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(54) **Method for providing a patterned coating**

(57) A method for providing a patterned coating on a substrate is provided. The method comprises: providing a substrate comprising a magnetizable material; arranging a patterned magnetic field in said substrate; applying a coating composition onto said substrate, wherein said

coating composition comprises at least one magnetic component; and allowing said at least one magnetic component to align to said patterned magnetic field.

By the method of the invention, a patterned coating, for example having the impression of a 3D-pattern can easily be obtained.

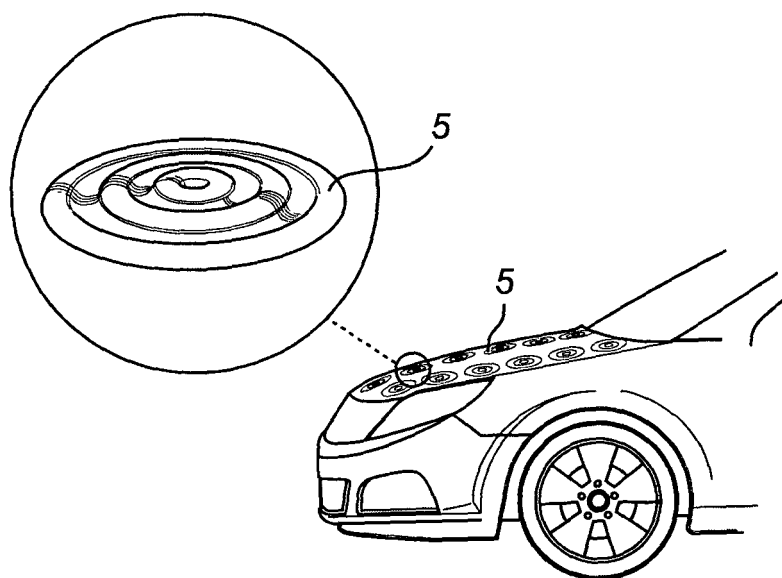


Fig. 1c

Description

Field of the Invention

[0001] The present invention relates to a method for providing a patterned coating on a substrate, such as an automotive part.

Technical Background

[0002] Automotive parts are often coated, painted, lacquered or the like. The coating preferably have protecting properties, but also give a nice visible appearance of the automotive part.

[0003] Advanced patterns on coated articles give a nice appearance to the article, and also to products comprising the articles. For creating advanced patterns, handcraft is typically needed, which is both time demanding and very expensive. In addition, the pattern and the precision depend on the skills of the person performing the pattern.

[0004] Hence, there is a need in the art for an efficient and less expensive coating method for producing advanced patterned layers on automotive parts, especially a method that is applicable on conventional iron steel material.

[0005] Especially, it is desirable to find a method for providing a patterned coating on a surface of a substrate, which can provide new exciting advanced patterns, which can provide a three dimensional effect, which efficiently can produce a pattern over a large surface area, which is less expensive than the existing alternatives, which can be used for large production volumes and/or which can easily be standardized.

Summary of the Invention

[0006] It is an object of the present invention to at least partly overcome the above-mentioned problems of the prior art and to at least partly meet the needs in the art, and thus to provide a method for obtaining a patterned coating on a surface of an at least partly magnetizable substrate.

[0007] Another general object is to provide a method, which provides the possibility to reduce pressed surface geometries of automotive articles, which reduces the risk for corrosion and/or which results in articles which can easily be washed.

[0008] These and other objects are achieved by methods and products according to the present invention.

[0009] Thus, in a first aspect, the present invention relates to a method for providing a patterned coating on a substrate, said method comprising:

providing a substrate, comprising a magnetizable material;
arranging a patterned magnetic field in said substrate;

applying a coating composition onto said substrate, wherein said coating composition comprises at least one magnetic component; and
allowing said at least one magnetic component to align to said patterned magnetic field.

[0010] By the method of the present invention, a patterned coating on a surface of a at least partly magnetizable substrate is provided, wherein a pattern, which is advanced; which has new exciting looks; or which provides a three dimensional effect easily can be achieved. Further, it is possible to produce a pattern over a large surface area efficiently, less expensive and with improved results compared to the existing alternatives. Advantageously, the method is beneficial for large production volumes and can easily be standardized.

[0011] For example, by a patterned painting on an automotive part, an impression of e.g. a shadow can be produced on the part. Conventionally, the automotive parts, such as on the car body, is provided with press lines to give it the desired appearance. These press lines can many times be replaced by a patterned painting, which gives the illusion of the fold. As a result, the car body part can be more planar, reducing the pressing of the automotive part and providing a more easily washed part. This reduces the corrosion problematic.

[0012] In embodiments of the invention, the magnetic field is arranged in the substrate by at least partly magnetizing the substrate by an external patterned magnetic field; and removing the external field when the substrate is at least partly magnetized.

[0013] Typically, the magnetizable material of the substrate comprises a ferromagnetic material. In such a material, a patterned magnetic field is readily arranged.

[0014] In embodiments of the present invention, the magnetic component of the coating composition comprises a ferromagnetic material.

[0015] The magnetic component of the coating composition can for example be small flakes or needles, which readily aligns to the patterned magnetic field of the substrate.

[0016] In embodiments of the present invention, the method may also comprise fixating said coating composition on said substrate.

[0017] This is typically done by curing, hardening, drying or the like of the coating composition.

[0018] In embodiments of the present invention, the method may also comprise the step of demagnetizing the substrate, since it in subsequent steps of the processing of the substrate may be disadvantageous to have a magnetized substrate.

[0019] In a second aspect of the present invention, the method of the present invention is used for coating an automotive part, such as carriage body part, with a patterned coating.

[0020] These and other objects of the present invention will be apparent from the following detailed description of the present invention.

Brief Description of the Drawings

[0021] The invention will now be described in more detail with reference to the accompanying schematic drawing, which by way of example illustrates an currently preferred embodiment of the invention.

[0022] Fig. 1a illustrates a method for arranging a patterned magnetic field in a substrate.

[0023] Fig. 1b illustrates a method for applying a coating composition onto a substrate.

[0024] Fig. 1c illustrates a third step of the coating method.

Detailed Description of Preferred Embodiments

[0025] An embodiment of the invention related to a coating method for providing a coating, such as a film, layer or the like, on a surface of a magnetizable substrate, wherein the coating method provides an advanced pattern will be described in more detail in the following with reference to the accompanying drawing.

[0026] Referring now to Fig.1a, where a method according to the invention for arranging a patterned magnetic field in a magnetizable substrate 1 is schematically illustrated. A magnetizing device 2 producing a patterned magnetic field is applied to the substrate 1, for obtaining an at least partly magnetized substrate. When the substrate has obtained a sufficient magnetic field, the magnetizing device 2 is removed. As a result, the patterned magnetic field of the magnetizing device is essentially reproduced in the obtained magnetic field of the magnetizable substrate 1.

[0027] The field strength of the magnetic field of the magnetizing device, as well as the time sufficient to produce the magnetic field in the substrate, depends on the material properties of the substrate. However, these conditions are obvious to the skilled person trying to utilize the present invention.

[0028] The magnetic field can be generate by any technology providing magnetic fields, such as using electrically producing magnetic fields or using a magnetic material, such as ferromagnetic materials.

[0029] The term "patterned magnetic field arranged in a substrate" as is used herein, refers to a magnetic field that exhibits a varying field strength, direction and/or polarity over the surface of the substrate that is to be coated.

[0030] Typically, the magnetizable substrate is a ferromagnetic material, such as iron steel, or any other ferromagnetic material commonly used in automotive parts. Alternatively, the substrate may be a non-ferromagnetic carrier material that comprises ferromagnetic material held by, such as dispersed or distributed in, the non-ferromagnetic carrier.

[0031] Referring now to Fig.1b, where a method according to the invention for applying a coating composition 4 onto the substrate 1 is disclosed. The coating composition can be applied by any method commonly known coating method, such as for example spraying the coat-

ing composition onto the substrate 1.

[0032] The coating composition is typically a liquid coating composition, such as a lacquer or a paint, which comprises a magnetic component, for example in the form of metal flakes or needles dispersed therein.

[0033] However, the coating can have any chemical state such as a liquid, solid, dispersion or a suspension as long as a patterned coating can be obtained.

[0034] The magnetic component may have a desired colour, for example a different colour tone of or a contrast colour to that of the coating composition, or may be metallic, black, etc.

[0035] After the coating composition is applied to the surface according to Fig. 1b, the magnetic component of the coating composition is allowed to align to the patterned magnetic field of the substrate.

[0036] Referring now to Fig.1c, a coated substrate comprising a pattern, which has formed using the method according to the invention, is shown.

[0037] After the pattern has been obtained in the coating, the coating is preferably fixated, e.g. cured, hardened or dried, to fixate the pattern.

[0038] When the pattern has been fixated onto the substrate, it may be advantageous to demagnetize the substrate. This can be done by any demagnetizing procedures known to those skilled in the art.

[0039] Although the present invention has been described in connection with particular embodiments thereof, it is to be understood that various modifications, alterations and adaptations may be made by those skilled in the art without departing from the claimed scope.

[0040] For example regarding the patterned magnetic field, different patterns can be used, such as a line, a dot, circles, symbols, and schematics of objects and images.

The method of the present invention can be used for producing a pattern which has any geometrical shape or shapes and/of for producing visible effects such as shadows and 3D effects.

[0041] The substrate does not need to be planar. Instead, the means for arranging the magnetic field in the substrate can have a shape adapted to fit any curvature of the substrate. Further, the coating can refer to a continuous or discontinuous layer or film, which is formed on the substrate.

[0042] The coating method can be repeated on the substrate surface in order to create multi layer effects. The coating method can be a paint or screen printing technology. In addition, it can be combined with additional processes, such as laser etching.

Claims

1. A method for providing a patterned coating on a substrate, said method comprising:
 - a) providing a substrate, comprising a magnetizable material;

- b) arranging a patterned magnetic field in said substrate;
c) applying a coating composition onto said substrate, wherein said coating composition comprises at least one magnetic component; and
d) allowing said at least one magnetic component to align to said patterned magnetic field. 5
2. A method according to claim 1, wherein arranging a patterned magnetic field in said substrate comprises: 10
- at least partly magnetizing said substrate by an external patterned magnetic field; and removing said external magnetic field when the substrate is at least partly magnetized. 15
3. A method according to claim 1 or 2, wherein said magnetizable material of the substrate comprises a ferromagnetic material. 20
4. A method according to any of the preceding claims, wherein said magnetic component of the coating composition comprises a ferromagnetic material.
5. A method according to any of the preceding claims, further comprising 25
- e) fixating said coating composition on said substrate. 30
6. A method according to claim 5, further comprising
- f) demagnetizing said substrate.
7. Use of method according to claim 1 for arranging a patterned coating on automotive parts. 35
8. An article having a coating obtainable by the method of claim 1. 40

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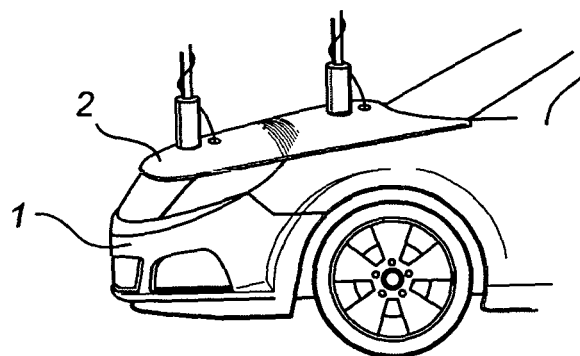


Fig. 1a

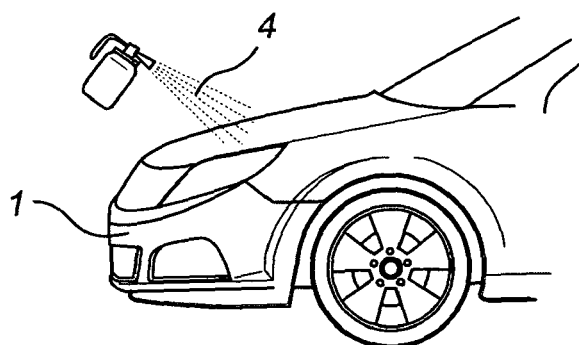


Fig. 1b

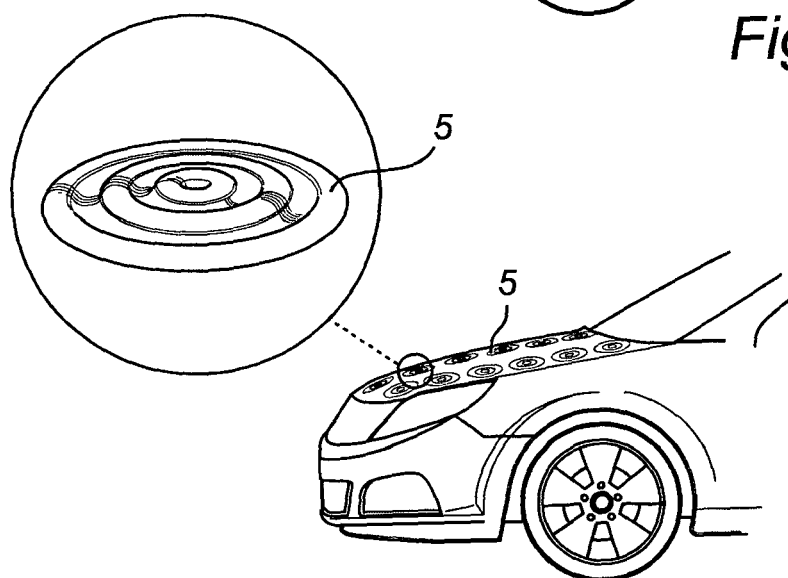


Fig. 1c



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 08 00 2095

| DOCUMENTS CONSIDERED TO BE RELEVANT | | | |
|---|--|--|---|
| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (IPC) |
| X | WO 2007/065998 A (PIVAUDRAN TECH ET INNOVATIONS [FR]; PIVAUDRAN MATHIEU [FR]; PIVAUDRAN) 14 June 2007 (2007-06-14) * the whole document * | 1-5,7,8 | INV. B05D3/14 B05D5/06 |
| X | WO 2007/107549 A (AKZO NOBEL COATINGS INT BV [NL]; DE RYDT TIM ELS LEO [BE]; GOUBET LAUR) 27 September 2007 (2007-09-27) * the whole document * | 1,3-8 | |
| X | DE 20 06 848 A1 (MAGNETFABRIK BONN GMBH) 2 September 1971 (1971-09-02) * claim 6 * * page 1, last paragraph * | 1,3-5,7,8 | |
| | | | TECHNICAL FIELDS SEARCHED (IPC) |
| | | | B05D |
| The present search report has been drawn up for all claims | | | |
| Place of search The Hague | | Date of completion of the search 25 July 2008 | Examiner Brothier, J |
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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 08 00 2095

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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25-07-2008

| Patent document cited in search report | | Publication date | Patent family member(s) | Publication date |
|---|----|---------------------|----------------------------|---------------------|
| WO 2007065998 | A | 14-06-2007 | FR 2894508 A1 | 15-06-2007 |
| WO 2007107549 | A | 27-09-2007 | NONE | |
| DE 2006848 | A1 | 02-09-1971 | NONE | |