Sept. 10, 1957 D. M. MALICK ET AL 2,805,800

CLOSURES

Filed Jan. 28, 1957

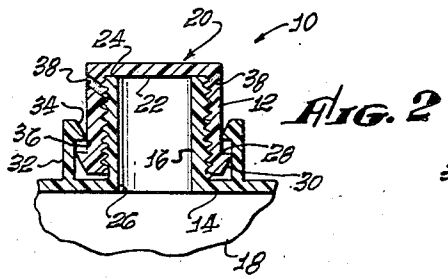

FIG. 2.

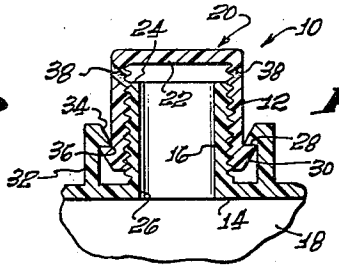

FIG. 3.

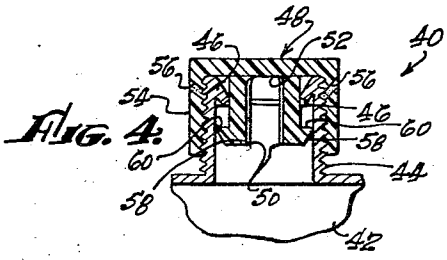

FIG. 4.

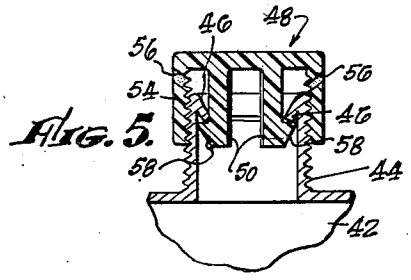

FIG. 5.

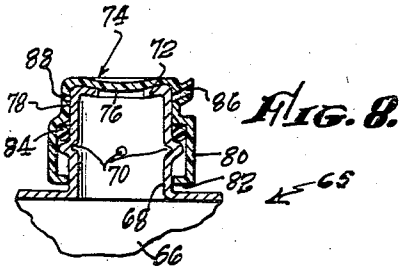

FIG. 8.

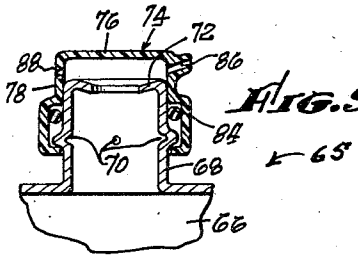

FIG. 9.

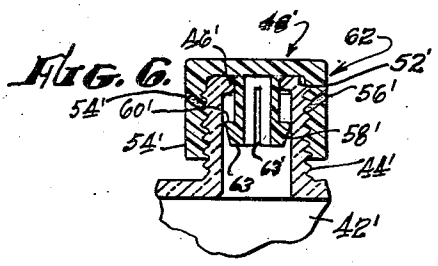

FIG. 6.

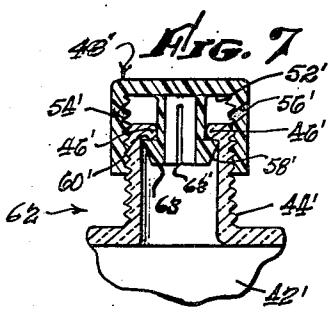

FIG. 7.

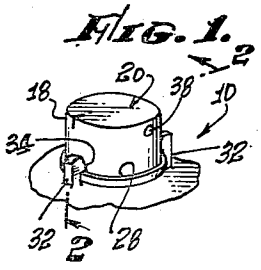

FIG. 1.

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CLOSURES

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Application January 28, 1957, Serial No. 636,689

3 Claims. (Cl. 222—519)

This invention relates to new and improved closures, and more particularly to closures which are adapted to be used in dispensing the contents from a container.

Traditionally closures have been commonly used merely to seal off the top of bottles, cans or other similar structures. As merchandising techniques have developed, there has been a decided need for a closure which is capable of being used in dispensing the contents of a container. A number of different structures have been developed in order to fulfill this need. In spite of the large amount of development work which has been devoted to this subject matter, one-piece dispensing closures are not commonly found on various widely sold commercial products at the present time.

It is believed that the lack of commercial acceptability of the prior one-piece dispensing closures relates primarily to certain construction details involved with them. Many of the prior one-piece dispensing closures are designed so as to include a dependent flange located on the bottom of a skirt of a cap-like structure. Such flanges preclude the use of one-piece closures of this category with modern automatic equipment for placing closures upon containers such as bottles, cans, tubes, etc. A number of other structures have been developed which utilize various separate latch springs, etc., so as to retain a dispensing closure upon the neck of the container. Such structures are comparatively complex and because of the number of parts involved tend to be relatively expensive. Also they cannot be conveniently located on containers using established modern equipment without modification of such equipment.

A broad object of the present invention is to provide one-piece dispensing closures which constitute a decided improvement over the aforegoing and other various related types of similar structures. A more specific object of the invention is to provide one-piece dispensing closures which can be easily assembled upon projecting necks of various containers utilizing established assembly equipment without material modification of such equipment. Another object of the present invention is to provide dispensing closures which can be used with various types of fluids or liquids in such a manner that these fluids or liquids can pour through openings provided within these closures.

Still further objects of the invention as well as many advantages of it will be more fully apparent from the detailed consideration of the remainder of this specification, including the appended claims and the accompanying drawing in which:

Fig. 1 is a perspective view of a dispensing closure structure of this invention;

Fig. 2 is a cross-sectional view taken at line 2—2 of Fig. 1;

Fig. 3 is a cross-sectional view similar to Fig. 2 showing this closure in an open or pouring position;

Fig. 4 is a view similar to Fig. 2 of a modified dispensing closure of this invention;

Fig. 5 is a view similar to Fig. 3 of the modified dispensing closure shown in Fig. 4;

Fig. 6 is a view similar to Fig. 2 of a second modified dispensing closure of this invention;

Fig. 7 is a view similar to Fig. 3 of the second modified closure shown in Fig. 6;

Fig. 8 is a view similar to Fig. 2 of a third modified closure of this invention; and

Fig. 9 is a view similar to Fig. 3 of the third modified closure shown in Fig. 8.

Whenever convenient for purposes of illustration and explanation like numerals have been used in the accompanying drawing in order to designate like parts. It is to be understood that the accompanying drawing is not to be taken as limiting the invention in any respect. It is primarily intended to designate certain presently preferred constructions falling within the scope of this invention; obviously those skilled in the art will be able to provide or design a variety of differently appearing dispensing closures utilizing the essential features of this invention.

In order that the invention can be readily understood, it may be stated in essentially summary form that it involves constructions each of which comprises a container having a projecting neck formed thereon, this neck being provided with an external surface, a top, a passage extending from the top into the container through the neck, and latch means associated with this neck. Each container formed in this manner is adapted to be used with a cap which is adapted to be positioned on this neck so that internal surface of the cap engages the external surface of the neck so as to form a seal therewith. A cap used with this invention also is formed so as to include an internal top surface designed to fit against the top of the neck of the container; it is also provided with latch means designed to co-act with the latch means formed upon the container; and with at least one opening leading through the cap adjacent to the internal top surface of it.

Constructions as briefly summarized in the aforegoing are, for the purpose of this specification, termed "closures" or "dispensing closures," even though these constructions utilize means formed upon the top of a container, which means are adapted to co-act with the cap utilized. An important feature of the invention lies in the fact that the latch means employed are designed in such a manner that these latch means do not interfere with the placement of the cap upon a container neck by established assembly equipment. The latch means referred to are designed so as to limit movement of a cap with respect to a container as when a cap is moved with respect to a container so that the contents of the container may be removed from the container itself through an opening formed in the cap.

The exact natures of this invention will be more fully apparent by referring to the accompanying drawing. In Fig. 1 there is shown a construction **10** of the present invention formed on the top of a conventional plastic container **18** such as may be manufactured by various injection molding operations. This construction includes a base portion **14** from which there projects a generally cylindrical neck **16** having located on the outside thereof threads which are adapted to mate against corresponding threads formed on the internal surface of a skirt **12** of a cylindrical character forming a part of a cap **20**. This cap **20** includes an internal top surface **22** designed to bear against the top **24** of the neck **16** so that when the cap **20** is in the position shown in Fig. 2 a passage **26** leading through the neck **16** from the top **24** into the interior of the container **18** is sealed. Around the bottom of the skirt **12** there is provided a band-like ledge

28 which is connected with the end of the skirt 12 by means of a sloping wall 30 formed on the skirt 12. Projections 32 are formed on the base 14 and each of these projections includes a small corresponding wall 34 of substantially the same slope as the wall 30 and a ledge 36.

If desired, the ledge 28 and walls 30 on the cap 20 may be considered one latch means employed with this species of the invention and the walls 34 and ledges 36 formed upon the projections 32 may be considered other latch means employed with this species of the invention, inasmuch as the ledge and walls structure are adapted to be used with one another. As seen in Figs. 2 and 3 of the drawing when the cap 20 is closed, the ledges 28 and 36 are spaced from one another; when the cap 20 has been twisted to an open position as shown in Fig. 3 of the drawings these ledges are adapted to fit against one another so as to limit the movement of this cap 20.

The latch means specified in the aforegoing are designed in such a manner that the projections 32 will spring away from one another by virtue of the walls 30 and 34 hitting against one another when the cap 20 is placed upon the container 18. For this action to be achieved, it is necessary that the projections 32 be formed out of a somewhat resilient material such as for example, polyethylene. It is preferred with this invention to form the entire structure shown by injection molding at least the base 14 and all attached parts using various known thermoplastic materials of a somewhat resilient character. If desired, the base 14 may be attached or secured to various metal or other containers by various means known to the art.

In order for the construction 10 to be operative for the purposes intended, it is preferred to provide within the cap 20 at least one opening 38 which is located in the skirt 12 adjacent to the internal top surface 22. As is apparent from Figs. 2 and 3 of the drawing the neck 16 serves to seal off this opening 38 when the cap 20 is in a closed position; when the cap 20 is in an open position, the opening is exposed as a liquid may flow through it. Preferably a second opening 38 is also employed so that liquid may be poured from out of either side of the cap 20 as convenient. When two openings of this character are utilized, one of the openings will serve to permit air to enter the container 18 so as to facilitate pouring. Preferably the cap 20 is formed of such materials as polyethylene or the like which cannot be wetted by particular liquid adapted to be used in conjunction with this cap. Further, it is preferred that the openings 38 diverge from one another away from the neck 16 so as to in effect form an edge lip-type structure of a "no drip" category. When the openings 38 are located at an angle to the neck 16 they also conveniently serve as pouring spouts.

In Figs. 4 and 5 of the drawing there is shown a modified construction 40 which is similar to the construction 10. This construction involves a metal container 42 from which there extends a cylindrical neck 44 having external threads formed thereon. From the interior of the top of the neck 44 there is located a small bent-over flange 46. The upper surface of this flange 46 slopes towards the container 42. With the modified construction 40, a cap 48 is adapted to be used which includes projections 50 which are dependent from the internal top surface 52 of this cap. The cap 48 also includes a peripheral skirt 54 which is adapted to contain threads which seal against and are mated with the threads in the outer surface of the neck 44. This cap 48 also contains at least one, and preferably two openings 56 corresponding to the openings 38 previously described. The cap 43 may be conveniently formed of various thermoplastic materials such as thermoplastic materials of non-wetting nature as previously discussed.

This cap may be easily asesmbled upon the container 42 by various conventional automatic machines, etc. During such assembly this sloping surface 58 on the projections 50 abuts against the upper surface of the flange 46 springing the projections 50 inwardly until such time as the projections 50 "snap over" the flange 46. At this point walls 60 on the projections are adapted to be used in retaining the cap 48 substantially as indicated in Fig. 5 of the drawing, when this cap is twisted upon the neck 44 to an open position.

In Figs. 6 and 7 of the drawing there is shown a modified construction 62 which is substantially identical with the modified construction 40 except for one detail. With this second modified construction 62 a container 42' is formed out of glass or other similar materials in a known manner so as to include a flange 46' which is similar to the flange 46 in that it is located upon an externally threaded neck 44'. This flange 46' does not have an upper surface formed as the flange 46 but, as is necessary with glass has a curved surface serving the same purpose as the slope of the flange 46.

In the construction 62 the projections 50 are replaced by a cylindrical skirt 63 which extends from the internal top surface 52' of the cap 48'. This skirt is provided with a slot 63' which extends part of the distance along the length of the skirt 63 from the bottom thereof parallel to the axis of the skirt. The slot 63' preferably terminates a short distance away from the surface 52'. This slot 63' is primarily designed so as to permit deformation of the lower part of the skirt 63 when an external lower sloping surface 58' on this skirt comes into engagement with the flange 46' during assembly of the construction 62. As this occurs, the lower part of the skirt 63 will temporarily deform permitting the lower surface 58' to "snap over" the flange 46' so that a wall 60' on this skirt 63 can engage the flange 46' in order to limit movement of the cap 48 substantially as indicated in connection with the modified construction 40. It is noted that the lower surface 58' and the wall 60' extend substantially around the skirt 63.

The construction of the cap 48' shown in Figs. 6 and 7 of the drawing is considered to be very advantageous for many purposes inasmuch as the upper portion of the skirt 63 in essence forms an auxiliary sealing ring by fitting against the flange 46' when the cap 48' is closed. The cap 48' is longer than the skirt 63 so as to permit the initial threading of this cap upon a container 42' to serve to guide the skirt 63 into the position shown. The same size limitations are of course shown in construction 40. Here the projections 50 are shorter than the entire cap 48 for the same purpose. Either of the caps 48 or 48' may be interchanged with one another, and either of these caps may be formed of various materials, such as polyethylene of a non-wetting category.

In Figs. 8 and 9 of the drawing there is shown a third modified construction 65 of the present invention which, unlike the previous constructions of the invention, does not embody or employ threads. This construction is primarily of a "snap over" variety. It is adapted to be used with a container 66 formed of metal or similar material so as to include a neck 68 of either a cylindrical or non-cylindrical character. This neck has a uniform cross-section configuration and includes at least two symmetrically located resilient projections 70. The neck 68 may, if desired, also include a top internal flange 72 employed for sealing purposes, although this is not necessary.

The third modified construction is adapted to include a cap 74 having an internal top surface 76 adapted to resiliently engage the top flange 72 so as to form an internal seal. Around the exterior of the top surface 76 there is formed with the cap 74 as a part of it a skirt 78 which is adapted to fit tightly against the upper portion of the neck 68 so as to form a seal therewith. At the bottom of this skirt 78 there is provided another skirt 80 of larger internal dimension than the skirt 78. At the bottom of this other skirt there is provided an inwardly pointed flange 82.

This construction is designed so that the cap 76 may be snapped into position on the container 66. As this occurs the projections 70 will snap inwardly permitting the passage of the flange 82; during the subsequent movement of the cap 84 in use from a closed position shown in Fig. 8 to an open position as shown in Fig. 9 the projections 70 will serve to limit movement of the cap 74 by hitting against the flange 82. For certain purposes it may be desired to obtain an even more efficient sealing action than can be obtained by manufacturing these parts to extremely close tolerances. In this case a small resilient or similar elastomeric O ring 84 may be disposed between the other skirt and the neck 68 so as to be held under compression at all times. Such an O-ring will roll as the cap 74 is moved with respect to the neck 68.

If desired a small spout 86 may be provided so as to extend slightly from the skirt 78 adjacent to the internal top surface 76 for the purpose of providing means for removing contents of the container 66. Another opening 88 which may or may not be similar to the spout 86 should also preferably be provided on the opposite side of the cap 74 from the spout 86 so as to provide two openings which are symmetrically located with respect to one another substantially as previously indicated. Various washers, etc., can, if desired, of course be located with the cap 74 so as to aid in forming a seal although this is not normally necessary. It is noted that the top flange 72 in construction 64 tapers slightly towards the container 66 so as to permit the run-off of liquid back into the interior of this container after the construction 64 has been used for the purpose intended. This top flange also, by virtue of this construction, acts in the nature of a "no drip" type of member. The entire construction 64 can be formed of metal as shown, although it can also be formed of other equivalent materials.

Those skilled in the art to which this invention pertains will realize that various types of flange means shown with constructions 10, 40 and 62 are, in essence, latch means as indicated with respect to the construction 10. They will also realize that the projections 70 and flange 82 of the construction 64 are also co-acting latch means designed to limit the movement of a cap. All of the constructions herein shown and described may be easily assembled and used on known equipment without modification of such equipment. Further, all of the constructions herein shown and described are extremely useful for the purpose intended and they all involve the formation of a seal between a cap and a neck.

Obviously the opening sizes of the openings of the various caps of the invention shown in the accompanying drawing may be varied within wide limits as desired. Further, these openings need not have any particular configuration. Thus, for example, for certain types of materials slot-like or oblong openings will prove more advantageous than conventional circular openings. The slant hole or opening construction shown is considered to be best in obtaining a "no drip" action when caps of this invention are formed out of appropriate materials which are not wetted by liquids which are designed to be passed through these caps. In many cases, however, conventional holes extending through the caps at right angles to the axes of them will achieve substantially the same results. Obviously any of the caps of the invention can be provided with spouts extending from the holes shown. Such spouts are not, however, considered advantageous inasmuch as they preclude the use of caps of this invention in an automatic assembly machine of an established category. It is specifically noted that the constructions such as are snown in Figs. 4 through 7 of the drawing can be readily applied to such equipment with the modification thereof.

Because of the fact that a wide variety of different constructions can be readily manufactured utilizing the essential features of this invention, the invention itself is to be considered as being limited only by the appended claims and these claims are to be interpreted in the light of patent doctrine of equivalents.

We claim:

1. A closure structure of the class described which includes: a container having a projecting neck formed thereon, said neck being provided with an externally threaded surface, a top, a passage extending from said top into said container through said neck, internally located flange means extending into said passage at the top of said neck; and a cap positioned upon said neck of said container, said cap including an internally threaded surface engaging said externally threaded surface of said neck so as to form a seal therewith; an internal top surface designed to fit against said top of said neck so as to form a seal therewith, latch means extending from said internal top surface into said neck, said latch means and said flange means both having sloping surfaces adapted to engage each other when said cap is being placed upon said neck so as to cause temporary deformation of said latch means, permitting said latch means to "snap-over" said flange means, said latch means being adapted to engage said flange means so as to limit movement of said cap with repect to said container, and at least one opening located leading through said cap adjacent to the top surface thereof, said opening being designed to be used in removing the contents of said container when said cap is moved so as to space said internal top surface from top of said neck.

2. A closure structure defined in claim 1 wherein said latch means comprises: projections capable of deformation when engaged by said flange means during the positioning of said cap upon said neck, said projection including surfaces designed to engage said flange means so as to limit movement of said cap with respect to said neck.

3. A closure structure as defined in claim 1 wherein said latch means comprises a cylindrical skirt formed on said cap so as to extend from the internal top surface of said cap, the bottom of said skirt being slotted so as to permit deformation thereof.

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