

Oct. 22, 1968

R. H. PARK
CONTAINER CLOSURE

3,406,875

Filed June 8, 1966

2 Sheets-Sheet 1

FIG. 1.

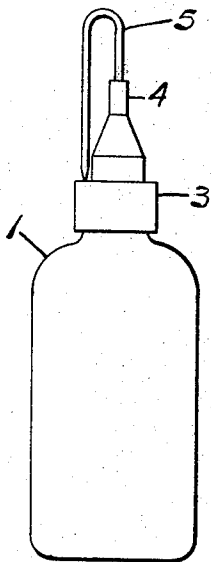


FIG. 2.

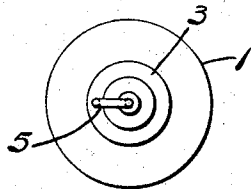


FIG. 3.

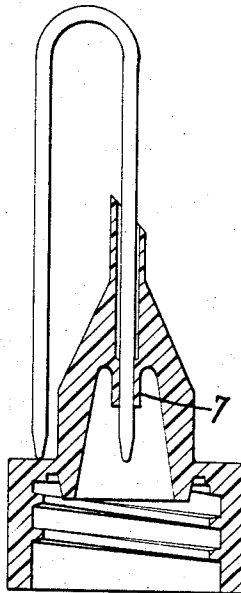


FIG. 6.

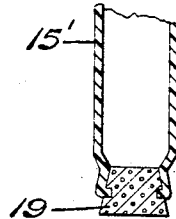


FIG. 7.

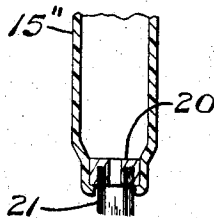


FIG. 4.

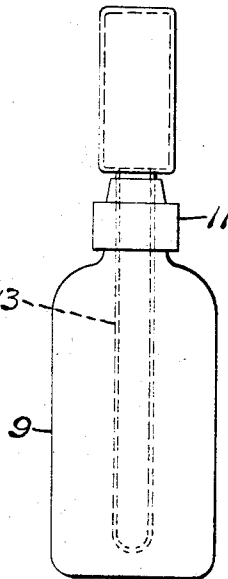


FIG. 8.

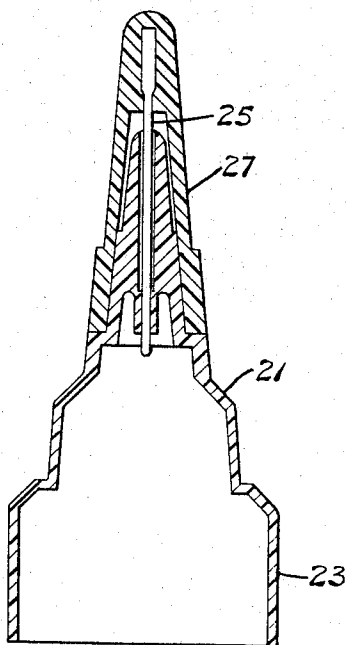
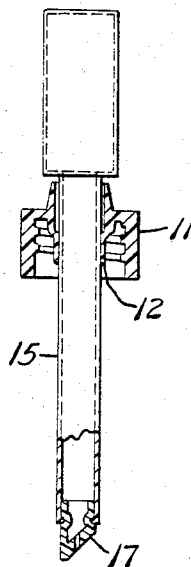


FIG. 5.



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FIG. 9.

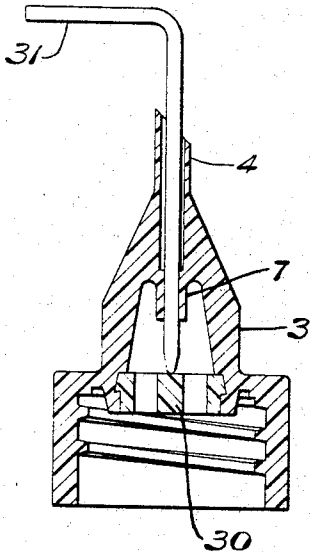


FIG. 10.

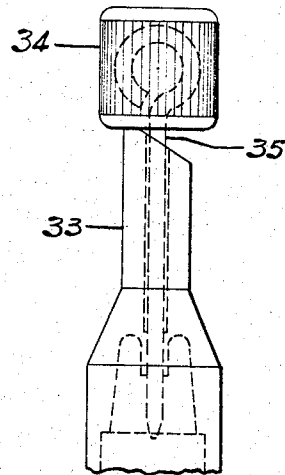
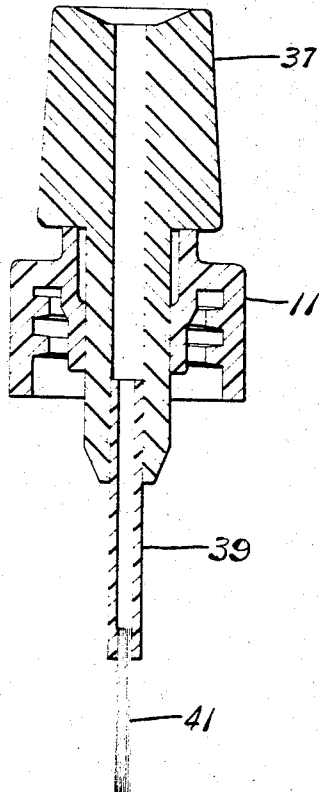


FIG. 11.



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CONTAINER CLOSURE

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Continuation-in-part of application Ser. No. 342,032,
Feb. 3, 1964. This application June 8, 1966, Ser.
No. 556,078

5 Claims. (Cl. 222—151)

ABSTRACT OF THE DISCLOSURE

A two part closure cap assembly for a container. One part is a cap which may be attached to the containers. An opening is formed through the cap and a tubular extension at the inside of the cap. The opening may be closed by a rod-like member fitting closely within the opening.

This invention relates to closures for containers and comprises a continuation-in-part of my co-pending application Ser. No. 342,032, filed Feb. 3, 1964 now United States Patent 3,255,925, dated, June 14, 1966.

The above application discloses a container and closure wherein a thermoplastic tube is secured into a wall portion of a tubular, baglike or other thermoplastic container element in such manner as to provide a passageway for the discharge of the container contents. A metal or plastic plug fits within the tube to close the same and it is an aspect of the invention that the inner end of the tube extends into the interior of the container whereby the periphery of such inwardly extending portion is exposed to such pressure as may be present or may develop within the container.

The present invention utilizes this concept of the prior application by incorporating the same in a screw-on or other type container cap structure which is adapted for production by injection molding, and also includes the concept of employing a dispenser type plug which can be either in the nature of a dropper or of a swab type applicator.

In particular, the applicator may comprise a tube with a porous or perforated plug at one end, and a squeezable bulb at the other end, whereby material such as an adhesive or other fluid within the container may be sucked into the tube, and the tube removed with the benefit of a wiping action along the walls thereof, while by suitable manipulation any drip may also be sucked into the applicator. After removal from the container the contents may be dispensed by squeezing, and the tube then reinserted in the container below the top surface of the fluid, whereby to avoid drying out at the dispenser contact surface, which if it occurred would plug the tube and/or pores.

Whereas what is shown in the pending application is operative and useful, the present invention offers additional advantages in certain fields in that:

(a) production can be carried out on commercially available, high production injection molding equipment

(b) the outer end portion of the closure may be molded to any desired form, and may thereby be so designed as to afford desirable structural properties not readily attainable with the construction shown in the pending application

(c) the closure can be applied to any conventional container whether of plastic or other material.

While illustrative embodiments of the principles of the present invention are shown in the accompanying drawings and described in detail in the following specification, it is to be understood that such embodiments are by way of example only, and that the scope of the invention is not limited thereto nor otherwise than as defined in the appended claims.

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For example, the closure could be made without threads and pushed in place over an unthreaded container finish onto which it could be held elastically, with or without the benefit of shrinkage achieved as by application of heat or otherwise, or with the aid of a banding element. Alternatively, the closure may be in the form of a plug forced into an opening and held therein elastically, preferably seating against a shoulder on the plug, or the plug may be bonded to the container with a suitable adhesive or by heating the plug and the inside of a plastic container to soften the contact surfaces enough to effect a weld after plug entry.

Again, it is possible to mold the closure from material other than a thermoplastic, for example from any other type of moldable elastomeric material.

Also, the closure may be injection molded on the end of a tube, filled from the open end, and the tube open end thereafter closed by any suitable means.

In the drawings:

FIG. 1 is an elevational view of a flexible container with a dispenser type screw top into which a bent wire type of closure plug has been inserted;

FIG. 2 is a top plan view of the container of FIG. 1;

FIG. 3 is an enlarged vertical cross sectional view of the dispensing and closure elements of FIG. 1;

FIG. 4 is a view similar to FIG. 1 showing a container and closure incorporating a dropper applicator;

FIG. 5 is an enlarged fragmentary view of closure and applicator similar to FIG. 4 except that the lower end of the applicator has a perforated, flexible elastomeric plug;

FIG. 6 is a fragmentary cross sectional view showing an applicator end plug of porous material;

FIG. 7 is a similar view showing an applicator and plug comprising an annular brush molded into an annular support collar;

FIG. 8 is a fragmentary vertical cross sectional view showing a container and closure incorporating a metal plug having a plastic head molded thereon;

FIG. 9 is a view similar to FIG. 3 showing a modified stopper arrangement;

FIG. 10 is an elevational view of a modified closure structure generally similar to that of FIGS. 1-3 excepting for the stopper construction; and

FIG. 11 is a vertical cross-sectional view similar to FIG. 3 showing a further modified form of dispenser closure structure.

Turning now to a detailed description of the invention, numeral 1 denotes a thermoplastic or other flexible walled blown or other container having a threaded neck portion and a body portion which, though shown round in FIG. 2, may be of any cross sectional shape.

Numeral 3 denotes a generally flexible cap structure of a dispensing type incorporating a nozzle portion 4. In the specific embodiment shown the cap 3 is provided with molded threads to allow fluid tight application to container 1. However, alternate means of fluid tight coupling to container 1 may be used.

Numeral 5 denotes a U-shaped plug member shown with tapered and rounded ends to facilitate insertion of a leg thereof into cap 3, the other leg serving as a stop to limit the degree of entry into cap 3 as clearly shown in FIG. 3.

As shown in FIG. 3, dispenser-cap element 3 is molded with a central hole the diameter of which slightly exceeds the diameter of rod 5 except at the lower end, where a depending tubular element 7 has an interior diameter, as molded, smaller than the diameter of rod 5, whereby the tube 7 operates to resiliently grip the rod 5 and effect an air and liquid tight seal.

Also, to obtain an effective resilient seal, yet avoid

an undue force requirement in entering or removing rod 5, it is desirable that the thickness of depending tube 7 be relatively small, and that the interior diameter be only slightly smaller than rod 5, whereby the force required to expand the tube when the rod is inserted will be small.

In a specific construction which was determined to be operative and wherein a closure such as shown in FIG. 3 was molded of low density polyethylene, the diameter of rod 5 is .063 inch, while the inside diameter of tube 7 was arrived at by use of a mold mandrel also having a diameter of .0625 in the tube 7 area, and a diameter .0670 in the enlarged hole area above tube 7, to facilitate inserting and removing rod 5, the wall thickness of tube 7 being about .012 inch.

In molding the tube 7 portion of the hole a mandrel slightly exceeding .0625, i.e. .0630 may be used without losing air tightness with rod 5, thereby indicating a shrink tendency of tube 7 after mandrel removal.

This shrinking is believed to be demonstrated by the fact that with a .0625" mandrel a .0620 plug is effective but a .0613 plug is too loose and will be forced out of the closure when pressure is applied.

Whereas the foregoing data applies to mandrel dimensioning found desirable in a specific experimental production process, other dimensions and proportions may apply in other conditions of production, but it will in any case always be possible to find a set of mandrel dimensions which will give a tight but not too tight rod fit in the tube 7 section and a loose fit but with only small clearance in the zone above tube 7.

An important feature of the invention which relates to the employment of inwardly extending tube 7 resides in the fact that when pressure is generated interiorly of container 1 as by squeezing or otherwise, tube 7 is caused to grip rod 5 all the more firmly and thereby prevent rod 5 from being ejected by virtue of the forces acting on its projected inner end area. Another feature of tube 7 is that it exercises a desirable wiping action on rod 5 as the latter is removed.

It will be noted that the outer end of dispenser-cap element 3 is slanted to provide a convenient applicator surface for liquid or semi-liquid material. Alternatively, the outer end may be in the form of a wedge or inverted V, or it may be conical or merely squared off, according to the use to which the dispenser is to be put.

The embodiment of FIG. 4 comprises a container 9 which could be of plastic, glass, or metal, onto which a cap 11 is screwed, which cap may be the same as the cap likewise designated 11 in the embodiment of FIG. 5. The cap 11 is similar to cap 3 of the first embodiment in that it is provided with a thin walled tube 12 which extends toward the interior of the container. The inside diameter of the hole in tube 12 is proportional to receive the tube of a dropper 13, which, as shown, comprises a commercially available unitary dropper that has been blow molded from low density polyethylene. However, other types of dropper may be used.

FIG. 5 shows an enlarged view of a modified dropper 15 incorporating an inserted beveled, hollow elastomeric plug 17 which is perforated as by one or more holes for use as an applicator element, while plug 19 of FIG. 6 illustrates generally a porous applicator plug. The plug 19 may be produced from any of a variety of commercially available porous materials to suit conditions as to type of product that would be dispensed, as, for example, the plug may be made from household plastic sponge. As a further form of applicator, FIG. 7 illustrates an annular plug 20 into which the bristles 21 have been molded to form an annular brush.

Whereas the container-dispenser devices of FIGS. 1 to 7 are adapted to contain and dispense a variety of materials, they are considered to especially be useful in the packaging and dispensing of adhesives. Heretofore commercially produced adhesive containers in which a

plastic squeeze bottle has been provided with a valve type cap typically have been influenced by their contents, so that after being valved shut, subsequent to dispensing use, the adhesive sets up in a manner which impedes subsequent opening of the valve.

In contrast, the construction of FIGS. 1 to 3 has been found to be virtually unaffected by plastic setup effects subsequent to plug reinsertion following a dispensing operation.

The advantage of the embodiments shown in FIGS. 4 to 7 resides in part in the fact that, especially with use of glass or metal as container, and by proper choice of material of applicator construction, and also by virtue of the wiping action of the depending tube 7 on the applicator tube 15', it is possible to effectively dispense and apply viscous fluid adhesives, including mucilage, without plugging of the applicator element by virtue of the fact that this element is submerged under the surface of the container contents when the applicator is reinserted in the container after removal for dispensing and application purposes.

Another advantage residing in the employment of the dropper type dispenser shown herein is that it is easier to use than a dropper which is made integral with a screw-on cap.

FIG. 8 shows a modification of the container dispenser of FIGS. 1 to 3 wherein a dispenser head 21 is shown molded onto the end of a cylindrical plastic tube 23, while a metal pin plug 25 has been molded into a plastic dust cap 27 which also serves as a grip handle for the plug.

It is to be understood that the container of FIG. 8 would be filled in inverted position and the bottom sealed either by pinching and effecting a weld at the pinch, or by inserting a cup shaped member and welding all around to form a cylindrical base, or in any other manner.

The type of container shown in FIG. 8 is well adapted to the dispensing of lubricants, since the chance of leakage at the junction of a container and cap is eliminated where a unitary construction is employed.

The modification of FIG. 9 is the same as that shown in FIG. 3 excepting that a stop plug 30 is provided for limiting the inward movement of a stopper rod 31.

In the embodiment of FIG. 10 the closure member, designated 33, is the same as in FIG. 3 excepting that the outer applicator end thereof is flattened or cut off as shown, to serve as a stop for a knurled knob 34 which is molded at the outer end of a stopper rod 35.

In the embodiment of FIG. 11 a solid plug 37, which typically would be molded from a suitable plastic molding compound, has a plastic tube 39 inserted into its lower end which is fixed therein as with a cement or otherwise, and which is provided at its lower end with a brush 41 which may be crimped or cemented in place.

To facilitate applying torque to loosen the plug 37 prior to removal from cap 11, the grip portion of the plug may comprise a figure of revolution with a knurled surface, or the grip portion may have a smooth surface and a generally oval cross section.

Relative to conventional screw type caps provided with an integral brush dispenser, the arrangement of FIGS. 4, 5, and 11 offers a way to counter problems, in dispensing, which can arise when adhesive has been allowed to come in contact with mating thread areas and causes seizing.

I claim:

1. In combination, a receptacle having a molded outlet formation of self-sustaining plastic material for sealing the receptacle against leakage due to internal pressure, means attaching said outlet formation to said receptacle, said outlet formation having a relatively thin-walled resilient tubular extension at its inner side extending freely into the interior of said receptacle and connected with said outlet formation only at its outer end, said outlet formation also having an outer projecting portion extending exteriorly of said attaching means, an axial bore forming an outlet passage in said outer projecting portion, said out-

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let passage constituting an outward continuation of the opening in said tubular extension and being of greater cross sectional dimension than said opening, and a rigid rod-like closure member inserted in said outlet passage and said bore with said tubular extension in resilient gripping engagement with said rod-like closure element to seal the contents while permitting ready insertion and removal of said closure member.

2. A receptacle combination as in claim 1 wherein said outlet formation comprises a separately fabricated part from said receptacle and is connected thereto.

3. A receptacle combination as in claim 1 wherein the inner end of said rod-like closure comprises material applicator means.

4. A receptacle combination as in claim 1 wherein said rod-like closure comprises a tube having an enlarged squeeze-bulb formation at its outer end for withdrawing material from said receptacle and dispensing the same.

5. A receptacle combination as in claim 4 wherein the inner end of said closure tube has a restricted dropper-type opening.

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