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(54) **PLASTIC CONTAINER HAVING REINFORCED GRIPPING STRUCTURE**

KUNSTSTOFFBEHÄLTER MIT VERSTÄRKTER GREIFSTRUKTUR

CONTENANT EN PLASTIQUE AYANT UNE STRUCTURE DE PRISE RENFORCÉE

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Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] This invention relates generally to the field of plastic containers, and more particularly to plastic containers that are intended for consumer use and that are fabricated using a blow molding process.

2. Description of the Related Technology

[0002] Molded plastic containers for packaging beverages such as orange juice are in wide commercial use throughout the world. Such containers may be fabricated using the extrusion blow molding process, which is typical for containers that are fabricated from a material such as polyolefin, or a stretch blow molding process, which is typical for containers that are fabricated from polyethylene terephthalate, which is commonly known as PET.

[0003] When filled with a product, molded plastic containers can be fairly heavy and difficult to handle by some consumers, particularly in the larger sizes. This problem is compounded by any condensation in the form on the exterior surface of the plastic container. Accordingly, it is typical for certain types of plastic containers to be designed with integrated gripping recesses and handles so as to facilitate safety and ease of handling by the consumer.

[0004] The configuration of many containers incorporating such gripping recesses and handles is such that a consumer will be induced to grip the container using the forefingers and the thumb in a pinching action that can impart significant compressive forces to the container. While this may facilitate a comfortable and effective manner in which to grip the container from the standpoint of the consumer, the resulting compressive forces, which tend to be concentrated near the recessed grip portions of the container, can result in significant inward deflection and deformation of the container. Such deformation can result in a reduction of the storage volume of the container, causing product to be forced out of the pouring opening of the container in unwanted fashion when the container is full or close to being full. In addition, such deformation can result in a change in the pouring characteristics of the container, either by changing the shape of the dispensing opening itself or the shape of the surfaces that are immediately adjacent to the dispensing opening.

[0005] In addition, some plastic containers must be designed to withstand significant pressure differentials between the inside of the container and ambient conditions. Carbonated beverages or malt beverages can generate significant internal pressure, on the order of 0.3MPa-0.4MPa (45-60 psi) for malt beverages such as beer. Beer can be packaged using a cold aseptic or cold filtered process, or it can be pasteurized after filling and capping the container in order to kill any remaining yeast and stop further fermentation of the product. The pasteurization process typically involves spraying the filled and capped containers with hot water until the internal temperatures reach 60°C-61°C (140-142 degrees Fahrenheit).

[0006] Plastic containers may also be designed for use in the hot fill process, which is typically used for packaging beverages such as fruit juices. For such containers, gripping recesses must be designed to withstand pressurization and the subsequent volumetric contraction that occurs during the hot-fill process.

[0007] A need exists for an improved plastic container that provides a safe and convenient gripping configuration for the consumer but that exhibits better resistance against deformation than has been the case with conventional designs.

[0008] A bottle with a high strength gripping portion is known from JP 2002154517. The gripping portion comprises a recess surrounded by a flat portion. Another arrangement is shown in document EP 1 419 970 A1 in which a cylindrical wall of a container is provided with 3 oval depressions on each of two opposite sides of the container Between the groups of 3 depressions are narrow ridges running essentially parallel to the container axis.

SUMMARY OF THE INVENTION

[0009] In order to achieve the above and other objects of the invention, a plastic container according to the invention is as defined in claim 1 below. Optional features are defined in claims 2-10.

[0010] These and various other advantages and features of novelty that characterize the invention are pointed out with particularity in the claims annexed hereto and forming a part hereof. However, for a better understanding of the invention, its advantages, and the objects obtained by its use, reference should be made to the drawings which form a further part hereof, and to the accompanying descriptive matter, in which there is illustrated and described a preferred embodiment of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011]

FIGURE 1 is a perspective view depicting a container that is constructed according to a preferred embodiment of the invention;

FIGURE 2 is a front elevational view depicting the container that is shown in FIGURE 1;

FIGURE 3 is a longitudinal cross-sectional view taken along lines 3-3 in FIGURE 2;

FIGURE 4 is a side elevational view depicting the container that is shown in FIGURE 1;

FIGURE 5 is a cross-sectional view taken along lines 5-5 in FIGURE 4; and

FIGURE 6 is a cross-sectional view taken along lines 6-6 in FIGURE 4.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT(S)

[0012] Referring now to the drawings, wherein like reference numerals designate corresponding structure throughout the views, and referring in particular to FIGURE 1, a plastic container 10 that is constructed according to a preferred embodiment of the invention includes a conventional threaded finish portion 12, a neck portion 14, a main body portion 16 and a conventional bottom portion 18.

[0013] Containers 10 may be fabricated using the extrusion blow molding process, which is typical for containers that are fabricated from a material such as polyolefin, or a stretch blow molding process, which is typical for containers that are fabricated from polyethylene terephthalate, which is commonly known as PET.

[0014] Plastic container 10 is shaped so as to be generally cylindrical and further includes a substantially smooth label panel 20 to which a label may be conveniently applied using conventional processes.

[0015] Plastic container 10 further includes an opposed pair of gripping recesses 22 that are constructed to facilitate gripping of the container 10 by a consumer when the container 10 is full of liquid. Each of the gripping recesses 22 is constructed so as to be able to withstand pressurization and volumetric contraction that may occur within the container 10 as a result of carbonation, pasteurization, the hot-fill process or that may occur during transportation or use of the container 10.

[0016] Referring briefly to FIGURE 2, it will be seen that each of the gripping recesses 22 has an outer boundary 24 when viewed in front elevation that has an oblong shape, with a major axis that is substantially vertical or parallel to the longitudinal axis of the plastic container 10. The oblong shape of the gripping recesses 22 is preferably substantially symmetrical about both the major vertical axis and the minor horizontal axis. As may best be seen in FIGURE 4, each of the gripping recesses 22 is also defined in part by a curved concave inner surface 32 when viewed in side elevation.

[0017] Each of the gripping recesses 22 includes a plurality of horizontal indentations, each of which are sized to receive a finger of the consumer when the plastic container is being gripped by the consumer. In the preferred embodiment, three horizontal recesses or indentations 26, 28 and 30 are provided. As viewed in longitudinal cross-section, a first lip or projection 36 is defined between the recesses 26, 28 and a second lip or projection 38 is defined between the recesses 28, 30.

[0018] Referring again to FIGURE 4, plastic container 10 has a maximum outer diameter D_{MAX}. Preferably, the curved concave inner surfaces 32 of the gripping recesses 22 each have a radius R_{IS} that is within a range of about 30 percent to about 130 percent of the maximum outer diameter D_{MAX} of the container 10, and that is more preferably within a range of about 50 percent to about 100 percent of the maximum outer diameter D_{MAX} of the container 10.

[0019] In the preferred embodiment, each of the horizontal indentations 26, 28, 30 has an outer surface 34 that is-convexly curved as viewed in horizontal cross section, as is best shown in FIGURE 5. Outer surface 34 in the preferred embodiment has a radius of curvature R_{GH} that is within a range of about 20 percent to about 70 percent of the maximum outer diameter D_{MAX} of the container 10, and that is more preferably within a range of about 30 percent to about 60 percent of the maximum outer diameter D_{MAX} of the container 10.

[0020] The outer surface 34 of each of the horizontal indentations 26, 28, 30 is also preferably concave as viewed in longitudinal cross-section, as is best shown in FIGURES 3 and 4. Each of the horizontal indentations 26, 28, 30 preferably has a longitudinal radius of curvature R_{GL} that is preferably within a range of about 5.1 mm (0.2 inches) to about 25.4 mm (1 inch) and that is more preferably within a range of about 11.4 mm (0.45 inch) to about 21.6 mm (0.85 inch). Preferably, the longitudinal radius of curvature R_{GL} is within a range of about 15% to about 35% of the maximum outer diameter D_{MAX} of the container 10.

[0021] FIGURE 6 is a horizontal cross-sectional view depicting a cross-section of the container 10 taken at an elevation that intersects the second lip or projection 38. Both of the lips or projections 36, 38 have an outer surface that is convexly curved at a radius of curvature R_{LH} that is preferably within a range of about 20 percent to about 50 percent of the maximum outer diameter D_{MAX} of the container. Preferably, the radius of curvature R_{LH} is within a range of about 15.2 mm (0.6 inch) to about 27.9 mm (1.1 inch).

[0022] It is to be understood, however, that even though numerous characteristics and advantages of the present invention have been set forth in the foregoing description, together with details of the structure and function of the invention, the disclosure is illustrative only, and changes may be made in detail, especially in matters of shape, size and arrangement of parts within the principles of the invention to the full extent indicated by the broad general meaning of the terms in which the appended claims are expressed.

Claims

1. A plastic container (10), comprising:

a main body portion (16) having a longitudinal axis, said main body portion (16) having a gripping recess (22) defined therein, said gripping

recess (22) having an oblong shape when viewed in front elevation and being defined in part by a curved concave inner surface (32) when viewed in side elevation, said gripping recess (22) further comprising a first horizontal indentation (26) and a second horizontal indentation (28), each of said first and second horizontal indentations (26, 28) being sized to receive a finger of a consumer when the plastic container is being gripped by the consumer;
wherein the first horizontal indentation (26) extends a shorter horizontal distance than said second horizontal indentation (28); and wherein said gripping recess further comprises a convexly curved projection (36), as viewed in horizontal cross-section, located between said first horizontal indentation (26)and said second horizontal indentation (28).

2. A plastic container (10) according to claim 1, wherein said plastic container (10) further comprises a substantially smooth label portion (20).

3. A plastic container (10) according to claim 1, wherein said plastic container (10) has a generally cylindrical shape and a maximum outer diameter (D_{MAX}), and wherein said curved concave inner surface (32) has a radius (R_{IS}) that is within a range of about 30 percent to about 130 percent of said maximum outer diameter (D_{MAX}).

4. A plastic container (10) according to claim 3, wherein said curved concave inner surface (32) has a radius (R_{IS}) that is within a range of about 50 percent to about 100 percent of said maximum outer diameter (D_{MAX}).

5. A plastic container (10) according to claim 1, wherein each of said first and second horizontal indentations (26, 28) is concave as viewed in longitudinal cross-section.

6. A plastic container (10) according to claim 1, wherein each of said first and second horizontal indentations (26, 28) is curved as viewed in horizontal cross-section.

7. A plastic container (10) according to claim 1 , wherein said plastic container (10) has a maximum outer diameter (D_{MAX}) and wherein each of said horizontal indentations (26, 28) is convexly curved as viewed in horizontal cross-section so as to have an external radius (R_{GL}), said external radius (R_{GL}) being within a range of about 20 percent to about 70 percent of said maximum outer diameter (D_{MAX}).

8. A plastic container (10) according to claim 1, wherein said gripping recess (22) comprises third horizontal indentations (30), wherein the third horizontal indentation (30) is the same size as the first horizontal indentation (26).

9. A plastic container (10) according to claim 1, wherein said container (10) is made according to a blowmolding process.

10. A plastic container (10) according to claim 1, wherein said gripping recess (22) has an oblong shape when viewed in front elevation.

Patentansprüche

1. Kunststoffbehälter (10), umfassend:

einen Hauptkörperabschnitt (16) mit einer Längsachse, wobei der Hauptkörperabschnitt (16) eine Greifmulde (22) darin definiert aufweist, die Griffmulde (22) bei Betrachtung in Vorderansicht eine längliche Form aufweist und bei Betrachtung in Seitenansicht zum Teil durch eine gekrümmte konkave Innenfläche (32) definiert ist, die Greifmulde (22) ferner eine erste horizontale Einbuchtung (26) und eine zweite horizontale Einbuchtung (28) umfasst, wobei jede der ersten und zweiten horizontalen Einbuchtungen (26, 28) bemessen ist, um einen Finger eines Verbrauchers aufzunehmen, wenn der Kunststoffbehälter durch den Verbraucher ergriffen wird;
wobei sich die erste horizontale Einbuchtung (26) eine kürzere horizontale Distanz als die zweite horizontale Einbuchtung (28) erstreckt; und wobei die Greifmulde ferner bei Betrachtung im Horizontalquerschnitt einen konvex gekrümmten Vorsprung (36) umfasst, der sich zwischen der ersten horizontalen Einbuchtung (26) und der zweiten horizontalen Einbuchtung (28) befindet.

2. Kunststoffbehälter (10) nach Anspruch 1, wobei der Kunststoffbehälter (10) ferner einen im Wesentlichen ebenen Etikettenabschnitt (20) umfasst.

3. Kunststoffbehälter (10) nach Anspruch 1, wobei der Kunststoffbehälter eine im Allgemeinen zylindrische Form und einen maximalen Außendurchmesser (D_{MAX}) aufweist, und wobei die gekrümmte konkave Innenfläche (32) einen Radius (R_{IS}) aufweist, der innerhalb eines Bereichs von etwa 30 Prozent bis etwa 130 Prozent des maximalen Außendurchmessers (D_{MAX}) liegt.

4. Kunststoffbehälter (10) nach Anspruch 3, wobei die gekrümmte konkave Innenfläche (32) einen Radius (R_{IS}) aufweist, der innerhalb eines Bereichs von et-

wa 50 Prozent bis etwa 100 Prozent des maximalen Außendurchmessers (D_{MAX}) liegt.

5. Kunststoffbehälter (10) nach Anspruch 1, wobei jede der ersten und zweiten horizontalen Einbuchtungen (26, 28) bei Betrachtung im Längsquerschnitt konkav ist.

6. Kunststoffbehälter (10) nach Anspruch 1, wobei jede der ersten und zweiten horizontalen Einbuchtungen (26, 28) bei Betrachtung im Horizontalquerschnitt gekrümmt ist.

7. Kunststoffbehälter (10) nach Anspruch 1, wobei der Kunststoffbehälter (10) einen maximalen Durchmesser (D_{MAX}) aufweist, und wobei jede der horizontalen Einbuchtungen (26, 28) bei Betrachtung im Horizontalquerschnitt konvex gekrümmt ist, um einen Außenradius (R_{GL}) aufzuweisen, wobei der Außenradius (R_{GL}) innerhalb eines Bereichs von etwa 20 Prozent bis etwa 70 Prozent des maximalen Außendurchmessers (D_{MAX}) liegt.

8. Kunststoffbehälter (10) nach Anspruch 1, wobei die Greifmulde (22) dritte horizontale Einbuchtungen (30) umfasst, wobei die dritte horizontale Einbuchtung (30) die gleiche Größe wie die erste horizontale Einbuchtung aufweist (26).

9. Kunststoffbehälter (10) nach Anspruch 1, wobei der Behälter (10) gemäß einem Blasformprozess hergestellt ist.

10. Kunststoffbehälter (10) nach Anspruch 1, wobei die Greifmulde (22) bei Betrachtung in Vorderansicht eine längliche Form aufweist.

Revendications

1. Contenant en plastique (10) comprenant :

une partie de corps principal (16) ayant un axe longitudinal, ladite partie de corps principal (16) ayant un évidement de préhension (22) défini à l'intérieur de cette dernière, ledit évidement de préhension (22) ayant une forme oblongue, lorsqu'il est observé en élévation de face et étant défini en partie, par une surface interne concave incurvée (32) lorsqu'il est observé en élévation latérale, ledit évidement de préhension (22) comprenant en outre une première indentation horizontale (26) et une deuxième indentation horizontale (28), chacune desdites première et deuxième indentations horizontales (26, 28) étant dimensionnée pour recevoir un doigt d'un consommateur lorsque le contenant en plastique est saisi par le consommateur ; dans lequel la première indentation horizontale (26) s'étend sur une plus courte distance horizontale que ladite deuxième indentation horizontale (28) ; et dans lequel ledit évidement de préhension comprend en outre une saillie incurvée de manière convexe (36), lorsqu'il est observé sur une coupe horizontale, positionnée entre ladite première indentation horizontale (26) et ladite deuxième indentation horizontale (28).

2. Contenant en plastique (10) selon la revendication 1, dans lequel ledit contenant en plastique (10) comprend en outre une partie d'étiquette (20) sensiblement souple.

3. Contenant en plastique (10) selon la revendication 1, dans lequel ledit contenant en plastique (10) a une forme généralement cylindrique et un diamètre externe maximum (D_{MAX}), et dans lequel ladite surface interne concave incurvée (32) a un rayon (R_{IS}) qui est dans une plage d'environ 30 pour cent à environ 130 pour cent dudit diamètre externe maximum (D_{MAX}).

4. Contenant en plastique (10) selon la revendication 3, dans lequel ladite surface interne concave incurvée (32) a un rayon (R_{IS}) qui est dans une plage d'environ 50 pour cent à environ 100 pour cent dudit diamètre externe maximum (D_{MAX}).

5. Contenant en plastique (10) selon la revendication 1, dans lequel chacune desdites première et deuxième indentations horizontales (26, 28) est concave, lorsqu'elle est observée sur une coupe longitudinale.

6. Contenant en plastique (10) selon la revendication 1, dans lequel chacune desdites première et deuxième indentations horizontales (26, 28) est incurvée, comme observée sur une coupe horizontale.

7. Contenant en plastique (10) selon la revendication 1, dans lequel ledit contenant en plastique (10) a un diamètre externe maximum (D_{MAX}) et dans lequel chacune desdites indentations horizontales (26, 28) est incurvée de manière convexe, lorsqu'elle est observée sur une coupe horizontale, pour avoir un rayon externe (R_{GL}), ledit rayon externe (R_{GL}) étant dans une plage d'environ 20 pour cent à environ 70 pour cent dudit diamètre externe maximum (D_{MAx}).

8. Contenant en plastique (10) selon la revendication 1, dans lequel ledit évidement de préhension (22) comprend des troisièmes indentations horizontales (30), dans lequel la troisième indentation horizontale (30) a la même dimension que la première indentation horizontale (26).

9. Contenant en plastique (10) selon la revendication 1, dans lequel ledit contenant (10) est réalisé selon un processus de moulage par soufflage.

10. Contenant en plastique (10) selon la revendication 1, dans lequel ledit évidement de préhension (22) a une forme oblongue, lorsqu'il est observé en élévation de face.

FIG. 1

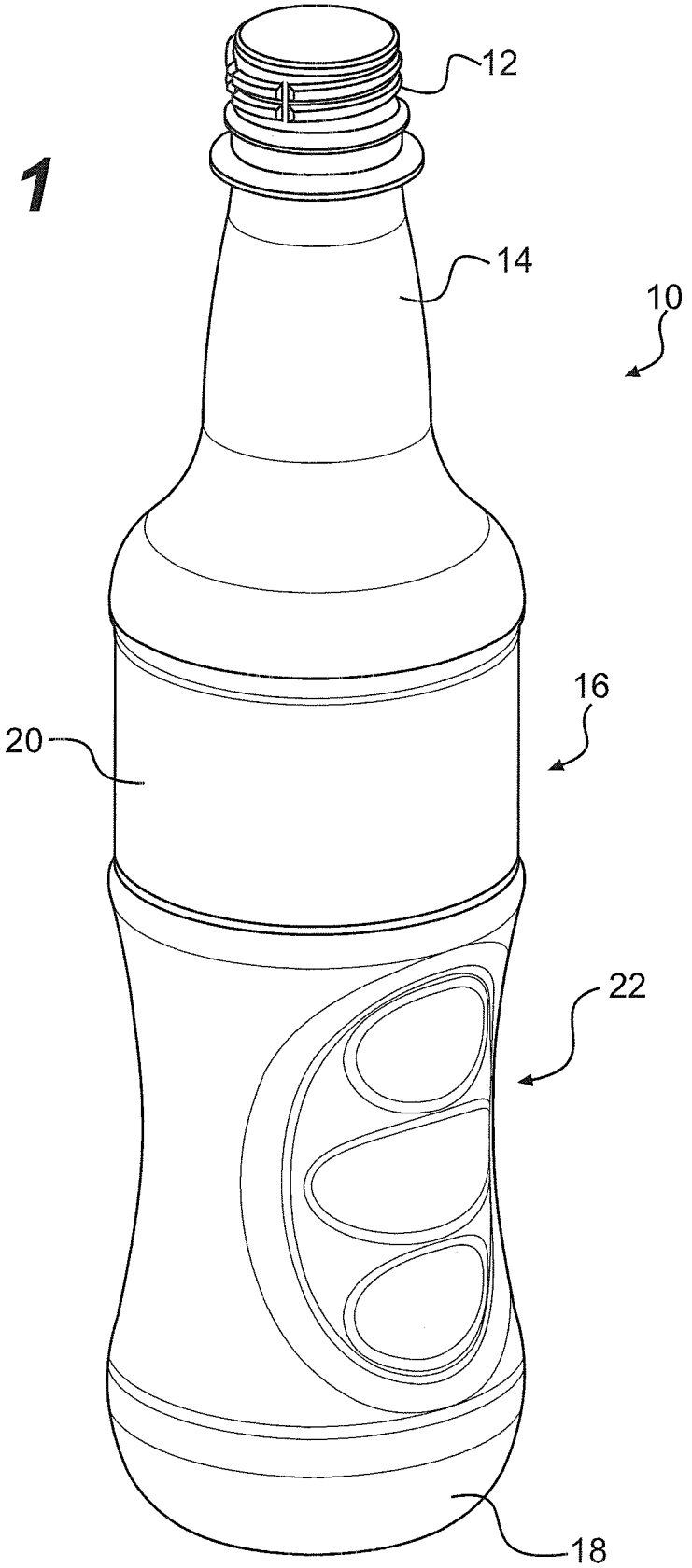


FIG. 2

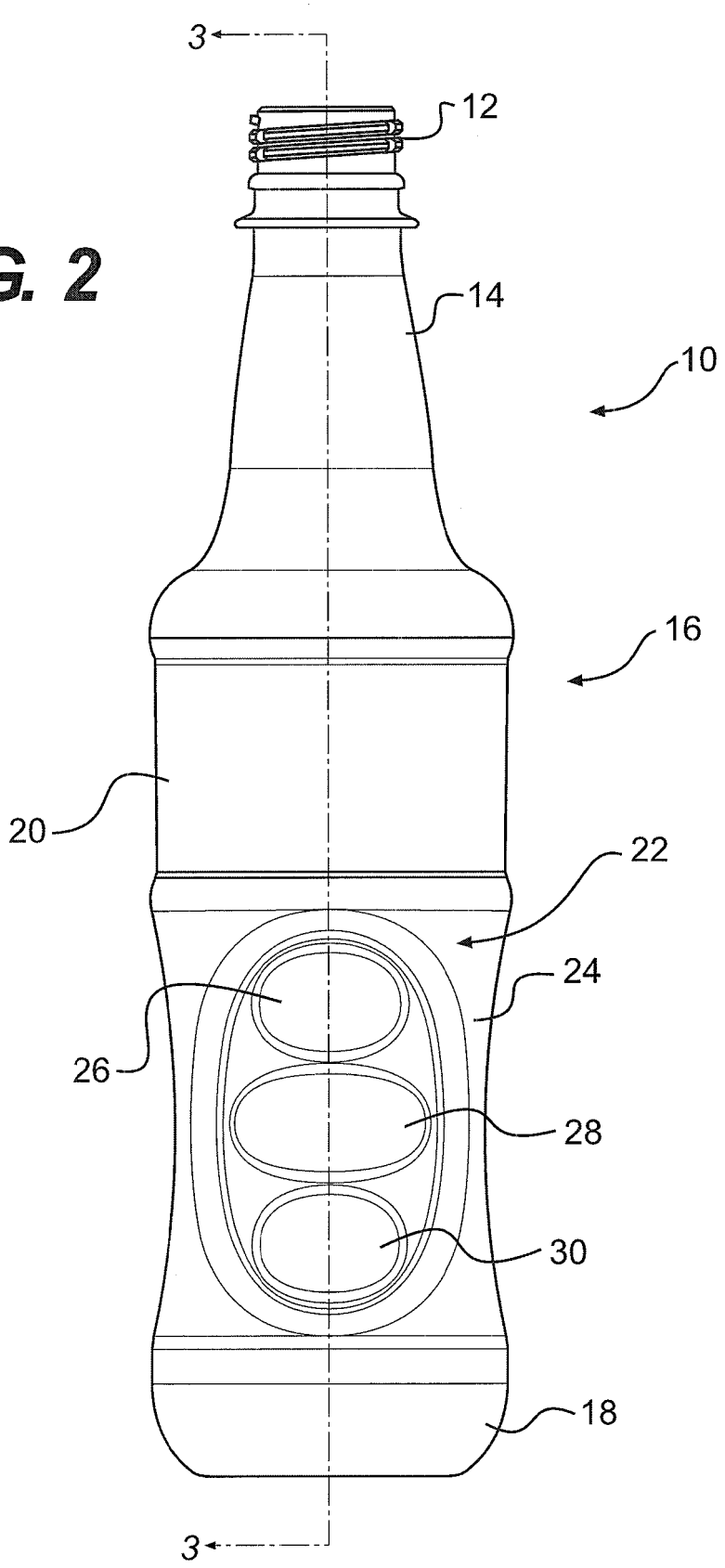


FIG. 3

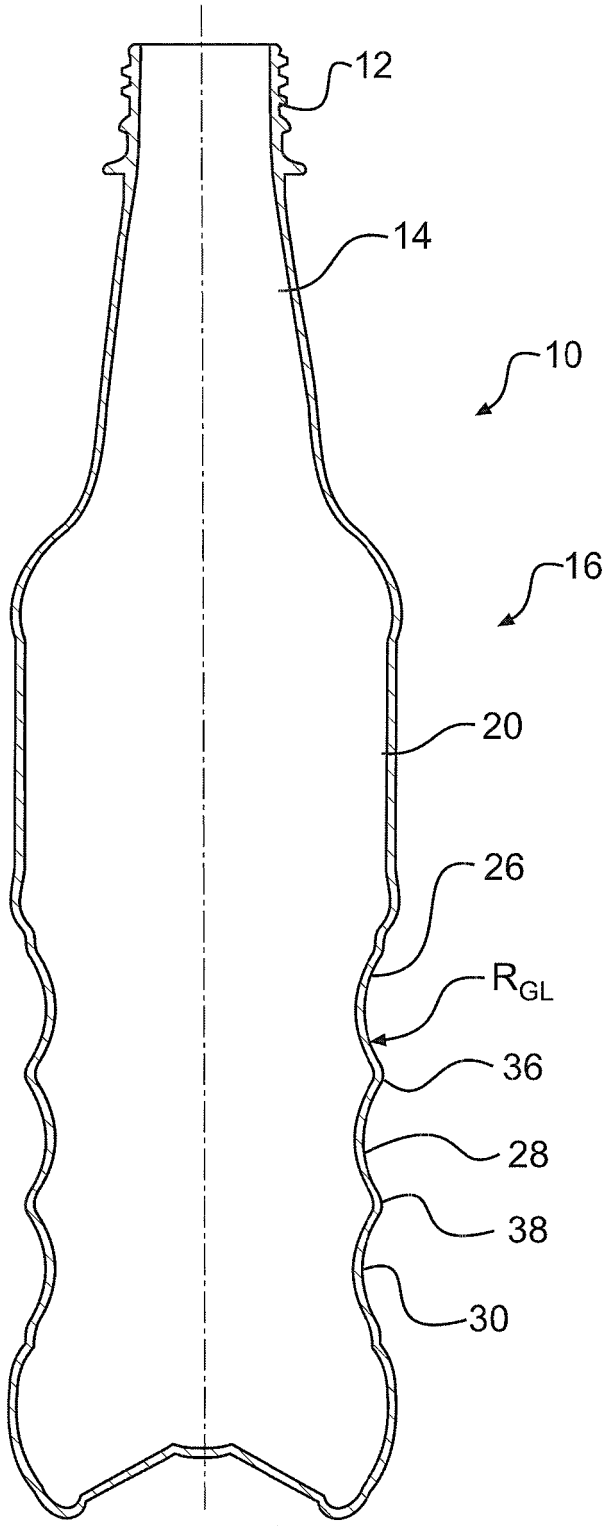
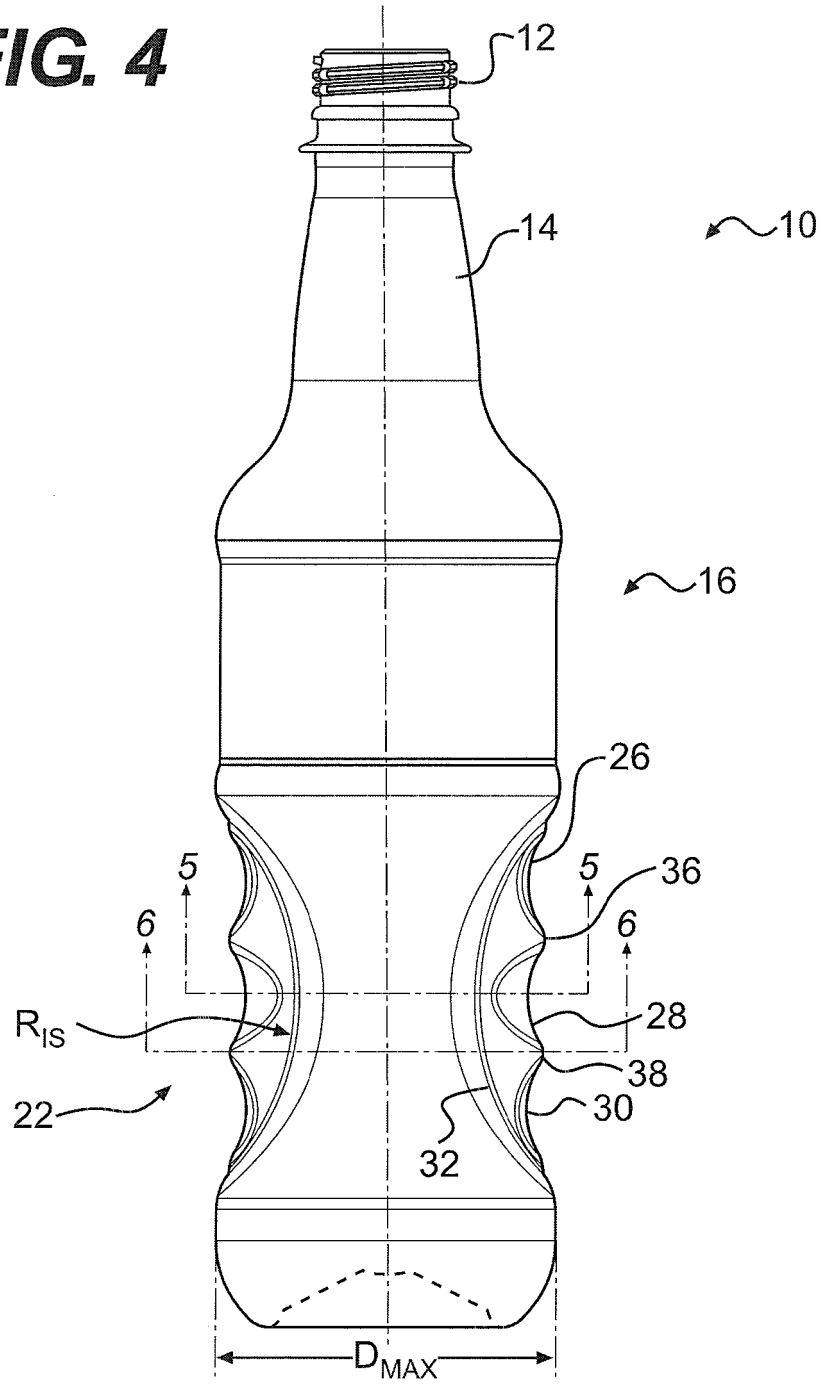


FIG. 4



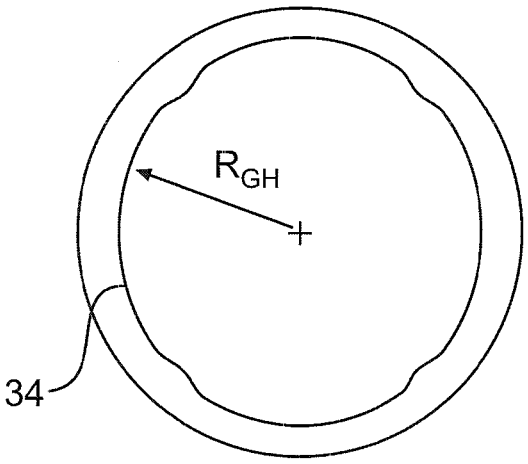


FIG. 5

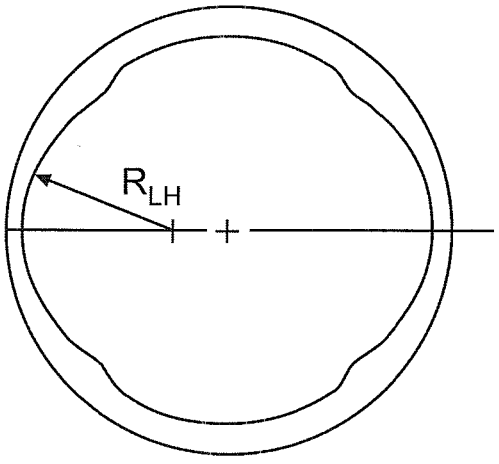


FIG. 6

REFERENCES CITED IN THE DESCRIPTION

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