Oct. 25, 1966 I. M. KOLTZ ETAL 3,281,048

LEAK-PROOF CARTON

Filed Sept. 21, 1964 3 Sheets-Sheet 1

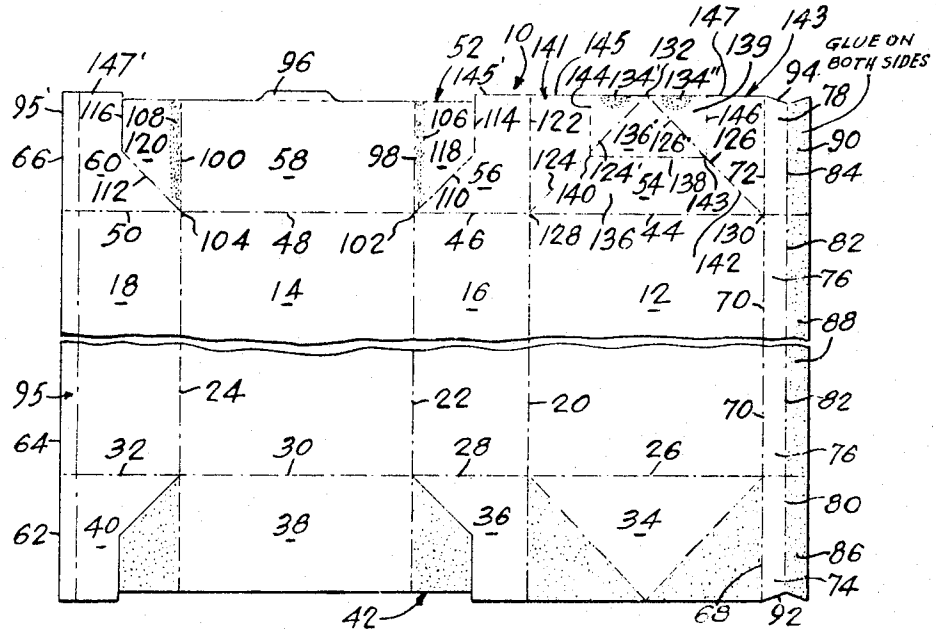


Fig. 1

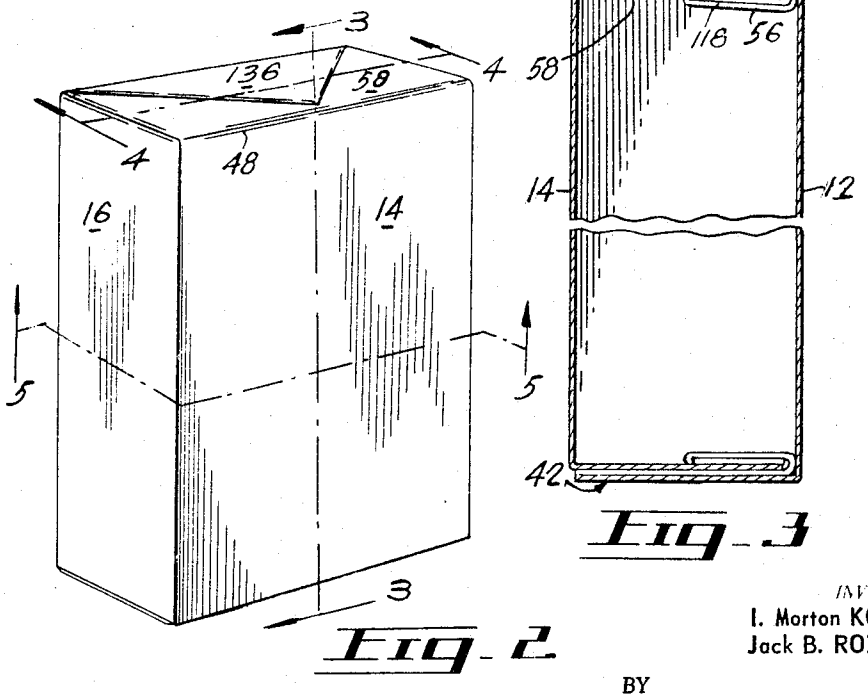


Fig. 2

Fig. 3

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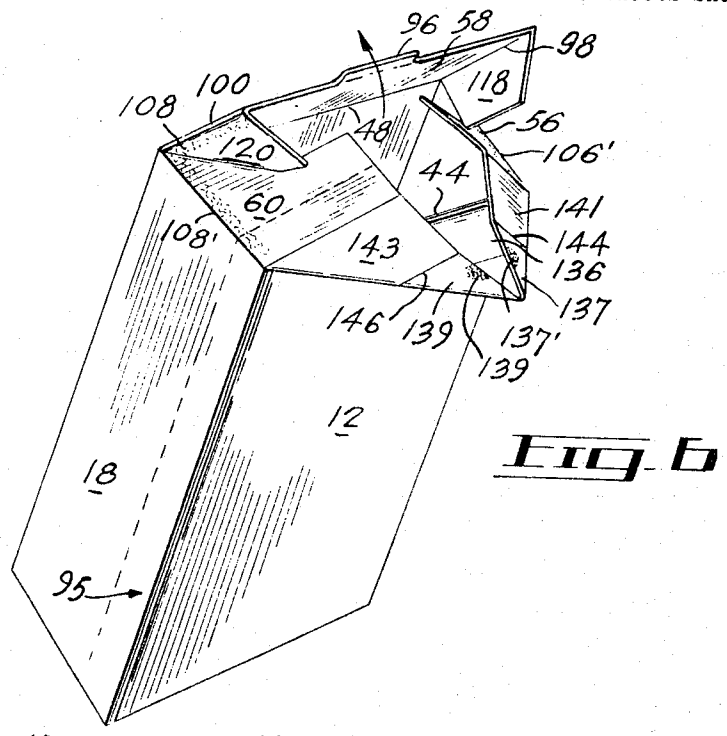


Fig. 6

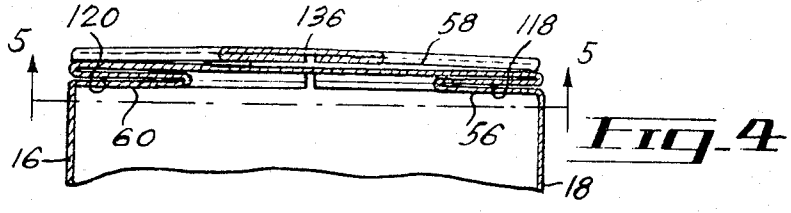


Fig. 4

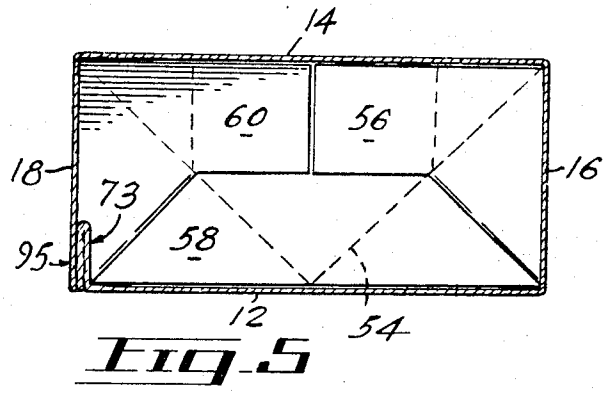


Fig. 5

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LEAK-PROOF CARTON

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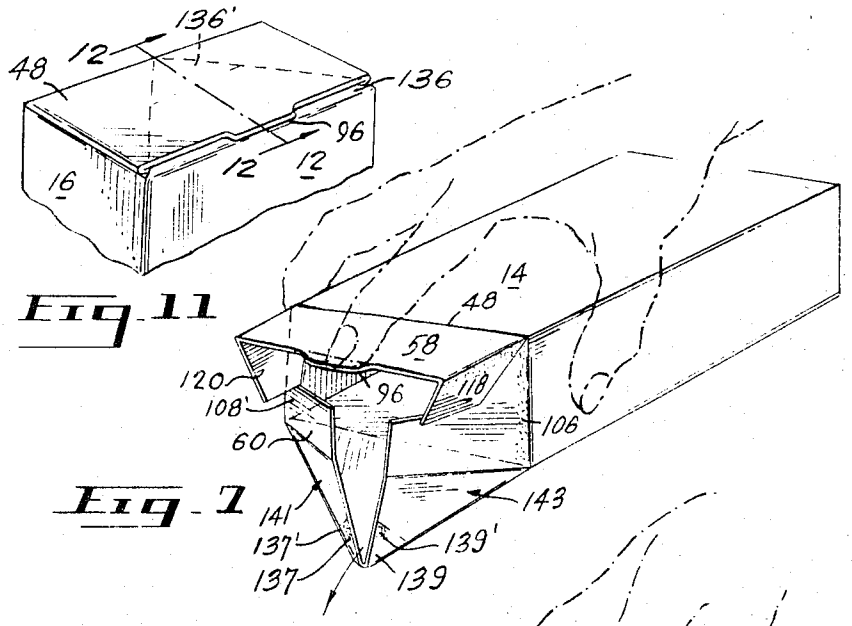


Fig. 11

Fig. 7

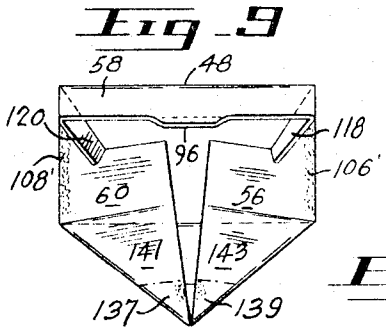


Fig. 9

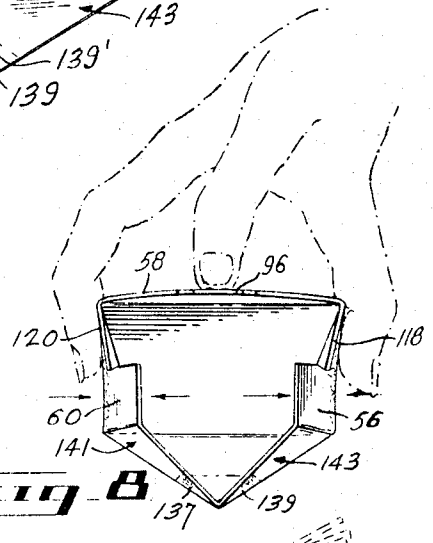


Fig. 8

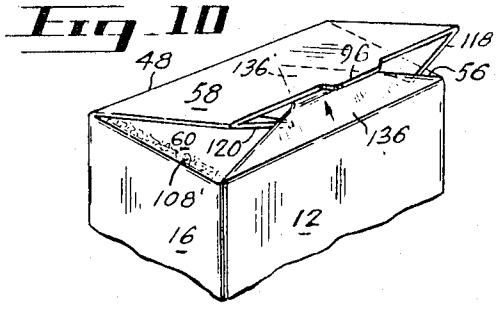


Fig. 10

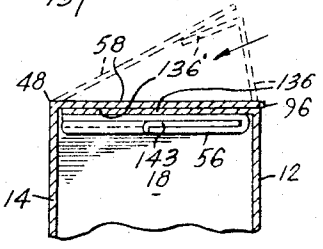


Fig. 12

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United States Patent Office

3,281,048

Patented Oct. 25, 1966

3,281,048

LEAK-PROOF CARTON

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Filed Sept. 21, 1964, Ser. No. 397,703

6 Claims. (Cl. 229—17)

This invention pertains to an improved carton including a novel closure which is readily adapted for reclosing after a portion of the carton contents have been dispensed.

The prior art is replete with various types of reclosable cartons; some particularly adapted for dispensing liquids, however, the prior art cartons have not generally afforded the novel features comprising the objects of the present invention.

A primary object of the present invention is to provide a novel blank for a reclosable carton which is substantially rectangular and minimizing waste of material.

Another object of the present invention is to provide a novel blank for a carton of the character mentioned above which forms a foldable-flat tube after being assembled to require a minimum of shipping and storage space.

A still further object of the present invention is to provide a novel reclosure assembly for a carton for fluent material, in which a pouring spout portion initially provides a closure flap and subsequently functions as lock means when the carton is reclosed.

These together with other and more specific objects of the invention will become apparent from the following description of an exemplary embodiment when taken in conjunction with the drawing, in which:

FIGURE 1 is a plan view of the novel blank from which the novel carton is produced, an intermediate portion of the blank being broken away;

FIGURE 2 is a perspective view of a carton assembled and erected from the blank of FIGURE 1;

FIGURE 3 is a vertical section, taken substantially on the plane of line 3—3 of FIGURE 2, with an intermediate portion of the carton broken away;

FIGURE 4 is a fragmentary vertical section taken substantially on the plane of line 4—4 of FIGURE 2, i.e., at right angles to the section of FIGURE 3;

FIGURE 5 is a horizontal section taken substantially on the plane of line 5—5 of FIGURE 2, i.e., looking at the undersurface of the closure assembly of the closed carton;

FIGURE 6 is a perspective view showing the position assumed by the parts of the upper closure assembly after the carton is opened;

FIGURE 7 is a perspective view showing the carton in a pouring position and illustrating by phantom lines the relative position of a user's hand and fingers;

FIGURE 8 is a top plan view of the carton of FIGURE 7, showing generally the position of a user's fingers in phantom lines, and illustrating by direction arrow the pressure exerted by the fluent material being poured, and showing by a dotted direction arrow how carton reclosure is initiated as well as control of material being poured;

FIGURE 9 is a top plan view of the open top closure assembly, i.e., as the carton is being reclosed from the condition shown in FIGURE 8;

FIGURE 10 is a fragmentary perspective view showing how the pouring spout serves as a lock during carton reclosure;

FIGURE 11 is a fragmentary perspective view showing the carton reclosed; and

FIGURE 12 is a fragmentary vertical section taken substantially on the plane of line 12—12 of FIGURE 11 and showing by phantom lines how the parts assume the condition of FIGURE 10 and eventually assume the position shown by solid lines.

This invention is particularly adapted for use when pouring fluent materials, i.e., milk, soap powders, etc., however, the invention is disclosed and described for purposes of illustration and not limitation.

Referring to FIGURE 1, a substantially rectangular, planar blank is indicated generally at **10** which is produced from any suitable paperboard material or the like; suitably waxed, coated with plastic, etc., for containing fluids, powders, etc.

The blank **10** will produce a container having a rectangular cross-section, however, it is within the purview of the invention to use the novel closure assembly on cartons of other shapes; for example, square or with curved sides, etc.

The blank **10**, in the exemplary embodiment, comprises pairs of alternately disposed walls **12**, **14** and **16**, **18** connected by mutually parallel fold lines **20**, **22** and **24**.

The walls **12–18** include a lower, segmental marginal fold line comprising colinear portions **26**, **38**, **30** and **32**, respectively, hingedly connecting closure flaps **34**, **36**, **38** and **40** of a bottom closure assembly **42** to said walls.

The bottom closure assembly **42** is illustrated as being the same as the upper closure assembly of the carton (as will subsequently be described in detail), however, other types of bottom closure assemblies may be used with the novel closure assembly.

The walls **12**, **16**, **14** and **18** are respectively bordered at the upper ends thereof by segmental upper marginal fold lines **44**, **46**, **48** and **50**; the walls **12**, **14** are conveniently described as side walls and the walls **16** and **18** are conveniently described as end walls. Hingedly connected to the fold lines **44–50** is a top closure assembly indicated generally at **52**. The assembly **52** comprises a combined spot-forming-and-closure flap panel indicated generally at **54**, a first end closure panel **56**, a closure panel **58**, and a second end-closure panel **60**.

The flap **40**, wall **18** and end-closure panel **60** include a free, linear side margin comprising portions **62**, **64**, and **66**, respectively, which the fold lines **32** and **50** define. The flap **34**, wall **12** and end closure panel **56** include a linear, side marginal fold line comprising portions **68**, **70** and **72**. Hingedly connected to the fold lines **68**, **70** and **72** is a gum of glue panel assembly **73** including first glue-flap panels **74**, **76** and **78**, respectively, which are respectively defined by colinear, segmental side marginal fold lines **80**, **82** and **84**, respectively. Hingedly connected to the fold lines **80**, **82** and **84** are second elongated glue-flap panels **86**, **88** and **90**, respectively. The adjacent panels **74**, **86** and **78**, **90** may conveniently include notches **92** and **94**, respectively, which facilitate assembly of the blank.

The glue panel assembly will be folded and secured to a portion indicated generally at **95**, i.e., extending parallel to and the entire height of the blank; see Figure 5, for example. The panels **86**, **88** and **90** will have a coat of adhesive on both sides thereof in order to form the side edge seam of the assembled blank. When the blank is assembled, and not closed or erected, the blank will be formed into a foldable-flat tube which can be stored or shipped in a condition to occupy a minimum amount of space.

Although the glue-panel assembly **73** is shown as attached to the panels of flaps **34**, **54** and wall **12**, it should be readily apparent to those skilled in the art that the seam can be formed integral with panels or flaps **40**, **60** and wall **18**; and it will be further apparent to those skilled in the art that the alternately disposed pairs of walls **12–18**

can be rearranged, i.e., wall **18** and flaps attached thereto could be formed at the extreme left of the blank and the glue flap or panel assembly **73** could appear at the left hand portion of the blank. This alternate arrangement (not shown) is readily apparent to those skilled in the art and a specific showing thereof is apparently unnecessary.

Specific details of the erection of the bottom closure assembly **42** will not be described, particularly since it is essentially identical to the top closure assembly **52**. Further, it is apparent to those skilled in the art that other types of bottom closure assemblies can be used on containers including a top closure assembly **52** of the character to be presently described.

The top closure assembly **52** includes, as previously mentioned, the combined spout-forming-and-closure flap panel **54**, first and second closure panels **56** and flanking the second closure panel **58**.

The panel **58** includes a convenient finger-tab **96**; the function of which is to subsequently be described. The panel **58** is flanked at opposite sides by side marginal fold lines **98** and **100** which terminate at **102** and **104** at the respective ends of the segmental fold line **48**. Disposed adjacent to the fold lines **98** and **100** are adhesive-receiving strips **106** and **108**, respectively formed by angular, score or fold line margins **110** and **112**, respectively, originating from the ends **102** and **104** at the intersection of fold lines **98** and **100** with the fold line **48**. The fold lines **110** and **112** terminate in vertical die-cuts **114** and **116** extending into the upper margins of the blank and form at opposite ends of the panel **58** tabs or segments **118** and **120** hingedly connected to the panel **58** by the respective fold lines **98** and **100** and the angular fold lines **110** and **112**.

The panel **58**, tabs **118** and **120** form with flaps or panels **56** and **60** a gusset panel construction which, in the assembled carton, will result in automatic opening and closing of the carton or container as the panel is pivoted about hinge line **48**; see FIGURES 7–11, for example.

The walls **16** and **17** have respectively hingedly or foldably connected at the fold lines **46** and **50** the closure flaps respectively having one side margin defined by angular fold line **110** and die-cut margin **114** and angular fold line **112** and die-cut margin **116**, respectively.

The spout-forming-and-closure flap panel **54** includes a side marginal fold line **122**, parallel to the opposed side marginal **72**; the fold line **122** forming the adjacent side margin of the first closure panel **56**. When the container or carton is assembled, fold line **72** will be disposed adjacent free margin **66**, since the glue panel segments **78**, **90** will adhere to portion **95'** on the second closure panel **60**.

The panel **54** includes angularly disposed, converging fold lines **124** and **126**, respectively extending from the terminal end **128** of the fold line **44** and the intersection of fold line **122** therewith, and end **130** at the other end of the fold line **44** and the intersection of fold line **72** therewith. The fold lines **124**, **126** intersect at **132**; terminating at the free upper margin **134** of panel **54**.

The fold line **44** together with fold lines **124**, **126** form an isosceles triangular segment which comprises the bottom **136** of a pouring spout as will be described, and portions **124**, **126** are hypotenuse sides of right triangular segments to be described.

In order to facilitate reclosure of the assembled container, the triangular base includes a transverse, intermediate segmental, fold line **138** intersecting intermediate portions of the fold lines **124** and **126** at points **140** and **142**, respectively. Extending vertically from points **140** and **142**, and extending into the free margin **134**, are segmental fold lines **144** and **146**.

The fold lines **138** and upper portions **124'** and **126'** of the fold lines **124** and **126**, respectively, form an isosceles triangular base **136'**. The fold lines **124'**, **144** and free margin portion **134'** and the fold lines **126'**, **146** and free marginal portion **134''** form right triangular panel segments **137**, **139**, respectively. The segments **137** and **139** comprise a combined area equal to that of the isosceles triangular segment or base **136'** and will be foldable, in the assembled container, during reclosures on the fold lines **138** and fold lines **144**, **146** (which will overlie the fold line **138** as seen, for example, in FIGURES 10 and 12).

Additionally, the spout base **136**, i.e., isosceles triangular base, will have overlying the same when the carton is assembled, the right triangular segment defined by fold lines **122**, **124** and free edge portion extending from point **132** to the upper portion of fold line **122** and identified generally at **141**, and the right triangular segment defined by fold line **72**, **126** and the free margin extending from point **132** to the right to the upper portion of fold line **72** and indicated generally at **143**. The upper free edge margins of the right triangular segments **141**, **143** comprise an area equal to that of the base **136** and the respective free edges **145** and **147** thereof, during carton assembly, will be disposed in close proximity and parallel relation to each other; see FIGURE 11, disposed normal or at right angles to the fold line **44** and bisecting the spout base **136**, note the hypotenuse of segments **137**, **137** is the fold lines **124**, **126**, respectively.

The right triangular segments **137** and **139**, respectively, include, for purposes of initial closure and assembly, suitable adhesive portions **137'** and **139'**, respectively, which will be in proximate relationship when the carton is initially closed and assembled.

Erection of the blank

The blank is formed as a rectangular tube by applying a suitable adhesive to both sides of glue flap segments **86**, **88**, **90**, and thereafter the segments **74** and **86**, **76** and **88**, and **78** and **90** are folded into overlying, adhered relationship. Thereafter, the glue flap assembly is disposed at right angles to panel **18** and flaps **40** and **60** to adhere to the area **95**, i.e., the side edge seam will extend the entire length of the container.

The bottom closure assembly **42** is closed and sealed on suitable apparatus and the container or tube once sealed at the bottom is filled with a liquid, such as milk, or a fluid-like powder or the like.

Closure of the container

After the bottom closure assembly **42** is sealed, the panels **56**, **60** and **54**, **58** will be in coplanar relation to walls **16**, **18** and **12**, **14**; it being noted the corners of the erected tubular container will comprise colinear fold lines **70** and **72**, **20** and **122**, **22** and **98**, and **24** and **100**.

Panels **56** and **60** will be pushed inwardly toward each other for ultimate opposed coplanar relation; see FIGURES 4, 5 and 9, for example. As the panels **56** and **60** are moved inwardly toward, since they are respectively connected to by fold lines **110** and **112** to panel segments **118** and **120**, these panel segments **118** and **120** will be drawn inwardly over the top of the container which has been filled with a pourable product. The panel segments **118** and **120** through the hinged connection at fold lines **98** and **100**, respectively, at opposite ends of panel **58** cause the panel **58** to be drawn into overlying relation to the inwardly folded panels **56** and **60**. The angular fold lines **110** and **112** thus form a gusset panel fold between the respective adjacent panel segments, **56**, **118** and **60**, **120** which will be disposed beneath the inner surface of the panel **58** and in juxtaposed relation to each other in the closed container; see FIGURES 3, 4 and 10, for example.

When panels **56** and **60** are moved inwardly toward each other, right triangular segments **141** and **143**, through the fold lines **122** and **72**, are moved into overlying relation upon the triangular base **136** and are juxtaposed upon the same. Edges **145** and **147** as well as free edges **145'** and **147'** at the upper edges of panels **56** and

60, respectively, will be disposed in parallel, confronting relation.

The adhesive strip areas **106** and **108** (manually separable adhesive) of segments **118** and **120** will adhere to areas **106'** and **108'** on the respective panels **56** and **60** parallel to and extending along the fold lines **46** and **50**.

Next, the triangular spout comprising base **136** and right triangular panels **141** and **143** are folded at fold lines **44** and **72, 122** (which now overlie fold line **44**) and folded onto panel **58**; the adhesive portions (manually separable) adhere to the outer surface of panel **58**.

The carton or container closure assembly is now closed and sealed.

Opening of container

The triangular spout, as seen in FIGURE 2, is pulled upwardly and this detaches adhesive portions **137'** and **139'** from the upper surface of panel **58**. The panel **58** is then pulled upwardly, and through the gusset panels **120, 60** and **118, 56**, the right triangular segments **143, 141** are pulled upwardly to form an upper guide partition overlying base **136**; see FIGURES 6 and 7, for example. The amount of material being dispensed or poured can be controlled, to a certain degree, by the angular orientation of panel **58**, i.e., from a full open position as seen in FIGURE 8, to a lesser degree of opening, as seen in FIGURE 7, for example.

Reclosure of container

To reclose the container, the panel **58** will now become the outermost panel. As the panel **58** is folded inwardly in the direction indicated by the dotted direction arrow of FIGURE 8, the gusset panels **118, 56** and **120, 60** fold into overlying relationship as mentioned regarding initial closing of the carton. At this time, the triangular panel segment **136'** and right triangular segments **137** and **139** which overlie the same, are bent angularly at fold lines **54** and **144, 146**, respectively, and the terminal pointed end of the spout is inserted beneath panel **58** and above panel segments **118** and **120**; see FIGURES 10 and 12. Finally, the spout is moved into planar relation beneath the panel **58** as clearly seen in FIGURE 11.

The container can be reopened by pulling upwardly on tab **96** and the panel **58** will in a sense automatically open the reclosed top, for subsequent dispensing of the remaining carton contents.

The present invention provides a container produced from an integral blank with a minimum waste of stock material. The container can be readily assembled and stored. The closure for the container is readily adapted for the storage of fluids, such as milk, oil, etc., and comprises a pouring spout facilitating dispensing as well as a reclosure of the container to thus protect from contamination the remaining contents of the container.

It will be understood by those skilled in the art that the specific description of this exemplary embodiment of carton or container is merely illustrative of the principles of the invention, and it will be obvious to those skilled in the art that changes may be made without departing from the spirit of the invention and therefore, the invention is not limited to what is shown in the drawings and described in the specification but only as indicated in the appended claims.

What is claimed:

1. In a blank comprising a one-piece planar element having cut-and-scored portions and including pairs of alternately disposed walls;

a closure assembly hingedly connected to a marginal fold line bordering one end of said walls,

said closure assembly comprising combined spout-forming-and-closure flap means, a first end closure flap means, a closure flap means, and a second end closure flap means,

said closure flap means including hinge line portions flanking adjacent end portions thereof for forming a tube when said blank is assembled,

said combined spout-forming-and-closure flap means comprising a triangular spout forming portion extending from said marginal fold line and a pair of triangular segments flanking the same and hingedly connected thereto and flanking fold line portions of said blank, said triangular spout forming portion comprising an isoceles triangular base extending the entire length of said marginal fold line, said triangular areas having a hypotenuse extending along a leg lar areas having a hypotenuse extending along a leg of said isosceles triangular base, one leg of said right triangular segments coinciding with a respective flanking fold line hingedly connecting the respective right triangular segments to said flanking fold line portions, said isosceles base including an intermediate transverse fold line portion parallel to said marginal fold line and terminating in angular opposite ends of said base, said right triangular segments including intermediate fold line portions normal to said intermediate transverse fold line portion in said isosceles base and forming secondary triangular segments flanking a secondary triangular base formed by said intermediate, transverse fold line portion.

2. In a blank as claimed in claim **1** in which said first and second end closure flap means and said combined spout-forming-and-closure flap means includes adhesive-receiving portions for retaining said carton formed from said blank in an initially sealed condition.

3. In a reclosable container formed by a one-piece blank and comprising a plurality of walls hingedly connected to form a tube, first closure means hingedly connected to said walls, and a second closure assembly hingedly connected to coplanar marginal fold lines of said walls, said closure assembly comprising a first and second end closure flaps disposed in opposed relation, at opposite sides of said container, a closure panel disposed between said end closure panels and hingedly connected to said marginal fold line, gusset panel means hingedly connected between terminal end portions of said third closure panel and said end closure flaps, and a combined spout-forming and closure flap means hingedly connected to said marginal fold line, said combined closure flap means comprising a triangular closure panel foldably connected to said gusset panel means and foldable onto and beneath said closure panel, said combined closure flap means including a secondary foldable portion comprising an isosceles triangle, flanked by a pair of right angle triangular segments at the terminal end of said combined closure flap means for facilitating insertion of said combined closure flap means beneath said closure flap and above a portion of said gusset panel means.

4. In a reclosable container as claimed in claim **3** in which said triangular base panel is an isosceles triangle having a base terminating at said first and second closure flaps, and right triangular panel segments having a combined area equal in area to said isosceles triangular base panel and hingedly connected at respective hypotenuse portions to angular sides of said base panel, said right triangular panel segments being respectively hingedly connected along one leg to said gusset panel means.

5. In a reclosable container as claimed in claim **3** in which said gusset panel means and said combined closure flap means include adhesive receiving portions facilitating initial sealing of said container, said combined closure flap means being secured in overlying relation on said closure panel.

6. In a blank comprising a one-piece planar element having cut-and-scored portions and including pairs of alternately disposed walls;

a closure assembly hingedly connected to a marginal fold line bordering one end of said walls, said closure assembly comprising a combined spout forming and closure flap means, a first end closure flap

means, a closure flap means, and a second end closure flap means, said closure flap means including hinge line portions flanking adjacent end portions thereof for forming a tube when said blank is assembled;

said end closure flap means including gusset panel portions hingedly connected to the opposite ends of said third-mentioned closure flap means, said gusset panel portions comprising an angular fold line portion extending from a lower terminal corner of said third-mentioned closure flap means and terminating in a cut line portion extending away from the marginal fold lines of said closure flap means into a free edge portion of said blank.

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