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(54) **Protective device**

(57) A protective device (1) comprising a cap (2) which can be associated detachably with a valve (10) of the type comprising a valve body (11) which forms a passage duct (12) which lies between a first, input end (12a) and a second, output end (12b) for connection respectively to a gas containment tank and to a pressure regulator; the valve body (11) has, on its outer surface (11a) and substantially at the second, output end (12a), a recess (13) for the accommodation of a sealing gasket (14) which lies between a first abutment (15) formed in a position proximate to said second, output end (12b) and a second abutment (16) which is formed in a position which is spaced axially from the first abutment (15). The valve body (11) is detachably associable with the pressure regulator by quick coupling means and the cap (2) supports a sealing body (5) which is adapted to mate with a cylindrical body (17) which forms a flow control chamber (18) associated with a flow control element (18), the cylindrical body (17) being supported by the valve body (11) along the extension of the passage duct (12).

According to the present invention, the cap (2) comprises a lateral portion (3) which is designed to be arranged around a region of the outer surface (11a) of the valve body (11) which is proximate to the second, output end (12b), the lateral portion (3) supporting means (4) for the detachable coupling of the cap (2) to the valve body (11) which are adapted to engage between the first abutment (15) and the sealing gasket (14), the sealing body (5) comprising an elongated sealing element (6) which lies, during use, along a longitudinal direction which corresponds substantially to the longitudinal axis of the cylindrical body (17), the free end of the elongated sealing element (6) being adapted to enter the cylindrical body (17).

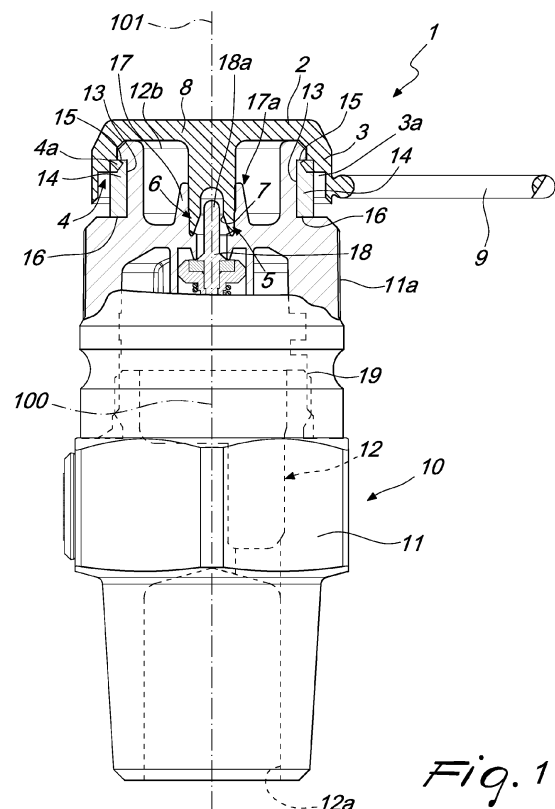


Fig. 1

Description

[0001] The present invention relates to a protective device for valves for dispensing gas such as LPG, of the type known commercially as "Jumbo valves".

[0002] Such type of valve is normally employed for dispensing butane, propane or a mixture of the two gases and comprises a valve body which forms, internally, an axial passage duct which lies between a first, input end and a second, output end for connection respectively to a gas containment bottle and to a device for dispensing the gas typically by means of a pressure regulator.

[0003] The valve body has, on its outer surface and substantially at the second, output end, a recess for accommodating a sealing gasket.

[0004] Such recess extends between a first abutment formed in a position which is proximate to the second, output end and a second abutment formed in a position which is spaced axially from the first abutment.

[0005] The valve can be associated detachably with the pressure regulator by quick coupling means which, normally, comprise a track defined on the outer surface of the valve body which can be coupled to a retention device, typically using balls, which is supported by the pressure regulator.

[0006] Along the extension of the passage duct and, generally, proximate to the second, output end, the valve body supports a cylindrical body which defines a flow control chamber associated with a flow control element.

[0007] Since it is routine for bottles filled with gas to be left for long periods in storage or in the open, it is appropriate to use protection devices, which are normally constituted by plastic caps, to be detachably applied to the second, output end of the valve body in order to prevent, on the one hand, dust or dirt from working its way into the valve body and at the same time in order to reduce the outflow of gas from the valve.

[0008] The protective caps used today have an element for engaging the valve body and, normally, an elongated closing element which is adapted, with the flat surface that forms its free end, to close, in an upper region, the end of the cylindrical body which is directed toward the second, output end.

[0009] With regard to the types of engagement elements associated with the caps and adapted to allow the detachable locking of the cap to the valve body, among the various types abutment bodies are to be noted which can be used with respective radial constrictions of the second, output end of the valve body or cage structures which can be locked, by way of a sealing ring, in the track defined on the outer surface of the valve body.

[0010] The solutions known today for providing the protection devices, although widely used, are not devoid of drawbacks.

[0011] With reference to the shape of elongated closing elements, it should be noted that these are inadequate to ensure an acceptable seal because the upper edge of the cylindrical body is usually deformed as a re-

sult of the operations to lock and release the pressure regulator.

[0012] This determines a perceptible increase in the "pull-off" force on the cap and consequently very effective engagement elements must be provided between the cap and the valve body, in order to counteract such pull-off force.

[0013] With regard to the engagement elements, some of them can only be applied to valves that have specific, non-standardized shape contrivances whereas, in other cases, they are complex in structure and rather impractical to apply and remove.

[0014] The aim of the present invention is to solve the above-mentioned problems and overcome the drawbacks, by providing a protective device which is considerably easier and more practical to use than conventional solutions.

[0015] Within this aim, an object of the invention is to make available a protective device which is extremely reliable in use.

[0016] Another object of the invention is to provide a protective device that is capable of being applied to all dispensing valves (such as "Jumbo valves") with the technical characteristics described above.

[0017] Another object of the invention is to provide a protective device that ensures an effective seal against the outflow of gas.

[0018] Another object of the invention is to make available a protective device which is low-cost, so as to make its use advantageous from an economic viewpoint as well.

[0019] This aim and these and other objects which will become more apparent hereinafter are all achieved by a protective device according to claim 1.

[0020] Further characteristics and advantages of the invention will become more apparent from the description of some preferred, but not exclusive, embodiments of a valve according to the invention, illustrated by way of non-limiting example in the accompanying drawings wherein:

Figure 1 is a partially sectional side elevation view of a first embodiment of a protective device associated with a dispensing valve;

Figure 2 is another partially sectional side elevation view of the first embodiment of a protective device separated from a dispensing valve;

Figure 3 is a partially sectional side elevation view of a second embodiment of a protective device associated with a dispensing valve;

Figure 4 is another partially sectional side elevation view of the second embodiment of a protective device separated from a dispensing valve;

Figure 5 is a partially sectional side elevation view of a third embodiment of the protective device.

[0021] In the embodiments illustrated, individual characteristics shown in relation to specific examples may in

reality be interchanged with other, different characteristics, existing in other embodiments.

[0022] With reference to the figures, the present invention relates to a protective device, generally designated with the reference numeral 1, for valves for dispensing gas (typically butane or propane or mixtures thereof) of the type commercially known as "Jumbo valves".

[0023] The protective device 1 comprises a cap 2 which can be associated detachably with a valve 10 of the type comprising a valve body 11 which forms a passage duct 12 which lies between a first, input end 12a and a second, output end 12b for connection respectively to a gas containment tank and to a pressure regulator or to a dispensing device in general.

[0024] Conveniently the passage duct 12 has an axial extension.

[0025] The valve body 11 has, on its outer surface 11a and substantially at the second, output end 12b, a recess 13 for accommodating a sealing gasket 14, advantageously hollow and cylindrical, which lies between a first abutment 15 formed in a position which is proximate to the second, output end 12b and a second abutment 16 which is formed in a position spaced axially from the first abutment 15.

[0026] The valve body 11 can, in particular, be associated detachably with the pressure regulator, not shown in the figures, by quick coupling means.

[0027] According to the present invention, the cap 2 comprises a lateral portion 3 which is designed to be arranged around a region of the outer surface 11a of the valve body 11 which is proximate to the second, output end 12b.

[0028] Specifically, the lateral portion 3 supports means 4 for the detachable coupling of the cap 2 with the valve body 11.

[0029] Such detachable coupling means 4 are, in particular, adapted to be engaged with the valve body between the first abutment 15 and the sealing gasket 14.

[0030] Advantageously, the cap 2 supports a sealing body 5, which is adapted to mate with a cylindrical body 17 defining a flow control chamber 19 which is associated with a flow control element 18; the cylindrical body 17 is supported by the valve body 11 and is positioned along the extension of the passage duct 12 and, conveniently, is arranged proximate to the second, output end 12b.

[0031] According to a preferred embodiment, the detachable coupling means 4 comprise at least one retention element 4a which extends in a radial direction from the inner surface of the lateral portion 3.

[0032] Conveniently, the retention element 4a has a circumferential extension.

[0033] Delving deeper into the details, the sealing body 5 is adapted to be coupled with the end 17a of the cylindrical body 17 which is directed toward the second, output end 12b.

[0034] According to the present invention, the sealing body 5 comprises an elongated sealing element 6 which extends, during use, along a longitudinal direction 101

which corresponds substantially to the longitudinal axis 100 of the cylindrical body 17.

[0035] In particular, the free end of the elongated sealing element 6 is adapted to enter, advantageously with interference, the cylindrical body 17.

[0036] Typically, the flow control element 18 has, at the end directed toward the second, output end 12b, an engagement head 18a.

[0037] The flow control element 18 moreover can move, with respect to the cylindrical body 17, between a flow control position, in which the engagement head 18a is arranged close to the second, output end 12b, and at least one passage position, in which the engagement head 18a is arranged in a spaced position with respect to the second, output end 12b.

[0038] Normally, the transition of the flow control element 18 from the flow control position to the passage position occurs as a result of a control lever which is brought by the pressure regulator in contrast to the action of a spring which is arranged axially and acts between the cylindrical body 17 and the flow control element 18 and tends to keep the flow control element in the flow control position.

[0039] In any case, since the application of the protective device is always performed when the pressure regulator is not associated with the valve body 11, in such condition the flow control element 18 is always in the flow control position.

[0040] Conveniently, the elongated sealing element 6 has, at its free end, an axial hollow 7 which is designed to accommodate, when the cap 2 is stably associated with the valve body 11, the free end portion of the engagement head 18a.

[0041] With reference to the embodiments shown in the figures, the cap 2 comprises a base element 8 which is connected, advantageously at its peripheral portion, to the lateral portion 3 and which supports the elongated sealing element 6.

[0042] Specifically, the base element 8 extends on a plane of arrangement which is arranged at right angles to the direction of extension 101 of the elongated sealing element 6.

[0043] According to a preferred embodiment, the cap 2 is connected to a manoeuvring body 9 which is adapted to allow traction, by the user, on the cap 2 so as to facilitate its removal from the valve body 11.

[0044] Such manoeuvring body 9 comprises a grip ring which is connected to a connecting portion formed substantially at the free edge 3a of the lateral portion 3.

[0045] Advantageously, the cap 2 is made of plastic.

[0046] In order to ensure a better seal, as shown in Figures 3 and 4, the elongated sealing element 6 can comprise a base body 6a which is provided monolithically with the cap 2 and a sealing body 6b which can be connected stably to the free end of the base body 6a and is made of a softer material than the base body 6a, for example elastomer, which is capable of deforming following the engagement inside the cylindrical body 17 so as to

ensure a substantially hermetic seal.

[0047] Advantageously, with reference to both of the embodiments described above, the free edge of the elongated sealing element 6 is structured so as to deform elastically following the compression action, during insertion of the elongated sealing element 6 in the cylindrical body 17, of such free edge against an annular abutment which extends along the extension of the cylindrical body 17 about the longitudinal axis 100.

[0048] The elastic deformation of the free edge of the elongated sealing element 6 can be obtained by using suitable materials (for example elastomers) or by shaping the free edge itself in an adapted manner (for example by way of tapering).

[0049] It has been found that, in this manner, the seal of the outflow of the gas is already ensured at the annular abutment, with the consequence that the cap is made more hermetic and, at the same time, the pull-off force is limited since the surface on which the pressure of the outflowing gas acts is reduced.

[0050] With reference to the variation of embodiment shown in Figure 5, it is possible for the elongated sealing element 6 to define a circumferential hollow 6b for accommodating a sealing body which is constituted, for example, by an O-ring 6c.

[0051] Such circumferential sealing hollow 6a can be provided during the molding of the elongated sealing element 6 (and in general of the cap 2) or by way of hot-folding the lower free end of the sealing element 6.

[0052] The valve 11 has, at its outer surface 11a, a track 19 which is adapted to accommodate an engagement device supported by the pressure regulator.

[0053] Optionally, a safety valve can be provided along the extension of the passage duct 12.

[0054] The use of the protective device 1 according to the invention is evident from the foregoing description.

[0055] In particular, when associating the protective device 1 with the valve body 11, the elongated sealing element 6 is inserted in the cylindrical body 17, simultaneously locking the lateral portion 3 around the top of the second, output end 12b thanks to the action of the detachable coupling means 4 which engage between the first abutment 15 and the sealing gasket 14.

[0056] Specifically, thanks to the particular shape of the elongated sealing element 6, on the one hand an excellent seal is ensured against the passage of the gas and, on the other hand, thanks to the friction force generated between the outer surface of the elongated sealing element 6 and the inner surface of the cylindrical body 17, it is possible to use, as detachable coupling means 4, the retention element 4a which can be locked at a region of the valve body 11 of standardized shape.

[0057] All the characteristics of the invention, indicated above as advantageous, convenient or similar, may also be missing or be substituted by equivalent characteristics.

[0058] The invention, thus conceived, is susceptible of numerous modifications and variations, all of which are

within the scope of the appended claims.

[0059] Thus, for example, on the cap 2 there can be at least one discharge opening which is adapted to allow the outflow of the gas possibly through the connecting region between the inner surface of the cylindrical body 17 and the outer surface of the elongated sealing element 6 in order to prevent, in fact, the force exerted by the pressure of such gas from resulting in the disengagement of the cap 2 from the valve body 11.

[0060] In practice it has been found that in all the embodiments the invention has achieved the intended aim and objects.

[0061] In practice the materials employed may be any, according to requirements.

[0062] Moreover, all the details may be substituted by other, technically equivalent elements.

[0063] The disclosures in Italian Patent Application No. VR2012A000107 from which this application claims priority are incorporated herein by reference.

[0064] Where the technical features mentioned in any claim are followed by reference numerals and/or signs, those reference numerals and/or signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference numerals and/or signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference numerals and/or signs.

Claims

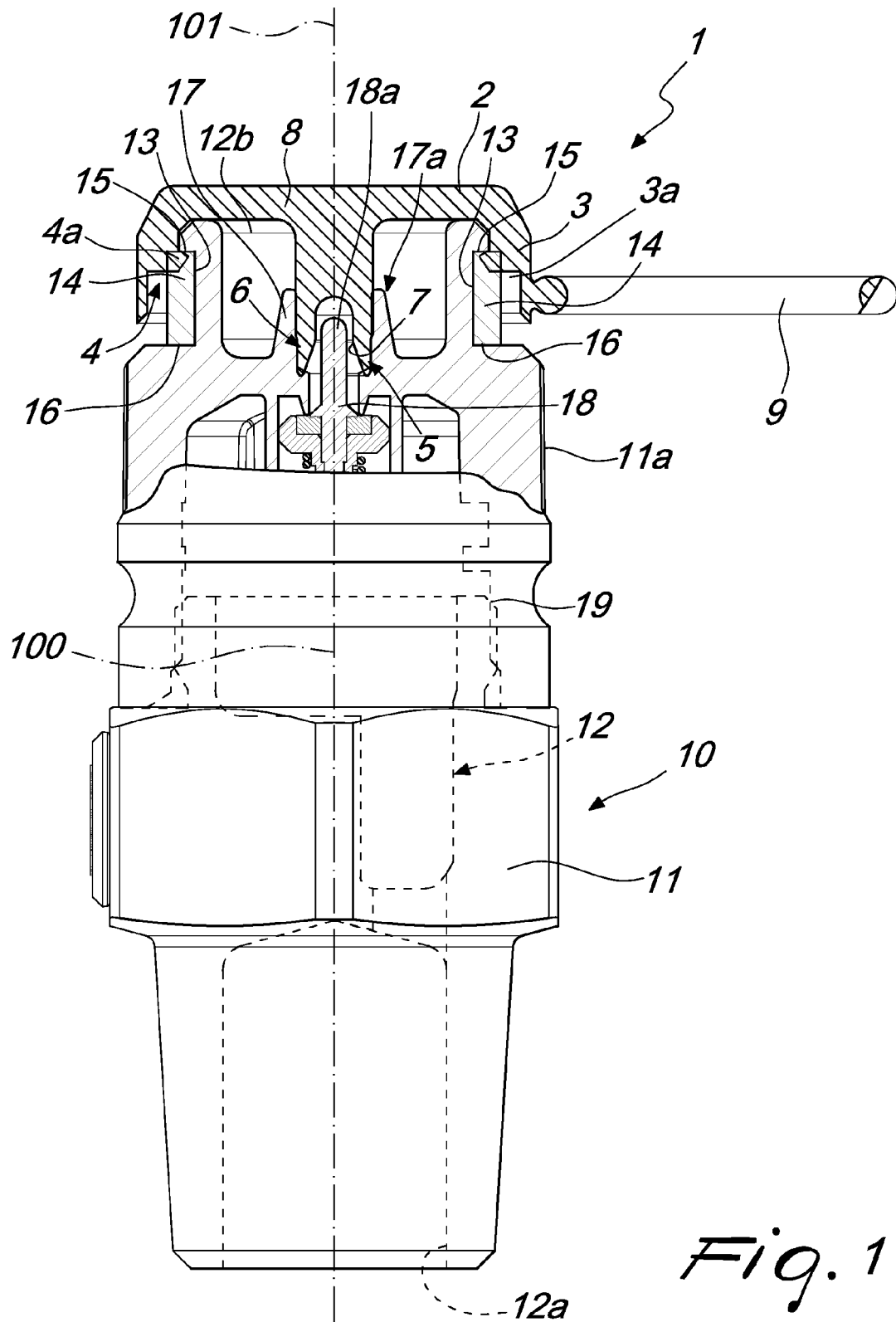
1. A protective device (1) comprising a cap (2) which can be associated detachably with a valve (10) of the type comprising a valve body (11) which forms a passage duct (12) which lies between a first, input end (12a) and a second, output end (12b) for connection respectively to a gas containment tank and to a pressure regulator, said valve body (11) having, on its outer surface (11a) and substantially at said second, output end (12a), a recess (13) for the accommodation of a sealing gasket (14) which lies between a first abutment (15) formed in a position which is proximate to said second, output end (12b) and a second abutment (16) which is formed in a position spaced axially from said first abutment (15), said valve body (11) being detachably associable with said pressure regulator by quick coupling means, said cap (2) supporting a sealing body (5) which is adapted to mate with a cylindrical body (17) which forms a flow control chamber (18) which is associated with a flow control element (18), said cylindrical body (17) being supported by said valve body (11) along the extension of said passage duct (12), said protective device (1) being **characterized in that** said cap (2) comprises a lateral portion (3) which is designed to be arranged around a region of the outer surface (11a) of said valve body (11) which is proximate to said second, output end (12b), said lateral

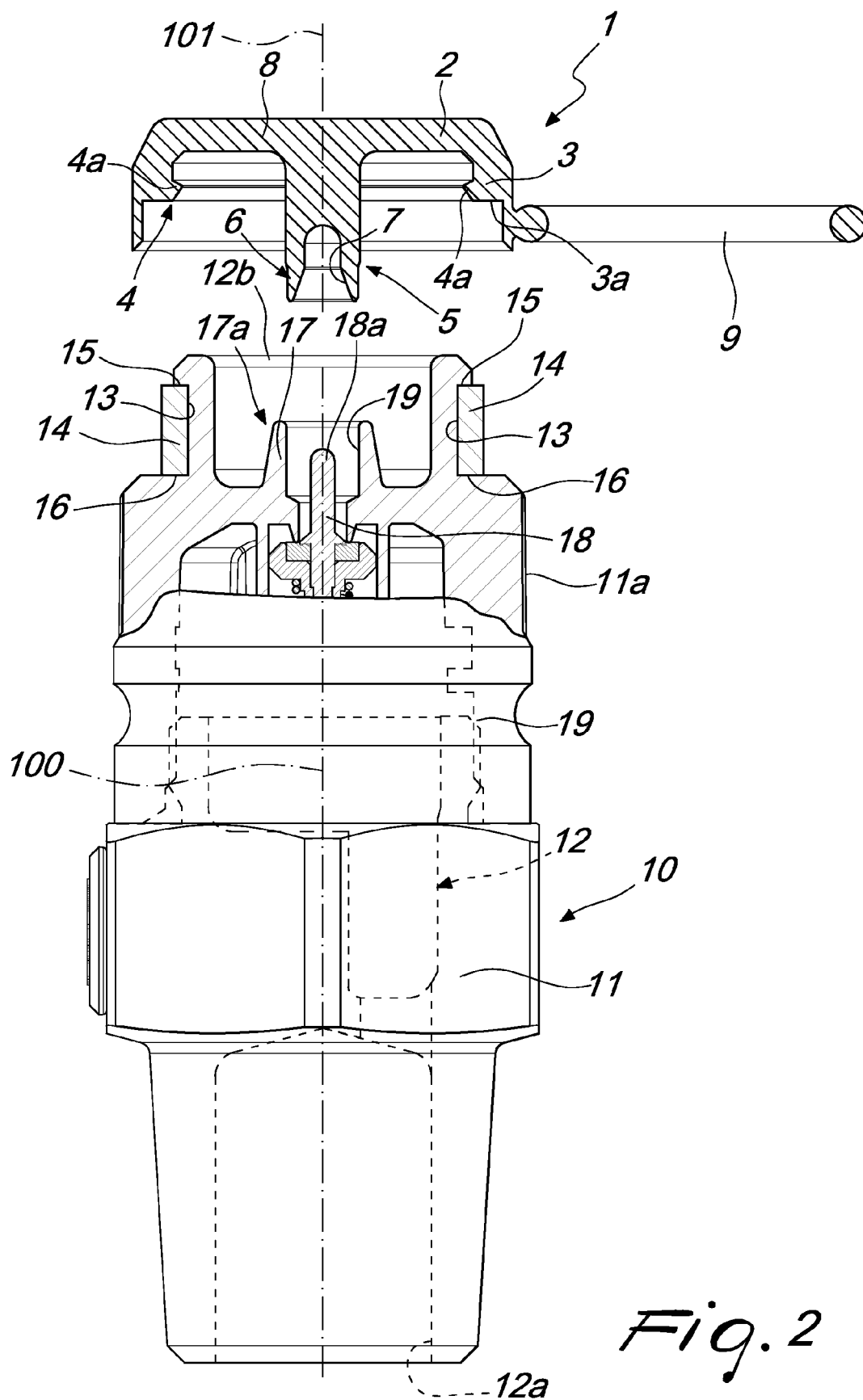
portion (3) supporting means (4) for the detachable coupling of said cap (2) to said valve body (11) which are adapted to engage between said first abutment (15) and said sealing gasket (14), said sealing body (5) comprising an elongated sealing element (6) which lies, during use, along a longitudinal direction which corresponds substantially to the longitudinal axis of said cylindrical body (17), the free end of said elongated sealing element (6) being adapted to enter said cylindrical body (17).

2. The protective device (1) according to claim 1, **characterized in that** said detachable coupling means (4) comprise at least one retention element (4a), which extends in a radial direction from the inner surface of said lateral portion (3).
3. The protective device (1) according to one or more of the preceding claims, **characterized in that** said retention element (4a) has a circumferential extension.
4. The protective device (1) according to one or more of the preceding claims, **characterized in that** said flow control element (18) has, at the end directed toward said second, output end (12b), an engagement head (18a) which can move, with respect to said cylindrical body (17), between a flow control position, in which said engagement head (18a) is arranged close to said second, output end (12b), and at least one passage position, in which said engagement head (18a) is arranged in a spaced position with respect to said second, output end (12b), said free end of said elongated sealing element (6) being adapted to enter said cylindrical body (17) when said flow control element is in said flow control position.
5. The protective device (1) according to one or more of the preceding claims, **characterized in that** said elongated sealing element (6) has, at its free end, an axial hollow (7) designed to accommodate the free end portion of said engagement head (18a).
6. The protective device (1) according to one or more of the preceding claims, **characterized in that** said cap (2) comprises a base element (8) which is connected to said lateral portion (3) and supports said elongated sealing element (6).
7. The protective device (1) according to one or more of the preceding claims, **characterized in that** said cap (2) is connected to a manoeuvring body (9) which is adapted to allow traction on said cap (2) in order to facilitate its removal from said valve body (11).
8. The protective device (1) according to one or more of the preceding claims, **characterized in that** said manoeuvring body (9) comprises a grip ring which

is connected to a connecting portion formed substantially at the free edge (3a) of said lateral portion (3).

9. The protective device (1) according to one or more of the preceding claims, **characterized in that** said cap (2) is made of plastic.
10. The protective device (1) according to one or more of the preceding claims, **characterized in that** said elongated sealing element (6) comprises a base body (6a) which is provided monolithically with said cap (2) and a sealing body (6b) which can be connected stably to the free end of said base body (6a).
11. The protective device (1) according to one or more of the preceding claims, **characterized in that** said sealing body (6b) is made of elastomer.
12. The protective device (1) according to one or more of the preceding claims, **characterized in that** said valve body (11) has, at its outer surface (11a), a track (19) which is adapted to accommodate an engagement device supported by said pressure regulator.
13. The protective device (1) according to one or more of the preceding claims, **characterized in that** the free edge of said elongated sealing element (6) can be deformed elastically as a consequence of compression against an annular abutment that extends along the extension of said cylindrical body (17) around the longitudinal axis (100), in order to obtain a seal against the outflow of gas at said annular abutment.
14. The protective device (1) according to one or more of the preceding claims, **characterized in that** said elongated sealing element (6) forms a circumferential hollow (6b) for accommodating a sealing body which comprises an O-ring (6c).





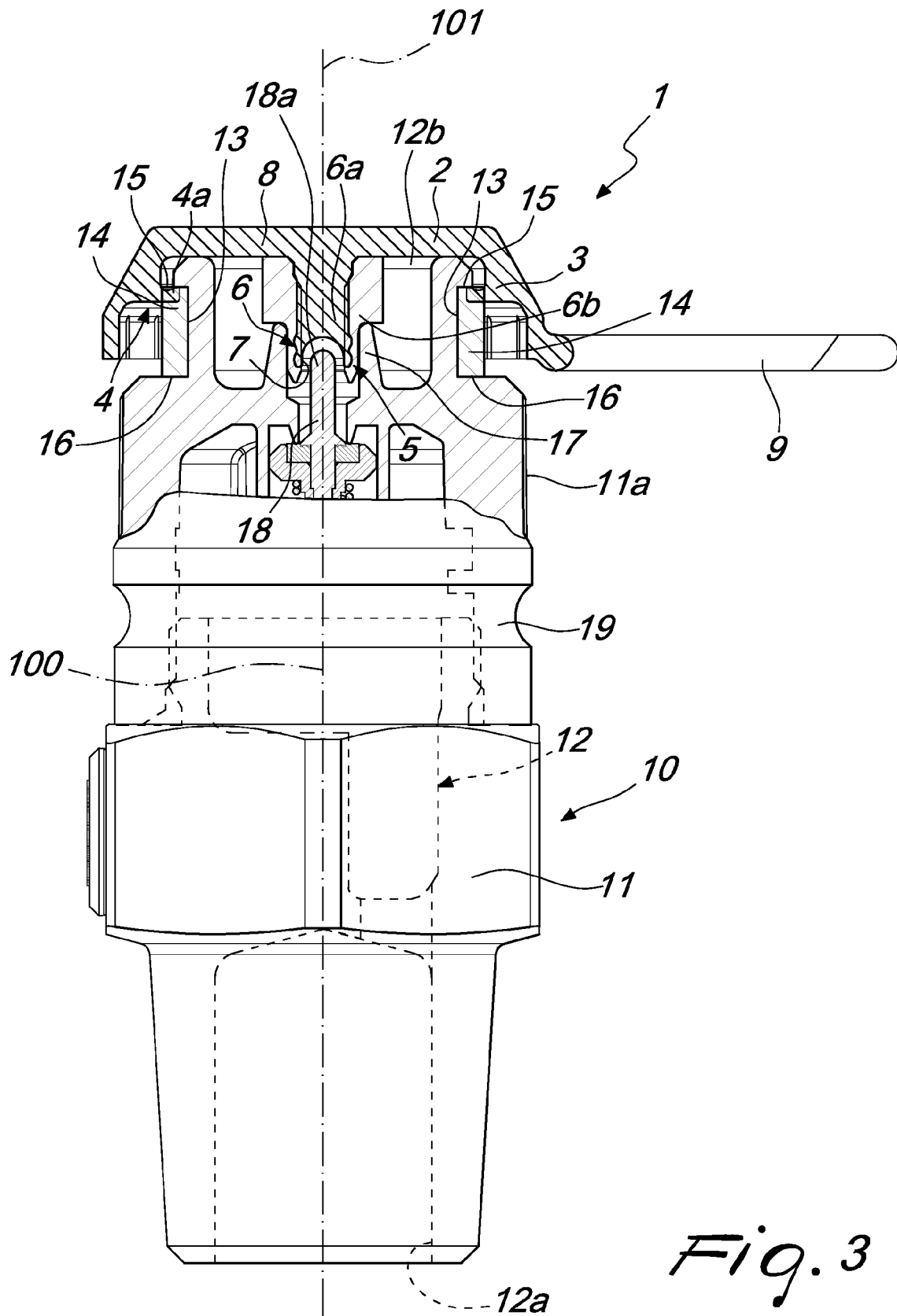
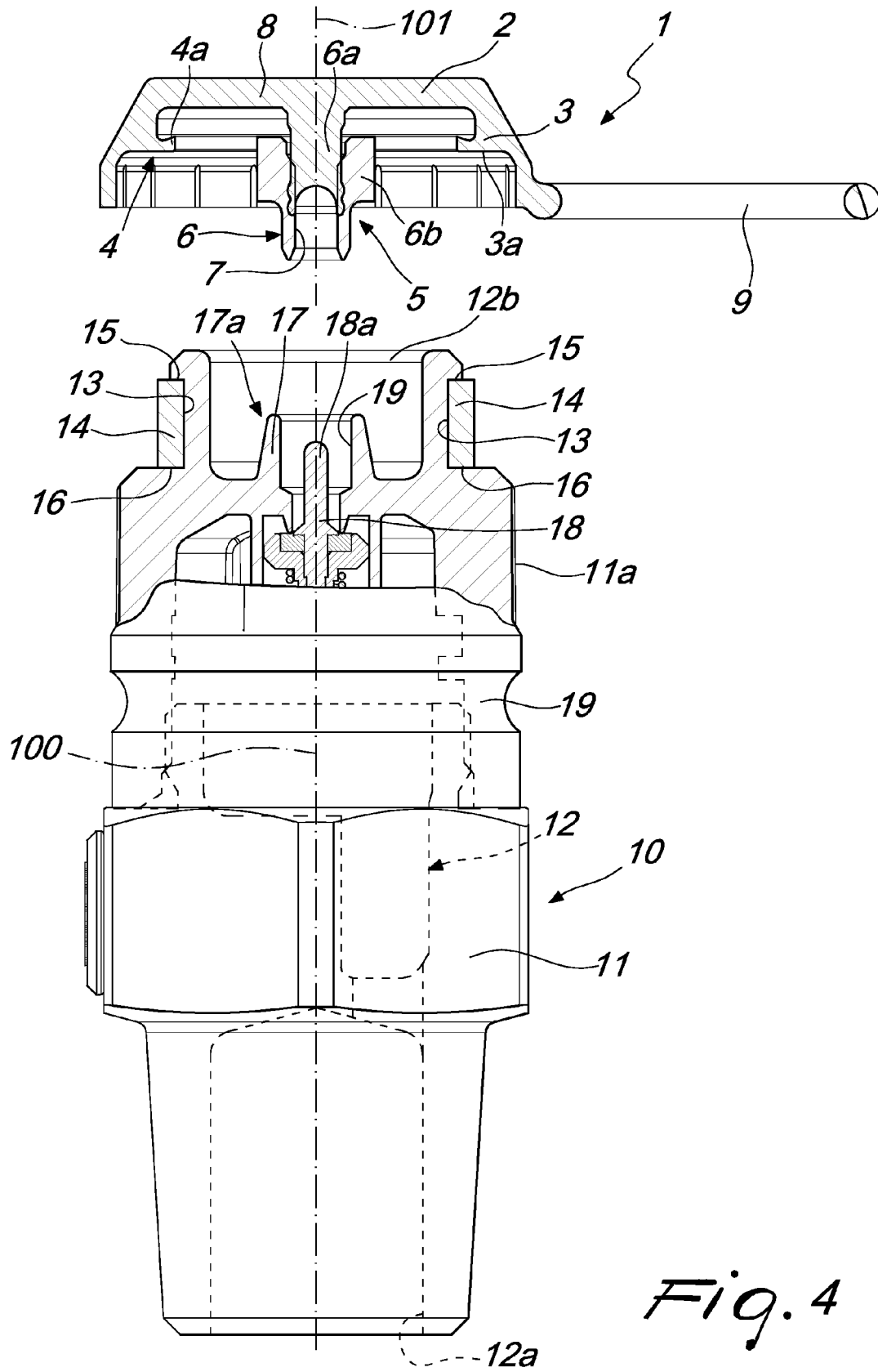


Fig. 3



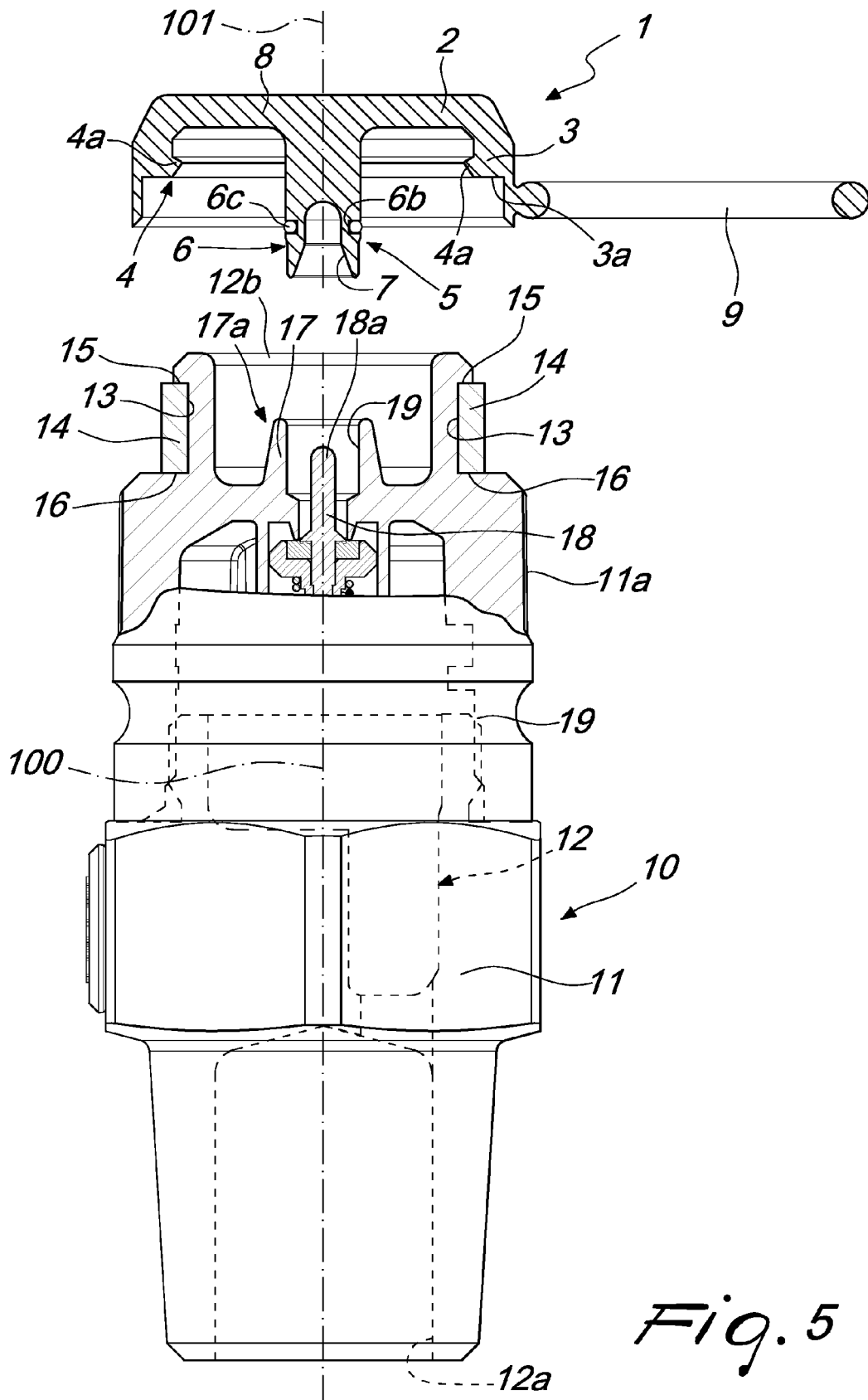


Fig. 5



EUROPEAN SEARCH REPORT

Application Number
EP 13 16 8421

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			F17C
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 24 June 2013	Examiner Stängl, Gerhard
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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