United States Patent

[11] **3,554,430**

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[54] **GABLE TOP CONTAINER**
14 Claims, 4 Drawing Figs.

[52] **U.S. Cl.** **229/17,** 229/37
[51] **Int. Cl.** **B65d 5/72,** B65d 5/74
[50] **Field of Search** 229/17, 37

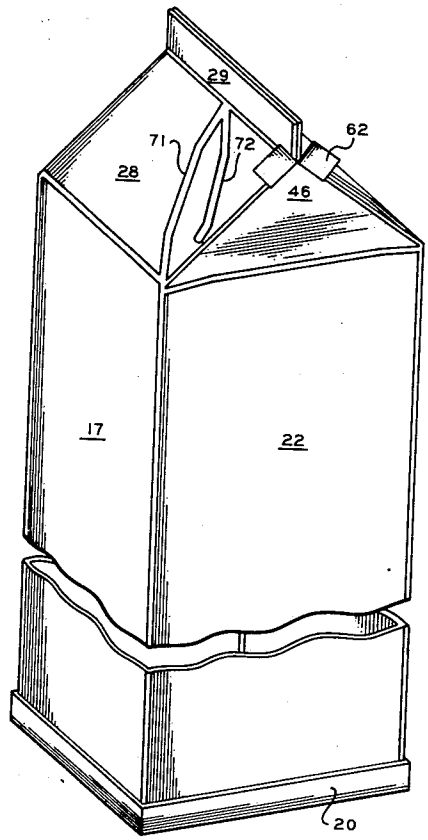
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Primary Examiner—David M. Bockenek
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ABSTRACT: A gable top container and blank for forming same. The container includes inclined roof panels which define a gable opening therethrough, and a pair of end closure panels for closing opposite ends of the gable opening. The gable top structure is provided with a novel score line configuration for causing one of the end closure panels to snap outwardly forming a pouring spout.



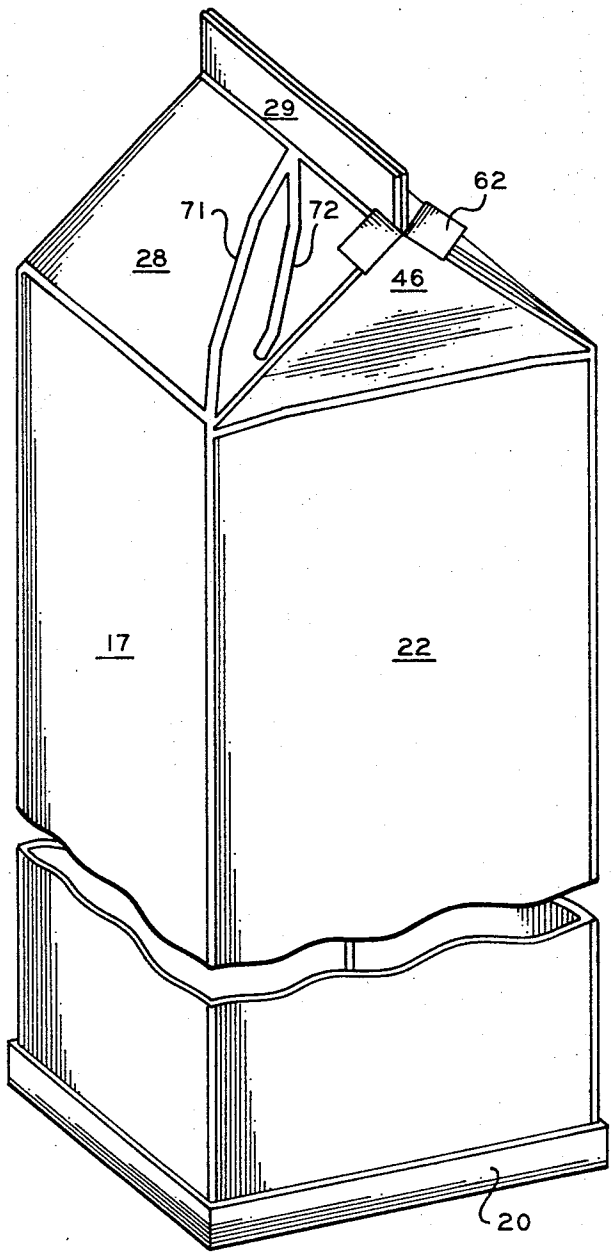


FIG. 1

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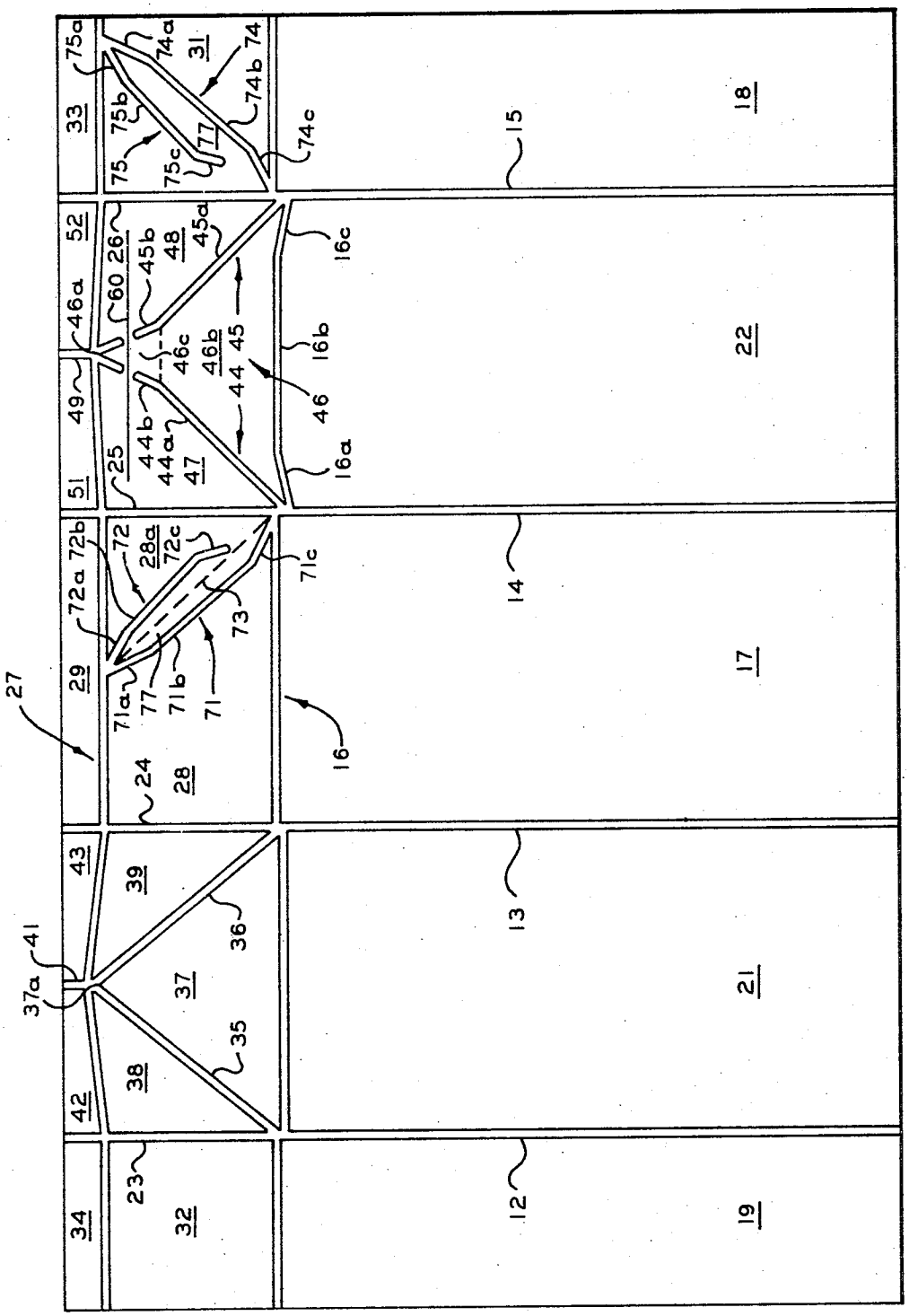


FIG. 2

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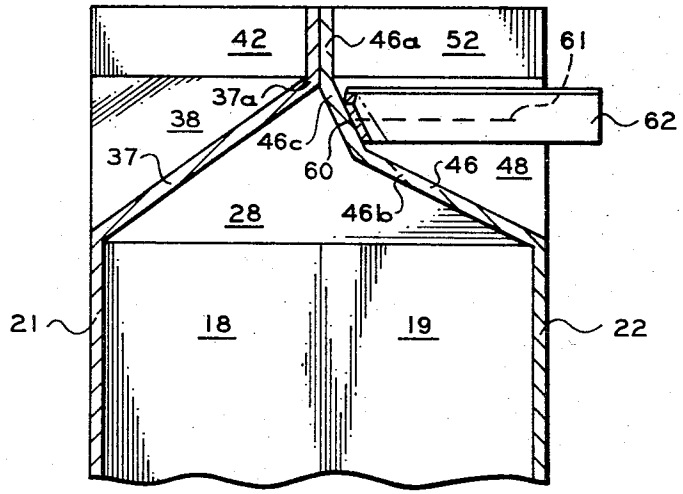
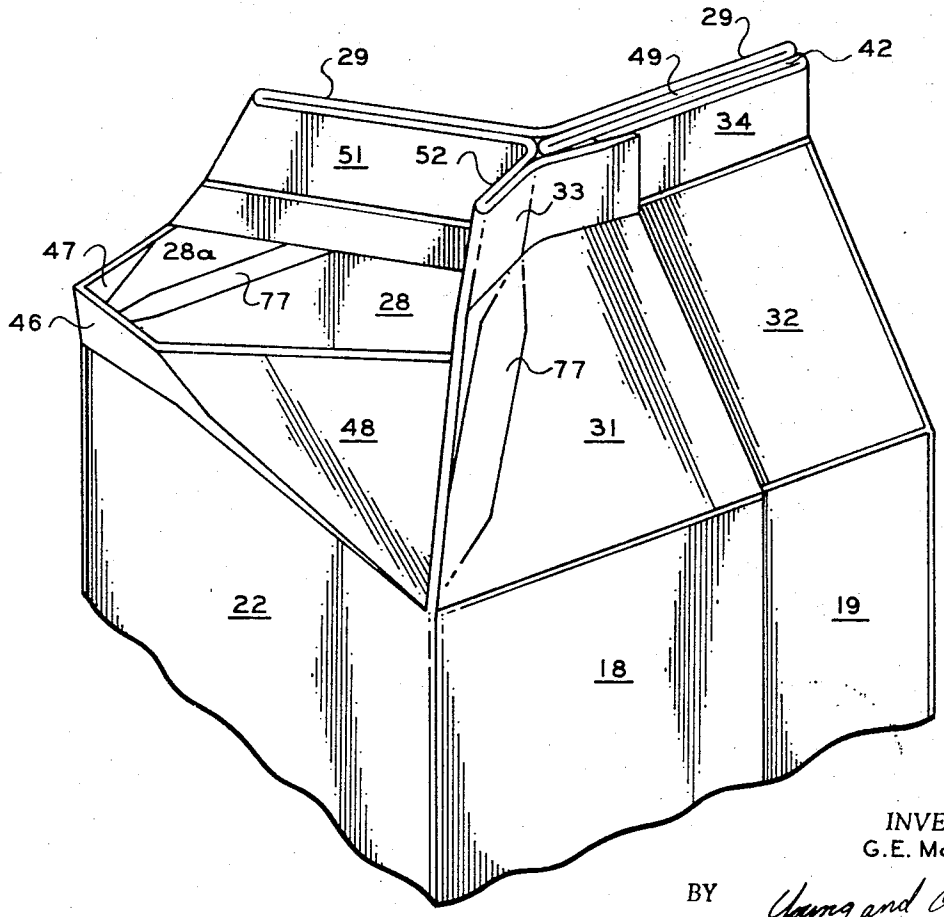


FIG. 3



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FIG 4

GABLE TOP CONTAINER

This invention relates to blanks for forming gable top containers and to the resulting container. In one aspect the invention relates to a novel gable top score line configuration which improves the snap action of the opening spout. More specifically, this invention is an improvement over the gable top container disclosed and claimed in U.S. Pat. No. 3,348,755, issued to G. E. MacEwen, and dated Oct. 24, 1967.

The invention is particularly applicable to gable top containers of rectangular cross section formed from a paperboard blank coated on one or both sides with thermoplastic material. These containers are commonly used in the dairy industry for packaging milk, orange juice, lemonade, and the like. A gable top closure structure consists generally of inclined roof panels which form gable end openings, and a pair of end closure panels inclined upwardly into the gable end openings. The end closure panels have integral foldback panels that assume a position lying against the underside of the front and rear roof panels. The foldback panels and the front and rear roof panels are formed with integral ridge panels, which are arranged in vertical contacting relation and are joined together by some form of adhesive, usually by a bonding of the thermoplastic coating, to form the ridge of the gable top.

Pry score lines are formed on one side of each of the roof panels so that when the roof panels and companion foldback panels are moved in opposite directions the uncovered end closure panel is permitted to snap out forming a pouring spout. The pry score lines shown in the aforementioned patent are configurated to provide a beam which when angularly disposed in relation to the plane of its associated roof panel imparts an outward force on the end closure panel causing it to snap open. While this configuration has been satisfactory for large containers, e.g., one-half gallon or larger, it has not been entirely reliable for small containers, e.g., quart or smaller cartons. The difficulty arises from the premature breaking of one of the score lines preventing the complete development of the beam portion.

It is therefore an object of the present invention to provide a novel score line configuration which improves the snap action of the closure end to form the pouring spout. Another object is to improve the sealability of the gable top container.

These and other objects will become apparent to those skilled in the art from the following disclosure taken in conjunction with the attached drawings in which:

FIG. 1 is a perspective view of a carton constructed according to the present invention;

FIG. 2 is a plan view of the paperboard blank used to form the container of FIG. 1;

FIG. 3 is a longitudinal sectional view of the gable top container shown in FIG. 1; and

FIG. 4 is a perspective view of an upper portion of the gable top container shown in FIG. 1, the container being shown with the end closure panel extending outwardly forming a pouring spout.

The reference character designations in FIGS. 1 and 2 follow generally that of the aforementioned patent of which the present invention is an improvement.

Referring to FIG. 2, the rectangular blank is provided with vertical score lines 12, 13, 14 and 15 which in combination with a generally horizontally extending score line 16 define sidewall panels 17, 18, 19, 21 and 22. In the assembled condition then, the panel 17 comprises the front wall of the container, panels 21 and 22 the sidewalls, and panels 18, 19 bonded together in overlapping relation comprise the rear panel of the container. A bottom closure 20 is permanently sealed to the lower end of the walls 17, 18, 19, 21 and 22 (see FIG. 1). Extending upwardly from the horizontal score lines 16 and aligned generally with vertical score lines 12, 13 14 and 15 are additional score lines 23, 24, 25 and 26, respectively. The score lines 23, 24, 25 and 26 are arranged in parallel relation and all terminate near the upper edge of the carton blank. A second continuous, generally horizontal score line 27, in combination with score lines 23, 24, 25 and 26, defines rib panels 29, 33–34 which on the blank are aligned with front wall 17 and rear wall 18–19, respectively. Thus when the carton is assembled, overlapping ribs 33 and 34 are bonded together in abutting relation (see FIG. 1).

Score lines 16, 24, 25 and 27 define a rectangular roof panel 28, and score lines 26, 16, 27 and 23 define roof panel comprising panels 31–32 bonded together in overlapping relation.

Score lines 23, 24, 16 and 27 define a closure panel which is divided into triangular sections 37, 38 and 39 by converging score lines 35 and 36. The score lines 35 and 36 meet at the junction with score line 27 forming the apex 37*a* of section 37 and a score line 41 extends upwardly to near the blank edge from the apex 37*a*. Triangular section 37 comprises the end closure panel for one of the gable openings defined by roof panels 28 and 31–32 and triangular sections 39 and 38 comprise the foldback panels which underlie the roof panels 28 and 31–32, respectively, in the assembled carton. As shown in FIG. 3, panel 37 in the assembled container extends angularly through the gable opening and the apex 37*a* is located near the midpoint of the upper ridge of the roof panels 28 and 31–32. Returning to FIG. 2, score lines 23, 24, 27 and 41 define two rib panels 42 and 43 which fold inwardly and are maintained in abutting relation between the confronting rib panels 29 and 33–34 surmounting the roof panels 28 and 31–32, respectively. (See assembled carton in FIG. 4). Score lines 25, 26, 16 and 27 define a second closure panel which is divided into polygonal sections 46, 47 and 48 by angulated score lines 44,45 and an angulated portion 16*a*, 16*b*,and 16*c*of score line 16. Score lines 44 and 45 meet at the junction with score 27 forming the apex 46*a* of section 46 and score 49 extends upwardly to near the edge of the blank from the apex 46*a*. Score lines 25, 26, 27 and 49 define rib panels 51 and 52 which when folded about score 49 are maintained in abutting relation between rib panels 29 and 33–34 surmounting roof panels 28 and 31–32, respectively. In the assembled container, section 46 comprises the end closure for gable opening defined by roof panels 28 and 31–32, and sections 47 and 48 comprise the foldback panels which underlie portions of roof panels 28 and 31–32. Score line 16 which defines the bottom edge of closure panel 46 is angulated having portions 16*a*, 16*b*, and 16*c*. Portion 16*a* joins score 44 at the junction with score 14 and section 16*c* joins score 45 at the junction with score 15. These junctions are located slightly below the score 16 of panels 17 and 18. The angular configuration afforded by 16*a*, 16*b* and 16*c* creates a downward pulling force on closure panel 46 so that its apex 46*a* is drawn downward and inward so as to maintain a forceful engagement of the folded edge along score line 49 with the folded edge along score line 41, which extend upwardly from apex 46*a* and 37*a*, respectively, thereby providing a secure top seal (see FIG. 3).

The score lines 44 and 45 are angulated having portions 44*a*, 44*b* and 45*a*, 45*b*, respectively. Portions 44*a* and 45*a* converge upwardly from a lower hinge line provided by 16*a*, 16*b*, 16*c*, define a generally trapezoidal section 46*b*. Portions 44*b* and 45*b* extend upwardly from the upper ends of 44*b* and 45*a*, respectively, terminating at apex 46*a*. The portions 44*a* and 45*b* define a triangular section 46*c* of panel 46 which has its base integral with the generally trapezoidal section 46*b*. A weakened line of severance 60 passes horizontally through the unscored portions of scores 44*b* and 45*b*. The junctions of 44*a* to 44*b*, and 45*a* to 45*b* are located a distance below the severance line 60. Thus, when a prying pressure is applied to panel section 46, the portion of panel section 46 below the severance line snaps open, the panel section 46 and the foldback panels 47 and 48 defining a pouring spout (see FIG. 4). As best seen in FIG. 4, the angular configuration of score lines 44 and 45 provide an improved pouring spout characterized as narrow and pointed. A strip of tape 61 (FIGS. 1 and 3) is bonded to the closure panel sections 46, 47, 48 in overlying relation to the weakened line of severance 60. The tape 61 is applied over the weakened line of severance 60 and heat sealed to the entire marginal surface about the weakened line of severance. The tape 61 can be formed of thermoplastic material or it can be a nonthermoplastic material provided

with a coating of thermoplastic material compatible and heat sealable to the thermoplastic coating on the container. It is presently preferable that the nonthermoplastic material have a heat reflective outer surface to prevent any weakening of the bond between the tape **61** and the container during the time the top section of the container is being subjected to radiant heat in preparation for sealing the rib panels to form the central laminar ridge. The ends **62** of tape **61** extend beyond the ends of the closure panel sections **46, 47, 48** to provide grasping tabs.

It has been found that the angular attitude of portions **44*b*** and **45*b*** provides for a more uniform seal by tape **61** over the line of severance **60** than with the prior art configuration which had an included angle at **46*a*** much greater than that disclosed herein. With the higher included angle between score lines **44** and **45**, the tape **61** wrinkles at the angular edges between the panel section **46** and panel sections **47** and **48**. The reduced included angle between scores **44** and **45** places the panel **46** bounding severance line **60** in a more vertical attitude (see FIG. **3**) permitting the tape to lie flatter at the edges of panels **46, 47** and **48**.

In order to provide a snap action for opening and closing the pouring spout, the roof panels **28** and **31** are provided with pry score lines shown generally as **71,72** and **74,75**, respectively. Since the pairs of pry score lines **71,72** and **74,75** are identical, only the configuration of pair **71–72** will be described, it being understood that **74–75** are similarly configurated.

In the aforementioned patent, the score lines **71** and **72** were symmetrically disposed on either side of an imaginary line **73** which extended diagonally from a medial point on score line **27** to the junction of score line **16** to score line **14**. The pry score lines **71** and **72** according to this invention are arranged in asymmetric relation. Score **71** is generally the same as that described in the aforementioned patent having portions **71*a***, **71*b***, and **71*c***. Portion **71*b*** extends generally parallel to the imaginary line **73** and portions **71*a*** and **71*b***, respectively, interconnect the opposite ends of portion **71*b*** to the upper ridge of roof panel **28** and the lower corner of roof panel **28**. Depending on the dimensions of the carton, the imaginary line 73 and hence portion **71*b*** forms an acute angle with score **27** in the range from 45° to 50°. Pry score lines **71,72** define an intermediate elongate beam section **77** and are so arranged that score **71** first breaks when section **47** and portion **28*a*** of panel **28** are moved outwardly, causing the beam section **77** to be angularly disposed in relation to the plane of roof panel **28**. Continued outward movement of section **47** and **28*a*** acts as a lever having the fulcrum at score line **72** to cause panel sections **46** to snap outwardly from the line of severance **60** after the tape **61** has been removed.

In order to ensure that the score **71** breaks first, the score **72** is configurated to present more resistance to breaking. More specifically, the score **72** has portions **72*a***, **72*b*** and **72*c***. Score **72*a*** meets with score **71** at the junction with score **27** and portion **72*b*** downwardly diverges outwardly with respect to portion **71*b***, generally in a plane parallel to the plane of end closure panel section **46*b*** and forms an angle with score **27** in the range from 44° to 49°. Portion **72*c*** joins portion **72*b*** at a point substantially removed from the junction of **71*c*** to scores **16** and **14**. Score portion **72*c*** extends generally toward the junction of scores **71*c*** and **16** but terminates a short distance therefrom. Thus there is an unscored portion between the end of **72*c*** and the junction. The unscored portion presents additional resistance to breaking of the score **72** thereby insuring that score **71** breaks first. The junction of score portion **44 *a*** and **44*b*** on the end closure panel defined by sections **46, 47, 48** is geometrically located so that maximum pry force is applied at this point which is proximate the line of weakness **60**. With panel **46** closed as shown in FIG. **3**, the plane of panel section **46*b*** intersects the area defined by score lines **71,72** and **74,75**. The line of intersection lies closer to score portions **71*b*** and **74*b*** to permit development of the beams **77,77** during the pry action. Thus when the pry force is applied about the fulcrum defined by score **72**, maximum pry force is applied at the junction of **44*a***, **44*b*** snapping the spout outwardly to a stable pouring position. Similarly when the spout is forced inwardly to an over center position in relation to the fulcrum defined by score **72**, the spout is snapped inwardly to a stable closed position. That is to say, score **75** has portions **75*a***, **75*b*** and **75*c***, portion **75*c*** terminating at a point removed from the junction thereby leaving an unscored space. Likewise, score **74** has sections **74*a***, **74*b*** and **74*c***.

The container of FIGS. **1** and **4** can be opened by applying outward pressure against the foldback panel sections **47** and **48** to cause separation of the bond between adjacent outer faces of rib panels **51** and **52**. Initial outward movement causes the roof panels **28, 31–32** to break along the pry score lines **71** and **74**, respectively. Note that the increased resistance of scores **72** and **75** ensures that the breaking will be first along scores **71, 74** Additional outward movement of roof panels **28, 31–32** causes a break along score lines **72** and **75** to form the elongate beam structure **77**. The lever action applies a maximum force at the junction of **44*a*** to **44*b*** and **45*a*** to **45*b*** causing splitting along the line of weakness which in turn permits the spout defined by panel sections **46, 47, 48** to snap outwardly to a pouring position. The over center position of the panel **46** in relation to scores **25** and **26** maintains the spout in a stable pouring position. Now when the panel **46** is moved toward the retracted position to a point over center of the score lines **25** and **26**, the spout snaps to a stable closed position. The opening and closing of the spout is identical to that disclosed in the aforementioned patent.

While the invention has been illustrated with the presently preferred container employing weakened line of severance **60**, it is applicable to other side opening containers which do not utilize a weakened line of severance or which provide the weakened line of severance in a different location and of a different configuration.

Reasonable variations and modifications are possible within the scope of the foregoing disclosure, the drawings, and the appended claims to the invention.

I claim:

1. A gable top container of sheet material including a tubular body having four sidewalls; a bottom closure fixed to said body; a pair of opposed roof panels inclining toward each other and overlying the top of said body; a pair of opposed end closure panels enfolded between said roof panels from the opposite gable ends formed by the later; first and second pairs of foldback panels, each pair of foldback panels being joined to opposite sides of a respective one of said end closure panels along fold lines which are in proximity with said roof panels, said foldback panels being folded against the underside of said roof panels; a ridge panel surmounting each of said roof panels; a ridge panel surmounting each of said foldback panels, each pair of ridge panels surmounting a pair of foldback panels being hinged together at the apex of the contiguous end closure panels and being folded about said hinge joinder in face-to-face relation between the ridge panels surmounting said roof panels, wherein the improvement comprises lower and upper score lines located in each of said pair of roof panels, said lower and upper score lines defining an elongate beam section extending diagonally from the upper edge of their respective roof panels toward the lower corner thereof contiguous with one of said closure panels, the upper end of said beam section being tapered to terminate substantially in a point on said upper edge, said lower score line extending continuously from said upper edge to said lower corner, the lower end of said upper score line terminating at a point longitudinally spaced from said lower corner and laterally spaced from said lower score line, said lower end of said upper score line defining the lower end of said beam section, the plane of said closure panel lying in the area defined by said beam section.

2. The invention as recited in claim **1** wherein said lower score line includes first, second and third score portions, said lower score line second portion extending generally parallel to the plane of said one end closure panel, said lower score line

first portion interconnecting the upper end of said lower score line second portion and said upper edge, and said lower score line third portion interconnecting the lower end of said lower score line second portion and said lower corner; and said upper score line includes first, second and third score portions, said upper score line second portion downwardly diverging outwardly from said lower score line second portion, said upper score line first portion interconnecting the upper end of said upper score line second portion and said upper edge, said upper score line third portion extending from the lower end of said upper score line second portion in a downwardly converging direction toward said lower score line second portion, said upper score line third portion terminating at a point spaced from said lower score line second portion and said lower corner.

3. The invention as recited in claim 1 wherein said first and second score lines are arranged so that the plane of said end closure panel is closer to said lower score line second portion that said upper score line second portion.

4. The invention as recited in claim 3 wherein said four sides are of substantially equal width, the apexes of said pair of opposed end closure panels being located substantially at the midpoint of the upper edge of their respective roof panels, and the point of intersection of said first score portion of each of said upper and lower score lines with the upper edge of the respective roof panels being substantially at the midpoint of said upper edge.

5. The invention as recited in claim 4 wherein said upper score line second portion extends in a diagonal straight line forming an angle with the upper edge of its respective roof panel, said angle being in the range from 44° to 49° and the plane of said one of said end closure panels extending generally parallel to said upper score line second portion.

6. A gable top container of sheet material comprising a tubular body having four sidewalls integrally joined along four corner edges, a bottom closure fixed to said body, a pair of opposed roof panels inclining toward each other and overlying the top of said body forming a gable opening having a top longitudinally extending ridge, a first enclosure panel extending angularly through said gable opening to close one end thereof, said closure panel having an apex disposed proximate the ridge of said gable opening and at a medial point therealong, the improvement comprising a second closure panel for closing the opposite end of said gable opening, said second closure panel including an end closure panel integrally hinged to the upper edge of one of said sidewalls along a fold line, and a pair of foldback panels flanking said end closure panel and integrally connected thereto along upwardly converging fold lines, said fold line panels being integrally joined to respective roof panels, said end closure panel having a first section extending angularly upwardly from said integral hinge through said gable opening and having the form of a trapezoid, and a second section extending angularly upwardly from said first section and joined thereto along an integral junction line, said second section having the form of a triangle and terminating at an upper apex, a weakened line of severance extending transversely across said second section and portions of said foldback panels, said weakened line of severance being proximate and parallel to said junction line, said foldback panels underlying said respective roof panels, each of said roof panels having pry score lines extending diagonally from the medial point of upper edge of its respective roof panel toward the lower corner contiguous with said end closure panel, said pry score having an elongate portion disposed above the plane of said second section and parallel thereto.

7. The invention as recited in claim 6 wherein said roof panels are identical terminating at lower parallel and generally horizontally extending edges, and said integral hinge includes first, second, and third portions, said second portion extending horizontally and disposed slightly above said lower edges of said roof panels, and said first and second portions interconnecting the outer ends of said second portion and respectively one of said upwardly converging fold lines at adjacent sidewall edges and at a point below the elevation of said horizontally extending lower edges of said side roof panels, said first and second portions tending to pull said apex of said enclosure panel into sealing engagement with said apex of said first end closure panel.

8. The invention as recited in claim 6 wherein the fold lines defining said second section of said enclosure panel are discontinuous on either side of said weakened line of severance.

9. The invention as recited in claim 8 wherein said closure panel includes a coating of thermoplastic material permanently bonded on the exterior side thereof, a tape overlying the exterior side of said weakened line of severance, at least the surface of said tape confronting said closure panel being formed of thermoplastic material heat sealable to said thermoplastic coating on said closure panel, said tape being bonded to the entire marginal area of said closure panel, said tape being bonded to the about said weakened line of severance by the heat sealing of said thermoplastic materials, said fold lines defining said score lines of said second section of said closure panel terminating at a point below the lower edge of said tape.

10. In a gable top container of the type having a pair of inclined roof panels defining first and second gable openings; a ridge panel surmounting each of said roof panels, said ridge panels being disposed in confronting relation, a first end closure including a panel of triangular configuration inclined upwardly and inwardly into said first gable opening and having its apex terminating proximate the midpoint of the upper edges of said roof panels, a ridge panel surmounting said first end closure and folded into face-to-face relation and disposed between said confronting ridge panels surmounting said roof panels, pry scores formed in the surface of each of said roof panels, each of said pry scores extending from the upper edge of its respective roof panel diagonally downwardly toward the lower corner of said second gable opening, the improvement for closing said second gable opening, said improvement comprising a second end closure including a panel having a lower edge and a pair of converging side edges which meet at an apex, said panel being inclined upwardly into said second gable opening, said apex being positioned proximate said apex of said first closure panel, each of said converging side edges having lower ends located below the lower edges of said roof panels, said lower edge of said closure panel having first, second and third portions, said second portion being substantially horizontal and having ends spaced from said converging side edges, said first portion extending downwardly from one of said ends of said second section to the lower end of one of said converging side edges, said third section extending downwardly from the other end of said second section to the lower end of the other of said converging side edges; and foldback panels interconnecting the outer edges of said closure panel and the outer edges of said roof panels.

11. The invention as recited in claim 10 wherein said second end closure has a horizontal line of severance extending across the upper portion thereof, said line of severance completely tranversing said end closure panel and a substantial portion of each of said foldback panels.

12. A paperboard blank for forming a container of rectangular formation and having a gable top, said blank being formed with laterally spaced-apart score lines extending vertically from the lower edge to the upper edge of the blank, a score line extending transversely on the blank in downward spaced relation to the upper edge thereof, said latter score line, in conjunction with said vertically extending score lines, defining opposed front and rear wall panels and opposed sidewall panels, a second transversely extending score line arranged intermediate the upper edge of said blank and said first transversely extending score line and defining, in conjunction therewith and with said vertically extending score lines, a front roof panel surmounting said front wall panel, a rear roof panel surmounting said rear wall panel, and an area surmounting each of said sidewall panels, each of said areas being provided

with converging score lines inclining upwardly from said first transverse score line to said second transverse score line and defining in each of said areas an end closure panel and a pair of foldback panels hinged to the end closure panel, said second transversely extending score line, in conjunction with said vertically extending score lines, defining ridge panels surmounting said front and rear roof panels and each pair of said foldback panels, and a weakened line of severance tranversing upper portion of said end closure panel and extending across a portion of said foldback panels, wherein the improvement comprises upper and lower pry score lines located on each of said roof panels, said score lines defining an elongate beam section extending diagonally from the upper edge of its respective roof panel toward the lower corner thereof contiguous with one of said end closure panels, the upper end of said beam section being tapered to terminate substantially at a point on said upper edge, said lower score line extending continuously from said upper edge to said lower corner, the lower end of said score line terminating at a point longitudinally spaced from said lower corner and laterally spaced from said lower score line.

13. The invention as recited in claim 12 wherein said lower score line includes first, second, and third portions, said lower score line second portion extending diagonally and

downwardly along said respective roof panel at an angle between 45° and 50° with said upper edge of said respective roof panel, said lower score line first portion interconnecting the upper end of said lower score line second portion, said upper edge of said respective roof panel, and said lower score line third portion interconnecting the lower end of said lower score line second portion and said lower corner; and said upper score line including first, second, and third portions, said upper score line second portion downwardly diverging outwardly from said upper score line second portion, said upper score line first portion interconnecting the upper end of said upper score line second portion and said upper edge of said respective roof panel, said upper score line third portion extending from the lower end of said second score portion in a downwardly converging direction toward said lower score line second portion, said upper score line third portion terminating at a point spaced from said lower score line second portion and said lower corner.

14. The invention as recited in claim 13 wherein said front and rear wall panels and said opposed sidewall panels are of substantially equal width, and the upper end of said beam is substantially at the midpoint of the upper edge of said roof panels.