(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 3 854 721 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
28.07.2021 Bulletin 2021/30

(51) Int Cl.:
B65D 51/28 *(2006.01)* ***A61J 1/00*** *(2006.01)*

(21) Application number: **20152856.9**

(22) Date of filing: **21.01.2020**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(71) Applicant: **Asamedic AS**
1411 Kolbotn (NO)

(72) Inventors:
- **KAPELUS, Aaron**
  N-0461 Oslo (NO)
- **ARLEHED, Petter**
  N-1362 Hosle (NO)

(74) Representative: **Onsagers AS**
P.O. Box 1813 Vika
0123 Oslo (NO)

(54) TWO-COMPONENT COMPOSITION DEVICE

(57) The present invention relates to a device (1) for containing two-component composition comprising a first component (12) and a second component (52), kept separate from one another prior to use. The device is configured to enable a user to mix the two components while the device is in a closed state, providing a two-component composition.

In particular, the invention relates to a device useful in the treatment and prevention of imminent myocardial infarction by providing an aqueous solution of acetylsalicylic acid (ASA) for ingestion.

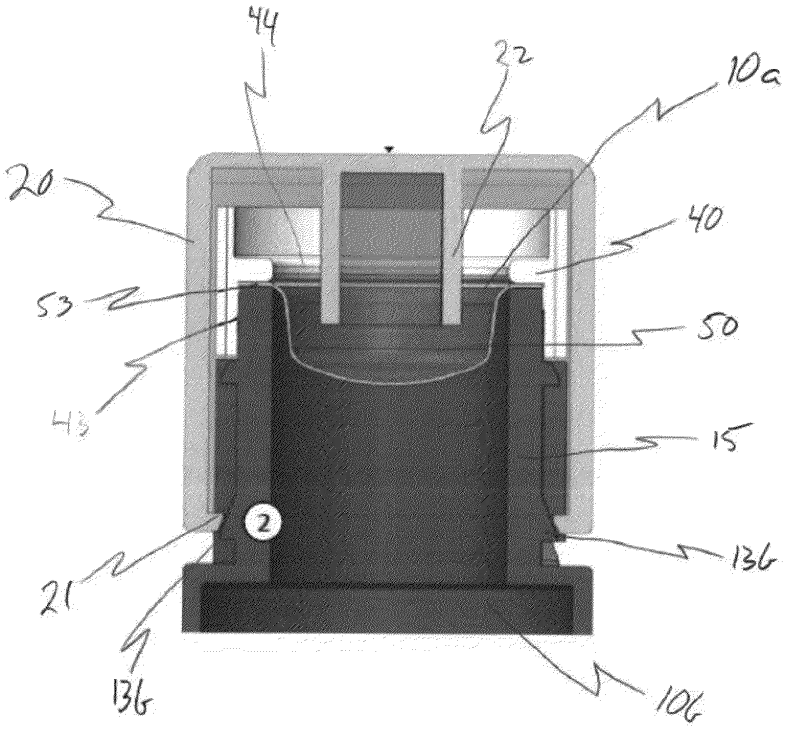


Fig. 2

EP 3 854 721 A1

Description

Technical field:

[0001] The present invention relates to a device for containing two-component composition comprising a first component and a second component, kept separate from one another prior to use. The device is configured to enable a user to mix the two components while the device is in a closed state, providing a two-component composition.

[0002] In particular, the invention relates to a device useful in the treatment and prevention of imminent myocardial infarction by providing an aqueous solution of acetylsalicylic acid (ASA) for ingestion.

Background and prior art:

[0003] Some pharmaceutical products are composed of two components that are mixed together in the moments before administration to form a product ready for administration. One reason for this practice is that the individual, separated components are more stable than the mixed, ready-to-use two-component system. One of the two components are often a solid e.g. a powder, and the other is generally a liquid, e.g. an aqueous solution. One factor that limits the stability of a two-component system in aqueous solution is hydrolysis.

Bottles and devices for storing and administering two-component systems which comprise a container for the liquid component and a compartment for the powder with a breakable foil-like seal are known. Common for these known devices are that they may be complicated to use, that they are too slow to use and unable to secure correct dosing of a pharmaceutical.

[0004] Cardiovascular diseases are one of the leading causes of mortality and morbidity in the western world. According to the World Health Organization cardiovascular diseases are the number one cause of death globally, and it is estimated that 17.5 million people die every year from cardiovascular disease, estimated to about 31% of all deaths worldwide. Furthermore, 80% of all deaths by cardiovascular diseases are caused by hearth attacks or strokes (cf. http://www.who.int/cardiovascular diseases/en/ and http://www.who.int/mediacentre/factsheets/fs317/en/).

[0005] A myocardial infarction (heart attack) is usually heralded by harbingers, i.e., warning signs occurring in advance, making it possible to take action and thus avoid or reduce the serious consequences of a myocardial infarction.

[0006] It is well known that chance of survival of patients experiencing symptoms of a myocardial infarction increase significantly if the patients receive ASA as quickly as possible, preferably immediately. Quick administration of ASA is thus crucial in order to avoid death and to reduce damage to the cardiovascular system. To ensure quick absorption and high bioavailability, ASA must be dissolved at the time of administration. ASA however has a poor solubility rendering it difficult to provide an aqueous ASA solution quickly. Further, ASA and salts of ASA hydrolyse rapidly in water (Connors et al., Chemical stability of Pharmaceuticals, A Handbook for Pharmacists, pages 151 - 160), so it is not possible to store dissolved ASA over time, as the shelf life of such an aqueous solution would not be practical or satisfactory.

[0007] Furthermore, a patient experiencing signs of an imminent (i.e., developing) myocardial infarction usually has reduced or deficient saliva production, resulting in a dry mouth. Reduced or deficient saliva production may cause problems related to dissolution of a dry formulation of ASA in the mouth of a patient. A patient with a dry mouth would not be able to swallow a standard tablet or ingest a chewing tablet. It is therefore crucial that the patient has liquid readily available in order to dissolve and/or ingest ASA

[0008] Hence, in order to successfully treat an upcoming myocardial infarction, a patient needs to have ASA available in a form that can be dissolved and administered (swallowed) very quickly and without need of additional water or adequate saliva production.

[0009] There are prior art documents showing the use of blister packs mounted at the opening of bottles and liquid filled containers. However, in these documents, the blister pack is manually pressed down by a finger or a thumb. Most of these therefore also require a cap, or a skirt around the blister pack to prevent it from self-releasing, and the prior art does not disclose a satisfactory device for providing a user with a two-component composition without drawbacks.

[0010] EP3127832A1 discloses a device with a blister pack arranged in a lid of a bottle, where the contents of the blister pack is released upon screwing down the lid to close the bottle: However, the purpose of this patent application is to release a traceable substance into a bottle when it is closed upon manufacture, such that the substance can later be identified upon opening of the bottle and the contents verified. It is therefore not suitable for the quick dissolution of a powder in the liquid container, easy removal of the cap and ingestion thereafter.

[0011] WO2004060766A1 A dispenser which comprises a container having a first opening and a first closure means for closing the first aperture. Further, the container has a second opening and a second closure means for closing the second opening, said second closure means includes a pressing means operable to press inwardly towards said second opening, a blister pack located to span across the second opening and sealing means to close the second opening. The construction and arrangement is such that in end use the container holds a first component and the blister pack holds a second component and when the pressing means is pushed the blister pack is ruptured enabling the mixing of the

contents thereof with those of the container. This dispenser would be complicated to operate when a user is in urgent need of treatment.

[0012] WO0024645A1 discloses a package for a conventional tablet or for a small amount of solid material in another suitable form, such as powder or granules. The tablet package also contains a predetermined quantity of liquid with the tablet(s) separated from the liquid. The package is for a single dose of a medicament such as a headache relieving tablet, the package containing the tablet and the liquid necessary for its consumption. The medicament is stored in a compartment in the lid of a bottle and is deposited into the liquid when user screws the lid all the way down the threads to break a seal. The user then opens the bottle by twisting the lid off again. This device will not be suited for an individual that lacks finger strength and is stressed because of pain related to a vascular condition.

[0013] WO03051744 discloses a package for keeping two substances separate prior to use. The package includes a primary container for storing a liquid and, a secondary container, for example defined within a bottle cap, for storing a solid. A user can push on the secondary container with a finger to deposit the solid into the liquid, allowing the two substances to mix. The user can then open the package to consume the two-component composition. Several versions of packages are suggested. Some have no satisfactory functions that protects against accidental activation and mixing of the two components. Others comprise several steps for activation, including removing a bottle cap before removing a foil seal, re-attaching the bottle cap, before pushing on top of the bottle cap for depositing a tablet into a bottle containing liquid, and finally removing the bottle cap again before consuming the mixed two component system. The suggested devices would not be practical for an individual in urgent need of medical treatment.

[0014] The object of the present invention is to eliminate the drawbacks associated with the devices known from prior art by providing device for storing, mixing and administering a two-component composition in a quick, simple and easy to use manner, without the need for additional water or adequate saliva production in a given user.

[0015] An object of the present invention is to secure complete dispensing of the product and thus administration of the full dose for a user in need thereof, even if the user is in a weakened state.

[0016] Another object of the present invention is to provide a device that is less likely to self-release and poses a minimal risk of spilling the contents during operation of the device.

[0017] Another object of the present invention is to provide a device that is of a convenient size and shape for bringing along at all times.

Summary of invention:

[0018] The present invention relates to a new device for containing a two-component composition, keeping the two components separate during storing. The device also allows for rapid mixing of the two components, upon user activation of the device, and administration of the mixed two-component composition to a patient in need thereof.

[0019] In particular, the invention relates to a device for containing a pharmaceutical two-component composition, comprising a first component and a second component, wherein the first component comprises an aqueous solution for dissolution of ASA, and the second component comprises acetylsalicylic acid (ASA). The two-component composition enables an immediate dissolution of ASA upon mixing of the first and second components of the present two-component composition and is in particular useful in the treatment of imminent myocardial infarction. The present device is in particular useful as a first aid treatment of patients in need for immediate administration of ASA in order to avoid the development of a heart attack or reduce the extent of damage of a heart attack.

[0020] In a first aspect of a first embodiment of the present invention there is provided a device comprising a container containing a first component, the container is arranged with a container opening, a blister holding device with a through opening for positioning a blister covering the container opening, the blister contains a second component sealed inside the blister with a blister seal a cap a plunger located within the cap characterized in that the plunger is moveably arranged to carry out a movement into the blister holder through opening to break the blister seal and release the second component into the first component.

[0021] According a further aspect of the first embodiment the plunger may be attached to or part of the cap which may be arranged for movement relative to the container for the plunger to brake the blister seal.

[0022] In another aspect of the first embodiment the device the container may comprise a container neck for receiving the cap, the container neck may comprise a first and second container guiding structure, for interaction with a cap guiding structure, wherein the first container guiding structure may be oriented vertically and the second container guiding structure may be oriented helically.

[0023] In yet another aspect of the first embodiment of the device the blister holder may be configured to engage a container rim surrounding the container opening to hold the blister between with the container rim and the blister holder for sealing the container.

[0024] In one aspect of the first embodiment of the present invention the second container guiding structure may be configured for guiding the cap guiding structure to interact with an opening structure on the blister holder to remove the blister holder and the blister with the cap when removing the cap from the container.

[0025] In another aspect of the first embodiment of the present invention the container neck may comprise snap ramps configured to interact with a cap guiding structure snap, for providing tactile feedback when the plunger has released the second component into the first component.

[0026] In another aspect of the first embodiment of the present invention the snap ramp may be configured to interact with the cap guiding structure snap for securing the cap onto the container neck prior to use.

[0027] In yet another aspect of the first embodiment of the present invention the snap ramp may be configured to interact with the cap guiding structure snap for securing the cap onto the container neck after the plunger has released the second component into the first component.

[0028] In one aspect of the first embodiment of the present invention the cap may comprise a blister holder opening pin located on the inside surface of the cap configured to interact with a guiding structure on the blister holder for opening the device.

[0029] In another aspect of the first embodiment of the present invention the container neck may comprise a blister holder lifting pin arranged to interact with a blister holder retaining structure for lifting the blister holder from the container neck.

[0030] In one aspect of a **second embodiment** the device the second container guiding structure is configured for guiding the cap guiding structure to interact with an opening structure on the blister holder to remove the blister holder and the blister with the cap when removing the cap from the container.

[0031] In another aspect of the second embodiment the first container guiding structure may comprise snap ramps and configured to interact with the cap guiding structure, for providing tactile feedback when the plunger has released the second component into the first component.

[0032] In one aspect of the second embodiment of the present invention the snap ramp may be configured to interact with the cap guiding structure for securing the cap onto the container neck prior to use.

[0033] In another aspect of the second embodiment of the present invention the snap ramp may be configured to interact with the cap guiding structure for securing the cap onto the container neck after the plunger has released the second component into the first component.

[0034] In one aspect of a **third embodiment** of the device the plunger may be arranged movably relative to the cap and that a spring device may be located within the cap, the spring device is configured for actuation of the movement of the plunger for the plunger to brake the blister seal.

[0035] In another aspect of the third embodiment the cap may comprise an activation guiding structure for keeping the spring device compressed, wherein the plunger may be associated with a plunger retaining structure which may comprise at least one activation structure suitable for releasing the spring device for actuating movement of the plunger.

[0036] In another aspect of the third embodiment of the present invention the container may comprise a cap retaining structure, with an opening slot, for interaction with a cap closing structure on the cap, for retaining the cap on the container, wherein the cap may be removed from the container via a twisting motion to align the cap closing structure with the opening slot of the cap retaining structure.

[0037] In another aspect of the present invention there is provided a method for depositing a second component contained in a blister into a first component held within a container, which may comprise the following steps: activating a plunger located within a cap of the container by an activating movement, thereby moving of the plunger toward a through opening of a blister holder, where the blister is arranged covering the through opening, and moving the plunger through the through opening, thereby depositing the second component contained in the blister into the first component located in the container.

Definitions

[0038] The terms "aspirin" or "acetylsalicylic acid" or "ASA" are used interchangeably herein.

[0039] The term "two-component composition" as used herein refers to a product comprising at least two compositions which are kept apart prior to administration, and which are to be mixed in order to provide a ready-to-use solution to be administered to patients in need thereof.

[0040] The term "component" as used herein in respect of the first and second component of the present two-component composition refers herein to a component comprising at least one ingredient or compound, and which may also be a mixture of different ingredients or compounds. A component may be in a solid or liquid form. This is evident from the herein description of the first and the second component of the present invention, e.g. from the fact that the first component comprises ASA and optionally one or more pharmaceutically acceptable excipients; and that the second component comprises an aqueous solution and optionally one or more a pharmaceutically acceptable excipient.

[0041] The term "container" as used herein refers to an object for holding, containing or transporting any substance or component.

[0042] The terms "blister and "blister pack" as used herein refers to a rupturable pack with a backing made e.g. of plastic that has a cavity or pocket suitable for holding e.g. a powder or a tablet. The cavity or pocket is sealed with e.g.

a thin metal foil.

[0043] The term "blister seal" as used herein refers to the rupturable seal found on the blister pack.

[0044] The term "cap" as used herein refers to a structure component that is used to cover the end of the container with the container opening and may be used interchangeably with the term "lid".

[0045] The term "plunger" as used herein refers to a structure being able to push against the back of the blister pack with sufficient force to rupture the blister seal, inverting the blister and releasing the contents of the blister.

[0046] The terms "vertical" and "vertically" as used herein refers to the longitudinal direction, with the cap in one end and the bottom of the device of the present invention in the other end.

[0047] The terms "horizontal" and "horizontally" as used herein refers to the direction perpendicular to the vertical direction.

[0048] The term "vertical axis" as used herein refers to the axis drawn from top to bottom of the device.

[0049] The term horizontal axis as used herein refers to the axis that is perpendicular to the vertical axis.

[0050] The term "top of the device" as used herein refers to the end of the device with the cap.

[0051] The term "bottom of the device" as used herein refers to the end of the device in the opposite longitudinal end of the end with the cap.

Detailed description of the invention:

[0052] In the following, specific embodiments of the invention will be described in more detail with reference to the drawings. However, the invention is not limited to the embodiments and illustrations contained herein. It is specifically intended that the invention includes modified forms of the embodiments, including portions of the embodiments and combinations of elements of different embodiments. It should be appreciated that in the development of any actual implementation, as in any engineering or design project, specific decisions must be made to achieve the developer's specific goals, such as compliance with system and/or business-related constraints. Moreover, it should be appreciated that such a development effort might be complex and time consuming, but would nevertheless be a routine undertaking of design, fabrication and manufacture for the skilled person having the benefit of this disclosure.

Fig. 1 shows a side view of a second embodiment a device according to the invention with a container, a container neck, container guiding structures and a cap.

Fig. 2 shows a vertical sectional view of the container neck, the cap with a plunger, a blister holder with a blister holder through hole, a inverted blister, a cap guiding structure and snap ramps, according to a second embodiment of the present invention.

Fig. 3 shows a cross sectional view of a second embodiment including the blister holder, the blister and an engagement of between the blister holder and the blister, according to a second embodiment of the present invention. Fig. 3 also applies to the first embodiment of the present invention.

Fig. 4 shows a cross sectional view the device with the container, a cap, the blister holder, the blister, the plunger and a loaded spring device, according to a third embodiment of the present invention.

Fig. 5 shows a cross sectional view of the device with a released spring device, the plunger in the blister holder through hole and an inverted blister, according to a third embodiment of the present invention.

Fig. 6 shows a side view of the device with the container and the cap, a cap retaining structure, an opening slot and a cap closing structure, according to a third embodiment of the present invention.

Fig. 7 shows a side view of the device with the container, the cap and a safety tab, according to a first or second embodiment of the present invention.

Fig. 8A and B shows a top view of the device with the cap, the activation guiding structure, the activation structure and the plunger retaining structure, according to a third embodiment of the present invention.

Fig. 9A, B and C shows a side view of the device with the cap comprising a pin that interacts with the blister holder device for holding the cap in place after activation and facilitating opening of the device, according to a second embodiment of the present invention.

Fig. 10A-G shows a side view of alternative blisters applicable to a first, second or third embodiment of the device.

Fig. 11A-D shows a side view of alternative shapes of the plunger applicable to a first, second or third embodiment of the device.

Fig. 12 shows side view of a first embodiment of the device according to the invention with a container, a seal gasket, a blister, a blister holder a safety tab and a cap.

Fig 13A-B shows a side view of the container neck, the container rim protruding structure, the seal gasket, the blister holder lifting pin and the blister holder retaining structure, according to a first embodiment of the present invention.

Fig. 14 shows a side view of the container neck, the cap, the first snap ramp, the second snap ramp, the cap guiding structure snap, the blister holder and the blister, according to a first embodiment of the present invention.

Fig. 15 shows a side view of the container neck, the cap, the blister holder, the cap guiding structure, the blister holder opening pin, the vertical container guiding structure, the helical container guiding structure, the guiding structure on the blister holder, according to a first embodiment of the present invention.

Fig. 16 shows a top view of the device, where the cap guiding structure engages the guiding structure on the blister holder and the vertical container guiding structure, according to a first embodiment of the present invention.

[0053] **A first embodiment** of the present invention as shown in Fig. 12 - Fig. 16 provides a device 1 comprising a container 10, with a container opening 10a, a blister 50, with a blister backing 54, and a blister foil seal 51, the blister 50 is positioned to cover the container opening 10a and a cap 20 and a plunger 22 movably arranged within the cap 20 for exerting a force on the blister backing 54 to break the blister seal 51.

[0054] The device 1 as shown in Fig. 12, according to the first embodiment of the present invention may have a total height from 50mm-120mm, 60mm-100mm or preferably from 70mm-90mm and a diameter from 15mm-50mm, 20mm-40mm or 25mm-35mm. In one embodiment the device 1 has an elliptical shape when viewed from the top, with a height from 50mm-120mm, 60mm-100mm or 70mm-90mm, a width from (10mm-50mm), (15mm-45mm) or (30mm-40mm) and a depth of (10mm-40mm), (15mm-35mm) or (20mm-30mm). In one embodiment the device 1 has an elliptical shape when viewed from the top with dimensions height:72mm, width 33,5mm and depth 26mm.

[0055] The device 1 may have any other suitable shape when viewed from the top, for example a square, a circle, triangle or a rectangle.

[0056] As shown in Fig. 12 the container 10 is configured to hold a first component 12 within a container compartment 10b. The first component 12 may be a solid e.g. a powder or more preferably a liquid, even more preferably an aqueous solution suitable for rapid dissolution of ASA or a pharmaceutically acceptable salt thereof. The container 10 may be configured to contain 5mL-40mL, 10mL-30mL, 18mL-28mL. In particular the container may be configured to contain 18mL, 19mL 20mL, 21mL, 22mL, 23mL, 24mL, 25mL, 26mL, 27mL or 28mL.

[0057] As shown in Fig. 12 the blister 50 contains a second component 52, the second component 52 may be a solid, e.g. a powder, granules, a tablet, preferably a powder comprising ASA or a pharmaceutically acceptable salt thereof.

[0058] As shown in Fig. 12 the blister may comprise a blister backing 54 and a blister foil seal 51, the blister backing 54 and the blister foil seal 51 forms an internal compartment suitable for holding the second component 52, the second component being sealed from the outside environment and therefore protected against moisture.

[0059] As shown in Fig. 12 and Fig. 14 the device 1 according to a first aspect of the present invention includes a blister holder 40 which is arranged at the container opening 10a.

[0060] As shown in Fig 12, Fig 13a, 13b and Fig. 14 the blister holder 40 has a through opening 44 and is configured to position the blister 50 to cover the container opening 10a, with the through opening 44 and the container opening 10a being aligned so that the blister seal 51 faces the container opening 10a and the blister backing 54 faces the plunger 22. The blister holder 40 may engage the container 10 via a tight mechanical fit or screwed on via threading to provide a seal. The blister holder 40 may also comprise at least one blister holder retaining structure 47 configured to engage with a blister holder 40 retaining pin 19a to secure the blister holder 40 to the container 10.

[0061] As shown in Fig 13a, 13b the blister holder retaining structure 47 is arranged with an edge slanting at an angle for facilitating smooth interaction with a blister holder lifting pin 19b. Said angle is slanting towards the blister holder lifting pin 19b at an angle diverging from the vertical axis of the device by 1°-89°.

[0062] The blister 50 may be attached to the blister holder 40 with a seal between the blister and the blister holder 53. The seal may be achieved mechanically, via heat welding or an adhesive.

[0063] As shown in Figs. 10A-G, the blister 50 may have a button shape (Fig. 10 A), a dome shape (Fig. 10B, C), an indented shape (Fig 10. D, E), comprise a foil cutting feature 55 (Fig. 10F, G.)

[0064] As shown in Fig. 12 and Fig. 14 the blister holder 40 with the blister 50 is configured to seal the container 10 thus keeping the first component 12 sealed within the container 10, eliminating any risk of contamination.

[0065] As shown in Fig 15, the device 1 according to the present invention includes a cap 20 configured to cover the blister holder 40 with the blister 50. The cap 20 has a top, walls and an opening in one end, forming an inner compartment when covering the blister holder 40 with the blister 50. The cap 20 has cap guiding structures 21, 28, 29, e.g. one or more guiding pins 21, one or more blister holder opening pins 28 and one or more guiding structure snaps 29 on the inside walls of the cap 20. The cap 20 is configured to be able to move relative to the container 10 in the longitudinal direction of the device 1.

[0066] As shown in Fig. 15 the cap 20 comprises at least one blister holder opening pin 28, located on the inside surface of the cap 20 that is arranged to interact with a guiding structure 41 on the blister holder, configured to facilitate opening of the device 1 when the cap 20 is rotated relative to the container 10.

[0067] As shown in Fig. 15 the cap 20 further comprises at least one cap guiding structure snap 29 protruding from the inside surface of the cap 20. The surface of the cap guiding structure snap 29 facing towards the top of the device 1 is slanted, i.e. the surface is arranged at an angle to the horizontal axis, slanting from the inner wall of the cap 20 and towards the top of the device 1. Said angle may be 1°-89°.

[0068] As shown in Fig 13a, 13b and Fig 14 the device 1 according to the first embodiment of the present invention includes the plunger 22 located within the cap 20, the plunger 22 is arranged to move in the longitudinal direction of the device 1, relative to the container 10 and into the blister holder through opening 44 to exert a force on the blister backing 54 to break the blister foil seal 51. Preferably, the plunger 22 moves far enough to fully invert the blister 50, ensuring that all of the second component 52 is deposited through the container opening 10a and into the container 10. The plunger 22 may be part of the cap 20, e.g. molded in one cap with plunger unit or the plunger 22 may be fixed to the cap 20.

[0069] As shown in Fig 11A-D the end of the plunger 22 for contacting the blister 50 may have different shapes for example flat cylinder form (Fig 11 A), Pointed (Fig. 11B), having a leading edge (Fig. 11 C) or dome shaped (Fig. 11 D)

[0070] The shape of the blister 50 and the plunger 22 may be matched to facilitate total emptying of the blister 50 upon activation of the device 1 by a user.

[0071] As shown in Fig. 12 and Fig. 15 the device 1 according to the present invention comprises a container neck 15, for engaging with the blister holder 40 and receiving the cap 20, located at the longitudinal end of the container 10 with the container opening 10a. The container neck 15 comprises container guiding structures 11b and 11c for interacting with the cap guiding structure 21 and the cap guiding structure snap 29.

[0072] As shown in Fig 13a the container neck 15 comprises a blister holder retaining pin 19a arranged to interact with a blister holder retaining structure 47 for securing the blister holder 40 to the container neck 15.

[0073] As shown in Fig. 13a the container neck 15 also comprises a blister holder lifting pin 19b arranged to interact with the blister holder retaining structure 47 to lift the blister holder 40 from the container neck 15 when a twisting motion of the cap 20 is initiated. The blister holder lifting pin 19b is arranged with an edge slanting at an angle for facilitating smooth interaction with the blister holder retaining structure 47. Said slanting edge is slanting in a direction such that the top edge of the blister holder lifting pin 19b is shorter than the bottom edge the blister holder lifting pin 19b. Said slanting edge may be diverging from the vertical axis of the device by 1°-89°.

[0074] As shown in Fig 15 the device 1 may have a stop surface 16 protruding at the bottom of the container neck 15, configured to stop the downward movement of the cap 20.

[0075] As shown in Fig 13a the container neck 15 comprises a container rim 14a surrounding the container opening at the top of the container neck 15 which comprises a container rim protruding structure 14b having a width of less than 60% of the width of the container rim 14a surrounding the container opening at the top of the container neck 15, preferably less than 50%, less than 40%, less than 30%, less than 20% or less than 10% of the width of the container rim 14a surrounding the container opening at the top of the container neck 15.

[0076] As best shown by Fig. 12 the device 1 may comprise a seal gasket 56 between the blister 50 and the container rim 14a surrounding the container opening at the top of the container neck. Other ways of sealing may be envisaged, including a tight mechanical fit or a sealing adhesive between the blister 50 and the container rim 14a.

[0077] The container rim protruding structure 14b facilitates sealing of the container opening 10a with the blister 50 pressing down on the gasket 56. Less pressing force is needed because of the reduced area of the container rim protruding structure 14b compared to if the gasket 56 were to be pressing down directly on the container rim 14a surrounding the container opening at the top of the container neck. This will result in smoother operation of the device 1 as less force is needed to activate and open it.

[0078] As shown in Fig 15 the container guiding structures 11b and 11c of the first embodiment of the present invention is configured as protruding structures on the container neck 15, the container guiding structures 11b and 11c being suitable for interacting with the cap guiding structure 21. The container guiding structures 11b, 11c may be arranged in multiple directions, e.g. horizontally 11a, vertically 11b or helically 11c, to guide the movement of the cap 20 upon user activation. In one non-limiting configuration the container neck 15 may have a vertical guiding structure 11b and a helical guiding structure 11c.

[0079] The vertical guiding structure 11b is configured to guide the movement of the cap 20 with the plunger 22 towards the container 10, this movement guides the plunger 22 into the blister holder through opening 44 to exert a force on the

blister backing 54 making the blister foil seal 51 break and depositing the second component 52 into the container 10. The stop surface protruding at the bottom of the container neck 16 may be configured to interact with the cap guiding structure 21 to stop the vertical movement of the plunger 22 before the blister backing 54 is broken, keeping the container 10 sealed so that the second component 52 may mix with the first component 12 without risk of spilling.

[0080] As shown in Fig 15, the container neck 15 comprise a plurality of snap ramps 13a, 13b. The snap ramps 13a, 13b may be protruding from the container neck and may be configured to interact with the cap guiding structure snap 29. The snap ramps 13a, 13b are wedge-shaped structures with a sloping side that first interacts with the cap guiding structure snap 29, configured to slightly lift the cap guiding structure snap 29 as it moves towards the stop surface 16 protruding at the bottom of the container neck 16. As the cap guiding structure snap 29 moves over the top of a snap ramp 13a, 13b it will abruptly snap back towards the container neck 15, thereby giving the user tactile feedback. The snap ramps 13a, 13b are configured to interact with the cap guiding structure snap 29 to prevent the cap 20 from moving up when the cap guiding structure snap 29 interacts with a snap ramp 13a, 13b. The first snap ramp 13a is configured to hold the cap 20 in place before user activation. This also has a function as a safety feature preventing a user from easily removing the cap 20 and accessing the blister holder 40 and the blister 50, without normal activation of the device. The second snap ramp 13b is configured to give tactile feedback to a user when the plunger 22 has emptied the blister 50, signaling that the second component 52 has been deposited in the first component 12. The second snap ramp 13b also interacts with the cap guiding structure snap 29 to secure the cap 20 to the container neck 15 after the plunger 22 has released the second component 52 into the first component 12, preventing the device 1 from accidentally opening, enabling the user to shake the device 1 to help speed up mixing of the first component 12 and the second component 52 without risking spilling the content.

[0081] As shown in Fig. 14 the surfaces of the snap ramps 13a, 13b that are facing towards the bottom of the device 1, are slanted, i.e. the surfaces may be arranged at an angle to the horizontal direction, slanting from the container neck 15 and towards the bottom of the device 1. Said angle may be 1°-89°. The slanted surfaces of 13a, 13b are preferably parallel to the slanting surface of the cap guiding structure snap 29.

[0082] The container guiding structure 11c is oriented helically, configured to interact with the cap guiding structure 21 to guide the cap 20 away from the container 10, initiated with a twisting motion by a user. The cap guiding structure 21 is guided to the bottom edge of the blister holder 40. Where an opening structure 42 on the blister holder 40,which is aligned with the container guiding structure 11c, where the cap guiding structure 21 interacts with the opening structure 42 to remove the blister holder 40 with the blister 50 from the container 10, thereby facilitating opening of the sealed container 10 letting the user gain access to the mixed two-component composition comprising the first component 12 and the second component 52.

[0083] The interaction between the cap guiding structure 21 and the opening structure 42 preferably retains the blister holder 40 with the emptied blister 50 within the cap 20 after opening of the device 1.

[0084] The opening structure 42 on the blister holder 40 is comprised of a ledge configured to interact with the cap guiding structure 21 for facilitating opening of the device. The blister holder 40 may have a larger diameter than the container neck 15 so that the bottom edge of the blister holder 40 protrudes out from the container neck 15. The opening structure 42 may also be comprised of an opening slot in the blister holder 40 configured to interact with the cap guiding structure 21.

[0085] As shown in Fig 12 the device 1 comprises a safety tab 30 located between the container 10 and the cap 20. The safety tab 30 is configured to keep the cap 20 from being pushed towards the container 10. To make the device 1 ready for use, the user must remove the safety tab 30. The safety tab 30 is configured to be destroyed upon removal. This provides an indication to the user that the device has been used.

[0086] An advantage of designing the container neck with protruding guiding structures and snap ramps is that it allows for a slim container neck, and an overall compact design of the device, while all the structures still meets necessary criteria for strength and robustness for the device's intended use.

[0087] **A second embodiment of the** present invention is shown in Fig. 1, Fig. 2, Fig 3 and Fig. 9 a,b,c provides a device 1 comprising a container 10, with a container opening 10a, a blister 50, with a blister backing 54 and a blister seal 51, the blister 50 is positioned to cover the container opening 10a. A cap 20 and a plunger 22 movably arranged within the cap 20 for exerting a force on the blister backing 54 to break the blister seal 51.

[0088] The device 1 as shown in Fig. 1, of the second aspect of the present invention may have a total height from 50mm-120mm, 60mm-100mm or more preferably from 70mm-90mm and a diameter from 15mm-50mm, 20mm-40mm or 25mm-35mm. In one embodiment the device 1 has an elliptical shape when viewed from the top, with a height from 50mm-120mm, 60mm-100mm or 70mm-90mm, a width from (10mm-50mm), (15mm-45mm) or (30mm-40mm) and a depth of (10mm-40mm), (15mm-35mm) or (20mm-30mm). In one embodiment the device 1 has an elliptical shape when viewed from the top with dimensions height:72mm, width 33,5mm and depth 26mm.

[0089] The device 1 may have any other suitable shape when viewed from the top, for example a square, a circle, triangle or a rectangle.

[0090] The container 10 is configured to hold a first component 12 within a container compartment 10b. The first

component 12 may be a solid e.g. a powder or more preferably a liquid, even more preferably an aqueous solution suitable for rapid dissolution of ASA or a pharmaceutically acceptable salt thereof. The container 10 may be configured to contain 5mL-40mL, 10mL-30mL, 18mL-28mL. In particular the container may be configured to contain 18mL, 19mL 20mL, 21mL, 22mL, 23mL, 24mL, 25mL, 26mL, 27mL or 28mL.

[0091] As shown in Fig. 1 the blister 50 contains a second component 52, the second component 52 may be a solid, e.g. a powder, granules, a tablet, preferably a powder comprising ASA or a pharmaceutically acceptable salt thereof.

[0092] As shown in Fig. 3 the blister comprises a blister backing 54 and a blister foil seal 51, the blister backing 54 and the blister foil seal 51 forms an internal compartment suitable for holding the second component 52, the second component being sealed from the outside environment and therefore protected against moisture.

[0093] As shown in Fig. 2 and Fig. 3 the device 1 according to the present invention includes a blister holder 40 which is arranged at the container opening 10a. The blister holder 40 has a through opening 44 and is configured to position the blister 50 to cover the container opening 10a, with the through opening 44 and the container opening 10a being aligned so that the blister seal 51 faces the container opening and the blister backing 54 faces the plunger 22. The blister holder 40 may engage the container 10 via a tight mechanical fit or screwed on via threading to provide a seal.

[0094] As shown in Fig. 9a and 9b the blister holder 40 may also comprise at least one blister holder opening slot 45 and at least one blister holder retaining slot 46.

[0095] As shown in Fig. 3 the blister 50 is attached to the blister holder 40 with a seal 53 between the blister 50 and the blister holder 40. The seal 53 may be achieved mechanically, via heat welding or an adhesive.

[0096] As shown in Figs. 10A-G, the blister 50 may have a button shape (Fig. 10 A), a dome shape (Fig. 10B, C), an indented shape (Fig 10. D, E), comprise a foil cutting feature (55) (Fig. 10F, G.)

[0097] The blister holder 40 with the blister 50 is configured to seal the container 10 thus keeping the first component 12 sealed within the container 10, eliminating any risk of contamination.

[0098] The device 1 may comprise a seal gasket 56 between the blister 50 and the container rim 14a surrounding the container opening at the top of the container neck.

[0099] The device 1 according to the present invention includes a cap 20 configured to cover the blister holder 40 with the blister 50. The cap 20 has a top, walls and an opening in one end, forming an inner compartment when covering the blister holder 40 with the blister 50. The cap 20 has one or more cap guiding structures 21, e.g. guiding pins, on the inside walls. The cap 20 may be configured to be able to move relative to the container 10 in the longitudinal direction of the device 1.

[0100] The cap 20 comprises at least one blister holder opening pin 28 located on the inside surface of the cap 20 that is arranged to interact with the blister holder opening slot 45 configured to facilitate opening of the device 1 by a twisting motion.

[0101] The device 1 according to the second embodiment of the present invention includes a plunger 22 located within the cap 20, the plunger 22 is arranged to move in the longitudinal direction of the device 1, relative to the container 10 and into the blister holder through opening 44 to exert a force on the blister backing 54 to break the blister seal 51. Preferably, the plunger 22 moves far enough to fully invert the blister 50, ensuring that all of the second component 52 is deposited through the container opening 10a and into the container 10. The plunger 22 may be part of the cap 20, e.g. molded in one cap with plunger unit or the plunger 22 may be fixed to the cap 20, or the plunger 22 may be configured to move relative to the cap 20, e.g. via a spring actuated mechanism.

[0102] As shown in Fig 11A-D the end of the plunger 22 for contacting the blister 50 may have different shapes for example flat cylinder form (Fig 11 A), Pointed (Fig. 11B), having a leading edge (Fig. 11 C) or dome shaped (Fig. 11 D)

[0103] The shape of the blister 50 and the plunger 22 may be matched to facilitate total emptying of the blister upon activation of the device 1 by a user.

[0104] As shown in Fig. 9a-c the device 1 according to the second embodiment of the present invention comprises a container neck 15, for engaging with the blister holder 40 and receiving the cap 20, located at the longitudinal end of the container 10 with the container opening 10a. The container neck 15 comprises container guiding structures 11b and 11c for interacting with the cap guiding structure 21. The container neck may also comprise a blister holder retaining pin 19a arranged to interact with the blister holder retaining slot 46 for securing the blister holder 40 to the container neck 15.

[0105] As shown in Fig. 1 the device 1 has a stop surface protruding at the bottom of the container neck 16.

[0106] As shown in Fig 9a-c the container guiding structures 11b and 11c is configured as grooves in the container neck 15, suitable for interacting with the cap guiding structure 21 if the cap guiding structure 21 is configured e.g. as a pin. The container guiding structures 11b, 11c may be arranged in multiple directions, e.g. horizontally, vertically or helically, to guide the movement of the cap 20 upon user activation.

[0107] In one non-limiting configuration the container neck 15 has a vertical guiding structure 11b and a helical guiding structure 11c.

[0108] The vertical guiding structure 11b is configured to guide the movement of the cap 20 with the plunger 22 towards the container 10, this movement guides the plunger 22 into the blister holder through opening 44 to exert a force on the blister backing 54 making the blister foil seal 51 break and depositing the second component 52 into the container 10.

The vertical guiding structure 11b is configured to interact with the cap guiding structure 21 to stop the vertical movement of the plunger 22 before the blister backing 54 is broken, keeping the container 10 sealed so that the second component 52 may mix with the first component 12 without risk of spilling.

[0109] As shown in Fig 1. the container guiding structure 11b 11c comprises a plurality of snap ramps 13a, 13b. A snap ramp is configured to interact with the cap guiding structure 21. The snap ramps 13a, 13b may be located within a container guiding structure. The snap ramps 13a, 13b may be wedge-shaped structures with a sloping side that first interacts with the cap guiding structure 21, configured to slightly lift the cap guiding structure 21 as it moves towards the stop surface protruding at the bottom of the container neck 16. As the cap guiding structure 21 moves over the top of a snap ramp 13a, 13b it will abruptly snap back into the container guiding structure 11b, 11c, thereby giving the user tactile feedback. The snap ramps 13a, 13b are configured to interact with the cap guiding structure 21 to prevent the cap 20 to move back once the cap guiding structure has passed a snap ramp 13a, 13b. The first snap ramp 13a is be configured to hold the cap 20 in place before user activation. A second snap ramp 13b is be configured to give tactile feedback to a user when the plunger 22 has emptied the blister 50, signaling that the second component 52 has been deposited in the first component 12. The second snap ramp 13b also interacts with the cap guiding structure 21 to secure the cap 20, preventing the device 1 from accidentally opening, enabling the user to shake the device 1 to help speed up mixing of the first component 12 and the second component 52 without risking spilling the content.

[0110] As shown in Fig 9a-c the container guiding structure 11c is oriented helically, configured to interact with the cap guiding structure 21 to guide the cap 20 away from the container 10, initiated with a twisting motion by a user. The cap guiding structure 21 will be guided to an opening structure 42 on the blister holder 40, which is aligned with the container guiding structure 11c, where the cap guiding structure 21 interacts with the opening structure 42 to remove the blister holder 40 with the blister 50 from the container 10, thereby opening the sealed container 10 letting the user gain access to the mixed two-component composition comprising the first component 12 and the second component 52.

[0111] The device 1 according to the second embodiment of the present invention comprises a safety tab 30 located between the container 10 and the cap 20. The safety tab 30 is configured to keep the cap 20 from being pushed towards the container 10. To make the device 1 ready for use, the user must remove the safety tab 30. The safety tab 30 is configured to be destroyed upon removal. This provides an indication to the user that the device has been used.

[0112] As shown in Fig. 4, Fig. 5, Fig 6, Fig. 7 and Fig 8 the device 1 according to the present invention may in **a third embodiment** include a plunger 22 that is arranged movably relative to the cap 20, wherein movement of the plunger 22 is actuated by a spring device 23 located within the cap 20. The spring device 23 is configured to activate the movement of the plunger 22 for the plunger 22 to break the seal 51.

[0113] The device 1 as shown in Fig. 4, according to the third embodiment of the present invention may have a total height from 50mm-120mm, 60mm-100mm or preferably from 70mm-90mm and a diameter from 15mm-50mm, 20mm-40mm or 25mm-35mm. In one embodiment the device 1 has an elliptical shape when viewed from the top, with a height from 50mm-120mm, 60mm-100mm or 70mm-90mm, a width from (10mm-50mm), (15mm-45mm) or (30mm-40mm) and a depth of (10mm-40mm), (15mm-35mm) or (20mm-30mm). In one embodiment the device 1 has an elliptical shape when viewed from the top with dimensions height:72mm, width 33,5mm and depth 26mm.

[0114] The device 1 may have any other suitable shape when viewed from the top, for example a square, circle or a rectangle.

[0115] As shown in Fig. 4 the container 10 is configured to hold a first component 12 within a container compartment 10b. The first component 12 may be a solid e.g. a powder or more preferably a liquid, even more preferably an aqueous solution suitable for rapid dissolution of ASA or a pharmaceutically acceptable salt thereof. The container 10 may be configured to contain 5mL-40mL, 10mL-30mL, 18mL-28mL. In particular the container may be configured to contain 18mL, 19mL 20mL, 21mL, 22mL, 23mL, 24mL, 25mL, 26mL, 27mL or 28mL.

[0116] As shown in Fig 4 and 8a-b if the plunger 22 is spring actuated, the device according to the third embodiment of the present invention may comprise at least one activation guiding structure 24 and a plunger retaining structure 27 within the cap 20. The activation guiding structure 24 may be fixed to or part of the inner wall off the cap 20. The plunger retaining structure 27 is moveably arranged within the cap 20. The plunger 22 may be associated with, or fixed to, the plunger retaining structure 27. The plunger 22 and the plunger retaining structure 27 may also consist of a single structural piece. The plunger retaining structure 27 comprises at least one activation structure 25, which is defined as a hole or opening through the plunger retaining structure 27. The activation structure 25 has dimensions that allows the activation guiding structure 24 to pass therethrough. Before user activation the spring device 23 is loaded, with the spring resting on the plunger retaining structure 27. The plunger retaining structure 27 is resting on the activation guiding structure 24. Activation of the device is initiated by a user with a twisting motion, causing rotation of the cap 20. The rotation will align the activation guiding structure 24 and the activation structure 25, allowing release of the spring device 23 when the plunger retaining structure 27 no longer rests on the activation guiding structure 24. Upon user activation via a twisting motion of the cap 20 the spring device 23 is released via the activation structure 25.

[0117] As shown in Fig 5 the spring device 23 drives the plunger into the blister holder through opening 44, thereby exerting a force on the blister backing 54 and breaking the blister foil seal 51 to deposit the second component 52 into

the container 10.

[0118] Fig. 6 shows that when the plunger 22 is spring actuated the cap 20 comprises a cap closing structure 26 for interaction with a cap retaining structure 17 on the container neck 15 for securing the cap 20 to the container 10 in a closed state. The container neck 15 comprises an opening slot 18 configured to release the cap 20, after a user initiated twisting motion to align the cap closing structure 26 with the opening slot 18.

1	Device
10	Container
10a	Container opening
10b	Container compartment
11a	Horizontal container guiding structure
11b	Vertical container guiding structure
11c	Helical container guiding structure
12	First component
13a	First snap ramp
13b	Second snap ramp
14a	Container rim
14b	Container rim protruding structure
15	Container neck
16	Stop surface protruding at the bottom of the container neck
17	Cap retaining structure
18	Opening slot
19a	Blister holder retaining pin
19b	Blister holder lifting pin
20	Cap
21	Cap guiding structure
22	Plunger
23	Spring device
24	Activation guiding structure
25	Activation structure
26	Cap closing structure
27	Plunger retaining structure
28	Blister holder opening pin
29	Cap guiding structure snap
30	Safety tab
40	Blister holder
41	Guiding structure.
42	Opening structure on blister holding device

(continued)

43	Seal between blister holder and liquid container
44	Blister holder through opening
45	Blister holder opening pin slot
46	Blister holder retaining slot
47	Blister holder retaining structure
50	Blister
51	Blister foil seal
52	Second component, ASA (acetyl salicylic acid)
53	Seal between blister and blister holder
54	Blister backing
55	Foil cutting feature
56	Seal gasket between blister and container neck rim

Claims

1. A device (1) comprising a

- container (10) containing a first component (12), the container is arranged with a container opening (10a),
- a blister holding device (40) with a through opening (44) for positioning a blister (50) covering the container opening (10a), the blister (50) contains a second component (52) sealed inside the blister (50) with a blister seal (51)
- a cap (20)
- a plunger (22) located within the cap (20)

characterized in that the plunger (22) is moveably arranged to carry out a movement into the blister holder through opening (44) to break the blister seal (51) and release the second component (52) into the first component (12).

2. The device (1) according to claim 1, **characterized in that** the plunger (22) is attached to or part of the cap (20) which is arranged for movement relative to the container (10) for the plunger to brake the blister seal (51).

3. The device (1) according any of the preceding claims, **characterized in that** the container comprises a container neck (15) for receiving the cap (20), the container neck (15) comprises a first and second container guiding structure (11b, 11c,) for interaction with a cap guiding structure (21), wherein the first container guiding structure (11b) is oriented vertically and the second container guiding structure (11c) is oriented helically.

4. The device (1) according to any of the preceding claims, **characterized in that** the blister holder (40) is configured to engage a container rim (14a) surrounding the container opening (10a) to hold the blister (50) between with the container rim (14a) and the blister holder (40) for sealing the container.

5. The device according to any of the preceding claims, **characterized in that** the second container guiding structure (11c) is configured for guiding the cap guiding structure (21) to interact with an opening structure (42) on the blister holder (40) to remove the blister holder (40) and the blister (50) with the cap (20) when removing the cap from the container (10)

6. The device (1) according to any of the preceding claims 3-5 **characterized in that** the container neck (15) comprises snap ramps (13a and 13b) configured to interact with a cap guiding structure snap (29), for providing tactile feedback when the plunger (22) has released the second component (52) into the first component (12).

7. The device (1) according to any of the preceding claims 3-6 **characterized in that** the snap ramp (13a) is configured to interact with the cap guiding structure snap (29) for securing the cap onto the container neck (15) prior to use.

8. The device (1) according to any of the preceding claims 3-7 **characterized in that** the snap ramp (13b) is configured to interact with the cap guiding structure snap (29) for securing the cap onto the container neck (15) after the plunger (22) has released the second component (52) into the first component (12).

9. The device (1) according to any of the preceding claims 3-8 **characterized in that** the cap (20) comprises a blister holder opening pin (28) located on the inside surface of the cap (20) configured to interact with a guiding structure (41) on the blister holder (40) for opening the device (1).

10. The device (1) according to any of the preceding claims 3-9 **characterized in that** the container neck (15) comprises a blister holder lifting pin (19b) arranged to interact with a blister holder retaining structure (47) for lifting the blister holder (40) from the container neck (15).

11. The device (1) according to claim 1. **characterized in that** the plunger (22) is arranged movably relative to the cap (20) and that a spring device (23) is located within the cap (20), the spring device (23) is configured for actuation of the movement of the plunger (22) for the plunger (22) to brake the blister seal (51).

12. The device (1) according to claim 11, **characterized in that** the cap (20) comprises an activation guiding structure (24) for keeping the spring device (23) compressed, wherein the plunger (22) is associated with a plunger retaining structure (27) which comprises at least one activation structure (25) suitable for releasing the spring device (23) for actuating movement of the plunger (22).

13. The device 1 according to any of the preceding claims 1, 11-12, **characterized in that** the container (10) comprises a cap retaining structure (17), with an opening slot (18), for interaction with a cap closing structure (26) on the cap (20), for retaining the cap (20) on the container (10), wherein the cap (20) is removed from the container (10) via a twisting motion to align the cap closing structure (26) with the opening slot (18) of the cap retaining structure (17).

14. A method for depositing a second component (52) contained in a blister (50) into a first component (12) held within a container (10), **characterized by** the following steps:

- activating a plunger (22) located within a cap (20) of the container (10) by an activating movement,
- thereby moving of the plunger (22) toward a through opening (44) of a blister holder (40), where the blister (50) is arranged covering the through opening (44),
- and moving the plunger (22) through the through opening (44), thereby depositing the second component (52) contained in the blister (50) into the first component (12) located in the container (10).

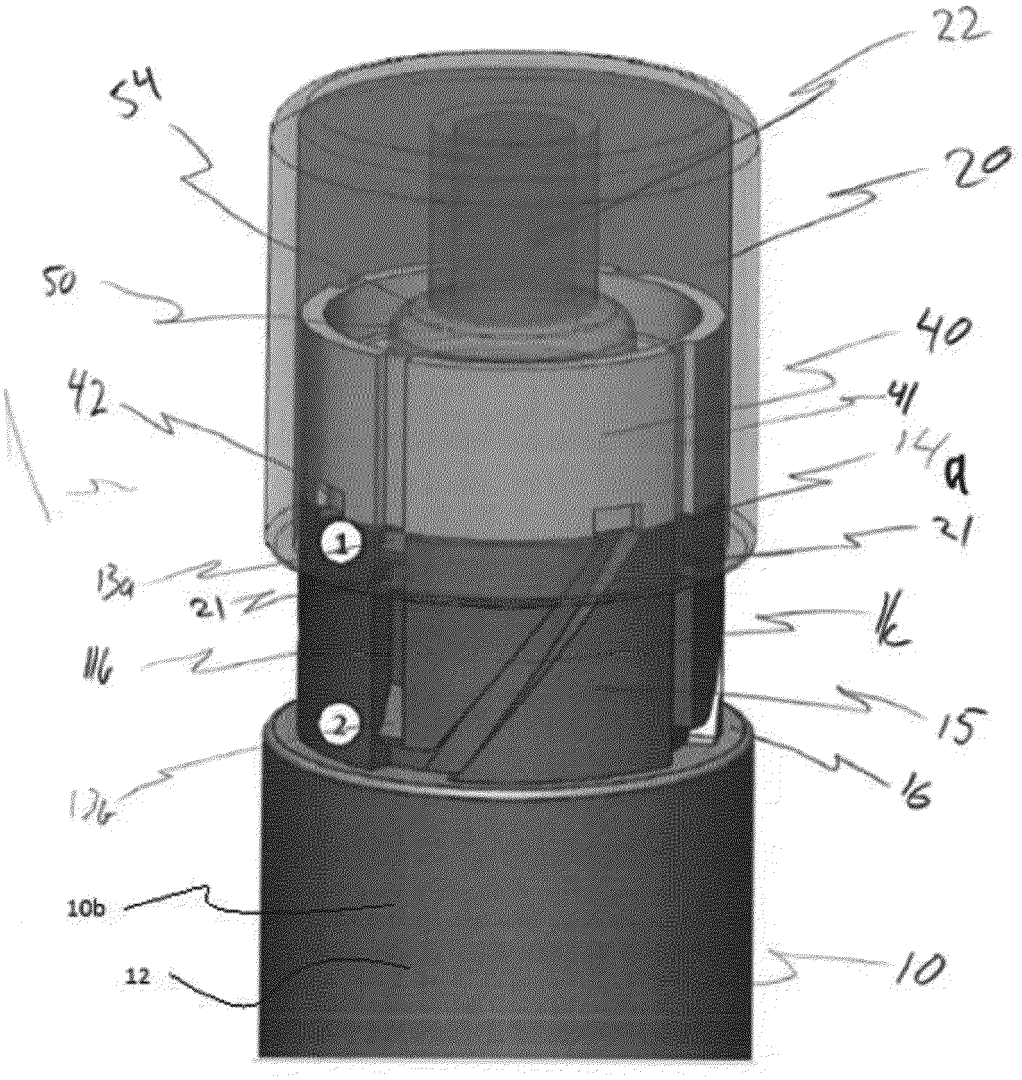


Fig. 1

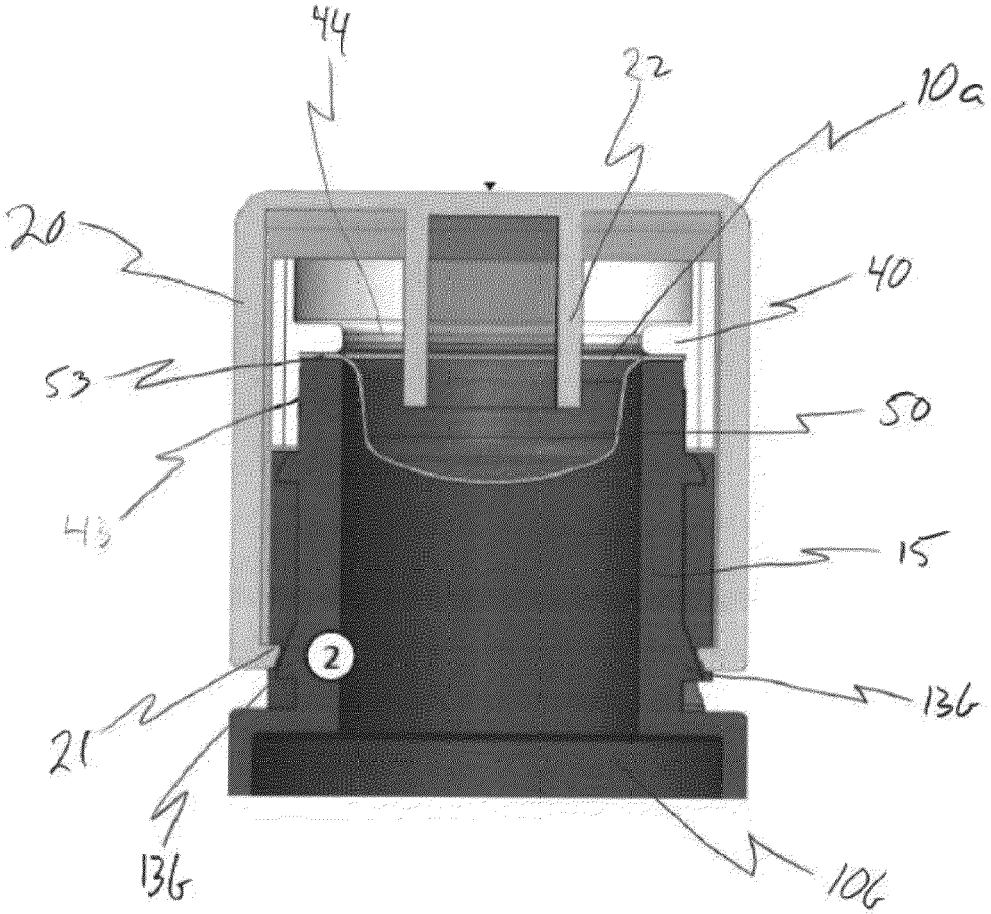


Fig. 2

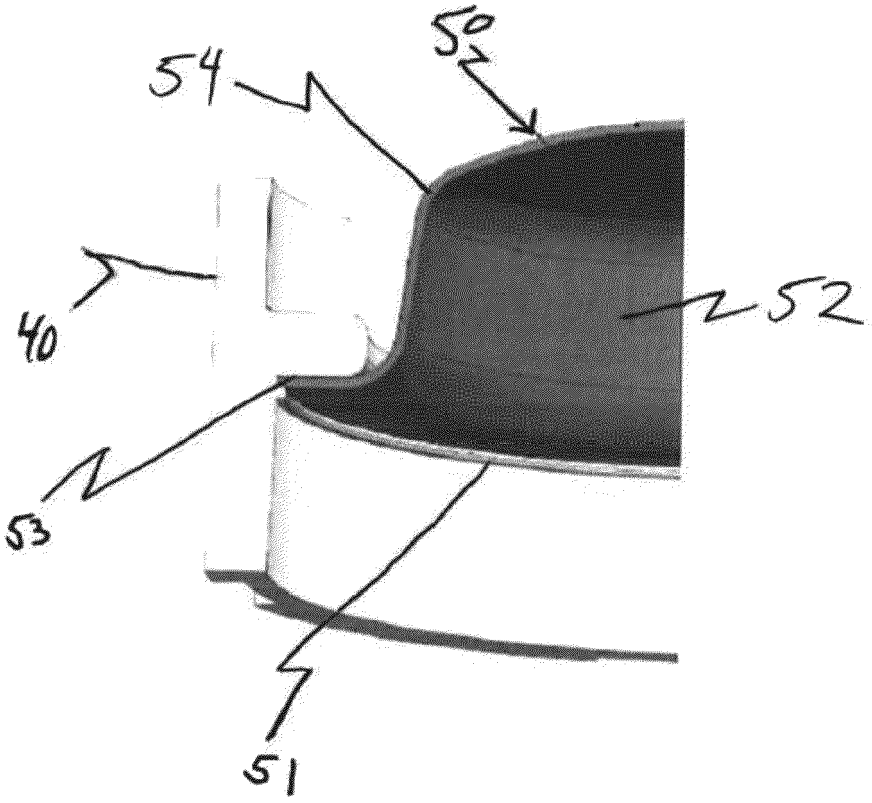


Fig 3

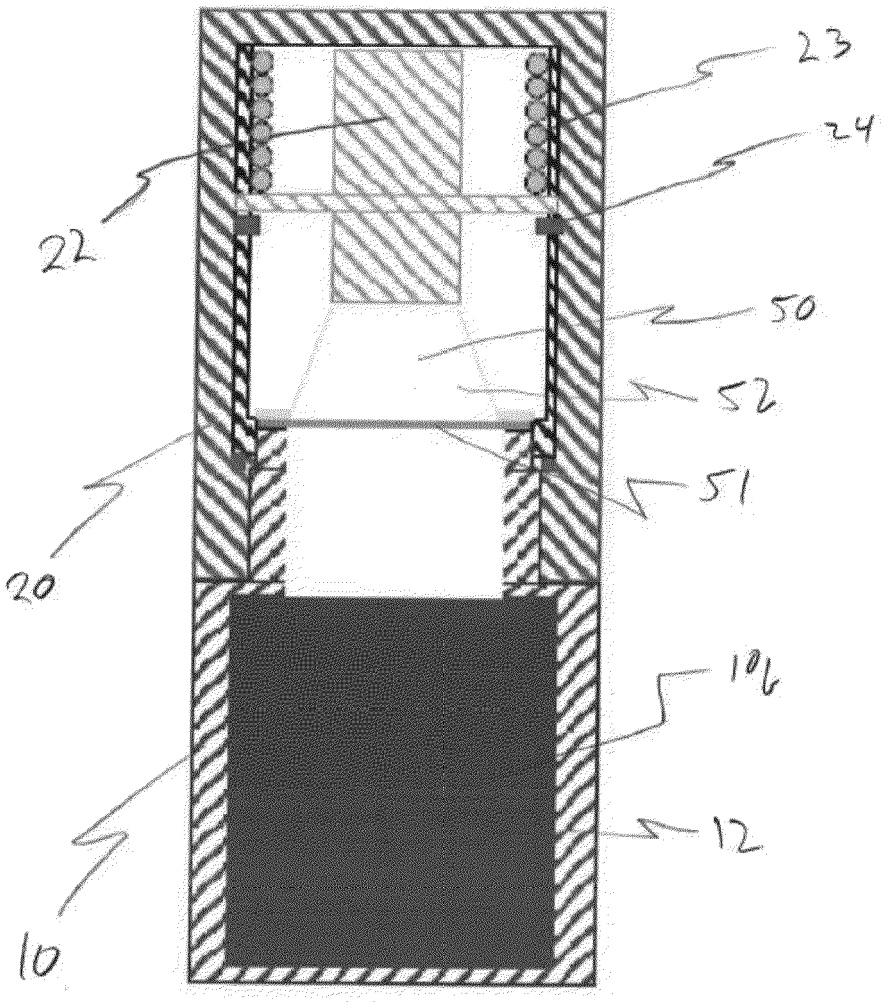


Fig. 4

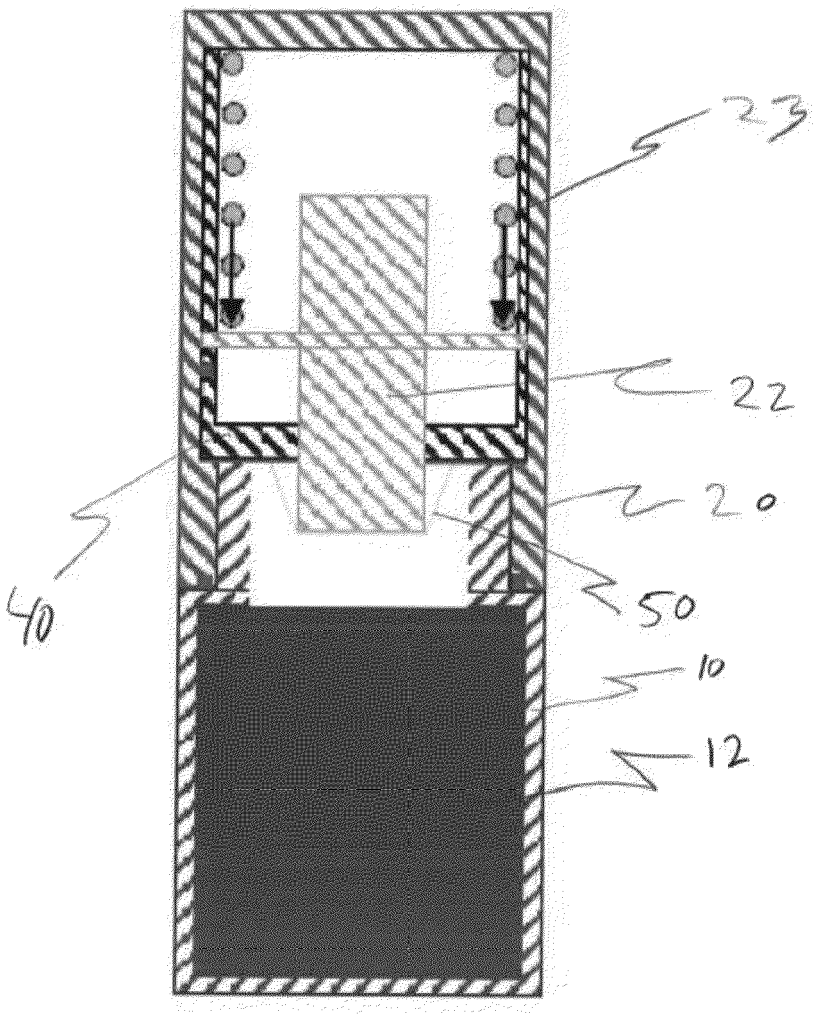


Fig. 5

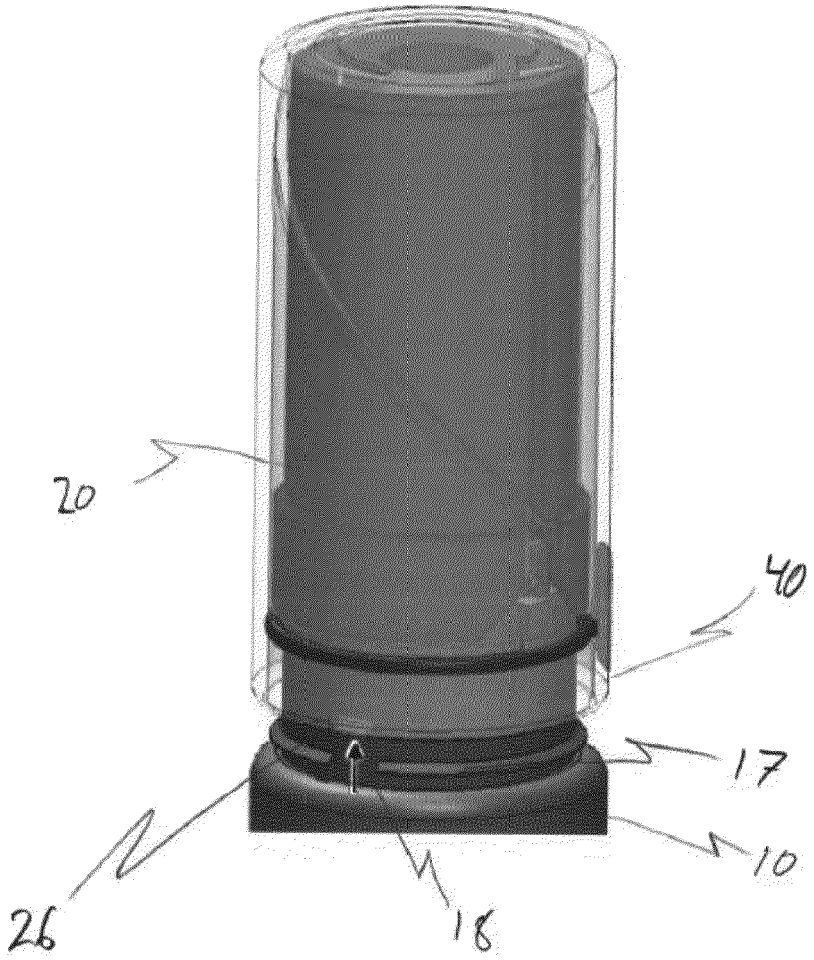


Fig. 6

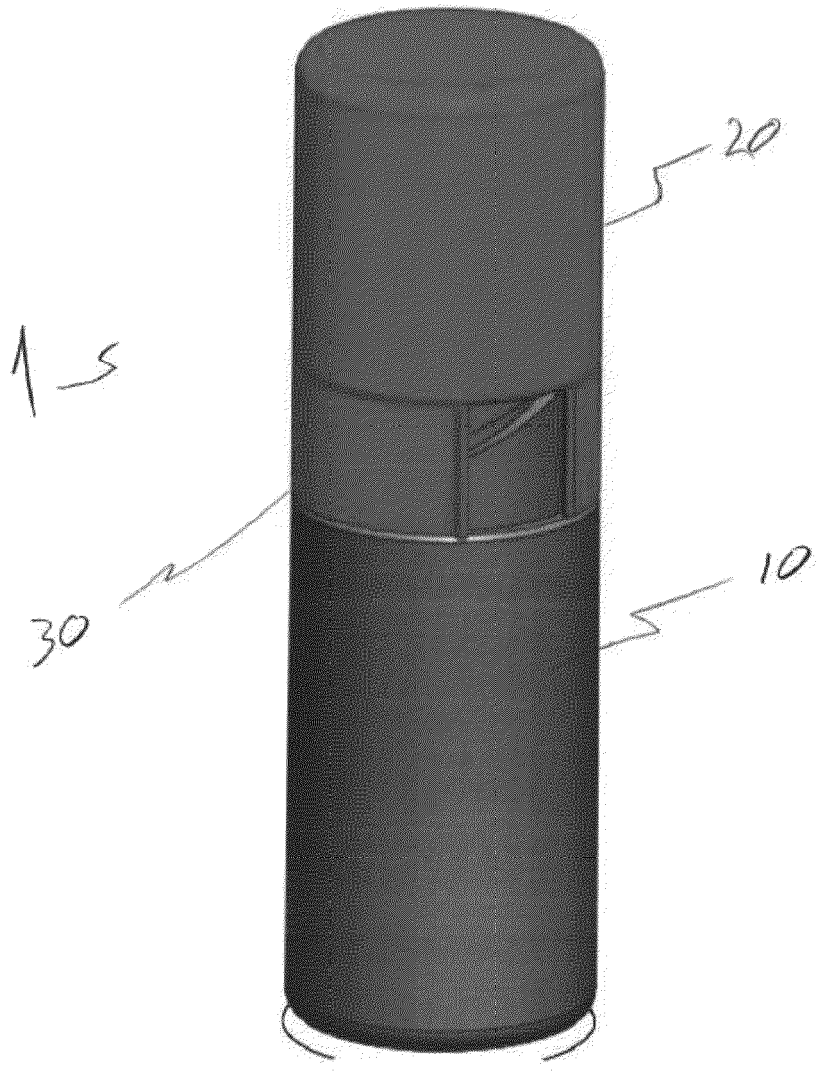
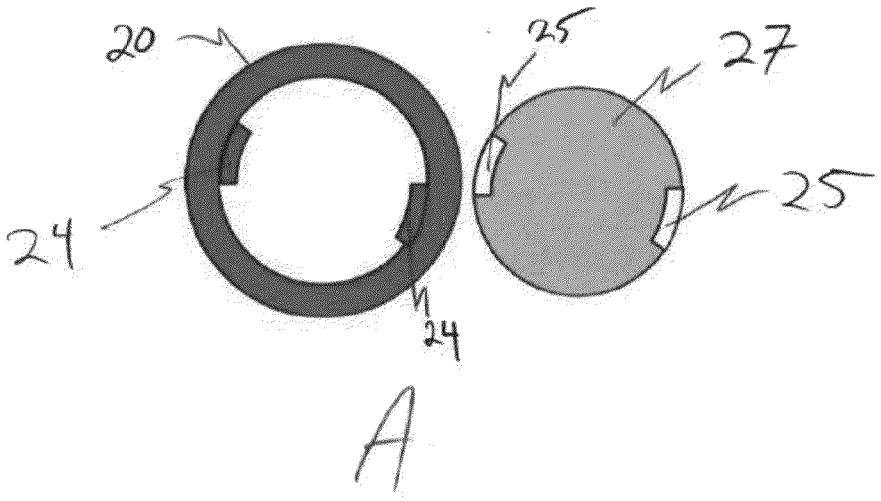


Fig. 7



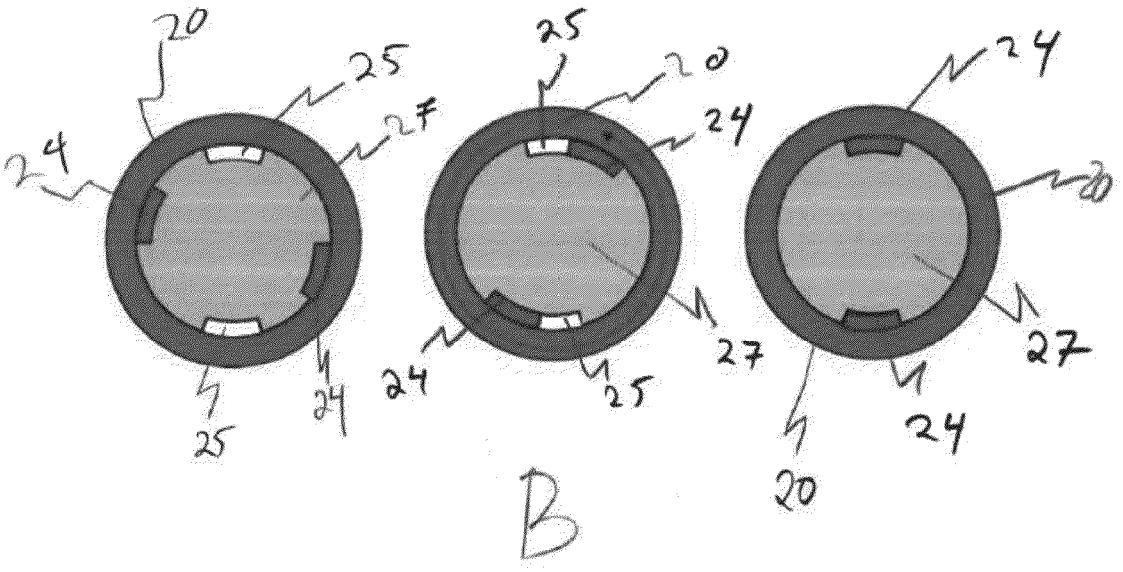


Fig 8

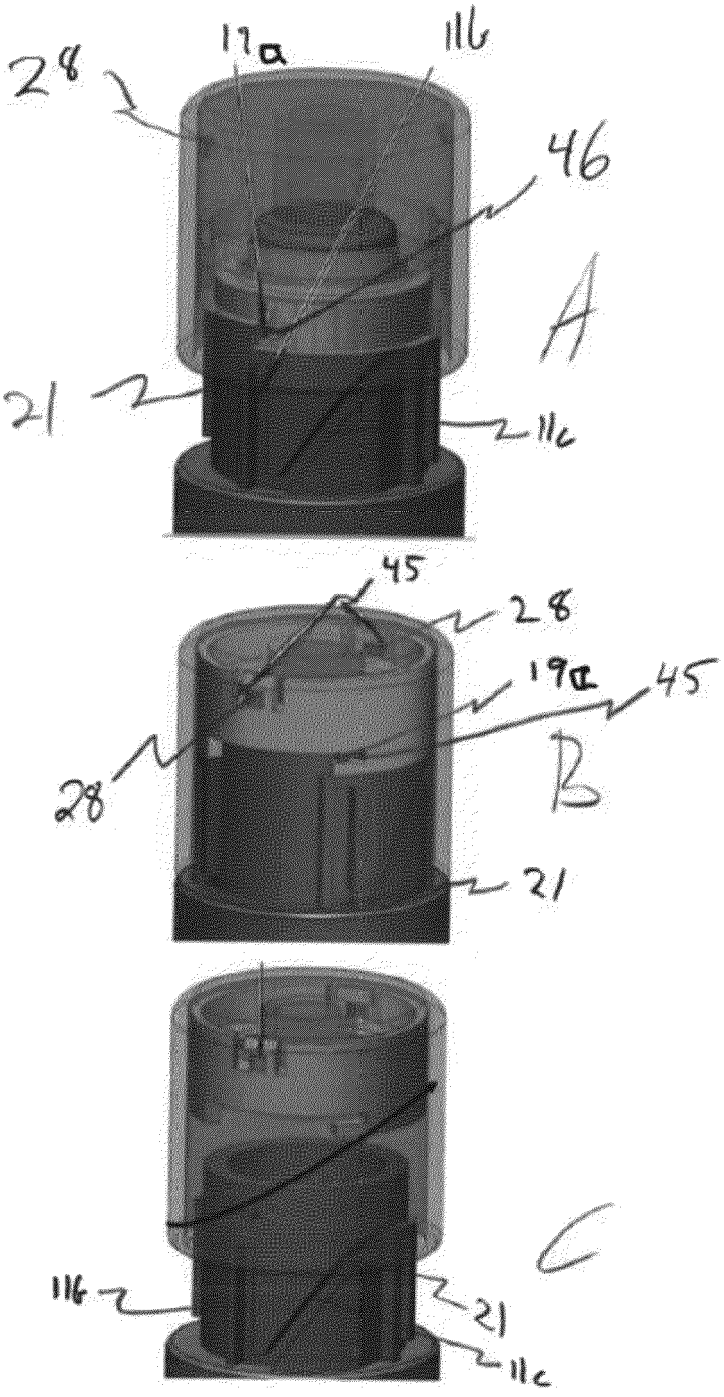


Fig 9

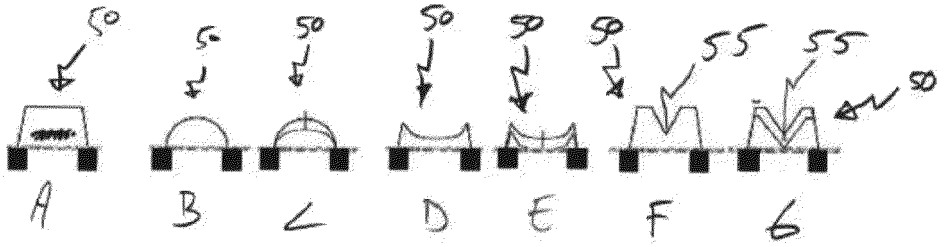


Fig 10

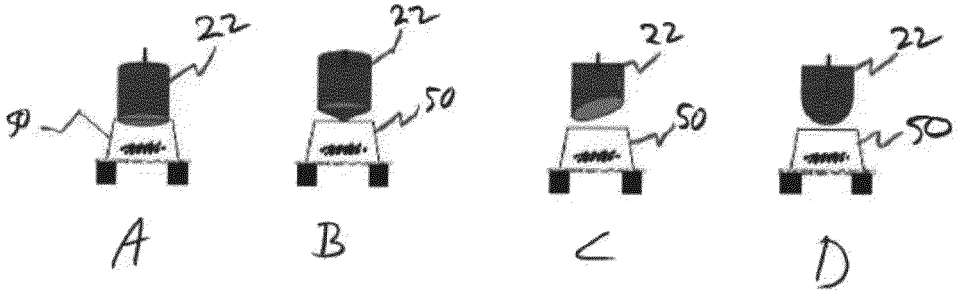


Fig 11

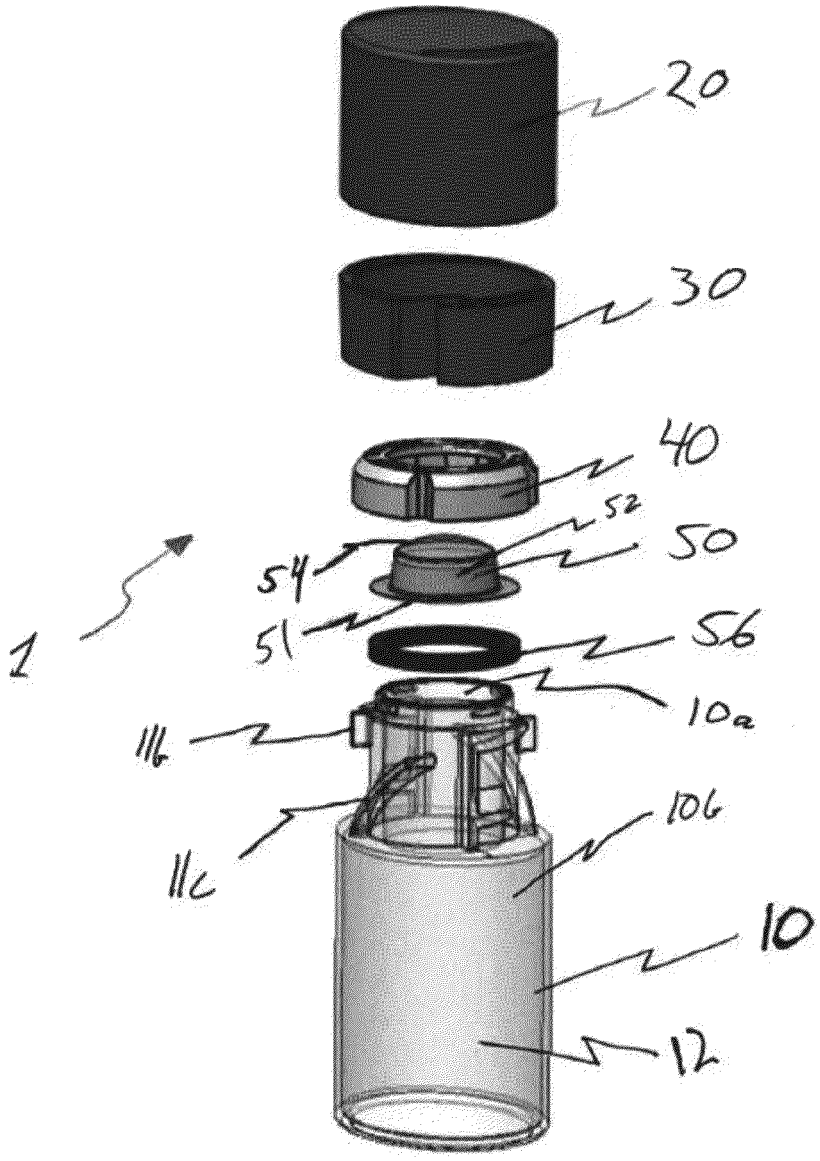


Fig. 12

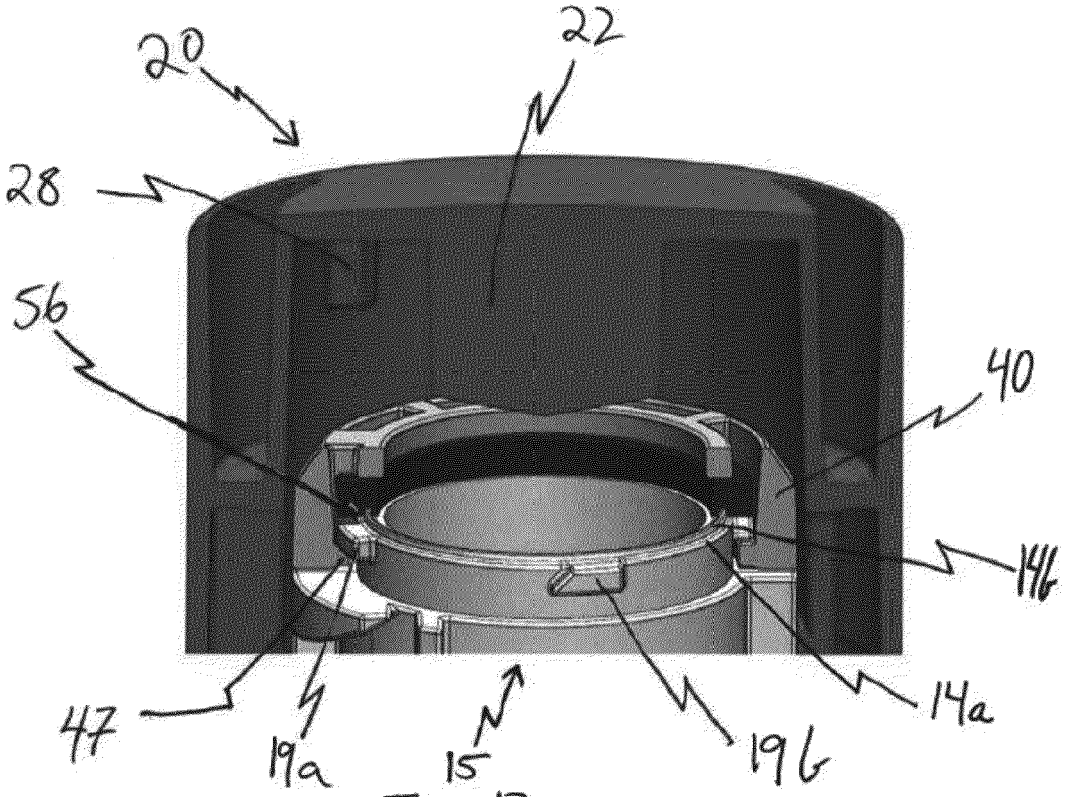


Fig. 13a

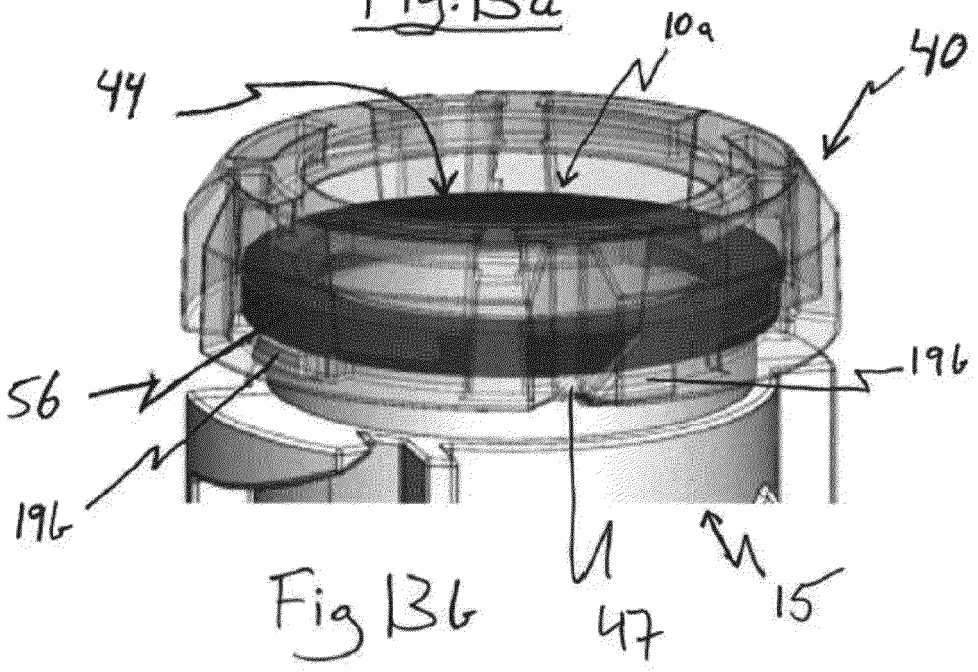


Fig 13b

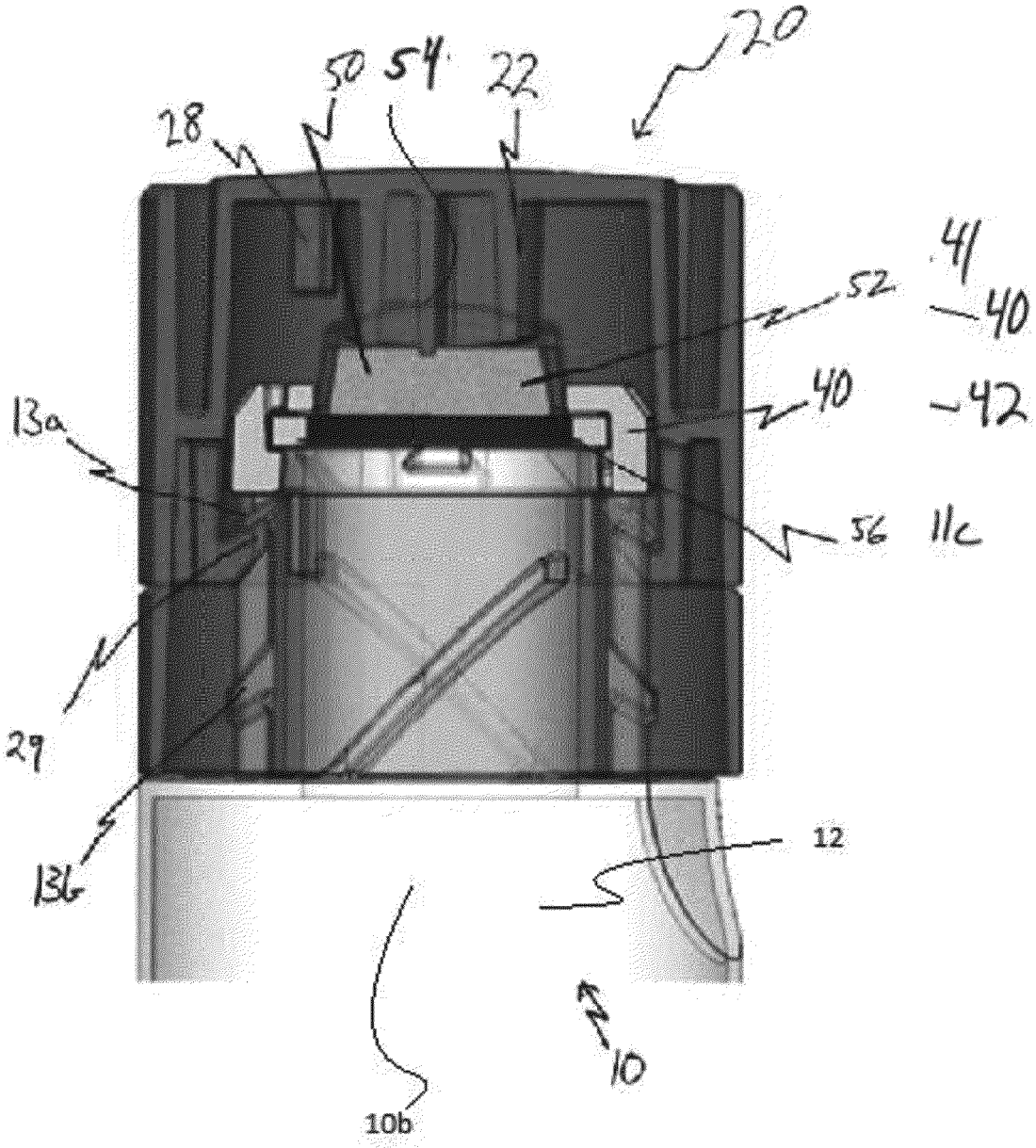


Fig. 14

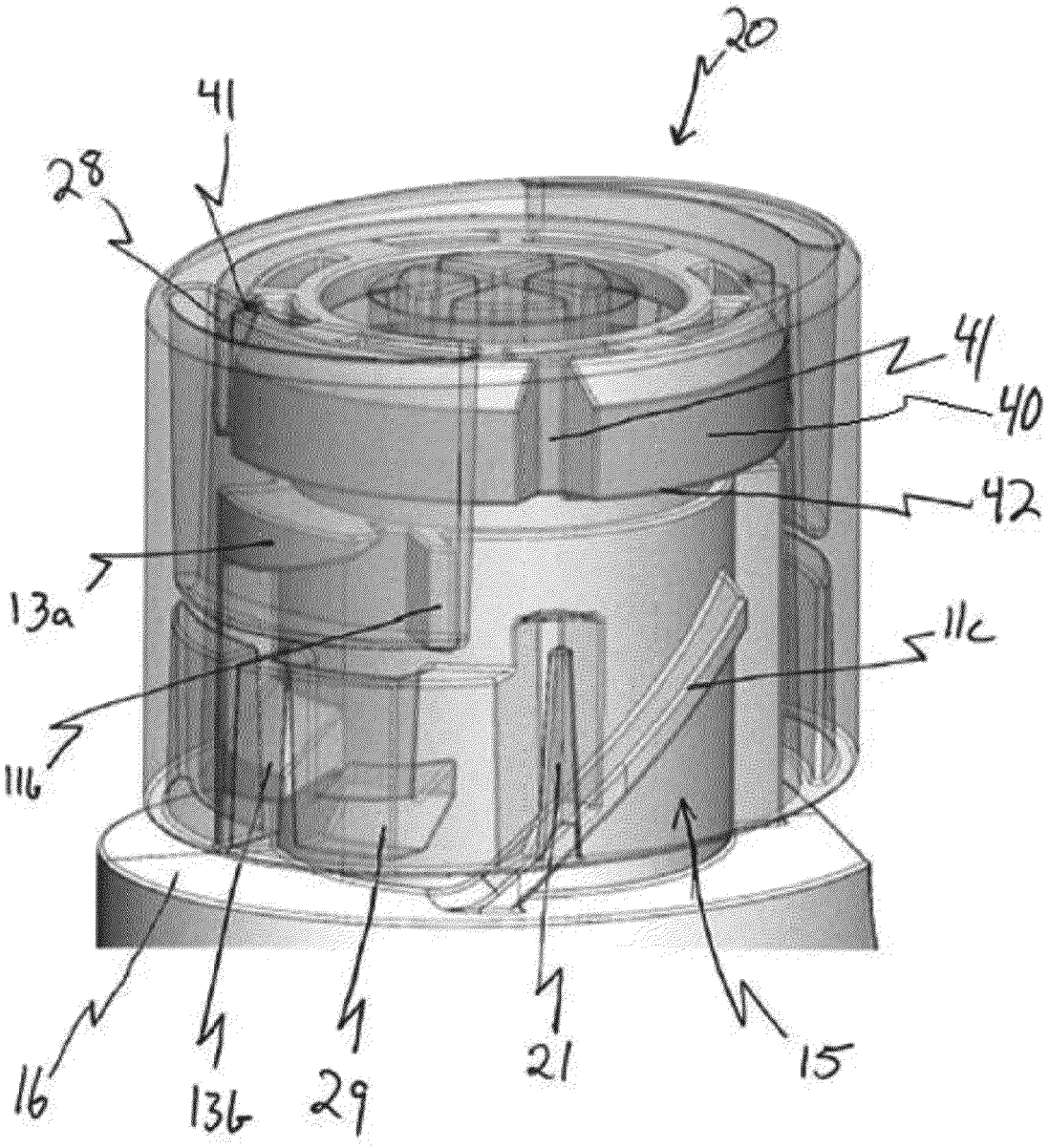


Fig. 15

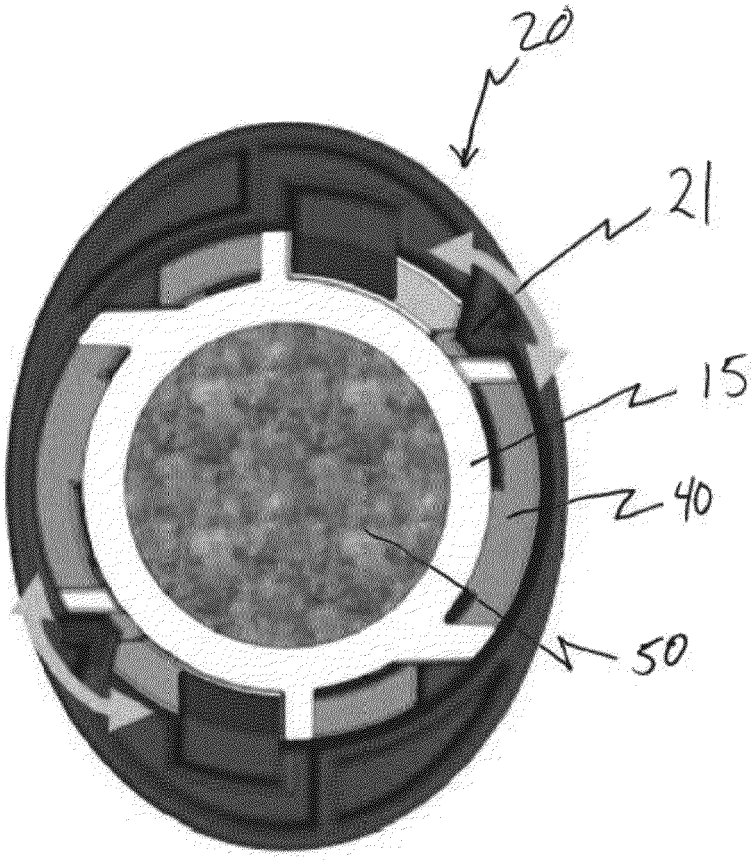


Fig. 16

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 20 15 2856

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 2012/140484 A1 (LAMEPLAST SPA [IT]; FONTANA ANTONIO [IT]) 18 October 2012 (2012-10-18) * figures 7, 8 *	1,2,4,14	INV. B65D51/28 A61J1/00
X	GB 2 466 187 A (SMITH ADAM DAVID [AE]) 16 June 2010 (2010-06-16) * figures 1, 4, 14 *	1,2,4,14	
X	WO 2018/030893 A1 (QWENSH B V [NL]) 15 February 2018 (2018-02-15) * figures 7, 8 *	1,2,4,14	
X	WO 2012/035417 A1 (BIOFARMA SPA [IT]; SCARPA GERMANO [IT]; COGOLO LUIGI [IT]) 22 March 2012 (2012-03-22) * figure 6 *	1,2,4,14	

TECHNICAL FIELDS SEARCHED (IPC)

B65D
A61J

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	26 June 2020	Balz, Oliver

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 20 15 2856

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

26-06-2020

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2012140484 A1	18-10-2012	EP 2697135 A1	19-02-2014
		ES 2574822 T3	22-06-2016
		US 2014027322 A1	30-01-2014
		WO 2012140484 A1	18-10-2012
GB 2466187 A	16-06-2010	NONE	
WO 2018030893 A1	15-02-2018	NL 2016799 A	23-11-2017
		WO 2018030893 A1	15-02-2018
WO 2012035417 A1	22-03-2012	AU 2011303593 A1	02-05-2013
		BR 112013006417 A2	26-07-2016
		CA 2811474 A1	22-03-2012
		CN 103221316 A	24-07-2013
		DK 2616354 T3	07-04-2015
		EP 2616354 A1	24-07-2013
		ES 2533599 T3	13-04-2015
		IT 1402348 B1	30-08-2013
		JP 5913319 B2	27-04-2016
		JP 2013542134 A	21-11-2013
		KR 20130140674 A	24-12-2013
		PL 2616354 T3	29-05-2015
		RU 2013116978 A	27-10-2014
		US 2013175188 A1	11-07-2013
		WO 2012035417 A1	22-03-2012

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- EP 3127832 A1 **[0010]**
- WO 2004060766A1 A **[0011]**
- WO 0024645 A1 **[0012]**
- WO 03051744 A **[0013]**

Non-patent literature cited in the description

- Chemical stability of Pharmaceuticals. **CONNORS et al.** A Handbook for Pharmacists. 151-160 **[0006]**