CONTAINER TOP CLOSURE CONSTRUCTION

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ABSTRACT OF THE DISCLOSURE

A liquid-tight extensible pouring spout for a large sized gable-top container formed of paperboard having an overall surface of heat sealable thermoplastic material with an abhesive sealing resistant coating applied over the surface adjacent the lip of pouring spout such that the abhesive coating is spaced from the lip of the spout a predetermined amount to define a marginal lip sealing area when the pouring spout is pressure heat sealed.

The present invention relates to packaging and more specifically to a container top closure construction. The invention finds particular, but not exclusive, utility in disposable containers adapted for fluid packaging, milk, orange juice, concentrated syrups and other products.

One form of container of the type just noted and presently in wide commercial use, is disclosed in U.S. Patent 3,116,002, issued Dec. 31, 1963, to D. J. Crawford and V. Arslanian. Such a container is customarily erected from a flat blank formed of sheet stock, such as paperboard having an overall coating of thermoplastic film, such as polyethylene applied on the surfaces of the sheet. The blank has been cut to shape and impressed with an appropriate pattern of score lines which define a plurality of side panels, together with corresponding upper and lower extensions of flaps or closure members.

The container having a sealed closure of the type referred to in the above patent was designed for use in packaging fluids, such as milk and other dairy products. When a carton of this type is used to package concentrated syrups and other food products having a longer shelf life, the necessity of providing an improved closure seal is encountered to eliminate so-called “top leakers.” Although the sealed top closure of the type disclosed in the patent 3,116,002 have been commercially successful, they do possess critical areas for the developing of incipient fluid escape channels. It has been discovered that with the increase in size of the container, such as the gallon container, the difficulty in sealing the escape channels is due to the heavier caliper paperboard. The increased amount of material in the larger size containers makes the control of the folding and sealing operation more difficult with the increased possibility of resulting fluid escape channels.

It is an object of this invention to provide a new and improved sealed gable top closure which can easily be released and extended by the consumer.

Another object of the present invention is to provide a container of the above characteristics which includes a sanitary extensible pouring spout having a line seal at the pouring lip edge.

A further object of the present invention is to provide an improved sealed container closure for large sized plastic coated paperboard containers which can be heat sealed over a pair of continuous offset parallel surfaces to eliminate incipient fluid escape channels, while eliminating the problem of effecting a continuous seal at their transition area, yet can be easily released while leaving the pouring lip area in a serviceable condition.

FIG. 1 shows an illustrative container having an enclosed pouring spout to which the present invention has been applied.

FIG. 2 illustrates a container of the type shown in FIG. 1 with the pouring spout opened and the pouring lip in position for dispensing the container contents.

FIG. 3 is a layout view of an inside surface of a container blank, with the side panels broken away, showing the inventive structure.

FIG. 4 is a cross-section view through the container rib and the upper portion of the pouring spout structure shown in FIG. 1.

One container of the type with which the present invention finds particular, but not necessarily exclusive utility, is shown in the accompanying drawings. Such a container is also disclosed in considerably greater detail in copending Egleston and Monroe U.S. Patent 3,270,940, issued Sept. 6, 1966. For purposes of the present invention, however, it will suffice to note that such container may be formed from paperboard or other appropriate foldable sheet material and is self-sustaining in shape. The sheet material is rendered liquid-tight by means of an overall coating, on both surface, of a thermoplastic material such as polyethylene, making the container capable of holding such acidic liquids as milk. This thermoplastic coating also serves as a heat sensitive adhesive of which overlapping layers of the sheet material may be sealed together when erecting and sealing the container. The coating adheres tightly to the paperboard so that it, as well as any seals utilizing the coating, remains permanent and liquid-tight.

Referring more specifically to FIG. 1, there is shown an illustrative container C, with its pouring spout extended, of the character set forth above and formed of plastic coated paperboard. The container comprises a tubular body 20 of generally rectangular cross-section having a flat bottom closure (not shown), and a top closure 22, which will be recognized as the familiar gable top closure characterized by inclined roof panels 24, 25, surrounded by an upstanding central sealing rib or truss 35. In the present instance, the paperboard from which the container is formed is preferably a laminated blank of the type disclosed in U.S. Patent 3,259,123, issued Mar. 8, 1967, and assigned to the assignees of the present application. Typical dimensional figures designating the thickness of the outer layer which is in use in a one-gallon container range from .0005 inch to .0004 inch of polyethylene. The paperboard material which is used as the main material of the container ranges from .017 inch to .030 inch. The inside coating of the container preferably comprises a laminate coating consisting of an adhesive layer ranging from .00050 inch to .00050 inch, an aluminum foil layer of approximately .00035 inch and a product contacting layer of polyethylene having a thickness in the range of .00005 inch to .0010 inch.

The gable top closure is formed by the inclined roof panels 24, 25 each of which is surrounded by an outer sealing rib panel 29, 30 together with a pair of in-turned triangular end panels 31, 32 each joined to the adjacent roof panels 24, 25 by triangular fold-back panels 34, 35 and 36, 37 respectively. A side seam flap 38 is provided at one edge of the blank for the container C, for joinder with roof panel 24 and its associated side and bottom panels, to complete the body of the container. To complete the rib portion, each of the triangular fold-back panels includes adjacent its upper edge a corresponding one of inner rib panels 39, 40, 41, 42. These panels are shown more clearly in FIGURE 3 which illustrates a layout of the inside surface of a blank adapted to be erected into the completed container and closure of FIGURE 1. When a container is erected from such a blank, the side seam flap 38 is first attached to the opposite edge portion of the blank to produce a flat-folded tube. This flat folded tubular blank may be erected in any manner known in the art to form a container and closure.
In a completed closure of the type shown, the rib panels 39, 40, 41, 42 folded between the outer rib panels 29, 30 on the inclined roof panels. To seal the closure, heat is applied to the thermoplastic coating on the various rib panels just before the container is closed, after which a sealing pressure is applied to the sealing rib or true 29, 30, so formed by the various rib panels so that the hot plastic on contacting the rib surface fuses to form a liquid tight sanitary seal.

In order to dispense the contents of the container C, a suitable opening or spout is accessibly provided as a part of the closure. In the case of the gable top closure as shown in FIGURE 1, one end of the closure is adapted to be pulled out to form a pouring spout as shown in FIGURE 2. The steps of opening the spout are well known and are shown and described in my U.S. Patent 3,116,002.

When the closure is heated and subjected to pressure to effect a seal and thereby provide a sanitary package, all of the rib panels are subjected to heat at a temperature sufficiently high to render the thermoplastic coating on the container molten or tacky so as to effect a liquid tight seal when the container closure elements are pressed together. As described in Patent 3,116,002, a heat and sealing resistant material which may, for example, be of the organo-siloxane type, is placed on the inner surface of the blank as shown in the shaded areas 46, 47 and 48 in the drawings, where it is desired to avoid permanent sealing.

As shown in FIGURE 3, the abhesive layers are printed or otherwise applied on each of the inner rib panels 39, 40 extending from a line 49, located a fraction of an inch below and parallel to the pouring edge 50. The abhesive extends downwardly and somewhat below the transverse score line 51. By dropping the printed layer 46 a small amount, as for example a distance of approximately ¼ inch on the blank used to form the one-gallon size container, a marginal sealing area 52 of untreated material is retained on the surface of the blank. Also, the abhesive layer 46 on each of the inner rib panels 39, 40 terminates short of the outer end thereof, as disclosed in our issued Patent 3,116,002, leaving at the outer end of each such rib panel the sealing areas 53 of untreated material on the surface of the blank.

It can thus be seen that in order to seal the pouring spout of the instant invention it is only necessary to apply pressure to the outer rib panels 29, 30 and in turn to the inner rib panels 39, 40 and 41, 42. However, it is not essential that the upper rib panels 54, 55 be heat sealed along their entire length to effectuate a fluid tight seal of the closure. As explained previously when the abhesive layer extended completely to the pouring edge 50 it was essential that a coextensive heat seal be attained between the upper rib panel 54, 55. With the employment of heavier gage paperboard the difficulty of preventing an escape channel from forming along the mating edge 50 is increasingly difficult. This is due to the larger radius of curvature indicated at the transition area 56 in FIGURE 4 caused by the transition from the four ply area of the container rib to the two ply area formed by panel 54, 55. By virtue of applicant's invention it is now only required to engage and heat pressure seal the opposed co-planar surfaces 29, 30 to liquid seal the pouring spout 50 along the edge 57 while attaining a seal along the upper and outer extremities of panel 54, 55 to Sanitarily protect the pouring spout.

In order to insure that the channel 58 is completely closed to the passage of liquids of low viscosity it is also additionally required to provide tufts 59, 60 that are located on the pouring lip edge 50 adjacent the vertical fold lines 61, 62 of the container blank. It will be noted that tufts 59, 60, which are formed as integral continuations of the sheet material, are spaced equidistant from the scores 61, 62 such that upon formation of the container they will be positioned in opposed relation near the outer extremity of rib 26. It can be seen from FIGURE 4 that the height of tufts 59, 60 are sufficient such that upon the formation of heat seal 63 the tufts will be joined together under substantial compression in both a vertical and horizontal direction to completely block channel 58. In this regard it should also be noted that the length tufts 59, 60 is limited to a distance in the order of one twentieth the total length of their associated edges 50. This is to prevent the accumulation of too great an amount of blocking material within channel 58 such that the folding and sealing operation of the container packaging machines is disrupted.

The cross-section view of FIGURE 4 also shows the inner surfaces of panel 39, 40 provided with a pressure heat-seal 64 located in the vertical plane of pressure heat-seal 63. It will be noted that U.S. Patent 3,116,022 shows this portion of rib panels 39, 40 provided with a coating of abrasive material to prevent the bonding of the juxtaposed surfaces of panels 39, 40. However, in the instant closure these surfaces, as indicated in FIGURE 2, are not coated with abrasive material with the resultant formation of the pressure heat-seal 64.

By virtue of the upward movement of the fold-back panel 34, 35 during the container opening sequence the seal 64 is initially broken prior to the seal 63. It was discovered that this sequential operation made it possible to eliminate the abrasive coating on the juxtaposed surfaces of panel 39, 40 without interfering with the easy release characteristics of the closure.

While it will be apparent that the preferred embodiment of the invention herein disclosed is well calculated to fulfill the objects above stated, it will be appreciated that the invention is susceptible to modification, variation, and change without departing from the proper scope or fair meaning of the subjoined claim.

I claim as my invention:

A gable-top container formed from a blank of paperboard of thickness of the order of .024 inch having a polyethylene coating covering each surface thereof and comprising a tubular body having a bottom closure thereon, a pair of opposed roof panels inclined toward each other and overlying said body, a pair of opposed triangular end panels infolded between said roof panels from the opposite gable ends formed by the latter, two pairs of triangular fold-back panels each pair of which is integral with a respective one of said infolded triangular end panels along fold lines which are substantially in contact with said roof panels, said fold-back panels being folded against the underside of said roof panels, a pair of side rib panels each integral with and surrounding a respective roof panel, two pairs of end rib panels, each end rib panel being integral with and surrounding a respective fold-back panel, the end rib panels of each pair being folded to lie against each other and to lie against the inner surface of a respective side rib panel, the height of said end rib panels being less than the height of said rib panels, said rib panels defining a central laminar top rib divided longitudinally into a fixed portion and a movable portion, a sanitarily protected extensible pouring spout housed in collapsed condition within said container and defined in part by one of said triangular end panels, an adjacent pair of said fold-back panels and an adjacent pair of said end rib panels, said spout also being defined by adjacent portions of said roof panels and side rib panels, said rib panels being adapted to be sealed together to form a liquid-tight seal by the application of heat and pressure thereto to bond together the contacting polyethylene coated surfaces thereto, the improvement in the invention comprising:

(a) an abhesive coating covering a substantially rectangular first strip portion on the inner surface areas of said adjacent pair of end rib panels,
(b) said first strip portion extending parallel to and spaced from the upper free edges of said pair of end
rib panels a distance of the order of \( \frac{3}{4} \) inch, said strip extending adjacent to and equally spaced from the opposed ends of said pair of end rib panels; and

(c) an adhesive coating covering a rectangular strip portion on the inner surface of each of said side rib panels, said last named strip portions being located such that their upper boundaries are colinear with the upper boundary of said first strip portion to coincide therewith to provide a marginal liquid-tight releaseable pressure heat seal having a ratio of length to width of the order of 30:1 to permit ease of opening upon formation of the container.