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(54) **RECESSED LED LIGHT UNIT**

EINGEBAUTE LED-BELEUCHTUNGSEINHEIT

UNITÉ LUMINEUSE À DEL EN RETRAIT

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## Description

**[0001]** The present invention relates to a recessed LED light unit, having the features set out in main claim 1.

**[0002]** In the specific technical field to which the invention relates, there are known light devices or units which are configured to produce lighting points of the so-called "recessed light" type, defined in this manner because it is provided to be inserted, at least partially or completely, in a support structure, which is generally constituted by plasterboard sheets, having the function of a covering as false walls and/or false ceilings.

**[0003]** Typically, these recessed light units comprise a plate-like support which has a small thickness and to which the light source is fixed, for example, an LED element, and provided with lateral wings for engagement with the internal portion of the plate to which the light unit is applied. There is fixed to the support a plate-like member which remains externally visible during the application of the light unit and which has a through-opening, through which the light emitted by the LED element is emitted outwards. Therefore, it is interposed between the support and the plate-like member, substantially in vertical alignment with the opening.

**[0004]** An example of an LED light unit having the features set out above is known from the production of the same Applicant. For example, document EP2886948A1 describes a recessed LED light unit according to the preamble of claim 1.

**[0005]** Lighting devices of this type do not generally allow the LED element to be readily removed from the light unit, once the application to the wall has been carried out. In fact, once the support is positioned and secured to the plasterboard sheet, the plate-like member which remains visible externally on the wall is subjected to the external levelling with the plasterboard sheet. Therefore, if it is necessary to gain access to the LED, for example, in order to replace it if necessary, it is necessary to dismantle the surface finish which is associated with the plate-like member and to remove the support from the anchoring seat which is provided in the plasterboard sheet. This operation, though it is not required often as a result of the long life of the LED elements, is found to be rather complex and difficult when it is necessary.

**[0006]** The main objective of the invention is to provide an LED light unit for recessed applications which is structurally and functionally configured to overcome the limitations set out above with reference to the currently available solutions. This object and other objects which will be appreciated more clearly below are achieved by the invention by means of a recessed LED light unit which is constructed according to the appended claims.

**[0007]** According to a first aspect of the invention, a recessed LED light unit, in particular for being applied to plates which constitute false walls and/or false ceilings, comprises a support for fixing an LED element which is provided with lateral wings for engagement with the internal portion of the sheet, to which the light unit is ap-

plied, a plate-like member which is capable of being fixed to the support and which has a through-opening, through which the light emitted by the LED element of the light unit is emitted outwards, the LED element being mounted in a position interposed between the support and the plate-like member, substantially in vertical alignment with the opening, the LED light unit further comprising a plate-like element which is interposed between the support and the member and which is mounted in a manner with limited sliding on the member, the plate-like element being provided with a first through-hole and a second through-hole, which are adjacent to each other, the first hole being capable of being engaged by a screen or lens element, and the plate-like element being movable between a first position, in which the first hole is arranged in accordance with the through-hole, for diffusing the light emitted by the LED element, and a second position, in which the second hole is arranged in accordance with the opening, the LED element being removable from the light unit through the second hole and the opening.

**[0008]** According to a second aspect of the invention, the LED element is capable of being fixed to the support by way of screw means, which can be screwed or unscrewed, from the outer side of the light unit, by means of a screwing tool which is guided through the opening and the second hole.

**[0009]** According to another aspect of the invention, the LED element is capable of being fixed to the support by way of magnetic connection means.

**[0010]** According to another aspect of the invention, the diameter of the second hole is selected so as to have a value between 9 and 16 mm.

**[0011]** According to another aspect of the invention, the support is constructed from a thermally conductive material for discharging the heat produced by the LED element.

**[0012]** According to another aspect of the invention, the plate-like element is at least partially received inside a seat which is formed in the member and which has such a formation as to guide the element during the sliding movement between the first position and the second position.

**[0013]** Additional features and advantages of the invention will be better appreciated from the following detailed description of a preferred embodiment thereof which is illustrated by way of non-limiting example with reference to the appended drawings, in which:

- Figure 1 is a perspective view of an LED light unit constructed according to the present invention,
- Figure 1A is an exploded perspective view of the LED light unit of Figure 1,
- Figures 2 and 3 are a front elevation and a side elevation of the LED light unit of the preceding Figures, respectively,
- Figure 4 is a plan view of the LED light unit of the preceding Figures,
- Figure 5 is a view corresponding to the one of Figure

- 4, in which the light unit is shown in a different operating condition,
- Figures 6 and 7 are perspective views of a detail of the preceding Figures, shown in different operating positions,
  - Figure 8 is an additional view, as a front elevation and a partial section, of the light unit of the preceding Figures, shown in the operating condition of Figure 5.

**[0014]** With reference to the cited Figures, there is generally designated 1 an embodiment of a recessed LED light unit which is constructed according to the present invention.

**[0015]** The unit is mainly configured for applications on sheets L (see Figure 8), for example, of plasterboard, which constitute false walls and/or false ceilings. Typically, the wall constructed with plasterboard sheets is positioned with spacing from the rear wall/ceiling and in the gap which has been produced there is received the rear portion of the light unit. The light unit 1 is constituted by two main portions, which are different from each other and intended to be mutually assembled, as will be appreciated in greater detail below. The light unit comprises a plate-like support 2, to which there is fixed an LED element 3 (as a light source for the light unit). The support is provided with a pair of opposite lateral wings 4 for engagement with the internal portion of the plasterboard sheet L, to which the light unit is intended to be applied. The support is preferably constructed from a material with high thermal conductivity (for example, from aluminium or other similar material or metal alloy which is suitable for the purpose), in order to rapidly dissipate the heat produced by the LED. The LED is applied to the support by way of screw type fixing means 5. A preferred embodiment provides for a plate 6 of the printed circuit board of the LED (also referred to using the term PCB) to be provided with eyelets or notches for engaging one or more securing screws 5.

**[0016]** In a construction variant, the plate 6 of the printed circuit board can be fixed to the support 2 by way of magnetic connection means.

**[0017]** The second portion of the light unit is constituted by a plate-like member 7 which is capable of being fixed to the support 2 and which has a through-opening 8, which is preferably formed as a cylindrical hole, through which the light emitted by the LED element 3 is emitted outwards. The LED is mounted in a position interposed between the support 2 and the plate-like member 7 so as to be substantially in vertical alignment with the opening (that is to say, the light source of the LED is arranged in the direction of the main axis of the cylindrical hole which defines the opening 8). It will be understood that it is alternatively possible to provide holes having a formation different from the cylindrical one described above.

**[0018]** The plate-like member 7 serves to protect the LED in the closure of the seat which is formed in the plasterboard sheet L and therefore remains visible once the application is complete. It is further advantageously

constructed from a material which makes the operation of external levelling with the plasterboard sheet easier.

**[0019]** According to a main feature of the invention, the light unit 1 further comprises a plate-like element which is designated 9 and which is mounted in a manner with limited sliding on the member 7 and which is provided with a first and a second hole, designated 10 and 11, respectively, which extend through the thickness of the element 9 and which are mutually adjacent, and with respective parallel main axes.

**[0020]** The first hole 10 is further closed by the engagement of an element 12 in the form of a screen or lens, which is suitable for screening the hole 8 or diffusing the light emitted by the LED with a preselected angulation of the light rays, respectively.

**[0021]** In another alternative, the element 12 can be constructed as a reflector of the light rays emitted by the LED.

**[0022]** The holes 10, 11 are further preferably constructed with a circular cross-section and with an identical diameter with respect to each other, this selection in any case representing a preferred but non-limiting embodiment.

**[0023]** The plate-like element 9 is at least partially received in a manner guided inside a seat 13 which is formed in the member 7, which has such a formation as to guide the element 9 during a translational sliding movement, the magnitude of which is delimited by the opposite end of the seat.

During the sliding movement, the element 9 is movable in translation between a first position (Figure 4), in which the first hole 10 is arranged in correspondence with the opening 8 (that is to say, in vertical alignment with the opening 8) so as to allow the diffusion outwards of the light emitted by the LED, and a second position (Figure 5), in which the second hole 11 is the one to be moved in correspondence with the opening 8.

**[0024]** In this second position (with the hole 11 and opening 8 substantially in vertical alignment), there is provision for the LED element 3 to be able to be removable from the light unit 1 by passing through the hole 11 and the opening 8.

**[0025]** More particularly, there is preferably provision for the diameter of the second hole 11 to be preferably selected with a value between 9 mm and 16 mm, and the LED element 3 and in particular the circuit board 6 thereof to have such dimensions as to be able to be removed/inserted with a reduced relative play, through the opening 8 and the hole 11. The operation of the light unit is as follows.

**[0026]** In a condition for use, with the LED light activated, the plate-like element 9 is arranged in the first position, in which the hole 10 is vertically aligned with the opening 8, and the light emitted by the LED element 3 is diffused outwards through the screen or lens element 12 which engages with the hole 10.

**[0027]** If it is desirable to remove the LED element 3 from the light unit, for example, in order to replace it, the

plate-like element 9 is initially moved from the first position to the second position (for example, by means of the tip of a screwdriver introduced from outside into the opening 8, in order to urge the element 9 into the sliding movement). Once this position is reached, the fixing screws 5 of the LED are accessible through the opening 8 and the hole 11 and can be unscrewed with a screwdriver tool C which is introduced through them from outside. Once the screws 5 are released, the LED element 3 can be removed by causing it to pass through the hole 11 in order to then be discharged from the opening 8 (shown in Figure 8 with broken lines). In this regard, the electrical connection wires of the LED are selected with a suitable length so as to allow the removal of the LED from the light unit with the wires connected thereto (Figure 8). After replacement, the new LED element 3 can be inserted again through the opening 8 and the hole 11 in order to fix the corresponding screws 5 against the support 2.

**[0028]** If the LED is fixed to the support with a magnetic connection system, the removal operation is further facilitated. In fact, it is simply necessary to move the LED away from the support by applying a removal force greater than the magnetic attraction forces so as to separate the LED from the support, and to allow the removal thereof from the light unit, in a manner generally similar to the preceding embodiment.

**[0029]** The invention thereby achieves the objectives set out by achieving a number of advantages which are cited with respect to the known solutions. In particular, the recessed light unit according to the invention ensures the interchangeability of the LED element which is received in the light unit, without requiring disassembly or removal of any of the structural members of the light unit, thereby preserving the recessed application originally brought about.

## Claims

1. A recessed LED light unit, in particular for being applied to plates which constitute false walls and/or false ceilings, comprising:

a support (2) on which an LED element (3) is fixed, which is provided with lateral wings (4) for engagement with the internal portion of a sheet (L), to which the light unit is applied, a plate-like member (7) which is capable of being fixed to the support (2) and which has a through-opening (8), through which the light emitted by the LED element (3) of the light unit is emitted outwards, the LED element (3) being mounted in a position interposed between the support (2) and the plate-like member (7), substantially in vertical alignment with the through-opening (8),

**characterized in that** it comprises a plate-like element (9) which is interposed between the support (2) and the plate-like member (7) and

which is mounted in a manner with limited sliding on the member, **in that** the plate-like element (9) is provided with a first through-hole and a second through-hole (10, 11), which are adjacent to each other, the first through-hole (10) being capable of being engaged by a screen or lens element (12), and **in that** the plate-like element (9) is movable between a first position, in which the first through-hole (10) is arranged in correspondence with the through-opening (8), for diffusing the light emitted by the LED element (3), and a second position, in which the second through-hole (11) is arranged in correspondence with the through-opening (8), the LED element (3) being removable from the light unit through the second through-hole (11) and the through-opening (8).

2. A recessed LED light unit according to claim 1, wherein the LED element (3) is capable of being fixed to the support (2) by way of screw means, which can be screwed or unscrewed, from the outer side of the light unit, by means of a screwing tool which is guided through the through-opening (8) and the second through-hole (11).
3. A recessed LED light unit according to claim 1, wherein the LED element (3) is capable of being fixed to the support (2) by way of magnetic connection means.
4. A recessed LED light unit according to any one of the preceding claims, wherein the diameter of the second through-hole (11) is selected so as to have a value between 9 and 16 mm.
5. A recessed LED light unit according to any one of the preceding claims, wherein the support (2) is constructed from a thermally conductive material for discharging the heat produced by the LED element (3).
6. A recessed LED light unit according to any one of the preceding claims, wherein the plate-like element (9) is at least partially received inside a seat (13) which is formed in the plate-like member (7) and which has such a formation as to guide the plate-like element (9) during the sliding movement between the first position and the second position.

## Patentansprüche

1. LED-Einbauleuchte, insbesondere zum Anbringen an Platten, die Zwischenwände und/oder Zwischendecken bilden, umfassend:

einen Träger (2), an dem ein LED-Element (3) befestigt ist, das mit seitlichen Flügeln (4) zum

- Eingriff mit dem inneren Abschnitt einer Platte (L) versehen ist, an der die Leuchte angebracht ist, ein plattenartiges Bauteil (7), das am Träger (2) befestigbar ist und das eine Durchgangsöffnung (8) aufweist, durch die das vom LED-Element (3) der Leuchte emittierte Licht nach außen abgestrahlt wird, wobei das LED-Element (3) in einer zwischen dem Träger (2) und dem plattenartigen Bauteil (7) angeordneten Position im Wesentlichen in vertikaler Ausrichtung mit der Durchgangsöffnung (8) montiert ist, **dadurch gekennzeichnet, dass** diese ein plattenartiges Element (9) umfasst, das zwischen dem Träger (2) und dem plattenartigen Bauteil (7) angeordnet ist und das am Bauteil begrenzt verschiebbar montiert ist, dass das plattenartige Element (9) mit einer ersten Durchgangsöffnung und einer zweiten Durchgangsöffnung (10, 11) versehen ist, die aneinander angrenzen, wobei die erste Durchgangsöffnung (10) mit einem Schirm- oder Linsenelement (12) in Eingriff bringbar ist, und dass das plattenartige Element (9) zwischen einer ersten Position, in der die erste Durchgangsöffnung (10) entsprechend der Durchgangsöffnung (8) zum Streuen des vom LED-Element (3) emittierten Lichts angeordnet ist, und einer zweiten Position, in der die zweite Durchgangsöffnung (11) entsprechend der Durchgangsöffnung (8) angeordnet ist, bewegbar ist, wobei das LED-Element (3) durch die zweite Durchgangsöffnung (11) und die Durchgangsöffnung (8) aus der Leuchte herausnehmbar ist.
2. LED-Einbauleuchte nach Anspruch 1, wobei das LED-Element (3) am Träger (2) mittels einer Schraubereinrichtung befestigbar ist, die von der Außenseite der Leuchteinheit mittels eines Schraubwerkzeugs, das durch die Durchgangsöffnung (8) und die zweite Durchgangsbohrung (11) geführt ist, angeschraubt oder abgeschraubt werden kann.
  3. LED-Einbauleuchte nach Anspruch 1, wobei das LED-Element (3) mittels einer magnetischen Verbindungseinrichtung am Träger (2) befestigbar ist.
  4. LED-Einbauleuchte nach einem der vorhergehenden Ansprüche, wobei der Durchmesser der zweiten Durchgangsöffnung (11) so gewählt ist, dass dieser einen Wert zwischen 9 und 16 mm aufweist.
  5. LED-Einbauleuchte nach einem der vorhergehenden Ansprüche, wobei der Träger (2) aus einem wärmeleitenden Material zum Ableiten der vom LED-Element (3) erzeugten Wärme hergestellt ist.
  6. LED-Einbauleuchte nach einem der vorhergehenden Ansprüche, wobei das plattenförmige Element

(9) zumindest teilweise in einem Sitz (13) aufgenommen ist, der im plattenförmigen Bauteil (7) ausgebildet ist und der eine solche Formgebung aufweist, dass dieser das plattenförmige Element (9) während der Verschiebebewegung zwischen der ersten Position und der zweiten Position führt.

## Revendications

1. Unité lumineuse à LED encastrée, en particulier pour être appliquée sur des plaques qui constituent de faux murs et/ou de faux plafonds, comprenant :

un support (2) sur lequel un élément LED (3) est fixé, qui est pourvu d'ailettes latérales (4) pour une entrée en prise avec la portion interne d'une feuille (L), sur lequel l'unité lumineuse est appliquée, un organe du type plaque (7) qui est capable d'être fixé au support (2) et qui a une ouverture traversante (8), à travers laquelle la lumière émise par l'élément LED (3) de l'unité lumineuse est émise vers l'extérieur, l'élément LED (3) étant monté dans une position interposée entre le support (2) et l'organe du type plaque (7), sensiblement dans un alignement vertical avec l'ouverture traversante (8),

**caractérisée en ce qu'elle** comprend un élément du type plaque (9) qui est interposé entre le support (2) et l'organe du type plaque (7) et qui est monté d'une manière avec un coulisserement limité sur l'organe, **en ce que** l'élément du type plaque (9) est pourvu d'un premier trou traversant et d'un second trou traversant (10, 11), qui sont adjacents l'un à l'autre, le premier trou traversant (10) étant capable d'être mis en prise par un élément écran ou lentille (12), et **en ce que** l'élément du type plaque (9) est mobile entre une première position, dans laquelle le premier trou traversant (10) est agencé en correspondance avec l'ouverture traversante (8), pour diffuser la lumière émise par l'élément LED (3), et une seconde position, dans laquelle le second trou traversant (11) est agencé en correspondance avec l'ouverture traversante (8), l'élément LED (3) pouvant être retiré de l'unité lumineuse à travers le second trou traversant (11) et l'ouverture traversante (8).

2. Unité lumineuse à LED encastrée selon la revendication 1, dans laquelle l'élément LED (3) est capable d'être fixé au support (2) à l'aide de moyens à vis, qui peuvent être vissés ou dévissés, à partir du côté extérieur de l'unité lumineuse, au moyen d'un outil de vissage qui est guidé à travers l'ouverture traversante (8) et le second trou traversant (11).
3. Unité lumineuse à LED encastrée selon la revendication 1, dans laquelle l'élément LED (3) est capable d'être fixé au support (2) à l'aide de moyens à vis, qui peuvent être vissés ou dévissés, à partir du côté extérieur de l'unité lumineuse, au moyen d'un outil de vissage qui est guidé à travers l'ouverture traversante (8) et le second trou traversant (11).

cation 1, dans laquelle l'élément LED (3) est capable d'être fixé au support (2) à l'aide de moyens de liaison magnétique.

4. Unité lumineuse à LED encastrée selon l'une quelconque des revendications précédentes, dans laquelle le diamètre du second trou traversant (11) est choisi de façon à avoir une valeur entre 9 et 16 mm. 5
5. Unité lumineuse à LED encastrée selon l'une quelconque des revendications précédentes, dans laquelle le support (2) est construit à partir d'un matériau thermoconducteur pour évacuer la chaleur produite par l'élément LED (3). 10
6. Unité lumineuse à LED encastrée selon l'une quelconque des revendications précédentes, dans laquelle l'élément du type plaque (9) est au moins partiellement reçu à l'intérieur d'un siège (13) qui est formé dans l'organe du type plaque (7) et qui a une telle formation que l'élément du type plaque (9) est guidé durant le mouvement coulissant entre la première position et la seconde position. 15 20

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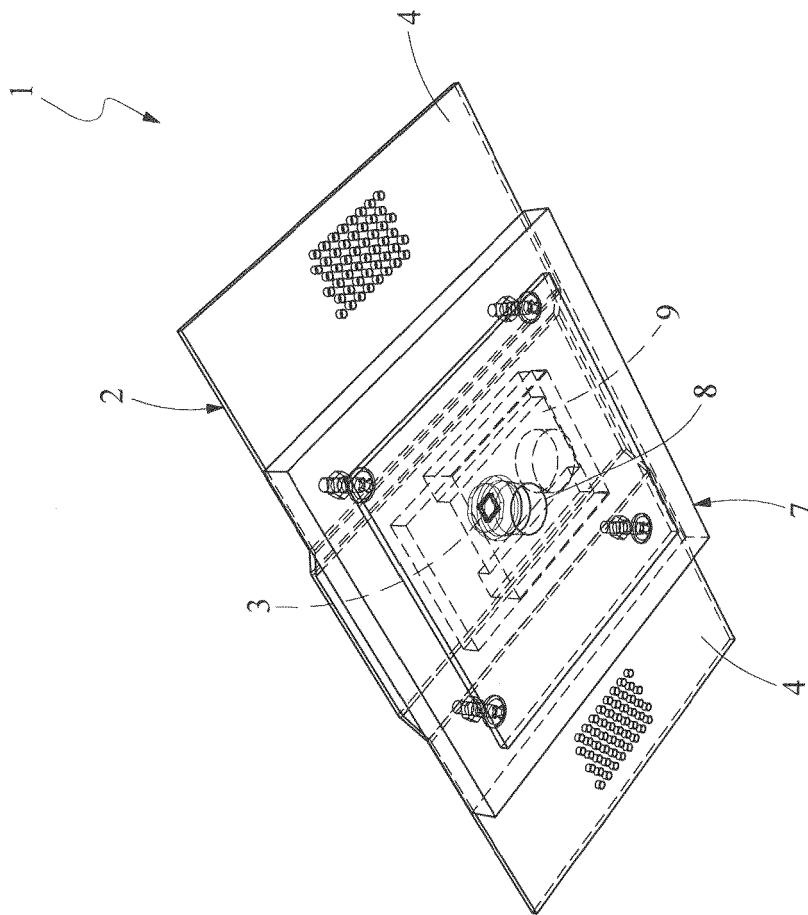
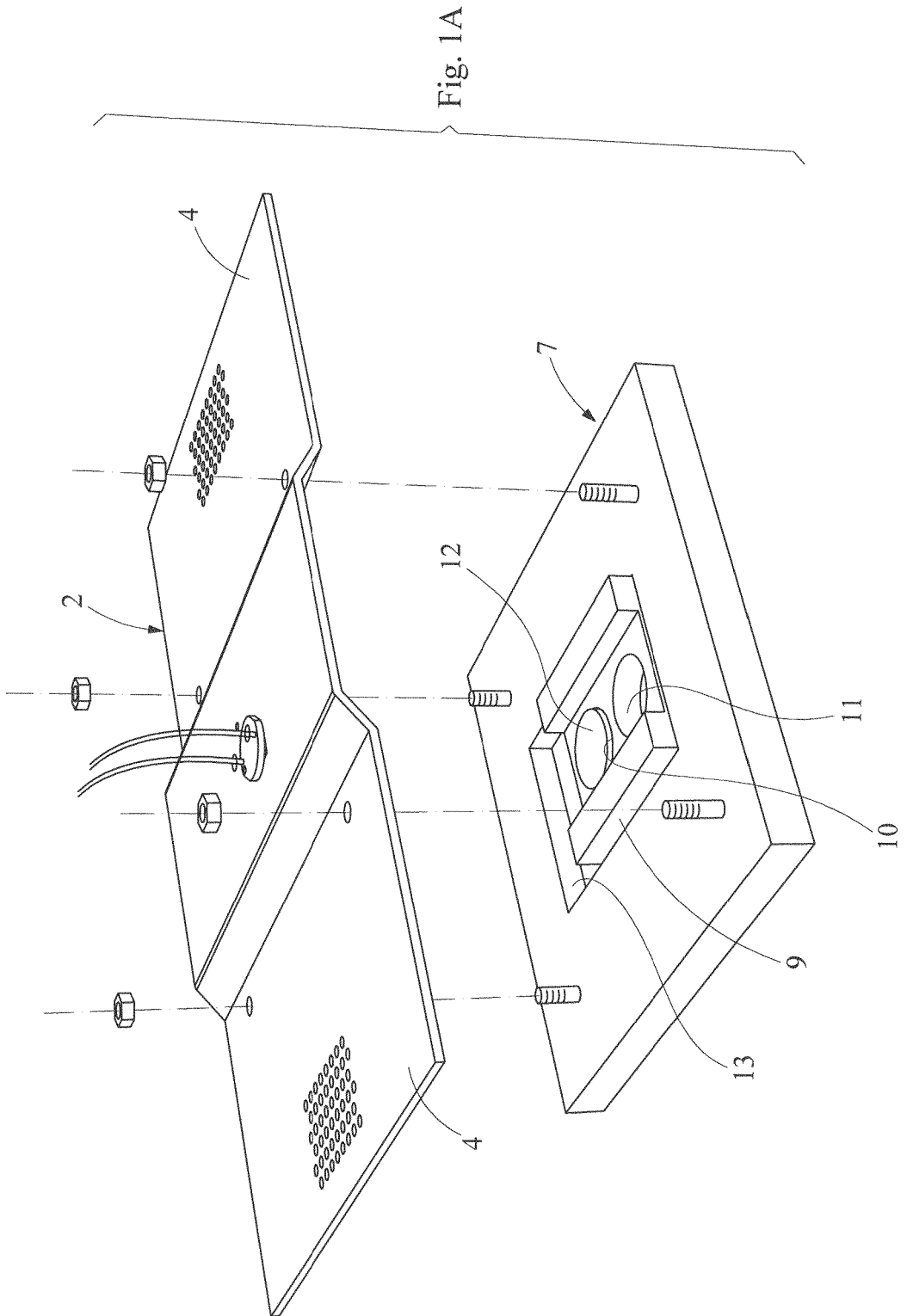


Fig. 1



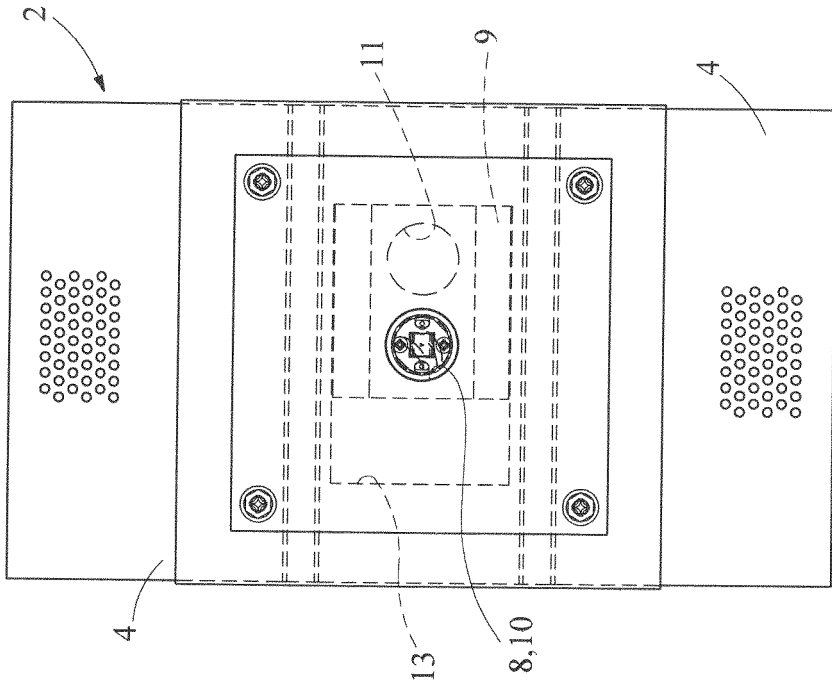


Fig. 4

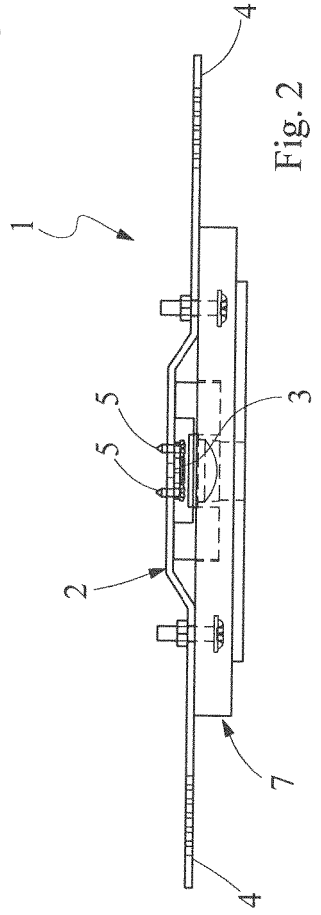


Fig. 2

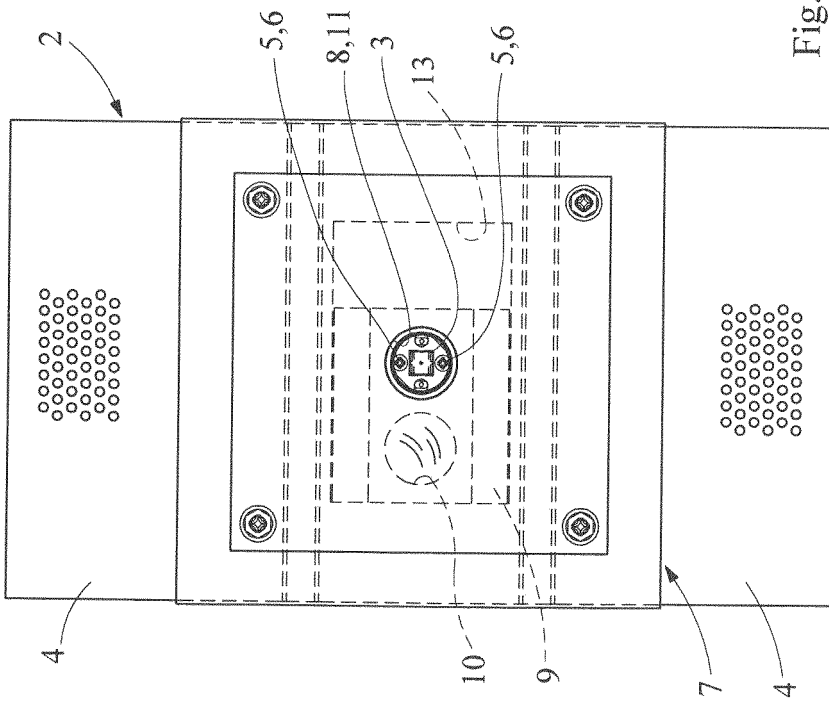


Fig. 5

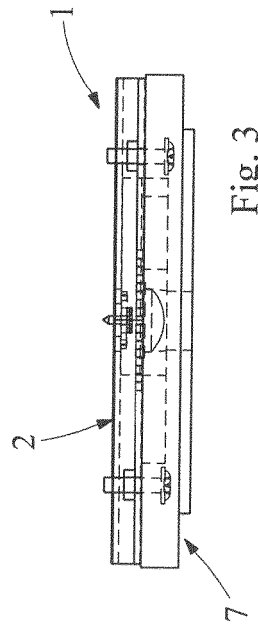
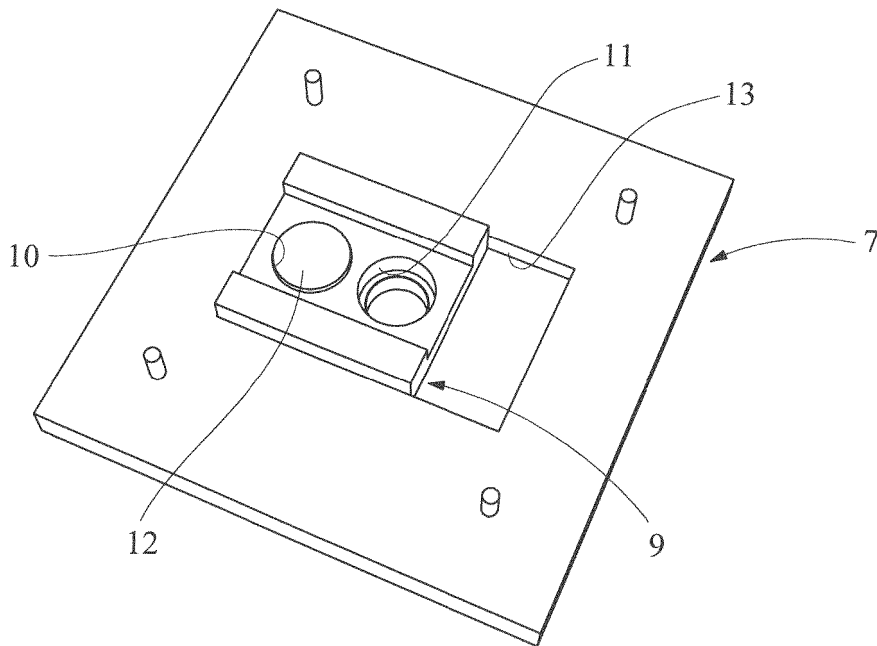
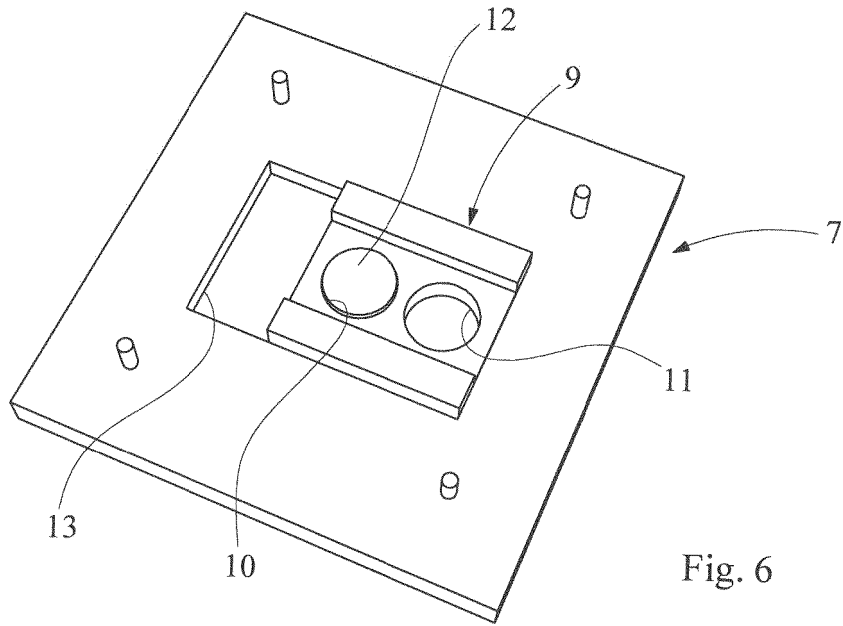


Fig. 3



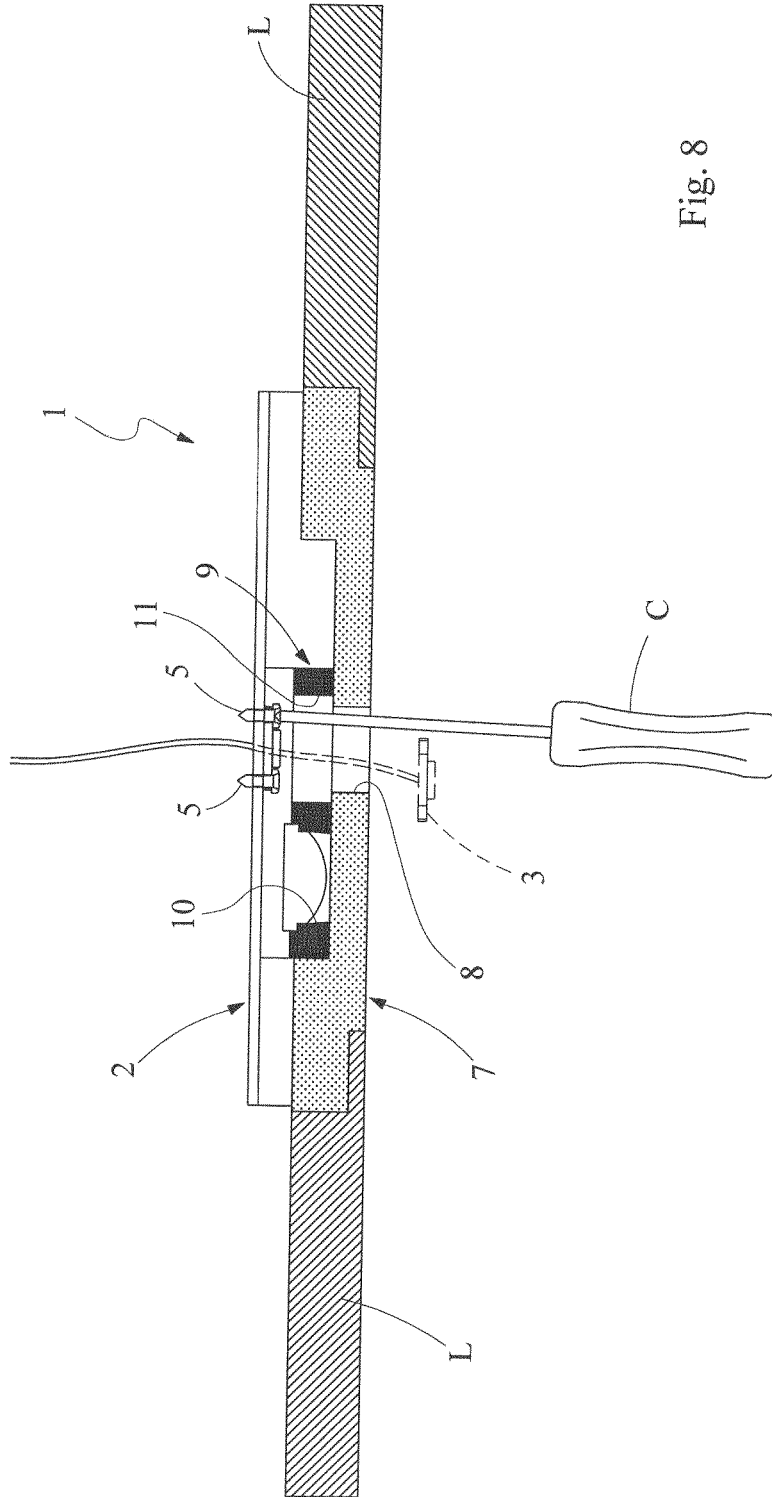


Fig. 8

**REFERENCES CITED IN THE DESCRIPTION**

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