

May 31, 1966

E. C. PELLATON
LEAKPROOF CONTAINER

3,253,767

Filed May 4, 1964

3 Sheets-Sheet 1

Fig. 1.

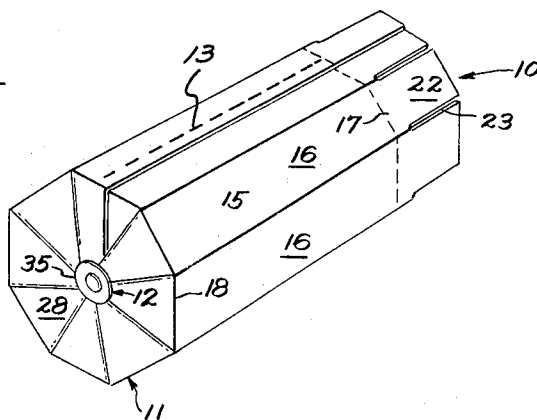
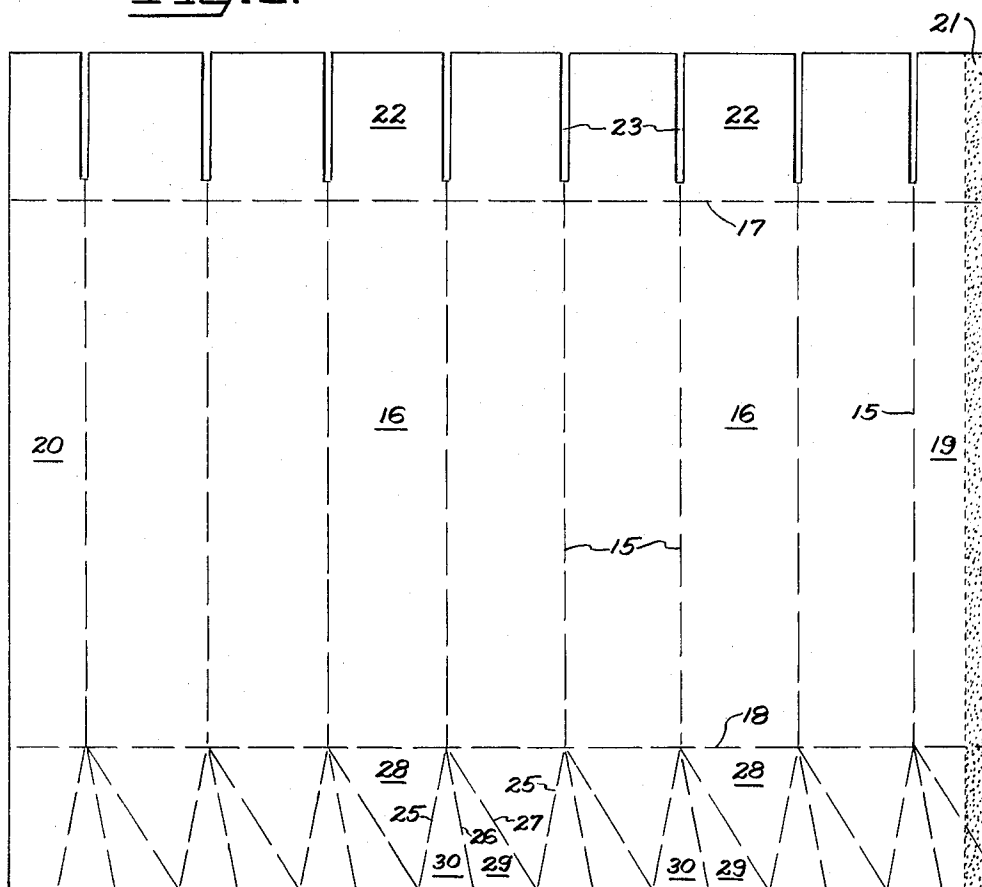


Fig. 2.



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PRIOR ART

Fig. 3.

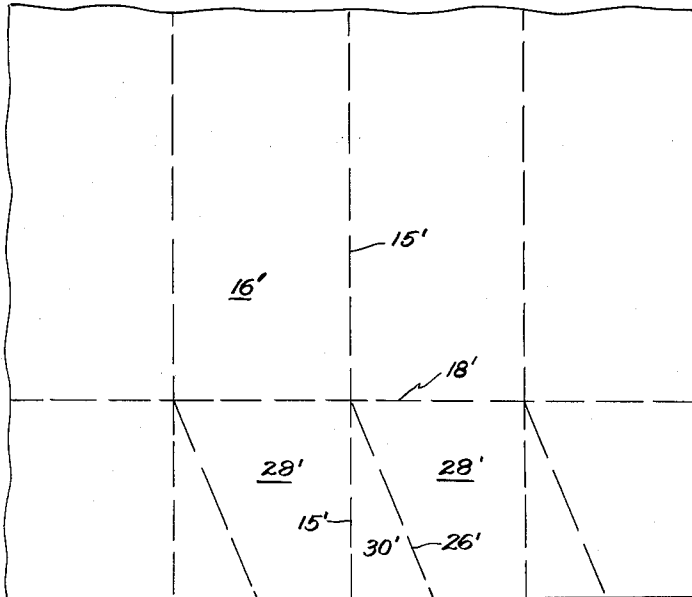
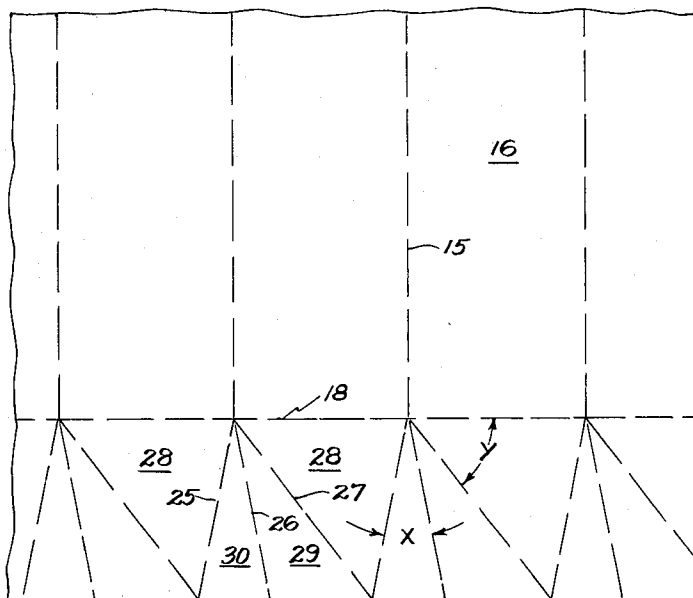


Fig. 4.



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Fig. 5.

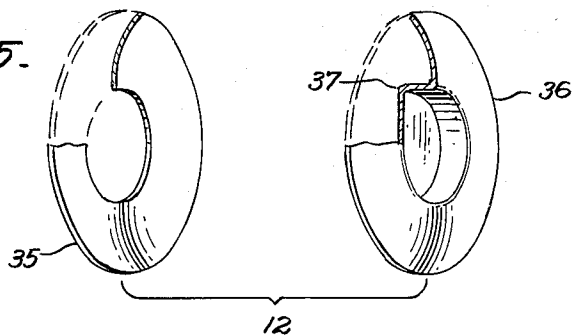


Fig. 6.

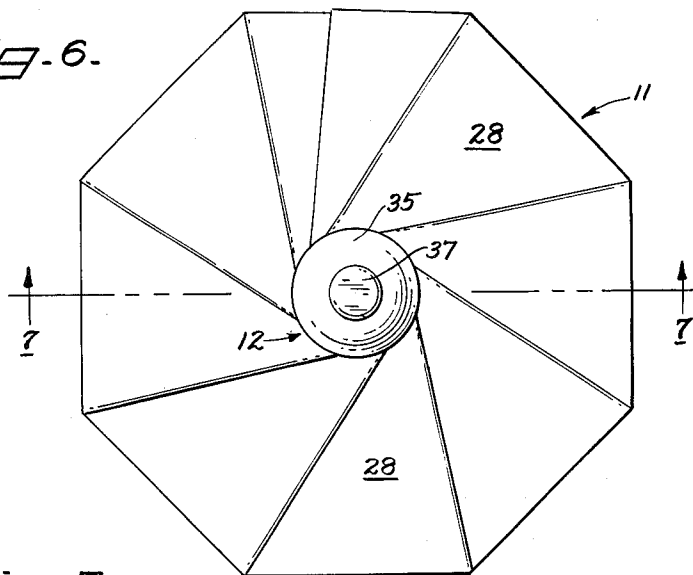
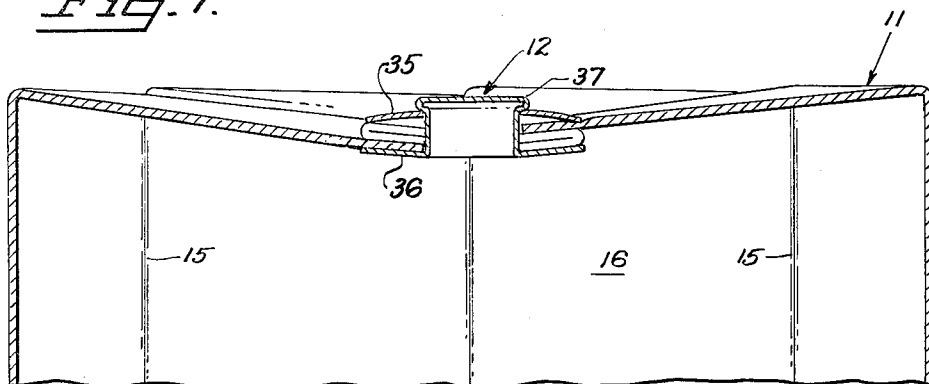


Fig. 7.



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LEAKPROOF CONTAINER

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Filed May 4, 1964, Ser. No. 364,655

7 Claims. (Cl. 229—37)

This invention relates to a container and a method for making same and more particularly relates to a cut and scored blank adapted to form a leakproof end closure for a container.

A recurring problem in the container art is one of providing a leakproof end closure capable of preventing escape or contamination of a liquified or granulated constituent. Such leakage and contamination problems become quite important in connection with the packaging of asphalt, for example. The problems are compounded when a rigid, corrugated paperboard material is utilized for the asphalt container.

The bottom end closure of a standard asphalt container oftentimes fails due to the wetting properties of a conventional low melt, extremely high penetration asphalt mixture. Such failure is further induced when the end closure, generally comprising corrugated paperboard, is subjected to water or other adverse elements during storage. Novel features employed in the end closure of applicant's container have been tested under rigid test conditions and were found to afford a high resistance to leakage and contamination.

Another problem encountered in the container art is one of providing an end closure which will stabilize the container when it is maintained in an upstanding position and filled with a constituent such as liquified asphalt. As will be seen from the following disclosure, the method and formed container end closure of this invention solve this problem by forcing the end closure to assume a concave configuration.

This invention comprises a uniquely cut and scored blank, preferably constituting a corrugated paperboard material, which may be expeditiously formed into a tubular container having a polygonal cross-section. Novel end closure aspects of this invention comprise a scoring arrangement whereby a plurality of folded-in panels may be uniquely positioned to provide an end closure which may be readily sealed. A grommet may be clamped over an aperture formed by the extremities of the folded panels to fully achieve the sealing function. The end closure is preferably formed to comprise a concave configuration to afford stability to the container when it is maintained in an upstanding position on the end closure.

An object of this invention is to provide a blank uniquely cut and scored at one end thereof and adapted to be expeditiously formed into a leakproof end closure for a container.

A further object of this invention is to provide a structurally sound and leakproof end closure for a tubularly shaped container of polygonal cross-section wherein the end closure is defined by uniquely arranged scorelines and may be fully sealed by a grommet or the like.

A still further object of this invention is to provide a method for forming a leakproof end closure for a tubularly shaped container wherein the end closure, comprising a plurality of folded-in panels, is formed in a manner whereby the end closure assumes a concave configuration.

Further objects of this invention will become apparent from the following description taken in connection with the accompanying drawings wherein:

FIG. 1 is a perspective view of a substantially completed container illustrating novel aspects of this invention;

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FIG. 2 is a top plan view of the blank which is adapted to be formed into the container of FIG. 1;

FIG. 3 is a fragmentary view of a blank employing conventional folding scores;

FIG. 4 is an enlarged view more particularly disclosing the folding scores employed in the blank illustrated in FIG. 2;

FIG. 5 is a perspective view of a two-part grommet which may be utilized to fully seal an end closure of the container of FIG. 1;

FIG. 6 is a partial end view of the end closure of the container shown in FIG. 1; and

FIG. 7 is a cross-sectional view taken on line 7—7 in FIG. 6.

The container of FIG. 1 comprises a suitably cut and scored blank arranged to form a top closure 10 and a bottom closure 11. A grommet 12 or the like may be utilized to completely seal the bottom closure. Suitable fastening means 13, such as staples or stitching, may be used to aid in the connection of the side wall panels of the carton together to form a container of polygonal cross-section. The top closure construction 10, per se, does not comprise novel aspects of this invention and is substantially described in U.S. Patent No. 2,761,611, assigned to the assignee of this invention. The inside of the container may be coated with a conventional constituent which will readily permit asphalt or another retained constituent to be expelled from the container prior to the use thereof.

Referring to FIG. 2 and the more specific constructions and arrangements of the blank, a plurality of longitudinally extending and parallel scorelines 15 substantially define a series of connected side panels 16. Although not materially adding to the folding capabilities of the blank, scorelines 15 may be extended to the edge of the blank in a commercial application thus facilitating the use of a conventional printer-slotter machine.

Two parallel scorelines 17 and 18 are each arranged perpendicular with respect to scorelines 15 to fully define panels 16. Although other conventional arrangements may be utilized, end flaps 19 and 20 may be secured together to constitute one of the side panels when the container is formed. A glue pattern 21 may be employed in addition to fastening means 13 (FIG. 1) to facilitate the connecting together of flaps 19 and 20.

Scoreline 17 is arranged to partially define a plurality of top closure flaps 22 which may be superimposed upon each other to substantially close this end of the container in the manner described in the above-mentioned patent. Slots 23 are arranged to facilitate this closing function. As illustrated, the slots preferably terminate at scorelines 15, a short distance from scoreline 17.

Novel aspects of this invention comprise the arrangement of scorelines 25, 26 and 27 on an end closure panel or flap defined by scoreline 18 and a parallel edge of the blank whereby the forming of an efficient end closure is achieved. As more clearly shown in FIGS. 1 and 7, scorelines 25, 26 and 27 provide that a plurality of triangular panels 28 may be arranged to substantially lie in a conically shaped plane, i.e., the panels substantially assume a concave configuration.

Each pair of substantially intersecting scorelines 25 and 26 further define a triangular panel 30 and each scoreline 26 along with each diagonal scoreline 27 further defines another triangular panel 29. The panels 29 and 30 may be then uniquely arranged in a tucked manner to substantially underlie panels 28. The apex of each panel 30 is arranged to substantially intersect each point whereat each parallel scoreline 15 intersects perpendicular scoreline 18. Also, each scoreline of each pair of scorelines 25 and 26 are arranged to diverge away from each adjacent parallel scoreline. The following discus-

sions will make it apparent that the above, briefly described scoring arrangements afford a fully leakproof end closure when a sealing means, such as grommet 12, is employed.

In order to more particularly point out the novel scoring arrangements of this invention, attention is directed to FIG. 3 which illustrates scoring arrangements employed in the type of conventional container disclosed in U.S. Patent No. 2,160,488, for example. As shown in this fragmentary view of the container's end closure, scorelines 15', 18', and 26' are arranged to form a series of side panels 16', end panels 28' and fold-back panels 30'. When this arrangement is folded to form an end closure for a container, fold-back panels 30' are folded along scorelines 15' and tucked underneath one panel 28' and in overlying relationship with respect to an adjacent panel 28'.

One of the disadvantages encountered with this type of conventional end closure is that the corners formed at the extremities of scorelines 15' are carried a considerable distance from the center of the end closure, i.e., from the longitudinal axis of the container. Thus, a large grommet or the like is needed to attempt to effect a positive sealing function.

It is obvious that the leakage problems increase as the size of the required grommet increases. Thus, flutes or the like are generally employed on the grommets to seal a conventional container. Furthermore, it is often times found difficult to completely seal such an end closure due to the fact that panels 28' cannot be arranged in a manner whereby positive sealing may be readily effected.

In contrast to the above-described conventional arrangements, this invention uniquely arranges scorelines 15 to place the apexes of folded panels 28 close together with respect to each other. Thus, a small, smooth and concentric grommet may be used to effect a very efficient sealing function. It can be readily seen that there is no need to employ flutes or the like on the grommet and precisely position same in an effort to obtain an efficient seal.

Also, simply constructed machinery may be employed to secure the grommet to the container. Furthermore, scorelines 27 provide that the edges of panels 28 at scorelines 25 may be easily folded during the forming operation to place all of the panels 28 in a position whereby they may be readily sealed. Due to the inherent rigidity of corrugated paperboard, difficulties normally arise when a folding jig is employed in the forming operation. Scorelines 27 effectively allow excessive stock, comprising triangular panels 29, to fold inwardly underneath panels 28 to thus substantially overcome the rigidity problem.

It has been found that the included angle, X, between diverging scorelines 25 and 26, may be made a function of the number, P, of side panels 16 in accordance with the following equation:

$$X = \frac{180^\circ}{P}$$

Since the number of side panels is identical to the number of triangular panels 30 in the preferred embodiment, it can be seen that the unknown P in the above equation may also represent the number of the triangular panels.

In the preferred embodiment, the included angle between each scoreline 25 and 26 and an imaginary line extended from each scoreline 15 constitutes one half of the angle X. Furthermore, it is preferred to employ at least five side panels 16 in the container.

The magnitude of angle Y primarily depends upon the desired width of panel 16. Scorelines 27 are preferably arranged to substantially extend from the apex of one triangular panel 30 into substantially intersecting relationship with respect to the base of an adjacent panel 30. In one successful container application wherein eight side panels 16 were employed, angle Y constituted 56°.

The method whereby the above-described blank may

be expeditiously formed into a container may be carried forth by first securing end flaps 19 and 20 together by means of the above-described glue pattern 21 and fastening means 13. The next step may be one of bending or folding end panels 28, 29, and 30 inwardly and in the same direction about the center of the end closure, i.e., either clockwise or counterclockwise about the longitudinal axis of the container depending upon the particular arrangement of scorelines 27.

The final formation of end closure 11 is achieved by arranging and maintaining the end panels so that they assume a concave or dish-shaped configuration (FIG. 7) and thereafter securing and sealing the ends of the panels together by means of grommet 12. Primarily due to the inherent rigidity of the container material, the above concave configuration will be forcibly maintained to thus afford stability to the container when it assumes an upstanding position on the end closure when filled.

The two-part grommet 12 preferably comprises an annular element 35 and a disc element 36 having a protuberance 37 formed thereon. As more clearly shown in FIGS. 6 and 7, elements 35 and 36 are arranged on opposed outer and inner sides of the end closure, respectively. The annular element 35 is mounted on the protuberance 37 of element 36 with the protuberance arranged to extend through an aperture formed by the folded panels. Automatic or semi-automatic machinery may be utilized to impart a suitable force to the head of protuberance 37 to flare the head over element 35 to secure the grommet to the container. The facing concave surface portions of the grommet elements permit the opposed outer edges of the elements to bury themselves into the container material a sufficient amount to insure the sealing function.

Due to the fact that the above-discussed scoreline arrangements function to precisely place the paperboard layers immediately adjacent the above-mentioned aperture in a predetermined position, an efficient sealing function is obtained. Furthermore, when corrugated paperboard is used for the container such paperboard inherently exhibits a spongy characteristic which aids in the sealing function. In particular, the portions of the end closure which are compressed by the grommet thereafter inherently spring-back to form a tight seal with the grommet.

I claim:

1. A container of polygonal cross-section comprising a blank of sheet material having a plurality of longitudinally extending and parallel scorelines formed thereon to substantially define at least five side panels and a perpendicular scoreline intersecting and arranged substantially perpendicular with respect to said parallel scorelines to further aid in defining said side panels and to also define an end closure panel, said end closure panel comprising pairs of substantially intersecting scorelines, each pair of scorelines arranged to form a triangular panel and further arranged to have an apex of said triangular panel substantially intersect each point whereat said parallel scorelines intersect said perpendicular scoreline, each scoreline of each pair of scorelines arranged to diverge away from each adjacent parallel longitudinal scoreline and terminating at a free edge of said blank, said free edge arranged in substantial parallel relationship with respect to said perpendicular scoreline, the portion of said free edge between said pair of scorelines forming a base for each triangular panel, and a diagonal scoreline arranged to substantially intersect the apex of each triangular panel and further arranged to substantially intersect a base of an adjacent triangular panel.

2. A container of polygonal cross-section comprising a blank of sheet material having a plurality of longitudinally extending and parallel scorelines formed thereon to substantially define at least five side panels and a perpendicular scoreline intersecting and arranged substantially perpendicular with respect to said parallel scorelines

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to further aid in defining said side panels and to also define an end closure panel, said end closure panel having pairs of substantially intersecting scoreline, each pair of scorelines arranged to form a triangular panel and further arranged to have an apex of said triangular panel substantially intersect each point whereat said parallel scorelines intersect said perpendicular scoreline, each scoreline of each pair of scorelines arranged to diverge away from each adjacent parallel scoreline, the included angle between the two scorelines of each pair of scorelines being a function of the number of side panels in accordance with the following equation:

$$X = \frac{180^\circ}{P}$$

wherein:

X=the included angle between the two scorelines of each pair of scorelines, and
P=the number of side panels.

3. The invention of claim 2 wherein each pair of scorelines is arranged so that the included angle between each scoreline of said pair and a line extending from each of said parallel scorelines is one-half of the angle X.

4. In a container, an end closure flap defined by a first scoreline and an edge arranged substantially parallel with respect to said first scoreline, pairs of scorelines defining at least five equally spaced triangular panels arranged to have apexes thereof substantially intersect said first scoreline and further arranged to have bases thereof positioned on the edge of said flap, each scoreline of each pair of scorelines arranged in diverging relationship with respect to a line intersecting the apex of each triangular panel in perpendicular relationship with respect to said first scoreline and a diagonal scoreline arranged to substantially intersect the apex of each triangular panel and further arrange to substantially intersect a base of an adjacent triangular panel.

5. A corrugated paperboard blank adapted to be formed into a container comprising a plurality of longitudinally extending and parallel scorelines substantially defining at least five panels, two perpendicular scorelines arranged parallel with respect to each other and further arranged perpendicular and intersecting with respect to said parallel scorelines to completely define said side panels, a first of said perpendicular scorelines arranged to define a top end closure flap suitably cut and scored to be formed into a top end closure, a second of said perpendicular scorelines arranged to define a bottom end closure flap, said bottom end closure flap comprising pairs of scorelines defining at least five triangular panels each arranged to have an apex thereof substantially coincide with the point whereat each of said parallel scorelines intersects the second of said perpendicular scorelines, each scoreline of said pair of scorelines arranged to diverge away from each adjacent parallel longitudinal scoreline and terminating at a free edge of said blank, said free edge arranged in substantial parallel relationship with respect to said perpendicular scoreline, the portion of said free edge between said pair of scorelines forming a base for each triangular panel, and a diagonal scoreline arranged to substantially intersect the apex of each triangular panel and further arranged to substantially intersect a base of an adjacent triangular panel.

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6. In a container, an end closure flap defined by a first scoreline and an edge arranged substantially parallel with respect to said first scoreline and pairs of scorelines defining at least five equally spaced triangular panels arranged to have apexes thereof substantially intersect said first scoreline and further arranged to have bases thereof positioned on the edge of said flap, each scoreline of each pair of scorelines arranged in diverging relationship with respect to a line intersecting the apex of each triangular panel in substantial perpendicular relationship with respect to said first scoreline, the included angle between each scoreline of each pair of scorelines and said line is a function of the number of triangular panels in accordance with the following equation:

$$X = \frac{90^\circ}{P}$$

wherein:

X=the included angle between each scoreline of each pair of scorelines and said line, and
P=the number of triangular panels.

7. A corrugated paperboard blank adapted to be formed into a container comprising a plurality of longitudinally extending and parallel scorelines substantially defining at least five panels, two perpendicular scorelines arranged parallel with respect to each other and further arranged perpendicular and intersecting with respect to said parallel scorelines to completely define said side panels, a first of said perpendicular scorelines arranged to define a top end closure flap suitably cut and scored to be formed into a top end closure, a second of said perpendicular scorelines arranged to define a bottom end closure flap, said bottom end closure flap comprising pairs of scorelines defining at least five triangular panels each arranged to have an apex thereof substantially coincide with the point whereat each of said parallel scorelines intersects the second of said perpendicular scorelines, each scoreline of said pair of scorelines arranged to diverge away from each adjacent parallel scoreline, the included angle between the scorelines of each pair of scorelines has a magnitude which is substantially a function of the following equation:

$$X = \frac{180^\circ}{P}$$

wherein:

X=the included angle between the scorelines of each pair of scorelines, and
P=the number of side panels.

References Cited by the Examiner

UNITED STATES PATENTS

1,140,927	5/1915	Walter	-----	229-47
2,047,804	7/1936	Shapiro	-----	229-37
2,160,488	5/1939	Ringler	-----	229-47

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