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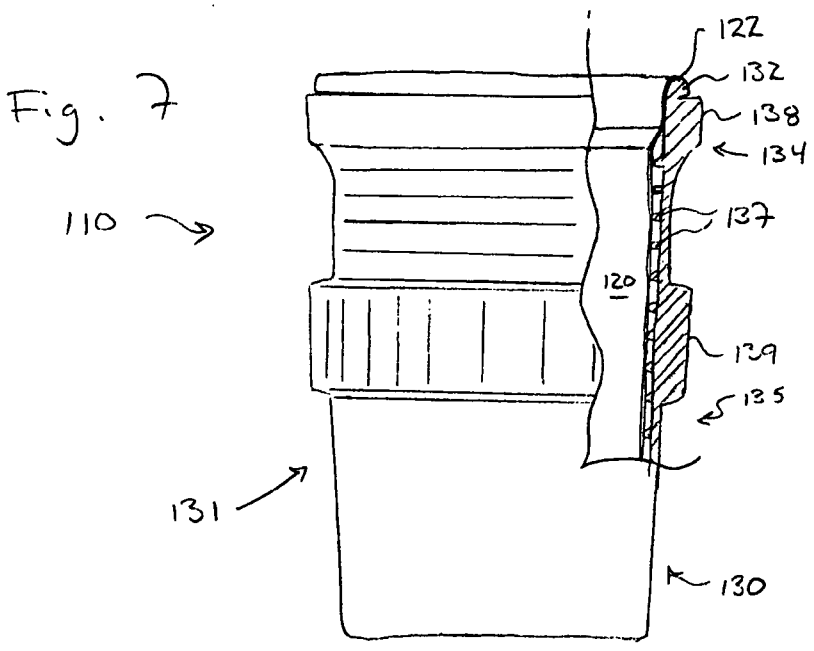

(57) Abstract: A double walled container device for holding liquid that includes a lining and a compressible, elastic shell. The shell may be formed of thermoplastic rubber or silicone or a related material and achieves an enhanced "grasping" and tactile sen - sation when holding the device. A plurality of spacers may be distributed over an area between the lining and the shell. The shell may be attached by crimping the rim of the lining into a top portion of the shell to form a water tight seal. Several different em - bodiments are disclosed.

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LIQUID HOLDING CONTAINER HAVING COMPRESSIBLE SHELL

Inventor (s): Alex L . Liu

CROSS REFERENCE TO RELATED APPLICATION (S)

This application claims the benefit of U.S. Provisional Application no. 61/271,455, filed July 21, 2009, entitled Squeezable, Soft Drinking Vessel and having the same inventor as above.

FIELD OF THE INVENTION

The present invention relates to liquid holding containers, including drinking vessels that hold hot or cold liquids. More specifically, the present invention relates to the provision of a soft, compressible shell on the exterior of these containers to enhance gripping and/or the tactile sensation experienced when holding the container.

BACKGROUND OF THE INVENTION

Various insulated drinking vessels are known in the art and include double-walled plastic devices, double-walled metal devices, and double-walled devices having a metal lining and a plastic or ceramic shell. These devices are typically used for coffee or tea (though they may also be used for cold drinks) and they tend to reach consumers through coffee shops, department stores, related retail outlets and on-line vendors. The market for these devices

is very competitive and shape, texture, size and color play an important part in marketing these items.

Known prior art double-walled drinking devices are disadvantageous for one or more of the following reasons.

Hard plastic devices tend to chip, crack and/or break when dropped. They also tend to fade over time and may contain toxic compounds that leach out .

Metal devices, which are often made of stainless steel, tend to be disadvantageously expensive. They also tend to bend or otherwise deform when dropped and they may cause damage to the article onto which they are dropped due to the hardness of metal.

Whether the shell is made of plastic or metal, prior art double walled drinking vessels tend to have exteriors that are smooth and hard, making them slippery and potentially difficult to grasp, particularly when wet or in cold temperatures. There is also an "unfriendliness" that comes with a hard, smooth exterior, compared to a sinking one's fingers into a compressible shell. The ability to sink one's fingers into the shell is an attractive tactile sensation not found in prior art devices.

Thus a need exists for a double-walled drinking vessel that has an exterior shell that is more "graspable" and includes a compressible exterior, into which a user may sink his or her fingers.

In addition, double-walled drinking vessels and related devices are typically constructed with a multiplicity of parts that may include internal fasteners and/or welds, separate members for spacing the shell from the lining, an 0-ring for sealing the shell to the lining, separate rims and/or bases, non-slip surfaces on the shell and/or base, and other components. The addition of one or

more of these components increases manufacture time, rate of failure, and cost.

A need further exists for a double-walled drinking vessel or other container that is formed of a small number of parts to reduce materials, manufacturing steps and/or likelihood of failure.

SUMMARY OF THE INVENTION

Accordingly, it is an object of the present invention to overcome the limitations of prior art devices.

It is another object of the present invention to provide a drinking vessel that has a compressible, elastic exterior surface that improves the tactile sensation experienced by a user when holding the vessel.

It is another object of the present invention to provide a drinking vessel that includes a plurality of spacers that are arranged in a distributed pattern between the lining and the shell.

It is also an object of the present invention to provide such a drinking vessel that has good insulative properties, may be formed with fewer components than prior art devices, and/or may be readily and cost-effectively produced in a wide array of designs and sizes.

These and related objects of the present invention are achieved by use of a compressible shell liquid holding container as described herein.

In one embodiment, the present invention includes a lining formed of a substantially rigid material and a shell formed of a flexible, elastic material that is compressible under the force of a human hand and regains its shape in the absence of the compressive force. The shell is preferably spaced from the lining to form an insulative space therebetween. A plurality of spacers may

be distributed between the lining and shell. The shell may be compressible into the gap between spacers and the spacers themselves may be compressible, though they are not necessarily so.

The present invention includes many other embodiments .

The attainment of the foregoing and related advantages and features of the invention should be more readily apparent to those skilled in the art, after review of the following more detailed description of the invention taken together with the drawings.

DETAILED DESCRIPTION

Fig. 1 is a perspective view of one embodiment of a squeezable or compressible shell drinking vessel in accordance with the present invention.

Fig. 2 is a side view that illustrates assembly of the device of Fig. 1.

Figs. 3A-3B are perspective views (Fig. 3B in cut-away) of one embodiment of spacers on the interior surface of the shell.

Figs. 4A-4C illustrate different spacer arrangements.

Figs. 5 and 6 illustrate compression of the shell side wall and spacers.

Fig. 7 is a side view with a partial cut-away of another embodiment of a compressible shell device in accordance with the present invention.

Figs. 8A-8C illustrate other embodiments of a compressible shell device in accordance with the present invention.

Fig. 9 is a partial cross-section of an embodiment having compressible foam as a spacer.

Figs. 10-11 illustrate an embodiment with a handle.

Figs. 12A-12B illustrate a lid.

DETAILED DESCRIPTION

Referring to Fig. 1, a perspective view of one embodiment of a squeezable or compressible shell drinking vessel or device 10 in accordance with the present invention is shown.

The drinking vessel 10 preferably includes a substantially rigid or "hard" lining 20. The lining is preferably formed of metal such as stainless steel, aluminum or an alloy, yet may be formed of a harder plastic or other sufficiently durable and food safe material. The lining may have a shape, contour and/or thickness, etc., similar to other double-walled drinking vessel linings.

Vessel 10 also includes a shell 30. Shell 30 is preferably formed of a compressible material as discussed herein. Suitable compressible materials include, but are not limited to, silicone, thermoplastic rubber (TPR), thermoplastic elastomer (TPE), ethylene-vinyl acetate (EVA) and other materials that exhibit similar the characteristics of these limited materials. Silicone, TPR, TPE and EVA are known in the art.

The "compressible" shell material of the present invention preferably compresses into itself under the force of a user's hand or fingers. The material may also be elastic such that it compresses into the insulative air gap between the lining and shell as discussed below.

Shell 30 may include a lip 32 (that is preferably expanded to form an O-ring type seal, shown in other figures), a bottom 33, and a side wall 31 that extends between the bottom and the lip. These components are preferably formed integrally. Shell may also include

spacers (formed integrally or added thereto) that space the shell from the lining to form an insulative air gap therebetween. This air gap also provides space into which the shell side wall can be compressed as discussed below. The spacers are on the interior side of the side wall 31 such that they are not visible in Figs. 1 and 2.

The shell 30 is preferably formed to fit around lining 20 such that the top rim 22 of the lining is crimped down onto lip 32 of the shell to secure the shell to the lining in a manner that forms a waterproof seal. The elastic properties of the silicone, thermoplastic rubber or like material form a seal that is dishwasher safe, without the use of an extraneous seal member such as a separate o-ring or glue, etc.

Fig. 1 also illustrates patterning on the exterior surface of shell 30. The patterning is formed by a plurality of recesses 46 that may define adjacent protruding (relatively) regions 47, rendering a visually discernable pattern. It should be recognized that the exterior may have other patterning, including the absence of recesses 46 to create a visually smoother surface or a pattern in relief or another pattern arrangement.

The pattern of Fig. 1, for example, provides aesthetic enhancement and a novel texture. It may also improve grip. The pattern of Fig. 1 is representative. Many widely varying patterns may be made without departing from the present invention. A few representative patterns are discussed below, but are in no way intended to limit the breath of possible patterns.

In Fig. 1, a lid 50 is provided on device 10. While lid 50 is inventive, it should be recognized that conventional lids are known in the art and any suitable lid may be used with device 10.

Referring to Figs. 12A-12B, lid 50 preferably includes an annular neck 53 that in use is seated within rim 22 at the head region 25 of device 10. A cover 51 extends inwardly from neck 53 and a flange 52 projects outwardly, nesting onto rim 22 during use.

An approximately semi-annular ridge 54 or the like may be provided extending upwardly from the cover. A drinking hole is preferably located at an accessible point on the ridge. A leash 56 is preferably connected to (coupled to or formed integrally with) the cover or flange and has a head 57 that includes a stopper 58 configured of a complementary shape to fit removably into hole 55. The leash is flexible and when head 57 is popped out of engagement with hole 55, the leash and head may hang down away from the drinking hole. Since the head and stopper are tethered to the cover, they may be easily grabbed and re-inserted in hole 55.

An air hole 62 may be provided in cover 51 and an air hole plug 65 may be provided on leash 56. Not only does the plug impede liquid from leaking from the air hole, but it permits the head to be more closely tethered to hole 55, for ease of insertion and use.

Lid 50 is preferably formed of thermoplastic rubber (TPE, TPR, TPU (Thermoplastic Polyurethane)), silicone or the like. Benefits of this material include that it is washable (reusable) , tolerates heat, is food-safe, and is elastic in a manner that permits snug, releasable mounting to device 10 and secure, releasable insertion of the stopper into hole 55, among other benefits. This material may, however, be rather floppy, particularly if made of a reduced hardness (to increase flexibility in the leash, hole and/or stopper, which may be desired for ease of use) . In this case, it may be beneficial to include a

layer of stronger material as a backing for the cover and/or neck. The backing material may be provided underneath the cover 51 and/or inside of the neck, etc.

Referring to Fig. 2, a bottom perspective view of the assembly process for device 10 is shown.

Shell 30 is slid in the direction of Arrow A onto the lining 20 until the expanded lip 32 fits into top rim 22 of the shell. Rim 22 is then crimped down onto lip 32 to securely affix the shell to the lining and to form a water tight seal.

Thus, device 10 may be formed of as few as two parts which is a significant improvement over prior art devices that are comprised of a greater number of parts.

Lining 20 includes a body 24 and head 25. The body is the main reservoir for holding liquid. The head includes a substrate from which lip 22 extends. A transition section 26 with a greater conical slope is provided between the head and body, and the head has a greater circumference than the body. This difference in circumference provides space for formation of the insulative air gap.

Fig. 1 illustrates device 10 after the assembly method demonstrated in Fig. 2.

Referring to Fig. 3A, an interior perspective view of shell 30 in accordance with the present invention is shown. Fig. 3A illustrates a plurality of inwardly disposed spacers 37. Fig. 3B illustrates a close-up cut¬away of these spacers. These spacers 37 space the shell from the lining to create an insulative air gap 44 (see Fig. 5). While the shell material and spacer material may be compressible into their respective selves as discussed below with reference to Figs. 5 and 6, the shell side wall may be compressed more in the gap between the spacers (because of the physical absence of a spacer). This

permits a user's fingers to move inwardly, into and with the shell side wall, increasing friction against vertical downward movement of device 10 and producing a more "secure" feeling of holding the device.

The spacers 37 are preferably substantially evenly distributed about the interior of the side wall. The bottom may or may not have spacers. In the embodiment of Figs. 1-3, approximately 80% or more of the interior side wall (in body region 34) has a distributed spacer arrangement (of the type described herein). This number, however, may be less. It may range on a lower end to approximately 10%, for example, for a band, positioned annularly where a user is most likely to hold the device. To increase the enhanced grasping sensation afforded by the present invention, the spacers may be provided over approximately 40 or more of the interior of the side wall and more preferably over 60% or more of the side wall.

Shell 30 may include a body 34 and head 35 that correspond to like parts in the lining 20. The spacers 37 are preferably provided on the interior side of the body of the shell. The head 35 is preferably configured to fit more snugly with the head 25 of the lining. Shell 30 may also include a transition region between the body 34 and head 35, though it may be less pronounced than transition 26. The reduced circumference of the bodies 24,34 also provides a circumferentially oriented rim or ridge under which a thumb and forefinger can be positioned when holding the vessel during use, to increase ease of holding the device.

Fig. *4A* illustrates a plan view of one embodiment of spacers 37 on the interior of the shell side wall. In this embodiment, the spacers are arranged at a density of approximately 14 per square inch. They are cylindrical

with a hemi-spherical top and may have a diameter of 1/16 to 1/8 inch. It should be recognized that the number, size and spacing of the spacers may vary widely while still being within the present invention.

A measure of 3/32" is between 1/16" and 1/8". The area of a spacer with this diameter is $A = \pi \cdot r^2$ or $3.14 \cdot 3/64 \cdot 3/64 = .0069$. If there are 14 spacers of this diameter per square inch, then the area given to spacers per square inch is $.0069 \times 14 = 0.097$ or approximately 0.1 sq. in. Thus, approximately 10% of the area per square inch is given to spacers. If the size or number of spacers increases, this percentage will increase. Conversely, the percentage will decrease as size and number decreases. For example, if the density is decreased in half, then approximately 5% of the surface area per square inch is occupied by spacers, and if the size of these spacers is decreased, this will drop to 3 or 4%.

It should be recognized that the number and size of the spacers can also be increased such that they occupy more that 1, 2 or 3 or even 10% per square inch.

The region of the interior side wall (or between the shell and lining) that has the spacers in this distributed arrangement may be referred to as the "distributed spacer area." The distributed spacer area fosters the enhanced "grasping" and squeezeable sensation afforded by the present invention.

In the case where the distributed area is arranged as an annular "band" provided where a user is most likely to hold device 10, then the distributed spacer area may occupy 10 to 20% of the interior side wall. For example, the above pattern of 14 spacers per inch (or other density) may be employed over approximately 10-20% of the

interior surface area of the side wall to thereby for the annular band.

It should be recognized that the distributed spacer area may occupy from 5% to 50% or more of the interior side wall, and it may range to nearly 100% (e.g., as may be the case with the embodiment of Fig. 3A) .

Fig. 4B illustrates the use of spacers 37 that are substantially rectangular and are arranged in a pattern 38 having a density of approximately 5 per square inch. These spacers 38 may be approximately 1/4" (+/- 1/16) inch square or otherwise configured. At 1/4" square, spacers cover approximately 5/16 or .3125 square inch per 1 square inch of interior side wall. This is approximately 30%. The percentage of surface area given to spacers may be a few percent to 70 percent or more, and is preferably in the range of 5-60% and more preferably in the range of 5-40%.

Fig. 4C illustrates spacers 37 arranged in a fishnet pattern 39. This pattern permits ready compression of the shell into the gap between adjacent spacers. The embodiment of Fig. 4C illustrates yet another of the myriad of different spacer arrangements within the present invention.

Various spacer arrangements, configurations, spacing, and sizes may be used without departing from the present invention.

It should be recognized that the spacers may be formed of the same material as the side wall, and be formed integrally therewith. If they are made of the same material, the spacers may be made to have the same compressibility as the side wall (or a different compressibility/rigidity) . The spacers may, however, be formed of a hard (non-compressible) or harder material than the side wall, in which case the compressibility of

the shell may come more (or exclusively) from the compression of the side wall into itself and/or into the gap between the spacers.

Fig. 5 is a side cross-sectional view of a section of lining 20 and shell 30. Fig. 5 illustrates that the material of the shell may be readily compressible, between two adjacent spacers 37 (at Arrow B), into the insulative air gap by the force of a user's thumb or fingers, thereby yielding a "squeezeability" to the shell. The elasticity of the shell material causes the shell to regain it original shape when the squeezing force is removed. The rubberized thermoplastics and other materials discussed herein provide a suitable degree of compressibility and elasticity.

Fig. 6 is a side cross sectional view of a section of lining 20 and shell 30. Fig. 6 illustrates that the material of the shell side wall 31 may be compressible into itself and the spacer may also be compressible into itself (at Arrow C). Note that the spacers may be formed integrally with or separately from the side wall. If formed separately, the spacers are preferably coupled to at least one of the shell and lining. The material of the side wall and spacer(s) is preferably sufficiently elastic to regain its shape once the force of a user's hand is removed.

Referring to Fig. 7, a side elevation and partial cut-away view of one embodiment of a squeezable or compressible shell drinking vessel 110 in accordance with the present invention is shown.

Device 110 illustrates a shell 130 having a variable thickness side wall 131, having in this embodiment a thicker band 138 at the head region 134 and a thicker band 139 in a section of the body region 135.

The flexible material of the shell allows formation techniques in which varying thickness side walls may be formed is a single mold, one-step fabrication process. This contrasts with .conventional injection molding techniques for fabricating shells (and linings) out of plastic or metal in which a reduce diameter feature cannot be formed between two wider diameter sections with a far more complicated and expensive mold arrangement.

Furthermore, the formation of a thicker band integrally with the sidewall eliminates the need for manufacture and assembly of a separate "gripping band" of the type sometimes mounted on metal or plastic shells. The wider band at the top defines a comfortable annular depression therebelow where a user's fingers and thumb can comfortably hold the device.

Device 110 may include spacers 137, a lining 120, and other components as discussed above for device 10. Fig. 7 illustrates rim 122, bent over and crimped into lip 132 to form a water tight seal.

Referring to Fig. 8A-8C, a perspective view of three other embodiment of a squeezable or compressible shell drinking vessel 210,310,410 are respectively shown.

These devices illustrate variations on the size, shape and surface patterning of double walled drinking vessel and/or liquid holding containers in accordance with the present invention.

Device 210 illustrates a node-and-link arrangement of recesses in the exterior surface. Device 310 is shorter in height and has a pattern of raised protrusions formed on only part of the exterior surface. Device 410 presents yet another surface pattern, a uniform array of protruding rectangles .

Each of these patterns provides a different aesthetic and serves to improve grasping over a smooth exterior.

It should be recognized that the thermoplastic rubber or like material of the present invention, together with the slide on and crimp manufacturing process, allows for the formation of a large number of designs that are visually and even tactilely distinct in a very inexpensive way.

Referring to Fig. 9, a cut-away cross-section of an alternative embodiment of a side wall region of device 10 (or another device 110, 210, etc.) is shown. The spacer 37' in this embodiment is made of a foam or like material, in contrast to the discrete spacer material illustrated with reference to Figs. 3 and 4A-4C. The foam may be installed as a sleeve that is fitted about the lining before the shell is mounted onto the lining. Alternatively, the foam may be inserted as a gel or spray foam that is inserted between the lining and shell. The foam spacer 37' is preferably compressible and elastic, regaining in shape after a compressive force is withdrawn. It preferably cover 25% or more of the interior side wall of the shell (though may cover less, e.g., 10% or more) and may extend to nearly 100% of the interior side wall. The foam or like material of spacer 37' may be more compressible than the compressible material of the shell.

Referring to Figs. 10-11, a side view of a device 510 having a handle and a perspective view of a frame for that device are respectively shown. Device 510 preferable includes a lining 520 and a shell 530 similar to lining 20 and shell 30 discussed above. A handle region 570 is preferably attached to shell 530 and may be formed integrally therewith.

A frame structure 580 may include a vertical support 582, and two horizontal supports 584. The horizontal supports preferably fit around the lining. Handle frame 581 extends from the vertical support. The shell material of handle 570 may be formed around the handle frame and integrally with the remainder of shell 530. This shell (with handle) may then be slid onto the lining and assembled as illustrated in Fig. 2 with the rim of the lining being crimped onto the lip of the shell to securely mount the shell to the lining, and with a water tight seal. Other mounting techniques may also be used.

A double walled drinking vessel of the present invention may include a lining or inner wall made with rigid but deformable material such as copper, aluminum, stainless steel, plastic, or other. The shell or outer wall may be made with soft and flexible material such as rubber, silicone or other types of natural or synthesis material, including, but not limited to the other materials (TPR, TPE, TPU, EVA) discussed herein.

While the invention has been described in connection with specific embodiments thereof, it will be understood that it is capable of further modification, and this application is intended to cover any variations, uses, or adaptations of the invention following, in general, the principles of the invention and including such departures from the present disclosure as come within known or customary practice in the art to which the invention pertains and as may be applied to the essential features hereinbefore set forth, and as fall within the scope of the invention and the limits of the appended claims.

CLAIMS

1. A double walled container device for holding liquid, comprising:

a lining formed of a substantially rigid material; and

a shell formed of a flexible, elastic material that is compressible under the force of a human hand and regains its shape in the absence of the compressive force, the shell provided about the lining;

wherein the shell is spaced from the lining to form an insulative space therebetween.

2. The device of claim 1, wherein the lining has a top rim and the shell has a top lip, and the rim is positioned into the lip so as to securely hold the shell to the lining and to form an air tight seal between the lining and the shell.

3. The device of claim 1, wherein the shell includes a side wall and a bottom formed integrally therewith.

4. The device of claim 1, wherein the shell includes a side wall and the device further includes a plurality of spacers disposed between the side wall and lining in a distributed spacer area,

wherein the spacers occupy at least 3% per square inch of the surface area of the side wall in the distributed spacer area.

5. The device of claim 4, wherein the spacers occupy at least 5% per square inch of the surface area of the side wall in the distributed spacer area.

6. The device of claim 4, wherein the spacers occupy at least 8% per square inch of the surface area of the side wall in the distributed spacer area.

7. The device of claim 4, wherein the distributed spacer area is provided adjacent 10% or more of the interior surface area of the side wall.

8. The device of claim 4, wherein the distributed spacer area is provided adjacent 30% or more of the interior surface area of the side wall.

9. The device of claim 4, wherein the distributed spacer area is provided adjacent 50% or more of the interior surface area of the side wall.

10. The device of claim 1, further comprising a plurality of spacers disposed between the shell and lining, the spacers formed integrally with the shell.

11. The device of claim 10, wherein the shell is compressible into the gap between the spacers.

12. The device of claim 1, further comprising a plurality of spacers disposed between the shell and lining, the spacers formed of a flexible, elastic material that is compressible under the force of a human hand and regains its shape in the absence of the compressive force.

13. The device of claim 1, further comprising compressible, elastic foam material provided between the

lining and shell, the foam material distributed over at least 25% of the interior surface area of the shell.

14. The device of claim 13, wherein the compressible foam material is more compressible than the shell material.

15. The device of claim 1, wherein the shell is made of one or more of TPE, TPR, TPU, EVA and silicone.

16. The device of claim 1, wherein the shell has a pattern including a plurality of protrusions that define adjacent recesses.

17. The device of claim 1, wherein the shell has first, second and third cross-sectional areas defined in a horizontal plane, the second area being positioned vertically between the first and second;

wherein the second area is less than the first and third areas.

18. The device of claim 1, wherein the shell has first, second and third cross-sectional areas defined in a horizontal plane, the second area being positioned vertically between the first and second;

wherein the second area is greater than the first and third areas.

19. The device of claim 1, further comprising a handle frame and a handle frame cover, that handle frame cover being formed integrally with the shell.

20. A double walled liquid holding device, including :

a substantially rigid lining; and

a shell formed of a flexible, elastic material that is spaced from the lining.

21. The device of claim 20, wherein a top portion of the shell is coupled a top portion of the lining in such a manner as to create a water tight seal between the shell and the lining.

22. The device of claim 20, further comprising a plurality of spacer members provided between the shell and lining, the spacer members distributed at a frequency of at least one per two square inches.

23. The device of claim 22, wherein the spacer members are distributed at a frequency of at least four per square inch.

24. The device of claim 22, wherein the material of the shell is sufficiently flexible to be compressed into the space between the spacer members under force of a user' s hand.

25. The device of claim. 22, wherein the spacer members are formed integrally with the shell.

26. The device of claim 21, wherein the shell has an 0-ring provided at the top portion thereof and the lining is formed into this 0-ring to form the water tight seal .

27. The device of claim 20, wherein the shell is formed of one or more of TPE, TPR, TPU, EVA and silicone.

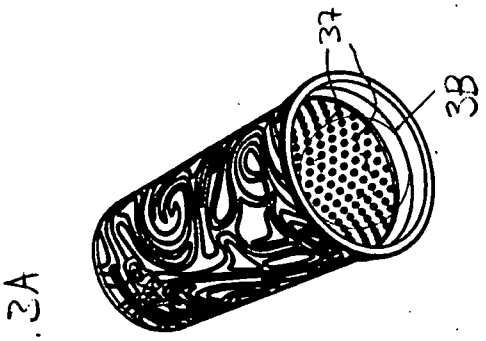


Fig. 2A

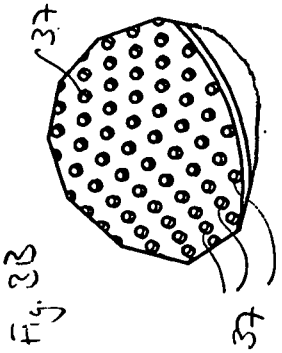


Fig. 2B

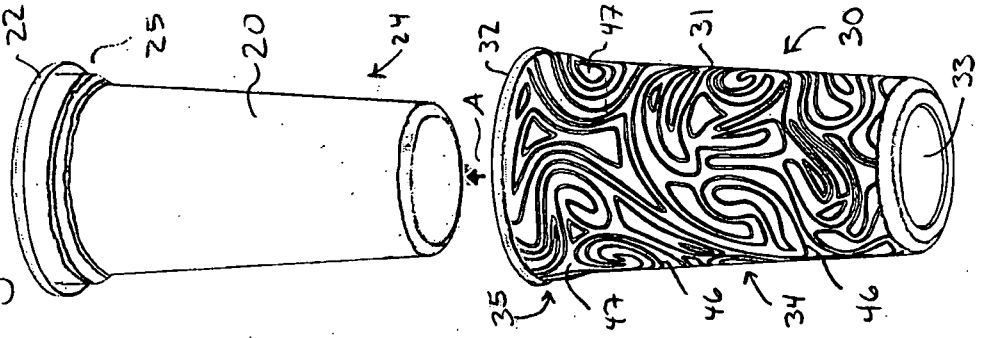


Fig. 2

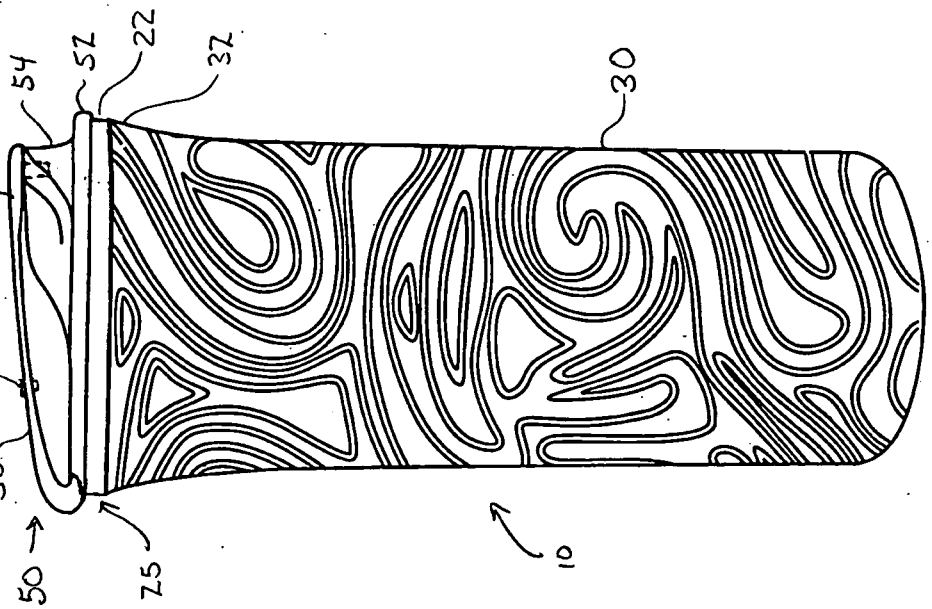


Fig. 1

Fig. 4A

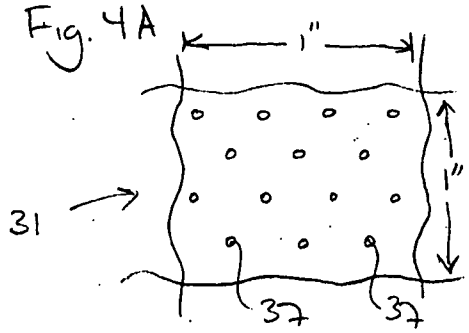


Fig. 4B

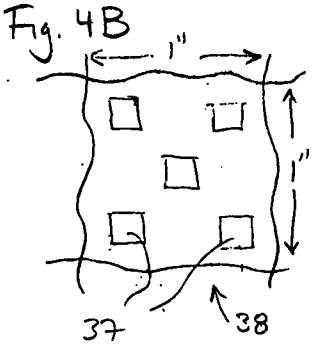


Fig. 4C

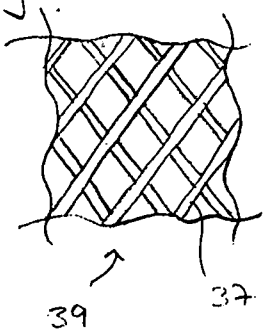


Fig. 5

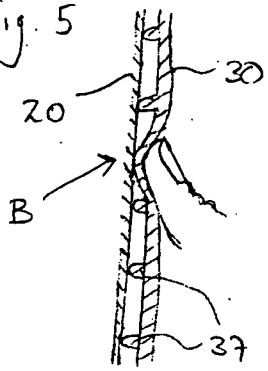


Fig. 6

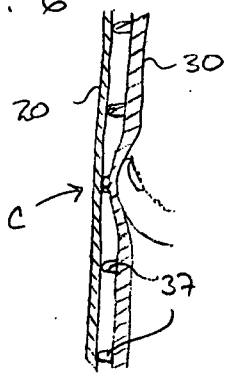
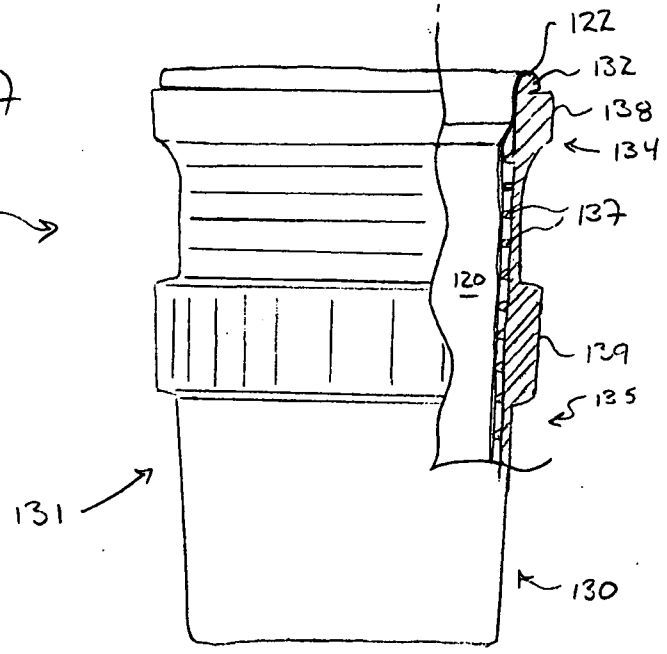


Fig. 7



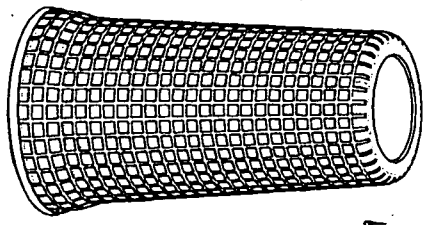


Fig. 8C

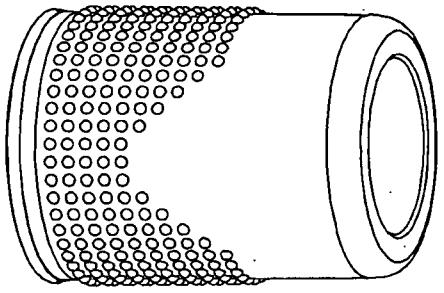


Fig. 8B

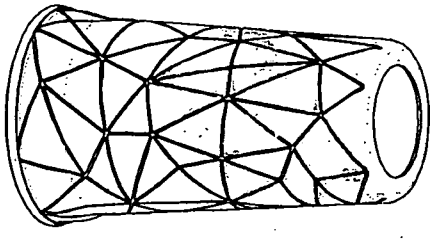


Fig. 8A

Fig. 9

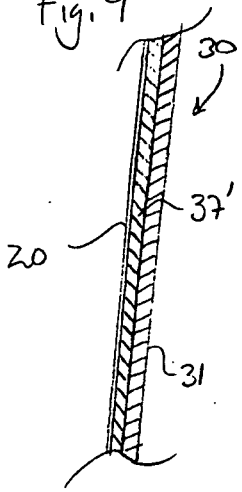


Fig. 10

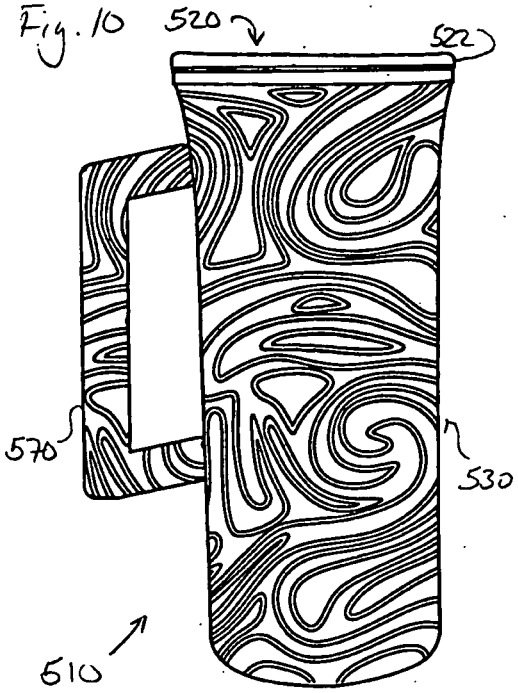


Fig. 11

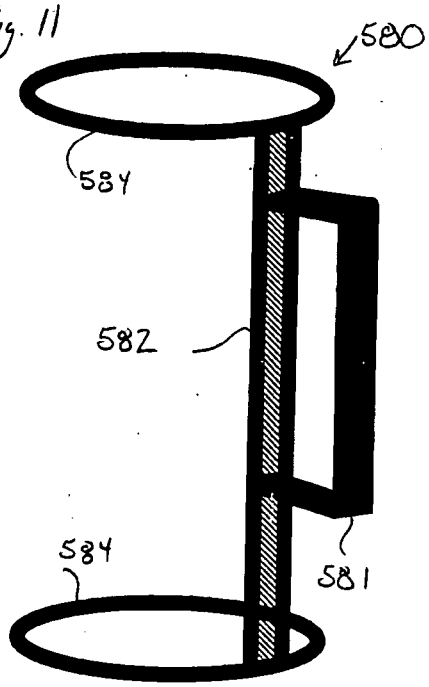


Fig. 12A

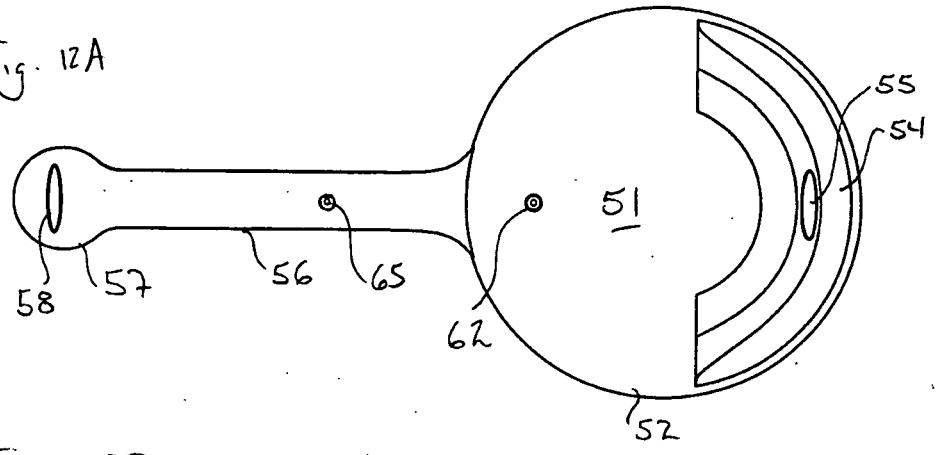
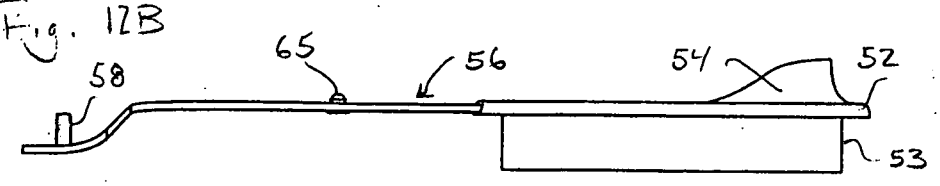


Fig. 12B



INTERNATIONAL SEARCH REPORT

International application No
PCT/US 10/02073

A CLASSIFICATION OF SUBJECT MATTER
IPC(8) - A47J 41/00 (201 0.01)
USPC - 215/13.1
According to International Patent Classification (IPC) or to both national classification and IPC

B FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC(8) - A47J 41/00 (2010 01)
USPC - 215/13 1

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

USPC - 215/1 1 3, 12 1, 347, 348, 383, 384, 220/9 1, 23 9, 62 12, 592 17, 666 (text search - see terms below)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
PubWEST(USPT,PGPB,EPAB,JPAB), Google Scholar, Google Patents
Search Terms fluid, liquid, vessel, container, holder, vessel, double, two, wall, liner, lining, shell, flexible, elastic, compressible, spacers, maintain, create, gap, space, ngid, stiff, inelastic, inflexible, shell, outer, exterior, inner, insulating, o-πng, lip, πm, TPE, TPR, EVA

C DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No
Y	US 3,120,570 A (Kennedy et al) 04 February 1964 (04 02 1964), entire document especially Fig 1-2, col 1, In 11-17, col 2, In 13-18 and In 23-39, col 3, In 26-31 and In 47-62, col 4, In 1-6	1-27
Y	US 2006/01 861 25 A 1 (Tew) 24 August 2006 (24 08 2006), Fig 10 and 11, para [0070]	1-27
Y	US 7,204,380 B2 (Webb et al) 17 April 2007 (17 04 2007), Fig 1, col 4, In 33-38	1-27
Y	US 4,549,410 A (Russell) 29 October 1985 (29 10 1985), Fig 1 and 2	16-18
Y	US 4,669,627 A (Ueda et al) 02 June 1987 (02 06 1987), Fig 1	19
Y	US 4,846,359 A (Baird et al) 1Uuly 1989 (11 07 1989), Fig 1	19
A	US 5,848,734 A (Melk) 15 December 1998 (15 12 1998), entire document, especially abstract	1-27

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*	**Special categories of cited documents**	"T"	**later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention**
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"E"	**earlier application or patent but published on or after the international filing date**	"Y"	**document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art**
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'O"	**document referring to an oral disclosure, use, exhibition or other means**		
"P"	**document published prior to the international filing date but later than the priority date claimed**		

Date of the actual completion of the international search	Date of mailing of the international search report
09 September 2010 (09 09 2010)	**21 SFP ?nw**
Name and mailing address of the ISA/US Mail Stop PCT, Arm ISA/US, Commissioner for Patents P O Box 1450, Alexandπa, Virginia 22313-1450 **Facsimile No** 571-273-3201	Authorized officer Lee W Young **PCT Helpdesk. 571 272-4300** **PCTOSP 571-272 7774**

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