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(54) **DEVICE FOR CAPPING A BOTTLE SUITED TO THE PRESERVATION OF SUBSTANCES TO BE KEPT SEPARATE UNTIL THEIR APPLICATION AND SUITED TO THE COLLECTION OF THE MIXTURE OBTAINED BY MEANS OF A SYRINGE**

VORRICHTUNG ZUR ABDECKUNG EINER FLASCHE, DIE ZUR KONSERVIERUNG VON BIS ZU IHRER ANWENDUNG GETRENNT AUFZUBEWAHRENDEN SUBSTANZEN UND ZUR SAMMLUNG DER MISCHUNG MITHILFE EINER SPRITZE GEEIGNET IST

DISPOSITIF DE BOUCHAGE D'UNE BOUTEILLE CONVENANT À LA PRÉSERVATION DE SUBSTANCES À CONSERVER SÉPARÉMENT JUSQU'À LEUR APPLICATION ET CONVENANT À LA COLLECTE DU MÉLANGE OBTENU AU MOYEN D'UNE SERINGUE

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Description

[0001] The present invention refers to a device for capping a bottle adapted for the preservation of substances, for example powders or liquids, to be kept separate up to the moment of use thereof, when they are mixed together.

[0002] There are currently containers on the market that allow substances contained in it to be kept separate up to the moment of use thereof. This need occurs, for example, in the case of preservation of pharmaceutical products that, if proposed to sale already mixed and ready to use, would lose their therapeutic power in a short time period.

[0003] Such containers are usually equipped with a device for capping the bottle consisting of a capsule inside which there is a cylindrical tank for a first substance, for example powdered, which must be mixed with a second substance present in the bottle, for example a liquid substance. Such a capsule is also associated with a breaking element, the top of which can be pressed so that a shank of such an element penetrates in the tank and so that the lower end of the shank breaks the lower base of the cylindrical tank along at least part of the circular perimeter thereof. In this way, the first substance is released inside the bottle forming the desired mixture with the second substance contained therein.

[0004] The perimeter of the base of the tank has a membrane that is advantageously provided with weakening or pre-fracture elements that facilitate the breaking thereof.

[0005] The device is usually connected to the bottle through a threaded coupling, so that the bottle itself can be opened to use the product contained therein after the formation of the mixture. Sometimes, the capsule, the tank and the breaking means are made in a single piece. Moreover, the base of the tank is a separation membrane welded to the tank itself and is made of a material adapted for preventing water vapour from passing, from outside to inside the tank and vice-versa. Moreover, there are known bottles adapted for containing liquid or powdered drugs that must be mixed with a liquid before use, which must be taken through a syringe. In such bottles the cap is provided with an annular portion for crimping to the neck of the bottle and with a central portion, for example made of rubber, which can be perforated by the syringe needle, avoiding the introduction of air from outside the bottle. In any case, the cap as a whole is provided with sealing means at the neck of the bottle for the preservation of the contents thereof. In the case in which the powdered content must be mixed with a liquid, for example a physiological solution, normally such a liquid is introduced by means of the syringe itself and then after having shaken the bottle to mix the two components with the same syringe the mixed drug is taken.

[0006] The present invention proposes a device for capping a bottle that is at the same time capable of keeping two substances separate up to the application thereof and capable to contain the mixture obtained to be taken through a syringe. A prior art device of this kind is disclosed in WO2016/038357.

[0007] The present invention concerns a device for capping a bottle having the characteristics of the attached claim 1.

[0008] The characteristics and advantages of the device for capping a bottle according to the present invention will become clearer from the following description, given as an example and not for limiting purposes, referring to the attached schematic drawings, in which:

- figure 1 shows a side view of a device for capping a bottle according to the invention;
- figure 2 shows a section along the line A-A of figure 1 of the device according to the present invention;
- figure 3 illustrates a view from above of the device according to the present invention.

[0009] With reference to the quoted figures, an embodiment of the capping device is illustrated that is associated with a bottle, for example of cylindrical shape (not shown). The present invention can in an equivalent manner be applicable to bottles having different shapes. Moreover, in the specific case in which the capping device is internally threaded and is consequently screwed onto the container. In a further embodiment, the closure device could be applied on the container by pressure or in equivalent ways that ensure the airtight seal of the closure.

[0010] In detail, the capping device 2 is preferably of internally hollow cylindrical shape, having an upper portion 21, which forms a tank 3 therein for a first substance to be mixed with a second substance present in the bottle.

[0011] Such a first and second substance can be formed for example from powder, liquid, granulate or other substances to be mixed with liquid. The device also comprises means for breaking the base of the tank that can be operated by pressure and manually from the top of said device.

[0012] The capping device 2 also comprises a lower portion 22, of greater diameter than the diameter of the upper portion, provided with means for securing to the bottle, like for example an internal threading 221, or alternatively pressure-fastening means onto the container 2.

[0013] Such a lower portion possibly comprises an annular closure seal 222 with the bottle, of the type of those present on the caps of drinks contained in the bottles made of plastic.

[0014] The base of the tank has a film 31 welded on an edge located near the junction of the upper portion with the lower portion.

[0015] Said film is for example thermowelded, induction welded or glued onto such an edge and is made of a plastic material coupled with aluminium film.

[0016] Such a film, when the separation device is closed on the bottle, separates the first substance con-

tained in the tank 3 from the second substance contained in the bottle.

[0017] In the case in which one of the two substances is liquid, the film prevents a possible passage of water vapour through it, and therefore an undesired pre-mixing between the two substances, which would make the product ineffective at the moment of use thereof.

[0018] Such means for breaking the tank are made by a piston 4 able to slide downwardly inside the hollow upper portion and is provided with at least one fracture tip 41 on its lower end, which during the descent of the piston pierces the aforementioned film releasing the contents of the tank.

[0019] Advantageously, the lower portion 22 comprises a plurality of ribs and/or recesses, arranged substantially vertically, adapted for facilitating the manipulation of the device during the opening and closing operation of the container.

[0020] According to the present invention, the top of the piston 4 comprises a membrane 42 that can be pierced by a syringe needle that when the piston itself has pierced the tank itself allows such a needle to take the contents of the mixture into the bottle.

[0021] Such a membrane can be made of rubber, plastic, in general of a material that guarantees airtight sealing and is easily punctured.

[0022] Such a membrane occupies a substantially central area of the top of the piston. Moreover, it is of discoid shape and is recessed in a seat formed on the top of the piston so as not to protrude with respect to a circular crown that delimits such a seat. The membrane is co-moulded together with the piston or with the device when the latter is made in a single piece. The membrane in the central area thereof has a tapered portion 43, preferably concave, which is the area where the syringe needle is inserted. In this way, the penetration of the needle is facilitated even when it is of a very thin type.

[0023] The device according to the present invention operates in the following way.

[0024] When it is wished to mix the two substances it is sufficient to press on the piston of the device. The latter is thus forced to descend until the fracture tip penetrates into the membrane, causing the almost complete breaking thereof and causing the first substance contained in the tank to fall by gravity into the bottle thus in contact with the second substance. Once the substances have been mixed, it is sufficient to slot a syringe needle into the membrane 42 and reach the mixture in the bottle, since the fracture tip 41 has already opened the film 31 and there are no further barriers between the needle and the inside of the bottle.

Claims

1. Device for capping a bottle of substantially cylindrical internally hollow shape, comprising

   • an upper portion (21), which forms a tank (3) therein for a first substance to be mixed with a second substance present in the bottle,
   • a lower portion (22) provided with means for securing to the bottle,
   • the base of the tank having a film (31) welded on an edge located in the vicinity of the junction of the upper portion with the lower portion,
   • means for breaking the base of the tank that can be operated by pressure and manually from the top of said device comprising a piston (4) able to slide downwardly inside the hollow upper portion provided with at least one fracture tip (41) on its lower end, which during the descent of the piston pierces the aforementioned film releasing the contents of the tank into the bottle,
   • the top of the piston (4) comprises a membrane (42) that can be pierced by a syringe needle that when the piston itself has pierced the tank itself allows such needle to take the contents of the mixture in the bottle,

   characterised in that
   said membrane is of a discoid shape and is recessed in a seat obtained on the top of the piston so as not to protrude with respect to a circular crown which delimits such seat, wherein the membrane is co-moulded together with the piston or the device when the latter is made in one piece.

2. Device according to claim 1, wherein such membrane occupies a substantially central area of the top of the piston.

3. Device according to claim 1, wherein the membrane in the central area thereof has a tapered portion (43), which is the area where the syringe needle is to be inserted.

4. Device according to claim 1, wherein the tapered portion is concave.

5. Device according to claim 1, wherein such membrane can be made of rubber, plastic, generally of a material that guarantees airtight sealing and is easily punctured.

Patentansprüche

1. Vorrichtung zum Verschließen einer Flasche mit im wesentlichen zylindrischer, innen hohler Form, umfassend

   • einen oberen Teil (21), der einen Behälter (3) für eine erste Substanz bildet, die mit einer zweiten in der Flasche vorhandenen Substanz gemischt werden soll,

• einen unteren Teil (22), der mit Mitteln zur Befestigung an der Flasche versehen ist,
• der Boden des Behälters ist mit einer Folie (31) versehen, die an einem Rand in der Nähe der Verbindung des oberen Teils mit dem unteren Teil verschweißt ist,
• Mittel zum Aufbrechen des Bodens des Behälters, die durch Druck und manuell von der Oberseite der Vorrichtung aus mit einem Kolben (4) betätigt werden können, der in dem hohlen oberen Teil nach unten gleiten kann und an seinem unteren Ende mit mindestens einer Bruchspitze (41) versehen ist, die beim Absenken des Kolbens die vorgenannte Folie durchstößt und den Inhalt des Behälters in die Flasche freisetzt,
• die Oberseite des Kolbens (4) weist eine Membran (42) auf, die von einer Spritzennadel durchstochen werden kann, welche, wenn der Kolben selbst den Tank durchstochen hat, der Nadel erlaubt, den Inhalt der Mischung in der Flasche zu entnehmen,

dadurch gekennzeichnet, dass
die Membran eine scheibenförmige Form hat und in einen Sitz eingelassen ist, der auf der Oberseite des Kolbens erhalten wird, so dass sie in Bezug auf eine kreisförmige Krone, die diesen Sitz begrenzt, nicht vorsteht, wobei die Membran zusammen mit dem Kolben oder der Vorrichtung geformt ist, wenn letztere in einem Stück hergestellt ist.

2. Vorrichtung nach Anspruch 1, wobei eine solche Membran einen im Wesentlichen zentralen Bereich der Oberseite des Kolbens einnimmt.

3. Vorrichtung nach Anspruch 1, wobei die Membran in ihrem mittleren Bereich einen sich verjüngenden Abschnitt (43) aufweist, der der Bereich ist, in den die Spritzennadel eingeführt werden soll.

4. Vorrichtung nach Anspruch 1, wobei der verjüngte Teil konkav ist.

5. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Membran aus Gummi, Kunststoff oder allgemein aus einem Material hergestellt werden kann, das eine luftdichte Abdichtung gewährleistet und leicht zu durchstoßen ist.

Revendications

1. Dispositif de bouchage d'une bouteille de forme sensiblement cylindrique et intérieurement creuse, comprenant

• une partie supérieure (21), qui forme un réservoir (3) à l'intérieur pour une première substance à mélanger avec une seconde substance présente dans la bouteille,
• une partie inférieure (22) pourvue de moyens de fixation à la bouteille,
• la base du réservoir ayant un film (31) soudé sur un bord situé au voisinage de la jonction de la partie supérieure avec la partie inférieure,
• des moyens pour rompre la base du réservoir qui peuvent être actionnés par pression et manuellement depuis le haut dudit dispositif comprenant un piston (4) apte à coulisser vers le bas à l'intérieur de la partie supérieure creuse pourvue d'au moins une pointe de rupture (41) sur son extrémité inférieure, qui pendant la descente du piston perce le film précité libérant le contenu du réservoir dans la bouteille,
• le sommet du piston (4) comprend une membrane (42) qui peut être percée par une aiguille de seringue qui, lorsque le piston lui-même a percé le réservoir lui-même, permet à une telle aiguille de prendre le contenu du mélange dans la bouteille,

caractérisé en ce que
ladite membrane est de forme discoïde et est en retrait dans un siège obtenu sur le sommet du piston de manière à ne pas faire saillie par rapport à une couronne circulaire qui délimite un tel siège, dans lequel la membrane est co-moulée avec le piston ou le dispositif lorsque ce dernier est réalisé en une seule pièce.

2. Dispositif selon la revendication 1, dans lequel cette membrane occupe une zone sensiblement centrale du sommet du piston.

3. Dispositif selon la revendication 1, dans lequel la membrane dans sa zone centrale présente une partie amincie (43), qui est la zone où l'aiguille de seringue doit être insérée.

4. Dispositif selon la revendication 1, dans lequel la partie amincie est concave.

5. Dispositif selon la revendication 1, dans lequel cette membrane peut être faite de caoutchouc, de plastique, généralement d'un matériau qui garantit une fermeture étanche à l'air et qui est facilement perforable.

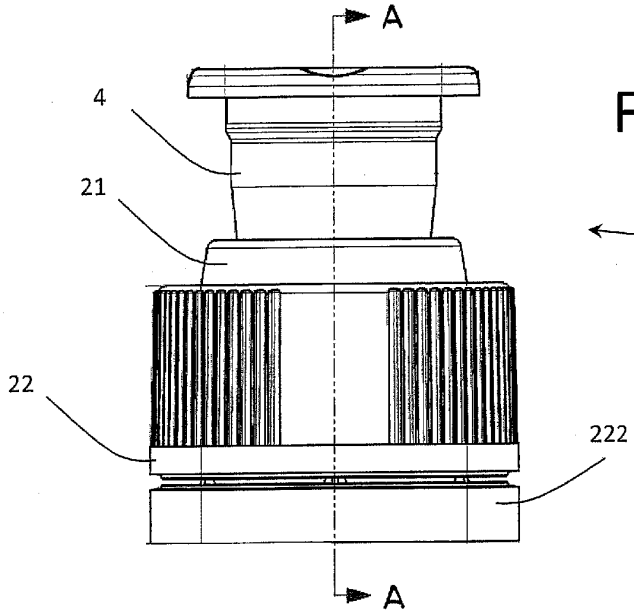

Fig.1

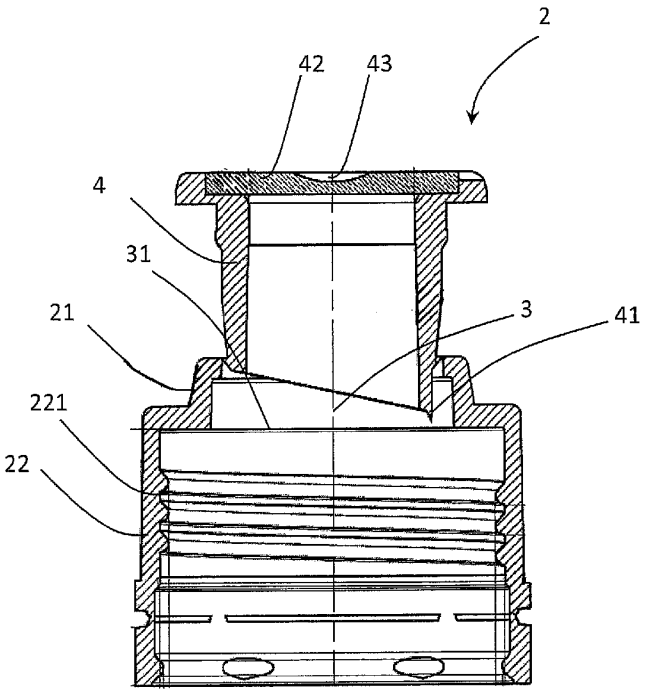

Fig.2

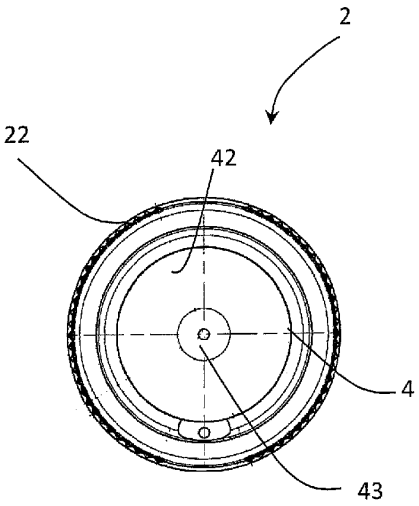

Fig.3

REFERENCES CITED IN THE DESCRIPTION

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