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**SNAP RING CLOSURE SEAL FOR  
 PLASTIC CONTAINERS**

Richard C. Allen, Glen Ellyn, Ill., assignor to Continental Can Company, Inc., New York, N.Y., a corporation of New York

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 1 Claim. (Cl. 220—60)

This invention relates to a novel snap ring closure of the type particularly adapted for sealing large mouth containers to provide an air tight seal between a closure and the container when the container is being transported to a customer or in storage.

An object of this invention is to provide a novel snap ring closure for sealing large mouth containers, the snap ring closure having a depending skirt spaced from a coaxial annular wall, the space between the skirt and the annular wall corresponding generally to the thickness of a container neck which is adapted to be inserted into the space, the skirt having a peripheral locking lug directed radially toward the annular wall for snap sealing engagement with a peripheral locking slot in an external wall of the container neck, and a locking ring overlying the skirt where-between the skirt and the annular wall of the closure is securely sealed therein with the annular wall providing internal support against the tendency of the locking ring to deform the skirt and the container neck radially inwardly.

A further object of this invention is the provision of a novel snap ring closure of the type having an end wall, a skirt depending peripherally from the end wall, the skirt being provided with an inwardly directed peripheral locking lug opposed and spaced from a depending annular wall and a locking ring overlying the depending skirt, and in addition, to provide the annular wall with a plurality of circumferentially spaced radial reinforcing ribs to provide additional internal support against the tendency of the locking ring to deform the skirt and the container neck radially inwardly.

Still another object of this invention is to provide a novel snap ring closure of the type immediately above described wherein the annular wall has an axial length at least equal to the distance between the peripheral locking lug and the end wall of the closure whereby the annular wall overlies and is spaced from the peripheral locking lug along the entire circumferential extent thereof.

A further object of this invention is the provision of a novel snap ring closure of the type particularly adapted for sealing large mouth containers having an upstanding neck including a peripheral locking slot in an external wall of the container neck, the snap ring closure including a recessed closure end wall terminating in an integral upwardly directed annular wall, the annular wall being joined to a depending skirt, the skirt having a peripheral locking lug directed radially toward the annular wall and a locking ring overlying the annular wall and the depending skirt, the junction between the recessed end wall and the annular wall being substantially radially adjacent the peripheral locking lug of the skirt thereby providing maximum internal support against the tendency of the locking ring to deform the skirt and the container neck radially inwardly.

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 claim and the several views illustrated in the accompanying drawings.

In the drawings:

FIGURE 1 is a fragmentary vertical sectional view of a snap ring closure constructed in accordance with this

invention, and illustrates a closure having a recessed end wall and a depending peripheral skirt snap sealed upon the neck of a large mouth container, and a locking ring retaining the closure upon the neck of the container.

FIGURE 2 is a fragmentary vertical sectional view of another snap ring closure constructed in accordance with this invention, and shows a closure having a depending peripheral skirt and a coaxial annular wall sealingly seated upon a neck of a container and lockingly retained thereon by a locking ring overlying a peripheral portion of the closure.

FIGURE 3 is a fragmentary transverse sectional view taken along line 3—3 of FIGURE 2, and shows a plurality of radial reinforcing ribs of the closure.

Referring to the drawing in detail, FIGURE 1 illustrates a container or bottle 3 having an integral upstanding neck 4 forming a large open mouth 5. The container 3 is particularly adapted for holding paint, but may also be used with other liquids. The container 3 is preferably constructed from a durable plastic material, such as polyethylene, or may be readily fabricated from metal.

The neck 4 of the container 3 includes a peripheral wall 6 having an inner peripheral surface 7 and an outer peripheral surface 8. A peripheral locking slot 10 is formed in the outer peripheral surface 8 of the container neck 4. The peripheral locking slot 10 is semi-circular in transverse section and is substantially one-third the depth of the thickness of the wall 6 between the peripheral surfaces 7 and 8 thereof.

A snap ring closure 11 includes a closure 12 and a locking ring 13. The closure 12 is preferably constructed from plastic material while the locking ring 13 is preferably made from an integral piece of metal. However, the closure 12 may also be constructed from a resilient piece of metal.

The closure 12 includes a recessed end wall 14 received within the wide mouth 5 of the container or bottle 3. The recessed end wall 14 of the closure 12 terminates in an upwardly directed annular wall 15 having an inner peripheral surface 16 in intimate engagement with the inner peripheral surface 7 of the neck 4. The annular wall 15 of the closure 12 is joined to and spaced from a depending peripheral skirt 17 by a peripheral connecting portion 18.

The depending skirt 17 includes an inner peripheral surface 20 in intimate engagement with the outer peripheral surface 8 of the neck 4, and an outer peripheral surface 21. The depending skirt 17 terminates in a rounded peripheral edge 22. The depending skirt 17 has an integral peripheral locking lug 23 directed radially inwardly toward the annular wall 15 of the closure 12. The peripheral locking lug 23 is semi-circular in transverse section and complements the semi-circular transverse section of the peripheral locking slot 10 in the wall 6 of the neck 4. The peripheral locking lug 23 is substantially radially adjacent the junction between the recessed end wall 14 and the annular wall 15 of the closure 12 for a purpose to be described fully hereafter.

The locking ring 13 is preferably constructed from metal and includes an inner peripheral wall 24, a peripheral end wall 25 and an integral depending peripheral outer wall 26. A free peripheral edge 27 of the peripheral inner wall 24 is flared slightly radially inwardly, while a free peripheral edge 28 of the outer peripheral wall 26 is flared slightly radially outwardly. The flared peripheral edges 27 and 28 of the locking ring 13 permit the locking ring 13 to be easily secured to the closure 12 and rapidly removed therefrom.

The locking ring 13 is preferably of the type which may be replaced on the closure 12 to reclose the container 3 after the closure 12 has at least once been removed. However, the locking ring 13 may be of the type which

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when once removed from the closure 12 cannot be re-applied thereto.

Irrespective of the type of locking ring 13 employed, it is important to note that the locking ring 13 is applied to the closure 12 to assure that the peripheral locking lug 23 remains in sealing engagement with the peripheral locking slot 10 of the neck 4. The locking ring 13 is press forced in place upon the closure 12 in the position shown in FIGURE 1. As the locking ring 13 is press forced upon the closure 12, the annular wall 15 and the recessed end wall 14 of the closure 12 provide internal support against the tendency of the locking ring 13 to radially deform the depending skirt 17 and the upstanding wall 6 of the neck 4. That is, as the locking ring 13 is forced upon the closure 12, in the absence of some portion of the closure 12 in the mouth 5 of the neck 4, the neck 4 and the skirt 17 would deform radially inwardly from the forces applied during the insertion of the locking ring 13 upon the closure 12. However, the presence of the annular wall 15 and the end wall 14 within the open mouth 5 of the container or bottle 3 precludes radial inward deformation of the depending skirt 17 and the neck 4. Because no radial deformation can occur, the seal between the peripheral locking lug 23 and the peripheral locking slot 10 is maintained air tight.

Another snap ring closure constructed in accordance with this invention is illustrated in FIGURE 2 of the drawings and is generally designated by the reference numeral 31. The snap ring closure 31 includes a closure 32 and a locking ring 33.

The closure 32 includes an end wall 34 having an annular wall 35 depending downwardly therefrom into the mouth 5 of the neck 4. An inner peripheral surface 36 of the annular wall 35 intimately engages the inner peripheral surface 7 of the upstanding wall 6 of the neck 4. The annular wall 35 terminates in a peripheral edge 37. An integral peripheral connecting portion 38 of the end wall 34 joins and spaces a peripheral depending skirt 39 to the annular wall 35. The peripheral skirt 39 includes an inner peripheral surface 40 in intimate engagement with the outer peripheral surface 8 of the container neck 4. An outer peripheral surface 41 of the depending skirt 39 terminates at a lowermost portion thereof in a rounded peripheral edge portion 42. An integral peripheral locking lug 43 is formed in the depending skirt 39, and is radially inwardly directed toward the depending annular wall 35. The peripheral locking lug 43 is of a semi-circular transverse section and is in complementary engagement with the peripheral locking slot 10 in the neck 4 of the container 3.

The locking ring 33 is preferably constructed of metal and overlies the outer peripheral surface 41 of the depending skirt 39. The locking ring 33 has an inwardly directed flange 44 overlying an uppermost portion of the closure 32 and an integral depending peripheral side wall 45 in intimate engagement with the depending skirt 39 of the closure 32. The peripheral side wall 45 of the locking ring 33 terminates in an outwardly flared peripheral edge portion 36 which enables the locking ring 33 to be more easily inserted upon and removed from the closure 32.

The depending annular wall 35 of the closure 32 provides internal support against radially directed forces of the locking ring 35 tending to deform the depending skirt 35 and the container neck 4, in a manner similar to that heretofore discussed with reference to FIGURE 1. However, a distinction between the internal support afforded by the depending annular wall 35 of FIGURE 2 and the annular wall 15 of FIGURE 1 should be apparent from a brief comparison of the respective figures. For example, the depending annular wall 35 is not supported

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internally of the container mouth 5 by the end wall 34 as is the annular wall 15 of the closure 12.

To provide additional internal support against the force of the locking ring 33, the closure 32 is provided with a plurality of integral circumferentially spaced radially extending reinforcing ribs 30 which are best shown in FIGURE 3. The reinforcing ribs 30 are integrally joined at the axis of the closure 32 to assure non-deformation of the depending skirt 39 and the upstanding wall 6 of the container 3 against radially inwardly directed forces created by the insertion of the locking ring 35 upon the closure 32. Thus, effective sealing between the peripheral locking lug 43 and the peripheral locking slot 10 is provided.

While specific embodiments of snap ring closures have been disclosed herein, it is to be understood that various modifications of the above-mentioned structures may be made without departing from the spirit and scope of this invention as defined in the appended claim.

I claim:

The combination of a wide mouth plastic container having an upstanding neck provided with a peripheral locking slot in an external portion thereof, said locking slot defining a peripherally weakened area of said neck having a thickness less than the thickness of the major portion of said neck, a removable snap ring closure secured upon said neck, said snap ring closure including a plastic closure having a depending peripheral skirt and an integral coaxial annular wall spaced from said peripheral skirt, said neck being sealingly received in the space between said skirt and said annular wall, said skirt including an integral peripheral radially inwardly directed locking lug received in sealing engagement in the peripheral locking slot of the container neck, the annular wall terminating internally of the neck in a planar end panel lying in a plane common to a plane through the locking slot and locking lug, said peripheral skirt terminating in a terminal edge axially spaced from both said peripheral locking lug and the end panel, a bight portion integrally joining the annular wall to the peripheral skirt, said peripheral skirt, bight portion and annular wall defining a generally inverted U-shaped portion of the plastic closure, a removable locking ring press forced upon said closure tending to deform the skirt and the neck of the container radially inwardly at the peripherally weakened area of the neck, said locking ring being formed of metallic material and being of a generally inverted U-shaped configuration in transverse section, and leg and bight portions of said locking ring overlyingly engaging the respective peripheral skirt, annular wall, and bight portion of said closure.

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THERON E. CONDON, *Primary Examiner.*