United States Patent [19]

Herzig

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[45] **July 23, 1974**

[54] **AUTOMATIC CLOSURE FOR CONTAINERS**

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[52] **U.S. Cl.** **222/212,** 222/494
[51] **Int. Cl.** **B65d 1/32**
[58] **Field of Search** 222/212, 494, 213

[56] **References Cited**

UNITED STATES PATENTS

2,904,225	9/1959	Earles, Jr.	222/494 X
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Primary Examiner—Stanley H. Tollberg
Attorney, Agent, or Firm—Herzig & Walsh

[57] **ABSTRACT**

This invention is an improved automatic closure for squeeze bottles or the like, tubes, or containers of the type formed from flexible or semi-rigid, flexible material such as polyethylene or semi-rigid polyvinyl chloride having properties of resilient flexibility. The container is provided with a preferably tapered neck portion terminating in end lips which form an openable closure which is elongated. The material adjacent one or both of these lips is preferably formed with a deformation or set so that when portions of tapered side edges are sealed together, they provide the closure which is opened by pressure digitally exerted on the container and closes on release of pressure.

7 Claims, 7 Drawing Figures

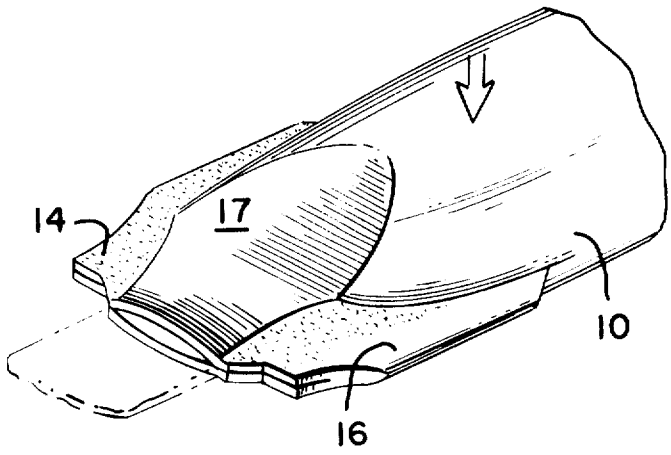


FIG.1

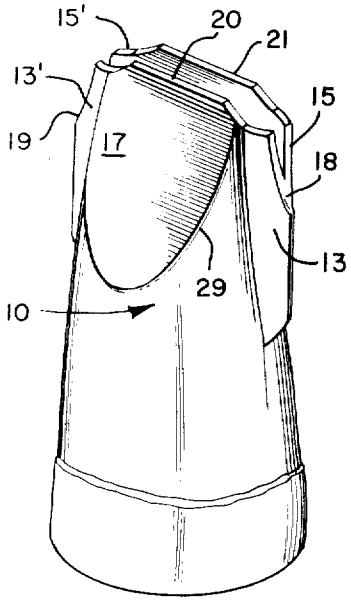
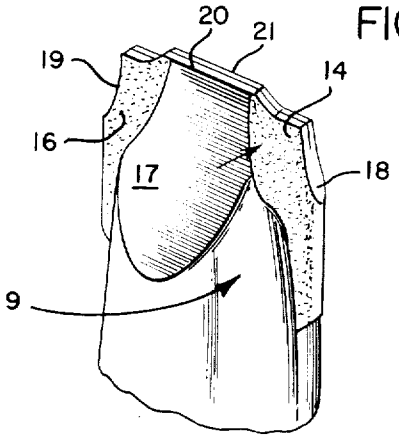


FIG.2



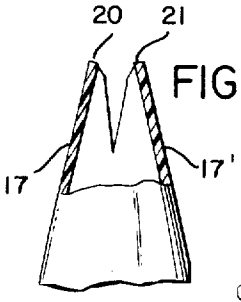


FIG.3

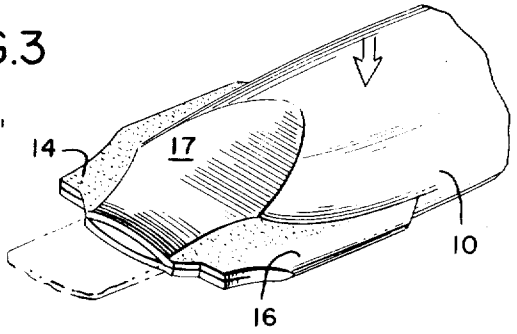
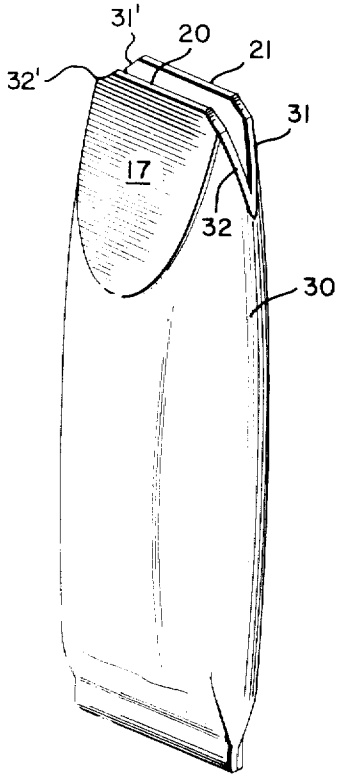


FIG.4

FIG.5



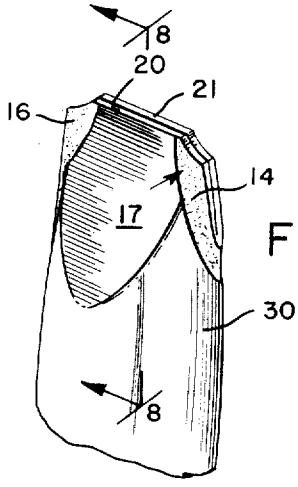
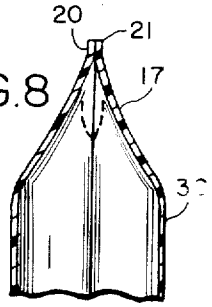


FIG.6

FIG.8



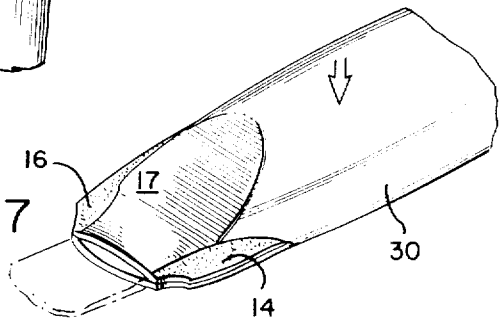


FIG.7

AUTOMATIC CLOSURE FOR CONTAINERS

SUMMARY OF THE INVENTION

This invention is an improved automatic closure for semirigid, flexible squeezable containers having the resiliently flexible characteristics of polyethylene or semi-rigid polyvinyl chloride. The invention is an improvement over that of U.S. Pat. Nos. 2,753,091; 2,815,150; 3,315,849; 3,451,120; and 3,469,478. In the background patents referred to, the containers shown have a neck portion with an automatic closure at the end of it. Typically, the side edges or side portions of the neck are flattened and joined, being heat sealed together.

It was discovered that an improved automatic closure could be created in a simple, effective way without the application of a separate stiffening or stretching member to the neck portion of the automatic closure as heretofore sometimes advantageously used with more rubbery or elastomeric materials such as rubber or plasticized vinyl, by the use of a stiffer, more self-supporting, but nevertheless springy or resilient material of the nature of polyethylene in the manner described in detail herein.

Also, using the method of heat sealing described herein and the particular polyethylene materials referred to or their like, a satisfactory automatic closure can be formed merely by incorporating a particular inherent set or deformation in the material at one or both sides of the neck of the container, i.e., the lips, to hold the surfaces together at this point, except when manual pressure is applied to force contents out of the container or optionally, by preforming a set or deformation in or at the neck of the container and sealing together side portions of the neck including at least a part of the area of the deformation.

A primary object is to realize an openable closure by way of the inherent set formed in at least one of the lips.

Another object is to provide an improved automatic closure for squeezable containers comprising a neck having tapered side edges or parts sealed together to from an openable outlet having opposed lips either one or both of which is advantageously provided with an inherent set so that these lips normally are held against each other to provide a closure, except when manual or the like pressure is applied to the contained material. A corollary object is to realize a closing force in the closure by way of having a sealed together area that overlaps the deformation or set.

BRIEF DESCRIPTION OF THE DRAWINGS

Further objects and additional advantages of the invention will become apparent from the following detailed description and annexed drawings, wherein:

FIG. 1 is a perspective view of a preferred form of automatic closure of the invention prior to sealing of the side edges;

FIG. 2 is a view similar to FIG. 1 with side edges sealed;

FIG. 3 is a longitudinal sectional view of the container of FIGS. 1 and 2;

FIG. 4 illustrates utilization of the container of FIGS. 1, 2, and 3;

FIG. 5 illustrates a modified form of closure before sealing of the side edges;

FIG. 6 is a view of the container of FIG. 5 with the side edges sealed;

FIG. 7 illustrates utilization of the container of FIGS. 5 and 6; and

FIG. 8 is a partial sectional view taken along line 8—8 of FIG. 6;

DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. 1 shows a preferred way to achieve positive closing pressure by tension or stress on the adjacent closure lips without changing the straight line slit appearance at the end of the tubes as shown in FIG. 2.

In the first embodiment, the container if formed from a material such as polyethylene having a suitable degree of springiness or resiliency but having such a degree of stiffness that stand-up type of bottles or containers are customarily made from it. Such containers can be formed by any suitable method such as blow molding or the like, preferably with tapered neck and side edges.

In the invention as described, the tapered side edges of the neck are optionally molded in an integral blank or in halves or blanks bonded together as aforesaid along their edges. In either event, the sides of the mouth define separated edges which when pressed together and when sealed, form the outlet. The deformation is formed on one or both sides of the neck, i.e., one or both lips, and may be impressed or formed on one or both sides of the neck by a heated forming die or in the process of forming the blank. The deformed surface merges with the tube or container body **10**. FIG. **1** shows the relative positions of the edges with the sides of the neck being brought together but prior to heat sealing.

For example, if the container is blow molded, the body of the container (including any desired bottom, presealed or not) is formed in a conventional manner which may provide integral blanks for the lips of the closure. However, the banks are each advantageously formed with the inherent set as will be described. In the sides of the container adjacent the ends of the lips **17** are flattened tab areas **13–15** and **13'–15'**.

Edges **13, 15, 13'**, and **15'** which are in the form or tabs are sealed together whereupon the end of the neck appears as in FIG. **2** with the sealed areas held contiguously or flush against each other, as identified at **14** and **16.** Thus, when the flattened side tabs are compressed together and sealed in a flat plane, i.e., as viewed in FIG. **2,** they inherently maintain a closing bias on the outlet.

Either one (or both) of the lips is preformed with a set provided by a deformation **17** shown in FIGS. **1, 2,** and **3** before sealing and closing along tapered edges **18** and **19** of the tapered neck of body **10.** Such set is readily accomplished during the blow molding or other such forming of tube **10** itself. The set as shown in the exemplary embodiment is simply a flattening of the rounded tapered side portions. Areas **17** and **17'** designate deformed flattened areas adjacent lips **20** and **21.** In this manner, it is possible to place the adjacent lips under any desired closing tension or stress by selection of materials of varying degrees of flexibility and rigidity and various wall thickness and/or curvature. The manner of sealing along the tapered edges is described in detail hereinafter.

Numeral **20** identifies the boundary of the deformation or permanent set area **11.** Sealed areas **14** and **16** overlap this boundary. The boundary itself is flattened giving rise to a stress in the material of lip **20,** urging it against lip **21** and resisting deformation away from that lip. The resulting outlet can then be straight or it may have different degress of curvature depending upon whether one or both lips **20** or **21** are initially deformed. In either event, the contents extrude through the outlet under sufficient digital pressure applied to container body **10** shown in FIG. **4.**

An alternative construction reflected by container **30** is shown in FIGS. **5–7.** Container **30** is similarly formed having a tapered neck or upper part, but of material of the nature of soft rubber or plasticized polyvinyl having less stiffness than polyethylene and its like. In FIGS. **5** and **6,** flattened tabs **13–15** and **13'–15'** are omitted, nevertheless areas **14** and **16** being pressed flat and sealed or bonded. When bonded or sealed as in FIG. **6,** the closure opens in response to digital pressure. When portions adjacent the tapered edges **31–32** and **31'–32 8** are heat sealed as shown, a closure as illsutrated in FIGS. **6** and **7** results. FIG. **5** illustrates one way of forming the bottom of the container.

In FIGS. **1–7,** the outlet walls (lips) are flat and merely in touching contiguity with one another when viewed from the top. The straight walled or flat closure thus provides an adequate closing pressure for most liquid contents of a collapsible type of container or squeeze tube which is intended to be laid on its side. But in some cases as in a stand-up bottle, it is adequate to provide a dust proof closure since the lips of the opening are in straight line in closely contiguous or touching relationships from edge to edge, though unstressed. Thus though preferably used for a stand-up type container, it can be used as one which is intended to be laid on its side or hung upside down if the contents of the tube are not under pressure and are relatively viscous and the lips flexible but sufficiently rigid. Otherwise, positive closure pressure is required.

From the foregoing, those skilled in the art will readily understand the nature of the invention and the manner in which it achieves the objects and advantages as set forth in the foregoing.

The herein disclosure of representative forms of the invention is intended to be illustrative, the invention to be accorded the full scope of the claims appended hereto.

What is claimed is:

1. In a container made of a resilient material and having an openable closure adapted to open for dispensing contents of the container in response to the application of pressure to the container, the closure comprising lips formed of side portions of the container which in closed position are juxtaposed against each other and held together in sealing relationship, the container having a curving cross sectional contour and having portions which are sealed together adjacent to the ends of the lips, the material of the container adjacent to at least one of the lips having a permanent set in it, the permanent set constituting a deformation in the surface of the material, there being a boundary between the deformation and the normal curved contour, the sealed together area of said portions of the container overlapping said boundary whereby the material of the deformation of the one lip is stressed so as to be held in firm sealing engagement with the other lip.

2. An article as in claim **1,** wherein the container has a rounded configuration, said deformation being constituted by flattening of one side wall portion of the container adjacent to a lip.

3. An article as in claim **1,** wherein said portions of the container which are sealed together are constituted by material which extends outwardly laterally on opposite sides of the container from the body thereof so that when sealed, opposite sides of the container at the ends of the lips extending away from the lips are held sealed together.

4. An article as in claim **1,** wherein the boundary defined between said deformation and said curved surface contour of the container is a curve.

5. An article as in claim **2,** wherein the boundary defined by said flat deformation and said curved contour of the container is a curve.

6. An article as in claim **1,** wherein said side portions of the container which are held together in sealing realtionship are tapered at their lateral edges.

7. An article as in claim **1,** wherein the materials of the container adjacent both of said lips have permanent sets therein, each defining a bouundary between the deformation and the normal curved contour of the container and the sealed together area of said portions of the container overlapping said boundaries whereby to stress the material of the deformation of both lips in a manner to cause them to normally be held together in firm sealing relationship.

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