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(54) Led lamp structure

(57) A LED lamp structure includes a circuit board (10) carrying multiple spaced LEDs (11) and provided with a power cable (12), a single-piece housing (20) cut from an integral tubular bar subject to the length of the circuit board (10) and adapted to accommodate the circuit board (10), two end plugs (30;40) respectively

plugged into the two ends of the single-piece housing (20), and two end caps (50;60) respectively capped on the two ends of the single-piece housing (20) for enabling the power cable (12) to extend to the outside of the single-piece housing (20) for connection to an external power source.

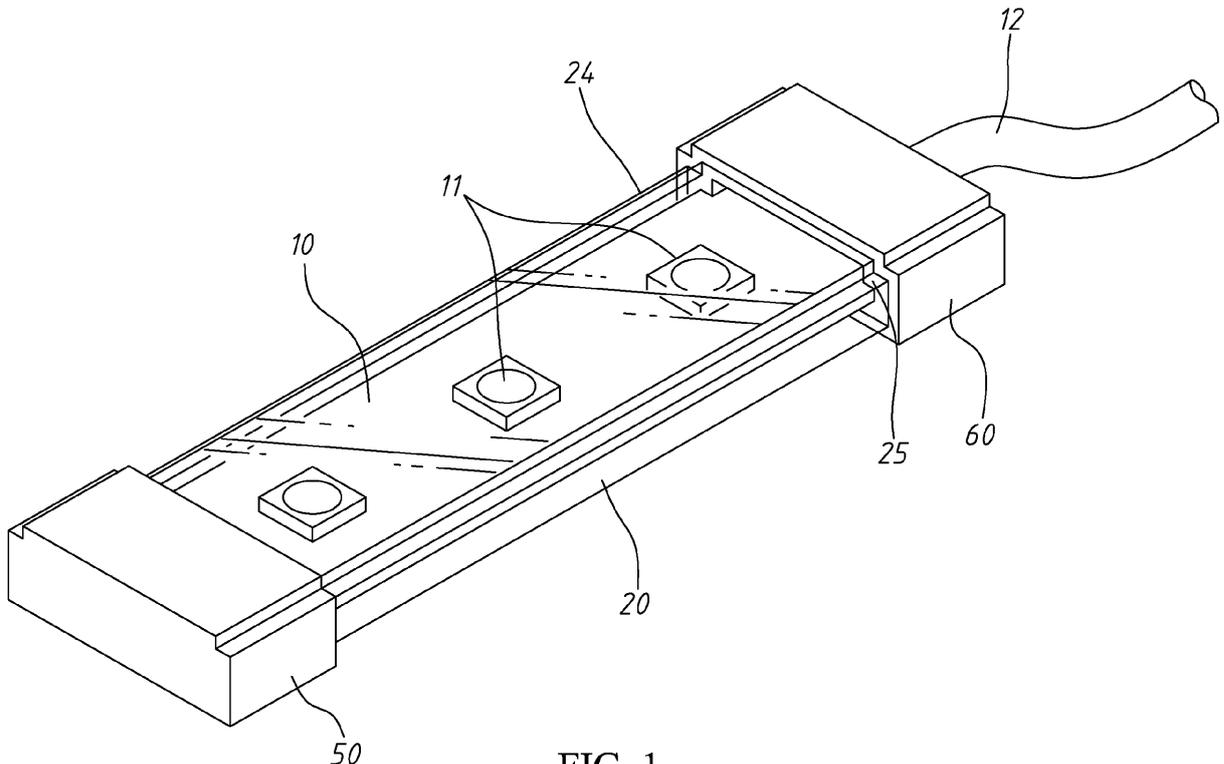


FIG. 1

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Description

BACKGROUND OF THE INVENTION

1. Field of the Invention:

[0001] The present invention relates LED lighting technology and more particularly, to a LED lamp structure, which allows the use of same component parts to make different lengths and configurations of LED lamps.

2. Description of the Related Art:

[0002] In the early days since the creation of semiconductor light source, LEDs can simply give off low-intensity red light. Single-color LEDs were developed a certain period of time after the creation of semiconductor light source. Nowadays, modern designs of LEDs are available across the visible, ultraviolet, and infrared wavelengths, with very high brightness. LEDs are used in applications as aviation lighting, automotive lighting, advertising, general lighting and traffic signals. LEDs prevent many advantages over conventional incandescent light sources, including lower energy consumption, longer lifetime, longer durability, smaller size, and faster switching.

[0003] However, for general lighting application, multiple LEDs shall be arranged on the surface of a circuit board, and a housing shall be provided subject to the dimension and length of the circuit board. A specific size of housing simply fits one specific circuit board, i.e., different housings must be prepared to fit different lengths or sizes of LED circuit boards. In consequence, the fabrication of different sizes or configurations of LED lamps will be complicated, increasing the manufacturing cost.

SUMMARY OF THE INVENTION

[0004] The present invention has been accomplished under the circumstances in view. It is main object of the present invention to provide a LED lamp structure, which allows the use of same component parts to make different lengths and configurations of LED lamps.

[0005] It is another object of the present invention to provide a LED lamp structure, which saves the manufacturing costs of different lengths of LED lamps.

[0006] It is still another object of the present invention to provide a LED lamp structure, which simplifies the manufacturing steps.

[0007] It is still another object of the present invention to provide a LED lamp structure, which meets watertight safety rules.

[0008] To achieve these and other objects of the present invention, a LED lamp structure comprises a circuit board carrying multiple spaced LEDs and provided with a power cable, a single-piece housing cut from an integral tubular bar subject to the length of the circuit board and defining therein an accommodation chamber for accommodating the circuit board, two end plugs re-

spectively plugged into the two ends of the accommodation chamber of the single-piece housing, and two end caps respectively capped on the two ends of the single-piece housing for enabling the power cable to extend to the outside of the single-piece housing for connection to an external power source.

[0009] Further, the single-piece housing comprises two longitudinal locating grooves bilaterally disposed in the accommodation chamber and configured subject to the board thickness of the circuit board for the positioning of the circuit board.

[0010] Further, each end plug comprises two opposing side flanges respectively fitting the longitudinal locating grooves of the single-piece housing.

[0011] Further, the single-piece housing comprises at least one step located on the outside wall and extending along the length thereof.

[0012] Further, each end cap has an inside wall thereof configured to fit the cross section of the opposing front and rear ends of the single-piece housing.

[0013] Other advantages and features of the present invention will be fully understood by reference to the following specification in conjunction with the accompanying drawings, in which like reference signs denote like components of structure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014]

FIG. 1 is an elevational view of a LED lamp structure in accordance with the present invention.

FIG. 2 is a perspective exploded view of the LED lamp structure in accordance with the present invention.

FIG. 3 is a longitudinal sectional view of the LED lamp structure in accordance with the present invention.

FIG. 4 is a sectional view taken along line A-A of FIG. 3.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0015] Referring to FIGS. 1 and 2, a LED lamp structure in accordance with the present invention generally is shown. The LED lamp structure comprises a circuit board **10** having a plurality of LEDs (light-emitting diodes) **11** mounted thereon by, for example, but not limited to, surface-mount technology; a power cable **12** extended from the circuit board **10** and electrically connectable to an external power source to obtain the necessary working voltage for the LEDs **11** at the circuit board **10**; a housing **20**, which is made of a transparent material (for example, transparent plastics) and comprises an accommodation chamber **21** extending through opposing front and rear ends thereof and configured to accommodate the circuit board **10** and its LEDs **11**, two longitudinal locating

grooves **22;23** bilaterally disposed in the accommodation chamber **21** and configured subject to the wall thickness of the circuit board **10** and at least one, for example, two outside steps **24;25** bilaterally located on the outside wall thereof and extending along the length thereof; two end plugs **30;40** respectively plugged into opposing front and rear ends of the accommodation chamber **21**, each end plug **30;40** having two opposing side flanges **31;32** or **41;42** respectively press-fitted into the longitudinal locating grooves **22;23**; and two end caps **50;60** respectively capped on the opposing front and rear ends of the housing **20**.

[0016] Further, the housing **20** can be each of a number of cut pieces obtained from an integral tubular bar of a transparent material subject to a predetermined length that fits the dimension of the circuit board **10**. Further, one of the two end plugs **30;40** provides a through hole for the passing of the power cable **12**. Further, the two end caps **50;60** have a cross-sectional configuration fitting the cross section of the housing **20**, i.e., each end cap **50;60** defines therein two inside steps in the inside wall thereof to fit the outside steps **24;25** of the housing **20**. Further, one of the two end caps **50;60** provides a through hole for the passing of the power cable **12**.

[0017] Referring to FIGS. 3 and 4, when assembling the LED lamp structure, insert the circuit board **10** into the longitudinal locating grooves **22;23** in the accommodation chamber **21** of the housing **20**, and then press-fit the two end plugs **30;40** into the opposing front and rear ends of the accommodation chamber **21** respectively, and then cap the two end caps **50;60** onto the opposing front and rear ends of the housing **20** respectively.

[0018] According to the present invention, the housing of the LED lamp structure is a cut piece obtained from an integral tubular bar of a transparent material subject to a predetermined length. The manufacturer can cut each prepared integral tubular bar into multiple pieces subject to different lengths for making different lengths of LED lamps, saving much the manufacturing costs and steps and meeting watertight safety rules.

[0019] Although a particular embodiment of the invention has been described in detail for purposes of illustration, various modifications and enhancements may be made without departing from the spirit and scope of the invention. Accordingly, the invention is not to be limited except as by the appended claims.

Claims

1. A LED lamp structure, comprising:

- a circuit board (10) comprising a plurality of spaced light-emitting diodes and a power cable (12) electrically connectable to an external power source;
- a single-piece housing (20) surrounding said circuit board (10), said housing (20) comprising an

accommodation chamber (21) extending through opposing front and rear ends thereof for accommodating said circuit board (10) and said light-emitting diodes;

two end plugs (30;40) respectively plugged into the opposing front and rear ends of said single-piece housing (20), each said end plug (30;40) having a cross section fitting the cross section of said accommodation chamber (21), one said end plug (30;40) defining a through hole for the passing of said power cable (12); and two end caps (50;60) respectively capped on the opposing front and rear ends of said single-piece housing (20), one said end cap (50;60) defining a through hole for the passing of said power cable (12).

2. The LED lamp structure as claimed in claim 1, wherein said single-piece housing (20) comprises two longitudinal locating grooves (22;23) bilaterally disposed in said accommodation chamber (21) and configured subject to the board thickness of said circuit board (10) for the positioning of said circuit board (10).
3. The LED lamp structure as claimed in claim 2, wherein each said end plug (30;40) comprises two opposing side flanges (31;32) or (41;42) respectively fitting said longitudinal locating grooves (22;23) of said single-piece housing (20).
4. The LED lamp structure as claimed in claim 1, wherein said single-piece housing (20) comprises at least one step (24;25) located on an outside wall thereof and extending along the length thereof.
5. The LED lamp structure as claimed in claim 2, wherein said single-piece housing (20) comprises at least one step (24;25) located on an outside wall thereof and extending along the length thereof.
6. The LED lamp structure as claimed in claim 3, wherein said single-piece housing (20) comprises at least one step (24;25) located on an outside wall thereof and extending along the length thereof.
7. The LED lamp structure as claimed in claim 4, wherein each said end cap (50;60) has an inside wall thereof configured to fit the cross section of the opposing front and rear ends of said single-piece housing (20).

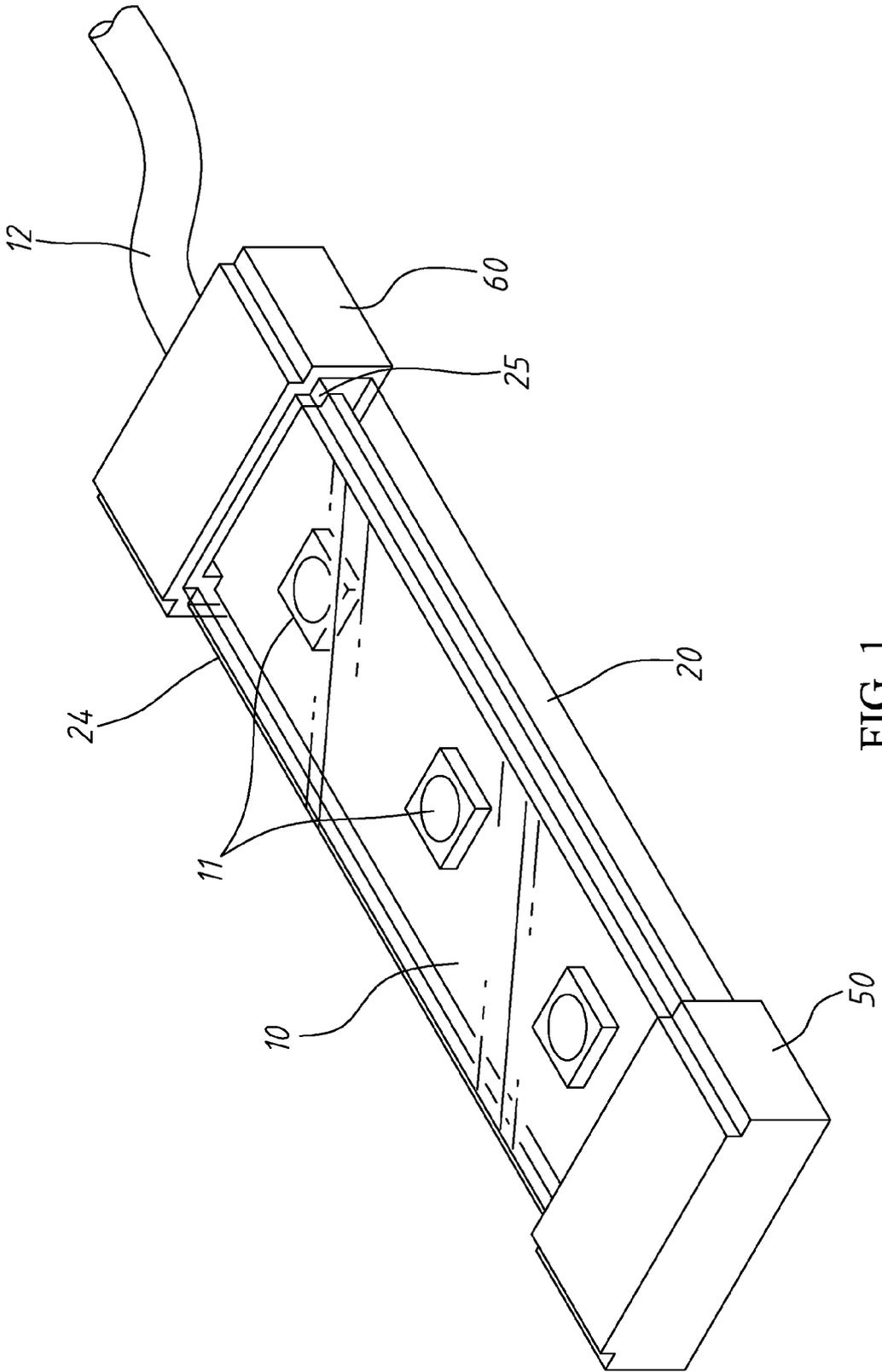


FIG. 1

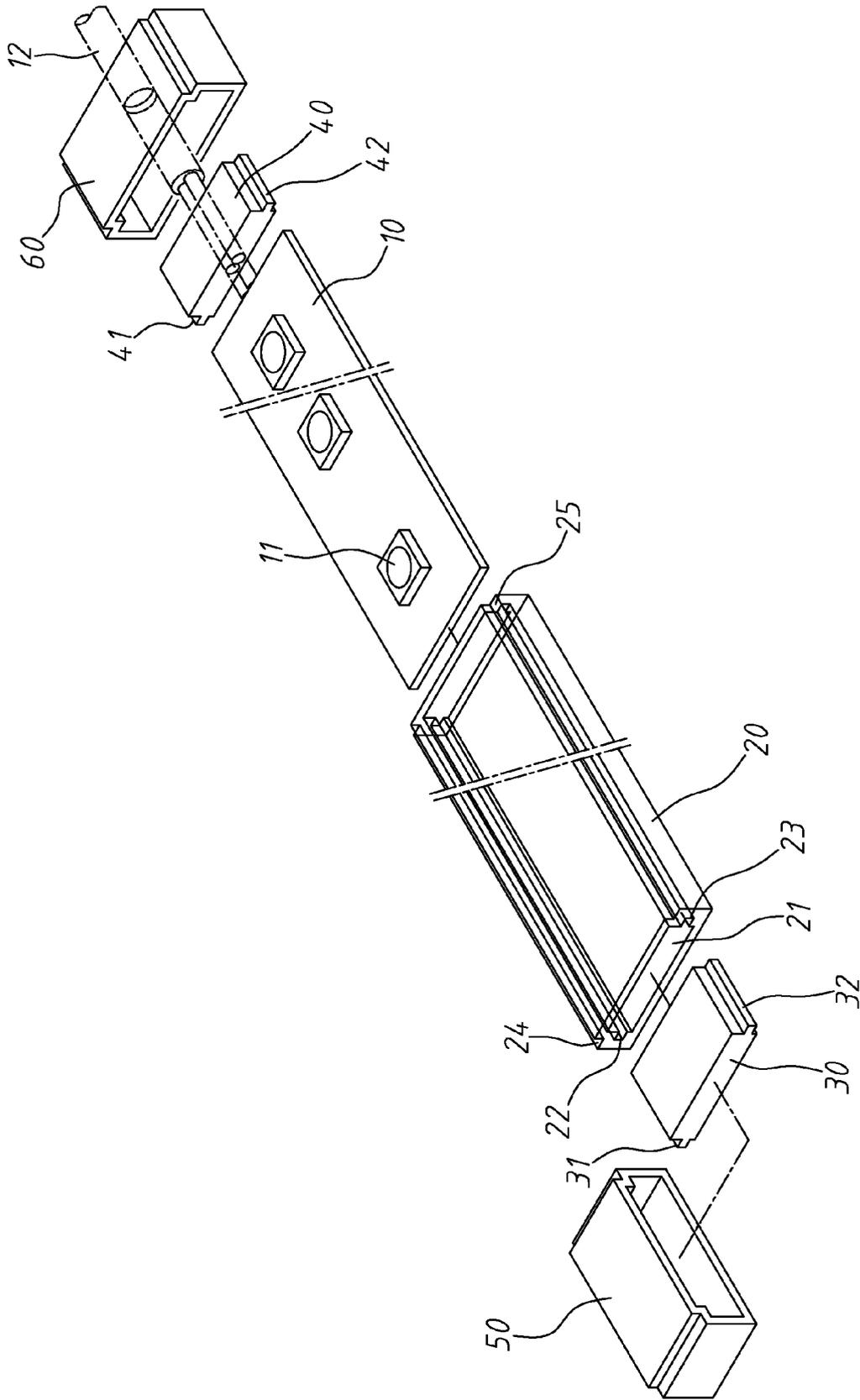


FIG. 2

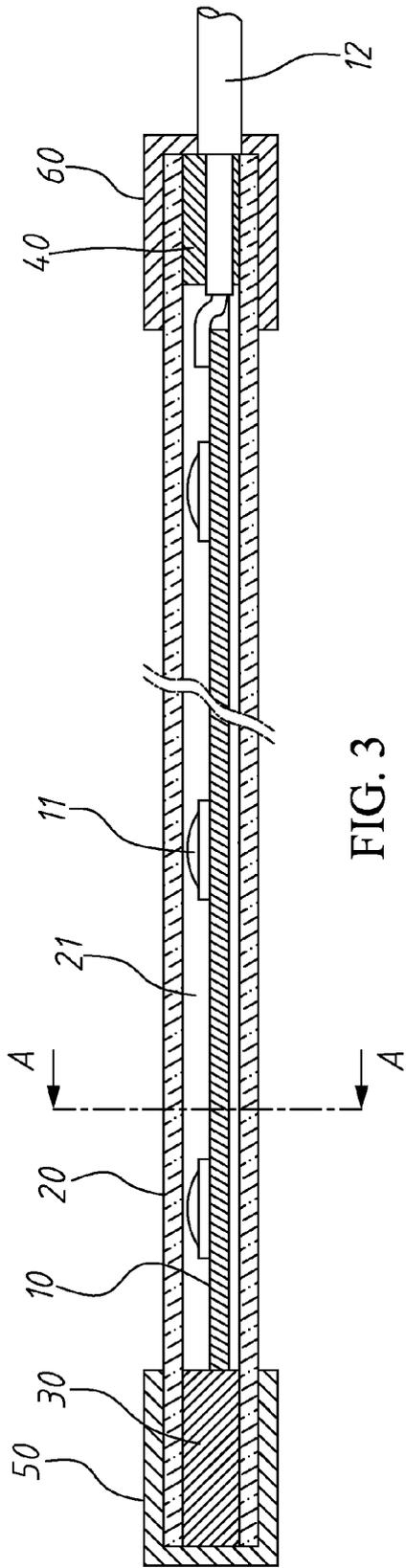
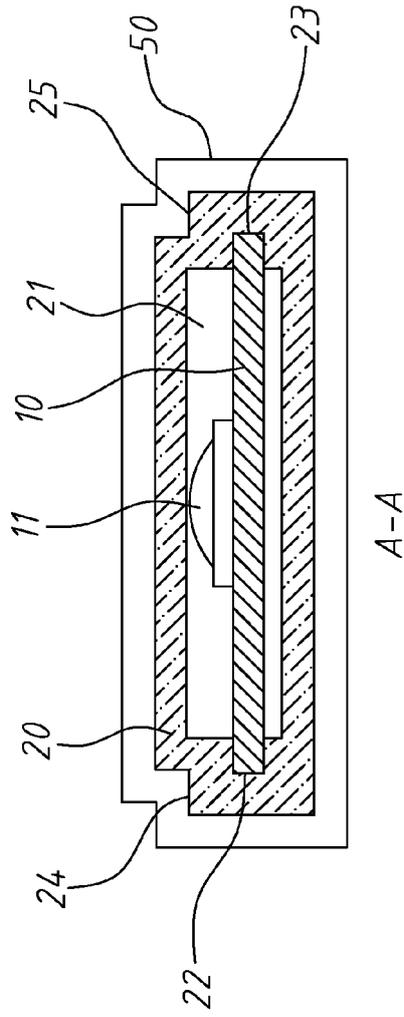


FIG. 3



A-A

FIG. 4



EUROPEAN SEARCH REPORT

Application Number
EP 12 17 6683

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	US 2010/238655 A1 (SLOAN THOMAS C [US] ET AL) 23 September 2010 (2010-09-23) * figure 1 * * figures 6-11 * * figures 17-19a * * paragraphs [0055], [0056] * * paragraphs [0072], [0073], [0077] * * paragraphs [0083], [0086] * * paragraphs [0091] - [0094] *	1-7	INV. F21S4/00 F21V15/015 F21V27/02 F21V19/00 ADD. F21Y101/02 F21Y103/00
X	EP 1 498 656 A2 (ELEKTRO PRO LIGHT KG DES BERGM [IT]) 19 January 2005 (2005-01-19) * figures 2a, 2b, 3a, 3b, 3c * * paragraph [0035] - paragraph [0036] *	1-3	
			TECHNICAL FIELDS SEARCHED (IPC)
			F21S F21V
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 19 December 2012	Examiner Sacepe, Nicolas
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

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