BEVERAGE CONTAINER LID

~~REFERENCE TO RELATED APPLICATIONS~~

~~This PCT patent application claims priority to co-pending U.S. patent application serial number 13/661,431, filed October 26, 2012, entitled "BEVERAGE CONTAINER LID". The aforementioned application is hereby incorporated herein by reference.~~

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

The invention pertains to the field of beverage container lids. More particularly, the invention pertains to ~~versatile and biodegradable~~ beverage container lids~~.~~ according to the preamble of claim 1.

DESCRIPTION OF RELATED ART

Beverage container lids for beverage containers holding hot beverages are known in the art. U.S. Patent No. 6,488,173, entitled "Beverage Container Lid Having Baffle Arrangement for Liquid Cooling" and issued December 3, 2002 to Milan, discloses a removable beverage container lid. The lid has a substantially enclosed space defined between an exterior cover and an interior cover. An inlet opening is formed in the interior cover directing a hot beverage to flow into the substantially enclosed space. A partition or wall assembly with a height extending to be located substantially against the exterior cover and a length at least equal to the length of an inlet opening is attached to the interior cover at the forward edge of the inlet opening. A gap area is located between the partition or wall assembly and the peripheral edge of the exterior cover. A dispensing opening formed in the exterior cover is connected with the gap area. Hot beverage is required to flow around the partition or wall assembly and into the gap area prior to flowing through the dispensing opening exteriorly of a beverage container.

U.S. Patent Application Publication No. 2009/0108006, entitled "Beverage Container Lid Having Liquid Cooling Effect" by Milan and published April 30, 2009, discloses a lid for a beverage container including external and internal covers, which,

when coupled together, define a cooling reservoir between them to receive and cool hot liquids that may be held in the beverage container. The external cover includes ventilation holes and a dispensing spout for dispensing the liquid to the user. The internal cover includes walls used for directed the hot liquid that enters from the beverage container. Entrance apertures are located in the interior cover to allow the hot liquid to enter the reservoir. Dispensing walls cooperate to direct the hot liquid entering through the entrance apertures and to separate the hot liquid from cooled liquid exiting the reservoir through a dispensing aperture in the spout.

~~The above-mentioned patent publications are hereby incorporated by reference herein.~~

Beverage container lids for beverage containers holding cold beverages are also known in the art.

Plastic beverage container lids have been conventionally prepared from polyethylene, polyvinyl chloride, polypropylene, polystyrene, and other resins. Although some of the lids prepared from these resins have excellent transparency, these lids have a very low rate of degradation and thus remain semi-permanently when discarded as refuse and buried under the ground. Disposal of these beverage container lids in the ocean causes aesthetic damage or destruction of the living environment of marine organisms.

Conventional beverage container lids are not made from lactic acid-based polymers. On processing a lactic acid-based polymer by conventional molding methods, such as compression molding (thermo forming) and injection molding, the polymer does not provide beverage container lids having sufficient impact strength for practical use as transparent or non-transparent beverage container lids.

SUMMARY OF THE INVENTION

A beverage container lid includes an interior cover, an exterior cover, and a hinge connecting the interior cover to the exterior cover. The beverage container is versatile in that it may be adapted for use with a beverage container containing a cold beverage, a hot beverage, or a foamy or creamy beverage. The beverage container lid preferably includes a spout, straw perforations, an elevated portion, a reservoir bottom, a well portion, and a pair

of retaining walls preventing direct flow of beverage from a pair of openings in the interior cover to the spout. The beverage container lid is preferably made of a biodegradable material, and more preferably, a biodegradable polymeric material. Methods of use of the beverage container are also described.

In a first aspect, the present invention provides a beverage container lid according to claim 1.

In a second aspect, the present invention provides a method of use of a beverage container lid of claim 13.

~~A beverage container lid includes an interior cover, an exterior cover, and a hinge connecting the interior cover to the exterior cover and foldable to orient the exterior cover over the interior cover. The interior cover has a pair of openings to allow passage of a beverage in a beverage container through the interior cover. The interior cover includes a reservoir bottom and a well portion extending downward and outward from an edge of the reservoir bottom to form a well. The interior cover also includes a pair of retaining walls, each retaining wall extending upward and outward from the reservoir bottom and flanking a side of the well portion and a side of one of the pair of openings, each retaining wall extending inward past an edge of the opening. The interior cover also includes an outer lip extending around an outer edge of the reservoir bottom, the well portion, and the retaining walls and formed to receive a rim of the beverage container and an inner lip extending inward from the outer edge of the interior cover. The exterior cover has an outer edge sized to be received by the inner lip of the interior cover. The exterior cover includes a flat portion extending inward from the outer edge of the exterior cover, a spout extending upward from the flat portion, and an elevated portion extending upward from an edge of the flat portion.~~

~~The interior cover, the exterior cover, and the hinge are arranged such that, when the hinge is folded and the outer edge of the exterior cover is received by the inner lip of the interior cover, the spout is located above the well portion and each retaining wall contacts the flat portion of the exterior cover, thereby preventing a beverage in the beverage container from flowing directly from the openings to the spout.~~

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 shows a schematic top perspective view of a beverage container lid with a substantially flat top in an embodiment of the present invention.

Fig. 2 shows a schematic top open view of a beverage container lid with a dome top in an embodiment of the present invention.

The thermoplastic polymer composition may be formed from monomer units of L-lactic acid, D-lactic acid, glycolic acid, or any combination of these.

A degradable beverage container lid preferably is degraded in a natural environment and has transparency and sufficient impact strength for practical use, shipping, in case of sudden drop of the beverage container.

Fig. 1 shows a schematic perspective view of a beverage container lid 10 with a substantially flat top in a closed position. The exterior cover 12 has been folded over the interior cover 14 by folding the hinge 16 connecting the exterior cover 12 and the interior cover 14. The interior cover 14 includes an outer lip 18 that seals the interior cover 14 around the rim of a beverage container. A spout 20 in the exterior cover 12 allows the user to drink a beverage in the beverage container. An opening, not visible in Fig. 1, allows the beverage to enter a reservoir space formed between the exterior cover and the interior cover. A pair of retaining walls, not visible in Fig. 1, formed in the interior cover 14 extend into indentations 27, 29 in the exterior cover 12 to prevent liquid from flowing over the retaining walls. Instead, beverage from the beverage container must flow through the opening in the interior cover, around the retaining walls, and into the spout 20. These indentations 27, 29 appear as protrusions, when viewed from the top of the exterior cover, as shown in Fig. 1. The top surface of the elevated portion 22 of the exterior cover 12 is substantially planar. A small hole 24 on the top of the lid vents the interior space so that no vacuum is formed and the drink is able to flow out of the spout and into the user's mouth easily. A sloped area or ditch 26 behind the spout 20 receives the user's upper lip, provides comfortable sipping, and captures and traps any possible over flow of beverage after each sip. A straw perforation 28 permits the user to insert a straw through the exterior cover 12 of the beverage container lid 10.

Although the details of the interior cover 14 are not visible in Fig. 1, the interior cover 14 may have any of the features or any combination of the features of the interior covers 34 shown in Fig. 2 through Fig. 13~~ within the spirit of the present invention~~.

Fig. 2 shows the top surfaces of the interior cover 34 and the bottom surfaces of the exterior cover 32 of a beverage container lid 30 with an elevated portion 46 in an embodiment of the present invention. A hinge 36 flexibly connects the exterior cover 32 to

Fig. 7 shows a side closed view of the beverage container lid similar to Fig. 5, except that with the reservoir bottom has been separated along the reservoir perforation and removed from the beverage container lid.

Although the exterior cover 32 is shown as being flat in the area around the spout 40 in Figs. 2 through 7, the exterior cover 32 may have indentations similar to the indentations 27, 29 shown in Fig. 1~~ within the spirit of the present invention~~. The tops of the retaining walls 42, 44 formed in the interior cover 34 extend into the indentations in the exterior cover 32 to prevent liquid from flowing over the retaining walls 42, 44.
Instead, beverage from the beverage container must flow through the openings 52, 54 in the interior cover, around the retaining walls 42, 44, and into the spout 20. These indentations appear as protrusions, when viewed from the top of the exterior cover 72.

With reference to Fig. 2 through Fig. 7, in one method of use of a beverage container lid, the interior cover 34 is placed over the beverage container containing a beverage by placing the outer lip 38 around the rim of the beverage container. The hinge 36 is folded, the exterior cover 32 is placed over the interior cover 34, and the lip 33 of the exterior cover 32 is inserted under the inner lip 39 of the interior cover 34. Finally, the spout cap 41 is broken off the spout 40 and a user may then enjoy the beverage by putting the spout 40 to their mouth and tipping the beverage container toward the spout 40. In this method, the beverage is preferably a hot beverage. The hot beverage enters the reservoir volume through the openings 52, 54. The retaining walls 42, 44 prevent the beverage from flowing directly to the spout 40. Instead the beverage must first flow around the walls 42, 44 toward the reservoir bottom 56. When the user takes a break from drinking and puts the beverage container down upright on a flat surface, some of the beverage in the reservoir volume flows back down into the beverage container through the openings 52, 54, but some flows into the well portion 58, which is directly below the spout 40, where it is retained and is able to cool until the user is ready to take another sip.

In another method of use of the beverage container lid, the reservoir perforation 62 along the well portion 58 and retaining walls 42, 44 is separated. This is preferably accomplished by grasping the indentations 63, 64 flanking the well portion 58 with two fingers on one hand, grasping the outer lip 38 with the other hand and pulling to separate along the reservoir perforation 62. Further pulling then separates the entire reservoir

Fig. 11 shows a side view of the beverage container lid 70 in a closed position with a straw 66 inserted through the straw perforations 50, 60. The straw perforation 60 of the interior cover 34 is preferably small to minimize passage of beverage through the straw perforation 60 around the straw 66 and into the reservoir space in the case of an accidental and unwarranted shaking, tipping, or dropping of the beverage container. The straw perforation 60 of the interior cover 34 is also located in a depression in the reservoir bottom 56, as visible in Fig. 11, in order to aid the user in locating the straw perforation 60 during insertion of a straw 66. The straw perforation 50 in the exterior cover 72 is preferably larger than the straw perforation 60 of the interior cover 34, as visible in Fig. 8, so that the user is able to angle the straw 66 to a greater degree without bending the straw 66 in order to be able to get the bottom of the straw 66 to a bottom edge of the beverage container. A preferred shape of the outer lip 38 is also shown in Fig. 1 1.

Fig. 12 shows a top view of the beverage container lid 70 in a closed position to show the relative positions of the openings 52, 54, the retaining walls 42, 44, and the well portion 58 with respect to the spout 40.

Although the exterior cover 72 is shown as being flat in the area around the spout 40 in Figs. 8 through 12, the exterior cover 72 may have indentations similar to the indentations 27, 29 shown in Fig. 1~~ within the spirit of the present invention~~. The tops of the retaining walls 42, 44 formed in the interior cover 34 extend into the indentations in the exterior cover 72 to prevent liquid from flowing over the retaining walls 42, 44.
Instead, beverage from the beverage container must flow through the openings 52, 54 in the interior cover 34, around the retaining walls 42, 44, and into the spout 20. These indentations appear as protrusions, when viewed from the top of the exterior cover.

Fig. 13 shows a side closed view of the beverage container lid similar to Fig. 11, except that with the reservoir bottom has been separated along the reservoir perforation and removed from the beverage container lid.

The reservoir prevents spills resulting from any accidental and unwarranted shaking, tipping, or dropping of the beverage container.

Accordingly, it is to be understood that the embodiments of the invention herein described are merely illustrative of the application of the principles of the invention.

What is claimed is:

1. A beverage container lid for attachment to a beverage container containing a beverage, the beverage container lid comprising:

an interior cover having a pair of openings to allow passage of the beverage in the beverage container through the interior cover, the interior cover comprising:

a reservoir bottom;

a well portion extending downward and outward from an edge of the reservoir bottom to form a well;

a pair of retaining walls, each retaining wall extending upward and outward from the reservoir bottom and flanking a side of the well portion and a side of one of the pair of openings, each retaining wall extending inward past an edge of the opening; and

an outer lip extending around an outer edge of the reservoir bottom, the well portion, and the retaining walls and formed to receive a rim of the beverage container; ~~and~~

~~an inner lip extending inward from the outer edge of the interior cover;~~

an exterior cover having an outer edge~~ sized to be received by the inner lip of the interior cover~~, the exterior cover comprising:

a flat portion extending inward from the outer edge of the exterior cover; and

a spout extending upward from the flat portion;

a hinge connecting the interior cover to the exterior cover and foldable to orient the exterior cover over the interior cover;

wherein the interior cover, the exterior cover, and the hinge are arranged such that, ~~when the hinge is folded and the outer edge of the exterior cover is received by the inner lip of the interior cover:~~

the spout is located above the well portion; and

each retaining wall contacts the flat portion of the exterior cover,
characterized in that:

the interior cover further comprises an inner lip extending inward from the outer edge of the interior cover, the outer edge of the exterior cover being sized to be received by the inner lip; and
the exterior cover further comprises a pair of indentations in the flat portion of the exterior cover, wherein, when the hinge is folded and the outer edge of the exterior cover is received by the inner lip of the interior cover, the pair of retaining walls of the interior cover is received by the pair of indentations of the flat portion of the exterior cover, thereby preventing ~~a~~ the beverage in the beverage container from flowing directly from the openings to the spout.

2. The beverage container lid of claim 1, wherein the spout further comprises a cap separable from the exterior cover by a cap perforation to provide a spout hole in the spout.

3. The beverage container lid of claim 1, wherein the exterior cover has an exterior straw perforation sized to receive a drinking straw.

4. The beverage container lid of claim 1, wherein the reservoir bottom has a reservoir straw perforation sized to receive a drinking straw.

5. The beverage container lid of claim 1, wherein the exterior cover further comprises an elevated portion extending upward from an edge of the flat portion.

6. The beverage container lid of claim 5, wherein the elevated portion has a curved shape.

7. The beverage container lid of claim 5, wherein the elevated portion has a hemispherical shape.

8. The beverage container lid of claim 5, wherein the elevated portion has a planar top surface and steep sides.

9. The beverage container lid of claim 5, wherein the elevated portion has an exterior straw perforation sized to receive a drinking straw.

10. The beverage container lid of claim 1, wherein the reservoir bottom, the well portion, and the retaining walls are separable from the outer edge of the interior cover by a reservoir perforation.

11. The beverage container lid of claim 8, wherein the well portion has a pair of indentations on opposing sides of the well portion.

12. The beverage container lid of claim 1, wherein the pair of openings are located such that when the interior cover is horizontal, the pair of openings are horizontally higher than the reservoir bottom.

13. A method of use of ~~a~~ the beverage container lid of claim 1~~comprising an interior cover, an exterior cover, and a hinge connecting the interior cover to the exterior cover, the interior cover having a pair of openings to allow passage of a beverage in a beverage container through the interior cover, the interior cover comprising a reservoir bottom, a well portion extending downward and outward from an edge of the reservoir bottom to form a well, a pair of retaining walls, each retaining wall extending upward and outward from the reservoir bottom and flanking a side of the well portion and a side of one of the pair of openings, each retaining wall extending inward past an edge of the opening, an outer lip extending around an outer edge of the reservoir bottom, the well portion, and the retaining walls and formed to receive a rim of the beverage container, and an inner lip extending inward from the outer edge of the interior cover; the exterior cover having an outer edge sized to be received by the inner lip of the interior cover, the exterior cover comprising a flat portion extending inward from the outer edge of the exterior cover, a spout extending upward from the flat portion, and an elevated portion extending upward from an edge of the flat portion~~; the method comprising:

a) filling the beverage container with the beverage;

b) attaching the outer lip of the interior cover around the rim of the beverage

container;

c) folding the hinge to orient the exterior cover over the interior cover; and

d) inserting the outer edge of the exterior cover under the inner lip of the interior cover such that:

the spout is located above the well portion; and

the pair of ~~each~~ retaining walls contact~~s~~ the flat portion of the exterior cover by being received by the pair of indentations, thereby preventing ~~a~~ the beverage in the beverage container from flowing directly from the openings to the spout.

~~14. The method of claim 13 further comprising:~~

~~e) separating and removing a cap from the spout along a cap perforation to provide a spout hole in the spout;~~

~~wherein the beverage is a hot beverage.~~

~~15~~14. The method of claim 13 further comprising:

prior to step b), separating and removing the reservoir bottom, the well portion, and the retaining walls from the outer edge of the interior cover along a reservoir perforation.

~~16. The method of claim 15 further comprising:~~

~~f) inserting a drinking straw through a straw perforation in the elevated portion;~~

~~wherein the beverage is selected from the group consisting of:~~

~~a foamy beverage; and~~

~~a creamy mix beverage.~~

~~17. The method of claim 13 further comprising:~~

~~e) inserting a drinking straw through an elevated straw perforation in the elevated portion and a reservoir straw perforation in the reservoir bottom;~~

~~wherein the beverage is a cold beverage.~~

~~18. A process for forming a beverage container lid, the beverage container lid being prepared from a biodegradable thermoplastic polymer composition comprising a lactic acid-based polymer having a molecular weight of at least 10,000, the process comprising:~~
~~a) pre-forming the thermoplastic polymer composition into a pre-form at a pre-form temperature in a range of 180 °C to 300 °C; and~~

~~b) drawn blow-molding the pre-form to form the beverage container lid at a molding temperature in a range of 20 °C to 125 °C.~~

~~19. The process of claim 18, wherein a draw ratio in step b) is in a range of 1.2 to 6 times and a glass transition temperature of the biodegradable thermoplastic polymer is in a range of 20 °C to 65 °C.~~

~~20. The process of claim 18, wherein the biodegradable thermoplastic polymer composition has a light transmission of at least 85%.~~