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(54) A CONTAINER

(57) A container including a storage chamber within which is located at least one concentrated product housed; a mixing chamber coupled to the storage chamber; and a closure element, wherein the storage chamber is isolated from the mixing chamber; the mixing chamber is defined by a body having a longitudinal length defined between opposed ends and along at least a portion of the length of the mixing chamber, the body defines circular bellows, such that the mixing chamber has a collapsed configuration when the ends of the body are urged together and an expanded configuration when the ends of the body are urged apart, the bellows further including a latching arrangement which acts to latch the bellows in their collapsed configuration and/or their expanded configuration; and wherein a first end of the mixing chamber is open and is selectively closable via the closure element.

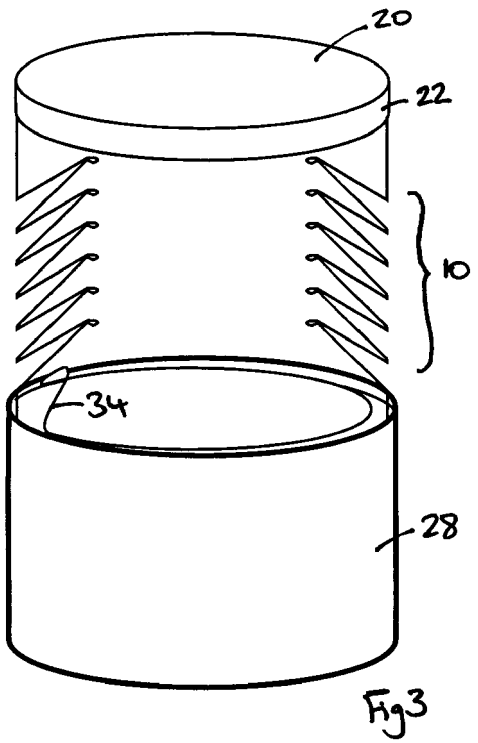

Fig3

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Description

FIELD OF THE INVENTION

[0001] The present invention relates to a container and, in particular, to a collapsible container that is capable of containing a concentrated product.

BACKGROUND OF THE INVENTION

[0002] Collapsible containers are known and are described, for example, in US4,773,458; US4,955,493; and US4,492,313.

[0003] However, the known collapsible containers have been in the form of a collapsible tube which defines a single chamber.

SUMMARY OF THE INVENTION

[0004] According to a first aspect of the invention, there is provided a container including a storage chamber within which is located at least one concentrated product; a mixing chamber coupled to the storage chamber; and a closure element, wherein the storage chamber is isolated from the mixing chamber; the mixing chamber is defined by a body having a longitudinal length defined between opposed ends and along at least a portion of the length of the mixing chamber, the body defines circular bellows, such that the mixing chamber has a collapsed configuration when the ends of the body are urged together and an expanded configuration when the ends of the body are urged apart; and wherein a first end of the mixing chamber is open and is selectively closable via the closure element.

[0005] The container of the invention defines two separate chambers: a storage chamber within which at least one concentrated product may be located; and a mixing chamber within which the concentrated product may be mixed with a diluent, such as water.

[0006] The circular bellows of the mixing chamber permit the container to be configured in a collapsed configuration when there is little or no diluent in the mixing chamber. This makes the container easier to store and transport. However, when it is desired to dilute the concentrated product, the mixing chamber may be expanded to receive the desired volume of diluent.

[0007] By storing the concentrated product in the storage chamber, the shelf life of the concentrated product may be significantly increased compared to a concentrated product simply located within the mixing chamber. This is because the polymeric material from which the mixing chamber may be formed in order to permit the collapsing and the expansion of the mixing chamber via its circular bellows may not provide optimum protection for the concentrated product against spoiling. In contrast, the storage chamber within which the concentrated product is located may provide the desired protection against spoiling without interfering with the operation of the container.

[0008] Furthermore, the circular bellows of the mixing chamber increases the agitation when the diluent is added to the concentrated product, which aids the mixing of the concentrated product with the diluent.

[0009] In the context of the present invention, the concentrated product may be in the form of a liquid, a gel or a solid, such as a powder or a tablet. Furthermore, the diluent is suitably water.

[0010] The mixing chamber is suitably defined by a mixing chamber body.

[0011] The circular bellows suitably include a latching arrangement which acts to latch the bellows in its collapsed and/or expanded configuration. It will be understood that in the context of the subject invention, the latching arrangement resists the movement of the bellows. In other words, the force exerted by the latching arrangement is greater than a stored force within the bellows which would otherwise urge the bellows out of its collapsed and/or expanded configuration. The latching arrangement does not prevent movement of the bellows. Instead, the latching force exerted by the latching arrangement must first be removed or overcome in order to move the bellows against the latching force.

[0012] In an embodiment of the invention, the mixing chamber is detachably coupled to the storage container. For example, the storage chamber may be screwed onto the mixing chamber or it may be snap-fit to the mixing chamber. As such, the mixing chamber and the storage container may include a threaded coupling or a snap-fit coupling.

[0013] In an embodiment of the invention, the closure element defines a well which is configured to receive a housing or container which contains the concentrated product. The closure element suitably includes an internally facing surface and an externally facing surface and the well may be open at the externally facing surface. The well may be an open well or it may include a closable lid. The well may define the storage chamber or it may define a holding chamber separate to the storage chamber.

[0014] In one embodiment of the invention, the storage chamber may be defined by a storage chamber body. In an alternative embodiment, the storage chamber may be defined within the closure element. In embodiments in which the storage chamber is defined by a storage chamber body, the body may be separate from the closure element.

[0015] In embodiments in which the storage chamber is defined by a storage chamber body, the storage chamber body may be coupled to the second end of the mixing chamber (i.e. the end of the mixing chamber which is opposite to the first end). The coupling between storage chamber body and the mixing chamber may be a releasable or reversible coupling, such as a threaded coupling or a snap-fit coupling. This permits the mixing chamber to be filled with a diluent without having to remove the storage chamber body from the mixing chamber.

[0016] The second end of the mixing chamber may be closed. It will be appreciated in the context of the subject invention that the term "closed" means that the relative end forms a liquid-tight seal with the mixing chamber body, for example, by the mixing chamber body, including the closed end, being formed by a continuous layer of moulded polymeric material. This means that the storage chamber need have no sealing function in respect of the mixing chamber. Accordingly, the storage chamber body need not form a liquid-tight seal with the mixing chamber when coupled thereto.

[0017] In such embodiments (second end of the mixing chamber is closed), the storage chamber body may define a closable opening for access to the storage chamber and the concentrated product located therein. The closable opening may be defined at any suitable location of the storage chamber body.

[0018] Alternatively, the second end of the mixing chamber may be open. This makes the manufacture of the mixing chamber slightly easier and the cost of the mixing chamber slightly lower, but means that the storage chamber body must form a liquid-tight seal when coupled to the second end of the mixing chamber.

[0019] In embodiments in which the second end of the mixing chamber is open, the mixing chamber body may include a sealing wall which closes the second end of the mixing chamber when the storage chamber body is coupled thereto; and the storage chamber body defines a closable opening. The opening is suitably separate from the sealing wall, such that opening does not compromise the seal generated by the sealing wall. Examples of such embodiments include (i) the storage chamber defining a tubular side wall having a proximal end wall which is adjacent to the mixing chamber in use and a distal end wall opposite to the proximal end wall; wherein the closable opening is defined in the proximal end wall and the sealing wall is formed by the distal end wall; and (ii) the storage chamber defining a tubular side wall having a proximal end wall which is adjacent to the mixing chamber in use and a distal end wall opposite to the proximal end wall; wherein the closable opening is defined in the distal end wall and the sealing wall is formed by the proximal end wall.

[0020] In the embodiments in which the closable opening is defined within the proximal end wall, any failure of the opening would simply result in the concentrated product(s) entering the mixing chamber, and as such, they would not be lost. Additionally, this arrangement permits the tubular side wall to extend into a bottom portion of the mixing chamber, which results in a more compact arrangement compared to embodiments in which the storage chamber is entirely located outside of the mixing chamber.

[0021] However, in such embodiments, the storage chamber body needs to be removed from the mixing chamber to access the concentrated product within the storage chamber. Alternatively, by forming the closable opening in the distal end wall of the storage chamber body and having the proximal wall form the sealing wall, the interior of the storage chamber can be accessed without needing to remove the storage chamber body from the mixing chamber.

[0022] As noted above, the storage chamber may be defined by the closure element or it may be carried by the closure element. For example, the storage chamber may be defined within the closure element. In such embodiments, the second end of the mixing chamber is suitably closed.

[0023] The closure element may define a tubular side wall having a top end and a bottom end opposite to the top end; wherein the side wall, top end and bottom end together define the storage chamber; and wherein a closable opening is defined in the bottom end.

[0024] The skilled person will understand that reference to "top" and "bottom" refer to the container when oriented in a substantially vertical orientation with the closure element located at the top of the mixing chamber.

[0025] By locating the closable opening in the bottom end of the storage chamber, the interior of the chamber may only be accessed when the closure element has been removed from the mixing chamber. Additionally, it permits a more compact arrangement, as the tubular side wall may extend wholly or partially into the interior of the mixing chamber.

[0026] In alternative embodiments, the closure element defines a tubular side wall having a top end and a bottom end opposite to the top end; wherein the side wall, top end and bottom end together define the storage chamber; and wherein a closable opening is defined in the top end. In this arrangement, the interior of the storage chamber may be accessed without removing the closure element from the mixing chamber.

[0027] The closure element is suitably releasably secured to the mixing chamber via a threaded coupling.

[0028] The mixing chamber is suitably in the form of a substantially tubular body.

[0029] In an embodiment of the invention, the storage chamber contains one or more concentrated products, wherein each concentrated product is stored within a respective housing. For example, the storage chamber may contain a plurality of separate concentrated products, each stored within a respective housing. The housings are suitable sealed against the ingress of gases and liquids.

[0030] The circular bellows may be defined by a series of circular bellows wall sections (i.e. a plurality of bellows wall sections arranged in a longitudinal array), wherein each circular bellows wall section includes a first wall portion and a second wall portion; the first and second wall portions are conical sections which are angled relative to each other; the first and second wall portions extend outwardly from the longitudinal axis of the mixing chamber and together define a V-shape; the connection between the first and second wall portions forms an outer return portion; and adjacent bellows wall sections are connected via inner return portions.

[0031] The skilled person will appreciate that reference to "V-shaped" is to be understood to a sideways V, in other words the outer return is ">"-shaped. In this way, as the container is collapsed, the angle between first and second wall portions of each bellows wall section will decrease and as the container is expanded, the angle between the first and second wall portions of each bellows wall section will increase.

[0032] The skilled person will understand that the angle between the first and second wall portions of each bellows wall section may range from 0° to 180°. However, this angle is suitably from 0° to 120°, 110°, 100° or 90°.

[0033] This arrangement of the bellows wall sections permits the maximum expansion and collapse of the bottle while maintaining a desired level of mechanical strength and resistance to cracking.

[0034] The inner return portions may include an arcuate connecting portion. In other words, a first or second wall portion of a bellows wall section is connected to a second or first wall portion of a neighbouring (i.e. adjacent) bellows wall section via an arcuate connecting body, such as a semi-circular connecting body. Without wishing to be bound by theory, it is believed that the arcuate connecting portion is more resistant to cracking and permits the adjacent wall portions to hinge relative to each other with less strain. This may be because the bottle material is not weakened at the inner return portions by fracturing as the plastic material is not deformed beyond its elastic limit.

[0035] In such embodiments, the second wall portion may be shorter than the first wall portion in each of the bellows wall sections. The arrangement causes an "over-centre" arrangement when the mixing chamber is moved to its collapsed configuration, which in turn latches the circular bellows in their collapsed configuration. Thus, in such embodiments, a latching mechanism is formed by second wall portions being shorter than the first wall portions, resulting in an over-centre arrangement of the inner return portions in the collapsed configuration. The over-centre arrangement results when an inner return portion located between a pair of outer return portions is displaced longitudinally during the compression of the mixing chamber such that after compression, the inner return portion has been displaced vertically above or below both of the pair of outer return portions either side of the inner return portion (on the basis that the mixing chamber is collapsed in a vertical direction). This "over-centre" arrangement generates latching forces in the circular bellows portion that are typically greater than the restorative forces stored in the return portions as a result of the collapsing of the mixing chamber and therefore prevents or resists the restorative forces urging the mixing chamber back to its expanded configuration.

[0036] Accordingly, when the mixing chamber is urged into its collapsed configuration, it will typically remain in that configuration until it is urged into its expanded configuration. The expansion force exerted on the mixing chamber will overcome the latching forces of the bellows wall sections.

[0037] Further embodiments of the invention are set out in the following definitions:

1. A container including a storage chamber within which is located at least one concentrated product housed; a mixing chamber coupled to the storage chamber; and a closure element, wherein the storage chamber is isolated from the mixing chamber; the mixing chamber is defined by a body having a longitudinal length defined between opposed ends and along at least a portion of the length of the mixing chamber, the body defines circular bellows, such that the mixing chamber has a collapsed configuration when the ends of the body are urged together and an expanded configuration when the ends of the body are urged apart, the bellows further including a latching arrangement which acts to latch the bellows in their collapsed configuration and/or their expanded configuration; and wherein a first end of the mixing chamber is open and is selectively closable via the closure element.
2. A container according to definition 1, wherein the closure element defines a well which is configured to receive a container which contains the concentrated product.
3. A container according to definition 2, wherein the closure element includes an internally facing surface and an externally facing surface and the well is open at the externally facing surface.
4. A container according to any of definitions 1 to 3, wherein the mixing chamber is detachably coupled to the storage container.
5. A container according to definition 4, wherein the mixing chamber and the storage container include a threaded coupling or a snap-fit coupling.
6. A container according to any of definitions 1 to 5, wherein the storage chamber is defined by a storage chamber body.
7. A container according to definition 6, wherein the mixing chamber defines a second end opposite to the first end, and wherein the storage chamber body is coupled to the second end of the mixing chamber.
8. A container according to definition 7, wherein the second end of the mixing chamber is closed.
9. A container according to definition 7, wherein the second end of the mixing chamber is open; the mixing chamber body includes a sealing wall which closes the second end of the mixing chamber when the storage chamber body is coupled to the mixing chamber; and the storage chamber body defines a closable opening separate from the sealing wall.
10. A container according to definition 9, wherein the storage chamber defines a tubular side wall having a proximal end which is adjacent to the mixing chamber in use and a distal end opposite to the proximal end; and wherein the closable opening is defined at the proximal end and the sealing wall is located at

the distal end.

11. A container according to definition 9, wherein the storage chamber defines a tubular side wall having a proximal end which is adjacent to the mixing chamber in use and a distal end opposite to the proximal end; and wherein the closable opening is defined at the distal end and the sealing wall is located at the proximal end.

12. A container according to any of definitions 1 to 5, wherein the storage chamber is defined within the closure element and the mixing chamber is closed at its second end.

13. A container according to definition 12, wherein the closure element defines a tubular side wall having a top end and a bottom end opposite to the top end; and wherein a closable opening is defined in the bottom end.

14. A container according to definition 13, wherein at least a portion of the storage chamber extends into the mixing chamber when the closure element is coupled to the mixing chamber.

15. A container according to definition 12, wherein the closure element defines a tubular side wall having a top end and a bottom end opposite to the top end; and wherein the closable opening is defined in the top end.

16. A container according to any of definitions 1 to 15, wherein the closure element is threadedly coupled to the mixing chamber.

17. A container according to any of definitions 1 to 16, wherein the mixing chamber is defined by a substantially tubular body.

18. A container according to any of definitions 1 to 17, wherein the circular bellows are defined by a series of bellows wall sections, wherein each bellows wall section includes a first wall portion and a second wall portion; the first and second wall portions are conical sections which are angled relative to each other; the first and second wall portions extend outwardly from the longitudinal axis of the mixing chamber and together define a V-shape; the connection between the first and second wall portions forms an outer return portion; and adjacent bellows wall sections are connected via inner return portions.

19. A container according to definition 18, wherein the inner return portions comprise an arcuate connecting portion.

20. A container according to definition 18 or definition 19, wherein the latching arrangement is formed by the second wall portion being shorter than the first wall portion in each of the bellows wall sections, whereby each inner return portion forms an over-centre arrangement in the collapsed configuration.

21. A container according to any of definitions 1 to 20, wherein the storage chamber contains one or more concentrated products, wherein each concentrated product is stored within a respective housing.

[0038] The skilled person will appreciate that the features described and defined in connection with the aspect of the invention and the embodiments thereof may be combined in any combination, regardless of whether the specific combination is expressly mentioned herein. Thus, all such combinations are considered to be made available to the skilled person.

[0039] An embodiment of the invention will now be described, by way of example only, with reference to the accompanying drawings as follows.

DESCRIPTION OF THE DRAWINGS

[0040]

Figures 1a, 1b and 1c are perspective views of a container according to a first embodiment of the invention in exploded form;

Figures 2a and 2b show a section of the inner and outer return portions of the mixing chamber in expanded and collapsed configurations;

Figure 3 shows the container of Figures 1a, 1b and 1c in a collapsed configuration;

Figure 4 shows a container according to a second embodiment of the invention in its collapsed configuration;

Figure 5 shows a container according to a third embodiment of the invention in its collapsed configuration;

Figures 6a and 6b show a container according to a fourth embodiment of the invention in an expanded configuration;

Figure 7 shows the container of Figures 6a and 6b in its collapsed configuration;

Figures 8a and 8b show a container according to a fifth embodiment of the invention in an expanded configuration;

Figure 9 shows a container according to a sixth embodiment of the invention in an expanded configuration;

Figure 10 shows the container of Figure 9 in its collapsed configuration;

Figure 11 shows a container according to a seventh embodiment of the invention in an expanded configuration; and

Figure 12 shows the container of Figure 11 in its collapsed configuration.

DESCRIPTIONS OF THE PREFERRED EMBODIMENTS

[0041] For the avoidance of doubt, the skilled person will appreciate that in this specification, the terms "up", "down", "front", "rear", "upper", "lower", "width", etc. refer to the orientation of the components as found in the example when installed for normal use as shown in the Figures.

[0042] Figures 1a, 1b and 1c show a container 2 ac-

cording to a first embodiment of the invention. The container comprises a mixing chamber 4 (shown in Figure 1a) which is generally tubular in shape and which is open at both ends 6, 8. The mixing chamber 4 is blow-molded from a polymeric material. The mixing chamber 4 includes a central circular bellows 10, wherein the circular bellows 10 is formed from a number of bellows wall sections, which, in turn are formed from first conical wall portions 12, second conical wall portions 14 and outer return portions 16. The length of the first conical wall portions 12 is greater than the length of the second conical wall portions 14.

[0043] Each bellows wall section is connected to adjacent or neighbouring bellows wall sections via respective inner return portions 18. The bellows wall sections are shown in more detail in Figure 2a. The inner return portions 18 include a semi-circular connecting portion, which prevents or minimises the deformation of the polymeric material beyond its elastic limit.

[0044] Figure 1b shows a detachable closure element 20 in the form of a screw-on lid. The lid includes a downwardly extending skirt 22, which defines a threaded portion (not shown) on the inwardly facing wall of the skirt 22. The top end 6 of the mixing chamber 4 carries a complementary threaded portion 24, such that the closure element 20 may be screwed onto or unscrewed from the open top end 6 of the mixing chamber 4.

[0045] Figure 1c shows a storage chamber defined by a storage chamber body 26. The storage chamber body 26 includes a cylindrical side wall 28, a closed bottom wall (not shown) and an upwardly extending skirt 30. The skirt 30 defines a threaded portion (not shown) on its inwardly facing wall. The bottom end 8 of the mixing chamber 4 carries a complementary threaded portion 32, such that the storage chamber body 26 may be screwed onto or unscrewed from the open bottom end 8 of the mixing chamber 4. A top wall of the storage chamber body 26 defines an opening 33 to provide access to the interior of the storage chamber, and the opening 33 is closed via a removable sealing film 34. The sealing film 34 is adhered or welded to a peripheral portion of the top wall which defines the opening 33.

[0046] The container 2 is assembled by screwing the storage chamber body 26 to the open bottom end 8 of the mixing chamber 4 and by screwing the closure element 20 to the open top end of the mixing chamber 4. A concentrated product (not shown), for example a flavoured powder for forming a flavoured drink, is located within the sealed storage chamber 26.

[0047] Figure 2a shows a section of the circular bellows 10 in an expanded configuration. As can be seen, the angle between the first conical wall portion 12 and the second conical wall portion 14 at the outer return portion 16 is about 90°. As the second conical wall portion 14 is shorter than the first conical wall portion 12, the angle between adjacent second conical wall portions 14 and first conical wall portions 12 at the inner return portion 18 is about 80°.

[0048] Figure 2b shows the over-centre arrangement of the first and second wall portions 12, 14 in the collapsed configuration. The dashed line A in Figures 2a and 2b projects through a common point (an outer return portion 16). As can be seen in Figure 2b, both of the inner return portions 18 are displaced vertically upwards as the mixing chamber 4 is collapsed until both of these inner return portions are located above the dashed line A. The displacement of the inner return portion 18 such that it lies outside of the cylindrical region defined between the two adjacent outer return portions 16 is referred to herein as an "over-centre" arrangement. Such an arrangement generates a latching force at each of the inner return portions 18 which are greater than the restorative forces that are stored in the return portions when the mixing chamber 4 is collapsed. Accordingly, the latching forces resist or prevent the expansion of the mixing chamber towards is expanded configuration.

[0049] Figure 3 shows the container 2 in its collapsed configuration. This is the typical configuration for storage or transportation of the container 2. Starting from this configuration, the user first unscrews the storage chamber body 26 from the mixing chamber 4. This releases the air tight seal between the storage chamber body 26 and the mixing chamber 4 and prevents the generation of a partial vacuum within the mixing chamber during expansion. The mixing chamber is then expanded by urging the two end 6, 8 apart. Once expanded, the sealing film 34 is removed to expose the powdered concentrate product located within the storage chamber. The storage chamber body 26 is then screwed back onto the mixing chamber 4. The closure element 20 is then unscrewed from the top 6 of the mixing chamber 4 and a diluent (such as water) is added to the mixing chamber via the open end 6 of the mixing chamber 4. The closure element 20 is then screwed back onto the top end 6 of the mixing chamber 4 and the concentrated powdered product is mixed with the diluent, for example with agitation or shaking. The circular bellows arrangement aids with the mixing of the concentrated powdered product and the diluent.

[0050] The skilled person will appreciate that the concentrated product within the storage chamber defined by the storage chamber body 26 may be in the form of a liquid, paste or gel, instead of a powder.

[0051] Figures 4 and 5 show alternative embodiments of the invention in which the mixing chamber 4 and the closure element 20 are as described above in connection with Figures 1 to 3, but the storage chamber is different.

[0052] In Figure 4, a storage chamber body 40 includes a cylindrical side wall 42, an upwardly extending skirt 44, and a closed, gas-tight and liquid-tight top wall 46. A bottom wall 48 of the storage chamber body 40 defines an opening 50 and includes a detachable base 52 which is arranged to form a snap-fit with the bottom wall 48. In this way, the opening may be selectively closed or opened via the detachable base 52. To ease removal, the detachable base 52 may include a circular aperture

through which a user's finger may be located to permit a downward force to be exerted on the detachable base 52.

[0053] As the detachable base 52 does not form a gas-tight and liquid-tight seal with the bottom wall 48, the concentrated product is located within a separate sealed housing 54 which includes an opening at its upper end that is sealed with a sealing film 56.

[0054] Figure 5 shows a similar arrangement to that shown in Figure 4 and described above, except that the cylindrical side wall is longer and a plurality of sealed housings 60 containing separate concentrated products are located within the storage chamber defined by the storage chamber body. In this embodiment, the concentrated products in the sealed housings 60 may be the same or different. All other features of the storage chamber body are as described above in connection with Figure 4.

[0055] In order to use the container 2 shown in Figures 4 and 5, the user removes the closure element from the top of the mixing chamber and expands the mixing chamber as described above. The detachable base is then removed from bottom wall and the or one of the individually sealed housings are removed from the storage chamber. The sealing film is then removed from the housing and the concentrated product is emptied into the mixing chamber. A diluent, such as water is then added to the mixing chamber, the closure element is then screwed back onto the top open end of the mixing chamber and the concentrated product mixed with the diluent.

[0056] The skilled person will appreciate that in the embodiments shown in Figures 4 and 5, the diluent may be added to the mixing chamber first and the concentrated product added to the diluent in the mixing chamber.

[0057] Figures 6a, 6b and 7 show a further embodiment of the invention. In this embodiment, a container 102 includes a closure element 120, which in turn includes a storage chamber body 126. In this embodiment, the container 102 further includes a mixing chamber 104 comprising an open top end 106, a closed bottom end 108 and a circular bellows 110 as described above in connection with the circular bellows 10.

[0058] The closure element 120 includes an upper element body 120a from which the storage chamber body 126 depends. From around the periphery of the upper element body 120a depends a skirt 122, which defines a threaded portion 122a on the inwardly facing wall of the skirt 122.

[0059] The top end 106 of the mixing chamber 104 carries a threaded portion 124 which is complementary to the threaded portion 122a of the closure element 120.

[0060] The storage chamber body 126 is open at its bottom end and includes a sealing film 134 adhered to or welded to the storage chamber body which maintains the concentrated product within the storage chamber defined within the storage chamber body 126.

[0061] Figure 7 shows the container 102 in its collapsed configuration. It will be noted that in this configuration, the storage chamber body 126 is located within the mixing chamber 104.

[0062] In use, a user follows similar steps to this described above. The closure element 120 is first unscrewed from the open top end 106 of the mixing chamber 104 and the circular bellows of the mixing chamber are urged into their expanded configuration. The sealing film 134 is removed from the bottom of the storage chamber body 126 and the concentrated product is mixed with a diluent within the mixing chamber 104 and agitated after the closure element 120 has been screwed back onto the open top 106 of the mixing chamber 104.

[0063] Figures 8a and 8b show a further embodiment of the invention, which is similar to the embodiment shown in Figure 5, except that mixing chamber is closed at its bottom end. Thus, Figures 8a and 8b show a container 202 which includes a mixing chamber 204 that is open at its top end 206 and closed at its bottom end 208 with a sealing wall 208a.

[0064] The top end 206 of the mixing chamber 204 carries a threaded element 224 and a closure element (not shown) is provided which is the same as described above in connection with Figure 1b.

[0065] The mixing chamber includes circular bellows 210 which are as described above in connection with Figures 1a, 2a and 2b.

[0066] The storage chamber of this embodiment is similar to that described above in connection with Figure 5, except that the storage chamber is closed at its bottom end and open at its top end. Accordingly, the container 202 includes a storage chamber body 240 which includes a cylindrical body 242 which is closed at its bottom end 248 and open at its top end 246. On an inwardly facing surface of the top end 246 is carried a threaded element 244.

[0067] The threaded element 244 threaded engages with a corresponding threaded element 232 carried by a lower portion of the mixing chamber 204.

[0068] The storage chamber includes a plurality of sealed housings 254, each of which is sealed via a respective sealing film 256. A concentrated product is located within each of the housings. The skilled person will appreciate that instead of the housings comprising relatively rigid bodies closed with sealing films, the housings may instead comprise sachets which contain the concentrated product.

[0069] In this embodiment, the storage chamber body 240 need simply be unscrewed from the mixing chamber 204 and one of the housings 254 removed from the storage chamber. The concentrated product located within the housing may then be mixed with a diluent as described above.

[0070] Figures 9 and 10 show a further embodiment of the invention which is similar to the embodiment shown in Figures 6a, 6b and 7.

[0071] In this embodiment, a mixing chamber is provided which is identical to the mixing chamber 104 described above in connection with Figures 6a, 6b and 7. In order to close the open top end of the mixing chamber

104, a closure element 320 is provided.

[0072] The closure element 320 includes a circular top wall 320a and a skirt 322 which depends downwards from a peripheral edge portion of the top wall 320a. The skirt 322 carries a threaded element 322a

[0073] A storage chamber body 326 depends downwards from a central portion of the top wall 320a. The storage chamber body 326 comprises a cylindrical wall 328 which is closed at its bottom by a sealing wall 330. The storage chamber body 326 is open at its top end 332. The opening is selectively closed by a snap-fit lid 334, which forms a snap fit with the circular top wall 320a. As noted above, the snap-fit lid 334 may include a circular aperture through which a user's finger may be located to permit an upward force to be exerted on the snap-fit lid 334 in order to remove it.

[0074] As with the preceding embodiment, the storage chamber defined by the storage chamber body includes a plurality of sealed housings 354, each of which is sealed via a respective sealing film 356. A concentrated product is located within each of the housings. The skilled person will appreciate that instead of the housings comprising relatively rigid bodies closed with sealing films, the housings may instead comprise sachets which contain the concentrated product.

[0075] As can be seen from Figure 10, when the closure element 320 is screwed on the top end of the mixing chamber 104, the storage chamber body 326 is located within the mixing chamber 104. This results in a very compact configuration in the collapsed configuration.

[0076] A user uses the container in much the same way as described above: the snap-fit lid 334 is removed and one of the housings 354 is removed from the storage chamber defined by the storage chamber body 326. The snap-fit lid 334 is then replaced. The closure element 320 is unscrewed from the mixing chamber 104 and the concentrated product from the housing 354 and a diluent are added to the mixing chamber 104. The closure element 320 is then screwed back onto the mixing chamber and the concentrated product is mixed with the diluent.

[0077] A final embodiment is shown in Figures 11 and 12, which is similar to the embodiment shown in Figures 1a, b, 1c and 3.

[0078] Figures 11 and 12 show a container 402. The container 402 comprises a mixing chamber 404 which is identical to the mixing chamber 4 shown in Figure 1a and which is open at both ends 406, 408.

[0079] The container 402 further includes a closure element 420 in the form of a screw-on lid. The lid 420 includes a downwardly extending skirt 422, which defines a threaded portion (not shown) on the inwardly facing wall of the skirt 422. The top end 406 of the mixing chamber 404 carries a complementary threaded portion 424, such that the closure element 420 may be screwed onto or unscrewed from the open top end 406 of the mixing chamber 404.

[0080] The container 402 also includes a storage chamber defined by a storage chamber body 426. The storage chamber body 426 includes a base portion 427 upwardly from which extends a cylindrical storage portion formed from a cylindrical side wall 428, which has a closed top 428a and an open bottom 428b. Upwardly extending from a peripheral edge portion of the base portion 427 is a skirt 430. The skirt 430 carries a threaded portion 430a on its inwardly facing wall. The bottom end 408 of the mixing chamber 404 carries a complementary threaded portion 432, such that the storage chamber body 426 may be screwed onto or unscrewed from the open bottom end 408 of the mixing chamber 404.

[0081] The storage chamber body 426 further includes a snap-fit plug 452 which selectively closes or opens the open bottom end 428b of the cylindrical storage portion. As noted above, the snap-fit plug 452 may include a circular aperture through which a user's finger may be located to permit an downward force to be exerted on the snap-fit plug 452 in order to remove it.

[0082] As with the preceding embodiment, the storage chamber defined by the storage chamber body 426 includes a plurality of sealed housings 454, each of which is sealed via a respective sealing film 456. A concentrated product is located within each of the housings 454. The skilled person will appreciate that instead of the housings comprising relatively rigid bodies closed with sealing films, the housings may instead comprise sachets which contain the concentrated product.

[0083] The container 402 is assembled by screwing the storage chamber body 426 to the open bottom end 408 of the mixing chamber 404 and by screwing the closure element 420 to the open top end 406 of the mixing chamber 404.

[0084] As can be seen from Figure 12, when the storage chamber body 426 is screwed on the bottom end 408 of the mixing chamber 404, the cylindrical storage portion is located within the mixing chamber 404. This results in a very compact configuration in the collapsed configuration.

[0085] A user uses the container in much the same way as described above: the snap-fit plug 452 is removed and one of the housings 354 is removed from the cylindrical storage portion. The snap-fit plug 452 is then replaced. The closure element 420 is unscrewed from the mixing chamber 404 and the concentrated product from the housing 454 and a diluent are added to the mixing chamber 404. The closure element 420 is then screwed back onto the mixing chamber and the concentrated product is mixed with the diluent.

[0086] It will be noted that the storage chamber body 426 need not be unscrewed from the mixing chamber 404 in order to use the container 402 in this embodiment.

Claims

1. A container including a storage chamber within which is located at least one concentrated product housed; a mixing chamber coupled to the storage

chamber; and a closure element, wherein the storage chamber is isolated from the mixing chamber; the mixing chamber is defined by a body having a longitudinal length defined between opposed ends and along at least a portion of the length of the mixing chamber, the body defines circular bellows, such that the mixing chamber has a collapsed configuration when the ends of the body are urged together and an expanded configuration when the ends of the body are urged apart, the bellows further including a latching arrangement which acts to latch the bellows in their collapsed configuration and/or their expanded configuration; and wherein a first end of the mixing chamber is open and is selectively closable via the closure element.

2. A container according to Claim 1, wherein the closure element defines a well which is configured to receive a container which contains the concentrated product.

3. A container according to Claim 2, wherein the closure element includes an internally facing surface and an externally facing surface and the well is open at the externally facing surface.

4. A container according to any of Claims 1 to 3, wherein the mixing chamber is detachably coupled to the storage container.

5. A container according to Claim 4, wherein the mixing chamber and the storage container include a threaded coupling or a snap-fit coupling.

6. A container according to any of Claims 1 to 5, wherein the storage chamber is defined by a storage chamber body.

7. A container according to Claim 6, wherein the mixing chamber defines a second end opposite to the first end, and wherein the storage chamber body is coupled to the second end of the mixing chamber.

8. A container according to Claim 7, wherein the second end of the mixing chamber is open; the mixing chamber body includes a sealing wall which closes the second end of the mixing chamber when the storage chamber body is coupled to the mixing chamber; and the storage chamber body defines a closable opening separate from the sealing wall.

9. A container according to Claim 8, wherein the storage chamber defines a tubular side wall having a proximal end which is adjacent to the mixing chamber in use and a distal end opposite to the proximal end; and wherein the closable opening is defined at the proximal end and the sealing wall is located at the distal end; or wherein the closable opening is defined at the distal end and the sealing wall is located at the proximal end.

10. A container according to any of Claims 1 to 5, wherein the storage chamber is defined within the closure element and the mixing chamber is closed at its second end.

11. A container according to Claim 10, wherein the closure element defines a tubular side wall having a top end and a bottom end opposite to the top end; and wherein a closable opening is defined in the bottom end, optionally wherein at least a portion of the storage chamber extends into the mixing chamber when the closure element is coupled to the mixing chamber.

12. A container according to Claim 10, wherein the closure element defines a tubular side wall having a top end and a bottom end opposite to the top end; and wherein the closable opening is defined in the top end.

13. A container according to any of Claims 1 to 12, wherein the closure element is threadedly coupled to the mixing chamber.

14. A container according to any of Claims 1 to 13, wherein the circular bellows are defined by a series of bellows wall sections, wherein each bellows wall section includes a first wall portion and a second wall portion; the first and second wall portions are conical sections which are angled relative to each other; the first and second wall portions extend outwardly from the longitudinal axis of the mixing chamber and together define a V-shape; the connection between the first and second wall portions forms an outer return portion; and adjacent bellows wall sections are connected via inner return portions.

15. A container according to Claim 14, wherein the latching arrangement is formed by the second wall portion being shorter than the first wall portion in each of the bellows wall sections, whereby each inner return portion forms an over-centre arrangement in the collapsed configuration.

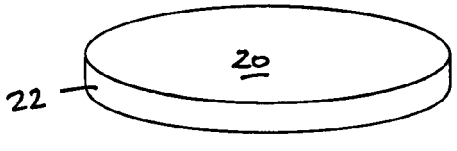

Fig 1b

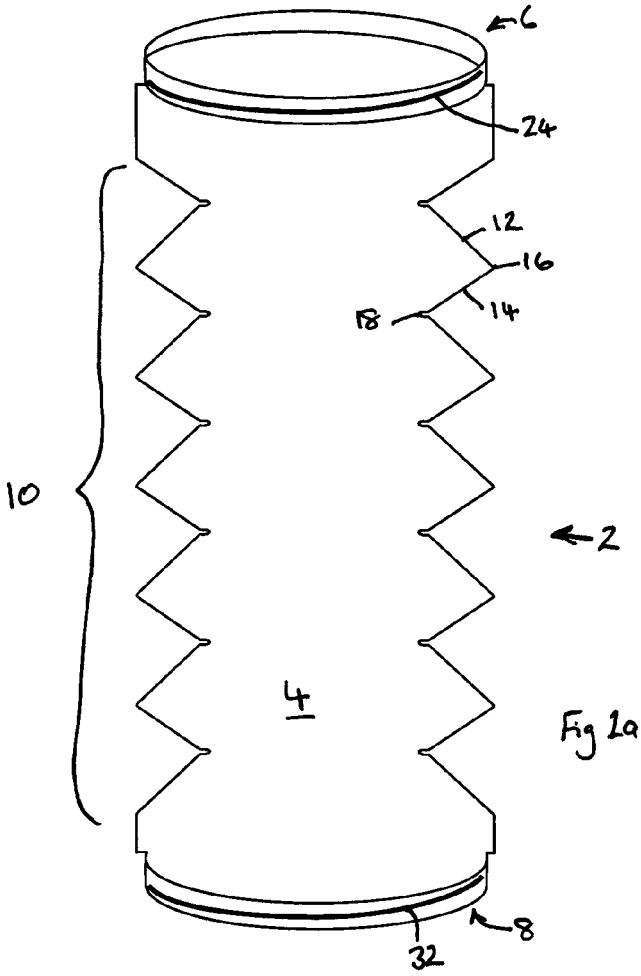

Fig 1a

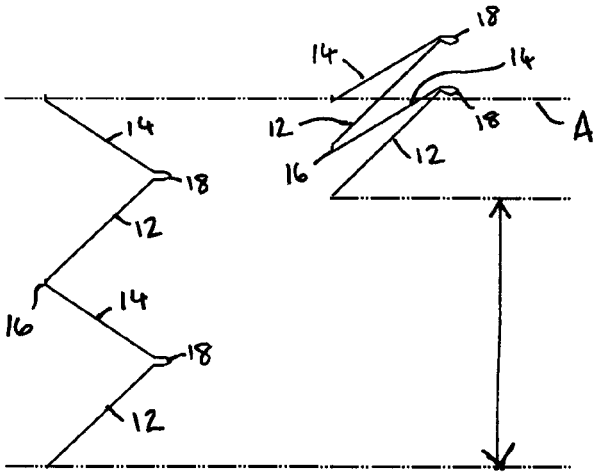

Fig 2a Fig 2b

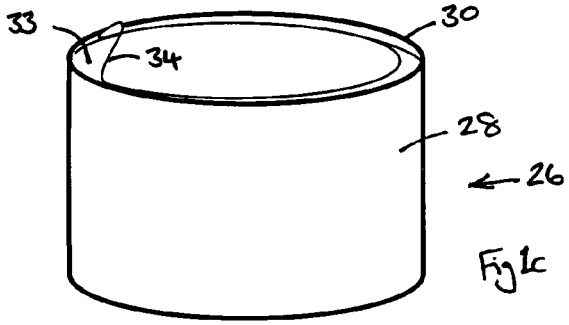

Fig 1c

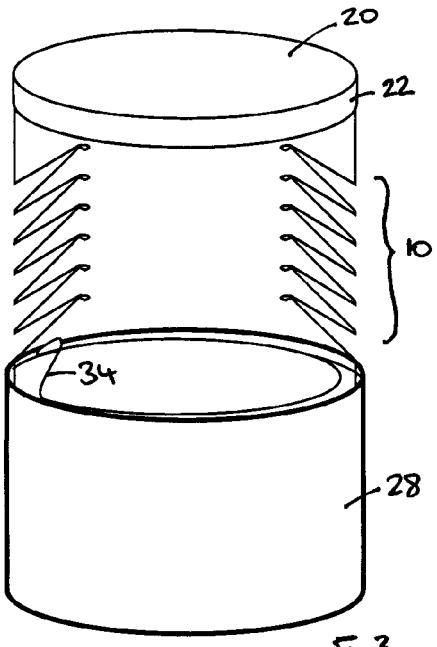

Fig 3

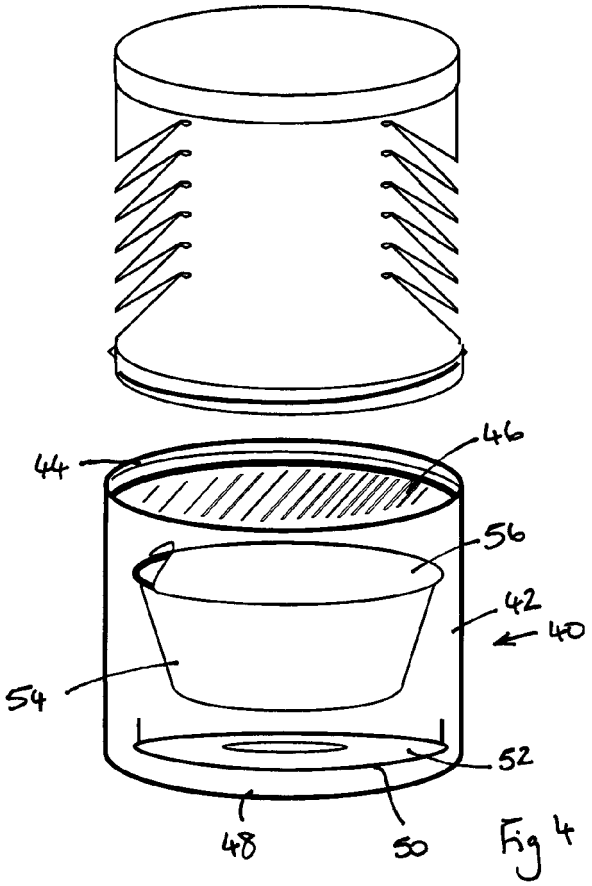

Fig 4

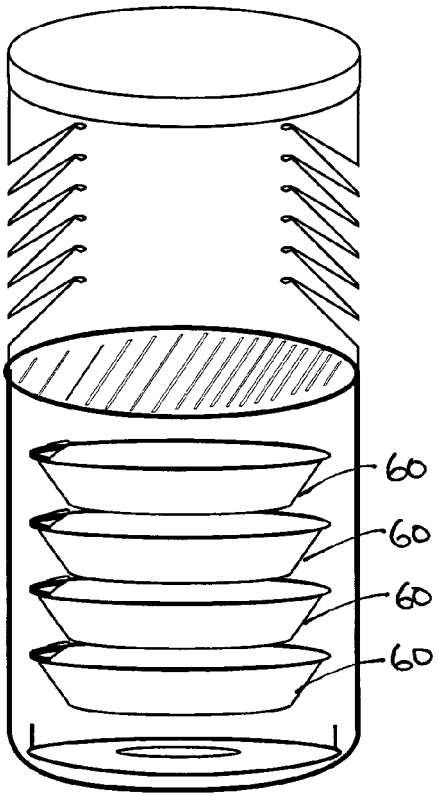

Fig 5

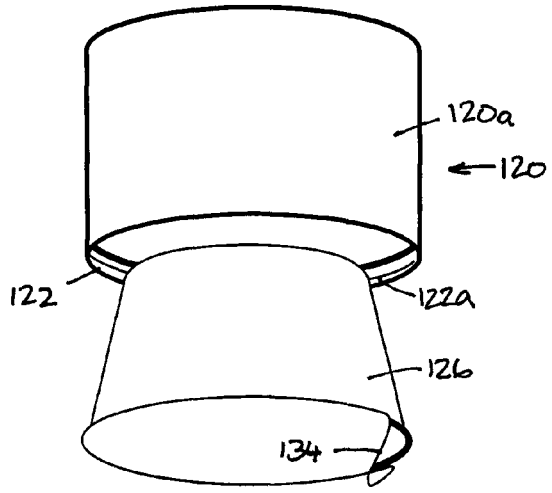

Fig 6a

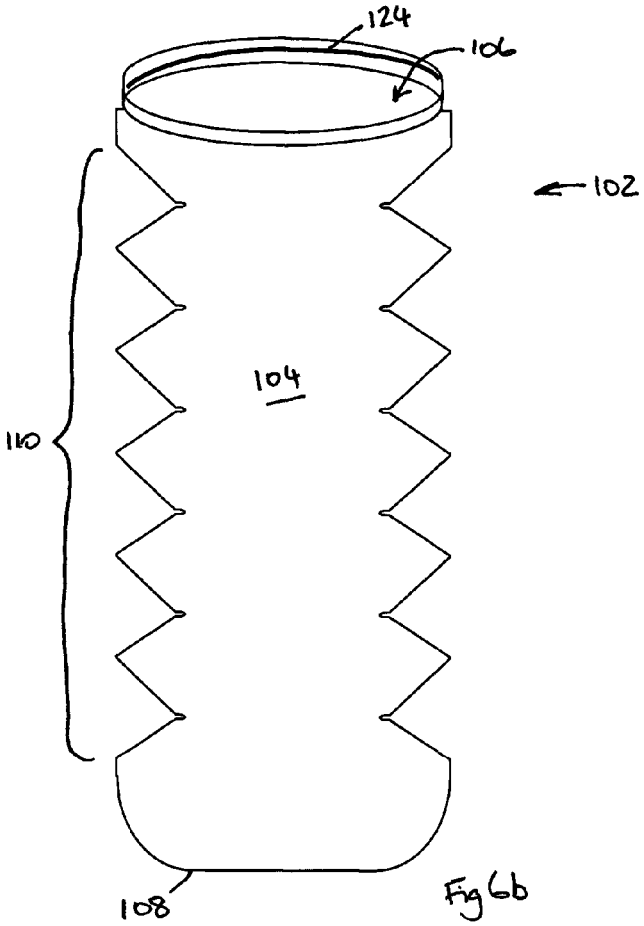

Fig 6b

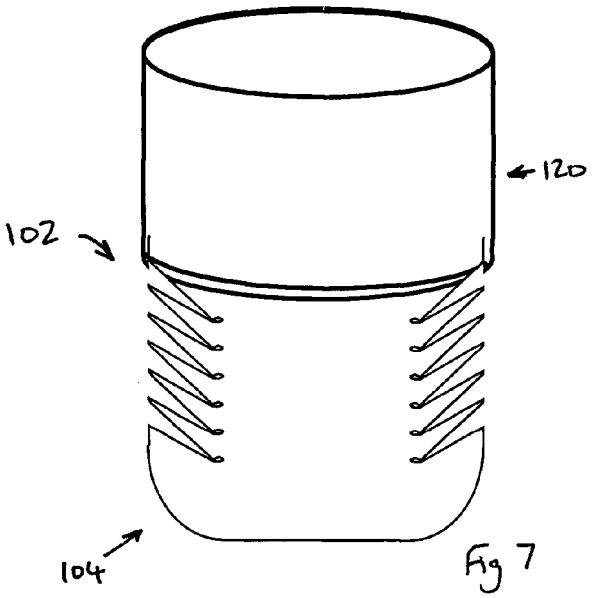

Fig 7

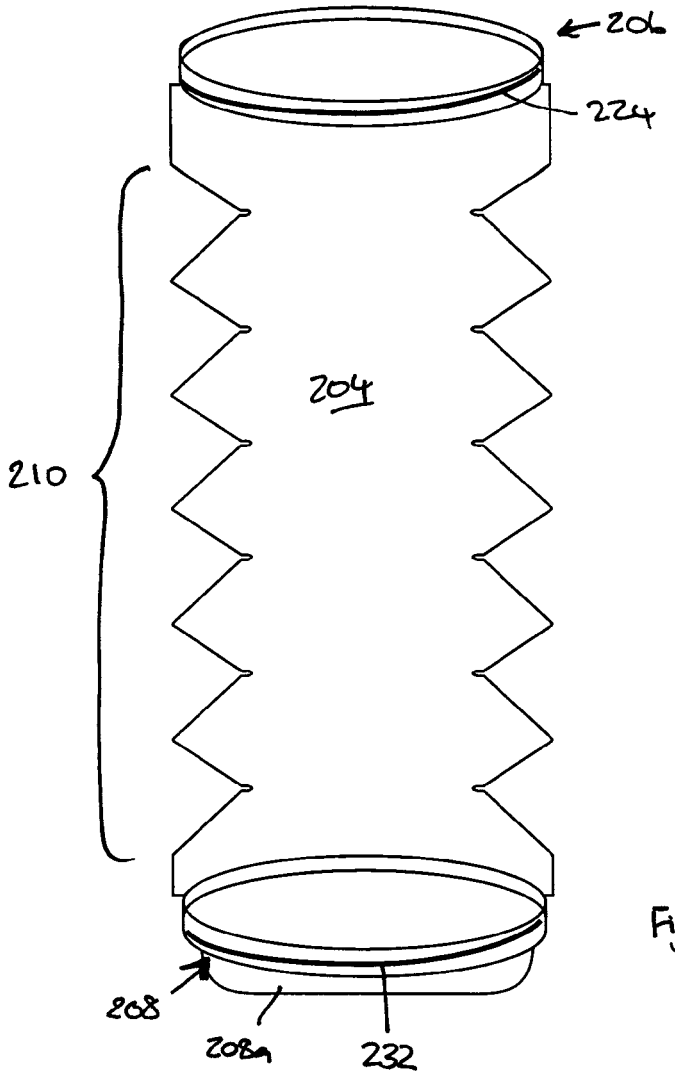

Fig 8a

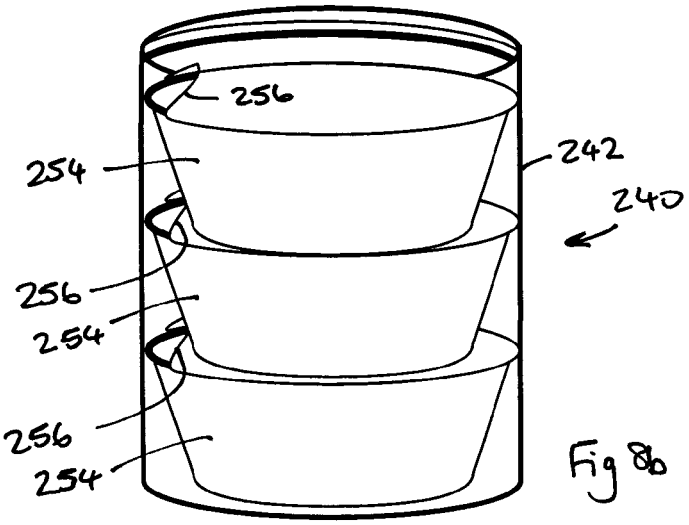

Fig 8b

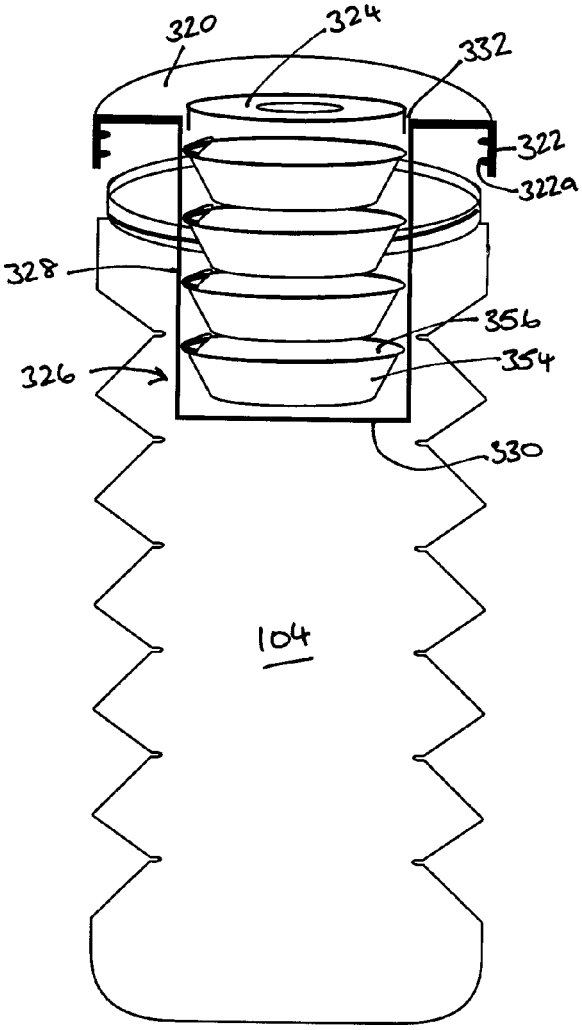
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Fig 9

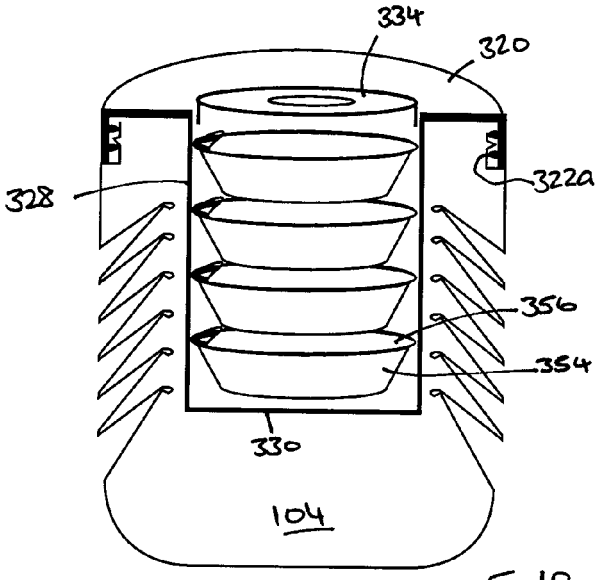
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Fig 10

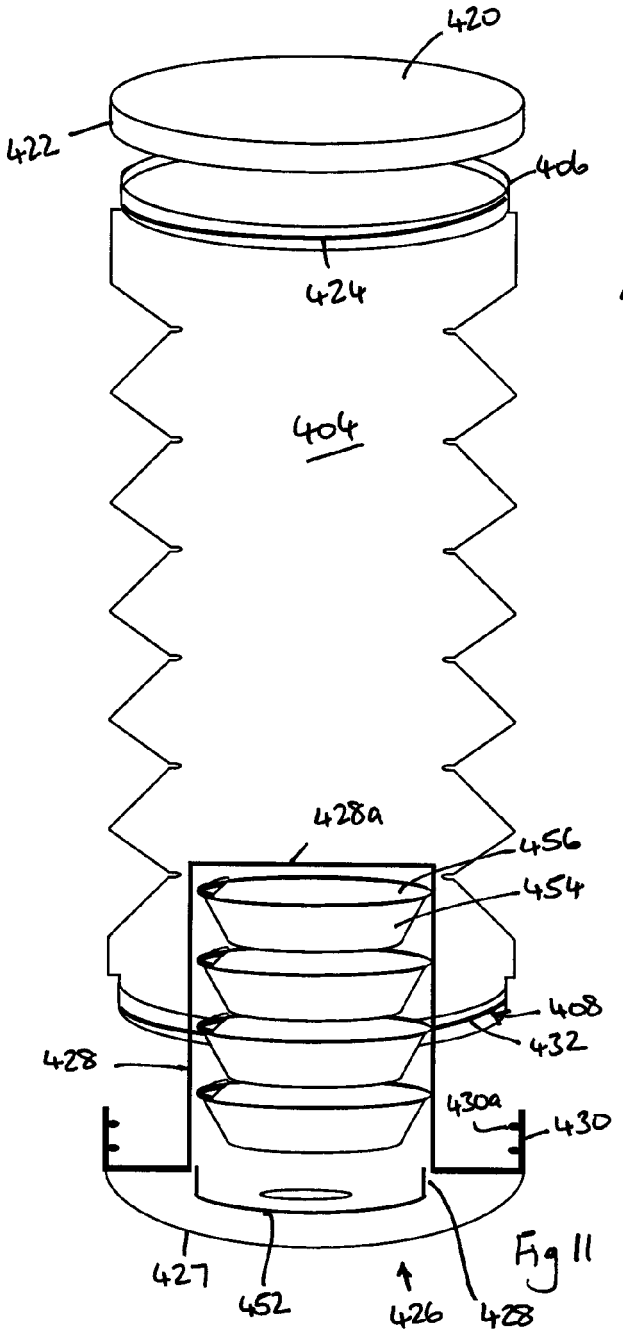
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Fig 11

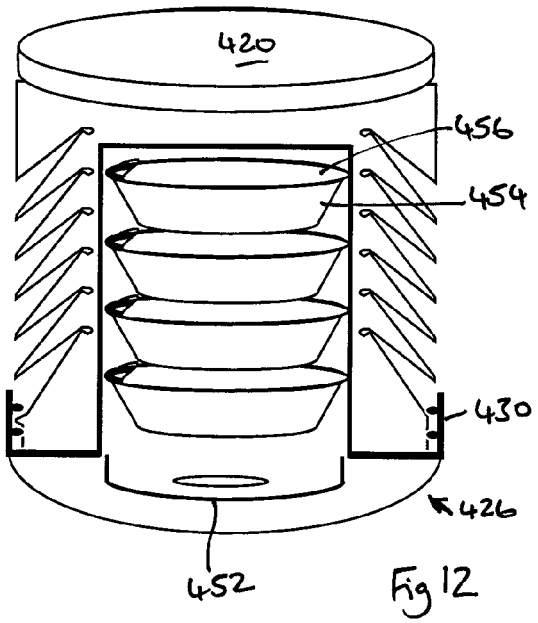
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Fig 12

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EUROPEAN SEARCH REPORT

Application Number
EP 20 17 8628

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Y	* the whole document *	14,15	
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B65D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	22 October 2020	Derrien, Yannick

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