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L. S. TOBIAS ET AL

3,178,091

GABLE TOP CONTAINER

Filed March 19, 1963

FIG. 1

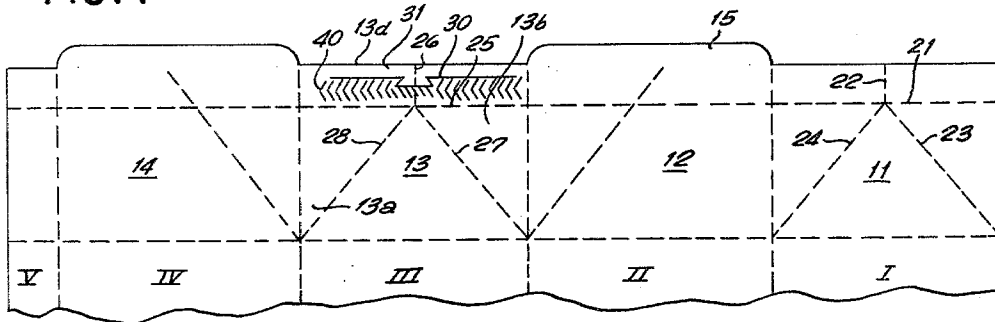


FIG. 2

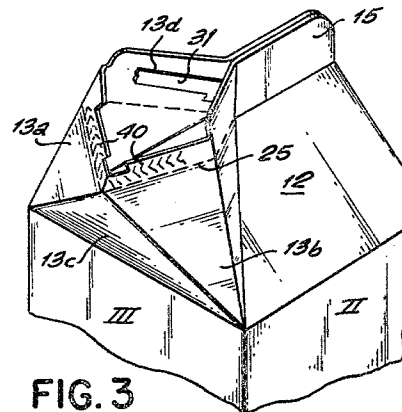
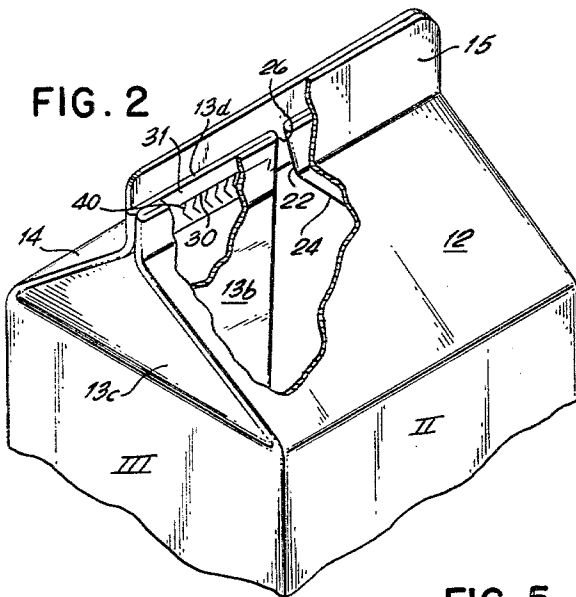


FIG. 3

FIG. 5

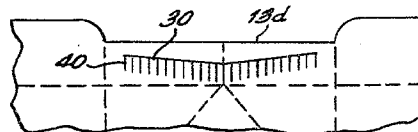


FIG. 4

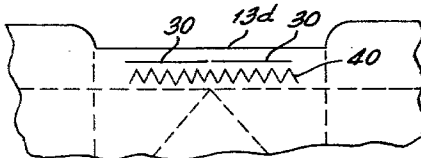
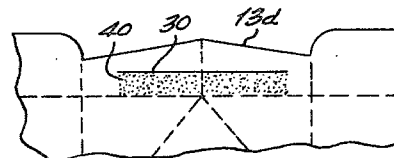


FIG. 6



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GABLE TOP CONTAINER

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8 Claims. (Cl. 229-17)

The present invention relates to closures for containers. More particularly, it relates to a heat-sealed closure for a plastic-coated gable topped overlap container for fluids including milk and other beverages. This application is a continuation-in-part of co-pending applications Serial No. 201,899, filed June 12, 1962, and Serial No. 247,118, filed December 26, 1962, now abandoned.

Broadly, overlap containers made from paperboard or the like are circular or square in their lateral cross section and, in the latter case, they are formed from a blank scored or given foldlines which define four, rectangular, larger panels and a fifth, smaller panel thereon. Each of the four larger panels adjoins at least one of the others along one of its longer sides as defined by a score or a foldline and it, when the blank is formed into the container, constitutes one of the normally vertically disposed side walls of the container. The fifth, smaller panel or side seam flap extends from the fourth, larger panel along the longer side thereof cf., U.S. Pat. No. 3,137,436. A score or foldline separates the fourth and fifth panels. Then, in the finished, erect container, the outside of the side seam flap and that area of the first panel adjacent to its edge are bonded together with the aid of glue or some other adhesive. It is the lapping of the inside of such first panel over the outside of the fifth panel, usually to the locus of the foldline between the fourth and fifth panels, which gives these containers their name.

Questions of structural and material strength arise with all disposable containers made of paperboard or the like, particularly when the goods sought to be packaged are wholly or partially liquid, since any rupture, break or delamination in the structure, whether caused by having undue stresses designed into the container or placed upon the container and the blank therefor during the converting operation or normal handling, or inherent penetrability in the material leads to a loss of the goods. Heretofore, answers to these questions have been sought in the technique of basic stock coating. It has been suggested to coat the finished containers with various agents such as waxes by dipping them into tanks thereof and it has been suggested to precoat the stock before the containers are formed therefrom with, for example, polyethylene. However, the use of such coatings has not been found to answer the questions fully in a number of critical areas. "Areas" is used advisedly here, since one problem not solved by the coating technique is precisely in the area of the overlap container's score or foldlines and the area of its side seam. A solution of this problem is supplied by co-pending application Serial No. 61,886, filed October 11, 1960, now U.S. Pat. No. 3,137,436, issued June 16, 1964. Another problem not solved by, and, indeed, largely created by, the polyethylene coating technique is in the area of an ultimately free edge provided for in many overlap containers, e.g., those bearing the "Pure-Pak" trademark of Ex-Cell-O Corporation. This problem involves, broadly, the delamination of the edge due to its undesirable, but heretofore unremedied, bonding to the container coating and the consequent debilitation of the edge structure and destruction of its normally clean and attractive appearance. Co-pending application Serial No. 201,899, filed June 12, 1962, overcomes this problem and affords

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other advantages which will become apparent to those skilled in the art. A related problem is solved in co-pending application Serial No. 231,532, filed October 18, 1962.

Illustrative of the type of problem met and conquered by the present invention is one which arises in the manufacture of gable topped overlap containers having integral pour spouts of the type shown in co-pending application Serial No. 201,899, filed June 12, 1962, and where a paperboard stock is used which has laminated thereto, usually by means of the extrusion method, a thin film of a thermoplastic material such as polyethylene for purposes of protective coating. It occurs because heat is used to achieve the sealed closure of the gable top and such heat does not always reach critical areas in sufficient amounts to give an acceptable closure.

The thermoplastic coated overlap container blanks here in question have the general configuration of those shown, for instance, in expired U.S. Pat. Nos. 2,218,670 and 2,329,797 and include four upper end closure panels connected along and by means of lateral score or foldlines to the four larger panels of the blank hereinbefore discussed. Two of such end closure panels which can be connected to the first and third larger, side panels of the container blank often have only one or more additional lateral score or foldlines and, in the finished or erected container, form the roof surfaces of the gable top therefor. The other two end closure panels which can be connected to the second and fourth larger, side panels of the container blank have, for example, a lateral, a vertical, and two convergingly diagonal score or foldlines defining several triangles on such end closure panels and, in the completed container, form the gable surfaces of the gable top therefor. In addition, if made in accordance with co-pending application Serial No. 201,899, filed June 12, 1962, or co-pending application Serial No. 231,532, filed October 18, 1962, at least one of such gable surface end closure panels has a lateral line of weakness cut therein near its outer lip. Upon the erection of the containers from the blanks as described, triangular portions of the triangulated end closure panels are brought into an abutting relation with inside portions of the roof surface end closure panels. Then in the hands of the container's user, such triangular portions of one of the triangulated end closure panels are brought out of the abutting relation with some portions of the roof surface end closure panels, and beyond, to form a pour spout, the edge of which was and is the line of weakness, e.g., the slit, cut into the triangulated end closure panel of the container blank.

However, it sometimes occurs that, because of difficulty in distributing radiant heat from calrod units or convected heat from a gasburner hot air unit to, over, and around the top closure elements or members which are to be formed into the gabled structure, the sealing together thereof, and, particularly, the sealing together of parts of such elements to prevent an untimely opening of the container along the line of weakness in the gable surface end closure panel, is not wholly successful.

But now, it has been found that, by a surprisingly simple modification of the blanks for gable topped, four sided overlap containers for fluids of the type which are made from thermoplastic coated paperboard, a well-sealed top closure of the container can be achieved, together with pour spouts therein which are unexpectedly strong and rigid, clean looking, and not subject to undesirable bonding, wetting, loss of pourability, or unsanitary handling at the edges over which the container contents are normally expected to flow. Such modification results from a process wherein the first step includes the forming by conventional means of a full slit (i.e., one completely through the material being cut), as distinguished from

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a mere score, foldline, partial slit, or line of perforations or holes in at least one of the container's gable surface or triangulated end closure panels near the outer lip thereof and wherein a second step includes the forming of an exterior zone of surface disruption in such panel below and, optionally, above the full slit.

The full slit or line of severance can be straight or patterned. Preferably, it should run laterally in the gable surface end closure panel and generally parallel to its outer lip. It is also preferable to have it lie from about $\frac{1}{16}$ " to $\frac{3}{8}$ " from such outer lip in a quart-size container, but this depends, in part, on the dimensions of the container wherein it is employed.

By "exterior zone of surface disruption" is meant an area on the container blank side which will ultimately form the outside of the container which has been roughened by any one or more conventional means (such as means for abrading, scratching, engraving, embossing, knurling, serrating, cutting, etc., in lines or patterns or at random) to a depth equal to some or all of the thickness of the thermoplastic coating on the container exterior, e.g., about 1 mil, and, preferably, some of the thickness of the container's paperboard, e.g., about 18 mils. But it can also involve nothing more than removing or lessening the glossiness of the thermoplastic on the paperboard by, for instance, a careful application of heat to or, at least, an avoidance of a chill rolling of the area in question with a highly polished surface (as is presently common), or, for another example, including a dulling pigment in the thermoplastic at the area in question.

The modification of the present invention supplies the finished thermoplastic coated paperboard container with, above the line of the full slit, a strip of similarly coated container stock which, on its inside, can and will be bonded to the insides of the roof surface end closure panels of the container and which, on its outside, can and will be bonded to itself as the formation of the gable topped end closure structure causes it to be doubled over upon itself just prior to the application of the heat utilized in the sealing of several thermoplastic-coated elements. It supplies the container, at the line of the full slit with a locus for a clean break, i.e., the inside edge of the cut when viewed in the erected container, without delamination when the container is opened and its pour spout is formed. It also supplies the container, below the line of the full slit, with heightened sealability upon filling, because, when the gable top end closure of the container is formed and portions or halves of the zone of surface disruption on the outside of a gable surface end closure panel are thereby made to abut each other, the sealing heat applied in their vicinity tends to concentrate in the area of such zone and produce surprisingly better sealing engagement where they abut.

Parenthetically, it is not entirely clear why this last is so, but it may be that the roughening of the thermoplastic coated surface, particularly when it is to a depth that requires the roughening of the paperboard, provides a means for the neighboring, otherwise insulating, air content of the paperboard to escape and for the immediately involved plastic and paperboard to receive and retain more of the heat emanated by the heat source. This theory appears to find corroboration in that, when the roughening extends above the line of the full slit, the sealing of the added roughened area is heightened, but, unless added care is taken, the sealing of the inside of the gable surface end closure panel to the roof surface end closure panels, just behind such roughened area is worsened; it is as if the roughening tends to draw heat away from proximate unroughened areas. However, whatever the theory involved here, it appears that the components of the present invention provide not only a useful way of closing up thermoplastic coated gable topped containers for milk and the like, but also a way of effecting better seals in thermoplastic coated paper-

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board laminar structures, irrespective of the form they are in, without the need for anything more than a tool, wheel, razor, knife, or the line to supply the requisite roughening.

For a better understanding of the present invention, reference should be had to the attached sheet of drawings in which—

FIGURE 1 shows a plan view of a blank for a gable topped overlap container modified in accordance with the invention;

FIGURE 2 shows an isometric view of the upper end of the closed container formed from the blank of FIGURE 1;

FIGURE 3 shows an isometric view of the upper end of the opened-for-pouring container formed from the blank of FIGURE 1;

FIGURES 4, 5, and 6 show sectional plan views of different blanks for gable topped overlap containers modified in accordance with the present invention.

The usual panels of a rectangularly cross-sectioned overlap container blank made from polyethylene-coated paperboard stock are partially shown in FIGURE 1 and identified by numerals I, II, III, IV, and V. The upper end closure panels of the gable top of the container to be made from the blank are numbered 11, 12, 13, and 14 and 11 and 13 are shown with the conventional lateral, vertical, and diagonal scores or foldlines 21 to 28 and with patterned, full slit 30.

As shown in FIGURE 2, panel 13 is folded in between panels 12 and 14, below panel extension 15, in the erection, filling and closing of the container formed from the blank of FIGURE 1. Triangular portions 13a and 13b are, at this time, folded toward each other over triangular portion 13c and so that their insides at least approach the insides of panels 12 and 14. The lip 13d of panel 13 actually abuts panels 12 and 14 and, when heat is applied to seal the entire closure of the thermoplastic container, it plows into the molten polyethylene coating. At the same time, the halves or knurled zone of surface disruption 40 lying on either side of vertical foldline 26, which are in face-to-face abutment, are sealed together below line 30, so that any contents of the container thrown toward its top can not get beyond slit 30 until such seal is intentionally broken.

As shown in FIGURE 3, strip 31, which lies between lip 13d and slit 30 in the blank remains heat sealed and affixed to the insides of panels 12 and 14, particularly as a result of the aforementioned plowing action, when foldable triangular portions 13a and 13b are so actuated as to open the container by breaking the heat seal formed with the aid of knurled zone 40 along the line of slit score 30, which is never involved in such plowing action, to form a previously unhandled and, therefore, more sanitary, as well as firm and less susceptible to wetting, pour spout. Clearly, foldable portions 13a, 13b and 13c can also be so positioned to vary the size of the pour spout opening or to re-close it.

FIGURES 4 to 6 depict various other embodiments of the slit 30 and zone of surface disruption 40 of the present invention in types of container gable surface panels in which it can be utilized. FIGURE 5 shows zone 40 as made up of a plurality of parallel, partial cuts. FIGURE 4 shows zone 40 as made up of a single partial cut having a wave-like configuration. FIGURE 6 shows zone 40 as an abraded, scuffed, or knurled area.

What is claimed is:

1. A thermoplastic coated paperboard gable topped, four sided, overlap container for fluids having, in and as components of the gable top structure, gable surface end closure panels with outer lips, means defining a laterally disposed full slit in at least one of the gable surface end closure panels near the outer lip thereof, means defining an exterior zone of surface disruption wherein the thermoplastic coating has a glossiness less than that of the thermoplastic coating outside the zone and an im-

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proved heat sealability at least below the slit, first portions of the zone being disposed abuttingly and heat-sealed to second portions of the zone, and roof surface end closure panels.

2. A thermoplastic coated paperboard gable topped, four sided, overlap container for fluids having, in and as components of the gable top structure, gable surface end closure panels with outer lips, means defining a laterally disposed full slit in and generally parallel to the outer lip of at least one of the gable surface end closure panels near the outer lip thereof, means defining an exterior zone of surface disruption wherein the thermoplastic coating has a glossiness less than that of the thermoplastic coating outside the zone and an improved heat sealability at least below the slit, first portions of the zone being disposed abuttingly and heat-sealed to second portions of the zone, and roof surface end closure panels.

3. A thermoplastic coated paperboard gable topped, four sided, overlap container for fluids having, in and as components of the gable top structure, gable surface end closure panels with outer lip whereon triangles are defined by means of foldlines, means defining a full slit in at least one of the gable surface end closure panels near the outer lip thereof, means defining an exterior zone of surface disruption wherein the thermoplastic coating has a glossiness less than that of the thermoplastic coating outside the zone and an improved heat sealability at least below the slit, first portions of the zone being disposed abuttingly and heat-sealed to the second portions of the zone, and roof surface end closure panels.

4. In a thermoplastic coated paperboard gable topped, four sided, overlap container for fluids having, in and as components of the gable structure, at least one gable surface end closure panel adapted to form a pour spout integral therewith and roof surface end closure panels, in combination, an outer lip of the gable surface end closure panel, means defining a full slit in the gable surface end closure panel, a panel strip between the outer lip and the slit, means bonding the strip to the insides of the roof surface end closure panels, means defining an exterior zone of surface disruption wherein the thermoplastic coating has a glossiness less than that of the thermoplastic coating outside the zone and an improved heat

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sealability at least below the slit, first portions of the zone being disposed abuttingly and heat-sealed to the second portions of the zone and means bonding the first and second portions together.

5. The thermoplastic coated paperboard container of claim 1 wherein the thermoplastic coating inside the zone is physically roughened, and has an improved heat sealability.

6. The container of claim 4 wherein the thermoplastic coating inside the zone is physically roughened, and has an improved heat sealability.

7. In a thermoplastic coated paperboard gable topped, four sided, overlap container for fluids having, in and as components of the gable structure, at least one gable surface end closure panel, means defining an exterior zone of surface disruption wherein the thermoplastic coating has a glossiness less than that of the thermoplastic coating outside the zone and an improved heat sealability on the gable surface and closure panel, and first portions of the zone being disposed abuttingly and heat-sealed to the second portions of the zone, wherein the thermoplastic coating inside the zone is physically roughened, and has an improved heat sealability.

8. In a thermoplastic coated paperboard container, means defining a zone of surface disruption wherein the thermoplastic coating has a glossiness less than that of the thermoplastic coating outside the zone and an improved heat sealability, and first portions of the zone being disposed abuttingly and heat-sealed to the second portions of the zone, wherein the thermoplastic coating inside the zone is physically roughened, and has an improved heat sealability.

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