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(54) Triangular composite container

(57) A triangular composite container has a composite bottom closure and an outwardly-curled beaded top edge adapted to receive a membrane closure and a snap-on overcap. The composite container has outwardly-bowed curved side walls and curved corners defining six circular segments in transverse cross-section arranged symmetrically and at least some of which have different radii. Preferably, the container is of a combination triangular and circular shape in transverse cross-section.

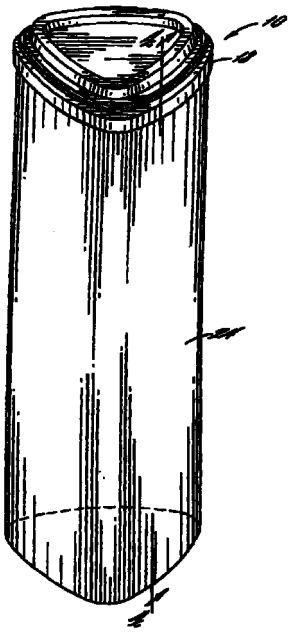

Fig.1.

EP 0 999 143 A2

Description

Field Of The Invention

[0001] This invention relates to a triangular composite container having a composite bottom closure and an open outwardly-curved beaded top edge adapted to receive a membrane closure and a snap-on overcap.

Background Of The Invention

[0002] Composite containers constructed of desired layers of material usually including a paper body layer, a liner layer and a label layer have heretofore been utilized for packaging food and other products including detergents, cleansers, baking powders, etc. These composite containers have included a composite bottom closure which can be made of the same materials as the container or a different combination of materials. These containers have been closed at the top by a variety of top closures including a membrane closure, which along with the bottom closure can preferably provide a hermetically sealed container and an overcap. A preferred construction includes an outwardly curled beaded top edge on the composite container produced by conventional curling equipment for receiving the membrane closure which is secured thereto by heat sealing, adhesive or the like to seal the container. A snap-on overcap is adapted to fit over the outwardly-curled beaded top edge of the composite container.

[0003] U.S. Patent No. 3,892,351 to Johnson et al. (hereinafter "the Johnson '351 patent") is a representative prior art cylindrical composite container having an outwardly curled, beaded, open upper edge. The beaded edge receives a membrane closure and snap-on overcap. Cylindrical containers, such as in the Johnson '351 patent, are effectively curled by conventional curling equipment because the curling forces are substantially evenly distributed about the circumference of the open upper edge.

[0004] Conventional curling equipment has, however, been ineffective for curling a container having sharp corners and flat sidewalls. This is because the curling forces are not evenly distributed and tearing occurs at tangents of the container configuration, such as adjacent the corners. Even if curling is effectively accomplished, it cannot be repeatedly accomplished on high speed production lines with reasonable acceptance limits.

[0005] Round containers, such as cylindrical containers, are desirable because of the volumetric capacity of the container relative to the packaging material necessary for forming the container, thereby resulting in material cost savings. Other shapes, however, provide significant "bill boarding" and are therefore desirable for exposing additional areas of labeling on the outside walls of the containers When placed on a shelf or other retail display. Also, shapes other than cylindrical containers may allow more efficient placement in cartons for shipping and on retail shelves. However, as stated above, it has been found difficult, if not impossible, to provide composite containers having sharp corners with the desired outwardly-curled beaded top edge due to the construction of such edge and the equipment conventionally utilized to form such edge, since these containers have sharp corners. This difficulty is exacerbated with composite containers having a significant body wall thickness. The sharp corners do not allow for uniform distribution of curling forces, thereby preventing proper curl formation or tearing along the beaded upper edge. This, in turn, prevents hermetic seal formation between the beaded edge and the membrane closure. Additionally, containers with sharp corners do not lend themselves to outwardly-curled beaded top edges with conventional curling equipment. This problem is exacerbated with thicker walled containers and containers having multiple layers.

[0006] A prior art attempt of curling the open upper edge of containers having sharp corners is described in U.S. Patent No. 5,752,646 to Sandstrom. The Sandstrom '646 container is a representative prior art container having a curled open, upper edge and tapered sidewalls. The tapering of the sidewalls facilitates the curling due to the direction of the curling forces on the outwardly tapered sidewalls. Such containers, however, are more time consuming and costly to manufacture because each container must be individually wound or drawn. In contrast, containers having non-tapered sidewalls are formed from a formed tube having a finite length which is cut into discrete lengths to form several containers.

Objects And Summary Of The Invention

[0007] It is therefore an object of this invention to provide a non-tapered, triangular composite container having a composite bottom closure and an outwardly-curled beaded top edge which is adapted to receive a membrane closure and a snap-on overcap.

[0008] It is a further object of this invention to provide a triangular composite container having a desired volumetric capacity to material ratio while simultaneously having increased surface area for displaying text and/or graphics.

[0009] It has been found by this invention that these and other objects may be accomplished by providing a composite container having three outwardly-bowed side walls and curved corners defining six circular segments in transverse cross-section arranged symmetrically and at least some of which have different radii. Preferably, the composite container is of generally a combination triangular and circular shape in transverse cross-section wherein the side walls have a common predetermined radius in transverse cross-section and the corners have a common predetermined radius in transverse cross-section.

[0010] Preferably, the corner radius is an acute angle of a predetermined size that is tangent to the curved side walls. It is also preferable that the radius of the side walls are of predetermined sizes an as to not form a tangential or negative intersection.

[0011] The construction of the triangular composite container allows the use of conventional beading or curling equipment for forming the beaded top edge. Additionally, the combination triangular and circular shape provides an easy-grip which is not present with round containers or with rectangular or square containers. This easy-grip is provided by the bowed or curved walls and corners which easily fit into the curved palm of a hand of a user gripping such container.

Brief Description Of The Drawings

[0012] Some of the objects and advantages of this invention having been stated, other objects and advantages will become evident from the following detailed description of a preferred embodiment of this invention when taken in conjunction with the accompanying drawings, in which:

Fig. 1 is a perspective view of a triangular composite container constructed in accordance with this invention;

Fig. 2 is an enlarged front elevational view of the composite container of Fig. 1 with areas broken away and shown in section,

Fig. 3 is a sectional view, taken generally along the line 3-3 of Fig. 2, and showing the various radii utilized for forming the walls and corners of the container;

Fig. 4 is a partial sectional view, broken away, and taken generally along the line 4-4 of Fig. 1; and

Figure 5 is an enlarged portion of Figure 3.

Description Of Preferred Embodiment Of The Invention

[0013] Referring now to the drawings, a preferred embodiment of a triangular composite container, generally indicated at **10**, is shown. This composite container **10** is of the type having a composite bottom closure **12** and an open outwardly curled beaded top edge **14** adapted to receive a membrane closure **16** and a snap-on overcap **18**.

[0014] The composite container **10** may be constructed of a plurality of layers which usually include a liner layer **20**, a body or board layer **22** and a label layer **24**. The liner layer **20** can be constructed of a polymer (e.g. polyethylene) coated aluminum foil on a paper substrate, a polymer (e.g. polyethylene) coated plastic film or metallicized film on a paper substrate, a plastic or metallicized film on a paper substrate, a hot melt adhesive sealable liner, etc. The body layer **22** may comprise one or more plies of recycled or virgin paper. Preferably two body plies **26**,**28** form the body layer **22**. The label layer **24** may be a paper layer, an aluminum foil laminated paper layer, a polyethylene coated paper layer, a plastic film layer, etc. The composite container **10** has a body wall thickness of preferably between 0.01 inches and 0.05 inches, e.g., about 0.03 inches. The thickness varies depending upon the desired container usage and the container dimensions, e.g., the corner radii. The composite container **10** can also be constructed from a single wrap layer (not shown) which may be a pro-laminated coated and printed board or body layer with a polyethylene sealing layer thereon.

[0015] This composite container **10** may be convolutely wound, spirally wound or linearly drawn. Preferably, the composite container **10** is linearly drawn wherein the layers are individually wrapped about a mandrel to create a tube having an axially extending seam. The formed tube may then be cut to the desired length, depending upon the container usage. The cut tubes are then curled such as by the method and apparatus set forth in U.S. Patent No. 5,431,619 to Bacon et al., entitled Process and Apparatus for Forming an Outwardly Curled Lip on a Container Body, which disclosure is incorporated herein by reference.

[0016] According to a preferred embodiment of the invention, the seams of the individual layers are staggered. As illustrated in Figure 5, the liner layer seam **36**, the inner body ply seam **38**, outer body ply seam **40** and the label layer seam **42** each extend axially, parallel to one another. No two seams, however, are in alignment. Rather, according to one embodiment of the invention, the liner layer seam **36** is positioned adjacent a center portion of one of the three curved sidewalls **30**. The position of the seam in this location is desired so as not to interfere with the curling operation of the beaded edge **14** of the composite container **10**. The inner body ply seam **38** may then be positioned in a radial direction remote from the liner seam **36** and the outer body ply seam **40** may then be positioned in a radial direction distanced from the inner body ply seam **38**. Although the seams may be in alignment, it is preferred that they be staggered so as to avoid a particularly weakened area extending axially along the composite container **10**. The label layer seam **42** may then be positioned remote from the second body ply seam **40** and, preferably, adjacent one of the curved corners **32**. The label layer seam **42**, so positioned, will not interfere with any text or graphic design on the label layer **24**. If the composite container **10** is spirally round or convolutely round, it is also preferred that the seams be positioned in a staggered relationship.

[0017] The composite bottom closure **12** can be constructed of the same composite materials utilized for the container **10** or may be constructed of other materials. The bottom closure **12** may be generally cup-shaped and secured to the container **10** by an inwardly curled portion at the bottom of the container **10** and by heat sealing, adhesives or other desired means. The

beaded top edge **14** on the container **10** may be formed by conventional beading or curling equipment, well known to those with ordinary skill in the art, to produce an outwardly curled beaded top edge. The membrane closure **16** may be constructed of any desired membrane materials including a composite material of a plastic film layer, an aluminum foil layer, an adhesive layer, a paper layer, etc. and may be secured to the beaded top edge **14** by heat sealing, adhesive or other desired means. The snap-on overcap **18** may be injection molded of low density, linear low density or high density polyethylene or it may be thermoformed from a variety of plastic film materials and may he of conventional construction utilizing a downwardly extending skirt having a configuration for snapping over and being secured around the beaded top edge **14** of the composite container **10**. The resulting composite container **10** is suitable for packaging food and other products, as described above, and may be hermetically sealed.

[0018] In accordance with the present invention, the composite container **10** has outwardly-bowed curved sidewalls **30** and curved corners **32** defining six circular segments in transverse cross-section arranged symmetrically. At least some of the circular segments have different radii. The sidewalls **30** have a common predetermined radius **R1** in transverse cross-section and the corners **32** have a common predetermined radius **R2** in transverse cross-section, as shown in Fig. 3. Preferably, the composite container **10** is generally of a combination circular and triangular shape in transverse cross-section. A curve is a line having no straight parts or bend or a bend with no angles. Accordingly, as may be seen in Fig. 3, the combination triangular and circular shape in cross-section is provided by the six circular segments defining the transverse cross-section of the outwardly-bowed curved side walls **30** and curved corners **32** of the composite container **10**.

[0019] Preferably, as may be seen in Fig. 3, the corner radii **R2** are acute angles of a predetermined size that are tangent to the curved sidewalls **30**. It is also preferred that the radius **R1** of the side walls **30** are of predetermined sizes so as to not form a tangential or negative intersection.

[0020] An exemplary container of a standard inside volume could be constructed having a corner radius **R1** of at least 0.70 inches and a sidewall radius **R2** of at least approximately 2 inches, for example, approximately 4 inches. Of course, the sidewall radius **R2** varis depending on the container size. The length of the interior of the container along the axes **A** would be about 9.49 inches and the width of the inside of the container along the axes **B** would be about 2.86 inches. The height of the inside of the container **10** (from the top of the bottom closure **12** to the bottom of the membrane **16**) would be approximately 9.61 inches. This exemplary triangular composite container **10** would have an interior volume of about 57.57 cubic inches, which would be generally the same as a round or cylindrical container having a volume of about 3.18 cubic inches. The composite container **10** illustrated is an equilateral triangle but it is within the scope of this invention for the container to exhibit other triangular configurations. For example, the sidewalls **30** may be different lengths and have different radii and the curved corners **32** may have different radii.

[0021] Thus, this invention has provided a new construction and shape for a triangular composite container **10** having a composite bottom closure **12** which results in having an easy grip for a user of the container and which provides an outwardly-curled beaded top edge **14** adapted to receive a membrane closure **16** and a snap-on overcap **18** and wherein the outwardly-curved beaded top edge **14** can be produced repeatedly on high speed production lines with conventional beading or curling equipment.

[0022] This invention has been described in considerable detail with reference to its preferred embodiment. However, variations and modifications can be made within the spirit and scope of the invention as described in the foregoing specification and as defined in the following claims.

Claims

1. A triangular composite container having a combination circular and triangular shape and a composite bottom closure and an arcuate, open outwardly-curled beaded top edge adapted to receive a membrane closure and a snap-on overcap, said composite container having outwardly-bowed curved side walls and curved corners defining six circular segments in transverse cross-section and at least some of which have different radii.

2. A triangular composite container according to Claim 1 wherein said curved corners are acute angles.

3. A triangular composite container according to Claim 1 wherein said side walls have a common predetermined radius in transverse cross-section and said corners have a common predetermined radius in transverse cross-section.

4. A triangular composite container according to Claim 3 wherein maid corner radium is of a predetermined size that it is tangent to said curved side walls.

5. A triangular composite container according to Claim 3 wherein said radium of said side walls are of predetermined sizes so as to not form a tangential intersection.

6. A triangular composite container according to Claim 1 wherein said outwardly-curled beaded top

edge is substantially continuous.

7. A triangular composite container according to Claim 1 wherein said circular segments are arranged symmetrically.

8. A triangular composite container according to Claim 1 wherein said composite container includes a liner layer and a body layer, each having a seam which do not overlap one another.

9. A composite container according to Claim 8 wherein said liner layer seam and said body layer seam extend axially along the length of said composite container.

10. A composite container according to Claim 9 wherein said liner layer seam is positioned adjacent a middle portion of one of said curved sidewalls.

Fig. 1.

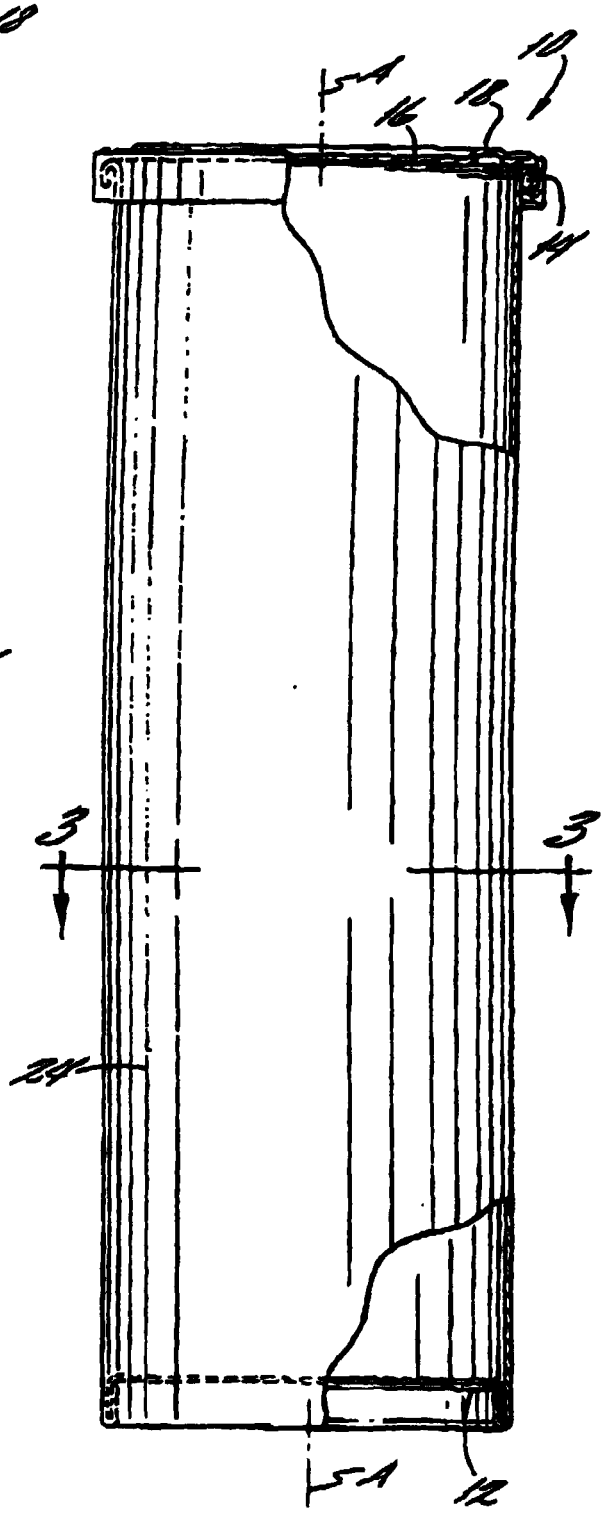

Fig. 2.

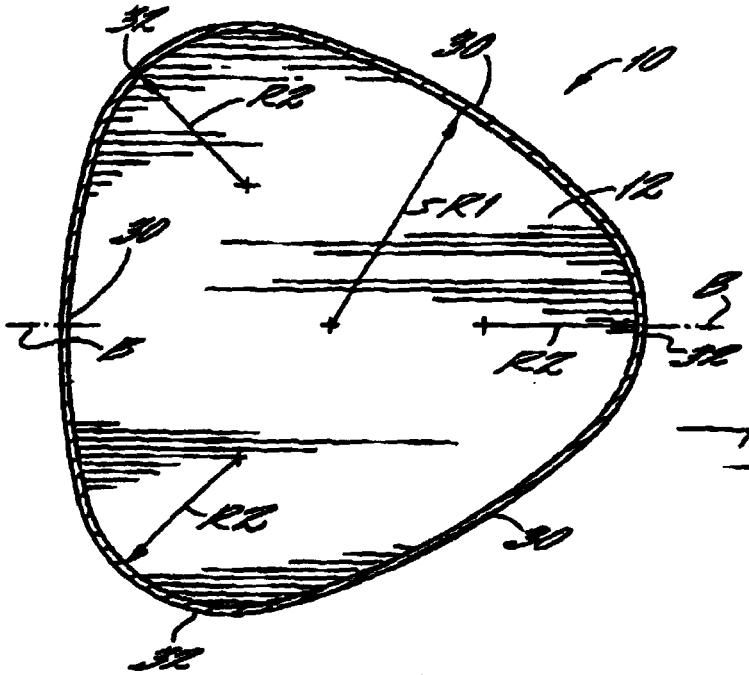

Fig. 3.

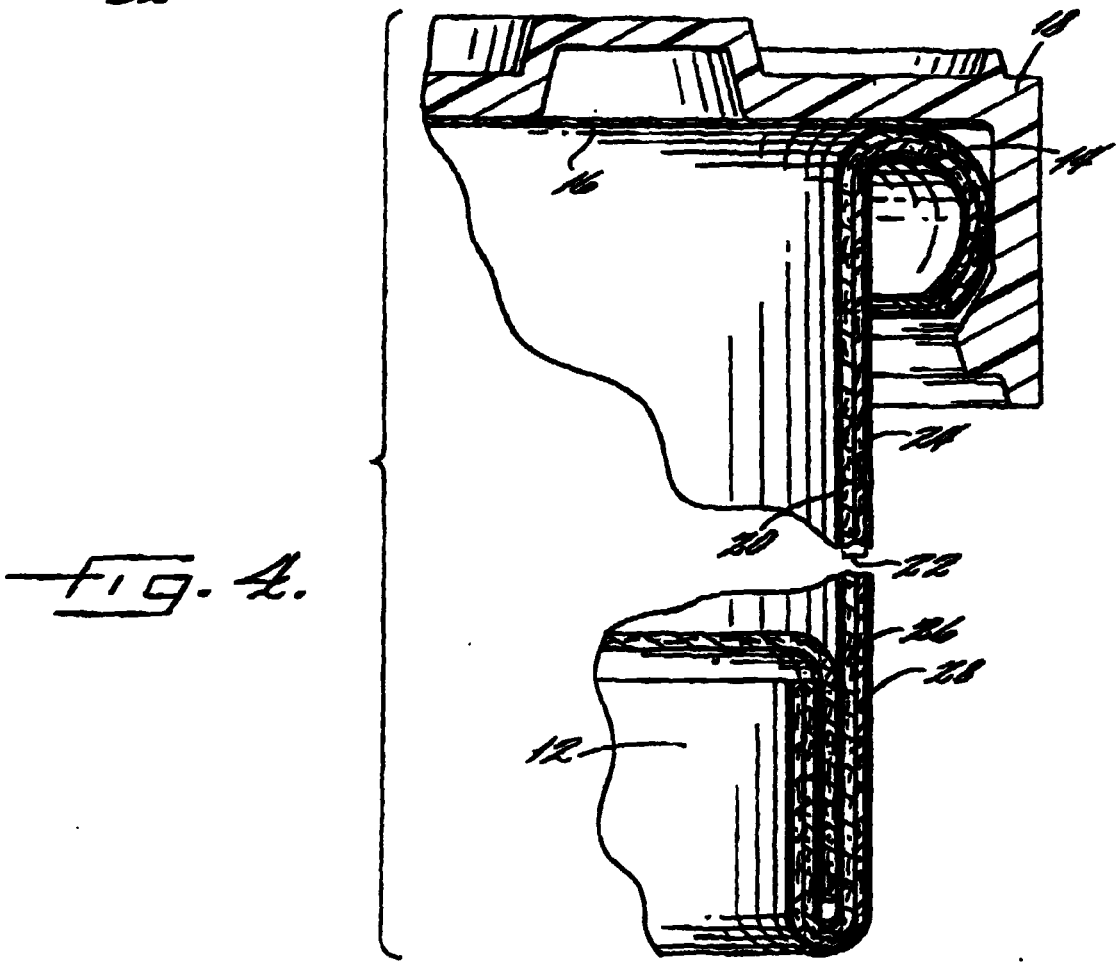

Fig. 4.

Fig. 5.