap comprising a cap body and a basal relatively horizontally disposed annulus, said annulus overlying the outwardly turned portion of the closure plate flange and having a depending rim and an associated inwardly projecting rib shaped to conform with the exterior of said flange, said annulus, rib and rim being made of material which is rigid but sufficiently resilient to effect tight snap-on engagement with said flange, said rim having an outwardly directed indented channel and shoulder and an associated snap-on protective cover; said cap body projecting upwardly from said annulus and being formed to provide a button guide including an upstanding wall provided with a spray discharge window, a finger pressure button slidable in said guide, a bore in said button for passage of spray material, a nozzle set into one end of said bore and communicating through said window with the atmosphere, a spindle set vertically into the other end of said bore and having an interior longitudinal channel, said spindle projecting downwardly from said button and engaging said valve and being adapted, on in-thrust of said button, to axially move said spindle to open said valve and to place said port, channel and nozzle in spray material communication.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,614,532	Mobley	Jan. 18, 1927
1,892,750	Rotheim	Jan. 3, 1933
2,119,643	Mendl	June 7, 1938
2,171,501	Gebauer	Aug. 29, 1939
2,225,320	Saffell	Dec. 17, 1940
2,244,341	MacLean	June 3, 1941
2,328,863	Threm	Sept. 7, 1943
2,494,793	Boe	Jan. 17, 1950
2,506,449	Greenwood	May 2, 1950
2,514,030	Coyle et al.	July 4, 1950
2,536,231	Simanton	Jan. 2, 1951

FOREIGN PATENTS

Number	Country	Date
620,884	Great Britain	Mar. 31, 1949