



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
18.07.2012 Bulletin 2012/29

(51) Int Cl.:
E04F 15/10^(2006.01)

(21) Application number: **12151306.3**

(22) Date of filing: **16.01.2012**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(71) Applicant: **Anselmi, Francesca**
42122 Reggio Emilia (IT)

(72) Inventor: **Anselmi, Francesca**
42122 Reggio Emilia (IT)

(74) Representative: **Locas, Davide et al**
Cantaluppi & Partners
Piazzetta Cappellato Pedrocchi, 18
35122 Padova (IT)

(30) Priority: **14.01.2011 IT PD20110009**

(54) **Prefinished panel for floorings and coverings and method for the manufacturing thereof**

(57) A prefinished panel (1) for floorings and coverings comprises a support substrate (2) having a superficial layer of aluminium (21), a superficial decorative layer (4) which is applied to a face of the substrate and a cov-

ering layer (5) which covers the decorative layer, wherein the covering finishing layer includes a layer of resin which is transparent in the solid state and which is capable of subsequently solidifying, having a mean thickness between 1.2 and 3 mm.

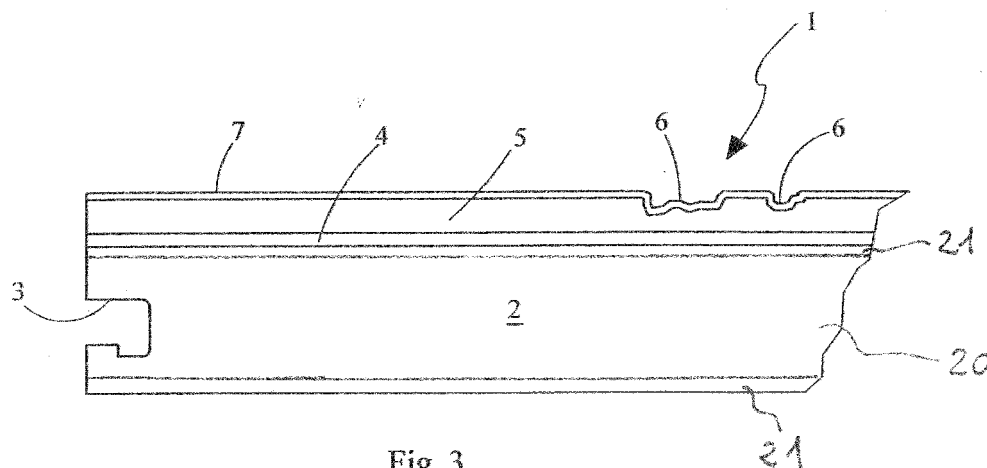


Fig. 3

Description

[0001] The invention relates to a method for producing a prefinished panel for floorings and coverings and a relevant production method and the relevant panel.

[0002] The high cost of positioning and superficially finishing floorings and coverings and the difficulty of finding qualified specialist operators for positioning and finishing them has substantially contributed to the spread of prefinished panels, for which the operation of simple positioning concludes the construction of the flooring or covering.

[0003] Normally, those panels have a wooden support substrate which is intended to fulfil the mechanical functions of the flooring and to which a relatively thin finishing layer is adhesively bonded, in comparison with the thickness of the support, for example, wood of a more highly valued substance than the support. Therefore, any finishing varnish is applied to that thin layer.

[0004] In that manner, it is possible to construct parquet flooring and similar floorings whilst, if it is desirable to construct floorings and coverings with more artistic and sophisticated decorative designs, it is still necessary to construct large surfaces which are then intended to receive a protective layer applied during operation.

[0005] However, this technique involves high costs, positioning methods which are not very compatible with dust-laden environments as may often be encountered on work sites in which the flooring has to be positioned, etc. Another example of a prefinished panel is described in the international patent application WO 2006/037977 and comprises a substrate of a material based on cellulose/polyester and a decorative layer covered with one or more layers of transparent PVC plastisol. The superficial layer of PVC plastisol comprises a series of coloured scales or glass scales so as to confer a specific aesthetic appearance and, to that end, is spread with a spatula on the layer below.

[0006] In an alternative embodiment to the one set out above with the plastisol layer, there may be used another layer of polymer material, for example, a resin, of small thickness, comparable to that of the substrate of 0.15 mm.

[0007] However, the construction of that panel is quite complex, requiring a number of successive steps which are difficult to carry out by means of an in-line system.

[0008] In particular, the need to spread a layer using a spatula and the steps of drying at a relatively high temperature require quite complex machines.

[0009] In addition, the need for printing the decorative layer beforehand and subsequently applying it to the substrate is not very suitable in the case of high-quality printing, requiring particular attention during the application phase.

[0010] An object of the invention is to provide a prefinished panel which allows all the disadvantages set out with reference to the cited prior art to be overcome.

[0011] The features and advantages of the invention

will be appreciated more clearly from the following detailed description of a preferred embodiment thereof which is illustrated by way of non-limiting example with reference to the appended drawings, in which:

- Figure 1 is a perspective view of a panel according to the invention;
- Figure 2 is a schematic cross-section of the panel of Figure 1;
- Figure 3 is a cross-section of a detail of Figure 2, drawn to an enlarged scale. In the Figures, there is generally designated 1 a panel constructed in accordance with the present invention. The panel 1 is prefinished, that is to say, it is positioned in its current state without any additional finishing processing operations after the positioning, and it is intended for the construction of floorings and coverings.

[0012] It is constructed on the basis of a support substrate 2 which is preferably constructed from known material with the commercial name Dibond® produced by 3A Composites.

[0013] That material is formed by two sheets of aluminium which have a thickness equal to 0.012" (approximately 0.3 mm) and which are fixed to a polyethylene core.

[0014] The aluminium sheets therefore form two superficial layers 21 which define the outer faces of the substrate.

[0015] More generally, as an alternative to Dibond®, there could be provision for the use of a substrate of other materials composed of aluminium, in which at least one outer face is composed of that material or an alloy thereof.

[0016] Therefore, the method according to the present invention provides for a direct printing step on the outer layer of aluminium so as to form a superficial decorative layer 4.

[0017] In Figure 3, it will be appreciated that the decorative layer is illustrated as a separate layer with respect to the substrate for greater descriptive clarity, the layer also being printed directly on the outer surface thereof.

[0018] Therefore, that layer will be defined by an image printed on the face of the substrate 2 preferably by means of direct UV printing. That technology is known per se and is, for example, produced with digital printers of the type Durst Rho 800 or Daytona H700UV Flatbed Printer.

[0019] It must be noted that the superficial layer of aluminium is particularly suitable for being printed directly, allowing high definition and short drying times.

[0020] In addition, the UV ink-jet printing technology also allows continuous printing on surfaces having large dimensions.

[0021] That capacity, together with the structural characteristics of Dibond, allows the construction of prefinished panels having large dimensions even of 200 x 400 cm.

[0022] After the printing step, the method according to the present invention provides for the application of a

transparent covering layer produced by pouring an aliphatic epoxy resin or aliphatic polyurethane resin having self-levelling properties.

[0023] Those resins also have the property of dissipating the solvents used during the solidifying step, which may occur at ambient temperature, making those materials completely suitable for forming coverings having surfaces which are intended for contact with food products.

[0024] In greater detail, the resin is poured on the printed surface by means of one or more nozzles and, owing to the self-levelling properties, once it has been poured it is capable of spreading to form a uniform and continuous layer above the decorative layer.

[0025] In particular, once solidified, the resin becomes transparent and the decorative layer will be completely covered by the covering layer.

[0026] The covering layer 5 is applied to the second layer with a mean thickness between 1.2 mm and 3 mm and preferably with a mean thickness of approximately 1.5 mm.

[0027] The covering layer 5 therefore allows, on the one hand, the decorative layer to be covered and the panel to be provided with surface resistance, in particular to being walked on.

[0028] However, it is evident that the thickness used depends on the type of intended purpose of the panel and the decoration underneath.

[0029] In particular, there may be provision for, in addition to the printed decorative layer, the use of other decorative elements, for example, fabrics, embedded in the resin layer 5.

[0030] That production method, together with the specific combination of materials used, is therefore particularly advantageous because it does not require any type of processing for spreading the covering layer.

[0031] In addition, the use of a superficial layer of aluminium having a thickness greater than 0.1 mm allows the use of sufficiently thick layers of resin, providing overall a prefinished panel of high quality.

[0032] In fact, if a smaller thickness of aluminium were to be used for the superficial layer, it would not be possible to carry out the operation of pouring the resin because the aluminium would be readily removed by the resin.

[0033] In each case, however, in order to obtain special decorative effects, in particular three-dimensional effects, the covering layer 5 of resin may have form impressions, markings or the like, generally designated 6.

[0034] Particularly when the panel 1 is intended to be positioned on a flooring, it is advantageous to provide another fourth protective layer 7 of scratch-resistant varnish, for example, an aqueous acrylic/polyurethane varnish. Those varnishes are conventionally used as superficial finishes after positioning for floorings of wood of the parquet type.

[0035] According to a preferred embodiment, the panel is provided on the four perimeter edges with connection profiles 3 with conjugate shapes for connection to adja-

cent panels in an interlocking manner. Suitable profiles in that sense are described, for example, in US 7,658,048.

[0036] The panel 1 is constructed on the basis of the substrate 2 with subsequent positioning of the above-indicated layers.

[0037] Owing to the presence of recesses at the perimeter, the panel may be positioned in the dry state, without using adhesives or the like.

[0038] The method thereby solves the problem set out, affording a number of advantages including that of allowing a high level of personalization of the panels constructed, owing to the use of direct printing on the substrate.

[0039] In addition, the method is particularly well suited to being implemented in systems with linear advance, allowing optimum implementation at an industrial level.

[0040] The specific combination of materials further allows the construction of panels having large dimensions which are completely decorated and particularly resistant.

[0041] In addition, owing to the reduced construction and installation times and the low weight, those panels may be readily produced to order and positioned, reducing the storage and site costs.

Claims

1. A method for producing a prefinished panel (1) for floorings and coverings comprising the steps of:
 - providing a support substrate (2) comprising a superficial layer (21) of aluminium or an aluminium alloy which defines an outer face of that substrate;
 - applying a superficial decorative layer (4) by means of printing on the superficial layer,
 - pouring an aliphatic epoxy resin or an aliphatic polyurethane resin on the superficial layer (4) so as to obtain a continuous covering layer (5) having a mean thickness between 1.2 mm and 3 mm, the resin having self-levelling properties, being capable of subsequently solidifying and being transparent once solidified.
2. A method for producing a prefinished panel (1) according to claim 1, wherein the substrate comprises a core (20) of polymer material.
3. A method for producing a prefinished panel (1) according to claim 1, wherein the substrate (2) is produced from Dibond®.
4. A method for producing a prefinished panel (1) according to one or more of the preceding claims, wherein the decorative layer (4) is applied to the substrate (2) by means of direct UV printing.

5. A method for producing a prefinished panel (1) according to one or more of the preceding claims, comprising another step of printing forms, markings or the like (6) on the covering layer (5) of resin. 5
6. A method for producing a prefinished panel (1) according to one or more of the preceding claims, comprising another step of applying another layer of scratch-resistant varnish (7) above the covering layer (5) of resin. 10
7. A method for producing a prefinished panel (1) according to one or more of the preceding claims, comprising a step of producing connection profiles (3) of conjugate shapes at the perimeter edges of the substrate (2) for connection to adjacent panels in an interlocking manner. 15
8. A prefinished panel (1) for floorings and coverings comprising a support substrate (2), which includes a superficial layer (21) of aluminium or an aluminium alloy which defines an outer face of the substrate (2), a superficial decorative layer (4) which is applied to a face of the substrate (2) by means of printing on the superficial layer (21) and a covering layer (5) which completely covers the decorative layer (4), wherein the covering layer (5) includes a thick layer of resin which is transparent in the solid state and which is capable of subsequently solidifying, having a mean thickness between 1.2 and 3 mm, the covering layer (5) being produced by pouring an aliphatic epoxy resin or an aliphatic polyurethane resin. 20 25 30
9. A panel according to claim 8, wherein the decorative layer (4) is applied to the substrate (2) by means of direct UV printing. 35
10. A panel according to either claim 8 or claim 9, wherein the covering layer (5) has form impressions, markings or the like (6). 40
11. A panel according to one or more of claims 8 to 10, wherein the covering layer (5) comprises an additional scratch-resistant layer (7) of varnish. 45
12. A panel according to one or more of claims 8 to 11, comprising connection profiles (3) having conjugate shapes at the perimeter edges of the substrate (2) for connection to adjacent panels in an interlocking manner. 50

55



Fig. 1



Fig. 2

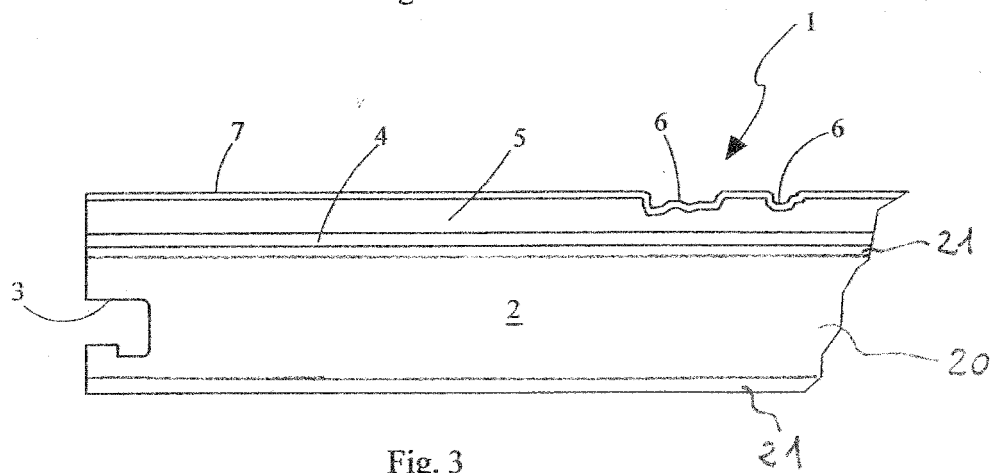


Fig. 3



EUROPEAN SEARCH REPORT

Application Number
EP 12 15 1306

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	GB 1 566 086 A (FORMICA INT) 30 April 1980 (1980-04-30) * page 2, line 130 - page 3, line 112; claims 1-5 *	1-12	INV. E04F15/10
A	EP 0 993 938 A1 (PREMARK RWP HOLDINGS INC [US]) 19 April 2000 (2000-04-19) * paragraphs [0026] - [0027]; figure 3 *	1-12	
A,D	WO 2006/037977 A1 (ALTRO LTD [GB]; HALL BARRY [GB]; MASTERS KAREN [GB]) 13 April 2006 (2006-04-13) * page 8, line 23 - page 9, line 30; figure 1 *	1-12	
A,D	US 7 658 048 B2 (MORIAU STEFAN S G [BE] ET AL MORIAU STEFAN SIMON GUSTAAF [BE] ET AL) 9 February 2010 (2010-02-09) * the whole document *	7,12	
			TECHNICAL FIELDS SEARCHED (IPC)
			E04F B44C
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 16 May 2012	Examiner Urbaniec, Tomasz
<p>CATEGORY OF CITED DOCUMENTS</p> <p>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</p> <p>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</p>			

1
EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 12 15 1306

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.

16-05-2012

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
GB 1566086	A	30-04-1980	AU 3624378 A	22-11-1979
			BR 7804059 A	03-04-1979
			DE 2828004 A1	25-01-1979
			ES 471188 A1	01-09-1979
			FR 2395833 A1	26-01-1979
			GB 1566086 A	30-04-1980
			IT 1105263 B	28-10-1985
			JP 54011982 A	29-01-1979
			NZ 187336 A	19-12-1980
			SE 7807233 A	29-12-1978
EP 0993938	A1	19-04-2000	BR 9904923 A	08-08-2000
			CA 2281446 A1	16-04-2000
			CN 1251806 A	03-05-2000
			EP 0993938 A1	19-04-2000
WO 2006037977	A1	13-04-2006	AU 2005291056 A1	13-04-2006
			CA 2581928 A1	13-04-2006
			EP 1807579 A1	18-07-2007
			GB 2433903 A	11-07-2007
			JP 2008514838 A	08-05-2008
			US 2007237926 A1	11-10-2007
			WO 2006037977 A1	13-04-2006
			ZA 200703468 A	27-08-2008
US 7658048	B2	09-02-2010	US 2006225370 A1	12-10-2006
			US 2006225377 A1	12-10-2006
			US 2006236630 A1	26-10-2006
			US 2006236631 A1	26-10-2006
			US 2006236632 A1	26-10-2006
			US 2006236633 A1	26-10-2006
			US 2006236634 A1	26-10-2006
			US 2006236635 A1	26-10-2006
			US 2006236636 A1	26-10-2006
			US 2006236637 A1	26-10-2006
			US 2006236638 A1	26-10-2006
			US 2006236643 A1	26-10-2006
			US 2006248829 A1	09-11-2006
			US 2006248830 A1	09-11-2006
			US 2006248831 A1	09-11-2006
			US 2006254183 A1	16-11-2006
			US 2006254184 A1	16-11-2006
			US 2006254185 A1	16-11-2006
			US 2006260249 A1	23-11-2006
			US 2006272263 A1	07-12-2006
			US 2007094986 A1	03-05-2007

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 12 15 1306

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.

16-05-2012

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		US 2008053027 A1	06-03-2008
		US 2008053028 A1	06-03-2008
		US 2008060309 A1	13-03-2008
		US 2008060310 A1	13-03-2008
		US 2008060311 A1	13-03-2008
		US 2008066416 A1	20-03-2008
		US 2010319292 A1	23-12-2010
		US 2011023405 A1	03-02-2011

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- WO 2006037977 A [0005]
- US 7658048 B [0035]