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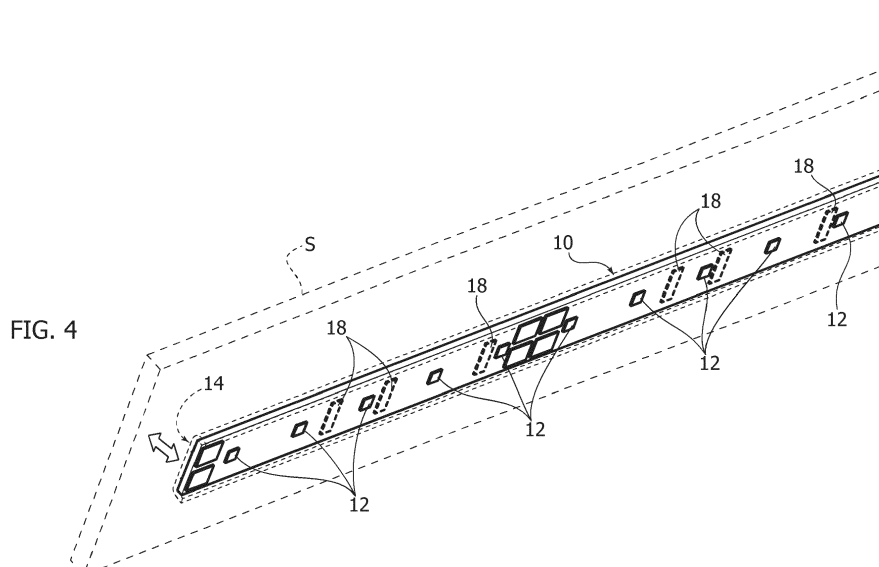
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(54) **A lighting device and corresponding method**

(57) A lighting device includes at least one strip-like carrier member (10, 14) carrying electrically powered light radiation sources (12), e.g. LED sources, wherein said at least one carrier member (10, 14) includes magnetically attractive formations (16, 18) along the length

of the at least one strip-like carrier member (10, 14).

The lighting device can therefore be mounted on a magnetically attractable support structure, such as a metal plate, so that the lighting device is retained on the support structure (S) by the magnetic attraction force.



## Description

### Technical field

**[0001]** The present description relates to lighting devices.

**[0002]** One or more embodiments may refer to solid-state lighting devices such as, for example, modules using LED light radiation sources.

### Technological Background

**[0003]** An ever-increasing interest is focusing on lighting devices consisting in modules featuring solid-state light radiation sources, e.g. LEDs, having the ability to change the shape of the module thanks for example to a general flexibility.

**[0004]** In some implementations, such a module is adapted to be mounted onto a support element (e.g. a mounting surface) by a bi-adhesive tape. In some implementations, the bi-adhesive tape may be provided directly on the back of the module.

**[0005]** This solution may involve various disadvantages such as:

- the difficulty in achieving an optimum adhesion between the module and the mounting surface,
- the comparatively low reliability of the adhesive connection, which in time may lead to a detachment,
- the difficulty in installing the module without exerting a pressure on the electronic components thereof,
- the virtual impossibility to move the module after it has been installed.

**[0006]** One way to omit the use of a bi-adhesive tape and to avoid incurring in the previously outlined drawbacks may consist in using external supports. However, this solution may require a longer mounting time, and may involve the risk of fixing the module only in some points and not in others.

**[0007]** For this reason the use of an external support is not widespread.

### Object and Summary

**[0008]** One or more embodiments aim at overcoming the previously outlined drawbacks.

**[0009]** According to one or more embodiments, said object is achieved thanks to a device having the features specifically set forth in the claims that follow.

**[0010]** One or more embodiments may refer to a corresponding method.

**[0011]** The claims are an integral part of the technical teaching provided herein with reference to the embodiments.

**[0012]** One or more embodiments lead to one or more of the following advantages:

- possibility of installing the device, e.g. a flex LED module, in an easy way, without the need of a bi-adhesive tape,
- optimum contact between the device and the support,
- it is unnecessary to press on the device in order to install it, and
- possibility of removing and re-installing the device in another position.

### Brief description of the Figures

**[0013]** One or more embodiments will be described, by way of non-limiting example only, with reference to the enclosed figures, wherein:

- Figure 1 is a perspective view of a lighting device to which one or more embodiments may be applied,
- Figure 2 exemplifies one or more embodiments,
- Figure 3 exemplifies one or more embodiments, and
- Figure 4 shows possible use of embodiments.

**[0014]** It will be appreciated that, for a better clarity of illustration, the visible parts in the Figures may not be necessarily drawn to scale.

### Detailed Description

**[0015]** In the following description, numerous specific details are given to provide a thorough understanding of one or more exemplary embodiments. The embodiments may be practiced without one or several specific details, or with other methods, components, materials, etc. In other instances, well-known structures, materials or operations are not shown or described in detail to avoid obscuring various aspects of the embodiments. Reference throughout this specification to "an embodiment" means that a particular feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment. Thus, the possible appearances of the phrases "in one embodiment" or "in an embodiment" in various places throughout this specification are not necessarily all referring to the same embodiment. Furthermore, the particular features, structures, or characteristics may be combined in any suitable manner in one or more embodiments.

**[0016]** The headings provided herein are for convenience only and therefore do not interpret the scope or meaning of the embodiments.

**[0017]** Figure 1 generally shows a lighting module including an optionally flexible strip-like substrate 10 (substantially in the form of a Printed Circuit Board, PCB).

**[0018]** On substrate 10 there can be mounted one or more electrically powered light radiation sources 12, which for example may consist of solid-state lighting sources, e.g. employing LEDs.

**[0019]** The module exemplified in Figure 1 belongs to a wide range of lighting sources of a known type. The

structural features, the implementations and the applications of such lighting sources are to be considered as known, and therefore they do not require a detailed description herein.

**[0020]** One or more embodiments aim at enabling the installation of such a lighting source 10, 12 on a support S including, for example, a flat support the surface of which has properties of magnetic attractability (i.e. the ability to be attracted by a magnetic material).

**[0021]** In one or more embodiments, the surface of support S may simply consist of a plate or sheet of metal material.

**[0022]** One or more embodiments may employ a different support S, e.g. of a material which in itself does not have magnetic properties but which includes, in the form of dust or inserts, formations of magnetically attractable material.

**[0023]** One or more embodiments aim at enabling the attachment (and the removal) of a lighting source such as source 10, 12 on such a support S.

**[0024]** In one or more embodiments, as exemplified in Figure 2, this result may be achieved by associating to lighting source 10, 12 a profile element 14 having a channel-like structure, i.e. a generally U-shaped section, with a bottom or core wall 14a from which side walls 14b extend.

**[0025]** In this way, substrate 10 with electrically powered light radiation sources 12 mounted thereon may be received in the profile element 14, the sources 12 facing the open side (that is the mouth part) of profile 14.

**[0026]** This is schematically shown in Figure 2, wherein the profile of lighting source 10, 12 is schematically shown in dashed lines.

**[0027]** In one or more embodiments, on the lighting source 10, 12, i.e. on the mouth part of profile 14, there may be applied a potting material which is transparent to light radiation, so that the lighting source 10, 12 may be protected from the outside.

**[0028]** In one or more embodiments, profile 14, e.g. the bottom or core wall 14a, may be associated with formations of magnetic material, i.e. a material which may generate a magnetic attractive force towards a magnetically attractable material (e.g. a support such as previously mentioned support S).

**[0029]** As exemplified in Figure 2, in one or more embodiments formations 16 may consist of one or more strips coextensive with profile 14.

**[0030]** In one or more embodiments, strip(s) may be produced together with profile 14, for example in a process of (co)extrusion.

**[0031]** In one or more embodiments, profile 14 may be implemented in a flexible material, such as a silicone material.

**[0032]** In one or more embodiments, the strip(s) 16 may be embedded in profile 14 (optionally at bottom wall 14a, or possibly in one or both side walls 14b) as strips of a magnetic material, such as magnetite or ferrite.

**[0033]** In one or more embodiments, such a magnetic

material may be embedded in profile 14 as a particulate material (e.g. a ferrite dust) distributed into profile 14 itself.

**[0034]** In one or more embodiments, the lighting device thus obtained (substrate 10, sources 12, profile 14) is adapted to be mounted on substrate S and may be retained thereon thanks to the magnetic attraction force present between formations 16 included in profile 14 and the magnetically attractable material which is comprised in support S.

**[0035]** Figure 3 exemplifies one or more embodiments wherein the possibility of (removable) mounting on a support S is achieved thanks to a force of magnetic attraction, which in this case is obtained via magnets 18 mounted on substrate 10.

**[0036]** In one or more embodiments, magnets 18 may be mounted onto substrate 10 on the same face of the substrate wherein the light radiation sources 12 are arranged.

**[0037]** In one or various embodiments, the mounting of magnets 18 may be achieved by resorting to technologies currently employed to mount on substrate 10 the light radiation sources 12 (or possibly the electronic circuitry, not visible in the drawings, which may be associated with such sources).

**[0038]** In one or more embodiments, magnets 18 may be mounted on substrate 10 as SMD (Surface Mounted Device) components.

**[0039]** One or more embodiments, therefore, enable to achieve the effect exemplified in Figure 4, thanks to the possibility of mounting lighting source 10, 12 in a removable way on a magnetically attractable substrate S.

**[0040]** In one or more embodiments, as exemplified in Figure 2, this result may be achieved thanks to the magnetic formations 16 associated to profile 14 (the section whereof is schematically shown with dashed lines in Figure 4), thus with a lighting source 10, 12 of a "protected" kind.

**[0041]** In one or several embodiments, as exemplified in Figure 3, this result may be achieved via magnets 18 (the profile of which is schematically shown with a dashed line in Figure 4), which makes it possible to mount lighting source 10, 12 on substrate S as a "naked" component.

**[0042]** This is achieved while keeping, in one or more embodiments, the general flexibility of the overall device.

**[0043]** Of course, without prejudice to the basic principle, the embodiments and the implementation details may vary, even appreciably, with respect to what has been described herein by way of non-limiting example only, without departing from the extent of the invention.

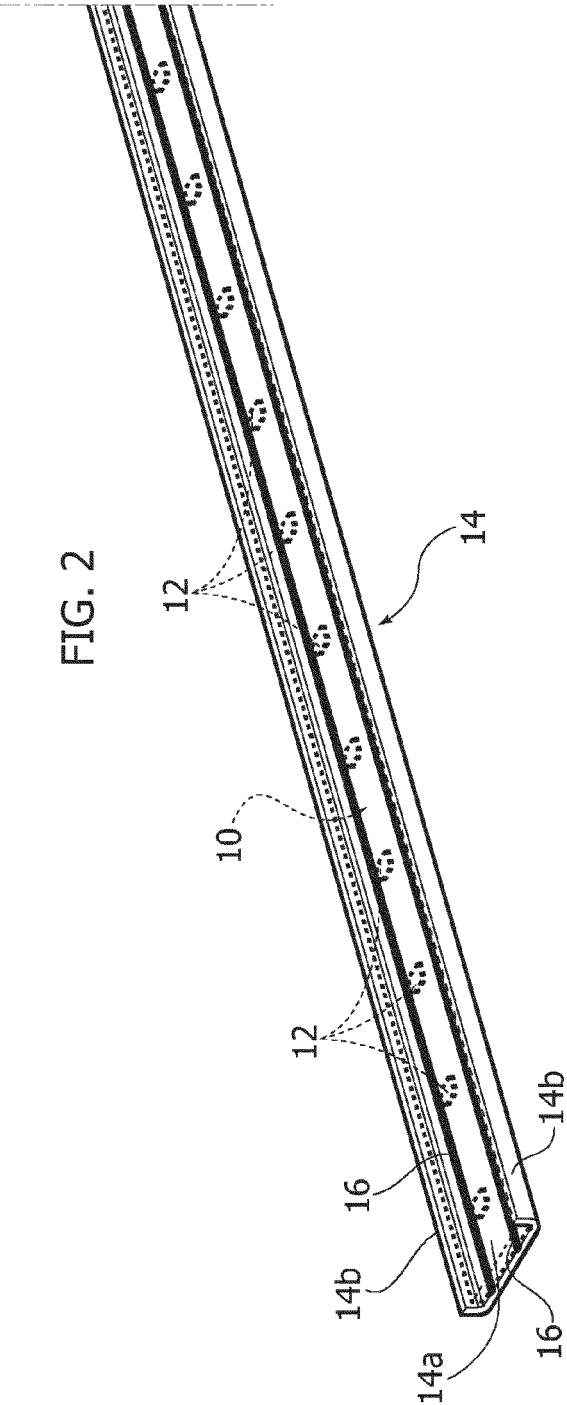
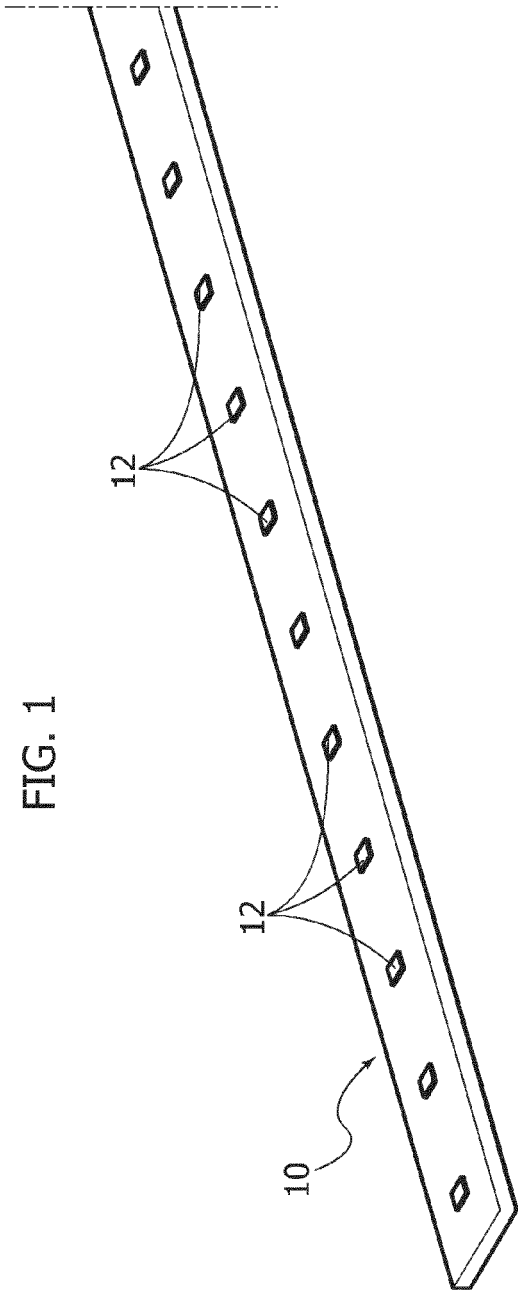
**[0044]** Said extent is defined by the annexed claims.

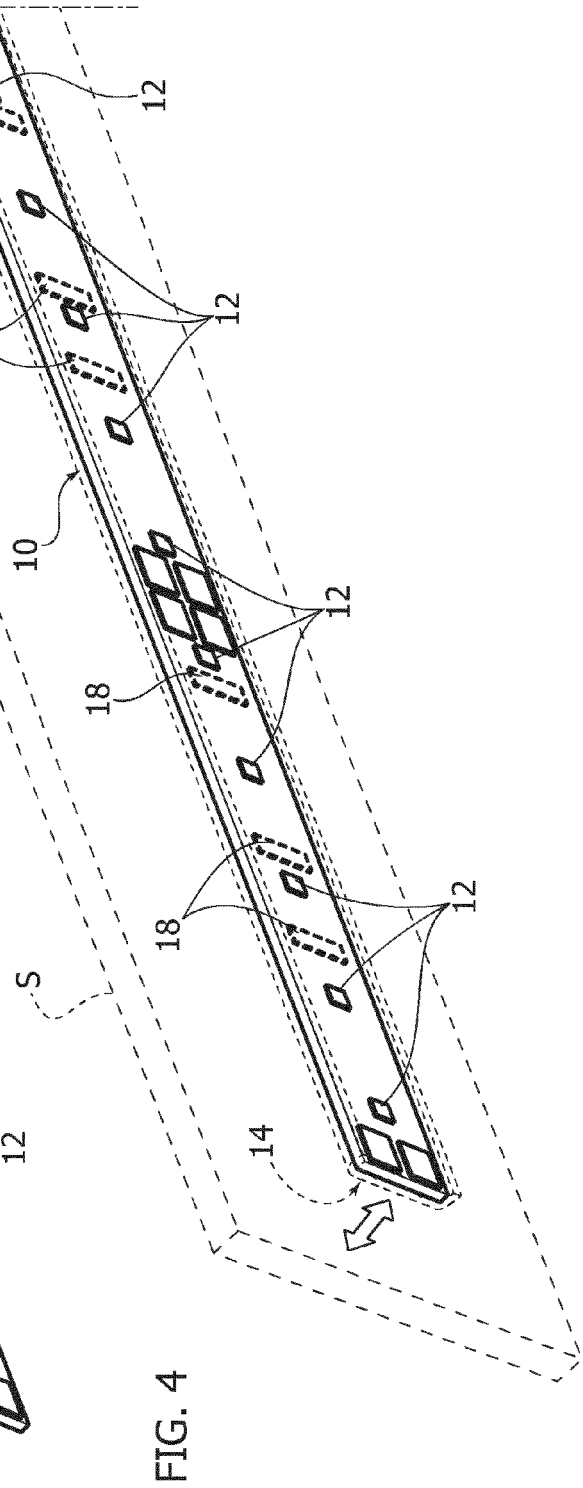
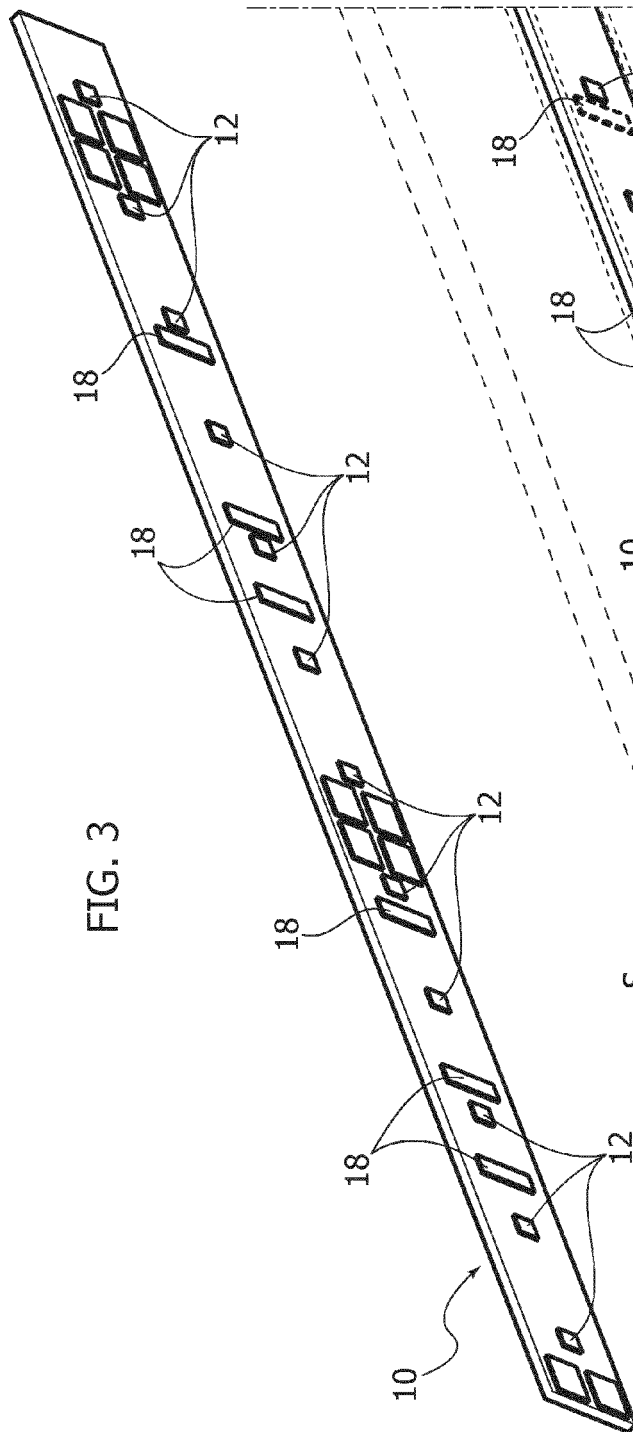
## Claims

1. A lighting device including at least one strip-like carrier member (10, 14) carrying electrically powered light radiation sources (12), wherein said at least one

carrier member (10, 14) includes magnetically attractive formations (16, 18) along the length of said at least one carrier member (10, 14).

2. The lighting device of claim 1, wherein said at least one carrier member (10, 14) is flexible. 5
  
3. The lighting device of claim 1 or claim 2, including a strip-like substrate (10) carrying said light radiation sources (12) and a channel-like profile (14) receiving said strip-like substrate (10) with said light radiation sources (12) facing the open side of the channel-like profile (14), wherein said magnetically attractive formations (16) are arranged in said channel-like profile (14), preferably in the bottom wall (14a) thereof. 10  
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4. The lighting device of claim 3, wherein said magnetically attractive formations include at least one magnetically attractive strip (16) extending along the length of said channel-like profile (14). 20
  
5. The lighting device of claim 4, wherein said at least one magnetically attractive strip (16) is embedded in said channel-like profile (14), preferably by being co-extruded therewith. 25
  
6. The lighting device of claim 3, wherein said magnetically attractive formations include a magnetically attractive particulate material distributed in said channel-like profile (14). 30
  
7. The lighting device of claim 1 or claim 2, including a strip-like substrate (10) carrying said light radiation sources (12) and said magnetically attractive formations (18) mounted thereon, preferably on the same side. 35
  
8. The device of claim 7, wherein said magnetically attractive formations are magnets (18), preferably mounted as SMD elements on said strip-like substrate (10). 40
  
9. The lighting device of any of the previous claims, wherein said magnetically attractive formations (16) include material selected out of magnetite and ferrite. 45
  
10. A method of mounting a lighting device according to any of claims 1 to 9 on a support structure (S), the method including: 50
  - providing said support structure (S) as a magnetically attractable structure, and
  - mounting said lighting device on said support structure (S), whereby said lighting device is retrained onto said support structure (S) by magnetic attractive force. 55







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| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                    |                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                              |                                                            |
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