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(54) **Dispensing cap and connector for bottle-like containers**

(57) The present invention concerns a connector (1) able to be mounted on the neck of a container for liquids (100), in the form of a bottle, consisting of a main body having, sliding longitudinally therein, a slider provided with a radially expandable bottom portion so as to engage reversibly with a hollow probe, in which the hollow probe is able to perform the longitudinal displacement of the said slider and connect the inside of the container (100) with its interior so as to allow the dispensing of liquid from the container.

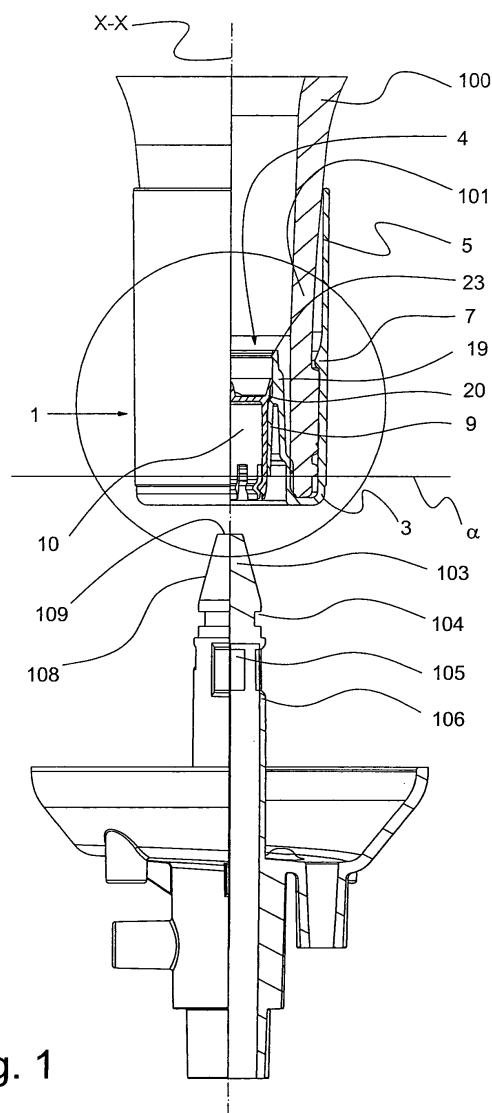


Fig. 1

Description

[0001] The present invention relates to a connector according to the preamble of Claim 1.

[0002] This type of connector may be used on containers with a neck, such as bottles, in combination with devices for controlled dispensing of the beverages present inside the said containers.

[0003] The devices for controlled dispensing of beverages referred to are already known in the art and comprise, in brief, control means, a probe able to be inserted inside the connector, an end unit by means of which it is possible to dispense the beverage and, in some cases, also a source of carbon dioxide or other inert gas.

[0004] When probe is inserted inside the connector, which is positioned on the mouth of the container and the latter is arranged with its mouth directed downwards, the device is ready for dispensing.

[0005] If the container is one of the ones which contain water, such as for example the ones which can be found in the offices, the dispensing device will comprise refrigerating means; if the container is a bottle containing an alcoholic beverage and the dispensing device is suitable for preparing a cocktail, it will comprise a source of inert gas which is able to exert on the beverage a pressure which allows it to easily reach the end unit from which it must be dispensed.

[0006] These latter devices are becoming increasingly popular in bars since, with them, precise quantities of beverages also of a varying nature may be rapidly dispensed; in this way, the cocktails which are normally served in these premises may be prepared much more precisely and quickly.

[0007] The connectors used on the bottles designed for this type of dispensing device comprise a main body which, during use, is constrained to the container and a slider positioned inside the main body. These connectors are very similar to the one described in the American patent US 4,375,864 which discloses a connector suitable for use in water dispensers.

[0008] The main disadvantage of the connectors known hitherto is that they are able to ensure sealing of the container only before initial opening and, thereafter, only when probe is inserted inside them.

[0009] In bars, however, there is a need to have a connector which is able to ensure sealing of the container also after initial opening and without probe necessarily having to be inserted.

[0010] This technical effect would allow temporary interruption during dispensing of the beverage present in the container, while ensuring, at the same time, that there is no risk of accidentally introducing into the container substances which are foreign to the liquid present therein and that there is no accidental leakage of liquid.

[0011] In view of the state of the art described, the object of the present invention is to provide connectors able to satisfy the requirements described above more so than known hitherto.

[0012] As a result of the present invention it is possible to provide a connector able to allow a large number of opening and closing cycles following insertion/extraction of probe of the dispensing device.

[0013] Moreover, since in bars these devices are used in particular in combination with containers containing alcoholic beverages, a further advantage of the present connector is that it is possible to disconnect probe from the connector without the alcohol contained in the beverages being able to evaporate, altering the organoleptic properties thereof.

[0014] In accordance with the present invention, this object is achieved by means of a connector according to Claim 1. Further preferred embodiments are included in the dependent claims.

[0015] The characteristic features and advantages of the present invention will become clear from the following detailed description of a practical embodiment provided by way of a non-limiting example, with reference to the accompanying drawings, in which:

- Figure 1 shows a partial cross-section and a partial front view of an example of a connector according to a preferred embodiment of the present invention, mounted on the mouth of a bottle-like container and a probe able to engage with the connector;
- Figure 2 shows a partial cross-section and a partial front view of the connector according to Figure 1 in the closed configuration with probe completely engaged inside it;
- Figure 3a shows a partial cross-section and a partial front view of the connector according to Figure 1 in an intermediate configuration between the closed configuration and the open configuration shown in Figure 5;
- Figure 3b shows the cross-section of a detail of the connector according to Figure 3a;
- Figure 4 shows a partial cross-section and a partial front view of the connector according to Figure 3a in an intermediate configuration between the configuration shown in Figure 3a and the open configuration;
- Figure 5 shows a partial cross-section and a partial front view of the container according to Figure 1 in the open configuration;
- Figure 6 shows an enlarged view of a detail according to Figure 1.

[0016] With reference to the figures, 100 denotes a container with a longitudinal axis Z-Z, having a neck 101 and a mouth, such as a bottle for example. A probe 103, which in Figure 1 is shown separate from the container/connector assembly, is connected to the apparatus which

controls it and which forms the dispensing device. As can be seen in the figures, it has a retaining groove 104 and windows 105 for allowing the introduction of liquid from the container 100 into the channel 106 of probe 103.

[0017] 1 denotes overall a connector which is integrally joined to the container 100 and composed of a main body 3 and a slider 4 situated inside it and longitudinally sliding therein.

[0018] The connector 1 has a longitudinal axis X-X which, when the connector 1 is mounted on container 100, coincides with the longitudinal axis Z-Z of the container 100.

[0019] The main body 3 is provided with retaining means able to constrain it firmly to the container 100. For example, it may advantageously comprise an outer skirt 5 with a lip 7 such as to engage with a suitable locating element formed on the neck 101 of the container 100, preventing extraction of the connector 1 from the neck 101 of the container 100.

[0020] The retaining means may also be formed by an inner thread able to engage with a corresponding thread formed on the container 100.

[0021] The main body 3 may also comprise means able to prevent rotation relative to the container 100; these means may advantageously consist of projections which are parallel to the axis X-X and engage with corresponding projections formed on the outer surface of the neck of the container 100.

[0022] Slider 4 is able to slide longitudinally between a bottom closed position, shown in Figures 1, 2 and 6, where it defines a closed configuration of the connector 1, and at least one upper open position, shown in Figure 5, where it defines an open configuration of the connector 1, and vice versa.

[0023] In the bottom closed position, slider 4 ensures the liquid-tightness of the connector 1 and is able to engage with and disengage from probe 103.

[0024] When connector 1 is in the upper open configuration, slider 4 is completely disengaged from main body 3 and is situated completely within container 100; the apertures of windows 105 associated with probe 103 are completely free.

[0025] It is also possible to regard as open those intermediate configurations between the upper open configuration and the bottom closed configuration, which nevertheless allow the liquid to flow out of the container 100. During the course of the present description reference will be made mainly to the upper open configuration shown in Figure 5.

[0026] The direction from the bottom closed position towards the upper open position thus defines the bottom-to-top direction and relates to the arrangement of the container 100 when it is being used, i.e. is upside down.

[0027] The connector 1 may furthermore comprise special means (not shown) for indicating attempts to remove the connector 1 from the container 100 or the fact that initial opening has occurred.

[0028] The main body 3 comprises a sliding sleeve 9

which preferably has a circular cross-section and which has a first end 11 such that, when the connector 1 is fixed to the container 100, the first end 11 is directed towards the mouth of the container 100; the first end 11 is therefore the bottom end of the sleeve 9, according to the definition given above.

[0029] Slider 4 comprises a central guiding portion 6 which is able to be guided by the sleeve 9 of the main body 3 and a bottom engaging portion 8 which is able to engage reversibly with probe 103 and is arranged towards the mouth of the container 100, i.e. on the bottom side of the central portion 6.

[0030] Slider 4 defines inside it a seat 10 able to receive probe 103.

[0031] When the connector 1 is in the closed configuration, the bottom engaging portion 8 of slider 4 is situated outside the sleeve 9 of the main body 3.

[0032] In other words, if α indicates the plane perpendicular to the axis X-X and passing through the first end 11 of the sleeve 9 directed towards probe 103, the bottom portion 8 of slider 4 is situated on the side of the plane α which is opposite to the said sleeve 9. The bottom portion 8 is able to receive probe 103 by expanding radially. It may be advantageously divided into a plurality, for example six, eight or ten elongated parts 12 which may advantageously be identical to each other and preferably equally spaced along the outer perimeter of the bottom portion 8 of slider 4.

[0033] Engagement with the retaining groove 104 of probe 103 is achieved by means of teeth 14 which are advantageously formed on said bottom portion 8 and preferably project towards said seat 10. Advantageously, a tooth 14 is formed on each elongated part 12.

[0034] In this way, when probe 103 moves longitudinally towards the seat 10 of slider 4, the conical end 108 of probe 103 will push the bottom portion 8 of slider 4 outwards, by means of the teeth 14 and the elongated parts 12, making use of their radial elasticity.

[0035] As soon as teeth 14 have completely passed over the conical part 108 of probe 103, the elasticity of the elongated parts 12 will allow the teeth 14 to return elastically into their rest position, thus resulting in snap-engagement of the bottom portion 8 inside the retaining groove 104.

[0036] The size of the seat 10 of slider 4 is determined so that the base 16 of the seat 10 is in contact with the top end 109 of probe 103, which is generally flat so as to allow also the transmission to slider 4 of high longitudinal forces directed towards the centre of the container 100.

[0037] Advantageously, the distance between the teeth 14 and the base 16 is slightly less than the distance between the top end 109 and the groove 104, so as to ensure constant contact between probe 103 and slider 4.

[0038] The main body 3 comprises, at the end of the sleeve 9 opposite to the bottom end 11, a first abutment surface 17 able to cooperate with a second corresponding abutment surface 18 formed on slider 4 in the vicinity

of the end of the central portion 6 which is longitudinally opposite to the bottom portion 8 and which has an outer diameter d2.

[0039] These first and second abutment surfaces 17, 18 are preferably formed as surfaces converging towards the plane α , for example frustoconical surfaces and/or surfaces with a cross-section in the form of a circumferential arc, and are respectively adjacent to the inner surface of the sleeve 9 and to the outer surface of the central portion 6 of slider 4.

[0040] The function of these surfaces is to allow extraction of probe 103 from the seat 10 formed in slider 4 and preventing extraction of slider 4 from the main body 3, exerting a longitudinal force greater than the maximum force which the bottom portion 8 is able to exert on probe 103 via the teeth 14.

[0041] When probe 103 must be extracted from the container 100 and slider 4 reaches the bottom closed position, the two abutment surfaces 17, 18 come into abutment with each other and the bottom portion 8 of slider 4 is situated outside the sleeve 9.

[0042] The bottom portion 8 is formed so that the longitudinal force which it is able to exert via the retaining means (i.e. teeth 14) is less than the maximum longitudinal force which the abutment surfaces 17 and 18 may exert.

[0043] Consequently, each additional longitudinal movement of probe 103 out from the seat 10 of slider 4 results in radial expansion of the bottom portion 8, therefore allowing probe 103 to pass over the teeth 14. Probe 103 at this point is free from its engagement inside the seat 10.

[0044] Advantageously, the inner diameter d1 of the sleeve 9 is such that it is able to provide a liquid-tight seal when said sleeve is engaged with the outer surface of slider 4 or with its central portion 6 or with the outer surface of the channel 106.

[0045] Normally the diameter of channel 106 constitutes one of the design data and consequently determines the dimensions of the other parts.

[0046] On the side of the first abutment surface 17 opposite to sleeve 9 (and therefore above it), the main body 3 comprises an upper portion 19 able to engage with a corresponding upper portion 20 of slider 4, formed on the opposite side, relative to the first abutment surface 18, to that of the central portion 6.

[0047] This upper portion 19 of the main body 3 is advantageously cylindrical, having an inner diameter d3>d1.

[0048] The bottom portion 19 of the main body 3 has, in the vicinity of its upper end (namely opposite to plane α), a third and a fifth abutment surface denoted by 25 and 27 in Figure 2, respectively. These surfaces are advantageously formed on a circumferential projection 23 projecting towards the inside of main body 3 and with an inner diameter d5.

[0049] The abutment surfaces 25 and 27 therefore define two conical surfaces having opposite vertices with

respect to the projection 23 and are advantageously inclined relative to axis X-X by about 15° and about 45°, respectively.

[0050] The upper portion 20 of slider 4 terminates in an end 22 opposite to the bottom portion 8 where the outer diameter d4 is such as to engage, with slight interference, with the upper portion 19 having a diameter d3, so as to prevent any relative movements of slider 4 and main body 3.

[0051] The upper portion 20 may advantageously have a cylindrical section with an outer diameter d6 (not indicated in the figures), where $d2 < d6 < d4$ and $d6 > d5$, joined on one side to the first abutment surface 18 and, on the opposite side, to an additional conical surface which converges towards the bottom portion 8 and the outer diameter of which reaches the value of d4 substantially at the end 22.

[0052] In the vicinity of this maximum diameter d4, namely above and below it, it is possible to identify a fourth abutment surface 26, facing the bottom of the container, and a sixth abutment surface 28 which is directed towards sleeve 9 and the functions of which will be described more fully below.

[0053] The surfaces 25 and 27 co-operate with surfaces 28 and 26, respectively, so as to allow safe opening and closing of the connector 1.

[0054] In fact, when the upper portion 20, during its longitudinal movement, passes over projection 23, the pairs 25/28 and 27/26 of abutment surfaces produce a peak in the axial resistive force which opposes the movement of slider 4.

[0055] This peak depends on the relative inclination of the surfaces, which is chosen so that slider 4 can be suitably actuated by probe 103.

[0056] The first of the two peaks mentioned above occurs, during opening of the connector, when surface 28 passes over surface 25; the second peak occurs during the closing phase, when surface 26 passes over surface 27.

[0057] The longitudinal distance between the end 22 and the projection 23 when the connector 1 is in the bottom closed configuration, namely the travel movement which probe 103 must perform between the bottom closed position and the position where the abovementioned peak may be detected, must be such as to satisfy a condition clarified below.

[0058] Since, when the projection 23 is passed over, a peak value in the force is reached and this force, applied to slider 4, opposes the movement of probe 103, it is important that this force does not cause disengagement of slider 4 from probe 103, namely that the bottom portion 8 should be able to maintain its grip on probe 103.

[0059] When probe 103 moves towards the centre of container 100, the force which probe 103 may apply on slider 4 depends on the engagement of the upper end 109 against the base 16 of slider. In this case, there is therefore no risk of the probe being able to disengage from seat 10.

[0060] In this case, the upper portion 20 of slider 4, which has a conical shape, tends to open, producing interference with the inner wall of the upper portion 19.

[0061] When probe 103, however, is moving from the centre of the container 100 towards its mouth, the force which probe 103 may apply on slider 4 depends on the engagement of the bottom portion 8 inside the retaining groove 104. Since the bottom portion 8 of slider 4 is deformable radially outwards, the force pulse produced as a result of passing over projection 23 could be greater than the opposing force which may be generated by the sole resistance to radial expansion of bottom portion 8 of slider 4.

[0062] It is therefore possible to design connector 1 so that the bottom portion 8 of slider 4 is situated inside the sleeve 9 when the upper portion 20 of slider 4 passes over the projection 23, as can be seen in Figure 3b.

[0063] In this way, radial expansion of the bottom portion 8 is prevented by the presence of the sleeve 9; moreover, the conical form of the upper portion 20 of slider 4 and the projection 23 are such that, as a result of passing over the projection 23, the cone of the upper portion 20 tends to close. This reduces friction with the inner wall of the upper portion 19 and the axial force which opposes longitudinal sliding of slider 4 and, consequently, also the axial force which tends to open the bottom portion 8.

[0064] In other words, the longitudinal distance between second abutment surface 18 and sixth abutment surface 28 may be advantageously greater than the longitudinal extension of the bottom portion 8 and less than the longitudinal distance between the first abutment surface 17 and third abutment surface 25.

[0065] Main body 3 and slider 4 may be both made of a single piece of polymer material, preferably by means of moulding.

[0066] Obviously a person skilled in the art, in order to satisfy contingent and specific requirements, may make numerous modifications and variations to the configurations described above, all of which are contained, moreover, within the scope of protection of the invention as defined by the following claims.

Claims

1. Connector (1) able to be mounted on the open end of the neck (101) of a container for liquids (100) in the form of a bottle, said connector (1) having a main longitudinal axis (X-X) and comprising:

- a main body (3), which comprises constraining means for constraining said connector (1) to said container (100), and a sleeve (9) able to connect the inside of said container (100) to the external environment;
- a slider (4) which is slidably inserted in said sleeve (9) and is able to move longitudinally between a closed bottom position, where said slid-

er (4) does not allow liquid to flow out from said container (100), and an open upper position, where said slider (4) allows liquid to flow out from said container (100);

- said slider (4) defining internally a seat (10) able to receive a probe (103) able to allow dispensing of said liquid;
- said slider (4) comprising a bottom portion (8) able to perform reversible engagement with said probe (103) and a central portion (6) able to be guided at least partially by said sleeve (9) ;

characterized in that:

- said bottom portion (8) protrudes from said sleeve (9) towards the outside of said container (100) when said slider (4) is in said bottom closed position;
- said bottom portion (8) is able to engage with and disengage from a corresponding engaging portion (104) formed in said probe (103) when said slider (4) is in said bottom closed position and said probe (103) is inserted in and removed from said slider (4), respectively.

2. Connector (1) according to Claim 1, in which said bottom portion (8) is able to engage with and/or disengage from said probe (103), expanding elastically in a radial direction with respect to said longitudinal axis (X-X).
3. Connector (1) according to any one of the preceding claims, in which said bottom portion (8) comprises a plurality of longitudinally elongated parts (12) so as to increase the radial flexibility of said bottom portion (8).
4. Connector (1) according to any one of the preceding claims, in which said bottom portion (8) comprises one or more teeth (14) projecting towards the inside of said seat (10).
5. Connector (1) according to Claims 3 and 4, in which said longitudinally elongated parts (12) each comprise one of said teeth (14).
6. Connector (1) according to any one of Claims 3 to 5, in which said longitudinally elongated parts (12) are circumferentially equally spaced from each other.
7. Connector (1) according to any one of the preceding claims, in which:
 - said main body (3) comprises a first abutment surface (17) ;
 - said slider (4) comprises a second abutment surface (18) ;

- said first abutment surface (17) being able to engage with said first abutment surface (18) when said slider (4) is in said bottom closed position, so as to exert on said slider (4), when it is longitudinally biased towards the outside of said container (100) by said probe (103), a retaining force greater than the maximum force which can be produced by said bottom portion (8), so as to allow disengagement of said probe (103) from said slider (4).
8. Connector (1) according to any one of the preceding claims, in which:
- said main body (3) comprises a third abutment surface (25) ;
 - said slider (4) comprises a sixth abutment surface (28);
 - said third abutment surface (25) being able to engage with said sixth abutment surface (28) when said slider (4) is biased by said probe (103) from said bottom closed position towards said open upper position, so as to allow sliding of said slider (4) towards the inside of said container (100) only when a threshold force F_1 greater than the resistance exercised by the normal engagement between said main body (3) and said slider (4) is exceeded.
9. Connector (1) according to any one of the preceding claims, in which:
- said main body (3) comprises a fifth abutment surface (27);
 - said slider (4) comprises a fourth abutment surface (26);
 - said fifth abutment surface (27) being able to engage with said fourth abutment surface (26) when said slider (4) is biased by said probe (103) from said open upper position towards said closed bottom position, so as to allow the sliding of said slider (4) towards the mouth of said container (100) only when a threshold force F_2 is exceeded.
10. Connector (1) according to any one of the preceding claims, in which said main body (3) comprises:
- a sleeve (9) with an inner diameter d_1 ;
 - an upper portion (19) having an inner diameter $d_3 > d_1$;
 - said sleeve (9) being longitudinally closer to the mouth of said container (100) than said upper portion (19), when said connector (1) is fixed to said container (100) ;
 - said upper portion (19) comprising a circumferential projection (23) projecting towards the inside of said main body (3) and having a height h such that $h < (d_5 - d_3) / 2$.
11. Connector (1) according to any one of the preceding claims, in which said slider (4) comprises:
- a central portion (6) with an outer diameter d_2 ;
 - an upper portion (20) having an outer diameter $d_4 > d_2$;
- said central portion (6) being longitudinally closer to the mouth of said container than said upper portion (20), when said connector (1) is fixed to said container (100) and said slider (4) is in said bottom closed position.
12. Connector (1) according to Claims 7 and 10, in which said first abutment surface (17) is formed between said sleeve (9) and said upper portion (19) of said main body (3).
13. Connector (1) according to Claims 7 and 11, in which said first abutment surface (18) is formed between said central portion (6) and upper portion (20) of said slider (4).
14. Connector (1) according to Claims 8 and 10, in which said third abutment surface (25) is formed by the surface of said circumferential projection (23) which is directed towards the mouth of said container (100).
15. Connector (1) according to Claims 8 and 11, in which said sixth abutment surface (28) is formed at the end of said upper portion (20) of said slider (4) which is longitudinally opposite to said central portion (6) of said slider (4).
16. Connector (1) according to any one of the preceding claims, when dependent upon Claims 9 and 10, in which, when said fourth abutment surface must pass over said circumferential projection (23), said bottom portion (8) of said slider (4) is situated at least partially inside said sleeve (9), so that said sleeve (9) prevents the outer radial deformation of said bottom portion (8) of said slider (4).
17. Connector (1) according to any one of the preceding claims when dependent upon Claims 10 and 11, in which d_1 is substantially equal to d_3 , and d_2 is substantially equal to d_4 .
18. Connector (1) according to any one of the preceding claims, in which said main body (3) comprises means able to indicate in a permanent manner removal of said connector (1) from said container (100).
19. Connector (1) according to any one of the preceding claims, in which said main body (3) comprises means able to indicate in a permanent manner initial open-

ing of said connector (1).

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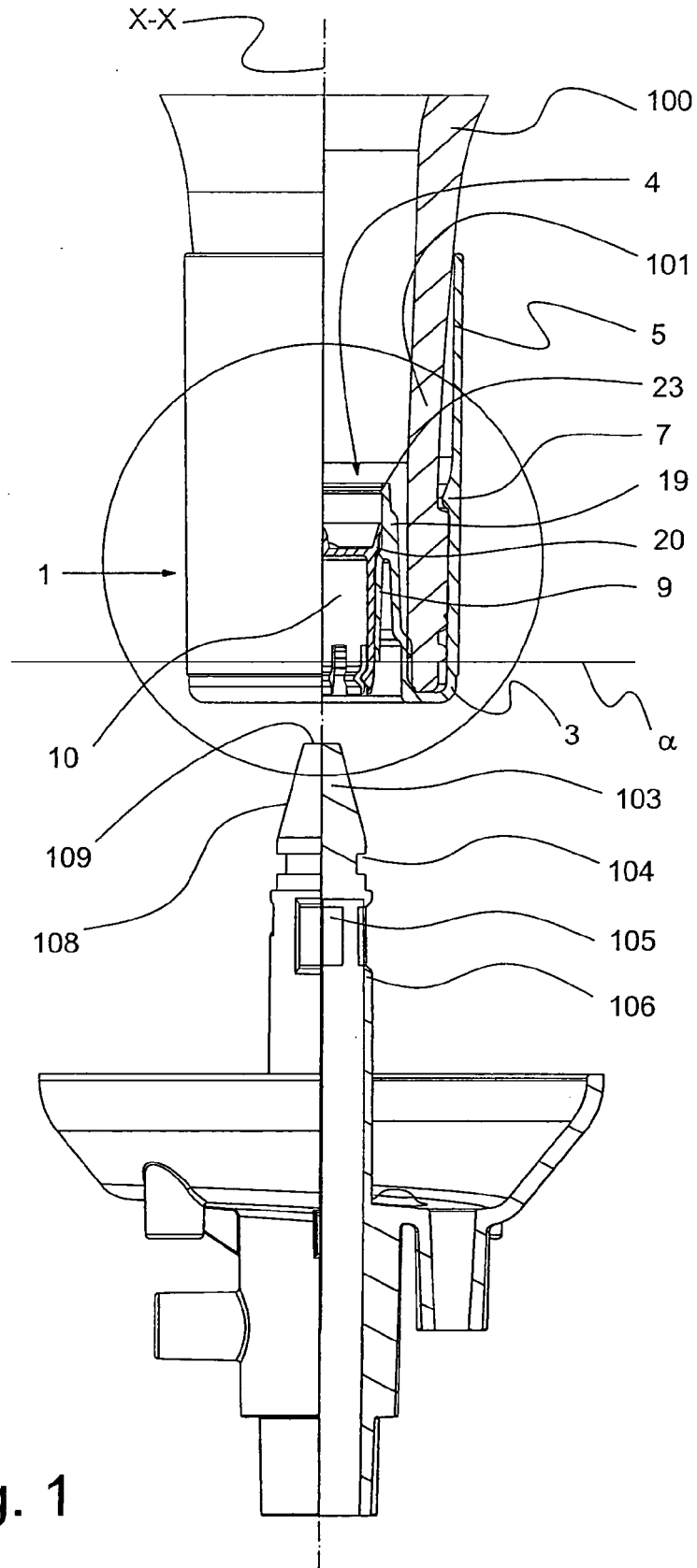
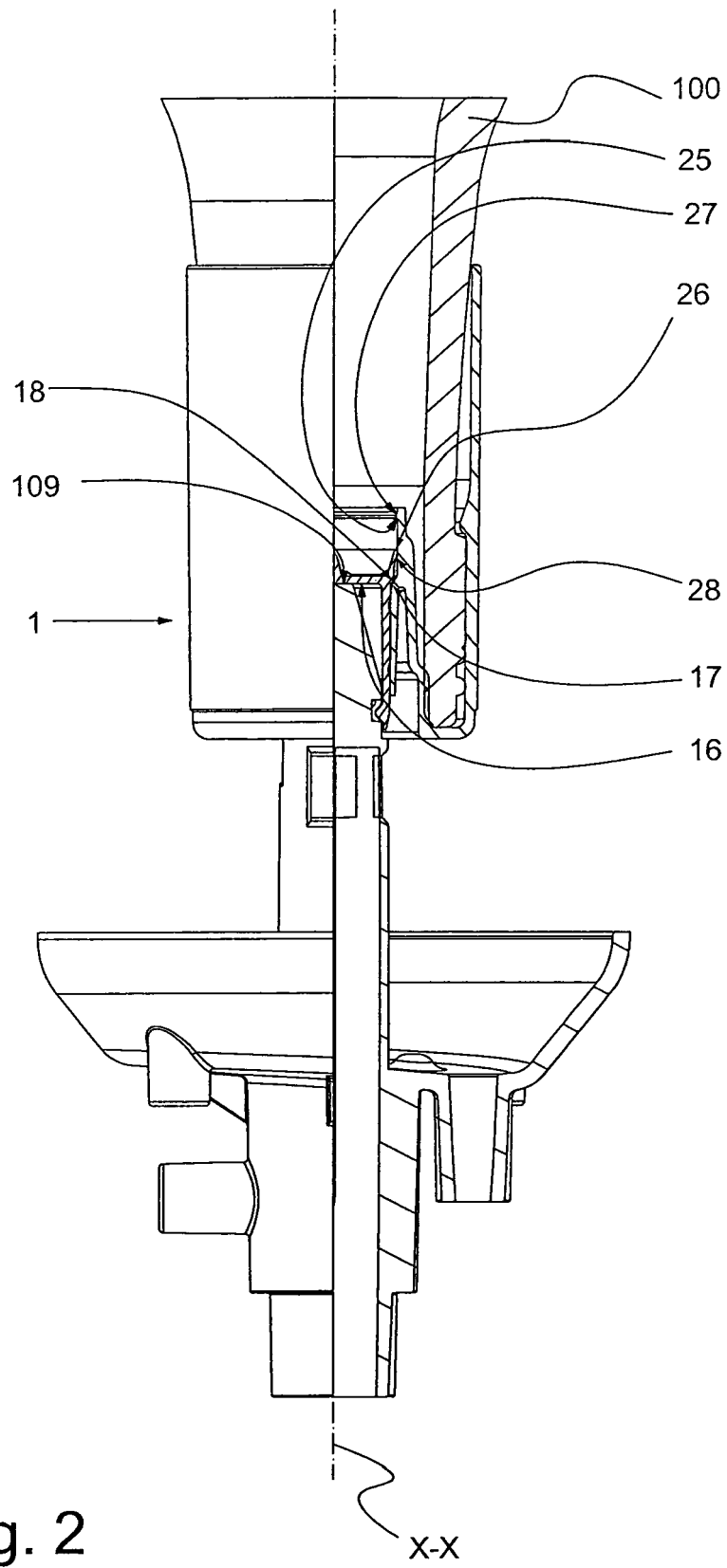


Fig. 1



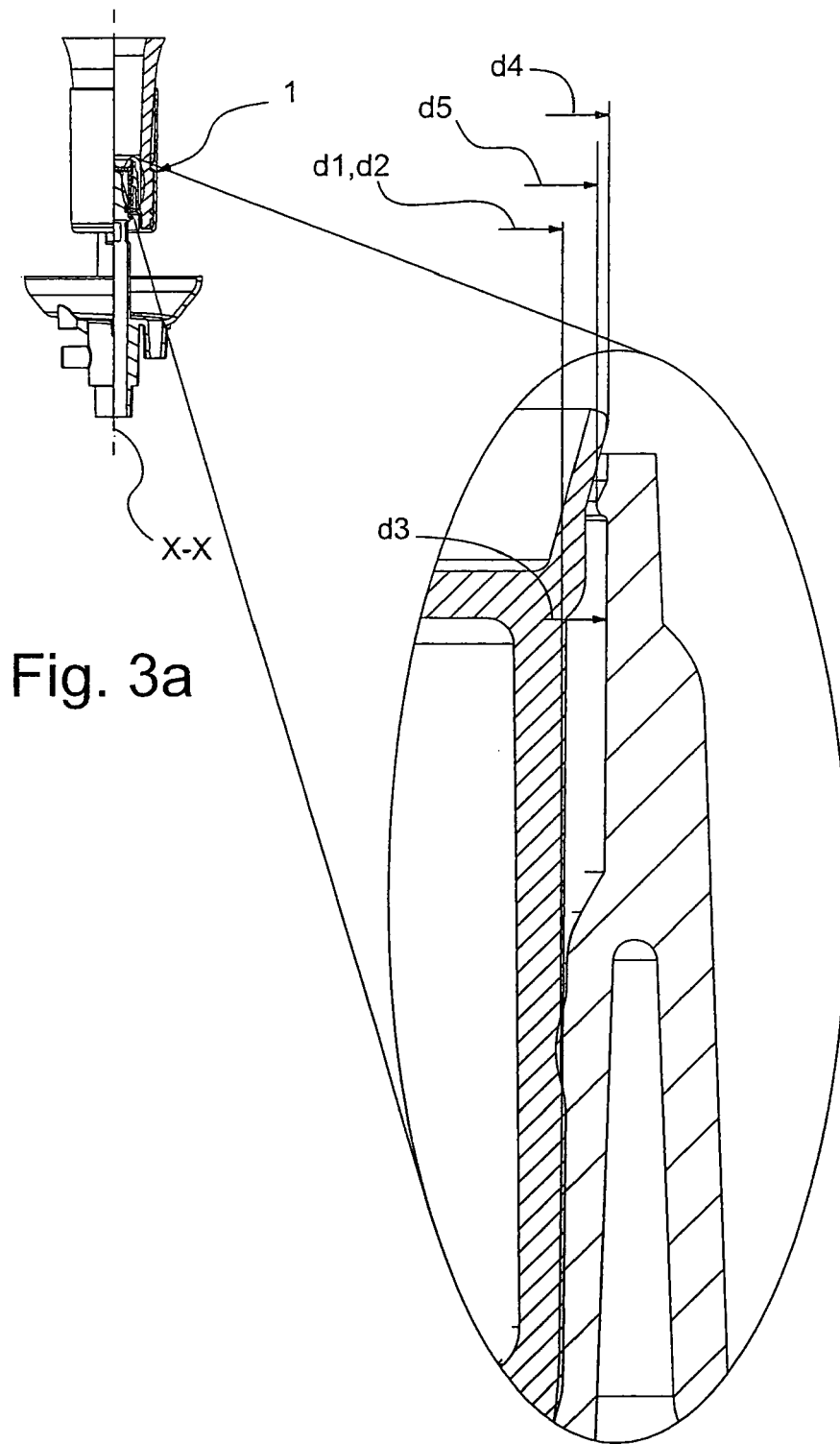


Fig. 3a

Fig. 3b

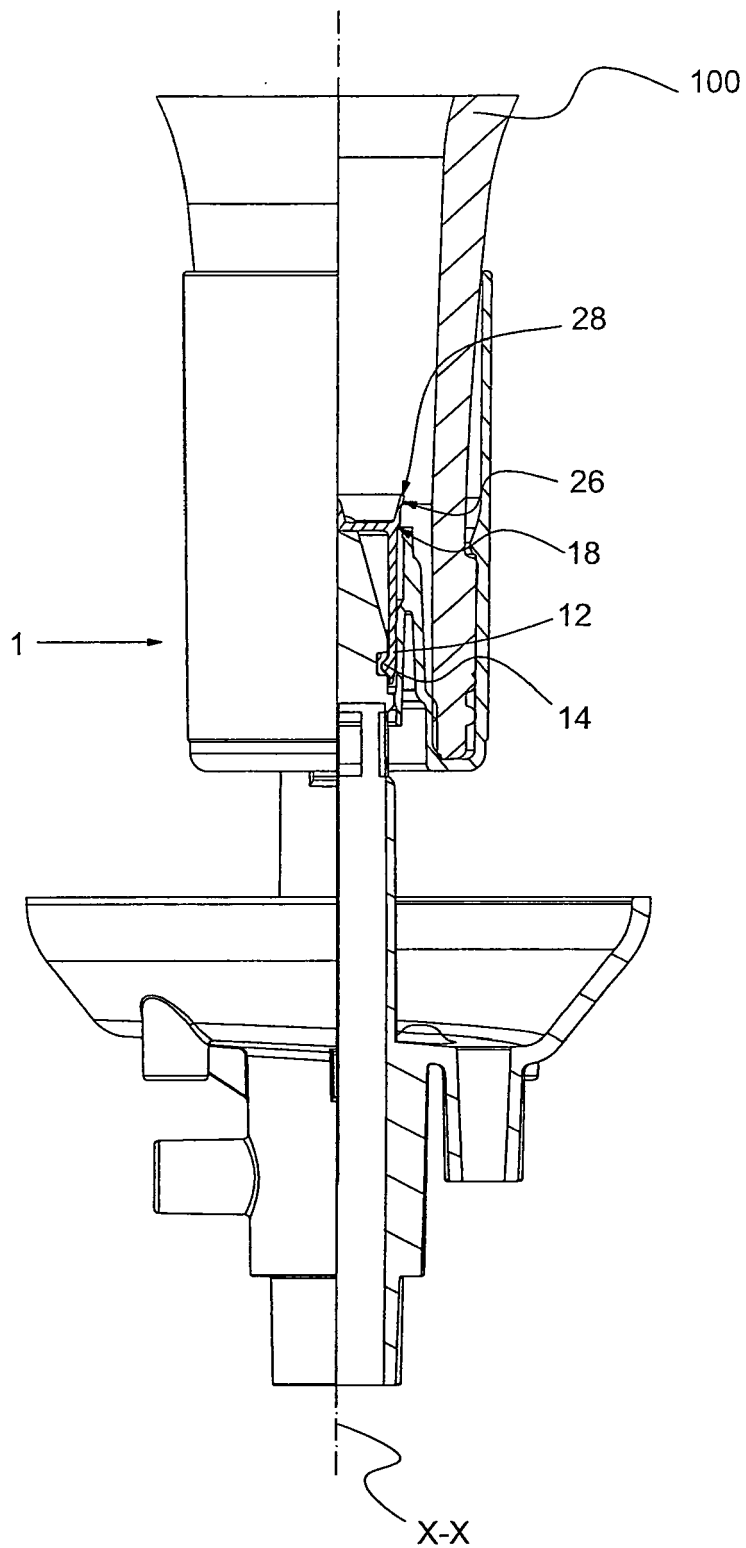


Fig. 4

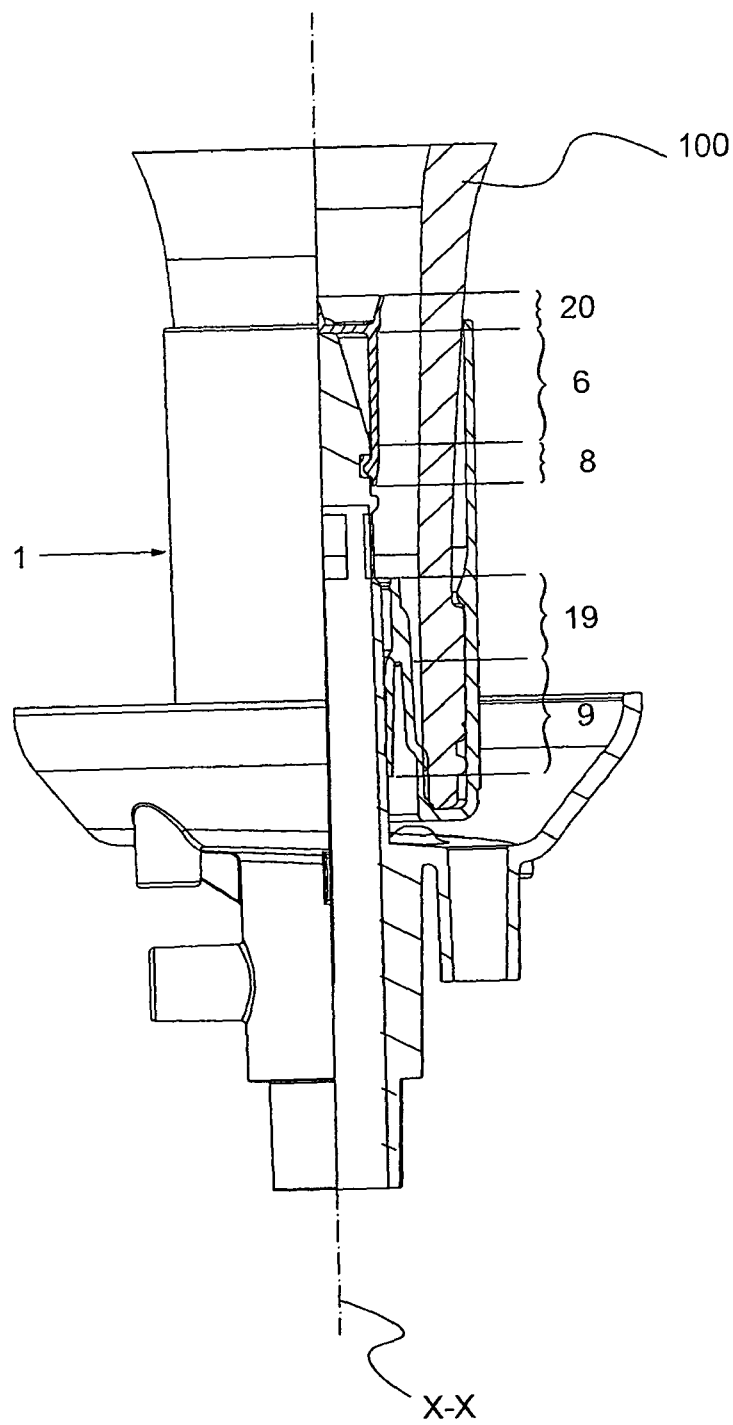


Fig. 5

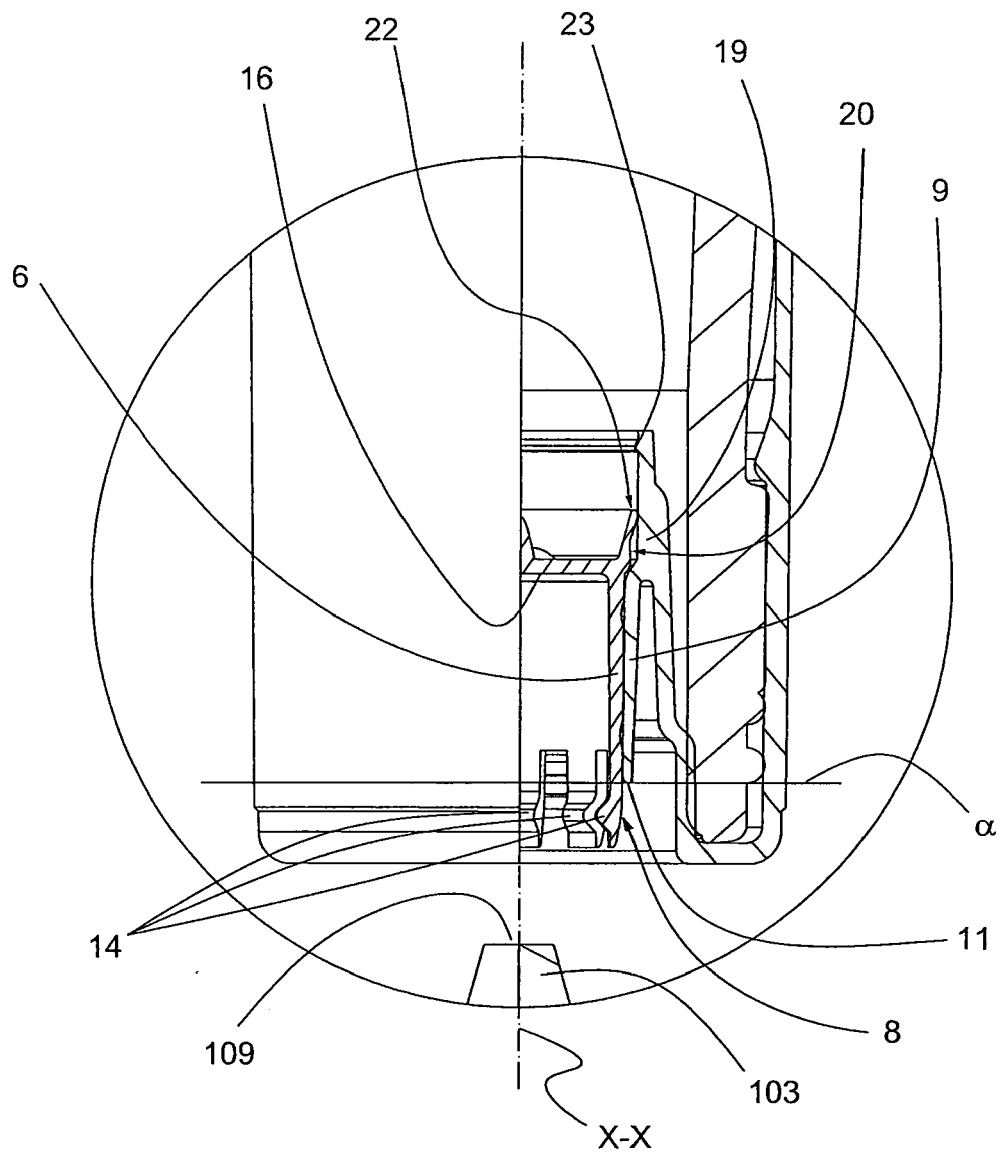


Fig. 6



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 06 42 5545

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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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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 06 42 5545

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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