May 27, 1969

J. F. B. EVERETT

3,446,380

SEALING SYSTEM FOR CONTAINERS

Filed Aug. 29, 1966

Fig. 1

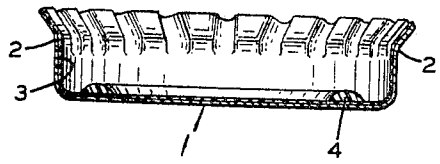


Fig. 2

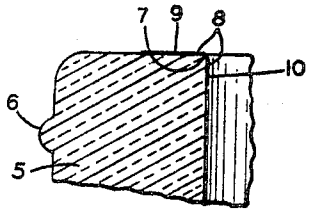


Fig. 3

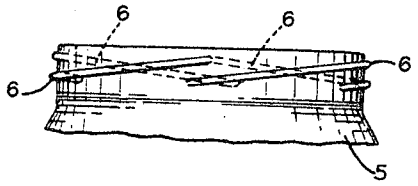
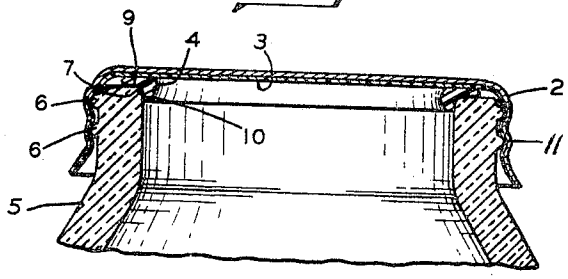


Fig. 4



INVENTOR
JAMES F. B. EVERETT

BY Theodore L. Thomas

ATTORNEY

United States Patent Office 3,446,380
Patented May 27, 1969

3,446,380

SEALING SYSTEM FOR CONTAINERS

James F. B. Everett, Lititz, Pa., assignor to Armstrong Cork Company, Lancaster, Pa., a corporation of Pennsylvania

Filed Aug. 29, 1966, Ser. No. 575,708
Int. Cl. B65d 41/08, 41/12
U.S. Cl. 215—39
4 Claims

ABSTRACT OF THE DISCLOSURE

A crimped closure on a container having a known type of neck opening but having an annular sharp corner on the inside diameter of the top annular inner lip of the opening. An annular sealing surface extends from the top of the neck across the sharp corner down inside the neck a distance of at least 1/64" from the top of the neck. The closure has a sealing gasket positioned on the interior panel of the closure, the sealing gasket pressing firmly against the sharp corner and being in continuous sealing engagement with the annular sealing surface on both the top and the inside of the neck. The closure is crimped over threads on the outside of the neck and is removable with the fingers.

This invention relates generally to a sealed container, and more particularly to a sealed container having a crimped closure thereon. Still more particularly, the invention relates to a container sealed with a crown-type closure which efficiently seals the container and yet which may easily be removed from the container, even by means of the fingers.

Bottles and other containers have been sealed with crown closures for years. In the past, these crown closures have been removed by means of a pry-off type bottle opener. To facilitate ease of opening, new types of closures have been recently described. Easy removal of such closures can be accomplished by several means. One type, known as a tear-tab, has a scored section of the crown. A suitable tab applies stress to tear the metal in the scored area and thus remove the crown. Another type provides a projection on one portion of the skirt of the crown. A finger of the hand may be used to press up on the projection and thus remove the crown. However, useful as these new crowns may be in many applications, they suffer from the disadvantage of having projecting tabs protruding from one of the crown surfaces. These projections hamper the free flow of crowns in standard capping equipment and present the possibility of inadvertent striking of the projection and thus premature opening of the container. There is therefore a need for a crown-type closure system which will allow the production of a sealed container on standard capping and bottling lines, which has no projections or other structural features which might allow premature opening of the bottle, and yet which are able to pass the stringent requirements for adequate sealing. At the same time, such containers should be readily openable with conventional pry-off tools and bottle openers, even with the fingers if desired.

It is the primary object of the present invention to supply these needs.

These objects are achieved by a surprisingly efficient and straightforward sealing system. The invention contemplates a container having a known type of neck opening, but having a sharp corner on the inside diameter of the annular inner lip of the opening. The annular interior sharp corner must have an angle ranging from a right angle to a radiused corner having a maximum radius of 1/32 inch. The neck is provided with an annular sealing surface that extends from the top of the neck across the sharp corner and down the inside of the neck a distance of

at least 1/64 inch from the top of the neck. The neck opening is sealed with a normal crown closure having a sealing gasket positioned on the interior panel of the crown, the sealing gasket being in continuous sealing engagement with said annular sealing surface on both the top and inside of the neck.

The invention will be better understood with reference to the attached drawing in which—

FIG. 1 shows a crown-type closure having an annular sealing gasket thereon;

FIG. 2 shows a sectional view of a container neck finish in accordance with the present invention;

FIG. 3 shows another view of a container neck having threads on the exterior surface of the top portion of the neck; and

FIG. 4 shows the sealing system of the present invention in which a crown having an annular sealing gasket is positioned on the container finish.

In FIG. 1, the crown there shown has a center top panel **1**, a fluted skirt **2**, a film of a sanitary lacquer **3** normally used to prevent corrosion of the crown metal, and the annular sealing gasket **4**. Materials from which the annular sealing gasket **4** can be made are well known in the art. For the purposes of the present invention, however, it is preferred to use for the annular sealing gasket the material fully described in U.S. Patent 3,171,560, the disclosure of which is hereby incorporated herein by reference. Other suitable plastic, rubber, or cork compositions may be used. For many uses, the width of the annular gasket or ring may conveniently be in the range 0.09–0.15 inch, while the diameter of the annulus or ring itself measured from the center of the mound which forms the gasket to the corresponding center 180 degrees away may conveniently be in the range 0.8–0.85 inch. The height of the annular ring may conveniently be in the range 0.03–0.04 inch. A solid disk may be positioned on the interior panel of the crown, and in that case the outer periphery will constitute the sealing gasket in continuous sealing engagement with the sealing surface on the finish.

Referring to FIG. 2, the neck **5** of a container, not shown, has a thread **6** on the finish of the neck **5**. The sharp corner **7** is part of the annular inner lip of the neck, the annular inner lip being that portion of the neck immediately adjacent the sharp corner **7**, both on the top surface and on the inside inner surface of the neck. The sealing surface **8** on the finish is comprised, in accordance with the present invention, of the top sealing surface **9** and the inside sealing surface **10**. The sealing surface **8** is shown in FIG. 2 in heavy lines extending from the top sealing surface **9** around the sharp corner **7** and down the inside sealing surface **10** of the finish of the neck of the container. The sealing surface **10** on the inside of the neck of the bottle must reach a distance of at least 1/64 inch down below the top sealing surface **9**. Preferably, the inside sealing surface **10** reaches even further to a preferred distance of about 1/32 inch. It is the extended length of the sealing surface **8**, coupled with the sharp corner **7** which so significantly improves the sealing characteristics of the sealing system of the present invention. By virtue of the very high loading achieved when the sharp corner **7** presses into the gasket **4**, with the sealing surface **8** extending to both sides of the region of high loading, a satisfactory seal is obtained which may nevertheless be easily broken with the fingers.

FIG. 3 shows a container having a neck **5** with four individual threads **6** thereon. These threads **6** are discontinuous and constitute a preferred embodiment of the present invention in order that the sealed container may more readily be opened with the fingers.

Although it is preferred that the sharp corner **7** be a right angle, the exigencies of the bottle-making art are

such that the right angle is often not achieved. The mold from which glass containers are made will have a right angle at the inner lip thereof, but the resulting bottle made in that mold more often than not will not quite reproduce the right angle. It has been found that the sharp corner **7** on the inner lip will nevertheless function in accordance with the present invention if the radius of the sharp corner is a maximum of 1/32 inch. Since the sharp corner **7** is designed to press into the annular sealing gasket on a crown to form a region of high loading, the sealing system functions better the more nearly the sharp corner approaches 90 degrees. If the sharp corner has a radius greater than 1/32 inch, the present system will not seal adequately. It is preferred, in the absence of the ability to produce a right angle at the sharp corner **7** in commercial bottle-making practice, that the radius of the sharp corner be no greater than about 1/64 inch.

FIG. 4 shows the complete sealing system of the present invention. The annular sealing gasket **4** of the crown is pressed against both the top sealing surface **9** and the interior sealing surface **10** around the sharp corner **7** which presses into and deforms the annular sealing gasket **4**, thus forming the region of high loading. The threads **6** press into the skirt **2** of the crown forming the groove **11** in the skirt **2**. The groove **11** is formed in the skirt **2** of the crown in the normal bottling and capping line when the capping head forces the crown into a sealing position and the skirt **2** is thus pushed downwardly so that it conforms generally to the shape of the exterior of the glass finish of the neck **5** and thus grips the threads **6**.

Crowns are normally made from 95-pound tin plate, and such tin plate may readily be used in the present invention. However, to aid ease of removal with the fingers, a lighter tin plate may be utilized, as for example an 80-pound tin plate. It is possible, if desired, for the cap to be replaced on threads from which the cap was removed with the fingers.

I claim:

1. In a sealed container comprising

(A) a container having a neck provided with

(1) at least one thread on the exterior surface thereof,

(2) an annular surface on the top thereof forming a top annular sealing surface, and

(3) a neck opening having an annular inner lip adjacent said top annular sealing surface, said lip having an annular interior sharp corner having an angle ranging from a right angle to a radiused corner having a maximum radius of 1/32 inch,

(4) a depending annular surface extending downwardly from said annular lip inside of said neck a distance of at least 1/64 inch from said top to provide an annular inside sealing surface, and

(B) a crown closure positioned on said neck and having

(1) a depending annular sealing gasket on the interior panel portion of said crown closure, said annular gasket having concentric inner and outer edges and being disposed so that said outer edge is located outwardly of said annular lip of said container and said inner edge of said gasket is located inwardly of and a relatively short distance from said container annular lip, said depending annular gasket being in sealing engagement with both said top annular sealing surface and said annular inside sealing surface, and

(2) a fluted skirt having a groove therein engaged with said thread.

2. A container according to claim **1** having four threads thereon.

3. A container according to claim **1** wherein said sharp corner has a radius no greater than about 1/64 inch.

4. A container according to claim **1** wherein said sealing surface on the inside of said neck extends a distance of about 1/32 inch from the top of said neck.

References Cited

UNITED STATES PATENTS

1,199,873	10/1916	Bussmann	215—39
1,722,587	7/1929	McDonnell	215—39
3,033,407	5/1962	Isele-Aregger	215—39
3,171,560	3/1965	Desch et al.	215—39
3,273,736	9/1966	Lister et al.	215—39

DONALD F. NORTON, *Primary Examiner.*

U.S. Cl. X.R.

215—40