

(19)



(11)

EP 1 904 787 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
03.09.2008 Bulletin 2008/36

(51) Int Cl.:
F21V 33/00 ^(2006.01) **E04F 15/02** ^(2006.01)
E04F 13/14 ^(2006.01)

(21) Application number: **06824410.2**

(86) International application number:
PCT/RO2006/000018

(22) Date of filing: **07.09.2006**

(87) International publication number:
WO 2007/037712 (05.04.2007 Gazette 2007/14)

(54) **ILLUMINATED TILE**

BELEUCHTETE FLIESE

CARREAU ECLAIRE

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI
SK TR**
Designated Extension States:
HR MK

(30) Priority: **30.09.2005 RO 200500828**

(43) Date of publication of application:
02.04.2008 Bulletin 2008/14

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Description

[0001] The present invention relates to a luminous slab made of transparent or translucent material (glass, for example), lighted from the underneath, by using SMD LEDs, being used for plating floors, walls and ceiling surfaces, for decorative or safety purposes.

[0002] From among them we specify the lighted flooring plates, for premises, containers lighted from the underneath with bulbs, LEDs, protected at the exterior with transparent and translucent tiles, fastened through a metallic frame on the surface whereof are written various messages, information. The main disadvantage of such lighting systems consists in the high price that is required for the make of such containers or premises.

[0003] There are also other luminous plates which are using electronic sub-assemblies for energy supply. The main disadvantages of these systems consist in high investment resources for purchasing and making the sub-assemblies and in necessity of using specialists for installation and maintenance.

[0004] DE20200400810U1 discloses a luminous slab comprising a tile made of a transparent material which is resistant to mechanical stress, lightly fixed on a printed circuit board by means of a distance separator and an adhesive, wherein an enclosed space is formed between said tile distance separator and printed circuit board. A plurality of LEDs are mounted on said printed circuit board so as to be located in said enclosed space, and electric contacts are placed on the other side of printed circuit board; an electrical circuit for a controlling said LEDs is also located in said enclosed space. Said electric contacts are connected, by means of a cable, to a power supply.

[0005] The technical issue solved by this invention for the purpose aimed at, is the making of a luminous slab, the dimensions whereof are compatible with those of stone/ceramic tile and which can be installed by the tiler with low costs without any assistance of a technician, using the same adhesive stuff used for the stone/ceramic tiles.

[0006] The luminous slab, according to this invention, is defined in the claim. It comprises a tile made of transparent or translucent material resistant to mechanical stress, such as, for instance glass, lighted from the underneath with SMD LEDs mounted on a printed circuit board, which is fixed on the glass tile using an A+B adhesive and a distance separator so that the thickness of the glass tile - printed circuit board assembly is compatible to the thickness of a stone/ ceramic tile. On the lower side of the printed circuit there are two electric contacts where two electric wires for the electrical power supply are tin solder fixed, after which on the side and rear face of the assembly formed by the glass tile - distance separator - printed circuit board there will be applied a continuous layer of a known silicone type, for tightness purpose.

[0007] The proposed invention has the following ad-

vantages:

- > Low electricity consumption;
- > Simple execution;
- > It does not require personnel skilled in the electronic or electrical field;
- > It can be installed by the tiler who has nothing else to do than lay the electric wires in the joints between the stone/ceramic tiles so that those wires can reach to the place where the power supply will be located.

[0008] It is given hereunder an exemple for the achievement of the invention, in connection, as well, with, fig: 1, 2, 3 and 4, wherein:

- fig. 1, exploded view of the luminous slab;
- fig. 2, horizontal cross-section view of the luminous slab;
- fig. 3, electrical wiring diagram of the printed circuit;
- fig. 4, example of a printed circuit.

[0009] The luminous slab according to the invention comprises a transparent or translucent tile **1**, made of an appropriate material resistant to mechanical stress, glass for example, a distance separator **2** fixed on the printed circuit board **3** on which the SMD LEDs **4** are mounted, as per drawing, and laid in order to obtain the desired luminous effect and on the lower side of the printed circuit **3** there are the electric contacts **5** where two electric wires **8** are tin solder joint, and which will be connected to an electric power supply, not shown in the drawing. The power supply, not shown in the drawing, may be a DC with the indicated polarization power supply or AC power supply, and in both cases, the voltage may range from 3 to 12 volts. The DC power supply, not shown in the drawings, can be a battery, an accumulator or a AC rectifier which can supply from 3 to 12 volts. On the printed circuit board **3**, the LEDs **4** are mounted in parallel, and are serially connected with the power supply and the diode **6**, which has the protection function in case of wrong polarization or rectification function in case of AC power supply. The used diode **6** is a rectifying diode which has the breakdown voltage higher than the supply voltage, for example 50-100 volts, and it can carry 1-2 amperes enough for supplying the LEDs **4** and the resistor **7**. Both the diode **6** and the resistor **7** are used to balance the electric currents in the circuit depending on the number of LEDs and their electric features. The resistor **7** has a value between 56 and 220 ohm. The transparent or translucent tile **1** together with the separator **2** and the printed circuit board **3**, compose a solid assembly sealed tight on the side and rear face with a known solution, such as silicone, which forms a continuous layer in order to prevent water infiltration into the assembly glass tile **1** - distance separator **2** - printed circuit board **3**.

Claims

1. Luminous slab comprising:

- a transparent or luminescent tile (1) made of a material resistant to mechanical stress; 5
- a printed circuit board (3) parallel to said tile (1), with a side directed towards said tile (1) and an opposite lower side, 10
- a distance separator (2) for tightly fixing said tile (1) and printed circuit board (3) to each other by means of an adhesive, and 15
- a sealing layer (9), made e.g. of silicone, applied as a continuous layer, wherein 20
- on said side of the printed circuit board (3) which is directed towards the tile (1) there are mounted a plurality of LEDs (4), as well as a diode (6) and a resistor (7) connected to said LEDs (4), 25
- on said lower side of the printed circuit board (3) there are placed two electric contacts (5) connected by means of tin solder joints to two electric wires (8) for further connection to a power supply, 30
- said distance separator (2) is arranged between said tile (1) and said printed circuit board (3) so that: 35
- i) - an upper face of said distance separator is in contact with the tile (1) and an opposite lower face of said distance separator is in contact with said side of the printed circuit board which is directed towards said tile, forming thereby an enclosed space between said tile (1), printed circuit board (3) and distance separator (2) where said LEDs (4), diode (6) and resistor (7) are located, and 40
- characterised in that,** 45
- ii) - the lateral surfaces of the distance separator (2) and of the printed circuit board (3) are retracted from the peripheric edge of the tile (1), and 50
- the sealing layer (9) is applied around said lateral surfaces of the distance separator (2) and of the printed circuit board (3) up to said peripheric edge of the tile (1), so that the whole slab assembly is sealed tightly on the side and rear face. 55

- eine durchsichtige oder lumineszierende Platte (1) aus einem Material, das widerstandsfähig gegen mechanischen Stress ist;
- eine gedruckte Leiterplatte (3), die parallel zur genannten Platte (1) angeordnet ist, mit einer zur genannten Platte (1) gerichteten Seite und einer gegenüberliegenden Unterseite;
- einen Abstandshalter (2) zur Befestigung der genannten Platte (1) und gedruckten Leiterplatte (3) zueinander mittels eines Klebstoffes, und
- eine als kontinuierliche Schicht aufgetragene Dichtungsschicht (9), z.B. aus Silikon; wobei
- auf der zur Platte (1) gerichteten Seite der gedruckten Leiterplatte (3) mehrere LEDs (4) montiert sind, zusammen mit einer Diode (6) und einem Widerstand (7), die an die genannten LEDs angeschlossen sind,
- auf der genannten Unterseite der gedruckten Leiterplatte (3) zwei elektrische Kontakte (5) angeordnet sind, die mittels Zinn-Lötverbindungen an zwei elektrischen Leitungen (8), zum weiteren Anschliessen an einer Stromversorgung, angeschlossen sind,
- der genannte Abstandshalter (2) zwischen der genannten Platte (1) und der genannten gedruckten Leiterplatte (3) so angeordnet ist, dass:

- i) - eine Oberseite des genannten Abstandshalters in Kontakt mit der Platte (1) steht, und eine gegenüberliegende Unterseite des genannten Abstandshalters in Kontakt mit der genannten, zur Platte (1) gerichteten, Seite der gedruckten Leiterplatte steht, so dass ein geschlossener Raum zwischen der genannten Platte (1), der gedruckten Leiterplatte (3) und dem Abstandshalter (2) entsteht, wo die genannten LEDs (4), die Diode (6) und der Widerstand (7) angeordnet sind, und

dadurch gekennzeichnet, dass

- ii) - die Seitenflächen des Abstandshalters (2) und der gedruckten Leiterplatte (3) zurückgezogen von dem Rand der Platte (1) sind, und

- die Dichtungsschicht (9) um die genannten Seitenflächen des Abstandshalters (2) und der gedruckten Leiterplatte (3), bis zum genannten Rand der Platte (1) aufgetragen ist, so dass die gesamte Baueinheit seitlich und hinten dicht versiegelt ist.

Patentansprüche

1. Leuchtende Platte, enthaltend:

55 Revendications

1. Plaque lumineuse comprenant:

- un carreau luminescent ou transparent fait d'un matériel résistant aux tensions mécaniques;
- une plaque à circuits imprimés (3) parallèle audit carreau (1), avec une face orientée vers ledit carreau (1) et une face opposée inférieure, 5
- un distancier (2) pour fixer d'une manière ferme à l'aide d'un adhésif ledit carreau (1) à la plaque à circuits imprimés (3), et
- une couche à étancher (9), par exemple en silicone, appliquée de façon couche continue, 10

où

- sur ladite face de la plaque à circuits imprimés (3) qui est orientée vers le carreau (1) sont montés plusieurs LEDs (4), ainsi qu'une diode (6) et une résistance (7) connectées auxdits LEDs (4), 15
- sur ladite face inférieure de la plaque à circuits imprimés (3) sont placés deux contacts électriques (5) connectés à deux fils électriques (8) à l'aide des soudures à l'étain, pour faire la connexion à une source d'énergie électrique, 20
- ledit distancier (2) est disposé entre ledit carreau (1) et ladite plaque à circuits imprimés (3) de telle manière que : . 25

i) une face supérieure dudit distancier est en contact avec le carreau (1) et une face inférieure opposée dudit distancier est en contact avec ladite face de la plaque à circuits imprimés qui est orientée vers ledit carreau, en formant un espace clos entre ledit carreau (1), la plaque à circuits imprimés (3) et le distancier (2), où sont placés lesdits LEDs (4), la diode (6) et la résistance (7), et 30

caractérisée en ce que

ii) les surfaces latérales du distancier (2) et de la plaque à circuits imprimés (3) sont rétractées du bord périphérique du carreau (1), et 40

- la couche à étancher (9) est appliquée autour desdites surfaces latérales du distancier (2) et de la plaque à circuits imprimés (3), jusqu'audit bord périphérique du carreau (1), de telle manière que tout l'ensemble qui constitue la plaque lumineuse est étanché fermement sur les faces latérales et arrière. 50

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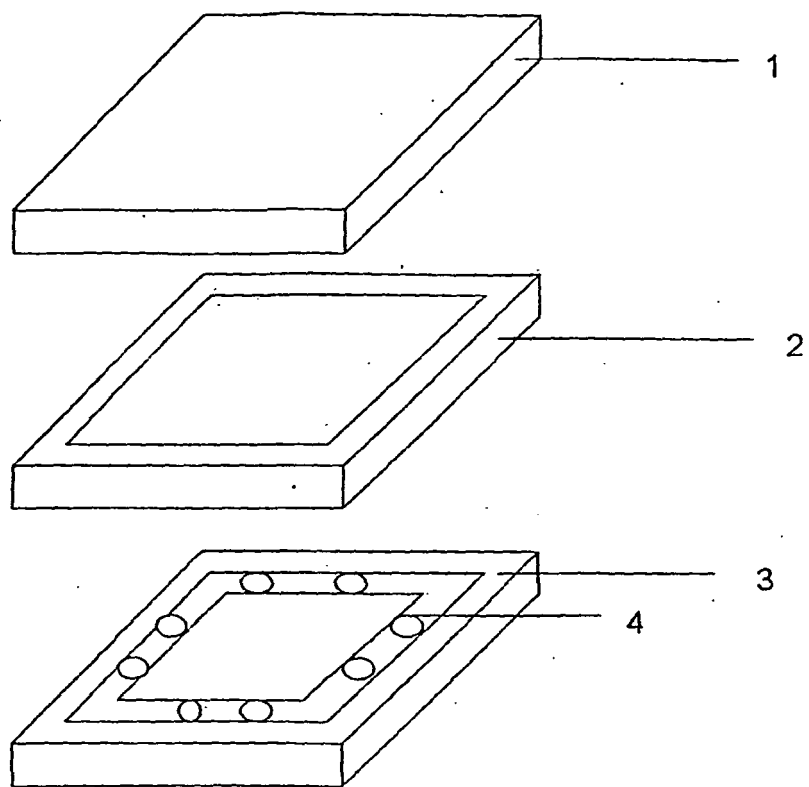


Fig. 1

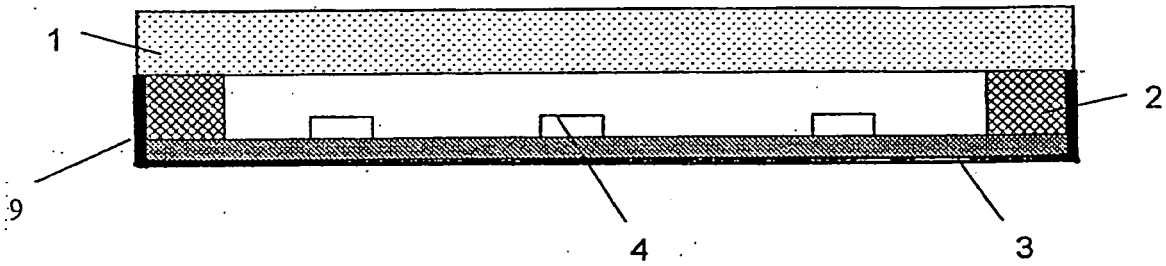


Fig. 2

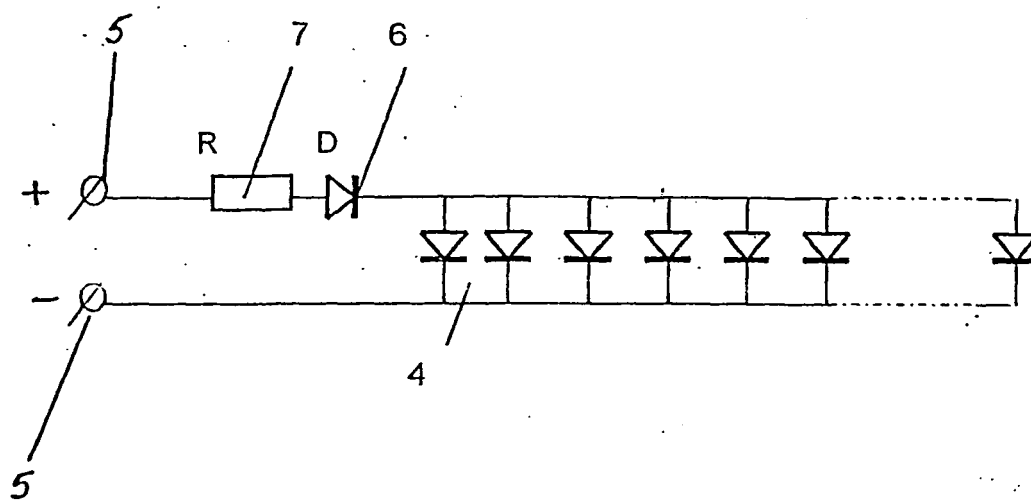
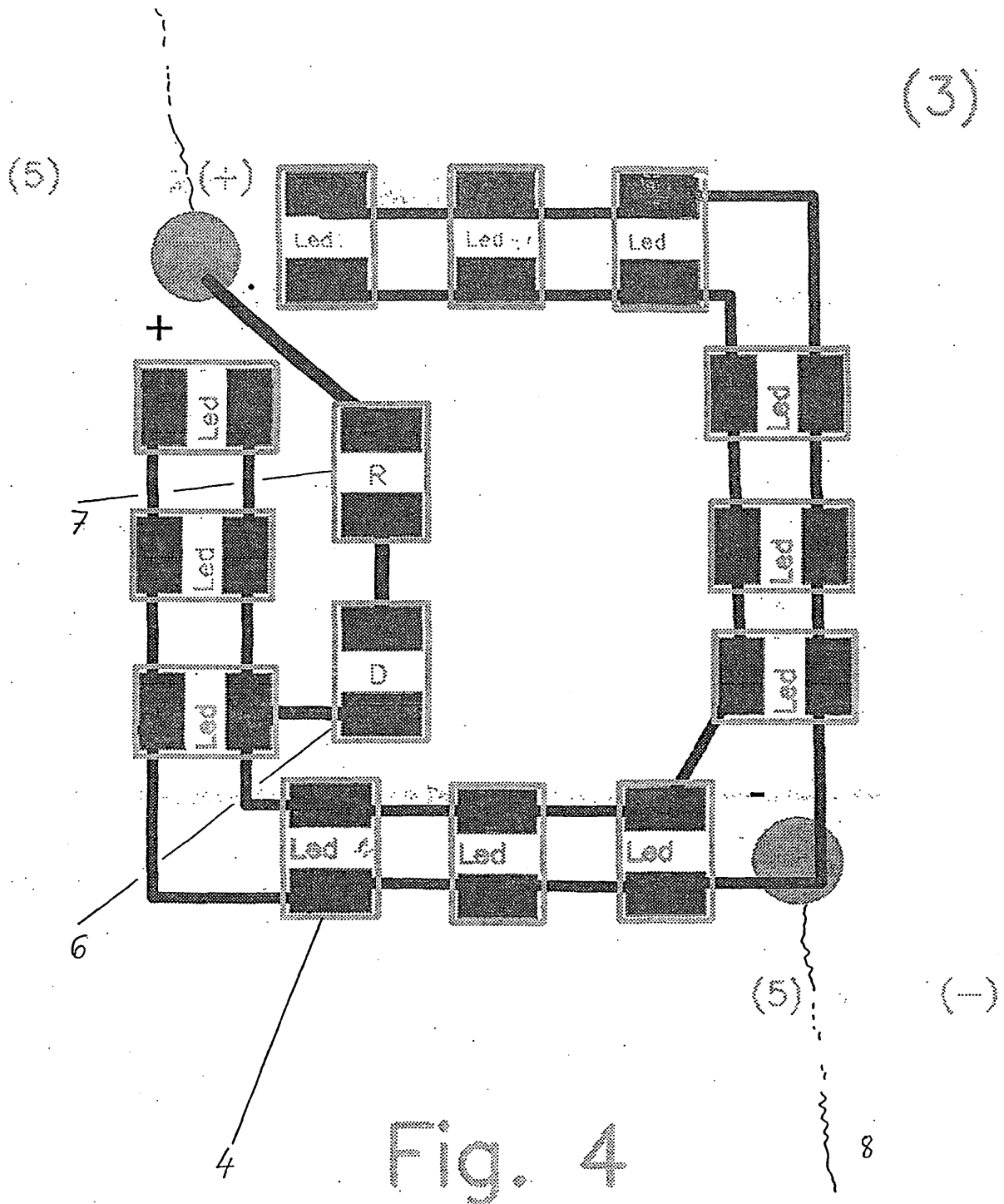


Fig. 3



REFERENCES CITED IN THE DESCRIPTION

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