ABSTRACT

This disclosure relates to an apparatus for applying a metal end unit to the upper end of a molded flexible plastic body. The apparatus includes a mold which receives the container after being filled, and effects the true shaping of the container, especially the upper portion thereof. The mold cooperates with a seaming chuck to maintain the configuration of the upper portion of the container during the seaming of the end unit thereto.

8 Claims, 7 Drawing Figures
METHOD OF AND APPARATUS FOR CLOSING CONTAINER


This application relates particularly to a molded plastic container which is extremely flexible and which is closed by a metal end unit.

While the molded container bodies have been found to be highly desirable and satisfactory when the end units are properly seated thereto, it has been found that it is extremely difficult to accurately mold much container bodies. For example, not only is it extremely difficult to maintain a constant body height among container bodies, but it is also difficult to maintain a constant body height throughout a single container body. In view of this, it will be readily apparent that if the container body is seated on a supporting surface during the performing of a conventional double seaming operation, the double seam will be improperly formed.

In accordance with this invention, it is not only necessary to shape the container body, but also to accurately position the upper seam forming portion thereof. Accordingly, there is provided a mold which not only facilitates the shaping of the container body at the time a product is being pressed therein, but also which mold cooperates with the container body to support the seam forming portion thereof at a predetermined elevation irrespective of variations in body height.

In accordance with this invention, the upper part of the container body includes a radially outwardly directed intermediate portion in the form of a supporting shoulder. The seam forming portion extends upwardly directly therefrom. By supporting the container body solely on the intermediate portion whereby the effects of variations in height of the container body have no influence on the vertical position of the seam forming portion thereof.

A further feature of this invention is that by supporting the container body solely on the intermediate portion thereof, when the product being packed therein is greater than the available space within the container body due to an improper container height, since the bottom wall of the container is unsupported, it may bulge downwardly to provide additional space for the product within the container.

Still another feature of this invention is the provision of a mold in which a plastic container, which may be badly distorted, may be readily positioned, followed by the compaction of the product contained therein and the forcing of a body wall of the container body radially outwardly in accordance with the intended configuration of the container body as defined by the mold, and the mold having an upper supporting surface supporting the upper portion of the body wall during the securment of a metal end unit thereon.

A further feature of this invention is the provision of a novel method of securing a metal end unit to a flexible plastic container body, the method including the supporting of the upper portion of the container body against both radial and axial movement therefrom applying the metal end unit to the container body under axially directed pressure to initially seat the end unit on the container thereafter securing the end unit to the body wall by means of a conventional type of double seaming operation.

With the above and other objects in view that will hereinafter appear, the nature of the invention will be more clearly understood by reference to the following detailed description, the appended claims and the several views illustrated in the accompanying drawing:

IN THE DRAWING

FIG. 1 is a top perspective of a mold and container body formed in accordance with this invention.

FIG. 2 is an exploded vertical sectional view taken through apparatus for closing the container body of FIG. 1 utilizing a metal end and shows the container body and end generally in position.

FIG. 3 is an enlarged fragmentary vertical sectional view taken through the upper portion of the container body and shows the initial relationship thereof with respect to the mold.

FIG. 4 is a sectional view similar to FIG. 3 and shows the container body after the initial positioning of a metal end unit thereon.

FIG. 5 is a further sectional view similar to FIG. 3 showing the end unit supported by the body wall during the seaming thereof to the body wall.

FIG. 6 in a fragmentary vertical sectional view taken through the seam portion of the container after a first seaming operation.

FIG. 7 in a vertical sectional view similar to FIG. 6 and shows the final seam configuration.

Referring now to the drawing in detail, it will be seen that there is illustrated in FIG. 1 a plastic container body formed in accordance with this invention, the container body being generally identified by the numeral 10. The illustrated container body is of a configuration particularly adapted to receive a ham and while this is the primary intended use of the container bodies formed in accordance with this invention, it is to be understood that the container body 10 may be of any configuration required for a particular product being packaged.

The container body 10 is of a one-piece molded construction and includes a bottom wall 11 and an upstanding body wall 12. As is best shown in FIG. 2, the body wall 12 is upwardly flared from the bottom wall 11. This both facilitates the handling of the container body 10 in a manner to be described hereinafter, and the removal of a product therefrom.

Referring now to FIG. 3 in particular, it will be seen that the body wall 12 includes an upper seam forming portion 13 which is of a reduced thickness as compared to the remainder of the body wall and terminates at the free end thereof in a radially outwardly directed flange 14 which may be further reduced in thickness and is about one half the thickness of the main portion of the body wall 12. The seam forming portion 13 is radially outwardly offset relative to the adjacent portion of the body wall 12 and is connected thereto by an intermediate shoulder 15. The shoulder 15 has a flat outer seat forming surface 16 which is disposed substantially parallel to the bottom wall 11, and a generally flat inner supporting surface 17. It is further to be noted that the intermediate shoulder 15 increases in thickness radially outwardly from the thicker body wall 12 into the
thinner seam forming portion 13. While this tapers the reverse of that which normally would be expected, it has been found that this specific construction provides for a more firm support of the container body during the seaming of the end unit thereto.

In accordance with this invention, it is proposed to close the open upper end of the container body 10 with a metal end unit which is generally referred to by the numeral 18. The end unit 18, as is best shown in FIG. 4, includes an end panel 20 which is surrounded by a downwardly directed bead 21. The bead 21 forms a lower extension of the usual chuck wall 22 which surrounds the end panel 20.

The end unit 18 is of the easy opening type and includes a peripheral score line 23 (FIG. 4) which defines the removal panel portion. It is to be noted that the score line 23 is so positioned wherein the removable part of the end panel 20 constitutes a major portion thereof. It is also to be noted that the intermediate shoulder 15 is of a radial extent such that the score line 23 overlies the shoulder 15 in a fully recessed position so that the raw edge which results along the score line 23 upon the opening of the container is well protected.

The end unit 18 further includes the usual seaming panel 24 which terminates at its free end in a curl 25. The seaming panel 24 is connected to the chuck wall 22 by means of a seaming panel radius 26.

At this time it is pointed out that in order to assure a proper seam between the end unit 18 and the container body 10, there is applied to the end unit 18 a sealing compound 27. It is to be noted from FIG. 4 that the sealing compound 27 is positioned along only the seaming panel radius 26 and an adjacent portion of the seaming panel 24. It has been found that an excess amount of the sealing material 27 will prevent the proper formation of the desired double seam.

Reference is now made to FIG. 2 wherein there is illustrated the apparatus utilizing in closing the container body 10 with the end unit 18. This apparatus includes a mold, which is generally referred to by the numeral 28. The mold 28 includes a bottom wall 29 and an uprighting wall 30, the walls 29 and 30 defining a cavity adapted to shapely receive the container body 10 when filled with a product.

At this time it is pointed out that because of numerous factors, including molding difficulties, distortion during shipment and handling, etc., the container bodies 10 do not conform exactly to the cavity of the mold 28. However, because of a slight taper of the container body and the corresponding taper of the mold, a filled container body 10 may be readily inserted into the mold with the container body being shaped as it moves into the mold and normally when the container body is fully seated within the mold, there will be a slight spacing between the body wall 12 and the uprighting wall 30 of the mold, as is shown in FIG. 4.

The uprighting wall 30 of the mold 28 terminates at its upper end in a horizontal supporting surface 31. It is to be understood that the filled container body 10, when placed within the mold 28, will be supported substantially entirely, if not solely by, the shoulder 15, which shoulder 15 seats upon the supporting surface 31. When the filled container body 10 is initially seated within the mold 28, the container body will fit into the mold with a 0 to 0.010 inch clearance on a side. At the same time, there will be ample clearance between the bottom wall 11 of the container body 10 and the bottom wall 29 of the mold 28. When the container body 10 is to be filled with a ham, a precut whole ham is placed in the container body and the filled container is then set in the mold 28. The mold and container body are then passed into a vacuum chamber of a closing machine of which the mold 28 may be fixed part and the metal end unit 18 is positioned in overlying relation to the ham.

The closing machine includes a support 32 on which the mold 20 is seated. The support 32 is carried by a vertically movable shaft 33. At this time it is pointed out that the bottom wall 29 of the mold 28 is provided with vent openings 34 wherein to facilitate the escape of air from the mold 28 when the can body 10 is seated therein. It may be desirable to provide matching passages 35 in the support 32.

The closing machine will also include a seaming chuck 36 which is particularly configured for cooperation with the end unit 18. The seaming chuck 36 will have associated therewith a knock out 37 to facilitate the separation of the seaming chuck 36 from the closed container. It is to be understood that the closing machine will also include conventional types of seaming rolls (not shown) which cooperate with the seaming chuck 36 to effect the double seaming of the end unit 18 to the container body 10.

Referring now to FIGS. 4 through 7, the method of applying the end unit 18 to the container body 10 will be briefly described. After the end unit 18 is seated on the container body 10 and the product disposed therein, the support 32 moved upwardly to bring the end unit 18 into engagement with the seaming chuck 36. This initial engagement is illustrated in FIG. 4. As the support 32 moves upwardly under further pressure, which may, for example, apply a total load of 450 pounds on the bottom of the mold 28, there is a compressing of the product within the container body 10 and the bead 21 moves down into engagement with the intermediate shoulder 15 while the intermediate shoulder 15 is, in turn, fully seated in supporting relation on the supporting surface 31 of the mold 28.

When the end unit 18 is moved down to the position of FIG. 5 and is ready for a double seaming operation, the product within the container body 10 has been sufficiently compressed so as to assure the shaping of the side wall 12 of the container body 10 to conform to that of the mold although it may not necessarily be in touching contact with the mold throughout its periphery. However, the container body 10 is sufficiently shaped in cooperation with the mold so that the seam forming portion 13 is of the necessary configuration to mate with the end unit 18.

At this time it is pointed out that in the event the product placed within the container body 10 has too much volume, within limitations, this will not cause a problem. After the body wall 12 has been expended outwardly into intimate engagement with the mold wall 30, if a further compaction of the product is required, the bottom wall 11 of the container body 10 is free to downwardly bow so as to increase the volume of the container body.
At this time it is also pointed out that inasmuch as the container body is supported, for all practical purposes, solely by the intermediate shoulder 15, it will be seen that vertical variations in the body wall 12 will in no way change the position of the seam forming portion 13. Thus, the seam forming portion 13 will always be of the desired height and desired configuration for mating with the end unit 18.

In order to form a satisfactory double seam between the metal end unit 18 and the plastic container body 10, care must be taken to set the first operation tightness so that the hook 40 (FIG. 6) of the end unit is rolled inwardly and outwardly until it is virtually parallel to the body wall 12. The second operation of the closing machine is set tight enough so that the body wall thickness in the cross section of the double seam is approximately 30 percent to 50 percent less than its original thickness as is shown in FIG. 7. The completed double seam is generally identified by the numeral 41 and is of a construction so as to provide a tight sealed joint between the end unit 18 and the body wall 12 with the seal being assured by means of the sealing compound 27.

It is pointed out at this time that inasmuch as the body wall is formed of plastic, its resistant to flow is only slightly greater than that of the sealing compound 27. Therefore, an excess amount of the sealing compound applied to the end unit 18 will result in an improper securement of the end unit to the body wall. It is for this reason that the placement of the sealing compound 27 is critical.

Although only a preferred embodiment of the container and the apparatus for closing the same has been specifically illustrated and described herein, it is to be understood that minor variations may be made in the container construction without departing from the spirit of the invention.

I claim:

1. A method of seaming a metal end unit to a flexible plastic container body having a bottom wall, an upper seam forming portion, and an adjacent radially outwardly directed supporting shoulder, said method comprising the steps of positioning the container body within a mold having an upper body supporting surface, positioning an end unit on the container body subsequent to the filling thereof, applying an axial force to the end unit to fully seat the end unit on the container body with the container body supporting shoulder being seated on the upper body supporting surface of the mold, and then while holding the end unit seated on the container body seaming the end unit to the container body by folding peripheral portions of both said upper seam forming portion and said end unit into interlocked seam forming relation.

2. The method of claim wherein the end unit compressively engages a product positioned within the container body prior to said seaming operation to radially outwardly expand the container body and in conjunction with the mold to shape the upper seam forming portion for proper mating with the end unit.

3. The method of claim wherein the end unit has a chuck wall radius which is seated on an upper surface of the supporting shoulder during said seaming operation.

4. The method of claim wherein the container body is primarily supported through the supporting shoulder during said seaming operation and the container bottom wall is spaced above a bottom wall of the mold and is free to deform downwardly under internal pressure.

5. The method of claim wherein a product is placed within the container body prior to the placement of the container body in the mold, and the container body is vertically positioned within the mold solely by engagement of the supporting shoulder with the upper body supporting surface of the mold.

6. The method of claim wherein the container body is vertically positioned within the mold solely by engagement of the supporting shoulder with the upper body supporting surface of the mold.

7. An apparatus for use in seaming a metal end unit to a flexible preformed container body of the type having a preformed radially outwardly directed intermediate shoulder adjacent the upper end thereof, said apparatus comprising a mold means for receiving therein a preformed flexible container body in shape maintaining relation, said mold means terminating at the upper end thereof in a container body supporting surface disposed adjacent the interior surface of said mold, and a seaming chuck receivable in an end unit, said seaming chuck having a lower peripheral portion aligned with and cooperative with said container body supporting surface of the mold to clamp therebetween portions of an end unit and a container body in supported container body shaping relation during a separately performed seaming operation.

8. The apparatus of claim wherein the container body supporting surface of the mold is in a vertical position to form the sole vertical support for a container body positioned therein.