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(54) JOINT FOR A LIGHTING DEVICE AND LIGHTING ASSEMBLY COMPRISING SAID JOINT

(57) Joint (1) comprising an outer body (2) connectable to a support structure (100) for a lighting device (102), an inner body (4), hollow and inserted in a telescopically movable manner in the outer body (2), between a substantially retracted configuration and a configuration partially extracted from said outer body (2), and a coupling portion (6) connected to the inner body (4) and articulated with respect to the outer body (2) about rotation axes (R1, R2) incident between them. The coupling portion (6) and the inner body (4) delimit cable-passage sections (8, 10) for at least one electrical conductor (200) supplying said lighting device (102). The invention further relates to a lighting device (102) and an assembly comprising the said joint (1).

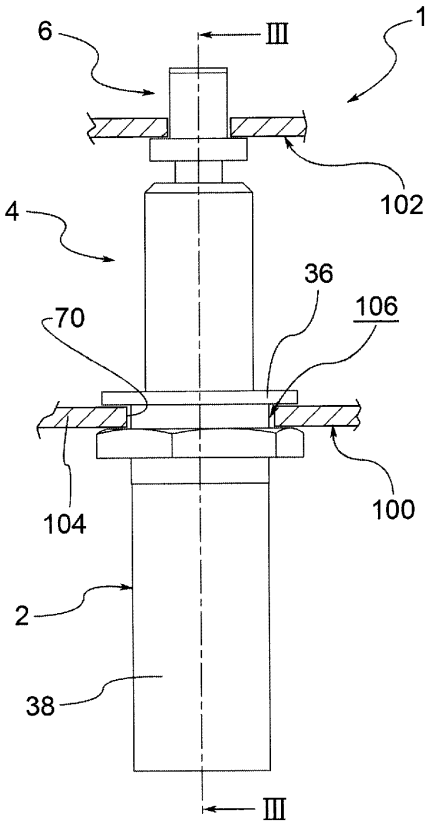

FIG.2

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Description

[0001] This invention relates to a joint for a lighting device, and a lighting assembly comprising such a joint.

[0002] As is known, the articulated connection between a supporting structure and a lighting apparatus is generally made using an articulated element, interposed between them, so that a light beam from such an apparatus can be oriented at will within predetermined freedom degrees.

[0003] Changing trends of taste, and the continued search for greater versatility of use, require companies of the industry to develop connections suitable to expand the variety of such movement freedoms, but always with an eye to manufacturing costs.

[0004] This invention belongs in this context, proposing to provide a joint and a lighting assembly able to overcome the above-mentioned drawbacks, and in particular to provide a joint capable of making available, in addition to traditional lighting orientations, an extensible movement of the light source.

[0005] This objective is achieved by means of a joint according to claim 1, and by means of an assembly according to claim 13. The claims dependent on these show variants of preferred embodiments.

[0006] The object of this invention will now be described in detail, with the help of the attached tables, wherein:

- Figures 1 and 2 represent, respectively, a perspective view and a side view of a joint, object of this invention, according to a possible embodiment, this joint being shown in an extracted configuration, and wherein Figure 2 only schematically shows a support structure and a lighting device;
- Figure 3 shows a sectional view along the plane III-III indicated in Figure 2 and further schematically showing an electrical conductor;
- Figure 4 shows a sectional view along the same plane of Figure 3, but in a retracted configuration of the inner body;
- Figure 5 is a sectional view such as that of Figure 3, but with the coupling portion oriented at 90° with respect to the previous representations and with an alternative passage of the electric conductor in the inner body;
- Figure 6 shows an exploded view of the joint according to Figure 1.

[0007] With reference to the above figures, reference number 1 identifies, in its entirety, a joint for a lighting device.

[0008] More precisely, this joint 1 serves to connect the lighting device 102 to a support structure 100 in a moveable manner.

[0009] For example, the support structure 100 could include a formwork, a device base, a support bracket, a fastening element or similar of the lighting device 102.

[0010] This joint 1 comprises an outer body 2 that extends around a longitudinal axis X and is connectable to the support structure 100 for the lighting device.

[0011] Within this description, the terms "axial" or "radial" will refer to orientations with respect to the longitudinal axis X, unless otherwise specified.

[0012] According to a variant, the outer body 2 may be generally or substantially tubular.

[0013] According to a further variant, an axial end portion 2' of the outer body includes an end wall 36, transverse or orthogonal with respect to the longitudinal axis X, that closes, at least in part, a compartment 20 of this body.

[0014] According to a still further variant, the outer body delimits a longitudinal compartment 20, for example of substantially cylindrical shape.

[0015] Preferably, the outer body 2 delimits within its thickness at least a longitudinal slot 28, for example with a development substantially parallel to the longitudinal axis X, which preferably puts in communication the longitudinal compartment 20 and a space external to the outer body 2.

[0016] According to an embodiment, the end wall protrudes radially externally with respect to an outer surface 38 of the outer body. For example, this end wall makes an abutment ring, in the embodiments shown a of circular shape, against the support structure 100.

[0017] In other words, the end wall serves to locate or to determine the depth of penetration of the outer body in the support structure.

[0018] Preferably, the outer body 2 terminates axially with an exit opening 22 of an inner body 4 described below.

[0019] According to an advantageous variant, the exit opening is formed in correspondence to the end wall 36.

[0020] The joint 1 further comprises an inner body 4 and a coupling portion 6.

[0021] The inner body 4 is hollow and inserted in a telescopically mobile manner in the outer body 2, between a substantially retracted configuration and a partially extracted configuration from said body (Figures 1 or 3).

[0022] For example, the inner body has a generally tubular shape.

[0023] According to a particularly advantageous variant, the inner body 4 comprises a guide portion 18 axial to the outer body 2, and an articulated portion 12, articulated around a second rotation axis R2 and integral in translation between the configurations discussed previously with respect to the guide portion 18.

[0024] For example, the second rotation axis R2 is substantially parallel to the longitudinal axis X.

[0025] In order to make this jointed connection integral in translation, the guide portion 18 could comprise a union stem 40 inserted into a proximal vane 42 of the articulated portion.

[0026] More precisely, the axial retention of such portions 18, 12 with possibility of rotation about the second

rotation axis R2 may be made through a junction component 44 (for example an elastic ring) partially received in seats 46, 46', formed in the thickness of each of the above-mentioned portions.

[0027] For example, the connection through the junction component 44 may be of an irreversible type.

[0028] According to a preferred embodiment, the axial guide portion 18 is shape-coupled, to achieve a prismatic pair, to a cross-section of the longitudinal chamber 20 delimited by the outer body 2.

[0029] In other words, the external outline of the axial guide portion 18 could be in contact, optionally indirectly, with the at least one inner surface 48 that delimits this compartment 20, so as to ensure the axial guidance of the inner body but to prevent rotations of the axial guide portion 18 around the rotation axis R2.

[0030] According to a further variant, the outer body 2 and the axial guide portion 18 could be shape-coupled to achieve the above-mentioned prismatic pair, through a protective tooth 32 or (semi-)sleeve of the axial guide portion 18 that protrudes in the longitudinal slot 28 delimited in the thickness of the outer body 2.

[0031] According to an embodiment, the axial guide portion 18 has a transverse or radial dimension greater than the transit section through the exit opening 22, so as to achieve an end-stroke towards the extracted configuration.

[0032] In other words, according to this variant, the axial guide portion 18 and this opening (or the transverse wall 46 when provided) could constitute end-stroke means of the inner body 4 with respect to the outer body 2.

[0033] The joint 1 further comprises a coupling portion 6 of said joint to the lighting device 102, connected to the inner body 4 and articulated in relation to the outer body 2 around rotation axes R1, R2 incident to each other.

[0034] According to a variant, the coupling portion 6 comprises an external thread 50, as shown in the tables.

[0035] According to a non-illustrated variant, the coupling portion could comprise an internal thread, or a hollow element with helical threads formed within that element.

[0036] With regards to the rotation axes of R1, R2, these axes are preferably substantially orthogonal.

[0037] Advantageously, the coupling portion 6 is hinged to the inner body 4 about a first rotation axis R1.

[0038] More precisely, the coupling portion could comprise an articulated portion 52 rotatably received in an articulation seat 54 arranged on or in the inner body 2. For example, the articulated portion could comprise a (semi-)spherical part.

[0039] Optionally, the articulated portion 52 - for example between the mentioned threaded and the (semi-)spherical part - could comprise an outer surface 56 that is arranged and/or shaped so as not to be subject to friction forces during the rotation of the coupling portion about the first rotation axis R1.

[0040] For example, the outer surface 56 could be lowered, thinned or retracted radially with respect to the surfaces that flank it in an axial direction.

[0041] Preferably, the first rotation axis R1 lies in a plane substantially orthogonal with respect to the longitudinal axis X.

[0042] According to a preferred variant, the maximum angle of rotation of the coupling portion 6 about the first rotation axis R1 is smaller than 140°, preferably smaller than 120°, for example equal to or smaller than about 90°.

[0043] According to a further variant, through the articulated portion 12 of the inner body 4, the coupling portion 6 is rotatable about the second rotation axis R2 with respect to the outer body 2.

[0044] In this way, according to these variants, it is possible to obtain an ability of rotation around the two axes, in addition to the discussed telescopic movement.

[0045] Preferably, the joint 1 comprises means for limiting the maximum angle of rotation of the coupling portion 6 around the second rotation axis R2, integrated in such joint. In particular, in the embodiment shown, such means could be integrated between the inner body 4 and the outer body 2.

[0046] According to a preferred variant, the maximum angle of rotation of the coupling portion about the second rotation axis R2 could be substantially equal to, or smaller than, 360°.

[0047] In this description, the term "maximum rotation of 360°" means a rotary movement from 0° to 360° without possibility of rotating further toward increasing angles, but with the sole possibility of rotating in a reverse direction (from 360° to the 0° of departure).

[0048] In order to allow a maximum rotation of 360°, the joint 1 may comprise a movable abutment 14 between the articulated portion 12 and the outer body 2. Such abutment 14 - for example a ball or a plate - could be placed in a circumferential groove 16 formed in this portion (or in the outer body 4), and could be movable by an axial overhang 58 formed on the other between this body (or such articulated portion 12).

[0049] It follows that, according to this variant, the means for limiting the maximum angle of rotation may include the above-mentioned movable abutment 14, circumferential groove 16 and axial overhang 58.

[0050] For example, the movable abutment 14 could be received partly in the circumferential groove 16 and partly in an annular groove 60, inside of which this overhang 58 protrudes axially.

[0051] In the embodiment shown in Figure 6, the axial guide portion 18 delimits the annular groove 60 and, more precisely, said groove is arranged at the union stem 40.

[0052] Preferably, the coupling portion 6 and the inner body 4 define cable-passage sections 8, 10 for at least one electrical conductor 200 supplying the lighting device.

[0053] It follows that, in addition to providing for the mobility of the lamp and of a corresponding light source, the joint according to this variant also allows the transit of the related electrical conductor inside the components described, in order to avoid cables external to the joint.

[0054] According to a particularly advantageous variant, the joint comprises end-stroke means of the inner body 4 with respect to the outer body 2, that act in the extracted configuration and/or in the retracted configuration, advantageously in both these configurations. Preferably, the end-stroke means are integrated between the inner body 4 and the outer body 2.

[0055] According to a further variant, the end-stroke means are configured to snap into the extracted configuration and/or in the retracted configuration.

[0056] Advantageously, the end-stroke means comprise at least one elastic element 24 (for example an O-ring) compressed in an intermediate configuration between the extracted and retracted configurations, and expandable at one or both of these configurations in an undercut or internal groove 26, 26' to prevent the movements of the inner body 4.

[0057] In other words, outside of the undercut or of the internal groove 26, 26', the elastic element 24 lies in a compressed condition by virtue of the restricted space between the inner body 4 and the outer body 2.

[0058] Since the undercut or internal groove 26, 26' form a widening of the space that can be housed by the elastic element, when the latter arrives in correspondence to it, it expands to fix the position of the inner body.

[0059] For example the undercut, the internal groove 26,26' or their plurality is delimited by the inner surface 48 of the outer body 2.

[0060] According to the variant shown, the elastic element 24 is placed in a lowered seat 62 of the inner body 4 and, specifically, in a lowered seat 62 of the axial guide portion 18. Advantageously, the elastic element 24 projects at least partly outside of the lowered seat, specifically in a radial direction.

[0061] Advantageously, the joint comprises an elastic element 24 or a friction element, interposed between the inner body and the outer body, calibrated in order to prevent movements of the inner body below a predetermined applied force.

[0062] It follows that the telescopic sliding between the above-mentioned bodies takes place only above a certain applied force, for example only when a user wants to cause a certain conversion of the joint.

[0063] According to the variant of Figure 3, the inner body delimits a first axial access 64 for the entry of the electrical conductor 200 in the cable-transit passage 8,10.

[0064] According to the variant of Figure 5, the inner body 4 comprises at least a second radial entrance 30 for the passage of the electrical conductor 200.

[0065] According to a further variant, the outer body could delimit a second axial access 66 for the entry of the electrical conductor 200 in the cable-transit passage 8, 10.

[0066] According to a still further variant, the longitudinal slot 28 could form a first radial entrance of the electrical conductor 200 in the cable-transit passage 8, 10.

[0067] Optionally, the second radial entrance 30 may be at least partially aligned with the first longitudinal radial entrance of the longitudinal slot 28 in any position of the inner body 4 with respect to the outer body 4.

[0068] According to a particular advantageous variant, the second radial entrance 30 is delimited by at least a part of a protective tooth 32 or of a (semi-) sleeve that projects into the longitudinal slot 28 to protect the electric conductor 200 from cutting forces.

[0069] This invention also covers a lighting device 102 comprising a joint 1 according to any of the previous variants.

[0070] Finally, this invention covers a lighting assembly comprising a support structure 100, at least one lighting device 102 and at least one joint 1, as described, connected to the structure and to the device.

[0071] Preferably, the support structure 100 comprises a structure wall 104 defining a shaped hole 106 shape-coupled to the outer body 2 for anti-rotation of these components.

[0072] In the variant schematically shown in Figures 2 and 6, the shaped hole 106 and the outer body 2 define abutment surfaces 68, 70 reciprocally shaped to define a prismatic pair.

[0073] It follows that, after the outer body has been inserted into said hole, the joint 1 can be firmly joined to the structure wall 104 by means of a locking nut 72 screwed to an external thread 34 formed on the outer body.

[0074] In this way, according to one of the variants discussed above, the structure wall 104 remains locked between the end wall 36 and the locking nut 72.

[0075] Innovatively, the joint covered by this invention allows effectively overcoming the drawbacks noted in relation to the prior art.

[0076] Advantageously, joint covered by this invention is able to achieve discrete positions of use, obtainable in a repeatable and reliable manner.

[0077] Advantageously, the joint covered by this invention is articulated along mutually incident axes, so as to achieve an articulation of 90° in a first direction, and 360° in a second direction incident or orthogonal to the first.

[0078] Advantageously, the joint covered by this invention can be adapted to different uses that, for example, involve a different spatial orientation or a different movement force of the parts described, with minor modifications of the components.

[0079] Advantageously, the joint covered by this invention can be used both in table lamps and suspended lamps.

[0080] Advantageously, the joint covered by this invention is designed to modify its positions only through a significant external intervention, as the tolerances of the mechanical parts have been tested for this purpose.

[0081] Advantageously, the joint covered by this invention can be used in recessed lamps, since the extractability and orientability described are particularly suitable for such use.

[0082] Advantageously, the joint covered by this inven-

tion allows preserving the integrity of the electrical cables passing inside, during both longitudinal and rotational movements.

[0083] More precisely, the joint is suitable to avoid twisting of the cables and, further, to protect them from accidental impacts that could damage the related insulating sheaths.

[0084] Advantageously, the joint covered by this invention is designed to make the cables transit indifferently in an axial and/or radial direction. This results in a high versatility of use.

[0085] Advantageously, the joint covered by this invention constitutes an innovative universal and miniaturized solution in the lighting industry.

[0086] Advantageously, the joint covered by this invention has an extremely reliable and reproducible operation, especially thanks to the techniques described above.

[0087] Advantageously, the joint covered by this invention is suitable to remain aesthetically pleasing even after intensive use, at least as regards the surface finish, for a longer time compared to traditional joints.

[0088] To embodiments of the above-described joint, device and assembly, one skilled in the art, in order to meet specific needs, may make variants or substitutions of elements with others functionally equivalent.

[0089] Even these variants are contained within the scope of protection, as defined by the following claims.

[0090] Moreover, each of the variants described as belonging to a possible embodiment can be realized independently of the other variants described.

Claims

1. Joint (1) comprising:

- an outer body (2), which extends around a longitudinal axis (X) and is connectable to a support structure (100) for a lighting device;
- an inner body (4), hollow and inserted in a telescopically movable manner in the outer body (2), between a substantially retracted configuration and a partially extracted configuration from said body;
- a coupling portion (6) of said joint to the lighting device (102), connected to the inner body (4) and articulated in relation to the outer body (2) around rotation axes (R1, R2) incident to each other;

the coupling portion (6) and the inner body (4) defining cable-passage sections (8, 10) for at least one electrical conductor (200) supplying said device.

2. Joint according to claim 1, wherein the coupling portion (6) is hinged to the inner body (4), wherein the maximum angle of rotation of said portion around a first rotation axis (R1) is smaller than 120°, for example smaller than or equal to about 90°.

3. Joint according to claim 1 or 2, wherein the coupling portion (6) is hinged to the inner body (4) about a first rotation axis (R1), and wherein said joint (1) comprises means for limiting the angle of maximum rotation of the coupling portion (6) around a second rotation axis (R2), integrated in said joint.

4. Joint according to any one of the preceding claims, wherein, through an articulated portion (12) of the inner body (4), the coupling portion (6) is rotatable around a second rotation axis (R2) with respect to the outer body (2), wherein the maximum angle of rotation of said portion around said second axis (R2) is preferably equal to or smaller than 360°.

5. Joint according to the previous claim, comprising a moveable abutment (14) between said articulated portion (12) and the outer body (2), placed in a circumferential recess (16) made in said portion or in said body, and movable by a radial overhang of said body or said portion to allow a maximum rotation of 360°.

6. Joint according to any of the previous claims, wherein the inner body (4) comprises an axial guide portion (18) with respect to the outer body (2), and an articulated portion (12), articulated around a second rotation axis (R2) and integral in translation with said configurations with respect to said guide portion.

7. Joint according to the previous claim, wherein the axial guide portion (18) is shape-coupled to achieve a prismatic pair with a cross-section of the longitudinal chamber (20) delimited by the outer body (2).

8. Joint according to claims 6 or 7, wherein the outer body (2) terminates axially with an opening for the exit (22) of the inner body (4), the axial guide portion (18) having a transversal dimension greater than the through section of said opening so as to form an end-stroke towards the extracted configuration.

9. Joint according to any one of the preceding claims, comprising end-stroke means of the inner body (4) with respect to the outer body (2), that are configured to snap into the extracted configuration and into the retracted configuration, integrated between the inner body (4) and outer body (2).

10. Joint according to any of the previous claims, wherein the outer body (2) defines in its thickness at least one longitudinal slot (28) to make a first radial entrance of the electrical conductor (200) in the cable-transit passage (8, 10).

11. Joint according to the previous claim, wherein the inner body (4) comprises at least a second radial entrance (30) for the passage of the electrical conductor (200), said second entrance being at least partially aligned to the first radial entrance of the longitudinal slot (28) in any axial position of the inner body (4) and being delimited by at least a part of a protective tooth (32) or by a (semi-)sleeve that projects into the longitudinal slot (28) to protect the electric conductor (200) from cutting forces.

12. Joint according to any of the previous claims, comprising an elastic element (24) or a friction element, interposed between the inner body and the outer body, calibrated in order to prevent movements of the inner body below a predetermined applied force.

13. Lighting assembly comprising a support structure (100), at least one lighting device (102) and at least one joint (1), according to any one of the previous claims, connected to said structure and to said device.

14. Assembly according to the previous claim, wherein the support structure (100) comprises a structure wall (104) defining a shaped hole (106) shape-coupled to the outer body (2) for anti-rotation of these components.

15. Assembly according to the previous claim, wherein the shaped hole (106) and the outer body (2) define abutment surfaces (68, 70) reciprocally shaped to define a prismatic pair.

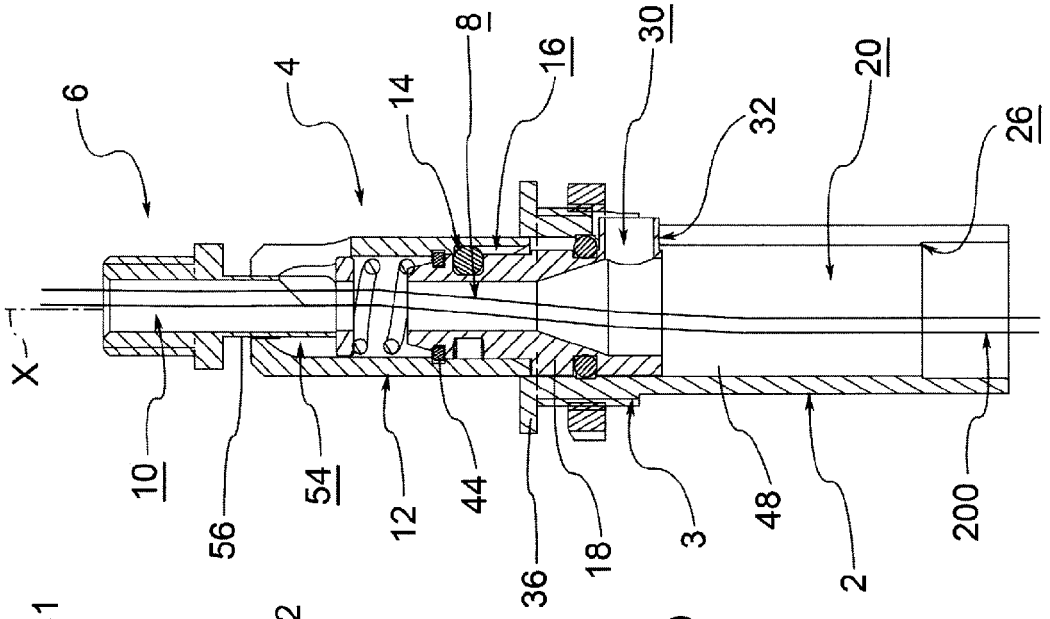

FIG.3

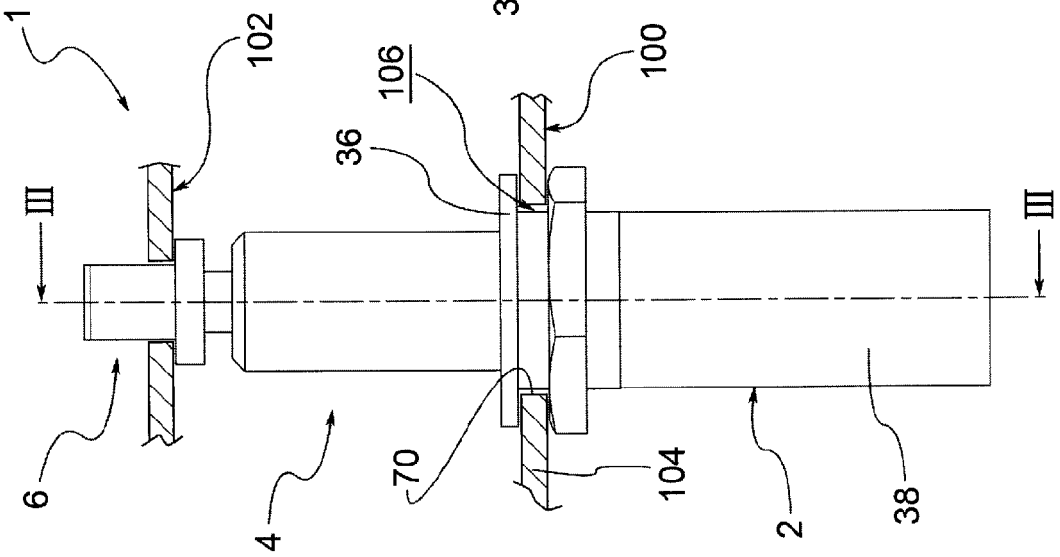

FIG.2

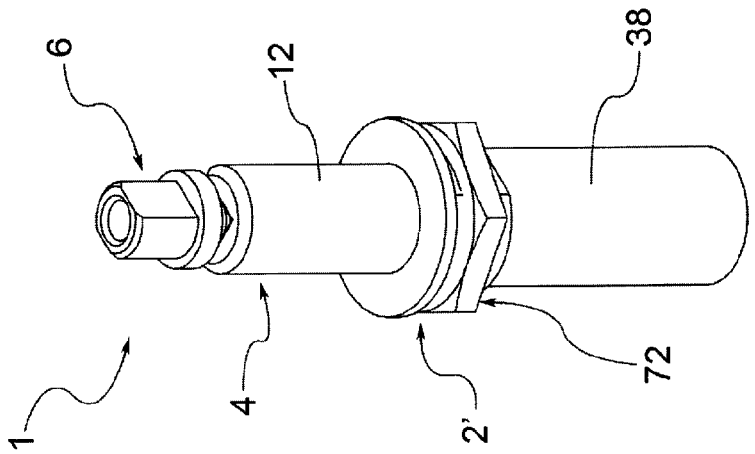

FIG.1

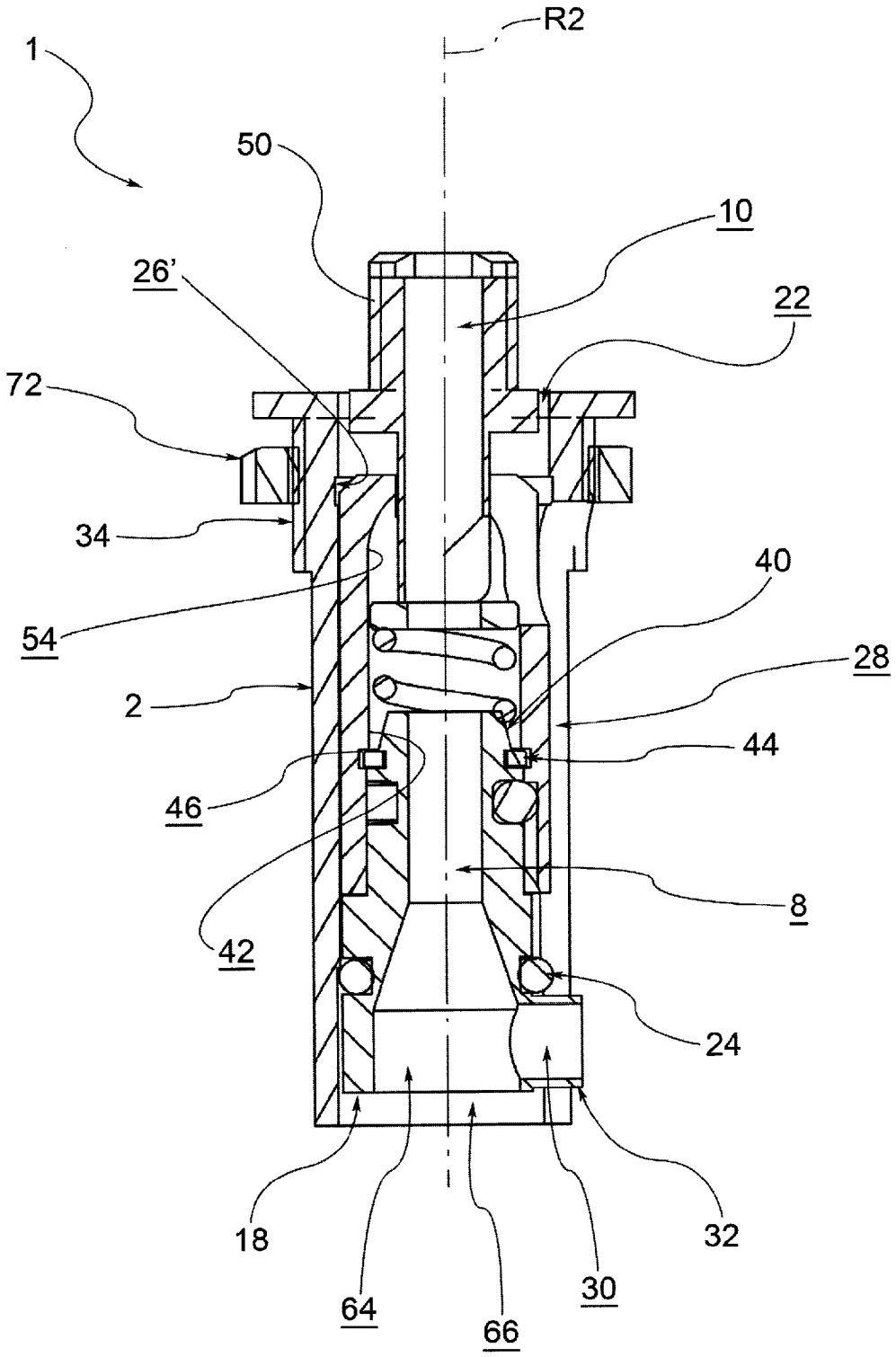

FIG.4

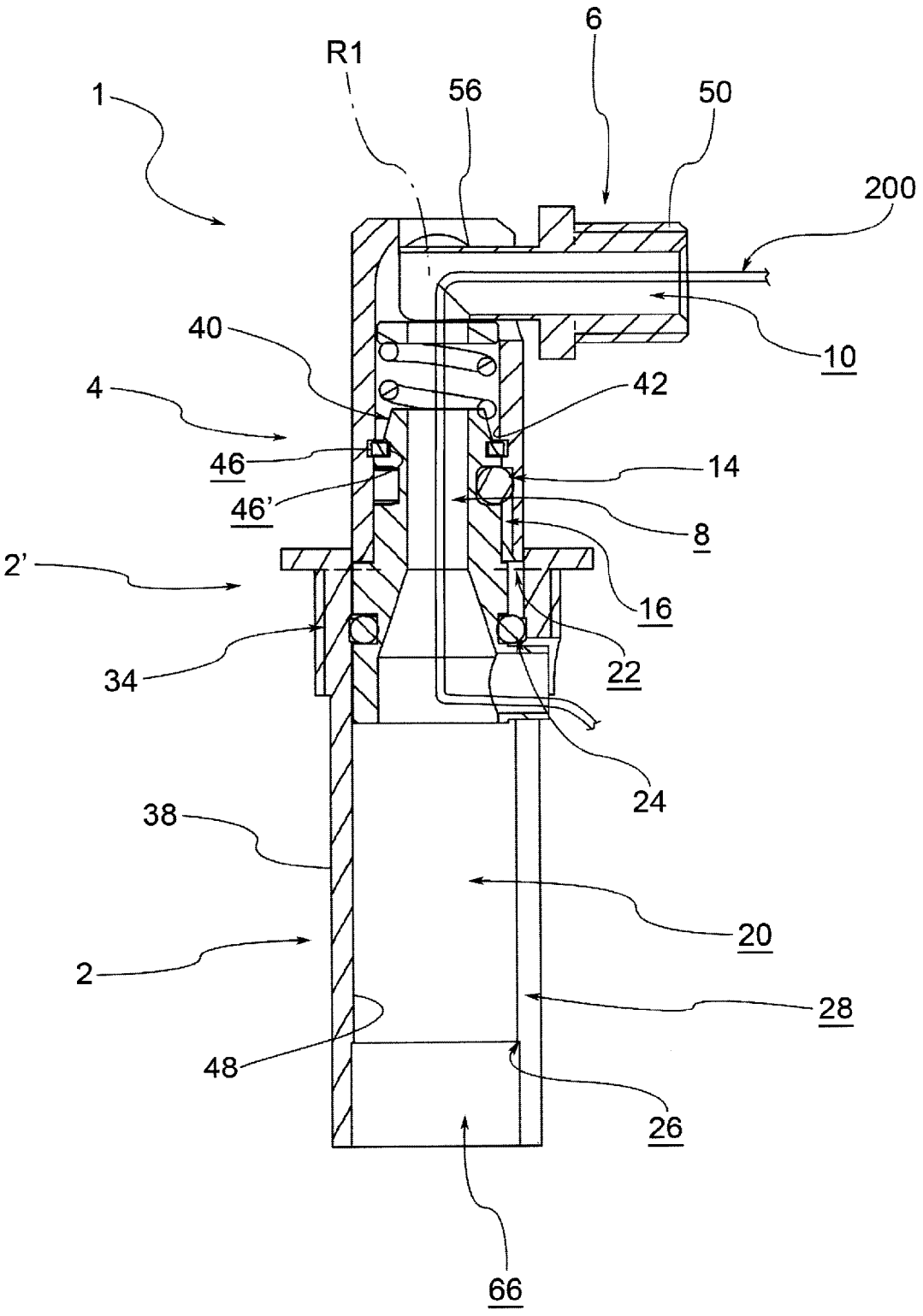

FIG.5

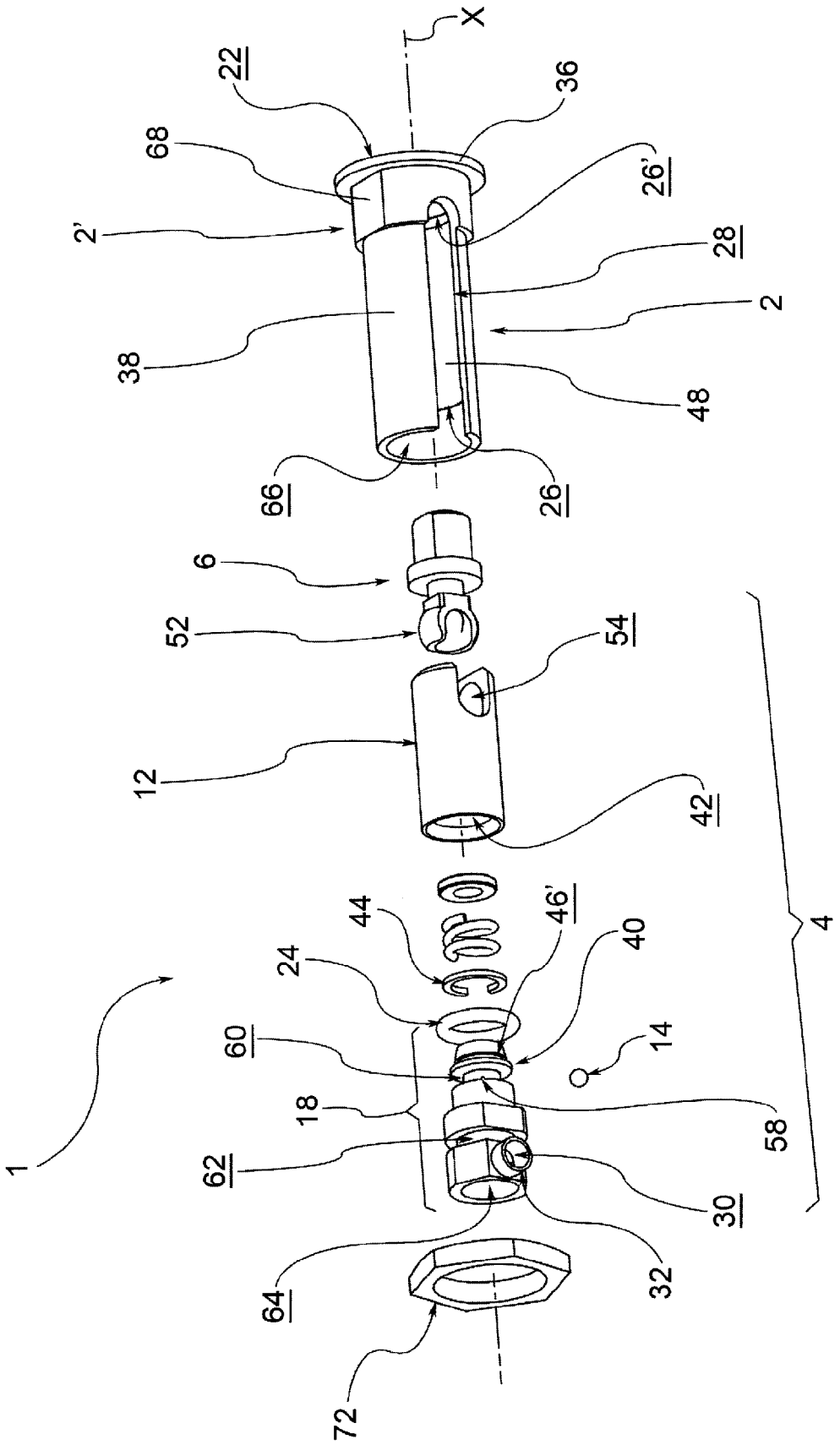
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FIG.6

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EUROPEAN SEARCH REPORT

Application Number
EP 15 16 9940

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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Y	WO 03/087666 A1 (COLOSIO LIVIO [IT]; COLOSIO FABIO [IT]; GREGORELLI ROBERTO [IT]) 23 October 2003 (2003-10-23) * the whole document * -----	1-9, 12-15	

TECHNICAL FIELDS SEARCHED (IPC)

F21V
F16M
F16C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	12 October 2015	Menn, Patrick

CATEGORY OF CITED DOCUMENTS

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12-10-2015

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