DOUBLE-SHELL CLOSURE HAVING AN ARCUATE GROOVE

BACKGROUND OF THE INVENTION

1. Technical Field of the Invention

The present invention relates to closures for use on containers. More particularly, the present invention relates to closures for use on containers wherein flexibility of the closure is enhanced by providing shell coring thereon.

2. Discussion of the Prior Art

Closures which "lock" onto an open end of a container neck (and thereby prevent easy access to the contents of the container) are relatively well known in the prior art, and the means by which such closures are "locked" onto their respective container necks varies widely. One such "locking" means is provided by a closure having concentric inner and outer cylindrical shells attached at first respective distal ends thereof by a continuous circular wall. The inner cylindrical shell is provided with internal threading on an inner surface thereof which is engageable with external threading provided on an external surface of a container neck. The outer cylindrical shell is provided with opposed downwardly-depending locking lugs which are engageable with mating locking lugs provided on the external surface of the container neck.

To "unlock" the closure of this style from its cooperating container neck, the outer cylindrical shell must be radially distorted sufficiently to permit the downwardly-depending closure lugs to pass outwardly beyond container neck locking lugs. Thus, the stiffness, weight and flexibility of the closure are all significant properties of the closure design which define the ease with which such radial distortion is to be achieved.

Various enhancements to closures of this general design have been proposed by the prior art, all of which attempt to maximize the strength, integrity and flexibility of the closure while simultaneously minimizing the stiffness, weight and production costs associated therewith. For example, U.S. Pat. No. 3,848,761 to Libit teaches the use of an inner cylindrical shell in combination with a separate outer cylindrical shell to permit sufficient axial distortion of the locking lugs without requiring equivalent distortion of the stiff internal threading integrally molded on an inner surface of the inner cylindrical shell. However, the use of the inner cylindrical shell requires additional material, thereby increasing the weight of the product, as well as the production costs associated therewith.

Further, various enhancements to the so-called double-shell closures, for example, such as the closure which is the subject matter of the above '761 patent to Libit, have been proposed by the prior art to reduce stiffness, material usage and production costs. The above '761 patent to Libit further teaches the use of arcuate slots provided through a top wall which joins the inner and outer cylindrical shells and reduces overall axial stiffness of the closure, thereby permitting axial distortion of the outer cylindrical wall relative to the inner cylindrical wall sufficient to "unlock" the closure from the container neck.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a closure for use on a container, wherein the closure is sufficiently rigid to prevent easy access to the contents of the container, yet sufficiently flexible to permit controlled access therein.

It is another object of the present invention to provide a closure for use on a container, wherein the closure can be manufactured through a relatively low-cost process.

A closure according to the present invention includes a top wall, an outer shell disposed towards an outer perimeter of the top wall and an inner shell disposed inwardly from and concentrically with the outer wall. The inner and outer shells depend downwardly from a lower surface of the top wall. The top wall includes a circular groove, usually continuous, therein disposed on an upper surface thereof integral with the inner shell. A pair of opposed locking lugs depend downwardly from a lower end of the outer shell and are sized to engage cooperating locking lugs provided on an exterior surface of a container. An internal thread is provided on an inner surface of the inner shell and is sized to engage a cooperating external thread provided on the exterior surface of the container.

BRIEF DESCRIPTION OF THE DRAWINGS

A better understanding of the present invention will be had upon reference to the following description in conjunction with the accompanying drawings in which like numerals refer to like parts, and wherein:

FIG. **1** is a top perspective view of a preferred closure according to the present invention;

FIG. **2** is a bottom perspective view of the preferred closure according to the present invention of FIG. **1**;

FIG. **3** is a side section view of the preferred closure according to the present invention taken along section line A—A of FIG. **2**;

FIG. **4** is a top perspective view of another embodiment of the present invention, showing a plurality of elongated arcuate grooves; and,

FIG. **5** is a top perspective view of another embodiment of the present invention, showing opposed, radially outwardly-projecting locking lugs.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to FIG. **1**, a closure **10** according to the preferred embodiment of the present invention is shown to include a top wall **20** and an outer shell **30** depending downwardly from an outer perimeter **22** of the top wall **20**. The top wall **20** includes a continuous arcuate groove **40** disposed in an upper surface **21** thereof concentric with the inner shell **60**, groove **40** defining a top wall inner portion **26** and a top wall outer portion **28**. A pair of lugs **50** and **52** project axially downwardly from a lower end **32** of the outer shell **30** opposite the top wall **20** and are sized to engage cooperating locking lugs provided on an exterior surface of a container (not shown).

With reference to FIG. **2**, the closure **10** includes an inner shell **60** depending downwardly from a lower surface **23** of the top wall **20**. The inner shell **60** is radially disposed immediately beneath and integral with the circular groove **40** (FIG. **3**). Inner shell **60** includes an internal thread **62** disposed on an inner surface **64** thereof which is sized to engage a cooperating external thread on the exterior surface of the container (not shown).

In use, a user applies inwardly directed radial forces towards an upper end of the outer shell **30** at opposed locations offset from the lugs **50** and **52** by about 90°. The inward distortion of the outer shell **30** at the locations of the applied inwardly-directed forces causes the outer shell **30** to be distorted outwardly at locations on the outer shell **30** coincident with the lugs **50** and **52**, thereby permitting the lugs **50** and **52** to overcome their respective container lugs (not shown).