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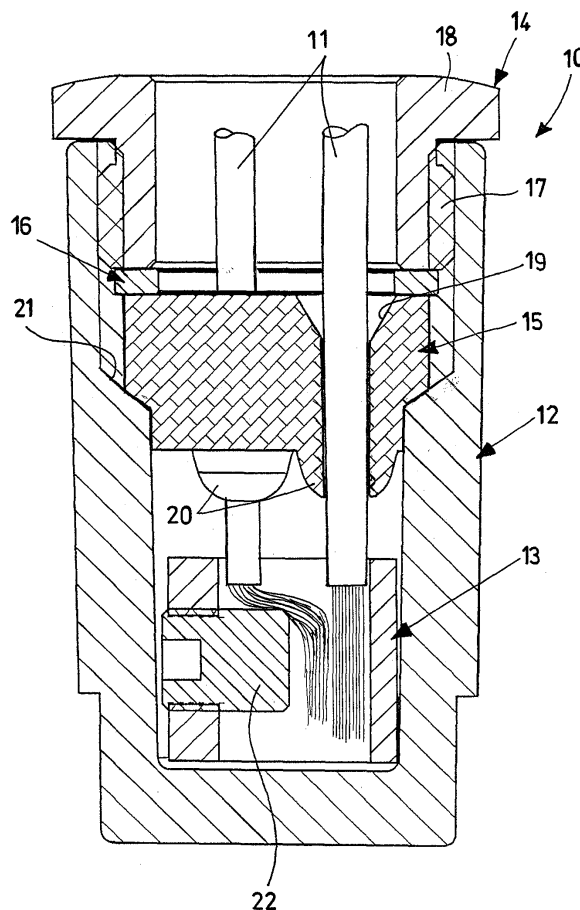
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(54) **Watertight connector for cables**

(57) A watertight connector for cables comprising a casing (12, 12'), a connecting clamp (13) between the single conductors, at least one tightening ring nut (14) and at least one sealing element in a rubber material (15, 15') equipped with at least one housing (19) or channel, closed by a wall having a reduced thickness (20), which can be perforated for the passage of a single conductor.

Fig. 3



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Description

[0001] The present invention relates to a watertight connector for cables.

[0002] In the field of built-in ground lighting appliances, in particular for those having led luminous sources, the dimension of the ground cavities have been miniaturized to adapt to the dimensions of the sources.

[0003] This has led to the fact that inside the lighting bodies there are no more spaces for the connections, either in terms of physical dimensions of the connectors or in terms of space for maneuvering on the part of installers.

[0004] For this reason, the miniaturized led lighting appliances, which must guarantee a high protection degree (IP), are supplied with an outgoing cable. The connection of the cable coming from the appliances with the supply cable and, possibly, with a third cable for the pass-through wiring, must be effected outside the appliance.

[0005] Even with this expedient, however, there are still wiring problems as, in products of this type, the spaces destined for the supply cables have also been drastically reduced.

[0006] The problem is made even more complicated by the fact that, even if these products have an extremely reduced power, therefore with corresponding voltages and amperages, the relative regulations do not define special cables for this new generation of lighting appliances, but compel the use of normal underground cables. These are consequently cables having external diameters of about 10 mm and a high rigidity.

[0007] Furthermore, for each product, both the supply cable and the relaunch cable for the cascade-assembled product should be taken into account. Due to the extremely limited spaces, it is not even possible to use resinated boxes or boxes with gels, which are currently available on the market.

[0008] At present, this type of connection is effected with the use of self-agglomerating tape or by producing a derivation well for collecting the cables.

[0009] The current solutions, however, have various drawbacks.

[0010] The use of self-agglomerating tape implies long time periods for the installation, which must be effected with great care on the site, and considerable difficulties for guaranteeing a high protection degree (IP) of the connection.

[0011] With self-agglomerating tape, moreover, it is only possible to connect head cables and consequently it is not possible to effect through-line wiring.

[0012] In addition, it is impossible to inspect the connections effected and also to remove the appliance, for example for carrying out maintenance interventions, without cutting the cables.

[0013] Resorting to a derivation well, on the other hand, substantially increases the plant costs and makes it more complex, increasing the installation restrictions, also from an aesthetical point of view.

[0014] An objective of the present invention is to provide a watertight connector for cables which solves the above-mentioned technical drawbacks.

[0015] An other objective of the present invention is to provide a watertight connector for cables having a high protection degree.

[0016] Another objective of the present invention is to provide a watertight connector for cables which is particularly simple and practical at low costs.

[0017] These objectives according to the present invention, are achieved by providing a watertight connector for cables as disclosed in claim 1.

[0018] Further characteristics of a watertight connector for cables are the object of the dependent claims.

[0019] The characteristics and advantages of a watertight connector for cable according to the present invention will appear more evident from the following illustrative and non-limiting description, referring to the enclosed schematic drawings in which:

figure 1 is an exploded perspective view of a watertight connector for cables according to the present invention;

figure 2 shows the connector of figure 1 exploded and sectional according to a median plane;

figure 3 is a sectional view of the watertight connector according to the present invention, assembled and clamped on cables;

figure 4 is a perspective exploded view of a second exemplification of a watertight connector for cables according to the present invention.

[0020] With reference to figure 1, a watertight connector for cables is shown, indicated on the whole as 10, comprising a casing 12, a connection clamp between single conductors 13, a tightening ring nut 14, a sealing element made of a rubber material 15 and a seat ring 16, or washer, which can be positioned between the ring nut and the sealing element.

[0021] The casing 12, preferably made of a plastic material, has a substantially tubular form, cylindrical in the example, and is closed at the bottom.

[0022] In the inlet portion, the casing 12 is internally threaded for its coupling with the tightening ring nut 14 which has a threaded portion 17 and a hexagonal head 18. The tightening ring nut 14 can be, for example, a cable-clip of the known type, made of a metallic material.

[0023] The rubber sealing element 15, shown in figure 1, is provided with three housings 19, or channels, in each of which single conductors 11 are inserted during use, as schematically shown in figure 3.

[0024] The housings 19 are closed by a wall having a reduced thickness 20, which is perforated or sheared during the laying operations by the installer for the passage of the single conductors 11.

[0025] Figure 2 shows the elements described sectioned according to a median plane. In particular, the sealing element is sectioned according to a track passing

along an axis of one of the housings 19.

[0026] According to a preferred, non-limiting embodiment shown, the housings 19 have a truncated-conical form and the walls 20 for closing the same protrude with respect to the rubber sealing element 15. The wall 20, in this embodiment, can be easily sheared from the outside of the sealing element 15, for example by means of common shears for electric installations.

[0027] Each of the housings shown in figure 1, for example equal to three, respectively hold one of the conductors of a multipolar supply cable, of a multipolar cable coming from a product, and also of a multipolar cable for pass-through supply, i.e. the cable used for supplying power to the subsequent products.

[0028] The casing 12 internally has a reduced section 21 suitable for contributing to the deformation of the rubber sealing element 15, when compressed through the tightening ring nut 14, according to what is schematically shown in figure 3. The sealing element 15, thus deformed, guarantees the seal of the outer surface of the single conductors 11 inserted in the housings 19, suitably perforated.

[0029] The end portions of the single conductors 11, unsheathed, are put into electrical contact with each other by means of the clamp 13, which in figure 3 is shown with a grain 22 in a non-clamped position and which could be selected from other types of known clamps, for example with several grains.

[0030] A further embodiment 10' of a watertight connector for cables, according to the present invention, is shown in figure 4.

[0031] A casing 12' is substantially tubular and at both ends has a sealing element 15' and the tightening ring nut 14.

[0032] The clamp 13, not shown, is arranged in an intermediate position between the two rubber sealing elements 15' and forms the electric connection between the cables 11 coming from both ends of the casing 12'.

[0033] This configuration is necessary in particular product conformations in which if the cables 11 were all situated on one side, they would be cumbersome.

[0034] The sealing element 15' comprises, at one end, a cylindrical extending portion 23 suitable for being engaged inside the tightening ring nut 14 to provide further insulation between the outer sheath of the cables and the metallic tightening ring nut 14.

[0035] Furthermore, the sealing element 15', shown in figure 4, is suitable for providing a seal at the most on two single conductors 11, as it has two housings 19.

[0036] Watertight connectors for cables 10, according to the present invention, can be equipped with rubber sealing elements have any number of housings in relation to the number of single conductors to be electrically connected.

[0037] The watertight connector for cables, object of the present invention, has the advantage of producing "cascade wiring" without the necessity of producing a derivation well and guaranteeing a high protection de-

gree to the connection obtained by the user as it is not effected manually.

[0038] The protection degree (IP) is in fact advantageously guaranteed by the clamping on the part of the rubber sealing element tightened by a rung nut, or a wire-clip.

[0039] A further advantage of the watertight connector for cables according to the present invention is that it can be used with different types of cables, either multipolar or unipolar.

Claims

1. A watertight connector for cables **characterized in that** it comprises a casing (12, 12'), a connecting clamp (13) between the single conductors, at least one tightening ring nut (14) and at least one sealing element in a rubber material (15, 15') equipped with at least one housing (19) or channel, said at least one housing (19) being closed by a wall having a reduced thickness (20), which can be perforated for the passage of a single conductor.
2. The connector according to claim 1, **characterized in that** said at least one housing (19) is truncated-conical.
3. The connector according to claim 1, **characterized in that** said at least one housing (19) protrudes with respect to said rubber sealing element (15, 15').
4. The connector according to claim 1, **characterized in that** said tightening ring nut (14) has a hexagonal head (18) and a threaded portion (17) for tightening onto said casing (12, 12').
5. The connector according to claim 1, **characterized in that** said casing (12, 12') is internally equipped with a reduced section (21) suitable for contributing to the deformation of said rubber sealing element (15, 15').
6. The connector according to claim 1, **characterized in that** it comprises a seat ring (16), which can be positioned between said tightening ring nut (14) and said sealing element (15, 15').
7. The connector according to claim 1, **characterized in that** said sealing element (15, 15') comprises, at one end, a cylindrical extending portion (23) suitable for being engaged inside said tightening ring nut (14).
8. The connector according to claim 1, **characterized in that** said casing (12, 12') is made of a plastic material and has a substantially tubular form.
9. The connector according to claim 1, **characterized**

in that said casing (12) is closed at the bottom.

10. The connector according to claim 1, **characterized in that** said casing (12') is equipped at both ends with a sealing element (15, 15') and a tightening ring nut (14). 5

11. The connector according to claim 1, **characterized in that** said housings (19) are equal to three, each suitable for respectively receiving one of the conductors of a multipolar supply cable, a multipolar cable coming from a product, as well as a multipolar cable for pass-through supply. 10

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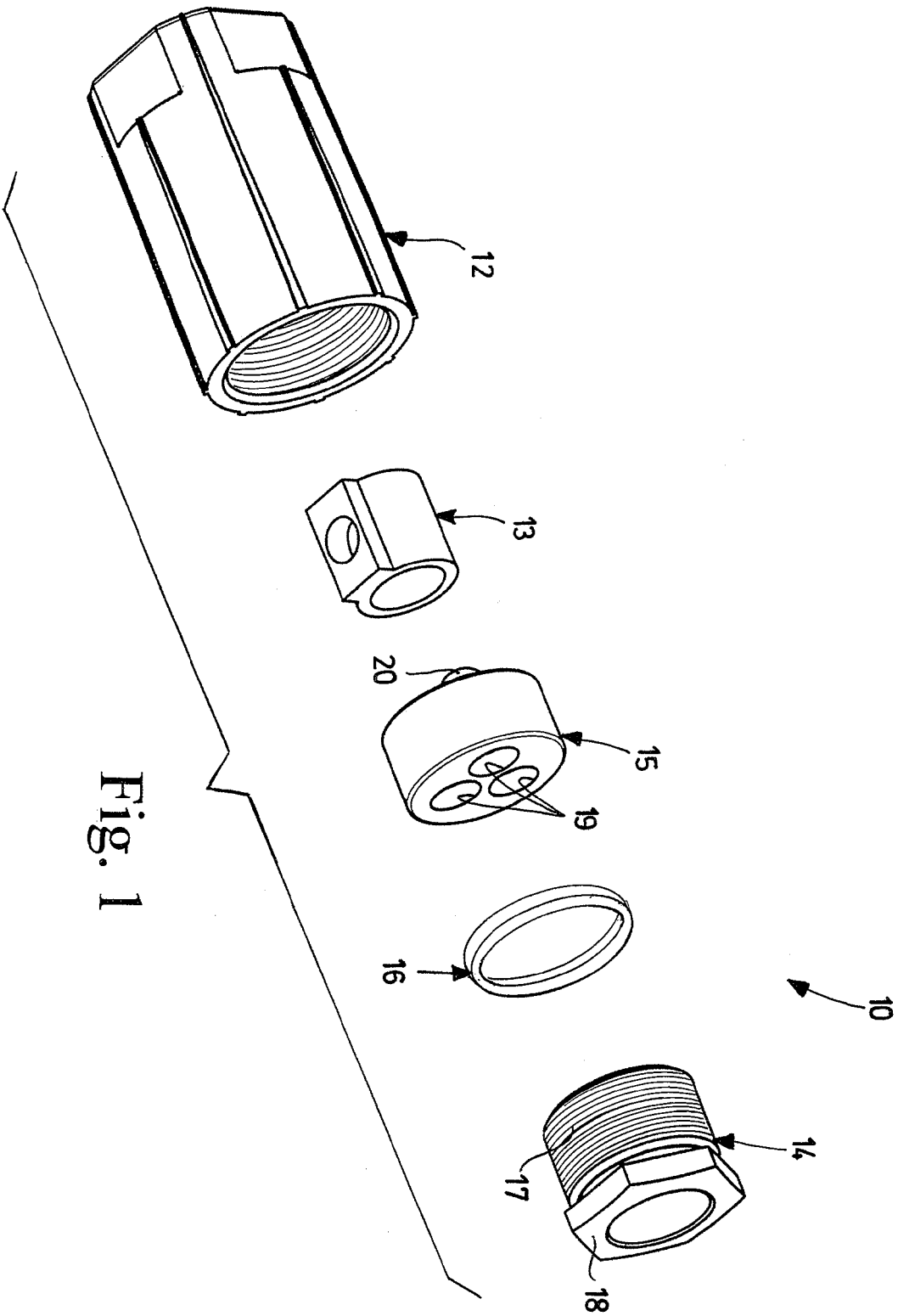


Fig. 1

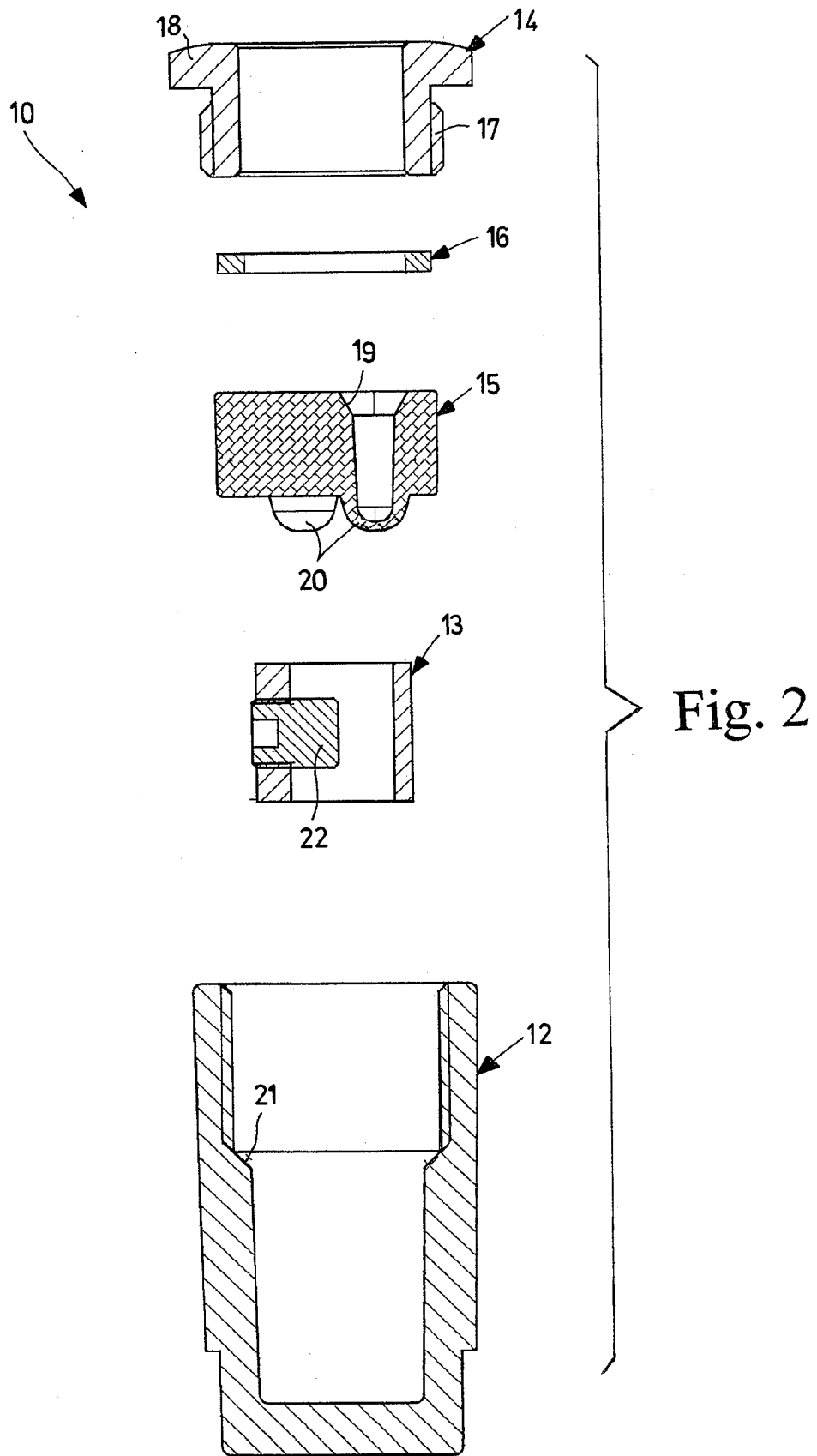
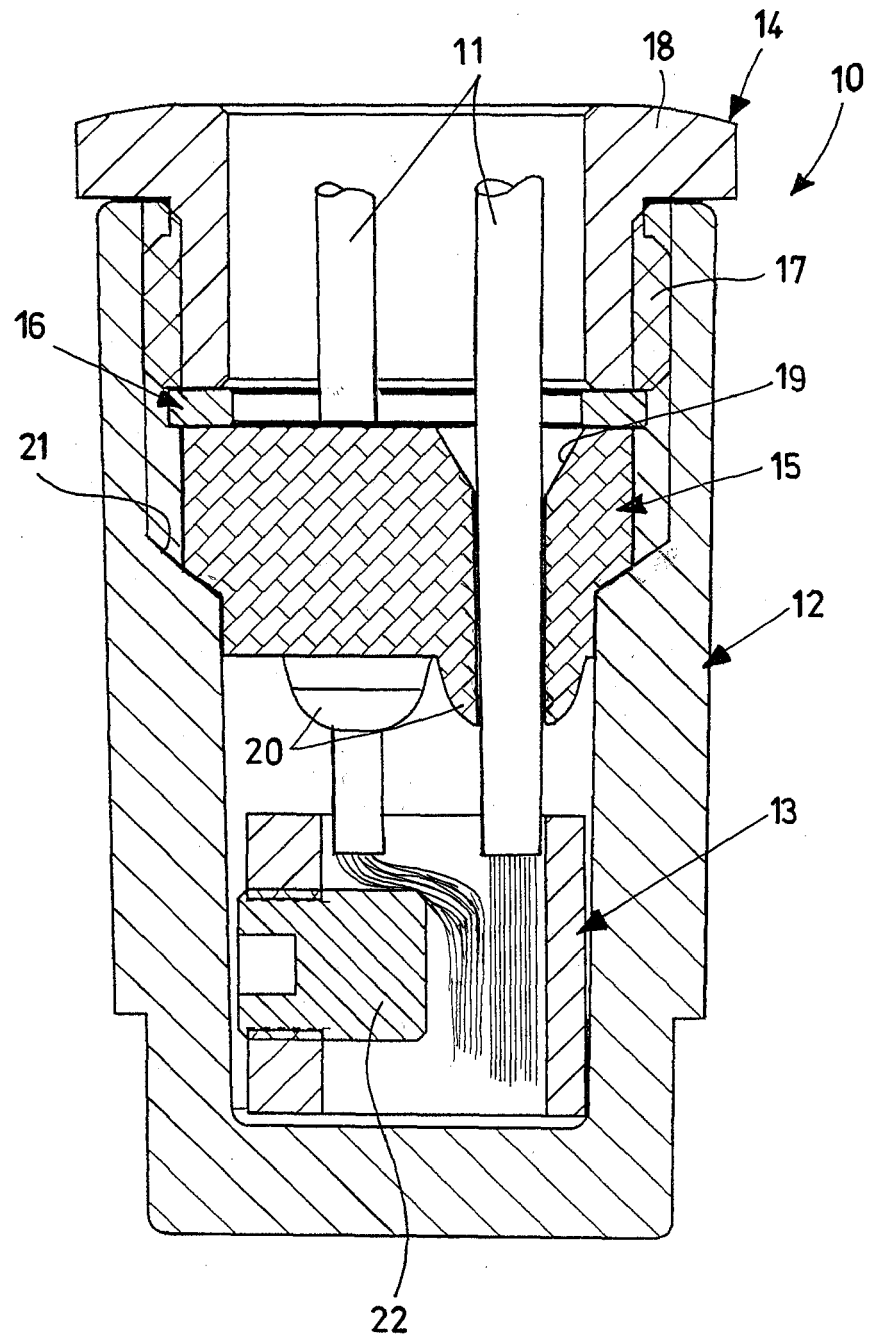


Fig. 3



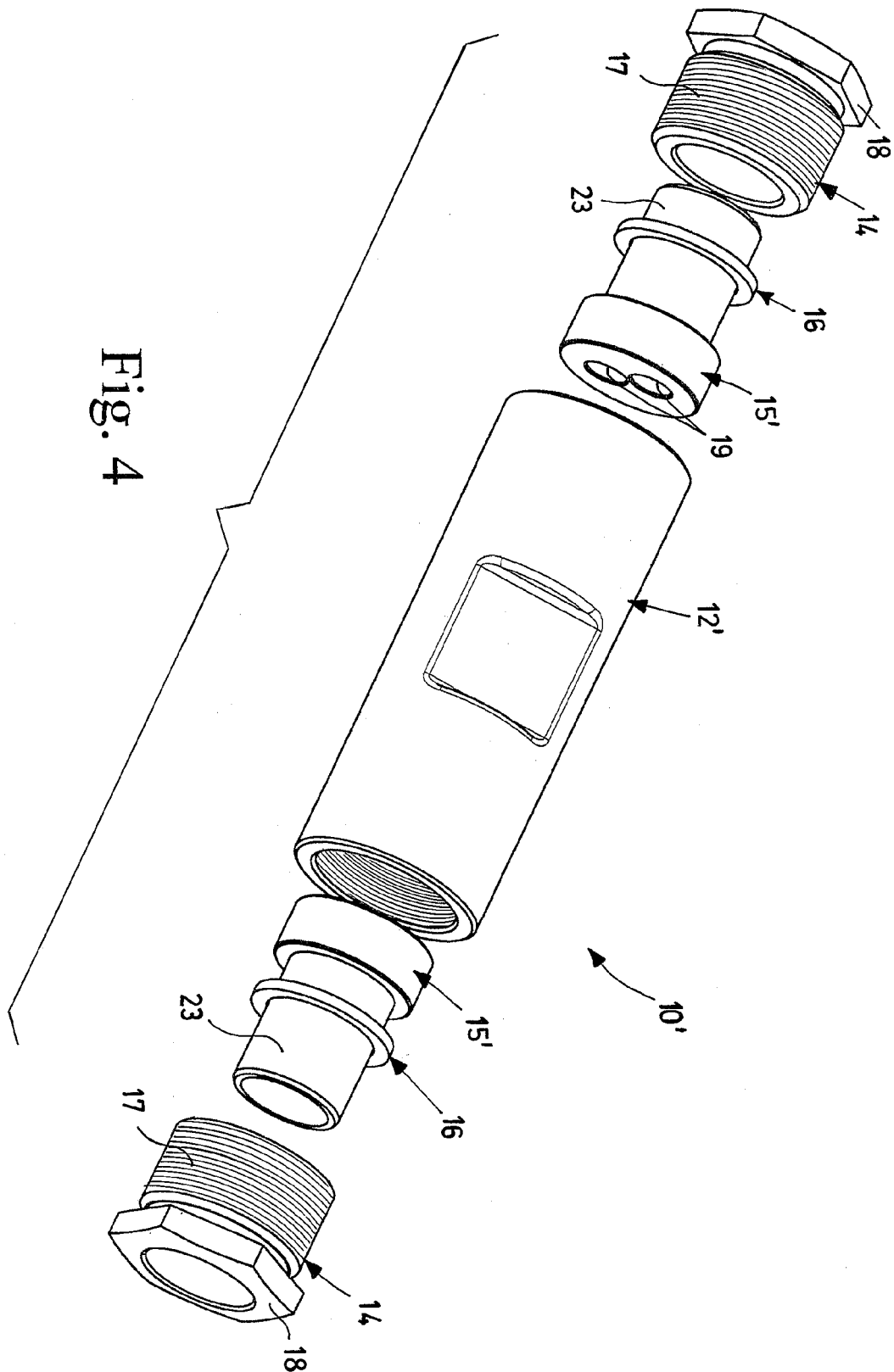


Fig. 4