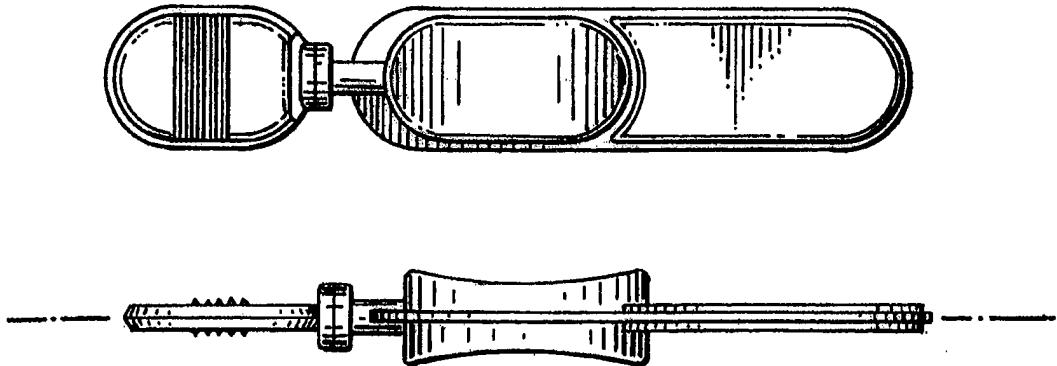




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(54) Title: SINGLE-USE FLEXIBLE CONTAINER



(57) Abstract

A single-use container (10) including: a vessel (12) for holding liquid wherein the vessel includes two opposing engagement surfaces (20, 20'), a removable seal top (16) for sealing the vessel, and a neck portion (14) interconnecting the vessel and the seal top, and wherein the improvement comprises the engagement surfaces of the vessel having a concave surface provided along the longitudinal axis of the container.

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SINGLE-USE FLEXIBLE CONTAINER

5

FIELD OF THE INVENTION

The present invention is a single-use container useful for storage and dispensing of small quantities of liquids. The subject container is particularly useful for dispensing sterile, preservative-free formulations, such as those used in single dose eye drop applications.

10

BACKGROUND

Single-use containers are commonly used for providing small quantities of sterile, preservative-free liquids, e.g. lubricating eye drops. Commercial examples of such containers are used in the following products: Dry Eye Therapy® Lubricating Eye Drops from Bausch & Lomb; Tears Naturale Free® and Bion® Tears Lubricating Eye Drops from Alcon; Celluvisc® and Refresh Plus™ Lubricating Eye Drops from Allergan; OcuCoat™PF Lubricating Eye Drops from Storz Ophthalmics; and Hypo Tears® PF Lubricating Eye Drops from IOLAB.

20 Such containers are typically molded from low density polyethylene using form-fill seal or blow-fill seal technology. The containers include: a vessel portion for containing a small quantity of liquid, (e.g. typically from 0.1 to 3.0 ml), a twist-off seal top for sealing liquid within the vessel, and a neck portion interconnecting the seal top and vessel. To dispense liquid from the container, the seal top is bent, twisted or otherwise broken from the neck. The vessel is then squeezed between the finger tips to force liquid from the vessel and through the neck portion where droplets are formed. Once the liquid has been dispensed, the container is discarded.

25 A significant drawback to current single-use containers is they are not adapted for engagement between the finger tips, (e.g. between the forefinger finger tip and the finger

tip of the thumb or other finger). That is, the outer surface of the vessel is egg-shaped, cylindrical, or wedge-shaped. As a consequence, when squeezing the vessel of current containers, the vessel tends to slip away from the opposing pressure of the finger tips. This problem is compounded with containers employing thicker vessel walls which are not easily deformed by squeezing. This situation is further compounded for persons suffering with arthritis or those otherwise having compromised hand and finger strength.

Another problem with current containers is the difficulty of removing the seal top. In order to avoid seal breakage during shipping and storage, the wall thickness of containers can be significant, thus making the seal tops difficult to remove. This problem is compounded by the small size of the seal top and its relatively smooth surface.

It is desired to provide a single-use container which provides greater ease of dispensing. It is further desired to provide such a container which is more easily opened.

15

SUMMARY OF THE INVENTION

The present invention provides a single-use container including: a vessel for holding liquid wherein the vessel includes two opposing engagement surfaces, a removable seal top for sealing the vessel, and a neck portion interconnecting the vessel and the seal top. In order to provide greater ease of dispensing, the engagement surfaces of the vessel are specifically adapted for engagement between the finger tips. More specifically, the engagement surfaces of the vessel are concave, (along the longitudinal axis of the container), thus trapping the vessel between the finger tips as the vessel is squeezed.

25 The seal top of the subject container is also provided with two opposing engagement surfaces. In order to provide a container which is easier to open, at least one, and preferably both engagement surfaces of the seal top are provided with a plurality of ridges, thus providing a surface which is easier to grip between the finger tips.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a top view of the subject single-use container;
Figure 2 is a side view of the subject single-use container;
Figure 3 is a front view of the subject single-use container;
5 Figure 4 is a rear view of the subject single-use container;
Figure 5 is a perspective view of the subject single-use container;
Figure 6 is a top view showing several container attached laterally forming a strip;
Figure 7 is a side view showing the container being opened; and
Figure 8 is a side view showing the container opened and liquid being dispensed

10 therefrom.

DETAILED DESCRIPTION OF THE INVENTION

As indicated above, the present invention is a single-use container useful for storing and dispensing small quantities of liquids. Although the subject container is particularly 15 useful for dispensing sterile, preservative-free formulations, such as those used in single dose eye drop applications, the subject container may also be used with other liquids, e.g. dyes, adhesive, medicines such as those administered orally, ear drops, nasal drops, and the like. The subject container is particularly well suited for providing introductory or promotional sample size quantities of liquids.

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With reference to the Figures, the subject container is generally shown at 10, including a vessel 12, neck 14, seal top 16, and tab 18. With most applications, the vessel 12 is designed to hold small quantities of liquid, i.e. typically from about 0.1 to 3 milliliters; however, vessels for accommodating larger quantities of liquid may be used. The vessel 12 25 includes two opposing engagement surfaces 20, 20' which are designed to accommodate the surface of one's finger tips, thus making the container easier to hold and squeeze. As best shown in Figures 2, 7, and 8, the engagement surfaces 20, 20' have concave surface (provided along the longitudinal axis A of container) which corresponds to the rounded surface of the finger tips. Consequently, the vessel 12 is self-centering between ones finger 30 tips while being squeezed therebetween, rather than sliding away as with outwardly rounded, egg-shaped, cylindrical, or wedge-shaped vessels.

The seal top 16 is relatively flat and includes two opposing engagement surfaces 22, 22' which are designed to be grasped between the finger tips. During removal, the seal top 16 is bent, twisted, and removed from the neck 14. This process is best shown in Figure 7.

5 In order to provide for greater ease of removal, at least one and preferably both engagement surfaces 22, 22' are provided with a plurality of ridges or ribs 24. These ribs 24 permit the engagement surface(s) 22, 22' to be easier grasped, (i.e. the engagement surface is less smooth), thus permitting the seal top 16 to be more easily removed. Similarly, although not shown, such ribs may be used on the engagement surfaces 20, 20' 10 of the vessel 12.

As previously indicated, the container 10 may further include a flat tab portion 18 extending longitudinally from the vessel 12, opposite the seal top 16. As shown in Figure 6, multiple containers 10 may be connected laterally by attaching the tabs 18 of each 15 container 10 to form a strip, generally shown at 26. This is usually accomplished during manufacturing wherein several containers 10 are made simultaneously, in lateral arrangement, as indicated in Figure 6. With respect to eye drop applications, strips 26 including four or five containers 10 are packaged. When needed, a single container 10 is removed from the strip 26 by grasping the tab 18 and tearing the intended container 10 20 from the strip 26.

Unlike prior art containers which include sharp corners at the end of the tab, the subject container 10 includes a tab 18 having a rounded corner, shown at 28. Thus, the subject container is less likely to catch on articles and may be easily stored in pockets of 25 clothing. Furthermore, the subject rounded end 28 of the tab 18 provides an area, best shown as 30 in Figure 6, which is not attached to adjacent containers during form-fill manufacturing. This area 30 provides a self-starting location for easing the removal of individual containers 10 from the strip 26.

Many modifications and variations of the instant invention are possible in light of the above teachings. It is therefore, to be understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described.

CLAIMS

1. A single-use container including: a vessel for holding liquid wherein the vessel includes two opposing engagement surfaces, a removable seal top for sealing the vessel, and a neck portion interconnecting the vessel and the seal top, and
5 wherein the improvement comprises the engagement surfaces of the vessel having a concave surface provided along the longitudinal axis of the container.

2. The container of claim 1 wherein the seal top comprises two opposing
10 engagement surfaces, and
wherein the further improvement comprises the seal top including a plurality of ridges provided on at least one of the engagement surfaces of the seal top.

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FIG. 1

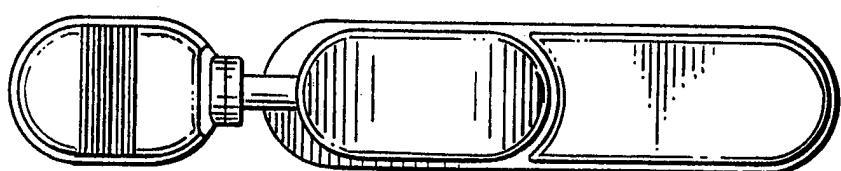


FIG. 2

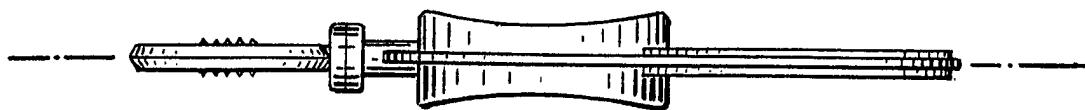


FIG. 3



FIG. 4

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FIG. 5

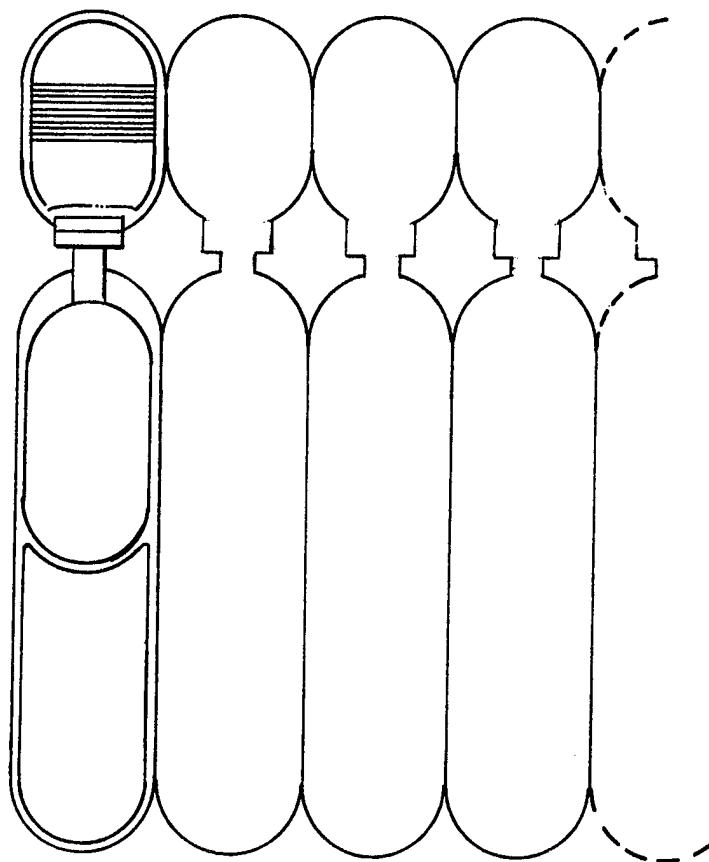
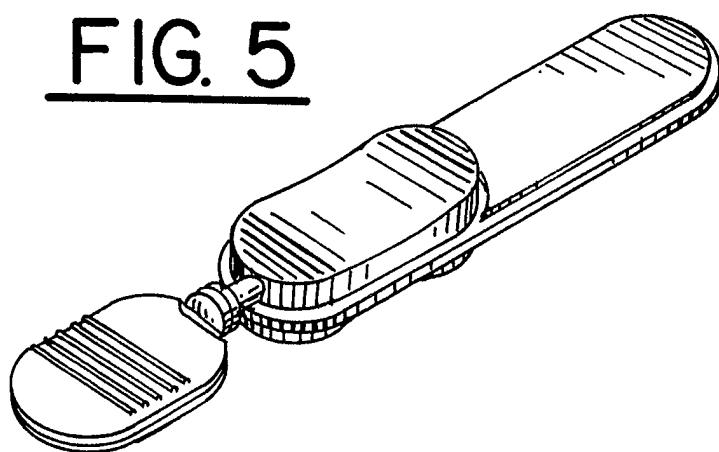


FIG. 6

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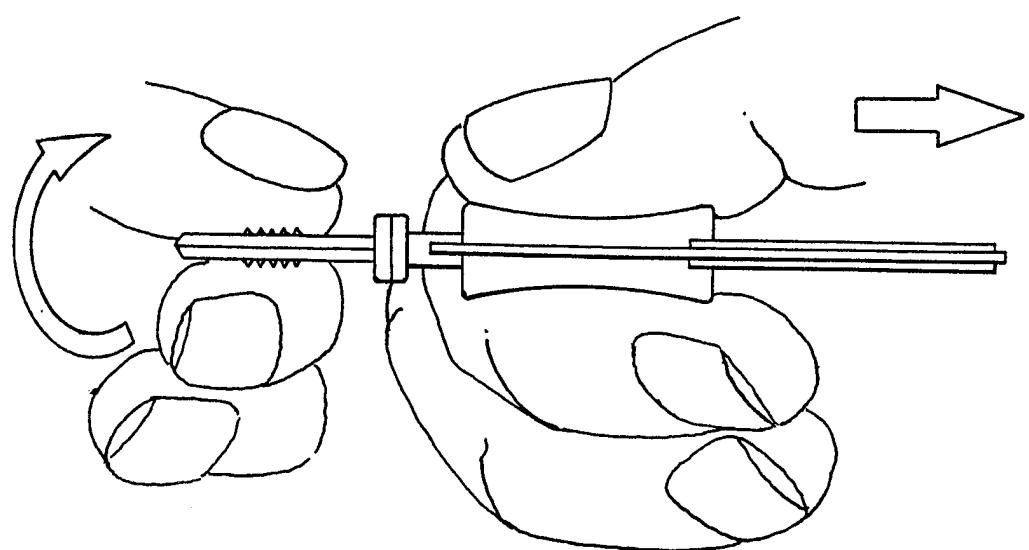


FIG. 7

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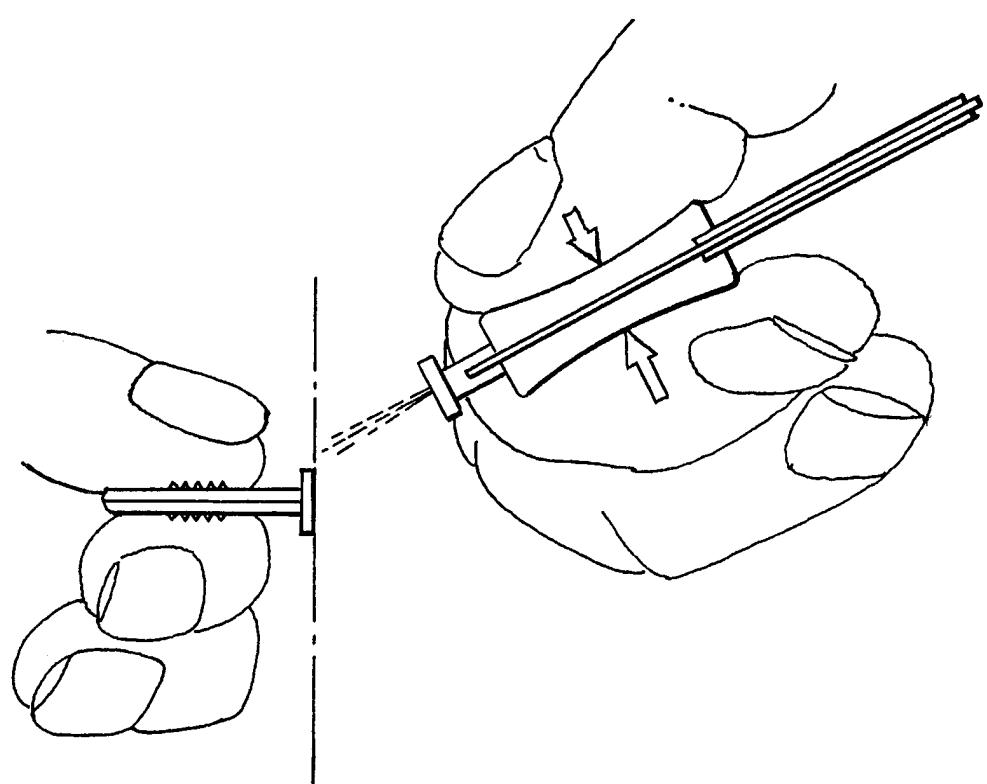


FIG. 8

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 97/21647

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 B65D1/09 A61J1/06

According to International Patent Classification(IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 B65D A61J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category ^o	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 832 056 A (HIND ET AL) 6 May 1960 see the whole document ---	1
X	FR 2 104 882 A (SMITH & NEPHEW) 21 April 1972 see page 7, line 22 - page 8, line 8; figures 2,3 ---	1,2
A	EP 0 743 057 A (SCHERER CORP.) 20 November 1996 see the whole document ---	1,2
A	EP 0 350 772 A (HANSEN) 17 January 1990 see the whole document ---	1,2
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Patent family members are listed in annex.

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