

Jan. 22, 1946.

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2,393,322

DISPENSING CLOSURE STRUCTURE

Filed Aug. 21, 1941

2 Sheets-Sheet 1

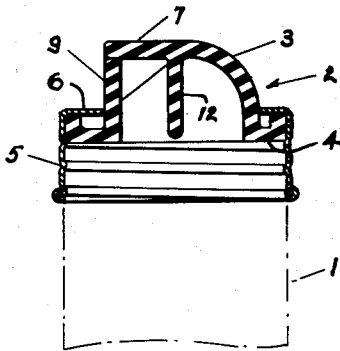


FIG. 1.

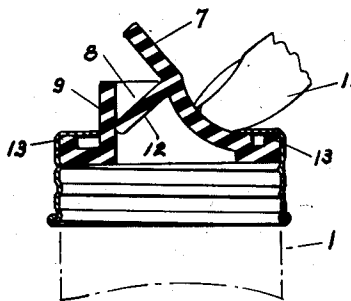


FIG. 2.

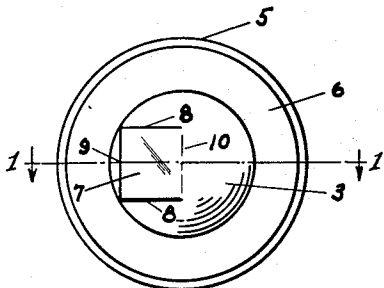


FIG. 3.

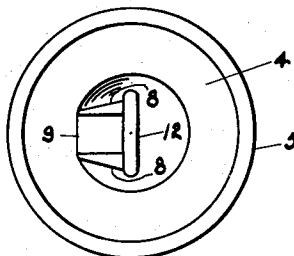


FIG. 4.

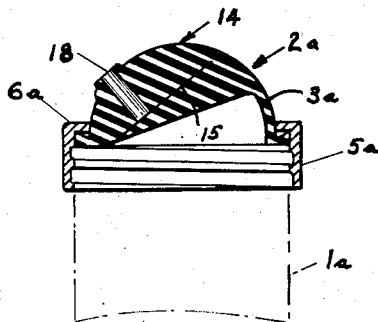


FIG. 5.

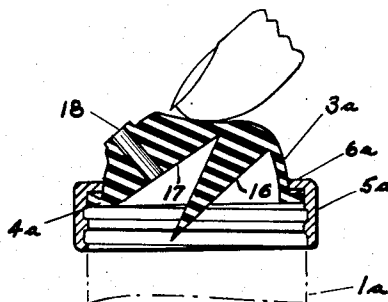


FIG. 6.

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2 Sheets-Sheet 2

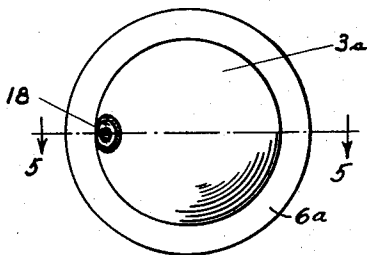


FIG. 7.

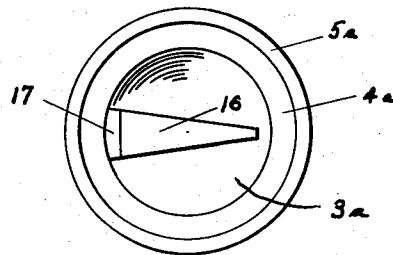


FIG. 8.

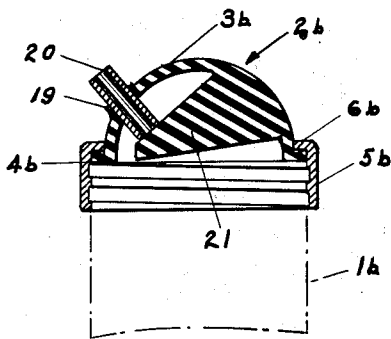


FIG. 9.

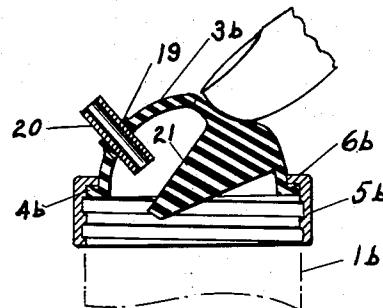


FIG. 10.

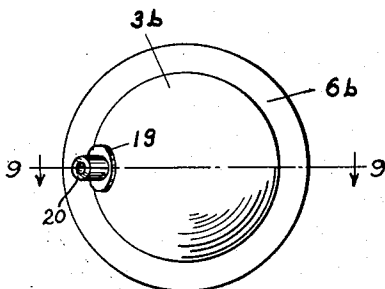


FIG. 11.

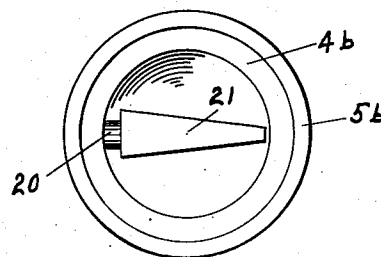


FIG. 12.

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DISPENSING CLOSURE STRUCTURE

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Application August 21, 1941, Serial No. 407,751

9 Claims. (Cl. 222—490)

This invention relates to closure structures for containers and more particularly, to closure structures having normally closed orifices which are opened, for the discharge of the container contents, by pressure applied to flexible resilient portions of the closure structures.

The present invention has for one of its objects the provision of a closure structure having simple and improved means by which may be discharged predetermined quantities or amounts of the contents of the container to which the closure structure is secured.

Another object of the present invention is the provision of a closure structure in which the discharge orifice thereof is normally closed by simple and improved means movable to non-closing position relative to said orifice by pressure applied to a flexible resilient portion of said closure structure.

Another object of the present invention is the provision of a closure structure having a flanged closure member and means for connection to a container, said closure member flange and said connecting means having improved sealing and assembly-maintaining relationship.

Further objects of the present invention and other of its practical advantages will be referred to in or will be evident from the following description of three embodiments of the invention, as illustrated in the accompanying drawings, in which

Fig. 1 is a central vertical sectional view, on the line 1—1, Fig. 3, of a closure structure embodying one form of the present invention, the closure structure being secured to a container fragmentarily indicated in dot-dash lines;

Fig. 2 is a similar view, showing the position of the closure member of the structure during the application thereto of flexing pressure for the discharge of a predetermined quantity of the contents of the container to which the structure is applied, the container being fragmentarily indicated in dot-dash lines;

Fig. 3 is a top plan view of such closure structure;

Fig. 4 is a bottom plan view thereof;

Fig. 5 is a central vertical sectional view, on the line 5—5, Fig. 7, of a closure structure embodying a second form of the present invention, the closure structure being secured to a container fragmentarily indicated in dot-dash lines;

Fig. 6 is a similar view of the closure structure and the container of Fig. 5, with the discharge orifice of the closure member of the structure

open as the result of flexing pressure applied to such member;

Fig. 7 is a top plan view of the closure structure of Fig. 5;

Fig. 8 is a bottom plan view of the closure structure of Fig. 5;

Fig. 9 is a central vertical sectional view, on the line 9—9, Fig. 11, of a closure structure embodying a third form of the present invention, the closure structure being secured to a container fragmentarily indicated in dot-dash lines;

Fig. 10 is a similar view of the closure structure and the container of Fig. 9, with the discharge orifice of the closure member of the structure open as the result of flexing pressure applied to such member;

Fig. 11 is a top plan view of the closure structure of Fig. 9; and

Fig. 12 is a bottom plan view of the closure structure of Fig. 9.

Before the closure structures here illustrated are specifically described, it is to be understood that the invention here involved is not limited to the structural details or the particular arrangements of parts here shown, as closure structures embodying the present invention may take other forms. It also is to be understood that the phraseology or terminology herein employed is for the purpose of description and not of limitation, the scope of the present invention being denoted by the appended claims.

Referring first to that embodiment of the invention illustrated in Figs. 1 to 4 inclusive, it will be noted that the closure structure constituting such embodiment is of generally circular shape in plan view, for use with a container having a generally cylindrical neck or rim portion, such as the container 1 fragmentarily and more or less diagrammatically indicated in dot-dash lines, Figs. 1 and 2.

The closure structure comprises a closure member 2 having an outwardly bulging hollow central portion or dome 3, and a laterally extending circumferential flange 4 surrounding said dome at the base thereof. As here shown, the base flange 4 is integral with the central dome 3, the closure member comprising such parts being made of rubber or a rubber-like material by a simple molding operation.

The base flange 4 of the closure member is of such size as to seat upon the upper edge of the neck or rim portion of the container 1, and to maintain said member in firm assembly with the container, the closure structure also includes a suitable connecting ring or equivalent assembly-

maintaining means. As here shown, said connecting ring comprises a threaded cylindrical body portion 5 for detachable connection to the correspondingly threaded neck or rim portion of the container 1, and a laterally extending annular top flange 6 overlying and having clamping engagement with the base flange 4 of the closure member 2. The base flange 4 of the closure member is therefore firmly clamped between the upper edge of the container 1 and the top flange 6 of the connecting ring, the clamping effect being increased as the ring is drawn down upon the container neck or rim portion.

At one side thereof, the central dome 3 of the closure member 2 is integrally provided with a laterally extending hollow projection of dormer-like form. As here shown, said projection has a generally flat and substantially square top wall 7, a pair of generally triangular and substantially upright side walls 8, and a generally upright and substantially square front wall 9, the lower edge of which is closely adjacent the base flange 4 of the closure member, as best shown in Fig. 3.

To provide the closure member with a discharge orifice, the top wall 7 of its dormer-like projection is separated, by a slitting or equivalent operation, from the front and side walls of such projection. Therefore, although said top wall normally rests upon said front and side walls, with the consequent normal closing of the upper end of the projection, said top wall 7 is connected only along its rear edge 10 to the central dome 3.

To open the orifice provided by the aforesaid slitting operation or in other words, to uncover the upper end of the hollow dormer-like projection, it is merely necessary to apply, by a finger 11 or otherwise (see Fig. 2), flexing pressure to the central dome 3 rearwardly of such projection. Upon the application of such flexing pressure, the top wall 7 of the dormer-like projection is swung upwardly about its connected rear edge 10, as in Fig. 2, with the consequent opening of the discharge orifice or the uncovering of the upper end of the dormer-like projection.

In order to enable predetermined constant quantities or amounts of the contents of the container 1 to be discharged or dispensed, the central dome 3 of the closure member 2 is provided with a depending flap 12. As here shown, said flap is integral with said dome, the upper end of the flap being joined to the dome along substantially the rear edge 10 of the top wall 7 of the dome's dormer-like projection. In depth, the flap 12 extends to substantially the bottom of the hollow of the dome and in width, said flap is somewhat greater than the distance between the side walls 8 of the dormer-like projection, as best shown in Fig. 4.

As will be evident from Fig. 2, upon the application of flexing pressure to the central dome 3, rearwardly of its dormer-like projection and hence rearwardly of its depending flap 12, said flap will be caused to swing upwardly and forwardly into a position to close the lower end of the chamber of said projection, the lower end of said flap engaging the front wall 9 of said projection and the side edge portions of said flap underlying the projection side walls 8. As will be readily understood, the projection top wall 7 and the depending flap 12 move together or in unison, the upper end of the projection chamber being uncovered by the wall flap 7 and the lower end of said projection chamber being closed by the interior flap 12 as the result of depression of a part of the central dome 3. Upon the release

of such flexing pressure, the wall flap 7 and the interior flap 12 return to their normal positions, the wall flap 7 closing the upper end of the projection chamber and the interior flap 12 moving to a position in which the lower end of said projection chamber is open or uncovered and hence in communication with the main chamber or hollow of the central dome 3.

By means of the flap 12, the quantity or amount of the container contents discharged or dispensed in one operation is limited to the volume of the chamber of the dormer-like projection. Inasmuch as said flap swings in the direction of the discharge orifice upon the application of flexing pressure to the central dome 3, the flap not only cooperates with the projection of said dome in limiting the discharge to a predetermined constant quantity or amount but also, aids in the discharge of the container contents.

To fill the chamber of the dormer-like projection for discharge purposes, it is of course desirable to shake the container and to tilt it downwardly and forwardly for free flow of the container contents trapped in said projection chamber, all as will be readily understood.

In order to insure a tight seal between the container and the base flange 4 seated thereon, notwithstanding the flexure of the central dome 3 in effecting a discharge of the container contents, said base flange is so constructed that only its outer circumferential edge is engaged by the overhanging top flange 6 of the connecting ring. That is accomplished, in this embodiment of the invention, by providing said base flange at its outer circumferential edge with an upstanding annular bead 13, the bead only of said base flange being engaged by the top flange of the connecting ring, as clearly shown in Figs. 1 and 2.

Referring now to the closure structure of Figs. 5 to 8 inclusive, it will be noted that such closure structure also is of circular shape in plan view, for use with a container having a threaded cylindrical neck or rim portion, such as the container 1a fragmentarily and more or less diagrammatically shown in Figs. 5 and 6. It also will be noted that said closure structure comprises a closure member 2a of rubber or rubber-like material, said member having an outwardly bulging central portion or dome 3a of hollow form, and a laterally extending circumferential base flange 4a for seating engagement upon the upper edge of the neck or rim portion of the container 1a.

As best shown in Figs. 5 and 6, the central dome 3a of the closure member has a thickened wall portion 14, here shown as of generally semi-circular form in cross section. By means of a slit 15, extending from the inner surface of said thickened wall portion toward but terminating short of the outer surface thereof, the thickened wall portion 14 is provided with inner and outer parts 16 and 17, the inner part 16 being of generally triangular form in longitudinal section and constituting a valve for a discharge orifice or passageway 18 provided in the outer part 17.

Normally, the valve 16 lies within the hollow of the central dome 3a, in planar contact with the outer part 17 and in closing relation to the inner end of the discharge orifice 18 in such outer part 17, as in Fig. 5. However, upon the application of flexing pressure to the central dome 3a, by the user's finger or otherwise (see Fig. 6), the valve 16 is swung away from the outer part 17 of the thickened wall portion 14 of said dome, with the consequent opening of the orifice or passageway 18 for the discharge

of the container contents. Upon the release of said flexing pressure, the valve 16 immediately returns to its normal, orifice-closing position, as will be readily understood.

To maintain the base flange 4a of this closure member in seating engagement upon the container 1a, a connecting ring corresponding to the one heretofore described is utilized, said ring having a threaded skirt or body portion 5a for connection to the correspondingly threaded neck or rim portion of the container 1a and an overhanging top flange 6a for clamping engagement with the base flange 4a. In order that said ring flange will engage only the outer circumferential edge of said base flange 4a, the latter flange is of triangular cross section, with its greatest depth or thickness at its outer edge, as clearly shown in Figs. 5 and 6. It is this outer edge only of the base flange which is engaged by the overhanging top flange of the connecting ring, so that a tight seal is maintained between said base flange and the container 1a, notwithstanding the flexure of the central dome 3a in the movement of the valve 16 to open position.

In the embodiment of the invention illustrated in Figs. 9 to 12 inclusive, the closure structure also is of circular shape in cross section, for use with a container having a threaded cylindrical neck or rim portion, such as the container 1b fragmentarily and more or less diagrammatically indicated in dot-dash lines, Figs. 9 and 10. Here, the outwardly bulging central portion or hollow dome 3b of the closure member 2b is provided with an apertured side wall boss 19 for the reception of a short section of relatively rigid tubing 20, the passageway of which constitutes the discharge orifice.

To normally close the inner end of the tube 20, the central dome 3b is integrally provided within the hollow thereof with a valve flap 21 of generally triangular form in longitudinal section. As best shown in Fig. 9, the tube 20 extends inwardly into the hollow of the central dome 3b, with its inner end normally engaged and closed by the valve flap 21. However, upon the application of flexing pressure to the central dome 3b, by the user's finger or otherwise (see Fig. 10), the valve flap 21 is swung away from the tube 20, with the consequent opening of the tube passageway for discharge of the container contents. Upon the release of said flexing pressure, the valve flap 21 immediately returns to its normal tube-closing position, as will be readily understood.

To maintain the base flange 4b of this closure member 2b in seating engagement upon the container 1b, a connecting ring corresponding to those of the previously described closure structures is utilized, said ring having a threaded body portion 5b for detachable connection to the correspondingly threaded neck or rim portion of the container 1b, and an overhanging top flange 6b for clamping engagement with the base flange 4b. To insure a tight seal between said base flange and the container 1b, said base flange has the form of the base flange 4a of the closure structure of Figs. 5 to 8 inclusive, the flange having its greatest depth or thickness at its outer circumferential edge, and such edge being the part which is engaged by the top flange 6b of the connecting ring.

From the foregoing description thereof, it will be evident that the present closure structures are of simple and inexpensive form, and particularly suitable for use with relatively small, hand-held

containers of powdery or granulated material. To those skilled in the art to which the present invention relates, other features and advantages of closure structures embodying such invention will be evident from the foregoing description of three such embodiments.

I claim:

1. A closure structure for a container for the expulsion of its contents by air pressure, said closure structure comprising a closure member of flexible resilient material, and a securing member for holding said closure member on said container, said closure member having an outwardly bulging central portion adapted when flexed by depression thereof to apply pressure to the air in said container for expulsion of the container contents through an opening with which the outwardly bulging portion of said closure member is provided, said closure member also having a laterally extending flange surrounding said outwardly bulging portion at the base thereof and said flange having an outwardly extending peripheral portion of continuous or endless character and in spaced relation relative to said outwardly bulging portion, said securing member having a skirt-like portion for securement to the container and also having a laterally extending flange surrounding the outwardly bulging portion of the closure member and overlying the laterally extending flange thereof, the flange of said securing member having engagement with the closure member flange only at its outwardly extending peripheral portion.

2. A dispensing closure member for a container, said closure member having a peripheral base flange and an outwardly bulging central portion defining therewithin a chamber, said outwardly bulging portion being of flexible resilient material and having a through slit therein to provide a discharge passageway for the container contents in said chamber, said passageway being normally closed but being openable by depression of a predetermined part of said outwardly bulging portion, and a depending flap carried by said outwardly bulging portion and located within the chamber defined thereby between said passageway and said depressible part, the depression of such part causing said flap to swing toward the now open discharge passageway to thereby assist in the discharge of the container contents through said passageway.

3. A dispensing closure member for a container, said closure member having a peripheral base flange and an outwardly bulging central portion defining therewithin a chamber, said outwardly bulging portion being of flexible resilient material and having a through slit therein to provide a discharge passageway for the container contents, said passageway being normally closed but being openable by depression of a predetermined part of said outwardly bulging portion, and a depending flap carried by said outwardly bulging portion and located within the chamber defined thereby between said passageway and said depressible part, the depression of such part causing said flap to swing toward the now open discharge passageway to thereby assist in the discharge of the container contents through said passageway, further depression of said part causing the free edges of said flap to engage said outwardly bulging portion about said passageway to thereby cut off communication between said passageway and the interior of said container.

4. A dispensing closure member for a container, said closure member having a peripheral base

flange and an outwardly bulging central portion defining therewithin a chamber, said upwardly bulging portion being of flexible resilient material and having a through slit in the wall thereof and providing a wall flap which when raised provides a discharge aperture for the container contents, said wall flap being normally in aperture closing position but being raisable to open said aperture by depression of a part of said outwardly bulging portion, and a depending flap carried by said outwardly bulging portion and located within the chamber defined thereby between the wall flap and said depressible part, the depression of such part causing the wall flap to raise, with the consequent opening of said discharge aperture, and simultaneously causing the depending flap to swing toward said discharge aperture to thereby assist in the discharge of the container contents through said aperture.

5. A dispensing closure member for a container, said closure member having a peripheral base flange and an outwardly bulging central portion defining therewithin a chamber, said outwardly bulging portion being of flexible resilient material and having a dormer-like projection consisting of a top wall and depending front and side walls, said top wall being separated from said front wall and the front portions of said side walls by a through slit so that said top wall constitutes a wall flap which when raised provides a discharge aperture for the container contents, said wall flap being normally in aperture closing position but being raisable to open said aperture by depression of a part of said outwardly bulging portion, and a depending flap carried by said outwardly bulging portion and located within the chamber defined thereby between said dormer-like projection and said depressible part, the depression of such part causing the wall flap to raise, with the consequent opening of said discharge aperture, and simultaneously causing the depending flap to swing toward said discharge aperture to thereby assist in the discharge of the container contents through said aperture.

6. A dispensing closure member for a container, said closure member having a peripheral base flange and an outwardly bulging central portion containing a main chamber and an auxiliary chamber, said chambers normally being in communication, said outwardly bulging portion being of flexible resilient material and having a through slit in an outer wall of said auxiliary chamber and providing a wall flap which when raised provides a discharge aperture for the container contents in said auxiliary chamber, said wall flap being normally in aperture closing position but being raisable to open said aperture by depression of a part of said outwardly bulging portion, and a depending flap carried by said outwardly bulging portion and located within the main chamber between said depressible part and said auxiliary chamber, the depression of such part causing said wall flap to raise, with the consequent opening of said discharge aperture, and simultaneously causing said depending flap to swing toward said auxiliary chamber, said depending flap being movable into closing position with respect to said auxiliary chamber by further depression of said depressible part.

7. A dispensing closure member for a container, said closure member having a peripheral base flange and an outwardly bulging central portion of flexible resilient material and pro-

viding a main chamber, said outwardly bulging portion having a hollow dormer-like projection thereon which provides an auxiliary chamber, said chambers normally being in communication by reason of an opening therebetween, said dormer-like projection having a top wall and depending front and side walls, said top wall being separated from said front wall and from the front portions of said side walls by a through slit so that said top wall constitutes a wall flap which when raised provides a discharge aperture for the container contents in said auxiliary chamber, said wall flap being normally in aperture closing position but being raisable to open said aperture by depression of a part of said outwardly bulging portion, and a depending flap carried by said outwardly bulging portion and located within the main chamber between said depressible part and said dormer-like projection, the depression of such part causing said wall flap to raise, with the consequent opening of said discharge aperture, and simultaneously causing said depending flap to swing toward said dormer-like projection, said depending flap being movable into engagement with the side and front walls of said projection to thereby cut-off communication between said chambers by further depression of said depressible part.

8. A dispensing closure member for a container, said closure member having a peripheral base flange and a centrally disposed outwardly bulging portion of hollow form and providing a chamber therewithin, said outwardly bulging portion being of flexible resilient material, a discharge tube mounted in the wall of said outwardly bulging portion and projecting inwardly therebeyond, and a depending flap carried by said outwardly bulging portion in the chamber thereof and normally engaging, and thereby closing, the inner end of said tube, said flap being movable away from the inner end of said tube, to thereby uncover said tube for the discharge of the container contents, by depression of a part of the outwardly bulging portion of said closure member.

9. A dispensing closure member for a container, said closure member having a peripheral base flange and a centrally disposed outwardly bulging portion of hollow form and of flexible resilient material, a portion of the wall of said outwardly bulging portion being of materially greater thickness than that of the remaining portion of said wall, said thickened wall portion being of generally semi-circular form in cross section and having a slit extending from the inner surface thereof toward but terminating short of the outer surface thereof, the part of said thickened wall portion on the outer side of said slit having a discharge passageway there-through and the part of said thickened wall portion on the inner side of said slit being of triangular form in longitudinal section and constituting a valve for said passageway, said valve or inner part normally lying completely within the outwardly bulging portion of the closure member and in engagement with said outer part, with the consequent closing of its discharge passageway, and said valve or inner part being movable away from said outer part, to thereby uncover the inner end of said passageway, by depression of a part of the outwardly bulging portion of the closure member.

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