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(54) **SOURCE SELECTING CAP AND CLOSURE FOR MULTIPLE CHAMBER BOTTLES**

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(51) **Int. Cl.**

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(52) **U.S. Cl.** **220/23.4**; 220/253; 215/6; 220/23.86

(57) **ABSTRACT**

A source selecting cap and closure for multiple cavity bottles incorporates a first element sealingly engaging a first opening in a first cavity of a bottle and a second opening in a second cavity of the bottle. A second element is movably engaged by the first element and provides an outlet and one or more channels connected to the outlet for selectively communicating with the first cavity of the bottle in a first position and communicating with the second cavity of the bottle in a second position.

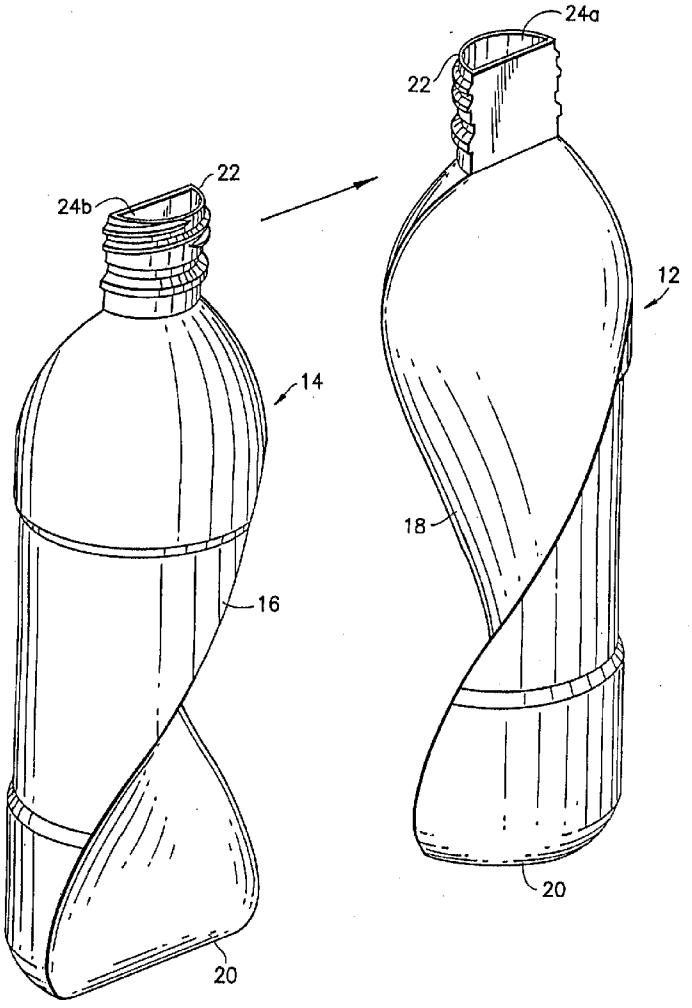


FIG. 1

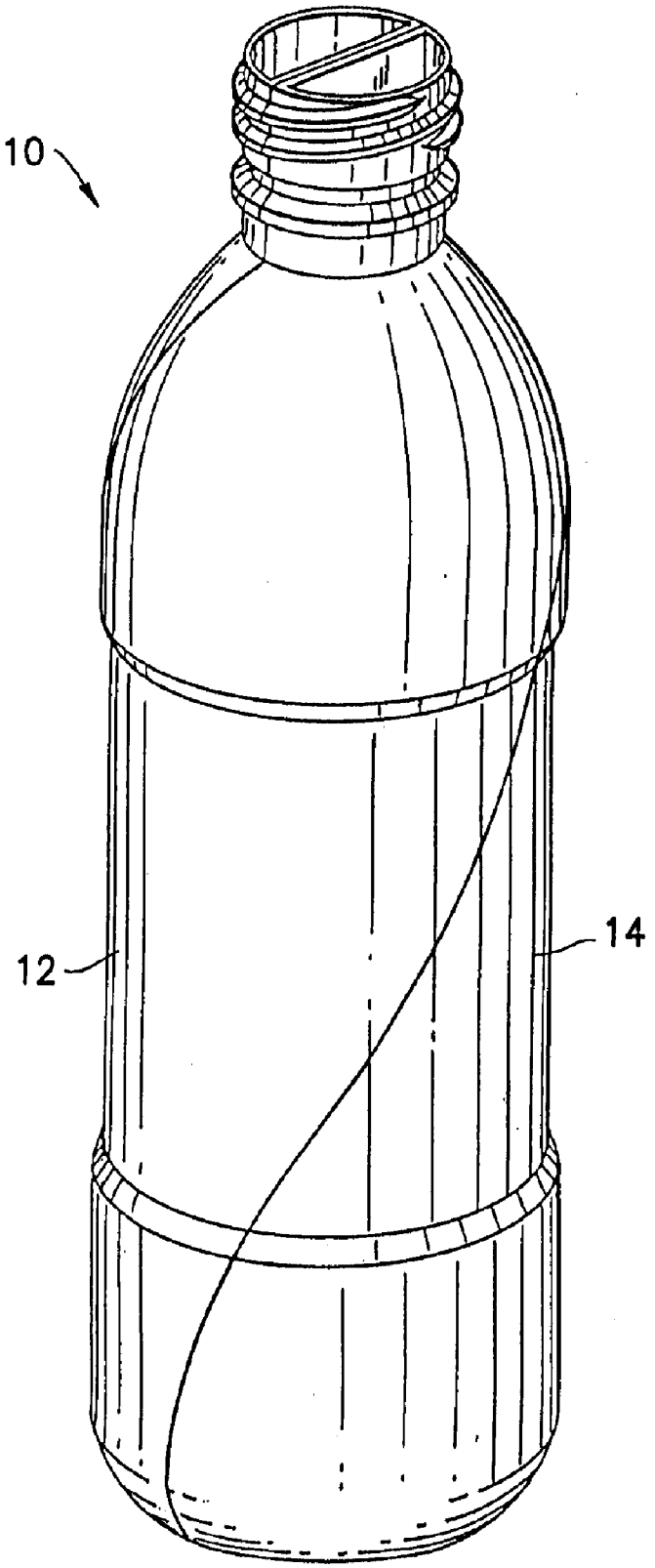
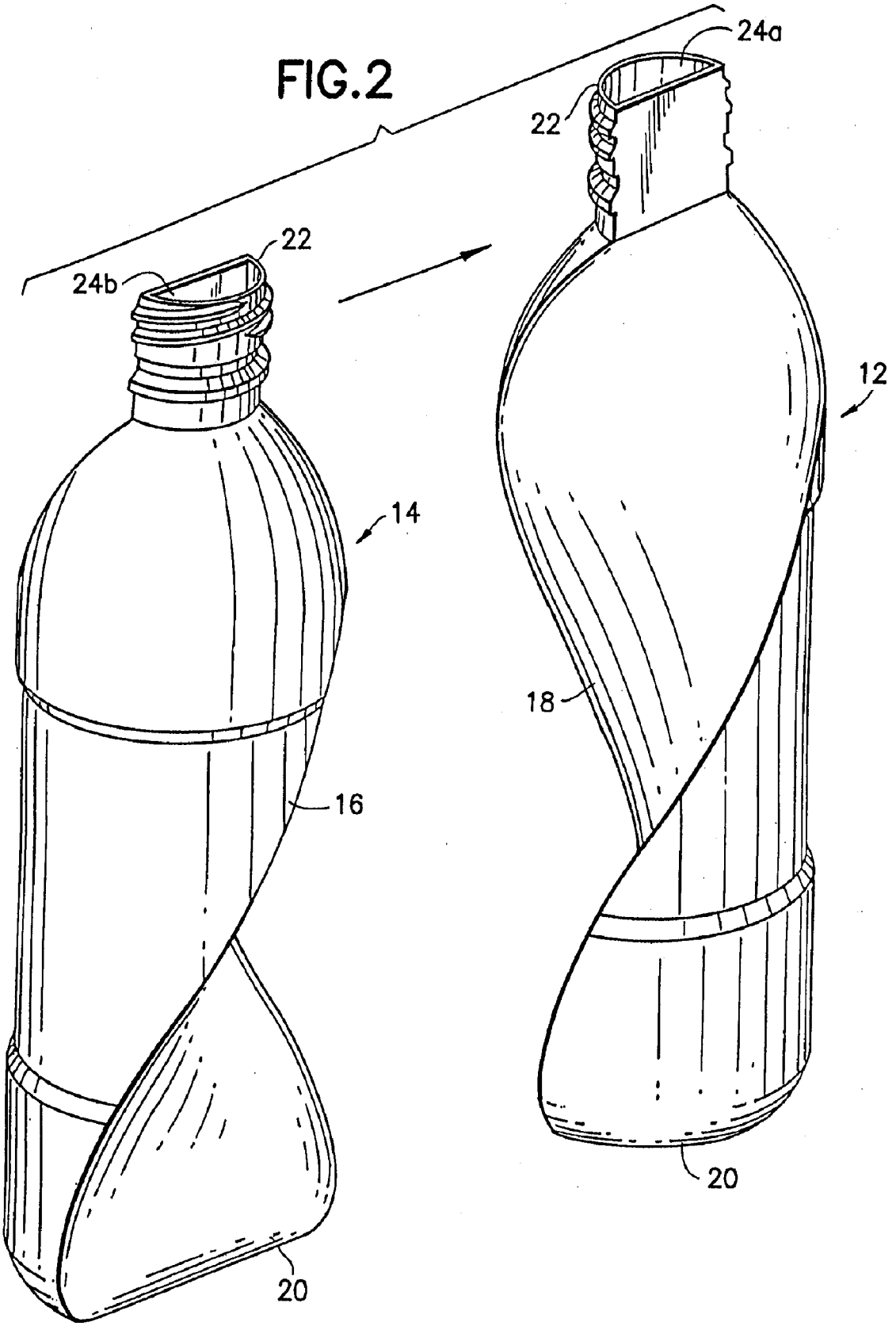


FIG.2



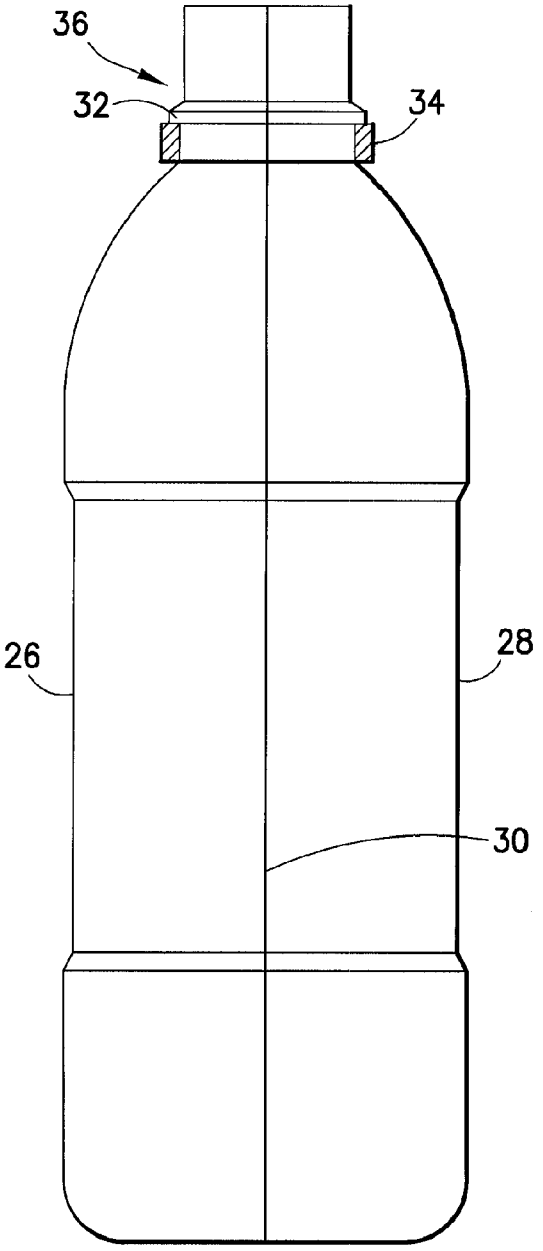


FIG.3a

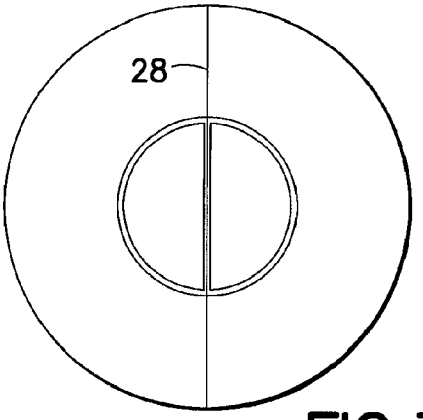


FIG.3b

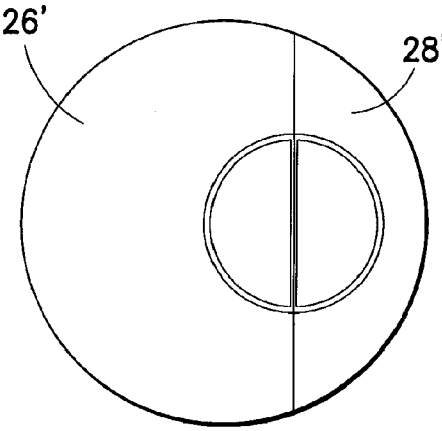


FIG.3c

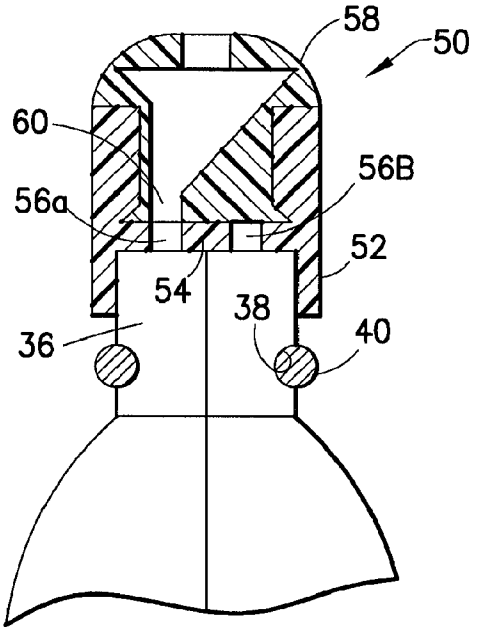


FIG.4

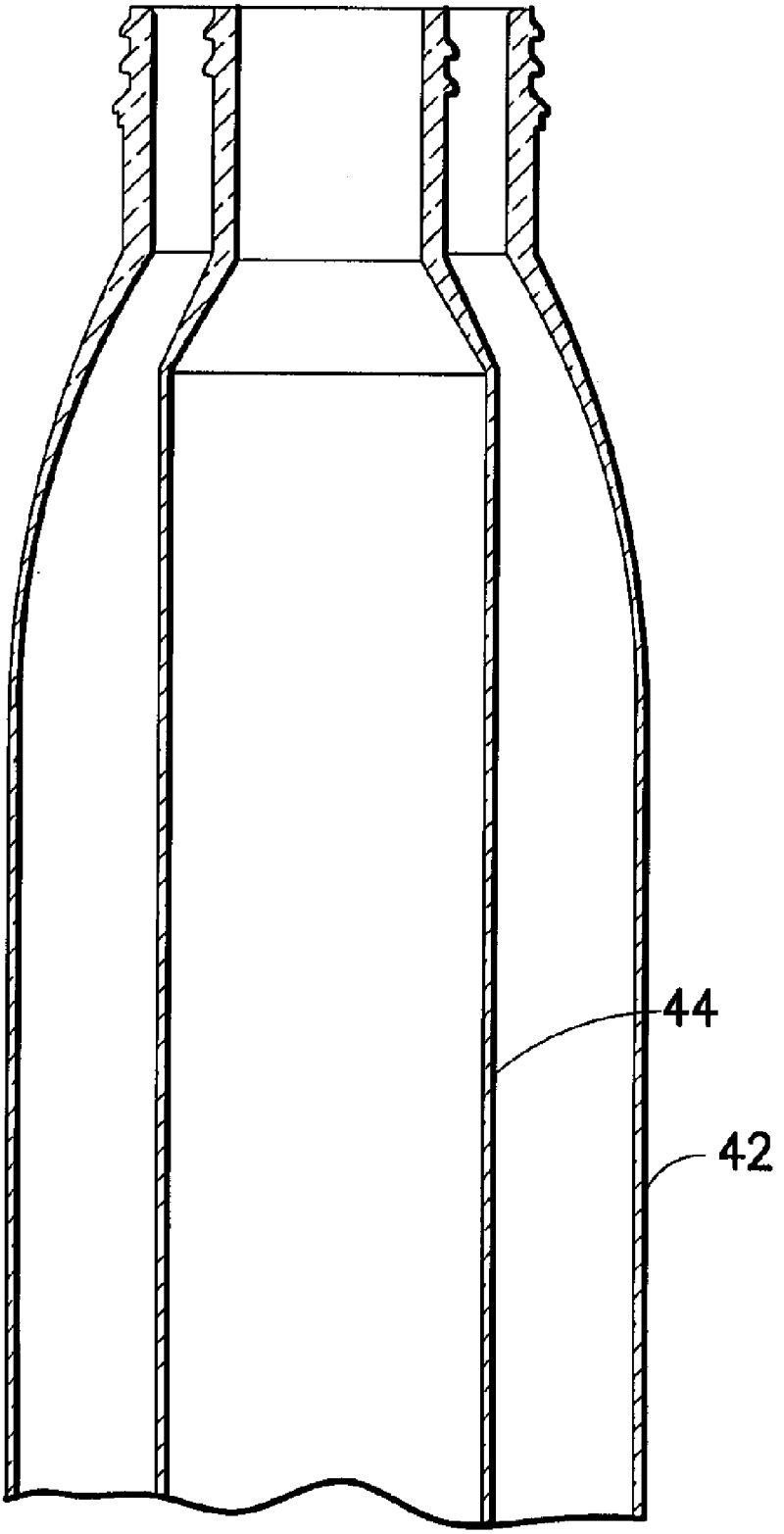


FIG.3d

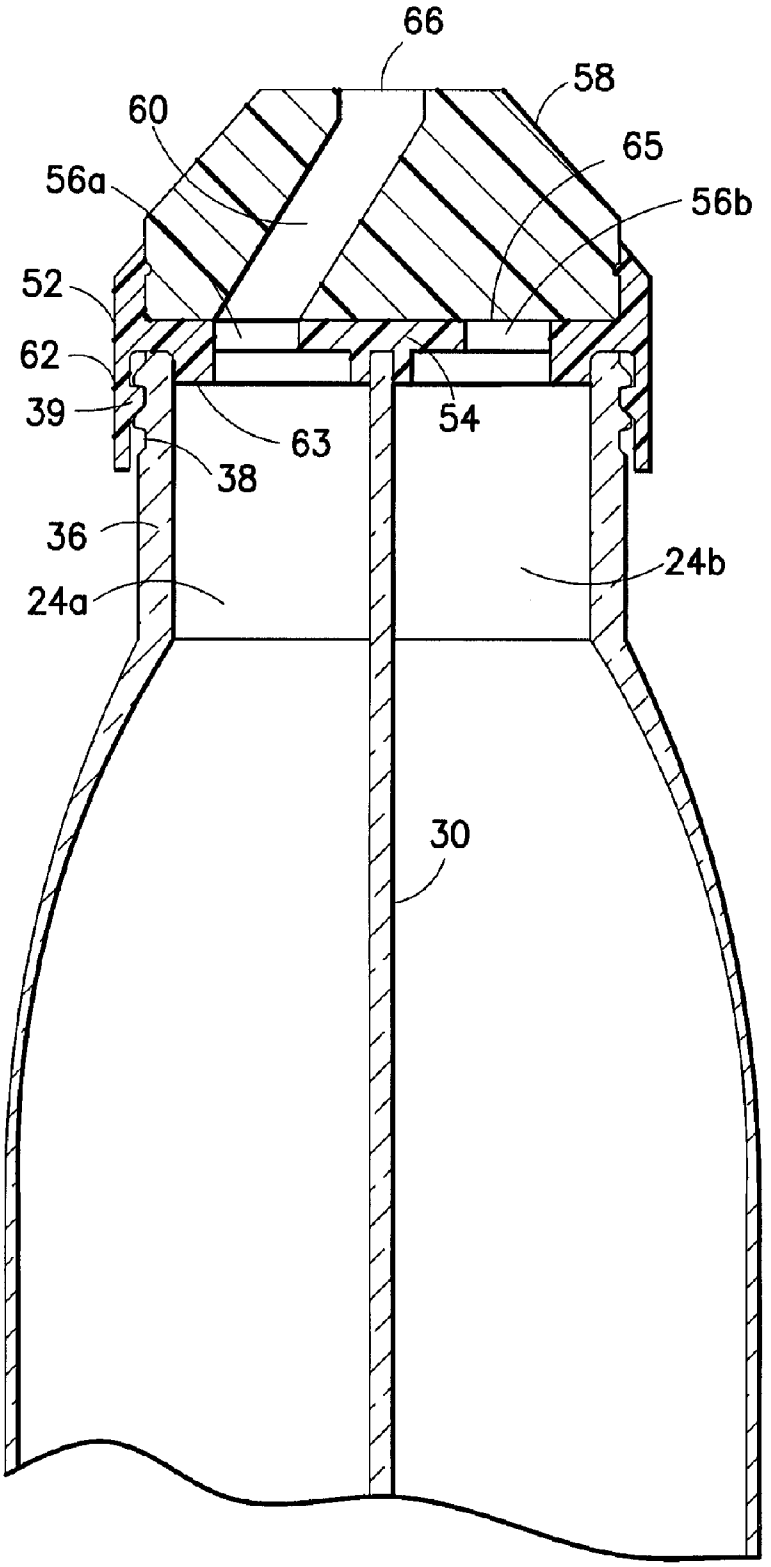


FIG.5a

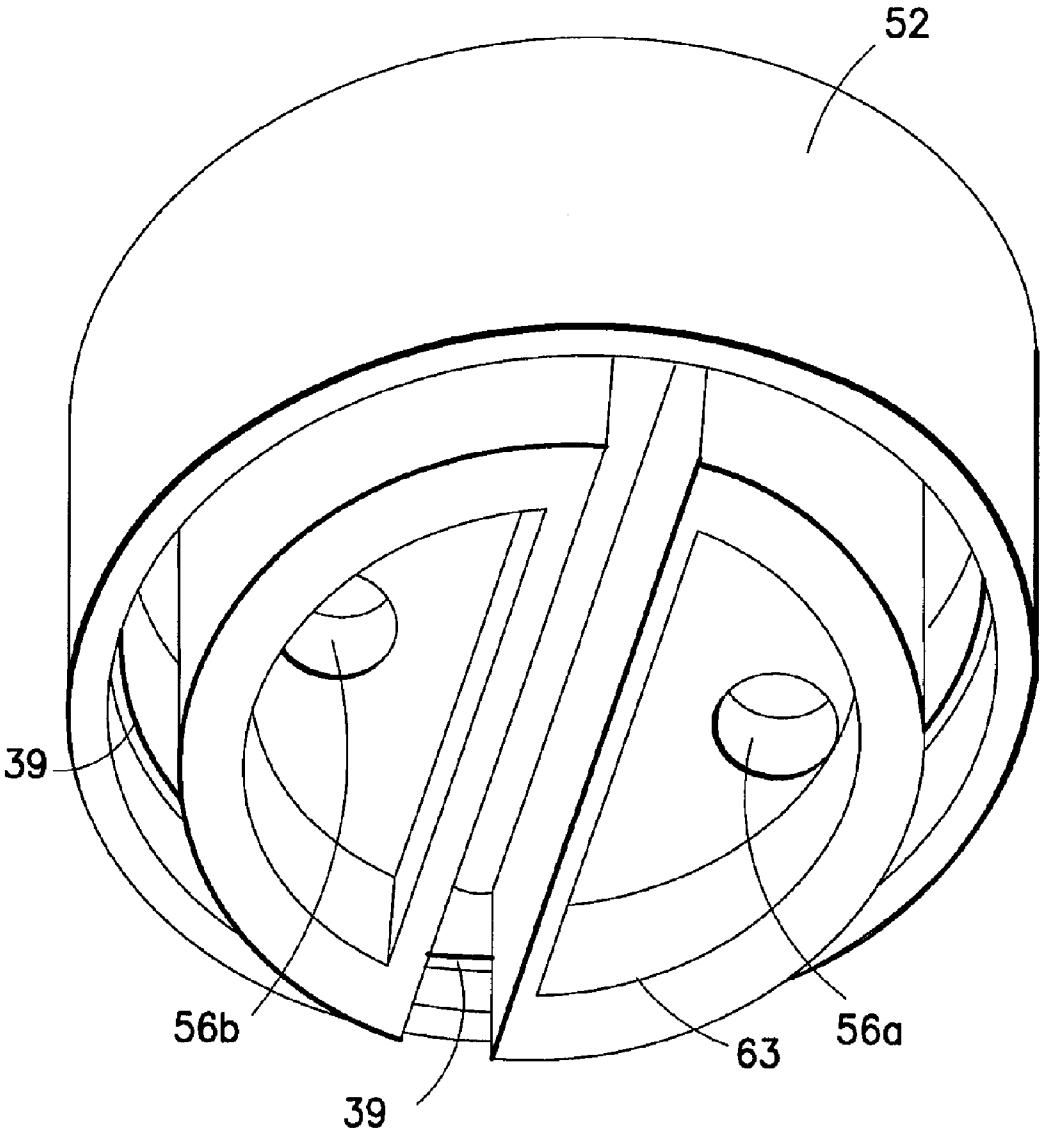


FIG.5b

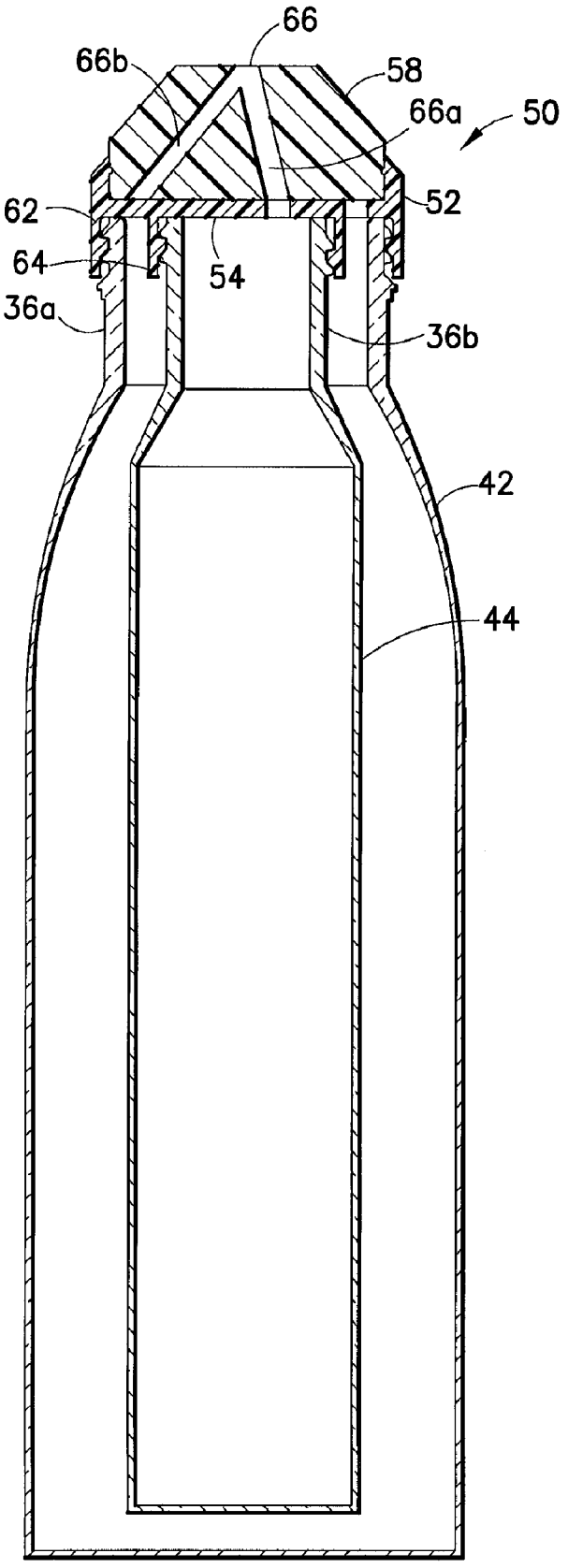


FIG.6

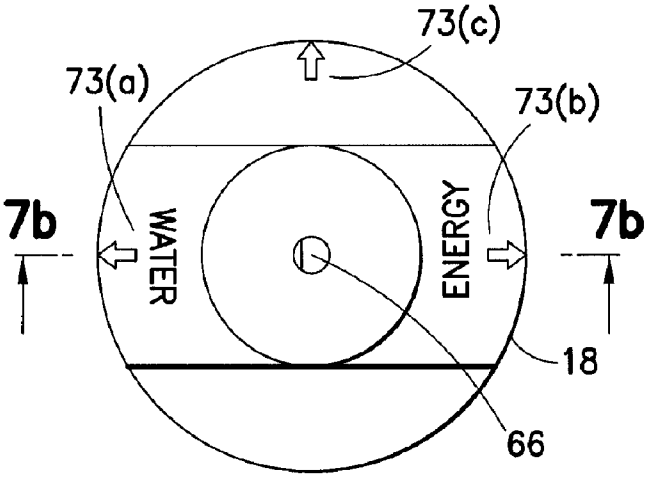


FIG.7a

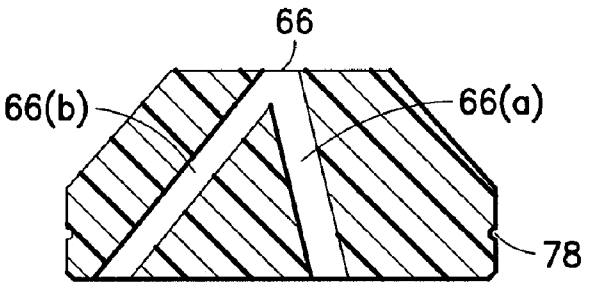


FIG.7b

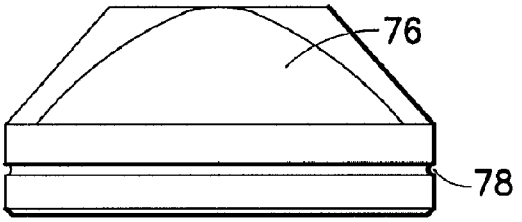


FIG.7c

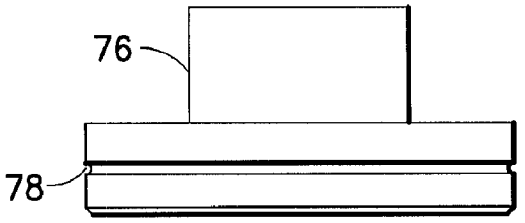


FIG.7d

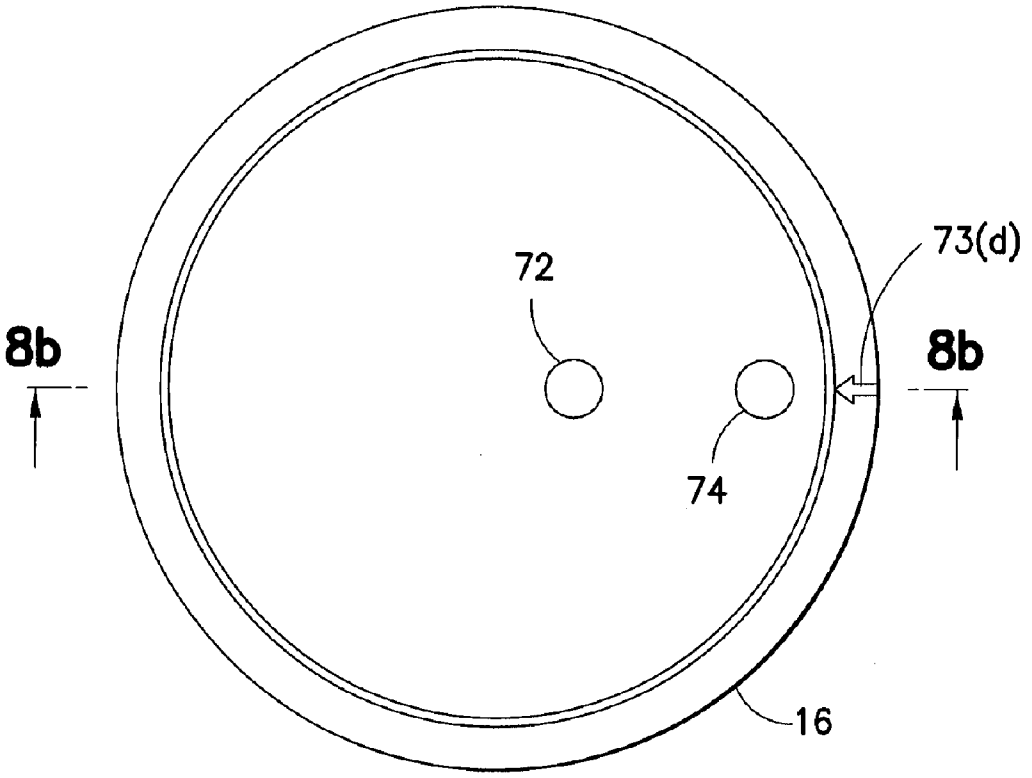


FIG.8a

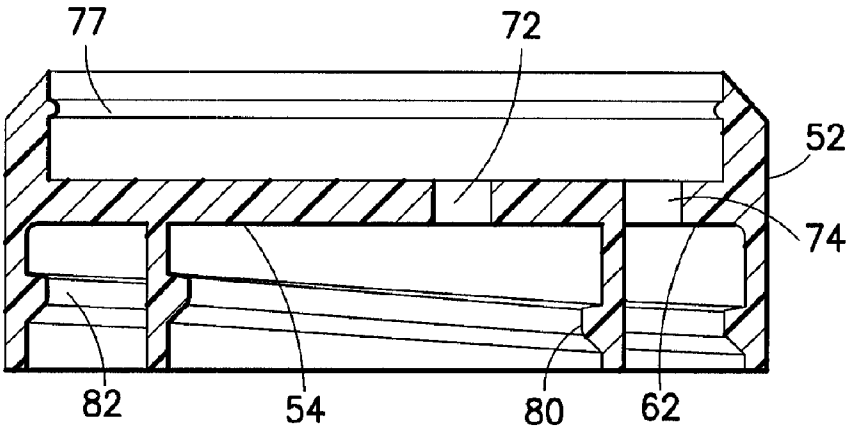


FIG.8b

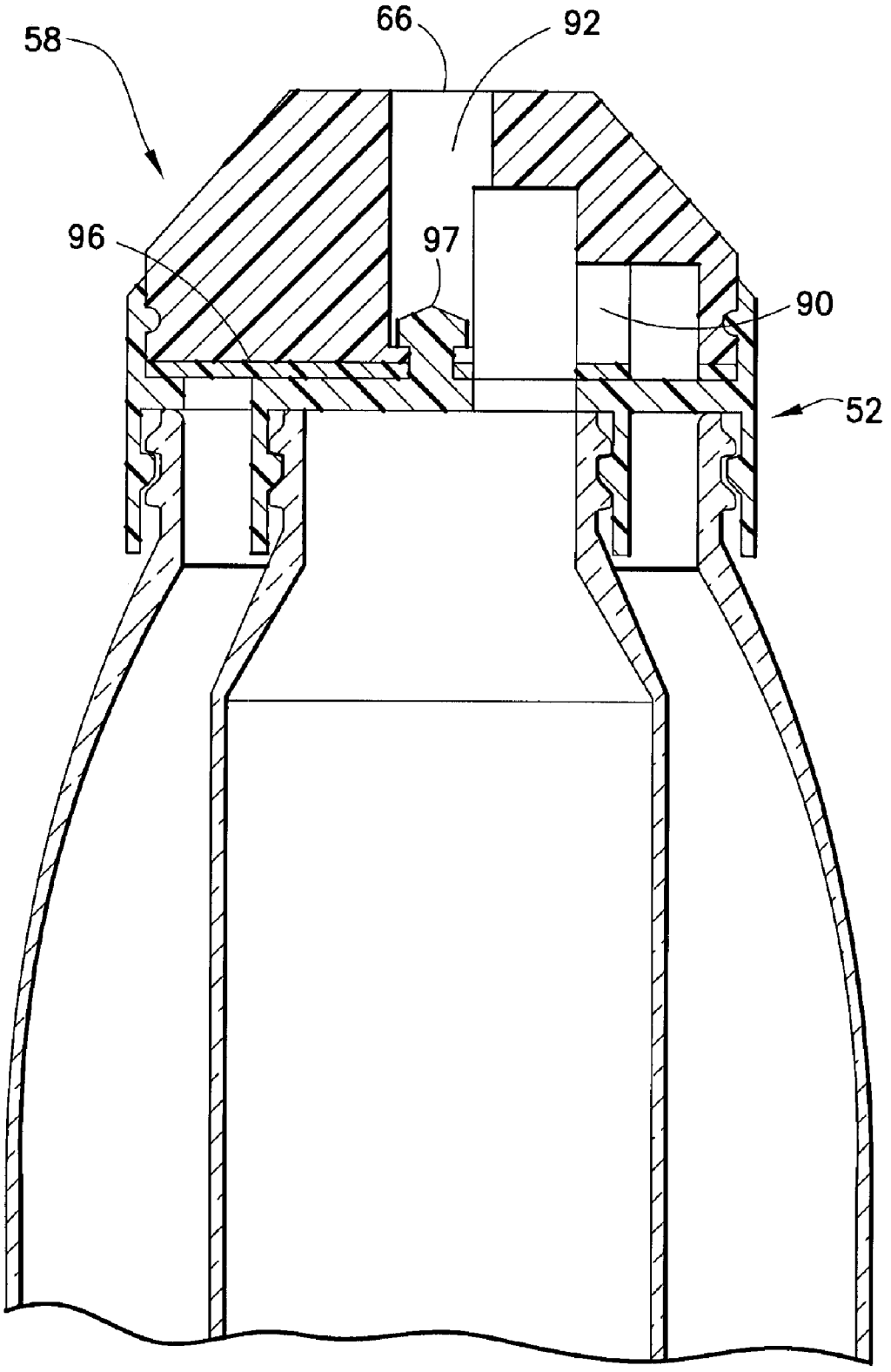


FIG.9a

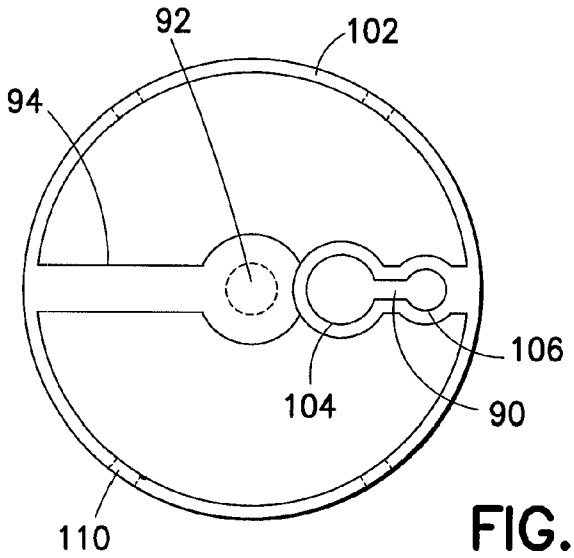


FIG.9b

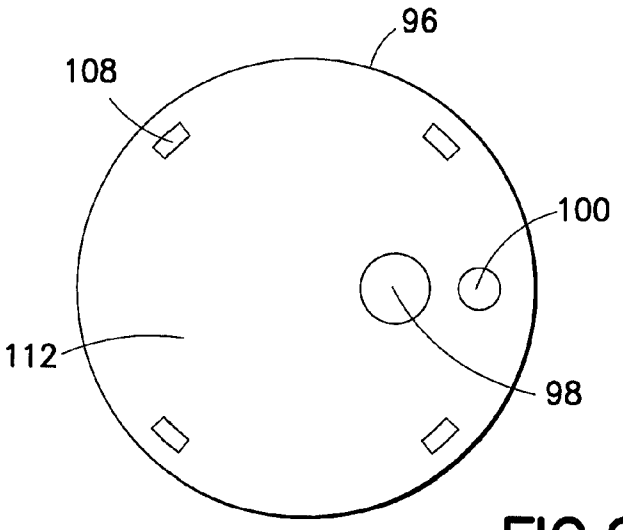


FIG.9c

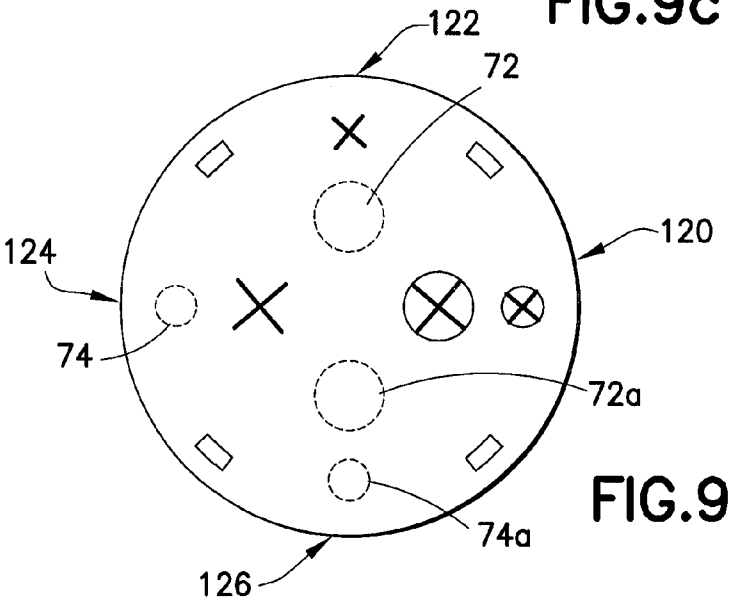


FIG.9d

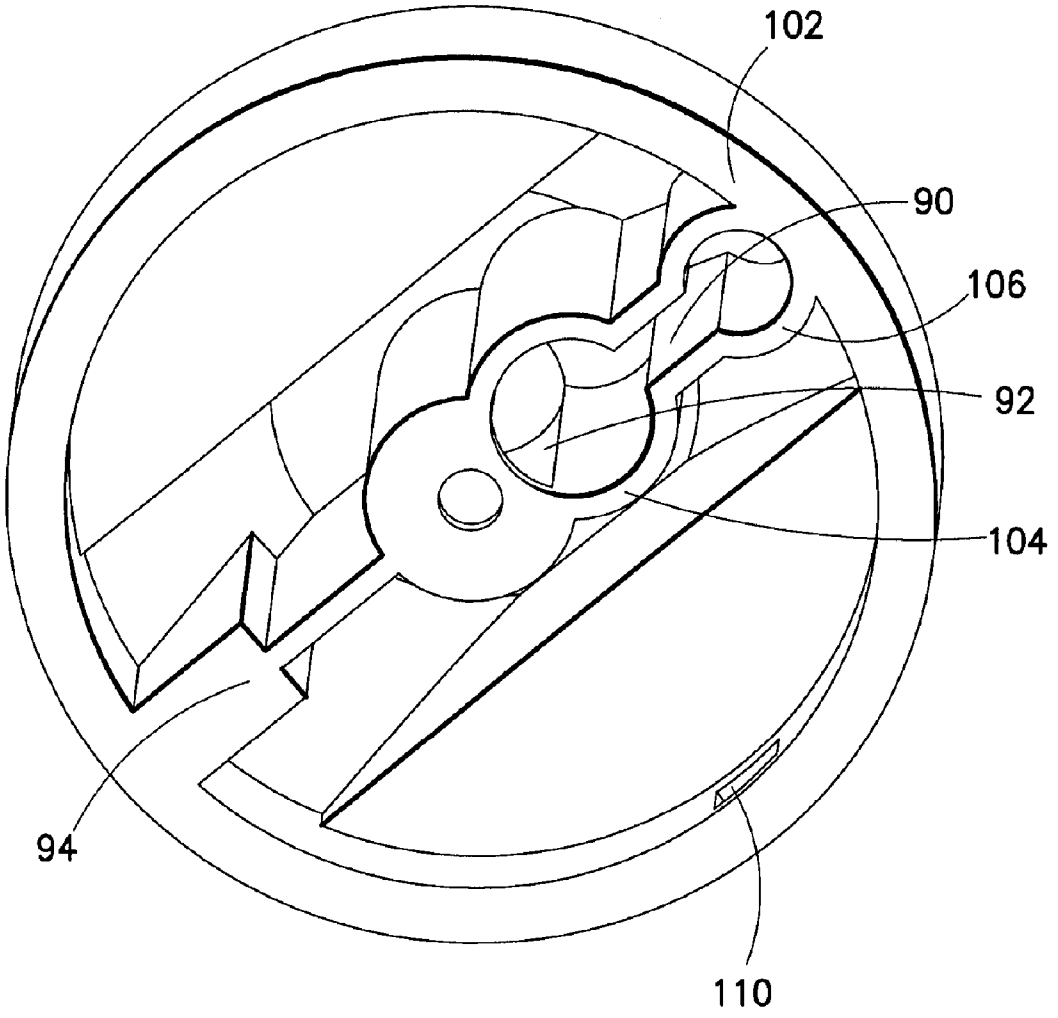


FIG.9e

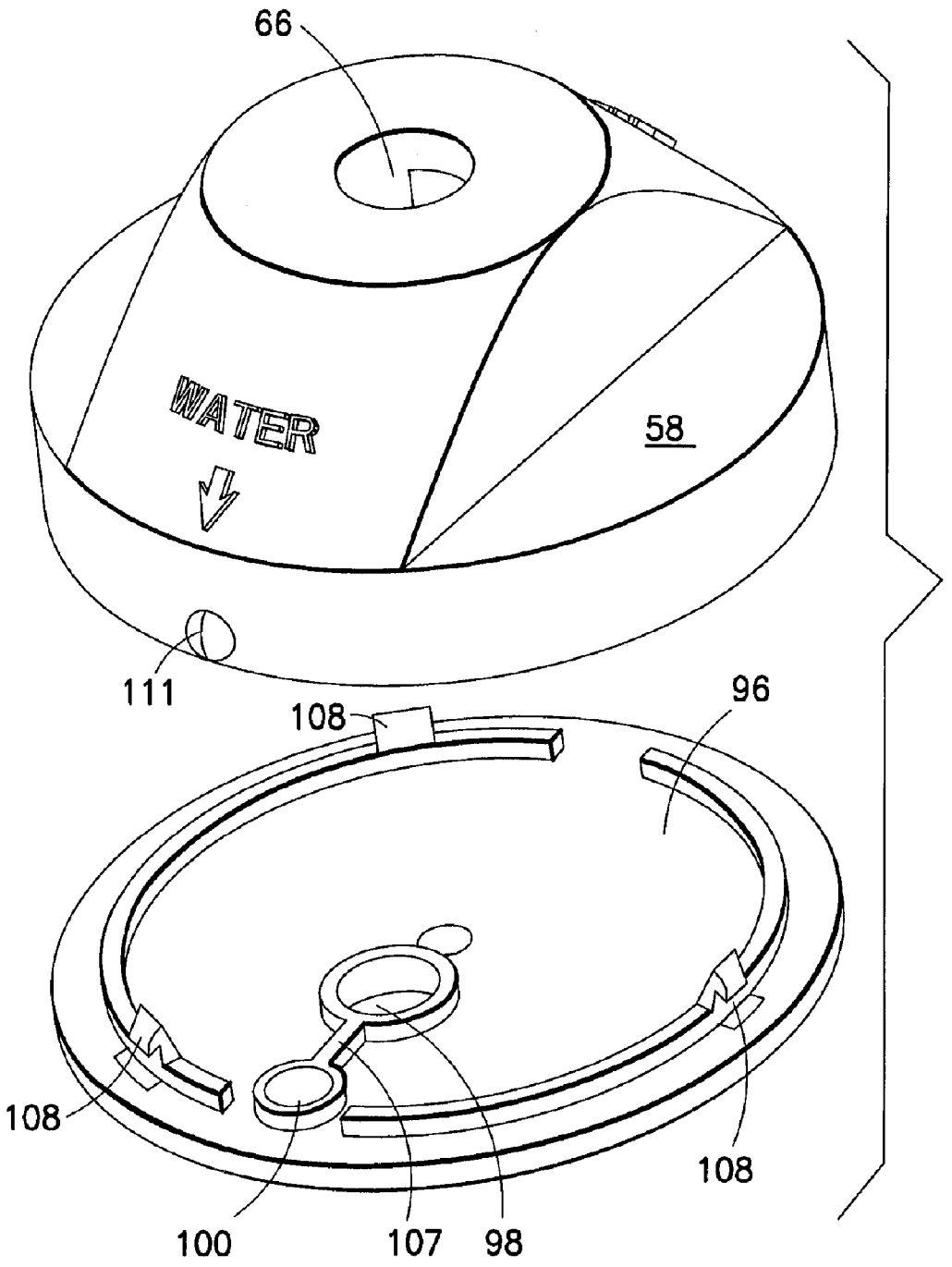


FIG.9f

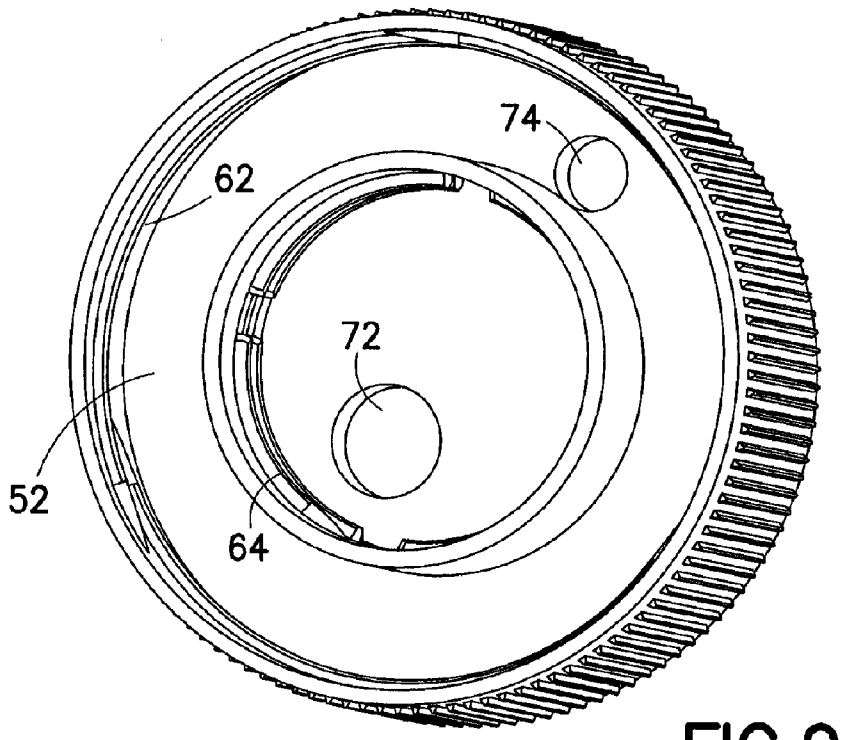


FIG.9g

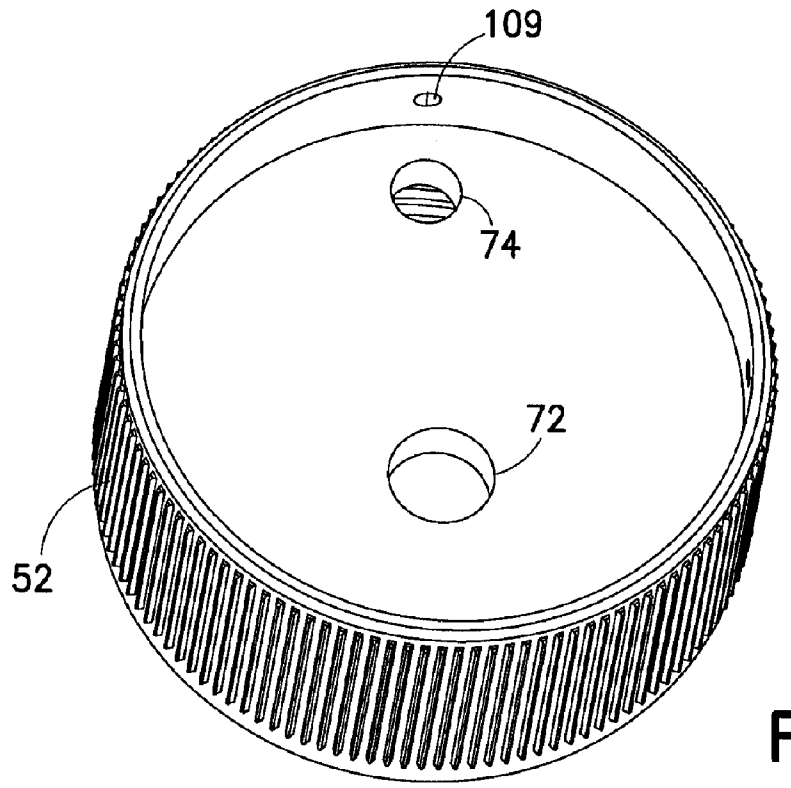


FIG.9h

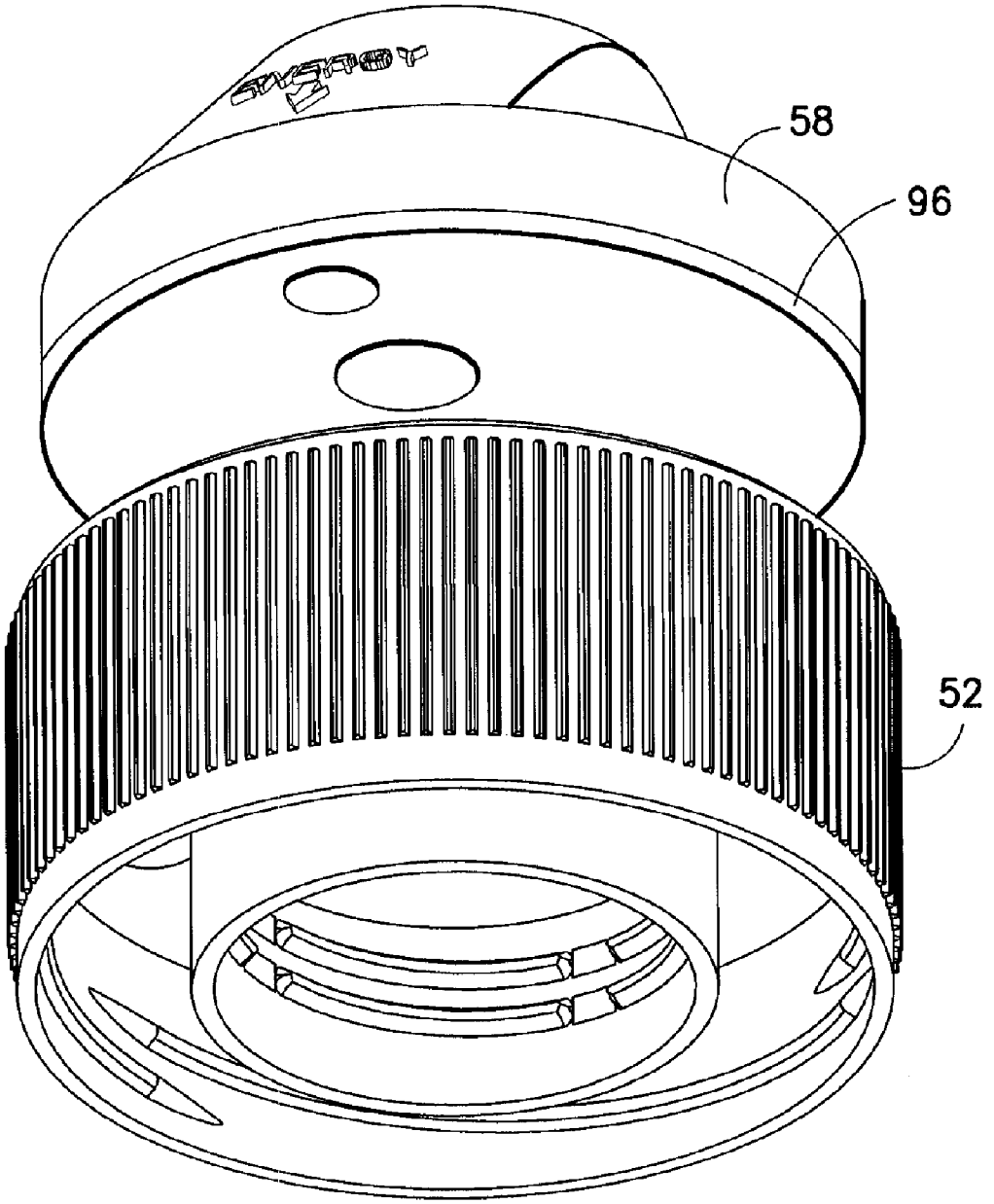


FIG.9i

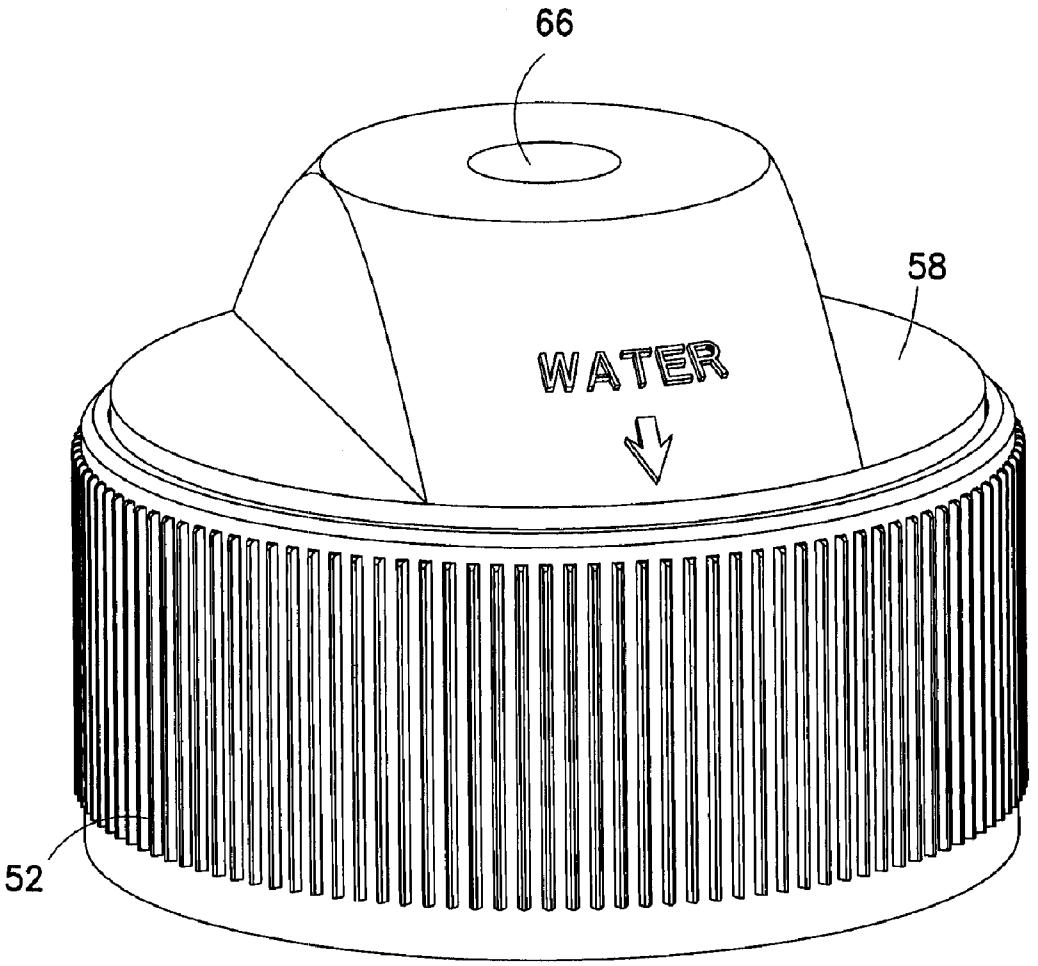


FIG.9j

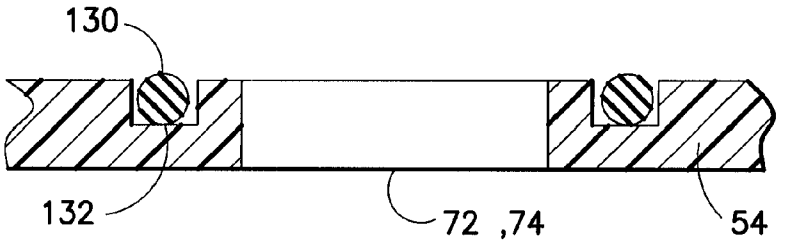


FIG.10a

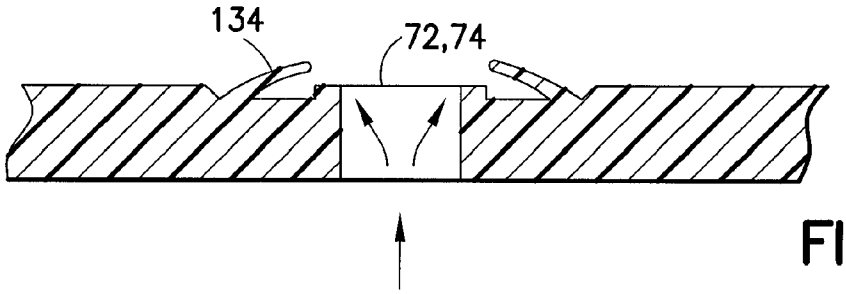


FIG.10b

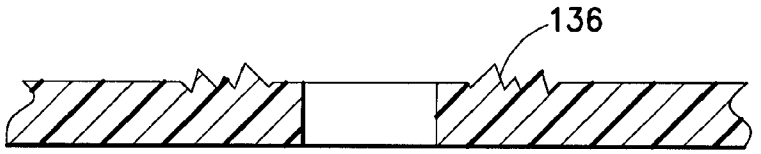


FIG.10c

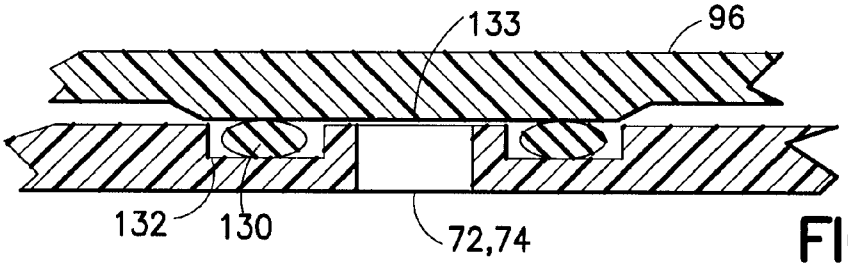


FIG.10d

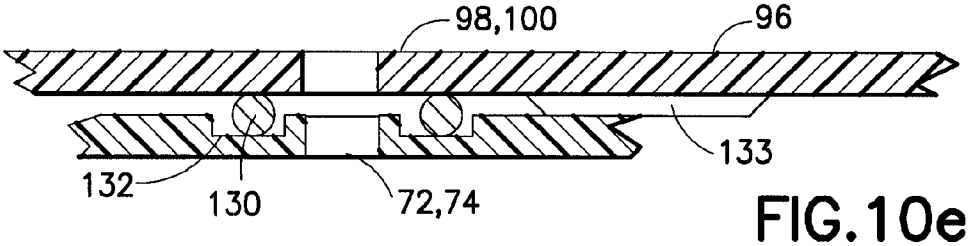


FIG.10e

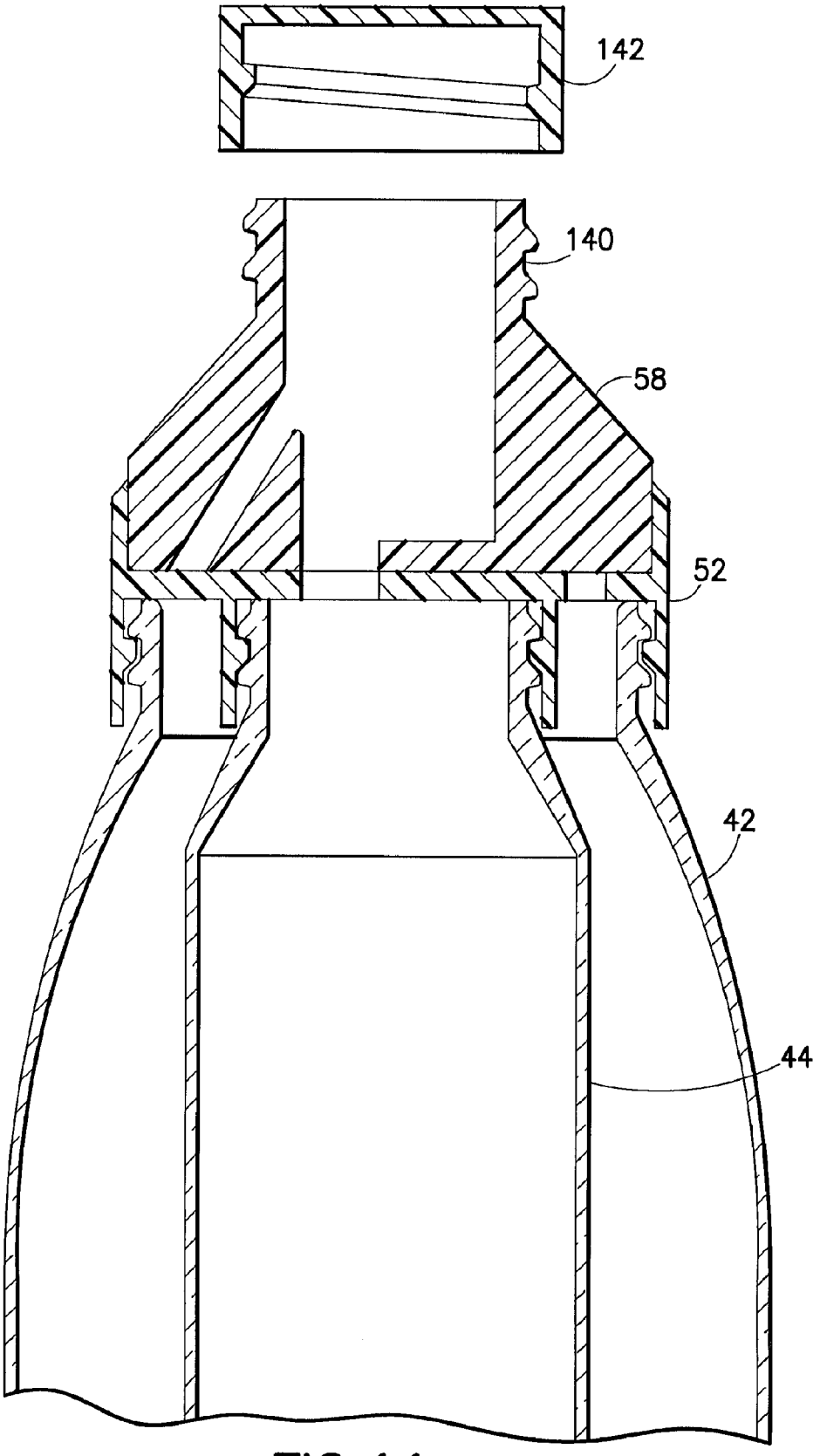


FIG. 11

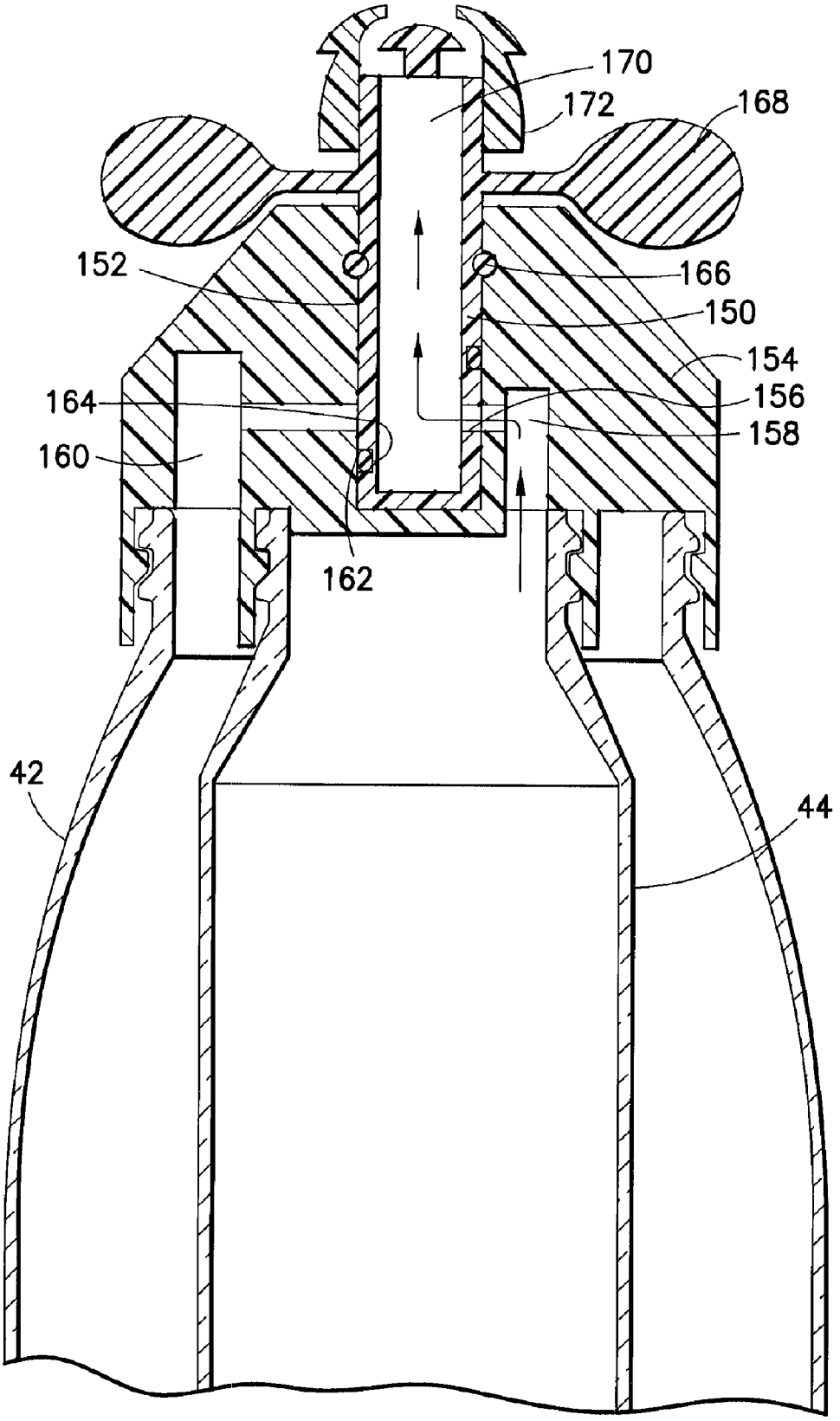


FIG. 12

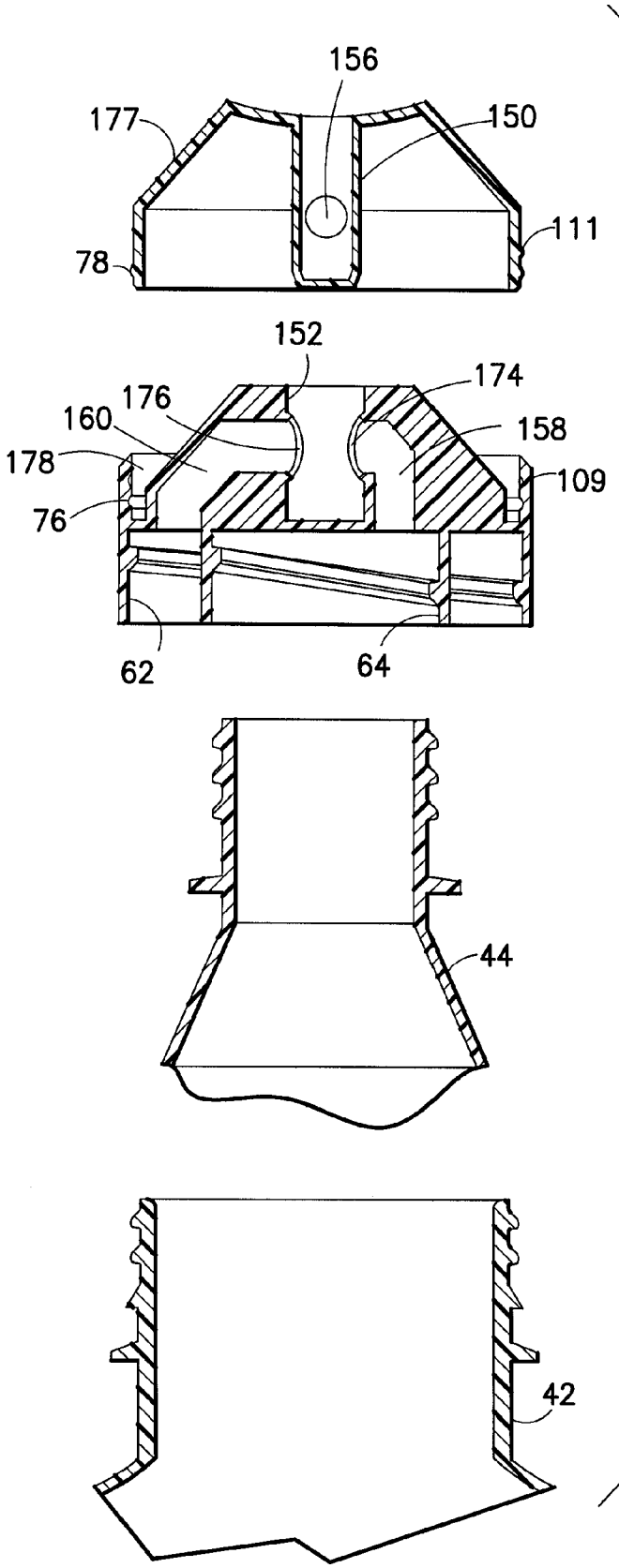


FIG. 13a

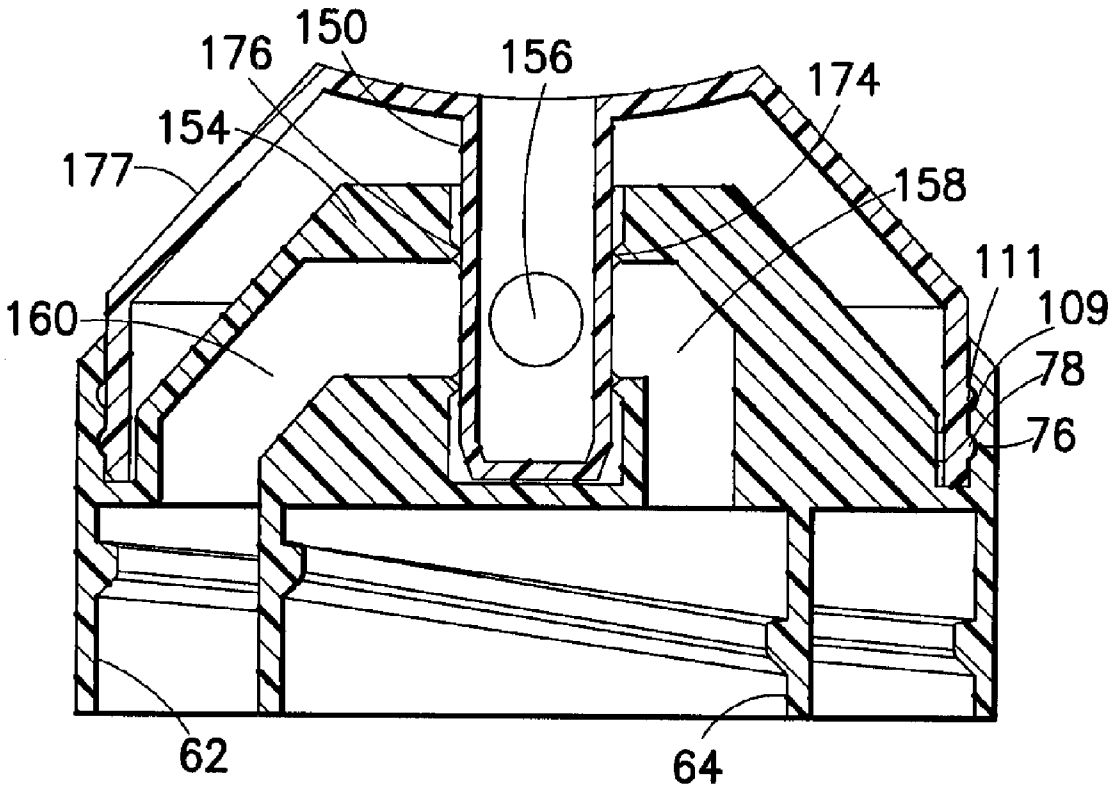


FIG. 13b

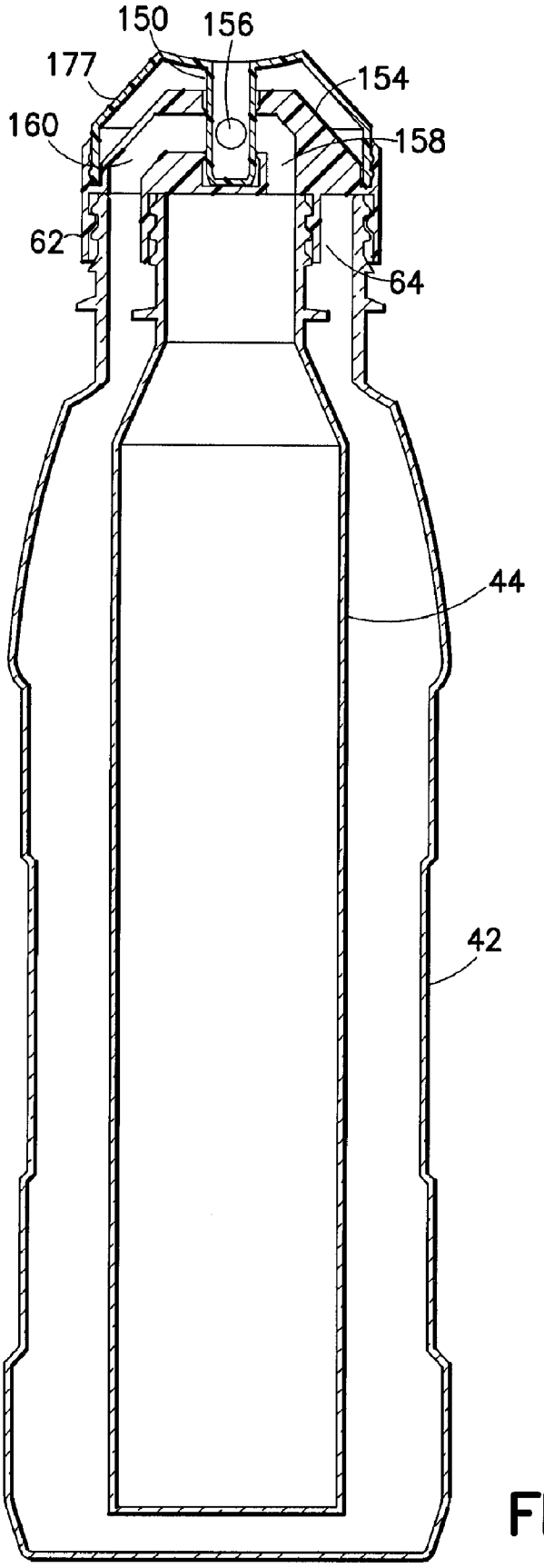


FIG. 13c

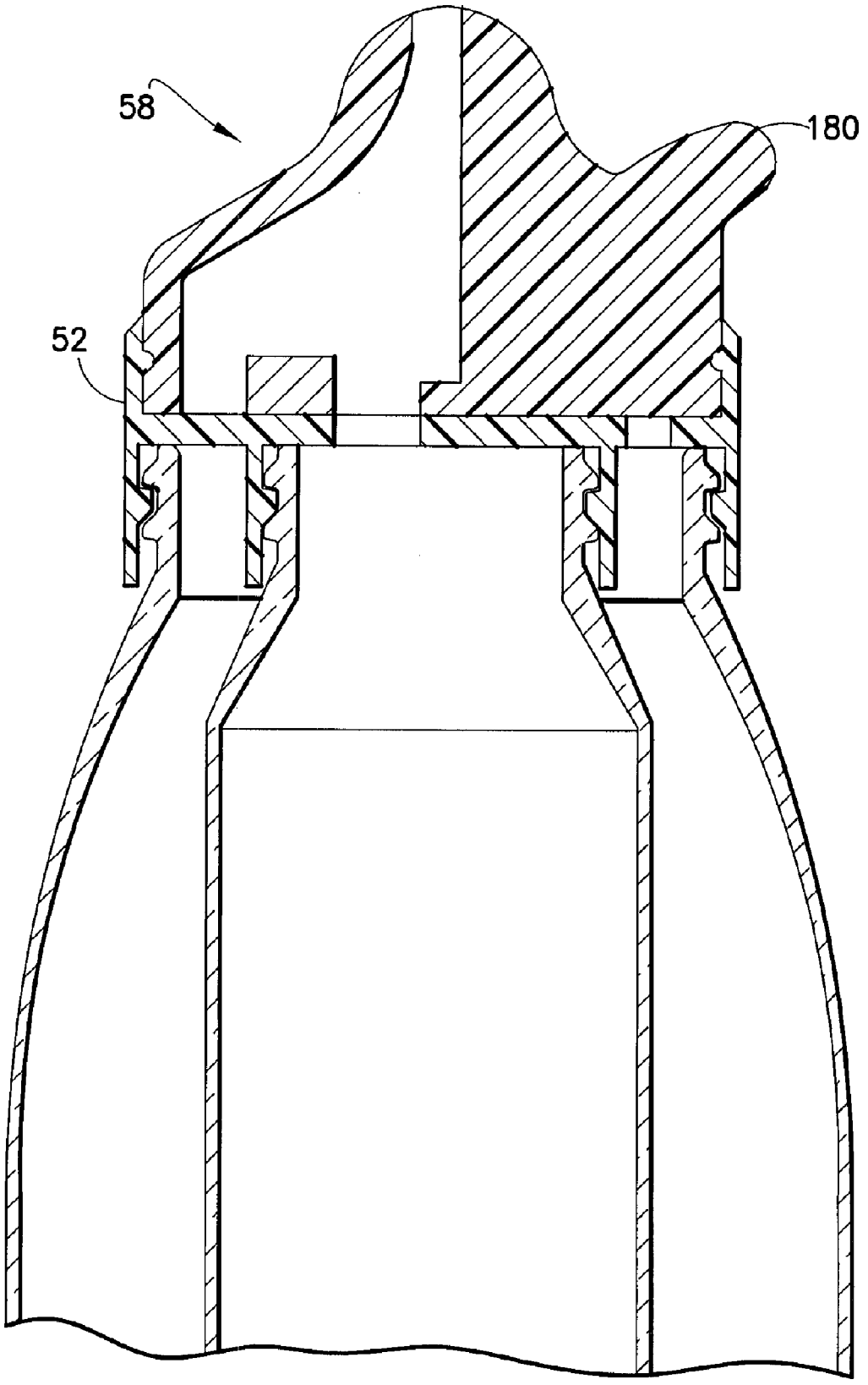


FIG. 14

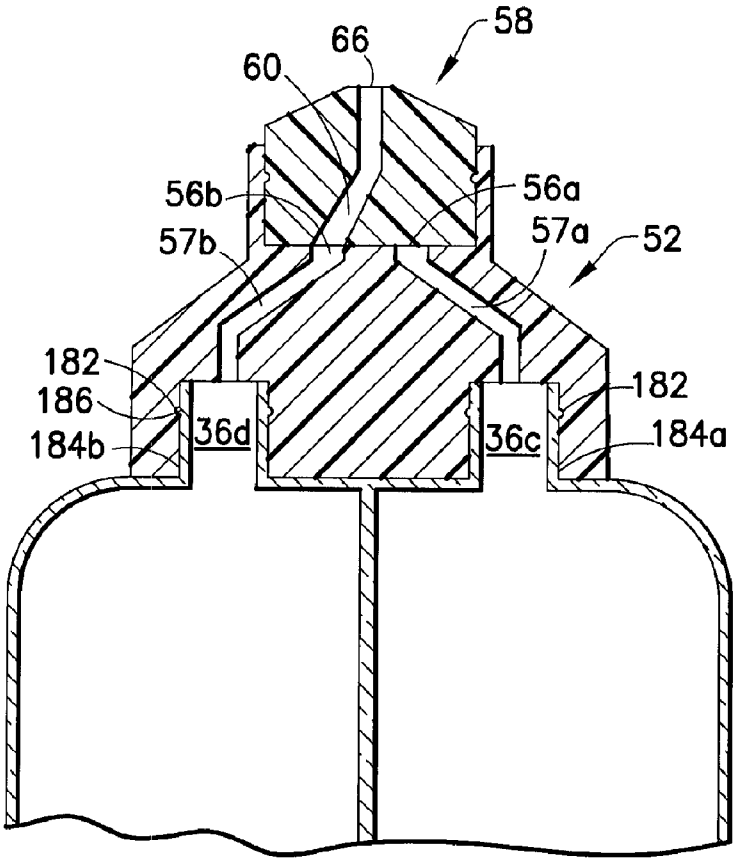


FIG.15a

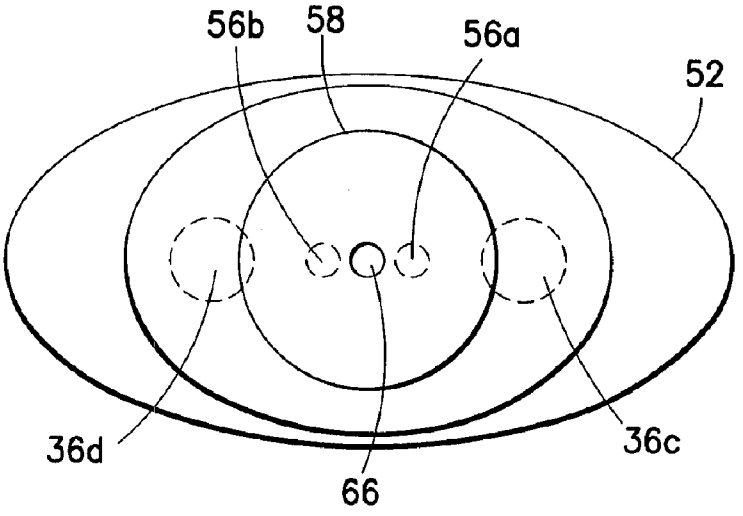


FIG.15b

SOURCE SELECTING CAP AND CLOSURE FOR MULTIPLE CHAMBER BOTTLES

[0001] RELATED APPLICATIONS

[0002] This application is a continuation in part of U.S. patent application Ser. No. 10/942,332 filed on Sep. 15, 2004 entitled MULTIPLE CAVITY BOTTLE AND METHOD OF MANUFACTURING SAME which claims priority of U.S. provisional application Ser. No. 60/502,892 filed Sep. 15, 2003 entitled "BOTTLE HAVING MULTIPLE CAVITIES" and U.S. provisional application Ser. No. 60/551,166 filed Mar. 08, 2004 entitled MULTIPLE CAVITY BOTTLE AND METHOD OF MANUFACTURING SAME, the disclosures of which are fully incorporated herein by reference. This application is co-pending with U.S. patent application Ser. No. 11/163,464 having attorney docket no. Y002 100179 filed Oct. 20, 2005 and entitled MULTIPLE CHAMBER BOTTLE AND METHOD OF FILLING AND ASSEMBLING SAME which claims the priority of U.S. provisional application Ser. No. 60/627877 filed on Nov. 15, 2004 entitled COAXIAL DUAL CAVITY BOTTLE AND METHOD OF MANUFACTURING SAME having a common inventor with the present application, the disclosure of which is fully incorporated herein by reference. This application also claims priority of that provisional application. This application is also co-pending with U.S. Design patent application Ser. No. 29/229152 filed on May 4, 2005 entitled A NECK AND CAP ARRANGEMENT AND ASSOCIATED NESTED BOTTLE BOTTOM FOR A BOTTLE IN A BOTTLE and having a common inventor with the present application, the disclosure of which is fully incorporated herein by reference.

BACKGROUND

[0003] 1. Field of the Invention

[0004] This invention generally relates to liquids containers, and more specifically to a cap for selective communication with multiple chambers in a common container for different commodities.

[0005] 2. Description of the Related Art

[0006] Liquid storage containers have been provided in numerous sizes and shapes for various liquid commodities. The most ubiquitous containers are presently plastic and provide multiple sizes and shapes with mass production capability and recyclable materials.

[0007] In many endeavors, individuals use multiple commodities in combination. Sports enthusiasts are typically becoming aware of the benefits of combining the use of electrolyte replacing sports drinks with water for ultimate performance enhancement and refreshment. Children often desire to purchase more than a single flavor of soft drink or juices or combine a soft drink or juice with other liquid refreshment such as water or milk.

[0008] Beverage companies frequently launch new product flavors and have the need to inform customers that the new flavors are associated with their existing well-known brand and comprise part of their product portfolio. Currently, these companies are limited to arranging single-cavity bottles containing the new flavors in close proximity to other single-cavity bottles containing the well-known brand at the point of purchase.

[0009] Having multiple beverages or other commodities contained within a single bottle requires means for selective access to one or more of the commodities and a sealing arrangement for closure of the bottle. In the current state of the art, multiple chamber bottles are generally only dual-chambered and are limited to either having a single closure covering both openings with no ability to select between the openings, or two separate closures covering both openings with no common output or variable selection means.

[0010] It is therefore desirable to provide a cap and selection system for integrated containers having multiple cavities or chambers for storage of different commodities. It is further desirable that such a cap be easily manufactured and applicable to various multiple chamber bottle configurations.

SUMMARY OF THE INVENTION

[0011] A source selecting cap and closure for multiple cavity bottles incorporates a first element sealingly engaging a first opening in a first cavity of a bottle and a second opening in a second cavity of the bottle. A second element is movably engaged by the first element and provides an outlet and means connected to the outlet for selectively communicating with the first cavity of the bottle in a first position and communicating with the second cavity of the bottle in a second position.

[0012] In one embodiment, the first element includes a wall covering the first and second opening, the wall including a first orifice in communication with the first cavity and a second orifice in communication with the second cavity. The second element incorporates a sealing face adjacently opposed to the wall and at least one channel in the second element extending from the outlet to an aperture in the sealing face, said aperture in alignment with the first orifice in said first position and in alignment with the second orifice in a second position for selectively communicating with the cavities.

[0013] In an alternative embodiment, the first element incorporates a bore with a first channel communicating with the first opening and terminating at a first orifice in the bore and a second channel communicating with the second opening and terminating at a second orifice in the bore. The second element incorporates a hollow cylindrical stem, a portion of which is closely received within the bore with the outlet located adjacent a first end of the stem. An aperture in a side wall of the stem distal the outlet and aligned with the first orifice in a first angular orientation of the stem and with the second orifice in a second angular orientation of the stem provides the selective communication with the cavities and rotating the stem establishes the first and second angular orientation.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] These and other features and advantages of the present invention will be better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

[0015] **FIG. 1** is an isometric view of a first embodiment of a bottle with which the present invention is employed;

[0016] **FIG. 2** is an isometric exploded view of the bottle of **FIG. 1** showing the interconnecting fit of the first and second elements;

[0017] **FIG. 3***a* is a side view of an embodiment of a bottle with which the invention is employed showing a top engagement feature;

[0018] **FIG. 3***b* is a top view of the embodiment of **FIG. 3***a;*

[0019] **FIG. 3***c* is a top view of a modification to the embodiment of **FIG. 3***a;*

[0020] **FIG. 3***d* is a side section view of a double bottle arrangement with which the present invention may be employed;

[0021] **FIG. 4** is a partial side section view of an alternative top engagement feature of the bottle of **FIG. 3***a* and a first sealing cap arrangement embodying the present invention;

[0022] **FIG. 5***a* is a partial side section view of an alternative embodiment of a bottle with which the present invention is employed with a second bottle embodiment;

[0023] **FIG. 5***b* is a lower perspective view of the cap elements in the embodiment of **FIG. 5***a;*

[0024] **FIG. 6** is a side section view of the bottle of **FIG. 3***d* with an alternative embodiment of the present invention;

[0025] **FIGS. 7***a*-**7***d* are top, first side section, first side and second side views of the rotatable upper element of the embodiment of **FIG. 6**;

[0026] **FIGS. 8***a* and **8***b* are top and side section views of the fixed bottom element of the embodiment of **FIG. 6**;

[0027] **FIG. 9***a* is a partial side section view of an embodiment of the present invention optimized for molding;

[0028] **FIG. 9***b* is a bottom view of the rotating upper element of the embodiment of **FIG. 9***a;*

[0029] **FIG. 9***c* is a top view of an intermediate sealing disc employed with the embodiment of **FIGS. 9***a* and **9***b;*

[0030] **FIG. 9***d* is a top view of the intermediate sealing disc demonstrating various porting combinations;

[0031] **FIG. 9***e* is a bottom perspective view of the molded rotating upper element;

[0032] **FIG. 9***f* is a top exploded perspective view of the molded rotating upper element and seailing disk;

[0033] **FIG. 9***g* is a bottom perspective view of the fixed lower element;

[0034] **FIG. 9***h* is a top perspective view of the fixed lower element;

[0035] **FIG. 9***i* is an exploded lower perspective view of the elements;

[0036] **FIG. 9***j* is a top perspective view of the elements as assembled;

[0037] **FIGS. 10***a*-**10***c* are partial side section views of embodiments of sealing features incorporated in the bottom element of **FIGS. 8***a* and **8***b;*

[0038] **FIGS. 10***d* and **10***e* are partial side section views of the o-ring sealing feature of **FIG. 10***a* demonstrating an additional "hard off" configuration;

[0039] **FIG. 11**. is a side section view of yet another embodiment of the invention;

[0040] **FIG. 12** is a side section view of another embodiment of the invention employing a rotatable stem;

[0041] **FIG. 13***a* is an exploded section view of a modification of the embodiment of **FIG. 12** providing alternative sealing elements and improved manufacturability;

[0042] **FIG. 13***b* is a side section view of the assembled cap elements of the embodiment of **FIG. 13***a;*

[0043] **FIG. 13***c* is a side section view of the assembled cap and bottle of the embodiment of **FIGS. 13***a* and **13***b;*

[0044] **FIG. 14** is a side section view of another alternative embodiment of the invention; and,

[0045] **FIGS. 15***a* and **15***b* are a side section view and top view of another embodiment of the invention for use with separately necked containers.

DETAILED DESCRIPTION OF THE INVENTION

[0046] Referring to the drawings, **FIG. 1** is an isometric view of a bottle **10** incorporating the multiple chambers with which the present invention is employed. For the embodiment shown, elements or moieties of a combination forming the invention are a first bottle half **12**, and second bottle half **14** that are engaged to form the completed bottle having two separate cavities for storage and dispensing of two separate liquids.

[0047] An exploded isometric view of the bottle for the embodiment described is shown in **FIG. 2**. Each half has an outer surface **16** and mating surface **18**. The outer surface of the first bottle half, and second bottle half may be of any shape, but the example shown have a generally cylindrical outer surface. The mating surfaces of each bottle half are formed as complimentary shapes, allowing the bottle halves to adjacently seat together in a side-by-side relationship.

[0048] In the embodiment shown, mating surface **18** of each bottle half forms a generally flat plane with a helical twist or, alternatively described, the helical mating surface has a planar cross section. The flat shape is preferred because it allows both bottle halves to be manufactured as the same part. Alternately, the mating surface may be shapes other than flat, such as concave and convex and may have male and female joining features, but any such features or shapes that are not symmetrical require that the bottle halves are formed as two separate parts from different molds. When the bottle halves are seated together, their mating surfaces sit adjacently together along the flat twisted plane that is formed at the angle of helical rotation. This helical shaping, particularly if 180° of twist or greater, allows the contents of the two cavities of the combined bottle to be viewed from any aspect thereby enhancing the marketability of the products contained in the bottle by clearly demonstrating the presence to two distinct commodities in the single bottle.

[0049] As shown in the drawings, first bottle half **12** and second bottle half **14** each have two ends, a bottom end **20** and a top end **22**. The bottom end is closed and is typically flat or concave, providing a base for standing the bottle upright. The top end of each bottle half has an opening **24***a* and **24***b* for individually dispensing the contents of each

bottle half. While the opening can be any shape, the opening shown is "D" shaped. Top portion **22** may also have a threaded or unthreaded surface for receiving a cap mechanism for sealing the opening, as will be described in greater detail subsequently.

[**0050**] The combined bottle can incorporate more than two bottle cavities, but the embodiments shown for this embodiment provide two cavities. The separate cavities of the combined bottle can be used to contain any substance that a person practicing the invention desires. One anticipated embodiment is as a beverage container holding, for example, an electrolyte replacing sports drink in one cavity and water in the second cavity.

[**0051**] Since both first bottle half **12** and second bottle half **14** are separate containers, each capable of holding a liquid and keeping the liquid sealed and separate from the contents of the other bottle half, there is a separate opening, **24***a* and **24***b*, in each cavity. In the embodiment shown, the opening of each cavity is generally "D" shaped and when first bottle half **12** and second bottle half **14** are intertwined together, the combination of opening **24***a* from first bottle half **12** and opening **24***b* from second bottle half **14** creates a generally cylindrical threaded or unthreaded neck.

[**0052**] **FIGS. 3***a* through **3***d* demonstrate alternative connection and cavity configurations for various embodiments of bottles with which the present invention is employed. **FIGS. 3***a* and **3***b* show a combined bottle incorporating two individually sealable bottle halves **26** and **28** with a mating surface **30**. The two cavities need not be constructed as equally proportioned halves, they may be constructed in unequal halves as shown by large left half **26'** and small right half **28'** demonstrated in **FIG. 3***c*. The threads or snap feature of the cap hold both halves together and seal their contents. For additional strength beyond that which is provided by the application of a threaded or snap-on closure to secure the bottle halves together, the embodiment of **FIG. 3***a* may incorporate an optional flange **32** over which a collar **34** (shown in section) is forced to circumferentially engage the neck **36**. An alternative embodiment of an upper engagement is shown in **FIG. 4** wherein an optional indentation **38** is provided in the circumference of the neck in which a ring **40** (shown in section) is engaged. **FIG. 3***d* shows a coaxial bottle within a bottle arrangement wherein an outer bottle **42** receives and surrounds an inner bottle **44**.

[**0053**] **FIG. 4** shows a cap mechanism **50** according to the present invention. A substantially cylindrical lower element **52** is received over the protruding neck **36** of the bottle halves. A wall **54** seals the lower element with orifices **56***a* and **56***b* positioned over the openings in the respective bottle halves. A rotatable upper element **58** is received in the cylindrical body of the lower element and incorporates a channel **60** which is positionable over orifice **56***a* for communication with the cavity of the first bottle half or over orifice **56***b* for communication with the cavity of the second bottle half or intermediate the two apertures to re-seal the bottle. In alternative embodiments, the housing incorporates a circumferential protrusion which mates with indentation **38** to eliminate the requirement for a separate securing ring. The housing is adhesively bonded or ultrasonically welded to the disk in alternative embodiments.

[**0054**] A side sectional view of an alternative embodiment of the present invention is shown in **FIG. 5***a* wherein the cap mechanism incorporates two elements as with the embodiment previously described. An upper element **52** is rotatably supported in a lower element **58**. The lower element incorporates a substantially cylindrical body **62** with a sealing wall **54** and is secured to the dual cavity bottle, in the embodiment shown by an engagement protrusion snap **39** in the inner circumference of the body snapped into position over a mating female engagement indentation **38** in the circumference of the neck **36** of the bottle. One example of such a bottle that is formed from a single part having a vertical septum separating two equal cavities is manufactured by Owens Illinois and is presently commercially available containing such commodities as drain clog removing chemicals and carpet cleaning solutions. The Owens Illinois single-part bottle is manufactured by the extrusion blowmolding technique from a plastic resin such as high density polyethylene (HDPE), and the septum is formed by a molding technique known to those skilled in the art of blowmolding containers as a "pinch off". An example of this single-part bottle with a vertical septum is shown in partial cross section in **FIG. 5***a*. The embodiment of the single-part bottle with a septum or common wall **30** provides sealing engagement between the wall and opposed D-shaped channels create protrusions **63** (best seen in the perspective view of **FIG. 5***b*) extending diametrically across the bottom of the lower element. These channels align the lower element with the corresponding "D" shaped neck openings in the bottle. During assembly the "D" shaped protrusions enter the neck of the bottle. After lowering the lower element down into the neck slightly, the snap engages and the bottle neck and septum collectively crush the soft underside sealing surface in the D-shaped channels of the lower element to create a tight seal against the top of the neck surface of the bottle and the top of the septum.

[**0055**] An upper element **58** is received within the cylindrical body of the lower element. The upper element has a substantially circular face **65** which sealingly engages the upper surface of wall **54** in the lower element. The wall in the lower element incorporates a first orifice **56***a* communicating with opening **24***a* of the first cavity of the bottle and a second orifice **56***b* communicating with opening **24***b* of the second cavity of the bottle. A channel **60** extending through the upper element to a dispensing opening **66** is positionable over a selected one of the orifices by rotation of the upper element. Rotation of the upper element to an intermediate position places the channel adjacent a blank portion of the wall while the circular face of the upper element seals the two orifices.

[**0056**] For bottles with a configuration similar to the coaxial bottle in bottle of **FIG. 3***d*, the cap mechanism shown in **FIG. 6** is employed. Lower element **52** again incorporates a substantially cylindrical body **62** which receives neck **36***a* of outer bottle **42**. A second cylindrical boss **64** depends from the wall **54** and receives neck **36***b* of inner bottle **44**. For the embodiment shown, the coaxial arrangement of the inner and outer bottles allows threaded engagement between mating moieties in the necks and the cylindrical body and boss. As in the embodiment described previously, a snap engagement is employed in alternative embodiments of the coaxial bottle arrangement.

[**0057**] The upper element employs two channels **66***a* and **66***b* in communication with the outlet. As will be described with respect to **FIGS. 8***a* and **8***b*, a first orifice in the wall

communicates with the outer bottle while a second orifice in the wall communicates with the inner bottle. Angular arrangement of the channels for alignment with the associated orifice upon rotation of the upper element to a predetermined position allows selection of a connection between the outlet and the contents of the inner bottle or the outer bottle. Again, rotation to a non-aligning position with both channels and orifices, provides for sealing of the orifices by the circular face of the upper element.

[0058] **FIGS. 7***a*-**7***d* show upper element **58** in more detail. To facilitate the rotation of the upper element, two parallel flat sides **76** may be formed into the generally conically-shaped upper element for the embodiment shown. The flat sides of the upper element are grasped using the fingers in order to more easily rotate the cap between the three (or more) desired positions for example off position, drinking the beverage in the outer bottle, drinking the beverage in the inner bottle and mixing the contents of both. Flat sides or protruding tabs are also useful to help the consumer overcome the sealing resistance of the upper cap as it statically compresses the seals surrounding the ports. The amount of static seal compression may be adjusted to accommodate and prevent leakage of commodities of varying carbonation levels or to provide a "hard off" as will be described in greater detail subsequently. Outlet **66** provides the selected contents to the user being provided by channel **66***a* from the inner bottle when appropriately aligned for communication with the inner bottle and through channel **66***b* from the outer bottle when properly aligned.

[0059] **FIGS. 8***a* and **8***b* are top view and side section view taken through plane **8***b*-**8***b* that show lower element **52** in more detail. It is apparent from the top view that the embodiment shown features two cylindrically-shaped orifices, inner orifice **72** and outer orifice **74**. The orifices may be any shape desired for practicing the invention as will be described in greater detail subsequently. The orifices are positioned for access to the inner and outer bottles as previously discussed with respect to **FIG. 6** with orifice **72** accessing contents of the inner bottle and orifice **74** accessing the contents of the outer bottle. Inner passageway **66***a* and outer passageway **66***b* of upper element **58** align with orifaces **72** and **74** respectively when the upper element is rotated to the respective alignment position. When neither orifice is aligned, the cap seals both the inner and outer bottle.

[0060] For the embodiment shown in **FIGS. 7***a*-**7***d* and **8***a* and **8***b*, the rotatable engagement between the upper and lower elements of the cap is accomplished by ridge **77** on the inner diameter of the lower element engaging groove **78** in the circumference of the upper element. The lower element is secured to the neck of the inner bottle by threads **80** and secured to the outer bottle with threads **82**. In alternative embodiments, a snap fit or alternative engagement mechanism is employed as previously described. Referring to FIGS. **7***a* and **8***a*, an arrow **73**(*d*) or other position indicating mark can be used on intermediate cap **16** to align with a corresponding mark **73**(*a*), **73**(*b*) or **73**(*c*) on upper cap **18** to indicate to the user which position the cap is in. In the example shown in the drawings, a high energy drink is contained in the inner bottle with the appropriate arrow **73**(*b*) labeled "ENERGY". The outer bottle contains water and label **73**(*a*) provides the appropriate reference. The "off" position is identified by label **73**(*c*) (not marked as off in the drawing). In an alternate embodiment, a detent feature is used to allow upper cap **18** to "click" into place as it is rotated relative to intermediate cap **16** into positions such as 1) off, 2) inner bottle contents, and 3) outer bottle contents.

[0061] The embodiment of the invention disclosed in **FIGS. 7***a*-**7***d* and **8***a* and **8***b* is easily optimized for molding using standard injection molding techniques. For example, groove **78** in **FIGS. 7***b*-**7***d* represents an "undercut" in an injection mold, however, it is a common practice to those skilled in the art of injection molding plastics to forcefully eject upper element **58** from an injection mold cavity with an ejector boss or elector sleeve relying on the elasticity and resilience of the molded plastic to flex off the mold without damaging or destroying the geometry of groove **78**. Similarly, threads **80** and **82** of lower element **52** represent undercuts in an injection mold, however it is a common practice to those skilled in the art of injection molding bottle closures to form such threads as "strippable threads" and forcefully strip them off of the mold core with an ejector boss or ejector sleeve relying on the elasticity and resilience of the molded plastic to flex off the mold core without damaging or destroying the geometry of threads **80** and **82**. The techniques described above allow for the construction of less expensive and simpler molds than molds containing unscrewing features, or collapsible cores.

[0062] **FIGS. 9***a*-**9***c* provide one such optimized embodiment. As shown in **FIG. 9***a* in side section the channels for communication with the outlet are created by a dumbbell shaped key slot **90** in communication with a bore **92** extending downward from the outlet **66**. As shown in **FIG. 9***b* the key slot is incorporated in a web **94** extending diametrically across the upper element creating open volume between the web and the cylindrical body. These "core outs" eliminate much of the sealing surface of the upper element disclosed in prior embodiments. The cylindrical openings of the key slot and the outlet bore are created within the web. This configuration provides a substantially constant wall thickness for the entire molded part. To maintain separation of the inlet ports for selective communication with the two orifices in the lower element a sealing disk **96**, best seen in **FIG. 9***c*, provides an inner aperture **98** and an outer aperture **100** for alignment with the inner and outer orifices in the lower element upon proper rotation of the upper element with respect to the lower element. As shown in **FIGS. 9***a* and **9***b*, the disk seals against the facing surface **102** of the molded walls of the upper element with the apertures (**72**, **74**) aligned with the inner and outer circular portions (**104** and **106**) of the key slot. Forming the key slot directly into the flat disk potentially creates edges at the transition of the key way into the two round orifices that may hang up on the soft seals or o-rings surrounding the ports. The use of two unconnected round holes or kidney-bean shaped ports in the flat disk as shown in the embodiments and described below avoids this issue. For the embodiment shown, the sealing disk is mechanically attached to the upper element using resilient tabs **108** received in mating slots **110**. Alternatively, the disk is adhesively bonded or ultrasonically welded to the upper element. Coupling of the upper and lower element is accomplished using a rib and groove arrangement as previously described or a central barb **97** extending from the mating wall of the lower element through apertures in the disk and web as shown in **FIG. 9***a*.

[0063] The disk has sufficient thickness and flatness to maintain a rigid planar sealing surface **112** which interfaces with the wall of the lower element. The wall can incorporate multiple orifices for creating selective communication with either one or both of the containers created by the bottle as shown in **FIG. 9***d*. The orifices in the wall are shown in phantom with the apertures in the disk shown in full line form. In a first position **120** with the upper element rotated to place the apertures in the right semicircle of the wall, nominally on the horizontal axis at 0 degrees, the apertures are adjacent blank portions of the wall and the bottle is sealed as indicated by two X marks. In a second position **122** with the upper element rotated to place the apertures in a 90 degree position, the inner orifice **72** is aligned with the inner aperture providing communication with the contents of the inner bottle. In a third position **124** with the upper element rotated to place the apertures in a 180 degree position, the outer orifice **74** is aligned with the outer aperture providing communication with the contents of the outer bottle. Finally, with the upper element rotated to a forth position **126** at 270 degrees, two orifices **72***a* and **74***a* are aligned with the inner and outer apertures to allow access to the contents of both containers simultaneously. The outer orifice **74***a* shown in the figure may be smaller in diameter than the outer orifice **74** providing less flow volume for the contents of the outer bottle in the mixed position than in the single flow condition at position **124**. Additional pairs of orifices with varying diameters are oriented at different rotation angles in alternative embodiments to provide various mixtures of the contents of the inner and outer bottle. Alternatively, slots of varying width are placed under the arc of the inner and outer orifice for flow variation. Additionally, while circular orifices and apertures are shown in the drawings, oval, crescent or other alternative shaped openings for increased flow capacity are employed in alternative embodiments.

[0064] The features of the described embodiment are seen in perspective views of the various elements and assemblies in **FIGS. 9***e*-**9***j*. The lower perspective view of **FIG. 9***e* shows the hog outs and wall thicknesses of the upper element with keyway **90** and inner and outer circular portions **104** and **106** forming the flow passages. Outlet bore **92** and web **94** are also displayed as well as engagement slot **110** for the locking tabs on the disk. The upper exploded perspective of **FIG. 9***f* shows molded case of upper element **58** in relation to disk **96**. Engagement tabs **108** protrude from the disk for engagement in slots **110** as previously described. Apertures **98** and **100** are surrounded by an elevated lip **107** which is sealingly received in the female circular and joining portions of the keyway.

[0065] Similarly, the bottom perspective of lower element **52** as seen in **FIG. 9***g*, shows ports **72** and **74** and the associated body **62** and boss **64** receiving the outer and inner bottles respectively while the upper perspective of **FIG. 9***h* shows the ports in relation to the flat receiving wall engaging the disk in the upper element. Detents **109** which receive dimple **111** on the upper element (best seen in **FIG. 9***f*) provide positive engagement at the rotated positions for selection of the inner and outer bottle contents and the "off" position.

[0066] **FIG. 9***i* shows a lower perspective exploded view of the upper element with the disk in place prior to insertion into the lower element while **FIG. 9***j* shows an upper perspective of the fully assembled cap. A plurality of vertical raised ribs are used on the outer diameter of the lower element **52**, as shown in the drawings, and are engaged by a capping chuck having a corresponding set of vertical female ribs for use in screwing the assembled cap shown in **FIG. 9***j* onto an inner bottle during a first step, and later onto an outer bottle during a second step of the filling process for a coaxial dual cavity bottle as shown in **FIG. 6**.

[0067] Additional features for sealing of the disk and orifices in the wall are employed in alternative embodiments as shown in **FIGS. 10***a*-**10***c*. An o-ring **130** inserted in a relief **132** surrounding the orifice **72** or **74** provides a reliable mechanical seal as shown in **FIG. 10***a*. A first alternative is shown in **FIG. 10***b* where a molded circular lip **134** surrounds the orifice. The lip may be formed facing towards the port and with such geometry that the application of increased pressure from the inside of the bottle will cause a tighter seal and prevent leakage. In certain embodiments, a one step molding process is employed for the lip seal while in alternative embodiments, a two step co-injection molding process is employed to provide a softer durometer material in the lip seal than in the remainder of the wall. **FIG. 10***c* shows a molded circular ridge seal **136** employing multiple teeth of varying height. As for the lip seal, a two step process can be employed to provide a different durometer in the seal element than in the remainder of the wall.

[0068] As shown in **FIGS. 10***d* and **10***e*, a "hard shutoff" is incorporated in certain embodiments of the present invention for shipment of the filled bottle to assure no leakage. As shown in **FIG. 10***d*, disk **96** incorporates depending plateaus **133** which hyper-compresses o-ring **130** to assure sealing over the associated orifice **72** or **74**. When the cap is initially rotated from the "hard off" position by the user to open the container for flow from one bottle as shown in **FIG. 10***e*, the plateau is rotated off the o-ring which assumes its normal sealing shape engaging the bottom of the disk. The hard off position for the exemplary embodiments previously described with respect to **FIGS. 7***a*-**7***d* and **8***a* and **8***b* above could be placed opposite the "off" indicator with no marking.

[0069] While the rotating closure mechanism provides closure for the separate cavities of the bottle, an alternative embodiment providing a positive closure on the outlet of the cap mechanism is shown in **FIG. 11**. The outlet incorporates an extended neck **140** which is threaded to receive a mating threaded cap **142**. This allows the cap mechanism to remain aligned with one of the content orifices but be sealed at the outlet. In other alternative embodiments, the threaded cap is replaced by a standard "sports top" sliding closure.

[0070] **FIG. 12** shows an alternative embodiment of the present invention employing a vertical hollow rotatable cylindrical stem **150** received in a cylindrical bore **152** in a body **154** of the cap mechanism. An input port **156** oriented on a side wall of the stem is selectively positionable at a first channel **158** in the body communicating with a first cavity, in the embodiment shown an inner bottle **44**, or at a second channel **160** communicating with a second cavity, the outer bottle **42** for the embodiment shown. A first angled o-ring **162** mounted on a receiving groove **164** on the stem engages the wall of the bore to seal the input port while a horizontal o-ring **166** mounted in a second groove seals the stem to the bore. Paddle tabs **168** attached to the shaft facilitate rotation of the shaft for alignment of the input port. The stem is

terminated at an end opposite the input port with one or more outlet ports **170** to communicate the selected commodity to the user. A closure mechanism, such as a sports top **172** as shown in the figure, or a threaded sealing cap in alternative embodiments, is provided to seal the outlet port. In alternative embodiments, the stem is axially movable to align the port with axially displaced channels for selection of the desired bottle contents.

[0071] **FIGS. 13***a*-**13***c* demonstrate a refined design for the embodiment of the invention disclosed in **FIG. 12** in which body **154** is molded to include threaded cylindrical receiver **62** for the outer bottle and threaded boss **64** for the inner bottle with channels **158** and **160** for flow communication with the contents of the bottles. The angled o-ring of the embodiment of FIG.**12** is replaced with triangular profile round seals **174** and **176** which encompass the outlets of channels **158** and **160** respectively. Stem **150** is received within bore **152** in the body. Seals **174** and **176** sealingly engage the stem preventing flow from either bottle unless port **156** is aligned with one of the channels.

[0072] Stem **150** is integrated into a shell **177** having sides received in an upwardly oriented mating boss **178** surrounding body **158**. As describe in previous embodiments, a groove **76** in the mating boss receives a rib **78** on the shell for rotatable engagement, restraining the shell and stem in the body. Detents **109** in the mating boss receive and engage a dimple **111** in the shell for positive positioning of the shell and stem with the port aligned with one of the channels or an intermediate "off" position as shown in **FIG. 13***b*.

[0073] In alternative embodiments two apertures on the stem at different elevations are alignable at predetermined rotational angles with the channels which are also arranged to terminate at different elevations and at different angles of rotation not horizontally opposed as shown in the drawings. In this configuration, plateaus added to the stem are also employed as previously described with respect to **FIGS. 10***d* and **10***e* to provide a "hard off" position for the stem.

[0074] Additional features to facilitate rotation of the cap mechanism such as the tabs employed in the embodiment described with respect to **FIG. 12** are also applicable in certain embodiments of the invention such as that shown in **FIG. 14**. Upper element **58** of the cap mechanism employs an extended tab **180** to provide additional leverage in rotating the upper element within the lower element for alignment of the respective orifice and aperture to select the desired commodity.

[0075] Alternative container arrangements for separate cavities or commodity chambers are also accommodated by the present invention. As shown in **FIGS. 15***a* and **15***b*, a cap mechanism having a rotatable upper element **58** and a lower element **52** secures a double bottle having two separate necks, **36***c*, and **36***d*. The lower element is elliptical and employs engagement elements **182** in the inner circumference of receptacles **184***a* and **184***b* snapped into position over mating engagement elements **186** in the circumference of the necks **36***c* and **36***d* of the bottle. Channels **57***a* and **57***b* in the lower element communicate with orifices **56***a* and **56***b* for alignment with one or channels **60** in the upper element which communicate with an outlet **66**. Multiple orifices and/or channels are employed in alternative embodiments for alternate selection and mixing of the commodities in the bottle chambers as previously described with respect to **FIG. 9***d*.

[0076] Having now described the invention in detail as required by the patent statutes, those skilled in the art will recognize modifications and substitutions to the specific embodiments disclosed herein. Such modifications are within the scope and intent of the present invention as defined in the following claims.

What is claimed is:

1. A source selecting cap and closure for multiple cavity bottles comprising:

a first element sealingly engaging a first opening in a first cavity of a bottle and a second opening in a second cavity of the bottle;

a second element movably engaged by the first element and having a single outlet;

means connected to the outlet for selectively communicating with the first cavity of the bottle in a first position and communicating with the second cavity of the bottle in a second position.

2. A source selecting cap and closure as defined in claim 1 wherein the means for selectively communicating placed in a third position precludes communication from either cavity to the outlet.

3. A source selecting cap and closure as defined in claim 1 wherein the first element includes a wall covering the first and second opening, the wall including a first orifice in communication with the first cavity and a second orifice in communication with the second cavity;

the second element incorporates a sealing face adjacently opposed to the wall and

the means for selectively communicating comprises at least one channel in the second element extending from the outlet to an aperture in the sealing face, said aperture in alignment with the first orifice in said first position and in alignment with the second orifice in a second position.

4. A source selecting cap and closure as defined in claim 2 wherein the second element is rotatably engaged in the first element and the means for selectively communicating comprises:

a first channel extending from the outlet to a first aperture at a first radius from a center of rotation of the second element, said first orifice located at a radius equal to the first radius and at a first angular orientation; and,

a second channel extending from the outlet to a second aperture at a second radius from the center of rotation, said second orifice located at a radius equal to the second radius and at a second angular orientation.

5. A source selecting cap and closure as defined in claim 4 wherein selective rotation of the upper element to a third angular orientation places the first aperture and second aperture adjacent the wall to create an "off" position.

6. A source selecting cap and closure as defined in claim 1 wherein the multiple cavity bottle incorporates two cavities having a separating septum, said cavities and septum terminating in a common circular neck having a first substantially D-shaped opening formed by the septum and a first portion of a circumference of the neck and a second substantially D-shaped opening formed by the septum and a second portion of the circumference of the neck, the first element further comprising a substantially cylindrical body

with a wall substantially bisecting the cylindrical body to sealingly cover the D-shaped openings.

7. A source selecting cap and closure as defined in claim 6 wherein the wall includes

a first orifice adjacent the first D-shaped opening and a second orifice adjacent the second D-shaped opening;

the second element incorporates a sealing face adjacently opposed to the wall; and

the means for selectively communicating comprises at least one channel in the second element extending from the outlet to an aperture in the sealing face, said aperture in alignment with the first orifice in said first position and in alignment with the second orifice in a second position.

8. A source selecting cap and closure as defined in claim 6 wherein at least one mating groove on the neck and at least one rib on an inner circumference of the cylindrical body to capture the neck in the body.

9. A source selecting cap and closure as defined in claim 1 wherein the multiple cavity bottle incorporates a first outer bottle forming a first cavity and a second inner bottle forming the second cavity, each bottle having a neck with an opening, the first element further comprising:

a substantially cylindrical body sealingly receiving the neck of the first bottle;

a wall substantially horizontally bisecting the cylindrical body;

a substantially cylindrical receptacle depending from the wall and sealingly receiving the neck of the second bottle, the wall sealingly covering both openings.

10. A source selecting cap and closure as defined in claim 9 wherein the wall includes

a first orifice adjacent the opening of the first bottle and a second orifice adjacent the opening of the second bottle;

the second element incorporates a sealing face adjacently opposed to the wall; and

the means for selectively communicating comprises a first channel in the second element extending from the outlet to a first aperture in the sealing face, said first aperture in alignment with the first orifice in said first position and a second channel in the second element extending from the outlet to a second aperture in the sealing face in alignment with the second orifice in said second position.

11. A source selecting cap and closure as defined in claim 9 wherein mating threads on the neck of the first bottle and an inner circumference of the cylindrical body provide the sealing engagement for the first bottle.

12. A source selecting cap and closure as defined in claim 9 wherein mating threads on the neck of the second bottle and an inner circumference of the cylindrical receptacle provide the sealing engagement for the second bottle.

13. A source selecting cap and closure as defined in claim 1 wherein

the first element incorporates a bore and further comprises:

a first channel communicating with the first opening and terminating at a first orifice in the bore and a second channel communicating with the second opening and terminating at a second orifice in the bore; and

the second element further comprises:

a hollow cylindrical stem, a portion of which is closely received within the bore, the outlet located proximate a first end of the stem; and

means for rotating the stem; and

the means for selectively communicating comprises an aperture in a side wall of the stem distal the outlet and aligned with the first orifice in a first angular orientation of the stem and with the second orifice in a second angular orientation of the stem.

14. A source selecting cap and closure as defined in claim 13 further comprising means for sealing the stem and orifices.

15. A source selecting cap and closure as defined in claim 14 wherein the sealing means comprises:

a first seal mounted on the stem angled from above the aperture to a point diametrically distal and below the aperture to seal the aperture for interface with the orifices; and

a second horizontal seal mounted on the stem spaced outboard from the first angled seal to seal the stem and bore.

16. A source selecting cap and closure as defined in claim 14 wherein the sealing means comprises a first seal circumferentially surrounding the first orifice and a second seal circumferentially surrounding the second orifice.

17. A source selecting cap and closure as defined in claim 16 wherein the first and second seals have a substantially triangular cross section.

18. A source selecting cap and closure as defined in claim 13 further comprising means for sealing the outlet.

19. A source selecting cap and closure as defined in claim 10 further comprising:

a first seal operably surrounding the first orifice and a second seal operably surrounding the second orifice, the sealing face engaging the first and second seals.

20. A source selecting cap and closure as defined in claim 19 further comprising:

at least one plateau depending from the sealing face, said plateau oriented and sized to engage and hyper compress one of said seals with the second element in a "hard off" position.

21. A source selecting cap and closure as defined in claim 10 wherein the second element comprises:

a molded cover having a facing surface and a diametric web, said means for selectively communicating incorporating a keyway having a first cylindrical column and a second cylindrical column in said web, said keyway in communication with a third cylindrical column depending from said outlet; and

said sealing surface comprises a sealing disk engaging said molded cover on the facing surface and having a first aperture aligned with said first cylindrical column and a second aperture aligned with said second cylindrical column.

22. A source selecting cap and closure as defined in claim 21 wherein the second element further incorporates indexing indicia for indicating said first and second position.

23. A source selecting cap and closure as defined in claim 21 wherein the second element further incorporates a dimple received in one of at least two detents in the cylindrical body of the first element, each detent positioned for engaging the dimple at one of said first or second positions.

24. A source selecting cap and closure as defined in claim 21 wherein said sealing disk incorporates a raised lip surrounding said first and second aperture, said lip sealingly received in said keyway.

25. A source selecting cap and closure for a multiple cavity bottle incorporating a first outer bottle forming a first cavity and a second inner bottle forming a second cavity, each bottle having a neck with an opening, said cap and closure comprising:

a first element having

a substantially cylindrical body sealingly receiving the neck of the first bottle;

a wall substantially horizontally bisecting the cylindrical body;

a substantially cylindrical receptacle depending from the wall and sealingly receiving the neck of the second bottle, the wall sealingly covering both openings, said wall further having a first orifice communicating with the opening of the first bottle and a second orifice communicating with the opening of the second bottle;

a second element movably engaged by the first element and having an outlet;

a molded cover having a facing surface and a diametric web, a keyway having a first column and a second column in said web, said keyway in communication with a third column depending from said outlet;

a sealing disk intermediate and engaging said molded cover on the facing surface and said wall, the disk having a first aperture aligned with said first column and a second aperture aligned with said second column; and

said first aperture in alignment with the first orifice in a first position and said second aperture in alignment with the second orifice in a second position.

26. A source selecting cap and closure as defined in claim 10 wherein the wall includes a third orifice communicating with the first bottle and a forth orifice communicating with the second bottle, said third and forth orifices aligned with the first and second aperture in a third position.

27. A sealing system for a multiple cavity bottle comprising:

a surface sealing a first cavity in the bottle;

a first orifice in the surface communicating with a first cavity in the bottle;

a seal surrounding the first orifice;

a mating surface closely adjacent the sealing surface and having at least one aperture, the mating surface movable to align the first aperture with the first orifice in a first open position;

a plateau extending from the mating surface, intermediate the mating surface and the sealing surface, said plateau alignable with the first orifice in a second hard off position, the pleateau hyper compressing the seal in the second hard off position.

28. A sealing system as defined in claim 27 wherein the mating surface engages the seal orientations other than the hard off position.

29. A sealing system as defined in claim 27 further wherein the sealing surface has a second orifice communicating with a second cavity in the bottle, said mating surface movable to a third position to align the aperture with the second orifice.

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