April 25, 1967 A. M. HERZIG 3,315,849

CLOSURE FOR COLLAPSIBLE TUBE

Filed Sept. 15, 1965

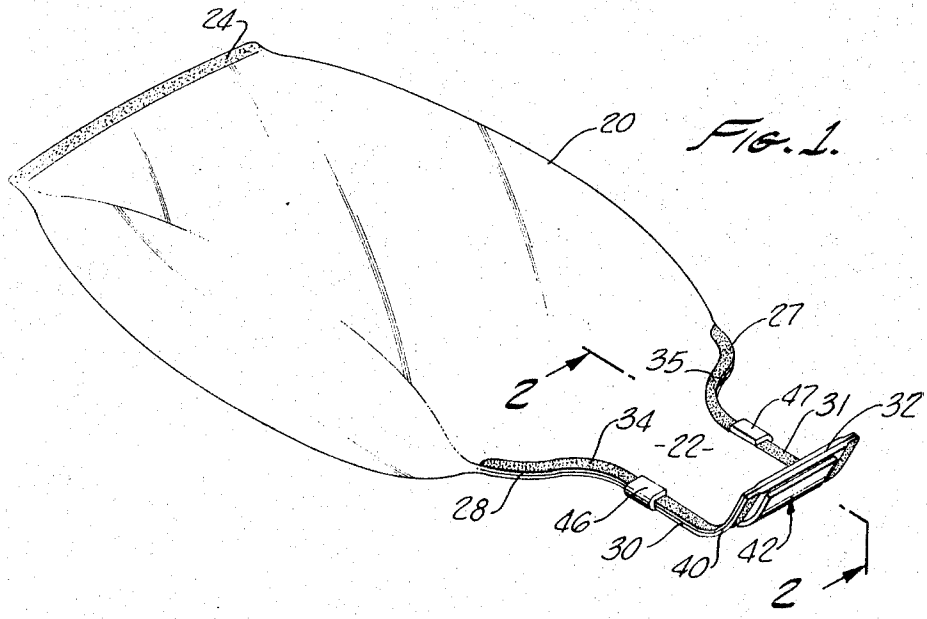
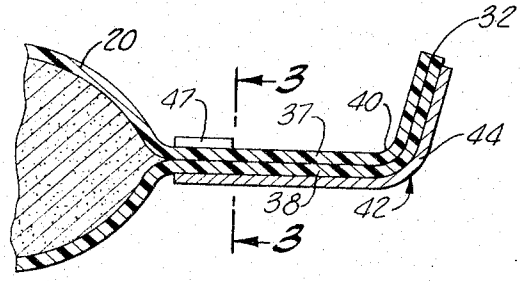


FIG. 1.

FIG. 2.



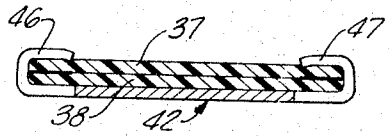
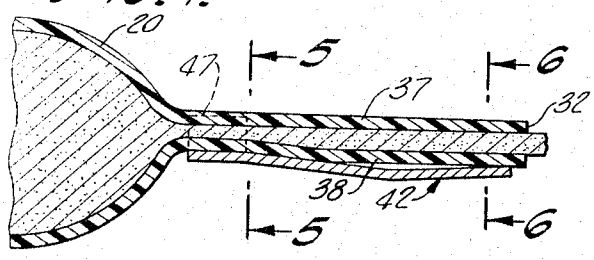


FIG. 3.

FIG. 4.



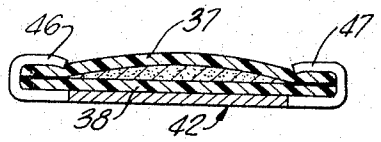


FIG. 5.

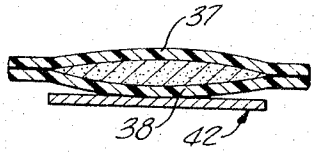


FIG. 6.

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CLOSURE FOR COLLAPSIBLE TUBE

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This invention relates to collapsible tubes or containers such as squeeze bottles incorporating automatic closure means. The closure means is formed as a part of the neck of the bottle which is resilient at least in part. It is conceivable that the closure means referred to might be used with a rigid container as well as a collapsible one. The automatic closure means might be integral with the container but might also optionally be separate.

The present invention is an improvement on my prior inventions shown in U.S. Patents Nos. 2,753,091 and 2,815,150.

The primary object of the invention is the provision of new and improved automatic closure means for containers of the type referred to. The invention particularly has among its objects the provision of new and improved removable sealing or closing construction for squeezable containers of the polyethylene type including polyvinyl and the like flexible or elastomeric types.

It is another object of the invention to provide improved sealing construction as referred to which is of a simplified and inexpensive type, but yet easy to fabricate and to produce.

It is a further object of the invention to provide a sealing structure characterized in that a flexible relatively flat neck is used and wherein the closing seal is effected simply by means of a bend or kink in the neck portion.

A further and correlated object is to provide such a sealing and closure device wherein a relatively solid or rigid member having a permanent set is used to produce the bend or kink in the neck of the closure. The construction is such that the seal will open and release extrudable material as a result of pressure on the container. The pressure of the material is sufficient to cause the member having a permanent set to straighten out which removes the bend or kink in the flattened neck portion. In this manner, an extremely effective but simplified closure device is provided using a minimum of parts and material. It should be understood that the container may be of any conventional type of material such as metal, e.g. aluminum or the like, such as commercially available for tooth paste, face cream, ointments, cold cream lotions, and other cosmetics.

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 collapsible tube embodying a closure device constructed in accordance with the invention;

FIG. 2 is a cross-sectional view taken along the line 2—2 of FIG. 1;

FIG. 3 is a sectional view taken along the line 3—3 of FIG. 2;

FIG. 4 is a sectional view of the closure device of FIGS. 1 and 2 in position for extruding material from the tube;

FIG. 5 is a sectional view taken along the line 5—5 of FIG. 4; and

FIG. 6 is a sectional view taken along the line 6—6 of FIG. 4.

Referring more particularly to the drawings, there is shown by way of example, but not of limitation, a collapsible bag 20 which may be used for containing oil or any other similar substance capable of being extruded through an opening as a result of pressure on the bag or sack. By way of example, the bag may initially be

formed of a piece of tubular material which may be any of various materials previously referred to such as polyethylene, polyvinyl or rubbery, or other similar materials. The bag has a narrowed neck part as designated at 22. The neck part is shown as being flat and with an additional part which provides the closure device for the bag as will be described presently. The material of the bag has an appropriate degree of flexibility or resiliency which will be referred to again presently. The tubular material from which the bag is formed may initially be round in cross-section or may have some other shape as desired. The material of the bag is heat-sealed or otherwise sealed together at one end as designated at 24 to close that end. As previously pointed out, the neck of the bottle is narrowed at 22, the neck being joined to the main body of the bag by rounded shoulders as shown at 27 and 28. The end part of the neck in the form of the invention shown has straight side walls as shown at 30 and 31 and is straight across the end as designated at 32. The edge portions of the neck are secured together by being heat-sealed or other means of sealing providing zones of fusion similar to the zone at 24 as designated at 34 and 35. The upper and lower portions of the material of the neck are contiguous to each other or in contact as shown at 37 and 38 in FIG. 2. These figures and FIG. 3 illustrate the relative positions of the upper and lower parts of portions of the neck of the container when it is sealed. Although the container is preferably formed as illustrated and described with reference to FIGS. 1, 2 and 3, a similar configuration or optionally different configuration may be obtained by molding of the container in a rounded or cylindrical or other form starting with a continuous tube or optionally making the container from separate pieces of material. It will be understood that the container may be made of any shape and might even be rigid, but having a neck portion embodying a closure means attached to it.

The neck part of the container may have various dimensions in respect to its width and length all within the scope of the invention is further described hereinafter.

The material of the bag is made of a material having a certain degree of resiliency or flexibility whereby the as described herein can be realized. As previously stated, when the bag is closed, the neck is held in a position in which there is a bend in its as designated at 40. This bend may be in the form of a kink depending upon the exact degree of flexilibity or resiliency of the material. As previously pointed out, the material of the bag may be of vinyl plastics or other elastomers or rubberlike products which are sufficiently elastic but yet stiff enough to accomplish the desired results. The particular materials used are selected to be unaffected by any products that might be used in the container. The neck 22 of the bottle is normally held in the configuration as shown in FIGS. 1, 2 and 3 by means of a member as designated at 42. In the exemplary form of the invention as shown, this member has a bend in it, that is it has a permanent set providing a configuration as shown in FIG. 2 at 44. In the exemplary form of the invention, the member 42 is held close to and adjacent to the upper and lower layers 37 and 38 of material of the neck portion by means of tabs as designated at 46 and 47, that is, the member 42 has at its end the transversely extending tabs 46 and 47 which are shaped or bent to extend around the edges of the fused portions 30 and 31 to be more or less clipped to these edge portions in a manner simply to hold the member 42 in place. It should be understood that the structure as described is exemplary of one form of member that may be utilized by being attached to the neck or other part of the bag and having means to hold the neck part in a configuration similar to that shown where there is a bend or kink in the material of the bag. The

relative resiliency or texture of the material of the bag is such that the bend or kink 40 in the neck portion holds the material of the upper layers 37 and 38 together sufficiently tightly that normally the extrudable material in the bag or other container cannot escape. In other words, the bend or kink provides a sufficient closure to retain the contents of the bag. The angle of bend 44 in the member 42 may vary depending upon the material of the bag and the contents to be held therein. The member 42 has a permanent set, but it is sufficiently resilient that it can fairly readily straighten out to relieve the neck part of the kink or bend. The member 42 may be made of different materials such as metal or plastic or other materials which can be given a permanent set but yet which are able to straighten without the application of a great deal of stress.

FIGS. 4 and 5 show the open position of the closure device. In this position, pressure has been applied to the flexible or collapsible bag tending to force the extrudable material out of it. This pressure exerts a force on the material of the upper and lower layers 37 and 38 adjacent the position of the member 42 at which the tabs 46 and 47 are located. The pressure is sufficient to cause the upper layer 37 to belly or bow upwardly, as shown in FIG. 5, allowing the material to pass between the upper and lower layers as shown in this figure. The material continues to be extruded between the upper and lower layers 37 and 38. At the position of the bend 42 in the member 44 where there is a bend or kink 40 in the material of the neck, the pressure tends to force its way between the upper and lower layers thereby exerting a force tending to straighten out the member 44 which, as has previously been explained, has a permanent set. As explained, the material of the member 42 is such that only a certain degree of force is necessary to cause it to straighten out, as shown in FIG. 4. On the other hand, the material has the quality that it would take a permanent set and that it may be straightened out with a limited amount of force, and that it will return to its normal position in which the set is present with the bend as shown at 44 in FIG. 2. Whenever the pressure in the bag 20 is released, that is, when the pressure exerted on the bag is released, the parts return to the position as shown in FIGS. 2 and 3. The member 44 in returning to its position as shown in FIG. 2, causes the material of the upper and lower layers 37 and 38 of the neck to be again brought into contact with each other so that any remaining extrudable material remaining between them is squeeed out. The device then again appears in cross-section as shown in FIGS. 2 and 3.

FIG. 6 illustrates the shape of the neck part at the line 66 when material is being extruded from the bag 20.

From the foregoing those skilled in the art will understand and appreciate the nature and characteristics of the invention and that it achieves and realizes all of the objects and advantages as set forth in the foregoing. It will be apparent that the invention is subject to a number of variations of the specific exemplary disclosure. The neck may be made so that one of the layers of material, either the upper or lower, can be less flexible to facilitate the extrusion of the material out of the closure. The member 42 having a permanent set may, as stated, be made of different materials but it might also have different shapes and might be attached in different ways to the neck, all coming within the scope and spirit of the invention, the principle being that of providing for a transverse bend or kink in the neck as described such that the material in the bag can only be forced out when pressure is applied to it. The member 42 having a permanent set might be secured to the neck or otherwise secured simply by being glued or sealed to one of the layers of flexible material. The relative viscosity and nature of the material contained in the bag will have a bearing on the size and the material of which the member 44 is made. The closure may be constructed so that only a very small pressure need be exerted on the bag to produce sufficient force to straighten out the member 42 and release the closure or seal. On the other hand, the member 42 may be made of a stiffer material requiring a greater degree of pressure necessary to produce force that will act on the bend or kink so as to straighten out the member 44. The member 44 might be applied either on one side or the other of the neck part. It will be observed that the closure member has a shape ideally adapted to having extrudable material such as toothpaste discharged from it directly onto a toothbrush.

From the foregoing, those skilled in the art will observe that the invention as described herein achieves and realizes all of the objects and advantages as stated in the foregoing as well as having many additional advantages that are apparent from the detailed description.

The foregoing disclosure is representative of a preferred form of the invention and is to be interpreted in an illustrative rather than a limiting sense, the invention to be accorded the full scope of the claims appended hereto.

I claim:

1. A container defining a flattened neck opening part formed of flexible material, the neck part when flat having front and back portions in contiguous relationship, the said portions having side edges, the material of the neck portion being sufficiently flexible that material in the container might be squeezed out between the contiguous portions, and improved resilient means providing an automatic positive closure for the container, said resilient means having a set providing a transverse bend in the neck portion for normally holding the front and back portions of the flattened neck together at the bend sufficiently tightly to prevent discharge of material from within the container, said resilient means being adapted to unbend said transverse bend and permit discharge of material through said opening as a result of pressure resulting from squeezing of the container whereby to allow discharge through the neck part.

2. A container defining a flattened neck opening part formed of flexible material, the neck part when flat having front and back portions in contiguous relationship, the said portions having side edges, the material of the neck portion being sufficiently flexible that material in the container might be squeezed out between the contiguous portions, and improved resilient means providing an automatic positive closure for the container, said resilient means having a set providing a transverse bend in the neck portion for normally holding the front and back portions of the flattened neck together at the bend sufficient tightly to prevent discharge of material from within the container, said resilient means being adapted to unbend said transverse bend and permit discharge of material through said opening as a result of pressure resulting from squeezing of the container whereby to allow discharge through the neck part, the texture of the material of the neck portion being such, and the degree of bend thereof being sufficient to create a transverse kink in the material of the flattened neck portion such that the kink forms a closure normally preventing the discharge of material from the container.

3. A container defining a flattened neck opening part formed of flexible material, the neck part when flat having front and back portions in contiguous relationship, the said portions having side edges, the material of the neck portion being sufficiently flexible that material in the container might be squeezed out between the contiguous portions, and improved resilient means providing an automatic positive closure for the container, said resilient means having a set providing a transverse bend in the neck portion for normally holding the front and back portions of the flattened neck together at the bend sufficiently tightly to prevent discharge of material from within the container, said resilient means being adapted to unbend said transverse bend and permit discharge of

material through said opening as a result of pressure resulting from squeezing of the container whereby to allow discharge through the neck part, and said means comprising a member having portions secured to a side of the flattened neck portion.

4. A container defining a flattened neck opening part formed of flexible material, the neck part when flat having front and back portions in contiguous relationship, the said portions having side edges, the material of the neck portion being sufficiently flexible that material in the container might be squeezed out between the contiguous portions, and improved resilient means providing an automatic positive closure for the container, said resilient means having a set providing a transverse bend in the neck portion for normally holding the front and back portions of the flattened neck together at the bend sufficiently tightly to prevent discharge of material from within the container, said resilient means being adapted

to unbend said transverse bend and permit discharge of material through said opening as a result of pressure resulting from squeezing of the container whereby to allow discharge through the neck part, said member comprising a flat part positioned adjacent the said flattened neck, the said member having side tabs bent around and secured to the side edges of the flattened neck part to hold the said member in position on the outside of said neck.

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