

June 2, 1959

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2,888,861

CONICAL CONTAINER OF PAPER, CARDBOARD OR THE LIKE CARTON
FORMING MATERIAL AND METHOD FOR PRODUCING THE SAME

Filed May 8, 1956

4 Sheets-Sheet 1

Fig. 1

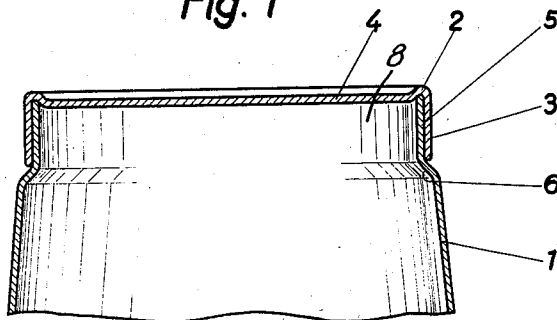
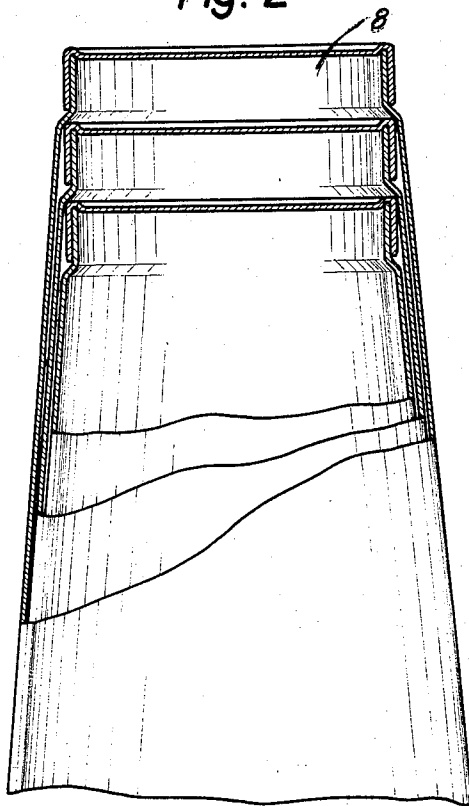


Fig. 2



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Fig. 3

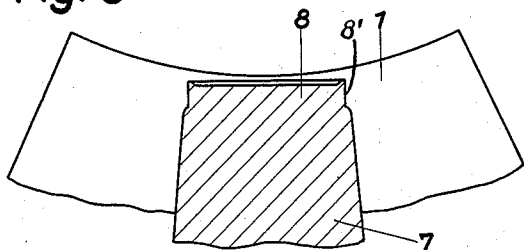


Fig. 4

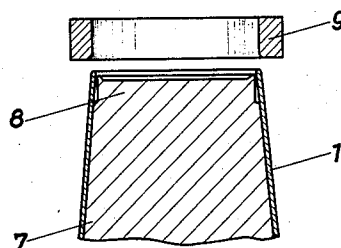


Fig. 5

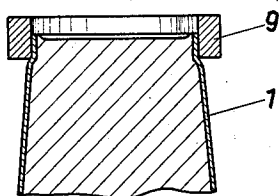


Fig. 6

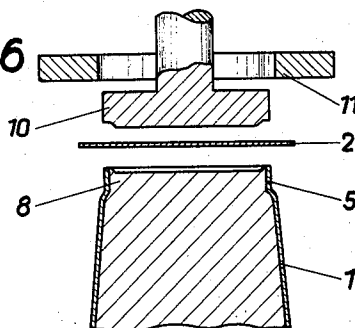


Fig. 7

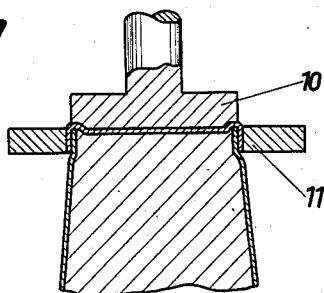


Fig. 8

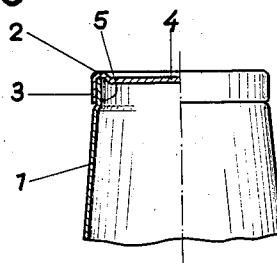
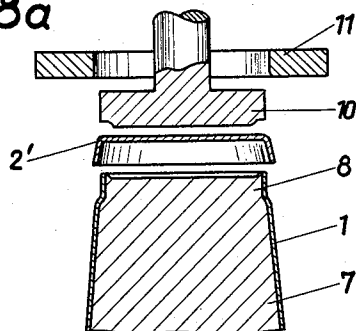


Fig. 8a



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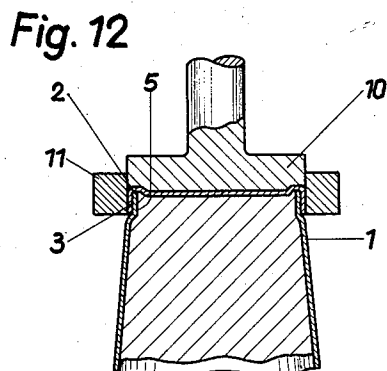
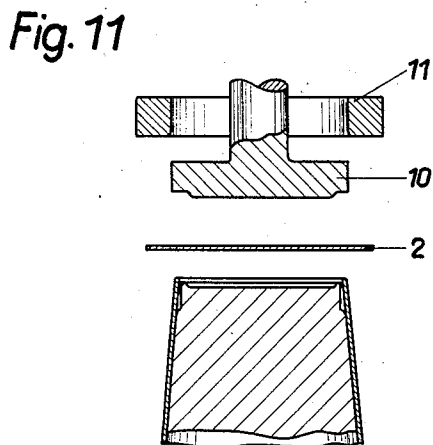
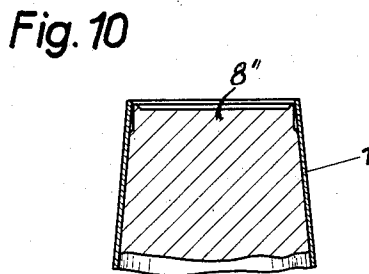
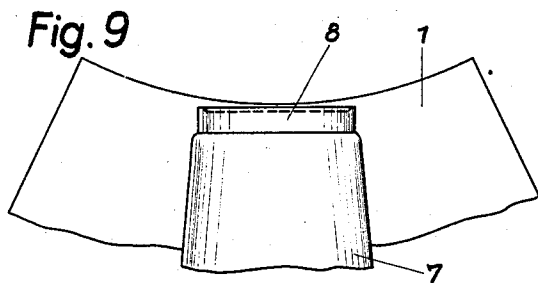
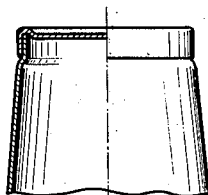


Fig. 12 a



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Fig. 13

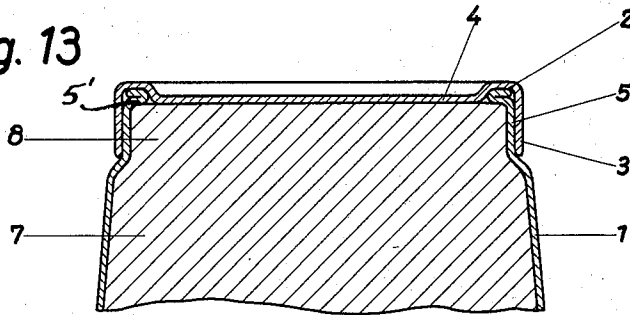


Fig. 14

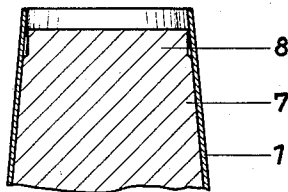


Fig. 15

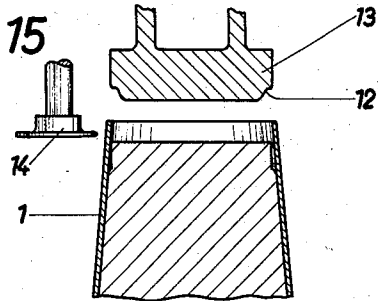


Fig. 16

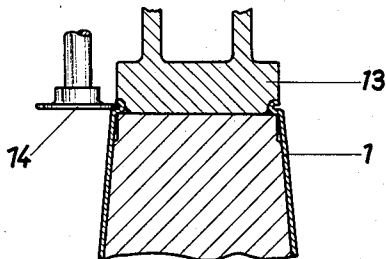


Fig. 17

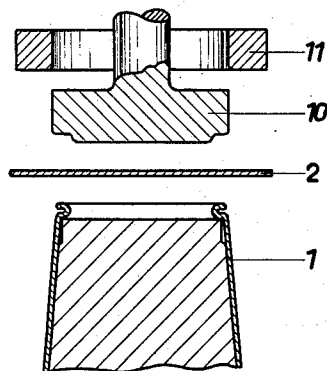
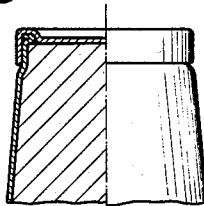


Fig. 18



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CONICAL CONTAINER OF PAPER, CARDBOARD OR THE LIKE CARTON FORMING MATERIAL AND METHOD FOR PRODUCING THE SAME

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Application May 8, 1956, Serial No. 583,532

Claims priority, application Germany May 21, 1955

7 Claims. (Cl. 93—39.1)

The present invention relates broadly to the art of container manufacture.

More particular, this invention relates to a container of conical configuration constructed of paper, cardboard or the like carton forming material and to the production of such containers.

More particularly, this invention relates to a conical container of the materials above-mentioned adapted to be filled with milk or other preferably liquid contents.

More specifically, the invention relates to the production of a conical container, and a resultant improved container, including particular shaping of the smaller end of the container into a closure structure for this smaller end, facilitating the nesting of conical containers.

Containers of the type in question are generally formed from a preshaped flat blank which is formed about a conical mandrel to tubular configuration and during which formation a longitudinal seam joins the opposite ends of the blank. The thus formed conical tubular body has its opposite ends closed by either inserting an end closure or by forming a folded closure at one end from the material of the blank.

Containers of this general description and adapted to contain milk or other liquids are generally referred to as single use containers. Since they are to be used only once the conical configuration is of importance, as it facilitates nesting of the containers. This factor produces substantial savings in connection with the storage and transportation of the containers, particularly since the containers are produced in a carton manufacturers plant and shipped to an intermediate user who fills and closes the container, for example, a milk producing or distributing concern.

It has been ascertained that the nesting relationship of conical containers has developed substantial difficulties. Due to the conicity of the individual containers, the nesting thereof causes them to wedge together, particularly adjacent the smaller bottom end. This wedging gives rise to difficulties in separating the containers from nested relationship. In the event the containers are to be separated by mechanical means further difficulties arise. Moreover, the wedging together of nested containers damages the layer of paraffin that has been applied, particularly to the interiors of the containers, to render them water-tight. Thus the containers are subjected to leakage and, additionally, loosened particles of paraffin can remain on the interior of the containers and possibly pollute the liquid contents to be placed therein.

Accordingly, the present invention has for an object to provide an improved conical container construction, with particular reference to the shaping and closing of the smaller end thereof so as to provide an internal supporting arrangement within one container that serves as a rest for the bottom of a container to be nested within the one container so as to prevent containers becoming wedged together and to render them easily separable.

Specifically, the invention has for an object to provide a method for producing such containers, including the

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formation of an internal annular bead above the bottom of the container and the reduction in cross section of the lower portion of the container in the area below the bead.

Still more specifically, the invention has for an object to provide an end structure arrangement for conical containers, including a reduced portion at the smaller end and an end closure embracing the reduced portion, including a side flange extending substantially perpendicular to the plane of the bottom of the container and having an extent substantially corresponding to the axial extent of the reduced lower portion of the container. Such an embracing bottom closure, including a flange surrounding the lower reduced portion of the container body, facilitates the connection and assembly of the closure to the body since this connection can be effected by pressing and shaping tools acting exteriorly of the shaping mandrel which shapes the body.

It is an additional object to provide a conical container and method of producing the same in which the reduced lower portion is so dimensioned relative to the remainder of the container body that the exterior diameter of the embracing closure does not extend beyond the adjacent surface of the exterior of the container body above the flange of the bottom closure. This assures that the inner diameter of the container adjacent the inwardly protruding annular head is somewhat larger than the exterior diameter of the closure so that a loose nesting arrangement of containers can be effected.

In order to further protect the container against leakage and to prevent entry therein of liquids the invention, as an additional object, provides a container end structure which includes a flanged closure surrounding the end portion of the tubular container body with the rim of the container body having an inwardly extending U-shaped fold with the terminal edge of the container body directed laterally outwards so that this terminal edge abuts the interior of the flange on the bottom closure.

In producing containers in accordance with the teachings of this invention there is utilized a conical shaping mandrel having a cylindrical end portion. The initially flat container body blank is folded in a known manner about the conical mandrel and secured in tubular shape by the formation of the longitudinal seam of adhesive. For necking in or reducing the end portion of the container about the reduced cylindrical portion of the mandrel, suitable drawing tools are pressed over the assembled body portion while it is on the mandrel, following which an end closure is formed about the reduced portion of the body.

Accordingly, the invention has for an object to provide improved methods of constructing such a container closure arrangement, including simultaneous reduction in size of the end portion of the container about the mandrel and the formation of an embracing end closure from a planar closure blank.

Further and more specific objects will be apparent from the following description taken in connection with the accompanying drawings, in which:

Figure 1 is a fragmentary vertical cross sectional view illustrating the reduced end portion of a conical container and its associated closure structure,

Figure 2 is a fragmentary view partly in longitudinal section illustrating a plurality of containers of the type shown in Figure 1 in nested relationship,

Figures 3 to 8 illustrate successive steps in the formation of the container end structure shown in Figure 1,

Figure 8a illustrates the step of Figure 6 utilizing a partially preformed closure blank,

Figures 9 to 12 illustrate the various steps in a modified method of producing the container of Figure 1,

Figure 12a is a view similar to Figure 1 but illustrating

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the container produced by the steps shown in Figures 9 to 12 on a reduced scale,

Figure 13 is a fragmentary longitudinal section on an enlarged scale illustrating a portion of the mandrel and a modified end structure arrangement including an inwardly directed U-shaped fold at the rim edge of the container body, and

Figures 14 to 18 illustrate diagrammatically and on a reduced scale the production of a container of the form shown in Figure 13.

The invention, as particularly shown in Figures 1 and 2, provides a container structure which includes a body 1 of conical shape, the larger end of which, after filling with preferably liquid contents, is closed by either an inserted closure, not shown, or by forming a folded closure from the material of the larger end of the body. Since the manner of closing the larger end of the container body is not part of this invention and is known in the art, the same is not illustrated.

Consistent with the objects of the invention, the important factor in connection with the conical containers that are to be nested is the elimination of the possibility of the containers wedging together in nested relationship. Accordingly, as shown in Figures 1 and 2, the smaller end of the container body is closed by a flanged or rimmed closure part 2, the flange 3 of which embraces the exterior of the coordinated portion of the smaller end of the container body, and is connected thereto by adhesive. In order to enhance the rigidity of the container the bottom closure is dished inwardly, as at 4. In other words, the plane of the major portion of the end closure lies within the perimetrical rim of the bottom of the body, the perimetrical rim being formed by forming the flange 3 about the end portion of the container body. As also shown in Figure 1, the smaller end 5 of the container body is reduced and deformed to cylindrical shape. The axial extent of the cylindrical portion of the container body corresponds substantially to the axial extent of flange 3.

Due to this reduction in cross sectional shape, there is formed an inwardly extending annular bead or projection 6. As shown in Figure 2, the bead 6 of the end container supports the perimetrical rim of the closure 2 of the next adjacent container. In this connection the exterior diameter of the reduced cylindrical portion 5 of the smaller end of the container body is so selected with relation to the conicity of the remainder of the body 1 that the exterior diameter of the flange 3 of the closure does not extend beyond the continuation of the conical side wall of the container body, whereby the containers can be nested one within the other without wedging together adjacent the bottoms as is customary with conventional conical containers where the side portions adjacent the bottom form continuations of the conical body.

In producing the container of Figure 1, the initial step is that shown diagrammatically in Figure 3, in which a flat blank 1 is placed about the conical shaping mandrel 7, the mandrel 7 having at its upper end a reduced cylindrical extension 8. The blank 1 is formed about the mandrel 7 and the overlapping ends are adhered together to form the container body on the mandrel which, as shown in Figure 4, includes an end portion that is spaced from the exterior of the reduced extension 8. A reciprocable annular drawing tool 9 then moves vertically downward from the position shown in Figure 4 to that of Figure 5, whereby in being forced upon the reduced extension of the mandrel 7 the end portion 5 of the container body is formed about the extension 8 of the mandrel in conformation to the shape of the mandrel. The ledge 8' on the mandrel insures the formation of the inwardly directed annular bead or ledge 6 of the container body. Following the formation of the reduced portion 5 of the container body, the annular drawing tool 9 is removed and, as shown in Figure 6, a closure member blank 2 is disposed above the

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mandrel 7. The blank 2 can be a planar blank as shown in Figure 6, or it can be a partially erected closure blank 2', Figure 8a, in which its flange 3 is partially formed. After the closure blank is positioned relative to the mandrel 7 a shaping die 10 is moved downwardly to press the blank onto the top of the mandrel which is dished so that the dished bottom 4 of the end closure is formed. While the blank 2 is being pressed against the top of the mandrel an annular drawing tool 11 moves downwardly to form rim or flange 3 of the closure and to conform and press this flange against the reduced cylindrical end of the container body so that, following the completion of these steps, the reduced end of the container body has the shape and internal configuration as shown in Figure 8.

In order to adhere the closure to the container body a thermoplastic binder is utilized which is applied to the blanks during their production. The strip of thermoplastic adhesive can be applied to the closure blank or to the outer portion of the container body adjacent the marginal edge thereof, or the adhesive can be applied to both blanks. The thermoplastic adhesive is activated and rendered adhesive under the influence of heat generated by heating elements, not shown, incorporated in the drawing and shaping tools. Since the use of heated shaping tools in container construction is old, the same have not been illustrated. If desired, a pressure activated adhesive can be employed, in which event the pressure generated by the annular drawing tool 11 would adhere the interior flange 3 to the exterior of the reduced portion 5 of the container body 1.

The method of Figures 3 to 8 embodies the step of reducing the end portion of the container body preliminary to applying and conforming the closure.

For simplifying the production, the method illustrated in Figures 9 to 12 can be utilized. In this alternate mode of procedure the initial step of deforming the end of the container body 1 about the extension 8 of the mandrel, as shown in Figures 4 and 5, is eliminated. Instead the container body blank 1 is formed about the mandrel 7 and has its opposite ends overlapped and adhered together to form a longitudinal seam so that it appears as shown in Figure 10. Following this, the positioning and deformation of the closure is effected simultaneously with the reduction in size of the end of the container body into conformation with the extension 8 of the mandrel. Thus, as shown in Figures 11 and 12, the closure blank 2 is disposed above the end of the mandrel 7 and the pressing tool 10 and annular shaping tool 11 are moved toward the end of the mandrel so that, as shown in Figure 12, the end of the pressing tool 10 forms a dished bottom of the closure while the annular tool 11 simultaneously forms the flange 3 of the closure and reduces the end of the body 1 to form the cylindrical portion 5 thereof about the reduced extension 8 of the mandrel. Figure 12a illustrates on a reduced scale the container resulting from the steps of Figures 9 to 12.

Figure 13 illustrates a modified form of container end structure in which the reduced cylindrical portion 5 of the container body is provided with a U-shaped fold to form an inwardly extending two-ply rim portion 5', the free edge of the container body being directed outwardly and embraced by the lower portion of the flange 3 of the closure 2. In producing the container of Figure 13 the blank 1 is folded about the mandrel 7 in a manner to leave a portion of the blank extending above the top surface of the reduced extension 8 on the mandrel. Prior to pushing and forming the closure 2 about the body 1 the projecting portion of the container body that extends beyond the end face of the mandrel is first folded inwardly and then outwardly so that the free edge of the container body is directed outwardly so as to be disposed against the inner surface of the flange 3 of the applied closure to prevent any liquid passing into the interior of the container.

In effecting these folds a die 13 having an annular recess 12' at the bottom edge thereof is positioned on the end of the mandrel. This results in the formation of an annular groove extending inwardly from the perimeter of the end of the mandrel. Into this groove formed between the upper surface of the mandrel and the recess on the die the projecting portion of the end of the container body is pressed by means of grooving discs 14, only one of which is shown. These discs circulate on a circular track and, as shown in Figure 16, produce the U-shaped fold in the end portion of the container body. Following the formation of the end structure of the container body the closure blank 2 is deformed and applied about the end portion of the container body in the manner described with reference to Figures 11 and 12. Thus, as shown in Figure 17, the end of the container body 1 is still spaced from the cylindrical extension 8 adjacent the ledge 8'. The pressing tool 10 and the annular die 11 push the blank onto the rim of the container body as defined by the U-shaped fold 5', simultaneously conforming the portion of the body about the extension to produce the reduced cylindrical portion 5 of the body and deforming the closure blank to form the flange 3 thereof.

It is therefore clear that the present invention provides an end structure arrangement for tubular container bodies which includes a reduced body portion adjacent one end, a closure having an outwardly directed flange or rim substantially coextensive in length with the axial extent of the reduced portion of the body and engaging and adhered to the reduced portion of the body, and in which the interior of the body has an annular bead extending completely therearound at the level of the end of the flange whereby the containers can be nested with the edge of the bottom of one container supported by the bead of the container within which it is nested.

The invention further specifically includes an arrangement in which the reduced portion of the container body includes a folded portion of U-shape configuration with the bight of the U inwardly of the wall of the container and the rim edge of the container body contacting the flange of the closure adjacent its juncture with the base of the closure.

What is claimed is:

1. In the production of conical containers the steps comprising shaping a flat body forming blank about a conical mandrel that has a reduced cylindrical end portion to form a conical tubular body, reducing the portion of the body adjacent the cylindrical end portion of the mandrel into conformation therewith to form an inwardly directed shoulder on the interior of the body and simultaneously with reducing the portion of the body adjacent the cylindrical end of the mandrel deforming a closure blank about the reduced portion of the body while forming a closure rim surrounding and embracing the reduced portion.

2. In the production of conical containers the improvement comprising reducing the smaller end of a conical tubular body by transforming the same into a cylindrical

portion extending from an area adjacent but axially spaced from the plane of the smaller end so as to form an internal annular shoulder within the body spaced from the smaller end and simultaneously closing the smaller end of the body.

3. The production of conical containers as claimed in claim 2, in which the closing of the smaller end of the body comprises forming and adhering a rimmed closure about the exterior of the reduced portion of the body with the rim engaging said portion and adhered thereto.

4. The production of conical containers as claimed in claim 2, in which the closing of the smaller end of the body comprises forming a rimmed closure about the smaller end of the body by simultaneously applying pressure from the exterior of the closure and body toward the interior thereof to form and apply a closure rim against the exterior of the body while reducing the exterior of the body and transforming the same into cylindrical shape.

5. A method of producing nestable conical containers of paper, cardboard or the like container forming material having a rimmed closure on the smaller end comprising supporting a conical shaping mandrel having a cylindrical extension on its smaller end with the free end of the mandrel exposed, forming a tubular container body around the mandrel with one end portion of the body surrounding the cylindrical end portion of the mandrel in spaced relation thereto and pressing said end portion of the body into conformation with the shape of the cylindrical end portion of the mandrel to provide a conical container body having its wall deformed to define an internal shoulder and a cylindrical end portion and simultaneously applying the closure to the cylindrical end portion of the body.

6. A method of producing conical containers as claimed in claim 5 in which the closure is an initially flat blank of larger transverse dimensions than the smaller end of the body and the application of the closure includes forming the rim around the cylindrical end portion of the container body simultaneously with the pressing of the end portion of the body against the cylindrical end of the mandrel.

7. A method of producing conical containers as claimed in claim 5 in which said closure is a pre-shaped, dish-shaped closure having a base and a rim extending therefrom and the application of the closure includes circumferentially pressing the rim inwardly against the body to reduce the rim contacting portions of the body into cylindrical conformation.

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