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(54) Mounting device for lamp holders

(57) Mounting device (24) for lamp holders suitable for cooperating with a reflector (22) for a lighting apparatus (10), in which the reflector includes a wall suitable for defining a reflecting channel (36) which extends along a longitudinal axis and in which the mounting device (24) includes fixing means (40, 42, 44) suitable for cooperating with a plurality of lamp holders (26, 28) for tubular gas discharge lamps to fix such lamp holders to the mounting device.

The mounting device comprises a mounting plate (38) including the fixing means (40, 42, 44) which is intended to be arranged in a transversal position with respect to the longitudinal axis of the reflector. The fixing means comprise:

- first (42) fixing recesses to removably fix a lamp holder for linear lamp (28) to the mounting plate; and
- second (40, 42, 44) fixing recesses to fix in a selective and mutually exclusive way with respect to said lamp holder for linear lamp:

a) two lamp holders (28) for a linear lamp in a substantially side by side configuration; and, alternatively or in addition to the fixing of said pair of lamp holders for linear lamp, and in this last case in a mutually exclusive manner with respect to the fixing of said pair of lamp holders,
b) a lamp holder (26) for compact lamps.

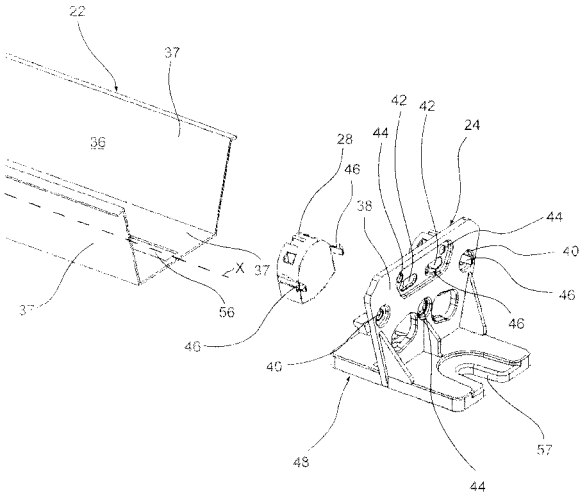

FIG. 5

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Description

[0001] The present invention refers to the technical field of lighting apparatuses and, more specifically, it concerns a mounting device for lamp holders as defined in the preamble of claim 1.

[0002] In many lighting apparatuses of the prior art a reflector group is foreseen including a reflector to project the light emitted by at least one lamp mounted to the reflector group a certain distance away from the lighting apparatus and mounting means to mount such a lamp to the reflector group.

[0003] A drawback of the lighting apparatuses of the prior art is represented by the fact that the reflector groups are normally designed in a specific way to exclusively cooperate with a predetermined type and number of lamps arranged in a predetermined operative configuration.

[0004] For example, referring to the case of bed head units used in hospitals or similar to assist a patient during hospitalization, such bed head units generally include at least one compartment to be used for lighting functions. In greater detail such bed head units usually comprise a containment structure including a plurality of independent housing spaces which are intended to house respective reflector groups which are different from one another. Each reflector group is particularly designed in a specific way depending on the function for which it is intended. For example, it may be that a reflector group used for ambient lighting can be devised to exclusively cooperate with a pair of lamps of a first type whereas a reflector group foreseen for the reading light can be devised to exclusively cooperate with a single lamp of a second type.

[0005] This forces bed head unit manufacturers to manufacture and to store different kinds of reflector groups, consequently determining substantial production and managing costs of the relative warehouse stock.

[0006] One purpose of the present invention is that of providing a mounting device for lamp holders which allows the aforementioned drawbacks with reference to the prior art to be avoided.

[0007] This and other purposes are achieved through a mounting device for lamp holders as defined and characterized in the attached claim 1 in its more general form and in the dependent claims in some of its particular embodiments.

[0008] Another object of the present invention is a group of parts as defined in any one of claims 17 to 20 and a bed head unit or a lighting apparatus as defined in claim 21.

[0009] The invention shall become clearer from the following detailed description of its embodiments, given as an example and therefore in no way limiting in relation to the attached drawings, in which:

- figure 1 is a perspective view of a lighting apparatus represented with some parts removed, in which such an apparatus comprises a plurality of lamps and a plurality of mounting devices for lamp holders according to an embodiment of the present invention;
- figure 2 is a perspective view of the lighting apparatus of figure 1 represented in a different operative configuration;
- figure 3 is a perspective view of the lighting apparatus of figure 2 seen from a different angle;
- figure 4 is a perspective view of a group of parts in which one of the mounting devices for lamp holders of figure 1 is visible in greater detail;
- figure 5 is a perspective view of the group of parts of figure 4 seen from a different angle and in which some components are represented detached;
- figure 6 is a perspective view of the group of parts of figure 5 seen from a different angle and in which one of the components has not been represented;
- figure 7 is a perspective view of the group of parts of figure 4, in which one of the components has not been represented and another component is represented in a different operative configuration;
- figure 8 is a perspective view of the group of parts of figure 7 in which one of the components has been replaced with a different component and in which the different components are represented detached from one another;
- figure 9 is a perspective view of the group of parts of figure 8 in which the components are represented attached to one another;
- figure 10 is a perspective view of the group of parts of figure 9 seen from a different angle;
- figure 11 is a perspective view which partially represents a group of parts comprising a mounting device according to a further embodiment of the present invention;
- figure 12 is a perspective view which partially represents the group of parts of figure 11 in which a component of such a figure has been removed;
- figure 13 is a perspective view in which the group of parts of figure 11 is seen from a different angle;
- figure 14 is a perspective view in which some components of the group of parts of figure 12 are seen from a substantially opposite side with respect to that of figure 13; and
- figure 15 is a perspective view in which a component of the group of parts of figure 11 is represented in greater detail.

[0010] In the following description, equivalent or similar elements represented in the figures shall be indicated with the same reference numerals.

[0011] Initially referring to figure 1, a lighting apparatus is wholly indicated with numeral 10. In the present example, the lighting apparatus is represented by a bed head unit 10 suitable for being used in hospitals or similar to assist a patient during hospitalization. However, the apparatus 10 can be in general a lighting apparatus suitable for being installed in civic buildings in general, such as buildings of the tertiary sector, for example offices.

[0012] Bed head units of the aforementioned type are usually intended for being installed, for example on a wall, close to the bed of the patient, and generally comprise a plurality of useful devices for the patient, such as medical gas pipes, electrical sockets etc., (not represented in the figures). The bed head unit 10 includes a containment structure or lighting body 12 comprising a plurality of housing spaces suitable for housing respective lamps.

[0013] In the example illustrated in figure 1, the lighting body 12 comprises two independent housing spaces 14, 16 in which two lighting groups 18, 20 are respectively received. Normally the housing spaces 14, 16 are each suitable for cooperating with a respective closing element (not represented in the figures), which is suitable for closing each of the lighting groups 18, 20 in the respective housing space and that is substantially transparent to the light emitted by one or more lamps associated with the lighting groups.

[0014] In the example illustrated in the figures each lighting group 18, 20 comprises a reflector 22, two mounting devices 24 for lamp holders in accordance with an embodiment of the present invention, at least one lamp holder 26, 28 and at least one lamp 30, 32. More specifically, referring to figure 1, the lighting group 20 comprises a single gas discharge lamp, more specifically a double ended tubular linear lamp 32 or "linear lamp", and two lamp holders of a first type 28 or lamp holders for a linear lamp or "linear lamp holders" intended to cooperate with such a lamp 32. Again with reference to figure 1, the lighting group 18 comprises, on the other hand, two gas discharge lamps, more specifically two single ended compact tubular lamps 30 or "compact lamps", and a second type of lamp holder 26 or "compact lamp holder" for each of such lamps 30.

[0015] It is worth explaining that the first 28 and second 26 type of lamp holders are *per se* known lamp holders and are specific for linear lamps 32 and for compact lamps 30, respectively. Such lamp holders generally include electrical connection means for the relative lamps. Moreover, it is worth explaining, that the expression "double ended" refers to lamps including electro-mechanical connecting members, such as connection jacks, foreseen on two opposite ends of the lamp and intended to simultaneously cooperate with two distinct lamp holders.

[0016] On the other hand, the expression "single ended" refers to lamps comprising electro-mechanical members foreseen at only one end of the lamp and intended to cooperate with a single lamp holder.

[0017] Referring now to figure 2, in which the bed head unit 10 is represented in a different operative configuration, the lighting group 20 comprises a pair of linear lamps 32 in a substantially side by side arrangement, where each of such lamps cooperates with a respective pair of linear lamp holders 28.

[0018] In the present example, the lamps 30, 32 illustrated in the figures are preferably, but not in a limiting manner, fluorescent lamps.

[0019] Figures from 4 to 7, represent in more detail the reflector 22 and the mounting device 24 for lamp holders. With reference to figure 4, the reflector 22, usually made in the form of an extruded aluminium profile, substantially extends along a longitudinal axis X (figures 4 and 11) and includes a concave wall suitable for defining a reflecting channel 36 to project light emitted by the lamps 30, 32 towards a region of space distant from the bed head unit 10.

In the example illustrated in figure 4, the reflector 22 is a symmetrical reflector and the concave wall comprises a plurality of walls 37 including a base wall joined with a pair of side walls which are inclined with respect to the base wall. However, the reflector 22 could also be an asymmetric reflector and/or the concave wall could comprise a single continuous wall, for example curved, suitable for defining the reflecting channel 36.

[0020] With reference to figure 5, the mounting device 24 comprises fixing means suitable for cooperating with a plurality of lamp holders to selectively and removably fix such lamp holders to the mounting device. More specifically, the mounting device 24 includes a mounting plate 38 comprising the aforementioned fixing means, and intended to be arranged in a transversal position with respect to the longitudinal axis X of the reflector 22. In accordance with an embodiment of the invention, the fixing means include a plurality of fixing recesses 40, 42, 44 suitable for cooperating with first anchoring members 46 and second anchoring members (not clearly visible in the figures) respectively foreseen on each linear lamp holder 28 and on each compact lamp holder 26, to removably fix such lamp holders to the mounting plate 38. In the example illustrated in the figures the first anchoring members comprise two elastic snap-in latching arms 46 whereas the second anchoring means (not clearly visible in the figures) include three latching protrusions substantially arranged according to the vertices of a triangle.

[0021] In accordance with the embodiment illustrated in figure 5, the plurality of fixing recesses 40, 42, 44 includes first and second fixing recesses. According to one embodiment the first and second fixing recesses respectively comprise a first 42 and a second 40, 42, 44 plurality of pass through fixing openings. The first plurality of openings 42 is suitable for removably fixing a linear lamp holder 28 to the mounting plate, in the example in a substantially central position with respect to the mounting plate 38. In the example, the second plurality of openings 40, 42, 44 is suitable for removably fixing a pair of linear lamp holders substantially side by side one another to the mounting plate alternatively with respect to the aforementioned linear lamp holder 28, i.e., in a selective and mutually exclusive way with respect to the aforementioned linear lamp holder 28.

[0022] In general the second plurality of fixing openings 40, 42, 44 can be made so that, as an alternative to or in addition to the fixing of said pair of linear lamp holders, and in this last case in a mutually exclusive way with respect to the fixing of said pair of linear lamp holders,

such a second plurality of openings allows a compact lamp holder 26 to be fixed to the mounting plate 38, in a mutually exclusive manner with respect to the fixing of said linear lamp holder 28.

[0023] In other words, the second plurality of openings 40, 42, 44 can be made so as to allow to removably fix to the mounting plate 38, in a mutually exclusive manner with respect to the aforementioned lamp holder 28 for a linear lamp fixed to the first plurality of openings 42, a pair of lamp holders 28 for linear lamp in a substantially side by side arrangement and/or a lamp holder 26 for compact lamp. More specifically, in the case in which the second plurality of openings 40, 42, 44 allows, like in the embodiments illustrated in the figures, said pair of lamp holders 28 for a linear lamp and the lamp holder 26 for a compact lamp, to be fixed, the pair of lamp holders 28 for a linear lamp and the lamp holder 26 for a compact lamp can be fixed to the mounting plate 38 in a mutually exclusive manner.

[0024] In the embodiment illustrated in figure 5, the first plurality 42 of fixing openings includes two slots 42.

[0025] Again with reference to figure 5, the second plurality 40, 42, 44 of fixing openings comprises a first 40, 42 and a second 44 group of pass through fixing openings which are suitable for respectively cooperating with a pair of linear lamp holders 28 and a compact lamp holder 26. In the example, the first group 40, 42 of openings comprises the two slots 42 and two distinct holes 40 each intended to cooperate with a respective lamp holder 28 for linear lamp of said pair, whereas the second group 44 of openings comprises three holes 44 substantially arranged according to the vertices of a triangle. In other words in the embodiment used in the example the two slots 42 are advantageously shared by the first 42 and the second 40, 42, 44 plurality of pass through fixing openings.

[0026] In accordance with one embodiment, the two slots 42 are positioned intermediate between the two holes 40. In such a way, in particular in the case in which the reflector is of the symmetrical type, it is advantageously possible to only use four openings 40, 42 to fix to the mounting device, in a mutually exclusive manner, either a single linear lamp holder 28 in a central position or a pair of linear lamp holders positioned side by side and in lateral positions with respect to said central position. In accordance with one particularly advantageous embodiment of the invention, the mounting device 24 comprises a base plate 48 arranged in a transversal position with respect to the mounting plate 38. With reference to the embodiments illustrated in the figures, the mounting plate 38 is substantially arranged perpendicular to the base plate 48 and it is joined at a central portion of such a plate. More specifically, in accordance with such embodiments, the mounting plate and the base plate are joined together so that the mounting device 24 has a generally "T"-shaped configuration.

[0027] With reference to figure 6, the mounting device includes interlocking means 50, 52, 54 suitable for cooperating with an end portion of the reflector 22 to removably interlock the mounting device 24 to the reflector.

[0028] In accordance with one particularly advantageous embodiment the interlocking means include abutting means 50 and elastic snap-in latching means 52, 54. In accordance with the embodiment illustrated in figure 6, the elastic snap-in latching means include a hook 52 and an elastic tooth 54 arranged on the base plate 48 of the mounting device. The elastic snap-in latching means are suitable for cooperating with a latching recess, in the example a pass through latching opening 56, foreseen on the concave wall of the reflector so that at least the hook 52 is suitable for passing through such a recess to hook onto the concave wall.

[0029] In accordance with one embodiment of the invention, the abutting means comprise a plurality of abutting protrusions, in the example a pair of protruding tabs 50, which project out from the mounting plate 38 and that are suitable for cooperating with an edge portion of the concave wall.

[0030] In accordance with one particularly advantageous embodiment, the hook 52 and the elastic tooth 54 are arranged between the protruding tabs 50.

[0031] Referring to figures 3 and 5, the mounting device 24 comprises locking means 57 for removably locking the mounting device to a supporting structure 58 foreseen in each housing space 14, 16 of the lighting body 12. In the example illustrated in figure 3, the supporting structure includes in particular a guiding structure comprising a pair of parallel rails or a track 60.

[0032] In accordance with one embodiment the locking means comprise a locking recess 57 foreseen on the base plate 48 of the mounting device. The locking recess 57 is suitable for cooperating with auxiliary locking means 62, such as a screw, a bolt and similar, to fix the mounting device to the supporting structure 58.

[0033] In accordance with one embodiment of the invention, the mounting device comprises centring and guiding means suitable for cooperating with the track 60 of the supporting structure. In accordance with a particularly advantageous embodiment, the centring and guiding means include a centring and guiding projection 64 (figure 10), foreseen on the base plate 48 of the mounting device on the opposite side with respect to the mounting plate 38. In accordance with the example illustrated in the figures, the centring and guide projection 64 is suitable for being intermediate between the tracks 60, i.e., between the rails 60, for slidingly guiding the mounting device along the guiding structure. In other words the centring and guiding projection 64 is suitable for being intermediate between the rails 60 so as to allow the position of the mounting device along such a structure to be adjusted.

[0034] Hereafter, a way of installing the mounting device in the bed head unit shall be described as an example.

[0035] Preliminarily the interlocking of the mounting device 24 with the reflector 22 is carried out by bringing

the concave wall of the reflector together with the base plate 48 of the mounting device so that the hook 52 passes through the latching recess 56 arranged on the concave wall. Thereafter, the reflector is made to translate towards the mounting plate 38. More specifically during the translating movement, the concave wall of the reflector causes the deformation and the withdrawal of the elastic tooth 54 elastically loading it whereas the edge portion of the concave wall slidingly inserts itself between the base plate 48 and the protruding tabs 50 arranged on the mounting plate 38. When the concave wall is substantially in abutment with the mounting plate 38, the elastic tooth 54 snaps into the latching recess, the hook 52 is hooked onto the concave wall and the edge portion is engaged between the protruding tabs 50 and the base plate 48. In such a way the mounting device is interlocked with the reflector. More specifically, in the example under consideration, the hook 52 and the elastic tooth 54 substantially stop the relative translation between the mounting device 24 and the reflector 22 along the longitudinal axis of the reflector, whereas the protruding tabs 50 and the base plate 48 stop the relative rotation of the same elements around a direction which is perpendicular to the longitudinal axis of the reflector.

[0036] The aforementioned interlocking operations can be repeated in an analogous manner for a further mounting device 24 so that the reflecting channel 36 is intermediate between two mounting devices interlocked at the two opposite ends of the reflector.

[0037] At this point the reflector group, including the reflector and the mounting devices, is coupled with the supporting structure 58. In particular the reflector group is coupled with the supporting structure by inserting the centring and guide projections of the mounting devices between the two rails 60, to allow the position of the group itself to be adjusted inside the lighting body 12, in an optimal way.

[0038] Once the correct positioning of the reflector group has been defined, such a group can advantageously be fixed to the supporting structure 58, for example, through a bolt 62 inserted in the locking recess 57 of each mounting device. In such a way the base plates 48 of the mounting devices are held tight between the nuts of the bolts and the track of the guiding structure (figure 3).

[0039] At this point one or more lamp holders can be fixed to each mounting device, depending on the desired operative configuration of the lamps 30, 32. For example, two linear lamp holders 28 can be fixed in a substantially side by side arrangement by inserting the two arms 46 of each lamp holder in one of the holes 40 and in one of the slots 42, respectively. Alternatively, and in a mutually exclusive manner with respect to the two side by side linear lamp holders, a single linear lamp holder 28 and, in a selective and mutually exclusive way, a single compact lamp holder 26 can be fixed to the mounting plate 38. More specifically the linear lamp holder 28 is fixed by inserting the two arms 46 respectively into the two slots 42, whereas the compact lamp holder 26 is fixed by inserting the latching protrusions (not clearly visible in the figures) inside the respective holes 44.

[0040] Based upon what has been described above, it is thus possible to understand how a mounting device for lamp holders according to the present invention is able to solve the aforementioned drawbacks with reference to the prior art.

[0041] The possibility of mounting both a single lamp and two lamps onto the lighting group also advantageously allows the light intensity of each lighting group to be increased or reduced depending on the specific requirements.

[0042] Advantageously, the fact that it is foreseen a mounting device for lamp holders suitable for allowing the fixing, in the aforementioned way, of a single lamp holder for linear lamp and, in a mutually exclusive manner with respect to such a lamp holder, of a pair of lamp holders for linear lamp substantially positioned side by side and/or a lamp holder for a compact lamp, advantageously allows a lighting group to be obtained suitable for passing from a single lamp configuration to a double lamp configuration whilst maintaining a compact structure of such group and at the same time a suitable uniformity of the distribution of the light radiation globally emitted by the lamps.

[0043] It is obvious that there can be modifications and/or variants to what has been described and illustrated above purely as an example.

[0044] In accordance with one embodiment of the invention the slots 42 could also each be divided into two distinct openings, for example two holes belonging to the first and to the second plurality of pass through fixing openings, respectively. In other words, in such a case the first and the second plurality of pass through fixing openings would not have any common fixing opening.

[0045] In accordance with one embodiment, not illustrated in the figures, the second plurality of fixing openings could be made so as to exclusively allow a single linear lamp holder 28 and, in a selective and mutually exclusive manner with respect to such a lamp holder, a single compact lamp holder 26 to be fixed to the mounting device. This could be carried out, for example, by not foreseeing the holes 40 on the mounting plate. In other words, in this embodiment, the second plurality of fixing openings 40, 42, 44 can be made so as to allow the lamp holder for compact lamp 26 to be fixed in a mutually exclusive manner with respect to the single lamp holder 28 for linear lamps, without allowing in this case the pair of lamp holders 28 for linear lamps to be fixed in a substantially side by side position.

[0046] In accordance with a further embodiment, not illustrated in the figures, the second plurality of fixing openings could be made so as to exclusively allow to fix to the mounting device a single linear lamp holder 28 and, in a selective and mutually exclusive way with respect to the single linear lamp holder, two linear lamp holders in a side by side position. This could be carried

out, for example, by not foreseeing the three holes 44. In other words, in this embodiment, the second plurality of fixing openings 40, 42, 44 could be made so as to allow the pair of lamp holders 28 for linear lamps to be fixed in a substantially side by side position, in a mutually exclusive manner with respect to the single lamp holders 28 for linear lamp, without allowing the lamp holder 26 for compact lamp to be fixed.

[0047] In accordance with a different embodiment of the lamp holders, the compact lamp holders 26 could foresee anchoring members at the mounting device, different with respect to the latching protrusions, such as a pair of holes intended to receive respective screws suitable for passing through the second group of pass through fixing openings 44. Similarly, also the linear lamp holders 28 could foresee anchoring members different with respect to the arms 46, for example, holes suitable for cooperating with respective screws.

[0048] In figures from 11 to 14 a particularly advantageous embodiment of a mounting device for lamp holders according to the present invention is illustrated. More specifically, in such figures it can be observed that, in addition or as an alternative to what has previously been described and illustrated, the mounting device 24 comprises snap-in connecting elements for removably coupling the mounting device with the supporting structure 58. In the example, the snap-in connecting elements advantageously comprise a fixing spring clip 100 (figures 12 and 15), preferably obtained from a strip of cut and bent metal. With particular reference to figure 12, the fixing spring clip 100 comprises a pair of opposite clamping arms 103, 105 for coupling with the supporting structure 58. As can be observed in figure 12, according to an embodiment, the fixing spring clip 100 also comprises a pair of grasping arms, preferably made in the form of two grasping tabs 108, 112. Moreover, the fixing spring clip 100 comprises a flat or plate shaped bridging fitting portion 115, which is intermediate between the pair of clamping arms 103, 105 and the pair of grasping tabs 108, 112. More specifically, in the example of figure 12, the fixing spring clip 100 is generally substantially in the shape of a bent "H". Even more specifically, the fixing spring clip is substantially "H"-shaped with at least the clamping arms bent. Advantageously, the clamping arms 103, 105 and the grasping tabs 108, 112 project from two opposite sides with respect to the bridging fitting portion 115.

[0049] According to an advantageous embodiment, the fixing spring clip 100 can be removably coupled with the mounting device 24. More advantageously the clip can be coupled with the base plate 48. In such a case the clamping arms comprise respective latching portions 116 substantially counter-shaped with respect to corresponding matching portions of the base plate, so as to allow the fixing spring clip to be coupled onto such a plate. According to a less advantageous alternative embodiment, such a clip, however, could also be substantially irremovably fixed to the mounting device 24. In such a case the fixing spring clip could be, for example, screwed, riveted, or glued to the base plate 48. As can be observed in figure 12, the fixing spring clip is advantageously suitable for being mounted across the base plate 48 so that the bridging fitting portion 115 can be arranged in contact with such a plate.

[0050] With particular reference to figures 13 and 14, it can be observed that according to an embodiment the locking means for removably locking the mounting device to the supporting structure 58 comprise an element for quarter-turn locking. In the example of figures 13 and 14 the locking means in particular comprise a locking hole or opening (not visible in the figures), foreseen on the base plate 48, and a locking pin 118 rotatably mounted in such a hole. The locking pin is suitable for taking on an operative locking position and an operative unlocking position angularly distanced from one another around the axis of the locking hole. In the example the pin 118 comprises a preferably flat head portion 119, including two abutment ears 122, 124 which are suitable for abutting, when the pin respectively takes on the locking position and the unlocking position, against two abutment elements 126, 128 foreseen on the base plate 48. Preferably, the head portion 119 comprises an actuating recess 129 suitable for receiving a tool (not represented in the figures), such as a screwdriver, to actuate the pin 119 in rotation. As can be seen in figure 14, the pin also comprises a substantially "T"-shaped foot portion 132. When the pin 118 takes on the unlocking position (not represented in the figures) the foot portion 132 is substantially parallel to the rails 60 so as to not mechanically interfere with such rails. On the other hand, when the pin takes on the locking position (figure 14) such a portion is suitable for mechanically interfering with the track 60 to lock the mounting device 24 onto the supporting structure 58.

[0051] With reference to figures 11 and 13, it can be observed that the fixing spring clip 100 is advantageously suitable for being operatively intermediate between the mounting device 24 and the reflector 22, more preferably between the base plate 48 and the reflector 22. Again with reference to such figures, it can be observed that according to an advantageous embodiment, the reflector 22 comprises a pair of movement openings 135, 137, in the example the same as one another, which are suitable for being passed through by the grasping tabs 108, 112, respectively. More specifically, while they are passed through by the grasping tabs, the movement openings 135, 137 are suitable for allowing a mutual approach movement of such tabs so as to decouple the mounting device 24 from the supporting structure 58. With reference to figure 11, it can be observed that according to an advantageous embodiment, the movement openings 135, 137 each extend from the same end of the reflector 22. Even more advantageously, each of the movement openings 135, 137 includes a guiding portion 139, for inserting the grasping tabs 108, 112, and a moving portion 142, for the movement of such tabs. In the example, the guide portion 139 is relatively narrower, and it is substantially configured as a slit made starting at one end of

the reflector 22. On the other hand, the moving portion 142 is relatively wider so as to allow the grasping tabs to be moved.

[0052] The installation of the mounting device 24 in the lighting apparatus 10, according to the embodiment shown in figures from 11 to 14, can be carried out in a way described hereafter.

[0053] If the fixing spring clip 100 is able to be removably coupled with the mounting device 24, such a clip can be coupled with the base plate 48 arranging it bridging the base plate 48 so that the bridging fitting portion 115 faces it and is arranged at a certain distance from such a plate. Thereafter, the fixing spring clip can be pushed towards the base plate 48 so as to elastically deform the clamping arms 103, 105, in particular, so as to open such arms, up until the latching portions engage by snapping-in with the corresponding matching portions of the base plate and the bridging fitting portion 115 comes into contact with such a plate. In particular, when the fixing spring clip is coupled with the base plate 48, the clamping arms have respective end portions which protrude from such a plate. At this point, with the fixing spring clip coupled with the mounting device, the connection between such a device and the reflector 22 can be carried out in a substantially analogous way to that described above. Specifically, in this case, during the translation movement of the reflector towards the mounting plate 38, the grasping tabs 108, 112 slide through the guiding portions 139 of the movement openings 135, 137 until they pass through the movement portions 142 of such openings. More specifically, when the mounting device and the reflector are stably coupled together, the grasping tabs pass through the movement portions 142 and the bridging fitting portion 115 is intermediate between the reflector and the base plate 48.

[0054] The coupling operations between the aforementioned mounting device and reflector can be repeated in an analogous way for a further mounting device 24 so that the reflector is intermediate between two mounting devices fixed at the opposite ends of the reflector itself.

[0055] At this point the reflector group including the reflector 22 and the mounting devices 24 can be coupled with the supporting structure 58 in a similar manner to that previously described. More specifically, in this case, preferably when the centring projection 64 (figure 14) is inserted between the rails 60, the reflector group can be pushed towards such rails so as to allow such a group to be coupled with the supporting structure 58 through the fixing spring clip. In other words, when the reflector group is pushed against the supporting structure, the rails 60, cooperating with the end portions of the clamping arms 103, 105, elastically deform such arms, in particular opening them, until the reflector group comes into contact with the rails 60 and the clamping arms snap-into the rails themselves.

[0056] It should be observed that once the reflector group is coupled with the supporting structure 58 through the fixing spring clip, the position of such a group along the track 60 can easily be adjusted, thus preventing, for example, the reflector group from slipping out of the hand of a worker, and therefore be damaged by dropping to the ground, while the worker carries out such an adjustment.

[0057] Once it has been coupled to the track 60, the reflector group can subsequently be secured to the supporting structure 58, for example, by inserting a screwdriver in the actuation recess 129 of the locking pins 118 so as to actuate such pins in rotation bringing them into the locking position.

[0058] As far as the decoupling of the reflector group from the supporting structure 58 is concerned, this can be carried out easily by bringing the locking pins into the unlocking position, for example through a screwdriver, and subsequently by acting upon the grasping tabs 108, 112 so as to facilitate the uncoupling of the clip from the track 60. More specifically, if the grasping tabs are acted upon, for example manually, so as to deform them elastically and bring them closer to each other, this causes the clamping arms to open out thus facilitating the release of the fixing spring clip from the track 60.

[0059] It should therefore be emphasised, that foreseeing snap-in connecting elements, and more preferably the fixing spring clip, advantageously allows the installation of the reflector group, or rather of the mounting device in the lighting apparatus to be easier and faster.

[0060] Without affecting the principle of the invention, the embodiments and the details can be widely varied with respect to what has been described and illustrated purely as an example and not for limiting purposes without for this reason departing from the scope of the invention as defined in the attached claims.

Claims

1. Mounting device (24) for lamp holders suitable for cooperating with a reflector (22) for a lighting apparatus (10), the reflector including a wall suitable for defining a reflecting channel (36) which extends along a longitudinal axis and the mounting device (24) including fixing means (40, 42, 44) suitable for cooperating with a plurality of lamp holders (26, 28) for tubular gas discharge lamps to fix such lamp holders to the mounting device,
   characterized in that it comprises a mounting plate (38) including said fixing means (40, 42, 44) and which is intended to be arranged in a transverse position with respect to said longitudinal axis, the fixing means comprising:

   - first fixing recesses (42) for removably fixing a lamp holder for a linear lamp (28) to the mounting plate; and
   - second fixing recesses(40, 42, 44) for removably fixing to the mounting plate (38), in a selec-

tive and mutually exclusive way with respect to said lamp holder (28) for a linear lamp, a pair of lamp holders (28) for a linear lamp in a substantially side by side arrangement and/or a lamp holder (26) for a compact lamp;
in the case in which the second fixing recesses (40, 42, 44) allow said pair of lamp holders (28) for a linear lamp and said lamp holder (26) for a compact lamp to be fixed, said pair of lamp holders (28) for linear lamp and said lamp holder (26) for compact lamp being adapted to be fixed to the mounting plate (38) in a mutually exclusive manner.

2. Mounting device (24) for lamp holders according to claim 1, wherein the first (42) and second (40, 42, 44) fixing recesses respectively include a first (42) and a second (40, 42, 44) plurality of pass through fixing openings.

3. Mounting device (24) according to claim 1 or 2, wherein said second (40, 42, 44) fixing recesses allow at least said pair of lamp holders (28) for a linear lamp to be fixed to the mounting plate (38) in a substantially side by side position and comprise at least two distinct fixing recesses (40) each intended to cooperate with a respective lamp holder (28) for a linear lamp of said pair, the first fixing recesses (42) being intermediate between said two recesses (40).

4. Mounting device (24) for lamp holders according to any one of the previous claims, wherein said second fixing recesses (40, 42, 44) allow at least said pair of lamp holders (28) for a linear lamp to be fixed to the mounting plate (38) in a substantially side by side position and wherein the first (42) and second (40, 42, 44) fixing recesses have at least two common fixing recesses (42).

5. Mounting device (24) for lamp holders according to any one of the previous claims, wherein said second fixing recesses (40, 42, 44) allow said pair of lamp holders (28) for a linear lamp to be fixed to the mounting plate (38) in a substantially side by side position as well as allowing said lamp holder (26) for a compact lamp to be fixed to the mounting plate (38), said second fixing recesses (40, 42, 44) including a first (40, 42) and a second (44) group of fixing recesses without fixing recesses shared among the two groups, wherein :

- the first group (40, 42) of fixing recesses is suitable for fixing said pair of lamp holders (28) for linear lamps to the mounting plate (38) substantially side by side; and
- the second group (44) of fixing recesses is suitable for fixing said lamp holder (26) for a compact lamp to the mounting plate (38).

6. Mounting device (24) for lamp holders according to any one of the previous claims, suitable for cooperating with a lighting apparatus (10) including a supporting structure (58) for the reflector (22), the mounting device (24) comprising locking means (57, 118) suitable for cooperating with the supporting structure (58) to removably lock the mounting device (24) to said supporting structure (58).

7. Mounting device (24) for lamp holders according to claim 6, wherein the supporting structure (58) comprises a guiding structure (60) and the mounting device (24) comprises centring and guiding means (64) suitable for cooperating with the guiding structure (60) for slidingly guiding the mounting device (24) along said guiding structure so as to allow the position of the mounting device (24) along such a structure (60) to be adjusted.

8. Mounting device (24) for lamp holders according to any one of the previous claims, wherein the mounting device comprises interlocking means (50, 52, 54) suitable for cooperating with an edge portion of the reflector wall (22) to removably interlock the mounting device to the reflector, the interlocking means (50, 52, 54) including elastic snap-in latching means (52, 54) and abutting means (50).

9. Mounting device (24) for lamp holders according to claim 8, wherein the edge portion of the reflector wall comprises at least a latching recess (56) and wherein the elastic snap-in latching means (50, 52, 54) comprise a hook (52) and an elastic tooth (54) suitable for cooperating with said latching recess (56), at least the hook (52) being suitable for passing through such a latching recess to latch onto said wall; the abutting means further comprising a plurality of abutting protrusions (50) protruding from the mounting plate (38), said protrusions being suitable for cooperating with the edge portion of the reflector wall.

10. Mounting device (24) for lamp holders according to any one of the previous claims, including a base plate (48) which is transversally positioned with respect to the mounting plate (38).

11. Mounting device (24) for lamp holders according to claim 10 dependent upon claim 8 or 9, wherein the base plate (48) comprises said elastic snap-in latching means (52, 54).

12. Mounting device (24) for lamp holders according to any one of claims 10 or 11 dependent upon claim 6, wherein the base plate (48) comprises said locking means (57, 118).

13. Mounting device (24) for lamp holders according to claim 1, suitable for cooperating with a lighting ap-

paratus (10) including a supporting structure (58) for the reflector (22), the mounting device (24) comprising snap-in connecting elements (100) for removably coupling said device (24) with the supporting structure (58).

14. Mounting device (24) for lamp holders according to claim 13, wherein the snap-in connecting elements comprise a fixing spring clip (100).

15. Mounting device (24) for lamp holders according to claim 14, wherein the fixing spring clip (100) comprises a pair of opposite clamping arms (103, 105) for coupling with said supporting structure (58), a pair of opposite grasping arms (108, 112) and a bridging fitting portion (115) intermediate between said pairs of arms (103, 105, 108, 112), the pair of clamping arms (103, 105) and the pair of grasping arms (108, 112) respectively protruding from two opposite sides with respect to the bridging fitting portion (115).

16. Mounting device (24) for lamp holders according to any one of claims 14 or 15, wherein the fixing spring clip (100) can be removably coupled with the mounting device (24).

17. Group of parts (22, 24)including:

- a reflector (22) for a lighting apparatus (10), the reflector including a wall suitable for defining a reflecting channel (36) extending along a longitudinal axis; and
- at least one mounting device (24) for lamp holders as defined in any one of the previous claims.

18. Group of parts according to claim 17 dependent upon any one of claims 15 or 16, wherein said fixing spring clip (100) is suitable for being operatively intermediate between the mounting device (24) and the reflector (22).

19. Group of parts according to claim 18, wherein the reflector (22) comprises a pair of movement openings (135, 137) suitable for being respectively passed through by said grasping arms (108, 112) and such as to allow, while they are passed through by such arms, a mutual approach of the grasping arms (108, 112) to decouple the mounting device (24) from the supporting structure (58).

20. Group of parts according to claim 19, wherein said movement openings (135, 137) each extend from a same end of the reflector (22).

21. Bed head unit suitable for being used during hospitalizations and similar, or apparatus for lighting civic buildings in general, including a mounting device (24) as defined in any one of claims 1 to 16 or a group of parts as defined in any one of claims 17 to 20.

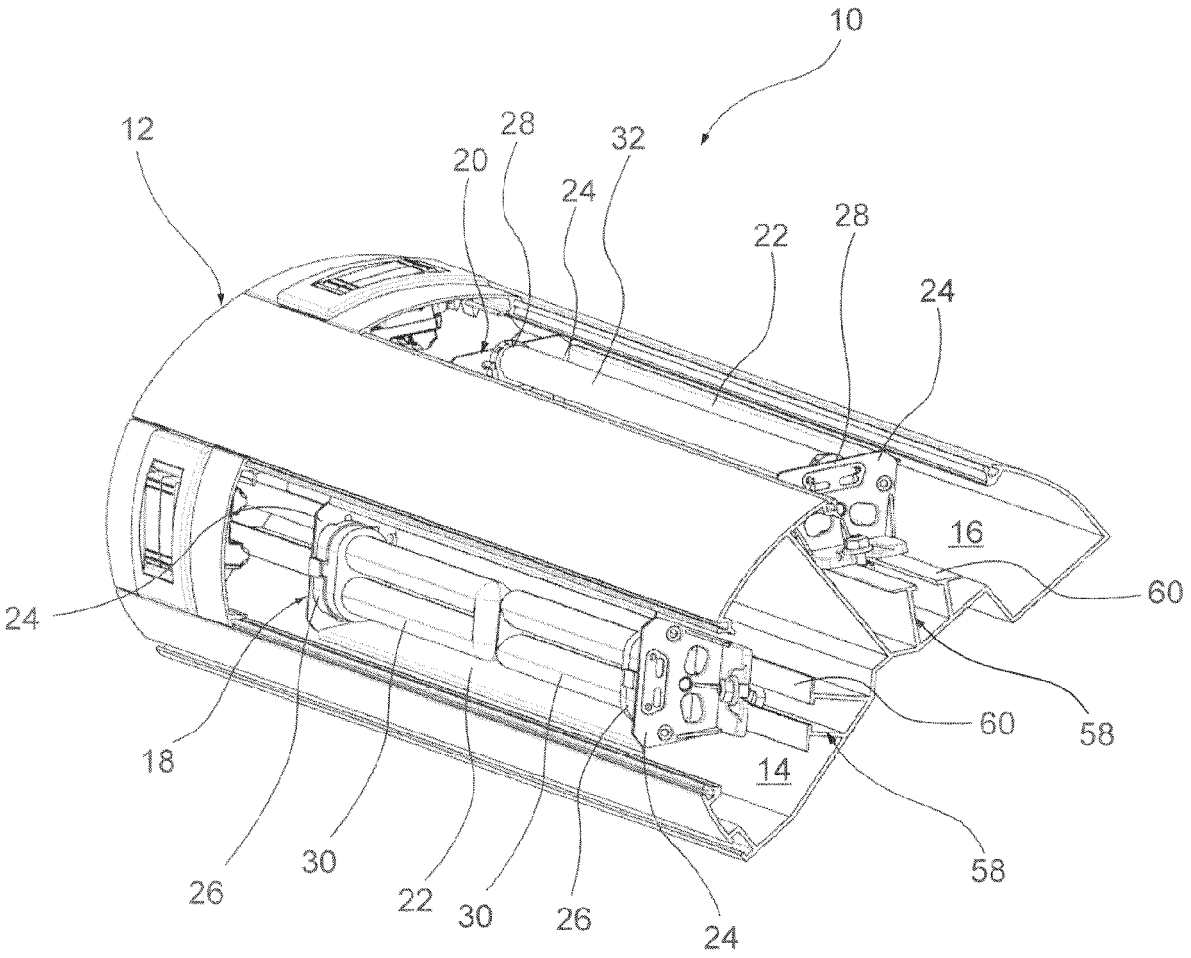

FIG. 1

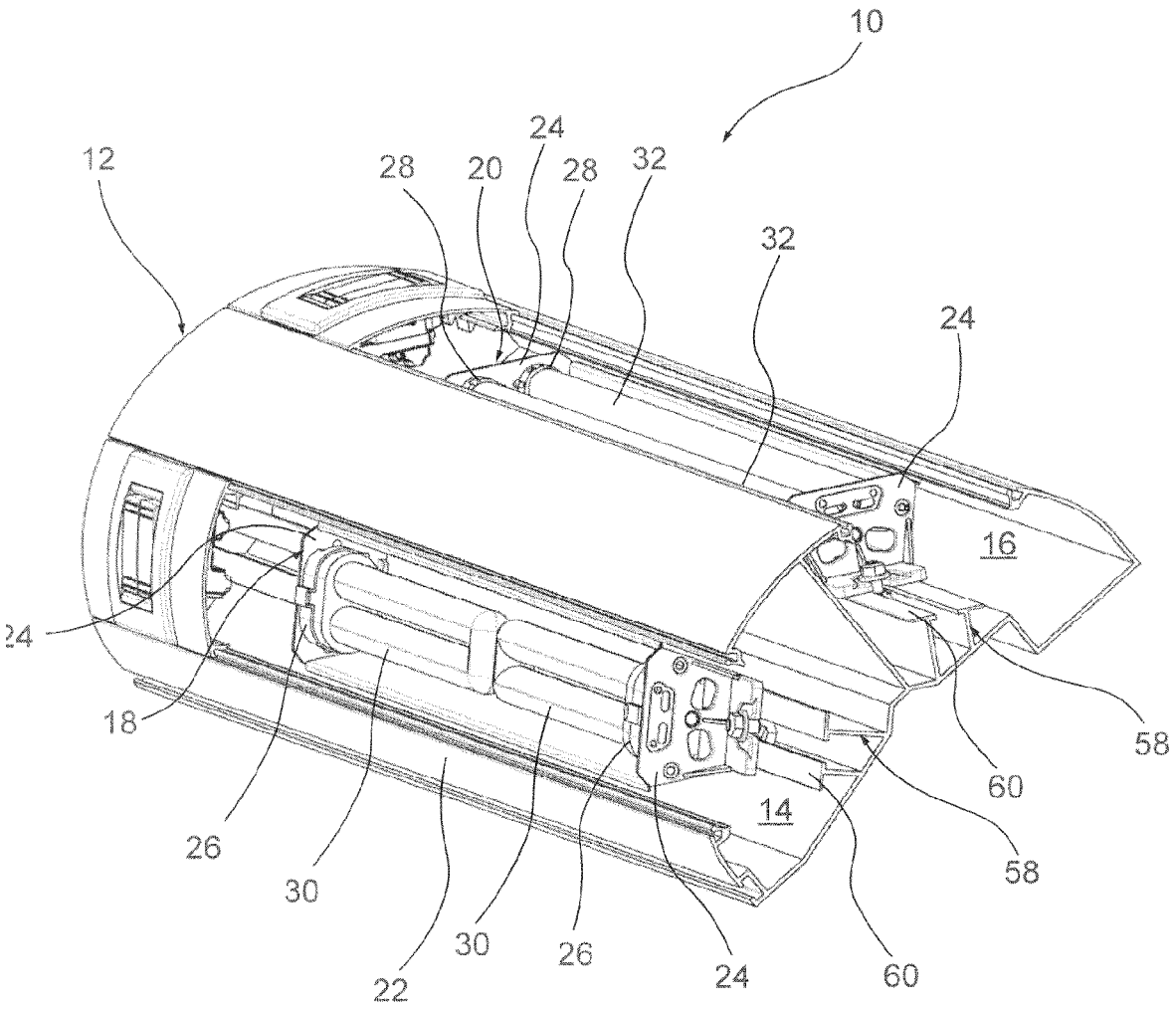

FIG. 2

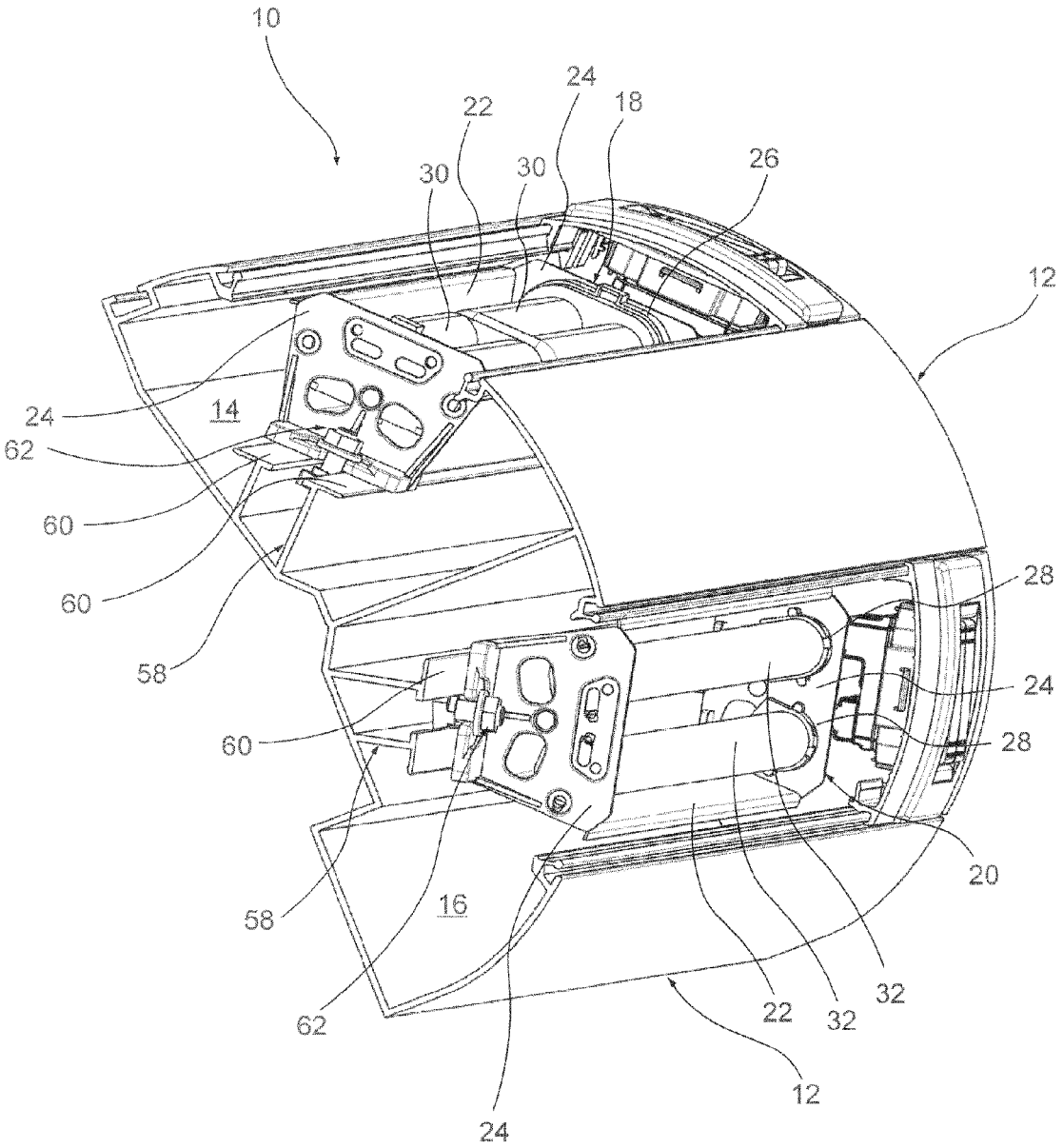
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FIG. 3

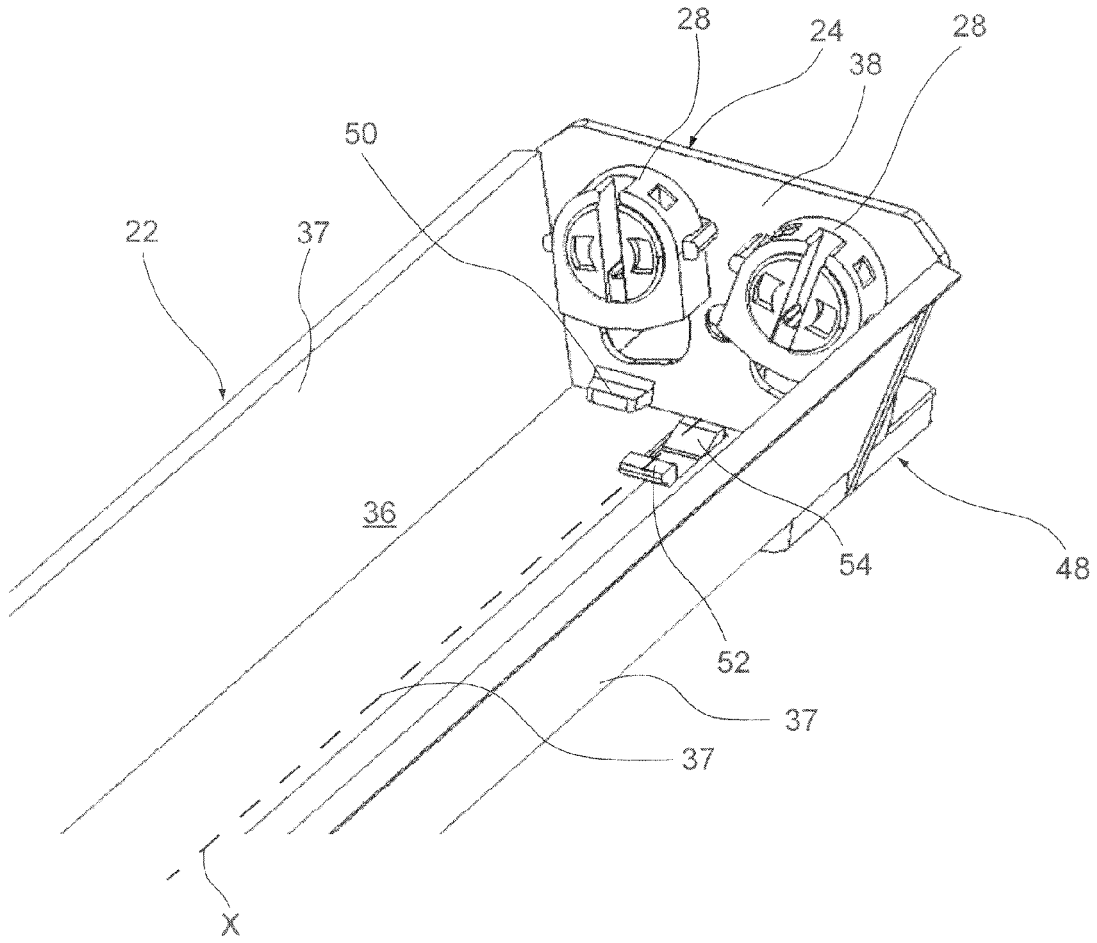

FIG. 4

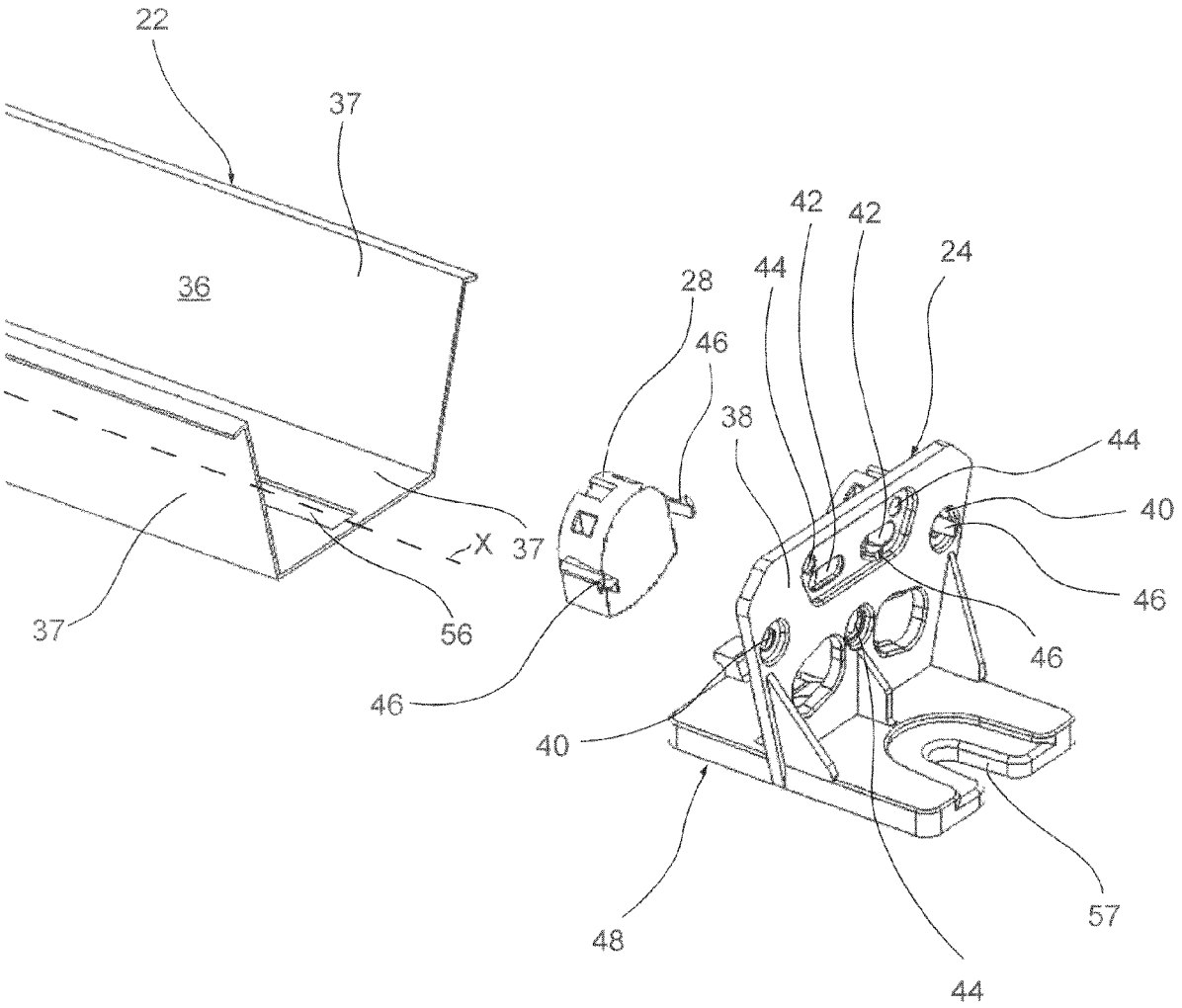

FIG. 5

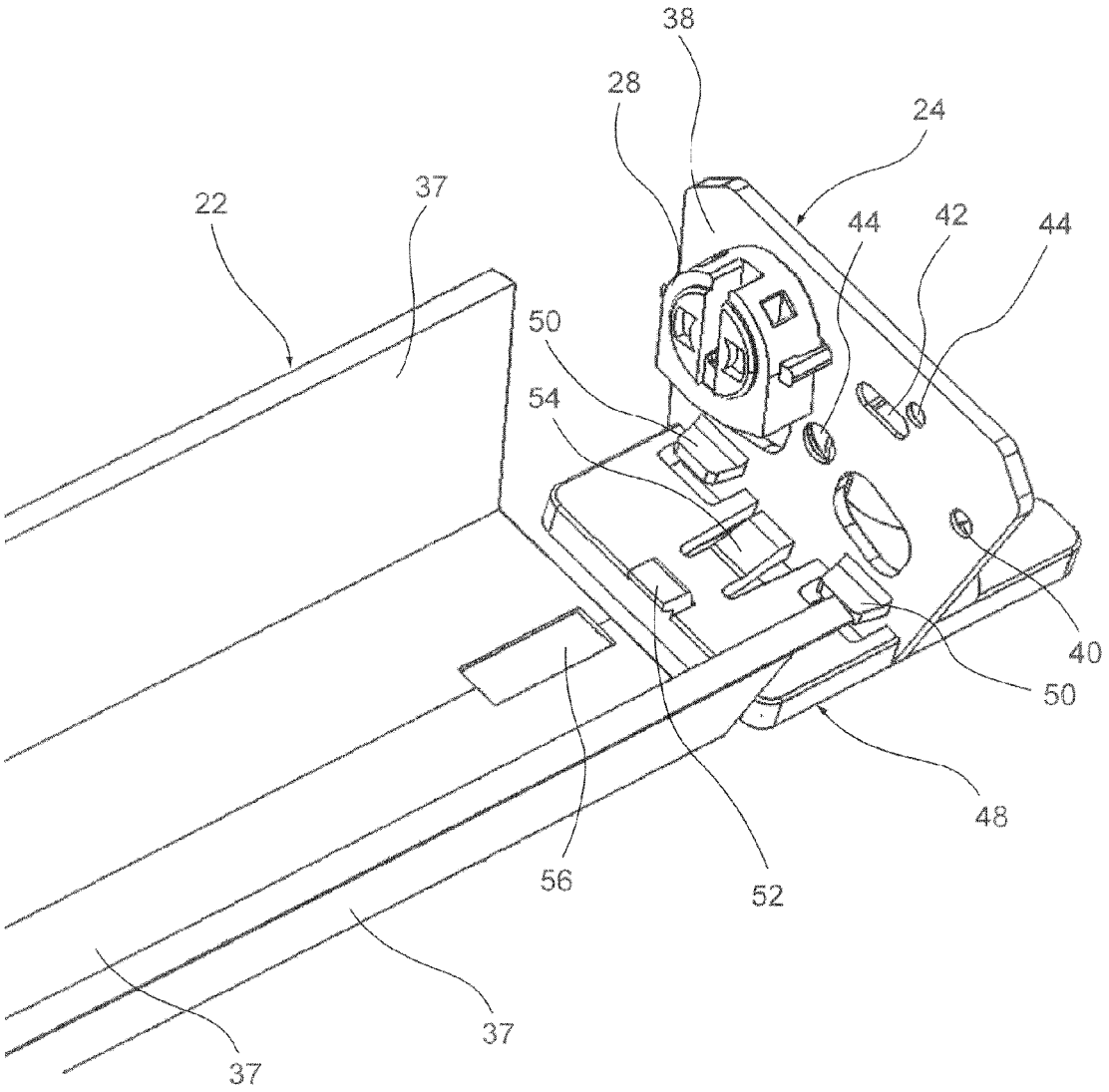

FIG. 6

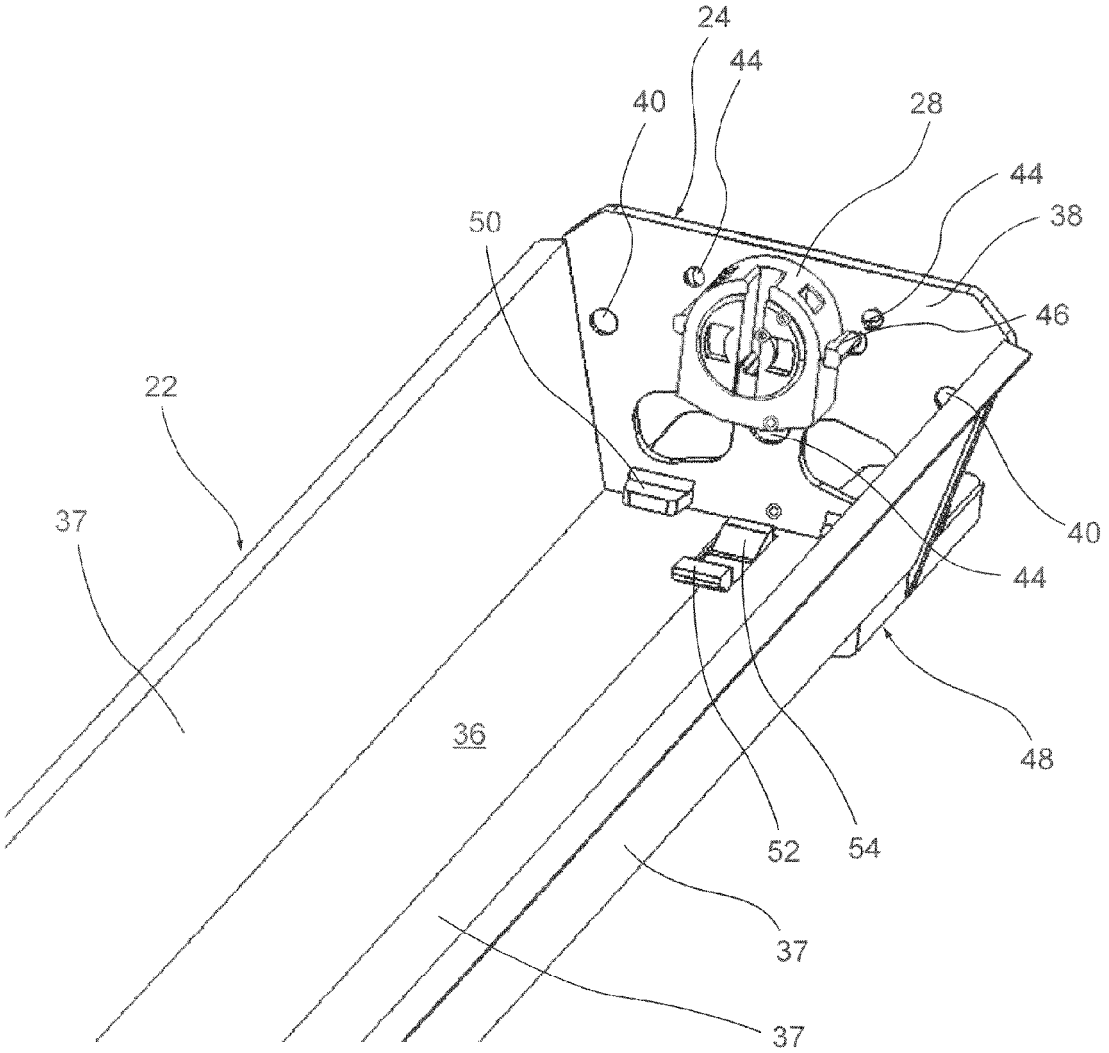

FIG. 7

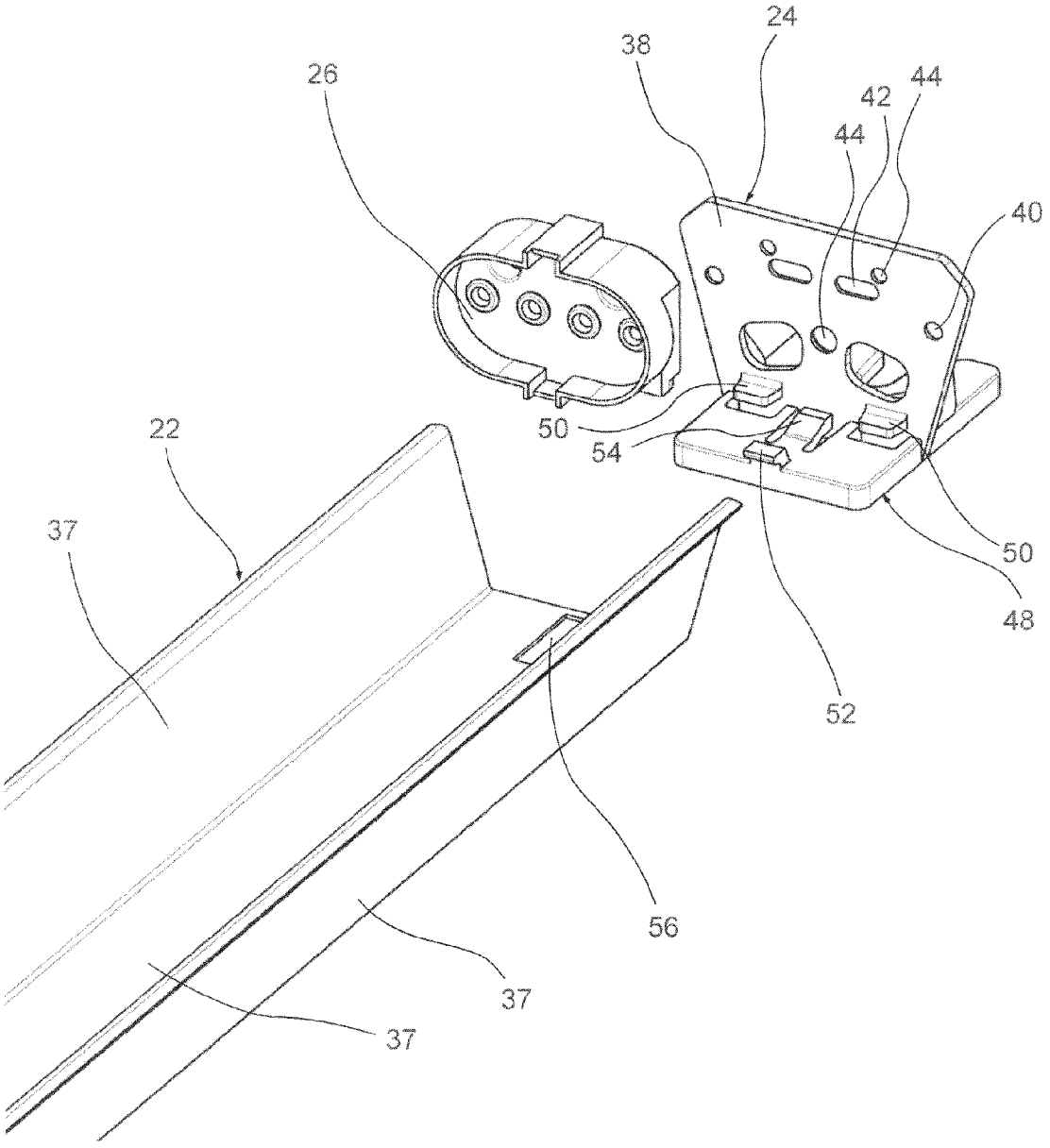

FIG. 8

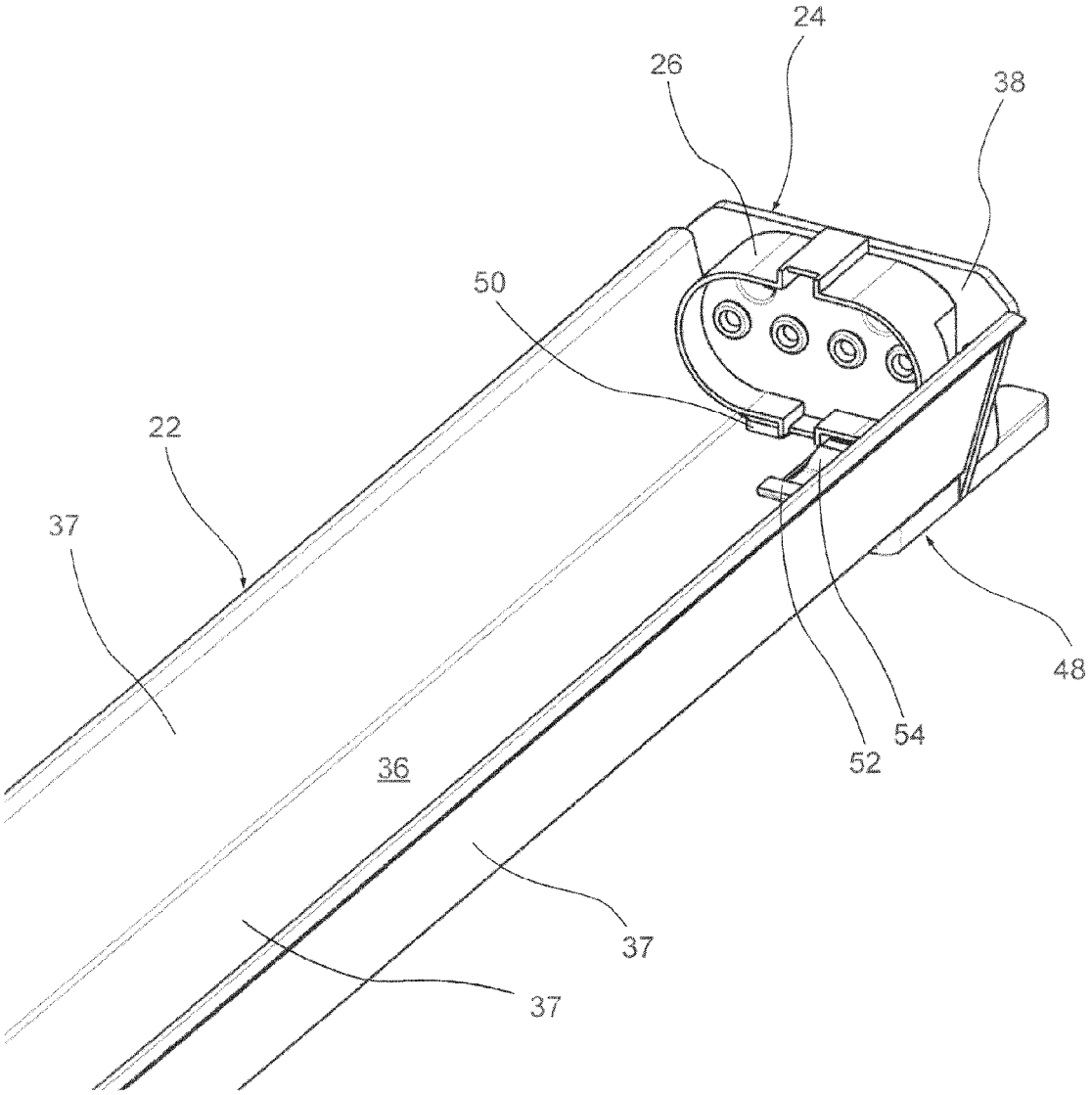

FIG. 9

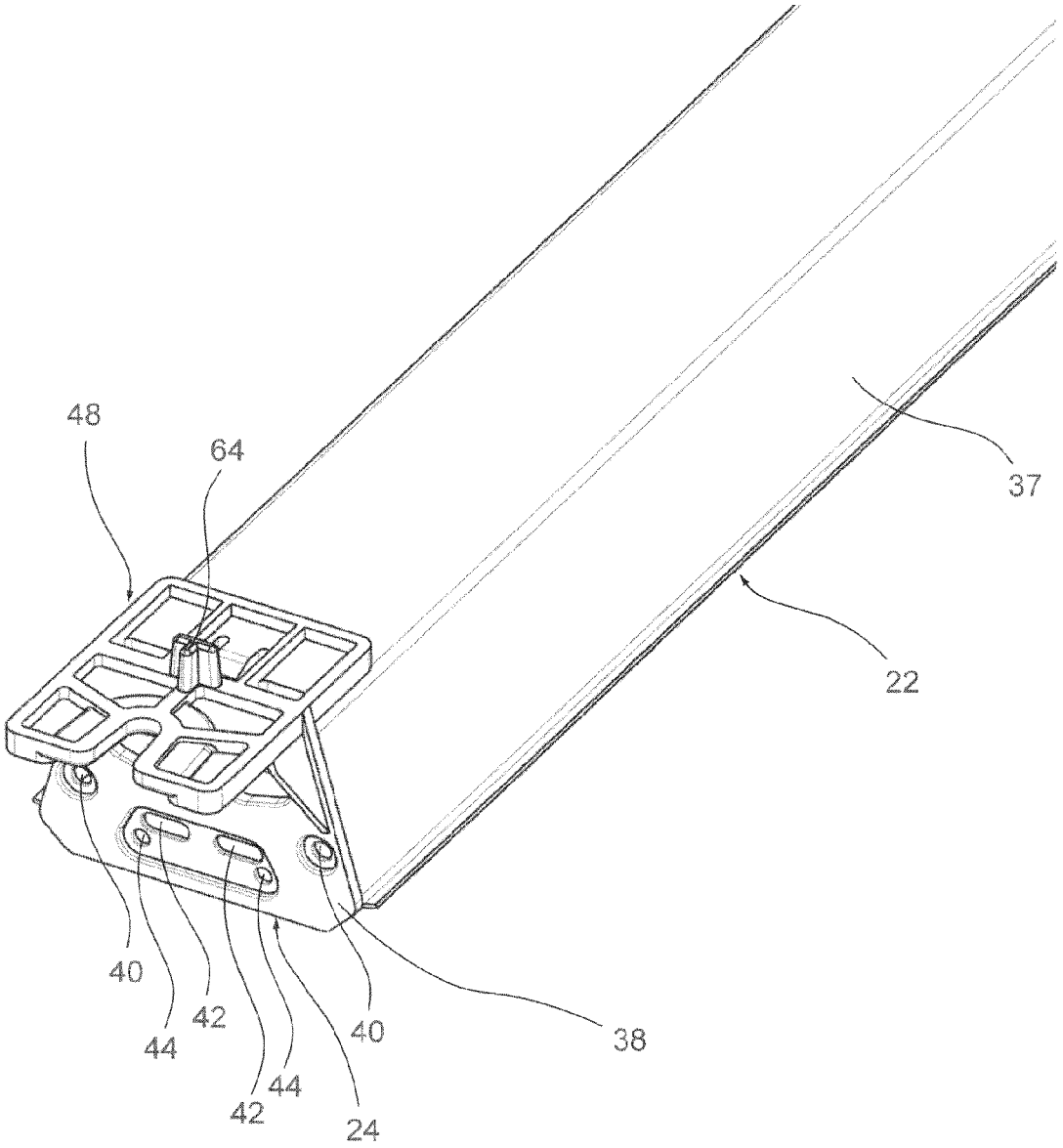

FIG. 10

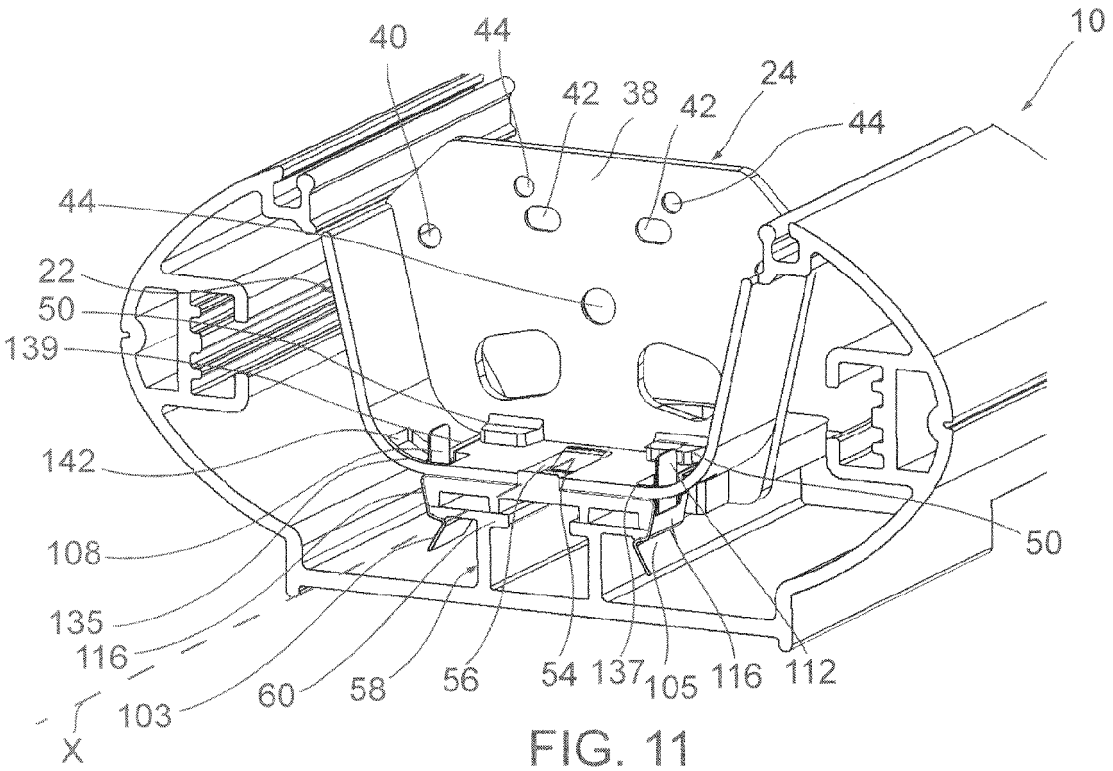
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FIG. 11

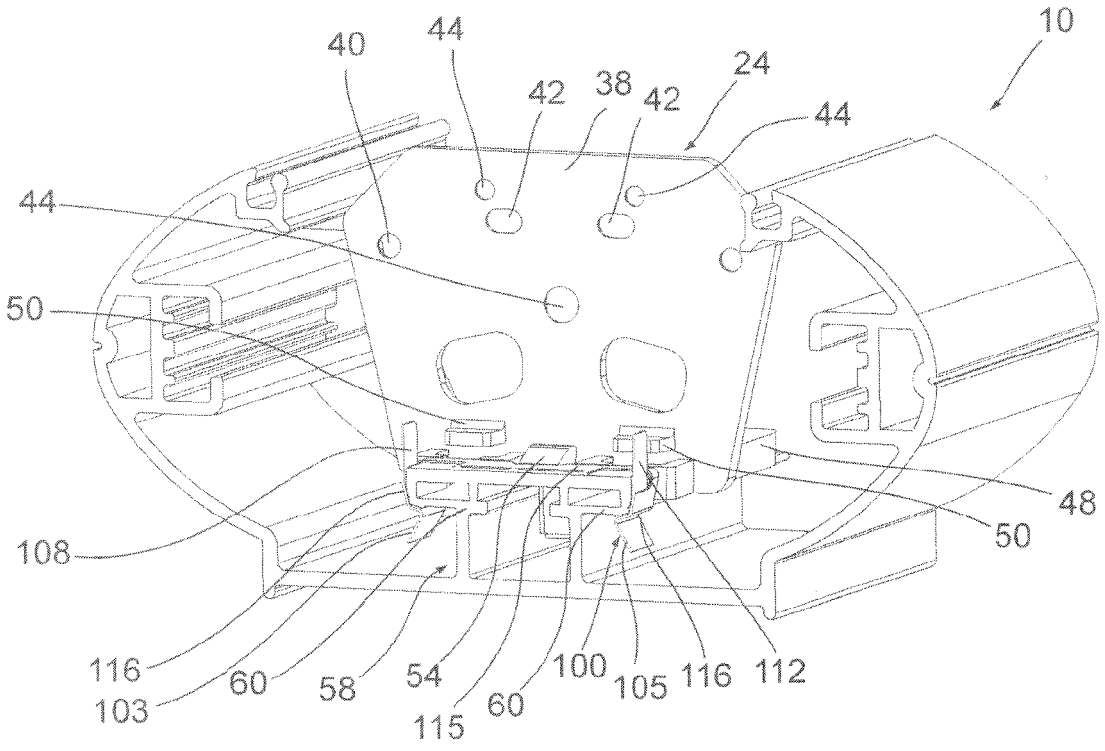
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FIG. 12

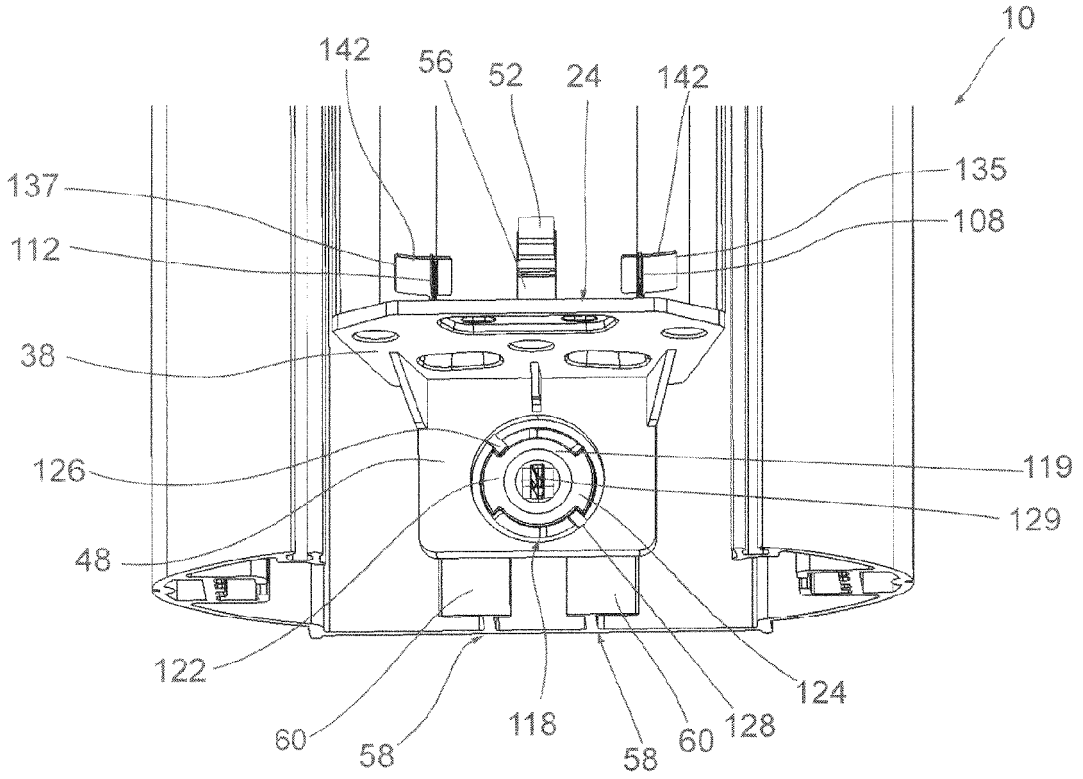
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FIG. 13

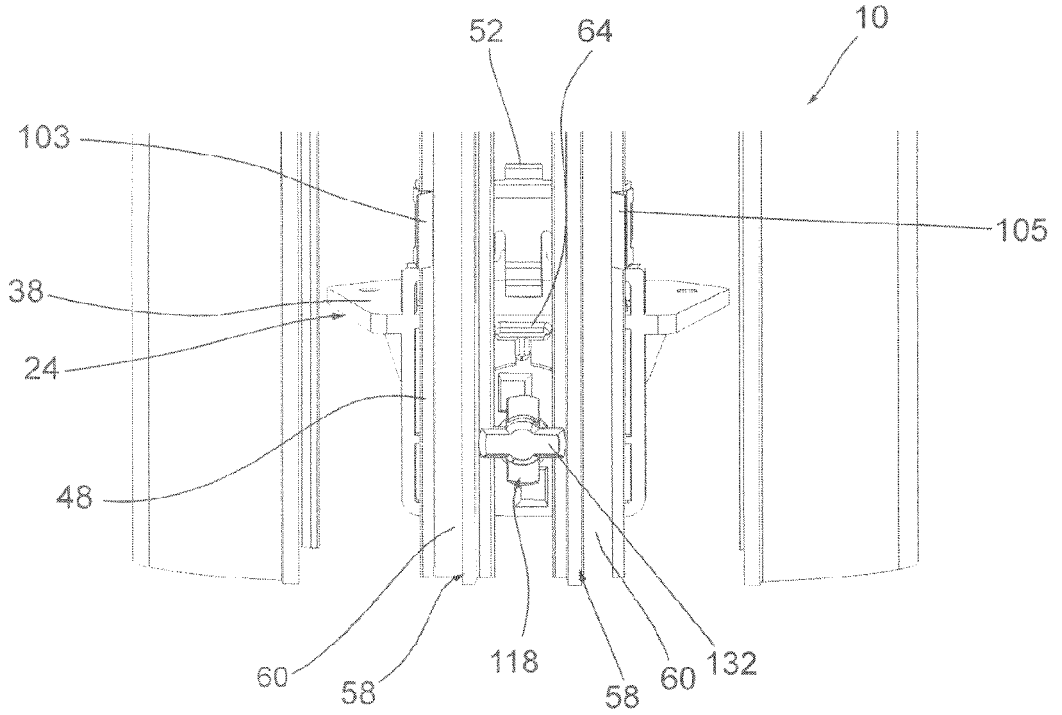
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FIG. 14

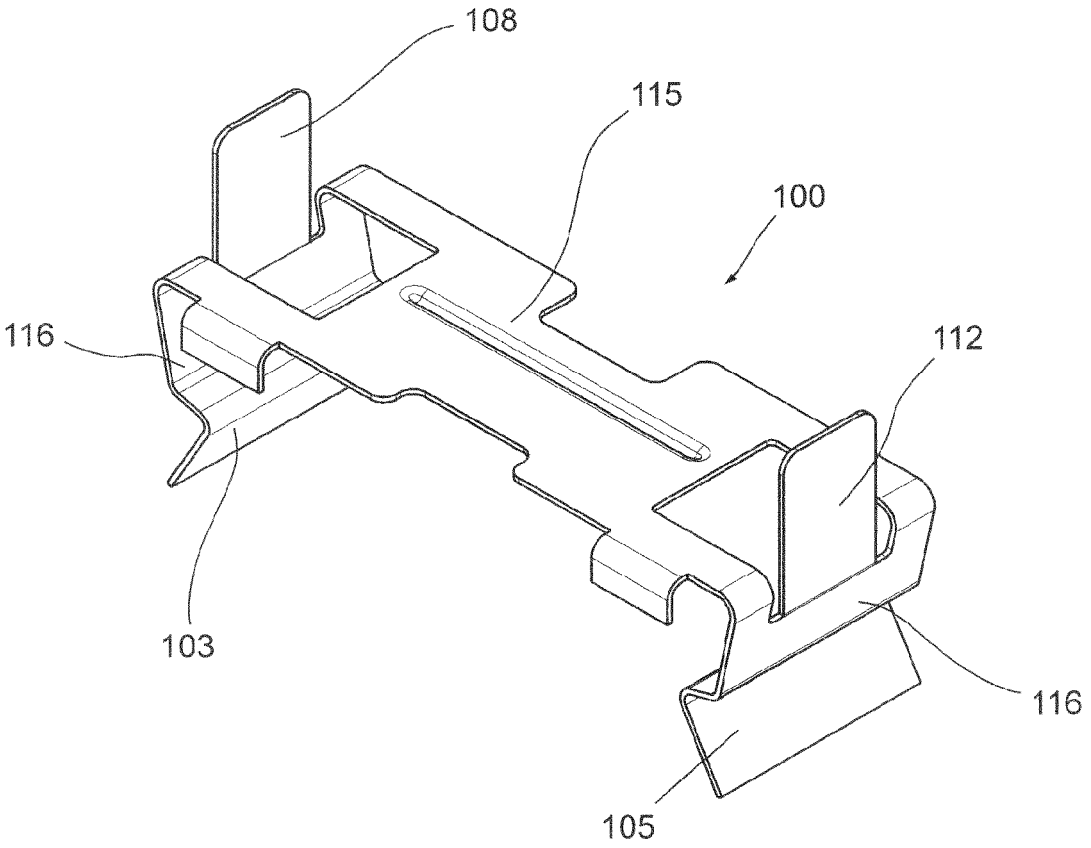

FIG. 15

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EUROPEAN SEARCH REPORT

Application Number
EP 09 16 6908

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	GB 615 712 A (BRITISH THOMSON HOUSTON CO LTD) 11 January 1949 (1949-01-11) * page 1 - page 6; figures 1-19 * -----	1-21	INV. F21V19/00
X	US 2 379 798 A (GUTH EDWIN F) 3 July 1945 (1945-07-03) * page 1 - page 2; figures 1-9 * -----	1-21	
X	US 3 080 476 A (GOLKO EDWARD H) 5 March 1963 (1963-03-05) * column 1 - column 6; figures 1-5 * -----	1-21	
X	US 3 359 414 A (HANS EGE) 19 December 1967 (1967-12-19) * column 1 - column 6; figures 1-10 * -----	1-21	
			TECHNICAL FIELDS SEARCHED (IPC) F21V

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	27 October 2009	Stirnweiss, Pierre

CATEGORY OF CITED DOCUMENTS

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27-10-2009

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82