CONCENTRATE RELEASE CAP

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ABSTRACT

A cap keeping separate the product and the liquid in a bottle, until the moment of consumption. It is useful for products having a short shelf life once mixed to each other, the product concentrate with the liquid.

The concentrate product is mixed opening the seal closed in a way that the shelf life of the product is the one required by the market, opening the seal of the cylinder containing the product concentrate, pressing with the finger on the top part of the cap and allowing release of the mix of the product with the liquid, so the consumer can drink the beverage with the nutritional, medicinal, functional features, etc., as offered by the manufacturer to the public.
CONCENTRATE RELEASE CAP

FIELD OF THE INVENTION

[0001] The present invention relates to a metering cap or closure, more particularly a concentrate release cap within a beverage container to feed the concentrate, the concentrate can be a flavoring, vitamin supplement, medicine supplement or another.

BACKGROUND OF THE INVENTION

[0002] The field of application is the market of flavor beverages, energy supplements, food supplements, vitamin supplements, natural supplements, medicine supplements, chemical supplements or others, that once they are mixed with the liquid, their shelf life is substantially reduced, thus once they are mixed they should be consumed or used in a short time.

[0003] The product or concentrate to mix, which may be powder, pellets or liquid held in the cavity or liquid held in the cavity or tight of cap, are used to close bottles previously filled with liquid in the bottling lines, leaving the bottle with the cap ready for delivery to the market, an operation of bottle labeling and/or secondary packaging may remain outstanding.

[0004] Previous filling of the caps can be done in a cap filling parallel line, within the bottling plant, and feeding these caps with product to the bottling lines or filling the caps in an independent plant and send them to the bottling plant for their application in the bottling line.

[0005] The caps once filled with product are placed on the mouth of the bottles with a closure which is part of the bottling line, once the bottles are filled with water or another liquid for human consumption during the bottling process, having thus the finished product for market delivery.

[0006] Once the finished bottle is in the hands of the final user, he/she will operate the mechanism to release the product, which will be mixed with the liquid, then to be shaken and once they are mixed will proceed to open the bottle, by twisting the cap to break the security or tamper-proof band, which may not be in the body of the cap, this way the liquid mix with the product is ready for consumption.

[0007] Some caps in the state of the art have drawbacks with reference to the cap of the present invention, as in the case of the lacto tab cap, which is a cap used in the “Lacto Tab” product of EMMI company, from Switzerland, said cap comprises 5 plastic pieces and a bottle with special neck, the cap comprises a capsule formed with two aluminum sheets, the powder or liquid product is contained in this capsule, the powder can be a flavoring agent, vitamin supplement or energy supplement, this capsule is placed on the bottle neck and becomes adhered by an induction process, thereafter the cap is placed, the cap is of special shape and dimensions, in accordance with the bottle neck, the operation thereof is as follows:

[0008] Cap is clockwise twisted, with the twist the security band is broken and following the twist an internal stem is driven down, the stem in the lower end having teeth or spikes that upon the twist movement and vertically driving down, brakes the aluminum capsule, allowing the product being spilled to the liquid held in the bottle, wherein shaking of the container mixes the product with the liquid, and the beverage is ready for drinking, the upper part of the cap has a protective cover, which is withdrawn and the seal is pulled allowing exit of the already mixed liquid, this latter concept is used in the caps known as “sport cap” or sport, “push-pull” as the push down of the seal closes again the exit duct of the product.

[0009] This cap was used only in this product and was removed from the market for lack of success, being of a high cost, comprising five pieces, the aluminum cap, which must be previously filled with the product and requires assembly of the cap and a special neck in the bottle, it is further required a special closure or binding machine to place the aluminum capsule and then the cap, all this increasing the cost of the product.

[0010] Another cap in the state of the art, is the single piece dispenser cap, comprising a product housing cylindrical section, sealed with an aluminum film, closing the product housing section, the internal part of the cap having a semicircular section, the diameter of which is supported in the wall of the housing section, in the center having a stem having a series of spikes in the lower end, this part remains within the housing section.

[0011] The cap operates as follows: the powder or liquid concentrated product is placed in the housing section, sealed with the aluminum film, ready to install, in the filling line the cap is placed on the bottles with standard neck as found in the market.

[0012] Once the bottle is in the hands of the end consumer, he/she then pushes downward the semicircular part located at the center of the cap in the upper part of the bottle, with this action the stem is shifted downwards and the spikes located in the lower end breaks the aluminum seal and allows passage of the product towards the liquid mixing with it by the consumer agitating the bottle, once the product is mixed with the liquid, the cap is removed, just as the standard caps are removed, breaking the tamper-proof band, thus the product becoming ready for consumption.

[0013] At times, the aluminum breaking or tearing is not big enough to allow the complete release of the product, resulting in a low content mixture, as the stem travel is limited by the semi-circle, the injection mold cost is very high, being very complex the shape of the spikes stem accruing to a high cost of the part or piece. Also at times the semi-circular sector in which pressure is applied to break the aluminum, returns to its original position without breaking enough the aluminum seal, resulting in a low content mixture of the product.

[0014] US2010/0044254 of Joseph Romeo, issued on Feb. 25, 2010, describes a beverage container cap dispensing a flavorful material into the liquid contained in the bottle includes a top element adapted and constructed to hold a predetermined quantity of flavorful material. A center element is connected to the top element by a valve mechanism actuated to selectively dispense the flavoring into the container; the valve mechanism is actuated by rotation of the center element with respect to the base element. Such cap comprises several parts and is a complex assembly.

[0015] Korean application KR20070606132 of Yorita Katsuhiro, issued on Jun. 12, 2007, describes a cap in which powder tea to be blended with the water held in the container. The cap is constructed to be removed by a thread bottle mouth, having a lid in the upper part twist opened and also a part being pressed in the vertical direction combined with the twist motion. In the lower part of the cap being pressed provides a cylindrical container receiving a flavoring mixture and mechanically breaking the bottom of said container; a pressing rod is integrally shaped with the lower surface and projected upwards. To release the flavoring, the upper lid is
twisted and pushed down, this opens and breaks the weakened section of the container and allows the mixture with the contained water.

[0016] US2007/0102306 of Emery J. Lantos et al, issued on May 10, 2007 describes bottle cap or closure including a base member, a sliding upper member coupled to the base, the upper member having a dispenser member. A sliding crown member coupled with the upper member and the base member and the upper member forms at least a flavoring reservoir to be released when removing the tamper-proof band and forcing the twisting downwards.

[0017] WO2006/123946 issued on Nov. 23, 2006, describes a container closure including a chamber housing a flavoring substance separated by a flexible membrane, the opening device of the membrane includes a central support structure in the shape of a cylinder having cutting teeth in the lower base, such cylinder acts by pressure applied in the upper face of the closure formed by a flexible cap is pressed with the thumb, by pressing the teeth breaks the membrane or seal and releases the flavoring for mixing with the water or beverage held in the bottle; but most often the teeth do not totally break the membrane and the flavoring is trapped within the container.

[0018] Mexican patent application MXP06002700 corresponding to U.S. Pat. No. 7,475,774, issued on Sep. 4, 2006, describes a beverage container cap or closure, such cap is provided with a compartment having a flavoring substance, such cylindrical lateral compartment having an top wall and a frangible bottom wall, provided with a cutting knife moveable relative to said side wall and the bottom wall with the purpose to open the bottom wall and release the flavoring substance within the container or bottle. Again this cap operates by means of pressure of the top compartment forcing the base to interact with the knife that breaks and allows the release of the flavoring.

[0019] U.S. Pat. No. 6,372,270 to Sean P. Denny, issued Apr. 16, 2002, describes a two-portions threaded cap, one portion defines a chamber containing a drink mix, such as tea bags, etc., a seal is provided to prevent mixing of the beverage and water within the bottle until desired. A plunger is pushed downwards driving the flavoring to burst the seal and deploying the flavor in the water contained in the bottle.

[0020] U.S. Pat. No. 4,722,449, to Warner F. Dubach, issued on Feb. 2, 1988, describes a threaded container closure in the bottle mouth provided with a tamper-proof band, in this case the seal a easily pierceable film, then to release the flavoring contents, the tamper-proof band should be removed and twist the cap downwards so that a peak element breaks the seal and releases the flavoring material within the liquid held in the bottle; but this cap has the risk that in placement thereof in the mouth of the bottle too much pressure is applied then braking the seal releasing the flavor at an unsuitable time, further it is a cap provided with a complicated structure making the manufacturing process too expensive.

[0021] Mexican patent application MXP2006005798 issued on Nov. 22, 2004 to Jung Min Lee describes a cap containing a flavoring, having a main hollow body and a support tubing extending downwards from an internal surface of the main hollow body, the support tubing having a discharge portion and a seal element formed in the lower end thereof, the moving element coupled to a fastening element. The open lower end of the tubing is tightly coupled with the seal element, to discharge the concentrate the tubing is raised and the concentrate contained therein is discharged to the liquid held in the bottle; but again it relates to a too complicated system that should be twisted moving upwards, and be made from two threadable bodies surely resulting in a too expensive production.

[0022] Mexican patent MX261034 issued on Oct. 10, 2008 to The Procter & Gamble Company describes a system to incorporate minerals in bottled drinking liquids, the system comprised a cap provided with a powder deposit and an opener adapted to said cap provided with a shaft shaped stem breaking the seal of the cap and releasing the contents within the liquid of the container.

[0023] Mexican patent application MXP2004010773 to Emilio Morin, issued on Apr. 30, 2002, describes a capsule with a lower lid and a tamper-proof strip removably inserted in the mouth of a bottle, the top part of the lower cap is open with a neck coupled to a top part also having a tamper-proof strip; a deposit comprised within the top lid and having a breakable bottom, the top lid can be axially moved downward in relation to the bottle neck; to break the seal it is only needed to press the upper lid for the cutter to act and release the concentrated substance to be added to the liquid contained in the bottle.

**BRIEF DESCRIPTION OF THE INVENTION**

[0024] An object of the present invention, is to provide a dosing cap designed to house inside a product that may be a flavoring, vitamins, energy supplements, medicine supplements, etc., that may be in the shape of powder or pellets or liquid to be released with opening of the cap.

[0025] Another object of the present invention is to provide a dosing cap that keeps separate the concentrate product from the liquid contained in the bottle, extending the shelf life thereof, making the mixture until the time of consumption.

[0026] Also an object of the present invention is to provide a dosing cap that is made with two plastic pieces, a cap with a cylindrical skirt and a rhombic shaped seal, are assembled once the concentrated product has been deposited in the cap cylinder.

[0027] Yet another object of the present invention is to provide a seal coupled that tightly closes the lower cylinder edge of the cap, together making the tight in which the product to be preserved is housed, is released by pressing the top part of the cap at the center thereof, to drive a central stem uncoupling the seal, are designed using the resilient properties of the plastic, the spring prevents the seal to return, keeping it open and allowing passage of the product to the liquid, to make efficient the mixture.

[0028] Still an object of the present invention is to provide a cap tight-sealingly housing a concentrated product, the release thereof is made by pressing with the finger the center of the top part of the cap, until the effect of the spring and recovery of the plastic, this part at the center of the cap is held downwards, with this opening the seal retaining the product and allowing its passage to the liquid, then the consumer proceeds to shake the container to make the mixture of the product and liquid, the cap is opened normally like the standard caps and the mix made is consumed.

**BRIEF DESCRIPTION OF THE FIGURES**

[0029] FIG. 1 is a top view of the cap of the present invention in which is shown the top ring of the skirt and the flexible center.
FIG. 2 is a lower view of the cap of the present invention in which is shown the skirt, the central cylindrical body, the flexible center, the central stem and the coupling pin.

FIG. 3, is a side-cut view of the cap of the present invention in which is shown the skirt with the screw threads, the tamper-proof band, the flexible ring, and the bends, as well as the central stem, the coupling pin and the cylindrical central body defining the tight or deposit of flavoring concentrate, medicine and vitamins supplements.

FIG. 4, is a top or lower view of the seal of the present invention showing each one of the vertex or endpoints of the rhombic perimeter ring, the central disk, the coupling structure with the vertical support walls and the groove thereof making them flexible to ease the coupling.

FIG. 5, is a side cut view of the seal structure of the present invention showing the rhombic perimeter ring, the external rings of each one of the surfaces, the disk or horizontal support and the vertical support structure defining the coupling entrance of the central stem pin.

FIG. 6, is a side cut view of the cap and seal of the present invention in which the seal closure position and the closure position of the flexible center of the cap are shown.

FIG. 7, is a side cut view of the cap and seal in partial aperture position in which the flexible center is depressed and the seal in uncoupled position defining a perimeter aperture by which the concentrate escapes.

FIG. 8, is a side cut view of the cap and seal in maximum aperture position, in which the flexible center is located totally depressed overcoming the first thread and by its geometry avoids it to return to the original position by itself, defining a maximum aperture between the edge of the cylindrical body and the seal.

FIG. 9, is a side view of the seal body having a barrel shape and being symmetrical with respect to a top central surface, the contact side surfaces are inclined and symmetrical such that the seal can be coupled by the top or bottom faces.

FIG. 10, is a side view of the cap showing the skirt with vertical grooves embossing, the tamper-proof band and a central cylinder body.

FIG. 11, shows a side view of the seal cap coupling, the cap is placed upward inverted position and the seal only couples at the central stem pin.

FIG. 12, is a side cut view showing the detail of the coupling between the seal and the inclined rim of the cylinder body.

FIG. 13, is a side cut view showing the angle of the seal contact surface and the angle of the central cylinder body rim, the latter is higher than the angle of the seal contact surface.

FIG. 14, is a side cut view of the coupling detail between the seal and the cylinder central body in which by pressure effect, the angles match.

FIG. 15, is a side cut view of the cap and seal coupled and containing the flavor concentrate in closure position.

FIG. 16, is a side cut view of the cap and seal in opening position in which is released the concentrate contained within the cylinder body.

FIG. 17, is a side view of the seal cap in closure position, ready to he placed in the mouth of the respective bottle.

FIG. 18, is a side cut view of a state of the art cap provided with a flexible center in the shape of a dome and a central body with peaks at the bottom breaking a seal of a plastic or metallic film, most often the breaking is defective or there is no break.

FIG. 19, is a side cut view of a state of the art cap provided with moving parts opening or closing according to the twist of the cap, manufacture thereof requires a too expensive mold.

DETAILED DESCRIPTION OF THE INVENTION

There is the condition that some beverages once prepared have a short shelf life, they require special housing or cooling conditions, or even the restriction of consumption in a very short term, if this does not happen, they loose their intended properties, reducing their presence in the market, these beverages can be a flavoring, vitamin supplement, energy supplement, feed supplement, a medicine product or others.

At times to extend the shelf life, it is necessary the use in the product of additives, preservatives or other substances, increasing the cost and modifying their properties, in other cases also are modified the bottles in which the product is packed by the used of UV rays protecting agents, pigments or other additives helping to extend the shelf life of the product. The above produces an increase in distribution costs, change in the properties of the beverage and in most cases, not reaching the required shelf life, with the consequent impact in the marketing of the product.

The concentrate release cap of the present invention is designed to extend the shelf life of the product, keeping separate the flavor concentrate product or other from the liquid until the time of consumption, this way having the required shelf life and keeping the properties of the product with the special features of the beverage.

The concentrate release cap is designed to keep the concentrate product separate from the liquid used as mixing agent, contained in a bottle, such bottle may be glass, plastic or other material, being a bottle with standard market features, with this allowing to keep the properties of the product for a long shelf term, mixing the concentrate product with the liquid until the time of consumption, this way reducing or eliminating the use of additives, preservatives or other substances in the product and avoiding the used of UV rays protection bottles, including pigments increasing the cost of the product not extending the shelf life for periods as extended, with the use of the concentrate release cap can be attained prolonged shelf life and keep the original properties of the product.

The cap is made by a plastic injection process, using a resin such as polyethylene or polypolypropylene, plastic resins commonly used to make these parts, being designed such that at the time mold extraction, in the end of the bottom edge of the cylinder body, remains an inclined or chamfered section pointing inside the cylinder, working as a pressure element or contact area and coupling with the seal this part during the filling process will be pushed to the internal face of the cylinder remaining an angle to ensure total contact area with the seal. Angle β having the seal area in the cap and formed with the cylinder wall thereof is bigger than the angle α of the perimeter seal wall, with this assuring full seal contact with the cap (β>α) at assembly moment due to the relation of angles that at the time of coupling such angles match to provide a tight seal between both parts. Once assembled the
Seal in the edge of the cylinder tight of the cap, angle $\beta$ is forced to match angle $\alpha$, leaving a tight contact area, pressuring between both seal surfaces and cylinder wall tab, ensuring tight seal between both parts.

Seal also has a perimeter ring "a" to ensure that the seal remains evenly seated on the edge of the outer diameter of the cylinder "c", additionally the seal in the bottom edge of the inclined contact wall having a slight boss "b" to retain the edge of the contact tab "d" of the cap in its right position to make the tight seal.

The seal design is symmetrical with a rhombic shape, allowing placement in any of both faces being equal to each other.

The seal fixing to the cap is made on its center, in which there is a cavity with a groove and an intermediate perimeter tab, that upon opening allows passage of the cap’s stem, which conical shape makes easy the seal orientation with the stem, such stem having a diameter groove allowing to reduce the diameter or thickness to ease insertion in the seal, once the stem penetrates the seal, parts recover their original shape leaving the seal firmly held in the stem and in the seal area there is contact between the seal and the cap uniformly and with pressure ensuring its tightness.

Filling the cap, this operation is made in a filling machine in which through the use of positioning means is placed the cap in an inverted position, with the mouth upwards, the cap passes a station in which it is bended to the inside of the cylinder the section in which the ring will seat, this part of the cap, is molded with an angle allowing extraction of the cap from the plastic injection mold, then filling with a dosing device and closing, insert the seal in the cap’s stem, remaining the seal diameter on the cylinder diameter and the contact seal areas, ensuring the tightness in the seal cylinder.

This cap having as main features, tightly housing the product, the release thereof made by pressing with the finger the center of the top part of the cap, until by effect of the plastic recovery and spring effect, such top central part of the cap is kept in extended position downwards, driving the seal body to allow opening thereof and exit of the contents within the tight or seal of the cap and allowing its passage to the fluid, then the consumer proceeds to shake the container to make the mix between the product and the liquid of the beverage, opening the cap as made normally with the standard caps and consume the mixture made.

FIG. 1, is a top view of the round cap (1) of the present invention in which each one of the circumferences defining the different zones and relevant elements thereof are shown; the larger diameter circumference shows the skirt edge (4) limiting a top flat ring (2) defined between the diameter (4) and the inside diameter (5) limiting a cylinder central body extending downwards inside and beyond the bottom limit of the skirt; the diameter (5) limits a flexible center (3) defined by bend surfaces and a central ring to form a flexible bellows type spring; the following marked diameter in the external bend (6), followed by the internal bend (7) of the flexible center, the bend (7) is the external limit of a flexible central flat ring (8) concentric with the internal minimum diameter (9) of the circumference defining a central stem extending downwards beyond the edge of the limit of the cylinder central body. One of the novelties of the cap of the present invention is the bellows type flexible center that being pressed pushes the central stem and beyond the limit of the cylinder central body. The flexible central ring is located at a level further below with respect to the top ring of the skirt, such pressed ring is depressed to the level of the first screw thread.

FIG. 2, is a bottom view of the round cap (1), in which the flexible central ring (8), the central stem (21), the cylinder central body (5) and its thickness, the external skirt (4) and the seal area of the cap (20). The central stem (21) having a diameter groove (22) that allows having a pin with coupling flexible diameter, such stem in a diameter defined by a central circumference (9) concentric with the ring (8) limited by a bend circumference (7), to the larger diameters is located the circumference defining the bend (6) and then the thickness of the cylinder body (5) defining the tight walls housing the flavor concentrate containing cap together with the seal, to be released at a time just before the consumption of the beverage contained in the bottle; between the cylinder central body (5) and the thickness (20) external skirt (4), is defined an empty space in which the mouth of the bottle enters with its own thread above the neck.

FIG. 3, shows a side cut view of the cap (1) of the present invention, the skirt (4) and the internal screw threads (30). Such skirt attached a tamper-proof band (34); the cylinder central body (5) defining the tight containing the concentrate and holding in the top end the central ring (8) and the bends (6 and 7) of the flexible center (3), it should be realized that such flexible center is located at lower level with respect to the upper ring (2) level of the skirt, such flexible center (3) comprising the bends (6 and 7) and the central ring (8) having adhered in the internal face a central stem (21), such stem having the lower end a lower diameter coupling pin (31) and with a diameter groove (22) making flexible such pin (31), the stem can be moved downwards due to the bends (6 and 7) by pressing the flexible center (3) in a vertical direction. The cylinder central body (5) extends beyond the limits of the tamper-proof band, in the lower border (c) having a flexible tab (d) inside bent working as a contact surface and coupling of a barrel type round body with inclined walls acting as seal to contain within the cylinder body the flavoring concentrate, medicine, energy supplement, vitamin supplement or another supplement containing the cap of the present invention.

FIG. 4, is a top or bottom view (50) of the seal of the present invention, in which is shown the perimeter ring (a) working as a coupling gasket or top surface for the edge of the central cylinder body and located on the vertical flat surface of the seal body; following the inclined surfaces towards the central diameters showing corresponding external perimeter rings (b), a vertex is formed beyond the inclined or ramp surfaces towards the central diameters showing one each external perimeter rings (b), and extends upwards and to the center another inclined surface ending up to a disc or horizontal support (53) to form the diameter (59), the disc (53) providing structural support to the seal and the central cylinder structure (54) defining the entrance of the central stem pin of the cap, such entrance (55) being flanked by an inclined perimeter rim (56) operating as a pin retention bump. This central structure (54) having a groove (42) providing flexibility and it can be opened by coupling the pin to overcome the bump (56), the same pin also having a central groove in turn allowing to reduce the diameter to couple the seal by a click, once inside the pin, the bumps or stops complement by matching horizontal surfaces preventing uncoupling between the seal and the pin.

FIG. 5, is a side cut view of the barrel shaped seal structure (50), with a rhombic shape perimeter ring (52)
joined by a disc or intermediate horizontal support (53), having in turn a vertical wall central support (54) divided in top or lower sections, the inside thereof defines the entrance (55) of the pin, the inside of the vertical support (54) having an inclined wall rim (56) acting as bump for the coupling pin in cooperation with the rim thereof; the rhombic perimeter ring (52) and the horizontal support (53), the vertical support (54) defines the internal spaces (57) making the seal a light part and resistant due to the described structural layout. The external side curves of the rhombic perimeter ring (52) having adhered rings acting as contact surface in the flexible tab of the end of the cylinder central body, the top or bottom contact surface (58) having the perimeter ring (b) and the middle surface or top surface (51) having adhered the perimeter ring (a) and acting as bump with the lower end of the cylinder central body defining the tight containing the concentrated surface.

[0063] FIG. 6, is a side cut view (60) of the cap and seal coupled in locking position (61) of the seal (50) coupled to the stem (21) and to the internal rim of the end of the cylinder body (5), the coupling between the stem (21) and the seal (50) is made through the pin (31) and the contact surface of the rhombic perimeter ring (52); the cap further showing the skirt (4) which is an element coupling to the mouth of the bottle by the screw threads (30) and the tamper-proof band (34) being an indicator of tampering with the opening of the bottle. In this figure, the seal is placed in locking position with the plates in position (61) retracted and keeping the stem (21) in the highest level.

[0064] FIG. 7, is a side cut view (70) of the semi-open seal providing a partial opening (72) and allowing exit of the concentrate housed within the cylinder body. In this position the depressed flexible center (71) is not fully deployed, this making the central stem (21) to uncouple the seal of the perimeter rim (d) located in the end of the cylinder body; the seal having a rim shaped contact surface in the shape of a rhombic perimeter ring (52) symmetric to a horizontal plane and to a central axis. The rhombic perimeter ring (52) having an internal structure comprising an horizontal disk and a central hollow cylinder defining a coupling opening with the pin of the central stem, the ring structure allows coupling both sides top or bottom to ease assembly of the complete cap with the seal.

[0065] FIG. 8, is a side cut view (80) of the seal completely open providing maximum perimeter opening (82) as the central stem (21) is completely shifted as the flexible center is being pressed to the top (81) matching the lower edge of the first screw thread. This position creates a maximum perimeter opening (82) because the perimeter contact ring (52) is totally separated of the perimeter rim of the cylinder body. This way avoiding traces of the concentrated substance to remain within the cylindrical body of the cap, because shaking the bottle makes a homogeneous mix and through the opening (82) the liquid passes therethrough and even washes the wall of the concentrate container, this not happening with the caps of the state of the art.

[0066] FIG. 9, is a side view of the seal of the present invention, showing an external surface thereof (90) in the shape of a barrel, comprising two inclined smooth surface rings and a central ring with vertical smooth surface; the inclined surfaces (58) are for contact and still on the edge of each one having a flexible material ring (b) acting a packing for coupling with the internal rim of the cylinder body of the cap and this way having a tight seal avoiding unintentional concentrate release. The intermediate vertical ring (51) also having a coat (a) acting as bump with the edge of the inclined rim of the cylinder body and not allowing the seal to enter further inside the cylinder body and that at a certain time it can be opened far beyond the cylinder body and also breaking the flexible channel of the of the top face of the cap. In this figure it is shown that the contact surfaces (58) are symmetric regarding the central top surface (51) and with it having the facility in the assembly with the cap no search of suitable coupling face is required.

[0067] FIG. 10, is a side view of the cap with the skirt (4) and the tamper-proof seal (34) and the end of the cylinder body (5). The skirt (4) having vertical lines (101) embossing acting as grip surface to make the cap (100) spin. The seal of FIG. 9 and the cap of FIG. 10 make the dosing cap of the present invention, to couple thereof is located the cap in a support with the cylinder body open upwards and the seal, within the cylinder body is filled with concentrate and then the seal is pressed on the edge and within the cylinder body.

[0068] FIG. 11, shows a cross-cut view of the seal coupling with the pin of the central stem (21). The internal seal structure forming a pair of top and bottom housings with and intermediate ring formed by the bump rim (56) retaining the bump tab (112) of the pin (31), which may pass through the ring due to the central groove (22) and the seal groove (42), which open or close in account of the pressure imposed. Then the central stem (21) in upright position and showing the coupling pin (31) with its inclined side walls over said pin is located the pressure seal and the pin (31) covering any of the top or bottom housings (113), as the case may be formed by the vertical walls (54) issuing from the horizontal disc (53). Vertical walls (54) show a boss with perimeter inclined walls forming the bump rim (56) defining the entrance (55) of the coupling pin (31), also having a vertical groove (42) allowing the walls (54) being opened under pressure and allowing the entrance of the coupling pin (31) which becomes trapped within the bump rim (56), thus between the tab (112) of the pin and the rim (56) within the vertical walls (54) a bump is formed preventing the deliberate displacement of both parts. The coupling pin (31) also having a central groove (22) that under pressure allows reducing the diameter and thus the bump rim (112) to be able to locate it within the housing (113).

[0069] FIG. 12, is an amplifed cut view (120) between the seal and the cylinder body (5) in which the surfaces of the rhombic perimeter ring (52) are coupled with the rim (d) of the cylinder body (5) and in which the ring (b) of the border acts as complementary bump to said rim, thus also the ring (a) acts as complementary bump with the edge (c) of the cylinder body of the cap. In such coupling the angle between the wall of the cylinder body and the rim (d) is bigger than the angle between the vertical wall and the inclined wall of the rhombic perimeter ring (52), this creates a tight coupling between both parts preventing unintentional release of the concentrated substance housed within the walls of the cylinder body (5) of the cap or deposit thereof.

[0070] FIG. 13, shows a cut view of the two parts of FIG. 12 separated in which is shown the angle (130) and the angle (131) with a ratio in which (131) is bigger than (130); the angle (130) formed by the contact surface of the rhombic perimeter ring (52) and with the vertical wall thereof; the angle (131) formed between the cylinder body (5) and the rim (d) and having as vertex the edge (c) in such end it is coupled
the seal perimeter ring (a). In the coupling of both parts \[ \alpha = \beta \]
or \[ (130) = (131) \] thus achieving a tongue-in-groove type tight coupling.

**[0071]** FIG. 14, both components of FIG. 13 are coupled and the pressure forced by the rhombic perimeter ring (52) on the rim (d) forcing the opening thereof to be matched to \( \alpha \) or which is the same as having only one angle (130) between the internal wall of the cylinder body (5) and the contact surface of the rhombic perimeter ring (52), the edge (c) is located in the position in which the seal perimeter ring (a) is placed in contact with the same, this way the tight coupling is presented between the cap and the seal keeping the concentrate within the cylinder body of the cap and seal coupled to the same to form a tight seal, controlled by the flexible center of the cap.

**[0072]** FIG. 15, shows a cross-cut view of the cap with the seal coupled in the use position and between both containing the concentrate (151). In this figure the flexible center is located in retracted or closed position (61), the seal (90) coupled in position in the end of the cylinder body (5) of the seal cap (150) which in turn comprises the lateral skirt (4) and the tamper-proof tape or strip (34) being a must-have. If the seal (90) is to be removed from the closure position it is necessary to press the flexible center of the cap in a vertical direction downwards to release the concentrate (151) kept therein.

**[0073]** FIG. 16, shows a cross-cut view in which the flexible center of the cap has been pressed down to an open position (81) making the release of the concentrate (151) as the seal (90) is uncoupled from the edge of the cylinder body (5) of the cap, as a consequence that the stem (21) has driven it to exit from the closure position.

**[0074]** Once released the concentrate (151) the bottle is shaken to make a homogeneous mix of the beverage for consumption. The cap still is held in the bottle through the screw threads in the internal face of the skirt (4) and the tamper-proof band (34) has not been removed, the mixing operation can be carried out still without opening the cap.

**[0075]** FIG. 17, is a side view (170) of the seal cap in closed position in which is shown the skirt (4) with the vertical lines embossing followed by the tamper-proof band (34), the section of the cylinder body (5) with the seal (90) located in the bottom edge of the cylinder body (5). In this position, the seal (90) is coupled, e.g., in closure position and only shows the top surface and the bottom contact surface, as the other contact surface is located within the wall of the skirt.

**[0076]** FIG. 18, is a side cut view of the dosing cap of the state of the art with a flexible dome driving a cylinder body (184) with teeth (185) on its bottom end; the side skirt (181) forms the concentrate deposit or container (182) separate from the mouth of the bottle by the metallic or plastic film forming the seal (186); when pressed the flexible dome (183) drives the cylinder body (184) and the teeth (185) breaking the seal (186) releasing the concentrate, but in most of the cases the seal resists and only allows small orifices that in the case of a powder concentrate is not 100% released, and sometimes the seal is not even broken as the pressure was not enough, lack of sharpness in the teeth or the pressure operation was too fast and shallow and the seal remains intact.

**[0077]** FIG. 19, is a side cut view of another dosing cap of the state of the art comprising a cap with two compartments for concentrate (191) and (192), both provided with a release mechanism by means of a lever which is activated by twisting the cap. In this case the cap is too complicated, contains loose parts that should be tied thus increasing the production cost.

Even though the cap in this case works efficiently production thereof is too high and unsuitable to subsist in the market. The cap comprises a skirt (190), a base (195), two release levers (194) retaining the contents (191) and (192) within the deposits (193) located inside the skirt (190), the cap is locked at the mouth of the bottle by the cylinder body (195).

1. Concentrate release cap to extend the shelf life of a beverage, comprises two independent plastic parts, the body of the cap and seal keeping separate the liquid of the bottle and the flavor concentrate in the corresponding compartment; the cap comprises a flexible top center provided with spring style bends, a external skirt and a tamper-proof band, a cylinder body with perimeter rim inclined inside thereof defining the contact surface or seal; a central stem concentric to the cylinder body and having a coupling pin in the bottom end; a barrel shaped seal with two end inclined side faces or seal surfaces, a vertical side face seating in the side edge of the cylinder body, the seal listen to the cap is made at the center thereof having a structure with a central cylinder body and a disc, the cylinder body defines a cavity with groove and intermediate perimeter rim that upon opening allows the passage of the stem pin, which also has a groove to ease the insertion of the seal structural body; once the seal is coupled to the cylinder body defines a tight closed cavity retaining inside a concentrate and release by pressing the caps flexible center kept is deployed position pushing the stem and seal joined thereto, generating a perimeter escape space of the concentrate.

2. The concentrate release cap according to claim 1, further wherein the flexible center occupies the base of the internal cylinder body and is located joined to the internal wall thereof, having an horizontal flat center joined to two concentric perimeter bends defining a perimeter channel like bellows or spring.

3. The concentrate release cap according to claim 1, further wherein the central stem is located joined to the internal face of the horizontal flat center and at the other end having a coupling pin wherein is pressure inserted the barrel shaped seal internal structure.

4. The concentrate release cap according to claim 1, further wherein the spring defined by the perimeter bends of the flexible center, prevents the central stem to return to its original closure position.

5. The concentrate release cap according to claim 1, further wherein the seal is located by pressure, with the cap in inverted position, upwards and with the compartment thereof filled with flavor concentrate.

6. The concentrate release cap according to claim 1, further wherein the seal comprises a barrel type round shape, with a central internal cylindrical structure, issuing from a horizontal disc in which ends has a rhombic cross-section ring defining a bump central surface and two coupling symmetric surfaces, each one with their respective perimeter ring acting as seal between the surfaces.

7. The concentrate release cap according to claim 1, further wherein the seal has a rhombic side section symmetric shape and allows the coupling in the stem in any of its two top and bottom faces.

8. The concentrate release cap according to claim 1, further wherein the flexible center to be pressed for opening the seal having a concentric bends geometry keeping it closed with the seal in the same position after filling; opening the seal
prevents return to the closure original position, keeping open the seal to ensure complete mixture of the liquid with the concentrate of the cap.

9. The concentrate release cap according to claim 1, further wherein the internal tab of the cylinder body or the contact area with seal has an angle larger than the seal contact wall, with this ensuring a tight closure between seal and cap.

10. The concentrate release cap according to claim 1, further wherein a ring is used in the seal external diameter ensuring correct location with the external diameter in the cylinder body of the cap.

11. The concentrate release cap according to claim 1, further wherein the concentrate is released opening the seal by pressure in the flexible center of the cap to drive the stem, in turn the seal and uncoupling its closure position to mix the concentrate with the contents of the bottle.

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