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Smith

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[54] **GENERALLY FRUSTOCONICAL CONTAINER AND BLANK THEREFOR**

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[73] Assignee: **Phillips Petroleum Company,** Bartlesville, Okla.

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[52] **U.S. Cl.** ..... **229/17 G,** 229/4.5, 229/22

[51] **Int. Cl.** **B65d 5/72**

[58] **Field of Search** ..... 229/4.5, 17 G, 18, 22, 229/410, DIG. 7, 3.1

[56] **References Cited**

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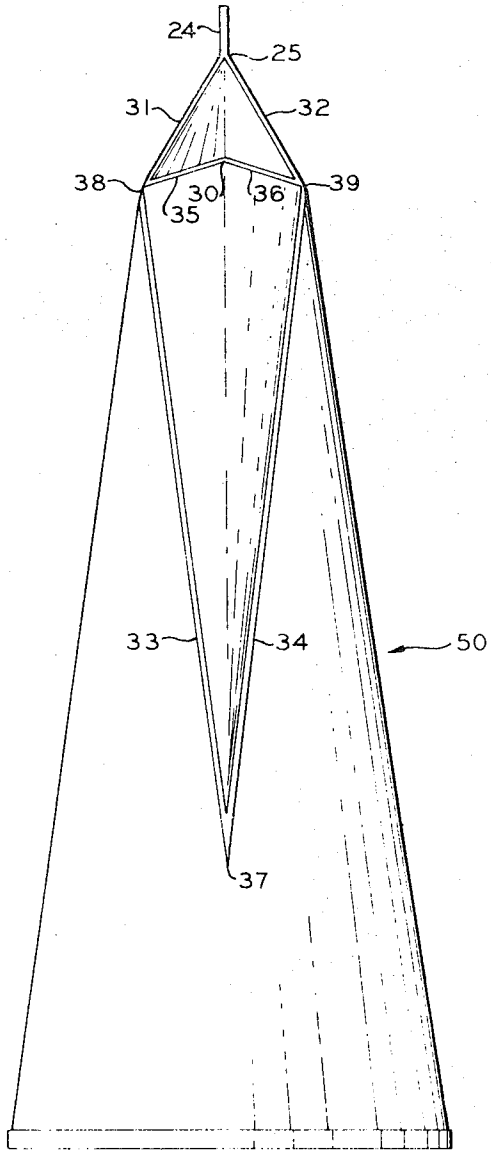
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Primary Examiner—William I. Price
Assistant Examiner—Bruce H. Bernstein

[57] **ABSTRACT**

A frustoconical preform is provided with pinched waist forming score lines for the production of a generally frustoconical container having a gable top with a planar upstanding ridge with the ends thereof projecting outwardly over a pinched waist. The gable ends serve as shoulders for manual grasping of the container. At least one of the gable ends can be opened by suitable means to serve as a pouring spout. The preform is made from a scored blank.

19 Claims, 5 Drawing Figures



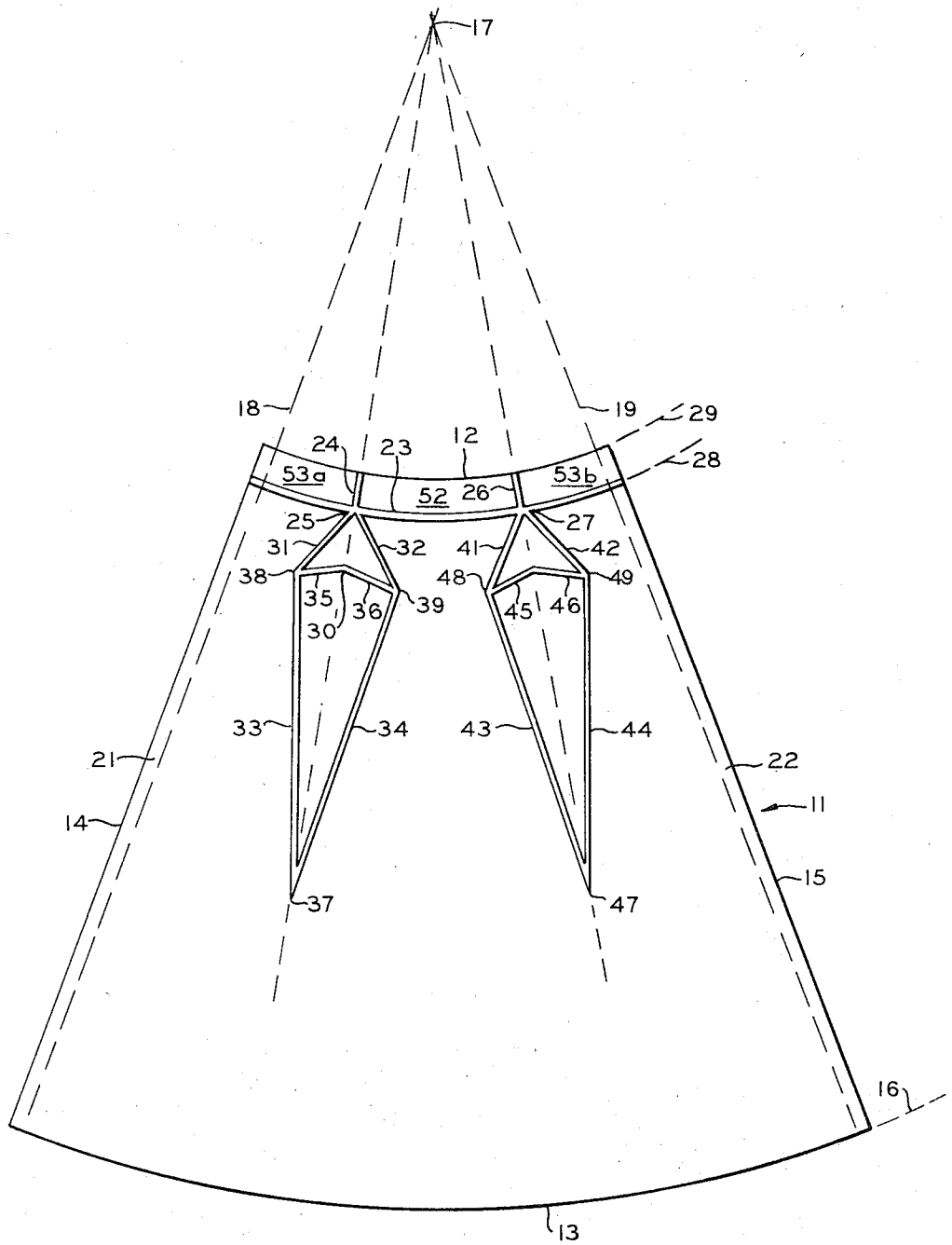

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FIG. 1

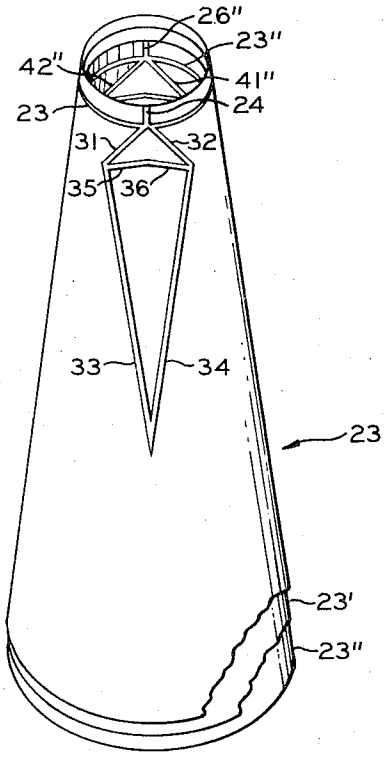

26"
23"
42"
41"
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34
23
23'
23"

FIG. 2

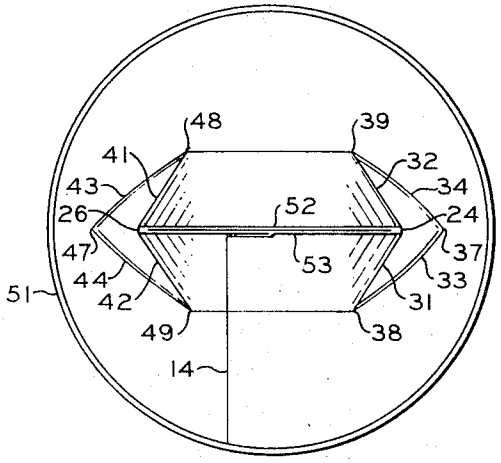

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FIG. 5

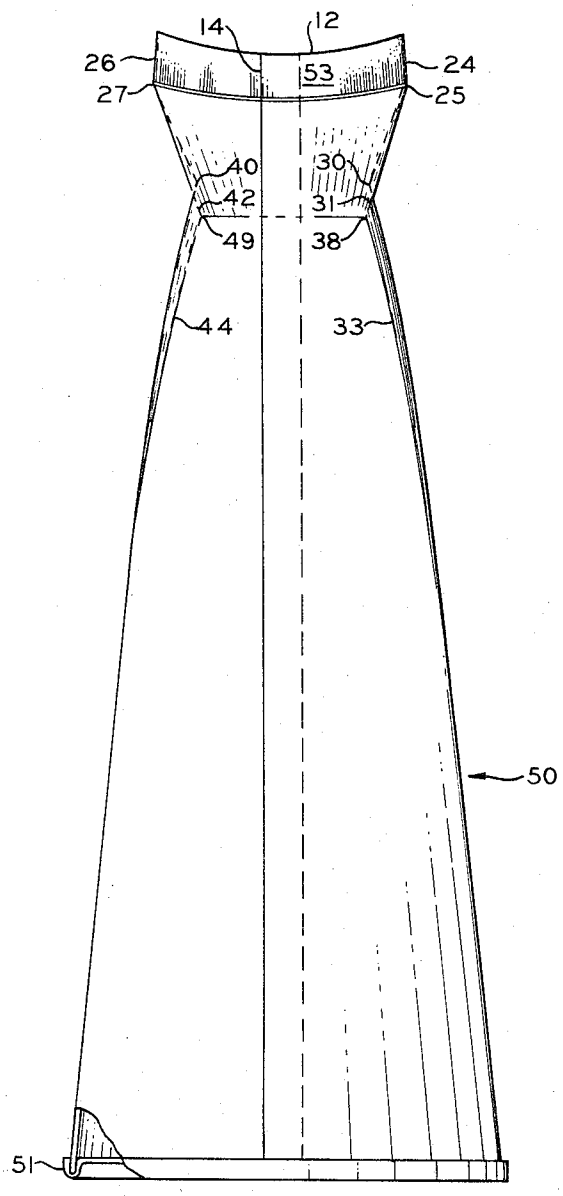


FIG. 3

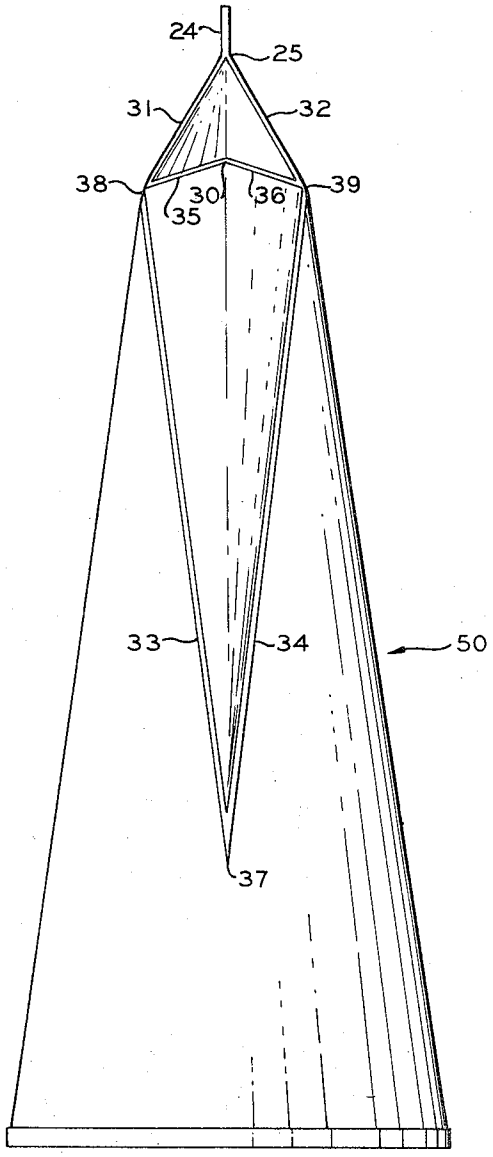


FIG. 4

GENERALLY FRUSTOCONICAL CONTAINER AND BLANK THEREFOR

This invention relates to a container and to a blank and a preform for the manufacture of the container.

Blow molded bottles having tapered sidewalls with protruding sections in the upper portion of the bottles for ease of grasping the bottles are well known. Paper containers, although frequently cheaper than blow molded bottles, are limited in types of design due to fabrication problems. Thus, most paper containers are cylindrical, frustoconical or rectangular. Although the frustoconical containers have a tapered appearance, these containers are not readily grasped and held when the top is the smaller end. Furthermore, the flat top of the frustoconical container requires a top disc blank with a machine operation for securing the top disc blank to the container sidewall, thereby increasing the cost.

In accordance with the present invention, a tapered container can be formed from only a paper sidewall blank and a bottom blank and still be provided with projecting shoulders in the upper portion thereof for grasping. This is accomplished by making the sidewall blank with at least two pinched waist forming score line configurations to permit the folding of the blank into a generally frustoconical sidewall with the upper portion thereof constituting a gable top structure with a planar upstanding rib wherein the gable ends project outwardly over the pinched waist.

Accordingly, it is an object of the present invention to provide a new and improved container. It is an object of the invention to provide a blank for the fabrication of the new container. It is another object of the invention to provide a frustoconical preform which can be readily nested for storage and shipping and which requires minimum equipment for the transformation of the preform into a generally frustoconical container. Other objects, aspects and advantages of the invention will be apparent from a study of the specification, the drawings and the appended claims to the invention.

In the drawings, FIG. 1 is a plan view of a blank embodying the present invention; FIG. 2 is a perspective view of a nested stack of preforms of the type made from the blank of FIG. 1; FIG. 3 is a front elevational view, partly in cross section, of a container formed from the blank of FIG. 1; FIG. 4 is a right side elevational view of the container of FIG. 3; and FIG. 5 is a top view of the container of FIG. 3.

Referring now to FIG. 1, the blank 11 is preferably formed of paperboard having a coating of a suitable thermoplastic material on each face thereof. Blank 11 has a top edge 12, a bottom edge 13, and first and second opposite side edges 14 and 15. Bottom edge 13 corresponds at least generally to the arc of a first circle 16 having a center at point 17 such that the radius of the circle 16 is greater than the distance from bottom edge 13 to top edge 12 along a radial ray of circle 16. Side edges 14 and 15 extend at least generally along first and second radial rays of circle 16. In the illustrated embodiment there are marginal portions 21 and 22 extending along the length of side edges 14 and 15 and lying outside of radial rays 18 and 19 to form seam margins for the conical surface located between rays 18 and 19 for overlapping and bonding to the opposite sides of the blank in the formation of the blank into the frustoconical configuration of the preforms 23 illustrated in FIG. 2. The seam margins which are additional to the conical surface can be divided equally or unequally on the two sides of the blank or the entire seam margin can be formed on only one side of the conical surface section of the blank.

A lateral score line 23 is formed in blank 11 spaced downwardly from top edge 12 and extending from first side edge 14 to second side edge 15. A generally vertical score line 24 extends from point 25 on score line 23 to upper edge 12 at least substantially along a radial ray of circle 16. A second generally vertical score line 26 extends from point 27 on sore line 23 to upper edge 12 at least substantially along another radial ray of circle 16. Score line 23 is preferably in the form of an arc of circle 28 having a center at point 17, while top edge 12 is in the form of an arc of circle 29 also having a center at point 17. However, score line 23 and top edge 12 can have other configurations; for example, score line 23 can be in the form of a first straight line segment from side edge 14 to point 25, a second straight line segment between points 25 and 27, and a third straight line segment between point 27 and side edge 15 while top edge 12 is in the form of an arc or three line segments parallel to the three line segments of score line 23.

A first pinched waist forming score line configuration is formed by a first pair of score lines 31 and 32, a second pair of score lines 33 and 34, and a third pair of score lines 35 and 36. Score lines 31 and 32 extend downwardly and outwardly from point 25 or score line 23. Score lines 33 and 34 extend upwardly and outwardly from point 37, which is spaced upwardly from the bottom edge 13. Score line 33 intersects score line 31 at point 38, while score line 34 intersects score line 32 at point 39 to form a first tetragon. Score lines 35 and 36 extend downwardly and outwardly from point 30. In the presently preferred embodiments, points 25, 30 and 37 lie at least substantially on a common radial ray of circle 16.

A second pinched waist forming score line configuration is formed by a first pair of score lines 41 and 42, a second pair of score lines 43 and 44, and a third pair of score lines 45 and 46. Score lines 41 and 42 extend downwardly and outwardly from point 27 on score lin 23. Score lines 43 and 44 extend upwardly and outwardly from point 47, which is spaced upwardly from the bottom edge 13. Score line 43 intersects score line 41 at point 48, while score line 44 intersects score line 42 at point 49 to form a second tetragon. Score lines 45 and 46 extend downwardly and outwardly from point 40. In the presently preferred embodiments, points 27, 40 and 47 lie at least substantially on a common radial ray of circle 16.

The first and second pinched waist forming score line configurations are spaced apart on blank 11 so as to be substantially 180° apart when blank 11 is converted to frustoconical preform 23. In the presently preferred embodiment, score lines 31, 32, 41 and 42 are equal in length to each other; score lines 33, 34, 43 and 44 are equal in length to each other; and score lines 35, 36, 45 and 46 are equal in length to each other. However, it is within the scope of the invention for score lines 31, 32, 41 and 42 to have differing lengths; similarly score lines 33, 34, 43 and 44 may have differing lengths; and score lines 35, 36, 45 and 46 may have differing lengths. Although score lines 35 and 36 and score lines 45 and 46 are shown as a pair of straight lines, other configurations can be utilized, preferably with the mid-

dle portion of the combination being higher on blank 11 than the end points 38, 39 or 48, 49. For example, each of the pair of score lines 35 and 36 and the pair of score lines 45 and 46 can be replaced by a single straight line or more preferably by an inverted generally U-shape curved score line. The pair of score lines 35 and 36 and the pair of score lines 45 and 46, or their equivalents, aid in forming the pinched waist in the container as well as the retention of the pinched waist configuration once formed.

Referring now to FIG. 2, a series of blanks 11 have been individually folded about a conical mandrel and the side margins thereof have been overlapped and bonded to each other to produce frustoconical preforms 23, 23' and 23'' which are shown in a nested position for shipping and handling. The pinched waist score lines have not been broken, thus the preforms retain their frustoconical configurations, facilitating stacking and denesting operations. The preform 23 made from the illustrated blank 11 has a circular bottom edge and a circular top edge with both the bottom edge and the top edge lying in planes perpendicular to the longitudinal axis of preform 23, thereby providing stability of stacks of preforms 23 as well as of individual preforms in processing equipment.

Referring now to FIGS. 3, 4 and 5, a suitable metal can bottom member 51 has been secured to the lower edge of a preform 23 to form a container 50. Inwardly directed pressures have been applied to the pinched waist score line configuration to move points 30 and 40 closer to the longitudinal axis of the container 50. The folding of the sidewall material along the score lines of the pinched waist score line configurations results in points 38, 39, 48 and 49 being moved away from the longitudinal axis of the container 50 and the changing of the circular configuration of top edge 12 into an elongated configuration. A back ridge panel 52 is formed by score lines 24, 23 and 26 and top edge 12, and a front ridge panel 53 is formed by the combination of the ridge panel component 53a outlined by side edge 14, top edge 12, and score lines 23 and 24 and the ridge panel component 53b outlined by top edge 12, side edge 15, and score lines 23 and 26. Inwardly directed pressures applied against the front ridge panel 53 and the back ridge panel 52 bring their interior surfaces into contact with each other. These interior surfaces of ridge panels 52 and 53 can be heated prior to, subsequent to, and/or during the folding or container 50 to bring the interior ridge panel surfaces into contact, for achieving a thermal bonding of the thermoplastic coatings on the interior surfaces of the ridge panels to seal the container.

The portion of the container sidewall above points 38 and 49 and within score lines 31, 23 and 42 form an approximately planar front roof panel while the portion of the container sidewall above points 39 and 48 and within score lines 32, 23 and 41 forms an approximately planar opposing rear roof panel. In the presently preferred embodiment, score lines 31, 32, 41 and 42 extend downwardly from points 25 and 27, respectively, on at least substantially equal angles to the vertical. Similarly, it is presently preferred that score lines 33, 34, 43 and 44 extend upwardly from points 37 and 47, respectively, on at least substantially equal angles to the vertical. Although the invention is preferably employed with right angle frustoconical preforms because of the simplicity of manufacture, it is within the scope of the invention to employ the pinched waist forming score line configurations with frustoconical preforms wherein the longitudinal axis thereof is inclined to the vertical and with preforms having a generally oval cross section in a plane perpendicular to the longitudinal axis thereof.

Container 50 of FIGS. 3, 4 and 5 can be opened by any suitable technique known in the art. One corner of the bonded ridge panel structure can be cut with scissors to expose the interior packaging space of the container. A weakened line of severance can be formed in blank 11 in the ridge panel area to aid in the removal of the corner of the bonded ridge panel structure. A portion of the interior surface of the ridge panels can be coated with a no-seal coating to prevent the bonding of the opposing interior surfaces of the ridge panels in that area. Such no-seal coating could extend from at or below score line 23 to a point below upper edge 12 in the area adjacent one or both of score lines 24 and 26 to form a spout extending up into the bonded ridge panel structure which can be exposed by cutting off only the top one-third or one-half of the ridge panel structure adjacent the corner to be opened. Horizontal score lines can be provided between points 39 and 48 and between points 38 and 49 in the container to provide a more uniform joinder or the conical surface of the lower portion of the container with the approximately planar roof panels. Similarly, the blank can be provided with a first pair of score lines extending downwardly from points 39 and 48 toward a point of convergence and a second pair of score lines extending downwardly from points 49 and 38 in the container toward a point of convergence to relieve the stresses in the container sidewall caused by the folding of the sidewall material. Although score lines 33 and 34 and score lines 43 and 44 are shown as extending to points 37 and 47, respectively, it is within the scope of the invention for these score lines to extend downwardly only part way toward the convergence point. While it is presently preferred for points 37 and 47 to be spaced above bottom edge 13 for simplicity in the application of a bottom member, it is within the scope of the invention for points 37 and 47 to be located at or below the bottom edge 13.

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

What is claimed is:

1. A blank for forming the sidewall of a generally conical container, said blank having a top edge, a bottom edge opposite said top edge, and first and second opposite side edges, said bottom edge at least generally corresponding to the arc of a circle having a radius greater than the distance from said bottom edge to said top edge along a radial ray of said circle, said first side edge extending at least substantially along a first radial ray of said circle, said second side edge extending at least substantially along a second radial ray of said circle, at least one of said first and second side edges having a marginal portion extending along the length thereof lying outside the respective one of the first and second radial rays to provide a seam margin along one of said side edges for overlapping and bonding to the margin along the other of said side edges in the formation of said blank into a generally frustoconical configuration; first and second pinched waist forming score

line configurations formed in said blank; said first score line configuration comprising a first pair of score lines extending downwardly and outwardly from a first point on said blank spaced downwardly from said top edge; said second score line configuration comprising a second pair of score lines extending downwardly and outwardly from a second point on said blank spaced downwardly from said top edge, said first and second points being spaced apart on said blank so as to be substantially 180° apart when said blank is formed into said generally frustoconical configuration; said first score line configuration further comprising a third pair of score lines extending upwardly and outwardly from a third point on said blank spaced from said bottom edge to points of intersection with said first pair of score lines to form a first tetragon with said first pair of score lines, said first pair of score lines being at least substantially equal to each other and said third pair of score lines being at least substantially equal to each other, said first and third points being at least subatantially on a first common radial ray of said circle with said first tetragon being at least substantially symmetrical about said first common radial ray; said second score line configuration further comprising a fourth pair of score lines extending upwardly and outwardly from a fourth point on said blank spaced from said bottom edge to points of intersection with said second pair of score lines to form a second tetragon with said second pair of score lines, said second pair of score lines being at least substantially equal to each other and said fourth pair of score lines being at least substantially equal to each other, said second and fourth points being at least substantially on a second common radial ray of said circle with said second tetragon being at least substantially symmetrical about said second common radial ray, the angle between said first aand second common radial rays being such that said first and second common radial rays would be substantially 180° apart when said blank is formed into said generally frustoconical configuration; a first score line extending between the points of intersection of said first pair of score lines with said third pair of score lines; and a second score line extending between the points of intersection of said second pair of score lines with said fourth pair of score lines.

2. A blank in accordance with claim **1** wherein said first score line extends outwardly and downwardly from a fifth point on said blank to the points of intersection of said first pair of score lines with said third pair of score lines, said fifth point being at least substantially on said first common radial ray and below said first point, and wherein said second score line extends outwardly and downwardly from a sixth point on said blank to the points of intersection of said second pair of score lines with said fourth pair of score lines, said sixth point being at least substantially on said second common radial ray and below said second point.

3. A blank in accordance with claim **2** further comprising a score line spaced downwardly from the top edge of said blank and extending from said first side edge through said first and second points to said second side edge.

4. A blank in accordance with claim **3** further comprising a score line extending at least substantially along a radial ray of said circle from said first point to said upper edge, and a score line extending at least substantially along a radial ray of said circle from said second point to said upper edge.

5. A preform comprising the blank of claim **4** formed into said generally frustoconical configuration with said seam margin and said margin along said other side edge being overlapped and bonded together.

6. A blank for forming the sidewall of a generally conical container, said blank having a top edge, a bottom edge opposite said top edge, and first and second opposite side edges, said bottom edge at least generally corresponding to the arc of a circle having a radius greater than the distance from said bottom edge to said top edge along a radial ray of said circle, said first side edge extending at least substantially along a first radial ray of said circle, said second side edge extending at least substantially along a second radial ray of said circle, at least one of said first and second side edges having a marginal portion extending along the length thereof lying outside the respective one of the first and second radial rays to provide a seam margin along one of said side edges for overlapping and bonding to the margin along the other of said side edges in the formation of said blank into a generally frustoconical configuration; first and second pinched waist forming score line configurations formed in said blank; said first score line configuration comprising a first pair of score lines extending downwardly and outwardly from a first point on said blank spaced downwardly from said top edge; said second score line configuration comprising a second pair of score lines extending downwardly and outwardly from a second point on said blank spaced downwardly from said top edge, said first and second points being spaced apart on said blank so as to be substantially 180° apart when said blank is formed into said generally frustoconical configuration; a first score line extending between the lower ends of said first pair of score lines; and a second score line extending between the lower ends of said second pair of score lines; said first and second score lines being higher at the mid portions thereof than at the ends thereof.

7. A blank in accordance with claim **6** wherein said first score line configuration further comprises a third pair of score lines extending upwardly and outwardly from a third point on said blank spaced from said bottom edge to points of intersection with said first pair of score lines to form a first tetragon with said first pair of score lines being at leaset substantially equal to each other and said third pair of score lines being at least substantially equal to each other, said first and third points being at least substantially on a first common radial ray of said circle with said first tetragon being at least substantially symmetrical about said first common radial ray, and wherein said second score line configuration further comprises a fourth pair of score lines extending upwardly and outwardly from a fourth point on said blank spaced from said bottom edge to points of intersection with said second pair of score lines to form a second tetragon with said second pair of score lines being at least substantially equal to each other and said fourth pair of score lines being at least substantially equal to each other, said second and fourth points being at least substantially on a second common radial ray of said circle with said second tetragon being at least substantially symmetrical about said second common radial ray, the angle between said first and second common radial rays being such that said first and second common radial rays would be substantially 180°

apart when said blank is formed into said generally frustoconical configuration.

8. A blank in accordance with claim 7 further comprising a score line extending at least substantially along a radial ray of said circle from said first point to said upper edge, and a score line extending at least substantially along a radial ray of said circle from said second point to said upper edge.

9. A blank in accordance with claim 7 further comprising a score line spaced downwardly from the top edge of said blank and extending from said first side edge through said first and second points to said second side edge.

10. A blank in accordance with claim 9 wherein said upper edge at least generally corresponds to an arc of a second circle having a common center with the first named circle, and wherein said score line spaced downwardly from the top edge and extending from said first side edge to said second side edge at least generally corresponds to an arc of a third circle having a common center with said first named circle.

11. A blank in accordance with claim 10 wherein said first and second pairs of score lines have equal lengths, and wherein said third and fourth pairs of score lines have equal lengths.

12. A preform comprising the blank of claim 6 formed into said generally frustoconical configuration with said seam margin and said margin along said other side edge being overlapped and bonded together.

13. A packaging container comprising a sidewall having a lower portion and an upper portion, and a bottom closure secured to the bottom edge of said sidewall to close the lower end of said container; said lower portion of said sidewall being in the form of an at least substantially frustoconical configuration, larger at the bottom than the top thereof; said upper portion of said sidewall comprising a first wall section formed by a first pair of score lines extending outwardly and downwardly from a first point on said upper portion of said sidewall spaced from the upper edge thereof, a second wall section formed by a second pair of score lines extending outwardly and downwardlly from a second point on said upper portion of said sidewall spaced from the upper edge thereof, said first and second points being spaced substantially 180° apart from the vertical axis of said container, first and second opposing roof panels joining said first and second wall sections and extending downwardly from a line through said first and second points to the upper extent of said lower portion of said sidewall, and first and second ridge panels surmounting said first and second roof panels, said first and second ridge panels being bonded together to close the upper end of said container; said lower portion of said sidewall being interrupted by third and fourth wall sections, said third wall section being formed by a third pair of score lines extending upwardly and outwardly from a third point on said lower portion of said sidewall spaced upwardly from the bottom edge thereof to points of intersection with said first pair of score lines, said fourth wall section being formed by a fourth pair of score lines extending upwardly and outwardly from a fourth point on said lower portion of said sidewall spaced upwardly from the bottom edge thereof to points of intersection with said second pair of score lines; a first score line extending between the points of intersection of said first pair of score lines with said third pair of score lines, and a second score line extending between the points of intersection of said second pair of score lines with said fourth pair of score lines.

14. A container in accordance with claim 13 wherein said first pair of score lines extend outwardly and downwardly on at least substantially equal angles to the vertical from said first point to the points of intersection of said first pair of score lines with said third pair of score lines, said second pair of score lines extend outwardly and downwardly on at least substantially equal angles to the vertical from said second point to the points of intersection of said second pair of score lines with said fourth pair of score lines.

15. A container in accordance with claim 14 wherein said first and second score lines are higher in the middle portion thereof than at the ends thereof.

16. A container in accordance with claim 15 wherein all of said first and second pairs of score lines are equal in length, and wherein all of said third and fourth pairs of score lines are equal in length.

17. A packaging container comprising a sidewall having a lower portion and an upper portion, and a bottom closure secured to the bottom edge of said sidewall to close the lower end of said container; said lower portion of said sidewall being in the form of an at least substantially frustoconical configuration, larger at the bottom than the top thereof; said upper portion of said sidewall comprising a first wall section formed by a first pair of score lines extending outwardly and downwardly from a first point on said upper portion of said sidewall spaced from the upper edge thereof, a second wall section formed by a second pair of score lines extending outwardly and downwardly from a second point on said upper portion of said sidewall spaced from the upper edge thereof, said first and second points being spaced substantially 180° apart from the vertical axis of said container, first and second opposing roof panels joining said first and second wall sections and extending downwardly from a line through said first and second points to the upper extent of said lower portion of said sidewall, and first and second ridge panels surmounting said first and second roof panels, said first and second ridge panels being bonded together to close the upper end of said container; a first score line extending between the lower ends of said first pair of score lines with the middle portion of said first score line being higher than the end portions thereof; and a second score line extending between the lower ends of said second pair of score lines with the middle portion of said second score line being higher than the end portions thereof.

18. A container in accordance with claim 17 wherein said first pair of score lines extend outwardly and downwardly on at least substantially equal angles to the vertical, and wherein said second pair of score lines extend outwardly and downwardly on at least substantially equal angles to the vertical.

19. A container in accordance with claim 17 wherein said lower portion of said sidewall is interrupted by third and fourth wall sections, said first wall section being formed by a third pair of score lines extending upwardly and outwardly from a third point on said lower portion of said sidewall spaced upwardly from the bottom edge thereof to points of intersection with said first pair of score lines, said fourth wall section being formed by a fourth pair of score lines extending upwardly and outwardly from a fourth point on said lower portion of said sidewall spaced upwardly from the bottom edge thereof to points of intersection with said second pair of score lines.

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