

Nov. 23, 1943.

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2,334,851

CONTAINER AND DISPENSING CLOSURE THEREFOR

Filed May 2, 1940

2 Sheets-Sheet 1

FIG. 1.

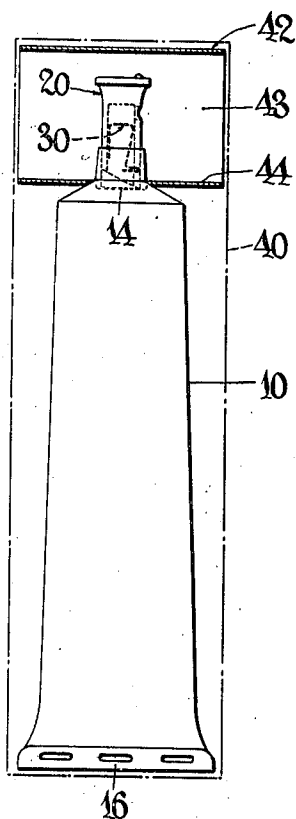


FIG. 2.

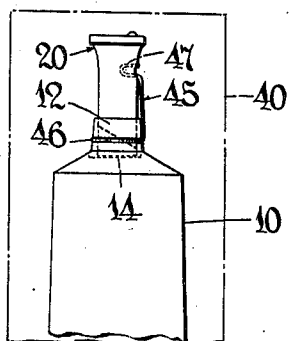


FIG. 3.

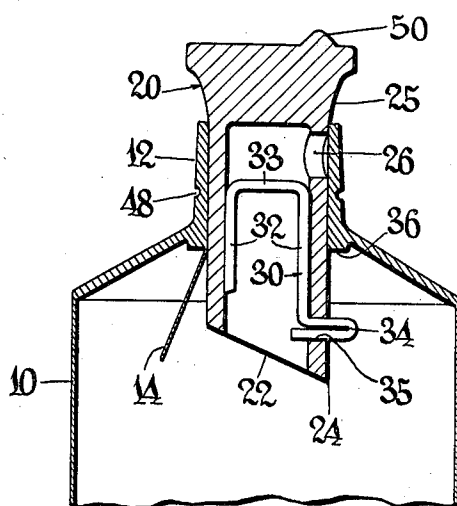
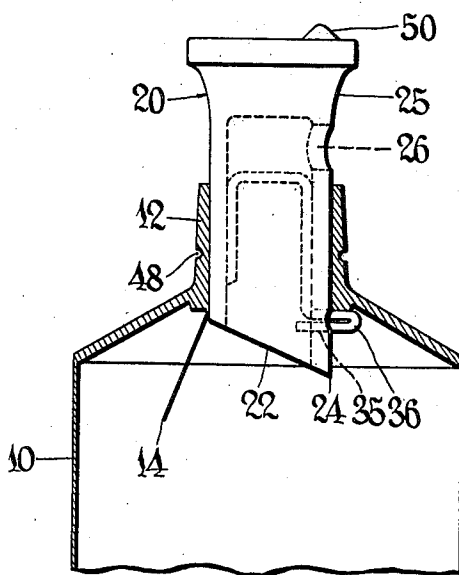


FIG. 4.



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FIG. 5.

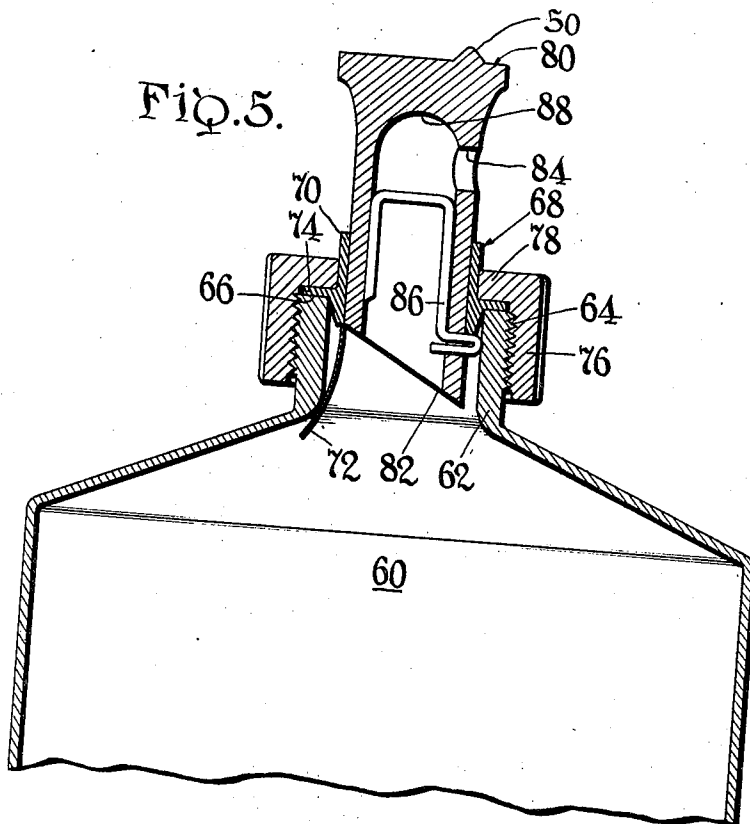


FIG. 7.

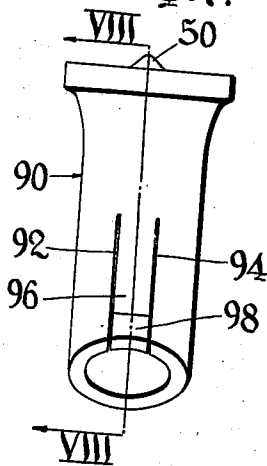


FIG. 8.

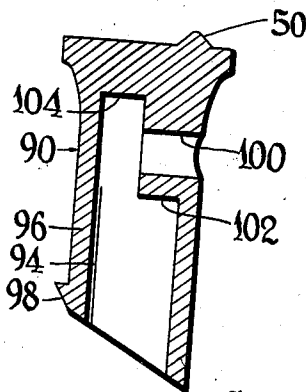
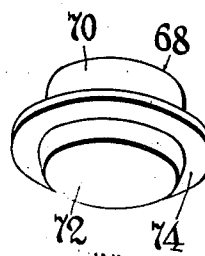


FIG. 6.



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CONTAINER AND DISPENSING
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5 Claims. (Cl. 221—60)

This invention relates to improvements in containers and dispensing devices, and more particularly pertains to dispensing containers and closures for containers of pastes and creams and powdered materials such as dentifrices, shaving cream, and the like.

One of the objects of the invention is to provide a device of the character described that will provide improved conveniences for the user. Another object of the invention is to provide a device of the kind described that is adapted to preserve the contents thereof in an improved manner. Another object is to provide a device of the character described in a form of utmost structural simplicity and ruggedness so as to be relatively inexpensive to manufacture and fool proof in use. Other objects of the advantages of the invention will appear from the specification herein.

In the drawings:

Fig. 1 is an elevation of a container of the compressible ejecting type provided with a dispensing closure of the invention and fitted with a packaging accessory thereof;

Fig. 2 is a fragmentary view similar to Fig. 1 showing a modified form of packaging accessory device fitted upon the tube and closure devices;

Fig. 3 is a fragmentary enlarged sectional view through a portion of the tube and the closure element when the latter is in non-dispensing position; and

Fig. 4 is a fragmentary view similar to Fig. 3 showing the closure element thereof in elevation and in its dispensing position of adjustment relative to the tube.

Fig. 5 is a view similar to Fig. 3 of another form of the invention;

Fig. 6 is a disassembled view in perspective of an original container sealing element of Fig. 5;

Fig. 7 is an elevational view of another form of the plunger element of the invention; and

Fig. 8 is a section taken substantially along line VIII—VIII of Fig. 7.

The invention is adapted to be used in conjunction with various kinds of material containers and is illustrated herein as being applied in connection with a compressible tubular material container 10 which is generally of a style now in use for holding tooth pastes, shaving creams, and the like. However, the dispensing end of the tube 10 is specially formed to include a dispensing conduit in the form of a reduced cylindrical throat 12 having a smooth circular inner bore terminating in a closed wall or membrane 14 which

functions to originally seal the dispensing end of the tube; the membrane 14 being formed as an integral part of the tube 10 during the manufacture thereof. Thus, the filling of the tube 10 with paste or cream or powder or the like is effected through the lower end thereof in accord with presently standard tube filling practices, following which the lower end of the tube is permanently closed by means of a clamp 16 or some other suitable means.

The dispensing control device of the invention comprises generally a hollow cylindrical plunger 20 which is closed at its outer end and beveled at its inner end, as at 22, thus forming an annular membrane-cutting edge which is led by a point 24. The main body portion of the plunger 20 is of straight cylindrical wall form and so dimensioned as to slidably fit within the throat 12 of the tube in closely fitting relation therein. The outer end of the plunger 20 beyond the region of the bore thereof is enlarged relative to the main body portion thereof in a smooth outwardly flaring manner as at 25 so as to provide a wedging action in cooperation with the outer edge portion of the throat 12 when pressed thereinto, as shown in Fig. 3.

An ejection port 26 is formed in a side wall portion of the body of the plunger 20 and in communication with the central bore thereof for dispensing the contents of the tube when the plunger 20 is moved outwardly therefrom as to the position shown in Fig. 4, at which time the tube 10 may be compressed to force the contents thereof through the plunger bore and thence out of the port 26 where it may be conveniently applied to a brush or to the fingers of the user.

To retain the plunger 20 in operative position in the tube 10 an internal stop device is provided in the form of a spring 30 formed of bent wire or the like. The spring 30 comprises a pair of opposed arm portions 32, an intermediate spacing portion 33, and a laterally extending end portion 34 at the free end of one of the arm portions. An opening 35 is provided through a side wall portion of the plunger 20 to receive the finger 34 therein; the finger 34 being of such length as to normally extend outwardly beyond the wall of the plunger so as to provide a stop element which is adapted to bear against the shoulder 36 formed by the inner end of the throat 12. The parts are so proportioned and arranged that the plunger 20 may be partially withdrawn from the throat 12 to the position shown in Fig. 4 prior to engagement of the stop finger 34 with the shoulder 36. Thus,

when the closure is in this position the contents of the tube may be dispensed through the port 26, and the stop finger 34 will prevent the closure from being further removed and/or accidentally displaced from mounted engagement within the throat 12. Between dispensing operations the plunger 20 may be manually pressed inwardly of the tube to the position illustrated in Fig. 3 wherein the throat 12 covers the port 26 of the plunger 20 and the plunger is wedgingly engaged within the outer end of the throat 12 so as to provide a snug seal therebetween. The wedging of the plunger in the throat 12 provides a perfect seal and also a sufficient degree of frictional engagement therebetween to prevent subsequent unintended movement of the plunger out of non-dispensing position. However, the grip between the throat and the plunger is such that it may be readily overcome upon application of manual pulling forces upon the plunger, and it will be noted that in this connection the outwardly flaring end of the plunger 20 provides a convenient means for gripping with the fingers for this purpose.

Thus, it will be seen that a combination container and dispensing closure therefor has been provided in such manner that the contents of the container are at all times kept hermetically sealed therein and wherein the dispensing port of the device is normally covered and withdrawn from exposure to the outside atmosphere in such manner that the material occupying the dispensing port is not subjected to drying. The dispensing control element of the device is of such character as to be easily manipulated manually to open and closed positions with a minimum effort and inconvenience to the user; and yet the control element thereof is so arranged and formed that it will not accidentally move from closed to opened position; nor can it become completely detached from the container discharge port after it has once been operatively connected therein. It will also be noted that the external surface portions of the structural elements of the device are perfectly smooth and pleasing in appearance and readily cleanable as by wiping them with a cloth. Because the movement of the dispensing control device toward closed position involves an initial movement of the discharge port into covered position under the container throat, the further closing operation does not operate to project the tube contents out of the discharge port.

Prior to use of the contents of the tube, as during transportation and storage, the plunger 20 is preferably withheld from the interior of the tube so that the membrane 14 of the tube 10 will continue to seal the contents of the tube until such time as the contents are to be dispensed. Thus, the plunger 20 may be furnished along with the tube and its contents but in unassembled relation thereto, and the purchaser may subsequently insert the plunger into the throat 12 by first pressing the finger 34 inwardly into line with the side wall of the plunger and then inserting the inner end of the plunger into the throat 12. The plunger may then be pressed against the membrane 14 until the cutting point 24 perforates the latter and progressively severs it from the tube wall from right to left as viewed in the figures until such time as the plunger is driven completely through the throat when the membrane will have been deflected laterally out of the path of the plunger as illustrated in Figs. 3 and 4. Due to the fact that the membrane is not

completely severed by the plunger from the left side of the tube, the membrane remains permanently attached to the tube in substantially the attitude shown in Figs. 3 and 4. Thus, it is prevented from becoming detached and possibly obstructing the passage of material into the bore of the plunger.

I prefer, however, to assemble the tube and plunger units prior to delivery to the user by inserting the plunger into the throat 12 for a limited distance only so as to avoid piercing the membrane 14. Thus, the purchaser will not be required to manipulate the spring stop 34 as during the initial inserting step, and the device will have been previously prepared for the membrane piercing operation. Therefore, the user will simply be required to press the plunger 20 more deeply into the throat to the position shown in Fig. 3, at which time the stop 34 will spring outwardly into operative position without attention by the user, and the device will then be fully prepared for dispensing use without danger of accidental displacement of the plunger from the tube. In connection with this method of preliminarily assembling the tube and plunger units prior to delivery to the consumer, it is also preferred to provide accessory packaging means for preventing accidental pressing of the plunger into the membrane such as might otherwise be caused by shifting of the tube longitudinally in its cardboard box wrapper 40. For this purpose I prefer to provide in combination with the tube and its packing box, a bracing element which may be in the form of a folded cardboard device 42 having opposed side walls 43 and a bottom wall 44, as illustrated in Fig. 1. The bottom wall 44 is centrally perforated to receive the plunger and collar elements; and the parts are so proportioned and arranged that when assembled the bottom wall 44 will embrace and bear against the shoulder of the tube 10 at the point of reduction adjacent the throat 12, and the side wall portions 43 will bear against the upper inner end of the package 40. Consequently, the tube will be prevented from shifting upwardly against the upper end of the package in such manner that the plunger would butt against the end wall thereof.

It will be apparent that various changes may be made in the form of the bracing element 43. For example, a suitable bracing element for the purpose could be provided in the form of a simple tubular collar of an internal diameter suitable to allow it to fit over the plunger and throat elements so as to bear at its opposite ends against the upper end shoulder of the tube 10 and against the adjacent end of the package, respectively, so as to prevent the plunger from butting against the box end during handling. Another form of plunger bracing device is illustrated in Fig. 2, and comprises a wire 45 bent in such manner as to have a lower end portion 46 encircling the throat 12 of the tube, and an upright body portion terminating in an inwardly bent finger portion 47 which is adapted to project into the port 26 of the plunger 20 when the latter is in the position illustrated in Fig. 1. Hence, when the wire brace is mounted thereon the plunger 20 will be prevented from being accidentally pressed against the membrane 14, but prior to dispensing use of the device the wire brace 45 may be readily removed. To facilitate the mounting of the wire brace 45 upon the throat 12 in operative position the throat 12 is preferably grooved as at 48 (Figs. 3 and 4) to receive the looped lower end 46 of the wire 45 in clamping relation therein.

As illustrated in the drawings, I also prefer to provide a boss 50 upon the upper end of the plunger 20 for the purpose of indicating to the user the position of the dispensing port 26. The boss 50 is therefore placed at the side of the plunger adjacent the opening 26, and the user may be advised as to the location of the point of egress of the material from the dispenser by feeling for the location of the boss 50.

Fig. 5 illustrates the dispensing closure device of the invention as applied to a container of a type suitable for tooth powder, paste, or the like, wherein the throat of the container is rigid and externally threaded as to receive a conventional form of screw cap. In this case the container 60 is shown as having a reduced throat 62 which is externally screw-threaded at 64 and terminated at its upper end in a flat annular face 66. An original closure or sealing device for the container is provided in the form of an insert 68 (Figs. 5 and 6) which comprises generally a tubular body portion 70 provided at its lower end with a sealing membrane 72 and intermediately of its ends with an outwardly and laterally extending flange 74. The insert 68 is so formed and proportioned that the flange 74 is adapted to seat upon the end face 66 of the container neck, thus disposing the lower end of the tubular body portion internally of the throat 62. An internally threaded collar 76 is arranged to be screwthreaded upon the throat 62 as illustrated in Fig. 5, and is provided with an intumed flange 78 for bearing upon the flange 74 of the insert 68 so as to lock the latter upon the container throat, thus sealing the contents therein. The insert 68 is hollow to receive in slidable relation therein a plunger device 80 of the type hereinabove described and illustrated in Figs. 1 to 4. The plunger 80 includes a membrane cutting edge 82, a discharge port 84, and a locking spring device 86; and it will be understood that in the form of the invention of Fig. 5 the tubular body portion 70 of the insert 68 corresponds to the throat portion 12 of Figs. 3 and 4. Upon application of pressure against the outer end of the plunger 80 the cutting edge 82 thereof will sever the membrane 72 and allow the plunger to assume the position illustrated in Fig. 5 wherein the spring device 86 is released to provide a stop means against subsequent complete withdrawal of the plunger 80 from the container throat. The proportioning and relative arrangement of the parts of the device, however, allows for reciprocal movement of the plunger relative to the tubular insert in such manner that the discharge port 84 will either be covered by the tubular wall 70 of the insert or open to the outside, as may be required during use of the container.

Fig. 5 also illustrates another form of the dispensing plunger of the invention wherein the internal material passage thereof is extended upwardly as at 88 beyond the level of the entrance to the discharge port 84 for a distance sufficient to provide thereabove a cushioning chamber wherein sudden increased pressures within the container and plunger structures such as are sometimes generated during movements of the plunger inwardly of the container toward port closed position will be absorbed. Hence, undesired projection of the container contents through the port 84 in response to port closing movements of the plunger into the container will be prevented. The provision of this cushioning chamber is particularly useful and effective in connection with the dispensing of powdered or liquid type commodities.

Figs. 7 and 8 illustrate another form of the plunger element of the invention wherein an integral portion of the plunger body is arranged to provide the effect of the plunger locking action of the spring device 30 of the form of the invention illustrated in Fig. 3. In Figs. 7 and 8 the plunger 90 resembles generally the plungers 20 and 80 of Figs. 3 and 5, respectively, but is partially severed as at 92 and 94 through a wall portion thereof by means of parallel cuts or slots therein. Thus there is provided an integral spring finger portion 96 which is adapted to flex due to the natural resiliency of the material of which the plunger is formed. The lower end portion of the finger 96 is provided with a laterally projecting barb 98 which terminates at its upper end in a shoulder disposed normal to the longitudinal axis of the plunger. Thus, the plunger of Figs. 7 and 8 is adapted to be inserted in the throat 12 of the container of Fig. 3 or in the tubular insert of Fig. 5 and pressed inwardly thereof until the respective membranes 14 and/or 72 thereof are severed. During the initial plunger inserting process the barb 98 will bear against the throat or insert inner wall to cause the finger 94 to be flexed inwardly of the plunger, but upon passage of the barb 98 beyond the inner end of the plunger carrying member the finger 94 will spring back to its normal position and the barb 98 will thus be moved outwardly so that the upper end thereof will be in position to function as a stop to prevent the plunger from being withdrawn from the container, as in the manner of the finger 34 of Figs. 3 and 4.

Fig. 8 also illustrates another form of the material discharging passage through the plunger of the invention wherein the side wall structure thereof in the region of the discharge port 100 is of increased thickness form. Thus, an abutment shelf 102 is provided to baffle the movement of a portion of the material as it passes through the plunger in such manner as to deflect it in a direction intersecting the direction of movement through the un baffled portion. Also the longitudinal bore in the plunger is arranged to extend upwardly as at 104 beyond the line of the outlet port 100 so as to provide the cushion chamber effect as hereinabove described in connection with Fig. 5. Thus, although the passageway through the plunger 90 normally provides for unrestricted movement of material from the container to the outlet port 100, under sudden and relatively intense pressure conditions within the plunger such as may be produced during movements of the plunger inwardly of the container toward port closing position, movement of material through the reduced bore portion of the plunger is intercepted by streams of material projected laterally and oppositely thereinto from under the shelf 102 and the upper end of the cushion chamber 104. This form of the plunger of the invention is particularly effective in preventing unintended projection of the container contents through the discharge port 100 during port closing movements of the plunger when the container contents are of the nature of creams, pastes, or the like.

Another important advantage of the construction of Fig. 8 results from the elongated form of the discharge port 100 which extends through the wall portion of increased thickness. By reason of this arrangement the conduit 100 is enabled to mold the extruding cream or paste as it passes therethrough into definite ribbon-like form, as distinguished from the operation of an

orifice in a thin wall structure such as would be entirely incapable of imparting any definite formation to the cream or paste passing there-through. In Figs. 5 and 8 the bosses 50 are provided at the top side portions of the plungers adjacent the ports 84 and 100, respectively.

Although only a limited number of forms of the invention have been shown and described in detail, it will be apparent to those skilled in the art that the invention is not so limited but that various changes may be made therein without departing from the spirit of the invention or the scope of the appended claims.

I claim:

1. A material containing and dispensing device including a container having an externally threaded discharge throat terminating in a flat annular face, a closure seal for said throat comprising a tubular body adapted to be inserted within said throat and having an outwardly extending flange portion disposed intermediately of said tubular body for seating upon said annular face and a membrane extending transversely of the interior of said tubular body and adapted to be pierced to permit dispensing of the contents of said container therethrough, and a collar mounted upon said throat in screwthreaded relation thereon and having a shoulder portion engaging said flange for clamping said closure seal upon said container throat.

2. A material containing and dispensing device including a container having an externally threaded discharge throat terminating in a flat annular face, a closure seal for said throat comprising a tubular body adapted to be inserted within said throat and having an outwardly extending flange portion disposed intermediately of said tubular body for seating upon said annular face and a membrane extending transversely of the interior of said tubular body, and a collar mounted upon said throat in screwthreaded relation thereon and having a shoulder portion engaging said flange for clamping said closure seal upon said container throat, and a plunger of hollow cylindrical form slidably fitted within the tubular body portion of said closure seal and adapted to be pressed against said membrane to pierce the latter to permit dispensing of the contents of said container therethrough.

3. A material containing and dispensing device including a container having an externally threaded discharge throat terminating in a flat annular face, a seal for said throat comprising a tubular body adapted to be inserted within said throat and having an outwardly extending flange portion disposed intermediately of said tubular body for seating upon said annular face and a membrane extending transversely of the interior of said tubular body and adapted to be pierced to permit dispensing of the contents of said container therethrough, and a collar mounted upon said throat in screwthreaded relation thereon and having a shoulder portion engaging said seal flange for clamping said seal upon said container throat, and a plunger of hollow cylindrical form and closed at its outer end and slidably fitted within the tubular body portion of said seal for piercing said membrane, said plunger having a lateral discharge port through a side wall portion thereof and in communication with the hollow interior thereof for dispensing of the contents of said container when said plunger is

in one position of sliding adjustment within said seal, said plunger being adapted to be moved from said dispensing position to another position wherein said discharge port is covered by said tubular body portion of said seal.

4. A material containing and dispensing device including a container having an externally threaded discharge throat terminating in a flat annular face, a seal for said throat comprising a tubular body adapted to be inserted within said throat and having an outwardly extending flange portion disposed intermediately of said tubular body for seating upon said annular face and a membrane extending transversely of the interior of said tubular body and adapted to be pierced to permit dispensing of the contents of said container therethrough, and a collar mounted upon said throat in screwthreaded relation thereon and having a shoulder portion engaging said seal flange for clamping said seal upon said container throat, and a plunger of hollow cylindrical form and closed at its outer end and slidably fitted within the tubular body portion of said seal, said plunger having a lateral discharge port through a side wall portion thereof and in communication with the hollow interior thereof for dispensing of the contents of said container when said plunger is in one position of sliding adjustment within said seal, said plunger being adapted to be moved from said dispensing position to another position wherein said discharge port is covered by said tubular body portion of said seal, the inner end of said plunger being beveled to provide a membrane shearing point.

5. A material containing and dispensing device including a container having an externally threaded discharge throat terminating in a flat annular face, a seal for said throat comprising a tubular body adapted to be inserted within said throat and having an outwardly extending flange portion disposed intermediately of said tubular body for seating upon said annular face and a membrane extending transversely of the interior of said tubular body and adapted to be pierced to permit dispensing of the contents of said container therethrough, and a collar mounted upon said throat in screwthreaded relation thereon and having a shoulder portion engaging said seal flange for clamping said closure upon said container throat, and a plunger of hollow cylindrical form and closed at its outer end and slidably fitted within the tubular body portion of said seal, said plunger having a lateral discharge port through a side wall portion thereof and in communication with the hollow interior thereof for discharge of the contents of said container when said plunger is in one position of sliding adjustment within said seal, said plunger being adapted to be moved from said dispensing position to another position wherein said discharge port is covered by said tubular body portion of said seal, the inner end of said plunger being beveled to provide a membrane shearing point, a stop element movably mounted upon said plunger, spring means operatively associated with said stop element for automatically projecting the latter laterally from said plunger subsequent to membrane piercing movement thereof, said stop member being adapted to abut the inner end portion of said seal to prevent subsequent complete withdrawal of said plunger from said closure.

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