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Remarks:
Amended claims in accordance with Rule 137(2) EPC.

(54) Container

(57) A Container for loosely stored products has a container body (42) and container cap (44). Said container cap is formed to close a container opening (50) and a flow-limiting device (12) is arranged close to said container opening (50). Said flow-limiting device (12) has at least 2 through-openings (20) arranged distant from a centre axis (28) of said flow-limiting device (12). Said flow-limiting device (12) has a central area (30) arranged distant from said container opening (50), with webs extending between said through-openings (20), preferably outward from said central area (30).

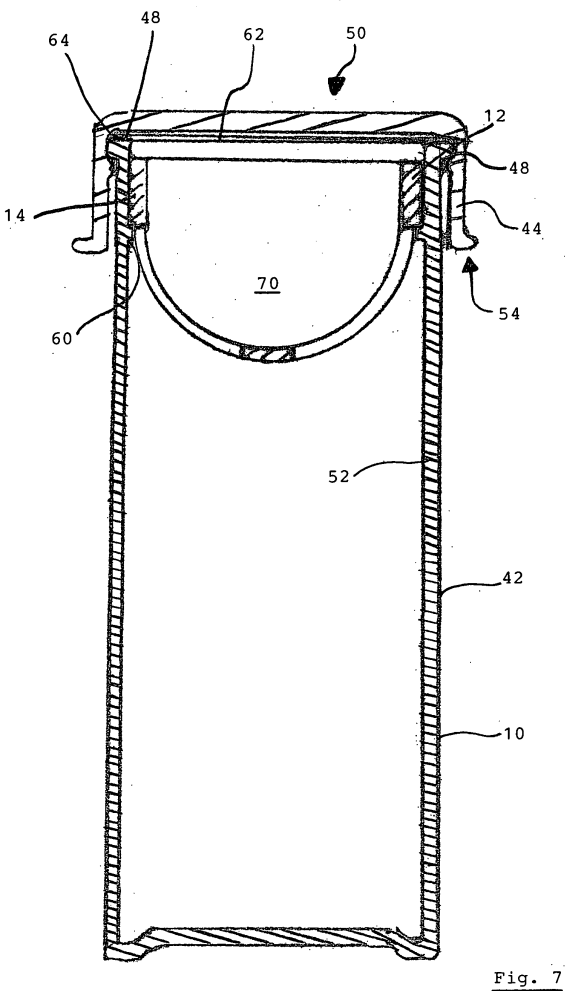

Fig. 7

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Description

[0001] The present invention refers to a container for receiving loosely stored products, such as drugs, pills, tablets, granule and even powder, according to the opening portion of claim 1.

[0002] Such containers are widely known. To increase the ease of handling, a flow-limiting device is usually provided which may be integrally molded or may be used as an insert filling the container opening.

[0003] Such a container for products like tablets is known from JP-A-11/105947. With this container, the products may be separated or individualized. This container has a flow-limiting device with lateral through-openings intended to allow the transition of a single tablet, i.e., one tablet a time. The special arrangement of this container is such that when turning the container upside down and pulling a push-out plate a tablet may drop from the container.

[0004] However, such containers require a careful handling and are unsuitable when to take out a plurality of tablets.

[0005] Another container which is may be suitable for elongated products is known from US-A1 2006/0,169,603. With such a container, an insert is provided which has a frustoconical underside, thus facilitating the entrance of the products into the central through-opening 44 when the container is turned upside down.

[0006] It is also known to adapt the cone angle to any suitable or desired amount. Among others, it is also known to use an insert in the form of double cones, also with different cone angles, such as disclosed in figures 1 and 2 of US patent 4,530,447 which patent shows a central through-opening for the discharge of these products to be separated from each other.

[0007] Although such inserts used as flow-limiting devices generally allow the separation of products, there are some disadvantages.

[0008] The distribution rate, with such containers, largely depends on the inclination when discharging the container. This is especially the case when using granules or powders as products, but also with small pills. Moreover, it may be difficult to fully discharge the container with such products.

[0009] Another disadvantage is that, with a double cone insert, the insert is quite heavy and bulky. If a greater cone angle is used for discharging, the insert even gets more bulky. Thus, such insert are not suitable for containers with a high/width relation of more than, e.g. 3 or 4.

[0010] On the other hand, the container known from JP-A-11/105947 which uses less material for the flow-limiting device blocks the reinsertion of unintentionally dispensed tablets, such that an unconstrained release is not possible with such a container.

[0011] Thus, it is an object of the invention to provide a container according to the opening portion of claim 1 which is suitable for light-weight arrangements, allows an unconstrained discharge and recharge of the container with the products, and also is unsensitive from and not dependant on the angle of repose of the products.

[0012] This object is settled by the features of claim 1. Advantageous developments may be taken from the subclaims.

[0013] According to the present invention, the container is provided with a flow-limiting device having a plurality of through-openings which extend until to the container wall.

[0014] Thus, there is no blocking barrier preventing the flow of the products through the individualizing through-opening. This is an important improvement for elderly users which then for discharging the product have to incline the container by only about 100°, compared to its normal upright position, independant from the filling status of the container with the product.

[0015] On the other hand, being an insert, the flow-limiting device may be formed in a way which is adapted to the products to be discharged. Larger tablets, e.g., may require larger through-openings while the distribution and discharge of smaller pills or even granules is possible and better suitable with smaller through-openings.

[0016] According to the invention, the through-openings extend from the ring of the flow-limiting device to the central area of the flow-limiting device. This elongated form reduces the weight of the flow-limiting device and also facilitates the discharge of e.g. capsules which may have a greater length than diameter.

[0017] According to the invention, the container is provided with a symmetric arrangement of through-openings. By this arrangement, the discharge is largely independant from the angle of rotation, if 3, 4, 5 or 6 or even more discharge through-openings are used.

[0018] According to an advantageous development of the present invention, webs are provided between the through-openings which are connected to each other via a central area. This arrangement stabilizes the flow-limiting device and brings about a grid structure to the flow-limiting device with light weight combined with stability.

[0019] A further special advantageous development of the invention provides a hemispherical concave structure of the flow-limiting device. By this structure, the reintroduction of pills, tablets, etc. is greatly facilitated, and the products may safely be discharged without blocking barrier.

[0020] On the other hand, this concave arrangement is especially suitable for containers having a neck, i.e. a smaller diameter of the container opening than the container diameter. The neck, with this arrangement, may be short. At its outer portion, a suitable protruding rim or thread may be provided for fixing the cap of the container while the inner portion of the neck, close to the container opening, may be provided with suitable means for fixing the flow-limiting device. Such means may comprise at least one recess or at least one protrusion for allowing a snap-fit of the flow-limiting device, or suitable means for allowing a force-fit of the flow-limiting device in the con-

tainer neck.

[0021] A further advantage of a concave arrangement of the flow-limiting device results from the curved rim or edge of each through-opening. This rim essentially guides the tablet or capsule thus facilitating its entrance into the through-opening and thus avoids a blockage or congestion during the discharge, even if the size of the through-openings of the flow-limiting device is only, e.g., 10 % wider than the width of the product to be discharged.

[0022] Thus, an efficient separation is possible without congestion.

[0023] A further advantage of the round shape leading to the concave arrangement of the flow-limiting device is that the cap easily may be provided with desiccating agents, such as a sachet or a buckler depending from the centre of the cap and being received in the flow-limiting device when the cap is closed.

[0024] This arrangement is suitable for products which have to be kept dry to a large extend. An example are containers with products which have a storage time of several years.

[0025] On the other hand, according to an advantageous development of the present invention, the flow-limiting device may be formed independant from the container body, i.e. not integrally to the container body. By this, a material comprising desiccant may be used for forming the flow-limiting device, such as desiccant entrained polymer. By this, the separate insertion of a desiccant entrained polymer insert is redundant which even reduces the weight of the container, also the production costs.

[0026] Further details, advantages and features may be taken from the following description of several embodiments of the present invention with reference to the drawing.

[0027] In the drawing:

Fig. 1 is a perspective view of a flow-limiting device to be used in one embodiment of the container according to the present invention;

Fig. 2 is another perspective view of the flow-limiting device according to Fig. 1;

Fig. 3 is a view of the flow-limiting device according to Fig. 1, from the underside;

Fig. 4 is a top view of the flow-limiting device according to Fig. 1;

Fig. 5 is a side view of the flow-limiting device according to Fig. 1;

Fig. 6 is a perspective view of a further embodiment of the container according to the invention;

Fig. 7 is another embodiment of the container according to the invention, in a sectional view, with the flow-limiting device mounted in the container close to the container opening;

Fig. 8 a partional sectional view of the upper portion of a container according to the invention, in a further embodiment;

Fig. 9 a partional sectional view of the container according to the invention, in a further embodiment;

Fig. 10 a partional sectional view of the container according to the invention, in a further embodiment; and

Fig. 11 a schematic view of a further embodiment of a container according to the present invention.

[0028] According to the embodiment of the invention shown in Fig. 1 to 5, a container 10 is provided with a flow-limiting device 12 which is suitable and adapted for being inserted to the upper portion of the container 10. An example of such an arrangement may be taken from Fig. 7 while also other containers with a neck, bottles, vials, etc. are possible without departing from the scope of the present invention.

[0029] According to the embodiment shown in Fig. 1 to 5, the flow-limiting device comprises a cylindrical portion forming a ring 14 and a hemispherical portion 16 which extend under said ring 14 and is formed from a plurality of webs 18 and through-openings 20.

[0030] In the embodiment shown in Fig. 1 to 5, there are 3 webs 18a, 18b and 18c and 3 through-openings 20a, 20b and 20c. The webs and through-openings alternate to each other.

[0031] According to the embodiment shown in Fig. 1 to 5, the through-openings 20a to 20c have a special form. They extend until to the ring 14 which forms a circumferential rim for each through-opening 20a to 20c. This circumferential rim may be provided with a chamfer facilitating the discharge of the products if the container is inclined only slightly more than the horizontal position, i.e. about 100° to 110°, compared to the upside position.

[0032] The circumferential rim 22 is clearly visible in Fig. 5 which however shows a rim without a chamfer.

[0033] Each through-opening 20 has 2 side rims, and the side rims 24 and 26 are clearly visible in Fig. 1.

[0034] The side rims 24 and 26 essentially extend radially from a vertical axis 28 of the flow-limiting device 12 toward the ring 14. Thus, the width of the through-openings 20a to 20c and of the webs 18a to 18c increase outwardly, and it is preferred that the webs 18a to 18c and the through-openings 20a to 20c essentially have the same cross-sectional area.

[0035] All 3 webs 18a to 18c are interconnected to each other via a central area 30 through which runs axis 28. In the embodiment shown in Fig. 1 to 5, the central area 30 is provided with a central hole 32 which may be taken

from Fig. 2, 3 and 4. Instead, the central area 30 may be provided as a flat and closed area, i.e. without said central hole.

[0036] As may be taken from Fig. 2, the thickness of the ring 14 is slightly larger than the thickness of the web 18. Thus, the flow-limiting device 12 is stabilized and fixed by the ring 14 while the webs 18 stabilize each other by forming a grid structure.

[0037] According to the embodiment shown in Fig. 1 to 5, the ring 14 is provided with 3 centering ribs 34, 36 and 38. These ribs are intended to abut an inner surface of a container neck or an upper container portion close to the container-opening.

[0038] A further embodiment of the flow-limiting device may be taken from Fig. 6. This device has through-opening 20a, 20b and 20c which have a slot-form, yet with an outwardly increasing width. The through-openings 20a to 20c are interconnected with each other via a central hole 32. Thus, there is no central area 30 interconnecting the web 18 with each other. Instead, the width of each web 18 is considerably larger. By means of its curved and convex forms, each web 18 stabilizes itself while each web 18 is also attached to and preferably integrally molded with the ring 14, which, in this embodiment, has the same material thickness as the webs 18.

[0039] Contrary to the first embodiment, there is a circumferential rib 40 extending around the ring 18 and intended for a snap-fit connection with the container. Instead of the circumferential rib 40, protrusions or projections may be provided extending outwardly and intended for the above-mentioned snap-fit connection.

[0040] Fig. 7 shows how the container 10 is provided with the flow-limiting device 12.

[0041] As it is well known, the container 10 comprises a container body 42 and a container cap 44. Instead of the separate cap 44 which is shown in Fig. 7, a hinged cap, either integrally molded with the container body, or in a two-part arrangement, may be used as well.

[0042] The cap 44 is provided with a circumferential inner groove 46 which is intended to be contacted by a rib 48 surrounding the opening 50 of the container 10.

[0043] An inner wall 52 of the container 10, at its upper portion 54, is equipped with protrusions or a circumferential rib 60. This rib 60 is intended for abutment against ring 14 such that the flow-limiting device 12 is form-fit into the upper portion of the container body 42.

[0044] After the flow-limiting device 12 is pressed onto its seat as it is shown in Fig. 7, a sealing foil 62 is secured onto the upper rim 64 of the container body 42, as it is known per se, e.g. by heat-sealing, preferably by induction sealing.

[0045] Alternatively, the flow-limiting device 12 may be aligned with the upper rim 64 such that it is sealable by the sealing foil 62 as well.

[0046] In a further amended embodiment, the upper ring 14 protrudes from the upper rim 64 and may be sealed by the sealing foil 62. In this embodiment, there must be an additional seal between ring 64 and inner wall 52.

[0047] In a further embodiment which is not shown in the drawing, the arrangement of the cap 44 and the flow-limiting device 12 is such that when bring the cap 44 into place, e.g., when depressing it, the flow-limiting device 12 is automatically seated to its correct position.

[0048] In a further embodiment which avoids an additional sealing foil 62, a desiccating element depends from the central area of the cap 44 to the inner space 70 provided within the flow-limiting device 12.

[0049] According to the embodiment shown in Fig. 8, the flow-limiting device 12 has an essentially hemispheric shape and is provided with a ring 40 abutting on a shoulder 72 provided on the upper portion of the wall of the container 10.

[0050] A sealing foil form 62 is provided by heat-sealing on the container wall.

[0051] A further embodiment of the arrangement of the flow-limiting device 12 in the container may be taken from Fig. 9. This embodiment has a snap-fit arrangement 74 which is intended to secure the flow-limiting device 12 to the wall of the container 10.

[0052] A further embodiment of the attachment of the flow-limiting device 12 on the wall of container 10 may be taken from Fig. 10. This arrangement is similar to ring 40 shown in Fig. 6.

[0053] All of the above-mentioned arrangements may have a circumferential ring or protrusion. Alternatively, the ring may be formed by small protrusions, thus facilitating the insertion of the flow-limiting device 12 into the container 10.

[0054] As may be taken from Fig. 11, this embodiment of the container has a screw cap 44 which is intended to firmly and safely close container 10. In this embodiment, the container 10 is formed in a sort of a bottle, with a neck portion 76 being provided with the flow-limiting device 12 according to the invention.

[0055] As may be taken from Fig. 11, the through-opening 20 of the flow-limiting device 12 has a width which is about a fifth or a forth of the perimeter of the flow-limiting device 12.

[0056] As may be taken from Fig. 11, the sealing foil may be applied by fusion welding on the upper surrounding rim of the container 10 which is formed as a bottle. As it is well-known, a part of the sealing foil may protrude from this rim, thus facilitating to grip the sealing foil for removal.

[0057] The cover 44 may be provided with a cardboard disk 80, as it is also well-known.

Claims

1. Container for loosely stored products, with a container body (42) and container cap (44), said container cap being formed to close a container opening (50), with a flow-limiting device (12) arranged close to said container opening (50), said flow-limiting device (12)

having at least 2 through-openings (20) arranged distant from a centre axis (28) of said flow-limiting device (12), and that said flow-limiting device (12) has a central area (30) arranged distant from said container opening (50), with webs extending between said through-openings (20), preferably outward from said central area (30).

2. Container according to claim 1, **characterized in** the said flow-limiting device (12) has a concave shape, viewed from the container-opening, and the said through-openings (20) have curved side rims (24,26), in particular having a convex form, viewed from the inside of the container (10).

3. Container according to one of the preceding claims, **characterized in** the said through-openings (20) have side rims (24 and 26) which extend essentially radially outward from that central area (30) of said flow-limiting device (12).

4. Container according to one of the preceding claims, **characterized in** the said through-openings (20) have a width, in the tangential direction of the flow-limiting device (12), which increases towards the rim (22) close to the container opening.

5. Container according to one of the preceding claims, **characterized in** the said flow-limiting device (12) comprises a circumferential ring, for an at least partial abutment against the inner side of the opening (50), which ring (14) preferably has a greater thickness then the remainder of the flow-limiting device (12).

6. Container according to one of the preceding claims, **characterized in** the said flow-limiting device (12) as a hemispheric shape, with the through-openings (20) ending at an essentially cylindrical circumferential ring, preferably at the transition from the hemispheric form to the cylindric form.

7. Container according to one of the preceding claims, **characterized in** the said flow-limiting device (12) as a central hole (32), preferably with a smaller cross-section than the through-openings (20).

8. Container according to one of the preceding claims, **characterized in** the said through-openings (20) extend to a central hole (32) of said flow-limiting device (12) and are connected to each other.

9. Container according to one of the preceding claims, **characterized in** the said flow-limiting device (12) comprises webs (18) extending between said through-openings (20), said web having a cross-sectional area between 30 % and 70 %, preferably about 50 %, of the cross-sectional area of the flow-limiting device (12).

10. Container according to the claim 8, **characterized in** the said webs (18) have a width which increases outwardly, and said web preferably has the same or similar form as said through-opening.

11. Container according to one of the preceding claims, **characterized in** the said flow-limiting device (12) has a symmetric form, with an even distribution of through-openings (20) around its central axis (28), and preferably has 3 through-openings (20).

12. Container according to one of the preceding claims, **characterized in** the said flow-limiting device (12) is made from dessicant entrained material, preferably from 2AP.

13. Container according to one of the preceding claims, **characterized in** the said flow-limiting device (12) is made from plastic material and preferably is molded with a customized aroma, preferably provided with scented polymer.

14. Container according to one of the preceding claims, **characterized in** the said flow-limiting device (12) is snap-fit into the opening of the container, and preferably is form-fit or positive-fit in said opening.

15. Container according to one of the preceding claims, **characterized in** the said flow-limiting device (12) is held with friction within said opening (50), and preferably is force-fit in said container.

16. Container according to one of the preceding claims, **characterized in** the said through-opening (20) is arranged in a manner spaced from the rim (22) of the said container opening.

17. Container according to one of the preceding claims, **characterized in** said container provided with an induction sealed film or foil extending over the container opening (50), as a moisture barrier, and sealing against an upper rim (64) of said container opening and/or against an upper rim (64) of said flow-limiting device (12).

18. Container according to one of the preceding claims, **characterized in** said cap is provided with a desiccating element, which preferably, in the closed position of the cap, extends into the inner area of the flow-limiting device (12).

19. Container according to claim 18, **characterized in that** said desiccating element is formed as a desiccant filled chamber or a desiccant entrainde polymer which is integrated in the inner area of the flow-limiting device, close to the cap.

20. Container according to one of the preceding claims, **characterized in that** a desiccant canister or a desiccating sachet is provided as a desiccating element, which is provided in the room for the loosely stored products, and which has a size preventing the desiccating element from passing through said through-openings (20).

21. Container according to one of the preceding claims, **characterized in** the said through-openings (20) extend from a circumferential extending ring (14) to a centre area of said flow-limiting device (12), said centre area having an extension or width essentially corresponding to the size of said products.

22. Container according to one of the preceding claims, **characterized in** the said flow-limiting device (12) is pre-assembled in said cap and is snap-fit in said opening of said container if the cap is closed for the first time.

Amended claims in accordance with Rule 137(2) EPC.

1. Container for loosely stored products, with a container body (42) and a container cap (44), said container cap (44) being formed to close a container opening (50), with a flow-limiting device (12) arranged close to said container opening (50), said flow-limiting device (12) having at least two through-openings (20) arranged distant from a centre axis (28) of said flow-limiting device (12), and wherein said flow-limiting device (12) has a central area (30) arranged distant from said container_opening (50), with webs (18) extending between said through-openings (20), preferably outward from said central area (30),
characterized in that said flow-liming device (12) has a hemispheric concave shape, viewed from the container-opening.

2. Container according to one of the preceding claims,
characterized in that said side rims (24, 26) extend essentially radially outward from the central area (30) of said flow-limiting device (12).

3. Container according to one of the preceding claims,
characterized in that said through-openings (20) have a width, in the tangential direction of the flow-limiting device (12), which increases towards the rim (22) close to the container opening.

4. Container according to one of the preceding claims,
characterized in that said flow-limiting device (12) comprises a circumferential ring (14), for an at least partial abutment against the inner side of the opening (50), which ring (14) preferably has a greater thickness then the remainder of the flow-limiting device (12).

5. Container according to claim 4,
characterized in that said ring (14) is provided with centering ribs (34, 36, 38) intended to abut an inner surface of an upper container portion close to the container-opening (50).

6. Container according to one of the preceding claims,
characterized in that said through-openings (20) of the hemispheric flow-limiting device (12) end at said circumferential ring (14) which is essentially cylindrical, and preferably at the transition from the hemispheric form to the cylindrical form.

7. Container according to one of the preceding claims,
characterized in that said flow-limiting device (12) has a central hole (32), preferably with a smaller cross-section than the through-openings (20).

8. Container according to one of the preceding claims,
characterized in that said through-openings (20) extend to a central hole (32) of said flow-limiting device (12) and are connected to each other.

9. Container according to one of the preceding claims,
characterized in that said webs (18) of the flow-limiting device (12) extend between said through-openings (20), wherein said web having a cross-sectional area between 30% and 70%, preferably about 50%, of the cross-sectional area of the flow-limiting device (12).

10. Container according to claim 8,
characterized in that said webs (18) have a width which increases outwardly, and said web preferably has the same or similar form as said through-opening.

11. Container according to one of the preceding claims,
characterized in that said flow-limiting device (12) has a symmetric form, with an even distribution of the through-openings (20) around its central axis (28), and preferably has 3 through-openings (20).

12. Container according to one of the preceding claims,
characterized in that said flow-limiting device (12) is made from desiccant entrained material, prefera-

bly from 2AP.

13. Container according to one of the preceding claims,
characterized in that said flow-limiting device (12) is made from plastic material and preferably is molded with a customized aroma, preferably provided with scented polymer.

14. Container according to one of the preceding claims,
characterized in that said flow-limiting device (12) is snap-fit into the opening of the container, and preferably is form-fit or positive-fit in said opening.

15. Container according to one of the preceding claims,
characterized in that said flow-limiting device (12) is held with friction within said opening (50), and preferably is force-fit in said container.

16. Container according to one of the preceding claims,
characterized in that an inner wall (52) of the container (10) is equipped with protrusions or a circumferential rib (60) for abutment against said ring (14).

17. Container according to one of the preceding claims,
characterized in that said through-opening (20) is arranged in a manner spaced from the rim (22) of the said container opening.

18. Container according to one of the preceding claims,
characterized in that said container is provided with an induction sealed film or foil extending over the container opening (50), as a moisture barrier, and sealing against an upper rim (64) of said container opening and/or against an upper rim (64) of said flow-limiting device (12).

19. Container according to one of the preceding claims,
characterized in that said cap is provided with a desiccating element, which preferably, in the closed position of the cap, extends into the inner area of the flow-limiting device (12) .

20. Container according to one of the claims 1 to 18,
characterized in that a desiccating element is integrated in the inner area of the flow-limiting device, close to the cap and is formed as a desiccant filled chamber or a desiccant entrained polymer.

21. Container according to one of the preceding claims,
characterized in that a desiccant canister or a desiccating sachet is provided as a desiccating element, which is provided in the room for the loosely stored products, and which has a size preventing the desiccating element from passing through said through-openings (20).

22. Container according to one of the preceding claims,
characterized in that said through-openings (20) extend from a circumferential extending ring (14) to a centre area of said flow-limiting device (12), said centre area having an extension or width essentially corresponding to the size of said products.

23. Container according to one of the preceding claims,
characterized in that said flow-limiting device (12) is pre-assembled in said cap and is snap-fit in said opening of said container if the cap is closed for the first time.

Fig. 1

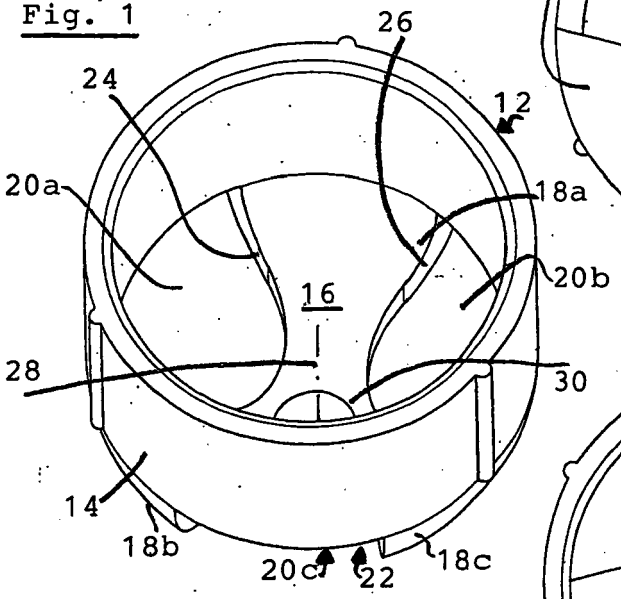
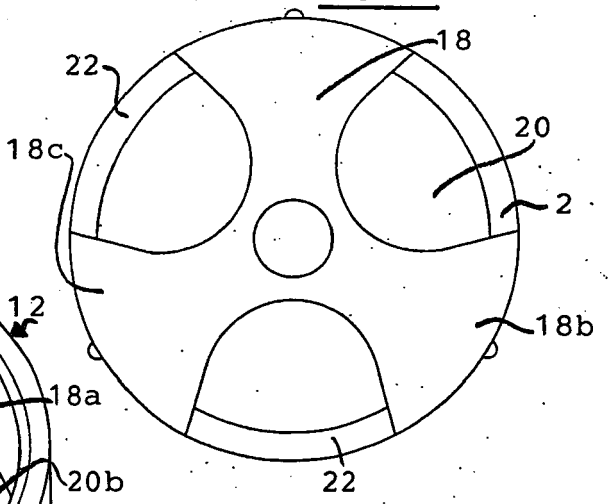


Fig. 3



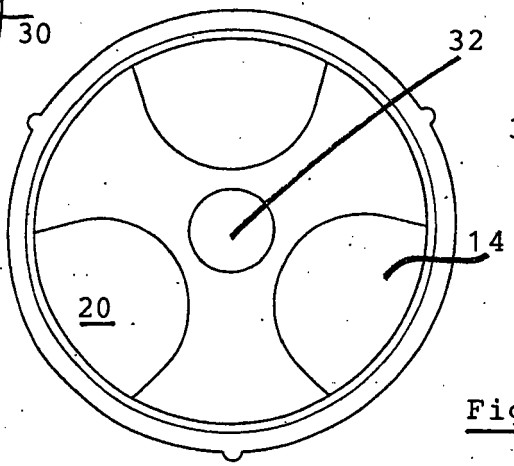


Fig. 4

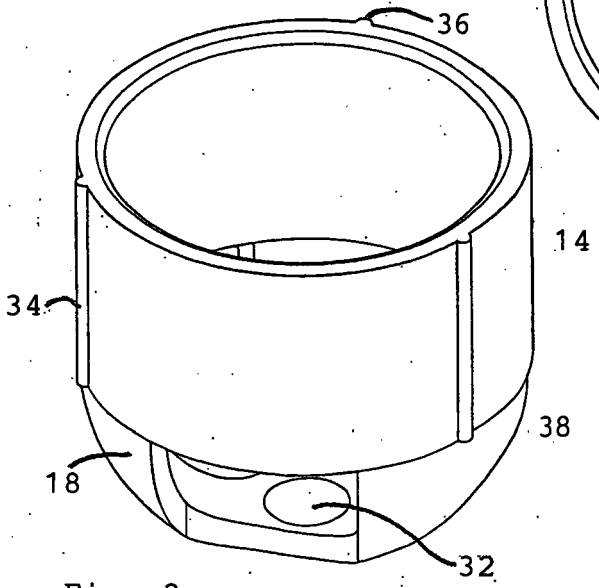


Fig. 2

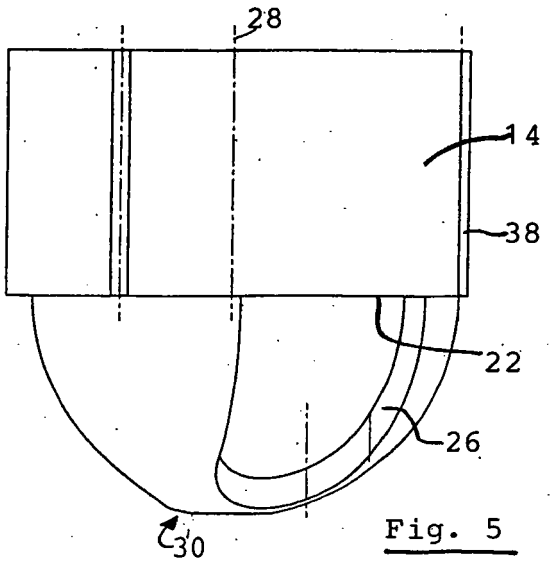


Fig. 5

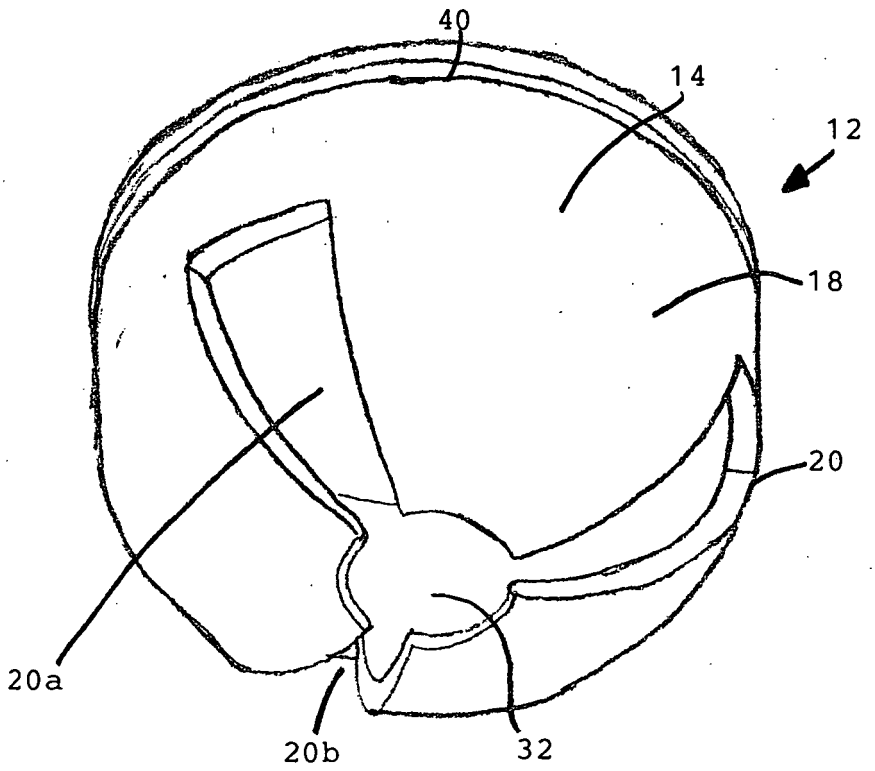


Fig. 6

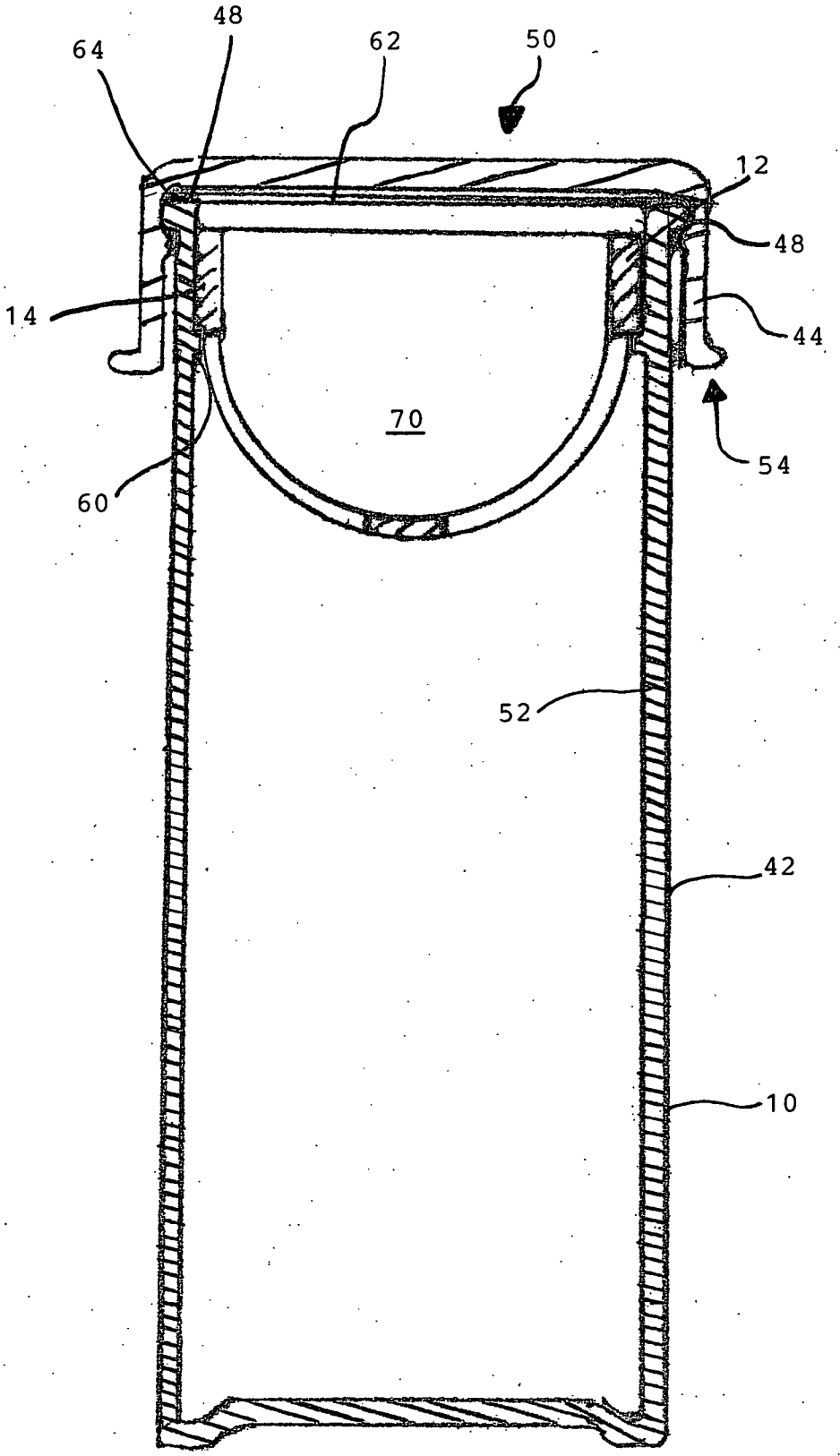


Fig. 7

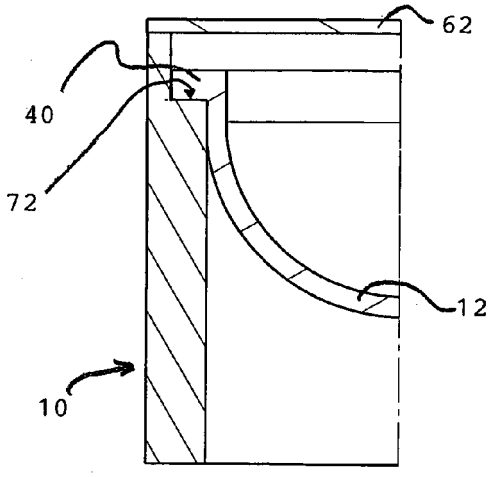


Fig. 8

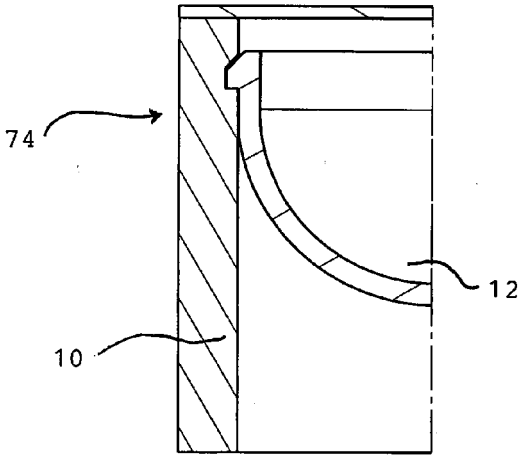


Fig. 9

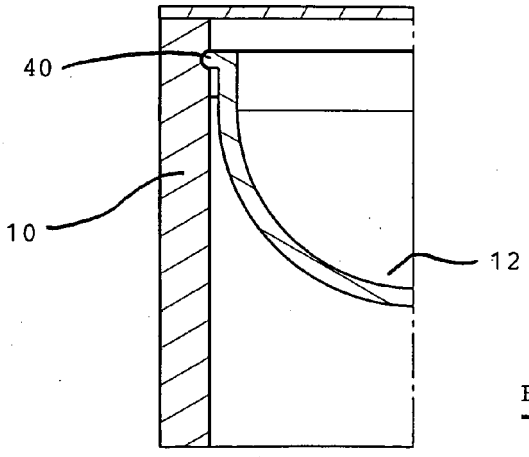


Fig. 10

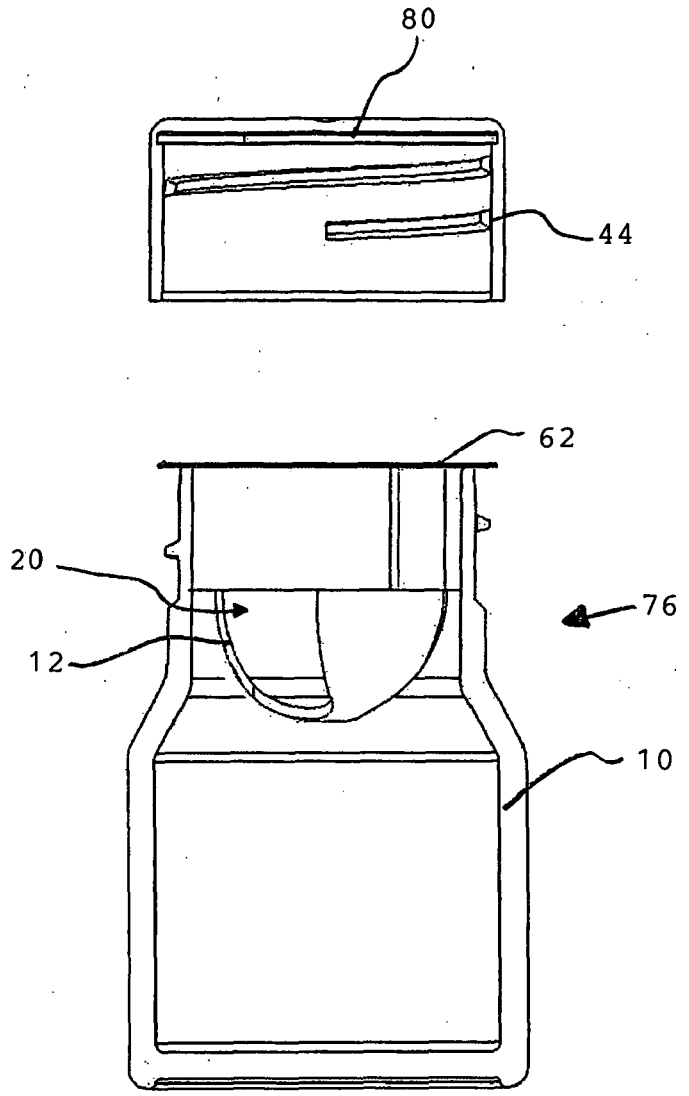


Fig. 11

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Place of search	Date of completion of the search	Examiner
The Hague	2 November 2007	Zanghi, Amedeo

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