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(54) **AUTOMATIC CAP/COVER LOCATORS AND ORIENTATION GUIDES**

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(57) **ABSTRACT**

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A closure device for joining a barrel and receptacle comprising a cylindrical barrel having a barrel lip at one end of the cylindrical barrel, and a barrel base at a second end of the cylindrical barrel, an outside surface having an outside diameter attaching the barrel base to the barrel lip, a plurality of substantially triangular projections disposed on the outside surface aligned along the barrel base, an annular depression adjacent the barrel lip, a cylindrical receptacle for receiving said cylindrical barrel having a receptacle lip at one end of the cylindrical receptacle and a receptacle base at a second end of the cylindrical receptacle, an inside surface having an inside diameter wherein the inside diameter is nominally equal to the outside diameter of said barrel, a plurality of substantially triangular indentations disposed on the inside surface aligned along the receptacle base having a reciprocal shape to the triangular projections disposed on the outside surface along aligned along the barrel base, and an annular bead adjacent the receptacle lip.

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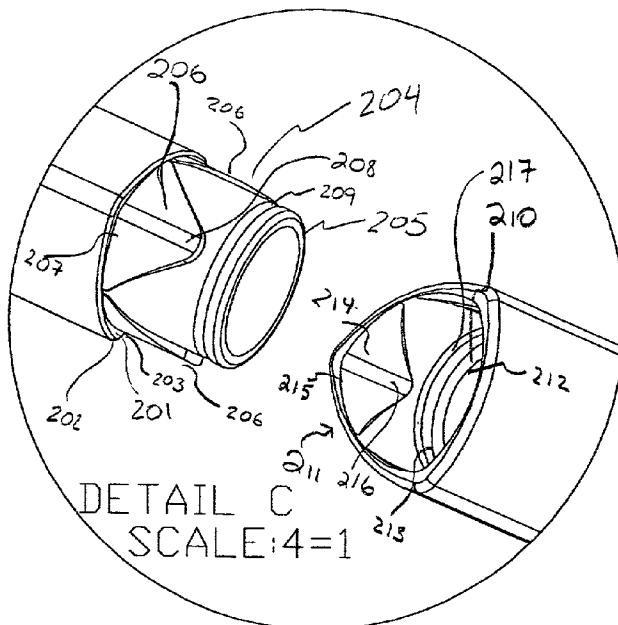
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Publication Classification

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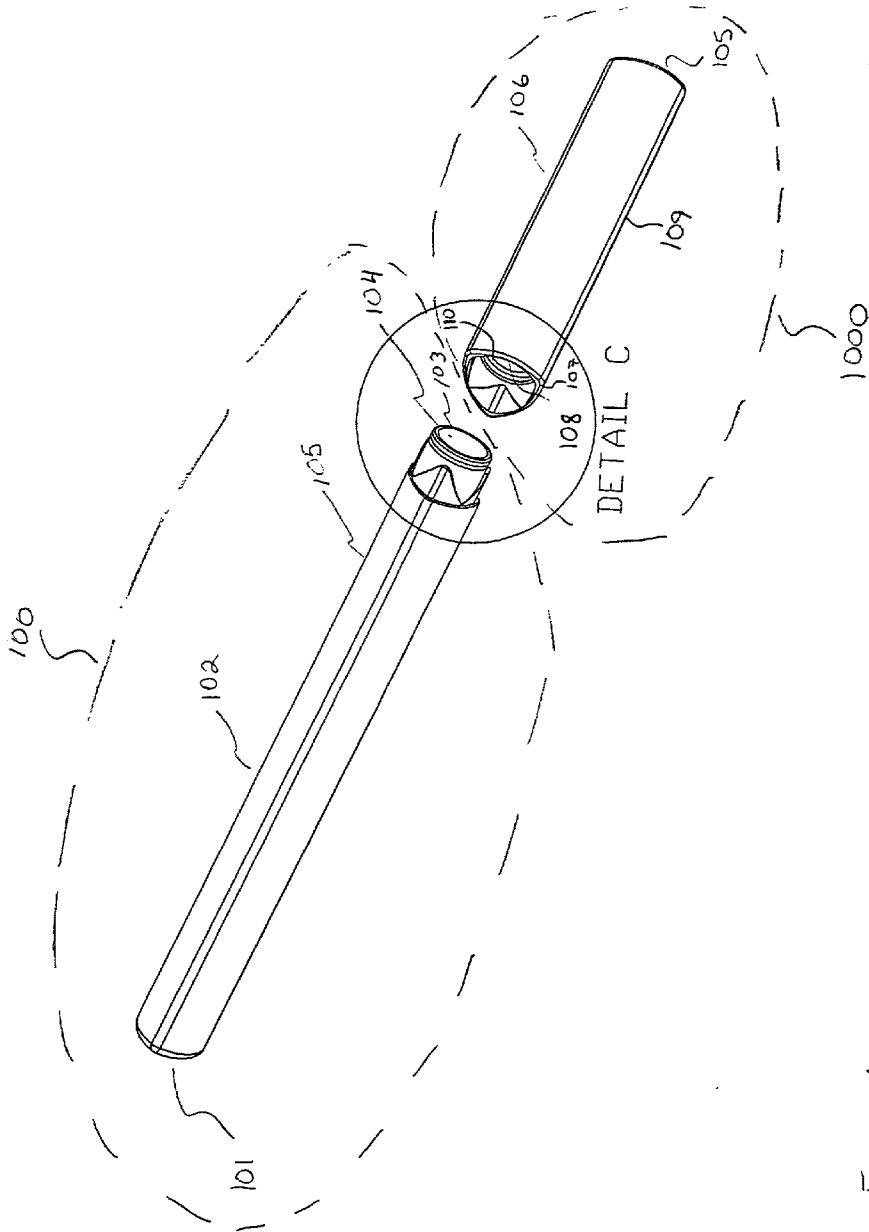


Figure 1

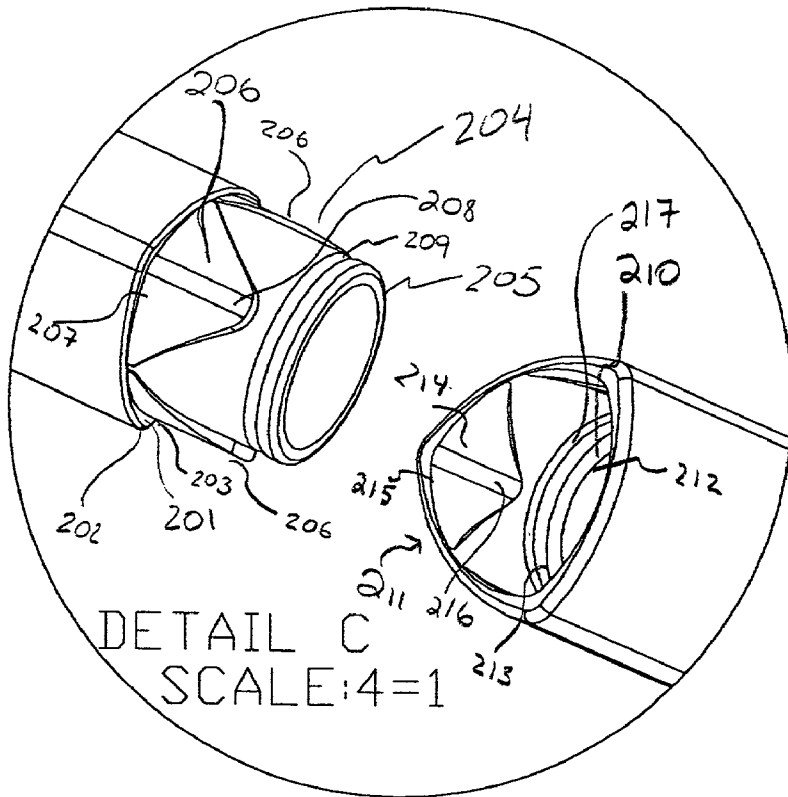


Figure 2

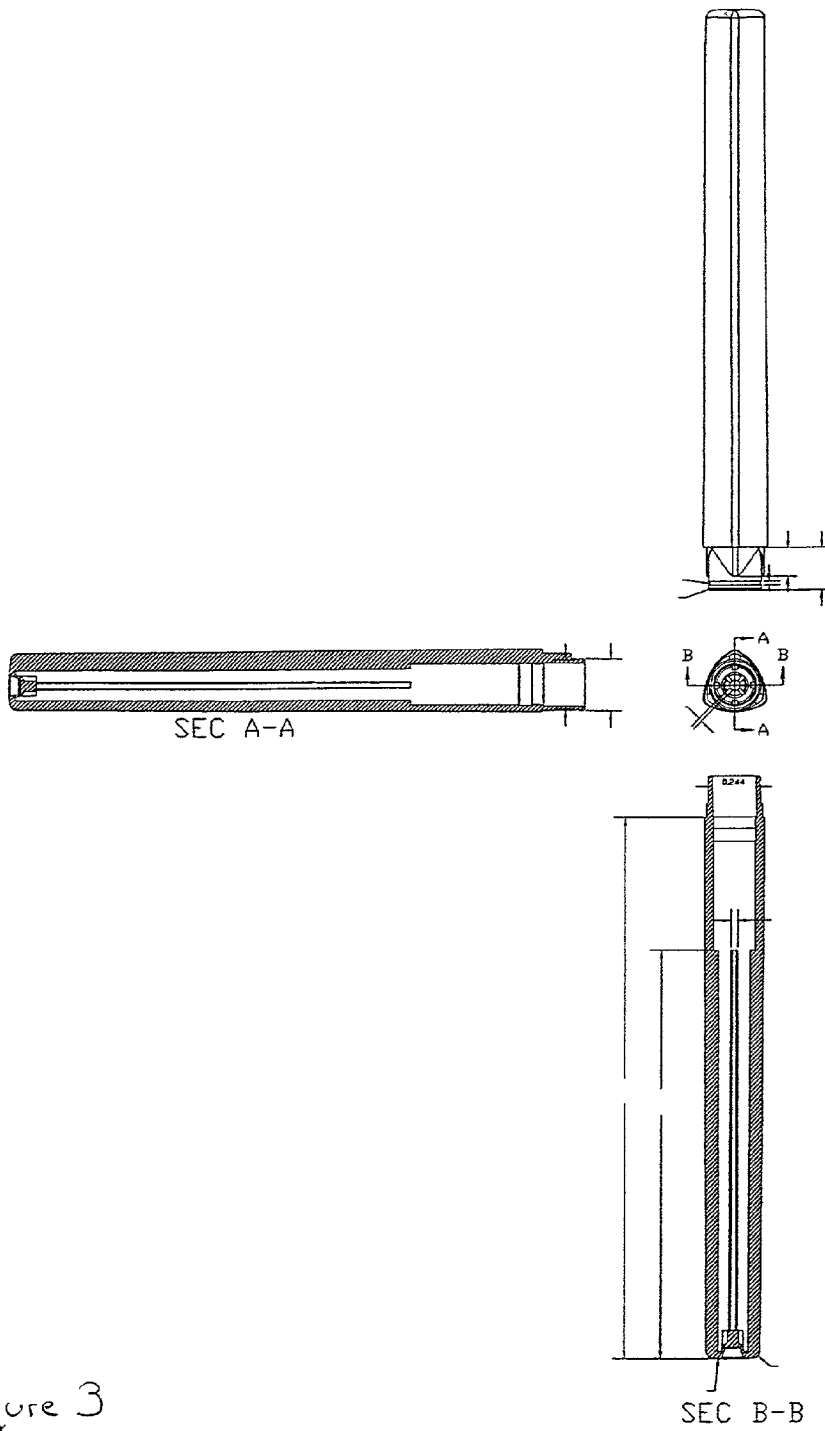


Figure 3

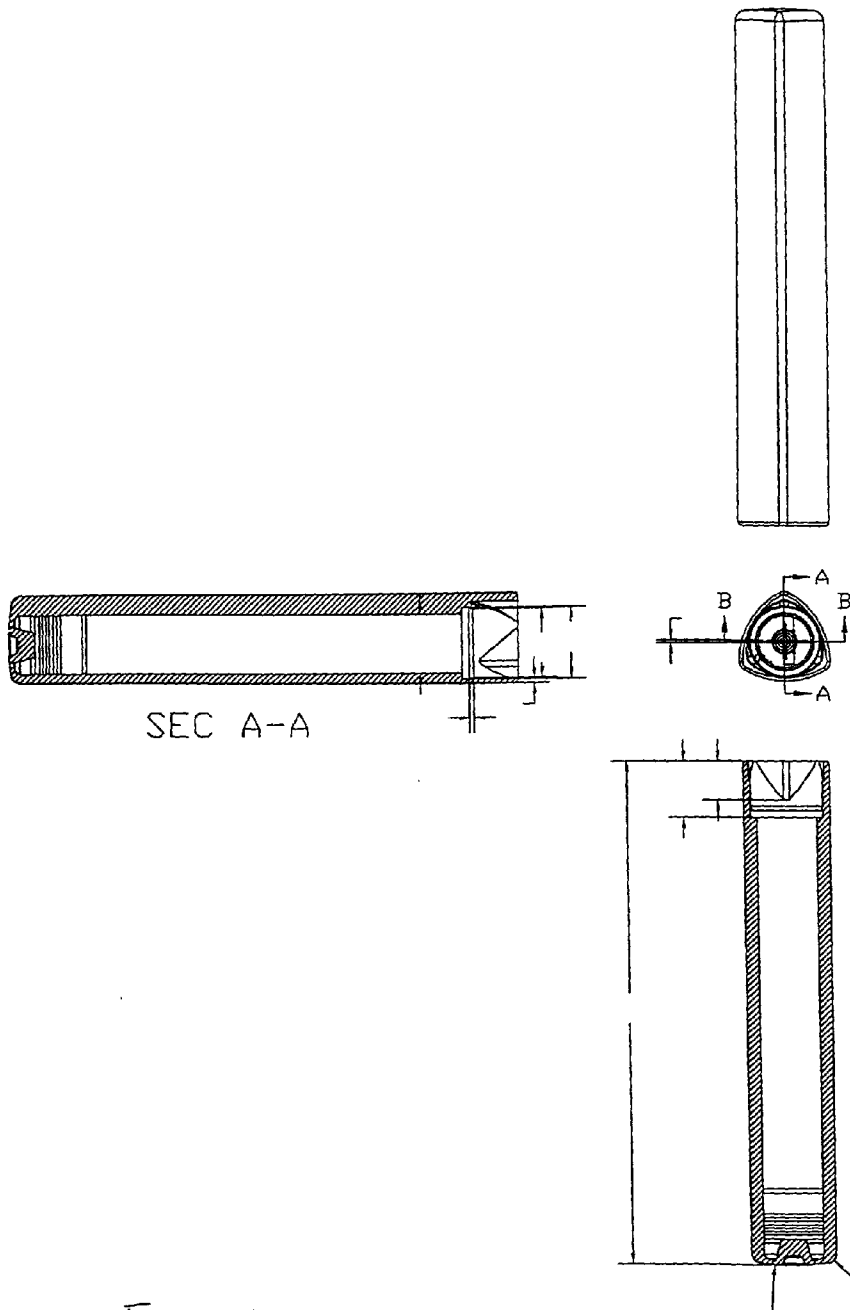
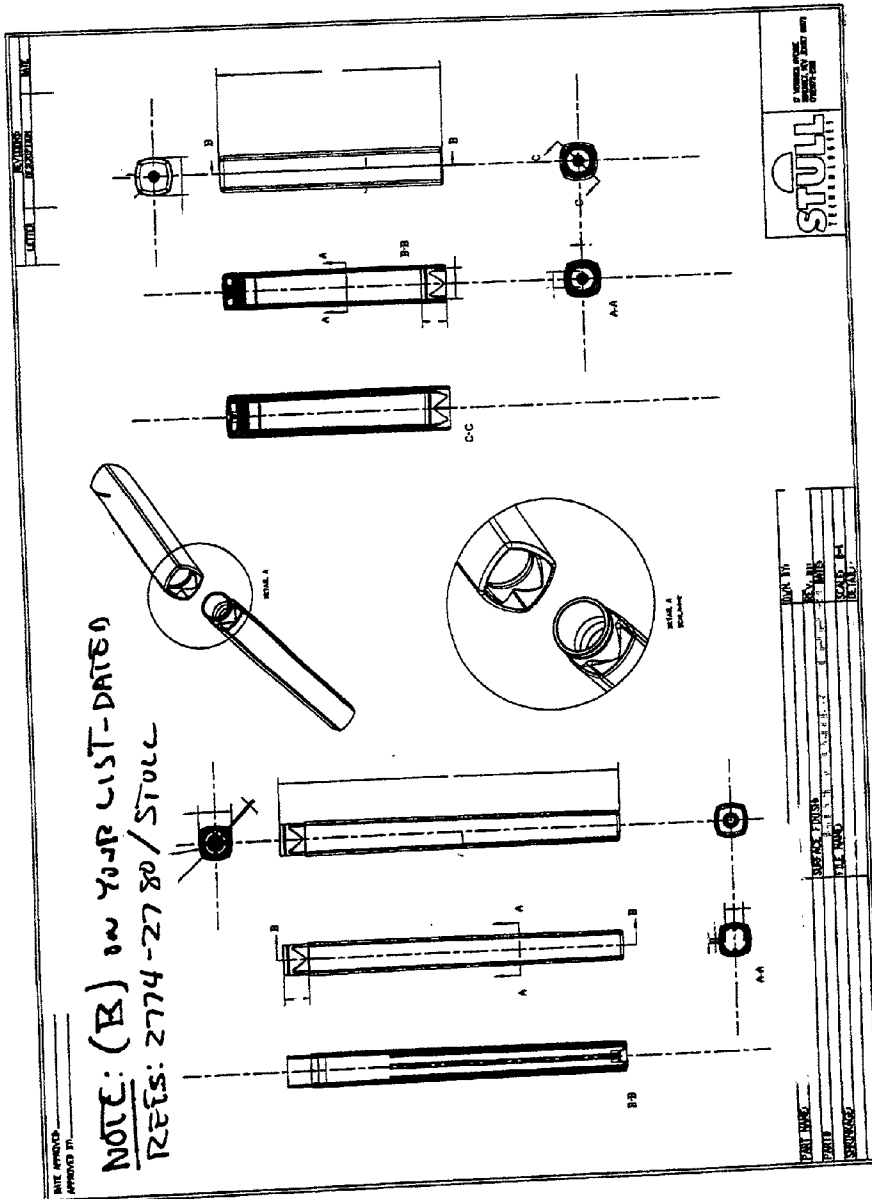


Figure 4

Figure 5



AUTOMATIC CAP/COVER LOCATORS AND ORIENTATION GUIDES

RELATED APPLICATIONS

[0001] This application claims priority of Provisional No. 60/171,943, filed on Dec. 23, 1999.

BACKGROUND OF THE INVENTION

[0002] The present invention is directed to an automatic cap/cover locator and orientation guide having application for various types of containers. More particularly, the invention relates to a device for properly aligning a container having two pieces or for aligning the cover with respect to a container so that a proper connection and seal is effected. Furthermore, the device of the present invention prevents the misalignment of the two separate pieces or the cap and container after being closed.

[0003] Packaging formed of a tube having two connectable pieces and containers with covers, which hermetically seal such containers, have been in use for some time.

[0004] Typically, the covers of such containers are installed by placing the cover over the container, pressing firmly, and working the edges of the cover over the rim of the container into the sealed position. When initially pressing the cover into position, the cover may tend to shift slightly one way or the other. For container rims having shapes, such as square or rectangular, misalignment of the cover relative to the container can present a problem. For example, a misaligned cover can cause the container to warp when the cover is on or make it impossible to completely install the cover. A misaligned cover can also affect the hermetic seal between the cover and the container. Furthermore, for containers having a substantially cylindrical shape, a displacement of the cover and container after the container has been put in place on the container can present a problem. If the contents adhere to the inner walls of the container, they can be rotated axially, corresponding to the displacement of the cover and container. This can potentially damage the contents.

[0005] In addition, tube type packaging is usually made of two telescoping pieces, wherein one half of the tube is placed within the other to form a closed container. However, typically the two pieces are free to rotate with respect to one another. Furthermore, the volume within the two portions is not fixed because the two portions are free to translate lengthwise with respect to each other while connected to form a tube. Thus, a tube constructed in the usual manner is not suitable for many uses due to the problems stated above.

[0006] What is desired therefore is an alignment means for a closure device for hermetically joining two portions of a packaging container, so that when the two portions are sealably attached both rotational and translational motion between the two portions is prevented when they are in physical communication. More specifically, a locator and orientation guide for various shapes, which requires registration of two portions of a container in order to sealably close the container.

[0007] It is also desired to provide a device to improve hermetically sealable containers and covers.

[0008] It is also desired to provide a device to assure proper alignment of the cover of a container as it is closed.

[0009] It is also desired to provide a locator and orientation guide arrangement for properly positioning a cover with respect to a container prior to closing the container.

[0010] It is also desired to provide a locator and orientation guide arrangement for preventing the movement of the cover relative to the container when the cover is sealably affixed to the container.

SUMMARY OF THE INVENTION

[0011] The present invention overcomes the drawbacks of the prior art by providing in a first aspect a closure device for joining a barrel and receptacle comprising a cylindrical barrel having a barrel lip at one end of the cylindrical barrel, and a barrel base at a second end of the cylindrical barrel, an outside surface having an outside diameter attaching the barrel base to the barrel lip, a plurality of substantially triangular projections disposed on the outside surface aligned along the barrel base, an annular depression adjacent the barrel lip, a cylindrical receptacle for receiving said cylindrical barrel having a receptacle lip at one end of the cylindrical receptacle and a receptacle base at a second end of the cylindrical receptacle, an inside surface having an inside diameter wherein the inside diameter is nominally equal to the outside diameter of said barrel, a plurality of substantially triangular indentations disposed on the inside surface aligned along the receptacle base having a reciprocal shape to the triangular projections disposed on the outside surface along aligned along the barrel base, and an annular bead adjacent the receptacle lip.

[0012] In another aspect of the present invention, a closure device is provided having a plurality of annular depressions adjacent the barrel lip, and a plurality of annular beads adjacent the receptacle lip.

[0013] In another aspect of the present invention a closure device is provided wherein said barrel and receptacle are each connected to a container and cover respectively.

[0014] In still a further aspect of the present invention, a closure device is provided wherein said barrel and receptacle have a perimeter of the shape chosen from the group comprising ellipsoid, square, pentagon, hexagon, heptagon or octagon.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] These and other objects and advantages of the invention will become more apparent from the following detailed description of a preferred embodiment of the invention when taken into conjunction with the drawings wherein:

[0016] **FIG. 1** is a perspective view of the container and cover cap assembly.

[0017] **FIG. 2** is a detailed view of the barrel and receptacle.

[0018] **FIG. 3** is an exemplary cross-sectional view of the container assembly.

[0019] **FIG. 4** is an exemplary cross-sectional view of the container assembly.

[0020] **FIG. 5** is an exemplary cross-sectional view of an alternate embodiment of the container and cover cap assembly.

DETAILED DESCRIPTION OF THE
PREFERRED EMBODIMENT

[0021] Referring more specifically to the drawings, and in particular to FIGS. 1-5, the container closure device of the present invention has been presented with respect to its application for a cylindrical container and cover. The closure device can be either integrally formed with a container and cover or formed separately and bonded thereto. As will be appreciated, the container and cover can be of other configurations. The closure device, while not limited thereto, has for purposes of illustration and description been presented to conform to the cylindrical container. The closure assembly is formed from a resilient and moderately deformable substance that will deform sufficient to permit full seating of the annular bead, which form part of the closure device, while retaining its original shape and structural rigidity.

[0022] Referring to FIG. 1, the container 100 includes a substantially planer bottom 101, a peripheral wall 102 integral with the periphery of the bottom and extending vertically upwards therefrom and an open top defined by the lip of the cylinder 103. The lip of the cylinder will typically have a radiused edge, consistent with the dimensions of the container. The peripheral wall defines an inner diameter of a cylinder 104 and an outer casing 105 with the outer casing having a substantially triangular shape. The inner cylinder having a circular cross-section, which may be constant for the height of the wall, or may have a varying cross-section, depending on the requirements imposed by the prospective use of the container.

[0023] As shown in FIG. 2, the outer casing extends from the planar bottom to a shoulder 201 at a point, this is approximately ninety percent of the height of the container. The shoulder defines a surface parallel to the planar bottom and is inset from the vertical casing surface. The outer edge of the shoulder 202 defines the periphery of the casing. The inner edge of the shoulder 203 defines the circumference of the outside of a barrel 204, which extends from the shoulder to the lip of the cylinder 205. The outer peripheral wall of the barrel is provided in this embodiment with a plurality of outward projections 206 extending from the shoulder to a height equal to approximately $\frac{2}{3}$ to $\frac{3}{4}$ of the barrel and are spaced evenly about the circumference of the barrel. The projections are substantially triangular with the base of each projection 207 along the edge of the shoulder. The sides of each projection are equal in length and have the same angle from the base to the vertex for each projection. The projections come to a point 208 at a height equal to approximately $\frac{2}{3}$ to $\frac{3}{4}$ of the barrel. Disposed on the outer peripheral wall of the barrel above the triangular projections, is an indented circumferential depression 209.

[0024] Referring again to FIG. 1, the cap portion 1000 includes a substantially planer top 105, a peripheral wall 106 integral with the periphery of the top and extending vertically downwards therefrom and an open bottom defined by the lip of the cylinder 107. The lip of the cylinder will typically have a radiused edge, consistent with the dimensions of the container. The peripheral wall defines a cylindrical inner surface 108 and an outer casing 109 with the outer casing having a substantially triangular shape. The inner cylindrical surface extends from the planar top to a shoulder 110 at a point, which is approximately ninety

percent of the height of the cap. The inner cylindrical surface has a circular cross-section, wherein the diameter is equal to the container inner diameter.

[0025] Turning again to FIG. 2, the shoulder 210 defines a surface parallel to the planar top and is offset from the inner cylindrical surface, forming a receptacle 211, which conforms to the shape of the barrel of the container. The diameter of the receptacle is larger than the diameter of the cylindrical inner surface. The outer edge of the shoulder 212 defines the circumference of the bottom edge of the cylindrical surface. The inner edge of the shoulder 213 defines the top edge of the receptacle. The inner peripheral wall of the receptacle is provided in this embodiment with a plurality of inward indentations 214 extending from the shoulder to a height equal to approximately $\frac{2}{3}$ to $\frac{3}{4}$ of the barrel and are spaced evenly about the circumference of the barrel. The indentations are substantially triangular with the base of each indentation 215 along the edge of the cover cap lip. The sides of each indentation are equal in length and have the same angle from the base to the vertex for each indentation. The indentations come to a point 216 at a height equal to approximately $\frac{2}{3}$ to $\frac{3}{4}$ of the receptacle.

[0026] Disposed on the wall of the receptacle above the triangular indentations, is a raised circumferential bead 217. This beads function as the seal for the container by mating with a circumferential depression 209 in the barrel. The seal is achieved by the circumferential bead 217 resiliently bearing against the circumferential depression 209 in the cap cover and exerting an uniform axial compressive force of the circumferential bead against the circumferential depression.

[0027] Exemplary cross-sectional views of the container and cover cap are shown in FIGS. 3 and 4. In addition, while the present invention has been described with respect to a triangular casing, alternate embodiments, as shown in FIG. 5 are also possible. Exemplary shapes for the casing perimeter includes circular, ellipsoid, square, pentagon, hexagon, heptagon, octagon or other such polygonal shapes. Likewise, the barrel and receptacle could also be formed of different three-dimensional geometric shapes. Exemplary shapes for the barrel and receptacle perimeter includes circular, ellipsoid, square, pentagon, hexagon, heptagon, octagon or other such polygonal shapes.

[0028] The projections function as guides for the alignment of the cap and container and the shoulder functions as a support or stop for the bottom edge of the cover cap, as described presently.

[0029] The cover cap receptacle 211 is placed over the open end of the container barrel 204. The cover container 100 and the cover cap 1000 are aligned into the proper orientation during the capping process by operation of the projections 206 and indentations 216. If the container and cap are not properly aligned the edge of the projections will bear against the edge of the indentations as the barrel is moved within the receptacle thereby indexing the container and cover cap by providing a rotational motion to properly align the barrel with the receptacle. When proper alignment is achieved, then the barrel can be fully inserted into the receptacle. The cap receptacle 211 is then forced onto the barrel 204 whereupon the circumferential bead 217 snaps over the upper circumferential depression 209. Since the barrel and receptacle are formed of resilient and slightly deformable material, the bead will deform to the extent

necessary to permit the seating of the bead **217** within the depression **209**, thereby effecting a seal.

[**0030**] The foregoing descriptions of specific embodiments of the present invention have been presented for purposes of illustration and description. They are not intended to be exhaustive or to limit the invention to the precise forms disclosed, and obviously many modifications and variations are possible in light of the above teaching. The embodiments were chosen and described in order to best explain the principles of the invention and its practical application, to thereby enable others skilled in the art to best utilize the invention and various embodiments with various modifications as are suited to the particular use contemplated. It is intended that the scope of the invention be defined by the Claims appended hereto and their equivalents.

What is claimed is:

1. A closure device for joining a barrel and receptacle comprising;

a cylindrical barrel having a barrel lip at one end of said cylindrical barrel, and a barrel base at a second end of said cylindrical barrel,

an outside surface having an outside diameter attaching said barrel base to said barrel lip,

a plurality of substantially triangular projections disposed on said outside surface aligned along said barrel base,

an annular depression adjacent the barrel lip,

a cylindrical receptacle for receiving said cylindrical barrel having a receptacle lip at one end of said cylindrical receptacle and a receptacle base at a second end of said cylindrical receptacle,

an inside surface having an inside diameter wherein said inside diameter is nominally equal to said outside diameter of said barrel,

a plurality of substantially triangular indentations disposed on said inside surface aligned along said receptacle base having a reciprocal shape to said triangular projections disposed on said outside surface along aligned along said barrel base, and an annular bead adjacent the receptacle lip.

2. A closure device according to claim 1 having a plurality of annular depressions adjacent the barrel lip, and a plurality of annular beads adjacent the receptacle lip.

3. A closure device according to claim 1 wherein said barrel and receptacle are each connected to a container and cover respectively.

4. A closure device according to claim 1 wherein said barrel and receptacle have a perimeter of the shape chosen from the group comprising ellipsoid, square, pentagon, hexagon, heptagon or octagon.

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