



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) **EP 1 431 014 A2**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
23.06.2004 Bulletin 2004/26

(51) Int Cl.7: **B28B 3/10**, B28B 3/06,
E01C 5/06

(21) Application number: **03028791.6**

(22) Date of filing: **13.12.2003**

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

(72) Inventor: **Valle, Fabio**
36027 Rosà (VI) (IT)

(74) Representative: **Gustorf, Gerhard, Dipl.-Ing.**
Patentanwalt,
Bachstrasse 6 A
84036 Landshut (DE)

(30) Priority: **20.12.2002 IT PD20020329**

(71) Applicant: **Valle Francesco S.r.L.**
36027 Rosà (VI) (IT)

(54) **Process for manufacturing modular refracting elements and modular refracting elements obtained therefrom**

(57) The invention concerns a new process for carrying out modular refracting elements to be inserted in the road surface, constituted by a body in cement mix, to which a refracting layer made of binder, agglomerate and glass or ceramic coated microspheres is applied, as well as the modular refracting element obtained

therefrom. The new modular refracting element is obtained by introducing into apposite moulds a quantity of cement mix slightly smaller than the quantity needed to fill each mould completely. A new layer made up of binder, agglomerate and microspheres is laid on the upper surface of this body and successively compressed onto the same.

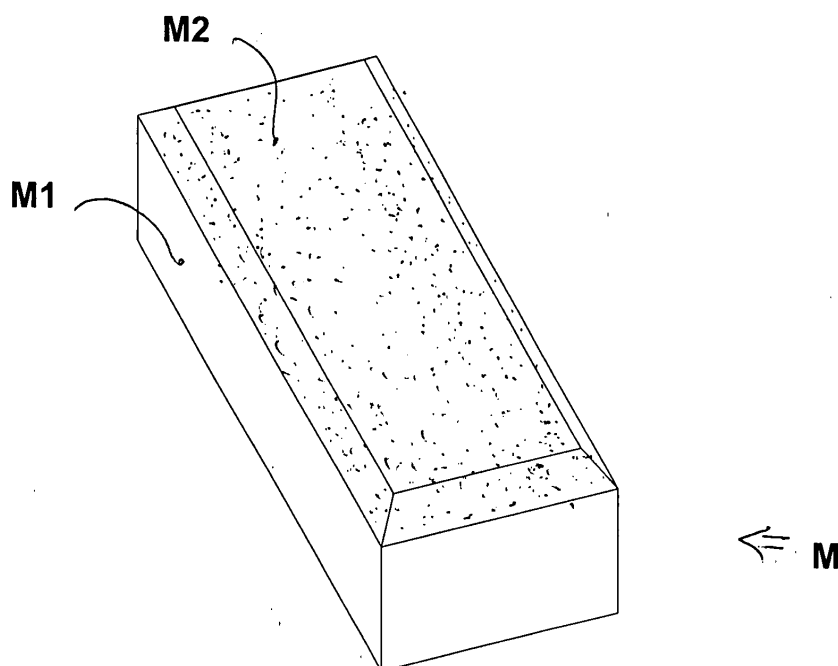


Fig. 1

EP 1 431 014 A2

Description

[0001] This patent concerns the sector of road signs and road safety devices, and in particular it concerns road markings.

[0002] Road markings are currently made with white paint.

[0003] The use of paint is widespread and it makes it possible to carry out road markings rather quickly, even if they are complex or special.

[0004] On the other hand, however, paint has the drawback that it fades very quickly, due to the passage of vehicles. Furthermore, paint has scarce reflecting properties and therefore in case of insufficient light or fog the road markings are not clearly visible.

[0005] The object of this patent is constituted by a new process for carrying out modular refracting elements to be inserted in the road surface and by the modular refracting element obtained therefrom.

[0006] The aim of the new modular element to be inserted in the road surface is to reflect the light projected by the lamps of the vehicles in transit.

[0007] Another aim of the new modular element is to reflect light even after being subjected to intense wear.

[0008] A further aim of the new modular refracting element is to be raised from the road surface and to produce sound waves that can be sensed by the drivers.

[0009] These and other direct and complementary aims are achieved through the new process for carrying out modular refracting elements to be inserted in the road surface, said elements being constituted by a cement mix body to which a refracting layer is applied, which comprises binder, aggregate and glass or ceramic microspheres, as well as through the relevant modular refracting element obtained therefrom.

[0010] The new modular refracting element is carried out by introducing into apposite moulds a quantity of cement mix slightly smaller than the quantity needed to fill the mould completely. The layer comprising binder, aggregate and microspheres is laid on the upper surface of the element and then compressed.

[0011] The characteristics of the new process for carrying out modular refracting elements to be inserted in the road surface and of the modular element obtained therefrom will be highlighted in greater detail by the following description of one among many possible applications of the invention, with reference to the attached drawings, wherein:

[0012] Figure 1 is an axonometric view of the new modular element (M).

[0013] The new modular element (M) comprises a body (M1) to which a layer of refracting mix (M2) is applied.

[0014] The body (M1) is preferably parallelepiped-shaped, or can be carried out in any other suitable geometric shape.

[0015] Said body (M1) is preferably made of cement mix and is suitable for being applied and fixed to the

road surface or to the road sub-base.

[0016] The reflecting layer (M2) is constituted by a mix of microspheres, binder and aggregate.

[0017] The microspheres have indicatively very small diameter, of the order of millimetres, and are constituted by glass, pure glass, semi-pure glass or are ceramic coated.

[0018] The binder can be constituted by cement, chemical bonding agent, or another type of binder suitable for binding the microspheres to one another and to the body (M1).

[0019] The reflecting layer (M2) is applied to the upper part of the body (M1) and its upper edges are preferably inclined, radiused or rounded.

[0020] The new modular refracting element (M) constituted as described above offers considerable advantages.

[0021] The new modular refracting element (M) can be inserted both in the already made-up road surface and in the road sub-base, on which the road surface must be laid.

[0022] The new modular refracting element (M) does not lose its reflecting characteristics over time, since it doesn't wear out due to the passage of vehicles, or only its upper layer wears out, showing the underlying reflecting part.

[0023] The new modular refracting element (M) is much more luminous, both in good and in bad visibility and light conditions.

[0024] The new modular refracting element (M) can be used to carry out any type of road markings, for example road center or road side lines, as shown in Figure 2, since the shape of the reflecting layer (M2) with inclined or rounded edges constitutes a raised section producing sound waves that can be sensed by the drivers.

[0025] The new refracting element (M) constituted as described above is carried out according to the process described below and represented diagrammatically in Figures 3a, 3b, 3c, 3d, 3e.

[0026] The cement mix that makes up the body (M1) is poured into apposite moulds (S1), preferably multiple moulds, in a slightly smaller quantity than that needed to fill each mould completely (Figure 3a).

[0027] Said cement mix is vibrated and compressed by relevant counter-moulds (S2), in such a way as to give it the shape of a parallelepiped or in any case to obtain a flat upper surface (Figure 3b).

[0028] Successively, a suitable quantity of refracting mix (M2) is poured into the same moulds (S1) (Figure 3c).

[0029] Further microspheres are spread, strewn or laid onto said refracting mix (M2), after properly compacting it through vibration (Figure 3d).

[0030] A further compressing action makes it possible to compact said refracting mix (M2), if necessary shaping its perimetric edges (Figure 3e).

[0031] Finally, the combination of body (M1) and re-

fracting mix (M2), compacted and shaped as described above, are left to harden.

[0032] The production process of the new modular refracting element (M) as described above may include only the spreading, strewing, or laying of microspheres on the cement mix already introduced in the mould (S1) and compacted. 5

[0033] The production process of the new modular refracting element (M) as described above may include the introduction of the refracting mix (M2) only into the mould (S), without the successive spreading, strewing or laying of microspheres. 10

[0034] Therefore, with reference to the above description and the enclosed drawings, the following claims are put forth. 15

Claims

1. Process for carrying out modular elements (M), **characterized in that** it comprises: 20

- the introduction of the cement mix constituting the body (M1) into apposite moulds (S1), in a smaller quantity than that needed to fill the moulds (S1) completely, and successive vibration of said moulds (S1); 25
- the pressure compacting of the cement mix constituting the body (M1) by means of apposite counter-moulds (S2); 30
- the laying of a further layer of refracting mix (M2);
- the spreading, strewing, or laying of microspheres on the refracting mix (M2) inside the moulds (S1); 35
- the compacting and compression of the refracting mix (M2) by means of apposite counter-moulds.

2. Process for carrying out modular refracting elements (M), **characterized in that** it includes: 40

- the introduction of the cement mix constituting the body (M1) into apposite moulds (S1) and the successive vibration of said moulds (S1); 45
- the spreading, strewing, or laying of microspheres inside the moulds (S1);
- the compacting and compression of the microspheres and of the cement or mix constituting the body (M1) by means of apposite counter-moulds. 50

3. Process for carrying out modular refracting elements (M), **characterized in that** it includes: 55

- the introduction of the cement mix constituting the body (M1) into apposite moulds (S1), in a smaller quantity than that needed to fill the

moulds (S1) completely, and the successive vibration of said moulds (S1);

- the pressure compacting of the cement mix constituting the body (M1) by means of apposite counter-moulds (S2);
- the introduction of a further layer of refracting mix (M2) in the moulds (S1);
- the compacting and compression of the refracting mix (M2) by means of apposite shaped counter-moulds (S3).

4. Modular element to be inserted into the road surface, comprising a body (M1) made of cement mix, **characterized in that** a refracting layer (M2) made up of binder, agglomerate and microspheres is laid on and joined to said body (M1).

5. Modular refracting element according to claim 4, **characterized in that** the microspheres of the refracting layer (M2) are made of pure glass.

6. Modular refracting element according to claim 4, **characterized in that** the microspheres of the refracting layer (M2) are made of semi-pure glass.

7. Modular refracting element according to claim 4, **characterized in that** the microspheres of the refracting layer (M2) are ceramic coated.

8. Modular refracting element according to claim 4, **characterized in that** the edges of the refracting layer (M2) are inclined, radiused or rounded.

9. Sound-emitting road line marking, **characterized in that** it comprises modular elements (M) with refracting upper layer (M2).

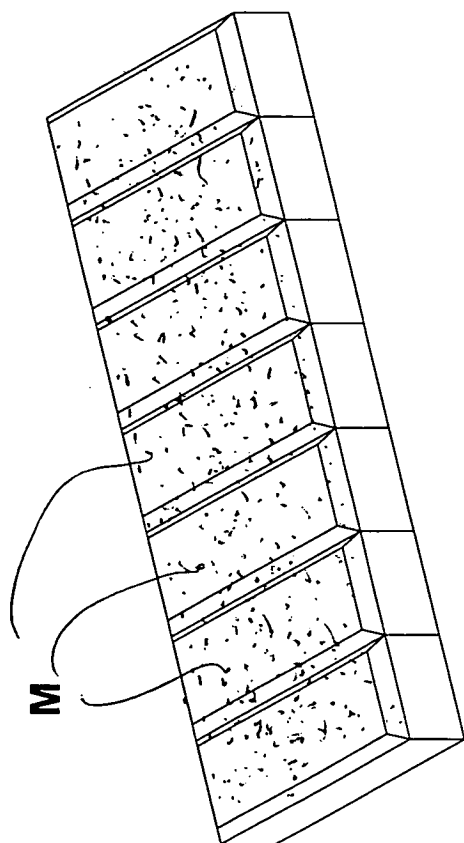


Fig. 2

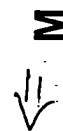
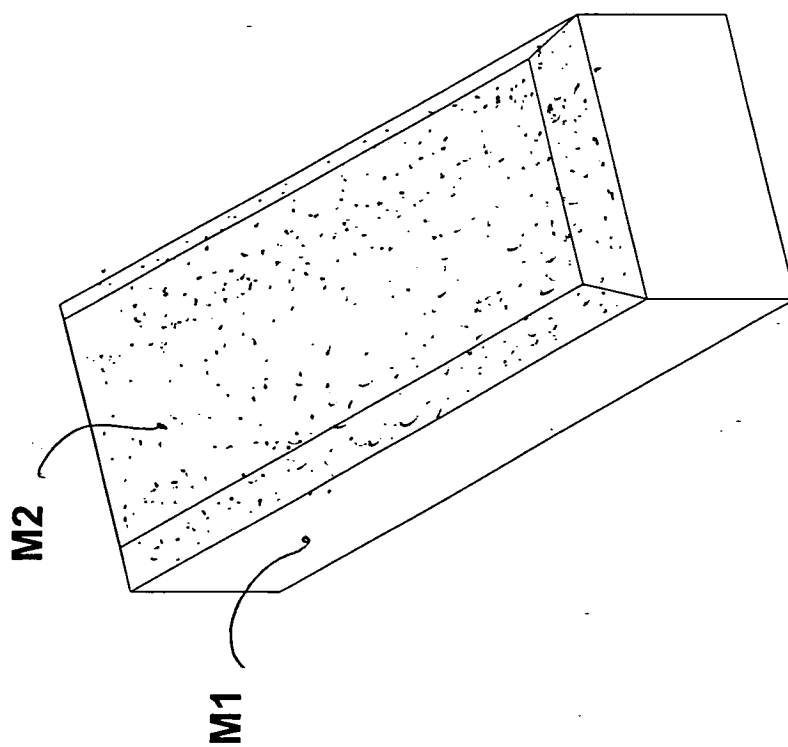


Fig. 1

Fig. 3a

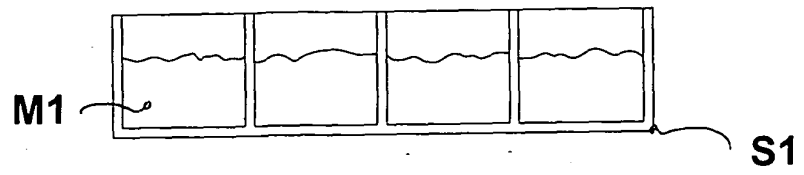


Fig. 3b

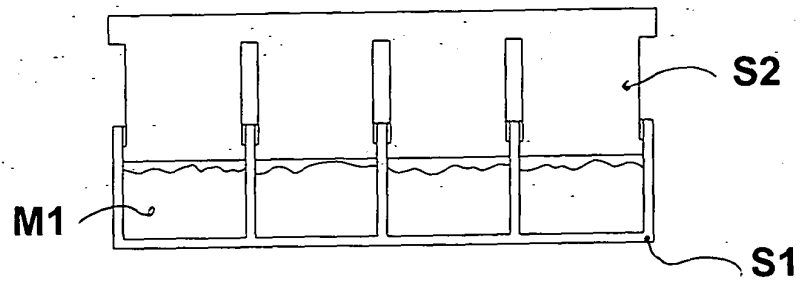


Fig. 3c

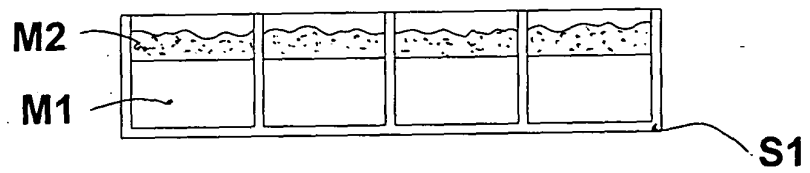


Fig. 3d

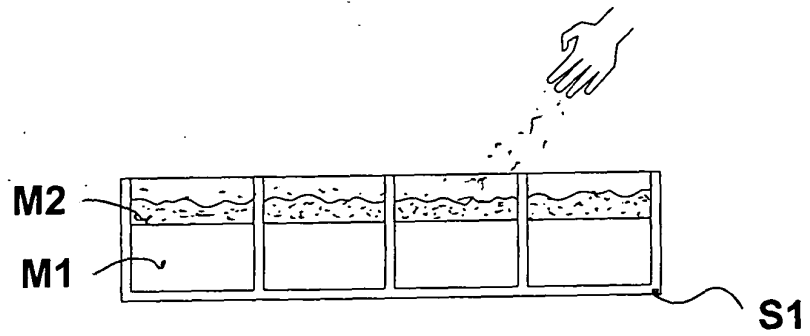


Fig. 3e

