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(54) **A DISPENSER FOR FLUID PRODUCTS, A CONNECTION PIECE FOR ASSEMBLING SUCH A DISPENSER AND USE OF THE DISPENSER**

(57) The invention is concerned with a dispenser for fluid products. The dispenser comprises a neck portion (8) with at least two outlets (6, 7), a first container (2) for a first fluid, the first container (2) being connected to a first outlet (6) of the outlets (6, 7) via a first open passageway (4), a second container (3) for a second fluid, the second container (3) being connected to a second outlet (7) of the outlets (6, 7) via a second open passageway (5). Said first and second passageways (4, 5) separately end up to respective outlets (6, 7). The invention is also concerned with a connection piece (18) with at least two passageways (18a, 18b) for fluid for connecting the passageways (18a, 18b) to at least a first container (2) and at least a second container (3). The dispenser is used for dosing at least two different fluid products, whereby the first fluid product is to be dispensed from the first container (2) through a passageway from a first outlet (6) of the neck portion (8), and the second fluid product to be dispensed from the second container (3) through a passageway from a second outlet (7) of the neck portion (8).

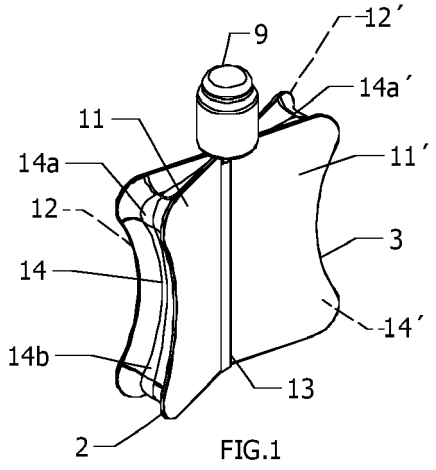

FIG.1

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Description

TECHNICAL FIELD

[0001] The invention is concerned with a dispenser for fluid products, a connection piece for assembling such a dispenser and uses of the dispenser.

BACKGROUND

[0002] Dry eye disease is a common condition that occurs when tears are not able to provide adequate lubrication and rinsing for the eyes. Tears can be inadequate and unstable for many reasons. The eyes might e.g. not produce enough tears or produce poor-quality tears. This tear instability leads to inflammation and damage of the eyes' surface.

[0003] Treatments for dry eyes may make help. These treatments can include lifestyle changes and eyedrops.

[0004] There are many kinds of eye drops for different problems and also other diseases than for dry eyes, such as glaucoma and allergies. The eye drops can e.g. be categorized based on their use, and e.g. whether they are intended for lubrication and moisturizing the eyes or for just rinsing or washing. Artificial tears are eyedrops used to lubricate dry eyes and also to maintain moisture on the outer surface of your eyes.

[0005] For most people, lubricating eye drops (also called artificial tears) are enough to soothe dry and irritated eyes.

[0006] Artificial eyedrops are further different categorized in eye drops with preservatives and preservative-free eyedrops. Eyedrops with preservatives often comes in multidose bottles and contains chemicals (preservatives) that discourage growth of bacteria once the bottle has been opened. The preservatives may irritate the eyes. Preservative-free eyedrops have fewer additives and are generally recommended if eyedrops are applied regularly. Preservative-free eyedrops may come in single-dose vials.

[0007] People usually use a type that they feel comfortable with. Some people use drops with a high water content since they are easy to use and an immediate good feeling in the eye is achieved since the eye feels moisture for a while. Other people use more greasy drops for the lubrication of the eyes, but no rinsing effect is achieved.

[0008] Thus, especially for the treatment of dry eyes, only one type of eye drops is used even if most often, more than one type, usually at least two different kinds, of eye drops should be used for the best treatment of the eyes.

[0009] Sometimes, when more than one type of function is needed, which especially is the case in the treatment of glaucoma, there are two different types of eyedrops mixed in one bottle. Then e.g. preservatives and other adjuvants are compromised to suit both types simultaneously, which is not an efficient solution.

[0010] If more than one type of eye drops has to be used, then, usually the more fluid one, i.e. those containing more water should be taken first from one bottle and then the more lubricating one from another bottle.

[0011] This is usually considered too complicated to be realized and thus, the use of eye drops is not as easy as one could think and there might be even more problems in the use of eye drops.

[0012] Most of the people who use eye drops are elderly people and rheumatica for which the dosing of the eye drops is difficult due to hand deformities.

[0013] Attempts have been made to solve the problem with dispensing two fluids with an all-inone dispenser.

[0014] WO publication 2016/110765 A2 discloses a container with two tanks for two different fluid products. The container comprises a selector element by rotation of which either one of the fluids can be selected for dispensing.

[0015] US patent application 2004/0035885 is presented as prior art for another solution for a fluid dispenser with two containers with respective passages for different fluid products. A discharge from only one container can be achieved by blocking one of the passages so that a closure in the passage is rotated.

[0016] None of these examples of prior art, however, avoids a repeated rotating of members for dispensing more than one fluid, which is troublesome for persons with hand problems.

[0017] The object of this invention is a more versatile, user-friendly, and technically simpler solution for dispensing fluids whether it is for medical or other use.

SUMMARY

[0018] The dispenser of the invention for fluid products comprises a neck portion with at least two outlets. It further comprises a first container for a first fluid, whereby the first container is connected to a first outlet of said outlets via a first open passageway. It also comprises a second container for a second fluid, whereby the second container is connected to a second outlet of said outlets via a second open passageway. Said first and second passageways end up separately to respective outlets.

[0019] The invention is also concerned with a connection piece with at least two separated passageways for connecting the passageways to at least a first container and a second container.

[0020] Furthermore, the invention is concerned with the uses of the dispenser of the invention for dosing different fluids, such as eye drops or foodstuffs, or other ingredients for e.g. drinks. The first fluid product is to be dispensed from the first container via a first passageway to a first outlet of the neck portion, and the second fluid product is to be dispensed from the second container via a second passageway to a second outlet of the neck portion. Said two different fluid products can consist of a first eye drop type and a second eye drop type, such as a moisturizing eye drop type and a lubricating eye drop

type, or said two different fluid products consist of a first foodstuff and a second foodstuff, such as a first sauce and a second sauce, or for a first drink ingredient and a second drink ingredient.

[0021] The passageways are open, with which is meant that there is a direct passage for fluid all the way from the container to the outlet of the neck portion or of the connection piece with no closure members in their way.

[0022] The preferable embodiments of the invention have the characteristics of the sub claims.

The neck portion

[0023] The neck portion with the outlets, such as a first outlet and a second outlet, separates the passageways from each other so that fluids from the respective containers can be dispensed to the outlets without being mixed with each other.

[0024] The separation can be performed in different ways. In one embodiment, the neck portion separate the passageways in being a compact piece with hollow channels therein which work as said passageways. In another embodiment, the neck portion can be hollow but comprises an intermediate partition wall dividing the interior of the neck portion into two compartments so that the fluids from the respective containers pass to the outlets through said different compartments, which compartments work as said passageways. In still one embodiment, the neck portion is hollow and there is a first channel from the first container, such as from a nozzle of the first container, to the first outlet and there is a second channel from the second container, such as from a nozzle of the second container, to the second outlet. Naturally, there can additionally be an intermediate wall even if there are especially constructed channels.

[0025] The neck portion not only separates the passageways from each other but also makes it possible to bring them closer to each other so that he different fluids from the separated passageways can be dispensed in a comfortable way.

[0026] The neck portion can have an additional function in even connecting the containers together.

[0027] The neck portion can be integral with the container or be a separate detachable piece and can then be considered to be a separate attachment.

[0028] When the neck portion is a separate detachable piece it can in one embodiment work as a connection piece for assembling a dispenser of the invention from two or more single containers or bottles or the like. In such an embodiment, the connection piece is connected to the nozzles of the containers to be combined into a dispenser of the invention.

[0029] The present invention can thus involve an integral or a separate eye drop dispenser attachment in the form of a neck portion having at least two outlets in its two legs that are dosing tips or cannula tips that can provide a consistent dose of medication. The attachment, i.e. the neck portion, consists of a base portion, and at least two tip portions. When the neck portion is a separate piece it can e.g. be threaded or it can be shaped to be pressed to containers or bottles in general thus enabling attaching and detaching.

The base portion of the attachment can thus contain threads on its outside for removable attachment as a threaded piece to a bottle or bottles or to a container or containers. The attachment can e.g. be configured to be pressed onto the bottle(s) or container(s) for example by a crimp connection.

[0030] The attachment can be incorporated or generally connected into a container of the dispenser or it can be screwed onto an existing container pair or assembly. The tips preferably have dimensions consistent with current ophthalmic cannula technology in the range of 20-40 gauge depending on the size of drops desired.

[0031] As mentioned above, the neck portion can optionally be constructed integral with the container as a part of it. Such an embodiment can advantageously be used in a one-time dispenser, wherein the neck portion can be broken for dosing of the fluid products therein. Such an embodiment is usually used when a fluid without additives, such as preservative-free eye drop solution, is needed to be used. Naturally, the dispenser is very small in such embodiments, the one-time dose being in the order of 2 - 4 drops so the size of the dispenser is thereafter.

[0032] So, the size of the dispenser of the invention can easily be scaled according to use. Where the size of the dispenser is in the order of 0.5. ml for a one-time eye-drop dispenser wherein the outlet is in the form of a dosing tip or pipette, it is in the order of 5 - 10 ml for an ordinary eye-drop dispenser. In foodstuff use, the size of the dispenser can for example be in the order of 500 - 1000 ml and even more for e.g. agricultural use.

[0033] The neck portion has two "legs" functioning as outlets and it connects the two containers without mixing the different fluid products in the respective passageways together having a barrier therebetween so the user can freely select which one of the two fluid products in the dispenser to dose in each situation.

The outlets are dosing tips and they are so close to each other that a drop of any of the fluid products is directed to the target place from each tip. On the other hand, they are so far from each other, that the fluid products will not be mixed, and one tip does not contaminate the other one at dosing.

[0034] The neck portion is preferably divided into two compartments or spaces by an intermediate wall, whereby the first channel extends in a first compartment or space and the second channel extends in a second compartment or space. As an alternative it can enclose two channels leading from the containers all the way to the outlets, whereby an intermediate wall optionally can be omitted. The neck portion can preferably be a so called dual-channel solution when enclosing two channels. There can in some embodiments be more channels, out-

lets, and containers.

The cap

[0035] The dispenser of the invention further usually comprises a cap enclosing the attachment, i.e. the neck portion. The attachment can thus be covered by the cap, which is a protective covering for surrounding the tip(s) to e.g. prevent contamination or injury to a user. The cap is removably attached to the attachment/neck portion by pressing or possibly as a screw cap.

Side-by-side solution

[0036] Said first container and said second container can be coupled side by side besides each other in different ways.

[0037] In the embodiments, wherein the containers are besides each other, they can already be connected by the neck portion but they can alternatively or additionally be coupled to each other by a dovetail joint or other form-shaped seal, such as a wedge joint, which further ensures that the containers are kept together.

[0038] Many form-shape joints enable connecting two pieces together without the use of glue joint or mechanical fasteners. The dovetail is a type of joint where adjoining pieces are fastened by interlocking fan-shaped cutouts. A specific type of dovetail joint, called the half-blind dovetail, involves a series of wedge-shaped sections that interlock, so they are very difficult to work apart once they are in place. Other examples that can be used for connecting the containers are the half-Lap Joint, tongue and groove joint, dado joint, Mortise and Tenon Joint, Rabbet Joint, Sliding Dovetail Joint, Box Joint, Bridle Joint, finger joint, wherein the pieces are connected by sliding or pressing.

[0039] It is pointed out that it is of manufacturing reasons advantageous that the individual containers are identical making the dispenser symmetric in its whole, which enables the manufacturing of both containers in a single production line.

Side-bv-side solution: Connection piece

[0040] Said first container and said second container can also be coupled by a connection piece extending over the channels or passageways of the containers on top of them.

[0041] Such a connection piece is in one embodiment divided into two compartments or spaces by an intermediate partition wall, whereby the first channel or passageway extends in a first compartment or space and the second channel or passageway extends in a second compartment or space.

[0042] The connection piece can be performed in different ways. In one embodiment, it is a compact piece with hollow channels therein which work as said passageways. In another embodiment, the connection piece can be hollow but comprises an intermediate partition wall dividing the interior into two compartments or spaces as mentioned above so that the fluids from the respective containers pass to outlets therein or to the optional neck portion through said different compartments or spaces. In still one embodiment, the connection piece is hollow and there is a first channel to be connected to a first container, such as to a nozzle of the first container and there is a second channel to be connected to a second container, such as to a nozzle of the second container. Naturally, there can be an intermediate wall even if there are especially constructed channels.

[0043] The connection piece makes it possible to bring fluid passageways from two or more different containers closer to each other so that he different fluids from the separate passageways can be dispensed in a comfortable way.

[0044] The connection piece has an additional function in also connecting the containers together.

[0045] The connection piece can in ne embodiment be connected between the neck portion and the containers. Alternatively, it includes the function of the neck portion and comprises the outlets which normally are comprised by the neck portion. In such a case, a separate neck portion is not needed.

[0046] Such a connection piece is especially useful as an adapter for combining two single containers and the connection piece can be further connected to the neck portion or the neck portion can be omitted. In this way, a dispenser of the invention can be assembled.

[0047] The connection piece can be fastened on the containers by thread or by a form-shaped means by pressing.

Side-bv-side solution: Bellows construction

[0048] In one embodiment, when the containers are besides each other, each container has two, preferably rigid, vertically standing sides, which are vertically interconnected by a movable joint, and with a flexible third side therebetween. The flexible side extends between the vertical sides horizontally at the bottom of a container continuing vertically and further horizontally again on top of the container. This is called a "bellows" solution, wherein a pair of bellows is formed by the containers, since the rigid vertical sides of each container can be pressed against each other for dosing to bring the fluid in the container upwards to the channel working as a passageway to the outlet. A bellow or a pair of bellows is an object or device with concertinaed sides to allow it to expand and contract.

[0049] One advantage with the bellows solution used in the invention is that the dispensers of the invention can be compressed so that they are completely empty. No shaking, knocking or stamping is needed, and the dispenser of the invention having a bellows construction does not need to be left upside down in order to be emptied from all content. Said flexible side is softer than the

sides to be pressed together, which preferably are rigid but can be flexible in some extent, the flexible side thereby being compressed between the more rigid sides, which are "wing" like in the "butterfly" solution (described below).

[0050] Thus, the "bellows" solution in the dispenser of the invention has several advantages over those used in prior art. The dispenser is easier to press and squeeze together, the form of which enabling more leverage and momentum than a round bottle. This advantage is even increased by the narrowed or inwardly curved middle section in the edges of the vertically connected rigid sides of the containers making the dispenser to look butterfly-like.

The bellows solution also has the advantage that a non-return valve can be used in the passageway at the outlet, thus hindering air or any reflux to enter the container after the dosing. Such air is not needed in the container since the container does not need to return to its original form. The return-valve improves shelf life. In a conventional bottle, air is always sucked into the bottle after squeezing. It is pointed out that since the intention of having two containers is that they contain different kinds of fluids, the fluids normally are not pressed out simultaneously and therefore only one of the containers are squeezed together. If it of some reason is desired to dispense both fluids simultaneously, then, consequently, both of the containers can be squeezed at the same time. The way of use is thus dependent on the aim of use.

The non-return valve can be in one or both passageways to prevent air from entering the container after dosing but preferably in both.

[0051] The "bellows solution, further, can be realized in different ways, such as in the form of a "butterfly", in the form of a "wedge", and as a one bellow solution.

Side-bv-side solution: Bellows construction: "Butterfly shaped"

[0052] In the so called "butterfly shaped" solution, the movable joint of each container extends as a hinge vertically along both respective vertically interconnected rigid vertical sides of the container between said first container and said second container. As the peripheral edges of the vertically interconnected rigid vertical sides preferably have an inwardly curved central portion, the two rigid sides are easy and practical to press against each other, e,g by pressing between the base of the thumb and the side of the fingers. The movable joint gives more compressive force compared to a bottle without such a bellows solution. This advantage is even increased by the narrowed or inwardly curved middle section in the edges of the vertically connected rigid sides of the containers making the dispenser to look butterfly-like.

Side-bv-side solution: Bellows construction: "Wedge shaped"

[0053] In another bellows solution, the so called "wedge shaped" solution, the movable joint of each container extends horizontally on the top end of each respective container on both sides of the neck portion. Also, in this solution, the peripheral edges of the vertically connected rigid vertical sides can have an inwardly curved central portion.

[0054] A further advantage with the wedge formed embodiments having the movable joint on top of the containers that extends horizontally on both sides of the neck portion is that they are practical to transport thus enabling an efficient logistic. They can be packed alternately every other container pair up and down just minimizing wasted space compared to other forms of dispensers.

[0055] The bellows solution embodiments of the dispenser of the invention can have a fitted piece, such as a clamp or a clips, for holding the container in their original stage with the vertically interconnected rigid vertical sides, or the "wings", apart when not in use. The fitted piece is placed between the peripheral edges of the rigid sides of the container to keep them apart. For use, the fitted piece is removed, e.g. by snapping or clicking, and the rigid sides, or the "wings", can be pressed against each other for dosing drops.

One-bellow solution

[0056] A one-bellow dispenser that comprises a container and a nozzle with an outlet for fluid is mentioned to be especially suitable as a dispenser that can be used for assembling a dispenser of the invention when using two or more of them.

[0057] Such a one-bellow container consists of two vertical sides interconnected by a movable joint and with flexible sides between the vertical sides, whereby the vertical sides can be pressed against each other for pressing out fluid to the outlet. The vertical side is preferable more rigid than the flexible side. The peripheral edges of the vertical sides preferably can have an inwardly curved central portion.

[0058] The movable joint of the container extends horizontally along both respective upmost vertical sides of the container, and if the nozzle is on the top of the dispenser, on both sides of the nozzle.

[0059] The outlet, such as a nozzle, is suitably on top of the dispenser so that the connection piece of the invention can be placed to cover both outlets when combining the one-bellow containers for assembling a dispenser of the invention.

[0060] This one-bellow dispenser further usually comprises a cap, which is placed on top of the connection piece.

[0061] Still further, it might comprise a fitted piece, such as a clamp or a clips, for holding the container in the original stage with the vertical sides apart when not in

use. The fitted piece is then placed between the peripheral edges of the vertical sides of the container to keep them apart.

[0062] There can be a non-return valve below the outlet to prevent air or any reflux from entering the container after dosing.

On top of each other solution: "Double-decker" solutions

[0063] In addition to solutions, wherein the containers are besides each other, said first container and said second container can be placed on top of each other, like in a "double-decker". "Double-decker" as a term is in dictionaries defined as something with the decks, layers, beds, tiers, beds or the like, as one above the other.

[0064] In such solutions, the uppermost container, has a space for the channel of the lowermost container, which can be considered to be the second container (or they can be considered vice versa).

[0065] The spaces or the channels of the containers can in such embodiments be arranged in different ways.

[0066] The space can e.g. be a groove on the outer side on the periphery of the uppermost container, and the lowermost container can have a upwards protruding channel, whereby the containers can be coupled by pressing the channel of the lowermost container into the groove of the uppermost container.

[0067] The groove solution alone might keep the containers together but there can additionally be a form-shaped connection fitted between the bottom of the uppermost container and the top of the lowermost container.

[0068] The space for the channel of the lowermost container can alternatively be inside the uppermost container.

[0069] In some embodiments, the lowermost container has an upper portion ending up to the channel, the diameter of which portion is larger than that of the channel, and is a so called narrowed section, since its diameter is smaller than that of the rest of the lowermost container. This sometimes facilitates the moving of the fluid in the lower container upwards. This narrowed section of the undermost conatiner also enables a more fit connection of the uppermost container to the undermost container. A further alternative is that the uppermost container has the form of a "ring", and the space is in the middle of the uppermost container but outside its walls.

The containers can in all embodiments of the invention have an inwardly convex upper internal surface to prevent rest fluid in the container. When the container has an inwardly convex upper internal surface, it prevents rests of fluid to stick in the container since the fluid flows out more easily, which is a great advantage since medical fluids are often very expensive. This is an especially important advantage in one-time dispensers described above.

[0070] The dispenser of the invention is used for dosing at least two different fluid products, whereby the first fluid product is to be dispensed from the first container through a channel therein and from a first outlet of the neck portion, and the second fluid product is to be dispensed from the second container through a channel therein and from a second outlet of the neck portion. Naturally, the different fluid products can be similar as well and in this context the term different also covers the case that the fluids are similar.

[0071] The dispenser of the invention is for dispensing fluids or liquids, in the first hand developed for dosing eye drops, whereby said two different fluid products consist of a first eye drop type and a second eye drop type. In practice, the user can e.g. first dose one or more eye-drops of the first type of eye drop product being the one with the higher water content and then one or more eye-drops of the second type of eye drop product being the greasier one for the lubrication of the surface of the eye.

[0072] Naturally, the dispenser of the invention can be configured to be used anywhere, wherein two different kinds of fluid products is desired to be dispensed or even for dispensing more than two different fluid products. Then there are as many outlets in the neck portion as there are containers and fluid products in the dispenser.

[0073] The dispenser can e.g. be used in connection with foodstuffs for dispensing a first foodstuff and a second foodstuff, for example for dispensing two different sauces, such as mayonnaise vs ketchup or for dosing vegetable oil and vinegar or balsamic into a salad. A further example is a use for the preparation of a drink from different ingredients.

[0074] The containers can be marked by using e.g. a pitch or a pen, so that it can be seen which of the containers contain the first fluid product and which one contains the second fluid product, e.g. with the numbers "1" and "2", or the letter "A" and "B" or by the whole respective names. In that way, the right fluid product can be chosen for dosing in each situation.

[0075] Depending on use or design, it might be suitable to call the containers bottles, compartments, spaces, or chambers.

Advantages

[0076] The solution of the invention enables two different fluids to be dispensed under one cap only so that repeated rotations are avoided when only one cap needs to be opened. The neck portion and/or the connection piece bring(s) the passageways for fluid close to each other so that both fluids can be dispensed easily and rapidly to the same target area.

[0077] Since the passageways are open with a direct passage for fluid all the way from the container to the outlet of the neck portion or of the connection piece, any tricky closure members, which are difficult to use are not needed.

[0078] The dispenser of the invention is technically simpler than those of prior art having no moving parts. The fact that the invention has no moving parts both helps

its use, but additionally lowers the costs, time consumption and sensitivity for errors and production failures in the mass production phase. Also, the hygiene level of the dispenser stays high as there is no need to touch the dispenser in other areas but the cap while removing and attaching it, and the designated squeezing sites to dispense the fluid. There is no switch nor a selector that needs to be turned to choose between the containers or to allow a particular fluid to be dispensed.

[0079] Its manufacturing is simple because the containers can be equal and thus, they can be manufactured in a single process line. The symmetrical embodiments of the invention provide the opportunity to have only one production line from which both sides/halves of the dispenser are manufactured. This further allows for economical and efficient production of the dispensers.

[0080] Elderly people with memory and/or physical disorders is mentioned as a special group that has advantages from the invention. If the dispenser is for dispensing two different kinds of eyedrops, the other type will not be forgotten very easily when both eyedrops are within the same dispenser, and consequently, they are always stored and found on the same place.

[0081] Especially, the invention helps to promote a new, better way of easing the symptoms of dry eyedness with two different consecutively administered eye drops. Without this solution, it would be much more difficult to educate and have the patients to use two different drops instead of just one, which has been the conventional way for the treatment of dry eyes.

[0082] The dispenser of the invention is very user-friendly for e.g. rheumatic hands, since only one cap has to be opened. A rotating movement is especially troublesome for people with such physical hand problems. The need of only one cap also decreases plastic waste.

[0083] Especially, the bellows shaped embodiments of the invention allow an easy and effortless grabbing and dispensing of the fluid even for weak hands and those with deformities caused by rheumatica, arthrosis or the like. With the bellows shaped embodiments of the dispenser there is no need for squeeze help devices, such as the *Autosqueeze* or the *Opticare*.

[0084] All these advantages in connection in medical use increases the compliance. Compliance in medicine and in the use of even the simplest drugs is acknowledged to be a big problem. The problem gets even bigger by each additional separate drug prescribed to a patient. This invention eases the use of multiple eye drops in many ways and tackles some of the reasons of incompliance. It is easier for a patient to buy, remember to use both, carry along and use the two or more separate drugs/eye drops if they are sold, packed and used together in the way this invention makes possible. Having no moving parts besides the one cap, it facilitates its use for not-so-dexter individuals or elderly people who mostly form the user base of this kind of drugs.

[0085] The invention also provides economic advantages for users, since, the bellows shaped embodiments give an easy way to make sure that all of the often pricy eye drops have been used as no spare space is left between the sides of the emptied bellows dispensers. Having tens of millions of eye drop bottles consumed all over the world per year, this and the effective logistics of the bellows shaped dispensers even partly help to reduce waste and the consumption of resources. A regular round bottle packed in a cubicle shaped box leaves more than 20% of its package volume unused whereas bellows packed on every other the other way around next to each other leave very little wasted space within storage and shipping containers.

[0086] The bellows shaped dispenser of the invention together with the non-return valve provide an option for prolonging the shelf life of fluids stored and used within them. Returning air and/or other substances is the main factor causing eye drops and foodstuff going bad in the container. The bellows container, contrary to a bottle, does not need to get back to the original shape after dispensing and therefore allows a way of reducing the use of preservatives and other more expensive means of for example filtering the reflux.

[0087] In foodstuff use, the quick and easy dispensing is a special advantage and the end result is aesthetic since the fluids are not mixed with each other. Dispensing foodstuff becomes easier, more fun and more hygienic as well with the use of this invention. There is no need to shake a ketchup bottle or use a lot of force to squeeze out the last bits of the sauce when one simply squeezes together the sides of the bellows. On a professional level, it is possible to quickly make nice bi- or multicolored decorations on a cake, salad or a hamburger with the multi-fluid dispenser. For foodstuff manufacturers, the invention provides a great way of designing and selling new combinations of sauces, drinks and the like.

[0088] In the following, the invention is described by means of some advantageous embodiments by referring to figures. The invention is not restricted to the details of the figures.

FIGURES

[0089]

Figures 1 - 4 illustrate a first embodiment of the dispenser of the invention ("Butterfly shaped")

Figure 1 is a perspective view of the first embodiment of the dispenser of the invention

Figure 2 is a cross-section of the first embodiment of the dispenser of the invention

Figure 3 is a perspective view of the first embodiment of the dispenser of the invention with its components apart

Figure 4 is a detailed cross-section view of a part of figure 2

Figure 5 shows a first type of connection between embodiments of the dispenser of the invention

wherein the containers are besides each other

Figures 6 — 7 illustrate a second embodiment of the dispenser of the invention (Wedge shaped")
Figure 6 is a cross-section of the second embodiment of the dispenser of the invention
Figure 7 shows in a perspective view, the second embodiment of the dispenser of the invention with the components apart for illustrative purposes.

Figures 8 — 10 illustrate a third embodiment of the dispenser of the invention
Figure 8 is a perspective view of the third embodiment of the dispenser of the invention
Figure 9 is a cross-section of the third embodiment of the dispenser of the invention
Figure 9b is a cross-section of an embodiment of a connection piece of the invention

Figure 10 shows in a perspective view, the third embodiment of the dispenser of the invention with the components apart for illustrative purposes

Figures 11 - 13 illustrate a fourth embodiment of the dispenser of the invention.
Figure 13 is a cross-section of a fourth embodiment of the dispenser of the invention
Figure 12 shows in a perspective view, the second embodiment of the dispenser of the invention with the components apart for illustrative purposes
Figure 11 shows a type of connection that can be used between the containers of the fourth embodiment of the dispenser of the invention

Figures 15 - 17 illustrate a fifth embodiment of the dispenser of the invention.
Figure 17 is a perspective view of a fifth embodiment of the dispenser of the invention
Figure 16 is a cross-section of the fifth embodiment of the dispenser of the invention
Figure 15 shows in a perspective view, the fifth embodiment of the dispenser of the invention with the components apart for illustrative purposes

Figures 18 - 20 illustrate a sixth embodiment of the dispenser of the invention.
Figure 18 is an outside side view of a sixth embodiment of the dispenser of the invention
Figure 19 is a cross-section of the sixth embodiment of the dispenser of the invention
Figure 20 shows the sixth embodiment of the dispenser of the invention with the components apart for illustrative purposes.

Figure 21 illustrate a suitable one-container dispenser to be used for assembling a dispenser of the of the invention.

DETAILED DESCRIPTION

[0090] Figure 1 is a perspective view of a first embodiment of the dispenser 1 of the invention and figure 2 is a cross-section of the same embodiment.

[0091] The dispenser 1 of the invention for fluid products comprises a first container 2 for a first fluid, the first container 2 being connected via a first passageway 4 ending up to a first outlet 6, a second container 3 for a second fluid, the second container 3 being connected via a second passageway 5 ending up to a second outlet 7.

[0092] It also comprises at least one neck portion 8, within which said first and second passageways 4, 5 separately end up to respective outlets 6 and 7. The outlets 6 and 7 are in the two "legs" of the neck portion 8 and they work as dosing tips or cannula tips that can provide a consistent dose of e.g. medication. The neck portion 8 in figure 1 is an attachment that thus includes a base portion, wherein the passageways 4 and 5 proceed first, and the passageways 4 and 5 further extending to the respective outlets 6 and 7. The base portion of the neck portion 8 can contain threads for removable attachment to a bottle or a container 2, 3. There is furthermore, optionally, a gasket 31 with holes for the passageways, such as channels, between (see figure 4) the neck portion 8 and the containers 2, 3.

[0093] In the embodiment of figures 1 - 4, the neck portion 8 is hollow and comprises an intermediate partition wall 10 dividing the interior of the neck portion 8 into two compartments so that the fluids from the respective containers 2 and 3 pass to the outlets 6 and 7 through said different compartments, which compartments work as said passageways 4 and 5. Other embodiments for realizing the passageways 4 and 5 are described in the summary section.

[0094] The dispenser 1 can also include a protective covering, such as a cap 9 for surrounding the outlets, which can be tips for dispensing eye drops. The cap 9 is removably attached around the neck portion 8.

[0095] When the neck portion 8 is a separate piece as in figures 1 - 4, it can e.g. be threaded thus enabling attaching and detaching to the containers 2 and 3 or to containers or bottles in general.

The neck portion 8, which in figures 1 - 4 have two outlets 6 and 7, otherwise has the form of "trousers" or "pants" with two legs representing the outlets but in the contrary to trousers or pants, it connects the two containers 2 and 3 without mixing the different fluid products together. The separation is e.g. performed by means of a barrier, such as an intermediate wall 10, separating compartments in the neck portion 8 or the separation can be performed by separate channels extending all the way as separate passageways 4 and 5 to the outlets 6, 7.

The neck portion 8 is preferably divided into two compartments by an intermediate wall 10 (see figure 4), whereby the first passageway 4 extends in a first compartment and the second passageway 5 extends in a second compartment.

[0096] In figures 1 and 2, said first container 2 and said second container 3 are coupled side by side besides each other.

[0097] In this embodiment, wherein the containers 2 and 3 are besides each other, they are already connected by the neck portion 8 that contains the passageways 4 and 5 from each container 2 and 3 but they can additionally and optionally be coupled to each other by a dovetail joint or other form-shaped seal, which further ensures that the containers 2, 3 are kept together.

[0098] Figure 5 shows an example of such a form-shaped seal 32 as a first type of connection between adjacent containers 2, 3 of a dispenser of the invention. It can be used in embodiments wherein the containers 2, 3 are besides each other.

[0099] When the containers 2 and 3 are besides each other in the way of figures 1 and 2, each container 2 and 3 has two rigid sides 11 and 12, and 11' and 12', respectively, vertically interconnected by a movable joint 13 and with flexible sides 14 and 14' there between. Even if there is only one reference number 13 for the movable joints, each container 2, 3 has an own movable joint, such as a hinge, between its rigid sides 11 and 12, and 11' and 12'. The containers are connected to each other at their movable joints 13. The invention also covers such embodiments, wherein the movable joint is constructed to be common for the containers 2, 3. The flexible sides 14 and 14' extend along the peripheries of the rigid sides, first having a horizontal portion 14a, 14a' on top of the vertical sides, then having a vertically extending portion 14b, 14b' and then having a second horizontal section at the bottom of a container (can not be seen in the figures). There is a dashed line from reference numbers 12, 12', 14', 14a', 14b' in figures 1 - 3 to show that these can not directly be seen in figure 1 being behind. Said flexible side 14, 14' is softer than the rigid sides 11, 12 and 11', 12' to be pressed together as in a bellows solution against each other, thereby being compressed between the rigid sides, which are "wing" like in the "butterfly" solution of figures 1 - 3.

[0100] This combination of movable sides is called a "bellows" solution, since the rigid sides 11, 12 and 11', 12' can be pressed against each other for dosing to bring the fluid in the container upwards to the channel working as a passageway to the outlet.

[0101] In the so called "butterfly" solution of figures 1 - 3, the movable joint 13 extends vertically as a hinge vertically along both respective rigid sides of each container between said first container 2 and said second container 3. As the peripheral edges of the rigid sides 11, 12 and 11', 12' preferably have an inwardly curved central portion 15, the two rigid sides of each container 2, 3 are easy and practical to press against each other.

[0102] Figure 3 is a perspective view of the first embodiment of the dispenser of the invention with its components apart shown of illustrative reasons. Figure 4 is a detailed view of a part of figure 2.

[0103] Figure 6 is a cross-section of a second embodiment of the dispenser of the invention and figure 7 shows in a perspective view, the second embodiment of the dispenser of the invention with the components apart for illustrative purposes.

[0104] Figures 6 and 7 illustrate another "bellows" solution, the so called "wedge" solution. In this embodiment, the movable joint 13' of each container 2, 3 extends horizontally on the top end of each respective container 2, 3 on both sides of the neck portion 8. In this embodiment, there are flexible sides 14, 14' between the peripheries of both rigid sides at the sides of the containers 2, 3 and at the bottom of the containers. Thus, there are two flexible sides 14", 14" at the vertical outsides of the containers 2, 3 and then there are flexible horizontal sides at the bottom of the containers 2, 3. The vertical sides 11, 12 and 11', 12' respectively, are pressed together for pressing out fluid.

[0105] Also, in this solution, the peripheral edges of the rigid sides (and the bottom flexible sides) can have an inwardly curved central portion 15' at the bottom of the containers 2, 3.

[0106] The rigid sides can be pressed against each other like those in figures 1 - 3 to press out fluid. The neck portion 8 and the cap 9 can be as in figures 1 - 3.

[0107] Figure 7 shows that, the bellows solution can in some embodiments of the dispenser of the invention have a fitted piece 16, such as a clamp or a clips, for holding the containers 2 in their original stage with the rigid sides 11, 11', or the "wings", apart when not in use or before use for transport. The fitted piece 16 is placed between the peripheral edges of the rigid sides 11, 11' of the container to keep them apart. For use, the fitted piece 16 is removed, e.g. by snapping or clicking, and the rigid vertical sides 11, 11', or the "wings", can be pressed against each other for dosing drops.

[0108] Figure 8 is a perspective view of a third embodiment of the dispenser of the invention and figure 10 is an outer view of the same third embodiment. Figure 9 shows in a perspective view, the third embodiment of the dispenser of the invention with the components apart for illustrative purposes. Figure 9b illustrates the connection piece 18 of the invention.

[0109] The containers 2, 3 and the bellows solution itself is like that of figure 7 as well as the neck portion 8 with threads 17.

[0110] Here and also generally said first container 2 and said second container 3 can be coupled by a connection piece 18 extending over the containers 2, 3 on top of them over the outlets or their nozzles, or extending over the mouths of two separate bottles or the like between the neck portion 8 and the containers 2, 3. In figure 9, the connection piece 18 is divided into two compartments by an intermediate wall 10, whereby the first passageway 4 extends in a first compartment 18a and the second passageway 5 extends in a second compartment 18b.

[0111] Such a connection piece 18 is especially useful as an adapter for combining two single containers and

is in this embodiment a "bellows connector". The connection piece 18 is preferably further connected to the neck portion 8 of the invention. In this way, a dispenser of the invention can be assembled.

[0112] There, however, does not, necessary, have to be any separate neck portion, since the connection piece 18 can be designed as is illustrated in figure 9b. In the embodiment of figure 9b, the connection piece 18 itself includes outlets 6 and 7 in addition to the passageways 4 and 5 and the intermediate wall 10.

[0113] The first, second, and third embodiments of the dispenser of the invention are so called double-bellow solutions, such as double-bellows bottles, or double-bellows containers.

[0114] Figure 13 is a cross-section of a fourth embodiment of the dispenser of the invention. In figure 13 it can be seen how two bottles or containers 2, 3 without the bellows function are coupled together so that their respective mouths works as channels 4, 5, and they end up as passageways to tip portions being outlets 6, 7 for fluid in a neck portion 8 of the invention. There is an intermediate wall 10 in the neck portion 8. Figure 13 also shows the cap 9. In the embodiment of figure 13, the containers 2, 3 are coupled together by a claw connection 34. Each container 2 and 3 has a claw connection half consisting of a protrusion part and a notch. Both halves of the coupling are exactly the same - no distinction between a coupler and an adapter so the containers have the same parts. They have two lugs (claws) each, which engage in the corresponding notches in the other container.

[0115] Figure 12 shows in a perspective view, the fourth embodiment of the dispenser of the invention with the components apart for illustrative purposes.

[0116] Figure 11 shows, seen from above, a cross-section of the claw connection used between the containers in the fourth embodiment of the dispenser of the invention of figures 13 and 14.

[0117] In figure 14, two sperate containers 2, 3 are coupled together. The neck portion 8 keeps them together so any other connection element to connect the containers is not necessary needed. Optionally, the connection can be ensured by e.g. a claw connection.

[0118] It is also possible to divide one container into two compartments by e.g. an intermediate wall.

[0119] Figure 17 is a perspective view of a fifth embodiment of the dispenser of the invention and figure 16 is a cross-section of the same fifth embodiment. Figure 15 shows in a perspective view, the fifth embodiment of the dispenser of the invention with the components apart for illustrative purposes.

[0120] In this embodiment, said first container 2 and said second container 3 are placed on top of each other.

[0121] The uppermost container 2, has a space for the channel 5 of the lowermost container 3. The channel 4 of the uppermost container 2 can also be seen in the figures.

[0122] The space can e.g. be a groove 21 or a recess on the outer side on the periphery of the uppermost container 2, whereby the containers 2, 3 can be coupled by pressing the channel 5 of the lowermost container 3 into the groove 21 of the uppermost container 2.

[0123] The groove solution alone might keep the containers 2, 3 together but there can additionally be a form-shaped connection 22 fitted between the bottom of the uppermost container 2 and the top of the lowermost container 3 as can be seen in figure 18.

[0124] Figure 18 is an outside side view of a sixth embodiment of the dispenser of the invention and figure 19 is a cross-section of the sixth embodiment. Figure 20 shows the sixth embodiment of the dispenser of the invention with the components apart for illustrative purposes.

[0125] In this embodiment, the space for the channel 5 of the lowermost container 3 is inside the uppermost container 2.

[0126] In this example, the lowermost container 3 has a portion 30 below the channel, the thickness of which portion is smaller than that of the channel, a so called narrowed section 30, but larger than that of the rest of the lowermost container 3. This sometimes facilitates the moving of the fluid in the lower container 3 upwards. This narrowed section 30 of the undermost container 3 also enables a more fit connection between the uppermost container 2 and the undermost container 3.

[0127] Especially, the uppermost container 2 has the form of a "ring", surrounding the channel 5 of the undermost container 3 and the space in the middle of it but outside.

[0128] Figure 21 illustrate a suitable one-container dispenser to be used for assembling a dispenser of the of the invention. It consists of a single container 2 being a "bellows" construction in the form of a (single) bellows bottle or a (single) bellows container. Thus, there are vertical rigid sides 11, 12 to be pressed together with flexible sides 14 therebetween on both sides of the vertical sides 11, 12 and at the bottom. The flexible joint 13 (not visible in figure 21) is between the flexible sides 11, 12 on top of them and there is inside a mount as a passageway 4 (can not be seen) for fluid to be pressed out, and a cap 9. The container of figure 21 has only one outlet and one passageway 4 but when two such containers of figure 21 are combined by means of the connection piece 18 of the invention, a dispenser of the invention has been assembled.

[0129] The containers can in all embodiments of the invention have an inwardly convex upper internal surface to prevent rest fluid in the container. When the container has an inwardly convex upper internal surface, it prevents rests of fluid to stick in the container since the fluid flows out more easily, which is a great advantage since medical fluids are often very expensive.

Claims

1. Dispenser for fluid products comprising

   a neck portion (8) with at least two outlets (6, 7),
   a first container (2) for a first fluid, the first container (2) being connected to a first outlet (6) of the outlets (6, 7) via a first open passageway (4),
   a second container (3) for a second fluid, the second container (3) being connected to a second outlet (7) of the outlets (6, 7) via a second open passageway (5),
   whereby said first and second passageways (4, 5) separately end up to respective outlets (6, 7).

2. Dispenser of claim 1, wherein the neck portion is a separate detachable piece working as a connection piece (18), whereby said first and second passageways (18a, 18b), are within the connection piece (18).

3. Dispenser of claim 1 or 2, wherein said first container (2) and said second container (3) are coupled together side by side besides each other.

4. Dispenser of any of claims 1 - 3, wherein said first container (2) and said second container (3) are coupled to each other by the neck portion (8), a dovetail joint and/or some other form-shaped seal, such as a wedge joint.

5. Dispenser of any of claims 1 - 4, wherein each container (2, 3) has two vertical sides (11,12; 11',12') interconnected by a movable joint (13) and with a flexible side (14; 14') therebetween and which vertical sides (11,12; 11',12') can be pressed against each other for dosing to bring the fluid in the container (2, 3) upwards to the passageway and further to the outlet (6, 7).

6. Dispenser of claim 5, wherein the movable joint (13) of each container (2, 3) extends vertically along both respective vertical sides (11,12; 11',12') of the containers (2, 3) between said first container (2) and said second container (3).

7. Dispenser of claim 5, wherein the movable joint (13) of each container (2, 3) extends horizontally on the top end of each respective container (2, 3) on both sides of the neck portion (8).

8. Dispenser of claim 1 or 2, wherein said first container (2) and said second container (3) are placed on each other.

9. Dispenser of claim 8, wherein the uppermost container (2) has a space for the channel (5) of the lowermost container (3).

10. Dispenser of claim 8, wherein the space is a groove (21) on the outer side on the periphery of the uppermost container (2), whereby the containers (2, 3) can be coupled by pressing the channel (5) of the lowermost container (3) into the groove (21) of the uppermost container (2).

11. Dispenser of any of claims 8 - 10, further comprising a form-shaped connection (22) fitted between the bottom of the uppermost container (2) and the top of the lowermost container (3).

12. Dispenser of claim 9 or 11, wherein the space is surrounded by the uppermost container (2).

13. Dispenser of any of claims 1 -12, wherein there is a non-return valve in at least one passageway (4, 5) to prevent air or any reflux from entering the container (2, 3) after dosing.

14. A connection piece (18) with at least two separated passageways (18a, 18b) for fluid for connecting the passageways (4, 5) to at least a first container (2) and at least a second container (3).

15. The connection piece (18) of claim 14, wherein the connection piece (18) further comprises two outlets (6, 7) for fluid, whereby said first and second passageways (4, 5) separately end up to respective outlets (6, 7).

16. The connection piece (18) of claim 14, wherein the connection piece (18) is connected to a separate neck portion (8) with two outlets (6, 7), whereby said first and second passageways (4, 5) separately end up to respective outlets (6, 7).

17. Use of the dispenser of any of claims 1 - 13 for dosing at least two different fluid products, whereby the first fluid product is to be dispensed from the first container (2) via a first passageway (4) to a first outlet (6) of the neck portion (8), and the second fluid product is to be dispensed from the second container (5) via a second passageway (5) to a second outlet (7) of the neck portion (8), wherein said two different fluid products can consist of a first eye drop type and a second eye drop type, such as a moisturizing eye drop type and a lubricating eye drop type, or said two different fluid products consist of a first foodstuff and a second foodstuff, such as a first sauce and a second sauce, or for a first drink ingredient and a second drink ingredient.

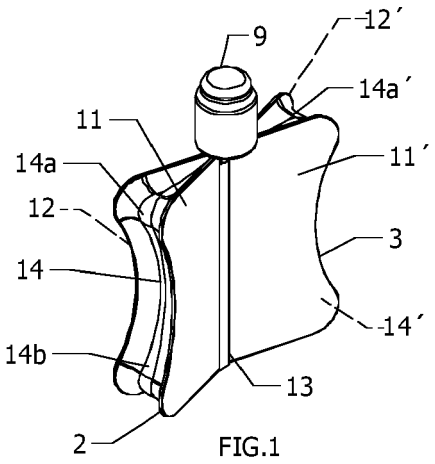

FIG.1

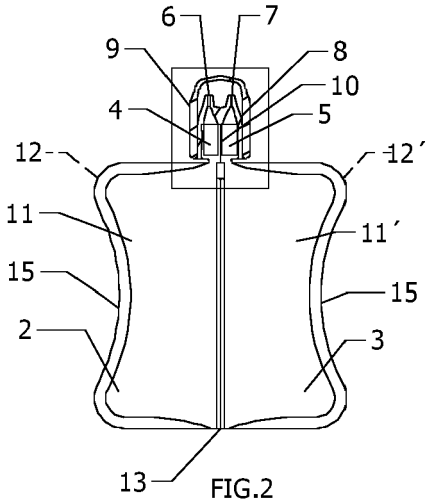

FIG.2

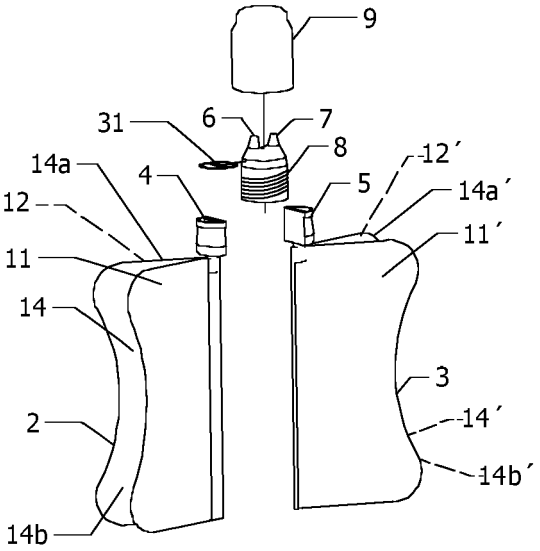

FIG.3

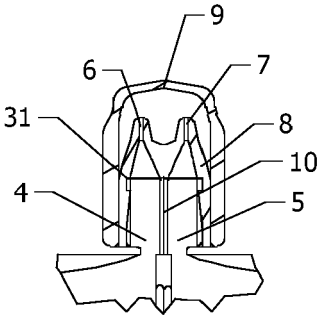

FIG.4

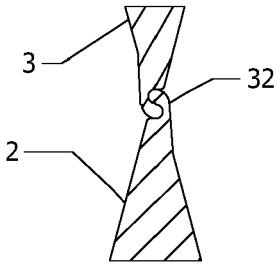

FIG.5

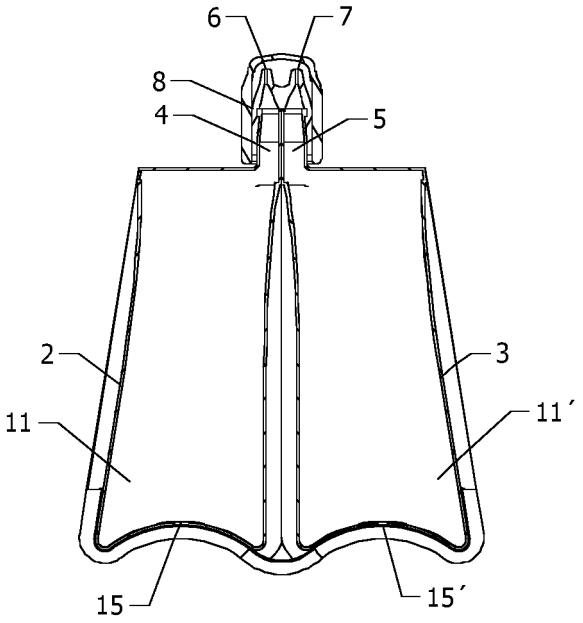

FIG.6

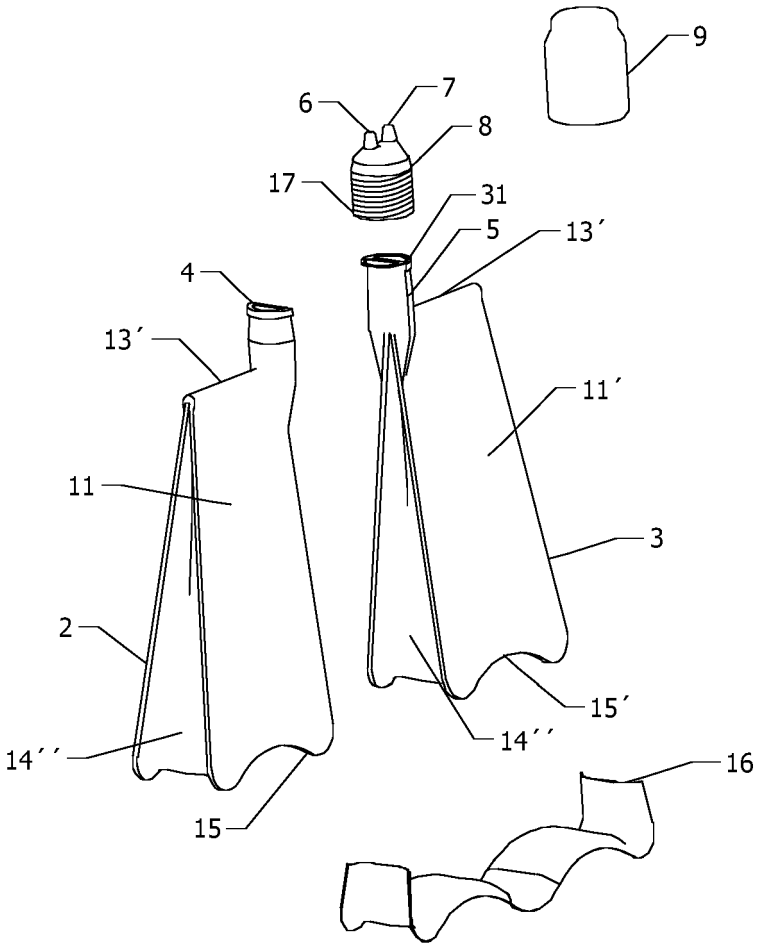

FIG.7

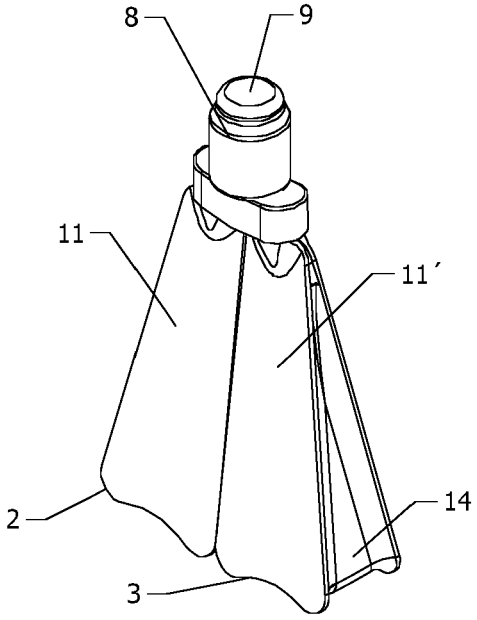

FIG.8

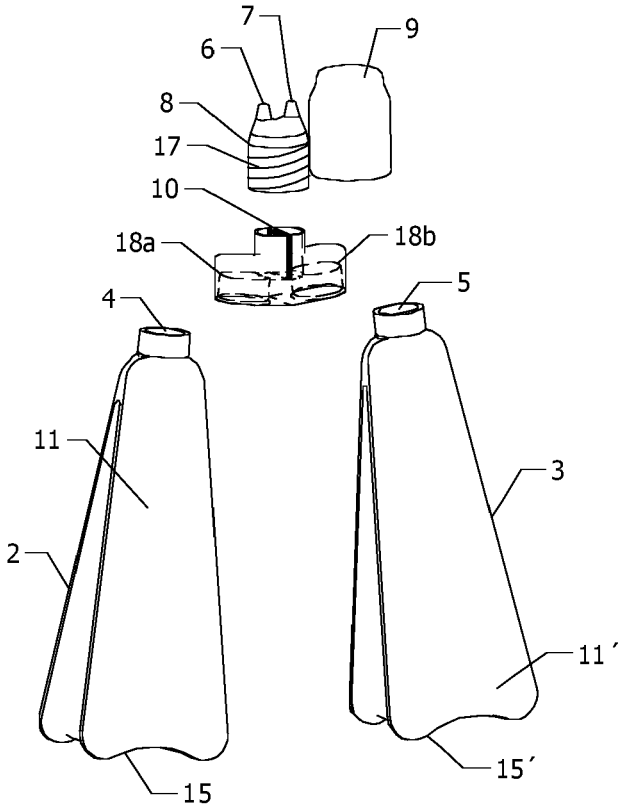

FIG.9

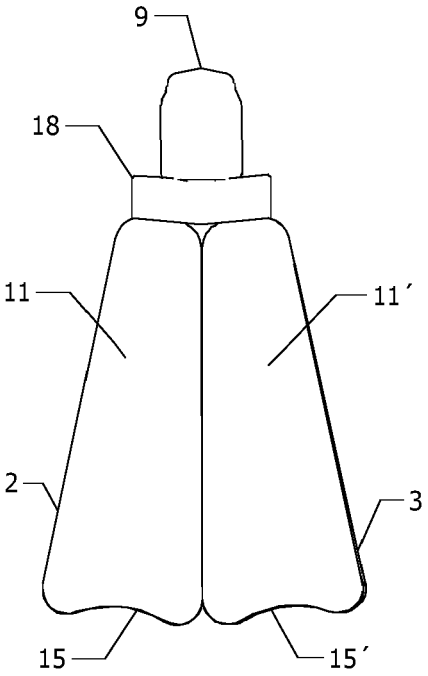

FIG.10

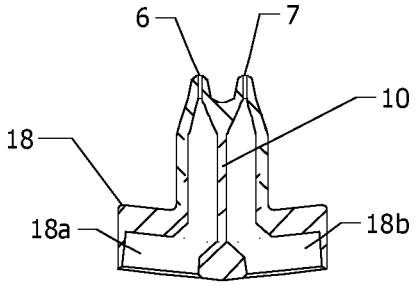

FIG.9b

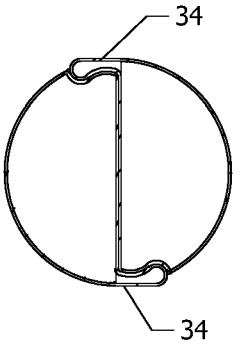

FIG.11

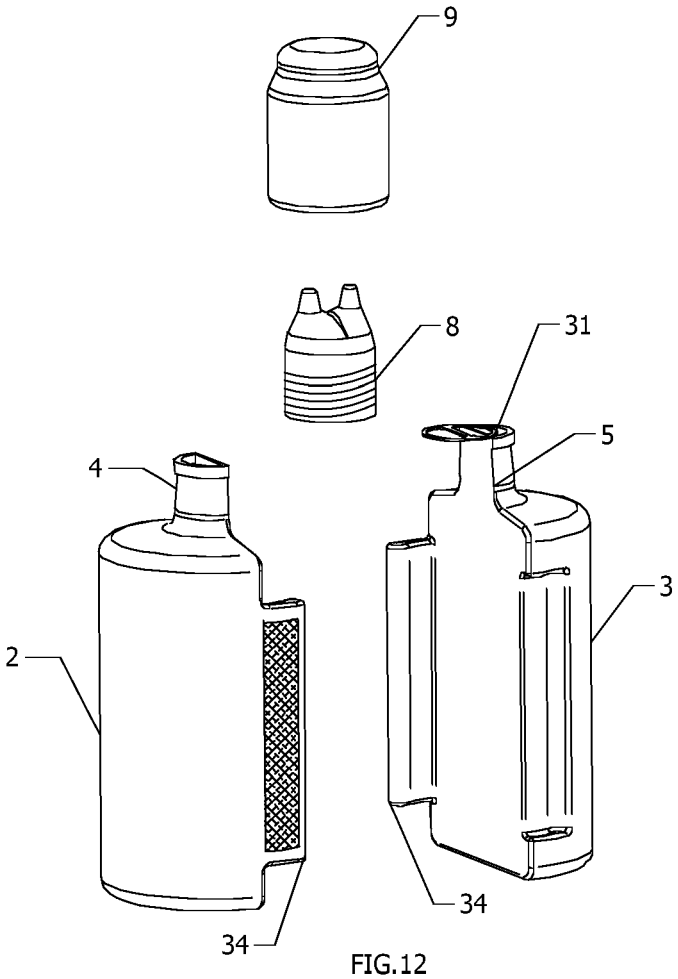

FIG.12

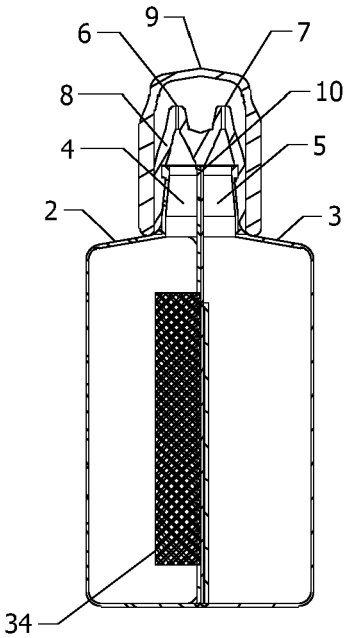

FIG.13

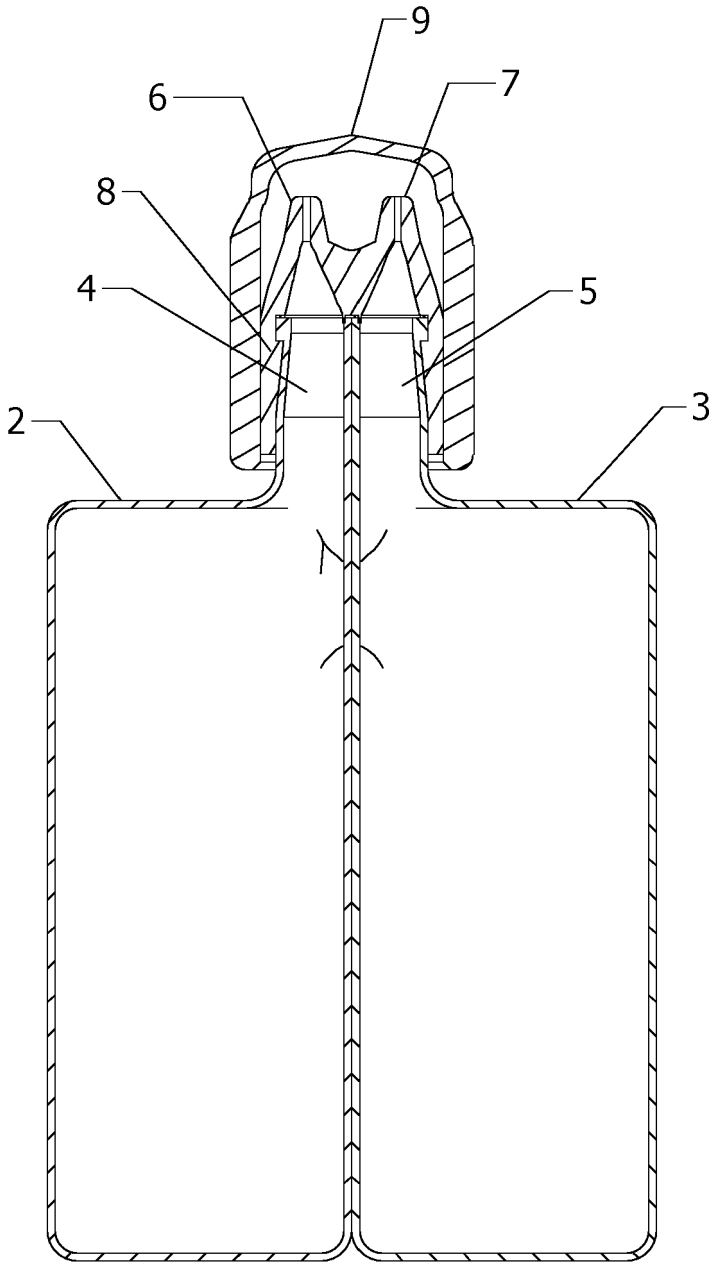

FIG.14

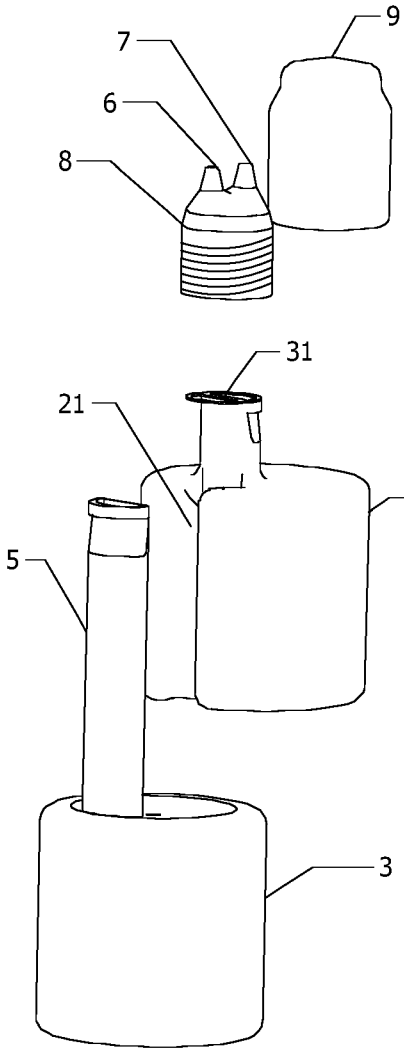

FIG.15

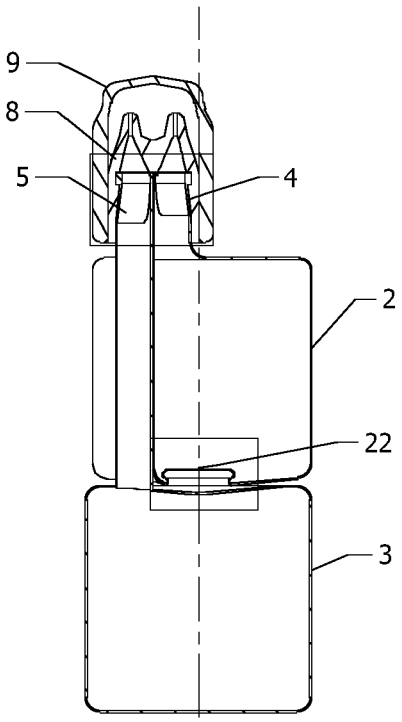

FIG.16

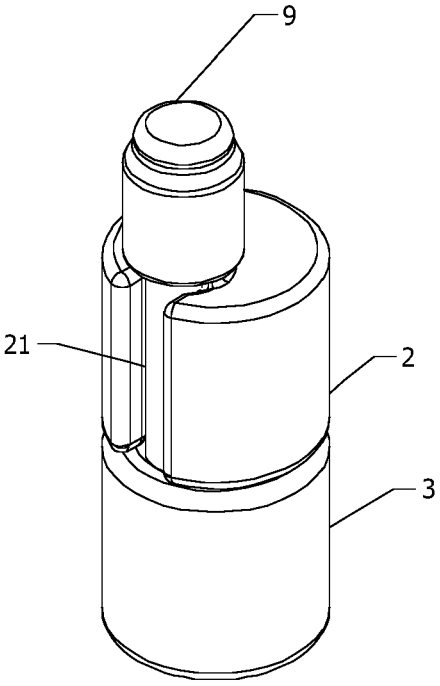

FIG.17

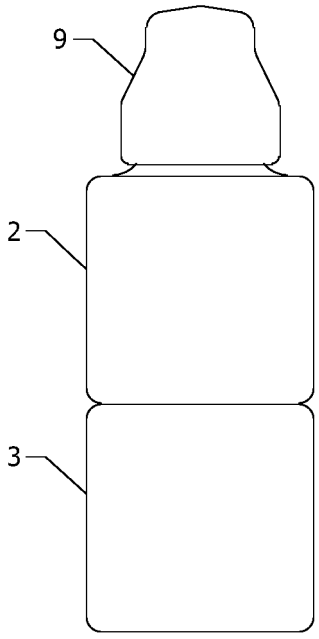

FIG.18

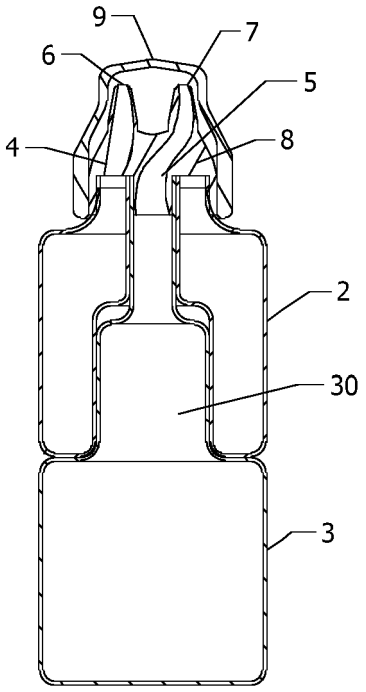

FIG.19

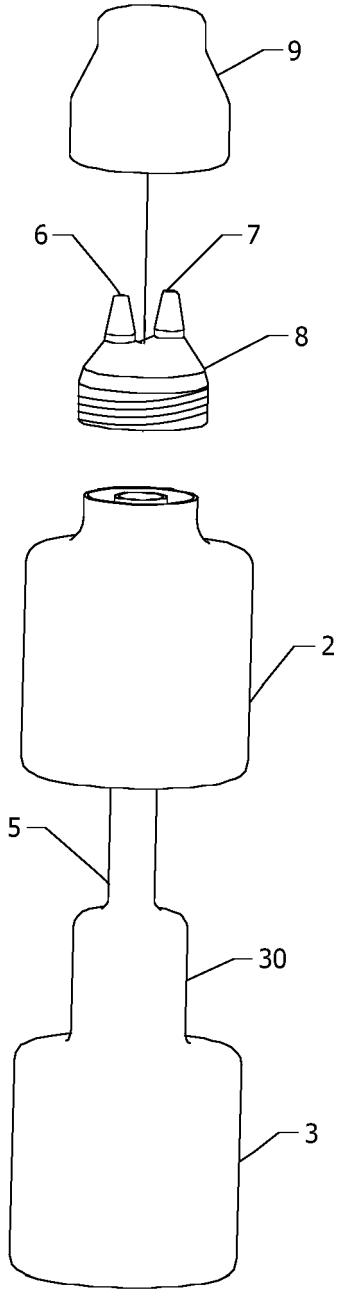

FIG.20

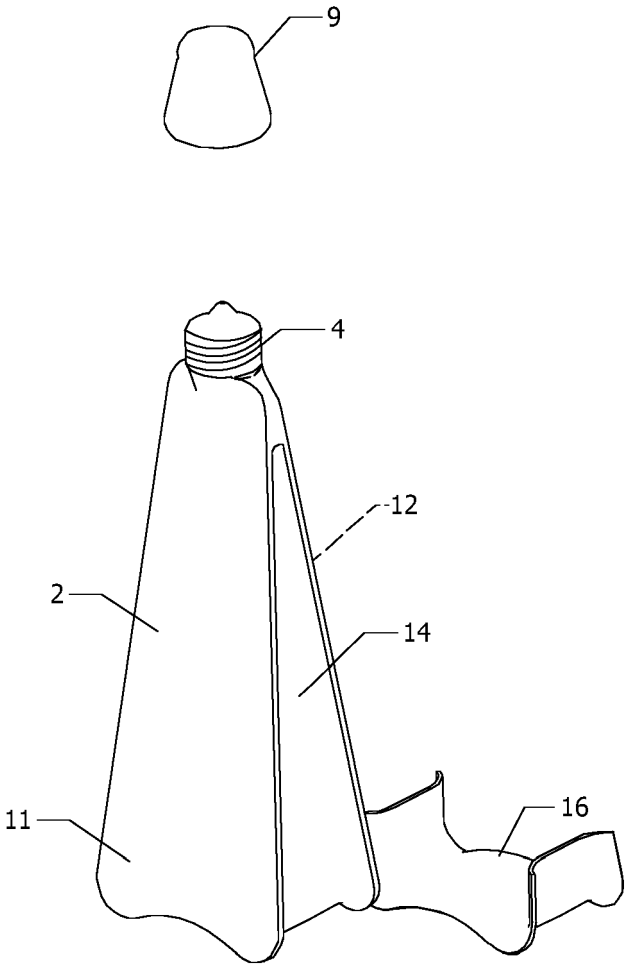

FIG.21

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 21 19 3264

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,D	WO 2016/110765 A2 (ALLAMPRESE JACOPO [IT]; R BIO TRANSFER S R L [IT]) 14 July 2016 (2016-07-14)	1-4,8, 13-15,17	INV. B65D1/32 B65D21/02
A	* abstract; figures 2,4,5 *	9	B65D25/48 B65D47/18
X,D	US 2004/035885 A1 (COLEMAN THOMAS J [US] ET AL) 26 February 2004 (2004-02-26)	1,3-8,17	B65D81/32
A	* abstract; figure 2 *	9	
X	US 10 582 786 B1 (SAINT GEOURS ALEJANDRO [US]) 10 March 2020 (2020-03-10)	1-4,8, 14-17	
A	* abstract; figures 1,3 *	9	
X	US 2015/129589 A1 (ESSLER MICHAEL [DE] ET AL) 14 May 2015 (2015-05-14)	1-4,8, 14,15,17	
A	* abstract; figures 1,3,5,6 *	9	
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A	* abstract; figures 1,3,5 *	9	TECHNICAL FIELDS SEARCHED (IPC)
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2 The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	10 March 2022	Tempels, Marco

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
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O : non-written disclosure
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& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

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Application Number
EP 21 19 3264

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☒ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).

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LACK OF UNITY OF INVENTION
SHEET B

Application Number
EP 21 19 3264

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-13, 17

Directed to a dispenser comprising a neck portion and a first and second container.

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2. claims: 14-16

Directed to a connection piece comprising two passageways.

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 21 19 3264

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
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10-03-2022

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

REFERENCES CITED IN THE DESCRIPTION

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