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PLASTIC CONTAINERS AND CLOSURE MEMBERS THEREFOR

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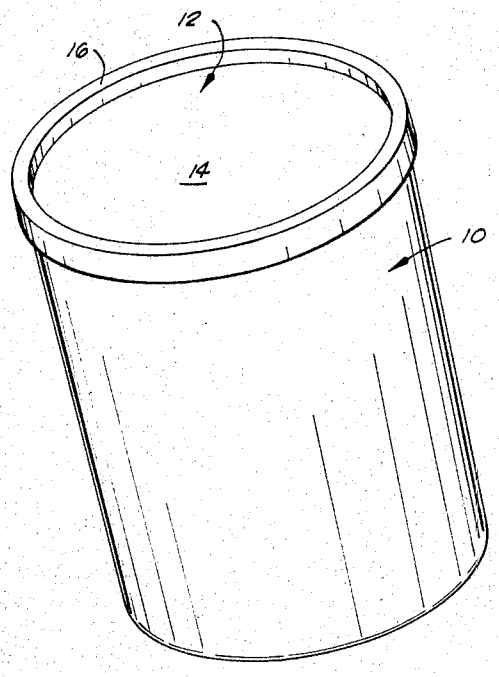


FIG. 1

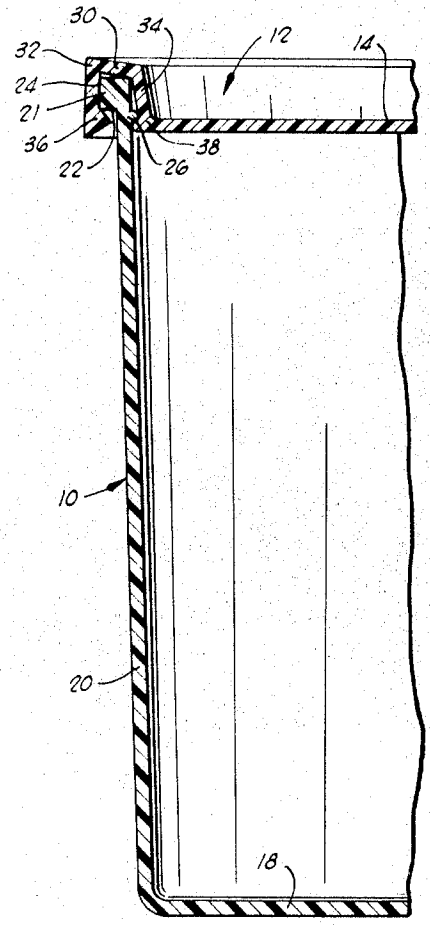


FIG. 2

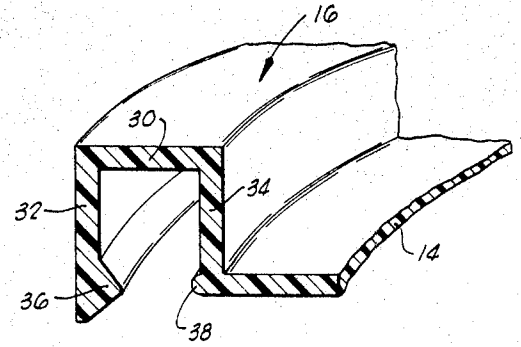


FIG. 3

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PLASTIC CONTAINERS AND CLOSURE MEMBERS THEREFOR

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ABSTRACT OF THE DISCLOSURE

A resilient material container and a closure member adapted for interlocking engagement with the container. The container carries an internal bead and external shoulder dimensioned and positioned thereon to engage a pair of beads carried by the closure member and form a pair of positive interlocks with these closure member beads. The beads carried by the closure member are located on a pair of generally parallel legs which form a peripheral rim portion of the closure member, such rim portion being of U-shaped cross-sectional configuration, with the legs being spaced to pass on opposite sides of a side wall of the container.

This invention relates to a plastic container and to a snap fitting plastic lid or closure member used in combination therewith. More particularly, but not by way of limitation, the invention relates to a double interlock type closure member for plastic containers, which closure member is constructed of a resilient synthetic resin material and is manually engageable and disengageable with the upper edge of a synthetic resin container.

Despite many efforts at improving and perfecting plastic or synthetic resin closure members for plastic containers of various sizes and configurations, a need continues to exist for an easily engaged, tightly fitting plastic cap or closure member which will be tenaciously retained in its operative or closing position during non-use of the contents of the container, and which will afford a good liquid seal. The present invention is an improved lid or cover member structure which engages the upper edge of a plastic container with a double snap fit interlock which affords a double seal against leakage of the contents of the container, and which can be integrally molded in a relatively economic manufacturing operation.

Broadly described, the closure member of the invention comprises a central portion which extends across and closes the central portion of the container between the walls thereof, and a peripheral rim portion which at least partially, and preferably completely, surrounds the central portion, such peripheral rim portion being of a U-shaped cross sectional configuration and having a web and two legs which project generally perpendicularly relative to the web, and to the major plane of the central portion. The closure member or lid is interlocked with the upper edge of the container by means of a first bead of generally triangular cross section which is disposed on, or formed integrally with, that one of the legs which is farthest from the center of the lid. This bead projects from the leg on which it is mounted toward the other leg of the peripheral rim portion. A second bead is formed on the other of the two legs and projects toward the outer leg which carries the triangular cross sectioned bead. The second bead is

positioned nearer to the web of the peripheral rim portion than is the first bead.

In a different aspect, the invention relates to the combination with the described closure member of a container having a bottom and a side wall or side walls. The container may be either round or polygonal in cross section as taken in a plane passed through the side of the container and parallel to the bottom thereof. The side wall or side walls each have an upper edge portion which is provided with an external peripheral shoulder extending around the outside of the container and having a downwardly facing surface extending normal to the outside surface of the side wall and an outwardly facing surface extending normal to the downwardly facing surface. Preferably, the external shoulder is of rectangular or square cross sectional configuration and is positioned immediately adjacent the upper edge of the side wall.

Spaced downwardly on the side wall from the external peripheral shoulder is an internal semicylindrical bead (semicircular in cross section) which is formed integrally with, or secured to, the internal surface of the side wall. The function of the external peripheral shoulder and the internal semicylindrical bead are to engage and interlock with the first and second beads formed on the snap fitting lid, as hereinbefore described. Thus, when the lid is pressed into interlocking position on the container, a double seal is formed by the cooperation of the two beads carried by the lid with the external peripheral shoulder and the semicylindrical bead carried on the container. A tenacious interlock is thereby provided which prevents the contents of the container from being spilled or lost during shipment, storage or other usage of the container.

From the foregoing description of the invention, it will have become apparent that it is a major object of the present invention to provide an improved closure member or lid for containers made of resiliently deformable material, such as synthetic resins.

An additional object of the present invention is to provide an improved synthetic resin, lid-container combination in which the lid snaps onto the open upper end of the container to form a double seal which effectively retains the contents of the container against loss.

Another object of the invention is to provide a closure member for a container having a double locking structure formed thereon, which closure member can be integrally molded as a single piece, and which is relatively inexpensive to construct and characterized in having a long, durable service life.

In addition to the foregoing described objects of the invention, additional objects and advantages will become apparent as the following description is read in conjunction with the accompanying drawing.

In the drawing:

FIGURE 1 is a perspective view of the container and lid combination of the present invention showing the lid snapped in place on the container.

FIGURE 2 is a vertical sectional view taken through one side of the container-lid combination illustrated in FIGURE 1 and illustrating the manner in which the lid or cover member of the invention is interlocked with the upper edge of the container.

FIGURE 3 is a detail sectional view illustrating the appearance of the peripheral rim portion of the container

closure member as this rim portion appears in its relaxed or unstressed state when the closure member is removed from the container.

Referring now to the drawings in detail, FIGURE 1 illustrates the combination of a container **10** with a closure member **12** constructed in accordance with the present invention. In the illustrated embodiment, both the container and the closure member or lid are constructed of a resilient synthetic resin material, such as polyethylene. The closure member **12** includes a central portion **14** having a peripheral rim portion **16** extending around the outer periphery of the central portion and illustrated in greater detail in FIGURES 2 and 3 of the drawing.

As illustrated in FIGURE 2, the container **10** includes a bottom wall **18** and at least one side wall **20** which, in the illustrated embodiment, is cylindrical in configuration. It will be understood, however, that the container can be made of various shapes, and can include a plurality of side walls intersecting each other at various angles to define an enclosure. Adjacent the upper edge of the side wall, an external peripheral shoulder **21** is formed on the outside of the container and extends at least partially around the container in a plane substantially parallel to the bottom wall **18** of the container. The external peripheral shoulder **21** preferably extends completely around the container, and in its preferred construction is characterized in having a downwardly facing surface **22** and an outwardly facing surface **24** which extends substantially normal to the downwardly facing surface. Thus, in the preferred construction of the external peripheral shoulder **21**, the shoulder is generally rectangular in cross sectional configuration as illustrated in FIGURE 2.

Formed on the inner surface of the side wall **20** of the container **10** and extending in a plane substantially parallel to the plane containing the external peripheral shoulder **21** is an inwardly projecting bead **26**. The inner bead **26** preferably extends completely around the container, and is preferably semicircular in cross sectional configuration as illustrated in FIGURE 2. It is further preferred that the bead **26** be spaced downwardly from the upper edge of the side wall **20** of the container, and be spaced in a vertically downward direction from the external peripheral shoulder **21**. The purpose of this offset arrangement will be explained in greater detail hereinafter.

The construction of the periphral rim portion **16** of the closure member **12** is best illustrated in FIGURE 3. As there shown, the peripheral rim portion **16** is of a generally U-shaped cross sectional configuration and includes a web **30** having a pair of legs **32** and **34** extending downwardly therefrom and substantially normal thereto. At its outer peripheral edge, the central portion **14** of the closure member **12** is secured to, or molded integrally with, the lower or free end of the leg **34**.

Formed relatively closely adjacent the lower or free end of the outer leg **32** is a radially inwardly extending bead **36** which, in a preferred embodiment of the invention, is of triangular cross sectional configuration as illustrated in FIGURE 3. Thus, the lower surface of the bead **36** tapers downwardly and outwardly and performs a self-centering function when the closure member is to be placed on and snapped over the upper edge of the container **10**. It will be noted in referring to FIGURE 2 that the triangular configuration of the bead **36** also affords a space into which the tips of the fingers or the fingernails may be inserted when it is desired to remove the closure member from the container.

On the innermost leg **34** of the peripheral rim portion **16** and adjacent the lower or free edge of this leg, a second bead **38** is formed and projects radially outwardly from the surface of the leg **34**. In other words, the bead **38** projects toward the radially outer leg **32** of the rim portion.

In its relaxed state, the rim portion **16** of the closure member **12** is configured as shown in FIGURE 3. Thus, it is of symmetrical U-shaped configuration with the legs **32** and **34** extending substantially normal to the web **30** and parallel to each other. When the closure member **12** is snapped into position on the container **10** so that the beads **36** and **38** engage the external shoulder **21** and the internal bead **26**, the peripheral rim portion **12** is deformed in the manner illustrated in FIGURE 2. Thus, the legs **32** and **34** are biased apart from each other slightly, and one of the legs is forced downward slightly further with respect to the side wall **20** of the container than is the other leg. The result of this deformation is to cause the beads **36** and **38** to constantly bear against the engaging surfaces of the shoulder **21** and the inner bead **26** of the container so as to form a double seal therewith. The double interlock which is thus provided tenaciously retains the closure member in position and resists inadvertent removal of the closure member either by gravitational forces imposed on the closure member by the contents of the container when the container is inverted, or by a force tending to depress the central portion of the closure member down into the container. It is to be noted that the central portion **14** of the closure member **12** is horizontally aligned with the bead **38** at the lower end of the inner leg **34** so that forces acting on the side walls of the container and which tend to collapse the side walls of the container are resisted by the columnar support afforded by the central portion **14** of the closure member.

When it is desired to remove the closure member **14** from the container, this can be quickly accomplished by gripping the lower edge of the outer leg **32** with the fingertips and pulling upwardly so as to force the triangular cross sectioned bead **36** past the edge of the shoulder **21**.

From the foregoing description of the invention, it will have become apparent that a novel closure member is provided which, in combination with a container having a cooperating external shoulder and internal bead, forms a convenient, highly stable and mechanically durable packaging instrumentality which can be used to ship liquids or solids with relatively little damage to the container, and without the occurrence of leakage. It will further be noted that by reason of the construction of the closure member, a plurality of the containers can be stored one on top of the other since, in a preferred construction, the side wall **20** of the container tapers inwardly slightly from the top to the bottom and the bottom wall **18** is of a diameter approximating the internal diameter of the closure member **12**, that is, the diameter of the central portion **14** of the closure member as measured thereacross inside the peripheral rim portion **16**.

Although a preferred embodiment of the invention has been herein described in order to provide an example of the manner in which the invention is to be practiced, it is to be understood that various changes and modifications can be made in the depicted structure without departure from the basic principles which underlie the invention. Thus, though the preferred construction of the invention contemplates the use of a rectangularly cross sectional external shoulder at the upper edge of the side wall of the container, and the use of a triangular cross sectioned bead adjacent the lower edge of the outer leg of the peripheral rim portion of the closure member, the shapes of these cooperating elements can be modified without sacrifice of many of the advantages afforded by the present invention. The same is true of the cross sectional configuration and location of the internal bead formed on the side wall of the container, and the cooperating bead of the closure member. Modifications and changes of the described type which do not result in a relinquishment or yielding up of the advantages afforded by the present invention over interlocking closure members of the type heretofore known are deemed to be

circumscribed by the spirit and scope of the invention except as the same may be necessarily limited by the appended claims or reasonable equivalents thereof.

I claim:

1. In combination, a container and a resilient closure member for the container, said container comprising:
- a bottom;
- at least one generally vertically extending side wall connected at its lower edge to the bottom and having an upper edge;
- an external peripheral shoulder on the side wall and extending at least partially around the outside of the container, said shoulder being positioned adjacent the upper edge of said side wall and projecting out of the plane of said side wall;
- an internal bead on the inner surface of said side wall and extending in a plane substantially parallel to the plane containing said external peripheral shoulder; and said resilient closure member comprising:
- a central portion adapted to extend across and close the central portion of the container surrounded by the side wall thereof;
- a peripheral rim portion of U-shaped cross sectional configuration at least partially surrounding said central portion, said peripheral rim portion having a web and two substantially parallel legs which are generally parallel in the relaxed, undistorted state of said rim portion, and which extend on opposite sides of said side wall adjacent the upper edge thereof, said parallel legs projecting, in the relaxed, undistorted state of said rim portion, substantially perpendicular to the web of said peripheral rim portion and one of said legs being secured to the peripheral edge of the central portion of said closure member, the other of said legs being on the opposite side of said one leg from said central portion;
- a first protuberant bead on said other leg of the peripheral rim portion of the closure member, said first bead being spaced from said web and projecting out of the plane of said other leg toward said one leg, said first bead engaging the external peripheral shoulder; and
- a second protuberant bead projecting out of the plane of said one leg toward said other leg and engaging the internal bead on the inner surface of the side wall of said container whereby said first and second beads form a positive double interlock with the external shoulder and internal bead of the container, said first and second protuberant beads being disposed closer to said bottom than said external peripheral shoulder and said internal bead during the existence of said interlock.

2. The combination claimed in claim 1 wherein said internal bead on the inner surface of the side wall of said container is spaced downwardly on said side wall from said external peripheral shoulder.

3. The combination claimed in claim 1 wherein said central portion of said resilient closure member is in substantially coplanar alignment with said second bead and is secured to said one leg at the lower free end thereof.

4. The combination claimed in claim 1 wherein said external peripheral shoulder includes
- a downwardly facing surface extending normal to the outside surface of the side wall and to said other leg; and
- an outwardly facing surface extending normal to the downwardly facing surface, and substantially parallel to said other leg, said downwardly and outwardly facing surfaces intersecting in a line;
- and wherein said first protuberant bead is generally triangular in cross-section with the apex of said triangular cross-sectional first bead pointing toward said one leg;
- and wherein the line of intersection of said downwardly and outwardly facing surfaces of said peripheral shoulder is substantially coincident with the line of intersection between said triangular cross-sectioned first bead and the surface of said other leg from which said first protuberant bead projects.

5. In combination, a container and a resilient closure member for the container, said container comprising:
- a bottom;
- at least one substantially vertically extending side wall connected at its lower end to the bottom and having an upper edge;
- an external peripheral shoulder on the side wall and extending at least partially around the outside of the container, said external peripheral shoulder being positioned adjacent the upper edge of said side wall and projecting out of the plane of said side wall;
- an internal bead on the inner surface of said side wall and extending in a plane substantially parallel to the plane containing said external peripheral shoulder, said internal bead being spaced downwardly on said side wall from said external peripheral shoulder; and said resilient closure member comprising:
- a central portion adapted to extend across and close the central portion of the container surrounded by the side wall thereof;
- a peripheral rim portion of U-shaped cross-sectional configuration at least partially surrounding said central portion, said peripheral rim portion having a web and two legs which are generally parallel in the relaxed, undistorted state of the rim portion, and which extend on opposite sides of said side wall adjacent the upper edge thereof, said parallel legs projecting, in the relaxed, undistorted state of the rim portion, substantially perpendicular to the web of said peripheral rim portion, one of said legs being secured to the peripheral edge of the central portion of said closure member, the other of said legs being on the opposite side of said one leg from said central portion;
- a first protuberant bead on said other leg of the peripheral rim portion of the closure member, said first bead being spaced from said web and projecting out of the plane of said other leg toward said one leg, said first bead engaging the external peripheral shoulder; and
- a second protuberant bead projecting out of the plane of said one leg toward said other leg and engaging the internal bead on the inner surface of the side wall of said container whereby said first and second beads form a double interlock with the external shoulder and internal bead of the container, said external shoulder and internal bead being spaced farther from each other in a vertical direction than said first and second beads of said closure member are spaced from each other in a vertical direction whereby said U-shaped peripheral rim portion is distorted from its relaxed configuration when said closure member is snapped on said container to engage said first bead with said external shoulder and said second bead with said internal bead.

6. A resilient synthetic resin closure member for a container comprising:
- a central portion adapted to extend across and close the central portion of a container between the walls thereof;
- a peripheral rim portion of U-shaped cross-sectional configuration at least partially surrounding said central portion, said peripheral rim portion having a web and two legs extending substantially parallel to each other and substantially perpendicular to the web in the relaxed state of the resilient synthetic resin, one of said legs being secured to the peripheral edge of said central portion and extending substantially normal thereto in the relaxed state of the resin;

a first bead on the other of said legs and spaced from said web, said first bead projecting out of the plane of said other leg toward said one leg and being of generally triangular cross-section and positioned adjacent the end of said other leg farthest removed from said web; and

a second bead of semicircular cross-sectional configuration projecting out of the plane of said one leg toward said other leg and disposed in substantially coplanar alignment with said central portion, said first and second beads forming a restriction in said U-shaped peripheral rim portion so that a smaller distance separates said first and second beads than separates the two legs of said U-shaped peripheral rim portion.

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