Dec. 15, 1953

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2,662,668

DISPENSING CONTAINER AND SLITTED RESILIENT VALVE THEREFOR

Filed Jan. 9, 1950

2 Sheets-Sheet 1

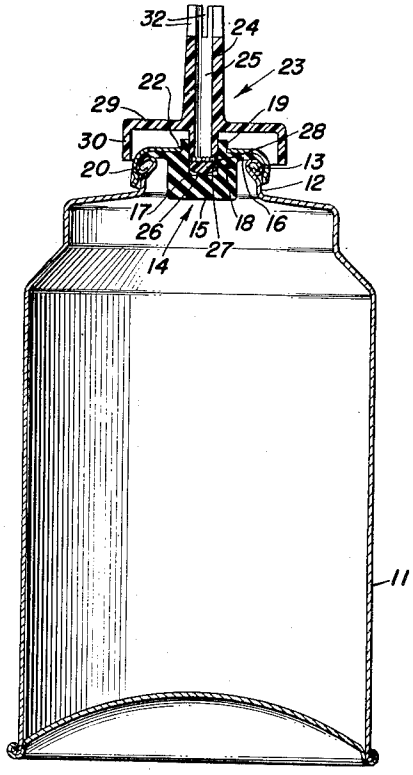

Fig. 1.

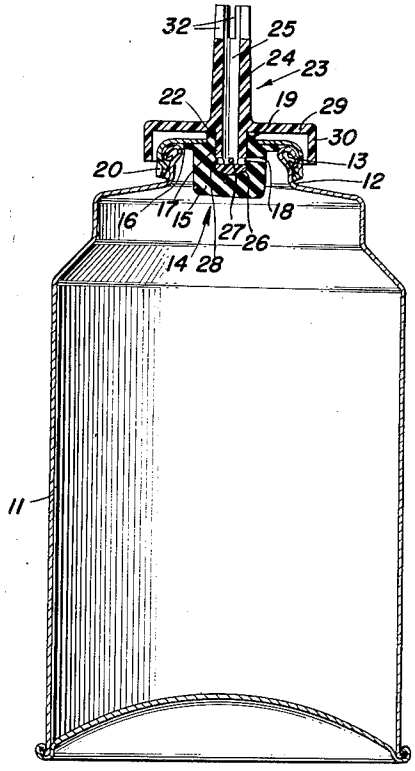

Fig. 2.

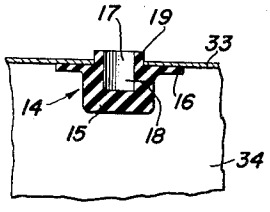

Fig. 3.

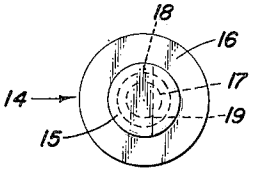

Fig. 4.

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2 Sheets-Sheet 2

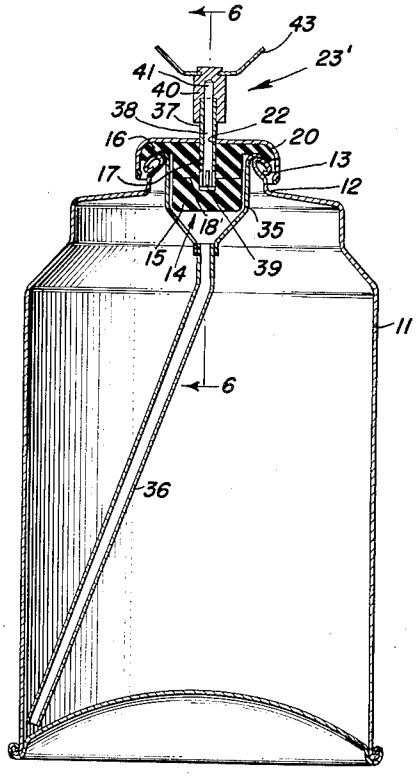

Fig. 5.

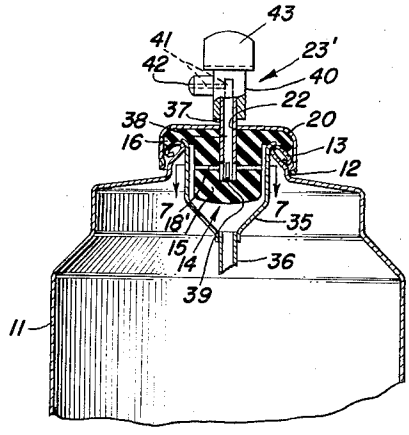

Fig. 6.

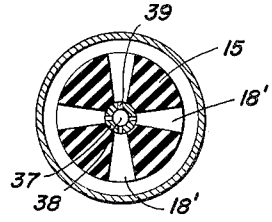

Fig. 7.

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DISPENSING CONTAINER AND SLITTED RESILIENT VALVE THEREFOR

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5 Claims. (Cl. 222—394)

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This invention relates to the art of dispensing, particularly to the dispensing of pressurized fluids. More specifically, the invention relates to valved closures for pressure containers.

Valved dispensing containers for spraying aerosols of insecticide and the like are well known and widely used. Similarly, valved pressure containers for dispensing pastes and aerated fluids are commonly employed, cans filled with cream and gas under pressure for dispensing whipped cream being a well known example. Most dispensers of these types being intended for but a single use, the complexity and cost of the elements thereof is of primary importance. It is a particular object of the present invention to provide a simplified, inexpensive, unitary valved closure adapted for use in dispensers of the types indicated and similar pressure containers.

It is a further object of the invention to provide a valved closure for pressure containers having finely controllable variable opening characteristics, and closing quickly and positively due primarily to internal pressure within the container.

Another object of the invention is to provide a unitary valved pressure container closure constructed of resilient material, adapted to frictionally engage a tubular discharge member operable to controllably open said closure by axial movement relative thereto.

Another object is to provide a novel dispensing container for pressurized fluids.

Further objects will be in part obvious and in part pointed out hereinafter.

The invention and the novel features thereof may best be made clear from the following description and the accompanying drawings, in which:

Figure 1 is a sectional elevational view of an exemplary embodiment of the present invention, adapted as a dispensing container for whipped cream and the like;

Figure 2 is a view corresponding to Figure 1, but showing the valved closure and associated discharge member of the dispenser in open or dispensing position;

Figure 3 is a sectional view of the valved closure of Figure 1 employed with an apertured flat container wall;

Figure 4 is a bottom plan view of the valved closure of the preceding figures, showing the conformation of the slit therein;

Figure 5 is a sectional elevational view of a modified form of the invention, adapted as an aerosol dispenser;

Figure 6 is a view taken on the line 6—6 of Figure 5, showing the valved closure and associated discharge member of the dispenser in open position, and

Figure 7 is an enlarged view taken on the line 7—7 of Figure 6, showing details of the slit conformation of the modified closure.

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Referring to the drawings, in Figures 1 and 2 is shown a pressure container in the form of metal can 11, formed at its upper end into a neck 12 which terminates in the mouth-defining bead 13. Can 11 is of the type commonly employed to package cream and gas under pressure, for dispensing as whipped cream. Positioned partly within neck 12 of the can is the valved closure indicated generally as 14, constructed in unitary form of resilient material such as rubber. Closure 14 comprises a cylindrical body member 15, provided at its outer end with the laterally extending annular flange 16. Bore 17, of substantially smaller diameter, enters the outer end of body member 15 and extends partially therethrough, the spacing from the bore bottom to the adjacent end of the body member being substantial and of the order of the wall thickness of the body member external of the bore, for reasons presently apparent. A transverse slit 18 extends from the periphery of the body member to bore 17, and may constitute a straight cut of proper depth into the side of the body member, as indicated in Figure 4. Longitudinally, slit 18 is disposed intermediate the inner surface of flange 16 and the bottom of bore 17, preferably about midway therebetween. A relatively short integral neck portion 19 may extend from the outer end of the body member about the bore, the outer diameter of the neck portion being substantially smaller than that of the body member.

Closure flange 16, it will be noted, is of greater diameter than the mouth defined by can bead 13, and may be retained thereagainst by an apertured crown cap 20, crimped about the bead in the usual manner, whereby the closure flange is compressed therebetween to properly position the closure and to form an effective seal. The cap aperture 22 encloses and desirably fits closely about neck portion 19 of the closure. Obviously, the valved closure may be otherwise secured to the pressure container, as for example by an apertured screw cap engaged to a threaded neck.

As shown in Figures 1 and 2, a tubular discharge member indicated generally as 23, constructed of metal or suitable synthetic plastic material, is frictionally retained in bore 17 of the closure and extends axially therefrom. The discharge member comprises body 24 having a longitudinal passage 25 extending substantially therethrough, the inner end of the discharge member body preferably terminating in the rounded pressure surface 26. Passage 25 may terminate somewhat short of the inner end of the discharge member, and is joined at this point by a plurality of radially spaced lateral passages 27 extending through the body wall and joined at their outer ends by the annular communicat-

ing groove 28. Intermediate the length of the discharge member body an annular grip flange 29 extends outwardly therefrom, the grip flange terminating, in the embodiment shown, in downwardly depending skirt 30. The outer end of the discharge member body may be provided with the usual longitudinal slots 32, adapted to shape the stream of whipped cream issuing therethrough into decorative fluted form.

The dispenser elements normally occupy the relative position shown in Figure 1, slit 18 being maintained firmly closed by the internal pressure of the container contents exerted against the inner end of the valved closure. To dispense the contents thereof, the container may be inverted in the usual manner, grasped in the hand with two fingers overlying grip flange 29, one on either side of the discharge member body. So held, the discharge member may readily be displaced axially and inwardly relative to the valved closure with easily controlled force, whereby the dispenser elements are caused to assume the relationship shown in Figure 2. Axial inward movement of the discharge member, it will be apparent, causes pressure surface 26 thereof to press against the bottom of bore 17, axially deforming the valved closure and causing slit 18 to open, whereby the contents of the container may pass therethrough to groove 28 and lateral passages 27 of the discharge member, and thence through passage 25 to the discharge end thereof.

The side and end walls thereof being of substantial thickness, the valved closure possesses adequate inherent rigidity and resilience to function satisfactorily entirely without reinforcement. In conjunction with this feature, the longitudinal disposition of slit 18 intermediate flange 16 and the bottom of bore 17 has been found to effect finely controllable variable opening characteristics in the valved closure, whereby the rate of flow of whipped cream in the example may be precisely controlled by finger pressure. Additionally, so constructed the valved closure closes quickly and positively on the release of opening pressure exerted by the discharge member, there being no tendency of the material flowing through the slit to maintain it in open position. Furthermore, the slit being spaced from the bottom of the bore, the inner end of the discharge member cannot enter the slit to cause malfunction in this manner.

The groove 28 and lateral passages 27 of the discharge member are so spaced from the pressure surface 26 thereof as to be generally aligned with the closure slit, especially when the assembly is in open position. If desired, the groove and lateral passages may be so positioned as to align with the closure slit only in open position, whereby in closed position the blank inner end portion of the discharge member will face the inner edge of the slit, as shown in Figure 1, functioning in this case as an additional seal.

Material issuing from the closure slit is conducted by discharge member groove 28 to all lateral passages 27 simultaneously, whereby even and full flow is effected at all times when the dispenser is in open position. The sharp change in direction of the issuing material in passing from lateral passages 27 to longitudinal passages 25, especially in the case of pasty materials such as whipped cream, assists in effecting uniformly optimum aeration of the material.

The short neck portion 19 not only functions to maintain alignment between the valved closure and the crown cap, but also separates the discharge member from the edge of the cap aperture whereby no binding therebetween can take place, and elongates the bore 17 to more effectively frictionally engage and retain the discharge member therein. Obviously, however, the discharge member may be readily removed therefrom for reuse, and need not be supplied with each dispenser unit.

The valved closure 14 is not limited in utility to the particular dispenser illustrated in Figures 1 and 2. In Figure 3, for example, the closure is shown in association with an apertured flat wall 33 of a pressure container 34. In this application also the closure is employed in conjunction with a discharge member 23, not shown, functioning in all respects in identical manner with the embodiment previously described. In this example, the valved closure may be inserted into the aperture of container wall 33 before filling, being adequately retained in place by frictional engagement of the edge of the aperture to neck portion 19 of the closure. It will be apparent that when the container is pressurized, the valve closure will be maintained in place by pressure exerted against the underside of flange 16, whereby the flange will form an effective seal with the container wall 33 about the aperture.

A further embodiment of the invention, particularly adapted as an aerosol dispenser, is illustrated in Figures 5 to 7. In this modification, a metal cup 35 is suitably affixed to bead 13 of the can and positioned within the neck thereof, the cup being joined at its inner end to an elongated tube 36 extending therefrom substantially to the bottom of the container, to permit upright dispensing. The cup 35, as shown, is of suitable size to enclose body member 15 of the valved closure without contact. As best shown in Figure 7, the body member of the valved closure is provided with a plurality of radially spaced slits 18', the slits being coplanar and extending as before from the periphery of the body member to the bore 17.

In conjunction with the modified dispenser a modified discharge member 23', adapted for side delivery, may be employed. As shown in Figures 5 and 6, the discharge member comprises tubular body 37, provided with a longitudinal passage 38 extending therethrough and a plurality of radially spaced longitudinal slots 39 at the inner end thereof. A metal cap member 40 is suitably affixed to the outer end of body 37, provided with suitable passages 41 therethrough for discharge of the aerosol through laterally disposed nozzle 42. Wing grips 43, adapted for finger manipulation, extend outwardly from cap member 40.

This modification functions similarly to that of Figures 1 and 2, the discharge member being displaced axially and inwardly relative to the valved closure by finger pressure exerted on wing grips 43, whereby the inner end of the closure is axially deformed and the slits 18' caused to open. The pressurized container contents may thereupon pass upwardly through tube 36 to cup 35, through the open slits 18' and slots 39 of the discharge member body, and thence through the passages of the body member and cap member to nozzle 42 for discharge. The particular slit configuration of the valved closure has been found to be especially desirable in aerosol dispensing, the opposed slits giving rise to oppositely directed high velocity fluid streams impinging within the discharge member to effect fine atomization of the dispenser contents. As in the case of the

modification first described, the valved closure of Figures 5 and 6 possesses finely controllable variable opening characteristics, and closes quickly and positively upon release of the opening pressure exerted by the discharge member.

The present invention involves distinct packaging and shipping advantages over similar devices presently in use, due to the fact that in all modifications the discharge member may be readily detached, thereby doing away with all projections above the cap line and avoiding the possibility of damage during shipment or tampering with or release of the contents of the containers. The outer opening of the closure bore may be sealed with a label or the like, whereby the closure may be sealed to maintain sterility and prevent tampering. The discharge member, if desired, may be packaged separately in an individual sterile wrapping.

It will thus be seen that there has been provided by this invention a structure in which the various objects hereinbefore set forth, together with many practical advantages, are successfully achieved. As various possible embodiments may be made of the mechanical features of the above invention, all without departing from the scope thereof, it is to be understood that all matter hereinbefore set forth or shown in the accompanying drawings is to be interpreted as illustrative, and not in a limiting sense.

I claim:

1. A valved container closure for use with pressurized fluid containers comprising a cylindrical body member of resilient material, an integral annular flange extending laterally from the outer end of said body member, an axial bore entering the outer end of said body member and extending partially therethrough, said body member having a transverse slit extending from the periphery thereof to said bore in a plane substantially perpendicular to the axis of said bore and positioned intermediate said flange and the bottom of said bore, and a tubular discharge member frictionally retained in said bore and extending therefrom, said discharge member having lateral passages communicating with the central passage therethrough adjacent the inner end thereof and generally aligned with the slit of said body member.

2. A dispensing container for pressurized fluids having a neck terminating in a beaded mouth, comprising a valved closure having a cylindrical body member of resilient material, an integral annular flange extending laterally from the outer end of said body member and disposed in sealing engagement with the mouth of said container, an axial bore entering the outer end of said body member and extending partially therethrough, said body member having a transverse slit extending from the periphery thereof to said bore in a plane substantially perpendicular to the axis of said bore and positioned intermediate said flange and the bottom of said bore, a relatively short integral neck portion extending axially from the outer end of said body member about said bore, and an apertured crown cap retaining the flange of said closure in sealing engagement with the mouth of said container, the aperture in said cap fitting closely about said closure neck portion.

3. A dispensing container for pressurized fluids comprising a valved closure having a cylindrical body member of resilient material, an integral annular flange extending laterally from the outer end of said body member and disposed in sealing engagement with an opening in said container, an axial bore entering the outer end of said body member and extending partially therethrough, a transverse slit extending from the periphery of said body portion to said bore in a plane substantially perpendicular to the axis of said bore and positioned intermediate said flange and the bottom of said bore, a tubular discharge member frictionally retained in said bore and extending therefrom, said discharge member having lateral passages communicating with the central passage therethrough adjacent the inner end thereof and generally aligned with the slit of said body member, and gripping means associated with said discharge member whereby said discharge member may be displaced axially and inwardly against the bottom of said bore, displacing the inner end of said body member against the internal pressure of said container and opening said slit, whereby the contents of said container may pass through said slit to the lateral passages of said discharge member and therethrough to the central passage thereof.

4. A valved container closure for use with pressurized fluid containers comprising a cylindrical body member of resilient material, an integral annular flange extending laterally from the outer end of said body member, an axial bore entering the outer end of said body member and extending partially therethrough, said body member having a plurality of transverse slits extending from the periphery thereof to said bore in a plane substantially perpendicular to the axis of said bore and positioned intermediate said flange and the bottom of said bore, and a tubular discharge member frictionally retained in said bore and extending therefrom, said discharge member having lateral passages communicating with the central passage therethrough adjacent the inner end thereof and generally aligned with the slits of said body member.

5. An aerosol dispenser comprising a valved closure having a cylindrical body member of resilient material, an integral annular flange extending laterally from the outer end of said body member and disposed in sealing engagement with the mouth of said container, an axial bore entering the outer end of said body portion and extending partially therethrough, a plurality of transverse slits extending from the periphery of said body portion to said bore in a plane substantially perpendicular to the axis of said bore and positioned intermediate said flange and the bottom of said bore, a tubular discharge member frictionally retained in said bore and extending therefrom, said discharge member having lateral passages communicating with the central passage therethrough adjacent the inner end thereof and generally aligned with the slits of said body member, and tubular means disposed in the interior of said dispenser enclosing said valved closure and extending to the bottom of said dispenser, whereby said valved closure is in communication with the interior of said dispenser only through the bottom portion thereof.

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