

LONGNECK GLASS OR METAL BOTTLE WITH INTERNAL EMBOSSEMENTS IN THE NECK AND METHOD FOR ITS MANUFACTURE

The present disclosure relates to manufacture of longneck bottles having at least one internal embossment on the bottle neck for affecting flow of fluid during dispensing through the bottle neck.

Background and Summary of the Disclosure

5 Longneck bottles are popular in the beverage packaging industry, particularly for packaging beer. A general object of the present disclosure is to provide a longneck bottle having at least one internal embossment in the bottle neck for affecting flow of fluid during dispensing through the bottle neck.

10 The present disclosure embodies a number of aspects that can be implemented separately from or in combination with each other.

A longneck bottle of one-piece integrally formed glass or metal construction, in accordance with one aspect of the present disclosure, has a body with a closed base and a shoulder at an end of the body remote from the base, and a neck extending from the shoulder along an axis and terminating in a neck finish for attachment of a closure. The bottle neck includes at least one
15 internal embossment for affecting flow of liquid from the body through the neck. In exemplary embodiments of the disclosure, the at least one internal embossment includes at least one internal annular rib or at least one internal rib coplanar with the neck axis or at least one internal spiral rib or at least one internal elliptical rib.

A method of making a longneck bottle, in accordance with another aspect of the
20 present disclosure, includes forming a parison or preform and blowing the parison into a longneck

bottle. During formation of the parison and/or blowing of the parison into a longneck bottle, at least one internal rib is formed on the neck of the bottle. The at least one internal rib may be formed by forming an external rib on the neck during the parison-forming operation and pushing the external rib into the neck during the blowing operation. In another exemplary embodiment, the at least one internal rib is formed by forming at least one external channel in the neck and a corresponding internal rib in the neck during the parison forming and/or the bottle blowing operation.

Brief Description of the Drawings

The disclosure, together with additional objects, features, advantages and aspects thereof, will best be understood from the following description, the appended claims and the accompanying drawings, in which:

FIG. 1 is an elevational view of a longneck bottle in accordance with an exemplary embodiment of the present disclosure;

FIGS. 2, 3 and 4 are sectional views taken substantially along the respective lines 2-2, 3-3 and 4-4 in FIG. 1;

FIG. 5 is an elevational view of a longneck bottle in accordance with another exemplary embodiment of the present disclosure;

FIGS. 6, 7 and 8 are sectional views taken substantially along the respective lines 6-6, 7-7 and 8-8 in FIG. 5;

FIG. 9 is an elevational view of a longneck bottle in accordance with a third exemplary embodiment of the present disclosure;

FIGS. 10, 11 and 12 are sectional views taken substantially along the respective lines 10-10, 11-11 and 12-12 in FIG. 9;

FIG. 13 is an elevational view of a longneck bottle in accordance with a fourth exemplary embodiment of the present disclosure;

FIGS. 14, 15 and 16 are sectional views taken substantially along the respective lines 14-14, 15-15 and 16-16 in FIG. 13; and

FIGS. 17 and 18 are elevational views of longneck bottles in accordance with respective further exemplary embodiments of the disclosure.

Detailed Description of Preferred Embodiments

FIG. 1 illustrates a longneck bottle 20 in accordance with one exemplary embodiment of the present disclosure as including a bottle body 22 having a closed base 24 and a shoulder 26, and a bottle neck 28 extending along an axis 29 from shoulder 26 to a bottle mouth 30 (FIGS. 2 and 3). Neck 28 terminates in a neck finish 32 contoured for attachment of a desired closure. Bottle 20 has an overall height 34, and neck 28 (including neck finish 32) has a height 36. For purposes of the present disclosure, the term “longneck bottle” is defined as a bottle in which the height 36 of the bottle neck is at least 25% of the overall bottle height 34. In exemplary embodiments of the present disclosure, neck height 36 is in the range of 33% to 40% of bottle height 34.

Longneck bottle 20 is of one-piece integrally formed construction, preferably glass or metal construction. (The term “integrally formed construction” does not exclude one-piece integrally molded layered glass constructions of the type disclosed for example in U.S. Patent 4,740,401, or one-piece glass or metal bottles to which other structure is added after the bottle-forming operation.) Longneck glass bottles can be fabricated in a press-and-blow manufacturing operation. A molten glass charge or gob is placed in a blank mold and a plunger is moved into the

blank mold to form the molten glass gob against the inside surfaces of the blank mold. The glass preform or parison is then removed from the blank mold and placed in a blow mold, in which the parison body and a major portion of the neck are stretched by blow gas (usually air) against the internal surfaces of the blow mold while the neck finish remains in the geometry formed in the blank mold. Longneck glass bottles also can be formed in a blow-and-blow manufacturing operation. Longneck metal bottles can be formed by any suitable technique.

In accordance with the present disclosure, at least one internal feature or embossment is formed on bottle neck 28 for affecting flow of liquid through the bottle neck during dispensing. In the embodiment of FIGS. 1-4, such internal feature or embossment takes the form of a plurality of internal ribs 40 that spiral around axis 29, which preferably is coaxial with body 22 and forms the central axis of the bottle. Spiral ribs 40 preferably are substantially identical and at uniform angular spacing from each other. As liquid product, such as beer, soda or other beverage, is dispensed from bottle 22, spiral internal ribs 40 impart a swirling action to the liquid.

FIGS. 5-8 illustrate a longneck bottle 42 in accordance with a second exemplary embodiment of the present disclosure. Elements in bottle 42 (and in the bottles of FIGS. 9-17) that are the same or substantially the same as elements in bottle 20 of FIGS. 1-4 are indicated by correspondingly identical reference numerals. In bottle 42, the internal embossments or ribs on bottle neck 43 take the form of closed elliptical ribs 44. Each elliptical rib 44 preferably is disposed in a plane at an angle to axis 29. There are three elliptical ribs 44 in the exemplary embodiment of FIGS. 5-8. Elliptical ribs 44 preferably are in spaced parallel planes at an angle to the axis 29 of the bottle. As liquid beverage is dispensed from bottle 42, passage over ribs 44 tends to agitate the liquid and release gas from the liquid, helping to form a head in beer or to aerate wine for example.

FIGS. 9-11 illustrate a longneck bottle 46 in which the internal embossments on neck 48 take the form of angularly spaced longitudinal ribs 50. Each rib 50 is coplanar with axis 29. In the example of FIGS. 9-12 in which neck 48 is substantially conical, each rib 50 is linear and at an angle to axis 29. If neck 48 were of the "bulged" configuration of FIG. 13, longitudinal ribs 50 would be curved but still coplanar with axis 29. Ribs 50 extend in the direction of the bottle neck - i.e., ribs 50 are not angled to the direction of product flow through the bottle neck. Ribs 50 thus tend to channel product flow and to reduce agitation of product during dispensing.

FIGS. 13-16 illustrate a longneck bottle 52 in accordance with a fourth exemplary embodiment of the present disclosure. Bottle 52 has a neck 54 that is of exemplary bulged geometry, as compared with the more conical geometries of bottle necks 28, 43 and 48 in FIGS. 1-12. The internal embossments in bottle 52 include at least one annular internal rib 56 disposed in a plane perpendicular to the longitudinal axis 29 of neck 54. In the example of FIGS. 13-16, there are a pair of axially spaced internal ribs 56 in parallel planes on the inside surface of neck 54. Ribs 56 tend to agitate product as the product is dispensed through the bottle neck, releasing gas and tending to form a head in beer for example.

FIG. 17 illustrates a longneck wine bottle 60 having a body 62 and a neck 64 with a cork-type finish 66. Spiral ribs 68 are formed on the inside surface of neck 64. FIG. 17 also illustrates that the internal embossments in the bottle neck are not necessarily confined to the neck but can extend into the body 62 of the bottle.

A longneck bottle may be made by forming a preform or parison, such as in a plunger-type pressing operation although a blowing operation could be employed. The parison is then moved from the parison or blank mold to a blow mold in which the bottle neck and body are

formed in a blowing operation. The bottle neck finish 32 or 66 typically is formed to final geometry in the parison-forming operation, while the bottle neck and the bottle body are reformed in the blowing operation. The exemplary embodiments illustrated in the drawings include screw thread-type neck finishes 32 for attachment of threaded closures. However, the neck finish could be of any suitable geometry, such as a crown finish geometry for crimp-attachment of a bottle cap or a cork-type finish 66.

The internal embossments on the bottle neck that characterize the present disclosure could be formed in any suitable operation. In one exemplary implementation of the present disclosure, the internal neck embossments are formed in accordance with the disclosure of US 2009/0084799A1. Briefly stated, the blank mold body has an internal surface with at least one debossment or pocket of predetermined geometry (a rib-shaped geometry in the present disclosure) corresponding to the geometry of the desired internal embossment on the bottle neck. The neck portion of the parison is pushed against the internal surface of the blank mold body forming at least one external embossment on the neck portion of the parison corresponding to the at least one internal debossment on the mold body internal surface. When the parison subsequently is blown against the internal surface of the blow mold, the external embossment on the parison neck is effectively pushed through the wall of the neck to form at least one internal embossment corresponding to the external embossment on the parison. Forming at least one internal embossment, preferably but not necessarily rib-shaped on the bottle neck in accordance with the present disclosure, does not preclude also forming internal functional and/or ornamental embossments on the bottle body.

As an alternative method of manufacture illustrated in FIG. 18, the at least one internal embossment on the bottle neck 70 in accordance with the present disclosure could be made

by forming at least one external channel 72 on the bottle neck and a corresponding internal rib 74 on the neck during the parison-forming or the operation in which a bottle is blown from the parison. If the external channel and corresponding internal rib are formed during the parison-forming operation, the external channel will tend to disappear during the bottle blowing operation.

As clearly shown in FIGS. 2-4, the spiral rib embossments or features in the embodiment of FIGS. 1-4 extend inwardly from an inside surface of the bottle neck. The inner edges of these ribs are rounded. The same is true of the embodiment of FIGS. 5-8, the embodiment of FIGS. 9-12, the embodiment of FIGS. 13-16 and the embodiment of FIGS. 17-18. As also clearly shown in FIGS. 1-4, the spiral rib embossments or features in this embodiment are disposed around neck 28 well below the inside surface of finish 32 and where the neck widens between finish 32 and shoulder 26. The same is true in the other embodiments. As also clearly shown in FIG. 4, each rib 40 in the embodiment of FIGS. 1-4 extends about 360° around the interior of neck 28.

In summary, a longneck bottle in accordance with the present disclosure is of one-piece integrally formed construction and has a neck that is at least 25% of the overall height or length of the bottle, preferably at least 33% to 40% of the overall bottle length. The bottle neck has at least one internal embossment for affecting flow of liquid through the bottle neck during dispensing. In the several exemplary embodiments of the disclosure, such internal embossments include spiral ribs (FIGS. 1-4 and 17) for imparting a swirling action to the liquid during dispensing, longitudinal ribs (FIGS. 9-12) for retarding swirling action during dispensing, and elliptical ribs (FIGS. 5-8) or annular ribs (FIGS. 13-16) for agitating the liquid during dispensing.

There thus have been disclosed a longneck bottle and method of manufacture that fully satisfy all of the objects and aims previously set forth. The bottle and method of manufacture have been disclosed in conjunction with several exemplary embodiments, and additional modifications and variations have been discussed. Other modifications and variations readily will suggest themselves to persons of ordinary skill in the art in view of the foregoing description.

CLAIMS

1.

A bottle of one-piece integrally formed construction having a body with a closed base and a shoulder at an end of said body remote from said base, and a neck extending from said shoulder along an axis and terminating in a neck finish for attachment of a closure,

wherein said neck includes a plurality of angularly spaced internal features for affecting flow of liquid from said body through said neck,

wherein said neck widens between said finish and said shoulder, and said spaced internal features are disposed within said neck where said neck widens and at positions spaced from an internal surface of said finish,

wherein said spaced internal features are disposed entirely within said neck and do not extend into said shoulder.

2.

The bottle set forth in claim 1 wherein said plurality of spaced internal features comprise a plurality of angularly spaced internal spiral ribs that extend inwardly from an internal surface of said neck.

3.

The bottle set forth in claim 1 wherein said bottle is of glass or metal construction and wherein said plurality of internal features comprises a plurality of angularly spaced internal spiral ribs, or a plurality of elliptical ribs disposed in parallel planes that are spaced from each

other along said axis and at angles to said axis, and said internal spiral ribs or said plurality of elliptical ribs are disposed entirely within said neck where said neck widens.

4.

The bottle set forth in claim 1 wherein said plurality of internal features comprises a plurality of angularly spaced internal spiral ribs and said internal spiral ribs are disposed within said neck where said neck widens.

5.

The bottle set forth in claim 1 wherein said bottle is of glass or metal construction.

6.

The bottle set forth in claim 5 wherein said bottle is a longneck bottle.

7.

The bottle set forth in claim 1 wherein said bottle is of glass or metal construction and wherein said plurality of spaced internal features comprises a plurality of elliptical ribs disposed in parallel planes that are spaced from each other along said axis and at angles to said axis.

8.

A longneck bottle of one-piece integrally formed glass or metal construction having a body (22 or 62) with a closed base (24) and a shoulder (26) at an end of said body remote from said base, and a neck (28 or 43 or 48 or 54 or 64) extending from said shoulder along an axis and terminating in a neck finish (32 or 66) for attachment of a closure, characterized in that

said neck widens between said neck finish and said shoulder, and

said neck includes raised internal features (40 or 44 or 50 or 56 or 68) that do not extend into said finish for affecting flow of liquid from said body through said neck.

9.

The bottle set forth in claim 8 wherein said features are disposed entirely within said neck and do not extend into said shoulder or said body.

10.

The bottle set forth in claim 8 wherein said features are selected from the group consisting of: angularly spaced spiral ribs (40 or 68), elliptical ribs (44) in planes at angles to said axis, longitudinal ribs (50) coplanar with said axis, and annular ribs (56) in planes perpendicular to said axis.

11.

A method of releasing gas from a liquid in a bottle having a body, a shoulder and a neck terminating in an open mouth, comprising the steps of:

constructing said neck to widen between said mouth and said body, and

providing features on an inside surface of said neck where said neck widens, and wherein said features extend onto an inside surface of said shoulder such that, as the liquid is poured from the body through the neck and mouth, the liquid flows over said features thereby agitating the liquid and releasing gas from the liquid.

12.

The method set forth in claim 11 wherein said features are integrally formed with and extend inwardly from an inside surface of said neck.

13.

The method set forth in claim 12 wherein said features are selected from the group consisting of:

- (1) spiral ribs
- (2) elliptical ribs in planes at an angle to an axis of said neck,
- (3) circular ribs in planes perpendicular to an axis of said neck, and
- (4) longitudinal ribs each of which is coplanar with an axis of said neck.

14.

A method of releasing gas from a liquid in a bottle having a body, a shoulder and a neck terminating in an open mouth, comprising the step of:

providing features on an inside surface of said neck such that, as the liquid is poured from the body through the neck and mouth, the liquid flows over said features thereby agitating the liquid and releasing gas from the liquid,

wherein said features extend onto an inside surface of said shoulder.

15.

The method set forth in claim 14 wherein said features are integrally formed with and extend inwardly from said inside surface of said neck.

16.

The method set forth in claim 15 wherein said features are selected from the group consisting of:

- (1) spiral ribs
- (2) elliptical ribs in planes at an angle to an axis of said neck,
- (3) circular ribs in planes perpendicular to an axis of said neck, and
- (4) longitudinal ribs each of which is coplanar with an axis of said neck.

17.

A method of making a longneck bottle having a body (22 or 62) with a closed base (24) and a shoulder (26) at an end of said body remote from said base, and a neck (28 or 43 or 48 or 54 or 64) extending from said shoulder along an axis and terminating in a neck finish (32 or 66) for attachment of a closure, said method including the steps of:

- (a) forming a parison,
- (b) blowing said parison into a longneck bottle of one-piece integrally formed construction, and
- (c) during said step (a) and/or said step (b), forming at least one internal rib (40 or 44 or 50 or 56 or 68) on said neck,
characterized in that said step (c) includes:
 - (c1) forming an external rib on said neck during said step (a), and
 - (c2) pushing said external rib into said neck during said step (b).

18.

The method set forth in claim 17 wherein said at least one internal rib formed in said step (c) includes at least one spiral rib (40 or 68) around said axis, or at least one elliptical rib (44) in a plane at an angle to said axis, or at least one longitudinal rib (50) coplanar with said axis, or at least one annular rib (56) in a plane perpendicular to said axis.