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(54) **ILLUMINATION DEVICE FOR VEHICLE**

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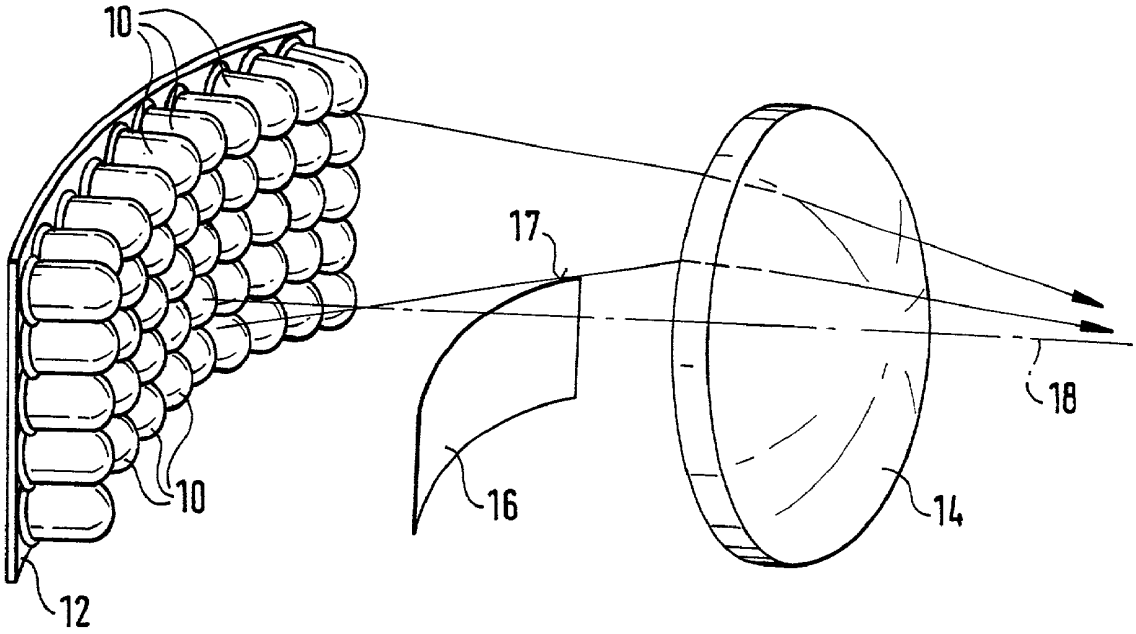
(57) **ABSTRACT**

An illumination device for a vehicle has a plurality of semiconductor sources distributed in a matrix, at least one optical active element which is located in a path of rays of a light emitted by the semiconductor sources, the semiconductor sources are arranged in partial quantities in different defined partial regions of the matrix and the partial quantities of the semiconductor sources are operatable independently from one another.



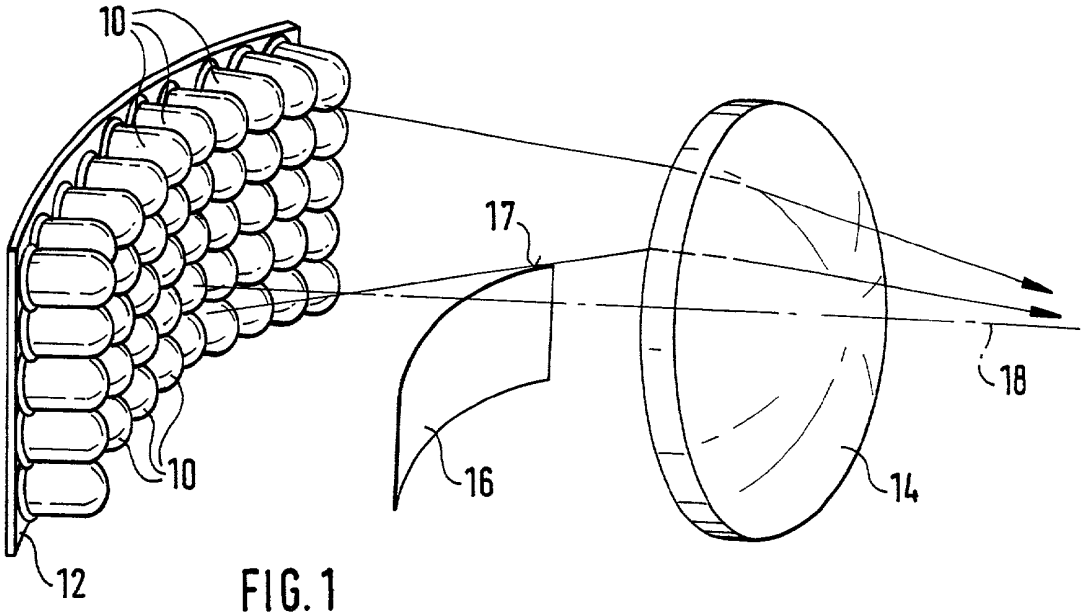


FIG. 1

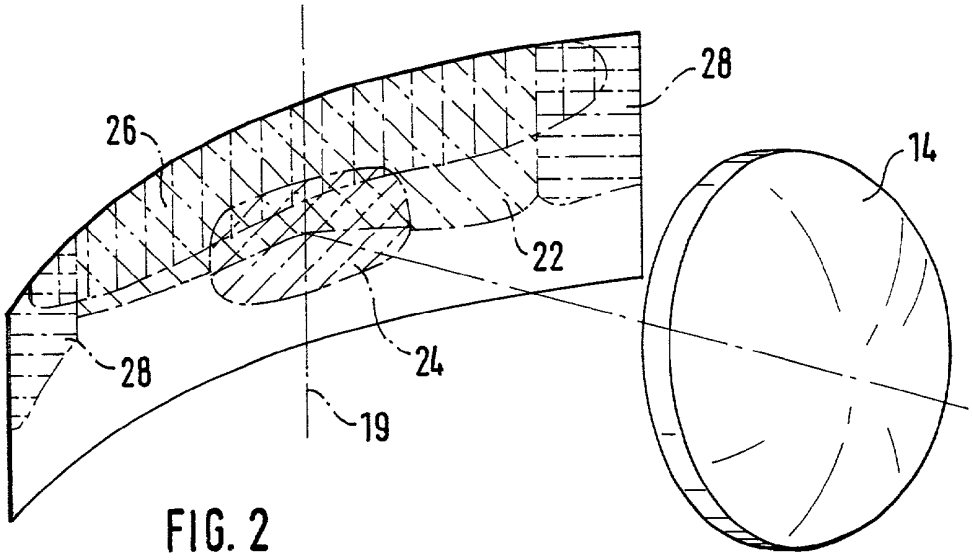


FIG. 2

FIG. 3

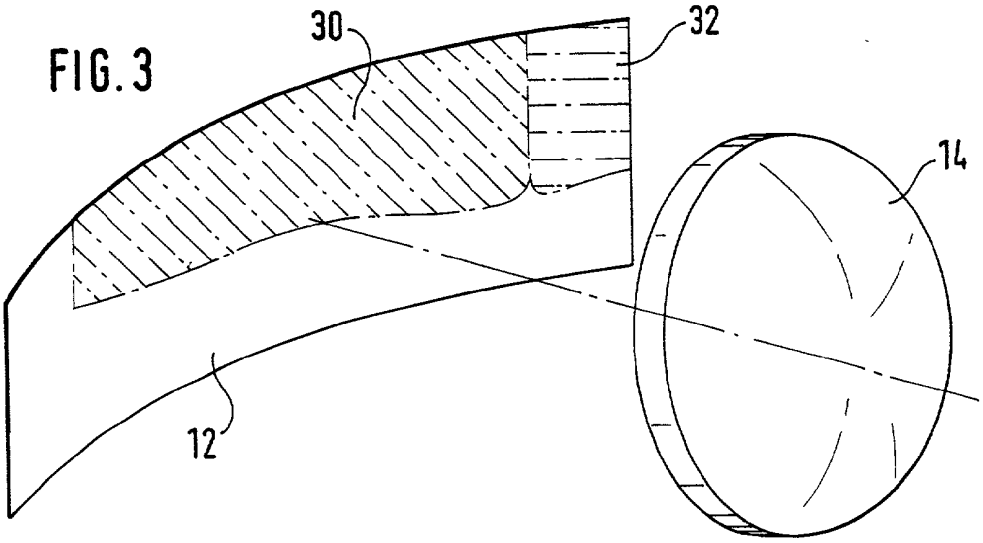
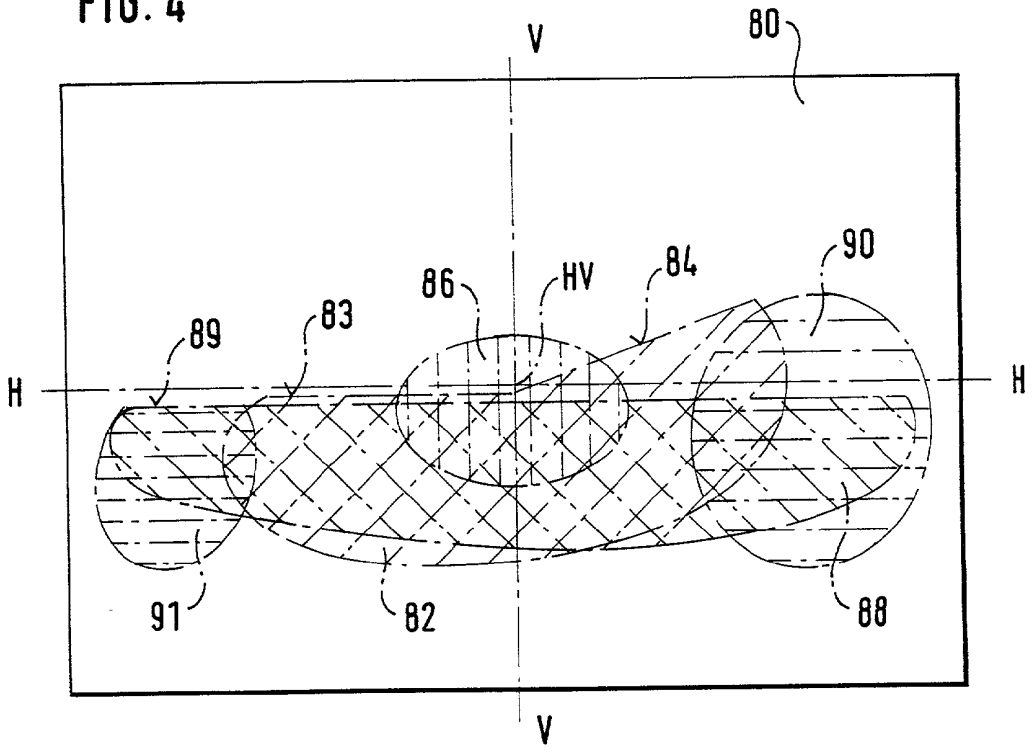


FIG. 4



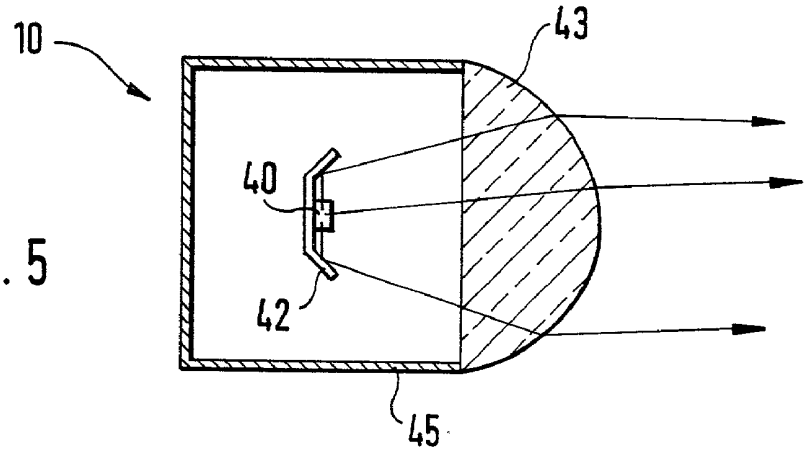


FIG. 5

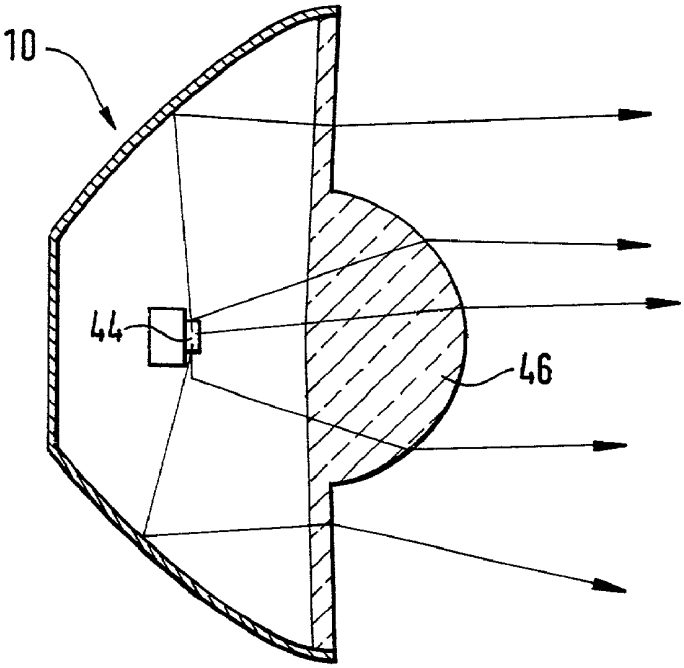


FIG. 6

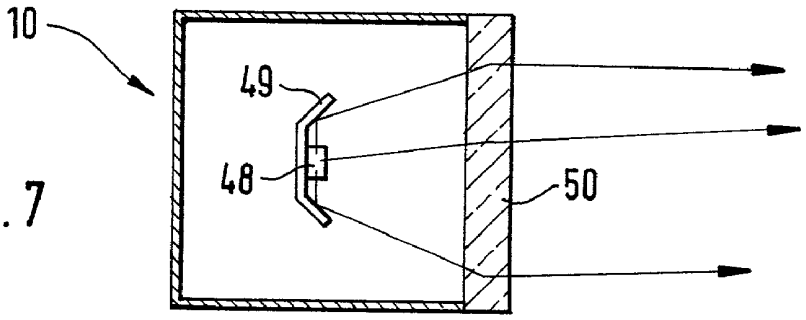


FIG. 7

ILLUMINATION DEVICE FOR VEHICLE

BACKGROUND OF THE INVENTION

[0001] The present invention relates to an illumination device for a vehicle.

[0002] Illumination devices for vehicles are known and wisely used. One of such illumination devices is disclosed for example in the German patent document DE 42 28 895. The illumination device has a plurality of semiconductors light sources arranged in a matrix. In a path of rays of light emitted by the semiconductor light sources, an optically active element is arranged and formed as a disc. It is provided with optical profiles in macroscopic size in form of lenses or prisms or in microscopic size in form of a diffraction grate. The optical profiles in a macroscopic size provide a predetermined characteristic for a light beam which exits the illumination device. The semiconductor light sources emit lights of different colors and each semiconductor light source sends only light of one color. With the optical profiles in microscopic size, a mixture of the lights emitted by the different semiconductor light sources is obtained. Therefore, light exiting the illumination device has a uniform, for example white color.

[0003] This illumination device is however usable only for one function, since the light beam exiting the device always has the same characteristic. The term "characteristic" of the light beam includes here a light color, its direction, its reaching distance, dispersion width and illumination intensity distribution produced by it.

SUMMARY OF THE INVENTION

[0004] Accordingly, it is an object of the present invention to provide an illumination device for a vehicle which has the advantage that by the operation of different partial numbers of semiconductor sources, the characteristic of the light beam exiting the illumination device can be changed so that it can be used for different functions.

[0005] In accordance with another feature of present invention, with the partial numbers of the semiconductor sources arranged in different defined partial regions, light of different colors is emitted and the partial quantities of the semiconductor light sources are operatable for producing a predetermined color of the light beam exiting the illumination device. In this construction the emission of the light beams of different light colors is possible, so that the illumination device can be used for example for different signal functions or for one signal function and as a headlight.

[0006] In accordance with another feature of the present invention, in the matrix a partial region is defined, by which semiconductor light sources produce a concentric light beam. This makes possible the use of the illumination device as a headlight with a strong illumination of a distance located far from the vehicle.

[0007] In accordance with still another feature of present invention, a partial region is defined in the matrix, by which the semiconductor light source produces a horizontally dispersed light beam. This makes possible the use of the illumination device as a headlight with a wider illumination in front to of the vehicle, as is specifically advantageous at low speeds, for example in street traffic and/or with low visibility distance for example in fog.

[0008] In accordance with another feature of present invention, in the matrix at least one partial region is defined, by which the semiconductor light sources produce at one side a light beam oriented to the right or to the left. This allow the use of the illumination device as a headlight with a one-sided oriented illumination in front of the vehicle, as especially advantageous during diving over a curve or in the case of a bending of the vehicle.

[0009] The novel features which are considered as characteristic for the present invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] **FIG. 1** is a view showing an illumination device for a vehicle in a schematic representation in accordance with the present invention;

[0011] **FIG. 2** is a view showing a matrix of semiconductor light sources of the illumination device in accordance with the first embodiment of present invention;

[0012] **FIG. 3** is a view showing a matrix of semiconductor light sources in accordance with the second embodiment of the present invention;

[0013] **FIG. 4** is a view showing a measuring screen arranged in front of the illumination device in accordance with the present invention and illuminated by light emitted by the latter;

[0014] **FIG. 5** is a view showing a semiconductor source in accordance with a first embodiment of the present invention;

[0015] **FIG. 6** is a view showing a semiconductor source in accordance with the second embodiment of the present invention; and

[0016] **FIG. 7** is a view showing a semiconductor source in accordance with a third embodiment.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0017] **FIG. 1** shows an illumination device for a vehicle, in particular a motor vehicle. The illumination device is arranged at the front end of the vehicle and is used for example as a headlight. Two substantially identically formed illumination devices can be arranged at the front end, as conventional headlights. The illumination device has a plurality of semiconductor sources **10** which are distributed in a matrix. A support element **12** can be provided, on which the semiconductor light sources **10** are held and electrically contacted.

[0018] The semiconductor light sources **10** can be arranged approximately in one plane, or can be distributed over a concavely curved surface or a stepped surface. The surface for example can have a substantially spherical curvature. In a path of rays of the light emitted by the semiconductor light sources, an optically active element **14** is arranged and formed as a collecting lens. The collecting

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