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(54) Multi-compartment container and method of producing such container

Behälter mit mehreren Kammern und Verfahren zur Herstellung eines solchen Behälters

Réceptacle doté de compartiments multiples et procédé de production dudit réceptacle

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Description

[0001] The invention relates to a multi-compartment container comprising two interconnectable compartments and a method of producing a closure element for a multi-compartment container.

[0002] DE 10 2006 028 912 B4 refers to a closing device for a drinks container comprising an inner compartment for receiving a drink and a container opening which is arranged on the upper side and contains the closing device comprising at least one receiving region. The content of said receiving region is introduced into the inner compartment of the drinks container. The closing device further comprises an axially mobile closing element in the upper region, said closing element being connected to a lower covering element, and a receiving region being provided between the two elements. The receiving region comprises a supply opening, through which the contents of the receiving region can be released by an axial pushing process into the inner compartment of the drinks container. The inner compartment is intended to store dietary or other supplements that are small in volume in relation to the inner compartment of the drinks container. When carrying out the axial pushing process, the supplement is completely released.

[0003] DE 20 2008 015 235 U1 relates to a bottle, comprising a receiving body having a receiving space, in which a first component is present, and a bottle neck on which a bottle opening is provided. An insert is arranged in the bottle neck, said insert comprising at least one inner sleeve with a supply space in which a second component is present, wherein the inner sleeve has at least one recess at its circumference and is guided in a sealed manner in the bottle neck against at least two sealing lips such that an axial displacement of the inner sleeve with respect to the receiving body creates a fluid communication between the receiving space of the receiving body and the supply space of the inner sleeve. When carrying out the axial displacement of the inner sleeve, the second component is completely released.

[0004] DE 34 26 739 A1 refers to a two-component pack having a beaker arranged in the neck of the pack for receiving the one component and a screw-cap associated with the neck of the pack and having, projecting into the beaker, a collar the front rim of which forms a ram edge for severing the beaker in the region of a predetermined line of break by screwing the screw-cap up further beyond the normal position at sale. After the having severed the beaker in the region of the predetermined line of break, the second component is completely released.

[0005] DE 20 2005 016 492 U1 refers to a bottle comprising a body in which is stored clean and pure drinking water. The body comprises a storage container with a storage space and a filling device to fill the storage space with foodstuff for mixing. The storage container and mouth of the body of the bottle are interconnected by a threaded connection. A breakable sealing element is in-

stalled between the storage container and mouth of the bottle. Breaking this seal is achieved by a screwing movement of the storage container and the bottle. After the seal having been broken the foodstuff falls into the bottle and is completely mixed with the water. It is not possible to re-separate the body from the filling device after the seal has been broken.

[0006] DE 699 09 618 T2 discloses a multi-chamber container comprising a first container for receiving a first product component and a second container for receiving a second product component, said containers being rotationally coupled with one another and each comprising a communication opening for the mutual exchange of said products. Moreover, a closing device is provided for simultaneously closing the two communication openings, said closing device comprising an engaging device for introducing the rotational movement of one container into the closing device and said closing device further comprising guide devices which are coupled to the other container such that upon rotation of the closing device is moved into a position of releasing both communication openings. The container is based on a quite complex and cost-intensive construction.

[0007] JP H11011538 A refers to a two-component mixing container capable of sufficiently mixing two kinds of materials and having a simple structure. Said container comprises a first container on the outer circumferential surface of which a threaded part is formed and which is provided with an open projecting part, and a second container which is capable of screwing the projecting part of the first container and has a recessed part 24 provided with a closing surface to close an opening of the first container. A hole to communicate the inside of the containers with each other when the opening of the projecting part is detached from the closing surface is provided on the inner circumferential surface of the recessed part.

[0008] FR 2 694 920 A1 refers to a multi-compartment container according to the preamble of claim 1.

[0009] The above mentioned containers either lack the possibility to close the interconnection between the at least two compartments after having opened the interconnection once or they are based on a complex and cost-intensive construction.

[0010] The problem to be solved is to provide a multi-compartment container allowing to repeatedly establish and separate a fluid communication between two compartments, the multi-compartment container being based on a simple construction and inexpensive in manufacturing. Furthermore, methods of producing a closure element for such a multi-compartment container and a multi-compartment container shall be provided.

[0011] The problem is solved by the features of claims 1 and 4, respectively.

[0012] The closure element of the multi-compartment container according to the invention comprises

- a) a container with a compartment for storing content,

- b) at least an opening with a channel leading to the compartment,
- c) the channel allowing to insert a bottle neck of an insertion element in an extension direction of the channel,
- d) a coupling element allowing to connect the closure element to the insertion element being inserted in the channel,
- e) means for opening and closing the fluid communication by relative movement of the closure element to the insertion element.

[0013] The above mentioned opening allows adding content to and taking content from the compartment. Alternatively the closure element may comprise one or more additional openings to add content to and take content from the compartment. The closure element is used with an insertion element comprising a coupling element being complementary to the coupling element of the closure element. The closure element allows for easy creation of an multi-compartment container by inserting an insertion element with a bottle neck in an extension direction of the channel and to mix different contents being stored in the compartment of the closure element and in a compartment of the insertion element at any time by the means for opening and closing the fluid communication. The closure element may be manufactured easily and does not require any additional and cost-intensive movable parts, in particular inner movable parts. In other words, the closure element provides a compartment for storing content and means for opening and closing a fluid communication to an insertion element that may be inserted in the channel of the closure element and coupled to the closure element.

[0014] An important advantage of the closure element is that it may be easily designed for use with standard bottles as insertion elements.

[0015] The term "extension direction" (of the channel) refers to the two directions along the "extension axis" of the channel, e.g. the extension axis of a cylinder if the channel is cylindrical in shape. In some embodiments of the closure element said directions are referred to as "opening (extension) direction" and the "closing (extension) direction" meaning that a relative movement of the closure element in the "opening extension direction" opens the fluid communication and that a relative movement of the closure element in the "closing extension direction" closes the fluid communication.

[0016] Hereinafter, the term "element" means either "one-piece elements", e.g. elements being produced as one piece by injection moulding, or "multi-part elements" wherein several elements may be manufactured separately, but wherein the parts are then rigidly coupled to one resulting "element", e.g. by ultrasonic welding, screwing or any other appropriate joining technique. It is essential that the resulting element is robust and does not have any movable parts. Thus, one element may comprise several elements.

[0017] The coupling element and/or the means for opening and closing the fluid communication is a thread, in particular a female screw thread for insertion of a standard bottle neck (with a male screw thread), preferably a female screw thread being formed on the inner surface of the channel. Such a screw thread may be easily formed during a single manufacturing process (e.g. injection moulding) without the need for any post-processing.

[0018] In a further preferred embodiment the channel of the closure element is at least partly cylindrical in shape and the opening is formed in the cylindrical part of the channel. For example one or several openings may be formed in the cylinder wall of a cylindrical channel. Said embodiment, again, has advantages in manufacturing, as it is based on a simple and low-cost construction.

[0019] The relative movement of the closure element to an insertion element in the closing extension direction is preferably limited by a sealing element extending transverse to an extension direction of the channel, said sealing element preferably limiting the length of the channel. In particular, the sealing element extends perpendicular to the extension axis. Preferably the extension axis intersects the sealing element in the middle, i.e. the sealing element is centred with respect to the extension axis.

[0020] The sealing element is preferably planar in shape at least on the side directed to the channel such that the sealing element may seal the bottle neck of a completely inserted insertion element. The sealing element may also be planar in shape only along a circular ring corresponding to the face side of a bottle neck of the insertion element. It is essential that the sealing element allows closing the fluid communication to an insertion element being inserted into the channel.

[0021] The channel is formed by at least two interconnected parts. One of the two parts comprises the aforementioned sealing element and the other of the two parts comprises the aforementioned coupling element. In a further preferred embodiment the aforementioned at least two parts comprise corresponding contact surfaces being formed to be mutually complementary. Such contact surfaces may for example be planar surfaces being arranged transverse (preferably perpendicular) to the extension axis. Such contact surfaces may comprise a geometrical shape being optimized for joining, e.g. ultrasonic welding, multistage injection moulding or the like. The two interconnected parts are a sealing element and a channel element as described in detail later on. If the relative movement between the closure element and an insertion element shall be limited bidirectional, i.e. restricted to both directions along the extension axis (closing extension direction and opening extension direction), it is preferred to provide at least one stop element, preferably arranged in the opening extension direction of the channel. Such a stop element might have a stop surface, e.g. formed as a hook, extending transverse to the extension axis of the channel, preferably a stop surface extending perpendicular to the extension axis of the channel. Preferably a stop element is arranged on the

closure element, e.g. on the sealing element or on the channel element if the closure element comprises such elements.

[0022] Such a multi-compartment container is easy to manufacture and does not require any additional movable parts. The closure element and the insertion element, i.e. two parts without any additional and without any movable parts, are sufficient to repeatedly establish and separate a fluid communication between the two compartments.

[0023] The insertion element of the inventive multi-compartment container comprises a screw thread, in particular a male screw thread on the outer surface corresponding to a female screw thread on the inner surface of the channel of the closure element. Such screw threads have been known from the prior art for decades. The production costs of such screw threads are low, in particular if the closure element and the insertion element are formed of plastic material like PET.

[0024] Furthermore, the insertion element of the inventive multi-compartment container comprises a support ring, in particular a planar support ring perpendicular to the extension axis, formed on the bottle neck of the insertion element. Bottles with support ring known from the prior art can be used. Such support rings may form one part of a stop element in the opening extension direction. Further details concerning this aspect are described in relation with an example described below and the drawings.

[0025] In a preferred embodiment the closure element and the insertion element have circular cross-sections. In particular the closure element and the insertion element are essentially cylindrical in shape, preferably such that the first element and the second element have - in the closed condition - the shape of a one piece container with a continuous contour.

[0026] As already mentioned, the closure element and/or the insertion element of an inventive multi-compartment container are preferably made of polyethylene terephthalate (PET). Said material is light, unbreakable, well-proven in the field of drink containers and allows for low-cost manufacturing.

[0027] The invention also refers to a method of producing a closure element for a multi-compartment container as described above, in particular a closure element as described above, comprising the following steps:

- a) producing a sealing element having a planar sealing section and a contact surface, being arranged transverse to the extension axis,
- b) producing a channel element having a channel allowing to insert a bottle neck of an insertion element in an extension direction of the channel, and having a contact surface being formed to be mutually complementary to the contact surface of the sealing element and being arranged transverse to the extension axis,
- c) producing a container element with a compart-

ment for storing content,

- d) connecting the sealing element, the channel element and the container element by welding.

[0028] The aforementioned method allows for an easy and economical manufacturing process.

[0029] A method, not part of the present invention, of producing a multi-compartment container comprises a closure element as described above wherein the compartment of the insertion element is filled with a first content, the insertion element and the closure element are connected such that a multi-compartment container is formed, wherein the fluid communication between the compartment of the closure element and the compartment of the insertion element is closed and wherein the compartment of the closure element is filled with a second content.

[0030] In another method, not part of the present invention, of producing a multi-compartment container the channel element, the sealing element and/or the container are formed with at least one stop element corresponding to a support ring formed on the insertion element, wherein the insertion element is screwed into the closure element such that the stop element(s) limit(s) the relative movement in the opening extension direction. Preferably, the stop element(s) limit(s) the relative movement in the opening direction in such a way that at full open the insertion element is still engaged with one full thread of the channel element when the stop element, in particular a hook of the stop element, engages with the support ring of the insertion element.

[0031] Further embodiments and advantages of the invention are described below with reference to the drawings.

Figures 1 a and 1 b show an example of an inventive multi-compartment container comprising a closure element and an insertion element in a closed condition (fig. 1 a) and in an opened condition (fig. 1 b) in perspective views from the side and above.

Figures 2a and 2b show the inventive multi-compartment container of figures 1 a and 1 b in a closed condition (fig. 2a) and in an opened condition (fig. 2b) in perspective views from the side and below.

Figures 3a and 3b show the inventive multi-compartment container of figures 1 a and 1 b in a closed condition (fig. 3a) and in an opened condition (fig. 3b) in side views.

Figures 4a and 4b show the inventive multi-compartment container of figures 1 a and 1 b in a closed condition (fig. 4a) and in an opened condition (fig. 4b) in sectional views.

Figures 5a and 5b show the details being marked with Va and Vb in figures 4a and 4b.

Figures 6a, 6b and 6c show the insertion element of the inventive multi-compartment container of figures 1 a and 1 b in a perspective view from the side and somewhat from above (fig. 6a), in a perspective view from the side and somewhat from below (fig. 6b) and in a sectional view according to a longitudinal cut through the centre axis of the lower element (fig. 6c).

Figures 7a, 7b and 7c show the closure element of the inventive multi-compartment container of figures 1 a and 1 b in a perspective view from the side and somewhat from above (fig. 7a), in a perspective view from the side and somewhat from below (fig. 7b) and in a sectional view according to a longitudinal cut through the centre axis of the upper element (fig. 7c).

Figures 8a, 8b and 8c show one subelement of the closure element of the multi-compartment container of figures 1 a and 1 b in a perspective view from the side and above (fig. 8a), in a perspective view from the side and below (fig. 8b) and in a perspective side view (fig. 8c).

[0032] Figures 1-4 show an inventive multi-compartment container 10 essentially comprising two elements, namely a closure element 12 and an insertion element 14. As can be seen in figure 4, the closure element 12 comprises a compartment 16 for storing content, and the insertion element comprises a compartment 18 for storing content. In a closed condition, as shown in figures 1a, 2a, 3a and 4a, there is no fluid communication between the two compartments 16, 18. In an opened condition, as shown in figures 1b, 2b, 3b and 4b, content may flow through a channel 20 and openings 44 from the compartment 16 of the closure element 12 to the compartment 18 of the insertion element 14 and vice versa. The extension axis of the channel 20 is indicated with "e" in figures 5a and 5b. The opening direction is indicated with "o" and the closing direction is indicated with "c" in figures 5a and 5b.

[0033] Figures 6a, 6b and 6c show the insertion element 14. It comprises a cylindrical bottle neck 22 with a male screw thread 24 on the outer surface and a support ring 26.

[0034] Figures 7a, 7b and 7c show the closure element 12. It comprises two essentially cylindrical subelements, namely a container element 28 and a connecting element 30. Both subelements 28, 30 are preferably produced by injection moulding and rigidly connected by ultrasonic welding. The connecting element 30 is shown in detail in figures 8a, 8b and 8c.

[0035] The container element 28 forms the compartment 16 of the closure element 12. It further comprises a cylindrical bottle neck 32 with a male screw thread on its outer surface. In figures 7a, 7b and 7c the bottle neck 32 is covered by a cap 34 being screwed on the bottle neck 32. The bottle neck 32 allows filling in and taking out content from the upper side of the closure element

12. The bottom of the container element 28 is formed by the connecting element 30 being rigidly connected to the container element 28.

[0036] As can be seen in figures 5a and 5b, the connecting element 30 comprises two subelements, namely a sealing element 36 and a channel element 38.

[0037] The sealing element 36 comprises a circular ring section 40 with a contact surface 58 and a recessed circular passage element 42 with a planar sealing section 60. The passage element 42 has several openings 44 at the circumference.

[0038] The channel element 38 comprises a cylindrical section 46 with a female screw thread 48 corresponding to the male screw thread 24 of the insertion element 14. Furthermore, the channel element 38 comprises several elastic stop elements 50 with stop surfaces 56 being formed perpendicular to the extension axis e. The stop surfaces 56 are formed as hooks in the embodiment shown in the figures. In addition the channel element 38 comprises a contact surface 62 corresponding to the contact surface 58 of the sealing element 36.

[0039] The sealing element 36 and the channel element 38 - together forming the connecting element 30 - are rigidly connected by ultrasonic welding. The connecting element 30 and the container element 28 - together forming the essential part of the closure element - are also rigidly connected by ultrasonic welding.

[0040] As can be seen in figures 5a and 5b, the sealing element 36 comprises a separate liner 52 made of ethylene vinyl acetate (EVA).

[0041] When the multi-compartment container 10 is in a closed condition (see figure 5a), the bottle neck 22 is pushed with its face side 54 against the liner 52. Thus, the insertion element is sealed by the liner of the closure element and the fluid communication is closed.

[0042] When the multi-compartment container 10 is in an opened condition (see figure 5b), the face side 54 is distant from the liner 52 and thus allows content flowing through the channel 20 and the circumferential openings 44 from the compartment 16 of the closure element 12 to the compartment 18 of the insertion element 14 and vice versa.

[0043] As can be seen in figure 5a the liner 52 forms a stop element for a relative movement in the closing direction.

[0044] As can be seen in figure 5b the stop surfaces 56 of stop elements 50 of the closure element 12 restrict the relative movement of the closure element 12 in the opening direction. In the position shown in figure 5b the stop surfaces 54 being arranged perpendicular to the extension axis abut on the support ring 26 of the insertion element 14.

[0045] As can be seen in Figures 8b and 8c, the closure element 12 comprises four stop elements 50 being arranged between the walls 64 of the channel 20 and the outer walls 66 of the channel element 38.

[0046] Changing the condition of the inventive multi-compartment container 10 from the closed condition to

the opened condition and vice versa takes place by simply rotating the closure element 12 relative to the insertion element 14 thereby causing a relative movement of the closure element to the insertion element 14 along the extension axis "e". Thus, the fluid communication between the compartment 16 of the closure element 12 and the compartment 18 of the insertion element 14 can be repeatedly opened and closed.

[0047] The stop elements 50 are elastic at least to such an extent that they may be moved outwards to pass the support ring 26 of an insertion element 14 when the insertion element 14 with a support ring 26 is initially screwed into the channel element 30 of the closure element 12. After having passed the support ring 26, the stop elements 50 spring back to the position shown in figures 5a and 5b limiting the relative movement of the closure element 12 and the insertion element 14 in the opening direction as described above. Preferably the stop elements 50 are designed such that the closure element 12 and the insertion element 14 may not be separated after the stop elements 50 have passed the support ring 26. This might guarantee that the content of the compartments 16, 18 may be inserted by the manufacturer only.

[0048] The features mentioned in the description above, in the claims and shown in the figures can be combined either separately or in any combination in order to realise the invention. The invention is not limited to the above-mentioned embodiment. It can be varied and modified taking into account the claims, the description and the knowledge of the person skilled in the art. In particular the number of elements, e.g. the number of stop elements, the number of openings etc. does not limit the scope of the invention. The person skilled in the art may vary such details applying their special knowledge.

Reference numbers

[0049]

10 multi-compartment container
12 closure element
14 insertion element
16 compartment (of the closure element)
18 compartment (of the insertion element)
20 channel
22 bottle neck
24 male screw thread
26 support ring
28 container element
30 connecting element
32 bottle neck (of the closure element)
34 cap
36 sealing element
38 channel element
40 circular ring section
42 passage element
44 opening

46 cylindrical section
48 female screw thread
50 stop element
52 liner
5 54 face side (of the bottle neck)
56 stop surfaces
58 contact surface
60 sealing section
62 contact surface
10 64 wall (of the channel)
66 outer wall (of the channel element)

Claims

1. Multi-compartment container comprising a closure element (12) and an insertion element (14), wherein the closure element (12) comprises

- a) a container with a first compartment (16) for storing content,
- b) at least one opening (44) with a channel (20) leading to the compartment (16),
- c) the channel (20) allowing to insert a bottle neck (22) of the insertion element (14) in an extension direction of the channel (20),
- d) a coupling element allowing to connect the closure element to the insertion element (14) being inserted into the channel (20),
- e) means for opening and closing a fluid communication by relative movement of the closure element to the insertion element,

wherein the insertion element (14) comprises a second compartment (18), a bottle neck (22) with an opening to fill in and to take out a second content, a coupling element being complementary to the coupling element of the closure element, the coupling element allowing a relative movement between the closure element and the insertion element along an extension axis (e) of the channel (20) and wherein a fluid communication from the second compartment (18) of the insertion element (14) through the channel (20) to the first compartment (16) of the closure element (12) is opened and closed by relative movement of the closure element (12) to the insertion element (14) along the extension axis (e), **characterized in that** the first compartment (16) is formed by a container element (28) comprising and being rigidly connected at its bottom to a connecting element (30), the connecting element comprising a sealing element (36) and a channel element (38), wherein the sealing element (36) and the channel element (38) both comprise contact surfaces (58, 62) being formed to be mutually complementary and being arranged transverse to the extension axis (e) and wherein the channel element (38) is formed with at least one stop element (50) corresponding to a sup-

port ring (26) formed on the insertion element (14), wherein the insertion element comprises a screw thread (24) and is screwed into the closure element (12) such that the stop element (50) limits the relative movement between the closure element (12) and the insertion element (14) in the opening extension direction.

2. Multi-compartment container according to one or more of the preceding claims, **characterized in that** the closure element (12) and the insertion element (14) have circular cross-sections.
3. Multi-compartment container according to one or more of the preceding claims, **characterized in that** the closure element (12) and/or the insertion element (14) are made of polyethylene terephthalate (PET).
4. Method of producing a multi-compartment container according to one or several of the claims 1-3 comprising the following steps:

- a) producing a sealing element (36) having a planar sealing section (60) and a contact surface (58) being arranged transverse to the extension axis (e),
- b) producing a channel element (38) having a channel (20) allowing to insert a bottle neck (22) of an insertion element (14) in an extension direction of the channel (20) and having a contact surface (62) being formed to be mutually complementary to the contact surface (58) of the sealing element (36) and being arranged transverse to the extension axis (e),
- c) producing a container element (28) with a compartment (16) for storing content,
- d) connecting the sealing element (36), the channel element (38) and the container element (28) by welding.

Patentansprüche

1. Behälter mit mehreren Kammern, umfassend ein Verschlusselement (12) und ein Einführelement (14), wobei das Verschlusselement (12)
 - a) einen Behälter mit einer ersten Kammer (16) zur Aufnahme von Inhalt,
 - b) wenigstens eine Öffnung (44) mit einem Kanal (20), der zu der Kammer (16) führt,
 - c) wobei der Kanal (20) das Einführen eines Flaschenhalses (22) des Einführelements (14) in einer Erstreckungsrichtung des Kanals (20) ermöglicht,
 - d) ein Kupplungselement, das das Verbinden des Verschlusselements mit dem in den Kanal (20) eingeführten Einführelement (14) ermög-

licht,

e) Mittel zum Öffnen und Schließen einer Fluidverbindung durch relatives Bewegen des Verschlusselements in Bezug auf das Einführelement

umfasst,

wobei das Einführelement (14) eine zweite Kammer (18), einen Flaschenhals (22) mit einer Öffnung zum Einfüllen und Entnehmen eines zweiten Inhalts, ein mit dem Kupplungselement des Verschlusselements komplementäres Kupplungselement umfasst, wobei das Kupplungselement eine relative Bewegung zwischen dem Verschlusselement und dem Einführelement entlang einer Erstreckungsachse (e) des Kanals (20) ermöglicht und wobei eine Fluidverbindung von der zweiten Kammer (18) des Einführelements (14) durch den Kanal (20) zur ersten Kammer (16) des Verschlusselements (12) durch eine relative Bewegung des Verschlusselements (12) in Bezug auf das Einführelement (14) entlang der Erstreckungsachse (e) geöffnet und geschlossen wird, **dadurch gekennzeichnet, dass**

die erste Kammer (16) durch ein Behälterelement (28) gebildet wird, das ein Verbindungselement (30) umfasst und an seiner Unterseite starr damit verbunden ist, wobei das Verbindungselement ein Dichtelement (36) und ein Kanalelement (38) umfasst, wobei das Dichtelement (36) und das Kanalelement (38) beide Kontaktflächen (58, 62) umfassen, die so geformt sind, dass sie komplementär zueinander und quer zur Erstreckungsachse (e) angeordnet sind, und

wobei das Kanalelement (38) mit wenigstens einem Anslageelement (50) gebildet ist, das das Gegenstück eines auf dem Einführelement (14) gebildeten Stützrings (26) ist, wobei das Einführelement ein Schraubgewinde (24) umfasst und so in das Verschlusselement (12) geschraubt ist, dass das Anslageelement (50) die relative Bewegung zwischen dem Verschlusselement (12) und dem Einführelement (14) in Richtung der Öffnungsverlängerung begrenzt.

2. Behälter mit mehreren Kammern nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** das Verschlusselement (12) und das Einführelement (14) kreisförmige Querschnitte aufweisen.
3. Behälter mit mehreren Kammern nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** das Verschlusselement (12) und/oder das Einführelement (14) aus Polyethylenterephthalat (PET) bestehen.
4. Verfahren zur Herstellung eines Behälters mit mehreren Kammern nach einem oder mehreren der An-

sprüche 1-3, umfassend die folgenden Schritte:

- a) Herstellen eines Dichtelements (36) mit einem planaren Dichtquerschnitt (60) und einer Kontaktfläche (58), die quer zur Erstreckungsachse (e) ausgerichtet sind,
- b) Herstellen eines Kanalelements (38) mit einem Kanal (20), der das Einführen eines Flaschenhalses (22) eines Einführelements (14) in einer Erstreckungsrichtung des Kanals (20) ermöglicht und eine Kontaktfläche (62) aufweist, die so geformt ist, dass sie komplementär zur Kontaktfläche (58) des Dichtelements (36) und quer zur Erstreckungsachse (e) angeordnet ist,
- c) Herstellen eines Behälterelements (28) mit einer Kammer (16) zur Aufnahme von Inhalt,
- d) Verbinden des Dichtelements (36), des Kanalelements (38) und des Behälterelements (28) durch Schweißen.

Revendications

1. Récipient à compartiment multiple comprenant un élément de fermeture (12) et un élément d'insertion (14), dans lequel l'élément de fermeture (12) comprend :
 - a) un récipient ayant un premier compartiment (16) pour stocker un contenu,
 - b) au moins une ouverture (44) ayant un canal (20) aboutissant au compartiment (16),
 - c) le canal (20) permettant l'insertion d'un goulot (22) de l'élément d'insertion (14) dans une direction d'extension du canal (20),
 - d) un élément de liaison permettant de relier l'élément de fermeture à l'élément d'insertion (14) inséré dans le canal (20),
 - e) des moyens pour ouvrir et fermer une communication de fluide par un mouvement relatif de l'élément de fermeture vers l'élément d'insertion,
 dans lequel l'élément d'insertion (14) comprend un second compartiment (18), un goulot (22) ayant une ouverture de remplissage et de prélèvement d'un second contenu, un élément de liaison complémentaire de l'élément de liaison de l'élément de fermeture, l'élément de liaison permettant un mouvement relatif entre l'élément de fermeture et l'élément d'insertion le long d'un axe d'extension (e) du canal (20), et dans lequel une communication de fluide depuis le second compartiment (18) de l'élément d'insertion (14) à travers le canal (20) vers le premier compartiment (16) de l'élément de fermeture (12) est ouvert et fermé par un mouvement relatif de l'élément de fermeture (12) vers l'élément d'insertion (14) le long de l'axe d'extension (e),

caractérisé en ce que

le premier compartiment (16) est formé par un élément de récipient (28) comprenant un élément de liaison (30) et relié de manière rigide à celui-ci au niveau de son fond, l'élément de liaison comprenant un élément d'étanchéité (36) et un élément de canal (38), l'élément d'étanchéité (36) et l'élément de canal (38) comprenant tous deux des surfaces de contact (58, 62) formées pour être mutuellement complémentaires et agencées transversalement par rapport à l'axe d'extension (e) et l'élément de canal (38) étant muni d'au moins un élément de butée (50) correspondant à un anneau de support (26) formé sur l'élément d'insertion (14), l'élément d'insertion comprenant un pas de vis (24) et étant vissé dans l'élément de fermeture (12) de telle sorte que l'élément de butée (50) limite le mouvement relatif entre l'élément de fermeture (12) et l'élément d'insertion (14) dans la direction d'extension de l'ouverture.

2. Récipient à compartiment multiple selon une ou plusieurs des revendications précédentes, **caractérisé en ce que** l'élément de fermeture (12) et l'élément d'insertion (14) ont des sections transversales circulaires.
3. Récipient à compartiment multiple selon une ou plusieurs des revendications précédentes, **caractérisé en ce que** l'élément de fermeture (12) et/ou l'élément d'insertion (14) sont constitués de polyéthylène téréphtalate (PET).
4. Procédé de production d'un récipient à compartiment multiple selon une ou plusieurs des revendications 1 à 3, comprenant les étapes suivantes :
 - a) produire un élément d'étanchéité (36) ayant une section d'étanchéité plane (60) et une surface de contact (58) agencées transversalement à l'axe d'extension (e),
 - b) produire un élément de canal (38) ayant un canal (20) permettant d'insérer un goulot (22) d'un élément d'insertion (14) dans une direction d'extension du canal (20) et ayant une surface de contact (62) formée pour être mutuellement complémentaire à la surface de contact (58) de l'élément d'étanchéité (36) et agencée transversalement à l'axe d'extension (e),
 - c) produire un élément de récipient (28) ayant un compartiment (16) pour stocker un contenu,
 - d) relier l'élément d'étanchéité (36), l'élément de canal (38) et l'élément de récipient (28) par soudage.

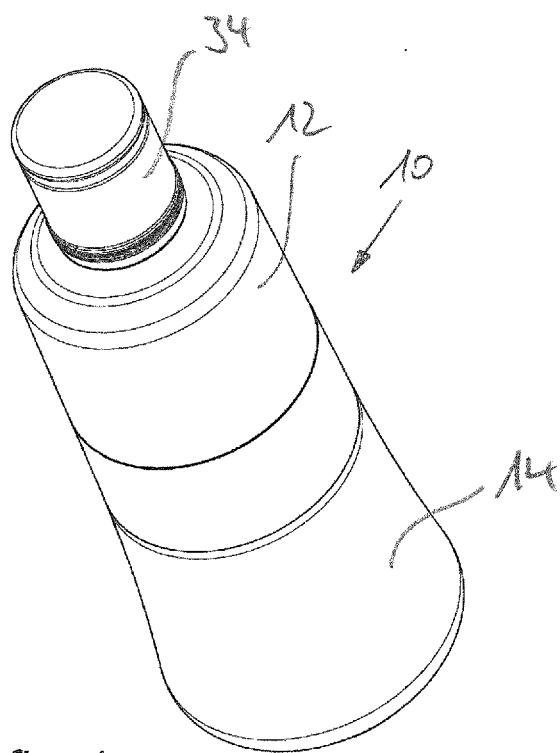


fig. 1a

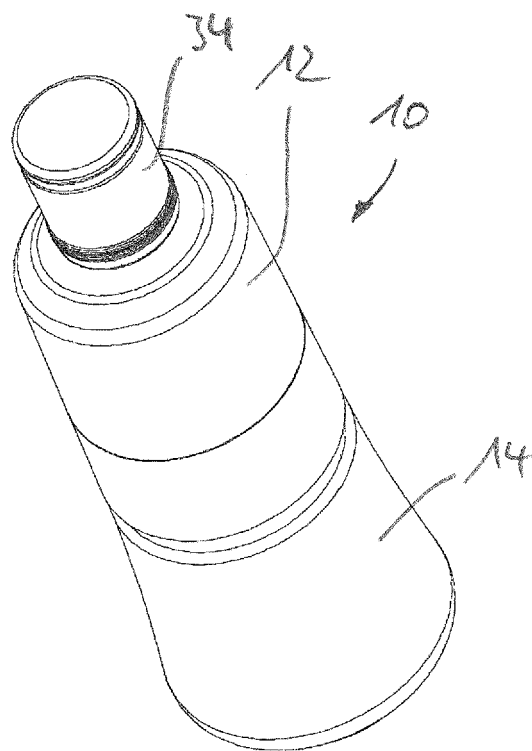


fig. 1b

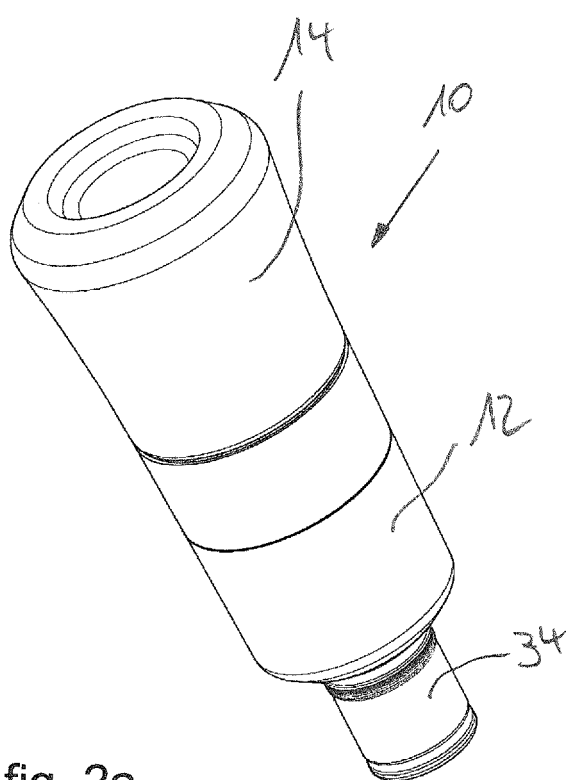


fig. 2a

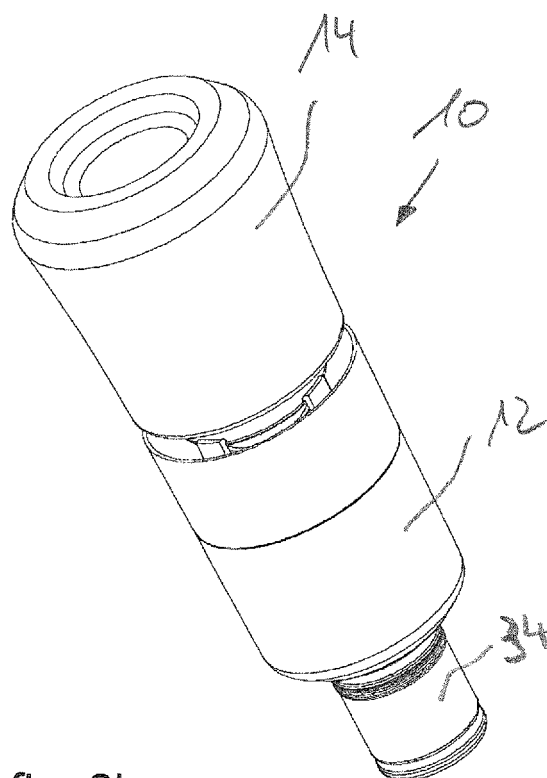


fig. 2b

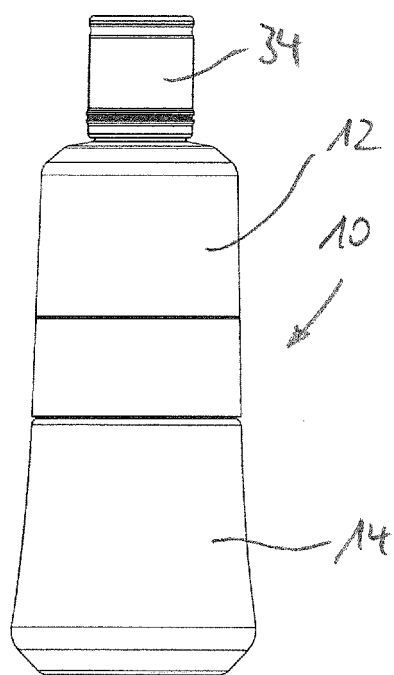


fig. 3a

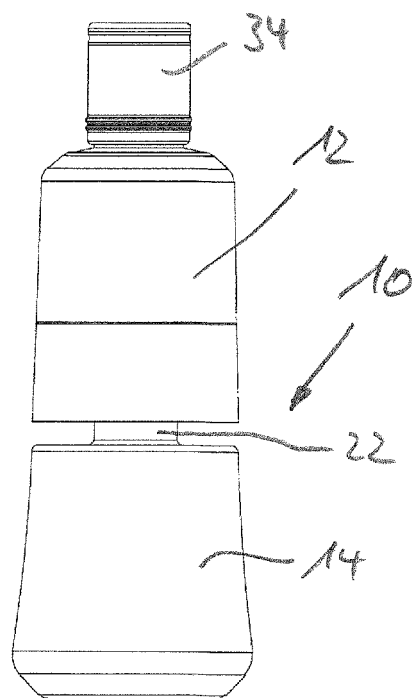


fig. 3b

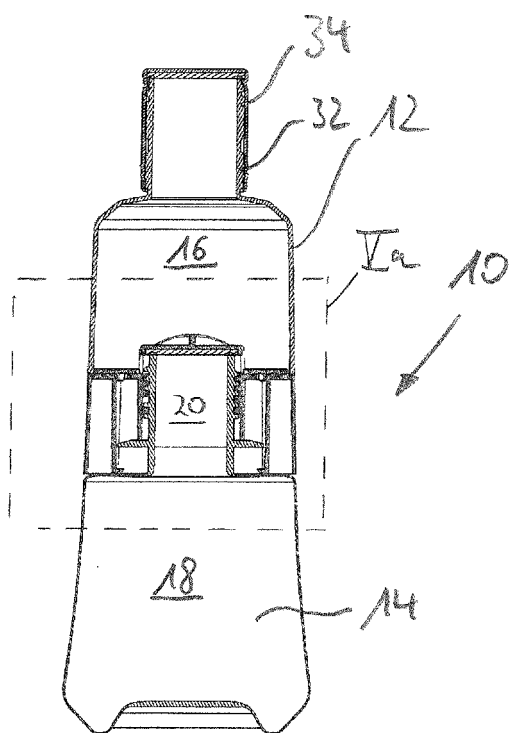


fig. 4a

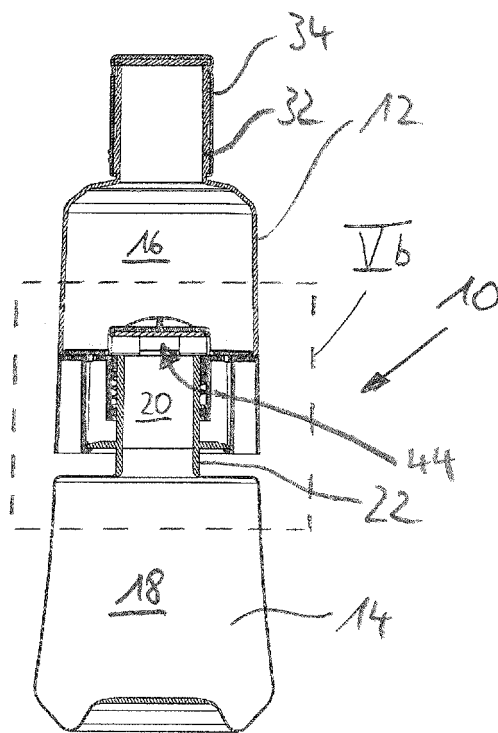


fig. 4b

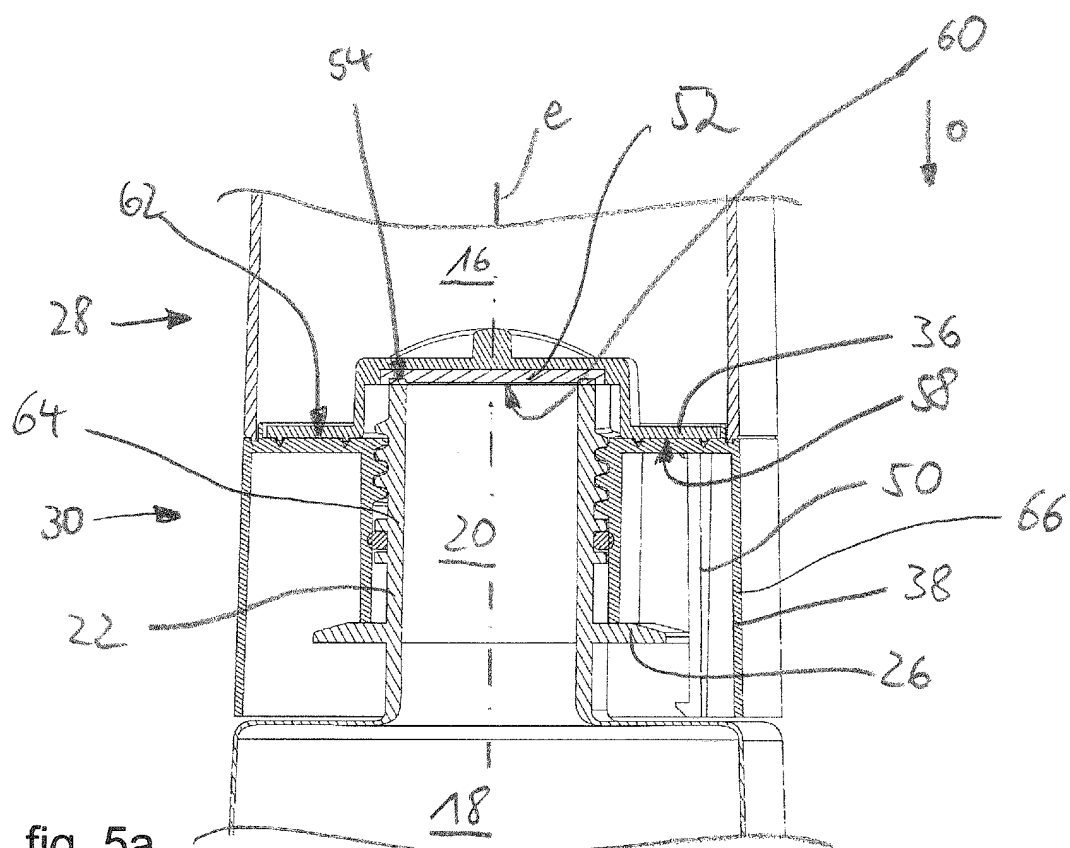


fig. 5a

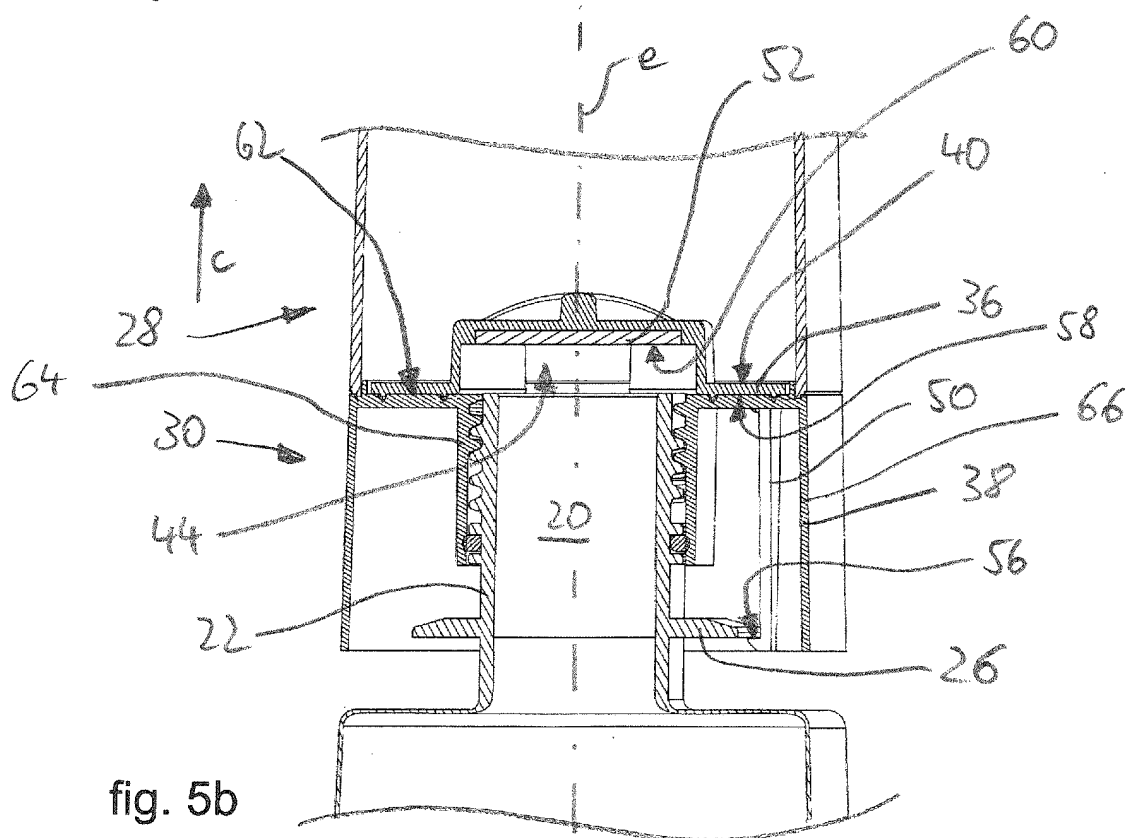


fig. 5b

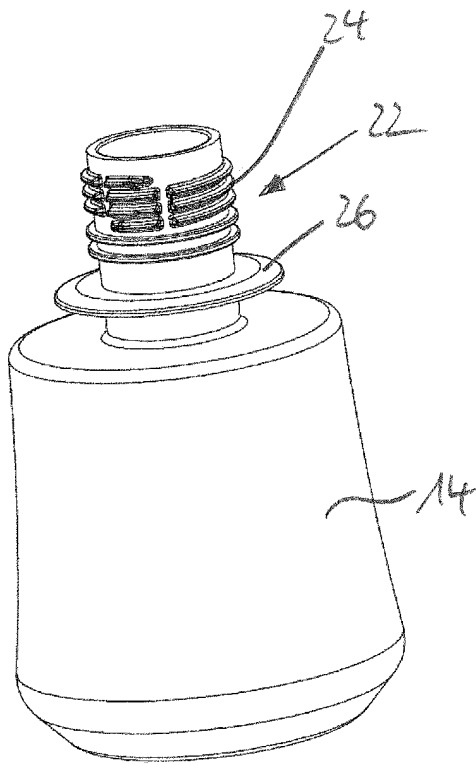


fig. 6a

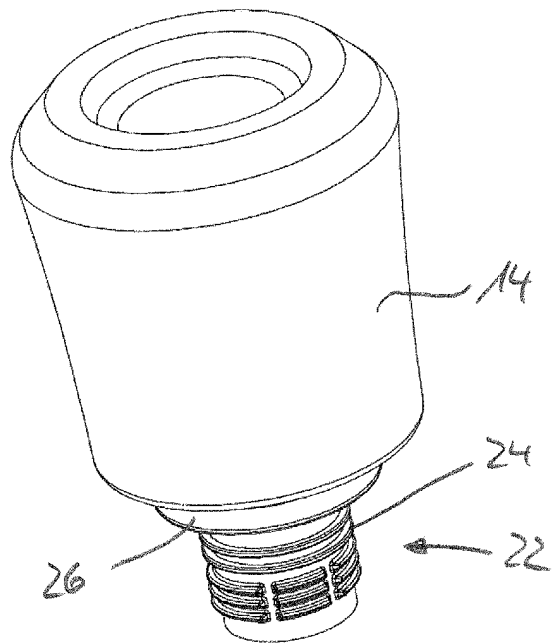


fig. 6b

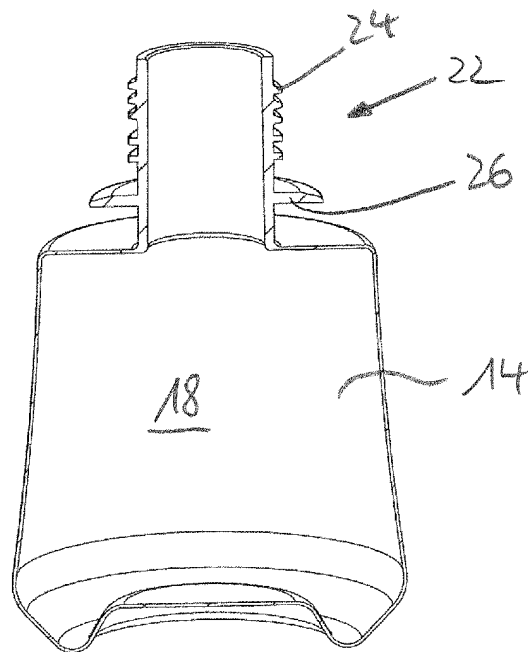


fig. 6c

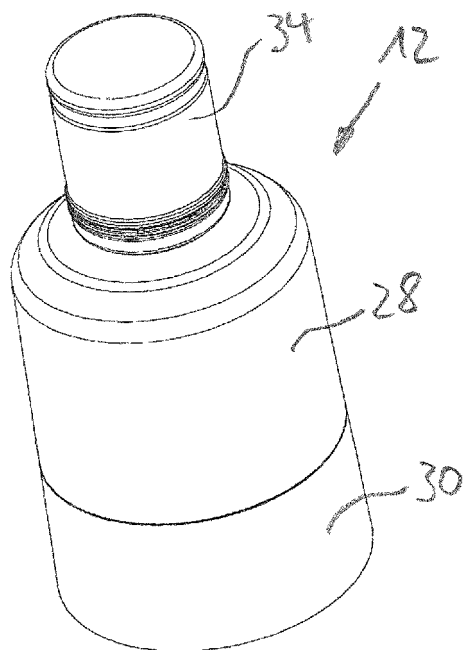


fig. 7a

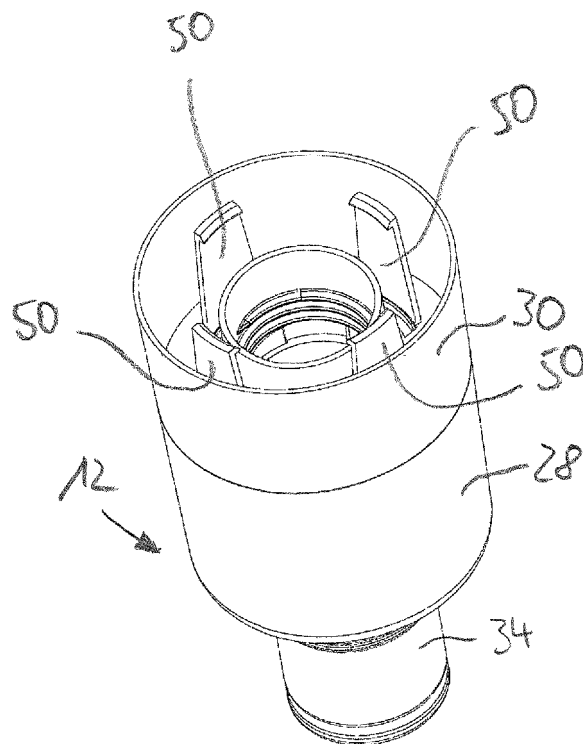


fig. 7b

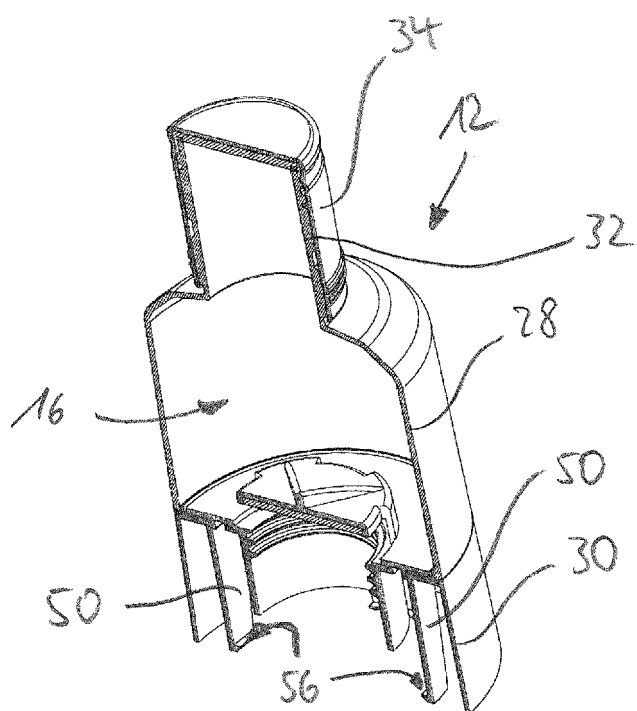


fig. 7c

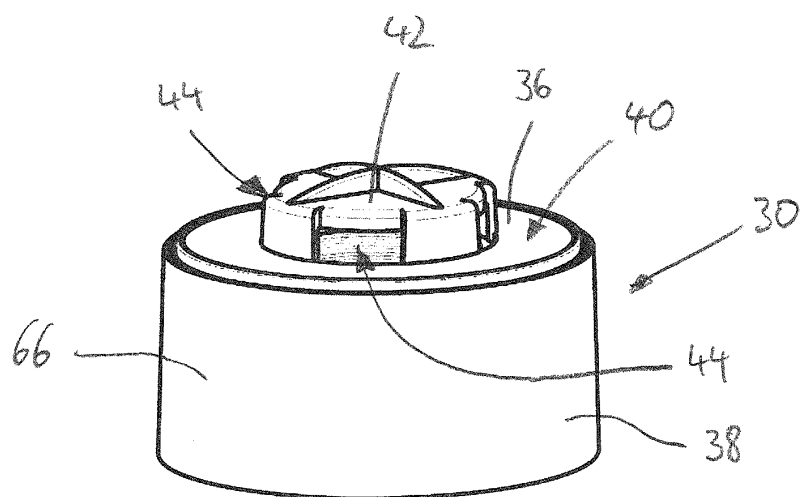
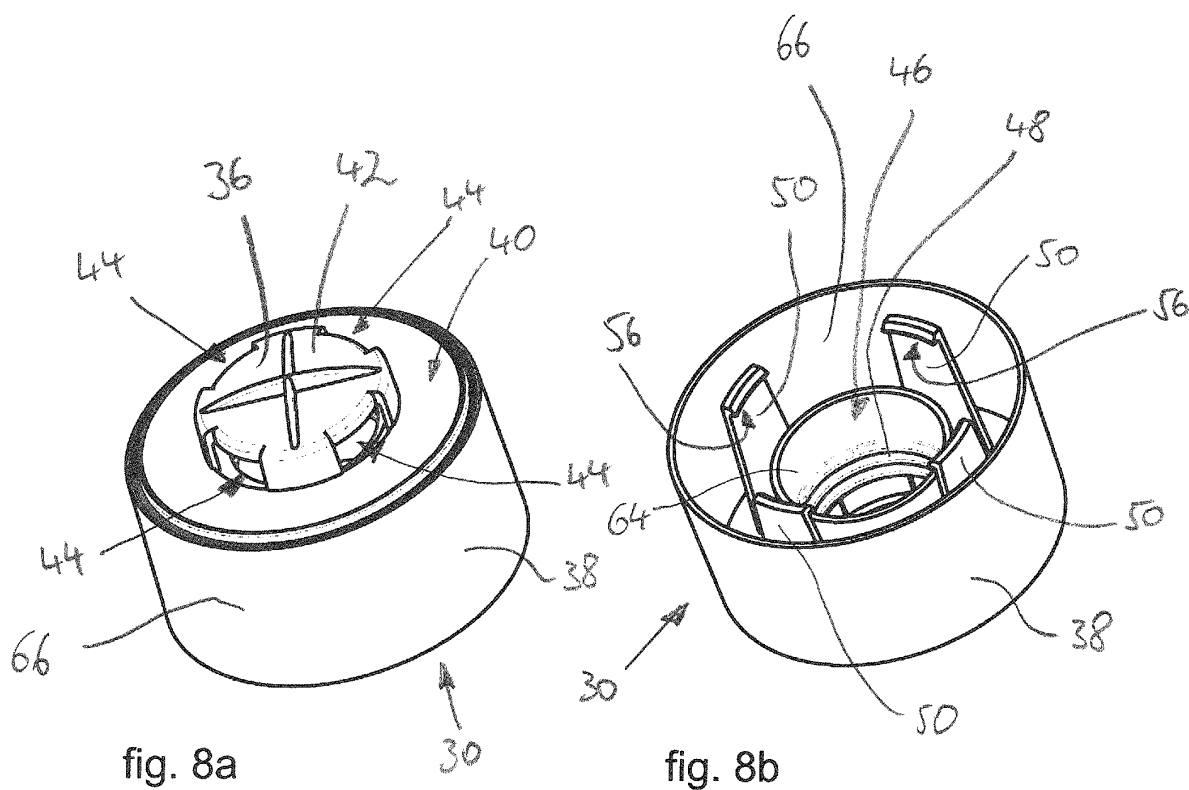


fig. 8c

REFERENCES CITED IN THE DESCRIPTION

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