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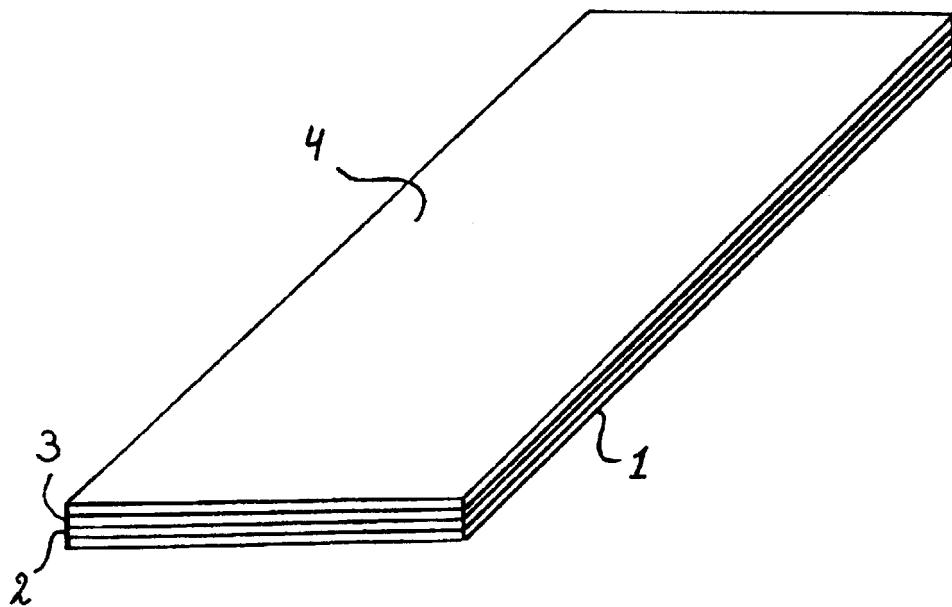
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(54) Road marking

(57) The invention is concerned with a method to give one or more instructions to one or more drivers of one or more respective vehicles, forwardly moving on a road surface, by using a sign lying in or on the road surface, switchable between two mutually differing signal modes, such as recognisable or unrecognisable to that driver(s), with the aid of active switching means, preferably from a central location, wherein said sign is

designed such that it provides a signal at least homogeneously spread over its surface, such as visible light or a colour, and wherefor energy is preferably supplied to said sign which transmits said energy into the signal energy.. The invention is also concerned with a road surface that is suitable to carry out said method, and a sign adapted for said road surface.



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Description

[0001] The invention is concerned with e.g. traffic controlling signs provided on the road, making part of the rideable section of the road surface, such as lines for e.g. marking the edge of the road surface or two coextending drive lanes, or sign posting such as piles or stripes for a cross walk such as a zebra crossing. Particularly, though not exclusively, it is concerned with such signs with which the traffic control can be adapted temporarily. An example of such adaptation of the traffic control is e.g. changing the number of available drive lanes. Another example is a temporary traffic re-route.

[0002] The sign can be based upon a single or multiply film or a laminate of several films. The sign is preferably conveniently rough or skid resistant to ride and therefore contains preferably a roughness layer. The sign is preferably no source of undesired light reflection and contains preferably a therefore suitable anti light reflection layer. The sign is preferably well adhered to the road surface and contains preferably a therefore convenient adhesive layer. The sign is preferably flexible. The sign is preferably supple pleadable. The sign has preferably an at least essentially even surface, e.g. such that when a wheel of a vehicle rides thereon, the driver does not notice it in particular. Preferably the surface condition of the sign is comparable to that of presently typical lines of retro reflective film or paint. The sign has preferably a thickness of approximately 3 mm. The sign has preferably a width of approximately 15 or approximately 20 cm.

[0003] The sign can e.g. be supplied prefabricated, e.g. in web shape, e.g. on a reel.

[0004] It is proposed, such a sign that can be made visible or invisible, or respectively more or less noticeable, at wish to the driver of a vehicle riding on the road surface. "Invisible" here means that the sign "disappears" in the background of the road surface, e.g. by accepting the same colour and brilliance as of the road surface. "Less noticeable" here means, that the sign may visibly differ from the road surface, e.g. when it has the same colour as, but is more brilliant than the road surface, but at typical traffic conditions is no longer viewed by the driver as a sign for him.

[0005] It is most preferred, to design the sign to be controllably illuminating. "Controllably" means that e.g. the rate of light yield (e.g. strong/weak or on/off) and/or e.g. emission of light type (e.g. diffuse/coherent) can be changed at wish and preferably at a time selected by the user. "Illuminating" means e.g. light reflection from another source (e.g. head lights of vehicles/lamp post) of light or e.g. by having an own light source.

[0006] the sign provides preferably an at least essentially homogeneous illuminated or accentuated plane. The sign is preferably designed such that the light is emitted under the desired angle, e.g. opposite the direction of view of the driver of a vehicle.

[0007] According to a preferred embodiment use is

made of a light emitting sign in that the sign is a light source, e.g. by transferring electrical energy into light. However, transfer of another convenient energy to function as light source is also feasible, such as a heat flow. Preferably the sign is based on an electro luminescent film. On top of it there can be a prismatic film or layer to provide the desired light emission under an angle.

[0008] The brightness of the film can be based on the availability of phosphorus in the film.

[0009] For e.g. lines between two coextending drive lanes it is preferred, to design the sign such that it is possible to switch at wish between a continuous or discontinuous line, e.g. wherein those two line types overlap, such that when one switches between those line types, there results no stagger of location. The sign is therefore preferably designed in several mutually prolonged sections, that can be separately switched. Such a type of sign is preferably supplied as an integral web.

[0010] The sign is preferably designed with convenient, e.g. integral, signal- and/or energy leads.

[0011] The sign has preferably a length approximately equalling half the distance between two succeeding power connection points, e.g. determined by the sub stations of the road signalling, presently being approximately 600 m at the Dutch roads.

[0012] A non-limiting example is as follows: At a highway lines for three lanes and lines for four lanes are provided over a road length of 5 km over the same width of the approximately 12 m wide road surface for the automotive traffic riding in one direction. Both these lines comprise the sign according to the invention. During times of relatively low traffic intensity the driver recognises the lines for three lanes. When the traffic intensity is relatively high, the driver recognises the lines for four lanes. It is appreciated that the four lanes will each be approximately 3 m wide while the three lanes are each approximately 4 m wide. Merely the most left and right lines are permanently visible and made of passive, retro reflective white paint and, apart from traffic entrances and exits, continuous. The discontinuous lines therebetween (two for the three lanes, three for the four lanes) can be actively switched on and off from the manned traffic control tower. As such there are five lines in total between the outer two lines (approximately 12 m apart), from which there are at maximum three recognisable at a time.

[0013] From the traffic control tower a switch signal is sent to the respective sub stations for the road signalling. On the basis of that signal, said sub stations switch the power supply to the switchable lines for the three lane design on and to the switchable lines of the four lane design off (or vice versa). Since the switchable lines show a discontinuous line, the switchable sign comprises a web with a plurality of simultaneous switchable sections with section free intermediate spaces to provide the discontinuous appearance of the lines.

[0014] According to the prior art, the division in lanes is permanent and not easily changeable since use

is made of permanent recognisable lines of, i.a., white paint. As such it is not possible, to flexible react to a temporary change in the traffic situation.

[0015] The enclosed drawing shows a non-limiting embodiment of the sheet- or web type marking in perspective view. It comprises a lower bonding layer 1 to adhere to a substrate (not visible), an electro luminiscent layer 2, a prismatic layer 3 and a cover layer 4 with a top surface that is skid resistant enough. The skilled man will understand how the layer 2 can be connected to a suitable power source such that it will shine, such that the marking will evenly illuminate. It will also be clear to the skilled person which materials are applicable as the electro luminiscent layer 2. Preferably all layers 1-4 are prefabricated films that are laminated by coating or else into an integral, prefabricated web. In stead of electro luminiscent material, the layer 2 can contain material that shines on the basis of some other energy supply, e.g. by the aid of a temperature difference. As such any material is applicable that transfers a suitable energy into electromagnetic radiation, particularly in the visible field.

[0016] From the prior art marking webs are known (refer to e.g. US-A-4 925 335; EP-A-0 422 694; US-A-3 996 556; EP-A-0 562 702) that contain a plurality of mutually spaced, discrete light sources, with which it is not possible to provide a marking with a homogeneous appearance. From DE-OS-2620037 a marking web is known, changing colours by a temperature difference, and mainly designed for application in buildings, such as sport halls and hospitals. For road application merely a sign is suggested to warn at frost, wherefor the sign is directly and passively influenced by the environmental temperature.

[0017] In stead of switching between visible and invisible, an embodiment is feasible wherein one switches between different colours or brightness, such that to the driver the marking remains clearly visible in both switch positions.

Claims

1. Method to give one or more instructions to one or more drivers of one or more respective vehicles, forwardly moving on a road surface, by using a sign lying in or on the road surface, switchable between two mutually differing signal modes, such as recognisable or unrecognisable to that driver(s), with the aid of active switching means, preferably from a central location, wherein said sign is designed such that it provides a signal at least homogeneously spread over its surface, such as visible light or a colour, and wherefor energy is preferably supplied to said sign which transmits said energy into the signal energy.
2. Road surface provided with a sign, being part of the rideable zone of the road surface, wherein said sign

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can be switched between two mutually differing signal modes, such as recognisable or unrecognisable to the driver of a vehicle riding over the road surface, by active switch means connected to said sign, wherein said sign is designed such that it provides a signal at least homogeneously spread over its surface, such as visible light or a colour, and wherefor said sign is preferably connected to an artificial energy source and is designed to transfer the energy therefrom into the signal energy.

3. Road surface according to claim 2, wherein said sign contains material, e.g. electro luminiscent, that transfers energy, e.g. electricity or heat, into electromagnetic radiation, such as visible light, wherein said material is preferably provided evenly spread in a layer that extends over at least essentially the complete surface of the sign.
4. Road surface according to claim 2 or 3, wherein said sign is provided with light directing means, such as a prismatic layer, to provide the desired light emission under an angle, and wherein said sign possibly contains a bonding layer to adhere to the substrate.
5. Road surface according to any of the claims 2-4, wherein said sign is designed such that it appears to the driver as a continuous or discontinuous line, if in recognisable condition, particularly wherein the sign contains a first and a second group of sections provided in a mutually alternating pattern and wherein a continuous line appears when both groups are switched on, while a discontinuous line appears when merely one of both groups is switched on.
6. Road surface according to any of claims 2-5, wherein at least two signs overlap at least essentially, which preferably mutually differ to said driver in appearance, if in the recognisable condition.
7. Road surface according to any of claims 2-6, wherein said sign is layered and preferably contains phosphorus for the aid of illuminating.
8. Road surface according to any of claims 2-7, wherein above the sign the surface condition of the road surface is comparable to that of presently common lines of retro reflective film of paint, wherefor that sign can contain a suitable protective layer.
9. Road surface according to any of claims 2-8, wherein said sign has a thickness of approximately 3 mm, is web like and has a width of approximately 15 cm or approximately 20 cm and a length of at least 100 m, such as approximately 300 m.

10. Sign for a road surface according to any of claims 2-9m wherein it is divided in sections, wherein means are provided such that two or more sections can be mutually independently switched between said switch modes.

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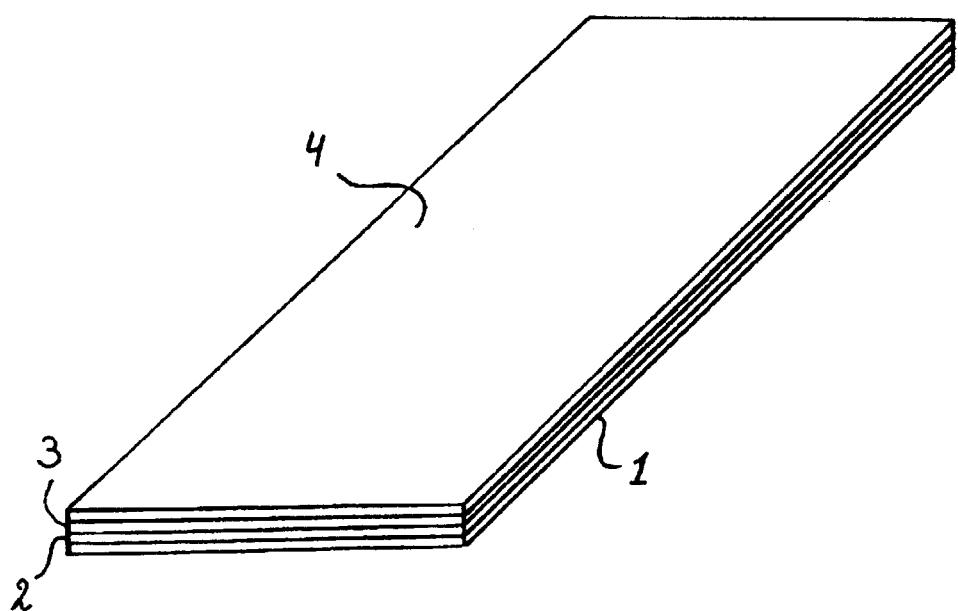
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DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int.Cl.7)						
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim							
X	GB 2 189 919 A (DOMINY GLYN MARTIN) 4 November 1987 (1987-11-04)	1-8, 10	E01F9/093 E01F9/08						
A	* the whole document *	9							
D, X	US 3 996 556 A (EIGENMANN LUDWIG) 7 December 1976 (1976-12-07)	1-3, 5, 7-9							
A	* column 2, line 64 - column 3, line 15 * * column 5, line 25 - line 30 * * column 6, line 15 - line 64; figures *	4							
A	WO 84 00231 A (MEIER HANS ULRICH ;RIES WALTER (DE); MEIER GERHARD (DE)) 19 January 1984 (1984-01-19)	----							
D, A	US 4 925 335 A (EIGENMANN LUDWIG) 15 May 1990 (1990-05-15)	----							
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)						
			E01F						
<p>The present search report has been drawn up for all claims</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Place of search</td> <td style="width: 33%;">Date of completion of the search</td> <td style="width: 34%;">Examiner</td> </tr> <tr> <td>THE HAGUE</td> <td>20 December 1999</td> <td>Verveer, D</td> </tr> </table>				Place of search	Date of completion of the search	Examiner	THE HAGUE	20 December 1999	Verveer, D
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<p>CATEGORY OF CITED DOCUMENTS</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; vertical-align: top;"> 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 </td> <td style="width: 50%; vertical-align: top;"> 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 </td> </tr> </table>				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.**

EP 99 20 2003

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.

20-12-1999

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
GB 2189919	A	04-11-1987		NONE		
US 3996556	A	07-12-1976		IT 982743 B IT 990785 B AT 352589 B AU 6769174 A BE 813514 A CA 997731 A CH 574016 A DD 113051 A DE 2417584 A FR 2224599 A GB 1469942 A JP 1155598 C JP 50030330 A JP 57045847 B NL 7404727 A		21-10-1974 10-07-1975 25-09-1979 09-10-1975 31-07-1974 28-09-1976 31-03-1976 12-05-1975 24-10-1974 31-10-1974 06-04-1977 15-07-1983 26-03-1975 30-09-1982 11-10-1974
WO 8400231	A	19-01-1984		DE 3224451 A EP 0113350 A		08-03-1984 18-07-1984
US 4925335	A	15-05-1990		NONE		