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METHOD OF AND INSTRUMENTALITIES FOR APPLYING PLASTIC CLOSURES TO CONTAINER BODIES

Filed May 14, 1964

FIG. 1

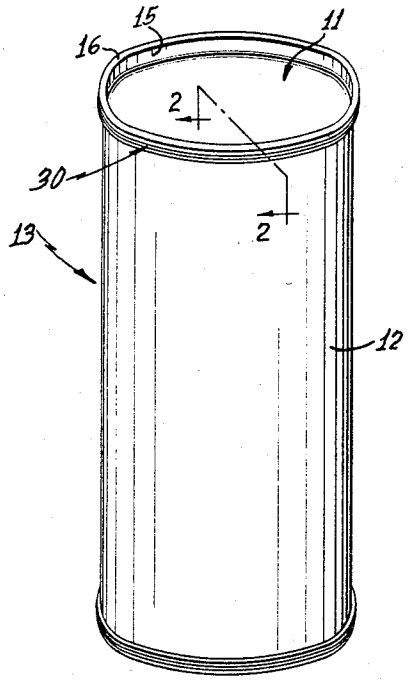


FIG. 2

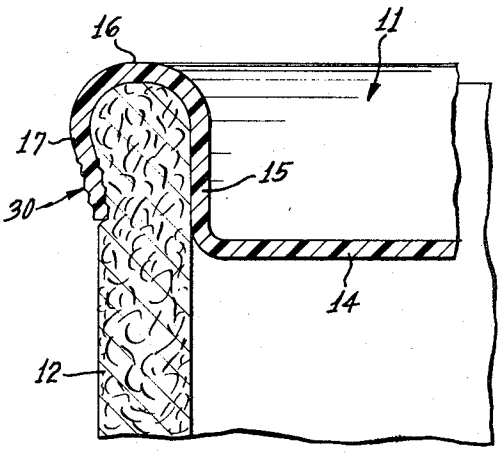


FIG. 3

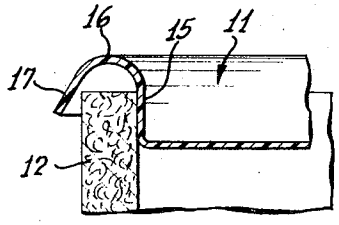
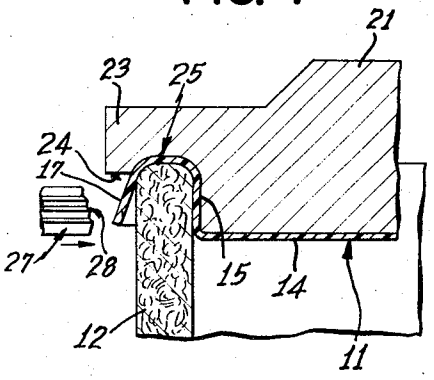


FIG. 4



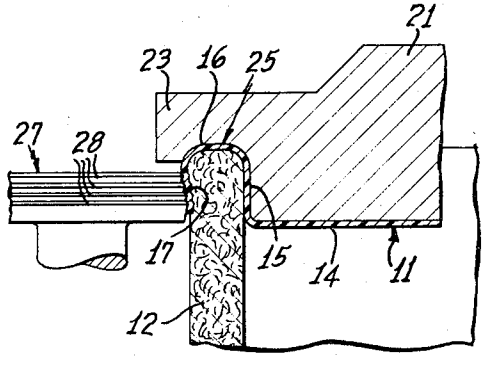


FIG. 5

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METHOD OF AND INSTRUMENTALITIES FOR APPLYING PLASTIC CLOSURES TO CONTAINER BODIES

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Int. Cl. B29d *31/00*; B32b *31/04*

The present invention relates to a method of and instrumentalities for applying closures to containers and has particular reference to conforming the flange of a plastic end closure to the shape of a container body.

The invention contemplates the use of plastic end closures on fibre or other flexible material container bodies to produce composite containers generally used for scouring powders, cleansers, and the like products. The substitution of the plastic closures for the generally used metal closures is to overcome the problem of rusting and corroding of the closure due to exposure to water.

It has been found that due to the weight of products such as scouring powders and the like, a substantially rigid plastic material such as various impact polystyrenes, polypropylenes, linear polyethylene and the like is preferable to effectively hold the contents in the containers without undue bulging of the end closures. Such a rigid plastic material has a tendency to be springy and therefore difficult to form into desired shapes and to bend into certain positions as in the formation of container end seams and the like at room temperatures.

It is an object of the instant invention to overcome the above mentioned difficulty by the provision of a method of cold working the flange of a plastic end closure applied to a container body so as to conform the flange to the shape of the body and to permanently set it in this conforming position to overcome its tendency to spring away from the body, so that such a flange may be utilized as a part of a container end seam.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

The object of the invention is accomplished by providing a plastic end closure having an angularly disposed or slightly flared peripheral flange which when the closure is applied over the open end of a tubular container body, is pressed inwardly at room temperature, against the outer surface of the body and is cold worked by a roller having a serrated face to produce in the outer surface of the pressed-in flange a plurality of annular elements such as ribs or ridges which conform the flange to the shape of the container body and permanently set it in position against the body and thus restrain it from springing away from the body.

Referring to the drawings:

FIG. 1 is a perspective view of a composite container having a flanged plastic end closure attached thereto in accordance with the method steps of the instant invention;

FIG. 2 is an enlarged sectional view of the upper end of the container as taken along a plane indicated by the lines 2—2 in FIG. 1;

FIGS. 3, 4 and 5 are reduced scale sectional views similar to FIG. 2, showing parts of the container and apparatus in the various stages of applying the closure in accordance with the instant method steps.

As a preferred and exemplary embodiment of the instant method invention the drawing discloses the steps of applying a rigid plastic end closure **11** to a flexible cylindrical body **12** to produce a composite container **13** for scouring powder or the like products.

The body **12** preferably is made of fibre board although it may be made of other relatively flexible plastic materials such as polyethylene or the like if desired, and could also be made of rigid materials such as metal.

The plastic end closure **11** preferably is made of high impact polystyrene, polypropylene, linear polyethylene or other plastic material which when molded into an end closure having a material thickness of approximately .023 inch is sufficiently rigid to contain heavy products such as cleaning and scouring powders without undue bulging of the closure.

This closure **11** comprises a countersunk panel **14** surrounded by an annular countersink wall **15** terminating in a curved wall section **16** which merges into a peripheral flange **17**. The countersink wall **15** preferably has an outside diameter substantially equal to the inside diameter of the container body **12** for a snug fit within the end of the body. The flange **17** initially flares outwardly at a slight angle to and in spaced relation to the countersink wall **15** as best shown in FIG. 3 to facilitate application of the closure to the body.

In accordance with the method steps of the instant invention, a closure **11** is placed over an open end of the body **12** as shown in FIG. 3 with its countersink wall **15** disposed within the body and in engagement with the inner surface of the body and with its curved wall section **16** extending over the end edge of the body. The flared flange **17** extends beyond the body adjacent the outer surface thereof. If desired a film of adhesive may be interposed between the outer surface of the countersink wall **15** and the inner surface of the body **12** to secure the closure in place when fully applied.

In this initial position on the body **12** as shown in FIG. 3, the closure **11** is forced into a fully applied position as shown in FIG. 4 by exerting an external pressure onto the closure. This pressure is exerted preferably by a chuck **21** which is pressed against the closure. The chuck **21** preferably is formed with a raised pad **22** adapted to fit within the closure and engage against and support the panel **14** and the countersink wall **15** of the closure. The chuck pad **22** preferably is formed with a surrounding shoulder **23** having a pressure face **24** in which there is formed an annular groove **25** located at the base of the pad **22** and having a width and depth of sufficient dimensions to receive and conform the curved wall section **16** of the closure to the end of the body as shown in FIG. 4 as the chuck presses the closure into its fully applied position.

Following this step, the still outwardly flared flange **17** is pressed inwardly against the outer surface of the body to conform it to the body shape and is permanently set to restrain it against springing away from the body wall. This is preferably effected by a cold working roller **27** which is rolled against the flared flange **17** at room temperature. The circumferential face of the roller **27** is serrated to provide therein a plurality of annular steps or ridges **28** as best shown in FIGS. 4 and 5. The roller **27** may be rotated around the closure flange **17** or the container may be rotated while the roller remains stationary.

In any event, as the roller **27** is moved inwardly into contact with the flared flange **17**, it presses the flange inwardly into tight engagement with the body **12** while the latter is backed up by the chuck pad **22** as shown in FIG. 5. Simultaneously with this action, the roller cold works the outer surface of the flange, producing therein a corresponding plurality of annular ribs or ridges **30** as best shown in FIG. 2. These ribs or ridges **30** extend entirely around the closure and for a reason not exactly known

exert a binding or restraining action on the reformed flange which nullifies its elastic or springy properties and thereby permanently sets the flange against springing away from its engagement with the outer surface of the body.

The roller **27** as shown in the drawing is provided with a tapered face to set off the serrations as steps in the face, thus providing forming ridges of various different diameters. However, a straight faced roller providing forming ridges of equal diameters has proven equally effective. It should be noted however, that a smooth faced roller without the forming ridges therein has been found to be ineffective in providing the cold working action on the closure flange.

This cold working of the flange **17** preferably is confined to the outer surface of the flange which thus leaves this inner surface of the flange smooth for close engagement with the outer surface of the body. If desired a portion of the flange may be imbedded into the body **11** as shown in FIG. 2. The term cold working is used to mean a working or plastic deformation of the material of the flange at room temperature, without the use of any heat or cooling treatments.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description and it will be apparent that various changes may be made in the form, construction and arrangement of the parts and that changes may be made in the steps of the method described and their order of accomplishment without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. A method of conforming a plastic end closure flange to the shape of a container body, comprising the steps of providing a plastic end closure having an outwardly flaring flange, placing said plastic end closure over an

end portion of said container body, pressing said flange inwardly into tight engagement with the outer surface of said body, and cold rolling the outer surface of said flange with a roller having a serrated face to reform the outer surface of said pressed-in flange by plastic deformation to permanently set and restrain said flange against retraction from its tight engagement with said body.

2. A method of the character defined in claim **1** wherein said flange pressing step and said cold rolling step are effected simultaneously.

3. A method of the character defined in claim **1** wherein said flange reforming step includes the formation in the outer surface of said flange of a plurality of annular ribs.

4. A method of the character defined in claim **1** wherein said cold rolling step includes the formation in the outer surface of said flange a plurality of annular ribs of different diameters.

5. A method of the character defined in claim **4** wherein the annular ribs are formed so that the diameter of each rib is less than the diameter of the rib immediately above it.

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U.S. Cl. X.R.

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