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

(11) EP 2 918 511 A1

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
16.09.2015 Bulletin 2015/38

(51) Int Cl.:
B65D 47/04 *(2006.01)* ***B65D 47/08*** *(2006.01)*

(21) Application number: **14159247.7**

(22) Date of filing: **12.03.2014**

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

(71) Applicant: **Revpack Tecnologia e Comercio de Componentes Plasticos Ltda.**
09990-090 Diadema, SP (BR)

(72) Inventor: **Neto, Vicente Romo Rodrigues**
11441-900 Guarujá, SP, (BR)

(74) Representative: **Dowling, Andrew**
Haseltine Lake LLP
Lincoln House, 5th Floor
300 High Holborn
London WC1V 7JH (GB)

(54) **A dosing cap for a flexible bottle package, and a flexible bottle package provided with a dosing cap**

(57) The present invention relates to a dosing cap (1) for flexible flask or bottle packages, which is configured from a single piece and comprises a restrictor (2) provided with means configured for enabling interruption of the product flow through its structure.

The benefits achieved by the dosing cap (1) of the present invention are related to the low production cost of this cap and to the low environmental impact generated during its manufacture and after the disposal thereof in the environment.

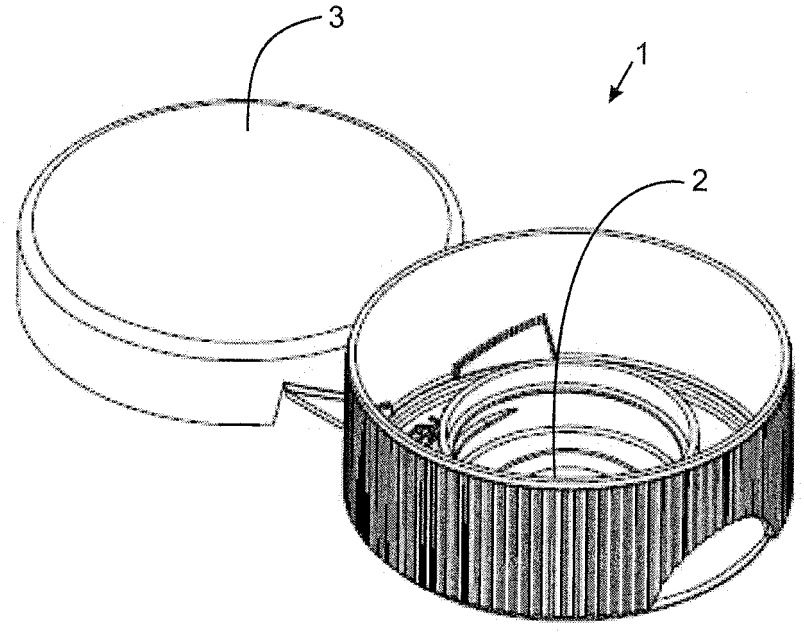

FIG. 2

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Description

[0001] The present invention relates to a dosing cap configured so as to result in lower manufacture costs and generate less environmental impact during the process of manufacturing it and after disposal thereof.

Description of the prior art

[0002] The commercial segment of packages comprises determined flasks and bottles provided with *dosing caps.*

[0003] A dosing cap can be useful in sealing the package of any type of liquid or pasty product, such as foods (for example, ketchup), cosmetics (for example, shampoo), cleaning products (for example, clothes softeners), among others.

[0004] The use of a dosing cap occurs most frequently with those products that require the control of liquid being dispensed. When using a bottle of mustard, for instance, the user does not always wish to pour the entire contents of the bottle of mustard directly onto his food or hot-dog. The user of a product such as mustard or ketchup needs a type of packaging that enables him to control the contents poured into his food.

[0005] With these products, where the control of flow affects directly the satisfaction of the user in using the product, it is essential to use a dosing cap.

[0006] A dosing cap functions on the basis of the following principle:

[0007] When the package flask or bottle is squeezed by the user's hands (flasks or bottles with this type of cap are compulsorily made from a flexible material, such as malleable polymers), a silicone valve 3' - also referred to as a diaphragm - arranged inwardly of the central cap orifice, is opened due from the positive pressure that forms from within the flask or bottle.

[0008] This valve is made up by a flexible membrane provided by a tear centrally arranged with respect to its top face. The pressure that forms inside the flask or bottle when it is squeezed is sufficient to increase the opening of this tear, thus enabling the evacuation of the flask or bottle content out of the package. When the user interrupts the squeezing of the flask or bottle, the silicone valve 3' closes, cutting the flow of fluid poured out of the flask or bottle (hence, the name "dosing cap").

[0009] It should be noted that, although this is quite a simple operational concept, the process of manufacturing the dosing valves presently available on the market is quite complex.

[0010] In general, a prior-art dosing cap 5' consists of the combination of three independent parts, namely:

- a cap body 1';
- a silicone valve 3'; and
- a holding ring 2'.

[0011] Each of these elements comprises a mold, a constitution material (resin) and a different manufacture process.

[0012] The cap body 1' is constituted by a first type of resin (for example, PP or PAD) and may be of the flip-top type, with either a threadable sealing or fitting sealing). In figure 1 of this specification specifically, a conventional flip-top cap is illustrated. The process of manufacturing the cap 1' body occurs by thermoplastic injection of the first type of resin into a mold cavity that contains the external profile of the cap.

[0013] The silicone valve 3', as the name itself indicates, is constituted by silicone (which constitutes a second type of resin). This valve has an "x"-shaped cut 4' arranged centrally in its structure. Its manufacturing process involves two different steps, namely: a first step for injecting silicone into a disc-shaped small mold, and a second step for making the X-shaped cut 4'. It should be noted that each of these steps is carried out by means of independent machines that operate at different times (that is, the operation for making the X-shaped cut 4' evidently can only be carried out after the silicone-injecting step).

[0014] The holding ring 2' is an intermediate piece placed between the silicone valve 3' and the cap body 1'. Its usefulness is due to the fact that the material that constitutes the silicone valve 3' is incompatible with the material that constitutes the cap body 1'. Thus, the holding ring 2' is necessarily made from a material whose molecular constitution enables it to be secured easily to both the material of the cap body 1' (usually, PP or PAD) and to the material of the silicone valve 3'. Since the holding ring 2' is constituted by a material other than those of the silicone valve 3' and of the cap body 1', it should necessarily be manufactured by a third thermoplastic injection process.

[0015] Notwithstanding the individual processes involved in the manufacture of each of these three parts, it is further necessary to carry out two independent mounting processes for manufacturing the dosing cap 5', which are:

- a process for mounting the silicone valve 2' on the holding ring 3', forming a valve-ring assembly 6';
- a process for mounting the valve-ring assembly 6' on the cap-body 1'.

[0016] Each of these two mounting processes is realized by using separate machines, which require equally independent labor.

[0017] It should be noted that it is not rare for several of the above-described operations to be carried out at different locations. The holding ring 2' may be manufactured in a determined country, while the other parts are manufactured in a second country, and so on. This decentralization of operations naturally increases the costs with logistics of manufacture of the prior-art dosing cap 5', thus raising the production costs of this part.

[0018] It should also be noted that, in addition to the

high costs involved in producing the dosing cap 5' of the prior art, another drawback resulting from the process of manufacturing this cap is its high environmental impact.

[0019] Its high environmental impact is due to the high consumption of energy involved in the various steps of producing and transporting the elements constituted in the manufacture of this cap, as well as to the difficulty inherent in the process of recycling this cap. Since the prior art dosing caps comprise at least three different materials, the recycling thereof requires that they be first fragmented into smaller pieces; then these small pieces have to be separated into different groups, according to their constituent material; and only then can each of the particulate portions resulting from this process be liquefied, giving rise to new polymeric materials.

[0020] Therefore, as a cap that exhibits a high manufacturing cost and incurs a high environmental impact (generated during and after the manufacturing thereof), this prior art dosing cap 5' should be replaced by a more economical and more ecological alternative. This new technology should lower the manufacture costs and the environmental impact of this cap, without, however, impairing its efficiency in operation, chiefly as far as the dosing or "drop-cutting" function is concerned, a characteristic essential to its functioning.

Objectives of the invention

[0021] The present invention has the objective of providing a dosing cap that has less environmental impact and exhibits lower manufacture cost.

[0022] The present invention has also the objective of providing a flexible flask or bottle package having a dosing cap as described above.

Brief description of the invention

[0023] The objectives of the present invention are achieved by means of a dosing cap for flexible flask or bottle packages, which is configured into a single piece comprising a restrictor provided with means configured to enable interruption of the product flow through its structure.

[0024] The objectives of the present invention are also achieved by means of a flexible flask or bottle package that comprises a dosing cap as defined above.

Brief description of the figures

[0025] The present invention will now be described in greater detail with reference to an example of the embodiment of the invention as represented in the drawings. The figures below illustrate:

- Figure 1 is an exploded perspective view of a prior-art dosing cap;
- Figure 2 is a bottom perspective view of the dosing cap of the present invention in open arrangement;
- Figure 3 is a top perspective view of the dosing cap of the present invention in an open arrangement;
- Figure 4 is a cross-sectional view of the dosing cap of the present invention in open arrangement;
- Figure 5 is a top view of the dosing cap of the present invention in open arrangement;
- Figure 6 is an enlarged perspective view of the restrictor of the dosing cap of the present invention;
- Figure 7 is an enlarged perspective side view of the restrictor of the dosing cap of the present invention.

Detailed description of the figures

[0026] In general, the present invention consists of a dosing cap 1, injected into a single piece (see figures 2, 3, 4 and 5).

[0027] The dosing cap 1 of the present invention can be injected into a single piece because it comprises elements constituted by the same resin of the cap body 1', which exhibit the same function of the valve-ring assembly 6' of the prior-art caps.

[0028] It should be noted that, since the dosing cap 1 of the present invention is injected into a single piece, it reduces drastically the costs with production and the impact caused on the environment (before and after disposal thereof), without diminishing the efficiency of the function performed by the cap. In other words, although it does not comprise a silicone valve 3', the dosing cap 1 of the present invention continues to be capable of cutting the flow of the product poured out of the flask or bottle, according to the interruption of the squeezing of the container.

[0029] The element of the dosing cap 1 that makes it capable of cutting the flow of material squeezed out of the flask or bottle is the restrictor 2, clearly represented by figures 4, 6 and 7.

[0030] The restrictor 2 can be defined as being any element provided with at least one restriction bore 6, which is arranged preferably at the same place where the silicone cap 3' of the prior-art dosing caps 5' is arranged.

[0031] The function of the restriction bore 6, as the name itself indicates, is to restrict - that is, "to hamper or make difficult" - the passage of the fluid stored in the package (not shown in the figures) while the flask or bottle is being squeezed.

[0032] The cross-sectional area of the restriction bore 6 should vary according to the viscosity of the fluid stored in the package. So, the more viscous the fluid the larger the cross-sectional area of this restriction bore 6 will be, since it is known that the higher the viscosity of a fluid the lower its flowing velocity through a determined bore. This cross-sectional area should be small enough to prevent the fluid from flowing through these bores under the exclusive action of the gravitational force on the fluid mass (a situation in which the flask is positioned "upside-down", without squeezing), but should be large enough

for enabling the fluid to flow when the flask is squeezed.

[0033] The model of dosing cap 1 disclosed in the figures of this specification is especially adapted for application to ketchup and mustard containing flasks or bottles.

[0034] For a fluid having medium viscosity, such as ketchup, it was found that a restrictor 2 having four restriction bores 6 arranged radially, each having about 1 mm^2 cross-sectional area, is sufficient to provide good dosing or "drop-cutting" for this type of fluid.

[0035] For a fluid having higher viscosity such as honey, the restriction bores 6 should have a substantially larger cross-sectional area, of about 4 mm^2 for each restriction bore 6. On the other hand, a fluid having lower viscosity, such as liquid soap, may require a dosing cap 1 provided with a restrictor 2 having restriction bores 6 having a much smaller cross-sectional area, for example with a bore opening of 0.5 mm^2.

[0036] It should be noted that, while the cross-sectional area of the restriction bores 6 varies depending on the viscosity of the fluid stored in the package, the number of restriction bores 6 of the restrictor 2 should vary according to the flow rate and the thickness of the liquid flow that is to be achieved for the use of a determined product.

[0037] In order to exemplify this point, it should be observed that it is recommendable to employ a small number of restriction bores 6 for a dosing cap 1 of a pepper-sauce flask or bottle. This is because the user of a pepper-sauce flask probably does not have the intention of applying more that a few drops of this sauce to his meal - an amount that is quite smaller than a *teaspoonful* of this product is usually sufficient to please any palate.

[0038] Unlike pepper-sauce, upon making use of a less concentrated condiment such as ketchup, the user generally wishes to apply an amount equivalent to a tablespoonful to his meal. Such a volume of product requires a dosing cap provided with a larger number of restriction bores 6, for which reason the dosing cap 1 disclosed in the present specification has four restriction bores 6. Thus, one understands that the number of restriction bores comprised by the restrictor 2 should be compatible with the user's need to use the flask or bottle.

[0039] Alternatively, the dosing cap 1 of the present invention may comprise other elements instead of the restrictor 2, which are configured to carry out the same restriction of the product flow. Such elements may be, for instance, flaps or restriction tubes, restriction protrusions or any other elements comprised by the matrix itself of the dosing cap that are configured for obstructing partially the passage of the fluid contained in a package out of the flask or bottle.

[0040] In short, the present invention can be defined as a dosing cap 1 configured for enabling one to cut any type of fluid, this dosing cap 1 being configured into a single piece.

[0041] The fact of constituting the dosing cap 1 configured as a single piece means that this piece is produced by a single thermoplastic injection process. The use of a single thermoplastic injection process, in turn, brings about two direct benefits to the dosing cap 1.

[0042] The first benefit is the decrease in costs with the production of the cap. This can contribute to increase the profit margin of the producer of the cap; the profit of the intermediate consumer (for example, a company from the foods industry or a manufacturer of cleaning products); and still to decrease the cost of the final product, for example, the price charged for a flask or bottle of mustard exposed on a supermarket shelf.

[0043] The second benefit is the ecological appeal of the dosing cap 1 of the present invention. Since it is manufactured by a single thermoplastic injection operation, the manufacture of this cap requires much less energy than the process of manufacturing conventional caps. Since one employs only resin in its constitution (as opposed to the three different types of polymeric resins employed ion the constitution of the prior-art dosing cap), this dosing cap 1 can be recycled quite easily.

[0044] The main characteristics of this invention having been disclosed so far, a few additional details that can be comprised by the dosing cap 1 are further demonstrated. These details do not limit the scope of the invention, but illustrate different possibilities that may be useful in conceiving of and manufacturing a dosing cap 1.

[0045] As a characteristic complementary to the invention, one can cite, for instance, the flip-top closure of the dosing cap 1. This flip-top system is quite known in the art and consists in providing a top covering 3 that is associated to the rest of the dosing cap 1 through small polymeric membranes 7 constituted by the same resin that forms the cap. Obviously, the flip-top closure is a mere detail complementary to the present invention, which could be replaced, for instance, by a threadable or snap-fit-type top covering 3, without this replacement altering the inventive concept defined in this specification.

[0046] A second characteristic complementary to the present invention refers to the double sealing provided by the sealing rings 4, 5, arranged on the inner face of the top covering 3. Such a sealing, however, could be replaced by any other form of sealing, as long as it is functional. Alternatively, the dosing-cap 1 of the present invention might comprise, for instance, only one external sealing ring 4 or only one internal sealing ring 5.

[0047] Finally, a preferred example of embodiment and various alternative embodiments of the same inventive concept having been described, one should understand that the scope of the present invention embraces other possible variations, being limited only by the contents of the accompanying claims, including possible equivalents.

Claims

1. A dosing cap (1) for flexible bottle packages, **char-**

acterized by comprising a restrictor (2) provided with means configured for enabling interruption of the product flow through its structure, which is configured in a single piece.

2. The dosing cap (1) according to claim 1, **characterized in that** the restrictor (2) comprises at least one restriction bore (6), the cross-sectional area of said restriction bore (6) being calculated according to the viscosity of the fluid contained in the flexible flask, and the number of restriction bores (6) comprised by the restrictor (2) being compatible with the user's need to use said bottle.

3. The dosing cap (1) according to claim 2, **characterized in that** the cross-sectional area of the restriction bore (6) is calculated so as to prevent passage of fluid through this structure, by exclusive action of the gravitational force on the fluid and so as to enable passage of the fluid by squeezing said bottle.

4. The dosing cap (1) according to any of claims 1 to 3, **characterized by** being injected by a single thermoplastic injection process.

5. The dosing cap (1) according to claim 4, **characterized in that** the thermoplastic injection process employed to manufacture it makes use of a single thermoplastic resin.

6. The dosing cap (1) according to any of claims 1 to 5, **characterized in that** the restrictor (2) comprises four restriction bores (6) positioned in radial arrangement around the restrictor (2), the cross-sectional area of each of these restriction bores (6) ranging from 0.5 to 2 mm^2.

7. The dosing cap (1) according to any of claims 1 to 6, **characterized by** being configured for use in food-condiment bottles.

8. The dosing cap (1) according to claim 7, **characterized by** being configured for use on ketchup, mustard and mayonnaise bottles.

9. The dosing cap (1) according to any of claims 1 to 6, **characterized by** being configured for use on personal hygiene and cleaning bottles.

10. A flexible bottle package **characterized by** comprising the dosing cap (1) as defined in any of the preceding claims.

(Prior Art)

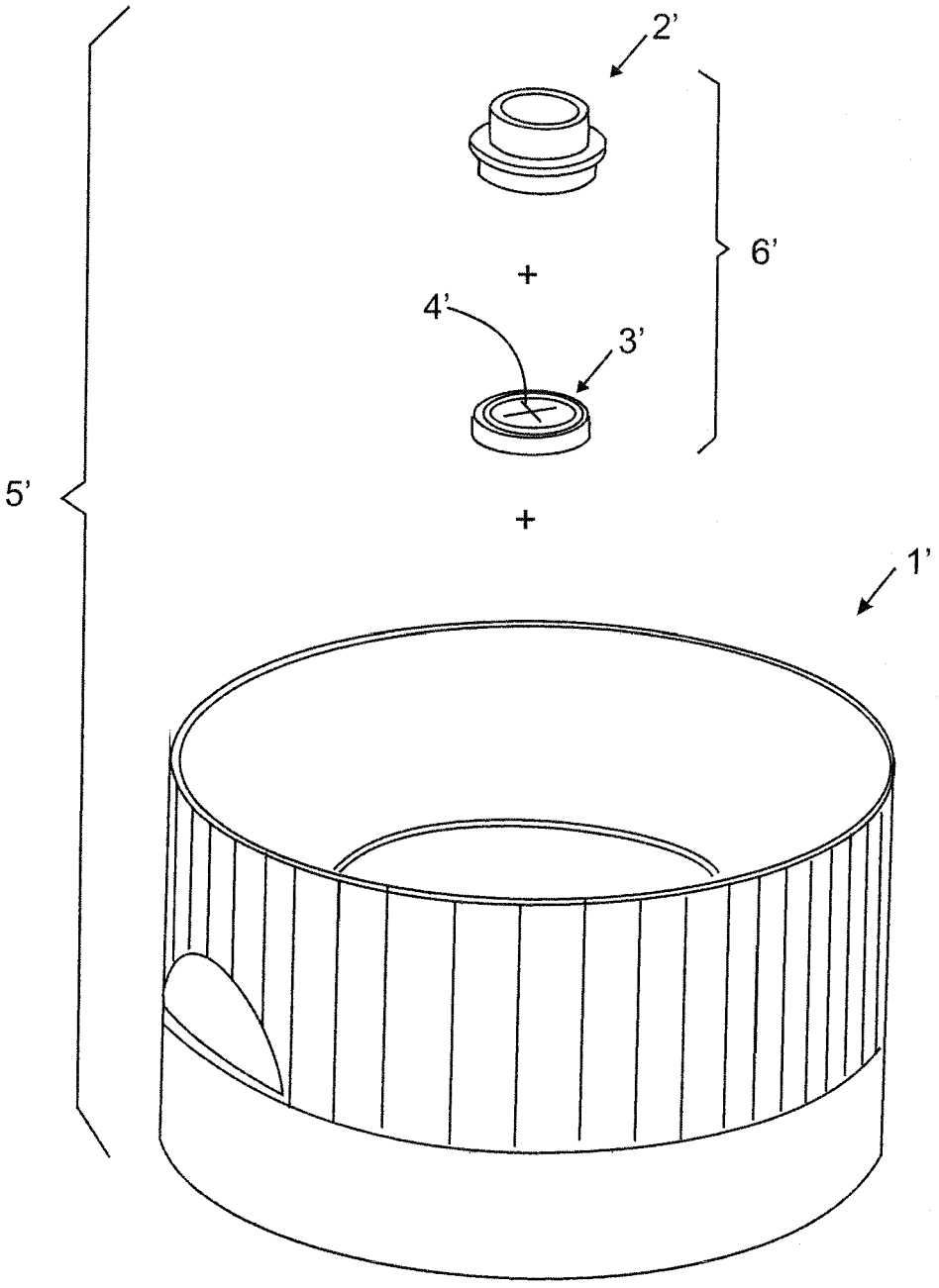

FIG. 1

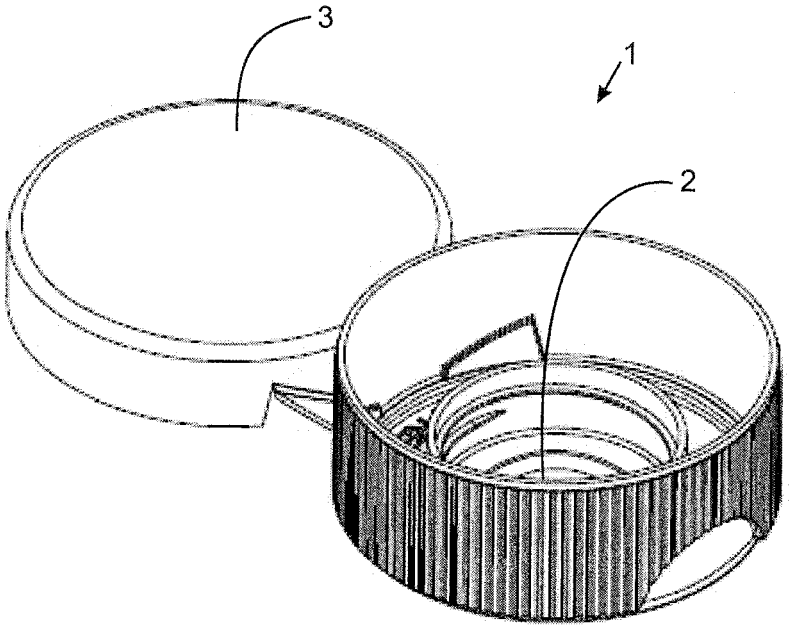

FIG. 2

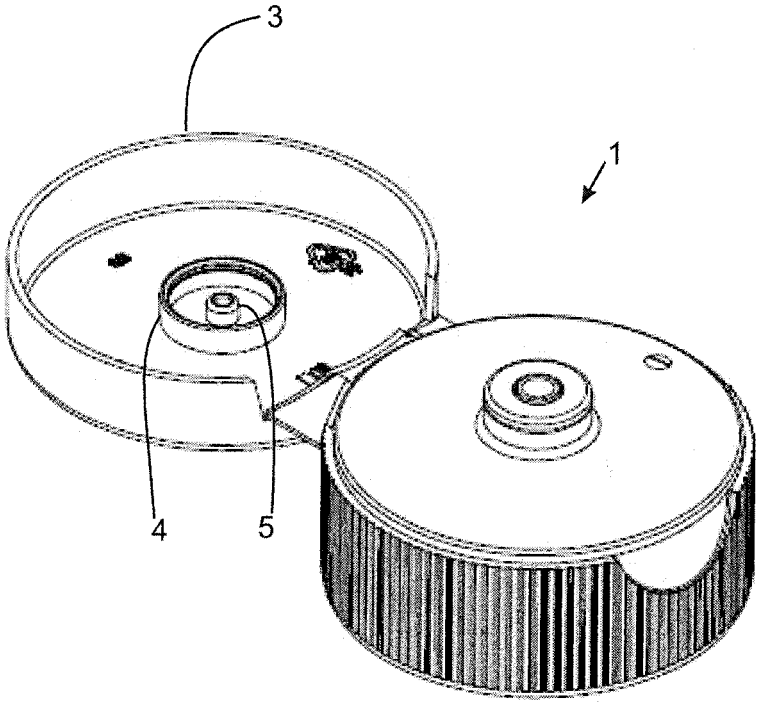

FIG. 3

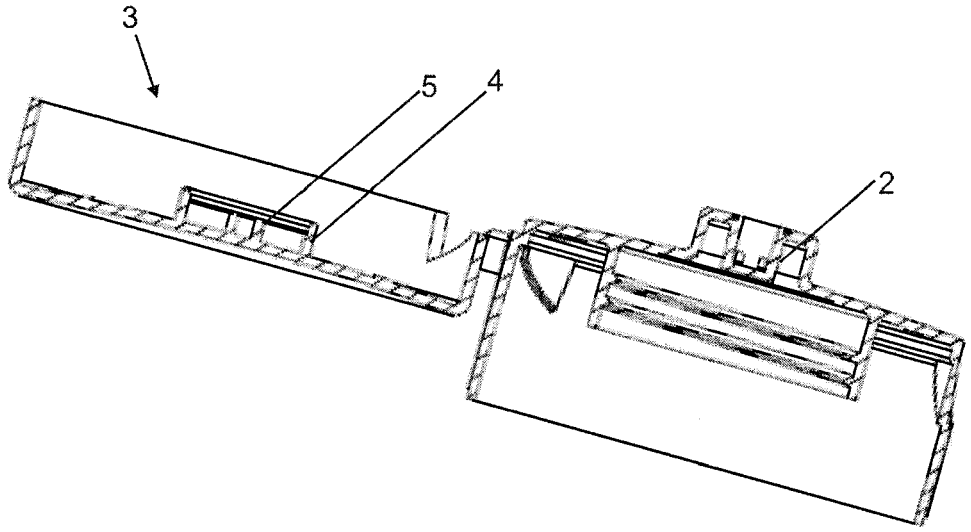

FIG. 4

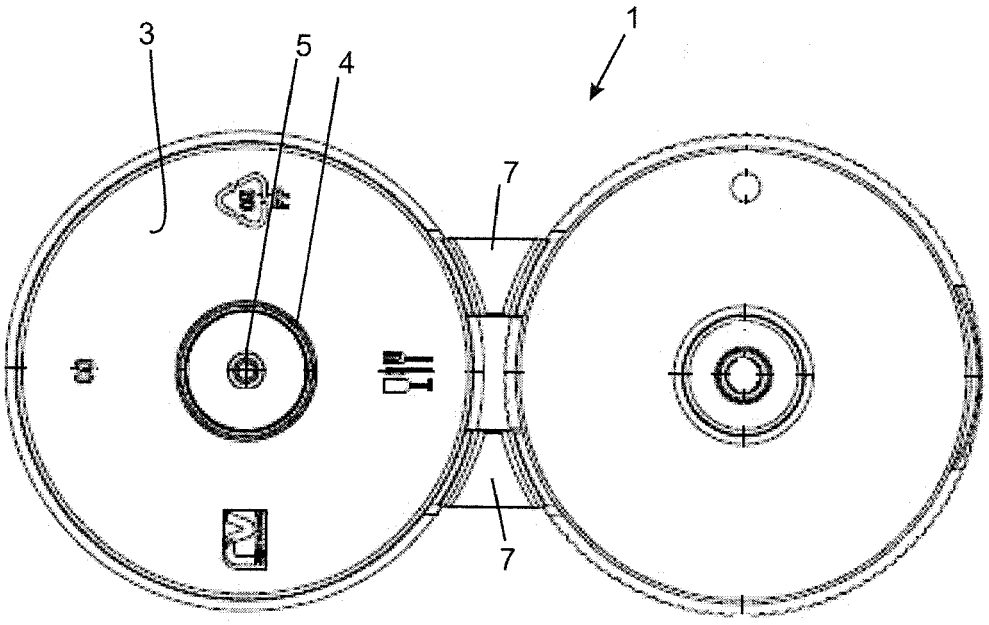

FIG. 5

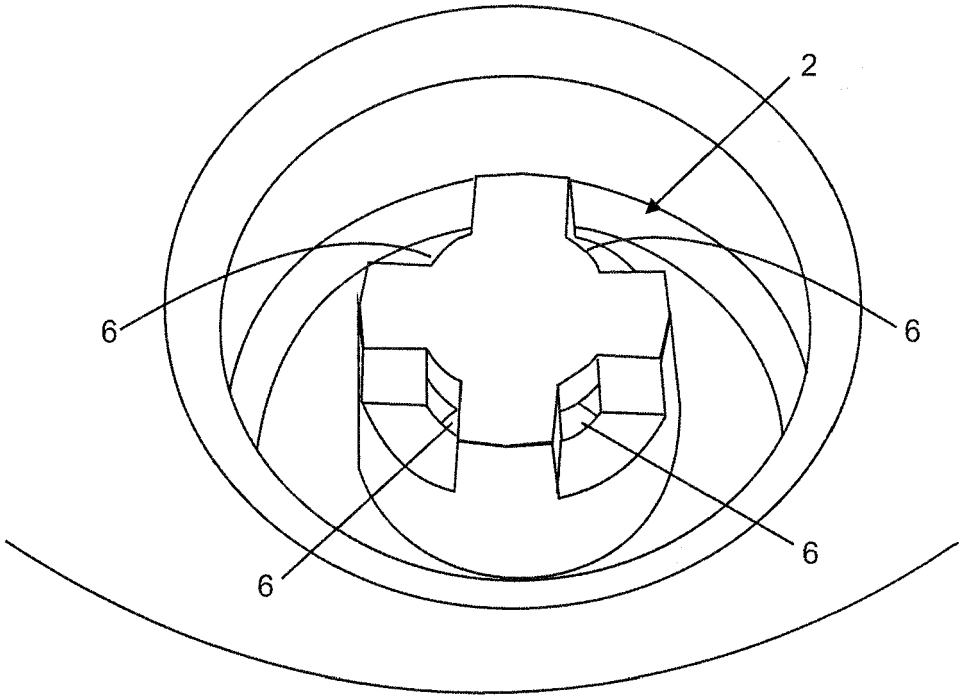

FIG. 6

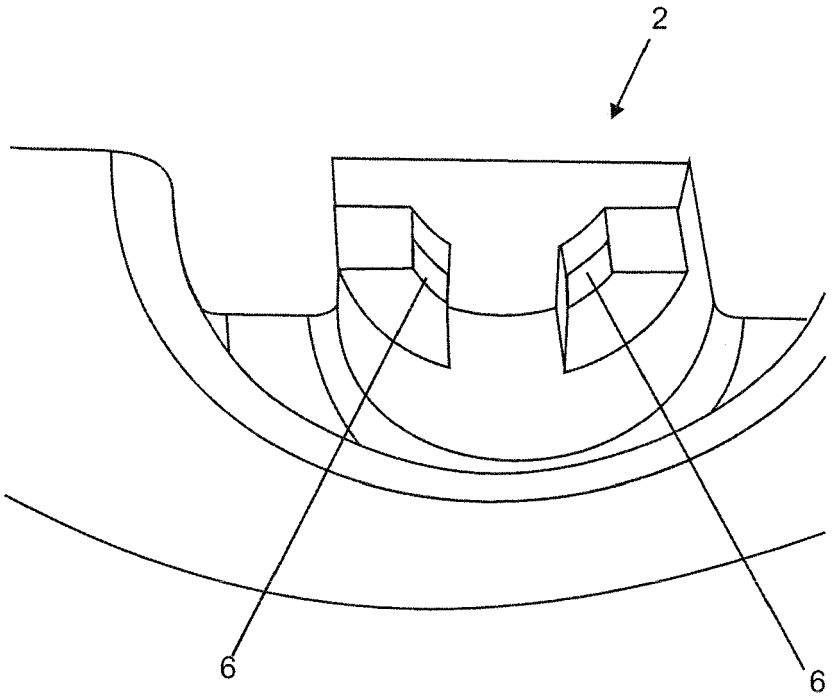

FIG. 7

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EUROPEAN SEARCH REPORT

Application Number
EP 14 15 9247

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 2007/087895 A1 (CAPARTIS AG [CH]; GAUL STEFAN [CH]; WOHLGENANNT HERBERT [CH]; WEIST MA) 9 August 2007 (2007-08-09) * page 7, lines 18-20; figures *	1-10	INV. B65D47/04 B65D47/08
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TECHNICAL FIELDS SEARCHED (IPC)

B65D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	6 June 2014	Fournier, Jacques

CATEGORY OF CITED DOCUMENTS

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