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MODULAR SUSPENDED LIGHTING DEVICE

(57) A modular suspended lighting device (1a-1e) comprising a suspension cable (4) and a plurality of lighting modules (2a-2h), wherein a first module is hung on the cable (4) and a second module is supported by the first module and is electrically connected to the first module. Each module comprises a body (30) consisting of an opaque casing (30') and a transparent casing (30''), which form a housing inside the body, a light source comprising an LED strip (60) housed in said housing inside the body (30), and a connecting mechanism (40) suitable to mutually engage with a connecting mechanism of the other module, suitable to connect electrically and mechanically the first and the second module.

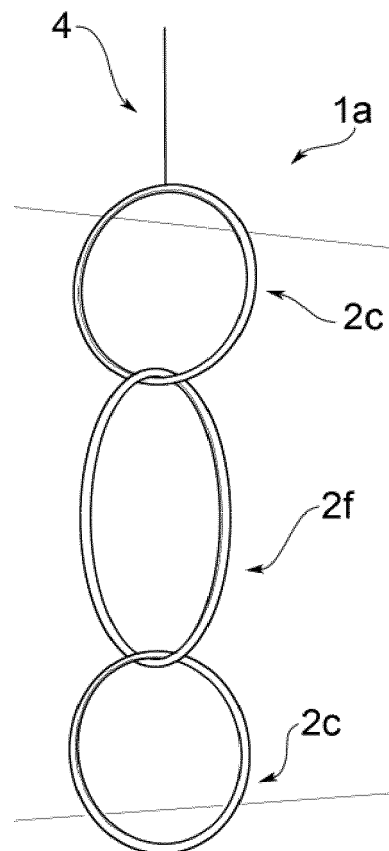


FIG.1a

Description

[0001] The object of the present invention is a suspended lighting device, i.e. one that is intended to be hung from the ceiling of a room or of a generic space inside a building.

[0002] As is known, the lighting sector is constantly evolving, both from a technological point of view, which involves the use of new technologies to improve room lighting or reduce consumption, and, from an aesthetic point of view, which involves the engagement of numerous designers, even those internationally renowned.

[0003] At the same time, the trend is becoming more widespread among buyers or interior decorating professionals to customize an environment, adopting solutions that reflect their own preference regarding forms and that give an impression of originality.

[0004] The object of the present invention is to combine the trends and requirements of this sector, providing a highly technological lighting device with great aesthetic impact and which is, at least within certain limits, customizable.

[0005] Such object is achieved by a suspended lighting device according to claim 1. The claims dependent thereon describe alternative embodiments of the invention.

[0006] The features and advantages of the suspended lighting device according to the present invention will be apparent from the description given hereinafter, provided by way of non-limiting example, in accordance with the accompanying figures, wherein:

- figures 1a to 1e show suspended lighting devices according to some different embodiments of the present invention;
- figures 2a to 2h illustrate lighting modules, according to some different embodiments of the present invention;
- figures 3a and 3b illustrate engagement means of the lighting modules;
- figures 4a and 4b illustrate further embodiments of lighting devices;
- figures 5a, 5b, 5c and 6a and 6b illustrate a mechanism for connecting the lighting modules.

[0007] With reference to the accompanying figures, the references 1a-1e each indicate, collectively, a suspended lighting device according to some different embodiments of the present invention.

[0008] Each lighting device 1a-1e comprises a plurality of modules 2a-2h, one hanging from the other in cascade, to form the lighting device 1a-1e.

[0009] For example, according to one embodiment (figure 1a), the lighting device 1a comprises a first module 2c suspended from the ceiling by a cable 4, a second module 2f strung to the first module 2c and electrically connected thereto, and a third module 2g strung to the second module 2f and electrically connected to the latter.

[0010] According to a further embodiment (figure 1b),

the lighting device 1b comprises a first module 2g suspended from the ceiling by a cable 4 and electrically connected thereto, a second module 2g strung to the first module 2g and electrically connected thereto, and so on up to a fourth module 2g.

[0011] According to a still further embodiment (figure 1c), the lighting device 1c comprises a first module 2h suspended from the ceiling by a cable 4 and connected electrically thereto, a second module 2d strung to the first module 2h and electrically connected thereto, and a third module 2g strung to the second module 2d and electrically connected to the latter.

[0012] According to a further embodiment (figure 1d), the lighting device 1d comprises a first module 2f suspended from the ceiling by a cable 4 and electrically connected thereto, a second module 2d strung to the first module 2f and electrically connected thereto, and a third module 2e strung through the second module 2d to be supported and electrically connected to the latter.

[0013] According to a still further embodiment (figure 1e), the lighting device 1e comprises a first module 2d suspended from the ceiling by a cable 4 and connected electrically thereto, and a second module 2b strung through the first module 2d and resting thereon to be supported and electrically connected to the latter.

[0014] A first lighting module 2a is composed of two rectilinear sections 4', 4", converging towards a vertex 6, so as to form collectively an angled shape.

[0015] Further lighting modules 2b, 2e consist of a single rectilinear section, having a predefined length.

[0016] Said lighting modules are defined as "open" because they have the shape of an open curve, and generally consist of rectilinear or curved sections in succession.

[0017] Further lighting modules 2c, 2d are composed of a single circular element, so as to assume the form of circumference, for example with different diameters.

[0018] Further modules 2c, 2d, 2f, 2g, 2h are defined as "closed" because they have a closed curve shape, with rectilinear or curvilinear or mixed sections. However, said modules may be opened to string with other closed modules.

[0019] For example, a first openable closed module 2f has an overall circular configuration.

[0020] Said first module 2f consists of a single curved element, provided with a coupling mechanism 7 comprising a first end section 8' of the element and a second end section 8" of the element, which may be detached from each other and spaced by virtue of the flexibility of the element, so as to open the module.

[0021] The coupling mechanism further comprises engaging means adapted to mechanically engage the first end section 8' and the second end section 8" to re-establish the structural continuity.

[0022] For example (figure 3a), the first end section 8' has a seat and a band 10 which surrounds it, wherein a hole 12 is made for a set screw 14; the second end section 8" has an attachment element 16, for example the head

of a screw, projecting and suitable to be received in the seat of the first end section 8'.

[0023] Once the ends of the two end sections 8', 8" (figure 3b) are brought together, the attachment element 16 is inserted into the seat and the application of the set screw 14 mutually engages the two ends, thus restoring the continuity of the element.

[0024] According to further embodiments, said coupling mechanism is magnetic or has a bayonet coupling.

[0025] A second closed module 2g has, for example, a teardrop shape, comprising a portion 18 comprising a broken line formed by two rectilinear sections 20', 20" converging at a vertex 22, and a second curved portion 24, for example semicircular, comprising a single arched element, connected at the ends to the first portion 18.

[0026] A third closed module 2h has a polygonal shape, for example triangular, quadrangular, rectangular or pentagonal.

[0027] For example, the third module 2h has a square shape and consists of four sections 24', 24", 24"', 24"" arranged orthogonally to each other and converging into four vertices.

[0028] Also, the second module 2g and the third module 2h have end portions that may be spread apart and said coupling mechanism, as described above.

[0029] Each module 2a-2h consists of a body 30 extending along a main axis Z which is arched or rectilinear or with a mixed configuration, according to the overall shape of the module (figures 4a and 4b).

[0030] Said body 30 has a cross-section perpendicular to said main axis Z which is substantially circular. The light source for example, comprising an LED strip 60, is housed inside the body 30.

[0031] The body 30 comprises an opaque casing 30', opaque to the light emitted by the light source, and a transparent casing 30", transparent to the light emitted by the light source, both having extension along said main axis Z; the two casings, coupling along said main axis Z, form the body 30 and define therein the housing for the light source.

[0032] For the closed modules, the opaque casing 30' is arranged toward the inside of the same module; preferably, moreover, said opaque casing 30' is made of an externally painted aluminum alloy, and at the same time provides a heat sink for the light source housed inside the body 30.

[0033] The open modules 2a, 2b, 2e, on the other hand, are suitable to diffuse a direct light if the transparent casing 30" faces downwards, i.e. towards the observer, or an indirect light if the transparent casing 30" faces upwards.

[0034] Each module 2a-2h is provided with at least one connecting mechanism 40 for the mechanical and electrical connection with another module of the device (figures 5a, 5b, 5c).

[0035] For example, said connecting mechanism 40 comprises a first semi-mechanism 42 forming part of a first module 2h and a second semi-mechanism 44 form-

ing part of a second module 2f; the two semi-mechanisms are suitable to engage mechanically and electrically with each other.

[0036] For example, the first semi-mechanism 42 comprises a first insulating base (42'), integrated within the opaque casing 30' of the first module 2h, from which conductor legs 46', 46" protrude for the electrical connection.

[0037] The second semi-mechanism 44 comprises a second insulating base 44', integrated within the opaque casing 30' of the second module 2h, from which pins 48', 48" protrude (for example two pairs).

[0038] When the two semi-mechanisms 42, 44 are engaged with each other, the legs 46', 46" of the first semi-mechanism 42 engage with the respective conductor seats provided in the second base 44', establishing the electrical connection, while the pins 48', 48" of the second semi-mechanism 44 are inserted into the respective holes provided in the first base 42', centering the two modules relatively.

[0039] The connecting mechanism 40 further comprises fixing means adapted to secure mechanically and stably the two modules 2f, 2g.

[0040] For example, said fixing means comprise a screw 50, for example, with a countersunk head, which traverses the second base 44', protrudes from the opaque casing 30' of the second module 2f and screws onto the first base 42' of the first module 2g.

[0041] A cable 4 is also provided with a similar semi-mechanism to connect the module hanging from the cable to the electrical network and also to connect it mechanically.

[0042] Innovatively, the suspended lighting device according to the present invention satisfies the requirements of the industry, as it constitutes a lighting device with a great aesthetic impact and customizability, due to the variety of possible combinations between modules with different shapes and sizes.

[0043] Advantageously, moreover, the heat generated by the light source is effectively dissipated by the opaque casing, which is visible and also has an aesthetic function.

[0044] According to a further advantageous aspect, the coupling mechanism and the connecting mechanism are particularly simple to use and therefore allow even the end user to install the modules.

[0045] It is clear that one skilled in the art, in order to meet contingent needs, may make changes to the lighting device described above, all contained within the scope of protection defined by the following claims.

Claims

1. Suspended lighting device (1a-1e) comprising a suspension cable (4) and a plurality of lighting modules (2a-2h), wherein a first module is hung on the cable (4) and a second module is supported by the first module and is electrically connected to said first

module,

- wherein each module comprises:

- i) a body (30) extending along a main axis (Z) having a rectilinear, curvilinear or mixed configuration, wherein the body (30) comprises an opaque casing (30') and a transparent casing (30''), extending along said main axis Z and engaging reciprocally along said main axis (Z) to form a housing within the body;
- ii) a light source comprising an LED strip (60), housed in said housing within the body (30), along said main axis (Z);
- iii) a connecting mechanism (40) adapted to engage reciprocally with a connecting mechanism of the other module, adapted to connect the first and the second module electrically and mechanically.

2. A lighting device according to claim 1, wherein said connecting mechanism (40) comprises a first semi-mechanism (42) forming part of the first module and a second semi-mechanism (44) forming part of the second module, wherein

- the first semi-mechanism (42) comprises a first insulating base (42'), integrated within the opaque casing (30') of the first module, from which conductor legs (46', 46'') protrude,
- the second semi-mechanism (44) comprises a second insulating base (44'), integrated within the opaque housing (30') of the second module, from which pins (48', 48'') protrude,
- wherein, when the two semi-mechanisms (42,44) are engaged with each other, the legs (46',46'') of the first semi-mechanism (42) engage with the respective conductor seats provided in the second base (44'), establishing the electrical connection, and the pins (48',48'') of the second semi-mechanism (44) are inserted into the respective holes provided in the first base (42'), relatively centering the two modules.

3. Lighting device according to claim 2, wherein the connecting mechanism (40) further comprises fixing means adapted to secure mechanically and stably the two modules.

4. A lighting device according to any one of the preceding claims, wherein at least one of said modules is open, i.e. has an open curve configuration.

5. A lighting device according to any one of the preceding claims, wherein at least one of said modules is closed, i.e. has a closed curve configuration.

6. A lighting device according to claim 5, wherein the opaque casing (30') of said closed module faces the inside of said closed module.

7. A lighting device according to claim 5 or 6, wherein the closed module comprises a first end section (8') and a second end section (8'') separable for connecting in series said module to another module.

8. A lighting device according to claim 7, wherein the two end sections (8', 8'') may be spread apart by virtue of the flexibility of the body (30).

9. A lighting device according to claims 7 or 8, comprising a coupling mechanism (7) comprising engaging means adapted to mechanically engage the first end section (8') and the second end section (8'') to re-establish the structural continuity.

10. A lighting device according to claim 9, wherein said coupling mechanism (7) comprises a seat on the first end section (8') and a band (10) that surrounds it, in which a hole (12) is made for a set screw (14), and an attachment element (16) on the second end section (8''), for example the head of a screw, protruding and adapted to be received in the seat of the first end section (8').

11. A lighting device according to claim 9, wherein the coupling mechanism is magnetic or includes a bayonet coupling between the first end section (8') and the second end section (8'').

12. A lighting device according to any one of the preceding claims, wherein the opaque casing (30') is made of aluminum alloy.

13. A suspended lighting device comprising a first module and a second module, supported by the first module and in electrical connection with said first module,

- wherein the first module includes:

- i) an annular body (30) extending along a main axis (Z) having a closed curve configuration, with rectilinear or curvilinear or mixed sections, having an inner housing;
- ii) a light source comprising an LED strip (60), housed in said housing within the body (30), along said main axis (Z);

- wherein at least one of the first and second modules may be opened to be strung to the other module.

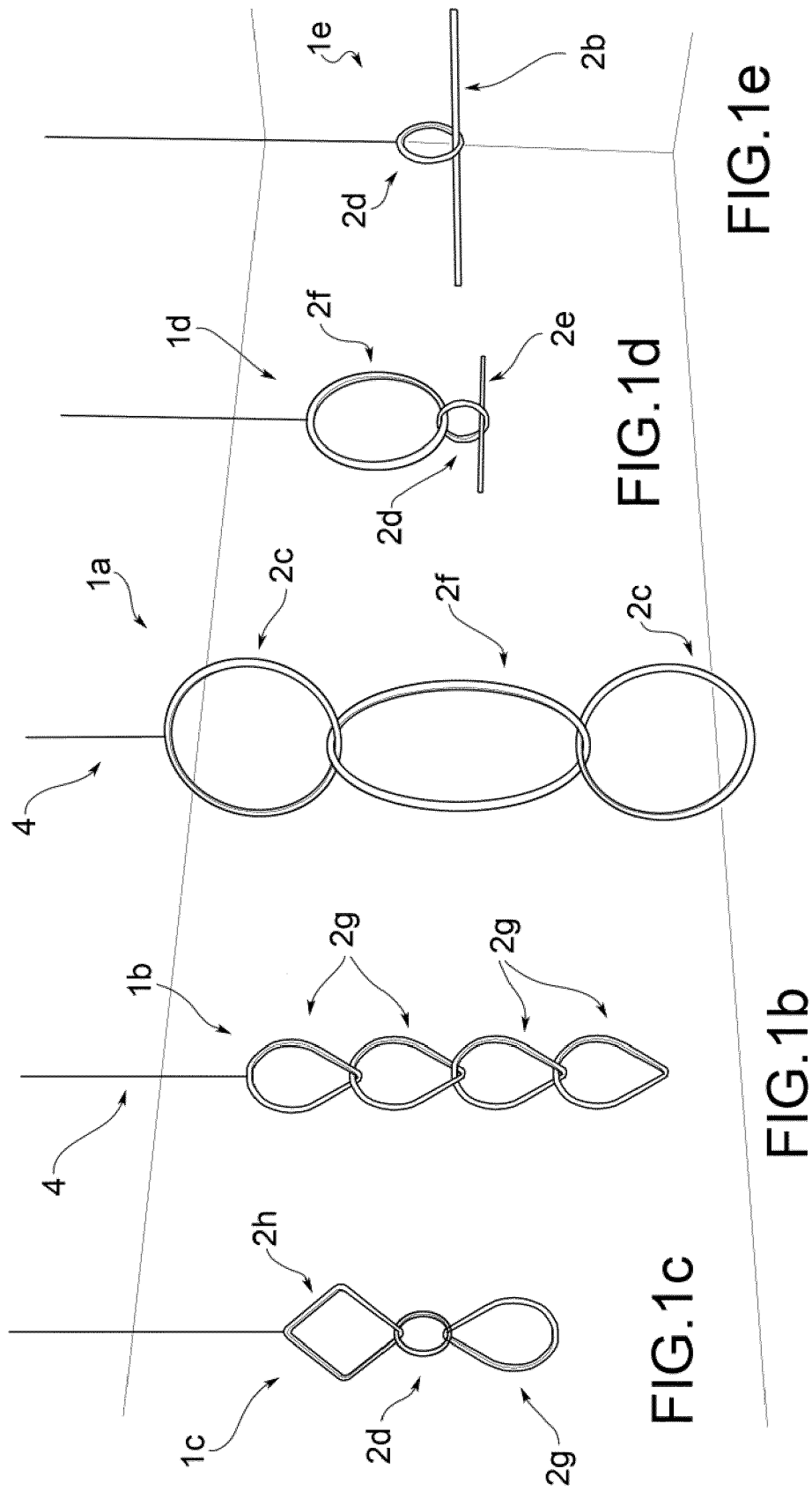


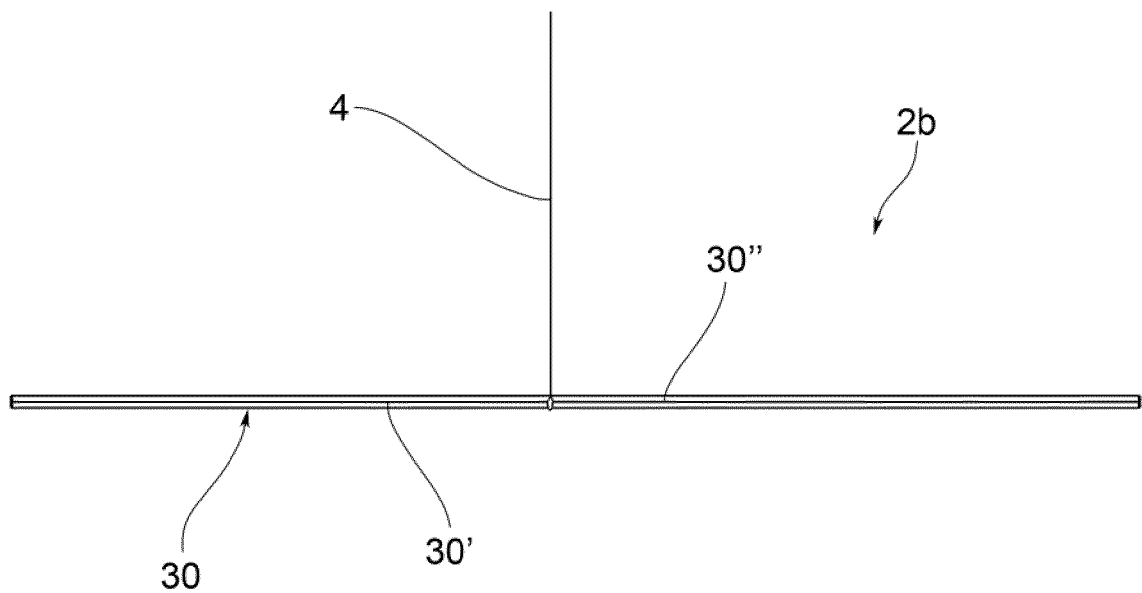
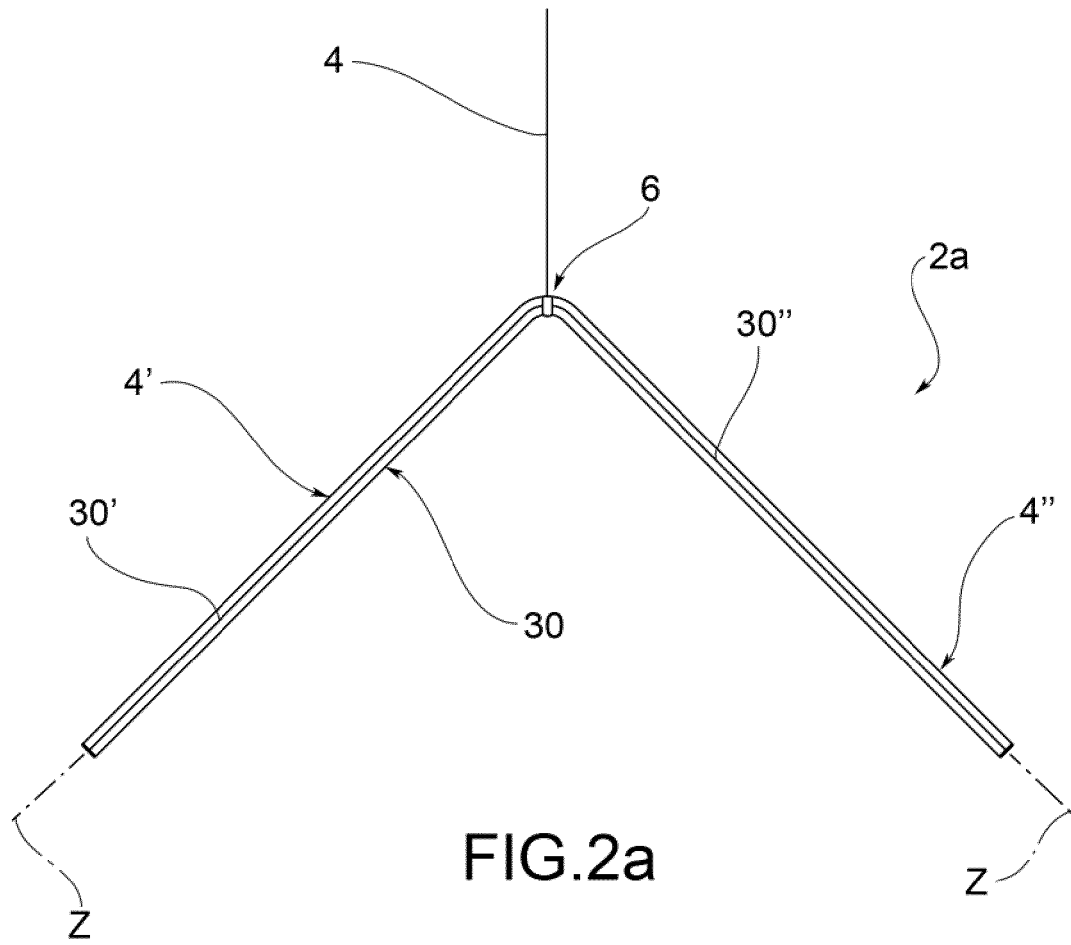
FIG.1e

FIG.1d

FIG.1a

FIG.1b

FIG.1c



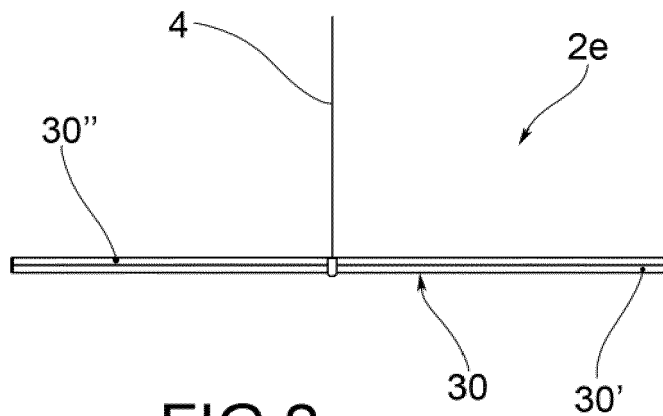


FIG. 2e

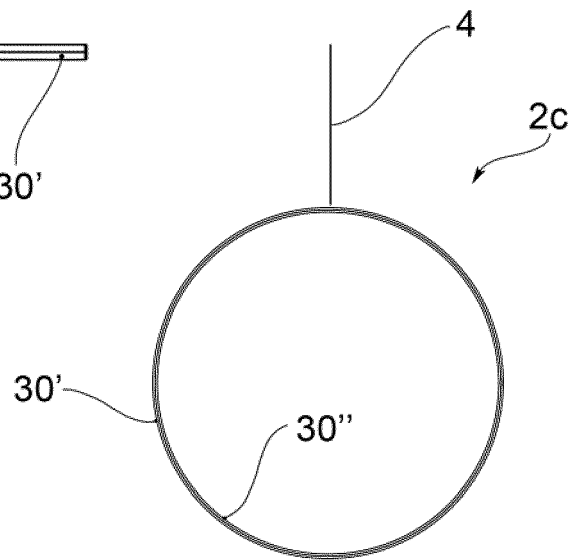


FIG. 2c

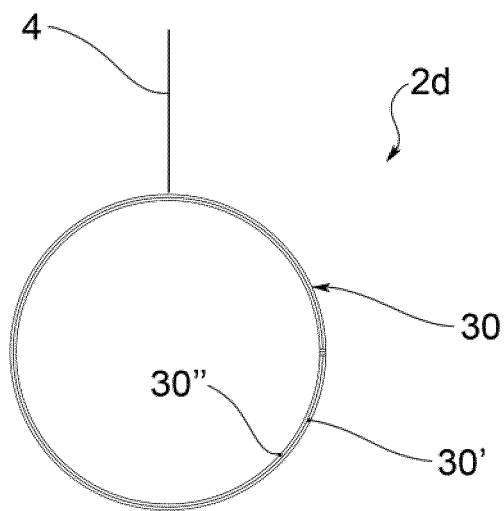


FIG. 2d

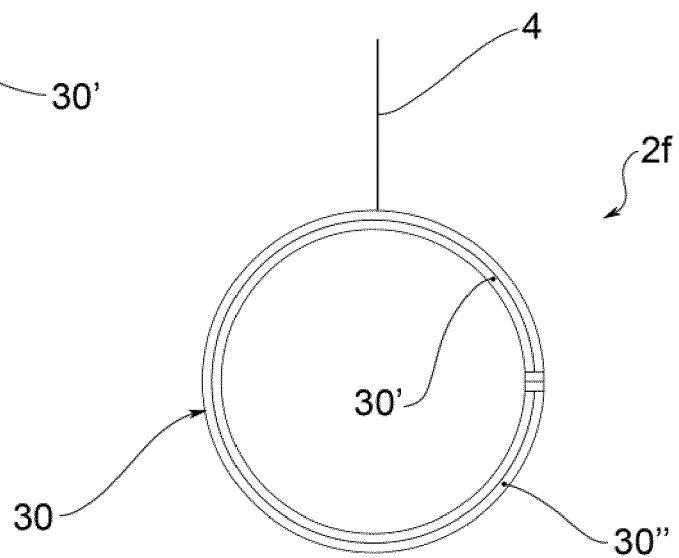


FIG. 2f

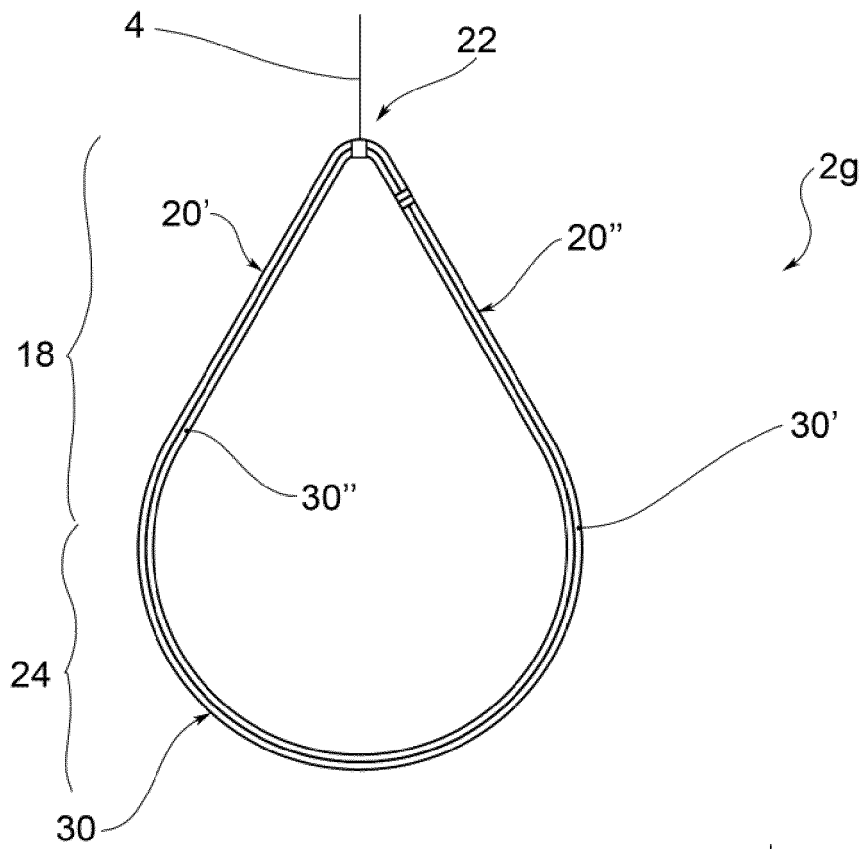


FIG. 2g

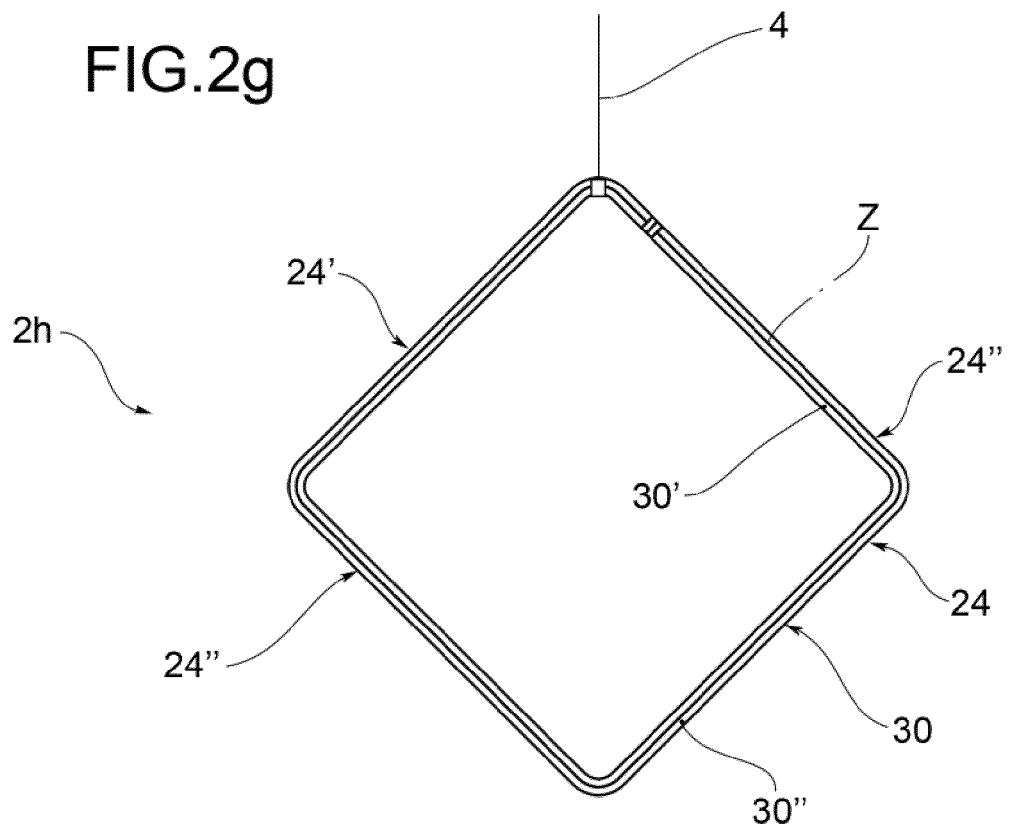


FIG. 2h

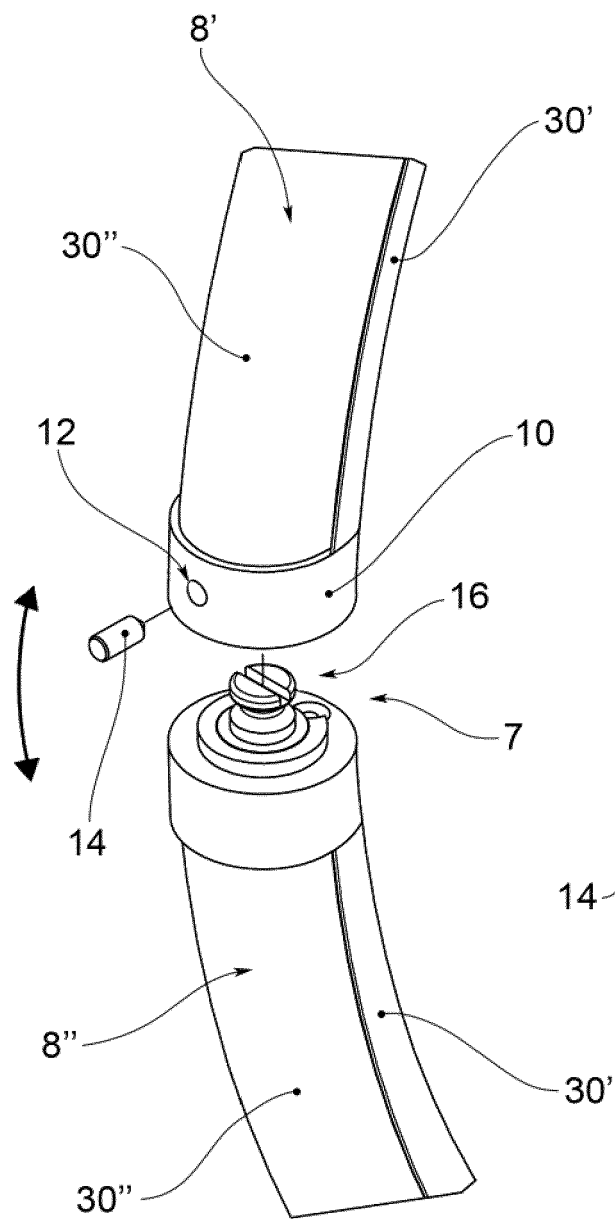


FIG. 3a

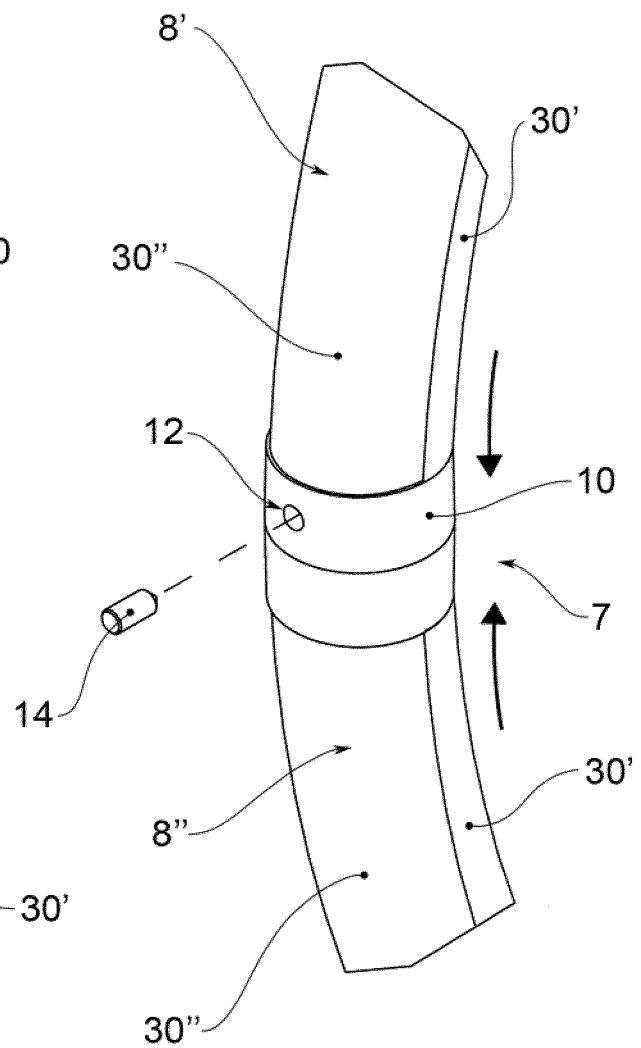


FIG. 3b

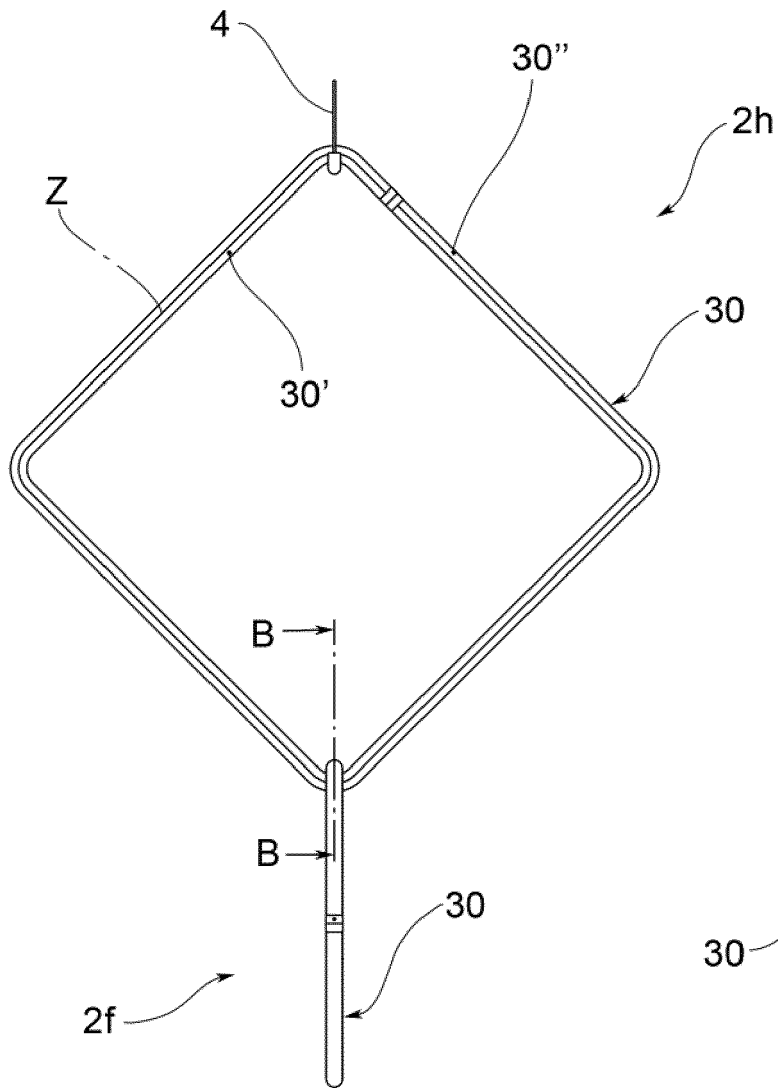


FIG. 4a

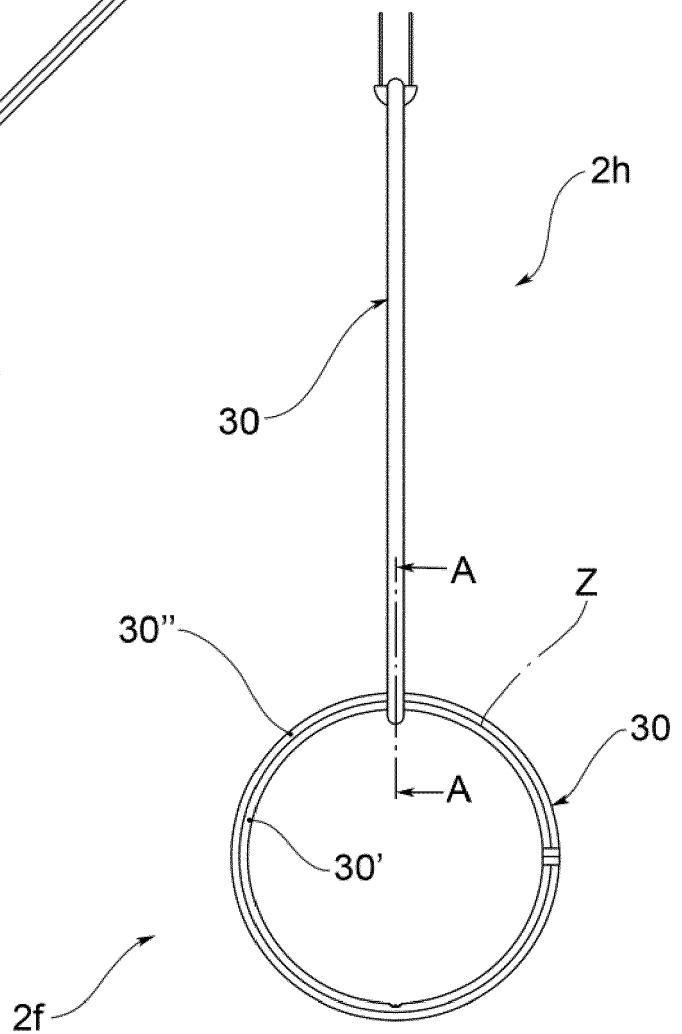
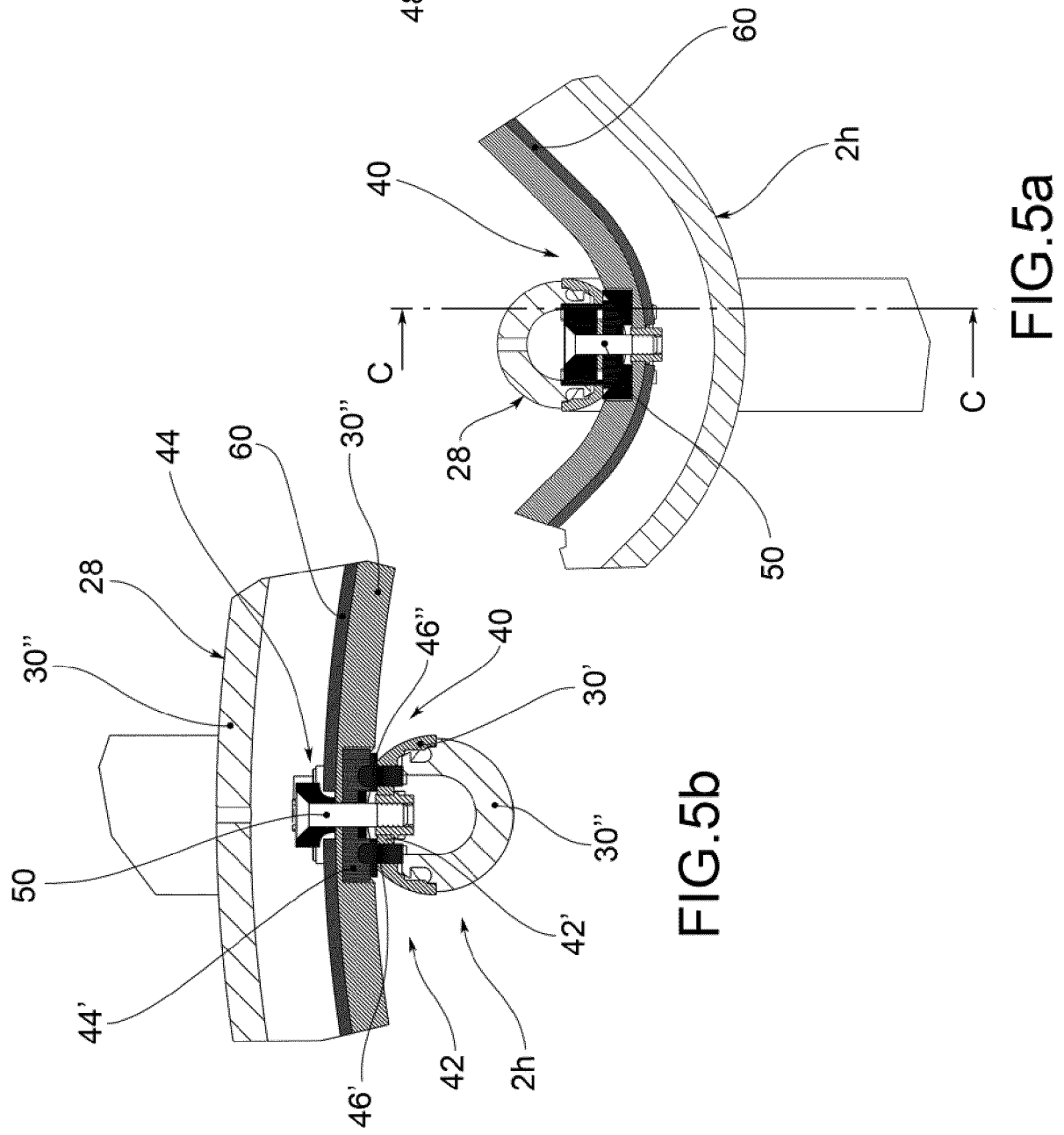


FIG. 4b



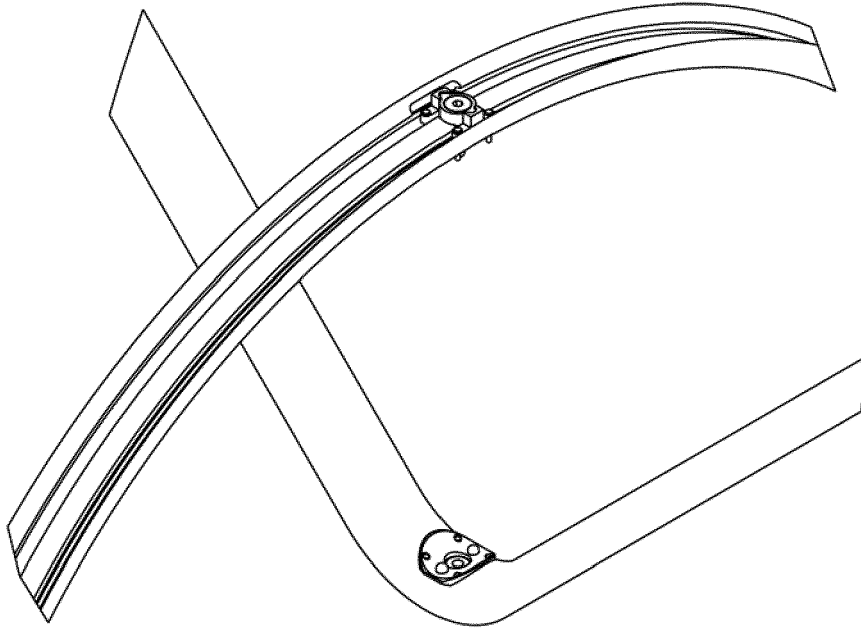


FIG. 6a

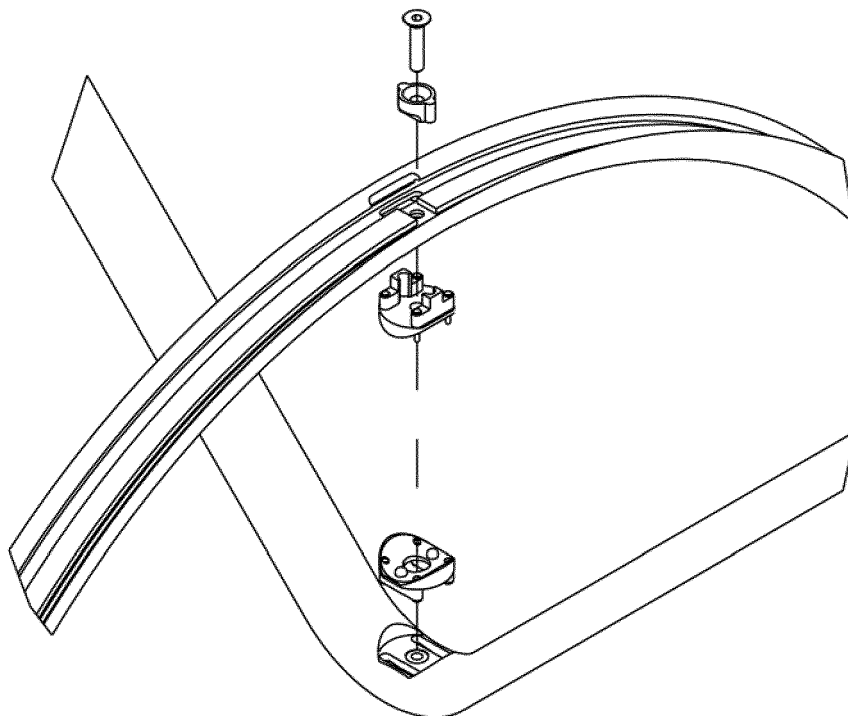


FIG. 6b



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Application Number
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The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		30 April 2018	Dinkla, Remko
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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