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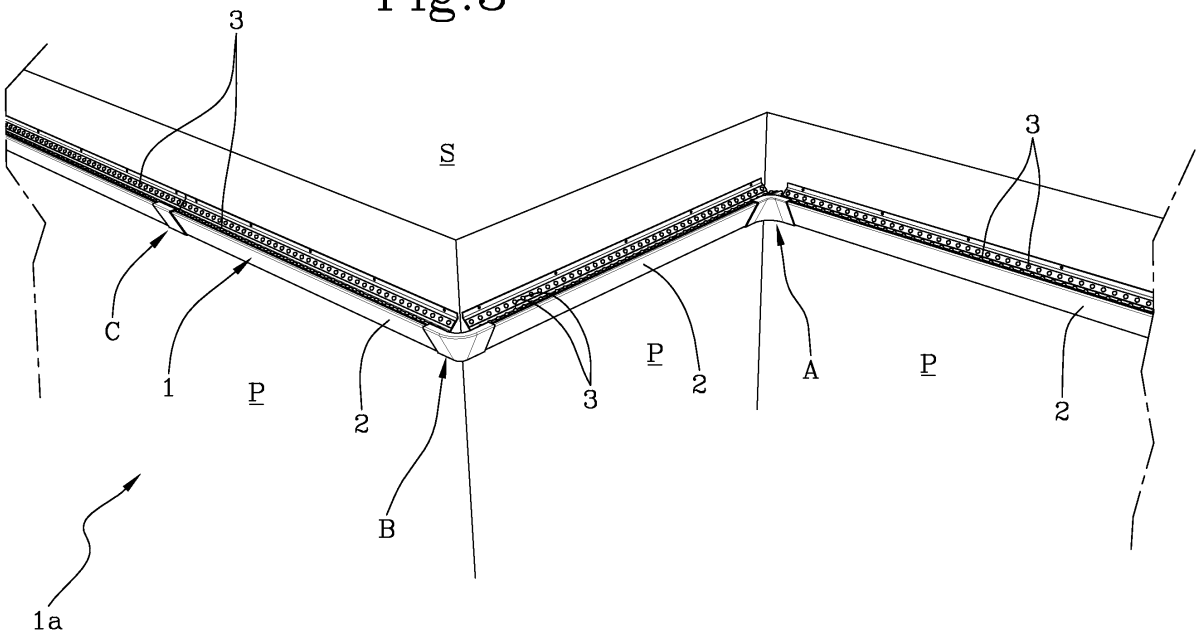
(54) **A system for supporting led lighting**

(57) Described is a supporting system (1) for LED lighting configured to be positioned along at least one wall (P) of a room near the ceiling (S), comprising at least one supporting element (2) designed to receive a plurality of LED lighting sources (3). The supporting element (2) comprises at least one shaped profile defining an outer seat (4) designed to receive the LED lighting sources (3) with beam of light facing upwards in an operating configuration of the supporting system (1), and an inner seat (5) designed to receive power supply means (5a) for the LED lighting sources (3). The supporting element (2) is configured as a modular supporting element designed to be assembled to other supporting elements (2) and/or connecting elements for covering at least one section of the wall (P).

Fig.3




EP 2 927 563 A1

## Description

**[0001]** This invention relates to a supporting system for LED lighting.

**[0002]** This invention also relates to a LED lighting device.

**[0003]** The invention is applicable in particular to the sector of lighting inside and outside areas, in particular for lighting rooms inside residential buildings. LED technology is increasingly used in the lighting of homes, thanks to the advantages which this technology offers in terms of costs, durability, design versatility, dimensions and, above all, efficiency.

**[0004]** LED technology is a valid alternative to traditional lighting systems, such as, for example, halogen lamps, fluorescent lamps and neon lamps.

**[0005]** As regards the arrangement of the light source, technical solutions are increasingly common in which the light source is arranged along the perimeter of the area to be illuminated. This lighting method is very widely used, as it frees the ceiling from light fixtures or suspended lights and it provides an alternative to the traditional arrangement of lighting sources on the ceiling.

**[0006]** In this regard, halogen spotlights or LED strips are currently most commonly used.

**[0007]** These lighting devices may be fixed directly on the wall or the ceiling, such as, for example, the halogen spotlights; however, the latter, in addition to be being unattractive positioned in this, generate a considerable glare effect upon direct exposure of the human eye with the light source, as they have a high luminance value.

**[0008]** The preference is therefore to orient the light source towards the ceiling or towards the walls, to illuminate the room in an indirect and reflected manner.

**[0009]** The above-mentioned lighting devices can also be associated with a continuous supporting system along the walls. This is the case of the prior art spotlights or LED strips installed inside support systems made of plasterboard or polystyrene.

**[0010]** The prior art supporting systems allow the lighting devices to be placed along the walls near to the ceiling, orienting them and placing them at a distance such as to allow the diffusion of the light in the room, at the same time hiding the light source from the eye of the user.

**[0011]** The lighting devices referred to in this description are those which comprise a supporting system designed to receive a lighting system which is occluded from the eyes of the user.

**[0012]** In effect, the supporting systems allow the lighting system to be fixed and hidden, preventing direct optical contact of the user with the light source and limiting the optical disturbances which might result.

**[0013]** The support function of the lighting system is usually achieved by making in-situ counter-panels or cornices, typically made of plasterboard or polystyrene, or by using the prefabricated products made of the same material.

**[0014]** The most commonly used prior art is the making of plasterboard cornices arranged along the walls at a certain distance from the ceiling; the cornices are shaped in such a way as to such as to receive the halogen spotlights or the LED strips designed to illuminate the room.

**[0015]** The systems for lighting internal rooms described above have drawbacks linked mainly to various aspects of the construction system used to create the supporting system.

**[0016]** In effect, making the supporting system on site according to the prior art requires a great deal of skilled labour. This also applies in the case of making prefabricated products, which whilst on the one hand it allows time to be saved in making them, on the other hand it requires a long and laborious assembly process, as well as a careful, precise and painstaking design and the difficulties connected to the transport to site. The assembly and fixing of the various parts which make up the structure of the prefabricated supporting system requires time, precision and accuracy by the installer, who must be a skilled and qualified technician.

**[0017]** The material (plasterboard or polystyrene) with which the support is generally made, both in-situ and prefabricated, is in effect fragile and could become spoilt or break during the operations for assembly and fixing to the wall and/or the ceiling.

**[0018]** The installation of lighting devices of this type is typically carried out by professionals in the trade and the cost often of the work is often high, due to the high incidence of the labour and materials which are necessary for making the supporting system.

**[0019]** Moreover, plasterboard and polystyrene have considerable production and processing costs compared with the overall cost of the lighting devices.

**[0020]** Another drawback which occurs during installation of these devices is that it is often necessary to carry out building works to adapt or free the surface which will receive the supporting system. Counter-panels or suspended ceilings are then made.

**[0021]** The step of making the supporting system is associated with the fixing step, which usually occurs by using silicone or special adhesives, as well as drilling holes for the mechanical fixing the to the wall and/or the ceiling. Thus, rubble and dust can be produced in the operating zone which requires a final cleaning and often painting and filling works.

**[0022]** Another drawback of the prior art is that the supporting system - in order to contain dimensions and costs - often does not provide sufficient space for housing the electricity supply system and for the wiring of the lighting devices.

**[0023]** Moreover, a problem collateral with the preceding one is that, as there is little space, there is also a poor dissipation of the heat generated by the electrical devices, with consequent deterioration of the supporting system and a possible generation of overheating phenomena.

**[0024]** Lastly, it should be noted that the supporting systems for the lighting devices in question are often

bulky and tend to create a re-sizing effect on the room.

**[0025]** In this context, the technical purpose which forms the basis of this invention is to provide a supporting system for LED lighting and a LED lighting device which overcomes one or more of the drawbacks of the prior art.

**[0026]** More specifically, the aim of this invention is to provide a supporting system for LED lighting which is structurally simple, has reduced dimensions, and is modular and integrated.

**[0027]** A further aim of this invention is to propose a LED lighting device which is quick and easy to install and which does not necessarily require skilled labour for its installation.

**[0028]** The technical purpose indicated and the aims specified are substantially achieved by a supporting system for LED lighting comprising the technical features described in one or more of the appended claims.

**[0029]** More specifically, this invention provides a supporting system for LED lighting configured to be positioned along at least one wall of a room near the ceiling. The supporting system comprises at least one supporting element designed to receive a plurality of LED lighting sources. The supporting element comprises at least one shaped profile defining an outer seat and an inner seat. The outer seat is designed to receive the LED lighting sources with beam of light preferably facing upwards in an operating configuration of the supporting system. The inner seat is designed to receive power supply means for the LED lighting sources. The supporting element is configured as a modular supporting element designed to be assembled to other supporting elements and/or connecting elements for covering at least one section of the wall.

**[0030]** According to a second aspect of this invention there is a LED lighting device comprising a supporting system and a plurality of LED lighting sources made in strips extending mainly along a longitudinal direction. The LED lighting sources are positioned on the supporting system in such a way that the longitudinal direction is parallel to the wall in an operating configuration of the lighting device.

**[0031]** The dependent claims, which are to be considered fully described here, correspond to different embodiments of the invention.

**[0032]** In one or more of the above-mentioned aspects, this invention may comprise one or more of the following features.

**[0033]** Preferably, the supporting system comprises a plurality of supporting elements defining an integrated system of modular supporting elements assembled together and configured for following the geometry of the walls of a room.

**[0034]** Preferably, the connecting elements comprise at least one angular interconnecting element configured for positioning the supporting system along two non-coplanar walls.

**[0035]** Preferably, the supporting element can be inserted and slide inside or outside the angular interconnecting element.

**[0036]** Preferably, the connecting elements comprise at least one linear interconnecting element configured for connecting together two supporting elements of the supporting system lying on coplanar walls.

**[0037]** Preferably, the supporting element can be inserted and slide inside or outside the linear interconnecting element.

**[0038]** Preferably, the supporting element comprises at least one fixing portion designed to be positioned parallel to the wall and preferably made in an upper portion of the supporting element with reference to an operating configuration of the supporting system.

**[0039]** Preferably, the fixing portion comprises at least one hole configured for receiving at least one fixing element which can be inserted inside the fixing portion for engaging the supporting element to the wall.

**[0040]** Preferably, the supporting element comprises two fixing portions designed to be positioned parallel to the wall and forming a longitudinal opening of the supporting element, each fixing portion facing towards the inner seat. Preferably, at least one connecting element is designed to be fixed to the wall and the supporting element has an elastic structure defining, in transversal cross-section, an open perimeter defined to be elastically deformed for receiving the connecting element.

**[0041]** Preferably, the connecting element comprises two wings each designed to define an abutment element for a fixing portion. Preferably, the connecting element comprises planar end portions, each located at one of the wings and folded towards the inside of the inner seat of the supporting element, in an operating configuration of the supporting system.

**[0042]** Preferably, the outer seat comprises at least a first planar portion and at least a second planar portion each designed to receive a plurality of LED lighting sources.

**[0043]** Preferably, the first planar portion and second planar portion are positioned obliquely to each other in such a way that a convex angle between the first planar portion and second planar portion is located towards the outside of the supporting element. The convex angle is preferably greater than 90°, even more preferably between 90° and 150°, for example equal to 125°.

**[0044]** Preferably, the first planar portion is positioned in such a way that a direction perpendicular to it and facing outwards away from the supporting element is oriented mainly towards the wall and wherein the second planar portion is positioned in such a way that a direction perpendicular to it and facing outwards away from the supporting element is oriented mainly towards a ceiling of a room, in an operating configuration of the supporting system.

**[0045]** Preferably, the shaped profile, in the operating configuration of the supporting system, defines together with the wall to which it is designed to be fixed a concave polygon comprising a concave internal angle positioned between the first planar portion and the second planar

portion. Preferably, the shaped profile comprises a lighting portion defining the outer seat and a closed portion defining the inner seat. The closed portion screens the lighting portion in the operating configuration of the supporting system.

**[0046]** Preferably, there is a plurality of LED lighting sources made in strips with an extension mainly along a longitudinal direction wherein the LED lighting sources are positioned on the supporting system in such a way that the longitudinal direction is parallel to the wall in an operating configuration of the lighting device.

**[0047]** Preferably, the strips are adhesive.

**[0048]** Preferably, the LED lighting sources are positioned along one of more of the first planar and second planar portions, in such a way that the LED lighting sources positioned along the first planar portion are oriented mainly towards the wall and that the LED lighting sources positioned along the second planar portion are oriented mainly towards the ceiling in an operating configuration of the lighting device.

**[0049]** Preferably, there are control means configured to manage the LED lighting sources. The control means are designed to control in a selective or simultaneous fashion the LED lighting sources positioned on the first planar portion and the LED lighting sources positioned on the second planar portion.

**[0050]** According to a yet further aspect, this invention relates to a method for mounting a supporting system for LED lighting comprising the steps of fixing the connecting element to the wall and fixing the supporting element to the connecting element by elastic deformation of the supporting element such as to open a longitudinal opening.

**[0051]** Preferably, the mounting method comprises the step of making a transit opening for example at the outer seat of the supporting element in such a way as to allow the passage of an opening tool and the step of opening the supporting element using the opening tool levering on a wing of the connecting element to surround the connecting element.

**[0052]** Further features and advantages of this invention are more apparent in the detailed description below, with reference to a preferred, non-restricting, embodiment of a supporting system for LED lighting as illustrated in the accompanying drawings, in which:

- Figure 1 is a schematic cross section of a portion of a supporting system for LED lighting according to this invention;
- Figure 2 is a schematic perspective view of the portion of Figure 1;
- Figure 3 is a schematic perspective view from above of a LED lighting device in an operating configuration according to this invention;
- Figure 4 is a schematic perspective view from below of a LED lighting device in an operating configuration according to this invention;
- Figure 5 is a schematic cross section of the LED lighting device of Figure 3 with schematic indication of the projection of a first beam of light;
- Figure 6 is a schematic cross section of the LED lighting device of Figure 3 with schematic indication of the projection of a second beam of light;
- Figure 7 is a detailed perspective view of the element A of Figure 3;
- Figure 8 is a detailed perspective view of the element B of Figure 3;
- Figure 9 is a detailed perspective view of the element C of Figure 3;
- Figure 10 is a schematic cross section of a portion of a supporting system for LED lighting according to a different embodiment of this invention;
- Figures 11-13 are schematic cross sections of the supporting system according to a different embodiment of this invention and in different assembly conditions.

**[0053]** With reference to the accompanying drawings, the numeral 1 denotes in its entirety a supporting system for LED lighting.

**[0054]** The supporting system 1 is configured to be positioned along at least one wall P of a room for example near the ceiling S.

**[0055]** The supporting system 1 comprises at least one supporting element 2 designed to receive a plurality of LED lighting sources 3.

**[0056]** The supporting element 2 comprises at least one shaped profile defining an outer seat 4 and an inner seat 5.

**[0057]** Moreover, the supporting element 2 comprises at least one fixing portion 6 designed, for example, to be positioned parallel to the wall P.

**[0058]** According to the embodiment illustrated in Figures 1 to 6, the fixing portion 6 is preferably made in an upper portion of the supporting element 2 with reference to an operating configuration of the supporting system 1.

**[0059]** With reference to Figure 2, the fixing portion 6 comprises at least one hole 7 configured to receive at least one fixing element which can be inserted inside the fixing portion 6 to engage the supporting element 2 to the wall P. More specifically, the fixing portion 6 comprises a planar fixing portion designed to be positioned parallel and in contact with the wall P and extending towards the outside of the supporting element, that is to say, at the outer seat 4.

**[0060]** The term "operating configuration" means a configuration wherein the supporting system 1 for LED lighting is fixed on the wall P, for example as illustrated in Figures 3 and 4.

**[0061]** The shaped profile may be obtained, for example, by means of a process for folding a single plate, preferably made of aluminium alloy. In some circumstances, the aluminium alloy profile can advantageously be covered in wood or other materials, according to the aesthetic and functional needs of the room.

**[0062]** Moreover, the shaped profile may be painted

the desired colour or used in the natural colour.

**[0063]** The folding of the plate with which the shaped profile of the supporting element 2 is made advantageously allows the folds to be created which define the inner seat 5, the outer seat 4 and the fixing portion 6 which, in the embodiment illustrated in Figures 1 to 6, is folded towards the outside of the supporting element 2.

**[0064]** The outer seat 4 is designed to receive the LED lighting sources 3 with beam of light facing towards the outside of the supporting element 2, preferably upwards in an operating configuration of the supporting system 1, as for example shown in Figure 3. More specifically, the outer seat 4 defines a concavity designed to receive the LED lighting sources 3.

**[0065]** The inner seat 5 is designed to receive power supply means 5a for the 25 LED lighting sources 3.

**[0066]** The supporting element 2 is configured as a modular supporting element designed to be assembled to other supporting elements 2 and/or connecting elements, described in more detail below, for covering at least one section of the wall P.

**[0067]** The supporting system 1 comprises a plurality of supporting elements 2 defining an integrated system of modular supporting elements assembled together and configured for following the geometry of the walls P of a room.

**[0068]** With reference to Figures 7 and 8, the connecting elements comprise at least one angular interconnecting element A, B configured for positioning the supporting system 1 along two non-coplanar walls P. The angular interconnecting element A of Figure 7 is, for example, an internal angular profile which makes it possible to join together two supporting elements 2 lying on two non-coplanar P walls which form between them an internal angle of 90°.

**[0069]** In the same way, the angular interconnecting element B of Figure 8 is, for example, an external angular profile which makes it possible to join together two supporting elements 2 lying on two non-coplanar P walls which form between them an external angle of 270°.

**[0070]** The supporting element 2 may be inserted and slide inside the angular interconnecting element A, B, as for example illustrated in the accompanying drawings. Alternatively, according to an embodiment not illustrated, the supporting element may be inserted and slide outside the angular interconnecting element A, B.

**[0071]** With reference to Figure 9, the connecting elements also comprise a linear interconnecting element C configured for connecting together two supporting elements 2 of the supporting system 1 according to this invention lying on the same wall P.

**[0072]** The supporting element 2 may be inserted and slide inside the linear interconnecting element C, as for example illustrated in the accompanying drawings. Alternatively, according to an embodiment not illustrated, the supporting element may be inserted and slide outside the linear interconnecting element C.

**[0073]** The linear and/or angular interconnecting means A, B, C are preferably made of plastic material and can be painted the desired colour.

**[0074]** The object of this invention is an integrated supporting and lighting system which is structurally simple.

**[0075]** The supporting element 2, being made of modules of defined length and associable to the connecting elements for example of the type shown in Figures 7-9, allows an easy, simple and fast installation.

**[0076]** The elements which define the supporting system 1 are lightweight and small in size and are therefore advantageously not very bulky and can be adapted also to situations with limited space and are easily moved.

**[0077]** This invention lends itself to DIY uses, which do not necessarily require skilled labour for making the supporting system 1 for the LED lighting.

**[0078]** It is possible to place several LED strips in the outer seat 4 of the supporting system 1.

**[0079]** In effect, as illustrated in the accompanying drawings, for example with reference to Figure 1, the outer seat 4 of the supporting element 2 may comprise at least a first planar portion 8 and at least a second planar portion 9, each of which designed to receive a plurality of LED lighting sources 3.

**[0080]** The first planar portion 8 and second planar portion 9 are positioned obliquely to each other in such a way that a convex angle $\alpha$ between the first planar portion 8 and second planar portion 9 is located towards the outside of the supporting element 2.

**[0081]** The convex angle $\alpha$ is preferably greater than 90° and even more preferably between 90° and 150°, for example equal to 125°.

**[0082]** With reference to Figure 5, the first planar portion 8 is positioned in such a way that a direction X perpendicular to it and facing outwards away from the supporting element 2 (that is, in the opposite direction to the inner seat 5) is oriented mainly towards the wall P, in an operating configuration of the supporting system 1. The term "oriented mainly" means that the perpendicular direction X faces towards the wall and has the main aim of supporting LED lighting sources designed to illuminate mainly, even if not only, the wall P.

**[0083]** With reference to Figure 6, the second planar portion 9 is positioned in such a way that a direction Y perpendicular to it and facing outwards away from the supporting element 2 (that is, in the opposite direction to the inner seat 5) is oriented mainly towards the ceiling S, in an operating configuration of the supporting system 1. The term "oriented mainly" means that the perpendicular direction Y faces towards the ceiling and has the main aim of supporting LED lighting sources designed to illuminate mainly, even if not only, the ceiling S.

**[0084]** The dual orientation, towards the centre of the ceiling S and towards the wall P, which it is possible to obtain with this invention should be noted.

**[0085]** As illustrated in Figure 5, a first beam of light coming from LED lighting sources applicable to the first planar portion 8, may be, for example, used to create a diffused lighting effect which highlights the cornice or end

zone of the wall P, due to the reflection of the light beam bouncing firstly against the wall P and then against the ceiling S. Figure 6 illustrates, on the other hand, how a second beam of light, coming from LED lighting sources applicable to the second planar portion 9, can be used to illuminate the room with diffused light.

**[0086]** In one possible embodiment, the LED lighting sources applicable to the first planar portion 8 can be coloured, for example of the RGB LED type. Advantageously, therefore, it is possible to create coloured lighting effects on the walls, whilst at the same time maintaining a diffused lighting inside the room.

**[0087]** Advantageously, the orientation of the LED lighting sources 3 positioned on the second planar portion 9 allows rooms of up to 6 metres in depth to be illuminated without the unpleasant dark areas which often occur with the prior art for LED lighting systems.

**[0088]** The shaped profile, in the operating configuration of the supporting system 1, defines in transversal cross-section, together with the wall to which it is designed to be fixed, a concave polygon comprising a concave internal angle $\beta$ positioned between the first planar portion 8 and the second planar portion 9.

**[0089]** The shaped profile surrounds the inner seat 5 using a longitudinally open structure on the side which is designed to be applied to the wall P. In other words, the shaped profile, in a transversal cross section, defines an open perimeter having two free ends at the portion designed to be applied to the wall P and defining a longitudinal opening 5a.

**[0090]** It should be noted in this regard how the sum of the concave internal angle $\beta$ and the convex angle $\alpha$ is equal to 360°.

**[0091]** In one possible embodiment, the shaped profile comprises a lighting portion 10 defining the outer seat 4 and a closed portion 11 defining the inner seat 5. The lighting portion 10 and the closed portion with 11 are connected to each other in such a way that a convex surface of the lighting portion 10 faces a concave surface of the closed portion 11. The lighting portion 10 and the closed portion with 11 are connected to each other, for example forming an acute angle y preferably between 40° and 60°, for example equal to approximately 50°.

**[0092]** In one possible embodiment, the closed portion 11 may comprise at least a third planar portion 11 a and at least a fourth planar portion 11 b positioned obliquely to each other, preferably in such a way that the fourth planar portion 11 b is positioned horizontally in an operating configuration of the supporting system 1 according to this invention.

**[0093]** The closed portion 11 screens the lighting portion 10 in the operating configuration of the supporting system 1 according to this invention.

**[0094]** Advantageously, therefore, the combined effect of the particular shape of the shaped profile together with the orientation of the LED lighting sources 3 designed to be positioned in the outer seat 4 allows the LED lighting sources 3 to be hidden from the human eye when they are switched ON, thereby preventing the view of the users present in the room from being disturbed.

**[0095]** Another advantage deriving from the shape given to the shaped profile is that the closed portion 11 allows the power supply means 5a to be hidden in the inner seat 5, including, for example, the electrical cables and the transformers of the LEDS strips, which are usually difficult to position. Advantageously, the space available in the inner seat 5 allows an excellent dissipation of the heat produced by the LED lighting sources 3 and by the electricity supply systems.

**[0096]** The LED lighting device according to this invention comprises a supporting system 1 and a plurality of LED lighting sources 3 made in strips extending mainly along a longitudinal direction.

**[0097]** The LED lighting sources 3 are positioned on the supporting system1 in a longitudinal direction parallel to the wall P, in an operating configuration of the lighting device.

**[0098]** The LED lighting sources 3 are positioned along one of more of the first planar 8 and second planar 9 portions, in such a way that the LED lighting sources 3 positioned along the first planar portion 8 are oriented mainly towards the wall P and that the LED lighting sources 3 positioned along the second planar portion 9 are oriented mainly towards the ceiling S, in an operating configuration of the lighting device.

**[0099]** The LED strips are preferably adhesive to the outer seat 4 of the supporting element 2.

**[0100]** The LED lighting device comprises control means configured to manage the LED lighting sources 3.

**[0101]** The control means are designed to control in a selective or simultaneous fashion the LED lighting sources 3 positioned on the first planar portion 8 and the LED lighting sources 3 positioned on the second planar portion 9. In one possible embodiment, not illustrated, the control means comprise remote controls to activate/deactivate the power supply means 5a, using radio or infrared commands.

**[0102]** According to a possible alternative, not illustrated, the supporting element 2 may be mounted on the wall P in such a way that the outer seat 4 is facing downwards.

**[0103]** Figure 10 illustrates a possible embodiment wherein the elements in common with the embodiment illustrated in Figures 1 to 6 are denoted with the same reference numeral.

**[0104]** The supporting element 2 according to this embodiment comprises two fixing portions 6a, 6b designed to be positioned parallel to the wall P. More specifically, the two fixing portions 6a, 6b define a longitudinal opening 5a of the supporting element 2. Preferably, a fixing portion 6a is made in an upper portion of the supporting element 2 whilst the other fixing portion 6b is made in a lower portion of the supporting element 2 with reference to an operating configuration of the supporting system 1.

**[0105]** Both of the fixing portions 6a, 6b face towards the inner seat 5. Advantageously, the supporting system

1 may comprise at least one connecting element 12 designed to be fixed to the wall using, for example, plugs 13. The connecting element 12 comprises two wings 14a, 14b each designed to define an abutment element for a fixing portion 6a, 6b. Preferably, the connecting element 12 comprises planar end portions 15a, 15b, each located at one of the wings 14a, 14b and folded towards the inside of the inner seat 5, in an operating configuration of the supporting system 1.

**[0106]** In one possible embodiment, the supporting element 2 has an elastic structure defining, in transversal cross-section, an open perimeter defined to be elastically deformed for receiving the connecting element 12.

**[0107]** In accordance with a possible further embodiment, the supporting element 2 may comprise a housing seat 13 located on the opposite side relative to the outer seat 4 and for example designed to be positioned with the opening facing downwards with reference to an operating configuration of the supporting system 1. The housing seat 13 is designed to receive a plurality of LED lighting sources 3. Figure 10 illustrates an example of the housing seat 13 which may be applied to any embodiment of the supporting element 2, for example that illustrated in Figures 1 to 6. The housing seat 13 may comprise means, not illustrated, for covering the lighting sources which can be associated with the housing seat 13. Figure 10 shows a possible embodiment, applicable to any type of supporting element, wherein, for example, there are coupling means 14 designed to receive the covering means.

**[0108]** Advantageously, one or more between the angular interconnecting element A, B or the linear interconnecting element C may also comprise a housing seat designed to be positioned with the opening facing downwards with reference to an operating configuration of the supporting system 1 and designed to receive a plurality of LED lighting sources 3. According to a possible embodiment, the supporting element 2 may comprise means for covering the lighting sources which can be associated with the outer seat 4. Figure 10 shows a possible embodiment, applicable to any type of supporting element, wherein, for example, there are coupling means 15 designed to receive the covering means.

**[0109]** Figures 11-13 illustrate a method for mounting the supporting system 1, wherein the connecting element 12 is fixed to the wall P and the supporting element 2 is fixed to the connecting element 12 by elastic deformation of the supporting element 2 such as to open the longitudinal opening 5a. Preferably, there is a transit opening 16 at, for example, the outer seat 4 in such a way as to allow the passage of an opening tool (for example, a screwdriver) which, by levering on one of the wings 14a, 14b allows the supporting element 2 to surround the connecting element 12.

**[0110]** The present invention achieves the preset aims, overcoming the disadvantages of the prior art.

## Claims

1. A system (1) for supporting LED lighting configured for being positioned along at least one wall (P) of a room, comprising at least one supporting element (2) designed to receive a plurality of LED lighting sources (3), wherein at least one supporting element (2) comprises at least one shaped profile defining an outer seat (4) designed to receive the plurality of LED lighting sources (3) with beam of light preferably facing upwards in an operating configuration of the supporting system (1), and an inner seat (5) designed to receive power supply means for the LED lighting sources (3); wherein the supporting element (2) is configured as a modular supporting element designed to be assembled, using connecting elements, to other supporting elements (2) for covering in conjunction at least one section of the wall (P).

2. The supporting system for LED lighting according to claim 1, wherein the supporting system (1) comprises a plurality of supporting elements (2) defining an integrated system of modular supporting elements assembled together and configured for following the geometry of the walls (P) of a room.

3. The supporting system for LED lighting according to any one of the preceding claims, wherein the connecting elements comprise at least one angular interconnecting element (A, B) configured for positioning the supporting system (1) along two non-coplanar walls (P) and/or at least one linear interconnecting element (C) configured for connecting together two supporting elements (2) of the supporting system (1) lying on coplanar walls.

4. The supporting system for LED lighting according to any one of the preceding claims, wherein the supporting element (2) comprises at least one fixing portion (6) designed to be positioned parallel to the wall (P) and preferably made in an upper portion of the supporting element (2) with reference to an operating configuration of the supporting system (1).

5. The supporting system for LED lighting according to any one of claims 1 to 3, wherein the supporting element (2) comprises two fixing portions (6a, 6b) designed to be positioned parallel to the wall (P) and forming a longitudinal opening (5a) of the supporting element (2), each fixing portion (6a, 6b) facing towards the inner seat (5).

6. The supporting system for LED lighting according to claim 5, comprising at least one connecting element (12) designed to be fixed to the wall (P) and wherein the supporting element (2) has an elastic structure defining, in transversal cross-section, an open perimeter suitable for being elastically deformed for re-

ceiving the connecting element (12).

**7.** The supporting system for LED lighting according to claim 6, wherein the connecting element (12) comprises two wings (14a, 14b) each designed to define an abutment element for a fixing portion (6a, 6b), preferably the connecting element (12) comprising planar end portions (15a, 15b), each located at one of the wings (14a, 14b) and folded towards the inside of the inner seat (5) of the supporting element (2), in an operating configuration of the supporting system (1).

**8.** The supporting system for LED lighting according to any one of the preceding claims, wherein the outer seat (4) comprises at least a first planar portion (8) and at least a second planar portion (9) each designed to receive a plurality of LED lighting sources (3).

**9.** The supporting system for LED lighting according to claim 8, wherein the first planar portion (8) and second planar portion (9) are positioned obliquely to each other in such a way that a convex angle ($\alpha$) between the first planar portion (8) and second planar portion (9) is located towards the outside of the supporting element (2), the convex angle ($\alpha$) being preferably greater than 90°, even more preferably between 90° and 150°, for example equal to 125°.

**10.** The supporting system for LED lighting according to claim 8 or 9, wherein the first planar portion (8) is positioned in such a way that a direction perpendicular to it and facing outwards away from the supporting element (2) is oriented mainly towards the wall (P) and wherein the second planar portion (9) is positioned in such a way that a direction perpendicular to it and facing outwards away from the supporting element (2) is oriented mainly towards a ceiling (S) of a room, in an operating configuration of the supporting system (1).

**11.** The supporting system for LED lighting according to any one of claims 8 to 10, wherein the shaped profile, in the operating configuration of the supporting system (1), defines together with the wall (P) to which it is designed to be fixed a concave polygon comprising a concave internal angle ($\beta$) positioned between the first planar portion (8) and the second planar portion (9).

**12.** The supporting system for LED lighting according to any one of the preceding claims, wherein the shaped profile comprises a lighting portion (10) defining the outer seat (4) and a closed portion (11) defining the inner seat (5), wherein the closed portion (11) screens the lighting portion (10) in the operating configuration of the supporting system (1).

**13.** An LED lighting device comprising a supporting system (1) according to any one of the preceding claims and a plurality of LED lighting sources (3) made in strips with an extension mainly along a longitudinal direction wherein the LED lighting sources (3) are positioned on the supporting system (1) in such a way that the longitudinal direction is parallel to the wall (P) in an operating configuration of the lighting device.

**14.** A method for mounting the supporting system for LED lighting according to claim 6 or 7, comprising the steps of fixing the connecting element (12) to the wall (P) and fixing the supporting element (2) to the connecting element (12) by elastic deformation of the supporting element (2) such as to open a longitudinal opening (5a).

**15.** The mounting method according to claim 14, comprising the step of making a transit opening (16) for example at the outer seat (4) of the supporting element (2) in such a way as to allow the passage of an opening tool and the step of opening the supporting element (2) using the opening tool levering on a wing (14a, 14b) of the connecting element (12) to surround the connecting element (12).

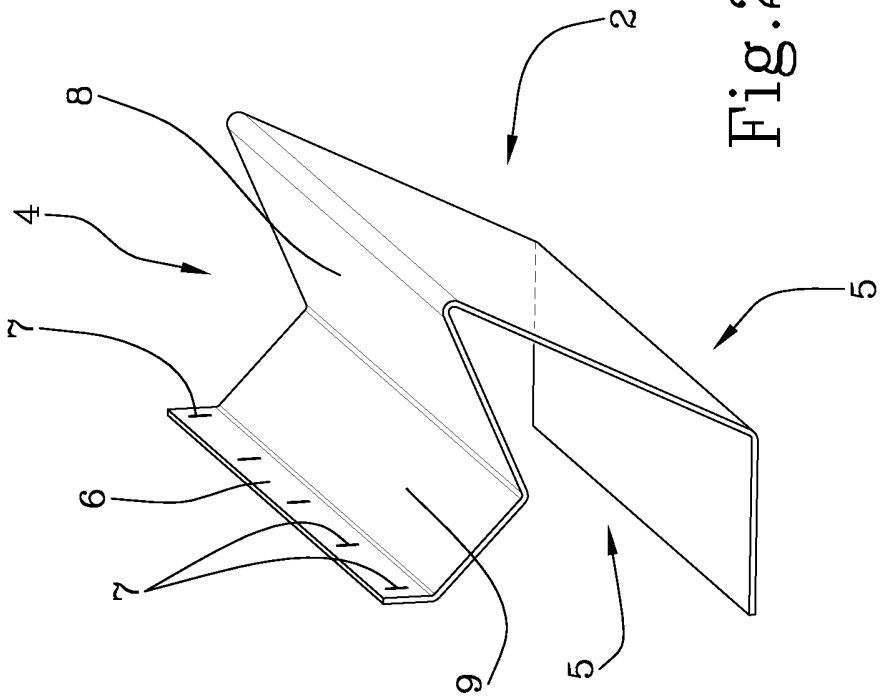



Fig.2

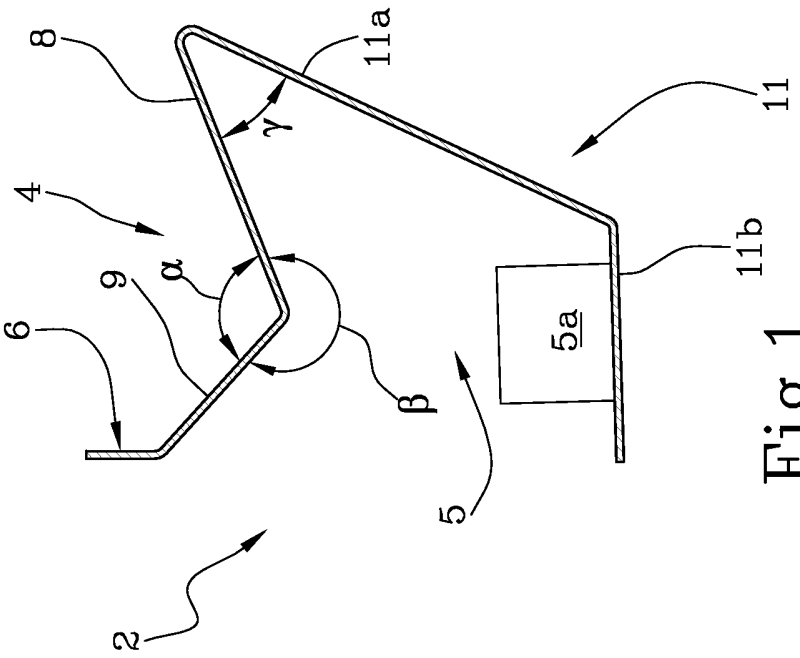



Fig.1

Fig.3

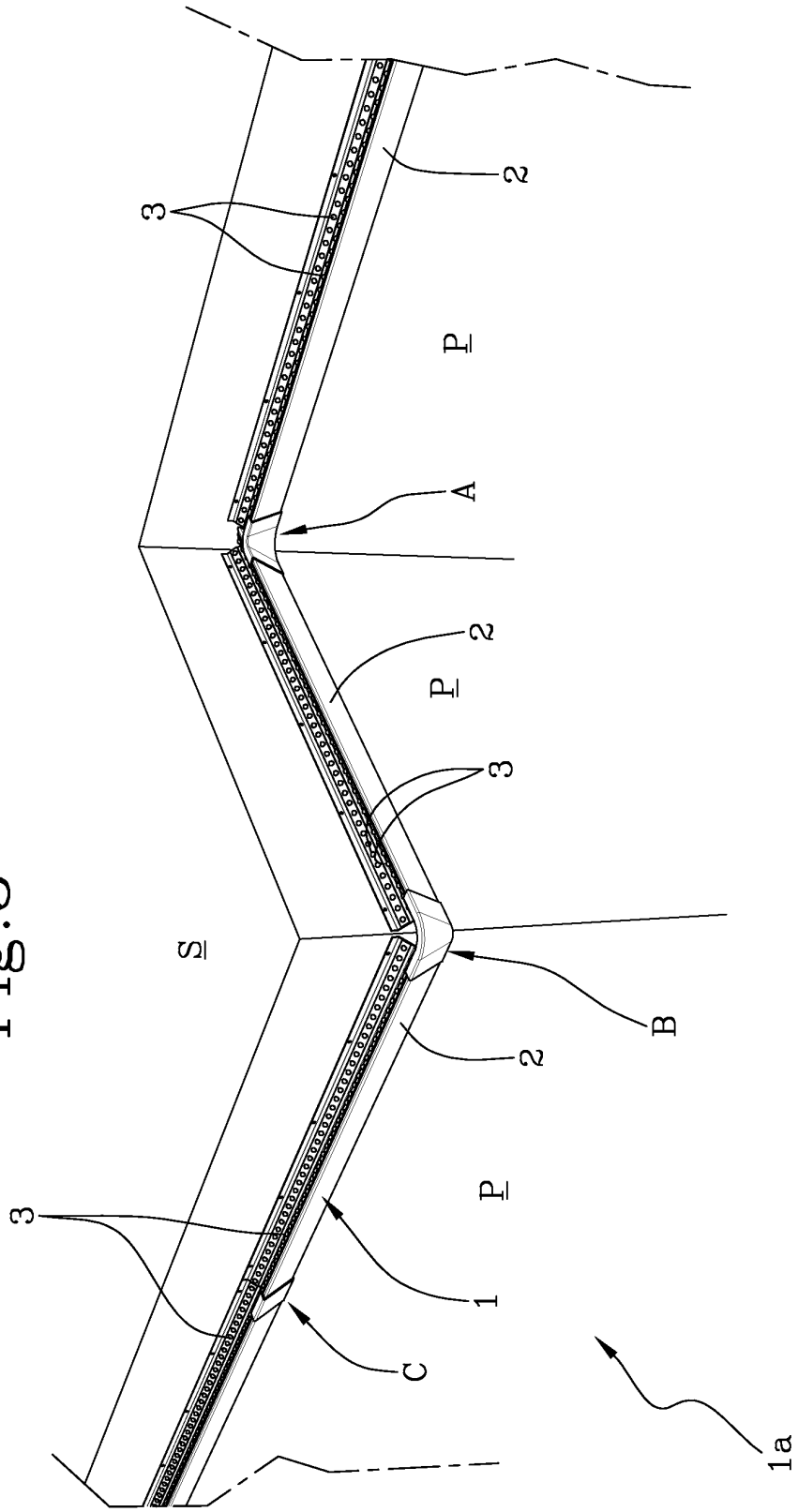


Fig.4

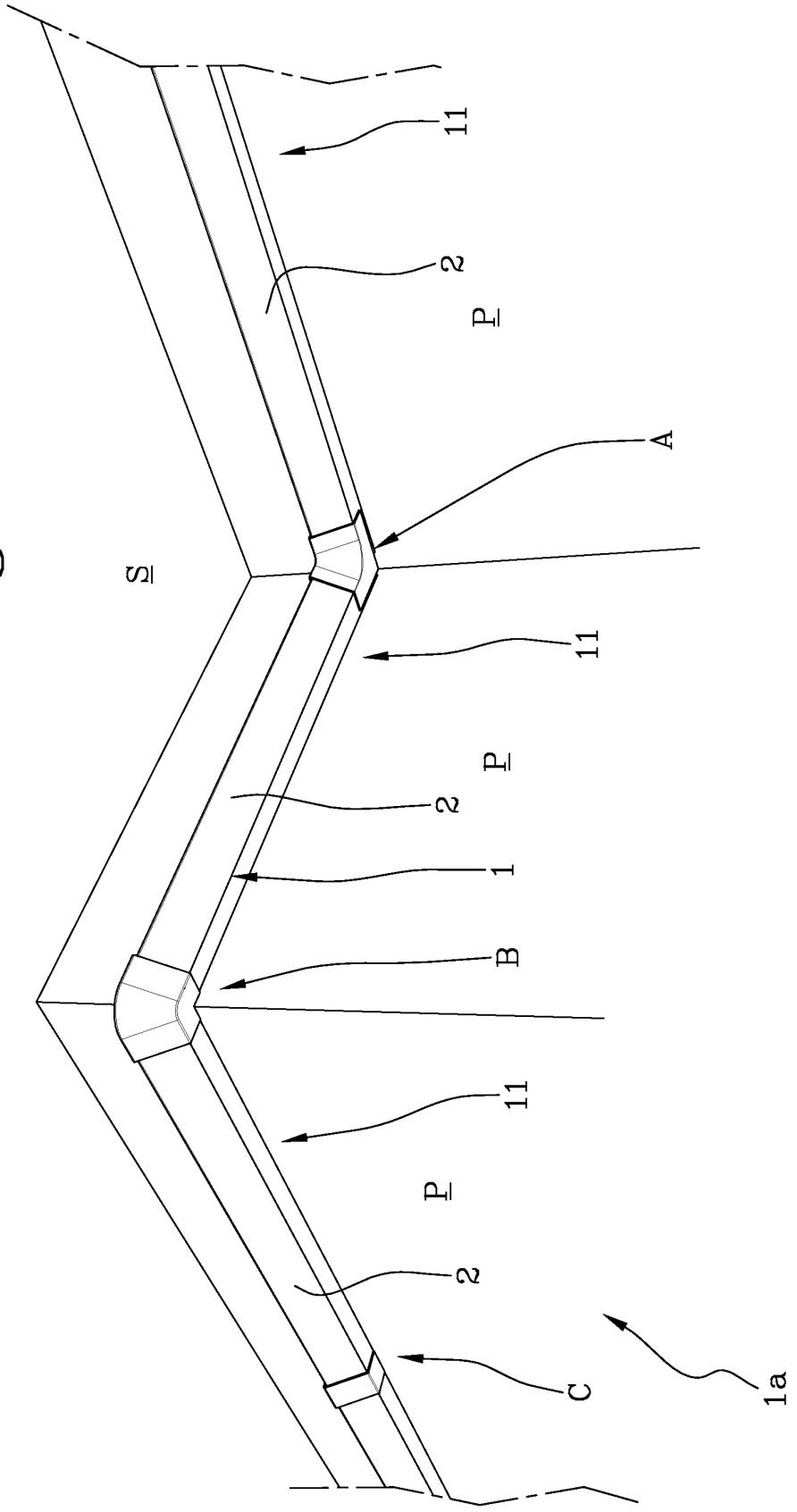


Fig.6

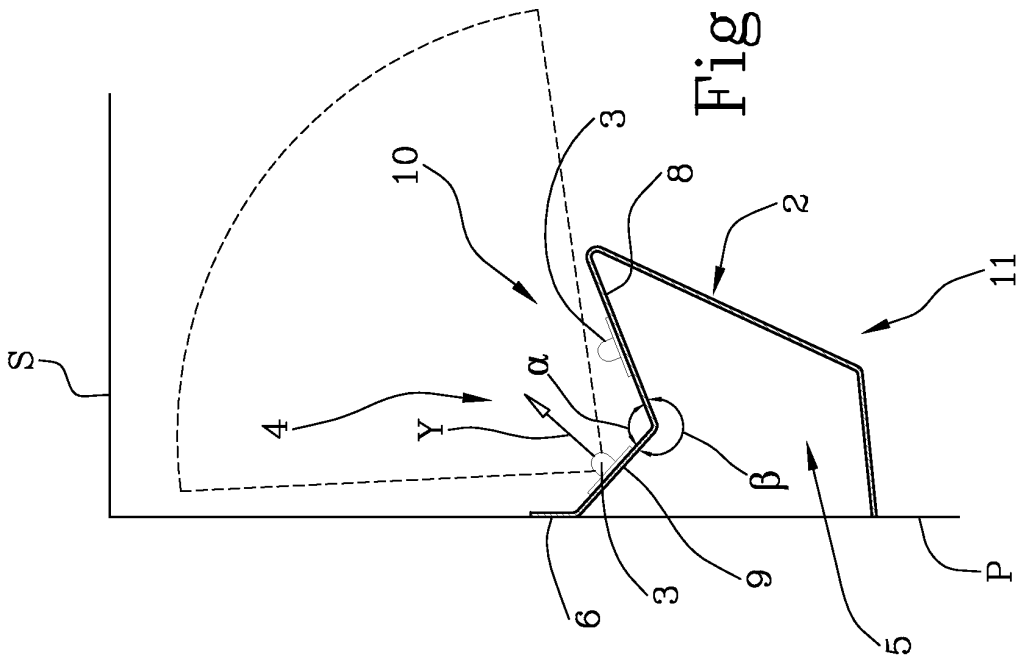



Fig.5

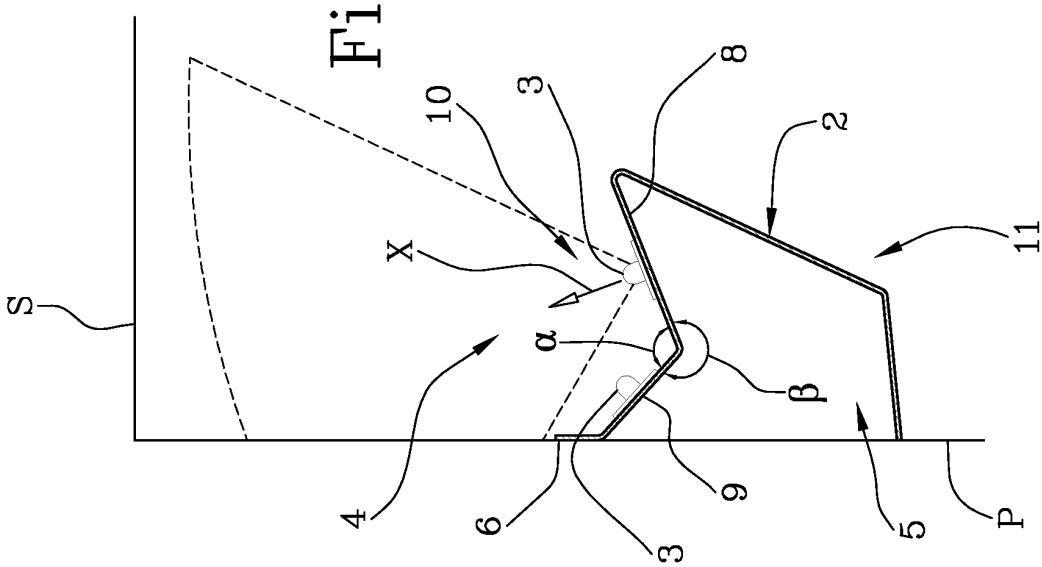


Fig.8

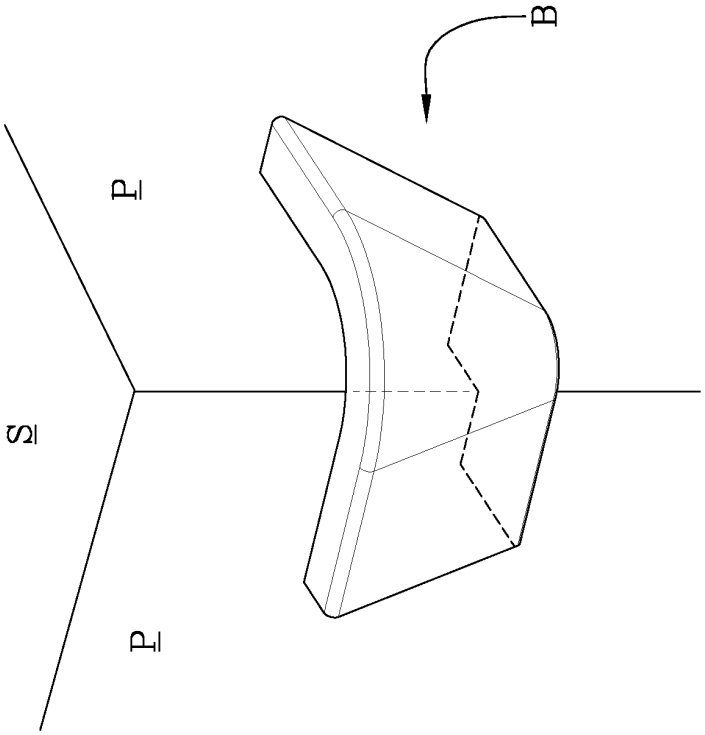
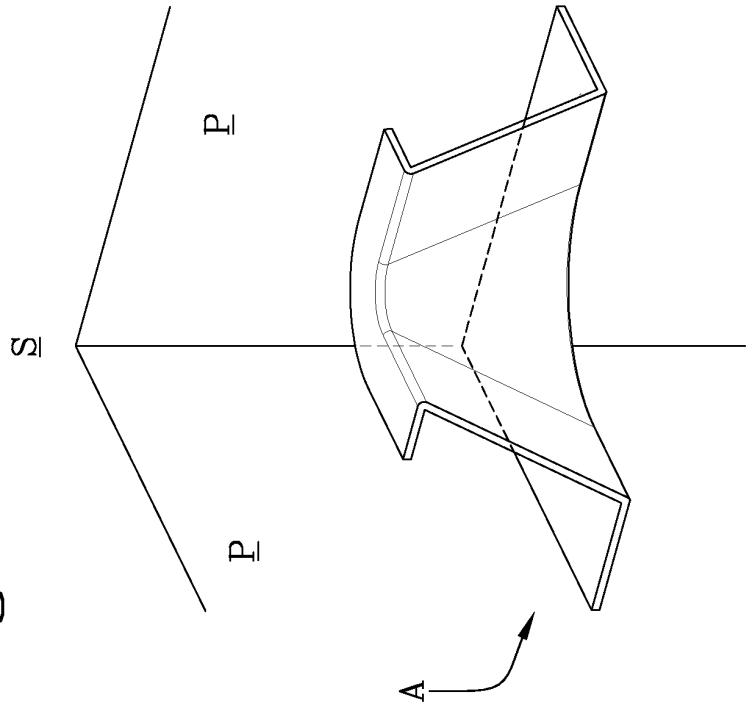



Fig.7



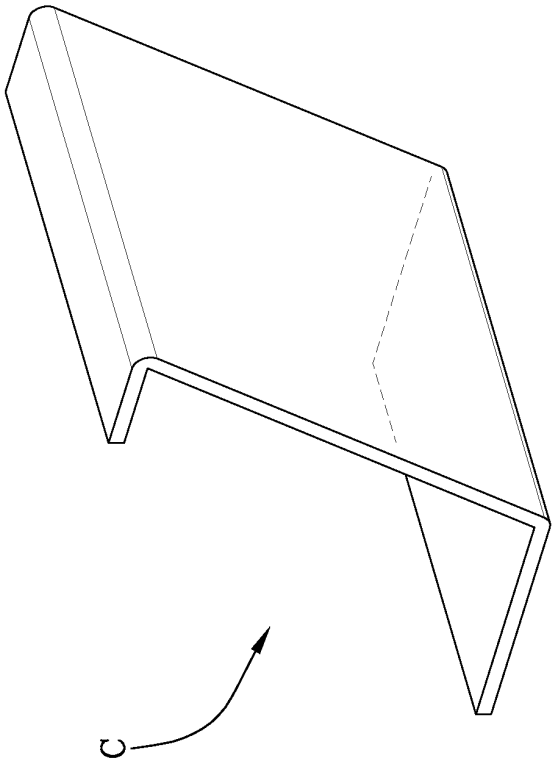



Fig.9

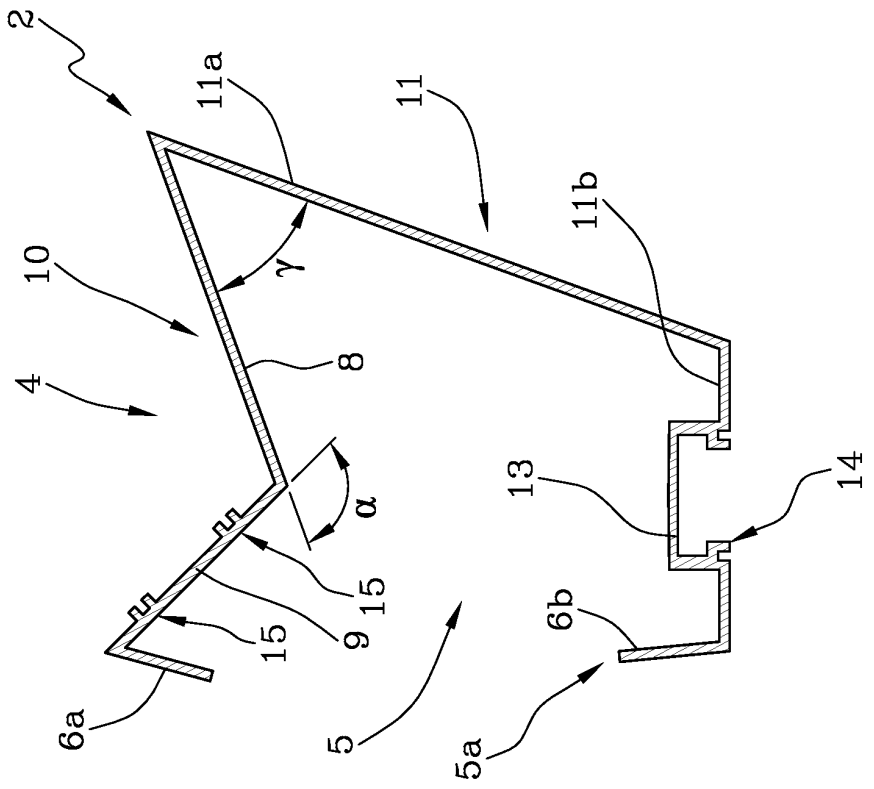



Fig.10

Fig.13

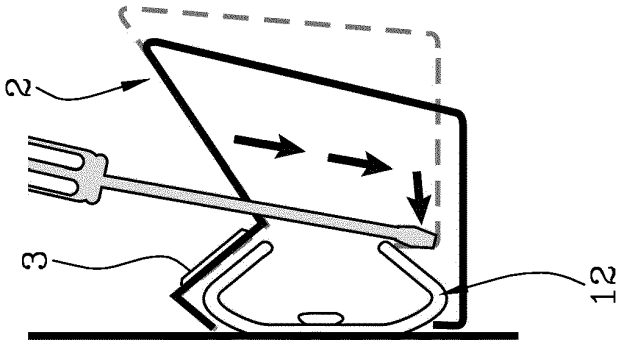



Fig.12

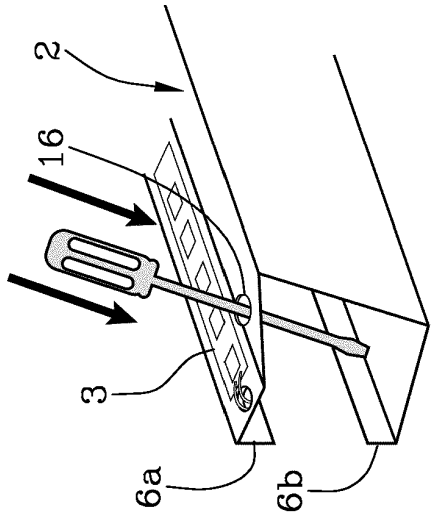
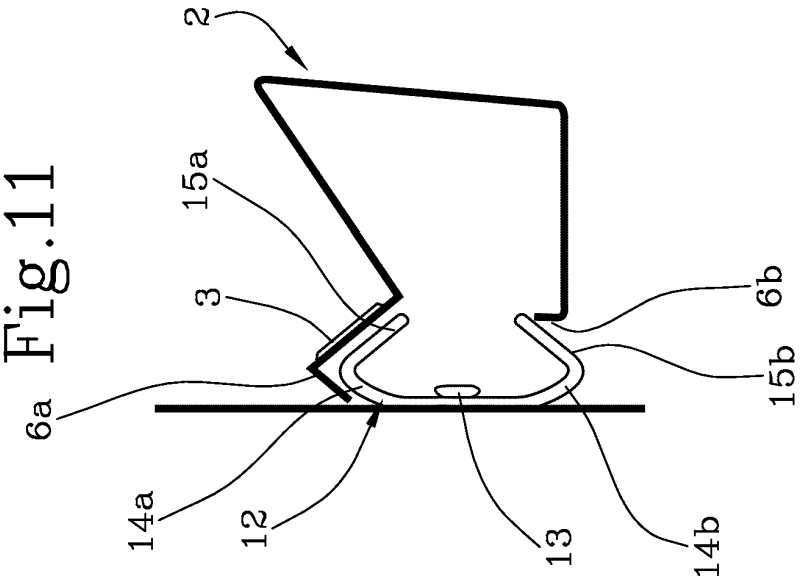



Fig.11



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Application Number
EP 14 19 0611

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| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| The Hague | 31 July 2015 | Menn, Patrick |

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