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J. SCHMIDT
DISPENSING CONTAINER AND SLITTED
RESILIENT VALVE THEREFOR

2,662,669

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2 Sheets-Sheet 1

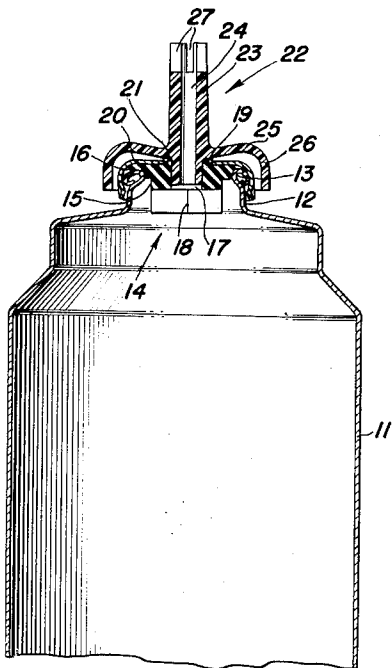


Fig. 1.

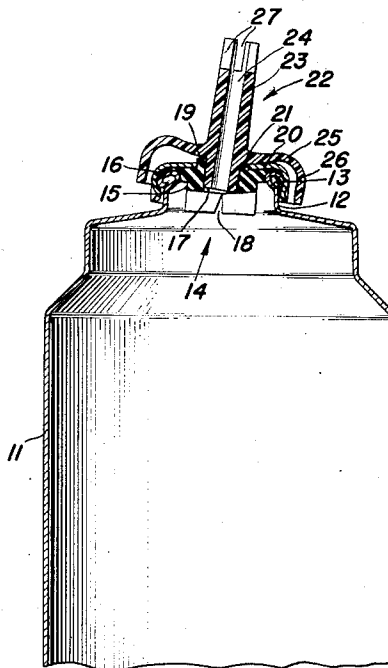


Fig. 2.

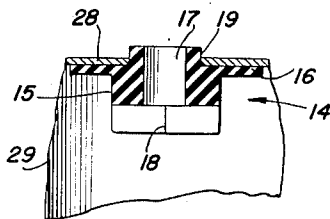


Fig. 3.

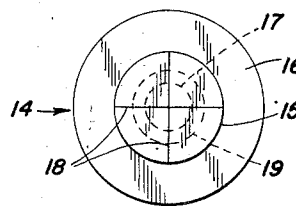


Fig. 4.

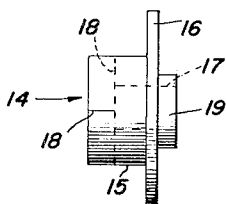


Fig. 5.

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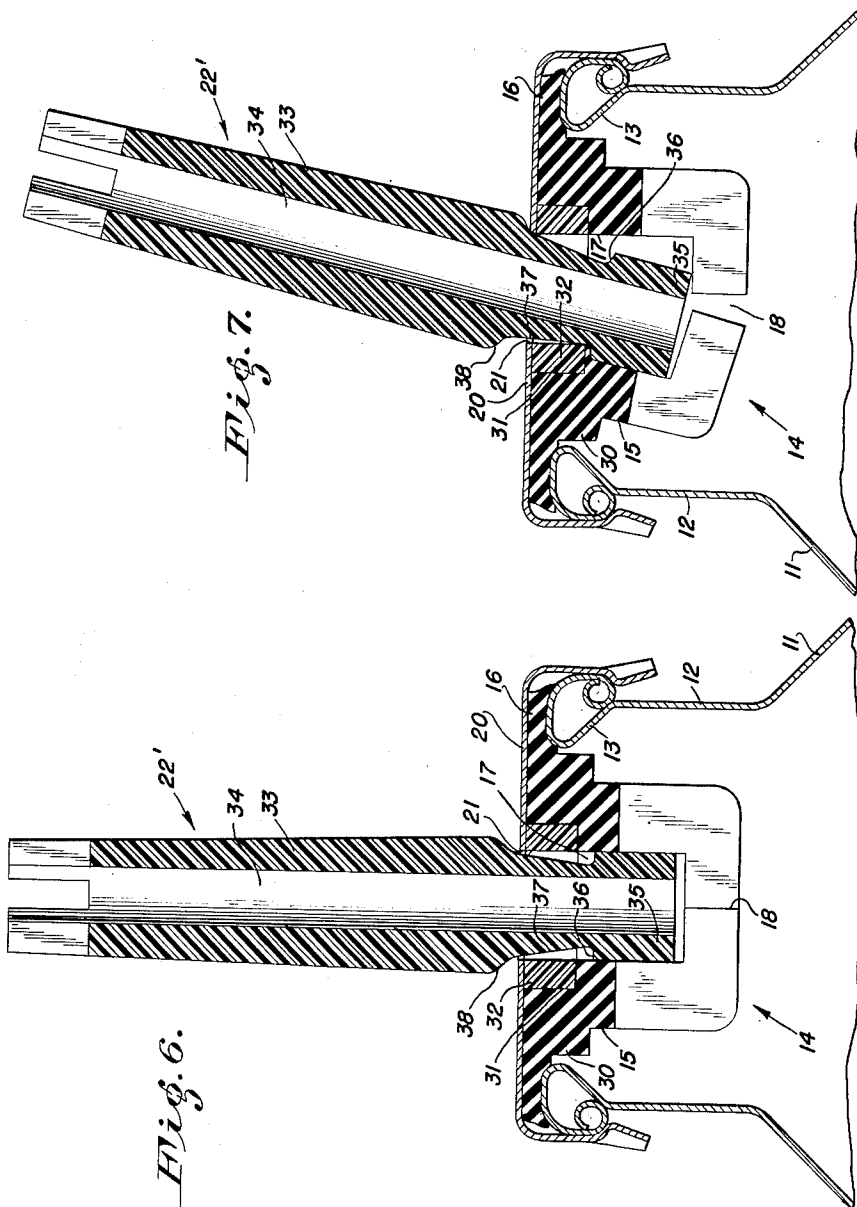
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UNITED STATES PATENT OFFICE

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DISPENSING CONTAINER AND SLITTED
RESILIENT VALVE THEREFORJohn Schmidt, Philadelphia, Pa., assignor to
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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 containers for dispensing pressurized fluids in the form of aerosols, pastes, aerated liquids and the like are well known and widely used, cans filled with cream and gas under pressure for dispensing whipped cream being a common 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 discharging position;

Figure 3 is a sectional view, somewhat enlarged, 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 disposition of the longitudinal slits therein;

Figure 5 is an elevational view of the valved closure, showing further details of the slits;

Figure 6 is a sectional elevational view of a modification of the invention, on a greatly enlarged scale, and

Figure 7 is a view corresponding to Figure 6, but showing the valved closure and associated discharge member of the dispenser in open or discharging position.

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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 there-through. Two longitudinal slits 18, disposed at right angles to each other and intersecting at the axis of body member 15, extend from the inner end of the body member to the bottom of the bore, as best seen in Figures 4 and 5. As there shown, the slits preferably constitute straight cuts of proper depth into the inner end of the body member. 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 21 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 22, 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 23 having a longitudinal passage 24 extending therethrough and an annular grip flange 25 extending outwardly therefrom intermediate its length, the grip flange terminating in the embodiment shown in downwardly depending skirt 26. The outer end of the discharge member body may be provided with the usual longitudinal slots 27, adapted to shape the stream of whipped cream issuing there-through into decorative fluted form.

The dispenser elements normally occupy the relative position shown in Figure 1, slits 18 being maintained firmly closed by the internal pressure of the container contents exerted against the inner end and sides of the valved closure, and the tubular discharge member being axially

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aligned by the inherent rigidity of the closure. To dispense the contents thereof, the container may be inverted in the usual manner, grasped in the hand conveniently with two fingers overlying grip flange 25, one on either side of the discharge member body. So held, the discharge member may readily be displaced laterally relative to the valved closure with easily controlled force, either by differential pressure applied on opposite sides of the grip flange or by lateral pressure exerted against the outer end of body 23, whereby the dispenser elements are caused to assume the relationship shown in Figure 2. It will be evident that axial movement of the discharge member into the closure is prevented by the grip flange. Lateral movement of the outer end of the discharge member, it will be apparent, causes the discharge member to pivot about an axis lying roughly in the plane of the outer end of the closure, whereby the inner end thereof is moved in the opposite direction against the bore wall, deforming the closure and opening one or both of the slits 18. Thereupon, the pressurized contents of the container may pass through the slits 18 and longitudinal passage 24 of discharge member body 23 to the discharge end thereof.

Upon release of the force laterally displacing the outer end of the discharge member, the member is promptly returned to axial position by the inherent rigidity and resilience of the valved closure, these properties effecting also closure of the slits, which function is assisted by the internal pressure of the container exerted against the closure bottom and sides. The side and bottom end walls of the closure being of substantial thickness, as shown, the closure possesses adequate inherent rigidity and resilience to function as described entirely without reinforcement. Further, by reason of the configuration of the closure and particularly of the slits thereof, the closure inherently possesses finely controllable variable opening characteristics, whereby the rate of flow of whipped cream in the example may be precisely controlled.

The inner end of the closure being divided by slits 18 into four identical sectors, it will be apparent that the valve action of the closure is always the same, no matter in which direction the discharge member is laterally displaced. It will be obvious that three or more slits 18 may be employed if desired, preferably equally spaced from each other and intersecting at the axis of the valved closure, whereby they define identical sectors as in the example shown.

The short neck portion 19 functions not only to maintain alignment between the valved closure and the crown cap, but also serves to separate the discharge member from the edge of the cap aperture whereby no binding therebetween can take place. The neck portion further acts as a resilient pivot upon which the discharge member is levered, contributing to the inherently fine pressure control of the closure opening. The neck portion also, of course, elongates bore 17 to more effectively frictionally engage and retain the discharge member therein. Obviously, however, the discharge member may be readily removed 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 23 of a pressure container 29. In this application also the closure is employed in con-

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junction with a discharge member 22, 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 28 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 valved 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 about the aperture.

A further embodiment of the invention is illustrated in Figures 6 and 7, wherein the closure body member adjacent flange 16 is formed into the enlarged shoulder portion 30, of substantially the same diameter as that of the container mouth defined by bead 13. In this embodiment, the neck portion 19 of the closure is omitted, and the outer end of bore 17 is formed into counterbore 31, which contains a ring 32 of metal, synthetic plastic or similar rigid material. The crown cap 20 overlies ring 32, the aperture 21 thereof and ring 32 desirably having an inner diameter corresponding to that of the closure bore.

In conjunction with the modified closure, a modified tubular discharge member 22' is preferably employed. As shown in Figures 5 and 6, the discharge member comprises a straight body 33 having a longitudinal passage 34 extending therethrough. The inner end portion 35 of the discharge member is of substantially the same diameter as closure bore 17, and of a length somewhat less than that of the bore. At its outer end, portion 35 terminates in the internal shoulder 36, which merges into an inwardly converging frusto-conical section 37 extending from shoulder 36 a distance somewhat exceeding the depth of ring 32, to the outwardly flaring surface 38. Adjacent surface 38, as shown, the body 33 is of larger diameter than is the bore 17. In this example, the slits 18 preferably extend beyond the bottom of the bore, terminating intermediate the length thereof.

This modification functions similarly to that of Figures 1 and 2, the discharge member 22' being displaced laterally relative to the valved closure by finger pressure exerted on the outer end thereof, whereby the discharge member pivots about the edge of the cap aperture and its inner end moves in the opposite direction, deforming the closure and causing one or both of the slits 18 to open. The relative position of the dispenser elements in open position is illustrated in Figure 7. As before, release of lateral pressure against the discharge member permits return of the elements to closed position, as in Figure 6, the return being effected by the inherent resilience of the closure and by the internal pressure within the container exerted upon the sides and bottom of the closure.

In this modification, shoulder portion 30 serves to properly align the closure in the container mouth until sealed thereagainst by the cap 20. Ring 32 prevents the closure from protruding outwardly through the cap aperture 21, and facilitates insertion of the discharge member 22' into the closure bore. The discharge member is retained within the bore by frictional force exerted on the outer surface of end portion 35, the internal shoulder 36 also functioning to some extent to prevent inadvertent removal of the

discharge member from the bore. As the discharge member is displaced laterally, the flaring surface 30 encounters the edge of the cap aperture and pivots thereon, the shoulder 36 eventually encountering the inner surface of ring 32 at the opposed position to limit the lateral movement. The outwardly flaring surface 38 being of greater diameter than that of the cap aperture, the discharge member is prevented thereby from entering bore 17 to an undesired extent.

With the modified discharge member 22', relatively deep slits, extending inwardly a substantial distance laterally of end portion 35, have been found particularly effective in obtaining the desired finely controllable variable opening characteristics in the valved closure. It will be apparent that either modification may be adapted for upright dispensing, as may be desirable in the case of aerosols, by enclosing the valved closure in an internal cup in communication with the bottom of the container, in the well known manner.

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 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 two longitudinal slits extending therethrough from the inner end thereof to the bottom of said bore, said slits being disposed at right angles to each other and intersecting at the axis of said body member, 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.

2. 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 longitudinal slits extending therethrough from the inner end thereof at least to the bottom of said bore, said slits being angularly disposed relative to each other and intersecting at the axis of said body member, a counterbore in the outer end of said bore, and a ring of rigid material positioned in said counterbore.

3. 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 longitudinal slits extending therethrough from the inner end thereof at least to the bottom of said bore, said slits being angularly disposed relative to each other and intersecting at the axis of said body member, a counterbore in the outer end of said bore, a ring of rigid material positioned in said counterbore, and a tubular discharge member frictionally retained in said bore and extending therefrom, said discharge member being of reduced diameter adjacent said rigid ring.

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 longitudinal slits extending therethrough from the inner end thereof to the bottom of said bore and substantially therebeyond, said slits being angularly disposed relative to each other and intersecting at the axis of said body member, a counterbore in the outer end of said bore, a ring of rigid material positioned in said counterbore, and a tubular discharge member frictionally retained in said bore and extending therefrom, the outer wall of said discharge member being formed into inwardly converging frusto-conical shape adjacent said rigid ring.

5. 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 of said container, an axial bore entering the outer end of said body member and extending partially therethrough, said body member having a plurality of longitudinal slits extending therethrough from the inner end thereof to the bottom of said bore and substantially therebeyond, said slits being angularly disposed relative to each other and intersecting at the axis of said body member, a counterbore in the outer end of said bore, a ring of rigid material positioned in said counterbore, and a tubular discharge member frictionally retained in said bore and extending therefrom, the outer wall of said discharge member being formed into inwardly converging frusto-conical shape adjacent said rigid ring.

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