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LUMINOUS INDICATING DEVICE

The present invention relates to a luminous block and more especially to a luminous indicating device incorporating the block, with the luminous indicating device being adapted for use to provide various types
5 of indication on roads.

So far, stop lines, pedestrian crossing zones, and central isolation zones on roads have been indicated by drawing lines on the roads, but since the drawn lines for indication are hard to see at night, recently
10 luminous devices have been employed for such indication.

There have been proposed various applications of luminous devices: a number of blinking lights buried on both sides or one necessary side of the pedestrian crossing (Japanese Utility Model Application Laid-open
15 No. 74192/1974), a light source connected via an optical transmission medium to a sign buried in a road at a location distant from this light source (Japanese Utility Model Application Laid-open No. 81110/1980), blocks
20 comprising a fluorescent material, buried on roads (Japanese Utility Model Application Laid-open No. 54422/1973), a light source for a blinking signal, connected via an optical fiber to a light radiating end buried along a pedestrian crossing (Japanese Utility Model Application Laid-open No. 43530/1975), and so on.

25 However, the luminous device simply using light bulbs or the like is protected for its upper part or periphery by a rigid material and must project from the paved road surface when used as an indicating device on the road. This obstructs the vehicle such as an automobile in
30 its running, and becomes a cause of noise. Moreover, since the buried block is not abraded to the same extent as is the paved road surface in which it is buried, a step occurs due to wear after a period of use to cause the same trouble.

The present invention is to provide a luminous
35 indicating device for roads in which the above defects are

obviated.

According to the present invention there is provided a luminous indicating device comprising at least one luminous block which is adapted to be buried in
5 a road surface so that an upper radiating surface thereof is flush with the road surface, said luminous block being formed as an abradable composite material block including at least one luminous element formed of an abradable light transmitting material block, at least one light
10 emitting diode disposed at one end of the light transmitting material block for causing light to radiate from the other end of the block, said light transmitting material block being so disposed in said composite material block that the said other end of said light transmitting material
15 block is flush with the top surface of said composite material block, said light transmitting material block being made of an acrylic resin or a vinyl chloride resin and said composite material block being made of a resin mortar.

20 The present invention will become more clear from the following description with reference to the accompanying drawings, in which:

Fig. 1 is a perspective view of a luminous block as one embodiment of this invention,

25 Fig. 2 is a perspective view of the luminous block of Fig. 1, showing the condition in which the luminous block is formed by luminous elements buried in a composite material;

Fig. 3 is a schematical perspective view of a
30 luminous element as used in the luminous block;

Fig. 4 is an explanatory diagram for explaining a luminous indicating device using a plurality of the luminous blocks to indicate a stop line on a road surface;

Fig. 5 is an explanatory diagram for explaining
35 a luminous indicating device using the luminous blocks to indicate a pedestrian crossing on a road;

Figs. 6 and 7 show other applications of the luminous blocks;

Fig. 8 is a plan view of a U-turn inhibition sign using the luminous blocks of this invention;

5 and

Figs. 9 and 10 are perspective views to illustrate the electrical wiring of a luminous block.

An embodiment of the present invention will be described with reference to the accompanying drawings.

10 Fig. 1 is a schematic, perspective view of a luminous block, Fig. 2 is a perspective view of a luminous block showing luminous elements buried in a composite material, and Fig. 3 is a schematic, perspective view of the luminous element.

15 The luminous block, as represented by reference numeral 1, is formed of luminous elements 3, buried in a composite material block 2 of an appropriate size which can be worn away by running vehicles, for example, with the block 2 being made of resin mortar in such a manner
20 that the radiant surfaces of the luminous elements 3 are flush with the top of the composite material block 2. The luminous element 3 is formed by a block of an appropriate size made of a light transmitting material which can be worn away, such as acrylic resin or vinyl chloride resin,
25 and a light-emitting diode 4 is provided at the lower end of the light transmitting material block. The acrylic resin and vinyl chloride resin sometimes cause diffused reflection of light when worn away and therefore, to prevent this it is recommended to use a necessary diffusing material in
30 the resin. However, a certain degree of diffused reflection of light due to abrasion is very effective for luminous indicating devices, as will be described later. Although normally a plurality of luminous elements 3 are buried at suitable distances in the composite material block 2 which
35 constitutes the luminous block 1, a single luminous element

can of course be buried in the material block 2 of a certain size. The size of luminous block 1 can be determined appropriately by considering the indicating line to be provided on a road. In Fig. 3, numeral 6 represents lead wires and in Fig. 1 a socket 5 is shown for power supply to the light source. The commercial power supply can be used.

In this way, the luminous block 1 is formed as a whole.

10 Figs. 4 and 5 show luminous indicating devices using the luminous blocks 1.

In the device of Fig. 4, a plurality of luminous blocks 1 are buried in a paved road surface 8 at equal spaces across the road in such a manner that the surfaces 15 of the blocks 1 are flush with the paved road surface 8, specifically as a stop line A. In the device Fig. 5, a plurality of luminous blocks 1 are used on a pedestrian crossing B. Figs. 4 and 5 show the whole luminous indicating devices. To install the device, for example, 20 the paved road surface is cut away along the stop line or the indicating line of the pedestrian crossing, a plurality of luminous blocks 1 are buried spaced apart at certain distances therealong, and the remaining spaces of the cut-away portion are filled with colored resin mortar to 25 fix the blocks 1.

The luminous block 1 according to this invention can be applied to other different purposes, for example, to the guide illumination on side walls D of a central isolating zone C of road, a curved road and so on as shown 30 in Figs. 6 and 7. In addition, this luminous block 1 can be installed at the entrance and exit of a garage or parking zone so as to automatically blink when a car is going in or out, informing pedestrians that the car is coming.

In addition, a sign for U-turn prohibition as shown 35 in Fig. 8 can be made by burying a number of luminous blocks 1 on road surface, and although not shown, it is possible to

indicate a figure for a speed restriction.

The electrical connection and control system for the luminous blocks may be achieved by known methods. For example, the control system may be one giving a
5 permanent illumination, one giving a blinking illumination or one giving direction indicating and blinking lights. The operation of the blocks may be made by timers, or responsive to a Cds light detector, detection of vehicle or by other means. The power supply to be used may be of
10 DC 2 to 5V or so, or may be a solar battery for converting solar energy to electrical power.

Figs. 9 and 10 are diagrams for the explanation of electrical wiring for supply of power to the luminous elements 3. Reference numerals 9A and 9B in Figs. 9 and 10
15 represent conductive terminals mounted on the luminous block 1 and which serve as mounting supports for fixing this luminous block 1 by tightening with bolts threaded through apertures 10. If the terminals 9A and 9B are respectively fixed as positive and negative bases, they
20 are advantageous in that they can be easily mounted, checked and so on. Numeral 12 denotes a printed wiring board to which a plurality of lead wires 6 are connected and both ends of which are connected to the terminals 9A and 9B, so that a plurality of (four in Fig. 10)
25 luminous elements 3 can be simultaneously connected by connecting and fixing the printed wiring board 12 to the terminals 9A and 9B.

Even although the top of the luminous element 3 is abraded by the tyre of vehicle or the like together
30 with the top of the composite material block 2, the light ray from the light source 4 transmits within the luminous element 3 without trouble and is moderately scattered from its top, or diffusely radiated in various different directions by the minutely irregular top surface
35 of the luminous element 3. This diffuse radiation is better

for effective illumination of the luminous block.

Thus, the luminous block can have wide application, and the luminous indicating device using the luminous block is well able to function as a sign
5 on a road surface. Since the luminous block itself can be abraded and is transparent, when used in a sign on a road surface, such as a stop line or a pedestrian crossing, it is able to be buried in the paved road so that its top is flush with the surface of the road. In
10 this case, when the surface of the paved road is abraded by the running vehicle and so on, the top of the luminous block is also similarly abraded thereby, resulting in no step being caused on the road. Thus, when buried in the road as described above, the luminous block not only
15 causes no trouble to the vehicle traffic, but also does not cause the production of noise. Moreover, since the light source is buried in the transparent-material block and fixed therein, it is almost not necessary to care about breakage of the light source.

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CLAIMS

1. A luminous indicating device comprising at least one luminous block which is adapted to be buried in a road surface so that an upper radiating surface thereof is flush with the road surface, said luminous block being
5 formed as an abradable composite material block including at least one luminous element formed of an abradable light transmitting material block, at least one light emitting diode disposed at one end of the light transmitting material block for causing light to radiate
10 from the other end of the block, said light transmitting material block being so disposed in said composite material block that the said other end of said light transmitting material block is flush with the top surface of said composite material block, said light transmitting
15 material block being made of an acrylic resin or a vinyl chloride resin and said composite material block being made of a resin mortar.

2. A luminous indicating device according to claim 1, wherein a plurality of luminous elements are
20 disposed in said luminous block with each luminous element including at least one ~~high intensity~~ light emitting diode, and wherein said luminous block further includes a printed wiring board for simultaneously supplying power to said plurality of light emitting diodes, said printed wiring
25 board being connected to lead wires of each of said light emitting diodes, and mounting means for fixing said luminous block in place, said mounting means serving as terminals to be connected to said printed wiring board.



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3. A luminous indicating device constructed and arranged to operate substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.
