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(54) Pouring arrangement and method for manufacturing a pouring arrangement

(57) Described is a pouring arrangement (1) manufactured from plastic and intended to be provided on a container body for holding liquids. The pouring arrangement (1) comprises at least one pouring opening (2) which is enclosed by a rim (3) and through which the content of the container body can be poured out. The pouring opening (2) can be closed by a closing element (4). The closing element (4) is connected in the initial situation to the rim (3) of the pouring opening (2) by a hermetically sealed connection (8) which remains unaffected by the influence of pressure and temperatures such as occur during sterilization of the content of the container body but which can be at least partially broken under the influence of a force exerted from outside.

Also described is a container body provided with the above stated pouring arrangement, in addition to a closing member which can be coupled to a container body and which is provided with the above stated pouring arrangement (1).

Finally, a method is described for manufacturing the pouring arrangement (1).

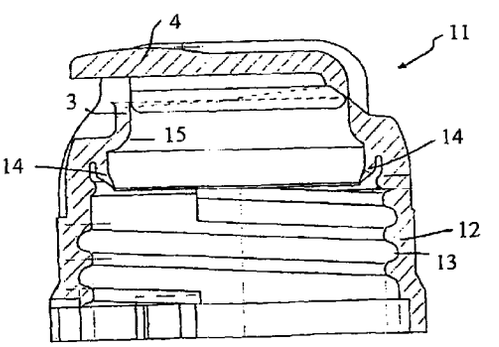

fig. 3

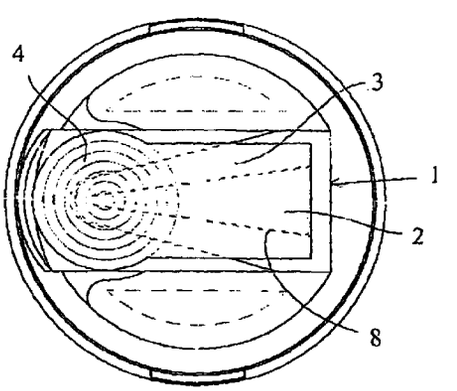

fig. 5

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Description

[0001] The present invention relates to a pouring arrangement manufactured from plastic and intended to be provided on a container body for holding liquids, which pouring arrangement comprises at least one pouring opening which is enclosed by a rim and through which the content of the container body can be poured out, which pouring opening can be closed by a closing element.

[0002] Such a pouring arrangement is known and is provided for instance on container bodies containing dairy products such as condensed milk. The pouring arrangement can herein be integrated into the container body; another option is that the pouring arrangement is coupled to the container body, with or without interposing of another member. Despite the fact that the above stated pouring arrangement has been known for many years, it has not proved possible until now to make it suitable for container bodies having a content which must be sterilized at high temperature. The known pouring arrangements are found in practice to begin leaking during sterilization, this being caused by the high temperature and pressure prevailing in the container body during sterilization, whereby at least a part of the content of the bottle is lost and the content of the bottle is in all likelihood contaminated. Such danger of contamination is very high particularly in the case of the frequently applied sterilization of the container bodies in a liquid bath.

[0003] There has therefore existed for many years a need for a pouring arrangement which can be provided on a container body for liquids and which can withstand the high temperatures and pressures occurring during sterilization of the content of the bottle. There is moreover a need to be able to close such a pouring arrangement in effective manner after opening thereof so that the content of the container body on which the pouring arrangement is arranged is protected against unnecessary contaminants.

[0004] The present invention provides for this purpose a pouring arrangement as according to the preamble which is characterized in that the closing element is connected in the initial situation to the rim of the pouring opening by a hermetically sealed connection which remains unaffected by the influence of pressure and temperatures such as occur during sterilization of the content of the container body but which can be at least partially broken under the influence of a force exerted from outside.

[0005] The term "initial situation" used in the previous paragraph is understood to mean the situation of the pouring arrangement when it has not yet been opened. In this initial situation the pouring arrangement can withstand the pressures and temperatures which occur during sterilization of the content of the container body due to the hermetically sealed connection between the closing element and the rim of the pouring opening. When sterilization of the content of the container body has taken place and the container body with the pouring arrangement is taken into use by a consumer, the connection can be at least partially broken under the influence of a (pressure) force exerted on the closing element so that the closing element can be taken - at least partially - off the pouring opening and the content of the container body can be poured out through this pouring opening. After use the closing element can simply be arranged on the pouring opening so that this latter is closed and the content of the container body is not exposed unnecessarily to contamination.

[0006] The hermetically sealed connection is particularly formed by a film connecting the rim of the pouring opening to the closing element.

[0007] This film possesses a strength such that the pressure and temperature prevailing during sterilization of the content of the container body can be withstood, while a breaking of the film under the influence of for instance a pressure force exerted by hand on the closing element is possible.

[0008] In order to prevent the closing element becoming wholly detached from the pouring arrangement, whereby there is the danger of the closing element being mislaid, the closing element advantageously moves rotatingly over a side of the pouring opening between the open and closed situation of the pouring opening. The closing element can hereby be pulled open and pressed shut manually in simple manner.

[0009] Although other embodiments of the pouring opening are possible, the pouring opening preferably takes a substantially triangular form, wherein the triangle comprises one short and two long sides and the individual lengths of the long sides comprise at least twice the length of the short side.

[0010] It is found that such a form of the pouring opening results in a good pouring behaviour, in particular when the content of the container body is poured through the portion of the pouring opening defined by the long sides and the corner between these two sides.

[0011] In order to enhance pouring of the content of the container body along precisely this above stated portion, the closing element advantageously moves rotatingly over the short side of the triangle.

[0012] The present invention likewise relates to a container body suitable for holding liquids which is characterized in that it is provided with a pouring arrangement as described above.

[0013] Such a container body can for instance comprise a closed container which is manufactured from a suitable plastic and in which a liquid, such as for instance condensed milk, can be received. The container can be provided, for instance on the top, with a pouring arrangement according to the present invention integrated therein. The advantage of such a container is that when the closing element of the pouring arrangement is situated in the initial position the container can be subjected to a treatment wherein the content of the

container body is sterilized without leakage occurring on the pouring arrangement.

[0014] The present invention further relates to a combination of a container body open at least on one end and a closing member coupled to the open end of the container body, which combination is characterized in that the closing member is provided with a pouring arrangement according to the present invention as described in the foregoing.

[0015] The closing member can herein comprise different forms and can also be coupled in different ways to the open end of the container body. The container body and the closing member do not necessarily have to be made from the same material.

[0016] In particular the container body comprises a bottle with a neck provided with screw thread and the closing member comprises a cap manufactured from plastic which is screwed onto the neck of the bottle and provided with a shell part having an internal screw thread.

[0017] Advantageously the pouring arrangement is herein integrated into the cap. Such a cap manufactured from plastic lends itself well to recycling. A glass bottle is particularly suitable for repeated use. The invention is not however limited to the application with glass bottles but is for instance equally suitable for plastic bottles.

[0018] In an advantageous embodiment the shell part of the cap extends concentrically round a sealing lip which is arranged in the cap and an outer end of which remote from an upper surface of the cap co-acts with a free end of the neck of the bottle, wherein the sealing lip narrows toward the outer end thereof and a base part of the sealing lip lies at least practically against the shell part of the cap.

[0019] Such an embodiment of the cap also ensures an effective sealing along the free end of the neck of the bottle at high temperatures and pressures in the bottle such as occur during sterilization. In addition, the cap is suitable in the screwed-on situation for realizing an active sealing of the bottle along the neck extremity, even after being screwed on and off a number of times. Due to the narrowing of the sealing lip, this latter has on its free end sufficient flexibility to remain pressed against the upper edge of the bottle under the influence of the pressure prevailing in the bottle during for instance a sterilization process and to thus ensure an adequate sealing. Because the base part of the lip lies at least practically against the shell pall of the cap, the lip is prevented from being raised together with the upper surface of the cap under the influence of a high pressure in the bottle and a thereby occurring upward bulging of this upper surface, which could adversely affect the seal. The invention thus provides an effective sealing of the bottle both when an overpressure prevails in the bottle and when an underpressure is present therein.

[0020] The present invention likewise relates to a closing member intended for use in the above stated combination.

[0021] The present invention further relates to a method for manufacturing a pouring arrangement according to the present invention. This method is characterized in that a fluid plastic is injected into an injection mould suitable for this purpose and comprising at least one injection point debouching into a first space substantially defining the form of a closing element, in addition to a second space defining the form of at least the rim of the pouring arrangement, wherein the first and the second space are in mutual communication by means of an opening which extends substantially over the length of the rim and which can vary in dimension such that, when a fluid plastic is injected into the injection mould through the injection point, the plastic first of all substantially fills the first space and then fills the second space in substantially fluid state via the opening between the first and the second space, wherein the fluidity of the plastic remains the same substantially over the whole length of the opening.

[0022] By varying the opening between the first and the second space such that the fluid plastic reaches substantially the whole second space in the same fluid state and the fluid plastic remains flowing substantially uniformly through the opening, the fluid plastic, which spreads as it were in circular shape into the mould, is prevented from already flowing through the opening into the second space at particular locations while the plastic has not yet reached the opening at other locations. In this latter case a part of the plastic can already harden while the remaining plastic is still fluid, so that after a determined time the cured and fluid plastic come into mutual contact and vulnerable seams are created in the pouring arrangement which can adversely affect the resistance of the pouring arrangement to high pressure and temperature. By now bringing about that the fluid plastic reaches the whole of the second space substantially in the same fluid state a pouring arrangement is obtained without such vulnerable seams, while between the rim of the pouring arrangement and the closing element a hermetically sealed connection is formed which remains unaffected by the influence of pressure and temperatures such as occur during sterilization of the content of the container body but which can be at least partially broken under the influence of a force exerted from outside.

[0023] The injection point of the injection mould is particularly situated substantially centrally relative to the upper surface of the closing element.

[0024] This further prevents seams undermining the strength of the connection from forming in the connection, or film, between the closing element and the rim of the pouring arrangement.

[0025] As stated above, the fluid plastic spreads from the injection point in a circular form over the mould. If the rim of the pouring arrangement does not lie concentrically relative to the injection point, it is then recommended that the dimension of the opening close to the

injection point be larger than the dimension of the opening at a distance therefrom, thus bringing about the above stated effect wherein the fluid plastic reaches the whole of the second space in substantially the same fluid state.

[0026] The present invention also relates to a method for manufacturing the container body described in the foregoing. This method is characterized in that the above stated method for manufacturing a pouring arrangement is applied, wherein the second space of the injection mould also defines the shape of a container body.

[0027] The present invention finally relates to a method for manufacturing the closing member described in the foregoing. This method is characterized in that the above stated method for manufacturing a pouring arrangement is applied, wherein the second space of the injection mould also defines the shape of a closing member.

[0028] The present invention will be further elucidated hereinbelow with reference to the annexed drawing, in which:

figure 1 shows a schematic top view of the pouring arrangement according to the present invention, wherein the pouring opening is closed by the closing element;

figure 2 shows schematically a cross-sectional side view of the pouring arrangement of figure 1;

figure 3 shows schematically a cross-sectional side view of a cap provided with a pouring arrangement according to the present invention;

figure 4 shows a schematic front view of the cap according to figure 3; and

figure 5 shows a schematic top view of the cap according to figures 3 and 4.

[0029] The figures are purely schematic and not drawn to scale. Some dimensions in particular are highly exaggerated for the sake of clarity. Corresponding components are designated as far as possible with corresponding reference numerals in the different figures.

[0030] Figure 1 shows a schematic top view of a pouring arrangement 1 according to the present intention. Pouring arrangement 1 comprises a pouring opening 2 - shown in broken lines - which is closed in the shown embodiment by a closing element 4. The broken line also shows a rim 3 which encloses pouring opening 2. In this embodiment the pouring opening takes a substantially triangular form, wherein the opening comprises two long sides 5A and 5B as well as a short side 5C. Closing element 4 can herein move rotatingly over the short side 5C of the triangle so that the pouring part used for pouring out the content of a container body provided with the pouring arrangement is bounded by the space between the corner 6 between the two long sides 5A and 5B and a part of the long sides 5A and 5B close to this corner 6. It has been found that the use of the above pouring part produces a favourable pouring behaviour.

[0031] In the initial state of the pouring arrangement, i.e. when it has not yet been opened at all, the closing element is connected to the rim of the pouring opening by a hermetically sealed connection which remains unaffected by the influence of pressure and temperatures such as occur during sterilization of the content of the container body but which can be at least partially broken under the influence of a force exerted from outside. This connection comprises a film 8 which connects the rim of the pouring opening to the closing element and is situated between the dashed lines lying directly adjacent to each other. By causing the corner 6 of pouring opening 2 to be not sharp but slightly rounded is achieved that the film in this part has a thickness corresponding to the thickness of the film in the other parts between the rim of the pouring opening and the closing element. The connection formed by film 8 will be further elucidated with reference to figure 2.

[0032] Figure 2 shows in schematic cross-section a side view of the pouring arrangement of figure 1. In the shown embodiment it can be seen clearly that the underside of closing element 4 lies against the rim 3 of pouring opening 2. In the initial situation of the pouring arrangement closing element 4 not only lies against rim 3 but a connection is also situated between these two elements which is formed by a film 8 having a strength such that it remains unaffected by the influence of pressure and temperatures such as occur during sterilization of the content of the container body provided with pouring arrangement 1. It is possible however to at least partially break connection 8 under the influence of a (pressure) force exerted from outside. For this purpose a person can manually press closing element 4 close to the front, i.e. the side situated close to corner 6, whereby closing element 4 is moved downward relative to rim 3 and a pinch effect occurs on film 8 so that it is broken. When closing element 4 is pressed close to the front the film will be broken in the corner 6 along the long sides 5A and 5B of the pouring opening so that closing element 4 is connected to rim 3 only along the short side 5C and can move rotatingly over this side between an opened and closed situation.

[0033] The pouring arrangement according to the present invention is manufactured from plastic, preferably of polypropylene, and can for instance be provided on a container body holding a liquid for pouring. Advantageously the container body will herein be made from the same plastic material so that the pouring arrangement and the container body can be manufactured integrally by means of injection moulding. It is of course also possible to incorporate the pouring arrangement in other manner in the container body, wherein it is however recommended that the coupling between the pour-

ing arrangement and the container body is such that it can withstand the pressure and temperatures such as occur during sterilization of the content of the container body. The pouring arrangement can also be accommodated in a closing member coupled to a container body. The same applies here in respect of the incorporation of the pouring arrangement in the closing member. This embodiment will be further explained in figures 3-5.

[0034] The method of manufacturing a pouring arrangement according to the present invention is such that a pouring arrangement, whether or not it is integrated into a container body or closing member, can be formed as one unit while the arrangement is provided with a hermetically sealed connection as discussed above between the rim of the pouring opening and the closing element. In this method a fluid plastic is injected into an injection mould suitable for this purpose which comprises at least one injection point debouching into a first space which substantially defines the form of a closing element. The mould also comprises a second space which defines the form of at least the rim of the pouring arrangement, wherein the first and the second space are in mutual communication by means of an opening. The opening extends over the length of the rim and varies in dimension. In figure 1 the injection point from which the pouring arrangement is formed by means of injection moulding is designated with reference numeral 10. Fluid plastic injected at this point will spread substantially in the shape of a circle through the mould so that the fluid plastic first reaches the opening between the first and the second space, where film 8 is formed, on the long sides 5A, 5B of the pouring opening at the position of injection point 10, well before for instance the corner and the short side 5 of the pouring opening are reached. Making the dimension of the opening in the mould on the long sides 5A, 5B at the position of injection point 10 larger than the opening close to corner 6 and short side 5C has the result that the plastic continues to flow through the opening along the whole length and does not harden prematurely, whereby seam-forming can occur in the product. The film 8 finally formed in the opening will therefore vary in thickness but is still such that the film can withstand pressure and temperatures such as occur during sterilization of the content of the container body, while the film can be broken under the influence of for instance a pressure force applied manually from outside. The thickness of film 8 preferably varies between 0.05 and 0.10 mm.

[0035] Shown in figures 3-5 is a closing member, a cap 11, which is provided with a pouring arrangement according to the present invention. The pouring arrangement and the cap are herein manufactured integrally by means of injection moulding, wherein the second space of the injection mould also defines the form of the cap. As shown in figure 3, cap 11 comprises a shell part 12 provided with internal screw thread 13. Shell part 12 extends concentrically round a sealing lip 14 which is arranged in the cap and which, when cap 11 is coupled to a neck of a bottle provided with screw thread, can co-act with a free end of the neck of the bottle. With such an embodiment of the cap an effective sealing at high temperatures and pressures in the bottle, such as occur during sterilization, is also ensured along the free end of the neck of the bottle. The narrowing of sealing lip 14 gives the lip sufficient flexibility on its free outer end to remain pressed against the upper edge of the bottle under the influence of an overpressure prevailing in the bottle which occurs for instance during sterilization, in order to thus ensure an adequate sealing. Because the base part of lip 14 lies at least practically against shell part 12 of cap 11, the lip 14 is prevented from being raised together with the upper surface of the cap under the influence of a high pressure in the bottle and a thereby occurring upward bulging of this upper surface, which could adversely affect the seal. Close to pouring opening 2 the cap 11 is also provided with a curving transition 15 to the rim 3, so that after being poured out of the container body liquid is drawn back by adhesion and does not cling to the underside of rim 3.

[0036] Figure 4 shows a front view of cap 11, wherein the internal part is indicated in broken lines. Finally, figure 5 shows a top view of cap 11, which clearly shows how pouring arrangement 1 as according to figures 1 and 2 is integrated into cap 11.

[0037] Although the invention is further elucidated in the foregoing with reference to only a single embodiment, it will be apparent that the invention is in no way limited to the given embodiment. Many other variations and embodiments are possible for the skilled person within the scope of the invention. The form of the pouring opening of the pouring arrangement can for instance be embodied differently, wherein the connecting film between the closing element and the rim of the pouring opening will vary accordingly in thickness.

Claims

1. Pouring arrangement (1) manufactured from plastic and intended to be provided on a container body' for holding liquids, which pouring arrangement (1) comprises at least one pouring opening (2) which is enclosed by a rim (3) and through which the content of the container body can be poured out, which pouring opening (2) can be closed by a closing element (4), **characterized in that** the closing element (4) is connected in the initial situation to the rim (3) of the pouring opening (2) by a hermetically sealed connection (8) which remains unaffected by the influence of pressure and temperatures such as occur during sterilization of the content of the container body but which can be at least partially broken under the influence of a force exerted from outside.

2. Pouring arrangement as claimed in claim 1, **characterized in that** the hermetically sealed connection (8) is formed by a film connecting the rim (3) of the pouring opening to the closing element (4).

3. Pouring arrangement as claimed in claim 1 or 2, **characterized in that** the closing element (4) moves rotatingly over a side of the pouring opening between the open and closed situation of the pouring opening.

4. Pouring arrangement as claimed in one or more of the claims1-3, **characterized in that** the pouring opening (2) takes a substantially triangular form, wherein the triangle comprises one short (5C) and two long sides (5A,5B) and the individual lengths of the long sides comprise at least twice the length of the short side.

5. Pouring arrangement as claimed in claims 3 and 4, **characterized in that** the closing element (4) moves rotatingly over the short side (5C) of the triangle.

6. Container body suitable for holding liquids, **characterized in that** it is provided with a pouring arrangement (1) as claimed in one or more of the claims1-5.

7. Combination of a container body open at least on one end and a closing member coupled to the open end of the container body, **characterized in that** the closing member is provided with a pouring arrangement (1) as claimed in one or more of the claims 1-5.

8. Combination as claimed in claim 7, **characterized in that** the container body comprises a bottle with a neck provided with screw thread and the closing member comprises a cap (11) manufactured from plastic which is screwed onto the neck of the bottle and provided with a shell part (12) having an internal screw thread (13).

9. Combination as claimed in claim 8, **characterized in that** the shell part (12) of the cap (11) extends concentrically round a sealing lip (14) which is arranged in the cap and an outer end of which remote from an upper surface of the cap co-acts with a free end of the neck of the bottle, wherein the sealing lip (14) narrows toward the end thereof and a base part of the sealing lip (14) lies at least practically against the shell part (12) of the cap.

10. Closing member intended for use in a combination as claimed in one or more of the claims 7-9.

11. Method for manufacturing a pouring arrangement as claimed in one or more of the claims 1-5, **characterized in that** a fluid plastic is injected into an injection mould suitable for this purpose and comprising at least one injection point debouching into a first space substantially defining the form of a closing element, in addition to a second space defining the form of at least the rim of the pouring arrangement, wherein the first and the second space are in mutual communication by means of an opening which extends substantially over the length of the rim and which can vary in dimension such that, when a fluid plastic is injected into the injection mould through the injection point, the plastic first of all substantially fills the first space and then fills the second space in substantially fluid state via the opening between the first and the second space, wherein the fluidity of the plastic remains the same substantially over the whole length of the opening.

12. Method as claimed in claim 11, **characterized in that** the injection point (10) of the injection mould is situated substantially centrally relative to the upper surface of the closing element.

13. Method as claimed in claim 11 or 12, **characterized in that** the dimension of the opening close to the injection point is larger than the dimension of the opening at a distance therefrom.

14. Method for manufacturing a container body as claimed in claim 6, **characterized in that** a method as claimed in one or more of the claims 11-13 is applied, wherein the second space of the injection mould also defines the shape of a container body.

15. Method for manufacturing a closing member as claimed in claims 7-10, **characterized in that** a method as claimed in one or more of the claims 11-13 is applied, wherein the second space of the injection mould also defines the shape of a closing member.

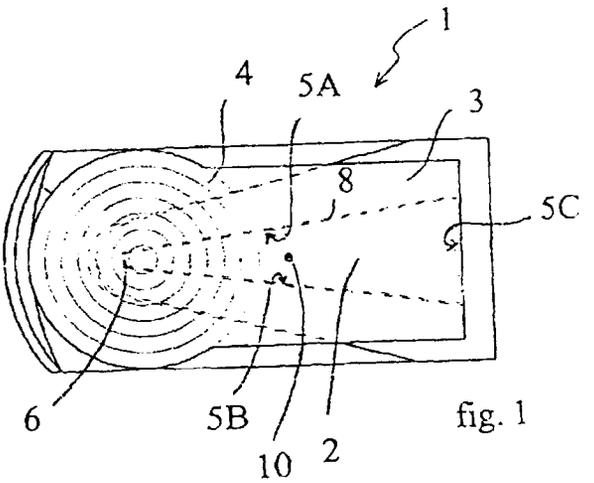

fig. 1

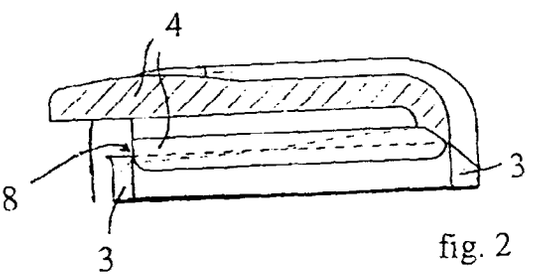

fig. 2

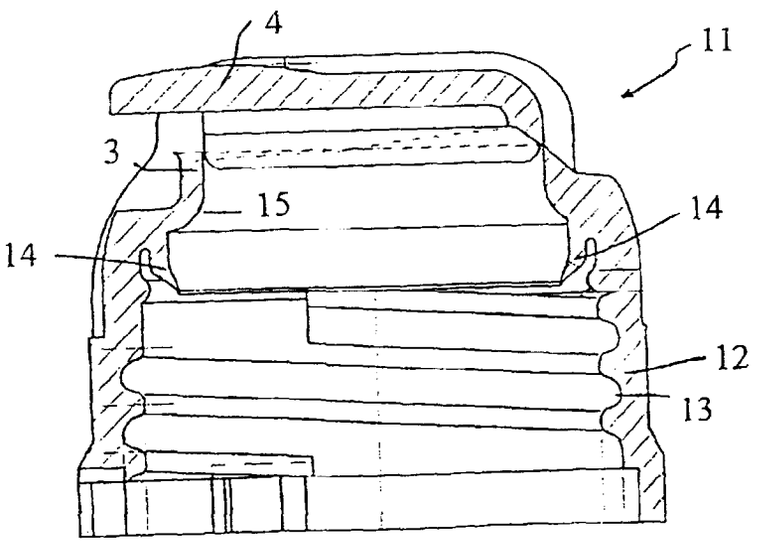

fig. 3

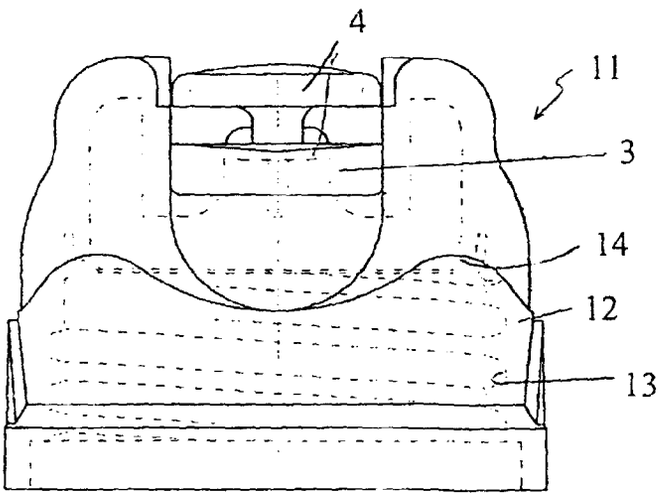

fig. 4

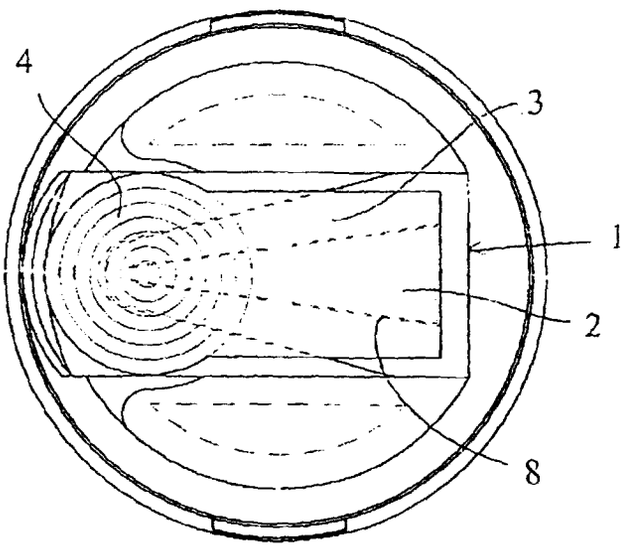

fig. 5

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 98 20 4399

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
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TECHNICAL FIELDS SEARCHED (Int.Cl.6)
B65D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	11 March 1999	Pernice, C

CATEGORY OF CITED DOCUMENTS

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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