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(54) **Sealed package for pourable food products and relative production method**

(57) There is described a sealed package (1) for pourable food products, having a removable portion (11), and a closable opening device (2). The opening device has a frame (15) defining a pour opening (16) and having a first connecting portion (20) fixed to the package (1) about the removable portion (11); and a re-

movable cap (17) fitted to the frame (15) to close the pour opening (16) and having an anchoring portion (25) fixed directly to the removable portion (11); and the frame (15) also has a second connecting portion (28) extending about the anchoring portion (25) of the cap (17) and fixed to a peripheral area (11a) of the removable portion (11).

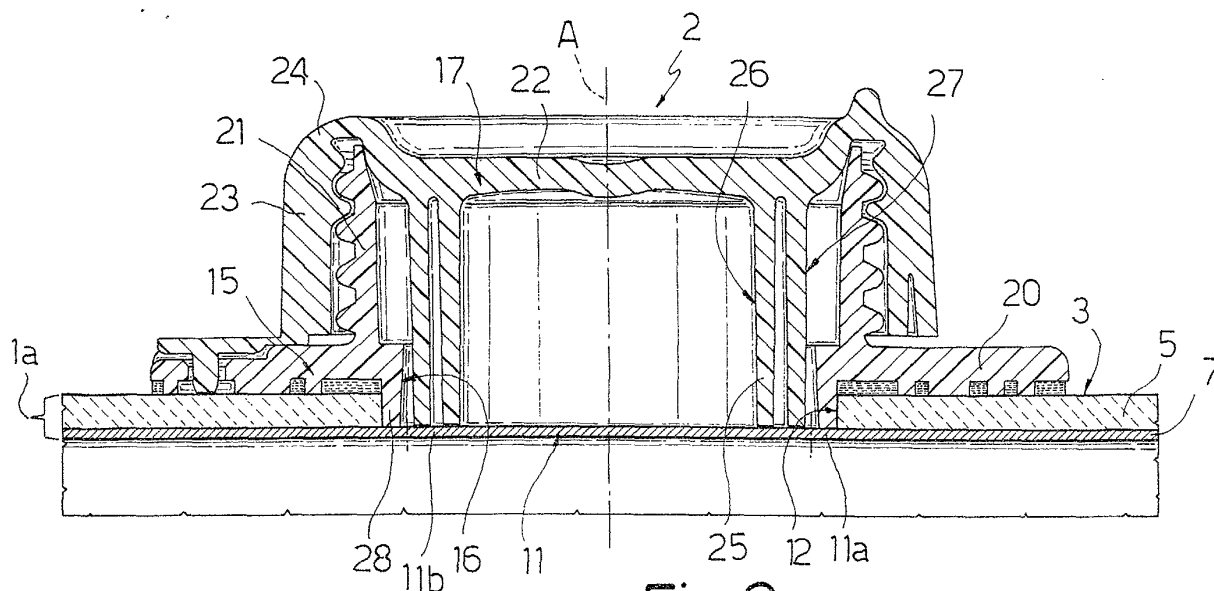


Fig.2

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Description

[0001] The present invention relates to a sealed package for pourable food products, and to the relative production method.

[0002] As is known, many pourable food products, such as fruit juice, UHT (ultra-high-temperature treated) milk, wine, tomato sauce, etc., are sold in packages made of sterilized packaging material.

[0003] A typical example of such a package is the parallelepiped-shaped package for liquid or pourable food products known as Tetra Brik Aseptic (registered trademark), which is produced by folding and sealing a web of laminated packaging material. The packaging material has a multilayer structure comprising a base layer, which imparts strength and rigidity to the package, and which may be defined by a layer of fibrous material, e.g. paper, or mineral-filled polypropylene material. The base layer is covered on both sides with layers of thermoplastic material, e.g. polyethylene films; and, in the case of aseptic packages for long-storage products, such as UHT milk, the packaging material comprises a layer of oxygen-barrier material, e.g. aluminium foil, which is superimposed on a layer of thermoplastic material, and is in turn covered with another layer of thermoplastic material eventually forming the inner face of the package contacting the food product.

[0004] As is known, such packages are produced on fully automatic packaging machines, on which a continuous tube is formed from the web-fed packaging material. The web of packaging material is sterilized on the packaging machine, e.g. by applying a chemical sterilizing agent, such as a hydrogen peroxide solution, which, after sterilization, is removed, e.g. vaporized by heating, from the surfaces of the packaging material; and the web of packaging material so sterilized is maintained in a closed sterile environment, and is folded and sealed longitudinally to form a vertical tube.

[0005] The tube is filled with the sterilized or sterile-processed food product, and is sealed and cut along equally spaced cross sections to form pillow packs, which are then folded mechanically to form the finished, e.g. substantially parallelepiped-shaped packages.

[0006] Alternatively, the packaging material may be cut into blanks, which are folded on forming spindles to form the packages, which are then filled with the food product and sealed. An example of this type of package is the "gable-top" package commonly known by the trade name Tetra Rex (registered trademark).

[0007] Such packages are normally fitted with closable opening devices to protect the food product in the package from contact by external agents, and to enable withdrawal of the product.

[0008] The most commonly marketed opening devices at present comprise a frame defining an opening and applied about a removable or pierceable portion of the top wall of the package; and a cap hinged or screwed to the frame and which can be removed to open the

package. Alternatively, other types of opening devices, e.g. sliding types, are also used.

[0009] The removable portion of the package may be defined, for example, by a so-called "prelaminated" hole, i.e. a hole formed in the base layer of the packaging material before the base layer is covered with the thermoplastic layers and with the barrier layer, which closes the hole to ensure aseptic airtight sealing, while at the same time being easily pierced.

[0010] In a particularly advantageous solution described in Patent Application EP-A-1081054 filed by the present Applicant, the cap of the opening device is applied, preferably heat sealed, directly to the thermoplastic material covering the hole in the base layer of the packaging material, so that, as the cap is removed from the frame, the removable portion remains attached to the cap and is detached from the rest of the top wall of the package. In other words, the package is unsealed in one single operation, by the user simply detaching the cap from the frame to simultaneously detach the removable portion.

[0011] Though relatively practical and cheap, the above solution leaves room for further improvement, particularly as regards unsealing of the package. That is, since the packaging material is laminated better inwards of than about the edge of the removable portion, the thermoplastic material defining the edge area tends to fray when removing the cap from the frame, thus preventing the food product from being poured smoothly from the package, by the frayed plastic remains of the removable portion projecting through the exposed hole in the packaging material once the cap is removed from the frame.

[0012] Moreover, when packaging particularly aggressive food products, such as fruit juice, the inner face of the package is normally made of thermoplastic materials with particular density characteristics, such as those commonly known commercially as "metallocene" and "LK25", which, while ensuring sound packages, even in the presence of aggressive food products, make the package particularly difficult to unseal using the opening devices described above.

[0013] Finally, in the event the package, with the removable portion detached and the cap put back on, is laid horizontally, e.g. is stored for further use in a refrigerator, continual absorption of the food product, particularly if of an aggressive nature, by the edge of the hole in the packaging material may result, after a relatively long period (eight hours on average), in detachment of the opening device from the package and leakage of the contents.

[0014] It is an object of the present invention to provide a sealed package for pourable food products, designed to eliminate the aforementioned drawbacks.

[0015] According to the present invention, there is provided a sealed package for pourable food products, having at least one removable portion, and a closable opening device in turn comprising a frame defining a

pour opening and having a first connecting portion fixed to said package about said removable portion, and a removable cap fitted to said frame to close said pour opening and having an anchoring portion extending through said pour opening and fixed directly to said removable portion; characterized in that said frame comprises a second connecting portion extending about said anchoring portion of said cap and fixed to a peripheral area of said removable portion.

[0016] The present invention also relates to a method of producing a sealed package of a pourable food product from sheet packaging material having at least one removable portion; said method comprising the steps of:

- fixing a frame, defining a pour opening, to said packaging material by causing a first connecting portion of the frame to adhere to a portion of the packaging material about said removable portion; and
- fitting said frame with a removable cap to close said pour opening, by causing an anchoring portion of the cap to adhere directly to said removable portion;

characterized by comprising the step of causing a second connecting portion of said frame, extending about said anchoring portion of said cap, to adhere to a peripheral area of said removable portion.

[0017] A preferred, non-limiting embodiment of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a view in perspective of a sealed package for pourable food products in accordance with the present invention;

Figure 2 shows a larger-scale cross section of a top wall of the Figure 1 package fitted with a relative closable opening device;

Figure 3 shows a much larger-scale detail of Figure 2;

Figure 4 shows the same view as in Figure 2, with the opening device in the open configuration.

[0018] Number 1 in Figure 1 indicates as a whole an aseptic sealed package for pourable food products, e.g. a parallelepiped-shaped package known as Tetra Brik Aseptic (registered trademark), which is made of sheet packaging material 1a as described in detail above, and is fitted with a closable opening device 2 made of plastic material and applied to a top wall 3 of package 1.

[0019] Packaging material 1a, from which package 1 is made, has a multilayer structure (Figure 3), and comprises a base layer 5 of fibrous material, e.g. paper, or of mineral-filled polypropylene, covered, on the side defining the outer face of package 1, with a film 6 of thermoplastic material - in the example shown, polyethylene. The side defining the inner face of package 1 has a layer 7 of oxygen-barrier material, e.g. aluminium foil, which is covered, on the side facing layer 5, with a film 8 of thermoplastic material, e.g. polyethylene, and, on

the opposite side, with an adhesive layer 9 and a further film 10 of thermoplastic material, e.g. metallocene, i.e. very low-density polyethylene (LLDPE), or a material commonly known commercially as "LK25", i.e. low-density polyethylene (LDPE). Film 10 therefore defines the inner face of package 1.

[0020] Opening device 2 is applied to a removable portion 11 - in the example shown, circular and of axis A - of top wall 3 of package 1, i.e. to a portion detachable from the rest of package 1 so the food product can be poured out.

[0021] Preferably, removable portion 11 is obtained by forming a hole 12 of axis A through layer 5 of packaging material 1a, and by laminating layer 5 with thermoplastic films 6, 8, 10 and barrier and adhesive layers 7, 9 to cover hole 12.

[0022] Alternatively, removable portion 11 may also comprise a layer of stiffening material defined, for example, by the same material as layer 5.

[0023] With particular reference to Figures 2 and 4, opening device 2 comprises an annular, externally threaded frame 15 fixed to wall 3 of package 1 at removable portion 11, and defining a circular opening 16 of axis A, through which the food product is poured; and a cap 17, which is formed separately from frame 15, is screwed to frame 15 into a closed position closing opening 16 (Figure 2), and adheres directly to removable portion 11. Package 1 is unsealed by unscrewing cap 17 from frame 15 (Figure 4), so that removable portion 11 remains attached to cap 17 and is detached from the rest of wall 3 of package 1 to open hole 12. Once unsealed, cap 17 is movable between said closed position and an open position (Figure 4) in which it is detached from frame 15.

[0024] More specifically, frame 15 substantially comprises an annular flange 20, of axis A, heat sealed to wall 3 of package 1 and internally defining opening 16; and an externally threaded, cylindrical, annular portion 21 projecting perpendicularly and coaxially from the opposite side of flange 20 to that fixed to wall 3.

[0025] Cap 17 comprises, integrally, a closing portion 22 for closing opening 16; and an internally threaded, cylindrical, annular portion 23 projecting from a circular outer peripheral edge 24 of portion 22, and which screws onto annular portion 21 of frame 15. Cap 17 also comprises, integrally, a cylindrical, annular anchoring portion 25, which projects from closing portion 22, is located radially inwards with respect to annular portion 23, engages pour opening 16 of frame 15, and is fixed, e.g. heat sealed, to removable portion 11. More specifically, anchoring portion 25 is defined by two concentric, annular, closely spaced projecting elements.

[0026] Anchoring portion 25 defines, with closing portion 22, an inner cavity 26 open towards removable portion 11 of wall 3, and, with annular portion 23 and peripheral edge 24 of closing portion 22, an annular seat 27 for receiving annular portion 21 of frame 15.

[0027] An important characteristic of the present in-

vention lies in frame 15 also comprising an edge portion 28, which projects from flange 20 in the opposite direction to annular portion 21, defines opening 16 so as to be located radially outwards of anchoring portion 25 of cap 17, and is fixed, e.g. heat sealed, at the end to a peripheral edge area 11a of removable portion 11. As shown in Figures 2 to 4, edge portion 28 covers the edge of hole 12 in layer 5 of packaging material 1a, and adheres at its free end to removable portion 11.

[0028] In the event package 1, with cap 17 closed and removable portion 11 detached from the rest of wall 3, is left in the horizontal position, absorption by the packaging material 1a defining the edge of hole 12 is thus prevented, together with any possibility of opening device 2 becoming detached from package 1.

[0029] Package 1 is unsealed by rotating cap 17 with respect to frame 15, so as to unscrew the cap from the frame. As it is rotated, cap 17 retains the part of removable portion 11 sealed to anchoring portion 25, thus detaching it from the rest of wall 3 to open hole 12. More specifically, by virtue of projecting edge 28 of frame 15 being fixed to peripheral edge area 11a of removable portion 11, anchoring portion 25 of cap 17 is fixed to a better laminated, more radially inner area 11b of removable portion 11, so that unsealing of package 1 is greatly improved as compared with known packages by ensuring clean removal of the packaging material 1a through pour opening 16.

[0030] Projecting edge 28 of frame 15 defines a rigid contrasting element, against which the material defining removable portion 11 is torn, thus simplifying unsealing of package 1, even when using materials which are particularly difficult to tear, such as metallocene and LK25.

[0031] Clearly, changes may be made to package 1 as described and illustrated herein without, however, departing from the scope of the accompanying Claims.

[0032] In particular, opening device 2 may be applied to package 1 using other fastening systems, e.g. adhesive substances, and may be of a different type, e.g. comprising a cap hinged to or sliding with respect to the frame.

Claims

1. A sealed package (1) for pourable food products, having at least one removable portion (11), and a closable opening device (2) in turn comprising a frame (15) defining a pour opening (16) and having a first connecting portion (20) fixed to said package (1) about said removable portion (11), and a removable cap (17) fitted to said frame (15) to close said pour opening (16) and having an anchoring portion (25) extending through said pour opening (16) and fixed directly to said removable portion (11); **characterized in that** said frame (15) comprises a second connecting portion (28) extending about said anchoring portion (25) of said cap (17) and fixed to

a peripheral area (11a) of said removable portion (11).

2. A package as claimed in Claim 1, **characterized by** being made of a packaging material (1a) having a multilayer structure and comprising a base layer (5) and layers of thermoplastic material (6, 8, 10) and of oxygen-barrier material (7).
3. A package as claimed in Claim 2, **characterized in that** said removable portion (11) is obtained by forming a hole (12) through said base layer (5), and by laminating said base layer (5) with said layers of thermoplastic material (6, 8, 10) and oxygen-barrier material (7) to cover said hole (12).
4. A package as claimed in Claim 3, **characterized in that** said second connecting portion (28) of said frame (15) covers the edge of said hole (12) in said base layer (5).
5. A package as claimed in any one of the foregoing Claims, **characterized in that** said second connecting portion (28) of said frame (15) is frame-shaped, defines at least partly said pour opening (16), projects from said first connecting portion (20), and is fixed at the end to said peripheral area (11a) of said removable portion (11).
6. A package as claimed in any one of the foregoing Claims, **characterized in that** said frame (15) and said cap (17) are heat sealed to said package (1).
7. A method of producing a sealed package (1) of a pourable food product from sheet packaging material (1a) having at least one removable portion (11); said method comprising the steps of:
 - fixing a frame (15), defining a pour opening (16), to said packaging material (1a) by causing a first connecting portion (20) of the frame (15) to adhere to a portion of the packaging material (1a) about said removable portion (11); and
 - fitting said frame (15) with a removable cap (17) to close said pour opening (16), by causing an anchoring portion (25) of the cap (17) to adhere directly to said removable portion (11);

characterized by comprising the step of causing a second connecting portion (28) of said frame (15), extending about said anchoring portion (25) of said cap (17), to adhere to a peripheral area (11a) of said removable portion (11).

8. A method as claimed in Claim 7, **characterized in that** said packaging material comprises a base layer (5), and layers of thermoplastic material (6, 8, 10) and of oxygen-barrier material (7).

9. A method as claimed in Claim 8, **characterized in that** said removable portion (11) is obtained by forming a hole (12) through said base layer (5), and by laminating said base layer (5) with said layers of thermoplastic material (6, 8, 10) and oxygen-barrier material (7) to cover said hole (12). 5
10. A method as claimed in any one of Claims 7 to 9, **characterized in that** said steps of causing said frame (15) and said cap (17) to adhere to said packaging material (1a) are performed by heat sealing. 10

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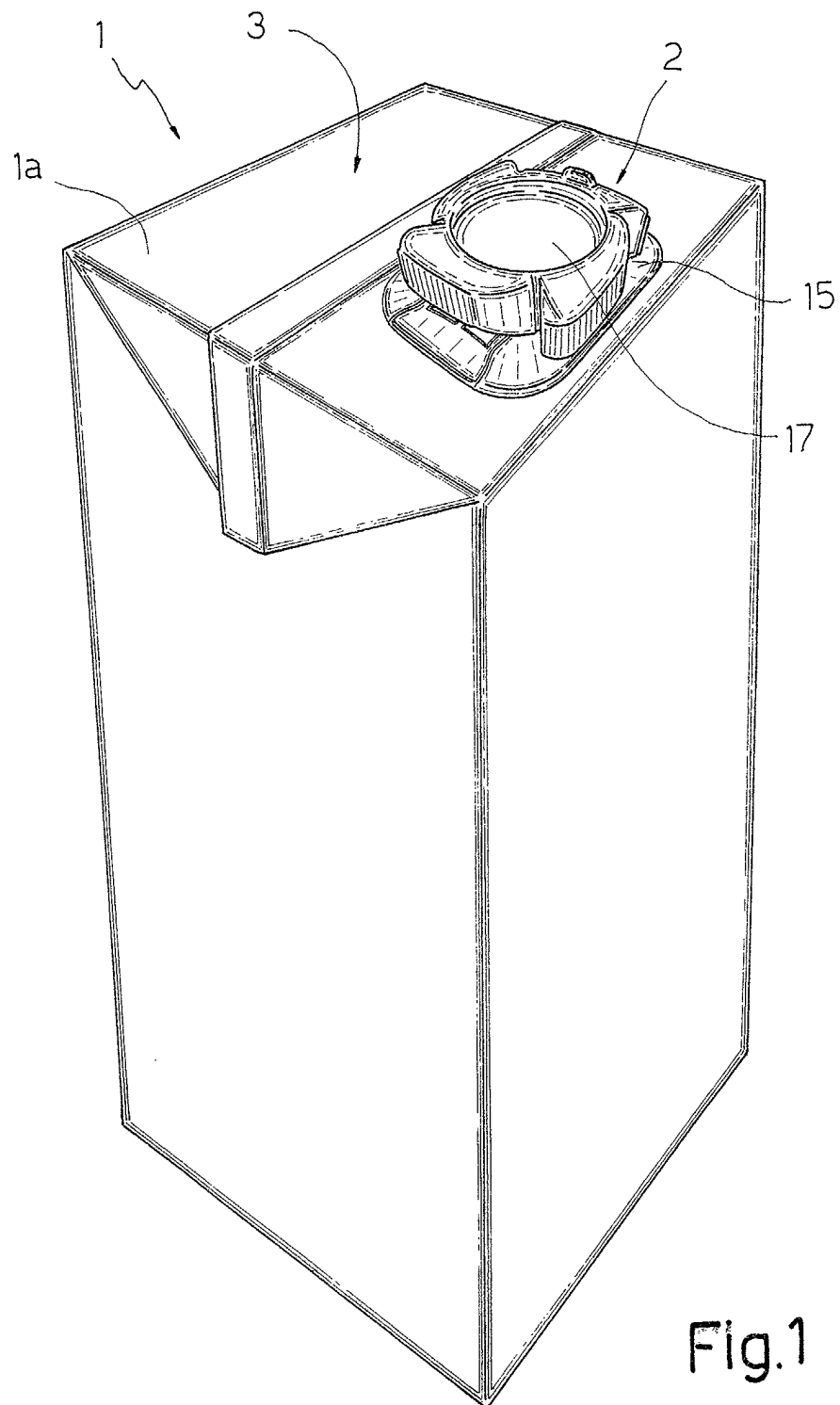


Fig.1

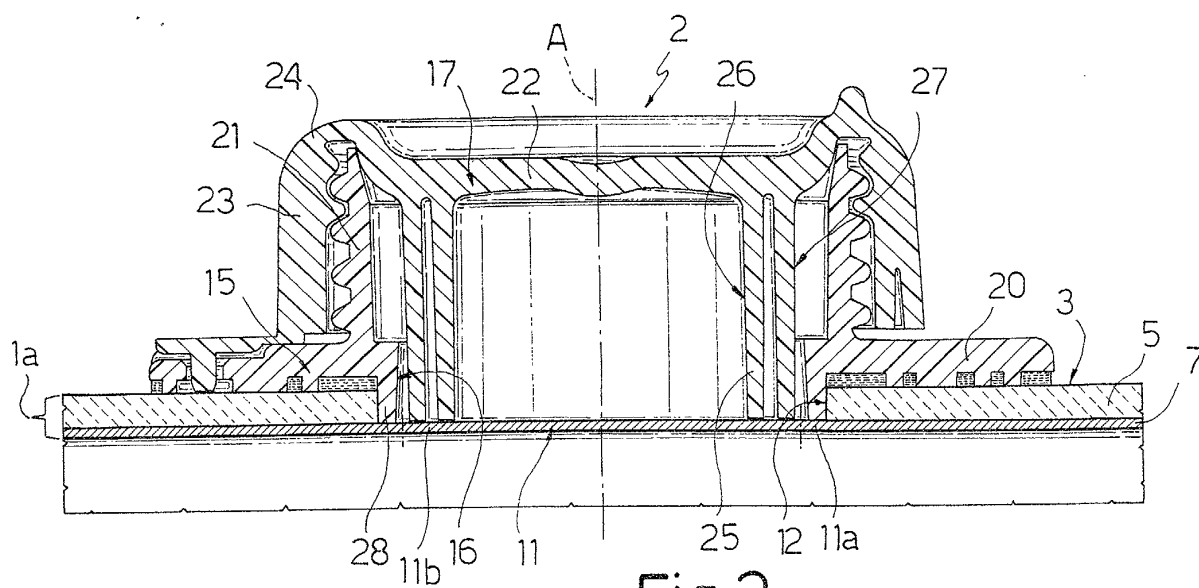


Fig.2

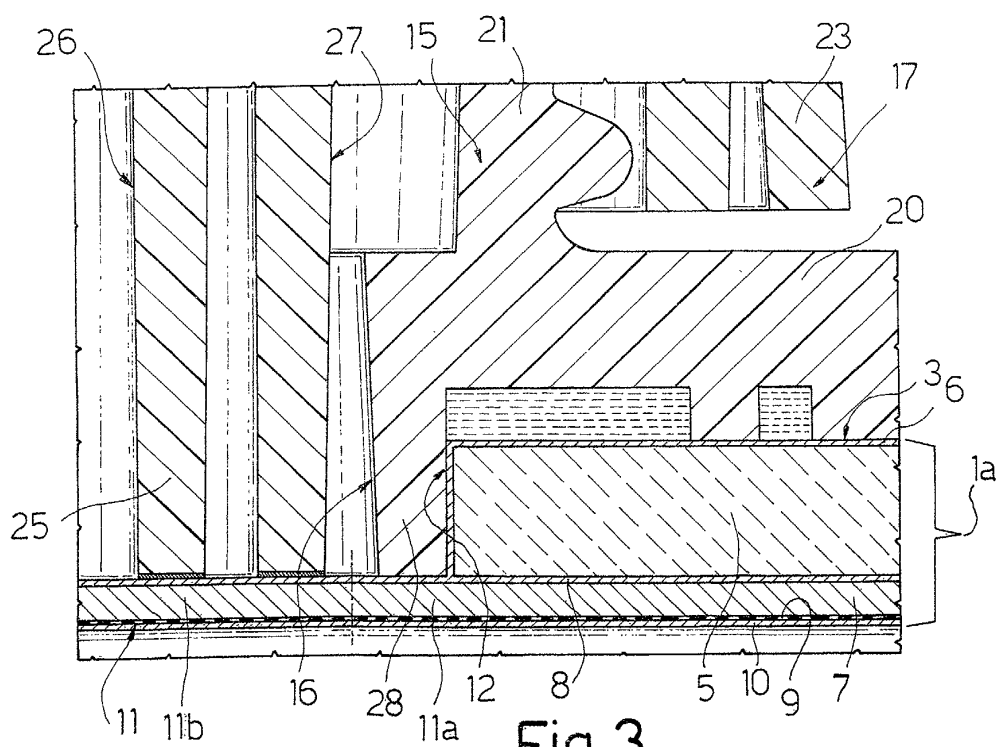


Fig.3

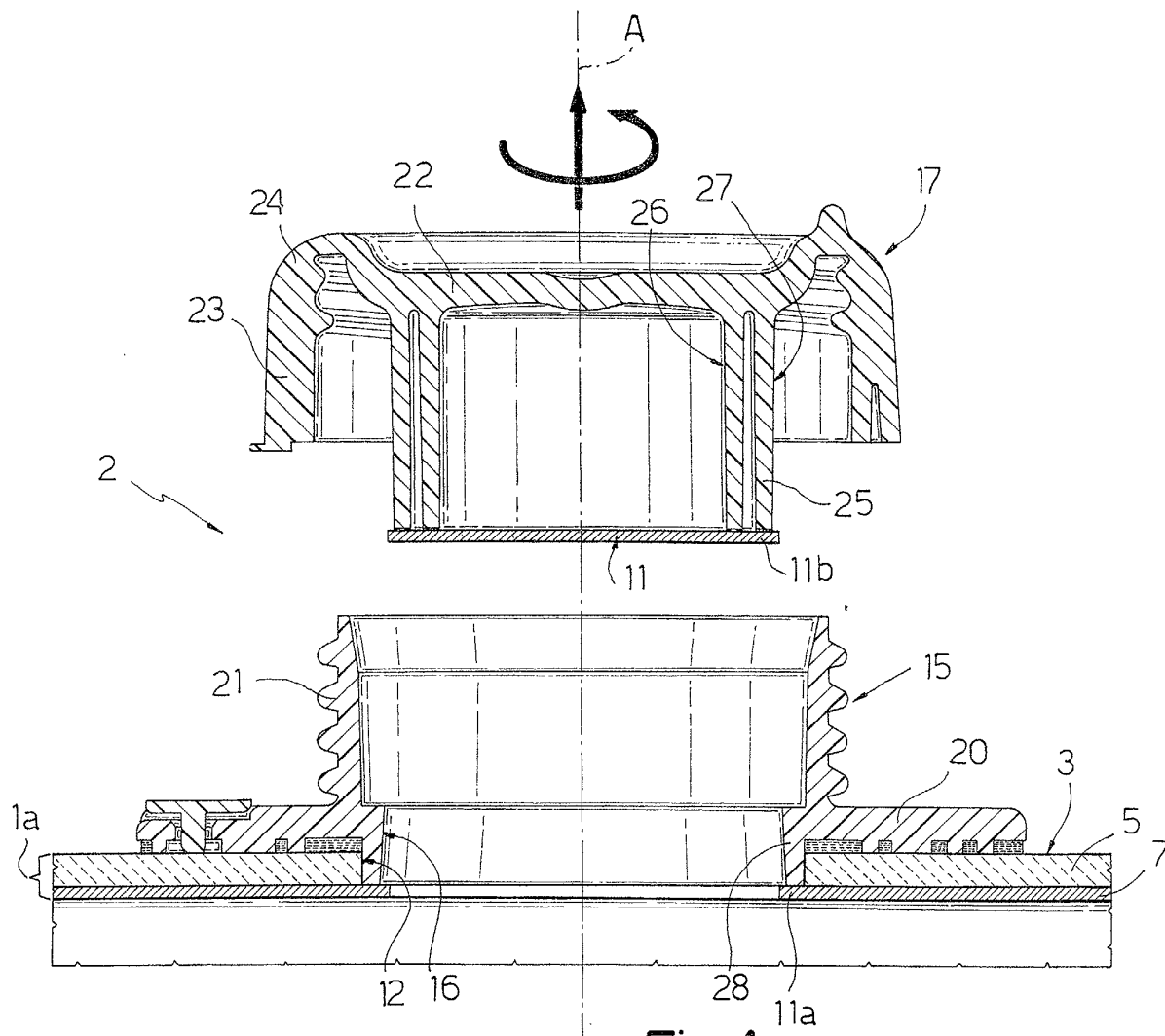


Fig.4



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EUROPEAN SEARCH REPORT

Application Number
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
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THE HAGUE		16 September 2002	Bridault, A
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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