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Señor

SUPERINTENDENTE DE INDUSTRIA Y COMERCIO

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No. 16-020052- -00003-0000

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Tra. 2 PATENTES Eve: 1 REGDEPOSITO
Act. 444 RESPUESTAREQUE Folios: 61

A-S

REFERENCIA: Expediente No. 16-20052
TÍTULO: "BOTELLA CAMPANA EN ESPIRAL CON NERVADURAS
ONDULADAS"
SOLICITANTE: NIAGARA BOTTLING, LLC.
TRÁMITE: RESPUESTA A REQUERIMIENTO DE FORMA OFICIO N°1766

JAIME EDUARDO DELGADO VILLEGAS, en mi condición de apoderado de la sociedad NIAGARA BOTTLING, LLC., dentro del término legal y luego de haber solicitado prórroga para dar respuesta al oficio de la referencia, presento respuesta a la acción oficial notificada mediante el oficio No. 1766 del 01 de marzo de 2016, en los siguientes términos:

1. Prioridad

- Se requiere presentar antes de dieciséis meses contados desde la fecha de presentación de la solicitud cuya prioridad se invoca, copia, certificada, por la autoridad que la expidió, y certificado de su fecha de presentación, expedido por la misma autoridad.

En respuesta a este requerimiento, nos permitimos adjuntar copia certificada del documento de prioridad autorizado por la Secretaría de Comercio para propiedad intelectual y el Director de la oficina de marcas y patentes de los Estados Unidos.

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2. Cesión

- La solicitud no contiene la copia del documento en que consta la cesión del derecho de la Patente de Invención del inventor al solicitante o a su causahabiente, conforme a lo establecido por el artículo 26 literal k) D486

Nos permitimos adjuntar el documento de cesión de esta patente de invención, firmado por el inventor **Jay Clarke Hanan** a favor de la sociedad **Niagara Bottling, LLC**.

3. Reivindicaciones

Las reivindicaciones 1 a 20 no son claras porque:

- Los términos "multiplicidad" (Reiv. 1), "pluralidad" (Reiv. 1, 2, 4, 13 a 15), sustancialmente (reiv. 1, 2, 5, 11, 15, 17), "al menos" (reiv. 1), "generalmente" (reiv. 2, 15) son imprecisos... se sugiere sustituirlos por un término preciso o un rango concreto.
- Las expresiones "de manera que resista al menos una de flexión, inclinación, desmoronamiento, o estiramiento a lo largo de la pared lateral y la base" (reiv. 1), "de tal manera que el envase se acomoda mejor a la presión interna" (reiv. 11), son resultados a alcanzar que dependen de las características del envase reclamado, se sugiere entonces modificarlas incluyendo las características técnicas estructurales que permiten este resultado.
- Las expresiones "configurada para resistir hacia el exterior inclinándose de la pared lateral debido a la presión interna al contenido en el interior del envase", "están configurada para contrarrestar las fuerzas dirigidas hacia el exterior en la pared lateral del envase debido a la presión interna, de manera que el envase presurizado asumen una sección transversal de forma sustancialmente circular"... corresponden a características funcionales, las cuales pueden estar incluidas en las reivindicaciones, no definen la invención; de tal manera no se tiene en cuenta para el estudio de patentabilidad.

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- El término "mayor que" (reiv. 5, 18) es relativo por lo cual no permite distinguir la invención del estado de la técnica. Se sugiere sustituirlo por un término o rango concreto.
- Se sugiere al solicitante incluir entre () los números de referencia de cada uno de los elementos que hacen parte de la invención de acuerdo con la numeración empleada en los dibujos, tanto en el capítulo reivindicatorio como descriptivo, los cuales debe ser coincidentes. Lo anterior, con el fin de hacer más fácil la comprensión de la materia reivindicada.

En procura de superar las objeciones planteadas por ese Despacho y siguiendo las sugerencias del examinador, el solicitante presenta nuevo capítulo reivindicatorio que consta de 18 reivindicaciones y en el cual se han efectuado las siguientes modificaciones:

- La reivindicación 1 ha sido modificada para definir más claramente el envase, en donde se ha eliminado el término "sustancialmente" y las frases: "de manera que resista al menos una de flexión, inclinación, desmoronamiento, o estiramiento a lo largo de la pared lateral y la base", "configurada para resistir hacia el exterior inclinándose de la pared lateral debido a la presión interna del contenido en el interior del envase" y "en donde las nervaduras de carga están configuradas para resistir la deformación de la base". De esta manera, la reivindicación ya no comprende términos generales ni frases de tipo funcional o que denoten algún resultado a alcanzar.
- La reivindicación 2, también se modificó de tal forma que ya no comprende el término "sustancialmente" y se ha establecido la sección transversal de forma triangular con un 2% a 20% de convolución.
- Reivindicación 4: el solicitante desea indicar que dicha reivindicación se ha eliminado del pliego reivindicatorio.

Por lo tanto, las siguientes reivindicaciones se han reenumerado.

- Reivindicación 11 (actual reivindicación 10): el solicitante desea indicar que el término "sustancialmente" ha sido eliminado y para mayor claridad, se ha

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incorporado la frase “hasta en un 10 por ciento”, el cual no constituye una ampliación del objeto inicialmente presentado.

- **Reivindicación 13 (actual reivindicación 12):** el solicitante desea señalar que el término “sustancialmente” fue eliminado.
- **Reivindicación 14 (actual reivindicación 13):** el solicitante indica que la frase “configuradas para resistir la presión interna de los contenidos” fue eliminada de dicha reivindicación.
- **Reivindicación 15 (actual reivindicación 14):** el solicitante señala que se ha eliminado el término “sustancialmente” y se ha especificado que “la pluralidad de las columnas rebajadas alineadas verticalmente comprende tres columnas rebajadas dispuestas uniformemente alrededor de la circunferencia de la pared lateral, y en el que una porción desplazada hacia dentro está dispuesto entre cada par de columnas rebajadas adyacentes, de manera que la circunferencia de la pared lateral está desplazada de una sección transversal de forma generalmente circular a una sección transversal con una convolución fraccional de forma triangular”; dicha modificación no constituye una ampliación del objeto inicialmente presentado.
- **La reivindicación 17** fue eliminada del pliego reivindicatorio.
- **Reivindicación 19 (actual reivindicación 17):** el solicitante desea manifestar que se corrige un error de redacción, de tal manera que se establece que el diámetro de la base es mayor por 0,5 a 4 milímetros que el diámetro del hombro.

Teniendo en cuenta las modificaciones realizadas en las reivindicaciones, así como la argumentación indicada en el presente escrito, se ruega sean reconsideradas y retiradas las objeciones emitidas por el Examinador.

En vista de las modificaciones efectuadas es evidente que los cambios efectuados cumplen con los lineamientos establecidos en el artículo 34 de la Decisión 486.

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ANEXO

- Nuevo capítulo reivindicatorio modificado conforme a las precisiones indicadas en este memorial.

PETICIÓN

Basándonos en los argumentos expuestos, consideramos que la totalidad de las objeciones presentadas por el Examinador han sido superadas, y que el nuevo capítulo reivindicatorio cumple con el requisito de claridad. En consecuencia, solicito a esa Superintendencia proceder a estudiar la patentabilidad de la invención según el capítulo reivindicatorio adjunto a este memorial.

Atentamente,



JAIME EDUARDO DELGADO VILLEGAS
C.C. No. 19.270.955 Bogotá
T.P. No. 43.308 C.S.J.

PA 7568316



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

February 03, 2016

THIS IS TO CERTIFY THAT ANNEXED HERETO IS A TRUE COPY FROM THE RECORDS OF THE UNITED STATES PATENT AND TRADEMARK OFFICE OF THOSE PAPERS OF THE BELOW IDENTIFIED PATENT APPLICATION THAT MET THE REQUIREMENTS TO BE GRANTED A FILING DATE UNDER 35 USC 111.

APPLICATION NUMBER: 14/610,940

FILING DATE: January 30, 2015

THE COUNTRY CODE AND NUMBER OF YOUR PRIORITY APPLICATION, TO BE USED FOR FILING ABROAD UNDER THE PARIS CONVENTION, IS US14/610,940

By Authority of the
Under Secretary of Commerce for Intellectual Property
and Director of the United States Patent and Trademark Office



M. TARVER
Certifying Officer

Electronic Acknowledgement Receipt

EFS ID:	21364530
Application Number:	14610940
International Application Number:	
Confirmation Number:	9422
Title of Invention:	Swirl Bell Bottle With Wavy Ribs
First Named Inventor/Applicant Name:	Jay Clarke Hanan
Customer Number:	34284
Filer:	Hani Z. Sayed/Francine Sanders
Filer Authorized By:	Hani Z. Sayed
Attorney Docket Number:	101832.0067P
Receipt Date:	30-JAN-2015
Filing Date:	
Time Stamp:	18:56:49
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$1740
RAM confirmation Number	6049
Deposit Account	502191
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		CIPPatent101832-0067P.pdf	996107 516bb03505c5c9b1967ed53e6206b4ed1d1b25bc	yes	47
Multipart Description/PDF files in .zip description					
	Document Description		Start	End	
	Transmittal of New Application		1	1	
	Fee Worksheet (SB06)		2	2	
	Application Data Sheet		3	8	
	Specification		9	31	
	Claims		32	35	
	Claims		36	36	
	Drawings-only black and white line drawings		37	47	
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	36784 f52d2f02714b8c02cd1c7988306e13af67c1196f	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			1032891		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Under the Paperwork Reduction Act of 1995 no persons are required to respond to a collection of information unless it displays a valid OMB control number

UTILITY PATENT APPLICATION TRANSMITTAL (ONLY FOR NEW NONPROVISIONAL APPLICATIONS UNDER 37 CFR 1.53(B))		Attorney Docket No. 101832.0067P	
		First Named Inventor Jay Clarke Hanan	
		Title	Swirl Bell Bottle With Wavy Ribs
		Express Mail Label No.	
APPLICATION ELEMENTS See MPEP chapter 600 concerning utility patent application contents.		ADDRESS TO: Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450	
1. ☒ Fee Transmittal Form (PTO/SB/17 or equivalent) 2. ☐ Applicant asserts small entity status. See 37 CFR 1.27 3. ☐ Applicant certifies micro entity status. See 37 CFR 1.29. Applicant must attach form PTO/SB/15A or B or equivalent. 4. ☒ Specification [Total Pages 28] Both the claims and abstract must start on a new page. (See MPEP § 608.01(a) for information on the preferred arrangement) 5. ☒ Drawing(s) (35 U.S.C. 113) [Total Sheets 11] 6. Inventor's Oath or Declaration [Total Pages] (including substitute statements under 37 CFR 1.64 and assignments serving as an oath or declaration under 37 CFR 1.63(e)) a. ☐ Newly executed (original or copy) b. ☐ A copy from a prior application (37 CFR 1.63(d)) 7. ☒ Application Data Sheet * See note below. See 37 CFR 1.76 (PTO/AIA/14 or equivalent) 8. CD-ROM or CD-R in duplicate, large table, or Computer Program (Appendix) ☐ Landscape Table on CD 9. Nucleotide and/or Amino Acid Sequence Submission (if applicable, items a. - c. are required) a. ☐ Computer Readable Form (CRF) b. ☐ Specification Sequence Listing on: i. ☐ CD-ROM or CD-R (2 copies); or ii. ☐ Paper c. ☐ Statements verifying identity of above copies			

FEE TRANSMITTAL		Complete if known	
		Application Number	To Be Determined
		Filing Date	Herewith
☐ Applicant asserts small entity status. See 37 CFR 1.27.		First Named Inventor	Jay Clarke Hanan
☐ Applicant certifies micro entity status. See 37 CFR 1.29. Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.		Examiner Name	Not Yet Assigned
		Art Unit	N/A
TOTAL AMOUNT OF PAYMENT	(\$)	Practitioner Docket No.	101832.0067P

METHOD OF PAYMENT (check all that apply)

☐ Check ☐ Credit Card ☐ Money Order ☐ None ☐ Other (please identify): _____

☒ Deposit Account Deposit Account Number: 50-2191 Deposit Account Name: Rutan & Tucker LLP

For the above-identified deposit account, the Director is hereby authorized to (check all that apply):

☒ Charge fee(s) indicated below ☐ Charge fee(s) indicated below, except for the filing fee

☐ Charge any additional fee(s) or underpayment of fee(s) under 37 CFR 1.16 and 1.17 ☒ Credit any overpayment of fee(s)

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

FEE CALCULATION

1. BASIC FILING, SEARCH, AND EXAMINATION FEES (U = undiscounted fee; S = small entity fee; M = micro entity fee)

Application Type	FILING FEES			SEARCH FEES			EXAMINATION FEES			Fees Paid (\$)
	U (\$)	S (\$)	M (\$)	U (\$)	S (\$)	M (\$)	U (\$)	S (\$)	M (\$)	
Utility	280	140*	70	600	300	150	720	360	180	1,600.00
Design	180	90	45	120	60	30	460	230	115	
Plant	180	90	45	380	190	95	580	290	145	
Reissue	280	140	70	600	300	150	2,160	1,080	540	
Provisional	260	130	65	0	0	0	0	0	0	

* The \$140 small entity status filing fee for a utility application is further reduced to \$70 for a small entity status applicant who files the application via EFS-Web.

2. EXCESS CLAIM FEES

Fee Description	Undiscounted Fee (\$)	Small Entity Fee (\$)	Micro Entity Fee (\$)
Each claim over 20 (including Reissues)	80	40	20
Each independent claim over 3 (including Reissues)	420	210	105
Multiple dependent claims	780	390	195

Total Claims	Extra Claims	Fee (\$)	Fee Paid (\$)	Multiple Dependent Claims
20	- 20 or HP =	x	=	Fee (\$)
HP = highest number of total claims paid for, if greater than 20.				
Indep. Claims	Extra Claims	Fee (\$)	Fee Paid (\$)	
2	- 3 or HP =	x	=	
HP = highest number of independent claims paid for, if greater than 3.				

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is \$400 (\$200 for small entity) (\$100 for micro entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.18(s).

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof	Fee (\$)	Fee Paid (\$)
39	- 100 =	/50 =	(round up to a whole number) x	=

4. OTHER FEE(S)

Non-English specification, \$130 fee (no small or micro entity discount)

Non-electronic filing fee under 37 CFR 1.16(t) for a utility application, \$400 fee (\$200 small or micro entity)

Other (e.g., late filing surcharge): 1051 Surcharge - Late filing fee, search fee, ... 140.00

SUBMITTED BY			
Signature	Registration No. (Attorney/Agent)	Telephone	
Name (Print/Type)	52,544	(714) 641-5100	
		Date	January 30, 2015

SWIRL BELL BOTTLE WITH WAVY RIBS

PRIORITY

[0001] This application is a continuation in part of, and claims the benefit of, U.S. Patent Application Serial No. 14/157,400, entitled "Plastic Container With Strapped Base," filed on January 16, 2014, which is a continuation in part of, and claims the benefit of, U.S. Patent Application No. 14/141,224, entitled "Plastic Container with Strapped Base," filed on December 26, 2013, which claims the benefit of U.S. Provisional Application No. 61/746,535, filed on December 27, 2012, the entirety of each of said applications is incorporated herein by reference and made a part of the present disclosure.

FIELD

[0002] This invention relates to plastic bottles and preforms, more specifically plastic preforms and bottles blown from such preforms that are suitable for containing beverages and utilize less resin such that they are lighter in weight than conventional bottles.

BACKGROUND

[0003] Plastic containers have been used as a replacement for glass or metal containers in the packaging of beverages for several decades. The most common plastic used in making beverage containers today is polyethylene terephthalate (PET). Containers made of PET are transparent, thin-walled, and have the ability to maintain their shape by withstanding the force exerted on the walls of the container by their contents. PET resins are also reasonably priced and easy to process. PET bottles generally are made by way of a process that includes blow-molding of plastic preforms which have been made by injection molding of PET resin.

[0004] Advantages of plastic packaging include lighter weight and decreased breakage as compared to glass, as well as lower costs overall when taking both production and transportation into account. Although plastic packaging is lighter in weight than glass, there is still great interest in creating the lightest possible plastic packaging so as to maximize the cost savings in both transportation and manufacturing by making and using containers that contain less plastic.

SUMMARY

[0005] The bottling industry is moving in the direction of removing auxiliary packaging from cases or pallets. A case of bottles with film only and no paperboard is called a "film only conversion" or "lightweighting" of auxiliary packaging. The removal of supporting elements such as paperboard places additional stress on a bottle, which increases the structural demands on the bottle. In certain embodiments, a bottle design can provide one or more of the benefits of reducing bending and point loading failures. The disclosed design embodiments can alleviate the stresses during shipping and handling (including film only packaging) while maintaining ease of blow-molding. In certain embodiments, a bottle design uses less resin for the same or similar mechanical performance, resulting in a lightweight product.

[0006] Embodiments of the bottle disclosed herein may use polyethylene terephthalate (PET), which has viscoelastic properties of creep and relaxation. As a plastic, PET and other resins tend to relax at temperatures normally seen during use. This relaxation is a time dependent stress relieving response to strain. Bending can provide exaggerated strains over what would be seen in tensile loading. Due to exaggerated strains, the relaxation in bending can be much more severe. Bending happens at multiple length scales. Bending can happen at the length scale of the bottle or on a small length scale. An example of the bottle length scale bending is a person bending the bottle in his/her hands, or bending experienced during packing in a case on a pallet. An example of the small scale is the flexing or folding of ribs or other small features on the wall of the bottle. In response to loads at the first, larger length scale, ribs flex at the local, smaller length scale. When they are held in this position with time, the ribs will permanently deform through relaxation.

[0007] Further, embodiments of the bottles disclosed herein may undergo pressurization. Pressure inside a bottle can be due to the bottle containing a carbonated beverage. Pressure inside a bottle can be due to pressurization procedures or processes performed during bottling and packaging. For example, a bottle can be pressurized to help the bottle retain its shape. As another example, the bottle can be pressurized with certain gases to help preserve a beverage contained in the bottle.

[0008] Embodiments of the bottles disclosed herein have varying depth ribs that achieve a balance of strength and rigidity to resist the bending described above while maintaining hoop strength, such as, for example, when pressure is not used or relieved. A collection of flattened and/or shallow depth ribs act as recessed columns in the body of the bottle that distribute bending and top load forces along the wall to resist leaning, stretching, and crumbling. The collection of flattened and/or shallow depth ribs can help the bottle retain its shape during pressurization, such as, for example, help inhibit stretching of the bottle when pressurized. Inhibiting stretching of the bottle helps retain desired bottle shape to aid in packaging of the bottles as discussed herein by, for example, maintaining a substantially constant height of the bottle. Inhibiting stretching of the bottle can help with applying a label to a label portion of the bottle. For example, with a label applied to a bottle, inhibiting stretching of the bottle helps retain a constant length or height of the bottle at the label panel portion, which can help prevent tearing of the label and/or prevent the label from at least partially separating from the bottle (i.e., failure of the adhesive between the bottle and the label). Further details on the features and functions of varying depth ribs are disclosed in U.S. Patent Application Serial No. 13/705,040, entitled "Plastic Container with Varying Depth Ribs," filed on December 4, 2012, now U.S. Patent No. 8,556,098, entitled "Plastic Container Having Sidewall Ribs with Varying Depth," which claims benefit to U.S. Provisional Patent Application Serial No. 61/567,086, entitled "Plastic Container with Varying Depth Ribs," filed on December 5, 2011, the entirety of each of which is incorporated herein by reference and made a part of this disclosure.

[0009] A balance may be achieved between flattened and/or shallow ribs and deep ribs to attain a desired resistance to bending, leaning, and/or stretching while maintaining stiffness in a lightweight bottle. In some embodiments, at least some of the aforementioned desired qualities may be further achieved through a steeper bell portion of a bottle. A steeper bell portion can increase top load performance in a lightweight bell. A lightweight bottle body and bell leaves more resin for a thicker base of the bottle, which can increase stability. A thicker base may better resist bending and top load forces and benefits designs with a larger base diameter with respect to the bottle diameter for tolerance even when the base is damaged during packaging, shipping, and/or handling.

[0010] Embodiments disclosed herein have a multiplicity of strap ribs that can function as straps from a base to a sidewall of the bottle to help further achieve resistance to bending, leaning, stretching and/or flexing while maintaining stiffness. A strap rib on a base helps the base resist deformation under pressure without necessitating the base being overly heavy in weight relative to the lightweight bottle (i.e., relative to wall thickness of flat foot base that does not resist pressure as well). The strap base rib can be incorporated into a flat foot base. A flat foot base helps retain base foot thickness. Retaining base foot thickness helps retain bottle integrity during packaging and handling using lightweight packaging, such as, for example, film only packaging that requires the base to directly resist forces, including bending and point loading, during packaging, shipping, and/or handling. A flat foot base performs well with or without internal pressure due to, for example, the ability to maintain relative foot thickness in the base in a lightweight bottle. Without strap ribs, the base may have little internal pressure resistance and may rollout (pop out and create a rocker bottom). The strap ribs help resist damage and deformation as discussed herein without requiring a relatively heavy footed base. Without requiring a relatively heavy footed base, less material is needed for the lightweight bottle. Further, the strapped base design may allow for a relatively easier blowing process than other known pressure bases. Thus, a base with strap ribs as disclosed herein provides for a material efficient, pressure optional bottle base.

[0011] Incorporating strap ribs into the base with column formations in the sidewall of the bottle as discussed herein offers pressure resistance for internally pressurized bottles while maintaining strength and performance (i.e., resistance to bending and leaning) when without internal pressure (i.e., pressure release by a user opening a closure of a bottle). The strap ribs can cooperate with the column formations on the sidewall of the bottle to form straps around the bottle to communicate stresses along the height of the bottle.

[0012] The base with strap ribs helps maintain strength and performance of the column formations for internally pressurized bottles. With strap ribs, resistance to bending, leaning, and/or stretching while maintaining stiffness and hoop strength is maintained without pressure while enhancing these characteristics when the bottle is pressurized. For example, strap ribs allow the utilization of a flat foot base for better base strength during processing at a plant (i.e., adding beverage contents), while preventing rollout or popping out of the base during

pressurization. Rollout of the base of the bottle leads to what may be called a "rocker bottom." Preventing rollout of the base helps the bottle stay level when resting on a surface and maintains the flat feet as the contact points on the surface. Further, base rollout can also occur without pressurization or low pressurization of the bottle, such as, for example, during shipping and handling or filling at high speed. Strap base ribs also help prevent base rollout without or low internal pressurization. While the specification herein may discuss preventing or inhibiting deformation under external/internal pressures and/or forces, it is to be understood that some deformation of a bottle may occur without straying outside of the scope of this disclosure. Some deformation of the bottle under external/internal pressures and/or forces may occur while retaining excellent structural properties of the features and functions disclosed herein.

[0013] Embodiments disclosed herein can be utilized for bottle pressures of a wide range. The strap base rib can help resist pressurization pressures in the bottle of up to 3 bars, including up to 2.5, up to 2, up to 1.5, up to 1, up to 0.5 bars, and up to 0.3 bars, including ranges bordered and including the foregoing values. The preform design also plays a role in resisting pressures such that much higher pressures than already demonstrated can be resisted with greater strap thickness available from the preform. The strap design provides a more efficient way of resisting the pressure in a bottle that also performs well without pressure.

[0014] Embodiments disclosed herein can be utilized in bottle volumes of a wide range. For example, features and functions disclosed herein can be utilized with a 3 ounce bottle up to a multiple gallon bottle. As another example, features and functions disclosed herein can be utilized with an 8 ounce (0.24 liter/0.15 liter) bottle up to a 3 liter bottle, including 12 ounces (0.35 liters) to 2 liters, 16 (0.47 liters) ounces to 1 liter, 18 ounces (0.53 liters) to 0.75 liters, and 0.5 liters, including ranges bordered and including the foregoing values.

[0015] Further, a new approach which relies on a general change in preform design, which significantly improves the ability to blow efficient, lightweight bottles is disclosed herein. The design elegantly incorporates features for protecting critical dimensions of the bottle and stabilizing the production blowing process. These features may also utilize less resin while achieving suitable mechanical performance resulting in a reduction in the use of petroleum products by the industry.

[0016] In an exemplary embodiment, a container comprises a base, a bell, a sidewall between the base and the bell, a neck and a finish which define an opening to an interior of the container, and a shoulder between the sidewall and the bell. The container further comprises a grip portion of the sidewall comprising a multiplicity of circumferentially positioned grip portion ribs; a label portion of the sidewall comprising a multiplicity of circumferentially positioned label portion ribs; a plurality of strap ribs, wherein each of the strap ribs extends substantially from a central portion of the base and terminates at a sidewall end in the grip portion, and wherein the strap ribs cooperate with a plurality of vertically aligned recessed columns of the sidewall so as to resist at least one of bending, leaning, crumbling, or stretching along the sidewall and the base; a plurality of inwardly offset portions of the sidewall configured to resist outward bowing of the sidewall due to internal pressure of contents in the interior of the container, each of the plurality of inwardly offset portions being disposed between each pair of adjacent vertically aligned recessed columns; a plurality of load ribs spaced equally between adjacent strap ribs, wherein the load ribs are configured to resist deformation of the base; and a plurality of feet formed between the strap ribs and the load ribs, wherein the plurality of feet comprises a resting surface of the container.

[0017] In another exemplary embodiment, the plurality of vertically aligned recessed columns comprises three recessed columns equally spaced around the perimeter of the sidewall, such that the sidewall comprises a circumference which is offset from a generally circular cross-sectional shape to a substantially triangular cross-sectional shape. In another exemplary embodiment, each of the plurality of inwardly offset portions is offset from 0 to 30 degrees from the circular cross-sectional shape. In another exemplary embodiment, the plurality of inwardly offset portions is configured to counteract outward-directed forces on the sidewall of the container due to internal pressure, such that the pressurized container assumes a substantially circular cross-sectional shape.

[0018] In another exemplary embodiment, the base comprises a diameter which is larger than a diameter of the shoulder, such that the base creates a single point of contact with other substantially similar containers in a production line, or in packaging. In another exemplary embodiment, the diameter of the base is larger than the diameter of the shoulder by 0.5 to 4 millimeters. In another exemplary embodiment, the diameter of the base is larger than the diameter of the shoulder by 1 to 2 millimeters.

[0019] In another exemplary embodiment, the plurality of strap ribs comprises three strap ribs equally spaced around the circumference of the base, and wherein the plurality of load ribs comprises six load ribs, such that two load ribs are equally spaced between each pair of adjacent strap ribs. In another exemplary embodiment, the base further comprises a gate centered on a longitudinal axis of the container, a wall extending from the gate toward the resting surface of the container, and a dome immediately surrounding the gate, wherein the dome is a portion of the wall of the base that slopes more steeply toward the resting surface of the container. In another exemplary embodiment, each of the strap ribs has a base end which terminates in the dome, near the periphery of the gate. In another exemplary embodiment, each of the strap ribs begins at the base end substantially parallel to the resting surface of the container and then extends along an upward curved path, a first portion of the upward curved path comprising a first radius, a second portion of the upward curved path comprising a second radius, and a third portion of the upward curved path comprising a straight portion, wherein at a first height the first radius terminates and the second radius begins, and at a second height the straight portion connects to the sidewall end of the strap rib, and wherein the first radius and the second radius cooperate to give the strap rib and the base a spherical configuration, such that the container better accommodates internal pressure. In another exemplary embodiment, each of the strap ribs further comprises two rib side walls that connect the strap rib to portions of the base and the feet, the rib side walls comprising smooth and gradual transitions into the base and the feet, such that the transitions comprise spherical features of the container.

[0020] In an exemplary embodiment, a container configured to substantially reduce triangulation of the container due to internal pressure of contents within the container, comprises a base which extends upward to a sidewall of the container; a shoulder connected between the sidewall and a bell, a diameter of the bell decreasing as the bell extends upward to a neck of the container; a finish connected to the neck, the finish configured to receive a closure and defining an opening to an interior of the container; and a plurality of inwardly offset portions of the sidewall configured to resist outward bowing of the sidewall due to the internal pressure of the contents.

[0021] In another exemplary embodiment, the sidewall comprises a plurality of vertically aligned recessed columns configured to resist the internal pressure of the contents. In another

exemplary embodiment, the plurality of vertically aligned recessed columns comprises three recessed columns disposed uniformly around the circumference of the sidewall, and wherein one inwardly offset portion is disposed between each pair of adjacent recessed columns, such that the circumference of the sidewall is offset from a generally circular cross-sectional shape to a substantially triangular cross-sectional shape. In another exemplary embodiment, each of the inwardly offset portions is offset from 0 to 30 degrees from the circular cross-sectional shape. In another exemplary embodiment, the inwardly offset portions are configured to counteract outward-directed forces on the sidewall of the container due to internal pressure, such that the pressurized container assumes a substantially circular cross-sectional shape.

[0022] In another exemplary embodiment, the base comprises a diameter which is larger than a diameter of the shoulder, such that the base creates a single point of contact with other substantially similar containers in a production line, or in packaging. In another exemplary embodiment, the diameter of the base is larger than the diameter of the shoulder by 0.5 to 4 millimeters. In another exemplary embodiment, the diameter of the base is larger than the diameter of the shoulder by 1 to 2 millimeters.

BRIEF DESCRIPTION OF THE DRAWINGS

[0023] The drawings refer to embodiments of the present invention in which:

[0024] Figure 1 illustrates a lower perspective view of an exemplary embodiment of a container in accordance with the present disclosure;

[0025] Figure 2 illustrates a front elevation view of an exemplary embodiment of a container, according to the present disclosure;

[0026] Figure 3 illustrates a rear elevation view of an exemplary embodiment of a container in accordance with the present disclosure;

[0027] Figure 4 illustrates a right side elevation view of an exemplary embodiment of a container, according to the present disclosure;

[0028] Figure 5 illustrates a left side elevation view of an exemplary embodiment of a container in accordance with the present disclosure;

[0029] Figure 6 illustrates a top plan view of an exemplary embodiment of a container, according to the present disclosure;

[0030] Figure 7 illustrates a bottom plan view of an exemplary embodiment of a container in accordance with the present disclosure;

[0031] Figure 8 illustrates a cross-sectional view along a longitudinal axis of an exemplary embodiment of a base of a container, according to the present disclosure;

[0032] Figure 9 illustrates an exemplary embodiment of a preform which may be blow-molded to form a container in accordance with the present disclosure;

[0033] Figure 10 illustrates a cross-sectional view of an exemplary embodiment of a preform, according to the present disclosure;

[0034] Figure 11 illustrates a cross-sectional view of a preform in a cavity of an exemplary embodiment of a blow-molding apparatus that may be used to make a bottle or container; and

[0035] Figure 12 illustrates an exemplary embodiment of a container formed by way of stretch blow-molding in accordance with the present disclosure.

[0036] While the present invention is subject to various modifications and alternative forms, specific embodiments thereof have been shown by way of example in the drawings and will herein be described in detail. The invention should be understood to not be limited to the particular forms disclosed, but on the contrary, the intention is to cover all modifications, equivalents, and alternatives falling within the spirit and scope of the present invention.

DETAILED DESCRIPTION

[0037] In the following description, numerous specific details are set forth in order to provide a thorough understanding of the present invention. It will be apparent, however, to one of ordinary skill in the art that the present invention may be practiced without these specific details. In other instances, specific numeric references such as "first load rib," may be made. However, the specific numeric reference should not be interpreted as a literal sequential order but rather interpreted that the "first load rib" is different than a "second load rib." Thus, the

specific details set forth are merely exemplary. The specific details may be varied from and still be contemplated to be within the spirit and scope of the present invention. The term "coupled" is defined as meaning connected either directly to the component or indirectly to the component through another component. Further, as used herein, the terms "about," "approximately," or "substantially" for any numerical values or ranges indicate a suitable dimensional tolerance that allows the part or collection of components to function for its intended purpose as described herein.

[0038] In general, the present disclosure provides an apparatus for a container comprising a base, a bell, a sidewall between the base and the bell, a neck and a finish which define an opening to an interior of the container, and a shoulder between the sidewall and the bell. In one embodiment, the base comprises a diameter which is larger than a diameter of the shoulder, such that the base creates a single point of contact with other substantially similar containers in a production line, or in packaging. In some embodiments, the diameter of the base is larger than the diameter of the shoulder by 0.5 to 4 millimeters, and preferably by 1 to 2 millimeters. Strap ribs extend from a central portion of the base and terminate at the sidewall. The strap ribs cooperate with vertically aligned recessed columns of the sidewall to resist bending, leaning, crumbling, or stretching along the sidewall and the base. An inwardly offset portion of the sidewall is disposed between each pair of adjacent recessed columns. In one embodiment, three recessed columns are equally spaced around the perimeter of the sidewall, such that the sidewall comprises a circumference which is offset from a generally circular cross-sectional shape to a substantially triangular cross-sectional shape. In one embodiment, each of the inwardly offset portions is offset from 0 to 30 degrees from the circular cross-sectional shape. The inwardly offset portions of the sidewall are configured to resist outward bowing of the sidewall due to internal pressure of contents within the container.

[0039] Figure 1 illustrates a bottom perspective view of an exemplary embodiment of a container 100 in accordance with the present disclosure. The container 100 comprises a base 104 that extends up to a grip portion 108. The grip portion 108 comprises a plurality of grip portion ribs 112 (i.e., sidewall ribs). As illustrated in Fig. 1, the plurality of grip portion ribs 112 generally vary in depth, and swirl or angulate around the grip portion 108. A label portion 116 is connected to the grip portion 108 and comprises one or more label panel ribs 120 (i.e., sidewall

ribs). The label panel portion 116 transitions into a shoulder 124, which connects to a bell 128. In the embodiment illustrated in Fig. 1, the bell 128 comprises a plurality of design features 132. In other embodiments, however, the bell 128 may include various other design features, or may be smooth and generally unornamented. The bell 128 connects to a neck 136, which connects to a finish 140. As shown in Fig. 1, the bell 128 comprises a diameter that generally decreases as the bell 128 extends upward from the shoulder 124 to the neck 136 and the finish 140. The finish 140 is adapted to receive a closure, such as by way of non-limiting example, a container cap or bottle cap, so as to seal contents within the container 100. The finish 140 generally defines an opening 144 that leads to an interior of the container 100 for containing a beverage, or other contents, such as any of a variety of carbonated soft drinks.

[0040] A substantially vertical sidewall comprising the grip portion 108 and the label portion 116 between the base 104 and the bell 128, extending substantially along a longitudinal axis of the container 100, and defines at least part of the interior of the container 100. In some embodiments, the sidewall may include the bell 128, the shoulder 124, and/or the base 104. A perimeter (i.e., periphery) of the sidewall is substantially perpendicular to the longitudinal axis of the container 100. The finish 140, the neck 136, the bell 128, the shoulder 124, the label portion 116, the grip portion 108, and the base 104 each comprises a respective perimeter (i.e., periphery) which is substantially perpendicular to the longitudinal axis of the container 100. For example, the label portion 116 comprises a label portion perimeter, whereas the grip portion 108 comprises a grip portion perimeter, both of which perimeters being substantially perpendicular to the longitudinal axis of the container 100.

[0041] In the embodiment illustrated in Figs. 1-5, each grip portion rib 112 comprises a deep rib portion 148 transitioning to a middle rib portion 152 and then transitioning to a shallow rib portion 156. Similarly, each label portion rib 120 comprises a deep rib portion 160 transitioning to a middle rib portion 164 and then transitioning to a shallow rib portion 168. The deep, middle, and shallow rib portions may also be referred to as deep, middle, and shallow ribs as a shorthand, but it is to be understood that these terms are intended to define portions of each rib in the grip portion 108 and the label portion 116. In the embodiment illustrated in Figs. 1-5, the shallow rib portions 156, 168 are vertically aligned with the longitudinal axis of the container 100. As best illustrated in Fig. 3, the shallow rib portions 156, 168 form an equivalent of

recessed columns 172 at portions where the shallow rib portions 156, 168 substantially vertically line up along the longitudinal axis of the container 100. Further, the deep rib portions 148, 160 are substantially vertically aligned along the vertical or longitudinal axis of the container 100. Thus, the embodiment illustrated in Figs. 1-5 comprises three recessed columns 172 and three portions where the deep rib portion 148, 160 are substantially vertically aligned.

[0042] In some embodiments, the shallow rib portions 168 of the label portion 116 may be vertically misaligned with the shallow rib portions 156 of the grip portion 108, such that the label portion 116 has a first set of recessed columns and the grip portion 108 has a second set of recessed columns. In some embodiments, the container 100 may have recessed columns solely in the grip portion 108 or solely in the label panel portion 116.

[0043] In the illustrated embodiment of Figs. 1-5, the three recessed columns 172 are equally spaced apart around the perimeter of the container 100 and located on an opposite sides of the container perimeter from the deep rib portions 148, 160. It will be appreciated that with three equally spaced recessed columns 172, the recessed columns 172 are spaced substantially every 120 degrees around the circumference of the container 100. Any number of recessed columns 172 may be incorporated into a design of the container 100 by either increasing or decreasing the number of shallow rib portions 156, 168 that are substantially vertically aligned along the longitudinal axis of the container 100. For instance, other embodiments of the container 100 may comprise a number of the recessed columns 172 ranging between 1 and 10 recessed columns.

[0044] In some embodiments, the label portion 116 may comprise a different number of recessed columns 172 than the grip portion 108. For example, the label portion 116 may comprise six equally spaced recessed columns, wherein three are vertically aligned with the recessed columns 172 of the grip portion 108 while the remaining three recessed columns are limited to the label portion 116. With six equally spaced recessed columns around the perimeter of the label portion 116, the recessed columns are positioned every 60 degrees around the circumference of the container 100. More recessed columns can help prevent triangulation of the label portion 116. As will be appreciated, shallow rib portions coupled with recessed columns better resists radial outward flexing, at least partially because the shallow rib portions possess a

relatively smaller radial depth available for flexing. Correspondingly, shallow rib portions coupled with recessed columns provides a greater resistance to internal pressure relative to deep rib portions. Thus, incorporating more frequent shallow rib portions and/or recessed columns around the circumference of the container 100 helps inhibit outward triangulation of the container due to internal pressure of contents within the container.

[0045] The vertical alignment of the shallow rib portions 156, 168 that form the recessed columns 172 provides resistance to leaning, load crushing, and/or stretching of the container 100. Leaning can occur when, during and/or after bottle packaging, a bottle, such as the container 100, experiences top load forces (tangential forces or otherwise) from other bottles and/or other objects stacked on top of the container. Similarly, top load crushing can occur due to vertical compression (or otherwise) forces from bottles and/or other objects stacked on top. Stretching can occur when the container is pressurized. The recessed columns 172 transfer the resulting forces along the sidewall of the container 100 to the base 104 and thus increase rigidity of the container 100. The deep rib portions 148, 160 of the grip portion ribs 112 and label panel ribs 120, respectively, provide a hoop strength that can be equivalent to the hoop strength imparted by ribs comprising a uniform depth. The number of ribs, including the grip portion ribs 112, and/or the label panel ribs 120 may vary between 1 and 30 ribs positioned, for example, every 10 centimeters along any rib-containing portion of the container 100, such as, but not necessarily limited to the grip portion 108 and/or the label portion 116. It should be understood that the aforementioned 10-centimeters that is used to measure the number of ribs in a portion of the container need not be actually 10 centimeters in length, but rather the 10-centimeters is used illustratively to provide a relationship between the number of ribs incorporated into a given length of a portion of the container.

[0046] As discussed above, the three recessed columns 172 operate to prevent outward triangulation of the sidewall of the container 100, wherein the shallow rib portions 156, 168 coupled with the recessed columns 172 better resists radial outward flexing of the sidewall of the container 100. Preferably, the portions of the sidewall between the recessed columns 172 are bowed inward, or offset, toward the interior of the container 100, such that the perimeter of the sidewall is offset from a generally circular cross-sectional shape to a substantially inwardly triangular cross-sectional shape. In some embodiments, the offset portions of the sidewall may

be offset from 0 to 30 degrees from the circular cross-sectional shape. The offset portions of the sidewall are configured to resist outward bowing of the sidewall due to internal pressure when the container 100 is filled with contents, particularly carbonated contents. It is envisioned that outward-directed forces on the sidewall of the container 100 due to internal pressure are counteracted by inward-directed resistance forces produced by the offset portions, such that the pressurized container assumes a substantially circular cross-sectional shape rather than becoming outwardly triangulated, as discussed herein. Thus, incorporating inwardly offset portions between the recessed columns 172 around the perimeter of the container 100 further inhibits outward triangulation of the container.

[0047] With reference to Fig. 1, the base 104 comprises three strap ribs 176. Each of the strap ribs 176 comprises a sidewall end 180 that terminates along the sidewall of the container 100, as discussed herein. Further, the base 104 comprises six load ribs 184. As illustrated in Fig. 1, two load ribs 184 are positioned between two strap ribs 176. In some embodiments, the base 104 may comprise a number of load ribs 184 ranging between 1 and 5 load ribs positioned between two strap ribs 176. Each of the load ribs 184 has a sidewall end 188 that terminates along the base 104 at a transition from the base 104 to the sidewall of the container 100. As illustrated in Fig. 1, the sidewall end 188 of the load rib 184 is vertically lower than the sidewall end 180 of the strap rib 176 along the longitudinal axis of the container 100. In some embodiments, the sidewall end 188 of the load rib 184 may terminate along the sidewall of the container 100 at a height which is substantially similar to the height of the sidewall end 180 of the strap rib 176. As further illustrated in Fig. 1, the base 104 comprises feet 192 formed between the strap ribs 176 and the load ribs 184.

[0048] The strap rib 176 is relatively larger and deeper than the load rib 184, as discussed herein. As illustrated in Figs. 1-5, each of the strap ribs 176 is vertically aligned with one of the recessed columns 172, and thus the strap ribs 176 are spaced equally around the circumference of the container 100. It will be recognized that with three equally spaced strap ribs 176, the strap ribs 176 are positioned every 120 degrees around the container circumference. The load ribs 184 are vertically aligned with the grip portion ribs 112 between the recessed columns 172. In some embodiments, the strap ribs 176 may be vertically misaligned with the recessed columns 172. In some embodiments, the strap ribs 176 may be spaced unequally around the circumference of the

container 100. In some embodiments, the base 104 may comprise more or less strap ribs 176 than the number of recessed columns 172. In some embodiments, the strap rib 176 may be vertically aligned with the deep rib portions 148, 160 and may terminate into a first deep rib portion 148 (first from the base 104). In some embodiments, the strap rib 176 may have a sidewall end 180 that terminates past the first shallow rib portion 156 and/or the first deep rib portion 148, such as for example at the second, third, and/or fourth grip portion ribs 112.

[0049] Figure 3 illustrates a rear elevation view of the container 100. As shown in Fig. 3, the sidewall end 180 of the strap rib 176 vertically aligns with, or points to substantially the center of the recessed column 172, which is coincident with the center point of the shallow rib portion 156. As further illustrated in Fig. 3, the strap rib 176 forms a recess 196, which is relatively a small area in comparison to the contact area of the feet 192 with a resting surface. Utilizing a small recess 196 aids in distributing more resin toward the feet 192 during the blowing process, which generally increases the abrasion resistance and strength of the feet 192. Thus, the strap ribs 176 operate to provide internal pressure resistance while leaving enough resin for the feet 192 to achieve the benefits of a flat foot base (i.e., thicker resin feet 192 for greater abrasion, deformation, and/or stress resistance; and/or greater foot contact area for stability and load distribution).

[0050] As best illustrated in Fig. 7, the strap ribs 176 extend substantially from a central portion of the base 104, coinciding with the longitudinal axis of the container 100, as discussed herein. As will be appreciated by those skilled in the art, the strap ribs 176 operate as a straps extending between the recessed columns 172 of the sidewall to the central portion of the base 104. As shown in Fig. 1, the strap rib 176 provides a more direct and shorter path from the center of the base 104 to the sidewall of the container 100 without proceeding to the vertical level of the feet 192. As discussed herein, the strap ribs 176 thus provide a relatively more pressure resistant base 104. Each of the strap ribs 176 provides a link for forces and stresses between the sidewall, including the recessed column 172, and the central portion of the base 104.

[0051] Figure 8 illustrates a cross-sectional view along the longitudinal axis of the base 104 of the container 100. As shown in Fig. 8, the strap rib 176 of the base 104 begins at a base end 212 substantially parallel to a resting surface of the base 104 and then extends along a curved

path, having a first radius R_{1d} , with an increasingly positive slope. At a height H_{1d} , the radius of the curved path of the strap rib 176 changes to a second radius R_{2d} with an increasingly positive slope before extending into a straight portion 220. At a height H_{2d} , the straight portion 220 connects to the sidewall end 180 as discussed herein. The first and second radii R_{1d} , R_{2d} , as well as the corresponding positive slopes and the heights H_{1d} and H_{2d} , may have dimensional values falling within any of the appropriate ranges of values discussed in detail in U.S. Patent Application Serial No. 14/157,400, entitled "Plastic Container With Strapped Base," filed on January 16, 2014, the entirety of which is incorporated herein by reference and forms a part of the present disclosure. Preferably, however, the combination of the radii R_{1d} and R_{2d} cooperate to give the strap rib 176, and thus the base 104, a smooth and gradual, spherical configuration. As discussed herein, spherical features of the container 100 better accommodate internal pressure. Experimentation has demonstrated that the spherical configuration of the base 104 depicted in Fig. 1-5 is capable of withstanding an internal pressure at least twice the internal pressure tolerable by conventional base configurations.

[0052] It will be recognized that the strap rib 176 illustrated in Fig. 8 does not include a transition curve between the first radius R_{1d} and the second radius R_{2d} , nor between the second radius R_{2d} and the straight portion 220. In other embodiments, however, a transition curve having a radius other than R_{1d} and R_{2d} may be positioned between the curved portions of the strap rib 176 having radii R_{1d} and R_{2d} . In still other embodiments, a transition curve may be positioned between the curved portion of the strap rib 176 having the second radius R_{2d} and the straight portion 220. It is envisioned that the transition curves may have dimensional values that further produce a spherical configuration of the strap rib 176, and thus the base 104.

[0053] As illustrated in Fig. 7, the base 104 comprises a gate 200 surrounded by a dome 204. The dome 204 comprises a portion of a wall of the base 104 which slopes more steeply toward a resting surface when the bottle is placed on the resting surface relative to the rest of the wall of the base 104 leading to the feet 192. The strap rib 176 comprises a base end 208 that terminates substantially at a periphery of the dome 204. In some embodiments, the base end 208 of each strap rib 176 may be positioned outside of the dome 204 similarly to base ends 212 of the load ribs 184. Each of the strap ribs 176 comprises a pair of rib side walls 216 that connect the strap rib 176 to portions of the base 104 and the feet 192. The rib side wall 216 smoothly and

gradually transitions into the base 104 and the feet 192. The smooth and gradual transition provides internal pressure resistance at and near the rib side wall 216 since more spherical features of the container 100 better accommodate internal pressure. The strap rib 176 is relatively deeper in the base 104 than the load rib 184 so as to provide stress transfer and pressure resistance, as discussed herein.

[0054] As mentioned above, each of the load ribs 184 comprises a base end 212 that terminates at, or near the dome 204. In the embodiment illustrated in Fig. 7, the base ends 212 of the load ribs 184 terminate before the base ends 180 of the strap ribs 176. Further, the load ribs 184 are shallow relative to the strap ribs 176. Accordingly, the load ribs 184 each comprises rib side walls that are relatively smaller than the rib side walls 216, and thus the transition from the load ribs 184 to the base 104 and the feet 192 is more abrupt, or sharper, than in the case of the rib side walls 216. It will be appreciated that when the container 100 is top loaded during packaging, shipping, and/or handling, the sharper transitions of the load ribs 184 resist bending and/or leaning as discussed herein by, for example, maintaining the integrity and shape of the base 104. Moreover, the sharper transitions of the load ribs 184 provide more area of the base 104 being available for relatively larger feet 192. It will be further appreciated that larger feet 192 of a flat-foot base, such as the base 104 discussed herein and as illustrated in Fig. 7, provide more resin contact area with a resting surface, and thus provide better abrasion resistance and stability of the base. As further illustrated in Fig. 7, the rib side walls 216 generally transition into the strap ribs 176 more abruptly, or sharply, relative to the transition from the rib side walls 216 to the feet 192. The sharper transitions to the strap ribs 176 provide more rigidity to the strap ribs so as to resist, or inhibit, flexing due to internal pressures.

[0055] In the embodiment of Fig. 7, the base ends 208 of the strap ribs 176 terminate substantially near the gate 200, and the base ends 212 of the load ribs 184 terminate near the periphery of the dome 204. It will be appreciated that terminating the base ends 208 of the strap ribs 176 and/or the base ends 212 of the load ribs 184 substantially near, or at the gate 200 provides greater internal pressure resistance to the base 104, as discussed herein, preventing, for example, base rollout. Moreover, terminating each of the base ends 208 substantially near, or at the gate 200 provides strap ribs 176 that are substantially continuous from (or near) the gate 200 to the sidewall ends 180. As shown in Figs 1-5, the sidewall ends 180 terminate at the first

shallow rib portion 156 and communicate directly with the recessed columns 172. The continuity from the recessed columns 172 to the gate 200 provides substantially continuous pressure resistance bands, or straps, from a top of the label portion 116 to the gate 200. Pressure resistance straps that are substantially continuous provide greater resistance to internal pressure, as discussed herein.

[0056] Figure 6 illustrates a top plan view of the container 100, showing the shoulder 124, the bell 128 with the design features 132, the finish 140, and the opening 144 to the interior of the container. As illustrated in Fig. 6, the shoulder 124 comprises a diameter D_S . Similarly, in the embodiment of the base 104 illustrated in Fig. 7, the base 104 comprises a diameter D_B . The diameter D_B of the base 104 preferably is larger than the diameter D_S of the shoulder 124, such that the base 104 creates a single point of contact with other substantially similar containers in a production line, or in packaging. In some embodiments, the diameter D_B of the base 104 is larger by 0.5 to 4 millimeters than any other diameter of the container 100, including the diameter D_S of the shoulder 124. It will be appreciated that the larger base 104 diameter D_B advantageously improves conveying a multiplicity of the container 100 in a production line. Further, the larger base 104 diameter D_B advantageously improves stability when there is any damage to the base 104. In some embodiments, the diameter D_S of the shoulder 124 may be equal to the diameter D_B of the base 104, thereby providing two points of contact, at the shoulder 124 and the base 104, with other substantially similar bottles in a production line, or in packaging. It will be appreciated that where the diameter(s) of any portion of the container 100 varies, the largest diameters create points of contact with other substantially similar containers in a production line, or in packaging. Thus, the containers generally may have either a single point of contact or multiple points of contact.

[0057] Figure 4 illustrates a right side elevation view of container 100, which shows a plan view of the shallow rib portions 156, 168 along the right-hand side of the container 100 and a plan view of the deep rib portions 148, 160 along the left-hand side of the container 100. Figure 5 illustrates a left side elevation view of container 100, which shows the shallow rib portions 156, 168 along the left-hand side of the container 100 and the deep rib portions 148, 160 along the right-hand side of the container 100. As discussed above in connection with Fig. 1, the deep rib portions 148, 160 comprise a depth which is larger than a depth of the middle rib portions

152, 164 which is larger than a depth of the shallow rib portions 156, 168. In some embodiments, a depth of the deep rib portions 148 may range from 1 to 10 millimeters. In some embodiments, a depth of the deep rib portions 160 may range from 0.5 to 10 millimeters. In some embodiments, a depth of the middle rib portions 152 may range from 0 to 5 millimeters. In some embodiments, a ratio of the depth of the deep rib portions 148 to the depth of the middle rib portions 152 may vary from 1:1 to 20:1.

[0058] In some embodiments, a depth of the shallow rib portions 156 may range from 0 to 2.5 millimeters. In some embodiments, a ratio of the depth of the deep rib portions 148 to the depth of the shallow rib portions 156 may vary from 1:1 to 100:1, including where the shallow rib portions 156 have zero depth, resulting in substantially an infinite ratio. In some embodiments, a ratio of the depth of the middle rib portions 152 to the depth of the shallow rib portions 156 may vary from 1:1 to 50:1, including where shallow rib portions 156 have zero depth, resulting in substantially an infinite ratio.

[0059] In some embodiments, a depth of the shallow rib portions 168 may vary from 0 to 2.5 millimeters. In some embodiments, a ratio of the depth of the deep rib portions 148 to the depth of the shallow rib portions 168 may vary from 1:1 to 100:1, including where the shallow rib portions 168 have zero depth, resulting in substantially an infinite ratio. In some embodiments, a ratio of the depth of the deep rib portions 160 to the depth of the shallow rib portions 168 may range from 1:1 to 100:1, including where the shallow rib portions 168 have zero depth, resulting in substantially an infinite ratio. In some embodiments, a ratio of the depth of the middle rib portions 152, 164 to the depth of the shallow rib portions 168 may vary from 1:1 to 50:1, including where the depth of the shallow rib portions 168 is zero, resulting in substantially an infinite ratio. In some embodiments, a ratio of the depth of the deep rib portions 160 to the depth of the shallow rib portions 168 may vary from 1:1 to 100:1, including a substantially infinite ratio arising when the shallow rib portions 168 have zero depth.

[0060] Transitions between the various depths of the rib portions are smooth, as illustrated in Figs. 1-5. In some embodiments, however, the transitions may comprise other forms, such as by way of non-limiting example, a step-change connecting the varying depth portions. Moreover, some embodiments may minimize the shallow rib portions 156, 168 to 20-30% of the

circumference of the container 100, thereby resulting in a respective 70-80%, of the container circumference comprising the deep rib portions 148, 160 and the middle rib portions 152, 164. However, any ratio of shallow rib portions to deep rib portions and middle rib portions may be utilized.

[0061] Figure 9 illustrates an exemplary embodiment of a preform 230 which may be blow-molded to form the container 100. The preform 230 preferably is made of material approved for contact with food and beverages, such as virgin PET, and may be of any of a wide variety of shapes and sizes. The preform 230 comprises a neck portion 232 and a body portion 234, formed monolithically (i.e., as a single, or unitary, structure). Advantageously, the monolithic arrangement of the preform 230, when blow-molded into a bottle, such as container 100, provides greater dimensional stability and improved physical properties in comparison to a preform comprising separate neck and body portions, which are bonded together. The preform 230 illustrated in Fig. 9 generally is of a type which will form a 12-16 oz. beverage bottle, but as will be understood by those skilled in the art, other preform configurations may be used depending upon the desired configuration, characteristics and use of the final article. The preform 230 may be made by injection molding methods including those that are well known in the art.

[0062] Figure 10 illustrates a cross-sectional view of an exemplary embodiment of the preform 230 which may be used to form the container 100. The neck portion 232 of the preform 230 begins at an opening 236 to an interior of the preform 230 and extends to and includes a support ring 238. The neck portion 232 is further characterized by the presence of a structure for engaging a closure. In the illustrated embodiment, the structure includes threads 240, which provide a means to fasten a cap to the container 100 produced from the preform 230. It will be appreciated that the illustrated preform 230 comprises a shorter overall neck portion than most conventional preforms. Further, the neck portion 232 of the preform 230 comprises a wall thickness 252 which is generally thinner than in conventional preforms, wherein the wall thickness 252 of the neck portion 232 is measured at the very top or between the threads 240, or between any other protruding structures.

[0063] The body portion 234 is an elongated structure extending down from the neck portion 232 and culminating in an end cap 242. In some embodiments, the body portion 234 is generally cylindrical, and the end cap 242 is conical or frustoconical, and may also be hemispherical, and the very terminus of the end cap 242 may be flattened or rounded. The preform 230 comprises a wall thickness 244 throughout most of the body portion 234 which depends upon an overall size of the preform 230, as well as a predetermined wall thickness and overall size of the resulting container 100. As illustrated in Fig. 10, the wall thickness 244 tapers, between 250 and 248, to a wall thickness 246 immediately below the support ring 238. In some embodiments, the wall thickness between 244 and 250 may further comprise a slight taper so as to facilitates a release of the preform 230 from a core during the injection molding process. Specific dimensions of the wall thickness, as well as dimensions of various other features of the preform 230 are discussed in detail in U.S. Patent Application Serial No. 13/295,699, entitled "Preform Extended Finish for Processing Light Weight Ecologically Beneficial Bottles," filed on November 14, 2011, the entirety of which is incorporated herein by reference and forms a part of the present disclosure.

[0064] Once the preform 230 has been prepared by way of injection molding, or other equivalent process, the preform 230 may be subjected to a stretch blow-molding process. As illustrated in Fig. 11, the preform 230 is placed in a mold 260 comprising a cavity corresponding to the desired container shape. The preform 230 is then heated and expanded by stretching such as by way of a stretch rod inserted into the center of the preform 230 to push it to the end of the mold 260 and by way of air forced into the interior of the preform 230 to fill the cavity within the mold 260, creating a container 264, as shown in Fig. 12. As illustrated in Fig. 12, the container 264 comprises a neck portion 232 and a body portion 234 corresponding to the neck and body portions of the preform 230 of Fig. 11. The neck portion 232 is further characterized by the presence of the threads 240 or other closure engagement means that provides a way to fasten a cap onto the container 264. Thus, the blow-molding process normally is restricted to the body portion 234 of the preform 230 with the neck portion 232, including the threads 240 and the support ring 238, retaining the original configuration of the preform 230.

[0065] In some embodiments, the containers 100, 264 described herein may be made from any suitable thermoplastic material, such as polyesters including polyethylene terephthalate (PET), polyolefins, including polypropylene and polyethylene, polycarbonate, polyamides,

including nylons (e.g. Nylon 6, Nylon 66, MXD6), polystyrenes, epoxies, acrylics, copolymers, blends, grafted polymers, and/or modified polymers (monomers or portion thereof having another group as a side group, e.g. olefin-modified polyesters). These materials may be used alone or in conjunction with each other. More specific material examples include, but are not limited to, ethylene vinyl alcohol copolymer ("EVOH"), ethylene vinyl acetate ("EVA"), ethylene acrylic acid ("EAA"), linear low density polyethylene ("LLDPE"), polyethylene 2,6- and 1,5-naphthalate (PEN), polyethylene terephthalate glycol (PETG), poly(cyclohexylenedimethylene terephthalate), polystyrene, cycloolefin, copolymer, poly-4-methylpentene-1, poly(methyl methacrylate), acrylonitrile, polyvinyl chloride, polyvinylidene chloride, styrene acrylonitrile, acrylonitrile-butadiene-styrene, polyacetal, polybutylene terephthalate, ionomer, polysulfone, polytetra-fluoroethylene, polytetramethylene 1,2-dioxybenzoate and copolymers of ethylene terephthalate and ethylene isophthalate. In certain embodiments, preferred materials may be virgin, pre-consumer, post-consumer, regrind, recycled, and/or combinations thereof.

[0066] In some embodiments, polypropylene also refers to clarified polypropylene. As used herein, the term "clarified polypropylene" is a broad term and is used in accordance with its ordinary meaning and may include, without limitation, a polypropylene that includes nucleation inhibitors and/or clarifying additives. Clarified polypropylene is a generally transparent material as compared to the homopolymer or block copolymer of polypropylene. The inclusion of nucleation inhibitors helps prevent and/or reduce crystallinity, which contributes to the haziness of polypropylene, within the polypropylene. Clarified polypropylene may be purchased from various sources such as Dow Chemical Co. Alternatively, nucleation inhibitors may be added to polypropylene.

[0067] As used herein, "PET" includes, but is not limited to, modified PET as well as PET blended with other materials. One example of a modified PET is IP A-modified PET, which refers to PET in which the IPA content is preferably more than about 2% by weight, including about 2-10% IP A by weight, also including about 5-10% IP A by weight. In another modified PET, an additional comonomer, cyclohexane dimethanol (CHDM) is added in significant amounts (e.g. approximately 40% by weight or more) to the PET mixture during manufacture of the resin. Additional techniques for forming the container 264, including additional materials, properties of

the materials, as well as various advantageous additives are discussed in detail in U.S. Patent Application Serial No. 13/295,699, entitled "Preform Extended Finish for Processing Light Weight Ecologically Beneficial Bottles," filed on November 14, 2011, the entirety of which is incorporated herein by reference and forms a part of the present disclosure.

[0068] While the invention has been described in terms of particular variations and illustrative figures, those of ordinary skill in the art will recognize that the invention is not limited to the variations or figures described. In addition, where methods and steps described above indicate certain events occurring in certain order, those of ordinary skill in the art will recognize that the ordering of certain steps may be modified and that such modifications are in accordance with the variations of the invention. Additionally, certain of the steps may be performed concurrently in a parallel process when possible, as well as performed sequentially as described above. To the extent there are variations of the invention, which are within the spirit of the disclosure or equivalent to the inventions found in the claims, it is the intent that this patent will cover those variations as well. Therefore, the present invention is to be understood as not limited by the specific embodiments described herein, but only by scope of the appended claims.

CLAIMS

What is claimed is:

1. A container comprising a base, a bell, a sidewall between the base and the bell, a neck and a finish which define an opening to an interior of the container, and a shoulder between the sidewall and the bell, the container comprising:
 - a grip portion of the sidewall comprising a multiplicity of circumferentially positioned grip portion ribs;
 - a label portion of the sidewall comprising a multiplicity of circumferentially positioned label portion ribs;
 - a plurality of strap ribs, wherein each of the strap ribs extends substantially from a central portion of the base and terminates at a sidewall end in the grip portion, and wherein the strap ribs cooperate with a plurality of vertically aligned recessed columns of the sidewall so as to resist at least one of bending, leaning, crumbling, or stretching along the sidewall and the base;
 - a plurality of inwardly offset portions of the sidewall configured to resist outward bowing of the sidewall due to internal pressure of contents in the interior of the container, each of the plurality of inwardly offset portions being disposed between each pair of adjacent vertically aligned recessed columns;
 - a plurality of load ribs spaced equally between adjacent strap ribs, wherein the load ribs are configured to resist deformation of the base; and
 - a plurality of feet formed between the strap ribs and the load ribs, wherein the plurality of feet comprises a resting surface of the container.
2. The container of claim 1, wherein the plurality of vertically aligned recessed columns comprises three recessed columns equally spaced around the perimeter of the sidewall, such that the sidewall comprises a circumference which is offset from a generally circular cross-sectional shape to a substantially triangular cross-sectional shape.
3. The container of claim 2, wherein each of the plurality of inwardly offset portions is offset from 0 to 30 degrees from the circular cross-sectional shape.

4. The container of claim 2, wherein the plurality of inwardly offset portions is configured to counteract outward-directed forces on the sidewall of the container due to internal pressure, such that the pressurized container assumes a substantially circular cross-sectional shape.
5. The container of claim 1, wherein the base comprises a diameter which is larger than a diameter of the shoulder, such that the base creates a single point of contact with other substantially similar containers in a production line, or in packaging.
6. The container of claim 5, wherein the diameter of the base is larger than the diameter of the shoulder by 0.5 to 4 millimeters.
7. The container of claim 5, wherein the diameter of the base is larger than the diameter of the shoulder by 1 to 2 millimeters.
8. The container of claim 1, wherein the plurality of strap ribs comprises three strap ribs equally spaced around the circumference of the base, and wherein the plurality of load ribs comprises six load ribs, such that two load ribs are equally spaced between each pair of adjacent strap ribs.
9. The container of claim 1, wherein the base further comprises a gate centered on a longitudinal axis of the container, a wall extending from the gate toward the resting surface of the container, and a dome immediately surrounding the gate, wherein the dome is a portion of the wall of the base that slopes more steeply toward the resting surface of the container.
10. The container of claim 9, wherein each of the strap ribs has a base end which terminates in the dome, near the periphery of the gate.
11. The container of claim 9, wherein each of the strap ribs begins at the base end substantially parallel to the resting surface of the container and then extends along an upward curved path, a first portion of the upward curved path comprising a first radius, a second portion of the upward curved path comprising a second radius, and a third portion of the upward curved path comprising a straight portion, wherein at a first height the first

radius terminates and the second radius begins, and at a second height the straight portion connects to the sidewall end of the strap rib, and wherein the first radius and the second radius cooperate to give the strap rib and the base a spherical configuration, such that the container better accommodates internal pressure.

12. The container of claim 1, wherein each of the strap ribs further comprises two rib side walls that connect the strap rib to portions of the base and the feet, the rib side walls comprising smooth and gradual transitions into the base and the feet, such that the transitions comprise spherical features of the container.
13. A container configured to substantially reduce triangulation of the container due to internal pressure of contents within the container, the container comprising:
 - a base which extends upward to a sidewall of the container;
 - a shoulder connected between the sidewall and a bell, a diameter of the bell decreasing as the bell extends upward to a neck of the container;
 - a finish connected to the neck, the finish configured to receive a closure and defining an opening to an interior of the container; and
 - a plurality of inwardly offset portions of the sidewall configured to resist outward bowing of the sidewall due to the internal pressure of the contents.
14. The container of claim 13, wherein the sidewall comprises a plurality of vertically aligned recessed columns configured to resist the internal pressure of the contents.
15. The container of claim 14, wherein the plurality of vertically aligned recessed columns comprises three recessed columns disposed uniformly around the circumference of the sidewall, and wherein one inwardly offset portion is disposed between each pair of adjacent recessed columns, such that the circumference of the sidewall is offset from a generally circular cross-sectional shape to a substantially triangular cross-sectional shape.
16. The container of claim 15, wherein each of the inwardly offset portions is offset from 0 to 30 degrees from the circular cross-sectional shape.
17. The container of claim 16, wherein the inwardly offset portions are configured to counteract outward-directed forces on the sidewall of the container due to internal

pressure, such that the pressurized container assumes a substantially circular cross-sectional shape.

18. The container of claim 13, wherein the base comprises a diameter which is larger than a diameter of the shoulder, such that the base creates a single point of contact with other substantially similar containers in a production line, or in packaging.
19. The container of claim 18, wherein the diameter of the base is larger than the diameter of the shoulder by 0.5 to 4 millimeters.
20. The container of claim 18, wherein the diameter of the base is larger than the diameter of the shoulder by 1 to 2 millimeters.

ABSTRACT

An apparatus is provided for a container comprising a base, a bell, a sidewall between the base and the bell, a neck and a finish which define an opening to an interior of the container, and a shoulder between the sidewall and the bell. Strap ribs extend from a central portion of the base and terminate at the sidewall. The strap ribs cooperate with vertically aligned recessed columns of the sidewall to resist bending, leaning, crumbling, or stretching along the sidewall and the base. An inwardly offset portion of the sidewall is disposed between each pair of adjacent recessed columns. The inwardly offset portions of the sidewall are configured to resist outward bowing of the sidewall due to internal pressure of contents within the container.

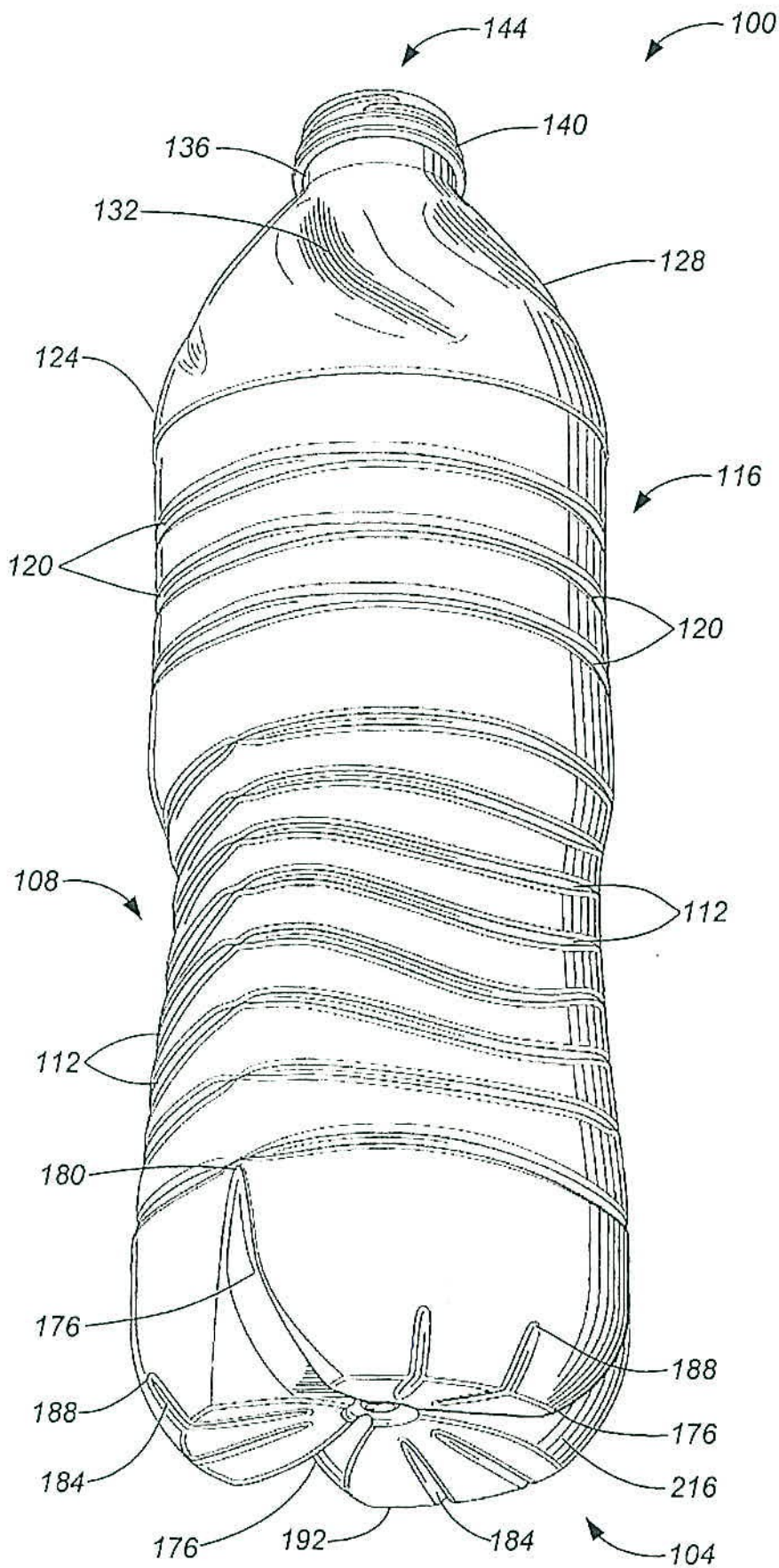
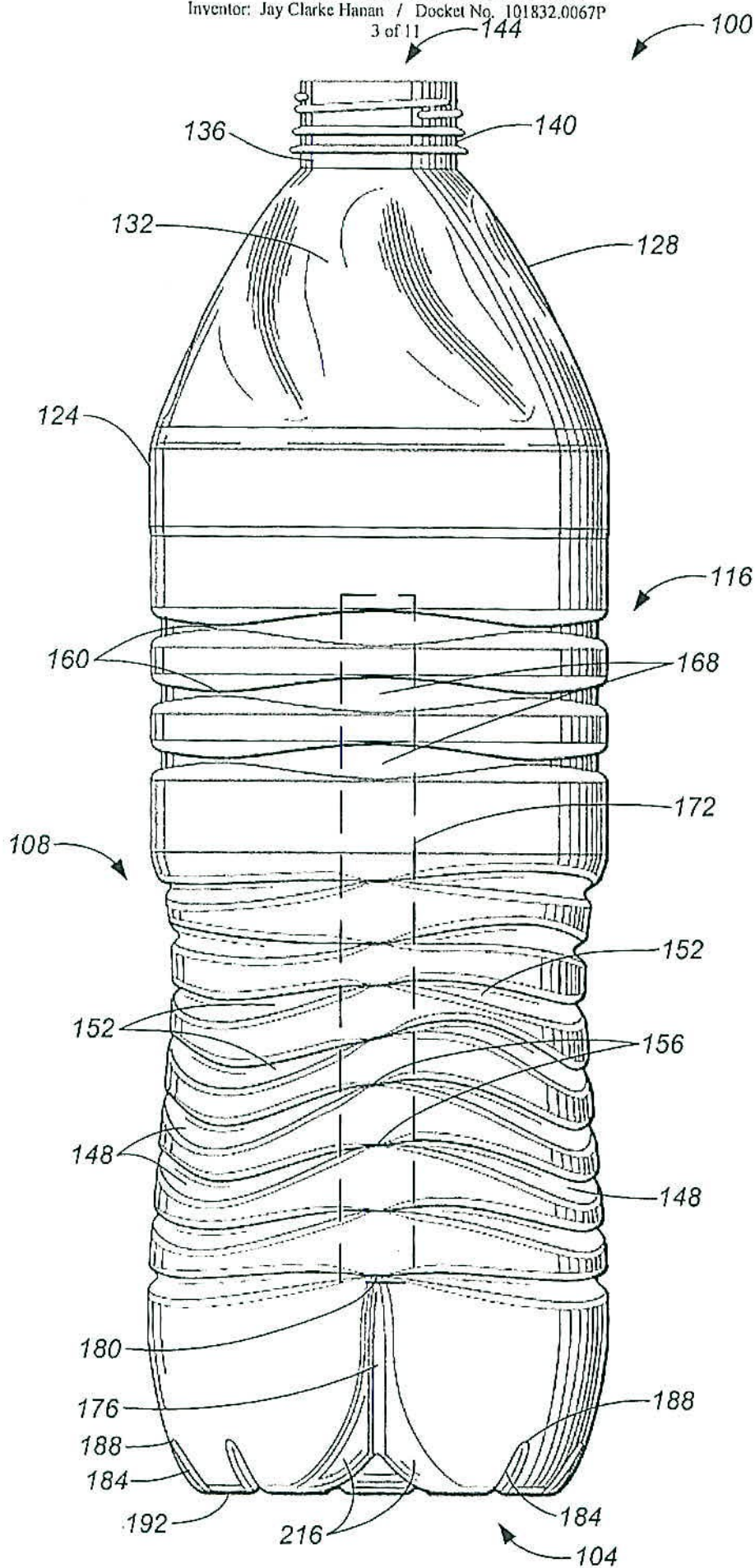


FIG. 1



42



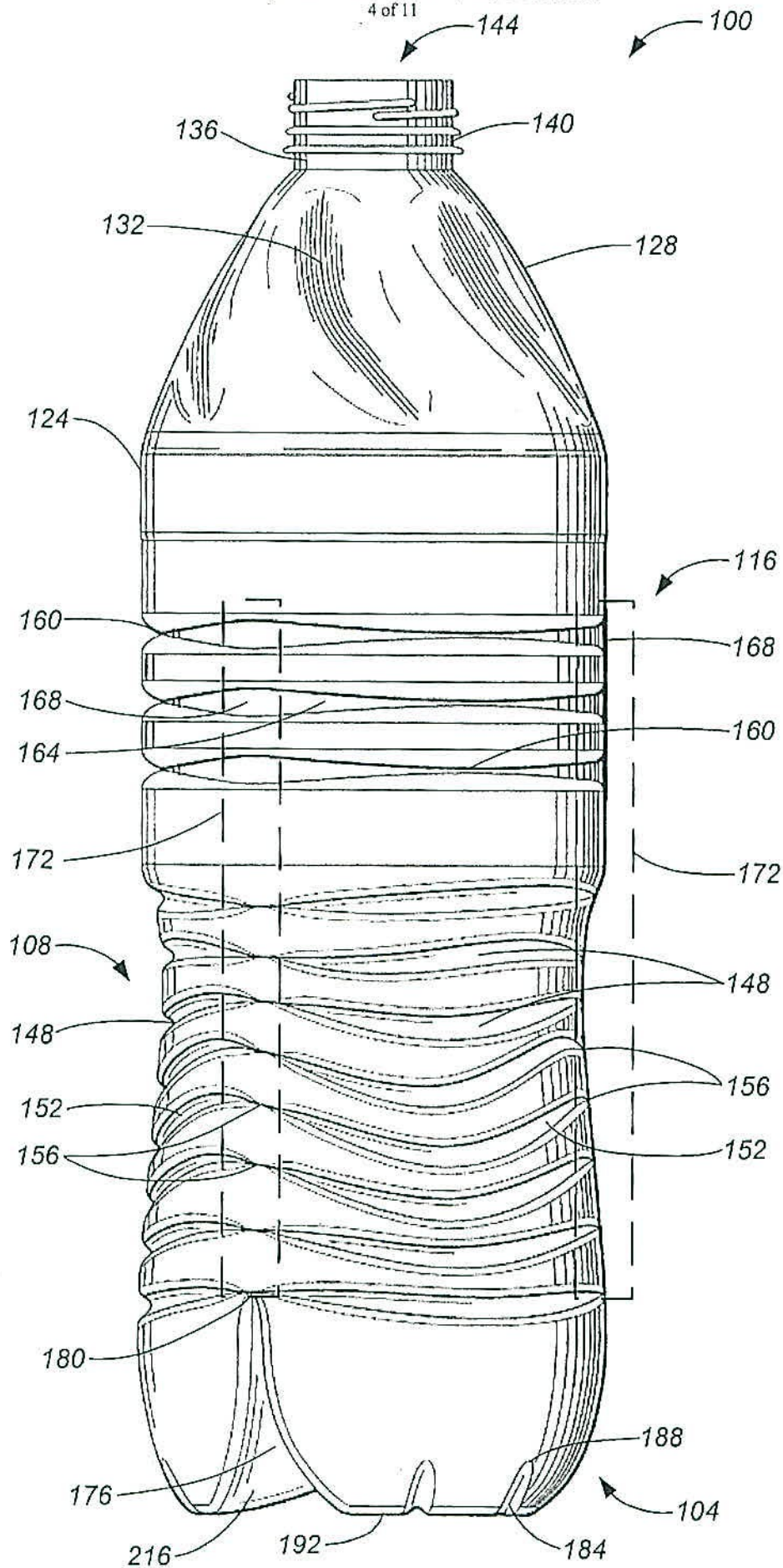


FIG. 4

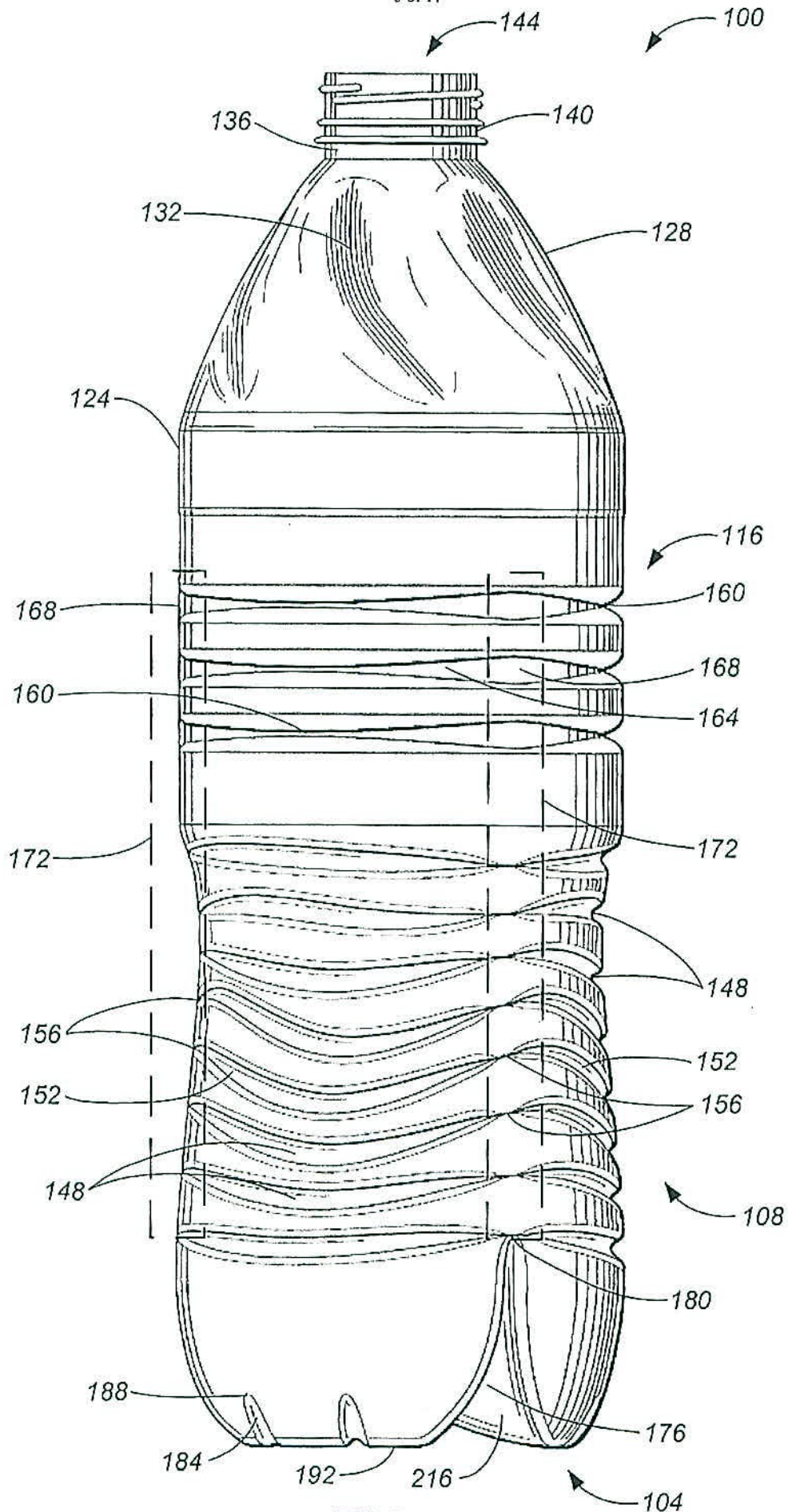


FIG. 5

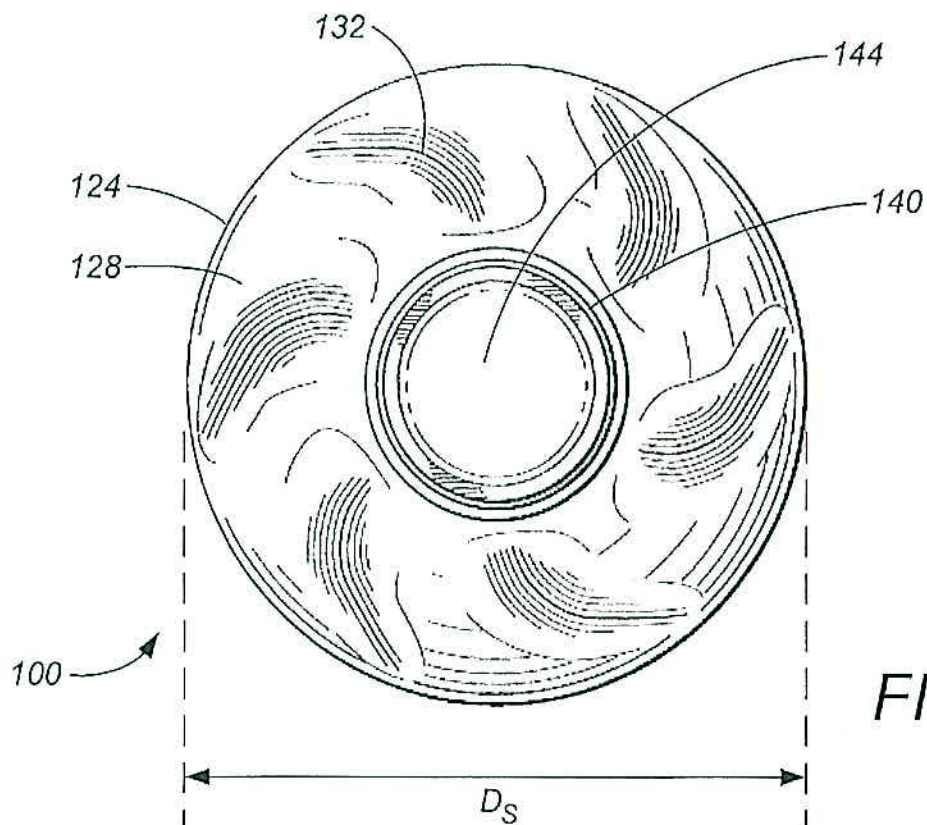


FIG. 6

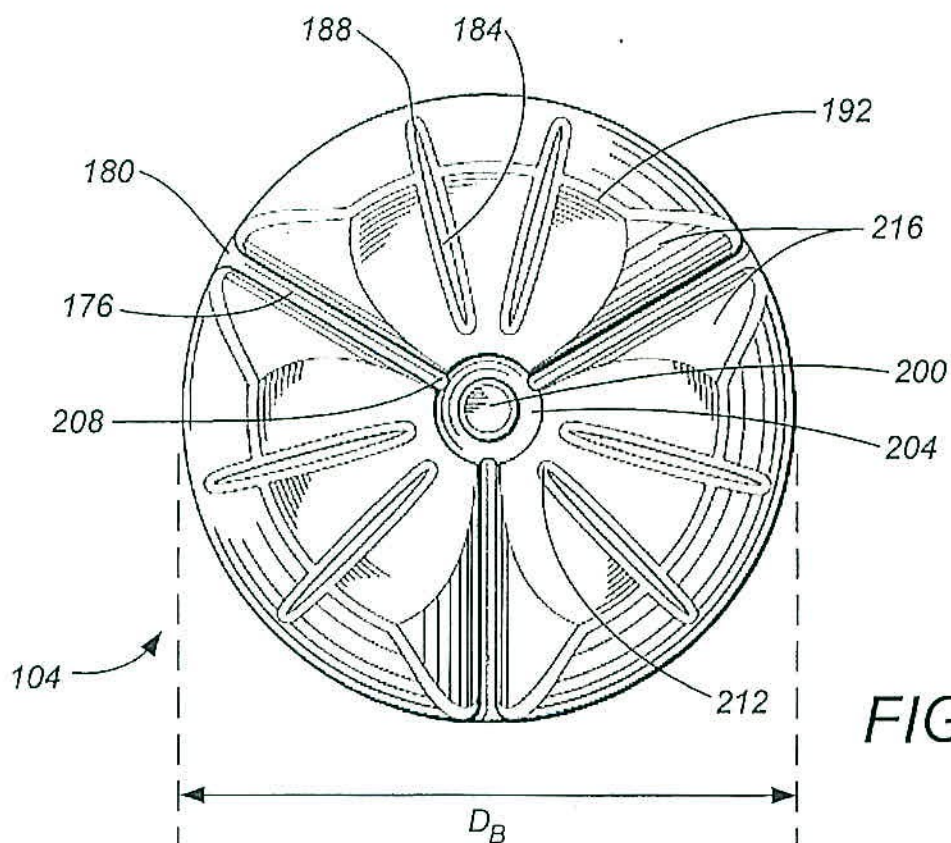


FIG. 7

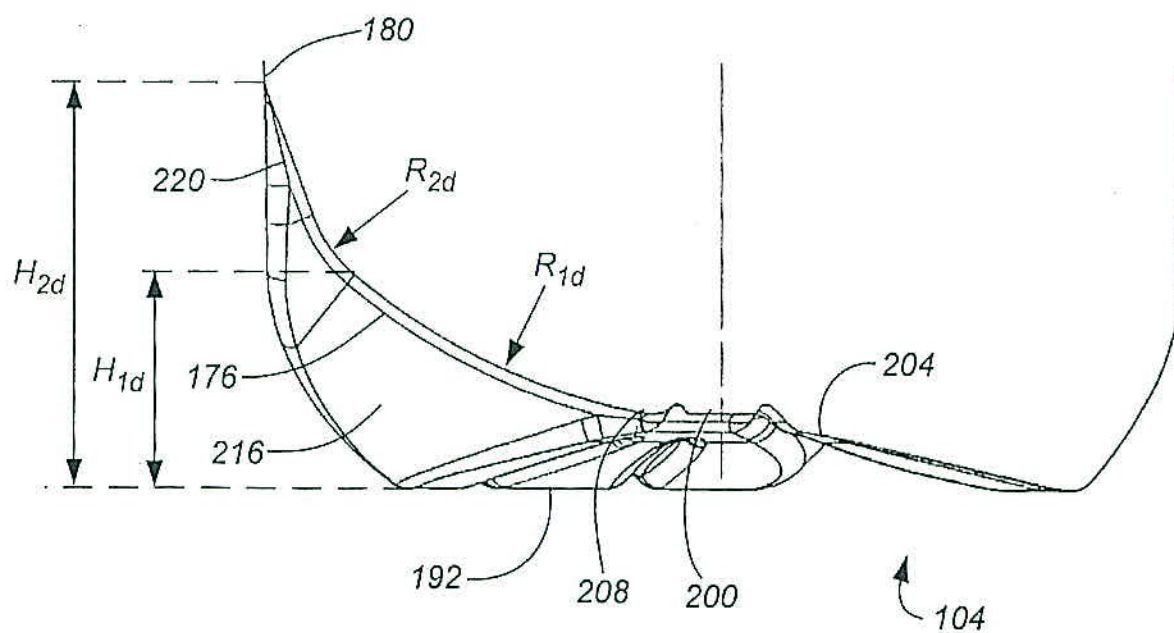


FIG. 8

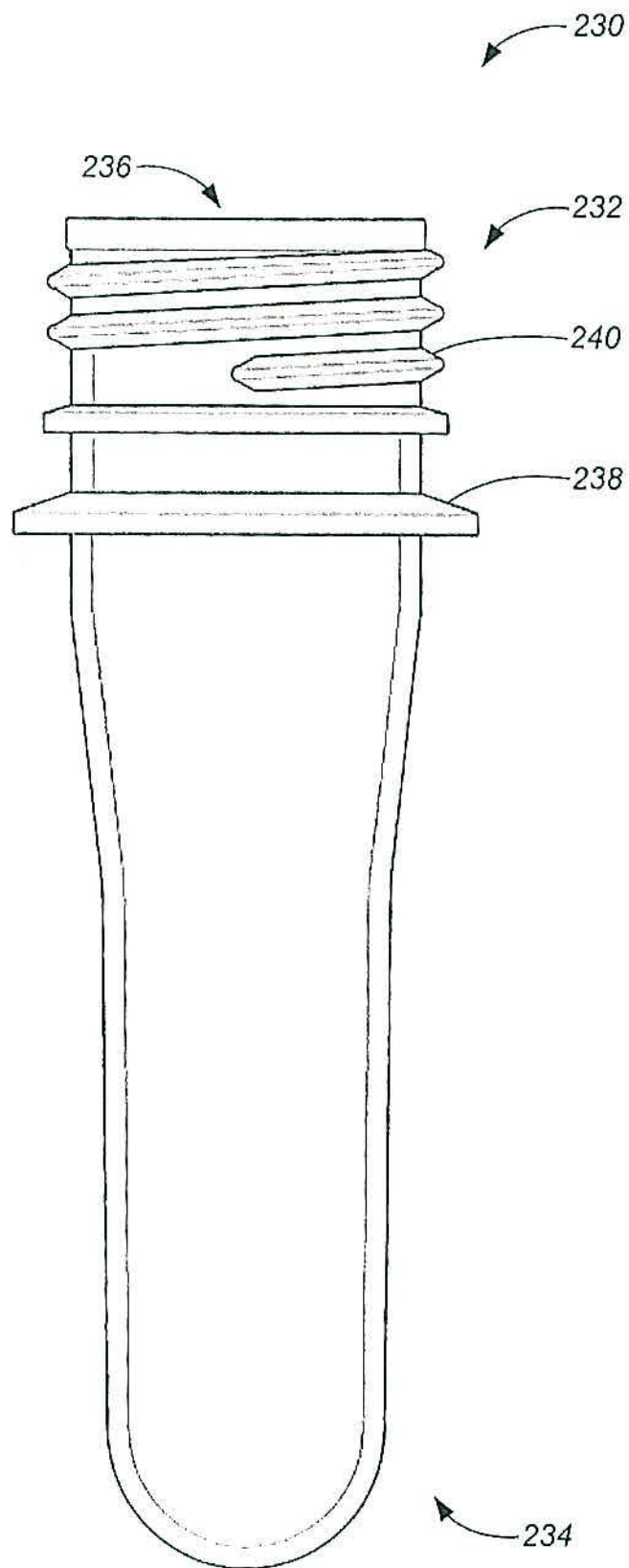


FIG. 9

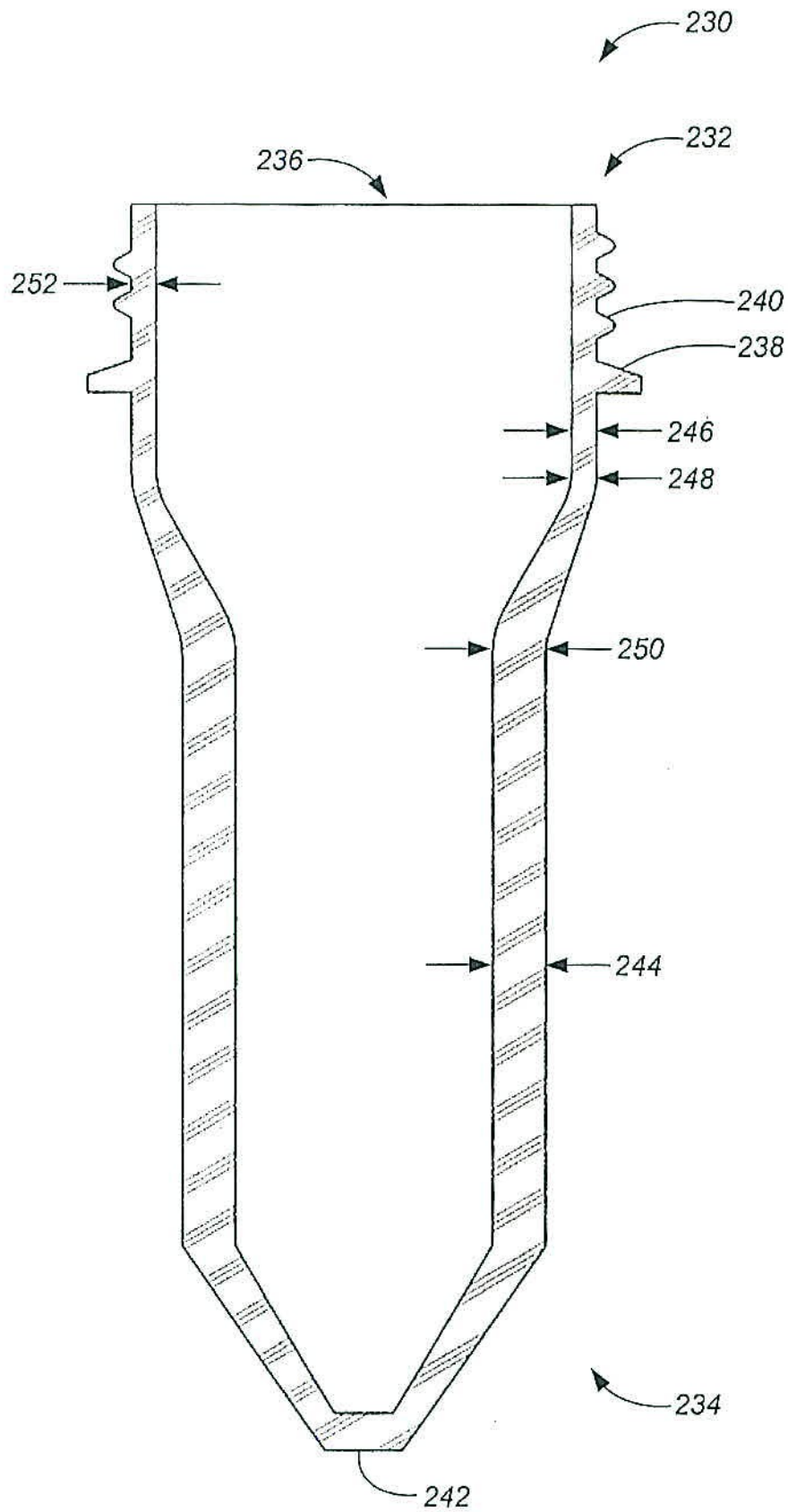


FIG. 10

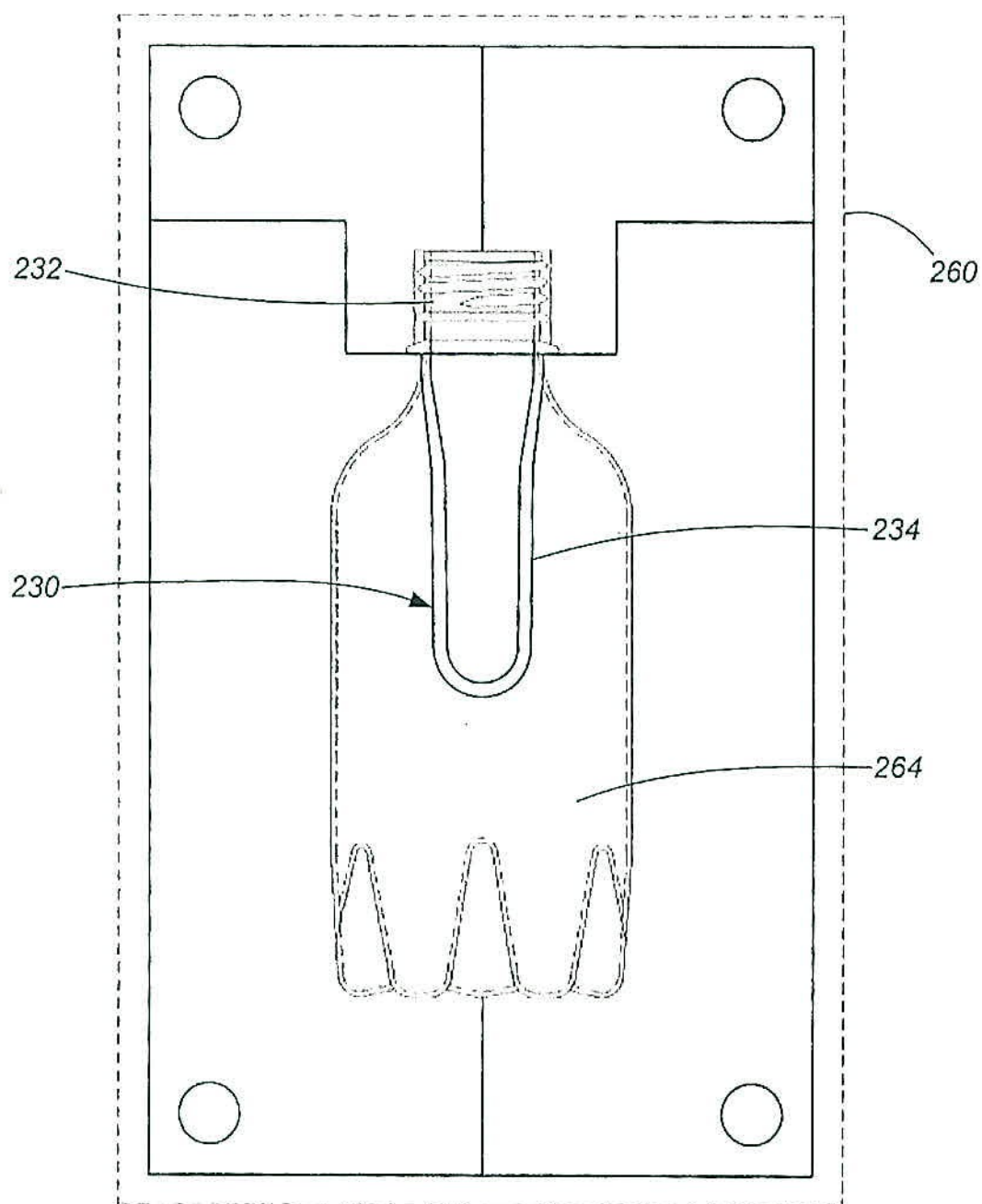


FIG. 11

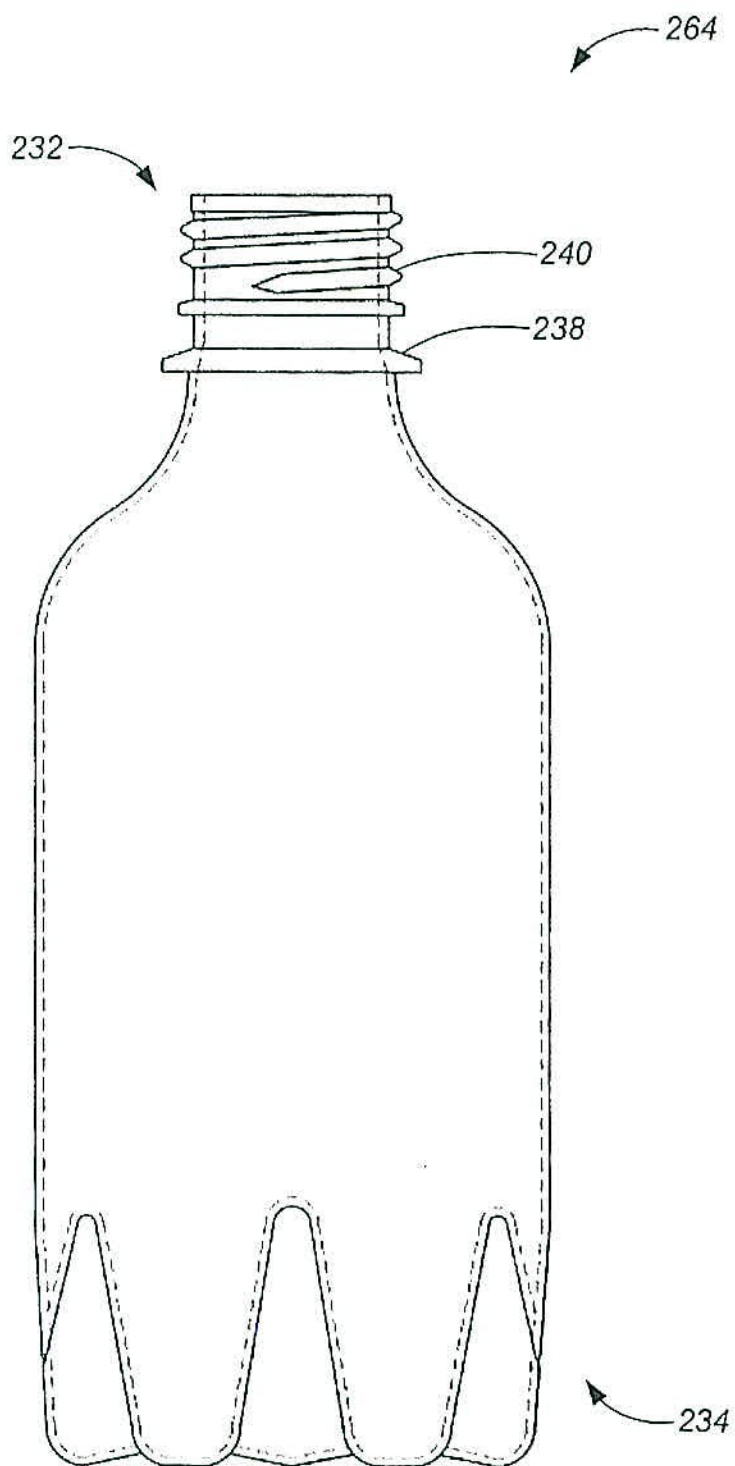


FIG. 12

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number 101832.0067P
		Application Number
Title of Invention	Swirl Bell Bottle With Wavy Ribs	
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.		

Secrecy Order 37 CFR 5.2

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)
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Application Information:

Title of the Invention	Swirl Bell Bottle With Wavy Ribs		
Attorney Docket Number	101832.0067P	Small Entity Status Claimed ☐	
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	11	Suggested Figure for Publication (if any)	
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Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐	Request Early Publication (Fee required at time of Request 37 CFR 1.219)
☐	Request Not to Publish. I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application has not and will not be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

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Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.			
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This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.

When referring to the current application, please leave the application number blank.

Prior Application Status	Pending	Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	Continuation in part of	14/157400	2014-01-16
Prior Application Status	Pending	Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
14/157400	Continuation in part of	14/141224	2013-12-26
Prior Application Status	Expired	Remove	

13

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	101832.0067P
		Application Number	
Title of Invention	Swirl Bell Bottle With Wavy Ribs		

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
14/141224	Claims benefit of provisional	61/746535	2012-12-27

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.

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This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(d). When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)ⁱ the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(h)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

			Remove
Application Number	Country ⁱ	Filing Date (YYYY-MM-DD)	Access Code ⁱ (if applicable)

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Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.

NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	101832.0067P
		Application Number	
Title of Invention	Swirl Bell Bottle With Wavy Ribs		

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In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application.

In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date of filing this Authorization.

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Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.				
Applicant 1				
If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.				
Clear				
☐ Assignee	☐ Legal Representative under 35 U.S.C. 117	☐ Joint Inventor		
☐ Person to whom the inventor is obligated to assign.		☐ Person who shows sufficient proprietary interest		
If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:				
Name of the Deceased or Legally Incapacitated Inventor:				
If the Applicant is an Organization check here. ☐				
Prefix	Given Name	Middle Name	Family Name	Suffix

75

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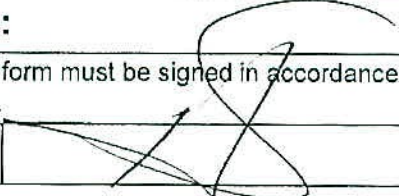
Application Data Sheet 37 CFR 1.76		Attorney Docket Number	101832.0067P
		Application Number	
Title of Invention	Swirl Bell Bottle With Wavy Ribs		

Mailing Address Information For Applicant:			
Address 1			
Address 2			
City		State/Province	
Country		Postal Code	
Phone Number		Fax Number	
Email Address			
Additional Applicant Data may be generated within this form by selecting the Add button.			

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.			
Assignee 1			
Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.			
If the Assignee or Non-Applicant Assignee is an Organization check here. ☒			
Organization Name	Niagara Bottling, LLC		
Mailing Address Information For Assignee including Non-Applicant Assignee:			
Address 1	2560 E. Philadelphia Street		
Address 2			
City	Ontario	State/Province	CA
Country	US	Postal Code	91761
Phone Number		Fax Number	
Email Address			
Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button.			

Signature:

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications.			
Signature			Date (YYYY-MM-DD)
			2015-01-30

56

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	101832.0067P		
		Application Number			
Title of Invention	Swirl Bell Bottle With Wavy Ribs				
First Name	Hani	Last Name	Sayed	Registration Number	52544
Additional Signature may be generated within this form by selecting the Add button.					

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

58
57

ASSIGNMENT BY THIS AGREEMENT

CESIÓN POR EL PRESENTE CONTRATO

Assignor: Jay Clarke Hanan

Cedente: Jay Clarke Hanan

addressed at:
2560 E. Philadelphia Street
Ontario, California 91761
United States of America

Domiciliado en:
2560 E. Philadelphia Street
Ontario, California 91761
Estados Unidos de América

assign (s) sell (s) and transfer (s) in whole ownership and
dominion to:

cede (n), vende (n) y transfiere (n) en toda propiedad y
dominio a:

Assignee: Niagara Bottling, LLC
Addressed at:

Cesionario: Niagara Bottling, LLC
Domiciliado en:

2560 E. Philadelphia Street
Ontario, California 91761
United States of America

2560 E. Philadelphia Street
Ontario, California 91761
Estados Unidos de América

All the rights, titles and interests on the following industrial
property rights:

Patent application in Colombia, claiming priority of US
Patent application n° 14/610,940

Todos los derechos, títulos e intereses correspondientes
a los siguientes privilegios de propiedad industrial:

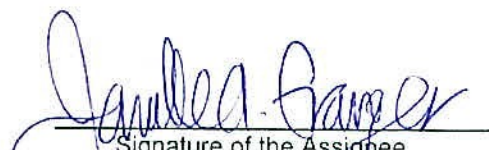
Solicitud de patente en Colombia, reivindicando prioridad
de la Solicitud de patente de Estados Unidos de América
n° 14/610,940

The price of this transfer is the amount of: \$ 1.00
(consideration or price of the assignment)

El precio de esta transferencia es la cantidad de:

Freely fixed by the parties and already received by the
assignor.

Libremente fijado por las partes y ya recibido por la parte
cedente.



Signature of the Assignee



Signature of the Assignor

Firma del cesionario

Firma del cedente

REIVINDICACIONES

1. Un envase que comprende una base, una campana, una pared lateral entre la base y la campana, un cuello y un acabado que definen una abertura hacia el interior del envase, y un hombro entre la pared lateral y la campana, caracterizado porque el envase comprende:

Una porción de agarre de la pared lateral que comprende una multiplicidad de nervaduras de porción de agarre posicionadas circunferencialmente;

Una porción de etiqueta de la pared lateral que comprende una multiplicidad de nervaduras de porción de agarre posicionadas circunferencialmente;

Una pluralidad de nervaduras de tira, en donde cada una de las nervaduras de tira se extiende desde una parte central de la base y termina en un extremo de la pared lateral en la porción de agarre, y en donde las nervaduras de tira cooperan con columnas rebajadas de la pared lateral;

Una pluralidad de porciones desplazadas hacia dentro de la pared lateral, cada una de las porciones desplazadas hacia dentro estando dispuestas entre cada par de columnas rebajadas alineadas verticalmente adyacentes;

Una pluralidad de nervaduras de carga igualmente espaciadas entre nervaduras de tira adyacentes; y

Una pluralidad de pies formados entre las nervaduras de tira y las nervaduras de carga, en donde la pluralidad de pies comprende una superficie de apoyo del envase.

2. El envase de la reivindicación 1, caracterizado porque la pluralidad de columnas rebajadas alineadas verticalmente comprende tres columnas rebajadas igualmente espaciadas alrededor del perímetro de la pared lateral, de tal manera que la pared lateral comprende una circunferencia que está desplazada de una sección transversal de forma generalmente circular a una sección transversal de forma triangular con un 2 % a 20% de convolución.

3. El envase de la reivindicación 2, caracterizado porque cada una de las porciones desplazadas hacia dentro está desplazada de 0 a 30 grados respecto a la sección transversal de forma circular.

4. El envase de la reivindicación 1, en el que la base comprende un diámetro que es mayor que el diámetro del hombro, de tal manera que la base crea un único punto de contacto con otros envases sustancialmente similar en una línea de producción, o en el envasado.
5. El envase de la reivindicación 4, en el que el diámetro de la base es mayor que el diámetro del hombro por 0,5 a 4 milímetros.
6. El envase de la reivindicación 4, en el que el diámetro de la base es mayor que el diámetro del hombro por 1 a 2 milímetros.
7. El envase de la reivindicación 1, en el que la pluralidad de nervaduras de tira comprende tres nervaduras de tira igualmente espaciadas alrededor de la circunferencia de la base, y en el que la pluralidad de nervaduras de tira comprende seis tiras de carga, de tal manera que dos nervaduras de carga están igualmente espaciadas entre cada par de las nervaduras de tira adyacentes.
8. El envase de la reivindicación 1, en el que la base comprende además una puerta centrada sobre un eje longitudinal del envase, una pared que se extiende desde la puerta hacia la superficie de apoyo del envase, y una cúpula que rodea inmediatamente la puerta, en el que la cúpula es una parte de la pared de la base que se inclina de forma más pronunciada hacia la superficie de apoyo del envase.
9. El envase de la reivindicación 8, en el que cada una de las nervaduras de tira tiene una base y que termina en la cúpula, cerca de la periferia de la puerta.
10. El envase de la reivindicación 8, en el que cada una de las nervaduras de tira comienza en el extremo de la base hasta en un 10 por ciento paralela a la superficie de apoyo del envase y luego se extiende a lo largo de una trayectoria curva hacia arriba, una primera porción de la trayectoria curva hacia arriba que comprende un primer radio, una segunda porción de la trayectoria curvada hacia arriba que comprende un segundo radio, y una tercera parte de la trayectoria curvada hacia arriba que comprende una parte recta, en el que en una primera altura del primer radio termina y el segundo radio comienza, y en una segunda altura de la porción recta se conecta al extremo de la pared lateral de la nervadura de tira, y en el que el primer radio y el segundo radio cooperan para dar la nervadura de tira y la base de una configuración esférica, de tal manera que el envase se acomoda mejor a la presión interna.

11. El envase de la reivindicación 1, en el que cada una de las nervaduras de tira comprende además dos nervaduras de pared lateral que conectan la nervadura de tira a porciones de la base y los pies, las nervaduras de pared lateral que comprenden transiciones suaves y graduales en la base y los pies, de tal manera que las transiciones comprenden los rasgos esféricos del envase.

12. Un envase configurado para reducir la triangulación del envase debido a la presión interna del contenido dentro del envase, comprendiendo el envase:

Una base que se extiende hacia arriba a una pared lateral del envase;

Un hombro conectado entre la pared lateral y una campana, un diámetro de la campana disminuyendo a medida que la campana se extiende hacia arriba al cuello del envase;

Un acabado conectado al cuello, el acabado configurado para recibir un cierre y que define una abertura al interior del envase; y

Una pluralidad de porciones desplazadas hacia dentro de la pared lateral configurada para resistir la inclinación hacia afuera de la pared lateral debido a la presión interna de los contenidos.

13. El envase de la reivindicación 12, en el que la pared lateral comprende una pluralidad de columnas rebajadas que pueden alinearse verticalmente.

14. El envase de la reivindicación 13, en el que la pluralidad de las columnas rebajadas alineadas verticalmente comprende tres columnas rebajadas dispuestas uniformemente alrededor de la circunferencia de la pared lateral, y en el que una porción desplazada hacia dentro está dispuesto entre cada par de columnas rebajadas adyacentes, de manera que la circunferencia de la pared lateral está desplazada de una sección transversal de forma generalmente circular a una sección transversal con una convolución fraccional de forma triangular.

15. El envase de la reivindicación 14, en el que cada una de las porciones desplazadas hacia dentro está desplazada de 0 a 30 grados respecto de la sección transversal de forma circular.

16. El envase de la reivindicación 12, en el que la base comprende un diámetro que es mayor que el diámetro del hombro, de tal manera que la base crea un único punto de

contacto con otros envases sustancialmente similar en una línea de producción, o en el envasado.

17. El envase de la reivindicación 16, en el que el diámetro de la base es mayor por 0,5 a 4 milímetros que el diámetro del hombro.

18. El envase de la reivindicación 16, en el que el diámetro de la base es mayor que el diámetro del hombro por 1 a 2 milímetros.