(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
9 February 2006 (09.02.2006)

PCT

(10) International Publication Number
WO 2006/013463 A2

(51) International Patent Classification:
B32B 31/00 (2006.01)

(21) International Application Number:
PCT/IB2005/002500

(22) International Filing Date: 29 July 2005 (29.07.2005)

(25) Filing Language: Italian

(26) Publication Language: English

(30) Priority Data:
MI2004A001579 30 July 2004 (30.07.2004) IT

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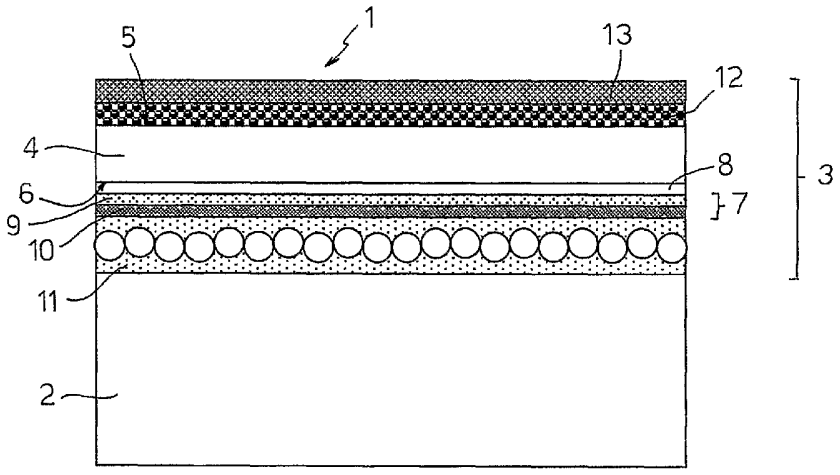
(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *without international search report and to be republished upon receipt of that report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: METHOD FOR PRODUCING ABRASION-RESISTANT DECORATIVE LAYERS, IN PARTICULAR FOR FACING LAMINATES AND/ OR FLOORING, AND ABRASION-RESISTANT DECORATIVE LAYER AND LAMINATE PRODUCED USING SUCH A METHOD



(57) Abstract: A method for producing abrasion resistant decorative layers, in particular for facing laminates and /or flooring, provides for the use of a cellulosic substrate (4) with fibrous matrix in sheet or strip form, the substrate being essentially transparent or suitable for becoming transparent following hot rolling, and having an upper face (5) designed to remain exposed during use, provided with a abrasion resistant particle substance, such as corundum, and a lower face (6) for coupling with a supporting panel (2); the lower face (6) of the substrate (4) is printed with a pre-specified print pattern (7) having colours, drawings and/or decorations; between the print pattern (7) and the panel (2) an opacifying layer (11) is positioned, consisting of a substantially opaque particle substance (for example ceramic spheres) incorporated in a polymeric resin.

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"METHOD FOR PRODUCING ABRASION-RESISTANT DECORATIVE LAYERS, IN PARTICULAR FOR FACING LAMINATES AND /OR FLOORING, AND ABRASION-RESISTANT DECORATIVE LAYER AND LAMINATE PRODUCED USING SUCH A METHOD"

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TECHNICAL FIELD

The present invention relates to a method for producing abrasion resistant decorative layers, in particular for facing laminates and /or flooring, and abrasion resistant decorative layers and laminates produced by said method.

BACKGROUND ART

It is known that widespread use is made of laminates based on thermosetting polymeric materials instead of natural wood coverings in the field of floor/wall coverings and furniture; these laminates generally consist of one or more sheets of paper substrate impregnated and coated with polymeric compositions and hot-rolled; the layer designed to remain exposed is normally provided with a printed decoration which reproduces the required drawings and/or shade.

To give the laminate adequate abrasion resistance, a protective anti-abrasion coating is customarily coupled with the decorative layer, the so-called overlay, which contains particles of a material with high abrasion resistance (for example corundum) and which furthermore gives the laminate a brilliant look which is particularly satisfactory in terms of appearance.

Coupling with an overlay is, however, relatively costly, both in terms of production costs and complexity of the process, and has the further drawback of resulting in general in laminates with poor flexibility.

DISCLOSURE OF INVENTION

An aim of the present invention is to provide a method for producing abrasion resistant decorative layers, in particular for facing laminates and /or flooring, without the drawbacks highlighted of the known art; in particular, an aim of the invention is to provide a method that is simple and relatively inexpensive to implement with respect to the known methods, and which provides fully satisfactory decorative layers and laminates in both functional terms (high abrasion resistance) and in terms of appearance.

The present invention therefore relates to a method for producing abrasion resistant decorative layers, in particular for facing laminates and /or flooring, the method comprising the step of providing a cellulosic substrate with fibrous matrix in sheet or strip form, the substrate being substantially transparent or suitable for becoming transparent following hot rolling, and having an upper face, designed to remain exposed during use, provided with a abrasion resistant particle substance, such as corundum, and a lower face for coupling with a supporting panel; the method being characterised in that it comprises a step of printing of said lower face of the substrate with a pre-specified print pattern having colours, drawings and/or decorations.

The method of the invention avoids the traditional coupling of decorative paper and overlay provided with the abrasion resistant particle substance (corundum), hence it is particularly simple and relatively inexpensive to implement; the method of the invention provides, in fact, for direct printing of a sheet or strip of material commonly used as overlay (and having appropriate characteristics which make it suitable for printing), which can then be directly hot rolled with a supporting panel; it is therefore not necessary to print a traditional decorative paper to be coupled with the overlay and the supporting panel. Furthermore decorative

layers are obtained (and laminates provided with said decorative layers) which are fully satisfactory in both functional terms (high abrasion resistance), and in terms of appearance.

According to a further aspect of the invention, the printing step is followed by a spreading step of an opacifying layer, comprising a substantially opaque particle substance (for example particles or spheres of ceramic, kaolin, chalk, clay, terracotta or other similar substances) incorporated in a polymeric resin, on the print pattern, said print pattern being positioned between the opacifying layer and the lower face of the substrate.

In this way, the opacifying layer conceals any defects in the supporting panel to which the decorative layer is applied, and which would be visible during use due to the transparency of the printed substrate.

BRIEF DESCRIPTION OF THE DRAWINGS

Further characteristics and advantages of the invention will appear clear from the description of the following non-limiting embodiments, with reference to the figures of the attached drawings, in which:

- figure 1 is a schematic out of scale view of a facing laminates and /or flooring provided with a abrasion resistant decorative layer produced according to the invention;
- figure 2 is a schematic out of scale view of a variation of the laminate of figure 1.

BEST MODE FOR CARRYING OUT THE INVENTION

In figure 1, 1 indicates a facing laminates and /or flooring comprising a supporting panel 2 (known) to which a abrasion resistant decorative layer 3 is coupled.

The laminate 1 is produced according to the following method.

A cellulosic substrate 4 with fibrous matrix is provided in sheet or strip form, of the type normally used as overlay; the substrate 4 has a composition and consistency such as to be substantially transparent or become transparent following hot rolling; the substrate 4 has a composition typical of materials used as overlay and has a grammage below approximately 60 g/m^2 and, preferably, between approximately 10 and approximately 40 g/m^2.

The substrate 4 has an upper face 5, designed to remain exposed during use, and a lower face 6 for coupling with the panel 2.

The method of the invention comprises a printing step in which the lower face 6 is printed with a pre-specified print pattern 7 having colours, drawings and/or decorations; in the printing step, the lower face 6 is provided first with a printing over-laquer 8, on which the print pattern 7 is then printed.

In particular, the printing step comprises first the printing of a decorative drawing 9, for example graining, on the printing over-laquer 8, and subsequently the printing of a uniform layer 10 of pre-specified colour above the decorative drawing 9.

The printed substrate 4 undergoes an impregnation step (known), in which the substrate 4 is immersed in a bath consisting of an aqueous solution of one or more polymeric components, in particular an aqueous solution of melamine resins and/or polyvinyl alcohol.

The printed impregnated substrate 4, after drying if necessary, is then subjected to a spreading step of an opacifying layer 11 on the print pattern 7, so that the print pattern 7 remains positioned between the lower face 6 of the

substrate 4 and the opacifying layer 11. The opacifying layer 11 comprises a substantially opaque particle substance (for example particles or spheres of ceramic, kaolin, chalk, clay, terracotta or other similar substances) incorporated in a polymeric spreading composition, for example based on melamine resin or other similar thermosetting resin or polyvinyl alcohol or their mixtures; the spreading step of the opacifying layer 11 can be performed by applying one or more overlapped layers of the polymeric spreading composition.

The particle substance consists, for example, of substantially spherical particles (small spheres) of ceramic or other opaque substance having dimensions between approximately 3 and approximately 500 μm; preferably, hollow spheres are used, for example the so-called "cenospheres" based on silica-alumina-hematite (Al_2O_3-SiO_2-Fe_2O_3).

After passing through a dryer for a drying step if necessary, the substrate 4 is subjected to a spreading step of an anti-abrasion layer 12 on the upper face 5 of the substrate 4; the anti-abrasion layer 12 comprises a abrasion resistant particle substance, for example corundum, dispersed in a polymeric composition comprising one or more polymeric components, in particular a melamine resin or other similar thermosetting resin or polyvinyl alcohol or their mixtures.

A protective layer 13 based on polymeric resin including particles and/or fibres of a material with high hardness and low abrasiveness, for example glass spheres and/or fibres, is then spread above the anti-abrasion layer 12, in a further spreading step, having the purpose of preserving the surfaces of the rolling presses in the subsequent work steps.

The decorative layer 3 thus obtained, consisting of the substrate 4 printed, impregnated and coated as previously described, is then dried, cooled and cut into sheets or wound

in reels for further processing; in particular, the decorative layer 3 is subjected to a hot rolling step with the panel 2 to form the laminate 1. The upper face 5 of the substrate 4, provided with the anti-abrasion layer 12 and the protective layer 13, is exposed and the print pattern 7 can be seen in transparency through the substrate 4; the lower face 6, provided with the print pattern 7, is coupled to the panel 2 with the opacifying layer 11 positioned in-between; the opacifying layer 11 masks any defects in the surface of the panel 2.

According to the embodiment schematically illustrated in figure 2, in which the details similar or identical to those already described are indicated by the same numbers, a substrate 4 is used in which the abrasion resistant particle substance such as corundum is dispersed directly in the fibrous matrix of the substrate 4; in this case, the spreading steps of the anti-abrasion layer 12 and the protective layer 13 can also be avoided; a polymeric layer 14, for example of melamine resin, is simply applied on the upper face 5 of the substrate 4.

CLAIMS

1. Method for producing abrasion resistant decorative layers, in particular for facing laminates and /or flooring, the method comprising the step of preparing a cellulosic substrate (4) with fibrous matrix in sheet or strip form, the substrate being substantially transparent or suitable for becoming transparent following hot rolling, and having an upper face (5), designed to remain exposed during use, provided with a abrasion resistant particle substance, such as corundum, and a lower face (6) for coupling with a supporting panel (2); the method being characterised in that it comprises a printing step of said lower face (6) of the substrate (4) with a pre-specified print pattern (7) having colours, drawings and/or decorations.

2. Method as claimed in claim 1, characterised in that it comprises, after the printing step, a spreading step of an opacifying layer (11) on said print pattern (7), the print pattern (7) being positioned between the opacifying layer (11) and the lower face (6) of the substrate (4).

3. Method as claimed in claim 2, characterised in that said opacifying layer (11) comprises a substantially opaque particle substance, for example spheres of ceramic, incorporated in a polymeric resin.

4. Method as claimed in claim 3, characterised in that said particles have dimensions of between approximately 3 and approximately 500 μm.

5. Method as claimed in one of the preceding claims, characterised in that in said printing step a printing over-laquer (8) is applied to said lower face (6) of the substrate (4), and the print pattern (7) is subsequently printed on said printing over-laquer (8).

6. Method as claimed in one of the preceding claims, characterised in that the printing step comprises the printing of a decorative drawing (9), for example graining, and subsequently the printing of a uniform layer (10) of pre-specified colour above the decorative drawing (9).

7. Method as claimed in one of the preceding claims, characterised in that the abrasion resistant particle substance, such as corundum, is dispersed in the fibrous matrix of the substrate (4).

8. Method as claimed in one of the preceding claims, characterised in that it comprises, preferably after said printing step, a step in which an anti-abrasion layer (12) comprising said abrasion resistant particle substance dispersed in polymeric resin is applied on said upper face (5) of the substrate (4).

9. Method as claimed in the preceding claim, characterised in that it comprises a step in which a polymeric resin-based protective layer (13) including particles and/or fibres of a material with high hardness and low abrasiveness, for example glass spheres and/or fibres, is applied to the anti-abrasion layer (12).

10. Method as claimed in one of the preceding claims, characterised in that the cellulosic substrate has a grammage below approximately 60 g/m^2 and preferably between approximately 10 and approximately 40 g/m^2.

11. Abrasion resistant decorative layer (3), in particular facing laminates and /or flooring, comprising a cellulosic substrate (4) with fibrous matrix in sheet or strip form substantially transparent or suitable for becoming transparent following hot rolling, the substrate having an upper face (5), designed to remain exposed during use, provided with a

abrasion resistant particle substance, such as corundum, and a lower face (6) for coupling with a supporting panel (2); the decorative layer (3) being characterised in that said lower face (6) of the substrate (4) is provided with a pre-specified print pattern (7) having colours, drawings and/or decorations.

12. Decorative layer as claimed in claim 11, characterised in that it comprises an opacifying layer (11) arranged on said print pattern (7), the print pattern (7) being positioned between the opacifying layer (11) and the lower face (6) of the substrate (4).

13. Decorative layer as claimed in claim 12, characterised in that said opacifying layer comprises a substantially opaque particle substance, for example spheres of ceramic, incorporated in a polymeric resin.

14. Decorative layer as claimed in claim 13, characterised in that said particle substance comprises substantially spherical particles (small spheres) of ceramic.

15. Decorative layer as claimed in claim 13 or 14, characterised in that said particles have dimensions of between approximately 3 and approximately 500 μm.

16. Decorative layer as claimed in one of the claims from 11 to 15, characterised in that it comprises an printing over-laquer (8) applied to the lower face (6) of the substrate (4), the print pattern (7) being arranged above said printing over-laquer (8).

17. Decorative layer according to one of the claims from 11 to 16, characterised in that it comprises, overlapping in succession starting from the lower face (6) of the substrate (4), an printing over-laquer (8), a decorative drawing (9), for example graining, and a uniform layer (10) of pre-

specified colour.

18. Decorative layer as claimed in one of the claims from 11 to 17, characterised in that the abrasion resistant particle substance, such as corundum, is dispersed in the fibrous matrix of the substrate (4).

19. Decorative layer as claimed in one of the claims from 11 to 18, characterised in that it comprises on the upper face (5) of the substrate (4) an anti-abrasion layer (12) comprising said abrasion resistant particle substance dispersed in polymeric resin.

20. Decorative layer as claimed in the preceding claim, characterised in that it comprises above the anti-abrasion layer (12) a protective layer (13) based on polymeric resin including particles and/or fibres of a material with high hardness and low abrasiveness, for example glass spheres and/or fibres.

21. Decorative layer as claimed in one of the claims from 11 to 20, characterised in that the cellulosic substrate has a grammage below approximately 60 g/m^2 and preferably between approximately 10 and approximately 40 g/m^2.

22. Abrasion resistant laminate (1) to, in particular facing laminates and /or flooring, comprising a decorative layer (3) coupled a supporting panel (2), the laminate being characterised in that it comprises the decorative layer as claimed in one of the claims from 11 to 21.

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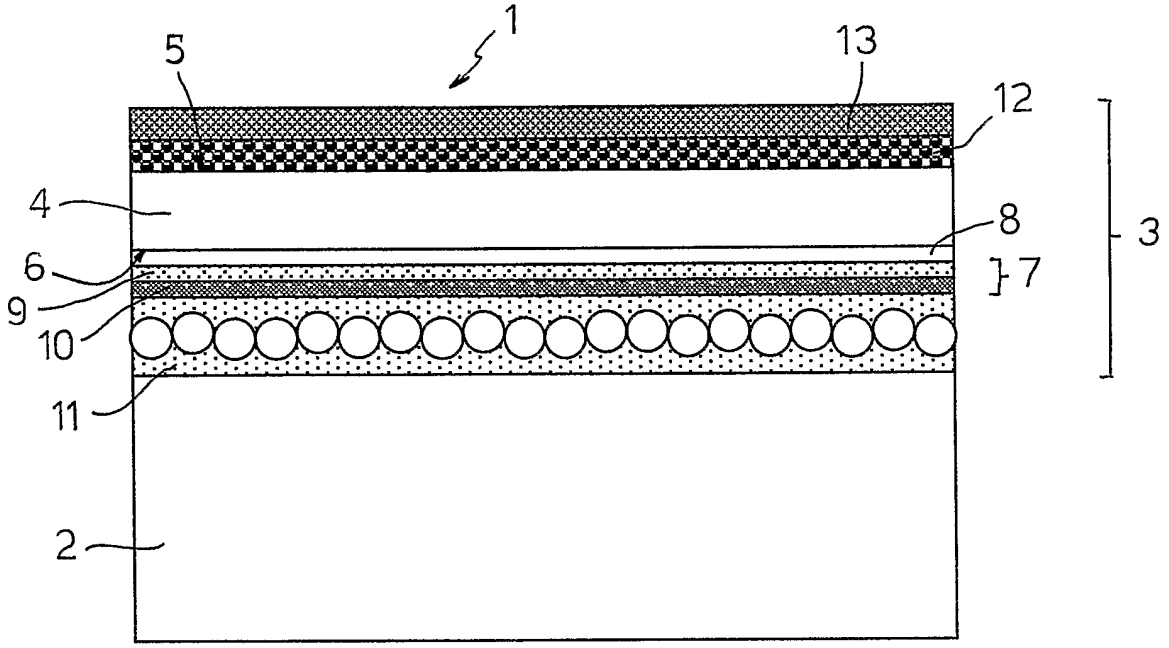


Fig. 1

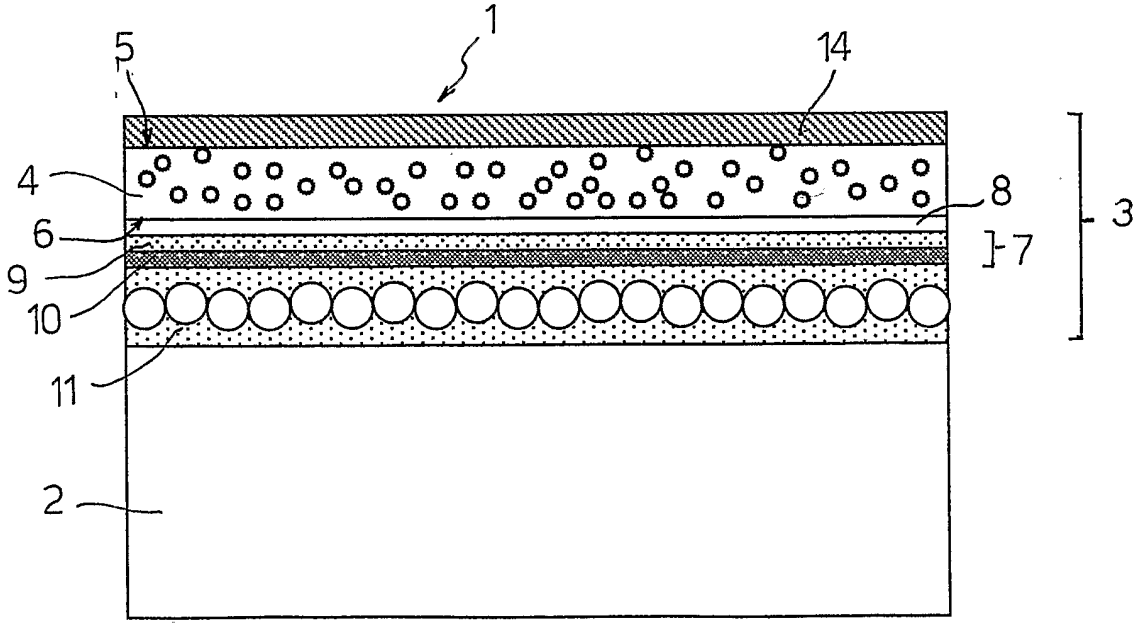


Fig. 2