(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 096 582**
A2

(12) # EUROPEAN PATENT APPLICATION

(21) Application number: **83303282.4**

(22) Date of filing: **07.06.83**

(51) Int. Cl.³: **B 65 D 51/14**
B 65 D 45/30

(30) Priority: **07.06.82 US 385946**

(43) Date of publication of application:
21.12.83 Bulletin 83/51

(84) Designated contracting States:
GB IT SE

(71) Applicant: **CONTINENTAL WHITECAP INC.**
2215 Sanders Road
At Northbrook Illinois 60062(US)

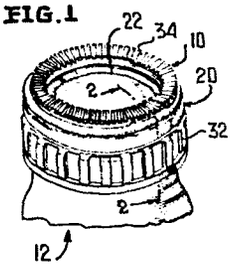
(72) Inventor: **Lecinski, Frank H., Jr.**
7546 West Argyle Street
Harwood Heights Illinois 60656(US)

(74) Representative: **Wendon, James**
METAL BOX p.l.c. Queens House Forbury Road
Reading Berkshire RG1 3JH(GB)

(54) **Composite closure.**

(57) This relates to a closure for containers wherein there is a relative twisting or rotation of the closure with respect to the container neck finish in the application and removal of the closure. In order to reduce the torque required in the removal of the closure and also to eliminate the lubricant customarily incorporated in the gasket material of the closure, the closure is of a composite construction including a ring member and a closure panel, with the ring member being so constructed as to provide for limited relative axial movement between the closure panel and the ring member. Thus, when a closure is to be removed, the initial removal torque is very low in that it is only necessary to rotate the ring member relative to the container and there is no axial force required to break the seal between the gasket material and the container neck finish. After an initial relative axial movement between the ring member and the closure panel and at a time when the ring member has mementum, the ring member engages the closure panel and moves the same axially to break the seal between the closure panel and the container with a minimal additional torque being required. This abstract forms no part of the specification of this application and is not to be construed as limiting the claims of the application.

FIG.1



EP 0 096 582 A2

0096582

COMPOSITE CLOSURE

This invention relates in general to new and useful improvements in closures for containers, such as glass jars, and more particularly to a closure which has a closure panel provided with a gasket for forming a seal with a container end finish and wherein the closure has a rotational or twist interlock with the container finish.

When a closure is of a one-piece construction, as the closure is finally applied the gasket engages the container end finish and impedes the final twist of the closure relative to the container to the sealed position of the closure. Attempts have been made to reduce the frictional engagement between the gasket and the container end finish by incorporating in the gasket material a suitable lubricant. While this aids in the application of the closure, it is always possible that this lubricant can appear on the surface or throughout the product in the form of particles or film. This is particularly true when the product is a clear juice or wine.

Further, even though a lubricant may be used in conjunction with the gasket material, when the product is vacuum packed and the closure panel is tightly retained in place on the container finish by the vacuum, during the initial removal of the closure not only is it necessary to apply a sufficient twisting torque to effect rotation of the closure, but also there must be a sufficient torque applied so as to effect the axial movement of the closure panel away from the container against the vacuum force until such time as the seal is broken.

In accordance with this invention, it is proposed to form the closure in two pieces. Two-piece closures are well known, the typical example being the well known Mason jar wherein the closure panel and the gasket carried thereby is separate and apart from the ring member. However, with the conventional Mason jar closure, after the ring member has been removed it is necessary to pry the closure panel from the container finish with the result that normally the closure panel is bent and distorted so that it can no longer be used to form a seal.

In accordance with this invention, it is proposed to provide a two-piece closure which includes, as in the case of the Mason jar closure, a ring member and a closure panel which are separately formed and wherein the ring member is relatively rotatable with respect to the closure panel both in the application of the closure and the removal thereof. However, in accordance with this invention, there is provided an axial interlock between the ring member and the closure panel wherein there is a specifically provided for permissible axial movement between the ring member and the closure panel so that when the closure is being applied the frictional contact between relative rotatable surfaces of the ring member and the closure panel will not come into play until substantially at the final rotational increment in the application of the ring member. In a like manner, and most particularly, when the closure is to be removed, only a low initial torque is required to effect rotation or twisting of the ring member relative to the container, and there is no force resisting the axial movement of the ring member relative to the container. After the initial twisting or rotation of the ring member relative to the container, detent means on the ring member will engage the closure panel and apply an axial removing force thereon. This will occur, however, at a time wherein the ring member is free to rotate relative to the container and

wherein the ring member has momentum so as to strike the closure panel and effect a driving axial removal force thereto.

In accordance with this invention, for economy purposes, the ring member may be formed of a suitable readily moldable plastic material. The plastic material also has a low surface coefficient of friction, and therefore relative rotation between the ring member and the closure panel requires minimal torque. Polypropylene is presently being utilized as the plastic material from which the ring member is formed.

It is conventional to coat metal with a suitable lacquer or the like, and the conventional coating on metal utilized in conjunction with closures is applied to the exterior of the closure panel. This coating reduces the frictional contact between the plastic ring member and the closure panel so as to reduce the torque required to rotate the ring member relative to the closure panel.

With the above and other objects in view that will hereinafter appear, the nature of the invention will be more clearly understood by reference to the following detailed description, the appended claims, and the several views illustrated in the accompanying drawings.

IN THE DRAWINGS:

Figure 1 is a fragmentary top perspective view of the closure as applied to a conventional glass container.

Figure 2 is an enlarged fragmentary sectional view taken generally along the line 2-2 of Figure 1, and shows the specific constructional details of the closure and the relationship of the components thereof to each other and to the container neck finish.

Figure 3 is an enlarged fragmentary sectional view similar to Figure 2, and shows the ring member having imparted thereto a slight degree of twisting, with the same having moved axially relative to the closure panel and the container.

Figure 4 is another fragmentary sectional view similar to Figure 2, and shows the ring member having been further rotated and having picked up and moved axially therewith the closure panel relative to the container end finish.

Referring now to the drawings in detail, it will be seen that the closure is generally identified by the numeral 10 and is applied to a conventional container generally identified by the numeral 12. The container 12, as is best shown in Figure 2, is provided with a neck finish 14 which includes lugs or threads 16 and which has a terminal or end seal finish 18.

The closure 10 is particularly constructed for scalingly closing the container 12 and is of a composite construction including a ring member 20 and a closure panel 22. The ring member 20 is preferably formed of a moldable plastic material, such as polypropylene, while the closure panel 22 is primarily in the form of a metal sheet or disk.

The molded ring member 20 includes a lower generally cylindrical skirt 24 which is joined to an upper retaining ring 26 by an intermediate corner portion 28.

The skirt 24 has formed integrally with the interior surface thereof lugs or threads 30 which are cooperable with the lugs or threads 16 of the container neck finish so as to permit a twist type locking engagement. For example, each of the lugs or threads 16 and 30 may be in the form of overlapping quarter-turn threads.

The exterior of the skirt 24 is provided with a plurality of axially extending, circumferentially spaced nibs or knurls 32 to facilitate the gripping of the ring member 20 to effect the manual twisting or rotation thereof relative to the container 12. In addition, the upper surface of the retaining ring 26 is provided with circumferentially spaced radiating nibs or knurls 34 which may engage top capper sealing belts to provide better traction in the application of the closure 10 to the container 12.

The closure panel 22 includes a sheet metal (preferably steel) panel member 36 which is provided with an external protective coating 38. The panel 36 is configurated so as to define a peripheral, annular, downwardly opening channel 40 in which there is seated a gasket 42 which is formed of a suitable sealing material. It is to be noted that in the formation of the channel 40, the panel 36 is upwardly offset as at 44 so as to define an annular upper portion 46. The panel 36 terminates in an outer peripheral depending flange 48 of a size to be snugly received within the upper portion of the skirt 24. The flange 48 is joined to the annular upper portion 46 by a corner portion 50 which is generally received within the corner portion 28.

It is to be understood that the coating 38 has a low coefficient of friction as does the undersurface of the retaining ring 26. Thus, there may be relative rotation between the ring member 20 and the closure panel 22 with a minimum of frictional resistance.

In order that the closure member 22 may remain associated with the ring member 20, the inner surface of the skirt 24 above the lugs or threads 30 is provided with detent means 52. The detent means 52 are illustrated in Figure 2 as being in the form of a plurality of circumferentially spaced detents or lugs 54, although the detent means 52 could be continuous.

It is understood that the closure panel 22 will snap past the detent means 52 due to the rounded corner 50, but the free edge of the flange 48 will not freely pass the detent means 52 in the opposite direction so as to permit separation of the closure panel 22 from the ring member 20.

It is also to be noted that the detent means 52 are spaced axially from the free edge of the flange 48 so that the closure panel is free to move a restricted distance in an axial direction relative to the ring member 20.

As will be apparent, when the closure panel 22 is assembled with the ring member 20, the annular portion 26 of the closure panel will not be in firm engagement with the underside of the retaining ring 26, but will have a certain degree of play. Thus, as the closure 10 is being applied to the neck finish 14 of the container 12, the closure panel 22 will rotate or twist with the ring member 20 until the gasket 42 engages the end seal finish 18 at which time rotation of the closure member 22 will discontinue and the ring member 20 will be free to be twisted or rotated relative to the closure panel 22 without resistance until such time as the retaining ring 26 moves axially into pressure engagement with the annular portion 46. At this time there will be some resistance to the further twisting or rotation of the ring member 20 relative to the closure panel 22, but because of the coefficient of friction of the mating surfaces of the ring member 20 and the closure panel 22, this resistance will be relatively light.

The primary advantage of the composite closure 10 is during the time of removal of the closure. As will be seen from a comparison of Figures 2 and 3, when a removal twisting or rotational torque is applied to the ring member 20, it will rotate relative to the container neck finish 14 and the closure panel 22 and, due to the relative camming action of the interengaged lugs or threads 16, 30, the ring member 20 will move axially relative to both the container neck finish 14 and the closure panel 22 until it reaches the position of Figure 3, wherein the detent means 52 engages the lower edge of the flange 48.

It will thus be apparent from the foregoing that since the closure panel 22 is not rotated with the ring member 20, it is not necessary initially to overcome the restraining torque engagement between the gasket 42 and the end sealing finish 18.

There is, however, a resistance to the gasket 42 being axially separated from the end seal finish 18. This is particularly true when the container is vacuum packed and a vacuum acts on the closure panel 22 to prevent axial movement thereof away from the container neck finish 14.

With the ring member 20 being rotated and having momentum at the time the detent means 52 engage the lower edge of the flange 48, it will be seen that only a slight additional torque is required to effect the axial movement of the closure panel 22 away from the end seal surface 18. Thus, at no time does the required removal torque reach the magnitude of that involved in conjunction with similar but one-piece closures.

Once the separation of the closure panel 22 from the end seal surface is effected, it will be seen that the closure panel 22 will be free to move axially with the ring member 20 in the complete removal of the closure 10.

Because there is no true relative rotational movement between the gasket 42 and the container neck finish 14, the previously utilized lubricant in the gasket material may be eliminated together with the deficiencies thereof.

The formation of the closure panel 22 separate and apart from the ring member 20 provides a further positive advantage. When the closure panel is integral with the ring member and the Plastosol or other gasket forming material is fixed for rotation with the closure cap skirt, as the closure cap is tightened onto a container, there is a torsional force developed in the gasket material and the closure skirt such that when the closure cap is fully applied and then released, there is an internal unwinding force which, as it relieves itself, loosens the closure cap relative to the container. By having the closure panel and gasket material formed separate and apart from the ring member and by having a very low frictional connection between the closure panel

and the ring member, it will be seen that this internal wind-up force within the closure cap is, for all practical purposes, eliminated even though the gasket material is not provided with a lubricant and has a tendency to adhere to the container finish as the closure cap is applied.

In addition, because the closure panel 22 is automatically removed by the ring member 20 without distortion, the closure panel may effectively reseal the container 12 when the closure 10 is reapplied.

It is also to be understood that the metal panel 36 may be provided with a conventional vacuum operated button feature (not illustrated).

Although only a preferred embodiment of the closure has been specifically illustrated and described herein, it is to be understood that minor modifications may be made in the closure without departing from the spirit and scope of the invention as defined in the appended claims.

CLAIMS

1. A composite closure of the type having a rotatable connection with a container neck finish, said closure comprising a ring member and a closure panel, said ring member including a skirt portion terminating in an upper retaining ring, said skirt having on an inner surface thereof rotatable locking elements wherein said ring member is securable to a container neck finish by a twisting action which axially advances said ring member, and said closure panel being received in said ring member adjacent said upper retaining ring and being rotatable relative to said ring member whereby when said ring member is twisted in the application and removal of said closure, said closure panel may remain stationary, said skirt having internal detent means retaining said closure panel within said ring member, said detent means being spaced from said upper retaining means a distance greater than the axial extent of said closure panel wherein said closure panel is free for limited movement axially within said ring member.

2. A composite closure according to claim 1 wherein at least said ring member is formed of a moldable plastic material.

3. A composite closure according to claim 1 wherein said ring member is formed of a moldable plastic material.

4. A composite closure according to claim 1 wherein said closure panel has on the underside thereof a gasket for engaging and forming a seal with a container end finish.

5. A composite closure according to claim 4 wherein said closure panel has a radially outer peripheral channel in which said gasket is seated.

6. A composite closure according to claim 4 wherein said closure panel has a radially outer peripheral channel in which said gasket is seated, said channel being generally aligned with said retaining ring.

7. A composite closure according to claim 4 wherein said closure panel has a radially outer peripheral channel in which said gasket is seated, said channel being generally aligned with said retaining ring, and said closure panel having a radially outer axially extending flange received in an upper portion of said skirt.

8. A method of removing a closure from a container wherein said closure includes a ring member and a closure panel separately formed and said ring member has a rotational interlock with said container, said method comprising the steps of applying a first twisting torque to said ring member to initiate release of said ring member from said container and to move said ring member axially relative to both said container and said closure panel, and while continuing rotation and axial movement of said ring member, axially engaging said closure panel with said ring member and axially displacing said closure panel relative to said container.

9. A method according to claim 9 wherein the initial twisting torque is a relatively low torque and said torque increases after said ring member engages said closure panel.

0096582

FIG.1

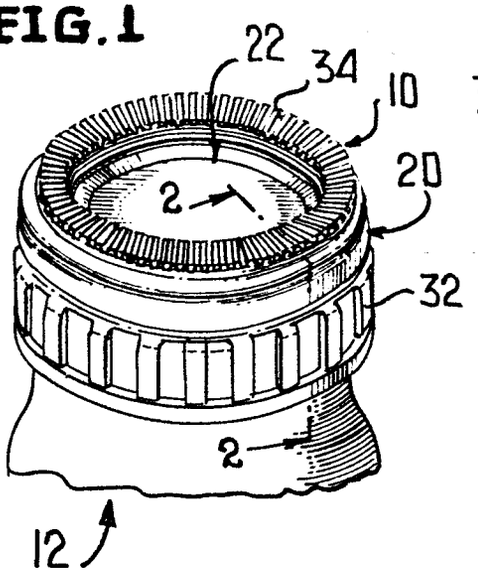


FIG.2

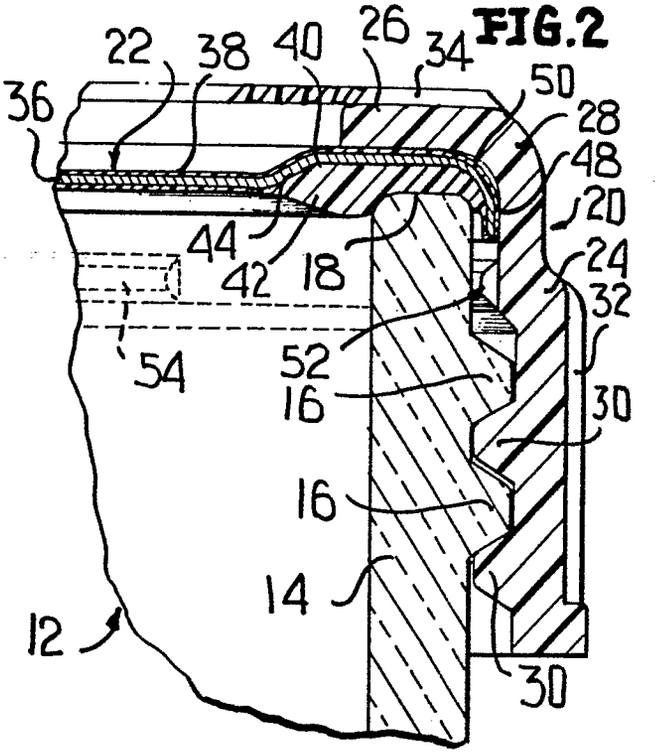


FIG.3

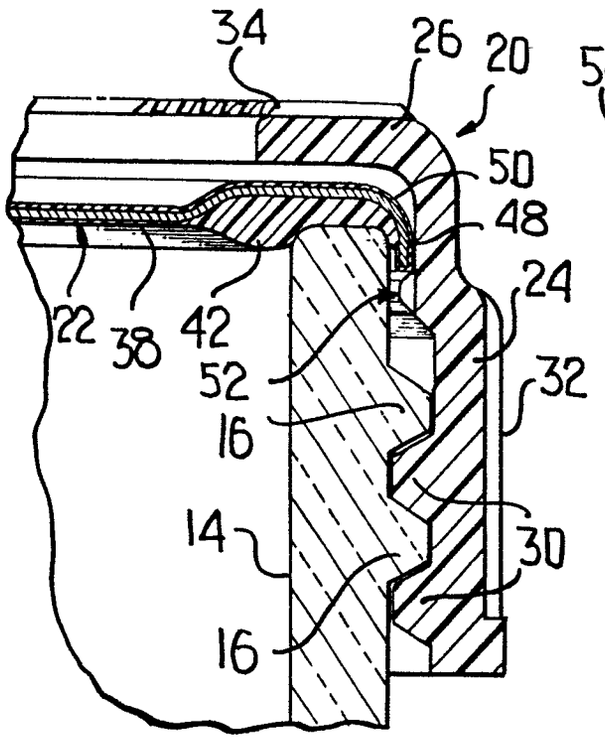


FIG.4