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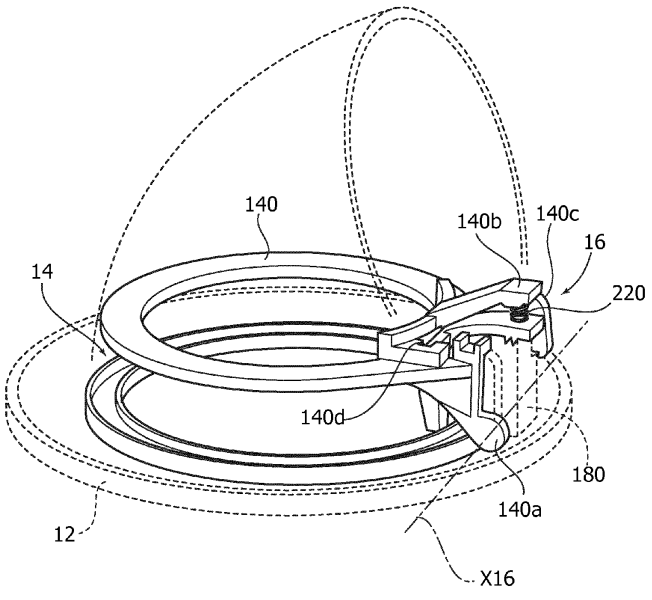
(54) Adjustable support for lighting sources

(57) An adjustable support for lighting sources, for example LED spotlights (L), includes a mounting element (12) for mounting on a surface (S) and a support element (14) to carry a light radiation source (L) which can be oriented with respect to the mounting element (12). Provision is made of a mechanism (16) for controlling the orientation movement of the support element (14), the mechanism including a first toothed sector (180a) and a second toothed sector (180b) arranged side by side, and a toothed actuator (200) movable between an engagement position, in which the actuator (200) counters the orientation movement of the support element (14), and a disengagement position, in which it is possible to orient the support element (14) and thereby orient the direction of the light radiation. A rotary damper (240) meshes with the second toothed sector (180b) for braking the orientation movement of the support element (14) with respect to the mounting element (12).

FIG. 2



EP 2 706 291 A1

Description

Technical field

[0001] The present description relates to supports for lighting sources.

[0002] Various embodiments can relate to orientable supports for lighting sources, such as recessed lighting sources.

[0003] Various embodiments can relate to orientable supports for LED lighting sources.

Technical background

[0004] The problem of allowing the orientation of a lighting source, for example a recessed lighting source, has already been tackled using various systems, for example hinge systems of various kinds.

[0005] These systems can have various negative operating features, such as the inability to obtain a regular and controllable orientation movement even for small variations in the orientation and/or the inability to easily obtain precise adjustment which can be sustained over time.

Object and summary

[0006] It is an object of various embodiments to avoid the disadvantages outlined above.

[0007] In various embodiments, this object is achieved by an adjustable support for lighting sources having the features mentioned specifically in the claims which follow. The claims form an integral part of the technical teaching provided here in relation to the invention.

[0008] Various embodiments make it possible to obtain regular and precise adjustment of an orientable lighting source, for example of the recessed type, with the resultant possibility to orient the light beam in a precisely selected direction.

[0009] Various embodiments make it possible to easily and accurately adjust the orientation of a lighting source, with the possibility to give rise to an esthetically pleasing solution.

Brief description of the figures

[0010] Various embodiments will now be described, purely by way of non-limiting example, with reference to the accompanying figures, in which:

- figure 1, including four parts denoted by a), b), c) and d), shows possible methods of use of embodiments,
- figure 2 shows the features of embodiments in a partially cut-away and transparent view,
- figures 3 to 8 show various components of embodiments, and
- figures 9, 10 and 11, each including two parts denoted respectively by a) and b), show the operation of embodiments in greater detail.

Detailed description

[0011] In the following description, various specific details aimed at providing a fuller understanding of various embodiments are explained. The embodiments may be implemented without one or more of the specific details or using other methods, components, materials, etc. In other cases, known structures, materials or operations are not shown or described in detail so that the various aspects of the embodiments may be understood more clearly.

[0012] The reference to "an embodiment" in the context of this description indicates that a particular configuration, structure or feature described in relation to the embodiment is included in at least one embodiment. Therefore, phrases such as "in one embodiment", which may occur at various points in this description, do not necessarily refer to the same embodiment. Moreover, particular forms, structures or features may be combined in any suitable manner in one or more embodiments.

[0013] The reference signs used here are provided solely for the sake of convenience and therefore do not define the scope of protection or ambit of the embodiments.

[0014] Figure 1 shows a possible orientation sequence for a lighting source 10, for example an LED lighting source.

[0015] In various embodiments, the lighting source 10 can be a recessed lighting source, for example for mounting in a false ceiling S.

[0016] In the exemplary embodiment to which figure 1 refers, the lighting source 10 can include, as the light radiation source L, an LED source, for example an LED spotlight.

[0017] In various embodiments, the light radiation source L can be of a different type. It will be understood moreover that the light radiation source L may in itself not form part of the embodiments which refer primarily to the adjustable support of the light radiation source L.

[0018] In various embodiments, a support of this type can include:

- a mounting element 12 intended to be fixed on a mounting surface (in the case of the example shown, the false ceiling S), and
- a support element 14 intended to support the light radiation source L.

[0019] In various embodiments, the mounting element 12 and the support element 14 are hinged to one another (like a book). A mechanism 16 makes it possible to control and adjust the orientation movement of the support element 14 with respect to the mounting element 12 about an orientation axis X16 (see figure 2).

[0020] In the example considered here, which is similar, the mounting element 12 is mounted on the false ceiling S (mounting surface) and the light radiation source L is carried by the support element 14. By varying the position adopted by the support element 14 with respect to the mounting element 12 about the axis X16 (that is the angle of aperture of the ideal dihedron formed by the support element 14 and by the mounting element 12, hinged to one another like a book), it is possible to vary the direction in which the light radiation emitted by the source L is projected.

[0021] It is thereby possible, for example (once again considering by way of example the case in which the lighting source 10 is mounted recessed in a false ceiling S extending along a horizontal plane), to go from a state in which the light radiation is projected in a "zenithal" direction downward (part a) of figure 1) to states in which the light radiation is projected in a more or less oblique or inclined direction, with the possibility to selectively vary the angle of inclination as shown schematically in parts b), c) and d) of figure 1.

[0022] In various embodiments, this can take place by acting, for example with a finger, on a drive element 160, which is accessible from the outside, for example, in that it is left uncovered by the support element 14. As described in more detail hereinbelow, by acting on the drive element 160 it is possible to ensure that the support element 14 (and the light radiation source L mounted thereon) can move downward, so as to vary the direction of the light radiation.

[0023] The angle which is adopted by the support element 14 with respect to the mounting element 12 (and therefore the direction of the light radiation emitted by the source L) can be adjusted into the desired position by making the support element 14 move down or back up with respect to the mounting element 12.

[0024] Various embodiments, as shown schematically in the accompanying drawings, can provide that both the mounting element 12 and the support element 14 have an on the whole annular shape, with the support element 14 (on the inside of which the light radiation source L is mounted) having smaller radial dimensions than the mounting element 12, which therefore surrounds the support element 14.

[0025] It will be understood moreover that various embodiments can provide for the use of a mounting element 12 and/or of a support element 14 having forms which differ from those shown here.

[0026] In various embodiments, the support element 14 can have an on the whole tubular structure with a spoon shape (see for example both figure 1 and figure 2 and also figures 9 to 11), with a tubular configuration curved according to an arcuate trajectory centered about the axis X16.

[0027] As can be seen clearly from figure 1, by resorting to this solution it is possible to ensure that, even though the relative orientation of the support element 14 with respect to the mounting element 12 is varied, the light radiation source L continues to be enclosed by the support element 14.

[0028] In various embodiments, the mechanism 16 can include various elements shown in greater detail in figures 3 to 8.

[0029] Figure 3 shows an annular body 140 which can form, in various embodiments, a type of ring-shaped rib of the support element 14.

[0030] In various embodiments, the rib ring 140 can be formed in one piece with the support element 14, even in the case in which the latter has a tubular spoon-like general configuration, as shown.

[0031] In various embodiments, the ring 140 can have, for example, two clamps 140a, which implement the hinging of the support element 14 with respect to the mounting element 12 so as to allow the relative orientation about the axis X16.

[0032] In various embodiments (see in particular figures 9 to 11), the ring 140 can be situated in a slightly withdrawn or "recessed" position with respect to the plane of the mouth of the support element 14, the mouth rim of which is usually situated along the outline of the mouth opening of the light radiation source L.

[0033] In various embodiments, the mechanism 16 can include a double toothed sector 180 with a first toothed sector 180a and a second toothed sector 180b, which are arranged side by side and are intended to extend with their arcuate trajectories (for example with that of the first toothed sector 180a having a greater radius than that of the second toothed sector 180b) centered about the axis X16.

[0034] In various embodiments, provision can then be made of a toothed actuator 200, which can have a rocker arm general structure and/or a fork shape such that it can be located astride the double toothed sector 180.

[0035] In various embodiments, the actuator 200 can have a tooth formation (single or multiple) 202 intended to cooperate (for example by a mechanism which can be grossly assimilated with a ratchet) with the first toothed sector 180a.

[0036] In various embodiments, provision can then be made of an elastic means, such as a spring 220, which is intended to elastically bias the toothed actuator 200 in the state in which the toothed formation 202 is in engagement with the first toothed sector 180a. For example, the spring can act in compression between an arm of the actuator 200 which carries the tooth formation 202 and a bracket 140b protruding from the ring 140.

[0037] In various embodiments, provision can then be made of a damper device 240 including a toothed wheel 242, which is intended to mesh with the second toothed sector 180b and is mounted on a support 244 so as to be able to rotate with respect to said support 244 with a rotational movement which is braked, for example by a general friction mechanism: rotary dampers of this type are known in the art and therefore there is no need to provide a detailed description at this point.

[0038] In various embodiments, the damper device

240 too can be mounted on a bracket 140c protruding from the ring 140 (see figure 3), in such a way as to make the toothed wheel 242 mesh with the toothed sector 180b, as shown schematically by dashed lines in figures 9 to 11.

[0039] The various elements which form the mechanism 16 as shown in figures 3 to 8 can be regarded as ideally subdivided into two sets of mutually cooperating elements which are intended to be mounted, respectively, on one or on the other of the mounting element 12 and the support element 14.

[0040] The phrase "respectively on one or on the other" takes into account the fact that the mounting device to which reference is made by way of example hereinbelow could be inverted, i.e. with:

- elements of the first set, presented here as mounted on the support element 14, mounted on the mounting element 12, and
- elements of the second set, presented here as mounted on the mounting element 12, mounted on the support element.

[0041] In various embodiments, the first set of cooperating elements may include essentially the double toothed sector 180, which, in the exemplary embodiments under consideration here, is assumed to be mounted on the mounting element 12, and therefore in a fixed position with respect to the orientation movement of the support element 14 (and therefore of the light radiation source L) exemplified in the accompanying drawings.

[0042] In various embodiments, the second set of cooperating elements can include, carried by the support element 14 in the exemplary embodiments under consideration here:

- the toothed actuator 200, associated with the elastic bias spring 220 which urges the toothed formation 202 of the actuator 200 into engagement with the toothed sector 180a and the drive element 160 to make the closure member 200 oscillate counter to the force of the spring 220 in order to disengage the toothed formation 202 of the actuator 200 from the toothed sector 180a, and
- the damper device 240, which meshes with the second toothed sector 180b whichever the angular position reached by the support element 14 with respect to the mounting element 12.

[0043] In various embodiments, the toothed actuator 200 can have two lateral pins 204 received in two recesses 140d of the ring 140. All of this in such a way that the actuator 200 is arranged with the bottom tongs of its fork shape located astride the double toothed sector 180 (mounted on the mounting element 12), having its toothed formation 202 facing the first toothed sector 180a.

[0044] In various embodiments, the drive element 160 associated with the actuator 200 can have an approximately arcuate profile, which allows for mounting on the mouth rim of the support element 14 in states in which the latter is accessible from the outside, as shown exactly in figure 1.

[0045] In various embodiments, the drive element 160 too has opposing pins 162 (only one of which can be seen in figure 7), which allow for the hinging on the body of the support element 14 in such a way that an action exerted on the drive element 160 in the sense of making it rotate with respect to the support element 14 translates into an urging action exerted by teeth 164 carried by said drive element 160 counter to the actuator 200 (for example counter to the prongs of the fork shape); all of this with the result of making the closure member 200 oscillate about the pins 204 with a resultant departure and disengagement of the toothed formation 202 from the toothed sector 180a.

[0046] Figure 9 can be regarded as ideally corresponding to the state shown in part a) of figure 1, i.e. with the mouth rim of the support element 14 extending in coplanar states with respect to the mounting element 12.

[0047] The state shown in part a) at the top in figure 9 relates to states in which the elastic action of the spring 220 urges the toothed formation 202 of the closure member into engagement against the toothed sector 180a. In these states, the orientation movement of the support element 14 (and of the light radiation source carried thereby) with respect to the mounting element 12 (and therefore with respect to the mounting surface, for example the false ceiling S) is prevented or at least opposed.

[0048] To allow the orientation, the user can act on the drive element 160 - as shown schematically in the sequence of parts a) and b) of figure 1 - in such a way as to determine the oscillation in the direction which makes the pins 164 act on the tongs of the fork shape of the actuator 200. All of this while making the actuator 200 oscillate in the direction (counterclockwise, according to the point of view of figures 9 to 11) which makes the toothed formation 202 of the closure member 200 move away from the toothed sector 180a, disengaging it.

[0049] In these states, the support element 14 can thus oscillate about the axis X16 and be oriented with respect to the mounting element 12 as shown schematically, for example, in part a) of figure 10.

[0050] The orientation movement can be blocked in any desired position (see for example figure 10b) by simply releasing the drive element 160 so as to bring about, under the action of the spring 220, the return of the toothed formation 202 of the actuator 200 into the position of engagement with the toothed sector 180a. All of this while therefore restoring the state in which the orientation movement of the support element 14 with respect to the mounting element 12 is opposed by the engagement of the toothed formation 202 with the toothed sector 180a.

[0051] As shown, for example, in part c) of figure 1, the modes of operation described above allow the user to precisely adjust the position of orientation.

[0052] The operation described above (acting on the drive element 160 and subsequently releasing the latter) can be repeated in any position reached by the support element 14. It is thereby possible, for example, to again change the position of orientation of the support element 14 (and of the light radiation source L carried thereby) with respect to the mounting element 12 (and therefore with respect to the mounting surface S).

[0053] The damper element 240, with the braked toothed wheel 242 which meshes with the toothed sector 180b, ensures that the orientation movement described is effected in a gradual and braked manner, avoiding for example undesired and unexpected returns of the support element 14 outside the mounting element 12.

[0054] Again, in various embodiments and as already stated, the profile of the toothing of the first toothed sector 180a can be realized with an asymmetric sawtooth profile, so as to give rise, in connection with the toothed formation 202 of the actuator 200, to a type of ratchet. This is the case in order to realize an action to counter the orientation movement of the support element 14 with respect to the mounting element 12 which is differentiated in both directions, for example countering the extraction movement of the support element 14 with respect to the mounting element 12 to a more pronounced extent than the orientation movement in the opposite direction.

[0055] In various embodiments, this differentiated countering action can, for example, make it possible to obtain the return of the support element 14 to the inside of the mounting element 12 (that is in the angular state shown in part a) of figure 1) with a simple pressing action exerted on the support element 14, without necessarily having to act on the drive element 160.

[0056] Of course, without affecting the principle of the invention, the constructional details and embodiments may vary, also significantly, with respect to that illustrated here purely by way of non-limiting example, without thereby departing from the scope of the invention: this scope is defined by the accompanying claims.

Claims

1. An adjustable support for lighting sources (L), including:

- a mounting element (12) for mounting on a mounting surface (S),
- a support element (14) to carry a light radiation source (L), the support element being hinged to the mounting element (12) about an orientation axis (X16) to allow the orientation of said light radiation source (L) with respect to said mounting surface (S), and
- a mechanism (16) for controlling the orientation movement of said support element (14) with respect to said mounting element (12) about said orientation axis (X16), the mechanism including a first set (180) and a second set (200, 160, 240) of cooperating elements mounted on one (12) and on the other (14) of said mounting element (12) and said support element (14), respectively, wherein said first set of cooperating elements includes a first toothed sector (180a) and a second toothed sector (180b) arranged side by side, and said second set of cooperating elements includes:
  - a toothed actuator (200) movable between an engagement position, in which said toothed actuator (200) engages said first toothed sector (180a) and counters the orientation movement of said support element (14) with respect to said mounting element (12) about said orientation axis (X16), and a disengagement position, in which said toothed actuator (200) is disengaged from said first toothed sector (180a), thus allowing the orientation movement of said support element (14) with respect to said mounting element (12) about said orientation axis (X16), and
  - a rotary damper (240) including a braked toothed wheel (242) which meshes with said second toothed sector (180b) for braking the orientation movement of said support element (14) with respect to said mounting element (12) about said orientation axis (X16).

2. The adjustable support as claimed in claim 1, wherein said toothed actuator (200) is elastically biased (220) toward said engagement position.

3. The adjustable support as claimed in claim 1 or claim 2, wherein said toothed actuator (200) has a fork shape with the tongs of the fork located astride said first (180a) and second (180b) toothed sectors.

4. The adjustable support as claimed in any of the preceding claims, wherein a drive element (160) is coupled to said toothed actuator (100) to move the toothed actuator (200) between said engagement position and said disengagement position, said drive element (160) being left uncovered by said support element (14).

5. The adjustable support as claimed in any of the preceding claims, wherein said toothed actuator (100) and said first toothed sector (180a) form a ratchet coupling that counters the orientation movement of said support element (14) with respect to said mounting element (12) about said orientation axis (X16) in a differentiated manner in the opposed directions of said movement.

6. The adjustable support as claimed in claim 5, wherein said ratchet coupling counters the orientation movement of said support element (14) with respect to said mounting element (12) about said orientation

axis (X16) to a greater extent in the direction of extraction of the support element (14) from the mounting element (12) than in the opposite direction.

7. The adjustable support as claimed in any of the preceding claims, wherein said first set of cooperating elements (180) is carried by said mounting element (12) and said second set of cooperating elements (200, 160, 240) is carried by said support element (14).

8. The adjustable support as claimed in any of the preceding claims, wherein said mounting element (12) and said support element (14) are of annular shape with said mounting element (12) surrounding said support element (14).

9. The adjustable support as claimed in any of the preceding claims, wherein said support element (14) has a tubular spoon structure with a curvature centered about said orientation axis (X16).

FIG. 1

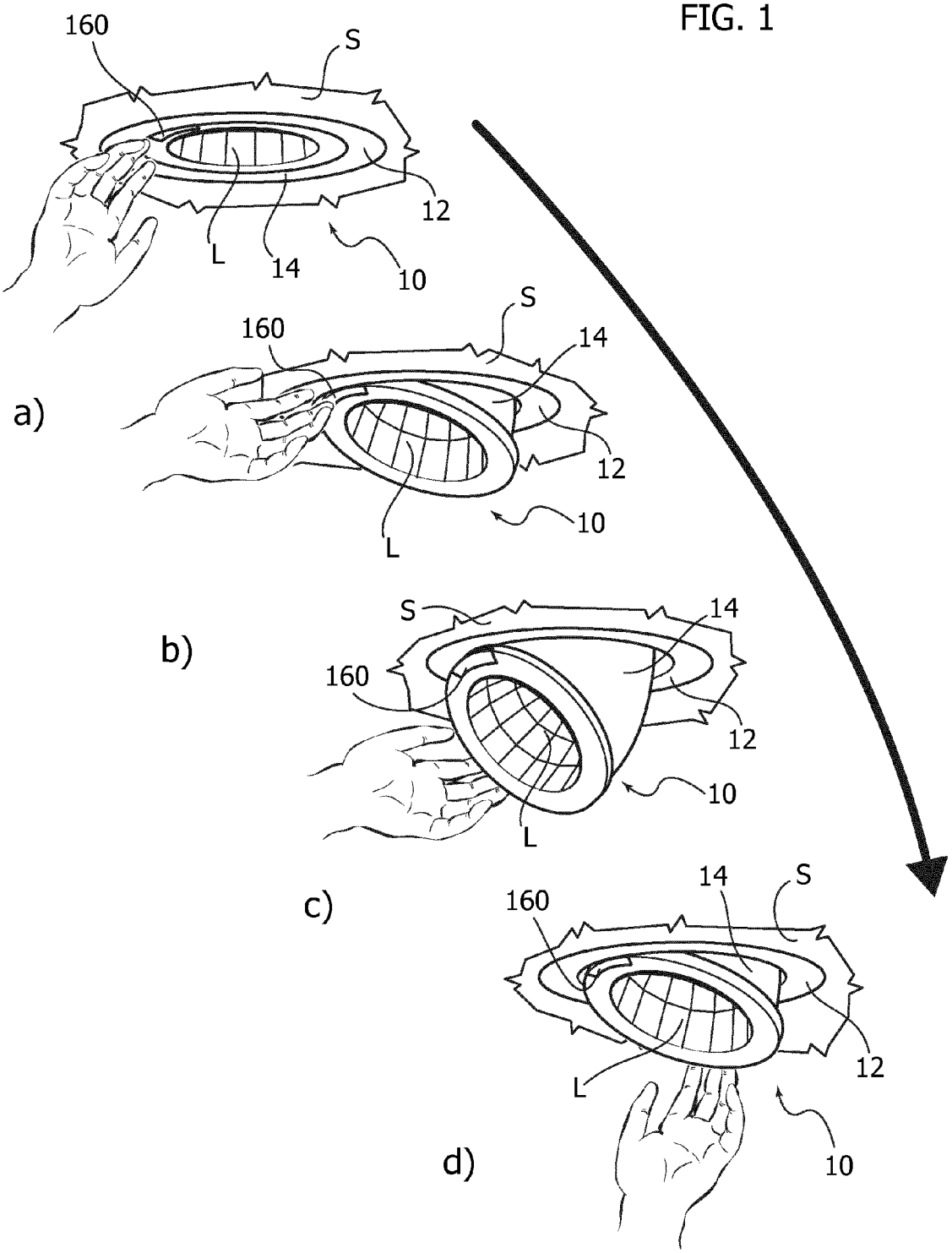


FIG. 2

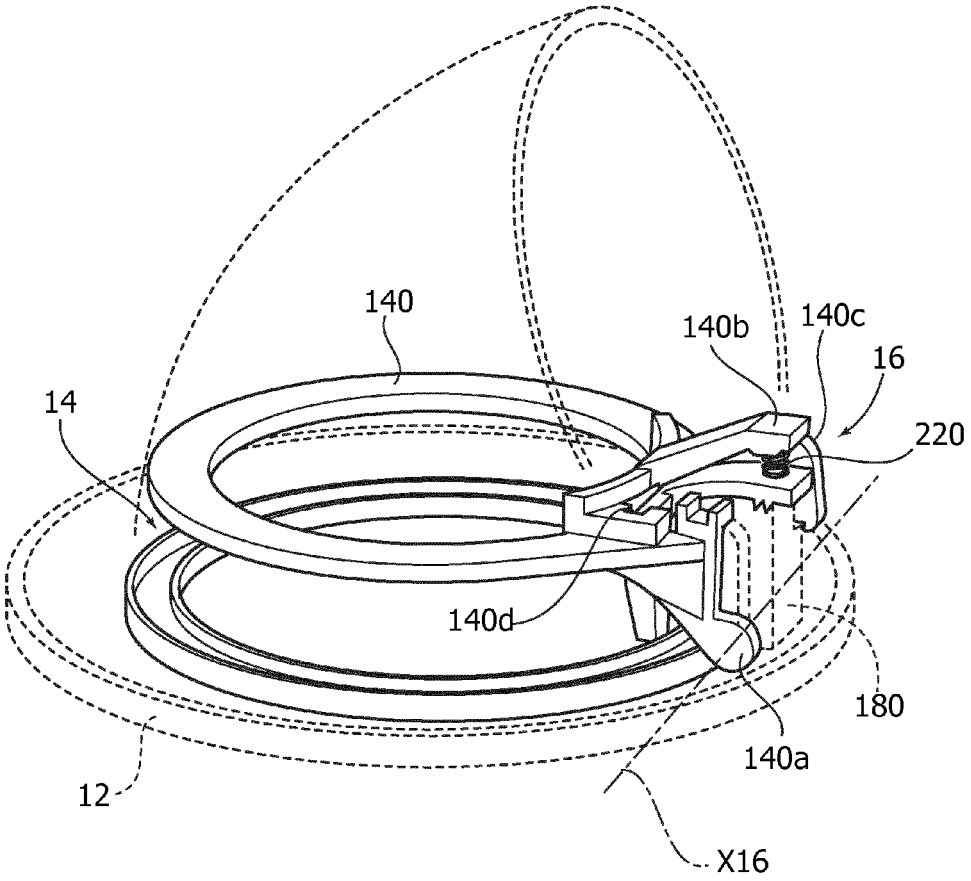


FIG. 3

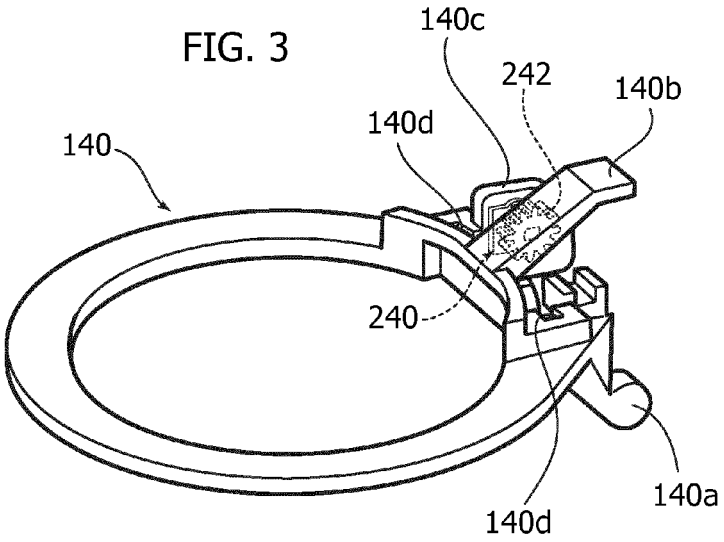


FIG. 4

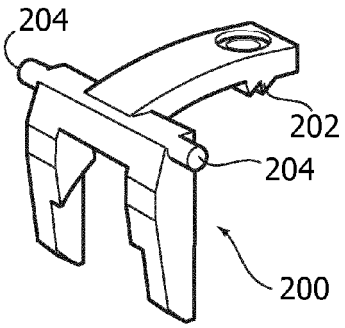


FIG. 5

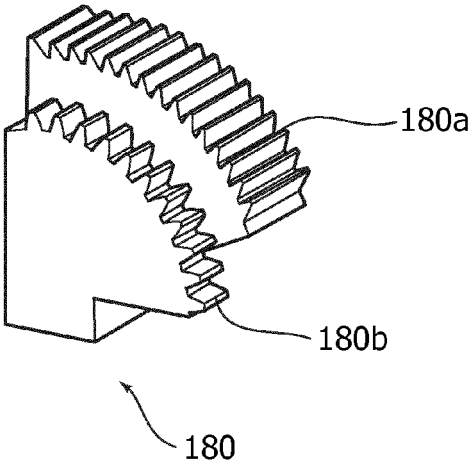


FIG. 7

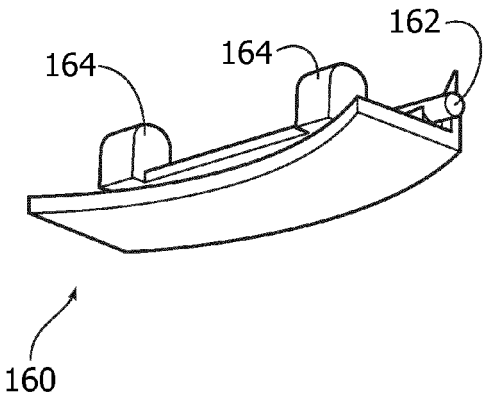


FIG. 6

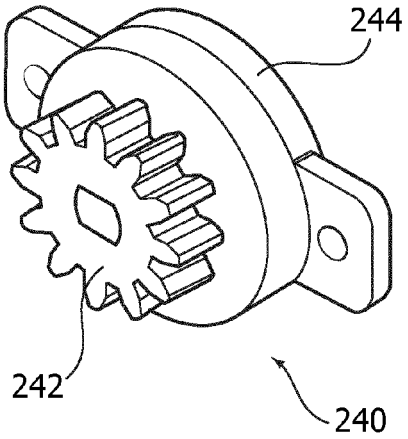


FIG. 8

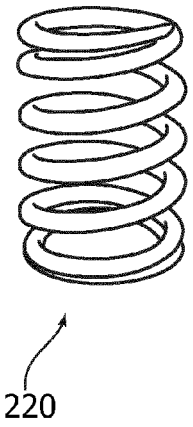


FIG. 9

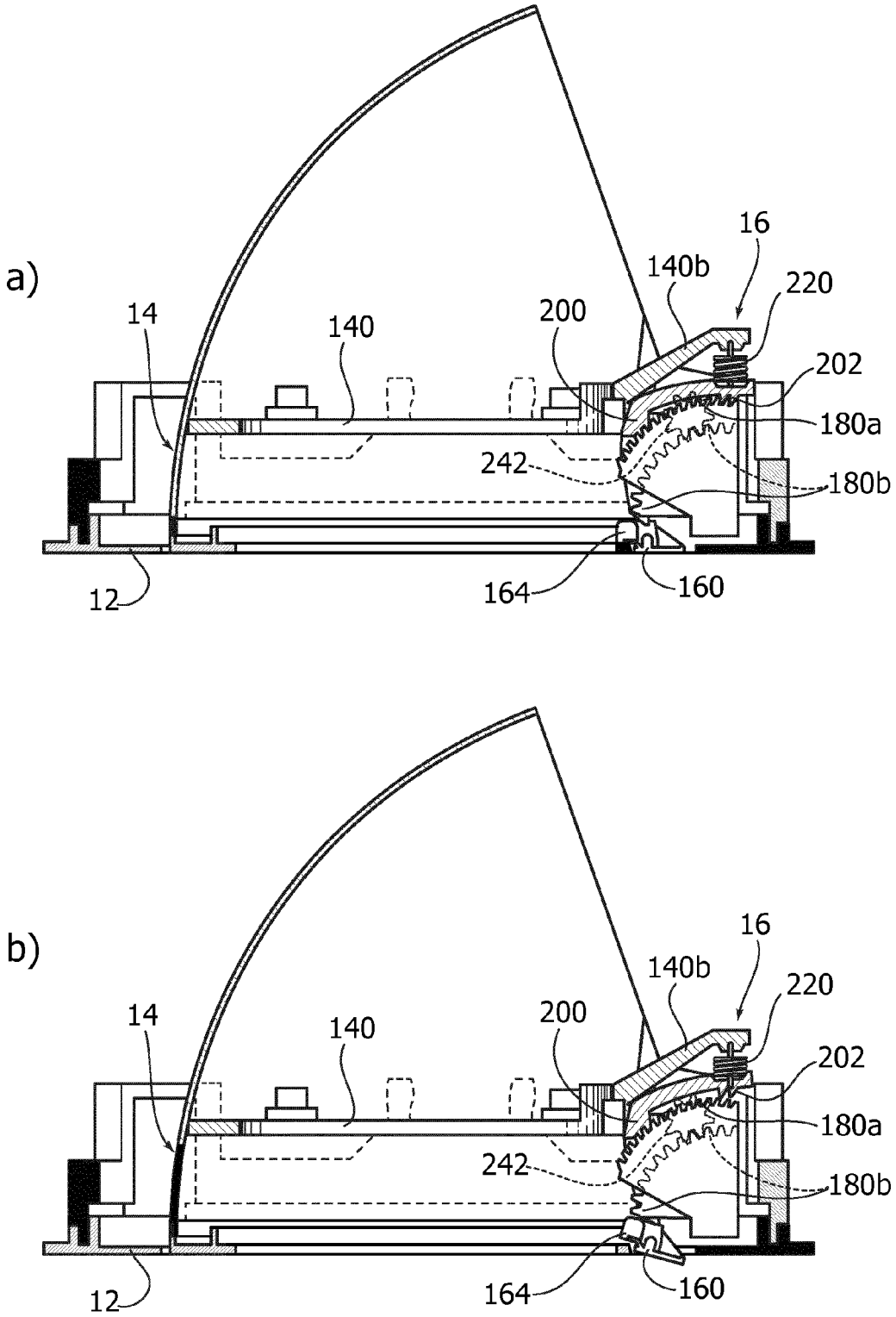

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FIG. 10

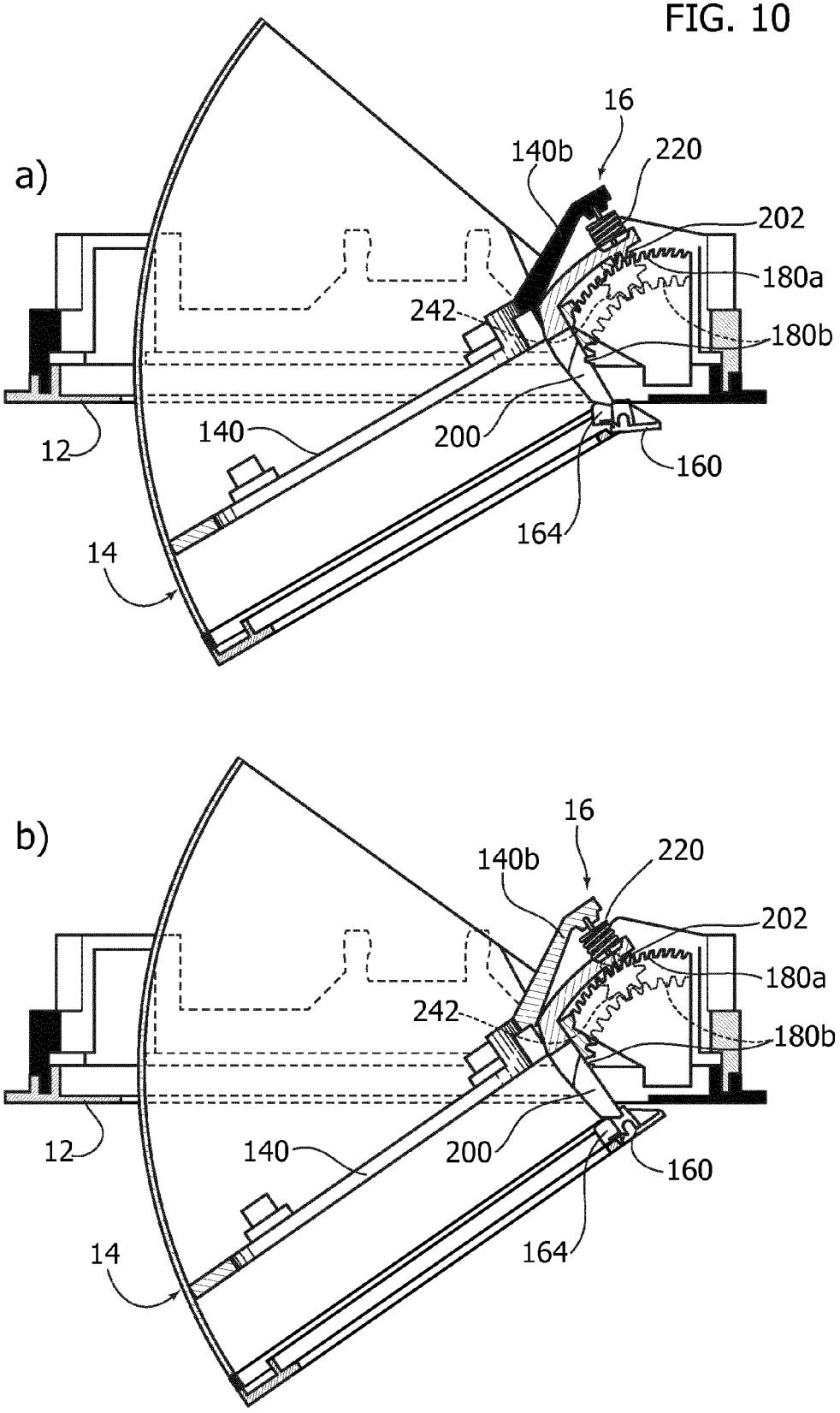
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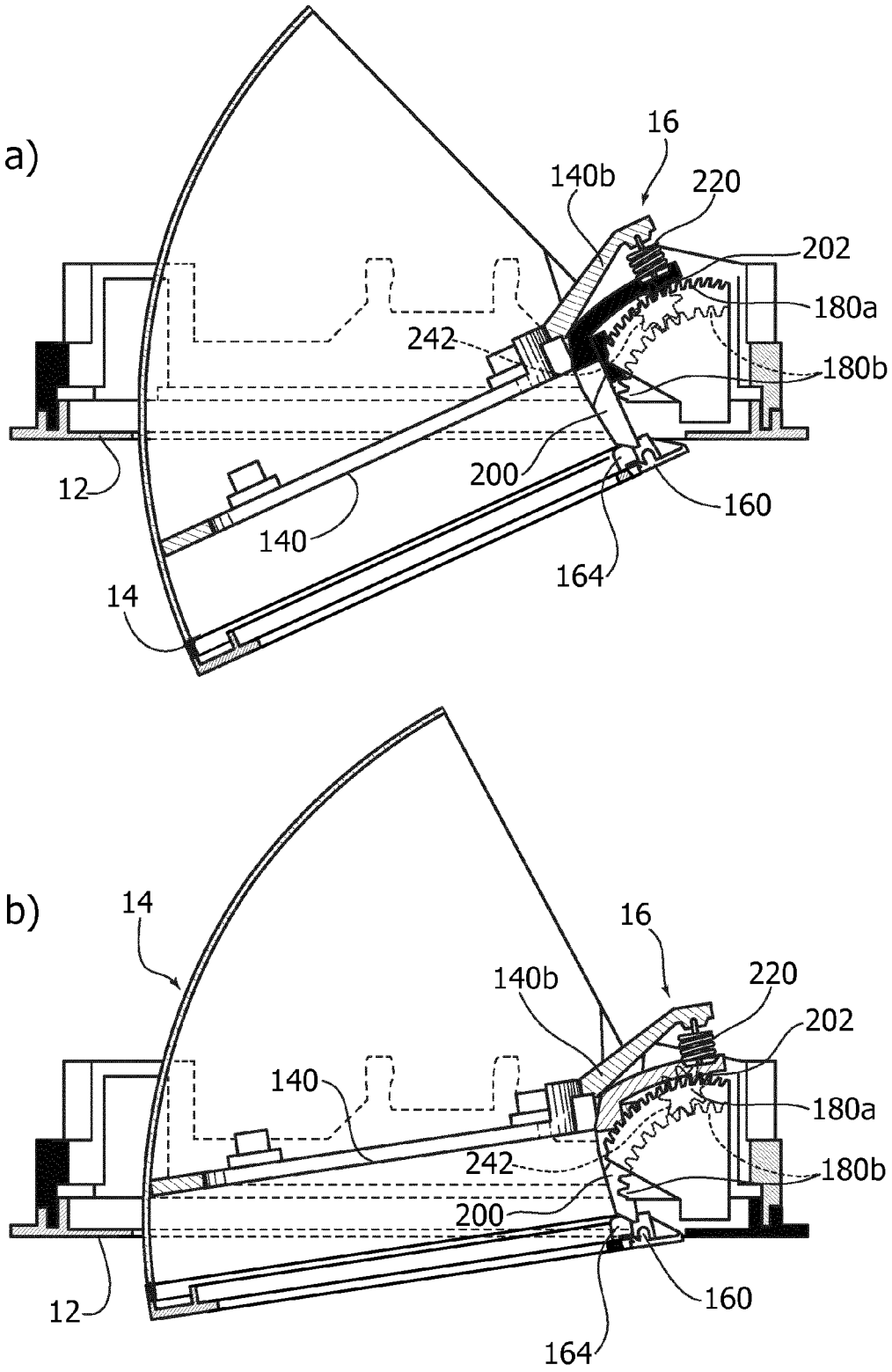
FIG. 11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EUROPEAN SEARCH REPORT

Application Number
EP 13 18 1897

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 2008/055905 A1 (CHIU SHIN-YUNG [TW]) 6 March 2008 (2008-03-06) * paragraph [0012] - paragraph [0025]; figures 1-4 * -----	1-9	INV. F21V21/30 F21S8/02
A	EP 0 736 729 A1 (TARGETTI SANKEY SPA [IT]) 9 October 1996 (1996-10-09) * column 2, line 37 - column 4, line 49; figures 1,2 * -----	1-9	
A	DE 299 16 102 U1 (SIDLER GMBH & CO [DE]) 24 February 2000 (2000-02-24) * page 6, line 12 - page 9, line 7; figures 1-5 * -----	1-9	
			TECHNICAL FIELDS SEARCHED (IPC) F21V F21S

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	16 December 2013	Arboreanu, Antoniu

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16-12-2013

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