Oct. 7, 1969 D. J. CRAWFORD 3,471,076

CONTAINER CLOSURE CONSTRUCTION

Filed Oct. 17, 1967 2 Sheets-Sheet 1

FIG. 1

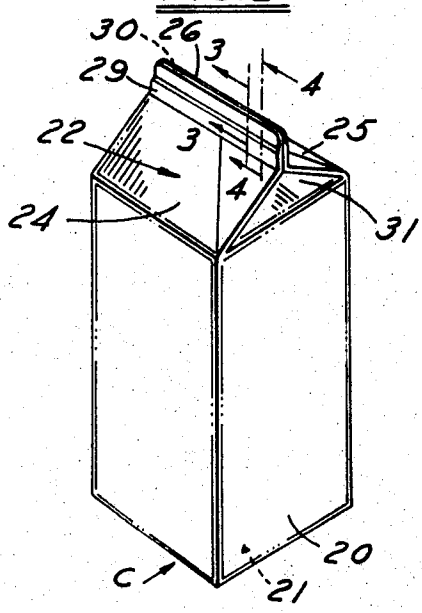


FIG. 2

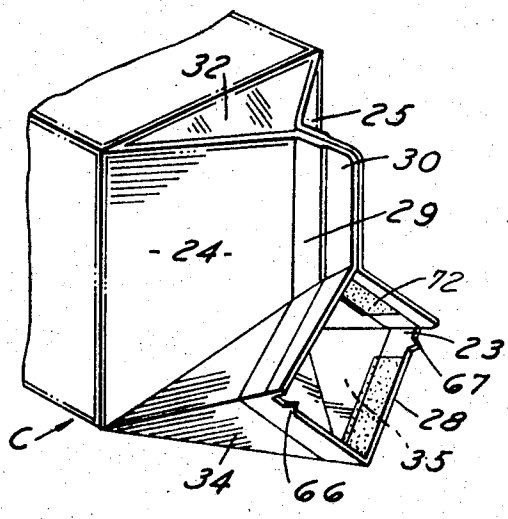


FIG. 3

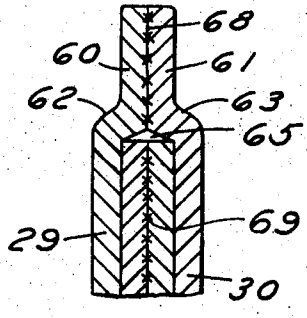
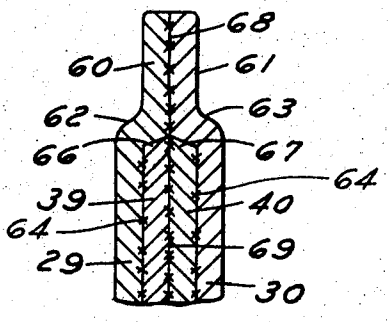


FIG. 4



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CONTAINER CLOSURE CONSTRUCTION

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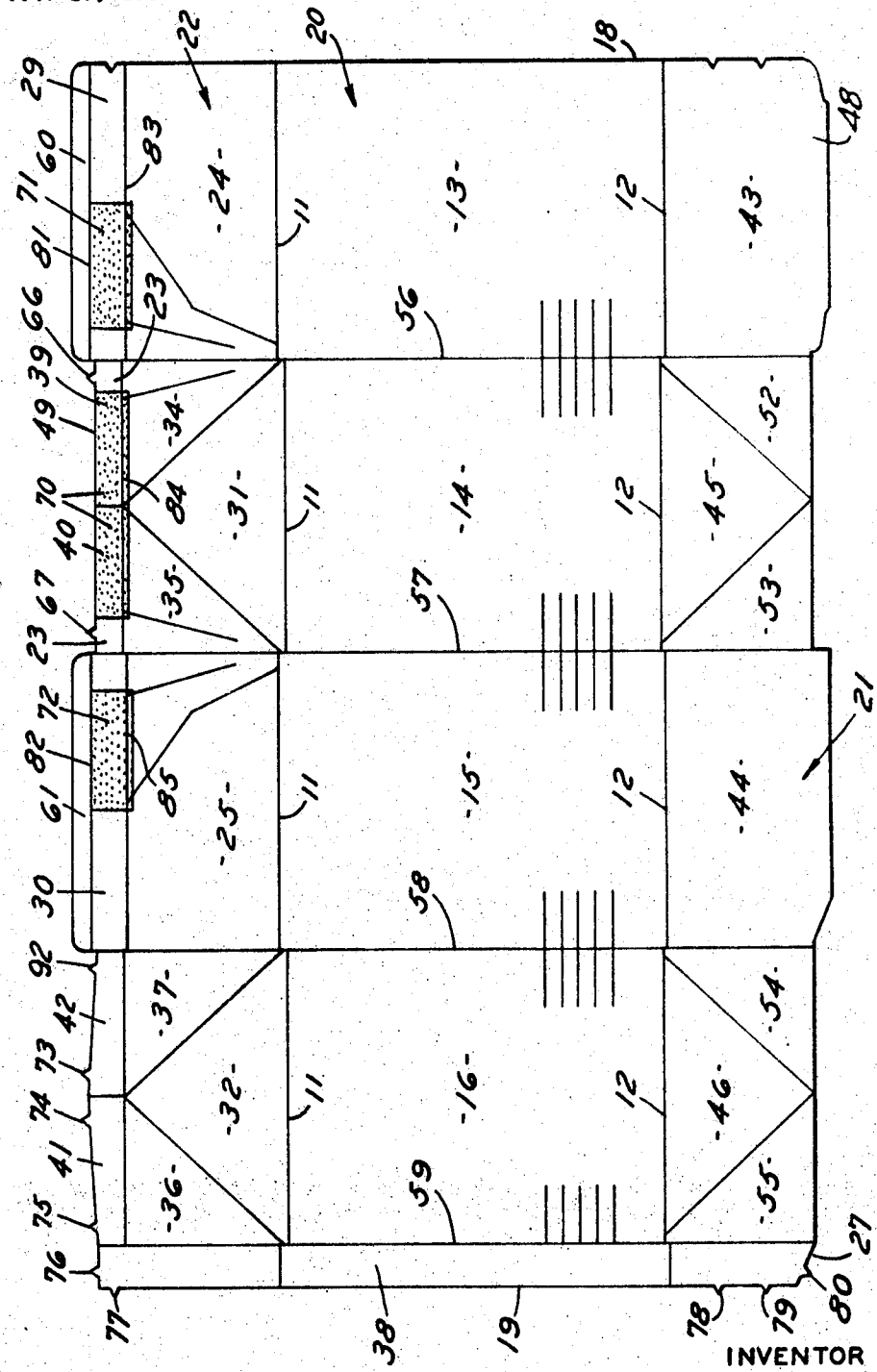

FIG. 5

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CONTAINER CLOSURE CONSTRUCTION

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Int. Cl. B65d 5/74
U.S. Cl. 229—17 7 Claims

ABSTRACT OF THE DISCLOSURE

A container blank having tufts of sheet material integral along preselected edges of said container blank whereby passage of liquid is prevented along channels in final container closure construction.

The present invention relates to packaging and more specifically to a container 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 3,334,799, issued Aug. 8, 1967, to D. J. Crawford. Such a container is customarily erected from a flat blank formed of sheet stock, such a paperboard having an overall coating of thermoplastic film, such as polyethylene applied on the surface 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 concentrated syrups, milk, and other dairy and food products. Although the sealed top closure of the type disclosed in the Patent 3,334,799 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.

A further object of the present invention is to provide an improved sealed container closure for all sized plastic coated paperboard container 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.

In the drawings:

FIG. 1 shows an illustrative container having the pouring spout inclosed 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 cross-section view through the container rib and the upper portion of the pouring spout structure shown in FIG. 1;

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

FIG. 5 is a layout view of an inside surface of a container blank, with the side panels broken away, showing the inventive structure.

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 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 as by means of an overall coating, on both surfaces, of a thermoplastic material such as polyethylene, making the container capable of holding such acidic liquids as milk. This thermoplastic coating also serves as 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, 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 **21** and a top closure **22**, which will be recognized as the familiar gable top closure characterized by inclined roof panels **24, 25**, surmounted by an upstanding central sealing rib or truss **26**.

The container body **20** is shown in FIG. 5 as the inside surface of a flat blank having a pattern of appropriate score lines. The container is separated into three groups by staggered score lines **11** and **12**. The area above score line **11** as seen in FIG. 1 is the top closure **22**, a discussion of which is not necessary for the disclosure of the present invention; however, a complete disclosure is given in Patent No. 3,185,376, issued May 25, 1965, and assigned to the assignees of the present application. The area between score lines **11** and **12** as seen in FIG. 5 is the container body **20** and comprises four panels **13** through **16** and side seam flap **38**. The container body **20** is defined on the sides by cut edges **18** and **19**. The panels **13** through **16** and side seam flap **38** are separated by score lines **56** through **59**. The area below score line **12** as seen in FIG. 5 is the bottom closure **21**, a complete discussion of which is not necessary to the disclosure of the present invention; however, a complete disclosure is given in Patent No. 3,120,333, issued Feb. 4, 1964, and assigned to the assignees of the present application.

The bottom closure group below score line **12** is made up of major bottom flaps **43** and **44** and minor bottom flaps **45** and **46**. The minor bottom flaps **45** and **46** are flanked by fold-back members **52–53** and **54–55**, respectively. The top closure group is made up of roof panels **24** and **25** and triangular end panels **31** and **32**. End panels **31** and **32** are flanked by triangular fold-back panels **34–35** and **36–37**, respectively. The panels extend between roof panels **24, 25** and triangular end panels **31, 32** upon construction as viewed in FIG. 1.

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 3,239,126, issued Mar. 8, 1966, and assigned to the assignees of the present application.

The gable top closure is formed by the inclined roof panels **24, 25** each of which is surmounted by an outer 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 13 and 43, to complete the body of the container. To complete the rib portion, each of the triangular fold-back panels 34, 35, 36, 37 includes adjacent its upper edge a corresponding one of inner rib panels 39, 40, 41, 42. These panels are shown more clearly in FIGURE 5 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.

To form the bottom, the container blank 20 is opened up into a tubular form with the major bottom flaps 43 and 44 moving toward each other. Also, the minor bottom flaps 45 and 46 are moved toward each other. This causes bottom fold-back member 55 to rotate around score line 59 so that the inside surfaces of member 55 and flap 43 are coming together. At the same time and during the same movement fold-back member 55 is rotating so that the outside surfaces of fold-back member 55 and flap 46 are coming together. Fold-back members 52, 53, and 54 make the same movements as member 55 with panels 43–45, 44–45 and 44–46, respectively. Bottom closure major flap 43 moves toward bottom closure major flap 44 just enough faster than flap 44 moves toward flap 43 so that tuck-in member 48 is positioned between fold-back member 53 and 54 and major bottom flap 44.

In a completed top closure 22 of the type shown in FIGURE 1, the rib panels are all laminated together, with the inner 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 truss 29, 30 thus formed by the various rib panel 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 22 as shown in FIGURE 1, one end of the closure is adapted to be pulled out to form an extended pouring spout as shown in FIGURE 2. The steps of opening the spout are well known and are shown and described in U.S. Patent 3,116,002, issued Dec. 31, 1963.

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 explained in U.S. Patent 3,116,002, a heat and sealing resistant material which may, for example, be of the organosiloxane type, is placed on the inner surface of the blank as shown as the shaded areas 70, 71 and 72 in FIGURE 5 of the drawings, where it is desired to avoid permanent sealing.

As shown on FIGURE 5, the abhesive layer 70 is printed or otherwise applied on each of the inner rib panels 39, 40. Likewise, abhesive layers 71 and 72 are printed or otherwise applied on outer rib panels 29, 30 and located up to center line of the score lines 81, 82 of panels 13, 15, respectively. The abhesive layers 71, 70 and 72 likewise extend downwardly and somewhat below the transverse score lines 83, 84 and 85, respectively. The abhesive layer 70 on each of the inner rib panels 39, 40 terminate short of the outer end thereof, as disclosed in issued Patent 3,116,002, leaving at the outer end of each such rib panel the sealing areas 23 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.

With the abhesive layer 70 extended completely to the pouring edge 49 it is essential that a coextensive heat seal be attained between the upper rib panels 60, 61. With the employment of heavier gage paperboard difficulty of preventing an escape channel to form along the mating edge 49 is increasingly difficult. This is due to the larger radius of curvature indicated at the transition area 62, 63, as shown in FIGURES 3 and 4, which is caused by the transition from the four ply area of the container rib to the two ply area formed by panel 60, 61. By virtue of applicant's invention it is now only required to engage and heat pressure seal the opposed co-planar inner surfaces of inner rib panels 39 and 40 of triangular fold-back panels 34, 35, outer rib panels 29, 30, and upper rib panels 60, 61 to liquid seal the pouring spout along heat seals 64 and 68, respectively, as shown in FIGURE 4.

In order to insure that the channel 65, as shown in FIG. 13, is completely closed to the passage of liquids of low viscosity tufts 66, 67 are located on the pouring lip edge 49 adjacent the vertical fold lines 56, 57 of the container blank. It will be noted that tufts 66, 67, which are formed as integral continuations of the sheet material, are spaced equidistant from the scores 56, 57 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 FIGS. 3 and 4 that the height of tufts 66, 67 are sufficient such that upon the formation of heat seal 68 the tufts will be crowded together under substantial compression in both a vertical and horizontal direction to completely block channel 65. In this regard it should also be noted that the length tufts 66, 67 is limited to a distance in the order of one twentieth the total length of the associated pouring lip edge 49. 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.

Additionally, it is apparent that tufts 92, 73 located on inner rib panel 42 of triangular fold-back panel 37, and tufts 74, 75 located on inner rib panel 41 of triangular fold-back panel 36 completely close off the channel to the passage of liquid in the outer rib panels 29, 30 opposite the pouring lip side when the carton is formed. The tuft 77 along the upper end of cut edge 19 of side seam flap 38 also prevents the passage of liquid in the upper gable portion when the side seam flap 38 is joined to outer rib panel 29 of the roof panel 24.

Tufts 78 and 79 along the lower edge 19, and tuft 80 along a bottom edge 27 of side seam flap 38, prevent the passage of liquids by closing off the channel along the side seam flap 38 when formed in the bottom 21 of container blank 20.

The cross-section view of FIGURE 4 shows the inner surfaces of panel 39, 40 provided with a pressure heat-seal 69 located in the vertical plane of pressure heat-seal 68. It will be noted that U.S. Patents 3,116,002, issued Dec. 31, 1963; 3,270,940, issued Sept. 6, 1966; and 3,334,799, issued Aug. 8, 1967, and assigned to the assignees of the present application, shows portions of rib panels, corresponding to rib panels 39, 40 of this disclosure provided with a coating of abhesive material to prevent the bonding of the juxtaposed surfaces 70 and 71, 72 of panels 39–40, 29 and 30, respectively, as shown in cross-section view of FIGURE 3. By virtue of the upward movement of the fold-back panels 34, 35 during the container opening sequence the seal 69 is initially broken prior to the seal 68. It was discovered that this sequential operation made it possible to eliminate the abhesive coating on the juxtaposed outside surfaces of panel 39, 40 without interferring

with the easy release characteristics of the closure. However, fluid escape is prevented by virtue of tufts **66, 67** adjacent the edges **56, 57** of the folded container, as shown in cross-section of FIGURE 4.

While it will be apparent that the preferred embodiment of the invention therein 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 score or fair meaning of the subjoined claims.

I claim as my invention:

1. In a dispensing container having a tubular body surmounted by a top sealed closure sanitarily housing a pouring lip, said closure and lip being formed of sheet material having a heat sealable thermoplastic surface comprising, in combination:

(a) said tubular body being rectangular in cross-section,

(b) said pouring lip having at least two inner rib panels,

(c) pouring lip ends positioned substantially at the outer surface of said tubular body,

(d) a pouring lip edge extending substantially the length of said pouring lip,

(e) first and second tufts positioned a predetermined distance from said pouring lip ends and projecting above said pouring lip edge,

(f) said top sealed closure forming fluid channel above said pouring lip edge,

(g) said first and second tufts filling a cross-section of said fluid channel,

(h) said first and second tufts are symmetrically located above their associated juxtaposed seal areas wherein said tufts are crowded together upon pressure heat sealing of said closure, and

(i) said first and second tufts are triangular in form.

2. In a dispensing container having a tubular body surmounted by a top sealed closure sanitarily housing a pouring lip, said closure and lip being formed of sheet material having a heat sealable thermoplastic surface with an adhesive coating applied on said pouring lip comprising, in combination:

(a) said tubular body being rectangular in cross-section,

(b) said pouring lip having at least two inner rib panels,

(c) pouring lip ends positioned substantially at the outer surface of said tubular body,

(d) a pouring lip edge extending substantially the length of said pouring lip,

(e) first and second tufts positioned a predetermined distance from said pouring lip ends and projecting above said pouring lip edge,

(f) said top sealed closure forming a fluid channel above said pouring lip edge,

(g) said first and second tufts filling a cross-section of said fluid channel,

(h) said top sealed closure having first and second sealing inner rib panels,

(i) said first and second sealing inner rib panels having outer ends positioned substantially at the outer surface of said tubular body and inner ends connecting said first and second inner rib panels,

(j) said inner ends positioned adjacent to the middle area of said pouring lips,

(k) said first sealing inner rib panel having a first upper edge and said second sealing inner rib panel having a second upper edge,

(l) third and fourth tufts positioned a predetermined distance from said outer ends of said first and second sealing inner rib panels, respectively, and projecting above said first and second upper edges, respectively,

(m) said top sealed closure forming said fluid channel above said first and second upper edges, and

(n) said third and fourth tufts filling a cross-section of said fluid channel.

3. A dispensing container as defined in claim **2**, wherein

(a) fifth and sixth tufts positioned a predetermined distance from said inner ends of said first and second sealing inner rib panels, respectively, and projecting above said first and second upper edges, respectively, and

(b) said fifth and sixth tufts filling a cross-section of said fluid channel.

4. A dispensing container as defined in claim **2**, wherein

(a) said top sealed closure has first and second outer rib panels,

(b) said first and second outer rib panels are coplanar with said pouring lip inner rib panels and said first and second sealing inner rib panels,

(c) said first outer rib panel's inside surface contacts the inside surfaces of one of said inner rib panels and said first sealing inner rib panel,

(d) said second outer rib panel's inside surface contacts the inside surface of the other inner rib panel and said second sealing inner rib panel, and

(e) said first and second outer rib panels extend above said inner rib panels and said first and second sealing inner rib panels and are higher than said tufts.

5. A dispensing container as defined in claim **4**, wherein

(a) said first, second, third, fourth, fifth and sixth tufts are triangular in form.

6. A dispensing container as defined in claim **4**, wherein

(a) said abhesive coating is applied on the inside surface of said pouring lip and positioned a predetermined distance from said pouring lip ends,

(b) first and second sealing areas formed between said pouring lip ends and said abhesive coating,

(c) said first tuft extending from said first sealing area, and

(d) said second tuft extending from said second sealing area.

7. A dispensing container as defined in claim **6**, wherein

(a) said first, second, third, fourth, fifth and sixth tufts are triangular in form.

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DAVID M. BOCKENEK, Primary Examiner

U.S. Cl. X.R.

229—37