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(54) **BOTTLE CLOSURE ASSEMBLY**

Publication Classification

(76) Inventor: **Bryan L. Reidenbach**, Millersburg, OH
(US)

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Correspondence Address:

SAND & SEBOLT
4801 DRESSLER RD., N.W.
SUITE 194
CANTON, OH 44718 (US)

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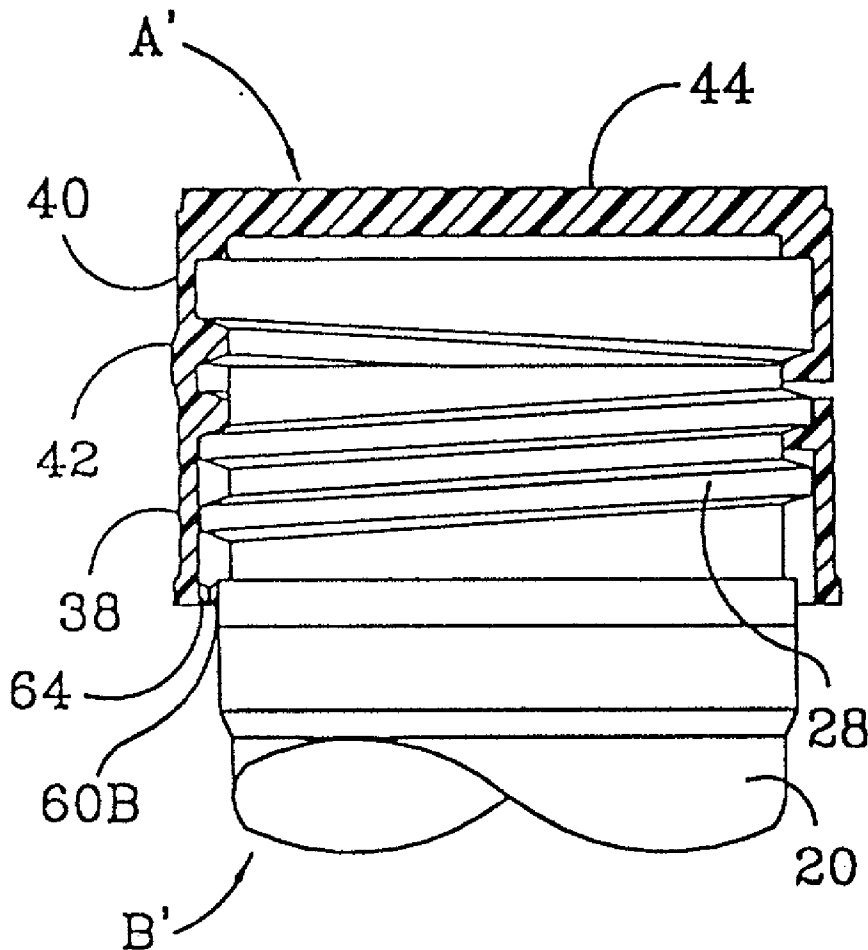
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(63) Continuation of application No. 09/440,412, filed on Nov. 15, 1999, now abandoned, which is a continuation of application No. 09/280,429, filed on Mar. 29, 1999, now Pat. No. 6,264,051, which is a continuation of application No. 08/549,950, filed on Oct. 30, 1995, now Pat. No. 5,944,207.

(57) **ABSTRACT**

A bottle closure assembly for providing access to the fluids within a bottle without the complete removal of the closure. The bottle closure apparatus comprising a cap and a sleeve connected by a hinge. Both the cap and the sleeve containing internal threads for twisting the closure apparatus onto a threaded bottle opening. The closure sealing the container when fully threaded on to the threaded opening, while providing access to the fluid therein when only partially threaded (sleeve only) by allowing the cap to pivot about the hinge. In addition, position nubs may be provided along the threads to resistively indicate when the cap is pivotable. Additional embodiments are presented wherein an opening is formed in a top end of the cap for receiving a nipple allowing the bottle closure assembly to be used on a baby bottle.



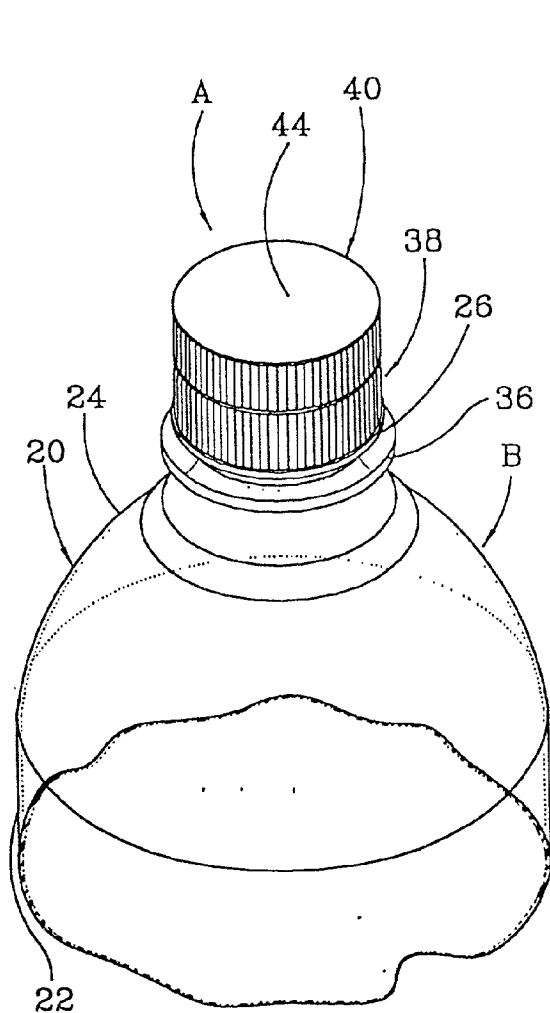


FIG. 1

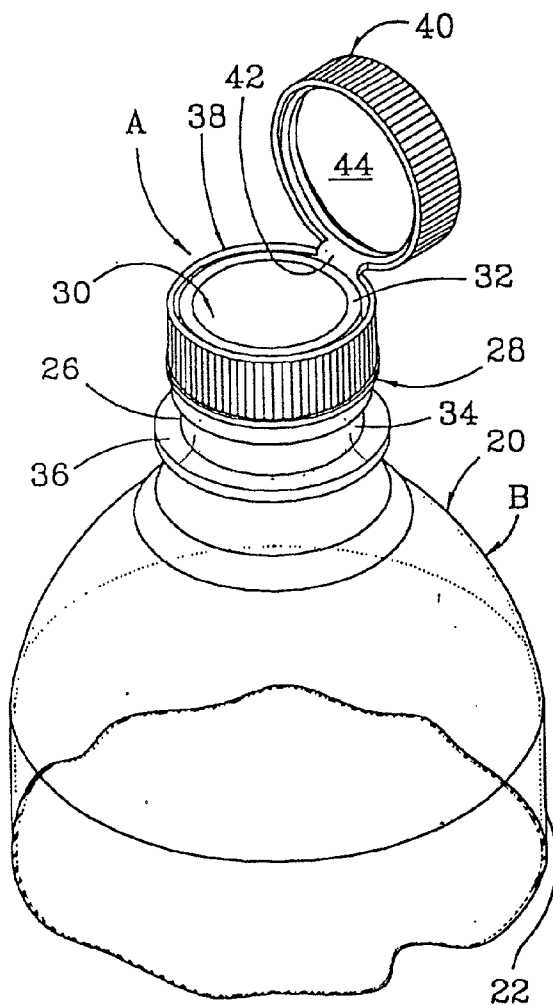


FIG. 2

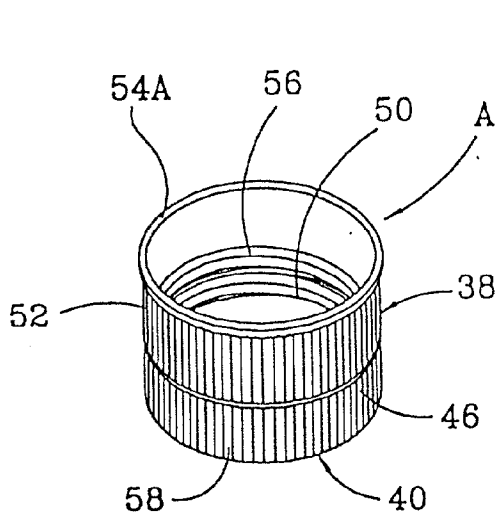


FIG. 3

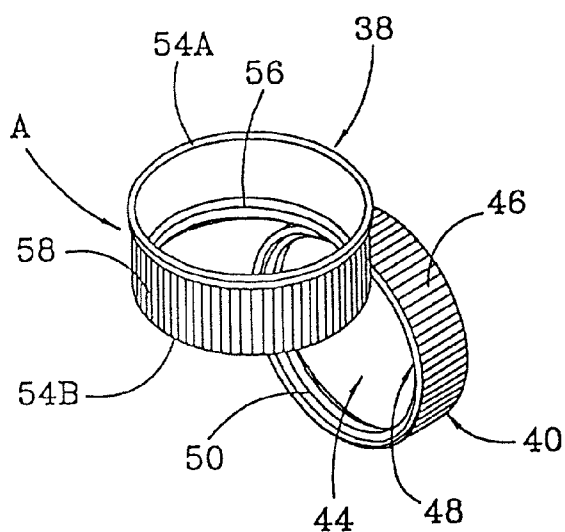


FIG. 4

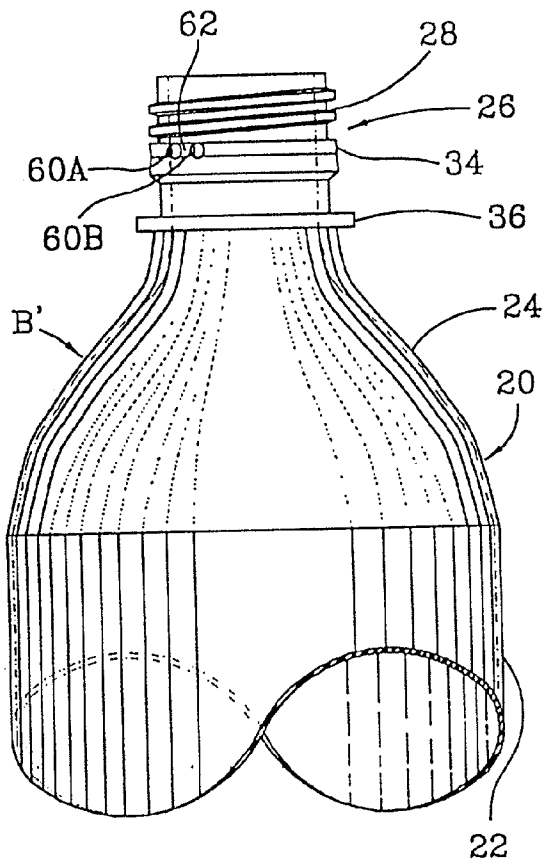


FIG. 7

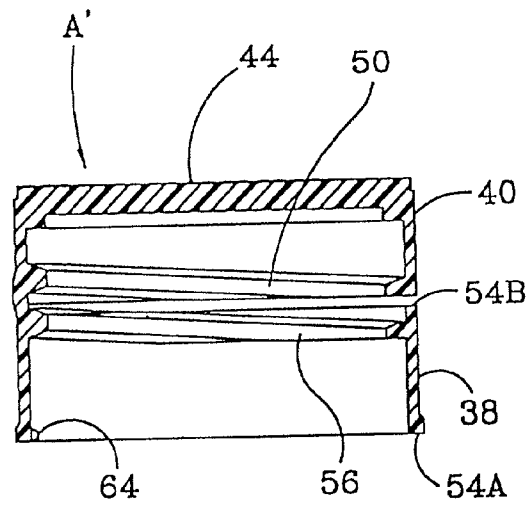


FIG. 8

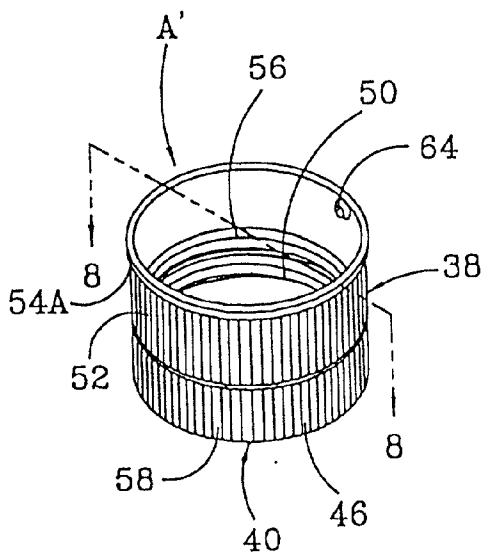


FIG. 5

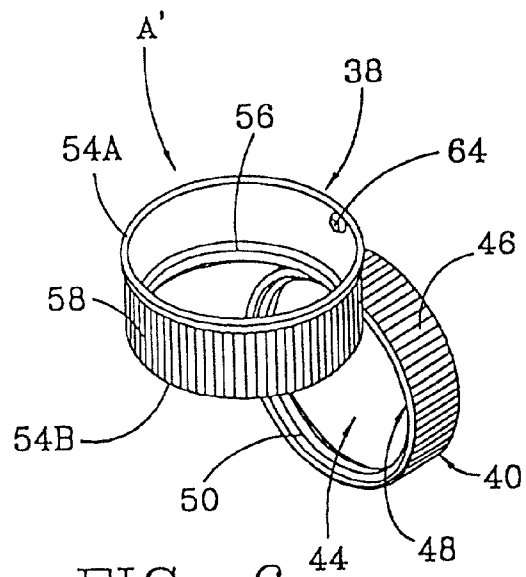


FIG. 6

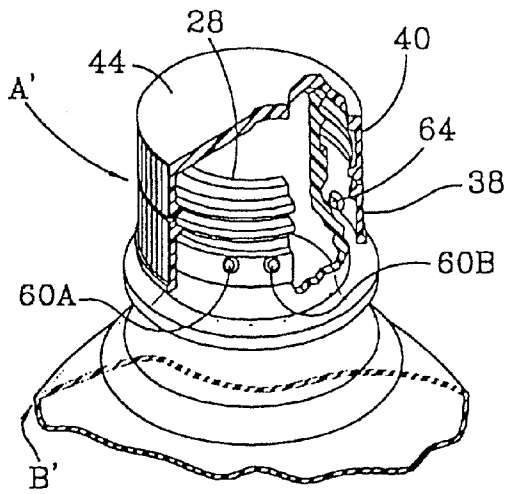


FIG. 9

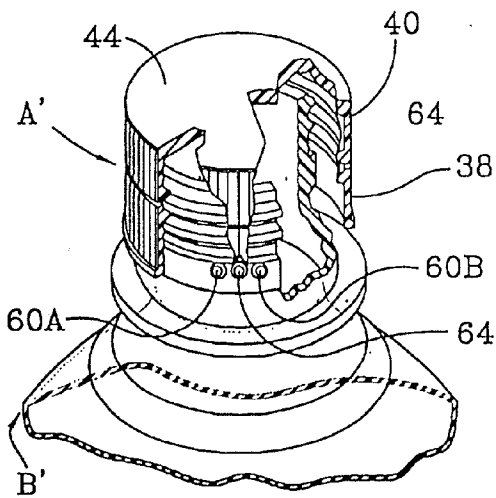


FIG. 10

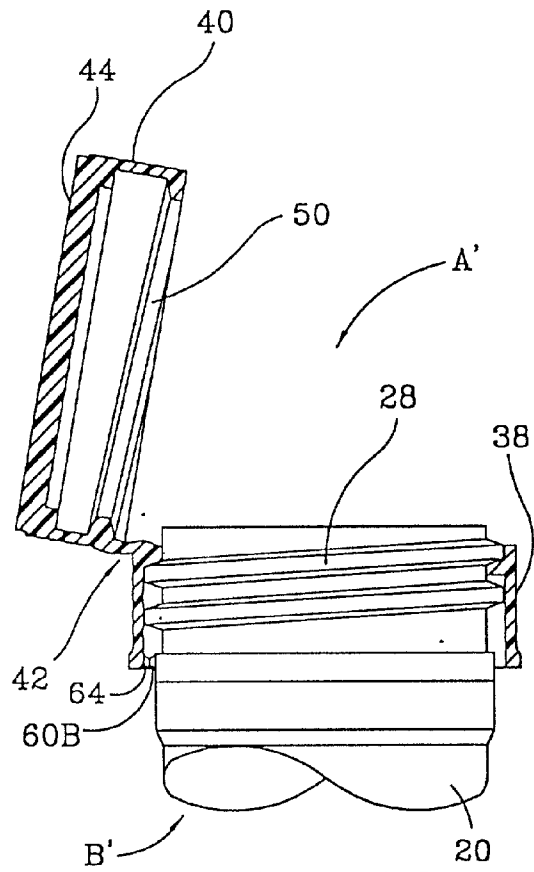


FIG. 13

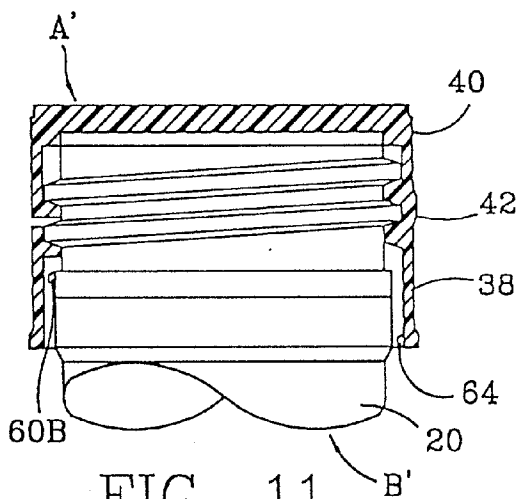


FIG. 11

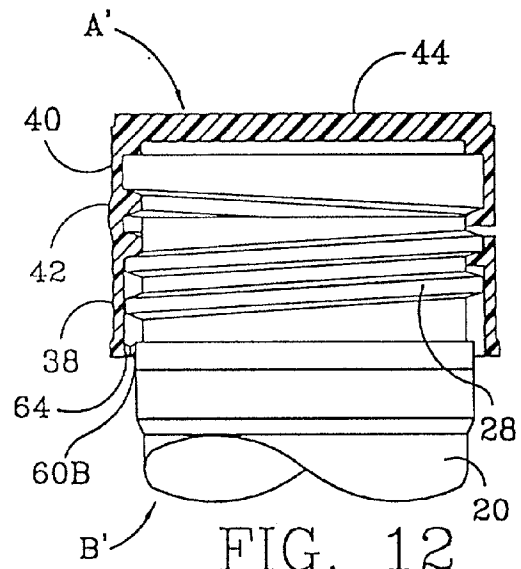


FIG. 12

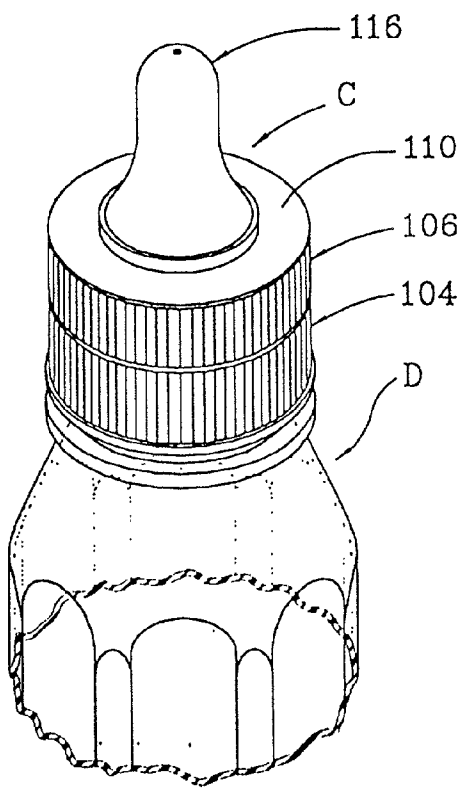


FIG. 14

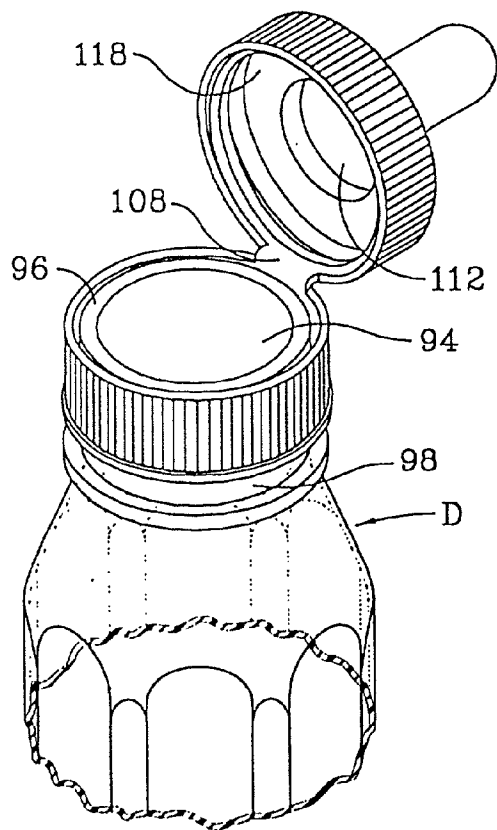


FIG. 15

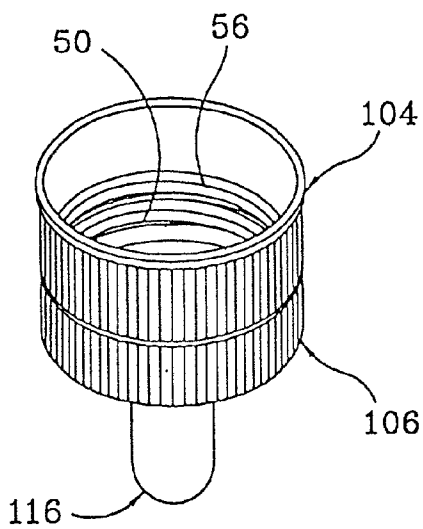


FIG. 16

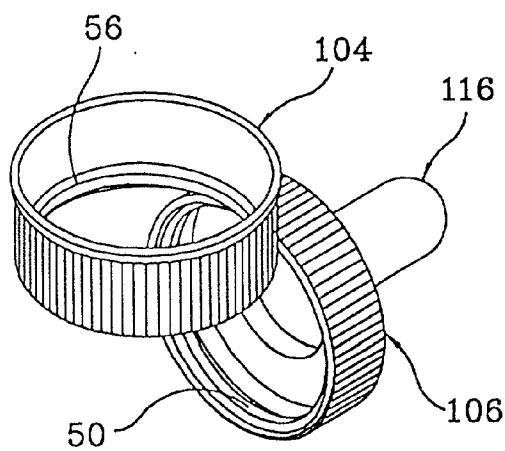


FIG. 17

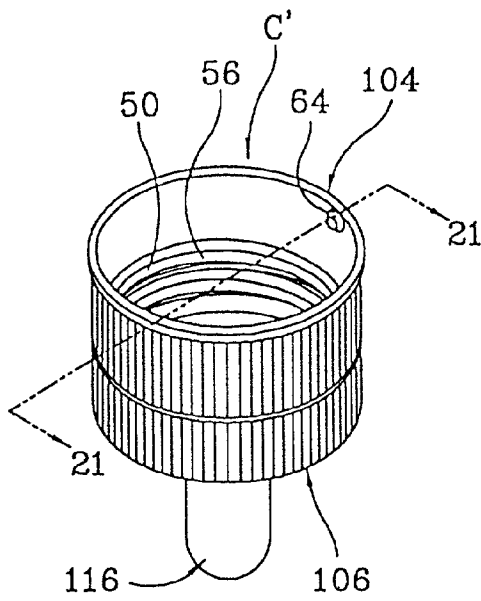


FIG. 18

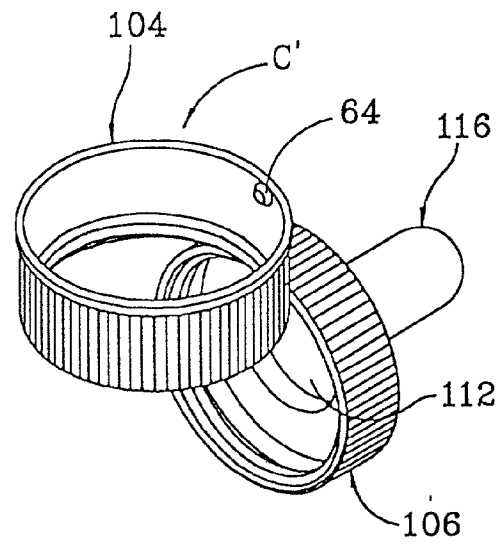


FIG. 19

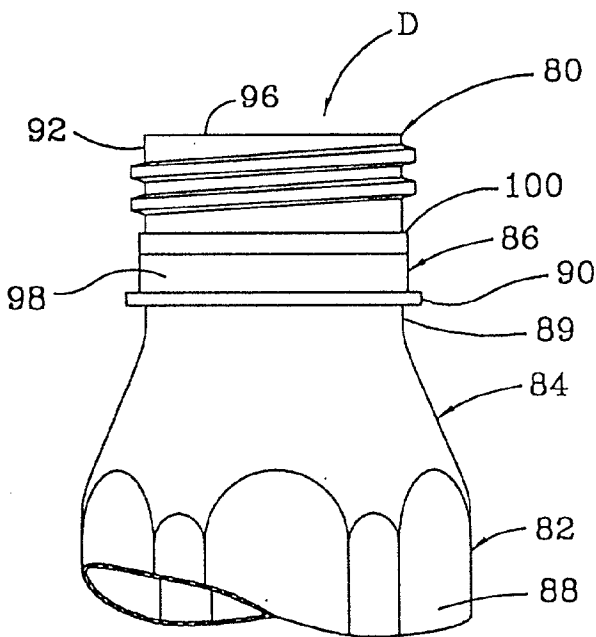


FIG. 20

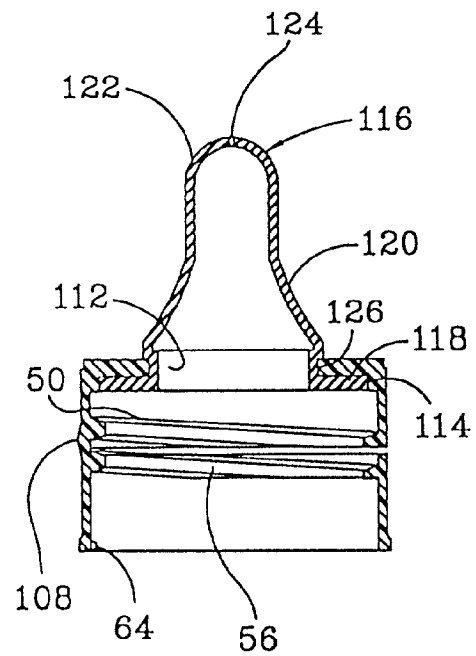


FIG. 21

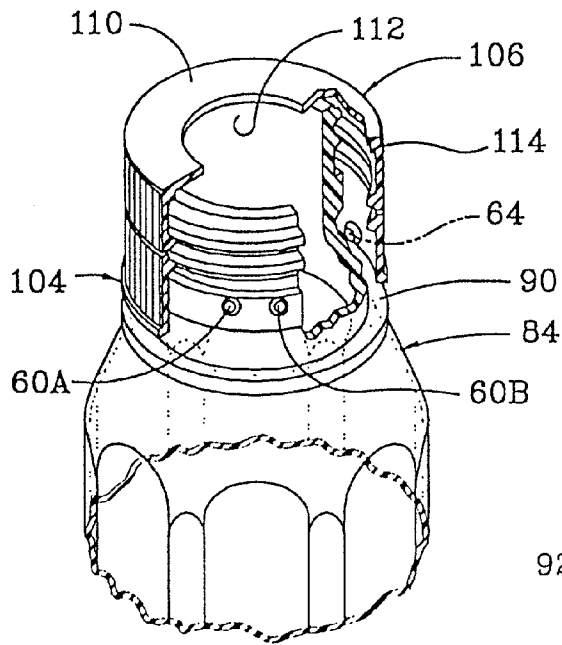


FIG. 22

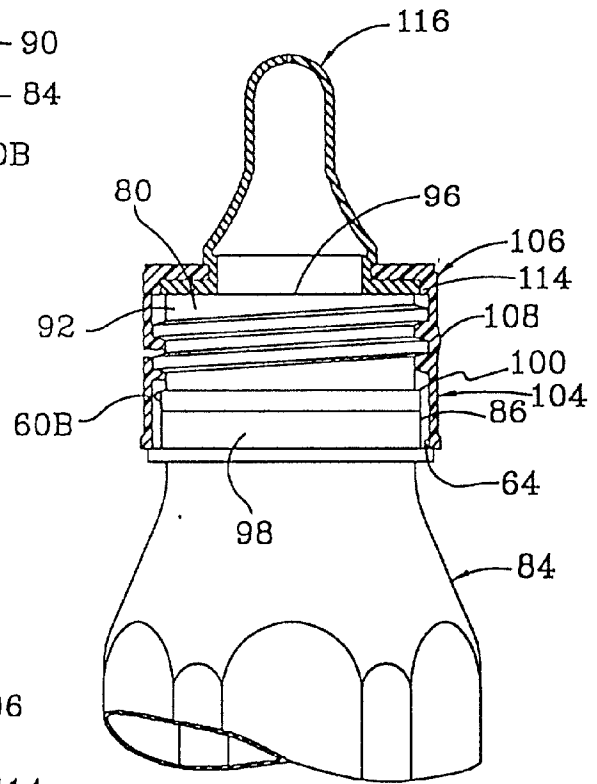


FIG. 24

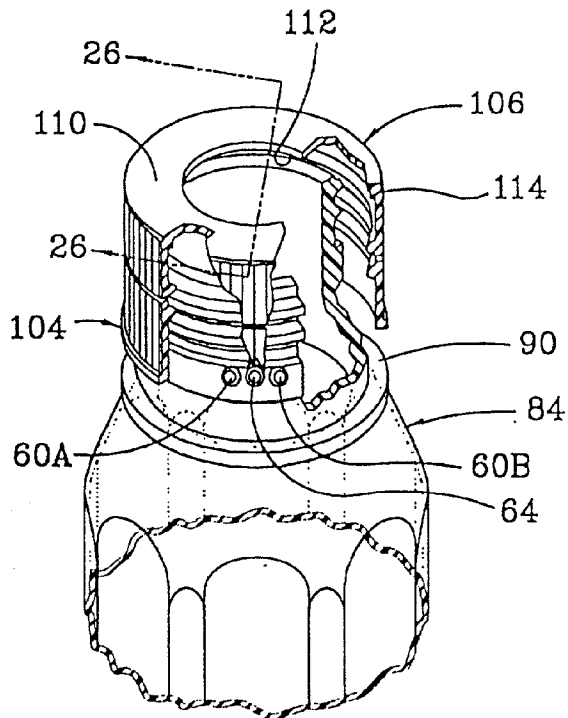


FIG. 23

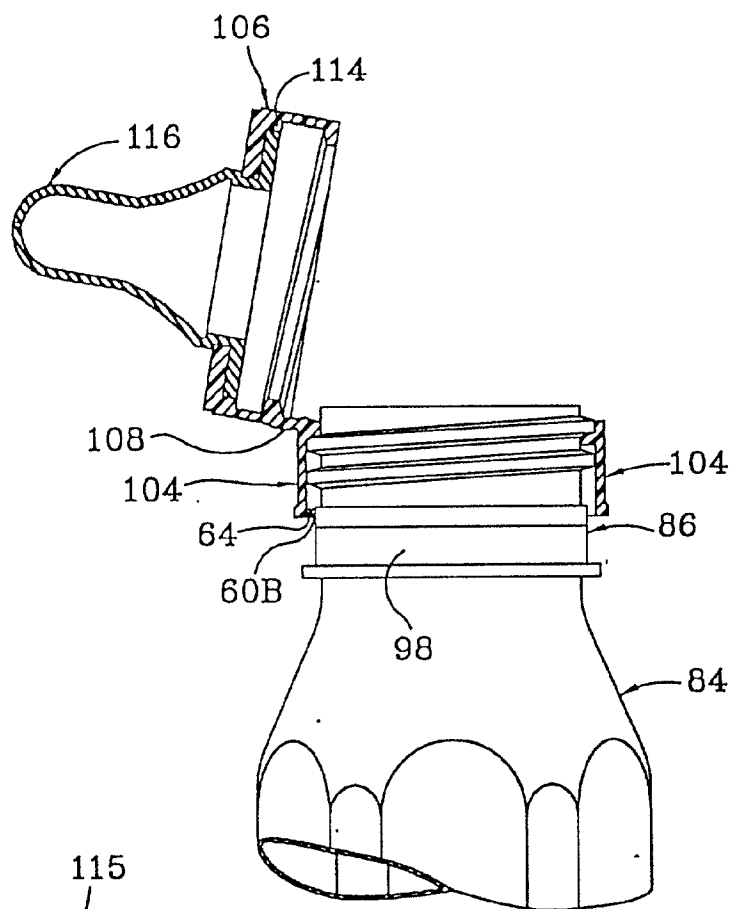


FIG. 25

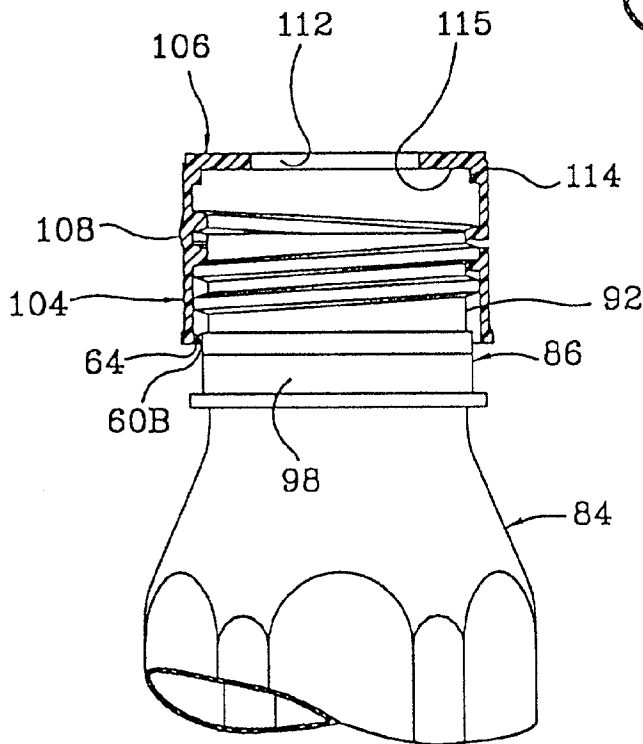


FIG. 26

BOTTLE CLOSURE ASSEMBLY

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] The present application is a Continuation Application of U.S. application Ser. No. 09/440,412, filed Nov. 15, 1999, which is Continuation-in-Part Application of U.S. Pat. No. 6,264,051 dated Jul. 24, 2001 which is a Continuation of U.S. Pat. No. 5, 944,207 dated Aug. 31, 1999; the disclosures of which are incorporated herein by reference.

BACKGROUND OF THE INVENTION

[0002] 1. Technical Field

[0003] The subject invention is generally directed to a closure for a container. More particularly, the invention relates to threaded closures for containers. Specifically, the invention relates to a closure for providing access to the contents of a container without the necessity of completely removing the entire closure and thereby subjecting the closure to loss or damage.

[0004] 2. Background Information

[0005] Various containers for storing and transporting fluids such as water have been known and used for thousands of years. Prior to modern times, water containers were a necessity since homes and businesses did not have running water and therefore containers were needed to transport water from the local well to each house or business.

[0006] Many closures for containers have been developed including lids, corks, snap-ons, and screw caps. Since man's discovery that fluids could be stored within containers for later use, new and better means for closing, sealing, or otherwise controlling fluid flow into and out of the container have been sought.

[0007] More recently, i.e., over approximately the past one hundred years, a phenomenal growth in the distribution of bottled beverages has occurred. The storage of beverages such as milk, water, juices, carbonated beverages, iced tea, and alcoholic beverages in containers such as cartons, bottles, flasks or jugs made from paper, plastic, or glass has flourished. Specifically, these various containers include paper milk cartons, 12 and 16 glass bottles, 2 liter plastic bottles, and other such containers.

[0008] Bottled beverages typically come in either plastic or glass bottles with metal or plastic closures sealing the beverage therein until the time for consumption. These containers typically include a narrowing neck with a fluid access opening therein. A number of closures have been used to cover this fluid access opening including metal lids requiring a bottle opener to remove, twist off metal lids, snap on-off plastic caps, screw on-off plastic caps, and pull up and push down type caps. These caps all serve to provide access to the fluid contained within the container. The closure is preferably reusable in that it may be removed from and replaced onto the container thereby allowing only a portion of the fluid contained within the container to be used at a given sitting.

[0009] The need for closure of these containers is historically based upon a number of concerns including spillage, spoilage, evaporation, and contamination of the fluid contained within the container. More recent designs continue to

take into account these historical needs as well as today's desired qualities such as ease and speed of use, and retention of carbonation.

[0010] However, one disadvantage of these closures is the requirement that the closure be completely removed to gain access to the container. Complete removal of the closure creates a risk that the closure will be misplaced or dropped.

[0011] One particular type of bottle whose closure is at risk of being misplaced or dropped is a baby bottle. The closures of baby bottles are typically cylindrical in shape and are formed with a central circular opening. The opening of the closure receives an elongated rubber nipple which is formed with a small pinhole at the apex thereof through which fluid contained in the baby bottle is dispensed. These baby bottles and baby bottle closures are continuously used and reused during the infant and toddler years of a child's life. The closures and nipples must be removed and cleaned between each use of the baby bottle, thus creating a risk that the closure may be misplaced or dropped.

[0012] Further, baby bottles and the fluids contained therein are often warmed or heated in a microwave oven before the fluid is consumed by the baby. The closure and attached rubber nipple must be removed from the baby bottle prior to heating the fluid in the microwave oven to prevent the microwave heat from weakening the rubber structure of the nipple. Often, the person feeding the baby is put in an awkward position of holding the child while attempting to align and screw the closure on to the top of the threaded baby bottle. It is thus desired to provide a baby bottle closure having a nipple that can be readily removed and installed.

SUMMARY OF THE INVENTION

[0013] Objectives of the invention include providing a container closure for providing access to the fluid contents of a container without the necessity of completely removing the entire closure and thereby subjecting the closure to loss or damage, and the fluid contents of the container to spillage, spoilage, evaporation, and contamination.

[0014] A further objective of the invention is to provide a two part closure connected together by a flexible hinge.

[0015] Still a further objective of the invention includes providing a closure which is only partially removed to allow access to the fluid within a container.

[0016] Another objective of the invention is to provide a closure which, when fully tightened down, seals off the fluid access opening thereby assuring continued quality of the beverage within the container.

[0017] A still further objective of the invention is to provide a closure with a position indicator to indicate that sufficient twisting has occurred to disengage the cap portion from the container while the sleeve portion continues to engage the container.

[0018] Yet a further objective of the invention is to provide a position indicator which also acts as a catch that tends to restrict rotation of the closure with references to the threaded nozzle.

[0019] Yet another objective is to provide a closure which will thread onto an existing container.

[0020] A further objective of the invention is to provide a closure having a top opening for receiving a nipple.

[0021] Another objective of the invention is to provide a closure which is adapted to engage a threaded neck of a baby bottle.

[0022] A still further objective of the invention is to provide a closure which allows the nipple to be attached to and removed from the closure while the closure remains fastened to the threaded neck of the baby bottle.

[0023] Yet another objective is to provide a closure which is of simple construction, which achieves the stated objectives in a simple, effective and inexpensive manner, and which solves problems and satisfies needs existing in the art.

[0024] These and other objectives and advantages are obtained by the improved closure of the present invention that is adapted to be secured to a nozzle of a container, the nozzle having a plurality of threads formed thereon, the general nature of which can be stated as including a cap portion having a circular top, the top being formed with an opening therein, the cap portion adapted to be selectively and removably threaded onto the threads of the nozzle, a sleeve portion adapted to be selectively and removably threaded onto the nozzle, and a flexible hinge connecting the cap portion to the sleeve portion.

[0025] Other objectives and advantages are obtained from the closure and container assembly of the present invention, the general nature of which may be stated as including a container formed with a fluid storage cavity, the container having a threaded nozzle formed with a fluid access port therein, the fluid access port being in fluid communication with the fluid storage cavity, a closure having a cap portion, a sleeve portion, and a hinge flexibly extending between the cap portion to the sleeve portion, the cap portion having a top and a cylindrical side wall, the top being formed with an opening, the side wall extending transversely from the top, the cap portion and sleeve portion each having a plurality of threads formed thereon, the threads selectively cooperating threadably with the threaded nozzle, the closure having a fully threaded position, a partially threaded position, and a removed position with respect to the threaded nozzle, the threads of the cap portion and the sleeve portion both at least minimally engaging the threaded neck when the closure is in the fully threaded position, the threads of the cap portion being unthreaded from the threaded nozzle and the threads of the sleeve portion at least minimally engaging the threaded neck when the closure is in the partially threaded position, and the threads of the cap portion and the sleeve portion both being disengaged from the threaded neck when the closure is in the fully threaded position.

BRIEF DESCRIPTION OF THE DRAWINGS

[0026] The preferred embodiments of the invention, illustrative of the best modes in which applicant has contemplated applying the principles of the invention, are set forth in the following description and are shown in the drawings and are particularly and distinctly pointed out and set forth in the appended claims.

[0027] FIG. 1 is a perspective view of the first embodiment of a closure assembly attached to a container (partially cut away and in the form of a 2-liter bottle) where the closure assembly is in a closed position;

[0028] FIG. 2 is a perspective view of the closure assembly and container of FIG. 1 except that the closure assembly is in a partially threaded position and a cap portion of the closure is pivoted from the closed position to an open position;

[0029] FIG. 3 is a perspective view of the closure assembly in the closed position;

[0030] FIG. 4 is a perspective view of the closure assembly similar to FIG. 3 in the open position;

[0031] FIG. 5 is a perspective view of a second embodiment of the invention, shown in the closed position;

[0032] FIG. 6 is a perspective view similar to FIG. 5 of the closure assembly of the second embodiment of the invention, shown in the closed position;

[0033] FIG. 7 is a side elevational view of the second embodiment of a container having two protuberances on the neck portion of the container.

[0034] FIG. 8 is a sectional view of the second embodiment of the invention taken along line 8-8, FIG. 5;

[0035] FIG. 9 is a perspective view of the second embodiment with portions broken away and in section and shown in a first position;

[0036] FIG. 10 is similar to FIG. 9 with the closure assembly shown in a second position;

[0037] FIG. 11 is a sectional view of the closure assembly and a portion of the container as shown in FIG. 9;

[0038] FIG. 12 is a sectional view of the closure assembly and a portion of the container as shown in FIG. 10;

[0039] FIG. 13 is a sectional view of the closure assembly and a portion of the container as is shown in FIG. 10 with the cap portion in the open position;

[0040] FIG. 14 is a top perspective view of a third embodiment of the closure assembly of the present invention in the closed position;

[0041] FIG. 15 is a top perspective view similar to FIG. 14 showing the closure assembly in the open position;

[0042] FIG. 16 is a bottom perspective view of the closure assembly of FIG. 14 in the closed position;

[0043] FIG. 17 is a bottom perspective view similar to FIG. 16 showing the closure assembly in the open position;

[0044] FIG. 18 is a bottom perspective view of a fourth embodiment of the closure assembly shown in the closed position;

[0045] FIG. 19 is a bottom perspective view similar to FIG. 18 showing the closure assembly in the open position;

[0046] FIG. 20 is a side elevational view of a portion of a container adapted to receive the closure assembly of FIGS. 16 and 17;

[0047] FIG. 21 is a sectional view taken along line 21-21 of FIG. 18;

[0048] FIG. 22 is a perspective view of the closure assembly of FIG. 19 in a fully threaded position with portions broken away and in section;

[0049] FIG. 23 is a perspective view similar to FIG. 22 except showing the closure assembly in a partially-threaded position;

[0050] FIG. 24 is a sectional view of the closure assembly of FIG. 21 attached to the container of FIGS. 22 and 23;

[0051] FIG. 25 is a sectional view similar to FIG. 24 showing the closure assembly in the open position; and

[0052] FIG. 26 is a sectional view taken along line 26-26 in FIG. 23.

[0053] Similar numerals refer to similar parts throughout the specification.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0054] The improved bottle closure assembly is indicated generally at A in its intended environment as a closure for a container B and is shown generally in FIGS. 1 and 2.

[0055] As illustrated in FIGS. 1 and 2, the container B is a bottle 20 comprising a main body 22, a neck 24, and a nozzle 26. The main body 22 is the fluid storage cavity. The neck 24 is an inverted funnel-shaped or dome-shaped portion connecting the main body 22 to the nozzle 26. The nozzle 26 includes an externally threaded cylindrical portion 28.

[0056] As is shown in FIG. 2, the top of the nozzle 26 has a hole 30 that functions as a fluid access port through which all fluid enters and exits the container B. Around the hole 30 is a lip or edge 32 upon which the closure A seats or rests when fully threaded onto the nozzle 26. The combination of the threaded interaction between the closure A and the nozzle 26, and the seating or resting of the closure A on the lip 32 results in a seal for preventing leaking of the fluid from within the container. Nozzle 26 also includes an unthreaded portion 34 and a flange 36. Bottle 20 is made from any of a variety of known material such as polymers or glass. In the preferred embodiment, the bottle is a plastic extrusion blow molded container such as a 2-liter bottle.

[0057] The closure assembly A, as is illustrated in FIGS. 1-4 comprises a sleeve portion 38 and a cap portion 40 pivotally connected together by a hinge 42. The cap portion 40 includes a closed top 44 against which the top edge or lip 32 of the nozzle 26 abuts when the closure A is fully threaded onto the nozzle 26.

[0058] In accordance with one of the main features of the present invention, the cap portion 40 is defined by a cylindrical side wall 46 and two circular ends. One end is open and has a circular face 48 of approximately the same thickness as the cylindrical side wall 46. The other end is closed by circular top 44. The cylindrical side wall 46 extends transversely away from the circular top 44. The cylindrical side wall 46 and circular top 44 define a cavity in the cap portion 40. The inner surface of the cylindrical side wall 46 in the cavity has circumferential threads 50 thereon that are complimentary to the external threads on the nozzle 26 thereby allowing the cap portion 40 to be threaded completely onto the externally threaded portion 28 of the nozzle 26.

[0059] The sleeve portion 38 is defined by a cylindrical side wall 52 with a top and a bottom open end. Each open

end has a circular face 54A and 54B, respectively. The sleeve portion 38 is shaped and functions as a cylindrical extension of the cap portion 40. The sleeve portion 38 is also axially alignable with the cap portion 40 when the cap portion is closed against the sleeve portion. The sleeve portion 38 is of the same cross-sectional size and shape as the cap portion 40. The cylindrical side wall 52 defines a through-bore in the sleeve portion 38. The inner surface of the cylindrical side wall 52 in the through-bore has circumferential threads 56 thereon that are complimentary to the external threads on the nozzle 26. The circumferential threads 56 are also alignable with the circumferential threads 50 of the cap-portion 40 so that when the cap portion 40 is closed against the sleeve portion 38 the external threads on the nozzle 26 can mate with both threads 50 and 56 thereby allowing the cap portion 40 and the sleeve portion 38 to be threaded completely onto the externally threaded portion 28 of the nozzle 26.

[0060] The external arcuate surface of both the sleeve portion 38 and the cap portion 40 is ribbed with longitudinal ribs 58. These ribs provide a better surface for gripping when tightening or loosening the cap portion 40 from the nozzle 26.

[0061] The closure A is made from a polymeric compound, although it can be made from any material without departing from the spirit of the present invention. In the preferred embodiment, the closure A is a molded plastic closure. The closure can be molded as a three part (cap, hinge, and sleeve) closure, or it can be molded as a one part cap and partially cross-sectionally cut thereby forming a cap and sleeve portion with a connecting hinge.

[0062] The use of the closure A and the container B involves three general closure positions or ranges with reference to the nozzle 26: a fully or substantially fully threaded position, a partially threaded position, and a completely unthreaded position. The results of these various positions are a sealed container, a fluid accessible container where the cap portion is movable from a closed to an open position, and a completely open (uncapped) container, respectively.

[0063] The closure A is shown in FIG. 1 in a fully threaded position where the lip 32 (hidden within the cap portion) abuts or nearly abuts the top 44. When the closure A is in this fully threaded position, the cap portion 40 is fixed to the closure 26 based upon the interengagement of the internal threads of the cap with the external threads of the nozzle 26. The result is that the cap portion is not pivotable about the hinge 42 thereby prohibiting access to the fluid within the container B via the hole 30.

[0064] The closure A is shown in FIG. 2 in a partially threaded position where only the sleeve portion 38 is threaded onto the threaded nozzle 26 and the threads of the cap portion no longer engage the nozzle 26. The result of this partial threading is that the cap portion 40 is pivotable about the hinge 42. FIG. 2 shows the cap portion 40 of the closure A after it has been pivoted to an open position from the closed position. This open position allows access to the fluid within the container B for removal (or addition) of fluid such as by pouring into a glass.

[0065] Although not shown in FIG. 1 or 2, the closure A is also completely removable from the nozzle 26. This

occurs by completely unthreading the closure A from the nozzle 26. This allows reuse of the closure A on another container after the fluids within container B have been fully depleted.

[0066] FIGS. 5-13 disclose a second embodiment for the container and the closure. Closure A' and container B' are substantially identical to closure A and container B except that both closure A' and container B' include one or more protuberances that extend into the interaction area where the threads 50 and 56, and corresponding adjacent surfaces of the sleeve portion 38 and the cap portion 40 interact.

[0067] In the second embodiment, the nozzle 26 as is shown in FIG. 7 includes a pair of protuberances 60A and 60B with a small gap 62 therebetween. Each of these protuberances 60A and 60B are small nubs protruding outward from the external surface of the nozzle 26. Preferably, the protuberances 60A and 60B protrude outward from the unthreaded portion 34 of the nozzle 26.

[0068] In accordance with one of the main features of the second embodiment, the closure A' has a single protuberance 64. This protuberance may be located at any position on the inside facing of the sleeve portion 38 or the cap portion 40, although this protuberance must be located in a position on this inside facing that corresponds at the proper cap release time with the location of the pair of protuberances on the nozzle 26. Typically, the protuberance 64 is located near the circular face 54A thereby corresponding to the pair of protuberances 60A and 60B which preferably protrude from the unthreaded portion 34. It is most preferred that protuberance 64 be located near circular face 54A inasmuch as the external arcuate surface of sleeve 38 extends outwardly slightly at that point (FIGS. 11-13) such that side wall 52 is thicker adjacent protuberance 64 than adjacent top 44, thus strengthening the lowermost region of sleeve portion 38 and providing enhanced support for protuberance 64 that extends inwardly therefrom.

[0069] All of the protuberances 60A, 60B, and 64 are arcuate in shape, such as rounded or conical, thereby providing a smooth, curving surface with a central peak for a corresponding protuberance interactively positioned in approximately tangential relation on an adjacent rotating surface to ride up and over with minimal yet accountable resistance. The result of this curving surface and the interactive positioning which provides some resistance is that the closure A' is freely rotatable on the threaded nozzle 26 until the protuberance 64 on the closure meets one of the protuberances 60A and 60B on the nozzle whereby additional twisting action is required to overcome the resistance of the two interacting protuberances 64 and 60A, or 64 and 60B. This additional twisting overcomes the resistance and pops the protuberance 64 up and over one of the protuberances 60A or 60B and positions protuberance 64 in the gap 62. Any continued twisting will overcome the second protuberance and allow the closure to completely be removed from the nozzle 26.

[0070] Specifically, the pair of protuberances 60A and 60B act as a locking area whereby when the single protuberance 64 of the closure is in the gap 62 between the protuberances 60A and 60B, the closure is restricted from free rotation due to the confinement of the single protuberance 64 between the close proximity protuberances 60A and 60B.

[0071] FIGS. 9 and 11 show the closure A'-nozzle 26 interaction when the single protuberance 64 of the closure is

in a first range of positions described with respect to the first embodiment of the invention (i.e., either fully threaded or partially threaded sufficiently that the cap portion is threaded onto the nozzle, and thus the single protuberance is not confined between the pair of protuberances 60A and 60B). The closure A' is freely rotatable about the threads on nozzle 26 within this first range of positions which specifically extends from a first cap-locked position where the closure has sealed hole 30 in the top of the container B' and the closure is fully threaded onto nozzle 26, to a second cap-locked position where the single protuberance 64 of the closure is adjacent protuberance 60A of the pair of protuberances 60A and 60B, and just outside the gap 62 in between the pair of protuberances 60A and 60B. As specifically shown in FIG. 11, the internal threads of both the cap portion and the sleeve portion engage the threads of nozzle 26.

[0072] In contrast, FIGS. 10 and 12 show the closure A'-nozzle 26 interaction when the single protuberance 64 of the closure is confined in the gap 62 between the pair of protuberances 60A and 60B. The closure A' is confined in this gap absent additional twisting action to overcome the resistance of the one of the two interacting protuberances 64 and 60A, or 64 and 60B and escape the gap. For instance, closure C' is depicted in FIG. 26 as being in a partially threaded condition.

[0073] The purpose of snapping the single protuberance 64 in between the pair of protuberances 60A and 60B is to indicate that the closure is properly positioned for the opening of the container B'. Specifically, the indication of proper positioning signifies that the cap portion 40 is properly positioned to be pivoted about the hinge 42 and away from the sleeve portion 40 to provide access to the hole 30 in the top of the container. In contrast, if the protuberance 64 is not in the gap, but still in the first range, i.e., not properly aligned in between the pair of protuberances, then the cap portion 38 cannot be removed from the nozzle 26 because the threads of each are at least partially still engaged.

[0074] The closure A' and the container B' may also be positioned in a second range of positions. If an additional twisting action is supplied to overcome the resistance of the pair of protuberances 60A and 60B, then the single protuberance snaps out the gap and into a second range. The closure A' is freely rotatable about the threads on nozzle 26 within this second range of positions which extends from a first cap-unlocked position where the single protuberance 64 of the closure is adjacent protuberance 60B of the pair of protuberances 60A and 60B and just outside the gap 62 in between the pair of protuberances 60A and 60B, to a second cap-unlocked position where the closure A' is completely removable from the nozzle 26.

[0075] The closure A' may be threaded back onto the nozzle 26 in a manner similar but reversed of the above described removal process. The closure A' is reusable and therefore may be removed from and re-threaded onto a container over and over.

[0076] As is best shown in FIG. 11, hinge 42 traverses between one of threads 50 formed on cap portion 40 and one of threads 56 formed on sleeve portion 38. Hinge 42 thus is a threadable member whereby external threads 28 of nozzle portion 26 are threadable directly over and threadingly engage hinge 42. In this regard, and as is best shown in FIG.

13, the threaded engagement of the thread 56 of hinge 42 adjacent sleeve portion 38 with external threads 28 of nozzle portion 26 provides an anchor that retains sleeve portion 38 on nozzle 26 when cap portion 40 is rotated upwardly away from nozzle 26 about hinge 42.

[0077] Furthermore, as is best shown in FIG. 12, the lowermost thread 50 of cap portion 40 is preferably disposed adjacent circular face 48 at a point diametrically opposed to hinge 42. In this regard, the aforementioned thread 50 abuts nozzle portion 26 when cap portion 40 is aligned with sleeve portion 38 as is shown in FIG. 12. The engagement of the aforementioned thread 50 with nozzle portion 26 provides an additional level of security to ensure that cap portion 40 does not rotate upwardly (FIG. 13) until the user affirmatively pulls thread 56 out of engagement with nozzle portion 26, thus permitting cap portion 40 to be rotated upwardly.

[0078] In sum, the invention is a closure A or cap for a container B such as a bottle having external threads 28 on a nozzle portion 26. The cap A includes a lower or sleeve portion 38 and an upper or cap portion 40. The sleeve portion 38 and the cap portion 40 are hingedly connected at living hinge 42. The sleeve portion 38 includes internal circumferential threads 56 on at least a portion of the cylindrical side wall 52 that are complementarily related to the threads 28 on the nozzle for retaining the sleeve portion to the nozzle. Similarly, the cap portion 40 includes internal circumferential threads 50 on the cylindrical side wall 46 for retaining the cap portion to the nozzle.

[0079] When the closure is rotated to the fully threaded position, i.e., fully tightened down on the nozzle, the threads 50 and 56 of the cap and sleeve portions 40 and 38 engage the threads 28 of the nozzle 26 to lock the cap portion 40 in a closed position. However, when the closure is rotated, the threads 50 within the cap portion 40 disengage from the threads 28 of the nozzle 26 such that the hinge 42 may be actuated to open the cap portion 40 thereby allowing access to the fluid within the container B.

[0080] The invention may also be embodied with protuberances or nubs 60A and 60B on the nozzle, and 64 on the sleeve portion, for restricting rotation (twisting) of the closure absent some additional force to overcome the resistance provided by the interaction of protuberance 64 with either protuberance 60A or 60B. This resistance indicates that the closure is properly positioned for the pivoting of the cap portion thereby provided access to the fluid within the container.

[0081] A third embodiment of the improved bottle closure assembly is indicated generally at C in its intended environment as a closure for a baby bottle container D and is shown generally in FIGS. 14 and 15. As illustrated in FIG. 20, container D is a bottle 80 having a main body 82, a tapered neck 84 and a nozzle 86. Main body 82 has a generally polygonal-shaped outer surface formed by a plurality of flat panels 88 extending one after the other. Neck 84 extends from the top of panels 88 and is tapered inwardly to a straight cylindrical section 89. Straight section 89 terminates in an annular flange 90.

[0082] Nozzle 86 includes an externally threaded cylindrical portion 92. Nozzle 86 has an annular top edge 96 through which extends a hole or opening 94 (FIG. 15) that functions as a fluid access port through which all fluid enters

and exits container D. Nozzle 86 also includes an unthreaded portion 98 between the lower end of threaded cylindrical portion 92 and annular flange 90. Unthreaded portion 98 has a slightly larger diameter than cylindrical portion 92 forming a stepped shoulder 100. In the preferred embodiment, bottle 80 is made from a polymeric compound, although it may be made from any appropriate material, such as glass, without departing from the spirit of the present invention.

[0083] Closure C is similar to closure A of the first embodiment in that it includes a sleeve portion 104 and a cap portion 106 pivotally connected together by a hinge 108. Cap portion 106 is generally similar to cap portion 40 of closure A except that cap portion 106 is formed with a central circular opening 112 in a top 110. Top 110 may additionally include an annular ring 114 extending therefrom for purposes to be set forth more fully below. Annular ring 114 defines a recess 115 within the arcuate inner surface of annular ring 114 and terminating at top 110. Sleeve portion 104 is generally similar to sleeve portion 38 of closure A and engages externally threaded cylindrical portion 92 of bottle 80.

[0084] A fourth embodiment of the closure assembly of the present invention is shown in FIGS. 18-19 and 21-26 and is indicated generally at C'. Closure C' is similar to closure C and includes sleeve portion 104 hingedly connected to cap portion 106 by hinge 108. Cap portion 106 is formed with opening 112 in top 110 thereof. Sleeve portion 104 of closure C' includes a protuberance 64 which interacts with a pair of protuberances 60A and 60B of an alternative embodiment D' of baby bottle container D.

[0085] Closure assemblies C and C' operate in a substantially similar manner to closure assemblies A and A', respectively, and receive a usual nipple 116 through opening 112. Nipple 116 has an annular base or flange 118, an upwardly tapered or funnel shaped middle section 120 and an elongated rounded upper section 122 formed with a small pinhole 124. An annular notch 126 is formed between middle section 120 and base 118 which allows nipple 116 to snap fit with cap portion 106.

[0086] In use, closure assemblies C and C' are partially threaded on nozzle 86 such that sleeve portion 104 engages the threads of cylindrical portion 92 and cap portion 106 sits in an unthreaded position. Closure C' is depicted in such a partially threaded position in FIG. 26. Cap portion 106 is pivoted to an open position (FIG. 25) and nipple 116 is inserted through opening 112 from the bottom of cap portion 106. Upper section 122 is pulled outwardly to snap fit notch 126 within the inner edge of opening 112 such that base 118 of nipple 116 abuts the lower surface of top 110 of cap portion 106. In such position, the circular planar face of base 118 that faces toward upper section 122 rests flush against top 110 and the arcuate edge of base 118 preferably rests flush against the arcuate inner surface of annular ring 114. The arcuate edge of base 118 can, however, be spaced from the arcuate inner surface of annular ring 114 without departing from the spirit of the present invention. In this regard, it is understood that the arcuate inner surface of annular ring 114 helps to axially orient base 118 within cap portion 106. Annular ring 114 thus helps to position base 118 to ensure reliable clamping of nipple 116 between cap portion 106 and top edge 96 of nozzle 86 and to facilitate sealing therebetween.

[0087] Cap portion **106** is then pivoted on hinge **108** back into axial alignment with sleeve portion **104** and closure assemblies **C** and **C'** are threaded onto nozzle **86** such that cap portion **106** threads onto nozzle **86** therewith. Base **118** of nipple **116** is sandwiched between the lower surface of top **110** of cap portion **106** and top edge **96** of nozzle **86** creating a seal that prevents any liquid contained in bottle **80** from spilling or leaking therefrom. Proturbances or nubs **60A** and **60B** on the nozzle **86** of container **D'** and **64** on the sleeve portion **104** of closure assembly **C'** (FIGS. 22 and 24) interact in a similar manner to the proturbances or nubs of container **B'** and closure assembly **A'** of the second embodiment, as described above.

[0088] Inasmuch as cap portion **106** and sleeve portion **104** are connected to one another with hinge **108**, cap portion **106** can be removed from the container without risk of losing cap portion **106**. Closures **C** and **C'** thus provide a timesaving closure because they obviate the risk that cap portion **106** may be lost during filling and/or cleaning of the container. In this regard, closures **C** and **C'** when used with nipple **116** often will be used by a mother holding a baby in one arm and having only one free hand to both fill container **D** or **D'** and operate closure **C** or **C'**. As such, closures **C** and **C'** provide a highly convenient method of opening and closing a container with only a single hand and without risk that cap portion **106** may be lost in so doing. Moreover, nubs **60A**, **60B**, and **64** cooperate to provide an audible and tactile indication that closure **C'** is in a partially threaded position and that cap portion **106** can be removed from container **D'** without sleeve portion **104** being removed therefrom. Nubs **60A**, **60B**, and **64** thus provide additional functionality and convenience in operation.

[0089] Accordingly, the improved bottle closure apparatus is simplified, provides an effective, safe, inexpensive, and efficient device which achieves all the enumerated objectives, provides for eliminating difficulties encountered with prior devices, and solves problems and obtains new results in the art.

[0090] In the foregoing description, certain terms have been used for brevity, clearness, and understanding; but no unnecessary limitations are to be implied therefrom beyond the requirement of the prior art, because such terms are used for descriptive purposes and are intended to be broadly construed.

[0091] Moreover, the description and illustration of the invention is by way of example, and the scope of the invention is not limited to the exact details shown or described.

[0092] Having now described the features, discoveries, and principles of the invention, the manner in which the improved bottle closure apparatus is constructed and used, the characteristics of the construction, and the advantageous new and useful results obtained; the new and useful structures, devices, elements, arrangements, parts, and combinations are set forth in the appended claims.

Having thus described the invention, it is claimed:

1. A closure assembly adapted to be secured to a nozzle of a container, the nozzle having a plurality of threads formed thereon, the closure assembly comprising:

a cap portion having a top, the top having an opening therein, the cap portion adapted to be threaded onto the nozzle;

a sleeve portion, the sleeve portion adapted to be threaded onto the nozzle; and

a hinge connecting the cap portion to the sleeve portion.

2. The closure assembly as set forth in claim 1, wherein the cap portion includes a side wall extending from the top, a plurality of threads being disposed on the side wall, the side wall adapted to be threaded onto the threads of the nozzle.

3. The closure assembly as set forth in claim 1, wherein the opening is circular.

4. The closure assembly as defined in claim 3, wherein the opening is centrally disposed in the top.

5. The closure assembly as defined in claim 1, wherein the sleeve portion includes a side wall and a plurality of threads formed on the side wall, the threads of the side wall of the sleeve portion adapted to be threaded onto the threads of the nozzle.

6. The closure assembly as defined in claim 1, further comprising a nipple, the nipple being received in the opening.

7. The closure assembly as defined in claim 1, further comprising a position indicator, the position indicator adapted to indicate the position of the cap portion with respect to the nozzle.

8. The closure assembly as defined in claim 7, wherein the position indicator is a rotation impediment adapted to indicate that the cap portion is no longer threaded onto the nozzle.

9. The closure assembly as defined in claim 8, wherein the position indicator is a protuberance, the protuberance adapted to extend toward the nozzle.

10. The closure assembly as defined in claim 1 wherein the cap portion is selectively axially alignable with the sleeve portion.

11. A closure and container assembly comprising:

a container formed with a fluid storage cavity, the container having a threaded nozzle formed with a fluid access port therein, the fluid access port being in fluid communication with the fluid storage cavity;

a closure having a cap portion, a sleeve portion, and a hinge extending between the cap portion to the sleeve portion;

the cap portion having a top and a side wall, the top having an opening, the side wall extending from the top;

a plurality of threads formed on each of the cap portion and the sleeve portion, the threads cooperating threadably with the threaded nozzle;

the closure having a fully threaded position, a partially threaded position, and a removed position with respect to the threaded nozzle;

the threads of the cap portion and the sleeve portion both at least minimally engaging the threaded neck when the closure is in the fully threaded position;

the threads of the cap portion being disengaged from the threaded nozzle and the threads of the sleeve portion at least minimally engaging the threaded neck when the closure is in the partially threaded position; and

the threads of the cap portion and the sleeve portion both being disengaged from the threaded neck when the closure is in the unthreaded position.

12. The closure and container assembly as set forth in claim 11, further comprising a nipple received in the opening of the top.

13. The closure and container assembly as set forth in claim 11, wherein the sleeve portion is open at both ends.

14. The closure and container assembly as set forth in claim 11 further comprising a position indicator, the position indicator adapted to indicate the position of the cap portion relative to the threaded nozzle.

15. The closure and container assembly as set forth in claim 14, wherein the position indicator is a rotation impediment adapted to indicate that the cap portion is disengaged from the nozzle.

16. The closure and container assembly as set forth in claim 15, wherein the position indicator includes at least a first protuberance formed on the closure and extending toward the nozzle.

17. The closure and container assembly as set forth in claim 16, wherein the position indicator further includes a second protuberance formed on the container and extending toward the closure.

18. The closure and container assembly as set forth in claim 17, wherein the at least first and second protuberances are in register with one another when the closure is in the partially threaded position.

19. The closure and container assembly as defined in claim 17, wherein the at least first and second protuberances are in register with one another at some position between the fully threaded position and the removed position.

20. The closure and container assembly as defined in claim 17, wherein the position indicator further includes a third protrusion formed on the container and extending toward the closure, the at least first protrusion interposed between the second and third protrusions when the closure is in the partially threaded position.

21. The closure and container assembly as defined in claim 11, further comprising a nipple received in the opening of the top and an annular ring extending from the top, the annular ring defining a recess adjacent the top, at least a portion of the nipple being received in the recess.

22. The closure and container assembly as defined in claim 21, wherein the portion of the nipple received in the recess is clamped between the top and the threaded nozzle when the closure is in the fully threaded position.

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