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(54) **Method for the production of a surfacing as well as surfacing**

(57) A method for the production of a hardened surfacing comprises the following steps:

- laying at least one layer consisting of granules of a rock-like material, which are at least bound by a fusible binder, obtained from oil refining, at a temperature of between 130 °C and 190 °C onto a substrate,
- compacting this layer immediately after laying by applying pressure, for example using a roller,
- allowing the layer to cool, and
- removing the top portion of the layer by mechanical means, such as milling, grinding or polishing, as a result of which granules that have been cut through

become visible, wherein, before the layer is compacted, particles are distributed over this layer, the particles are pressed into said layer during compaction of the layer and, after cooling of the layer, a portion of the particles is likewise removed with the removal of the top portion of the layer.

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Description

[0001] The invention relates to a surfacing for a pavement, for example for a square, roads and paths, where, in addition to the functional requirements, aesthetic requirements can also be met. Rolled asphalt is easy and quick to lay for large surface areas. The appearance is uniform black to grey without the addition of colouring pigments. This type of surfacing is not found to be aesthetically pleasing. By changing the appearance a more decorative and aesthetic appearance is obtained.

[0002] In the first instance the invention comprises the production of a hardened surfacing comprising the following steps:

- laying at least one layer of rock-like material consisting of granules, these granules being at least bound by a fusible binder, obtained from oil refining, at a temperature of between 130 °C and 190 °C onto a substrate,
- compacting this layer immediately after laying by applying pressure, for example using a roller,
- allowing the layer to cool, and
- removing the top portion of the layer by mechanical means, such as milling, grinding or polishing, as a result of which granules that have been cut through become visible, wherein, before the layer is compacted, particles are distributed over this layer, the particles are pressed into said layer during compaction of the layer and, after cooling of the layer, a portion of the particles is likewise removed with the removal of the top portion of the layer.

[0003] The result of this method can reveal a surfacing which displays cut granules and particles of different shape and colour embedded in, for example, a black matrix. This gives a special aesthetic appearance.

[0004] Before the direct laying of the surfacing, the substrate is a foundation of, for example, sand or crushed rock or a combination of the two. This substrate could also be a cement-based concrete.

[0005] If it is desired subsequently to make elements for such a surfacing and to use these elements as surfacing at another site, the substrate is then a non-sticky surface, such as an area comprising a layer of sand, horizontally levelled and compacted, which can be re-used. For example, these elements are made of compacted dense rolled asphalt or compacted open-textured rolled asphalt with a percentage voids of less than 20 % (V/V), which are laid as a continuous layer. A thin layer is then removed from the layer, as a result of which numerous cut surfaces of granules and particles are revealed. By sawing the layer vertically into pieces in such a way that elements with the desired dimensions are produced, these elements can be removed from the non-sticky sand layer and laid elsewhere on a foundation as covering.

[0006] Elements can also be made in another way. Moulds of identical dimensions are arranged on a

non-sticky layer, such as a compacted sand layer, a metal plate or wooden slab, which has been treated with a release agent. These moulds can, for example, consist merely of a future outer edge. At least one steel strip that extends all round is accommodated in this outer edge. These moulds are then filled with hot rolled asphalt (bitumen as binder) or "C-Fix®" asphalt (residue from oil refining as binder) to well above the top of the outer edge of the mould. The height of the overfill must correspond to the settlement after compaction of the layer plus the height of the top portion to be removed. In the hot state the particles are spread over the layer and the layer is compacted using, for example, a roller, during which operation the particles are also pressed into the layer. After cooling of the layer, a top portion of the layer, such as a thin layer, is removed down to the top of the outer edge of the moulds. Numerous cut surfaces of granules and particles will now have appeared at the surface. The outer edges of the moulds that are in contact with one another stick only to the asphalt and not to one another. Elements have then been produced that can be released from the non-sticky substrate. The elements can be transported, for example after storage, to another location for use as surfacing for a pavement, a floor or the like.

[0007] In order to obtain a desired appearance, for example a specific colour or effect, it is possible to use in the upper layer at least granules that, for example, have originated from old or existing river beds via extraction or have been obtained from igneous or sedimentary rocks via crushing. This usually refers to gravel, the particle size of which is between 2 and 63 mm.

[0008] In order to obtain an aesthetic effect from the cut granules visible at the surface it is preferred to use granules of rock-like material that have a particle size of between 1 and 80 mm.

[0009] An alternative is to make the particle size between 3 and 40 mm.

[0010] A binder that has been obtained from oil refining, such as modified bitumen or a residue material with the trade name C-Fix®, is preferably used for binding the granules. Known plastics can be added to this binder to improve the binding properties. Fillers or sand can also be added to the binder in order to obtain a sufficiently dense surfacing, the percentage voids in the compacted layer being less than 7 %. As far as the type of bitumen is concerned, it is possible to use either the most common "black" bitumen or white bitumen, which is termed colourless. It is also possible to add colourants to the binder to colour the matrix of the top layer.

[0011] To increase the aesthetic surface effect of the top layer, particles of a specific shape have been distributed over this layer before the top layer is compacted. Distributing means that the particles are mainly separated from each other. These particles can be applied by hand or using equipment to position the particles. The particles are decorative elements and to date have never been used in this application. When the layer is compacted these particles are pressed into the layer. The dimen-

sions of the particles are preferably on the whole between 2 and 100 mm. As an alternative, said dimensions can be between 2 and 60 mm. These particles can be metal, ceramic, glass, wood, plastic or hard decorative stone particles. In this context decorative stones are that type of stones that have not been used in rolled asphalt to date. The metal particles used are preferably metals which do not have the propensity to acquire an oxide coating or acquire only a very thin oxide coating. One example is stainless steel. Using, for example, particles of high-grade stainless steel, black bitumen and the correct types of gravel it is possible to simulate the appearance of rare black marble.

[0012] The shape of these particles can, for example, approximate to a block, a cube, a pyramid or a sphere. These particles could also be somewhat plate-shaped. The particles could also be in the shape of a symbol or image or of a trade mark, such as a bicycle, telephone, coin, flower, municipal coat of arms or a company trade mark. Another possibility is that reflective and/or photoluminescent material is mixed into the particles of fusible, transparent substances, such as glass and plastic. In the presence of little or no light these particles can, for example, reflect light or display markings or symbols that light up. Squares and shopping streets that light up could, for example, in this way give a distinctive appearance in the dark.

[0013] Positioning the particles on the hot layer can be done such that a group of particles forms a symbol, image or trade mark. In this way, for example, a name, logo and characterising images of a company or institute can be captured in the layer after pressing the particles into the layer.

[0014] The removal of a thin layer from the top layer, so that a smooth top with a structure of cut granules is produced, is preferably obtained by means of milling and/or grinding. Fine grinding, i.e. polishing, will have to be carried out as the final treatment in order to make the top shine or glisten.

[0015] The surface is preferably provided with a transparent coating for protection and/or to improve the slip-resistance of the top surface.

[0016] The invention also comprises a surfacing which can be used for a pavement or a floor, which has been produced in accordance with what has been described above. This surfacing can consist either of a continuous layer or of tiles. In the case of a continuous layer it is possible to give this the appearance of a covering made of tiles by making shallow saw cuts in the form of a tile pattern. In the case of separate tiles these can have the dimensions of block paving, pavement slabs or decorative tiles and also of slabs, which can have large to very large dimensions, for example 1 m x 2 m to 3 m x 8 m.

[0017] The invention will be explained in more detail below with reference to figures.

Figure 1 shows, diagrammatically, a surfacing on a foundation.

Figure 2 shows the surfacing with a top portion removed.

Figure 3 shows part of the top surface.

Figure 4 shows a top layer with inset particles.

[0018] Figure 1 shows the layer 1, which is laid hot and compacted, on a substrate 2. This substrate can, for example, be of sand, crushed rock or layers of rolled asphalt or "C-Fix®" asphalt or of cement-based concrete laid beforehand.

[0019] Figure 2 shows the top layer from Figure 1, where a thin layer or the top portion 3 has been removed from the top and a machined surface 4 has been produced. Top portion 3 has been removed, for example, by a mechanical treatment such as milling or grinding, optionally followed by polishing. This represents the state of the art.

[0020] Figure 3 shows part of the surface 4 which is a consequence of the removal of the top portion 3. Many granules 4 show a cut surface, which granules are embedded in a matrix 7. Here the matrix can consist of a fusible binder, obtained from oil refining, which is optionally mixed with known plastics, fillers or sand. Colouring pigments can optionally have been added.

[0021] Figure 4 shows only a cross-section of the machined layer 1 with particles 6 therein arranged at the top, in accordance with the invention. After laying the hot layer 1, these particles 6 are spread over this layer and pressed into the layer on compaction of the hot layer 1. Depending on the resistance that is experienced by the granules 5, the particles 6 have acquired a position that cannot be determined in advance. After removal of the top portion 3, the cut surface of these particles can have various shapes. In the case of a particle 6 that is block-shaped, for example in the form of a parallelepiped, or cube-shaped, the cut surface can have a triangular or rectangular shape. Block-shaped or cube-shaped particles have been used in Figure 4 as an example.

Claims

1. Method for the production of a hardened surfacing comprising the following steps:

- laying at least one layer (1) consisting of granules (5) of a rock-like material, which are at least bound by a fusible binder, obtained from oil refining, at a temperature of between 130 °C and 190 °C onto a substrate (2),
- compacting this layer (1) immediately after laying by applying pressure, for example using a roller,
- allowing the layer (1) to cool, and
- removing the top portion of the layer (1) by mechanical means, such as milling, grinding or polishing, as a result of which granules (5) that have been cut through become visible, wherein,

- before the layer (1) is compacted, particles (6) are distributed over this layer (1), the particles (6) are pressed into said layer (1) during compaction of the layer (1) and, after cooling of the layer (1), a portion of the particles (6) is likewise removed with the removal of the top portion of the layer (1).
2. Method according to Claim 1, wherein the substrate (2) is a foundation of sand or crushed rock or a combination thereof.
 3. Method according to Claim 1, wherein the substrate (2) is a non-sticky surface.
 4. Method according to Claims 1 - 3, wherein at least some of the granules (5) consist of granules extracted from river beds and/or produced from igneous rocks and/or sedimentary rocks via crushing.
 5. Method according to Claims 1 - 4, wherein the particle size of the granules (5) is between 1 and 80 millimetres.
 6. Method according to Claim 5, wherein the particle size of the granules (5) is between 3 and 40 millimetres.
 7. Method according to Claims 1 - 6, wherein the binder is a modified bitumen.
 8. Method according to Claims 1 - 6, wherein the binder is a residue material from oil refining.
 9. Method according to Claims 1 - 8, wherein the dimensions of the particles (6) are on the whole between 2 and 100 mm.
 10. Method according to Claim 9, wherein the dimensions of the particles (6) are on the whole between 2 and 60 mm.
 11. Method according to Claims 9 - 10, wherein the particles (6) consist of metal, ceramic, glass, wood, plastic or hard decorative stones.
 12. Method according to Claims 9 - 11, wherein the particles (6) have a shape approximating to that of a block, cube, pyramid or sphere.
 13. Method according to Claims 9 - 11, wherein the particles (6) have a plate-shaped appearance.
 14. Method according to one of the preceding claims, wherein the particles (6) are in the shape of a symbol, image or a trade mark.
 15. Method according to Claims 9 - 14, wherein reflecting and/or photoluminescent material is mixed into the particles (6) of fusible transparent substances, such as glass and plastic.
 16. Method according to Claims 9 - 15, wherein a group of particles (6) forms a symbol, image or trade mark.
 17. Method according to one of the preceding claims, wherein the machined surface (4) of the layer (1) is provided with a transparent coating.
 18. Surfacing to be used for a pavement or a floor, where this has been produced in accordance with preceding Claims 1 - 17.

Fig 1

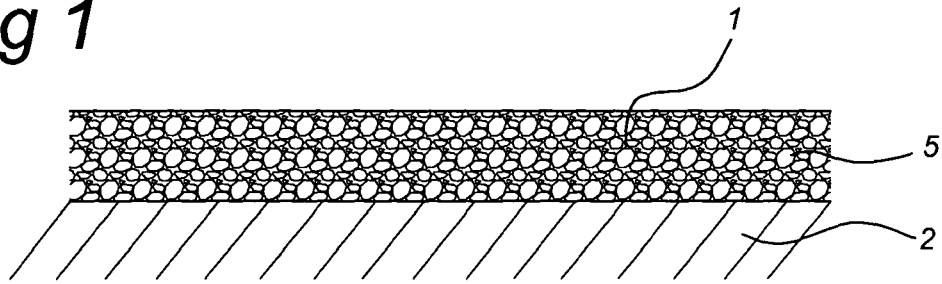


Fig 2

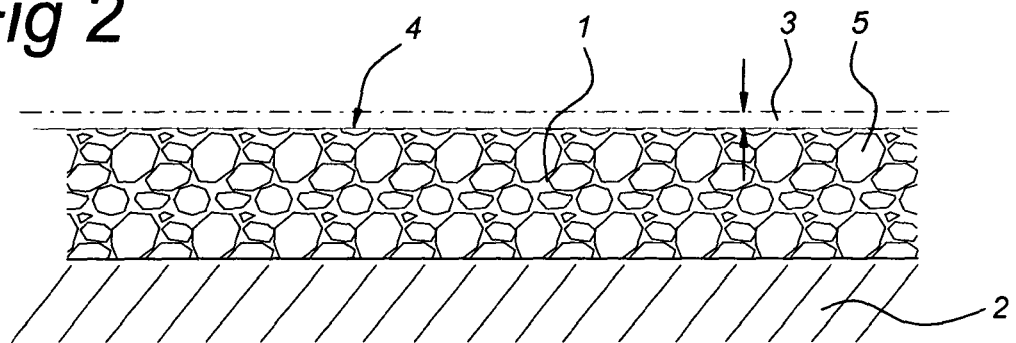


Fig 3

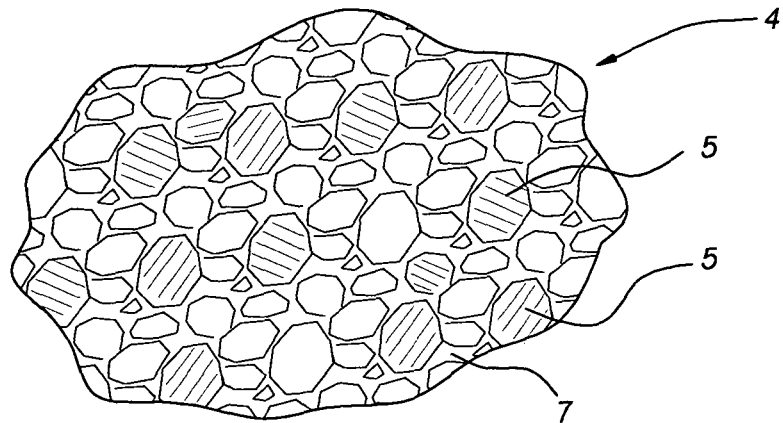
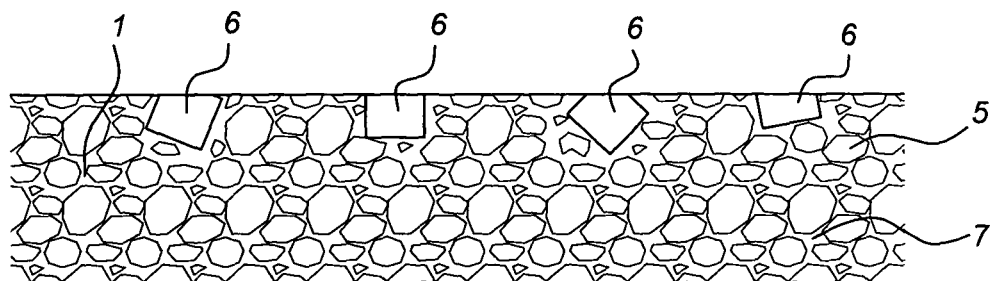


Fig 4





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EUROPEAN SEARCH REPORT

Application Number
EP 04 07 8301

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			TECHNICAL FIELDS SEARCHED (IPC)
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 9 January 2006	Examiner Dijkstra, G
CATEGORY OF CITED DOCUMENTS 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
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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
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