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(54) DISPENSER FOR A LIQUID PRODUCT

(57) Dispenser for a liquid product comprising:
- a container (2) for the product;
- an outlet (30) for the product defining a dropper;
- a duct (4) for the inlet of air into the container (2); said

duct (4) projecting inside the container (2).

The air duct (4) comprises at least one terminal section (41) defining a lead-in (40) for the engagement of the duct (4) in the container (2).

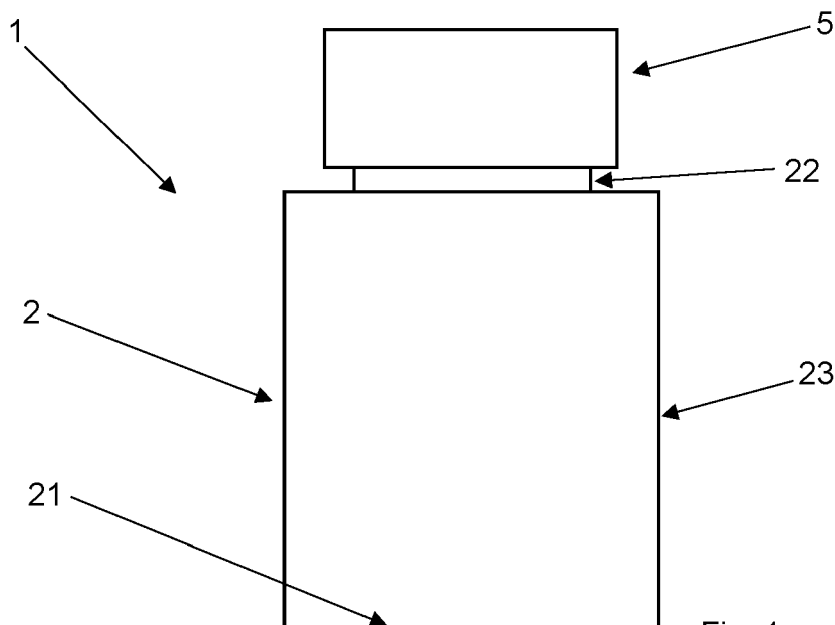


Fig. 1

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Description

[0001] An object of the present invention is a dispenser for a liquid product, e.g., pharmaceutical, nutraceutical, ophthalmic, etc.

[0002] Dispensers are known in which a container for the product is present, e.g., a liquid drug. Such a container has an opening which can be occluded by means of a dispenser. Such a dispenser comprises a product outlet (the product exits by gravity).

[0003] To compensate for the exit of the product from the container, an external air duct is made inside the container. The vacuum inside the container caused by the exit of the product is therefore compensated by the entry of external air. Such a duct projects inside the container. When the dispenser is assembled to the container, such a duct runs the risk of abutting a mouth of the container, becoming jammed. This occurs if the coupling system does not have sufficiently precise coupling tolerances or if the duct is slightly deformed.

[0004] In such a case, the duct will jam against the container, preventing the complete insertion of the dispenser inside the container and the subsequent screwing. This can produce assembly errors or even duct fractures. Consequently, the semi-finished product must be discarded. This causes production delays and even unwanted waste. The object of the present invention is to provide a dispenser for a liquid product and an assembly method which facilitate the correct assembly, reducing waste and speeding up production.

[0005] The stated technical task and specified objects are substantially achieved by a dispenser for a liquid product and an assembly method comprising the technical features disclosed in one or more of the appended claims. Further features and advantages of the present invention will become more apparent from the indicative and thus non-limiting description of a preferred but non-exclusive embodiment of a dispenser for a liquid product and an assembly method, as illustrated in the attached drawings, in which:

- figure 1 shows a schematic view of a dispenser for a liquid product;
- figure 2 shows a configuration in which two components are engaged;
- figure 3 shows a further solution in which two components are engaged;
- figure 4 shows a detail of figure 3;
- figure 5 shows a detail of a solution not comprised in the present invention to highlight the advantage of the dispenser of figure 4.

[0006] A dispenser for a liquid product is denoted in the appended figures by reference number 1. Such a dispenser 1 comprises a container 2 for containing the product. Such a product is, for example, a pharmaceutical or nutraceutical product. For example, the container 2 has a capacity comprised between 5 and 100 millilitres.

[0007] The container 2 is preferably rigid, e.g., made of glass. The container 2 typically comprises a side wall 23 and a bottom 21. The side wall 23 extends from such a bottom 21. Appropriately, but not necessarily, the side wall 23 and the bottom 21 are part of the same monolithic body.

[0008] The dispenser 1 also comprises an outlet 30 for the product. The outlet 30 is typically a small hole (e.g., with a diameter comprised between 0.3 and 4 millimetres) from which the product can exit. The outlet 30 allows the product to be dispensed outside the dispenser 1. The outlet 30 typically defines a dropper. In particular, it defines an inversion dropper.

[0009] Typically, the outlet 30 of the product is obtained on an element 3 at least partially occluding an opening 20 of the container 2. Such an opening 20 is usually located opposite the bottom 21 of the container 2. Appropriately, but not necessarily, the container 2 comprises a neck 22 in which the opening 20 is obtained. The neck 22 defines a narrowing of the container 2.

[0010] The dispenser 1 comprises a duct 4 for the inlet of air in the container 2. Such an air inlet duct 4 is also known in the technical field as a "vent". The duct 4 projects inside the container 2. Such an inlet duct 4 typically has a diameter comprised between 0.5 and 3 millimetres. Typically the duct 4 is straight. Purely by way of non-limiting example, the inlet duct 4 projects for more than half the height of the container 2. The inlet of air through the duct 4 allows to compensate for the vacuum caused by any product exiting from the container 2.

[0011] The air duct 4 comprises at least one terminal section 41 defining a lead-in 40 for the engagement of the air duct 4 in the container 2. Such a lead-in 40 allows the terminal section 41 to slide if it comes into contact with the container 2 during assembly, avoiding jamming. Such a situation is illustrated by comparing the solution of figure 4 (in which the lead-in facilitates the correct connection) and that in figure 5 (which is not part of the present invention and in which there is a jamming). The passage of air defined by the duct 4 also affects the terminal section 41. The terminal section 41 is at least partially inclined.

[0012] The terminal section 41 comprises an inclined portion (the lead-in 40) with respect to a direction 6 of engagement of the air duct in the container 2. Appropriately, the section 41 comprises a portion which is inclined with reference to a longitudinal extension direction 220 of the neck 22 of the container 2.

[0013] The terminal section 41 can possibly be defined as a sectional reduction for the passage of air. Alternatively, it could also be a constant section (as in the appended figures).

[0014] In particular, the terminal section 41 has an end section 413 for the passage 413 of air passing through the duct 4. Such a section 413 extends transverse to the longitudinal extension line (or direction) of the duct 4. In particular, the end section 413 is not orthogonal, but only transverse to the longitudinal extension line/direction of

the duct 4.

[0015] The terminal section 41 comprises a pointed end 401. In fact, the pointed shape allows to define one or more sliding surfaces defining the lead-in 40. The duct 41 (in particular the pointed end 401) is not intended to perforate any component of the dispenser 1. The pointed shape serves as a lead-in, not as a perforator.

[0016] In the example solution illustrated in the appended figures, the terminal section 41 has an end 401 (the lead-in 40) shaped like an obliquely-cut slice. Appropriately in such a case, the slice lies on the same plane crossing the terminal section 41 from side to side.

[0017] In such a case, the duct 4 has a main longitudinal extension line 42 (preferably, but not necessarily, straight). The duct 4 also has a terminal face 410. Such a terminal face 410 defines the end 401 shaped like an obliquely-cut slice. Appropriately, such a face 410 is flat. Advantageously, such a face 410 is inclined with respect to the line 42. The duct 4 is advantageously straight despite the presence of the inclined terminal face 410. Appropriately, such an inclination defines a minimum acute angle comprised between 20° and 70°.

[0018] Appropriately, the terminal face 410 faces a lateral side of the container 2. This appropriately occurs during the transit of the face 410 at the opening 20. Such a face 410 is appropriately flat, but could possibly also define a curved surface.

[0019] The dispenser 1 advantageously comprises a product dispenser 3. The dispenser 3 is applied to the container 2. The dispenser 3 at least partially occludes the opening 20. The dispenser 3 advantageously comprises the product outlet 30. The air inlet duct 4 projecting inside the container 2 is in a single body with said dispenser 3. In particular, it is a single monobloc body. The duct 4 and the outlet 30 are preferably made in a single piece (not an assembly of several pieces) typically obtained by moulding.

[0020] The dispenser 1 comprises a cap 5 for closing the outlet 30. The cap 5 is removable from the dispenser 3 and from the container 2 to allow the product to be dispensed. In the solution of figures 2 and 3, the cap 5 and the dispenser 3 are illustrated mutually assembled. In a configuration in which the cap 5 and the dispenser 3 are associated with the container 2, the cap 5 can be removed from and reapplied to the container 2 and/or the dispenser 3. In particular, the cap 5 can be directly connected to (in particular screwed onto) the neck 22.

[0021] Once the dispenser 3 and the container 2 are assembled, the cap 5 is removed to allow the dispensing, leaving the dispenser 3 associated with the container 2. Immediately before assembling the dispenser 3 and the container 2, advantageously, the cap 5 and the dispenser 3 are integral and are assembled together with the container 2.

[0022] Appropriately, the dispenser 3 is made of plastic material. Appropriately, the cap 5 is also made of plastic material. Appropriately, the dispenser 3 comprises a spout 31 defining the outlet 30 described above. The

cap 5 is (removably) constrained to the dispenser 3 by gripping around the spout 31. In this regard, the cap 5 comprises a protrusion 50 which grips the dispenser 3, in particular the spout 31 or an area (typically annular) surrounding the spout 31, preferably wrapping it. Such a protrusion 50 is, for example, an internally hollow body for housing the spout 31, e.g., the protrusion 50 is cylindrical. Such a protrusion 50 comprises a surface on which one or more reliefs 501 for anchoring to the dispenser 3 are obtained. Said one or more anchoring reliefs 501 extend inwards. For example, there could be at least one helical anchoring relief 501. The cap 5 comprises a plate 51 and a side wall 52 extending from the plate 51. At the end of the side wall 52 there is also a security strip 53. The side wall 52 is substantially cylindrical. The plate 51 is a discoidal element. When the cap 5 is opened, the security strip 53 separates from the remaining parts of the cap 5 and remains constrained to the container 2 (or rather to the neck 22). The above-mentioned protrusion 50 also extends from the plate 51. It is surrounded by the side wall 52 of the cap 5. The dispenser 3 comprises an outer side 32 surrounding the spout 31. Appropriately, the outer side 32 and the spout 31 in combination define a cavity 33 (typically annular) for housing the protrusion 50. The duct 4 also extends from such an annular cavity 33.

[0023] The object of the present invention is also a method for assembling a dispenser 1 for a liquid product.

[0024] Such a method is appropriately implemented in the assembly of a dispenser 1 having one or more of the features described previously.

[0025] The method comprises the step of at least partially occluding an opening 20 of a container 2 for containing the liquid product. Appropriately, the step of occluding the opening 20 occurs by means of a dispenser 3. Such a dispenser 3 also defines the outlet 30 of the liquid product from the dispenser 1 (once assembled). The dispenser 3 engages in the container 2 (in particular in the neck 22) by interference (pressure). This occurs while the cap 5 is being screwed onto the container 2 (in particular, it is being screwed onto the neck 22).

[0026] The step of at least partially occluding the opening 20 also provides inserting an air inlet duct 4 inside the container 2.

[0027] The air inlet duct 4 comprises at least one terminal section 41 defining a lead-in 40 facilitating the engagement of the duct 4 in the container 2. Such a lead-in minimises jamming and facilitates the sliding of the terminal section 41 during the step of inserting the air inlet duct 4 in the container 2. The terminal section 41 has a terminal face 410 having a first portion 411 which is located closer to a bottom 21 of the container 2 with respect to a second portion 412 which is closer to said opening 20 (in an assembly configuration of the dispenser 3 and the container 2).

[0028] The terminal section 41 comprises at least one inclined portion with respect to a direction 6 of engagement of the air duct 4 in the container 2. Appropriately, the terminal section 41 comprises at least one inclined por-

tion with reference to a longitudinal extension direction of the neck 22 of the container 2. During the step of inserting the air inlet duct 4 inside the container 2, the terminal section 41 passes at said opening 20 facing said terminal face 410 towards an edge 201 of said opening 20 (as, for example, illustrated in figures 2 and 3).

[0029] The present invention achieves important advantages.

[0030] Firstly, it allows to facilitate the assembly of the dispenser. In fact, thanks to the lead-in, the air duct can compensate for any misalignment, allowing it to bend in the correct direction and avoiding jamming. This reverberates in a higher assembly speed, less waste, possibility of being able to carry out the assembly more easily.

[0031] The invention thus conceived is susceptible to numerous modifications and variants, all falling within the scope of the inventive concept that characterises it. Furthermore, all the details may be replaced with other technically equivalent elements. All the materials used, as well as the dimensions, may in practice be any whatsoever according to needs.

Claims

1. A dispenser for a liquid product comprising:

- a container (2) for the product;
- an outlet (30) for the product defining a dropper;
- a duct (4) for the inlet of air in the container (2);
- said duct (4) projecting inside the container (2);

characterised in that said air duct (4) comprises at least one terminal section (41) defining a lead-in (40) for the engagement of the duct (4) in the container (2).

2. The dispenser according to claim 1, **characterised in that** said terminal section (41) comprises at least one portion which is inclined with respect to an engagement direction (6) of the air duct (4) in the container (2).

3. The dispenser according to claim 1 or 2, **characterised in that** the inclined terminal section (41) comprises a pointed end (401).

4. The dispenser according to any one of the preceding claims, **characterised in that** the inclined terminal section (41) has an end (401) shaped like an obliquely-cut slice.

5. The dispenser according to any one of the preceding claims, **characterised in that** the duct (4) has a main longitudinal extension line (42) and a terminal face (410) which is flat and inclined with respect to said line (42) by an acute angle which assumes a minimum value comprised between 20° and 70°.

6. The dispenser according to any one of the preceding claims, **characterised in that** it comprises a product dispenser (3), said dispenser (3) being applied to the container (2) and comprising said product outlet (30); said air inlet duct (4) projecting inside the container (2) being in a single body with said dispenser (3).

7. The dispenser according to claim 6, **characterised in that** it comprises a cap (5) for closing said outlet (30); said cap (5) being removable from the dispenser (3) and from the container (2) to allow the dispensing of the product.

8. A method for assembling a dispenser (1) for a liquid product comprises the step of at least partially occluding an opening (20) of a container (2) of the product; the step of at least partially occluding said opening (20) provides inserting an air inlet duct (4) inside the container (2); said air inlet duct (4) comprising at least one terminal section (41) defining a lead-in (40) which facilitates the engagement of the duct (4) in the container (2), minimising jamming and facilitating the sliding of the terminal section (41) during the step of inserting the air inlet duct (4) inside the container (2).

9. The method according to claim 8, **characterised in that** the terminal section (41) comprises at least one inclined portion and has a terminal face (410) having a first portion (411) which is located closer to a bottom (21) of the container (2) with respect to a second portion (412) which is farther away from said bottom (21).

10. The method according to claim 9, **characterised in that**, during the step of inserting the air inlet duct (4) inside the container (2), the terminal section (41) passes at said opening (20) facing said terminal face (410) towards an edge (201) of said opening (20).

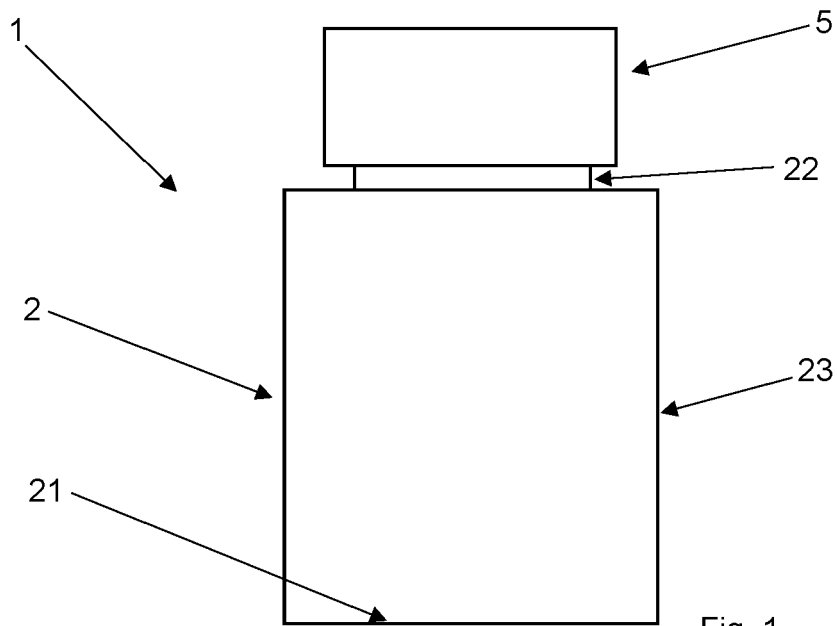


Fig. 1

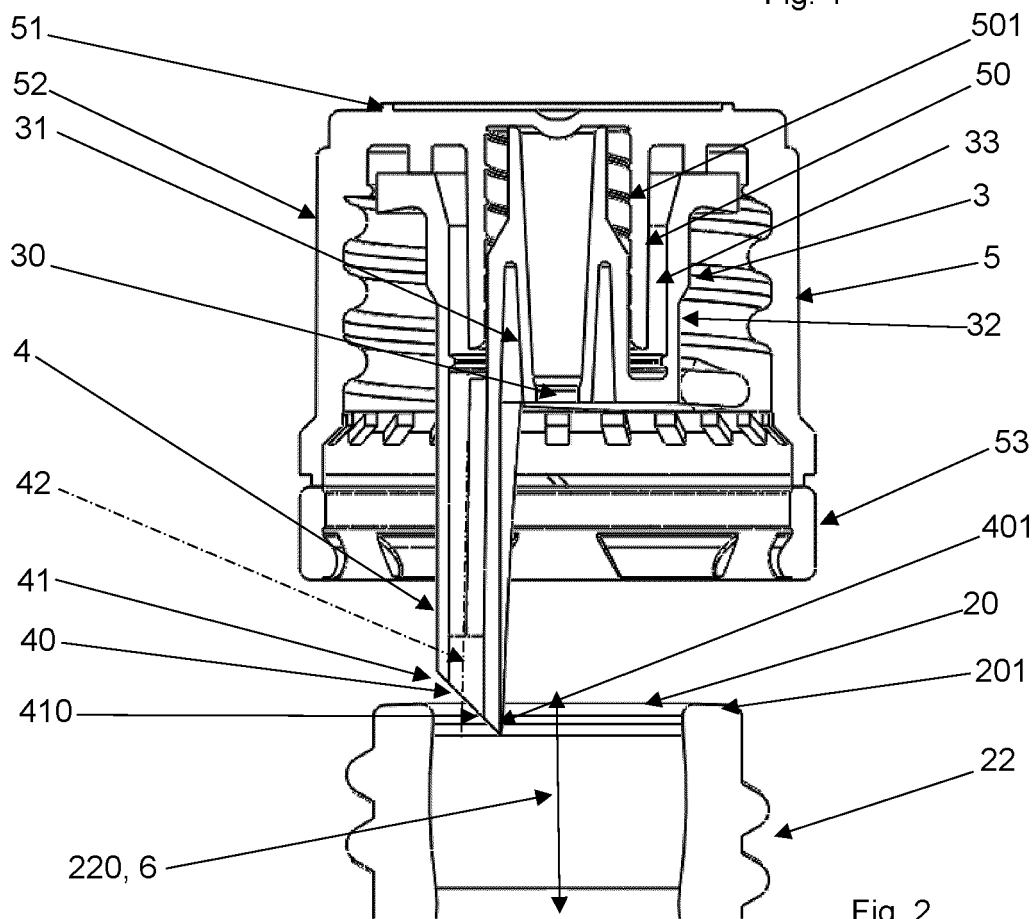


Fig. 2

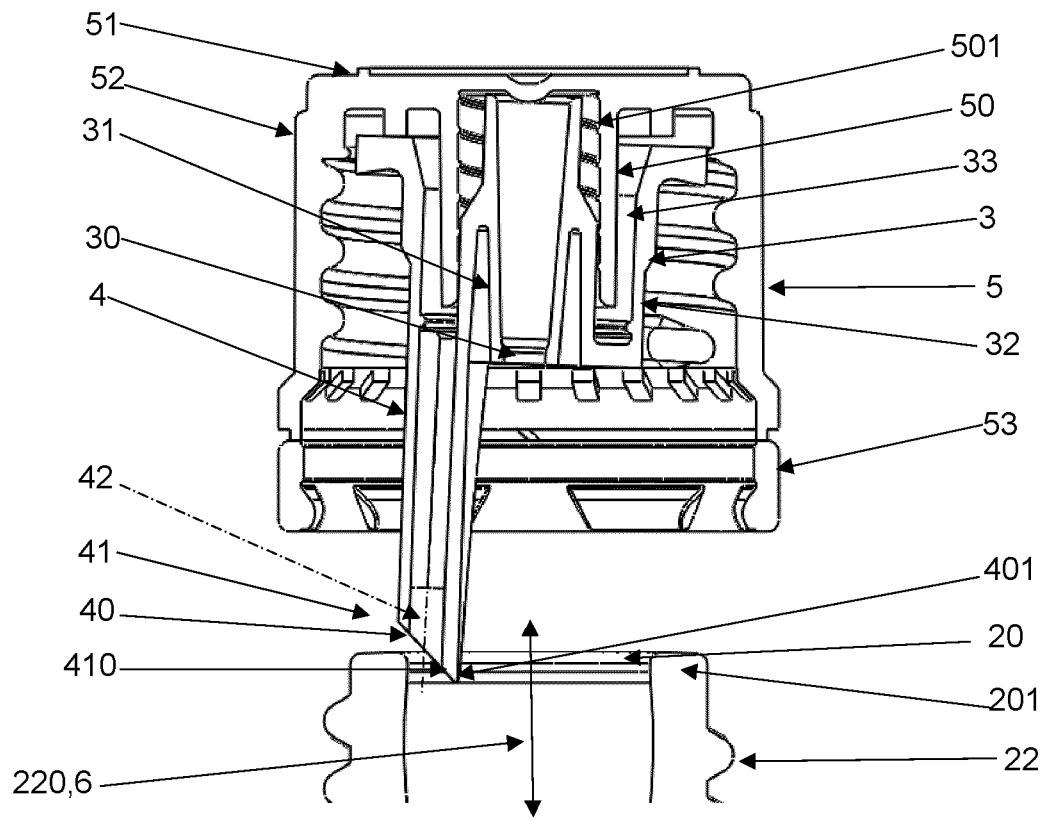


Fig. 3

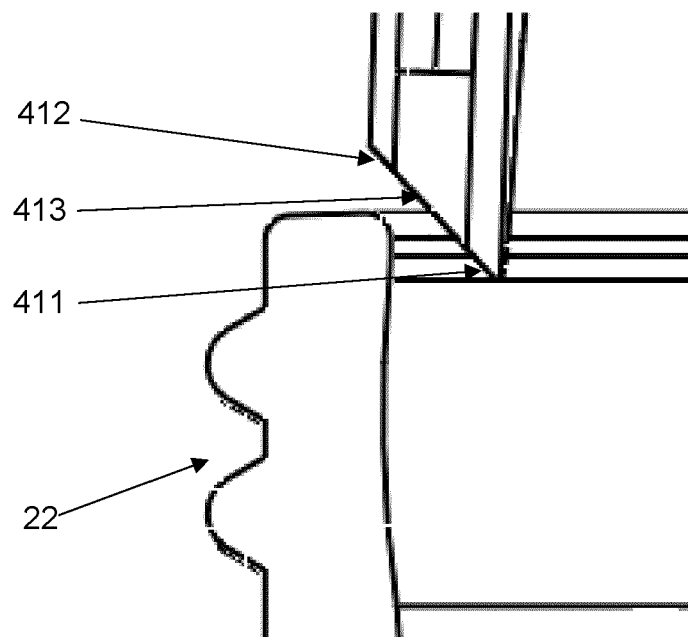


Fig. 4

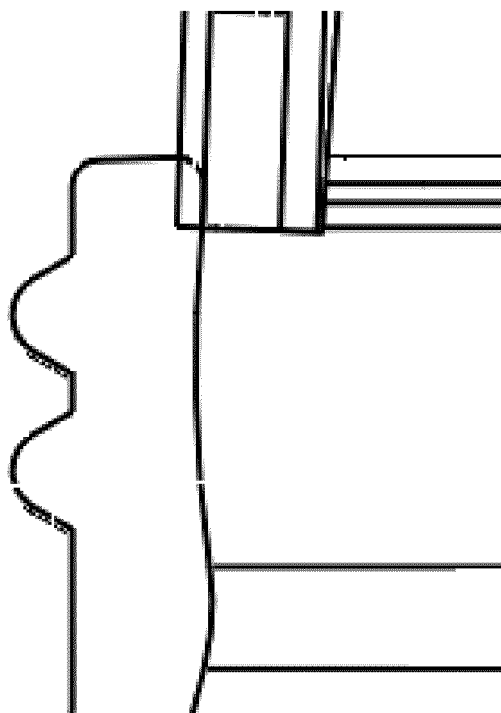


Fig. 5



EUROPEAN SEARCH REPORT

Application Number

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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
Munich		6 December 2024	Wimmer, Martin
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