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(71) Applicant: **F.Ceredi S.P.A.**
40069 Zola Predosa (IT)

(72) Inventor: **Ceredi, Gilberto**
40069, ZOLA PREDOSA (IT)

(74) Representative: **Jorio, Paolo et al**
STUDIO TORTA
Via Viotti 9
10121 Torino (IT)

(54) **Container with hermetic seal provided with a safety device**

(57) Container (1) with hermetic seal provided with a lid (3); an opening (4) obtained in the lid (3) and provided with an axis (5); an annular internal wall (13) surrounding the opening (4) and an annular external wall (12), said annular walls (12, 13) being coaxial with respect to the axis (5), extending upwards from the lid (3) and defining an annular cavity (11); a closing assembly (8) of the opening (4) provided with a plug (10), which has an annular peripheral cavity (25) suitable to internally house the annular external wall (12) with which it cooperates to enable the container (1) to be opened and closed, a number of radial bridges (22) that connect the annular internal wall (13) to the annular external wall (12) and a safety device (31) that cooperates with the radial bridges (22) to keep the container (1; 1') in a closed position.

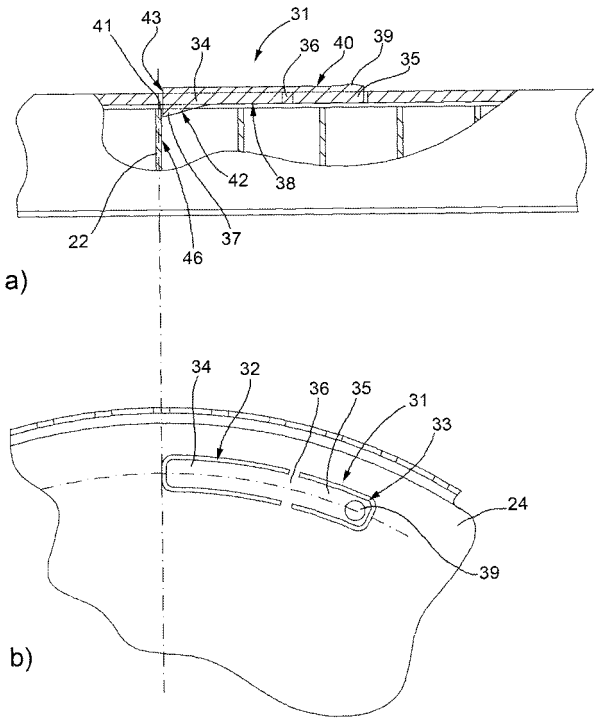

FIG.7

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Description

[0001] The present invention relates to a container with hermetic seal provided with a safety device.

[0002] In particular, the present invention relates to a container with hermetic seal of the type comprising a cup-shaped body provided with a lid, in which there is an opening surrounded by a collar giving access to the product, for example paint or varnish, inside the container. The container comprises a closing assembly of the opening comprising, in turn, a plug that is substantially capsule-shaped.

[0003] The containers with hermetic seal of the type described above are widely used as the closing assembly can easily be fitted to the opening of the container, and also because this type of coupling creates no particular problems and requires no particular precautions, for example to align the closing assembly with respect to the opening.

[0004] It is important to note that the containers of the type described above can contain, for example, paint or varnish and, for many products, the container must be able to guarantee a perfect seal to prevent any undesirable leaking of the product, even in the event of damage or tampering. Besides being easy to assemble, to limit the costs of production, and the need to ensure good hermetic sealing properties and reliability, there is an increasing need to prevent unauthorised opening of this type of container. As such containers are used to contain hazardous substances, it is important, for instance, to prevent children from being able to come accidentally into contact with the paint or varnish inside the container, which could represent a health hazard.

[0005] The object of the present invention is to provide a container with hermetic seal, which is easy and inexpensive to produce, overcomes the inconveniences of the prior art and in particular prevents accidental or unauthorised opening of the container.

[0006] According to the present invention there is provided a container as claimed in the appended claims.

[0007] The present invention will now be described with reference to the accompanying drawings, illustrating some non-limiting embodiments thereof, in which:

- figure 1 is a cross-sectional view of a first embodiment of the container according to the present invention;
- figure 2 is a cross-sectional view of a second embodiment of the container according to the present invention;
- figure 3 is a cross-sectional view of a first embodiment of a closing assembly of the container of figure 1;
- figure 4 is a plan view of the closing assembly of figure 3;
- figure 5 is a cross-section of a plug of the closing assembly of figure 3;
- figure 6 is a cross-sectional view of a second embodiment of the closing assembly of the container of figure 1;
- figures 7a and 7b are, respectively, a cross-section and a plan view of respective details of a safety device of the container of figure 1.

[0008] In figure 1, designated as a whole by number 1 is a container with hermetic seal made of a metal material, in which a cup-shaped body 2 is provided with a lid 3. The lid 3 is provided with an opening 4 that has a central axis 5 and is surrounded by a collar 6, the edge of which is folded so as to obtain a reinforced rib 7.

[0009] The opening 4 is closed by means of a closing assembly 8 comprising an adapter 9 made of a plastic material and a plug 10 also made of a plastic material and which is substantially capsule-shaped.

[0010] The adapter 9 may be moulded directly onto the collar 6 or, alternatively, it may be produced separately and then snap-fitted onto the collar 6. The adapter 9 is defined by an annular body that is substantially Y-shaped and is provided, at the end thereof facing the plug 10, with an annular cavity 11 defined by two side walls, indicated respectively with numbers 12 and 13, which are coaxial with respect to the central axis 5, and a portion 14 of lower wall.

[0011] The external side wall 12 comprises an external thread 15 to enable screw coupling with the plug 10. The adapter 9 also comprises an annular internal appendix 16 which faces the lid 3, extends towards the inside of the container 1, is connected to the portion 14 of lower wall and is provided with an annular cavity 17 obtained to house and define a support for a folded edge of the collar 6 and enable snap coupling to the reinforced rib 7 of the collar 6.

[0012] The adapter 9 also comprises a covering wall 18 connected to which is a gripping device 19 which, according to the second embodiment illustrated in figure 3, comprises a handle 20 that is joined to the covering wall 18, which is in turn joined, in correspondence with a weakening cut 21, to the internal side wall 13. The handle 20 protrudes towards the plug 10 so that, the first time the container 1 is opened and when the plug 10 is removed, the user can grip the handle 20 and detach the covering wall 18 from the internal side wall 13 in correspondence with the weakening cut 21, so that the rest of the adapter 9 continues to be joined to the collar 6 and the user can have access to the product inside the container 1.

[0013] As is more clearly illustrated in figure 4, the adapter 9 is also provided with a plurality of radial bridges 22 uniformly distributed around the central axis 5 and suitable to connect the internal side wall 13 to the external side wall 12 and defining a plurality of compartments 23. The radial bridges 22 are structured so as to prevent any deformation of the external side wall 12 even after repeatedly screwing and unscrewing the lid 10 onto and from the adapter 9. This ensures a hermetic seal of the container 1 even after it has been used numerous times.

[0014] According to that illustrated in figure 5, the plug 10 comprises an upper wall 24 and a annular peripheral cavity 25 coaxial with respect to the central axis 5 and engaged by the two side walls 12 and 13 of the adapter 9. The annular peripheral cavity 25 is defined by an annular external wall, coaxial with respect to the central axis 5, the internal surface 27 of which is provided with an internal thread 28 that couples, in use, with the external thread 15 of the adapter 9 to block the plug 10 on the adapter 9.

[0015] The annular cavity 25 is further defined by an annular internal wall 29, coaxial with respect to the central axis 5 that extends from the upper wall 24 towards the lid 3 and an external cylindrical surface 30 which cooperates in use with the internal side wall 13 of the adapter 9.

[0016] On the plug 10 there is also a safety device 31, which is suitable to block the lid 10 better on the adapter 9 to prevent the container 1 from being opened accidentally, for example by children.

[0017] The safety device 31 consists of two through cavities, indicated with 32 and 33, obtained in the upper wall 24, which are substantially U-shaped and such as to define together two appendixes 34 and 35 which belong to a same annular sector and are separated by a portion 36 connecting them to the rest of the upper wall 24. In particular, the two appendixes 34, 35 are of substantially the same width, but the appendix 34 is longer than the appendix 35. The connecting portion 36 is clearly the same width as and shorter than the two appendixes 34 and 35. In particular, the length of the connecting portion 36 is chosen in order to be able to guarantee a certain degree of relative elasticity between the two appendixes 34 and 35 and the rest of the upper wall 24 as described more fully below.

[0018] Moreover, the two appendixes 34 and 35 are arranged in correspondence with the annular cavity 11 of the adapter 9 and have a width that is, as an approximation by defect, substantially the width of said annular cavity 11. In other words, the intermediate diameter D of the annular cavity 11 coincides exactly with the intermediate diameter D' of the annular sector defined by the safety device 31 as a whole.

[0019] As is more clearly illustrated in figures 7a and 7b, the appendix 34 has a cross-section with a non-uniform thickness, in other words the appendix 34 is provided with a projection 37 in correspondence with its free end which extends downwards from the lower surface 38 of the appendix 34 and thus faces the adapter 9, has a triangular cross-section and acts as a retaining pawl of the plug 10 when the latter is screwed onto the adapter 9 as described more fully below.

[0020] According to a preferred embodiment, the appendix 35 is provided with a pressure key 39 that protrudes from the upper surface 40 of said appendix 35 and is suitable, in use, to facilitate the operations of releasing the plug 10 and unscrewing it from the adapter 9.

[0021] In use, to screw the plug 10 onto the adapter 9, said plug 10 is arranged so as to cover the opening 4 of the lid 3 and the internal thread 28 on the plug 10 and the external thread 15 on the adapter 9 cooperate to screw the plug 10 down. The plug 10 rotates about the central axis 5 and the projection 37 comes into contact with the upper surfaces 41 of the different radial bridges 22 of the adapter 9. The projection 37 has a triangular cross-section and is thus provided with a truncated pyramid-shaped lower surface 42.

[0022] During screwing, when a lower surface 42 of the appendix 34 comes into contact with a radial bridge 22, the elasticity and shape of the appendix 34 allow the front surface 43 to slide on the upper surface 41 of the radial bridge 22, pass over the radial bridge 22 and enter the next compartment 23. Said movement is also helped by the fact that the appendix 34 is only connected to the remaining portion of upper wall 24 of the plug 10 by means of the smaller connecting portion 36, so that the appendix 34 can rise when it meets a radial bridge 22 and then spring back into its original position.

[0023] Screwing is interrupted the moment the lower surface 44 of the annular cavity 25 of the plug 10 comes into contact with an upper surface 45 of the side walls 12 and 13 which define the annular cavity 11 of the adapter 9. In this closed position of the container 1, the front surface 43 of the appendix 34 stops against a side surface 46 of a radial bridge 22 with which it cooperates to maintain the container 1 in the closed position.

[0024] When the user wishes to open the container 1 and attempts to unscrew the plug 10 from the adapter 9, the side surface 43 of the appendix 34 is pushed against the side surface 46 of the radial bridge 22, creating a connection that makes it impossible to unscrew the plug 10 and open the container 1.

[0025] To unscrew the plug 10 it is necessary to raise the appendix 34 which is blocked by the contact with the radial bridge 22. It is raised simply by pressing on the appendix 35 and in particular on the pressure key 39. The pressure that is applied causes the appendix 35 to be lowered with respect to the upper wall 24 of the plug 10 and the appendix 34 to be raised to a height such that the projection 37 no longer interferes with the radial bridges 22 and the plug 10 can therefore be unscrewed.

[0026] Clearly the use of the safety device 31 can be rendered more or less simple by means of a series of variables, including for instance the width of the connecting portion 36 of the two appendixes 34 and 35 (i.e. the length of the connecting portion 36 that separates the two appendixes 34 and 35) or the type of material that is used (characterised by high or reduced elasticity).

[0027] The alternative embodiment shown in figure 2 illustrates a container 1' with hermetic seal entirely similar to that described above. However, in the container 1' there is no adapter between the plug 10' and the collar 6' of the container 1'. In particular, the container 1' is made entirely of a plastic material, it comprises a tubular body 47 and is provided with a bottom wall 48 and an upper wall 49 in which there is an opening 4' which is provided with a central axis 5' and surrounded by a collar

6'. The container is produced by means of a single procedure. A closing assembly 8' of the opening 4' comprises the collar 6' and the plug 10', both coaxial with respect to the central axis 5'.

[0028] The collar 6' is defined by an annular body provided, at one end thereof facing towards the plug 10', with an annular cavity 11' defined by two side walls 12' and 13', which are coaxial with respect to the central axis 5', and by a portion 14' of lower wall. The external side wall 12' comprises an external thread 15' to enable the screw coupling with the plug 10'. The collar 6' is also provided with a plurality of radial bridges (not illustrated) uniformly distributed around the central axis 5' and suitable to connect the internal side wall 13' and external side wall 12'.

[0029] Figure 6 illustrates an alternative embodiment, in which the container 1 is closed by a lid 3 provided with an opening 4 that has a central axis and is surrounded by a cylindrical collar 6, an upper edge of which is folded outwards from the opening 4 to form a reinforced annular rib 7. The closing assembly 8 of the opening 4 comprises an adapter 9 and a plug 10, both coaxial with respect to the central axis 5.

[0030] The adapter 9 is defined by an annular substantially H-shaped body provided, in addition to the annular cavity 11, with an annular cavity 50 at one end thereof which faces towards the lid 3 and is suitable to house the upper outwardly-folded edge of the cylindrical collar 6. The annular cavity 50 is defined by two side walls 12 and 13, which are coaxial with respect to the axis 5, and by a portion 14 of transversal wall. The side wall 12 comprises an entrance portion 51 increasing in thickness towards the portion 14 of transversal wall and defining a guide for the reinforced rib 7, and an internal portion 52, which is engaged by the rib 7 and is joined to the entrance portion 51 by means of an annular shoulder 53.

[0031] The container 1 with hermetic seal described above achieves numerous advantages in that the procedure to open the container 1 comprises a sequence of operations that prevent unauthorised opening and make it impossible for the container to be opened accidentally, for example by a child.

Claims

1. Container (1; 1') with hermetic seal comprising:

a lid (3);
an opening (4) obtained in the lid (3) and provided with an axis (5);
an annular internal wall (13) which is coaxial with the axis (5), protrudes upwards from the lid (3) and surrounds the opening (4);
an annular external wall (12) which is coaxial with the axis (5) and protrudes upwards from the lid (3);
an annular cavity (11) defined by the annular internal wall (13) and the annular external wall (12);
a closing assembly (8) of the opening (4) comprising a plug (10) which presents an annular peripheral cavity (25) suitable to internally house the annular internal wall (13) and the annular external wall (12) and cooperates with the annular external wall (12) to allow the closing and the opening of the container (1; 1');
the container (1; 1') being **characterised in that** the container (1; 1') comprises a plurality of radial bridges (22) connecting the annular internal wall (13) to the annular external wall (12) and the plug (10) comprises a safety device (31) cooperating with the radial bridges (22) to keep the container (1; 1') in a closed position.

2. Container according to claim 1, wherein the safety device (31) is obtained in an upper wall (24) of the plug (10) in correspondence with the annular cavity (11) and presents a width which substantially approximates by defect the width of the annular cavity (11).

3. Container according to claim 1 or 2, wherein the safety device (31) defines an annular sector presenting an intermediate diameter (D') which corresponds to an intermediate diameter (D) of the annular cavity (11).

4. Container according to claim 1, 2 or 3, wherein the safety device (31) comprises a pair of through cavities (32, 33) obtained in the upper wall (24) of the plug (10).

5. Container according to claim 4, wherein the through cavities (32, 33) are substantially U-shaped and are arranged in such a way that they define a pair of appendixes (34, 35) connected to one another by means of a connecting portion (36).

6. Container according to claim 5, wherein the radial bridges (22) are arranged uniformly around the axis (5) and are suitable to cooperate with a first appendix (34) to keep the container (1) in the closed position.

7. Container according to claim 6, wherein the first appendix (34) comprises a projection (37) which is located in proximity of a free end of said first appendix (34) and extends downwards in the direction of the lid (3).

8. Container according to claim 6 o 7, wherein, in the closed position of the container (1), a front surface (43) of the first appendix (34) stops in proximity of a corresponding radial bridge (22) in order to block the plug (10) on the annular cavity (11).

9. Container according to one of the claims from 6 to 8, wherein a second appendix (35) is provided with an upper surface (40) having a pressure key (39) which is suitable to facilitate the opening of the container (1).

10. Container according to one of the claims from 6 to 9, wherein the connecting portion (36) between the two appendixes (34, 35) presents relatively small dimensions, so that a pressure applied to a second appendix (35) causes a partial lifting of the first appendix (34).

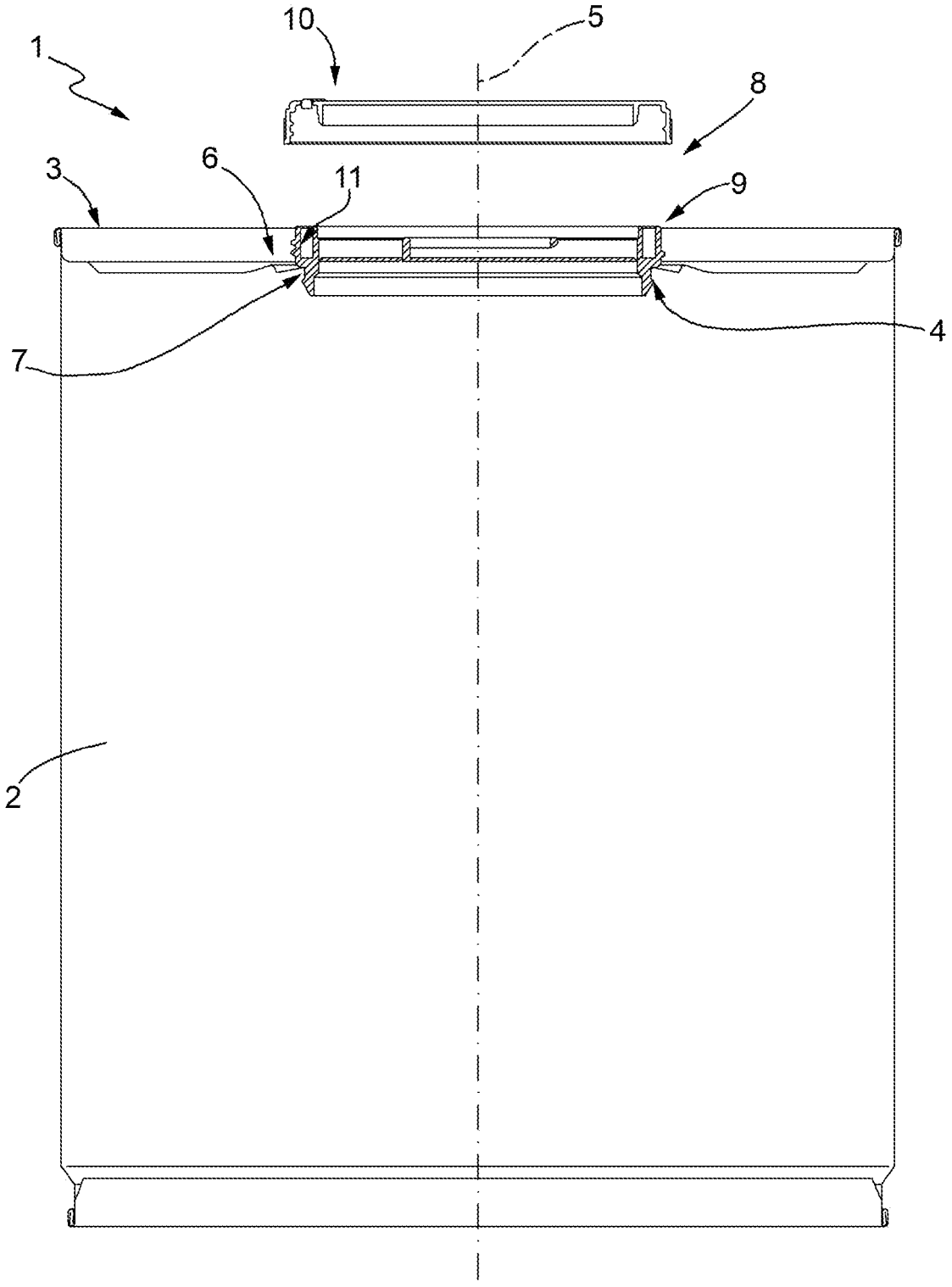

FIG.1

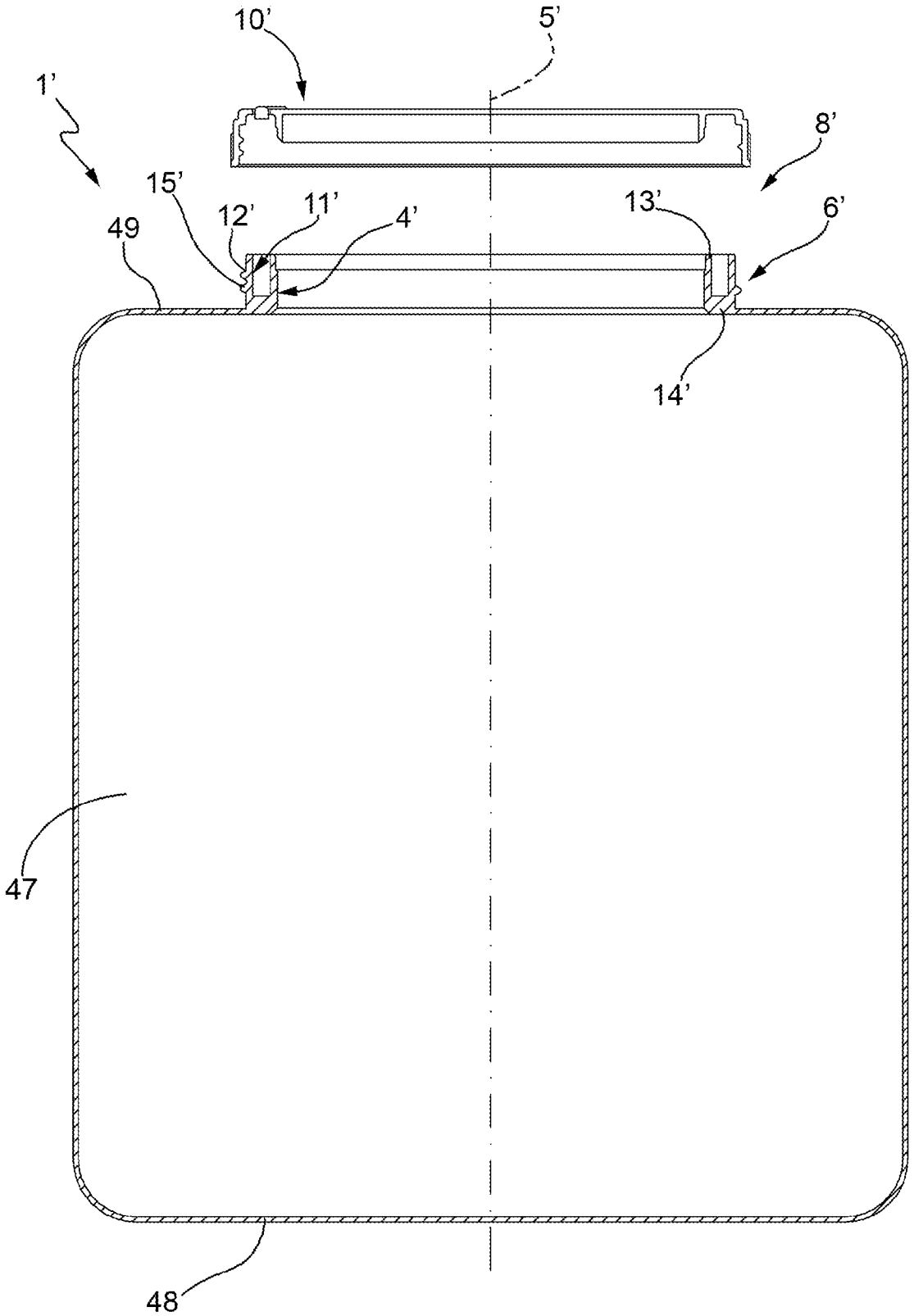

FIG.2

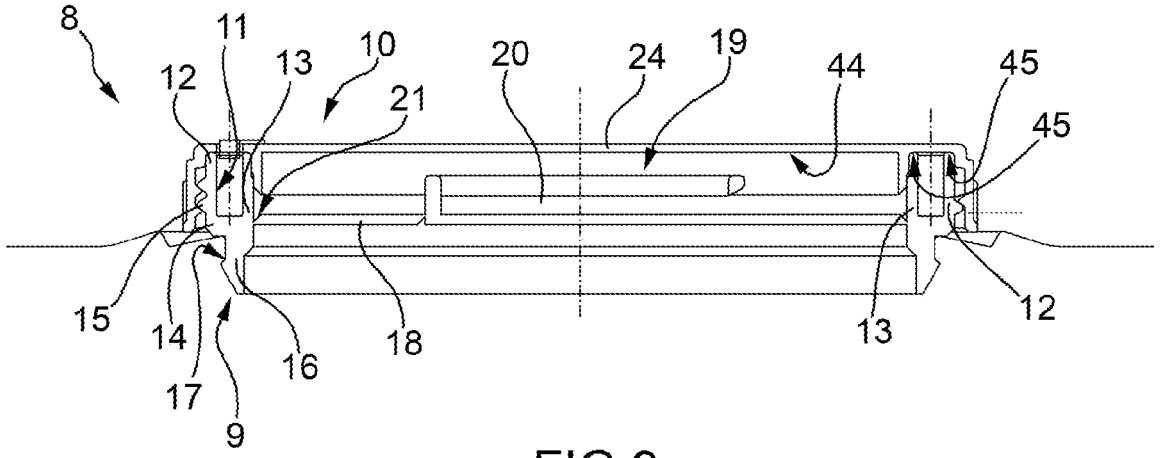
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FIG.3

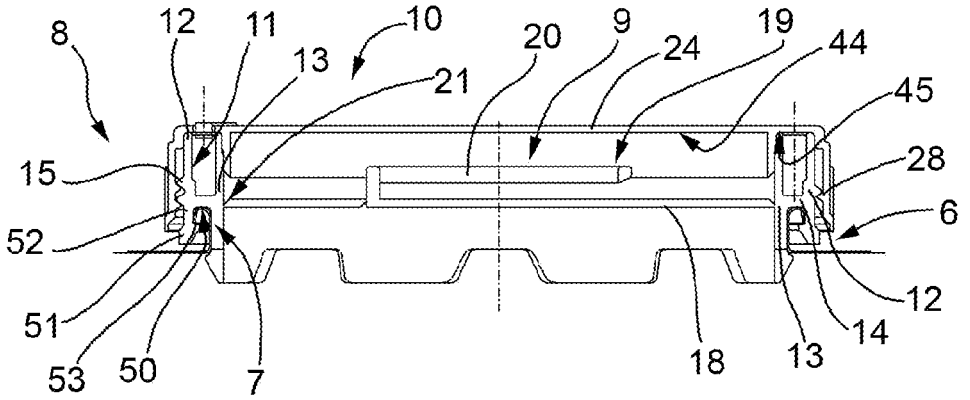
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FIG.6

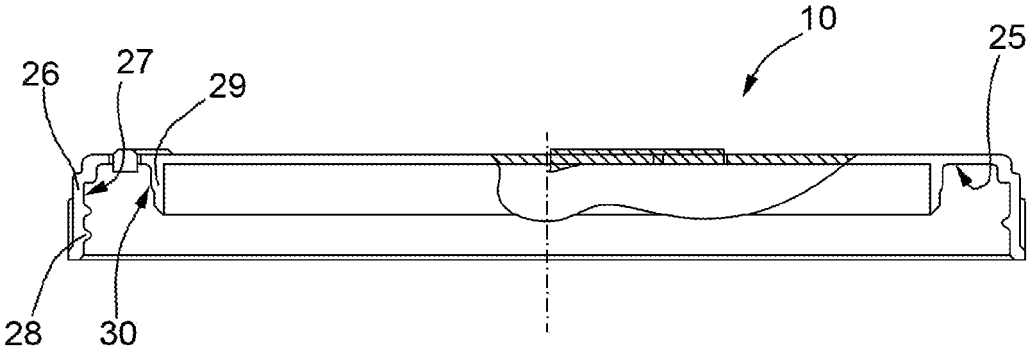

FIG.5

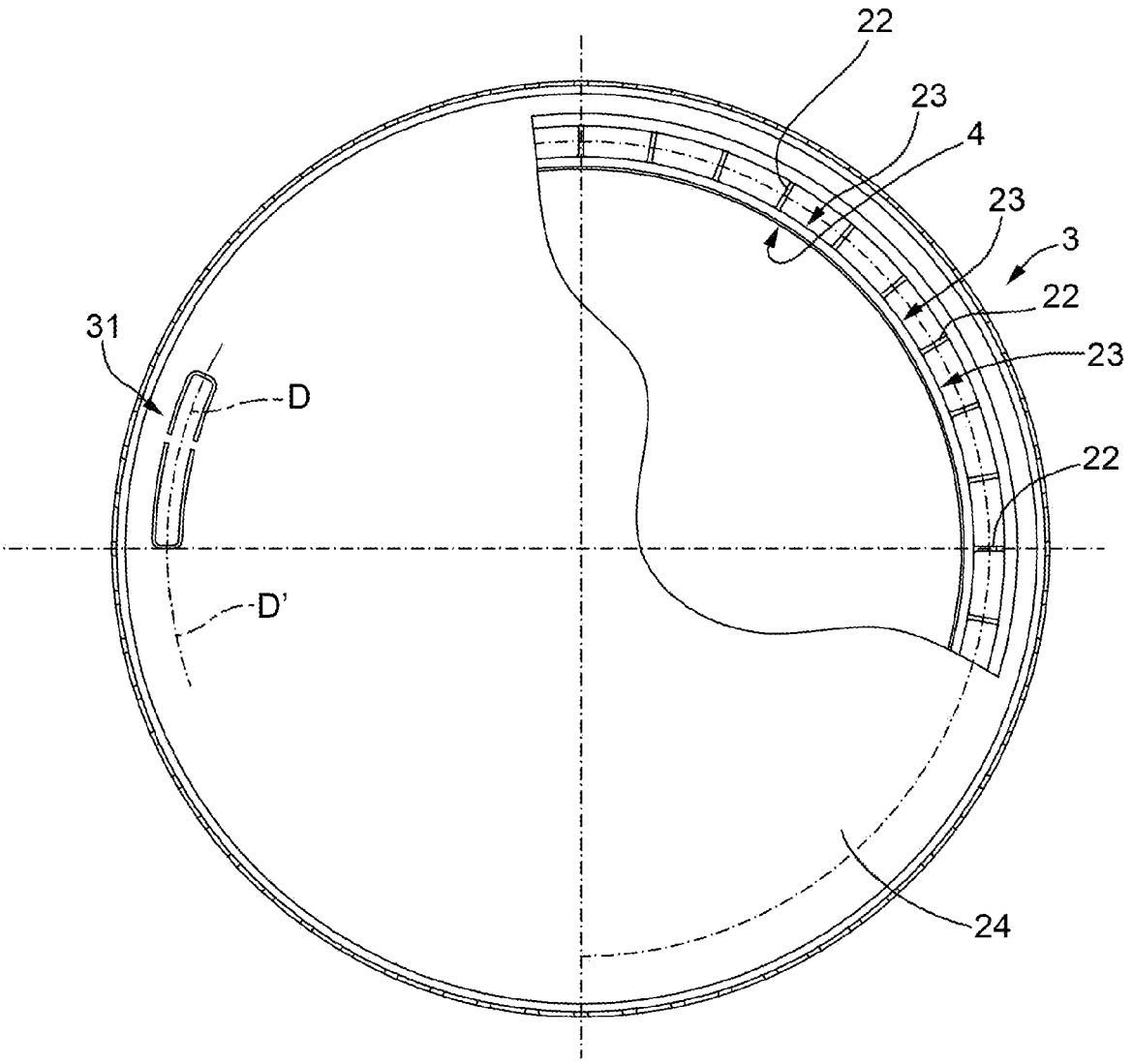

FIG.4

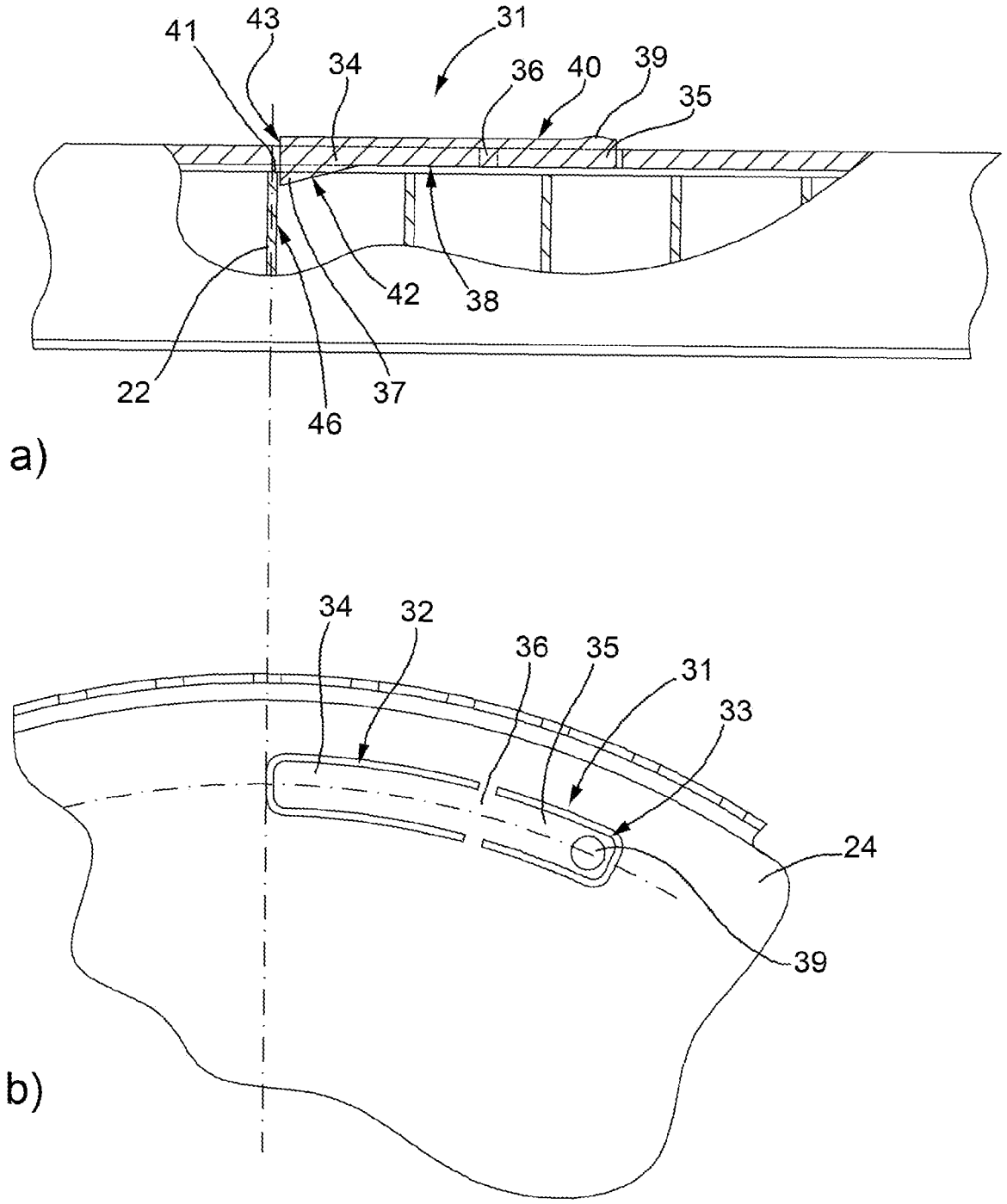

FIG.7

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EUROPEAN SEARCH REPORT

Application Number
EP 10 16 6235

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	3 September 2010	Dederichs, August

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