A metered trap dispenser cap with twist release valve for releasing a powder or other fluid material from a trap valve component into a container with liquid may be used for releasing medicinal, food beverage, or chemical or other component material into a liquid for time-of-use mixing and dispensing. The metered trap dispenser cap device includes an outer cap, an inner cap, a valve component and at least one screw-down deterrent mechanism connected to at least one of the inner cap and the outer cap. The outer cap includes a dispensing orifice for dispensing mixed liquid with material using a push pull nozzle mechanism, an open nozzle mechanism, a pour spout mechanism, a flip top nozzle, or the like.
METERED TRAP DISPENSER CAP WITH TWIST RELEASE VALVE

BACKGROUND OF INVENTION

[0001] a. Field of Invention

[0002] The invention relates generally to a metered trap dispenser cap with twist release valve for releasing a powder or other fluid material from a trap valve component into a container with liquid. This invention may be used for releasing medicinal, food beverage, or chemical or other component material into a liquid for time-of-use mixing and dispensing.

[0003] b. Description of Related Art

The following patents are representative of a log in

[0004] United States Patent Application Publication No. 2004/0200742 A1 to Young Kook Cho describes a cap device for bottles, which is capable of mixing two different additives separately contained therein with a material contained in a bottle to prepare a mixture in accordance with a simple rotating action of the cap device relative to the bottle, performed by a user, thus allowing the user to easily prepare the mixture just before drinking or using the mixture. The cap device has a cap cover acting as an additive containing part, and defining a cavity therein, with a partition wall provided in the cavity to divide the cavity into two chambers and to separately contain two different additives in the chambers; a first funnel part provided at a lower section of the cap cover; a breakable sheet having a structure to be easily broken by external impact provided at an open lower end of the first funnel part to close the open lower end of the first funnel part; a cap body assembled with a lower end of the cap cover externally tightened to an externally threaded mouth of a bottle; a second funnel part having the same shape as the first funnel part provided at an upper section of the cap body, such that the first and second funnel parts are spaced apart from each other or come into contact with each other; and a means for breaking the breakable sheet so as to open the lower end of the first funnel part.

[0005] United States Patent Application Publication No. 2003/0072850 A1 to Edward William Bumsiki describes a drink mix dispenser includes a reservoir for a drink mix and a stopper for the reservoir, all incorporated into a bottle cap. The stopper and reservoir are relatively moveable within the bottle cap, which is in turn secured to a bottle. By simple manipulations like twisting the cap onto a bottle or pushing/ pulling a cap attachment, the stopper removes an aperture within the reservoir for drink mix to be dispensed from. The all inclusive bottle caps may be provided separately from or in combination with reusable drink containers, saving storage space and creating far reduced container waste.

[0006] United States Patent Application Publication No. 2002/0090426 A1 to Sean P. Denny describes the present invention comprises various methods and apparatus for making or brewing personal quantities of beverages using bottled water, either in a conventional or specially formed bottle. One embodiment includes a cap assembly having an outer attachment portion and a plunger portion forming within the attachment portion. The two portions define a chamber therein containing a drink mix, one or more tea bags, etc. A seal is provided to prevent mixing of the drink mix and water within the bottle until desired. When the plunger is pushed downwardly, it drives the drink mix through the seal, bursting the seal and deploying the drink mix or tea bags into the water within the bottle. In another embodiment, the bottle and drink mix are packaged together, with; the bottle including a pocket formed in the side thereof and the; drink mix secured in the pocket by a label extending thereacross. Yet another embodiment includes a conventional bottle, with the, label having a pocket formed therein. The label may have fan fold, or accordion fold sides, for forming an open pocket after opening for insertion of a spent tea bag or the like therein for disposal. The labels preferably include wakening lines and a pull tab for opening the pocket to access the drink mix or tea bags for insertion into the bottle. Still another embodiment comprises tea bags or drink mix packets which are specially shaped and configured for ease of insertion into the relatively narrow neck of a bottle of water.

[0007] United States Patent Application Publication No. 2002/0090426 A1 to Young Kook Cho describes a mixing cap and method for use thereof, wherein the mixing cap is preferably pre-loaded during time of manufacture with a selected dry or liquid ingredient to facilitate subsequent consumer use. The mixing cap comprises an apertured inner tube threadably-engagable to the mouth of a bottle, and an outer housing cooperatively-engaged to the inner tube and slidably-restricted thereover via a flange arrangement. Preloaded ingredients contained within the outer housing may be introduced or discharged into the bottle by simply depressing the outer housing over the inner tube, thereby permitting the ingredients to flow through the apertures of the inner tube and into the liquid contents of the bottle. The combined ingredients and liquid within the bottle may subsequently be shaken without fear or risk of leakage or spillage.

[0008] U.S. Pat. No. 7,055,685 B1 to Brent Patterson et al. describes a mixing cap and method for use thereof, wherein the mixing cap is preferably pre-loaded during time of manufacture with a selected dry or liquid ingredient to facilitate subsequent consumer use. The mixing cap comprises an apertured inner tube threadably-engagable to the mouth of a bottle, and an outer housing cooperatively-engaged to the inner tube and slidably-restricted thereover via a flange arrangement. Preloaded ingredients contained within the outer housing may be introduced or discharged into the bottle by simply depressing the outer housing over the inner tube, thereby permitting the ingredients to flow through the apertures of the inner tube and into the liquid contents of the bottle. The combined ingredients and liquid within the bottle may subsequently be shaken without fear or risk of leakage or spillage.

[0009] U.S. Pat. No. 6,886,686 B2 to Michael R. Anderson describes a two piece sealed capsule that is inserted into a liquid bearing container wall or neck of a bottle, said capsule being a receptacle for sealably containing a liquid and/or dry material and a dispenser for releasing the material when desired into the container. The top of the capsule is depressed manually forcing a plunger tube connected to the bottom of the capsule to rip away the bottom and side portion dispensing the material. The present invention allows the use of materials that would discolor, degrade or interact with other substances when added to the contents of the bottle, to remain stable and/or inactive until the time of use.

[0010] U.S. Pat. No. 6,527,110 B2 to Brett Moscovitz describes the storage device engages a container, such as a bottle, to dispense a stored substance in the bottle. The device includes a housing for storing the substance, and a breakable seal disposed in the housing adjacent an opening for sealing the substance in the housing. Furthermore, the device includes a breaking member carried by the housing between the opening and breakable seal for being driven by the bottle when engaged with the device to break the seal and allow dispensing of the substance into the bottle.

[0011] U.S. Pat. No. 6,145,296 to Kuang-Sheng Shih describes an additive holder for a PET bottle includes a tubular member having an open top formed with a flange and an open bottom formed with a threaded neck, the tubular member being fitted in the externally threaded mouth with the flange resting on an upper edge of the mouth, the tubular member having an inner side formed with a circular protrusion, a container having an upwardly extending handle and fitted inside the tubular member and kept in place by the circular protrusion, with the handle extending upwardly out of the tubular member, a locking cap provided with internal threaded engageable with the externally threaded mouth and
having an axial through hole receiving the handle of the container, and a cover engageable with a top of the locking cap, whereby an additive such as sugar, cream milk, or the like in the container will drop down to mix with a drink in the PET bottle as desired.

[0012] U.S. Pat. No. 5,794,802 to Joseph Caola describes a reusable insert designed for off-the-shelf covered containers, and more specifically for baby bottles. The insert forms a storage compartment and which keeps the ingredients separated in the container. It is designed to allow the ingredients to be mixed in the same container and dispensed without removing the cover from the container. The insert generally includes a dry chamber housing. A chamber seal and a means to release the chamber seal such as a push rod. When used with a baby bottle, the insert slides into the bottle portion. A flange at the top of the dry chamber housing prevents it from moving too far into the bottle and still allows the nipple assembly to be attached directly to the bottle portion. When the nipple assembly is screwed in place, the flange is pinched between the nipple assembly and bottle portion forming a leak-proof seal. The dry chamber housing and chamber seal together for a cup-like container which stores the powdered formula slides into the open neck of the bottle portion containing a pre-measured amount of water and the nipple assembly is screwed in place. To mix the ingredients, the user pushes on the nipple which displaces the chamber seal and provides a passage for water and formula to combine in both the bottle portion and the dry chamber housing. The bottle is then shaken and the formula is dispensed. Other designs for the chamber seal and the means to release the chamber seal are specified.

[0013] U.S. Pat. No. 5,433,328 to Moises S. Baron et al. describes an extension assembly is adapted to fit between a tubular container of a baby bottle and a nipple end cap of the bottle. The extension assembly an elongated storage container body threadably coupled at an upper end with a lower end of the nipple end cap of the baby bottle and having an internal storage chamber for holding a quantity of food material, a release mechanism threadably coupled to an upper end of the tubular portion of the baby bottle for controlling access to the quantity of food material in the storage container body by the quantity of water stored in the tubular container of the baby bottle, and an outer ring mounting the storage container body to undergo movement toward and away from the upper end of the tubular container of the baby bottle so as to control lower and upper member of the release mechanism between a closed condition blocking access by the water in the tubular container of the baby bottle with the food material in the storage container of the extension assembly and an opened condition permitting access by the water in the tubular container of the baby bottle to the food material stored in the container boy of the extension assembly to facilitate shaking and mixing of the water with the food material.

[0014] U.S. Pat. No. 5,419,445 to David M. Kaesemeyer describes a baby bottle with two separate compartments for storage of powdered baby formula and water. Water is stored in a bottle portion and baby powdered formula is stored in a cartridge assembly. The cartridge assembly consists of a housing member, a seal member, a storage cylinder and a nipple assembly. Nipple assembly is attached to the top of storage cylinder which is disposed through the top of housing member. Seal member is attached to the bottom of housing member and engages an opposing mating surface on the bottom of storage cylinder, thus providing a releasable connecting means to disconnect the seal member from the housing member by allowing the seal member to be turned by the storage cylinder. The bottom of housing member is attached to the top of bottle portion. Seal member provides an internal leakproof seal that can be released by external means at a desired time by rotating nipple assembly. As a result, storage cylinder forces seal member to detach itself from the bottom of housing member. The seal member and powdered formula both fall into water. The seal member can provide a more efficient means of mixing the water and powder together while the bottle is being shaken. Once thoroughly shaken, the liquid formula is consumed through the end of a nipple.

[0015] U.S. Pat. No. 3,156,369 to D. R. Bowes et. al. describes a bicameral package with a mixing container and a cup fitting in the neck of a container that is adapted to be slidably removed therefrom. Below the cup is a bottom that is connected to a slenderable wall and is opened by a downward push on the cup top.

[0016] Notwithstanding the prior art, the present invention is neither taught nor rendered obvious thereby.

SUMMARY OF INVENTION

[0017] The present invention is a metered trap dispenser cap device with a twist release valve for providing a metered amount of a material to a container having a predetermined amount of liquid. This present invention metered trap dispenser cap device includes: (a) an outer cap having a top and side wall and having a dispensing orifice on the top, and having internal threading on the side wall; (b) an inner cap having an open top and a side wall, the side wall having external threading adapted to screw into the internal threading of the outer cap, the inner cap also having internal means for attachment to a neck of a container, the inner cap further including a metered trap wall extending downwardly from the inner cap open top and adapted to fit inside the neck of the container; (c) a valve component having a closed bottom adapted to fit the bottom of the metered trap wall so as to seal the cap wall to create a trap, the valve component further having at least one riser post connected to the closed bottom and extending upwardly and above and beyond the inner cap trap wall; (d) at least one screw-down deterrent mechanism connected to at least one of the inner cap and the outer cap and adapted to limit downward screwing of the outer cap on the inner cap when they are connected to one another and adapted so as to permit further downward screwing of the outer cap on the inner cap when the screw-down deterrent mechanism is removed; wherein, when the trap has been supplied with a metered amount of a material, the container has been supplied with a liquid, the inner cap has been inserted into and attached to the neck of the container so as to place the trap in the neck of the container, and the screw-down deterrent mechanism is removed, and a user screws the outer cap downwardly on the inner cap, top of the top of the outer cap will push downwardly on the at least one riser post of the valve component so as to push the valve component closed bottom away from the trap wall to permit the material and the liquid of the container to mix.

[0018] In one preferred embodiment of the present invention metered trap dispenser cap device with twist release valve for providing a metered amount of a material to a container having a predetermined amount of liquid, the dispensing orifice on the top and the outer cap is selected from the group consisting of a push-pull nozzle, an open nozzle, a pour spout and a flip top nozzle.
In one preferred embodiment of the present invention metered trap dispenser cap device with twist release valve for providing a metered amount of a material to a container having a predetermined amount of liquid, the screw-down deterrent mechanism is a tare away strip with a tare tab.  

In one preferred embodiment of the present invention metered trap dispenser cap device with twist release valve for providing a metered amount of a material to a container having a predetermined amount of liquid, the outer cap the inner cap and the trap wall have circular topography.  

In one preferred embodiment of the present invention metered trap dispenser cap device with twist release valve for providing a metered amount of a material to a container having a predetermined amount of liquid, the valve component has a plurality of riser posts symmetrically opposite one another.  

In one preferred embodiment of the present invention metered trap dispenser cap device with twist release valve for providing a metered amount of a material to a container having a predetermined amount of liquid, the tare away strip and tare tab integrally formed on the outer cap below the internal threads.  

In one preferred embodiment of the present invention metered trap dispenser cap device with twist release valve for providing a metered amount of a material to a container having a predetermined amount of liquid, the dispensing orifice includes a nozzle with a snap fit cap.  

In one preferred embodiment of the present invention metered trap dispenser cap device with twist release valve for providing a metered amount of a material to a container having a predetermined amount of liquid, the inner cap has internal threads for its internal means for attachment to the neck.  

In one preferred embodiment of the present invention metered trap dispenser cap device with twist release valve for providing a metered amount of a material to a container having a predetermined amount of liquid, the valve component bottom and the at least one riser post are separate, interconnected parts.  

In one preferred embodiment of the present invention metered trap dispenser cap device with twist release valve for providing a metered amount of a material to a container having a predetermined amount of liquid, the at least one riser post is fitted into the trap wall so as to inhibit the valve component from dropping out of the trap wall.  

Yet some other preferred embodiments of the present invention metered trap dispenser cap device with a twist release valve for providing a metered amount of a material to a container having a predetermined amount of liquid, the invention includes: (a) an outer cap having a top and side wall and having a dispensing orifice on the top, and having internal threading on the side wall, the outer cap further having at least one riser post having a proximal end and a distal end, the distal end being connected to a closed bottom of a valve component, the at least one riser post extending upwardly from the distal end and above and beyond the inner cap trap wall and being connected at the proximal end to the inside of the outer cap; (b) an inner cap having an open top and a side wall, the side wall having external threading adapted to screw into the internal threading of the outer cap, the inner cap also having internal means for attachment to a neck of a container, the inner cap further including a metered trap wall extending downwardly from the inner cap open top and adapted to fit inside the neck of the container; (c) a valve component having a closed bottom adapted to fit the bottom of the metered trap wall so as to seal the cap wall to create a trap, the closed bottom being connected to the at least one riser post; (d) at least one screw-down deterrent mechanism connected to at least one of the inner cap and the outer cap and adapted to limit downward screwing of the outer cap on the inner cap when they are connected to one another and adapted so as to permit further downward screwing of the outer cap on the inner cap when the screw-down deterrent mechanism is removed; wherein, when the trap has been supplied with a metered amount of a material, the container has been supplied with a liquid, the inner cap has been inserted into and attached to the neck of the container so as to place the trap in the neck of the container, and the screw-down deterrent mechanism is removed, and a user screws the outer cap downwardly on the inner cap, top of the top of the outer cap will push downwardly on the at least one riser post of the valve component so as to push the valve component closed bottom away from the trap wall to permit the material and the liquid of the container to mix.  

In the preferred embodiment of the present invention metered trap dispenser cap device with twist release valve for providing a metered amount of a material to a container having a predetermined amount of liquid that is described in the immediately preceding paragraph, all of the various preferred embodiments described above in this Summary are also applicable.  

Additional features, advantages, and embodiments of the invention may be set forth or apparent from consideration of the following detailed description, drawings, and claims. Moreover, it is to be understood that both the foregoing summary of the invention and the following detailed description are exemplary and intended to provide further explanation without limiting the scope of the invention as claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this specification, illustrate preferred embodiments of the invention and together with the detailed description serve to explain the principles of the invention. In the drawings:

FIG. 1 is a side cut view of one preferred embodiment of the present invention metered trap dispenser cap device with twist release valve for providing a metered amount of a material to a container having a predetermined amount of liquid;

FIG. 2 is a side cut sectional exploded view of components of the present invention metered trap dispenser cap device of FIG. 1, illustrating the details of the interconnective relationships between the inner cap and the valve component, and FIG. 3 shows these components assembled (connected), along with the outer cap and its interconnective relationship with both the inner cap and the valve component;

FIG. 4 is a side cut view of one preferred embodiment of the present invention metered trap dispenser cap device of FIG. 1, but having the device in open position and ready to mix the material with the liquid;

FIG. 5 is a side cut view of another preferred embodiment of the present invention metered trap dispenser cap device with twist release valve for providing a metered amount of a material to a container having a predetermined...
amount of liquid, illustrating an inner cap press fitted to a neck of the container in a closed position;

[0035] FIG. 6 is a side cut view of the embodiment illustrated in FIG. 5, but having the device in an open position ready to mix the material with the liquid;

[0036] FIGS. 7 and 8 show a front view and a cut view, respectively, of the outer neck of the device illustrated in FIGS. 5 and 6;

[0037] FIGS. 9 and 10 show a front view and a cut view, respectively, of the outer cap of the device illustrated in FIGS. 5 and 6;

[0038] FIGS. 11 and 12 show a front view and a cut view, respectively, of the inner cap of the device illustrated in FIGS. 5 and 6;

[0039] FIGS. 13 and 14 show a front view and a cut view, respectively, of the plug cap of the device illustrated in FIGS. 5 and 6;

[0040] FIG. 15 is a side cut view of another preferred embodiment of the present invention metered trap dispenser cap device with drop release valve for releasing a powder or other fluid material from a trap valve component into a container with liquid. More specifically, the invention may be used for releasing medicinal, food beverage, or chemical or other component material into a liquid for time-of-use mixing and dispensing.

[0041] FIG. 16 is a side cut view of the embodiment illustrated in FIG. 15, but having the device in an open position ready to mix the material with the liquid. e.g., a push pull cap assembly. The dispensing orifice cap assembly would make it very difficult for the sub-assembly and consequently the material to be removed from the container.

[0046] To mix the material with the liquid, a consumer would remove the at least one screw-down deterrent mechanism and screw down the outer cap completely, which would expose the material to the liquid by pushing the valve component away from the trap wall. Next, the consumer would shake the container to mix the liquid with the material. The mixed liquid would then be ready for dispensing through the dispensing orifice assembly on the outer cap.

[0047] In another preferred embodiment, the outer cap has at least one riser post having a proximal end and a distal end. The distal end is connected to the closed bottom of the valve component while the proximal end is connected to an inside of the outer cap. The at least one riser post extend upwardly from the distal end and above and beyond an inner cap metered trap wall and is connected at the proximal end to an inside of the outer cap. The at least one riser post is fitted into the metered trap wall so as to inhibit the valve component from dropping out of the metered trap wall. A plurality of riser posts is symmetrically opposite one another. Moreover, the valve component bottom and the at least one riser post are separate, interconnected parts.

[0048] The inner cap includes the metered trap wall which when the valve component is pushed down by screwing downwardly the outer cap, the closed bottom of the valve component is pushed away from the trap wall to permit the material and the liquid in a container to mix. The valve component has a closed bottom that is adapted to fit the bottom of the metered trap wall of the inner cap, so as to seal the cap wall to create a trap. The seal may be threads fitted to a plug cap, an adhesive, clamps, or the like.

[0049] In a preferred embodiment, the inner cap is secured to a neck of a container through corresponding threads on the container and inner cap. Other means for securing may be a press fit.

[0050] Referring now to the drawings wherein like reference numerals designate corresponding parts throughout the several views, FIGS. 1 through 4 show a preferred embodiment of the present invention metered dispensing cap device. FIG. 1 is a side cut view of a metered trap dispenser cap device with twist release valve for providing a metered amount of a material to a container having a predetermined amount of liquid. FIG. 2 is a side cut sectional exploded view of components of the present invention metered trap dispenser cap device of FIG. 1, illustrating the details of the interconnective relationships between the inner cap and the valve component, and FIG. 3 shows these components assembled (connected), along with the outer cap and its interconnective relationship with both the inner cap and the valve component. FIG. 4 is a side cut view of one preferred embodiment of the present invention metered trap dispenser cap device of FIG. 1, but having a trap in open position and ready to mix the material with the liquid.

[0051] The metered trap dispenser cap device 1 with a twist release valve for providing a metered amount of a material 60 to a container 11 having a predetermined amount of liquid 13 includes an outer cap 3, an inner cap 19, a valve component 51 and at least one screw-down deterrent mechanism 61 connected to at least one of the inner cap 19 and the outer cap 3. A container cap cover 35 with a snap fit may be employed to prevent liquid from leaking out of the container 11, after the
material 60 has been mixed with the liquid 13. The container 11 includes a neck 7, a stop 15 for preventing the outer top 29 from being screwed down further, a bottom 9, a side wall 5, threads 17 for attachment to the outer cap 3, and the liquid 13 within the container 11.

[0052] The outer cap 3 has a top 23 and a side wall 21, a dispensing orifice 33 on the top 31 of the top 23, and internal threading 25 on the side wall 21. In this case, the dispensing orifice 33 is a push-pull nozzle, but any type of pouring nozzle may be employed. Such dispensing orifices include an open nozzle, a pour spout, a flip top nozzle, or the like. As shown, the outer cap 3 has circular topography.

[0053] The inner cap 19 has an open top 29 and a side wall 41. The side wall 41 has external threading 45 adapted to screw into the internal threading 25 of the outer cap 3. Furthermore, the inner cap 19 has internal means for attachment, in this case, threads 47 to thread attachment means 17 of a neck 7 of a container 11, as well as a metered trap wall 31 extending downwardly from the inner cap 19 open top 29 and adapted to fit inside the neck 7 of the container 11. As shown, the inner cap 19 and the metered trap wall 43 have circular topography.

[0054] The valve component 51 has a closed bottom 49 adapted to fit the bottom of the metered trap wall 43, so as to seal the metered trap wall 43 to create a trap and at least one riser post 53, 57 and 59 connected to the closed bottom 49 and extending upwardly and above and beyond the inner cap 19 trap wall 31. At the least one riser post 53, 57 and 59 is fitted into the metered trap wall 43 so as to inhibit the valve component 65 from dropping out of the metered trap wall 43. A plurality of riser posts 57 and 59, and 53 and opposite side (not shown) is symmetrically opposite one another. Moreover, the valve component bottom 49 and the at least one riser post 53, 57 and 59 are separate, interconnected parts.

[0055] The at least one screw-down deterrent mechanism 61 is adapted to limit downward screwing of the outer cap 3 on the inner cap 19 when they are connected to one another and adapted so as to permit further downward screwing of the outer cap 3 on the inner cap 19 when the screw-down deterrent mechanism 61 is removed. In this case, the at least one screw-down deterrent mechanism is a tear away strip 61 with a tear tab 63, which are integrally formed on the outer cap 3 below the internal threads 25.

[0056] Referring now specifically to FIG. 4. The present invention device is shown in an open position. Therefore, when the trap has been supplied with a metered amount of a material 60, the container 11 has been supplied with a liquid 13, the inner cap 19 has been inserted into and attached to the neck 7 of the container 11 so as to place the trap in the neck 7 of the container 11, and the screw-down deterrent mechanism 61 is removed, and a user screws the outer cap 3 downwardly on the inner cap 19, top 31 of the top 23 of the outer cap 3 will push downwardly on at least one riser post 53, 57 and 59 of the valve component 51 so as to push the valve component closed bottom 49 away from the trap wall 43 to permit the material 60 and the liquid 13 of the container 11 to mix. The downward push on the outer cap 3 will permit the outer cap 3 to move down as far as the stop 15, which permits the valve component closed bottom 49 to be pushed away from the trap wall 43.

[0057] Referring now to FIGS. 5 through 13, another preferred embodiment of a present invention metered cap dispenser device with twist release valve for providing a metered amount of a material to a container having a predetermined amount of liquid is described and illustrated, having an inner cap press fitted to a neck of the container, as well as at least one riser post included as part of an outer cap. FIG. 5 is a side cut view of the device illustrating a cap press fitted to a neck of the container in a closed position, while FIG. 6 is a side cut view of the device in an open position. FIGS. 7 and 8 show a front view and a cut view, respectively, of the container neck of the device illustrated in FIGS. 5 and 6. FIGS. 9 and 10 show a front view and a cut view, respectively, of the outer cap of the device illustrated in FIGS. 5 and 6. FIGS. 11 and 12 show a front view and a cut view, respectively, of the inner cap of the device illustrated in FIGS. 5 and 6. FIGS. 13 and 14 show a front view and a cut view, respectively, of the plug cap of the device illustrated in FIGS. 5 and 6.

[0058] The present invention metered trap dispenser cap device 501 with a twist release valve for providing a metered amount of a material 560 to a container 511 having a predetermined amount of liquid 513 includes an outer cap 503, an inner cap 519, a valve component 551 and at least one screw-down deterrent mechanism 561 connected to at least one of the inner cap 519 and the outer cap 503. In this embodiment, a plug cap 571 seals the valve component 551 closed bottom 549 by mating threads 583 on the plug cap 571 with threads 585 on the valve component bottom 549. The container 511 includes a neck 507, a stop 515 for preventing the outer top 529 from being screwed down further, a bottom (not shown), a side wall 505 and the liquid 513 within the container 511. A container cap cover 535 with a snap fit may be employed to prevent liquid from leaking out of the container 511, after the material 560 has been mixed with the liquid 513.

[0059] The outer cap 503 has a top 523 and side wall 521, a dispensing orifice 533 on the top 531 of the top 523, and internal threading 525 on the side wall 521. In addition, the outer cap 503 further has at least one riser post 573 and 575 having a proximal end 577 and a distal end 579. The distal end 579 is connected to the closed bottom 549 of the valve component 551 while the proximal end 577 is connected to an inside of the outer cap 503. The at least one riser post 573 and 575 extend upwardly from the distal end 579 and above and beyond an inner cap 519 metered trap wall 543 and being connected at the proximal end to an inside 581 of the outer cap 503. As shown, the outer wall has circular topography.

[0060] The inner cap 519 has an open top 529 and a side wall 541. The side wall 541 has external threading 545 adapted to screw into the internal threading 525 of the outer cap 503. Furthermore, the inner cap 519 has internal means for attachment, in this case, a press fit, to a neck 507 of a container 511. The inner cap 519 further includes the metered trap wall 543 extending downwardly from the inner cap 519 open top 529 and adapted to fit inside the neck 507 of the container 511. As shown, the inner wall 519 and the metered trap wall 543 have circular topography.

[0061] The valve component 551 has the closed bottom 549 adapted to fit the bottom of the metered trap wall 543 so as to seal the trap wall 543 to create a trap and inhibit the valve component 551 from dropping out. The closed bottom 549 is connected to the at least one riser post 573 and 575. In this case, the plug cap 571 seals the valve component 551 closed bottom 549. The valve component 551 and the at least one riser post 573 and 575 are separate, interconnected parts.

[0062] The at least one screw-down deterrent mechanism 561 is adapted to limit downward screwing of the outer cap 503 on the inner cap 519 when they are connected to one another and adapted so as to permit further downward screw-
ing of the outer cap 503 on the inner cap 519 when the screw-down deterrent mechanism 561 is removed. In this case, the at least one screw-down deterrent mechanism is a tear away strip 561 with a tear tab 563, which are integrally formed on the outer cap 503 below the internal threads 525.

[0063] Referring now specifically to FIG. 6, the present invention device is shown in an open position. Therefore, when the trap has been supplied with a metered amount of a material 560, the container 511 has been supplied with the liquid 513, the inner cap 519 has been inserted into and attached to the neck 507 of the container 511 so as to place the trap in the neck 507 of the container 511, and the screw-down deterrent mechanism 561 is removed, and a user screws the outer cap 503 downwardly on the inner cap 519, top 531 of the top 523 of the outer cap 503 will push downwardly on the at least one riser post 573 and 575 of the valve component 551 so as to push the valve component closed bottom 549 away from the trap wall 543 to permit the material 560 and the liquid 513 of the container 511 to mix. The downward push on the outer cap 503 will permit the outer cap 503 to move down as far as the stop 515, which permits the valve component closed bottom 549 to be pushed away from the trap wall 553.

[0064] After the material 560 is mixed with the liquid 513, the cap 535 is removed and the container 511 is turned upside down. The mixed liquid 513 moves through aperture 538 and 536 in the top 531 to move out through the dispensing orifice 533. In this case the dispensing orifice 533a is a flip top nozzle, but any type of pouring nozzle may be employed. Such dispensing orifices also include an open nozzle, a pour spot, a flip top nozzle, or the like.

[0065] FIG. 15 is a side cut view of another preferred embodiment of the present invention metered trap dispenser cap device with twist release valve for providing a metered amount of a material to a container having a predetermined amount of liquid, illustrating an inner cap thread fitted to a neck of the container in a closed position. FIG. 16 is a side cut view of the embodiment illustrated in FIG. 15, but having the device in an open position ready to mix the material with the liquid. FIGS. 15 and 16 are similarly numbered as FIGS. 5 and 6 for similar parts, but beginning with ‘600’.

[0066] A container cap cover 635 with a snap fit may be employed to prevent liquid from leaking out of the container 611, after the material 660 has been mixed with the liquid 613. Furthermore, the neck 607 of the container 611 includes threads 617 for attachment to the inner cap 619 threads 647.

[0067] To summarize, the present invention thus provides a metered trap dispenser cap device with a twist release valve for providing a metered amount of a material to a container having a predetermined amount of liquid, which includes an outer cap, an inner cap, a valve component and at least one screw-down deterrent mechanism connected to at least one of the inner cap and the outer cap. The valve component has a closed bottom adapted to fit the bottom of a metered trap wall of the inner cap, so as to seal the metered trap wall to create a trap, and at least one riser post connected to the closed bottom and extending upwardly and above and beyond the inner cap trap wall. The at least one riser post is fitted into the metered trap wall so as to inhibit the valve component from dropping out of the metered trap wall.

[0068] Although particular embodiments of the invention have been described in detail herein with reference to the accompanying drawings, it is to be understood that the invention is not limited to those particular embodiments, and that various changes and modifications may be effected therein by one skilled in the art without departing from the scope or spirit of the invention as defined in the appended claims.

What is claimed is:

1. A metered trap dispenser cap device with a twist release valve for providing a metered amount of a material to a container having a predetermined amount of liquid, which comprises:

(a) an outer cap having a top and side wall and having a dispensing orifice on said top, and having internal threading on said side wall;

(b) an inner cap having an open top and a side wall, said side wall having external threading adapted to screw into said internal threading of said outer cap, said inner cap also having internal means for attachment to a neck of a container, said inner cap further including a metered trap wall extending downwardly from said inner cap open top and adapted to fit inside said neck of said container;

(c) a valve component having a closed bottom adapted to fit the bottom of said metered trap wall so as to seal said cap wall to create a trap, said valve component further having at least one riser post connected to said closed bottom and extending upwardly and above and beyond said inner cap trap wall;

(d) at least one screw-down deterrent mechanism connected to at least one of said inner cap and said outer cap and adapted to limit downward screwing of said outer cap on said inner cap when they are connected to one another and adapted so as to permit further downward screwing of said outer cap on said inner cap when said screw-down deterrent mechanism is removed;

wherein, when said trap has been supplied with a metered amount of a material, said container has been supplied with a liquid, said inner cap has been inserted into and attached to said neck of said container so as to place said trap in said neck of said container, and said screw-down deterrent mechanism is removed, and a user screws said outer cap downwardly on said inner cap, top of said trap cap will push downwardly on said at least one riser post of said valve component so as to push said valve component closed bottom away from said trap wall to permit said material and said liquid of said container to mix.

2. The metered trap dispenser cap device with twist release valve for providing a metered amount of a material to a container having a predetermined amount of liquid of claim 1 wherein dispensing orifice on said top on said outer cap is selected from the group consisting of a push-pull nozzle, an open nozzle, a pour spot and a flip top nozzle.

3. The metered trap dispenser cap device with twist release valve for providing a metered amount of a material to a container having a predetermined amount of liquid of claim 1 wherein said screw-down deterrent mechanism is a tear away strip with a tear tab.

4. The metered trap dispenser cap device with twist release valve for providing a metered amount of a material to a container having a predetermined amount of liquid of claim 1 wherein said outer cap said inner cap and said trap wall have circular topography.

5. The metered trap dispenser cap device with twist release valve for providing a metered amount of a material to a container having a predetermined amount of liquid of claim 1 wherein said valve component has a plurality of riser posts symmetrically opposite one another.
6. The metered trap dispenser cap device with twist release valve for providing a metered amount of a material to a container having a predetermined amount of liquid of claim 1 wherein said tare away strip and tare tab integrally formed on said outer cap below said internal threads.

7. The metered trap dispenser cap device with twist release valve for providing a metered amount of a material to a container having a predetermined amount of liquid of claim 1 wherein said dispensing orifice includes a nozzle with a snap fit cap.

8. The metered trap dispenser cap device with twist release valve for providing a metered amount of a material to a container having a predetermined amount of liquid of claim 1 wherein said inner cap has internal threads for its internal means for attachment to said neck.

9. The metered trap dispenser cap device with twist release valve for providing a metered amount of a material to a container having a predetermined amount of liquid of claim 1 wherein said valve component bottom and said at least one riser post are separate, interconnected parts.

10. The metered trap dispenser cap device with twist release valve for providing a metered amount of a material to a container having a predetermined amount of liquid of claim 1 wherein said at least one riser post is fitted into said trap wall so as to inhibit said valve component from dropping out of said trap wall.

11. A metered trap dispenser cap device with a twist release valve for providing a metered amount of a material to a container having a predetermined amount of liquid, which comprises:

(a) an outer cap having a top and side wall and having a dispensing orifice on said top, and having internal threading on said side wall, said outer cap further having at least one riser post having a proximal end and a distal end, said distal end being connected to a closed bottom of a valve component, said at least one riser post extending upwardly from said distal end and above and beyond said inner cap trap wall and being connected at said proximal end to the inside of said outer cap;

(b) an inner cap having an open top and a side wall, said side wall having external threading adapted to screw into said internal threading of said outer cap, said inner cap also having internal means for attachment to a neck of a container, said inner cap further including a metered trap wall extending downwardly from said inner cap open top and adapted to fit inside said neck of said container;

(c) a valve component having a closed bottom adapted to fit the bottom of said metered trap wall so as to seal said cap wall to create a trap, said closed bottom being connected to said at least one riser post;

(d) at least one screw-down deterrent mechanism connected to at least one of said inner cap and said outer cap and adapted to limit downward screwing of said outer cap on said inner cap when they are connected to one another and adapted so as to permit further downward screwing of said outer cap on said inner cap when said screw-down deterrent mechanism is removed; wherein, when said trap has been supplied with a metered amount of a material, said container has been supplied with a liquid, said inner cap has been inserted into and attached to said neck of said container so as to place said trap in said neck of said container, and said screw-down deterrent mechanism is removed, and a user screws said outer cap downwardly on said inner cap, top of said top of said outer cap will push downwardly on said at least one riser post of said valve component so as to push said valve component closed bottom away from said trap wall to permit said material and said liquid of said container to mix.

12. The metered trap dispenser cap device with twist release valve for providing a metered amount of a material to a container having a predetermined amount of liquid of claim 11 wherein dispensing orifice on said top on said outer cap is selected from the group consisting of a push-pull nozzle, an open nozzle, a pour spout and a flip top nozzle.

13. The metered trap dispenser cap device with twist release valve for providing a metered amount of a material to a container having a predetermined amount of liquid of claim 11 wherein said screw-down deterrent mechanism is a tare away strip with a tare tab.

14. The metered trap dispenser cap device with twist release valve for providing a metered amount of a material to a container having a predetermined amount of liquid of claim 11 wherein outer cap said inner cap and said trap wall have circular topography.

15. The metered trap dispenser cap device with twist release valve for providing a metered amount of a material to a container having a predetermined amount of liquid of claim 11 wherein said valve component has a plurality of riser posts symmetrically opposite one another.

16. The metered trap dispenser cap device with twist release valve for providing a metered amount of a material to a container having a predetermined amount of liquid of claim 11 wherein said tare away strip and tare tab integrally formed on said outer cap below said internal threads.

17. The metered trap dispenser cap device with twist release valve for providing a metered amount of a material to a container having a predetermined amount of liquid of claim 11 wherein said dispensing orifice includes a nozzle with a snap fit cap.

18. The metered trap dispenser cap device with twist release valve for providing a metered amount of a material to a container having a predetermined amount of liquid of claim 11 wherein said inner cap has internal threads for its internal means for attachment to said neck.

19. The metered trap dispenser cap device with twist release valve for providing a metered amount of a material to a container having a predetermined amount of liquid of claim 11 wherein said valve component bottom and said at least one riser post are separate, interconnected parts.

20. The metered trap dispenser cap device with twist release valve for providing a metered amount of a material to a container having a predetermined amount of liquid of claim 11 wherein said bottom of said trap wall is sufficiently connected to said at least one riser post so to inhibit said valve component from dropping out.

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