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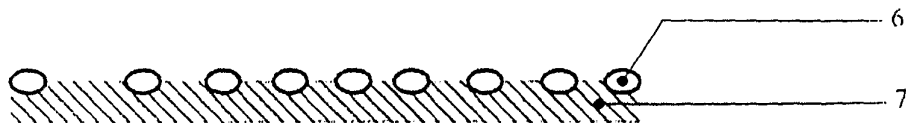
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[Fortsetzung auf der nächsten Seite]

(54) Title: DECORATIVE WOOD MATERIAL SHEET AND METHOD FOR PRODUCTION THEREOF

(54) Bezeichnung: DEKORATIVE HOLZWERKSTOFFPLATTE UND VERFAHREN ZU IHRER HERSTELLUNG



(57) Abstract: The invention relates to a preferably sheet-like manufactured wood material for furniture and interior construction, offering attractive decorative alternatives to conventionally applied finishings in numerous possible variations. The aim of the invention is to economically produce wood material sheets for decorative purposes without additional facings or without complicated coloured treatments, wherein wood material sheets of basic known construction are single-sidedly or double-sidedly provided with a surface particle or fragment coating of foreign materials which define the surface structure such that the foreign materials under a protective layer have an uneven separation from each other, covering more than 10 % of the sheet surface. The foreign materials, preferably natural materials such as cork or hemp cuttings, but also plastics, metal particles or recycling materials are arranged either such as to extend beyond the surface of the sheet in a relief pattern or form a smooth single sheet surface with the wood material. An example of the relief pattern structured material is shown in fig. 6.

(57) Zusammenfassung: Die Erfindung betrifft einen bevorzugt plattenförmig konfektionierten Holzwerkstoff für den Möbel- und Innenausbau, der in vielfältig möglichen Variationen reizvolle dekorative Alternativen zu konventionell verwendeten Veredelungen bietet. Aufgabe der Erfindung ist es, Holzwerkstoffplatten für dekorative Zwecke ohne zusätzliche Verblendungen bzw. ohne aufwändige Farbbehandlungen kostengünstig herzustellen. Erfindungsgemäß ist vorgesehen, dass Holzwerkstoffplatten mit grundsätzlich bekanntem Aufbau einseitig oder beidseitig oberflächlich partikelförmige oder kleinteilige Fremdmaterialien aufweisen, die ihre Oberflächenstruktur dadurch bestimmen, dass die unter einer Schutzschicht liegenden Fremdmaterialien ungleichmäßig zueinander beabstandet sind, wobei sie mehr als 10 % der Plattenoberfläche bedecken. Die Fremdmaterialien, bevorzugt Naturstoffe wie Kork oder Hanfschäben, aber auch Kunststoffe, Metallpartikel oder Recyclingmaterialien sind so eingebracht, dass sie zum einen reliefartig aus der eigentlichen Plattenoberfläche herausragen oder dass sie mit dem Holzwerkstoff eine einheitliche glatte Plattenoberfläche bilden. Eine Ausführung der reliefartig strukturierten Holzwerkstoffplatte zeigt Fig. 6.

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state as follows:-

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2. To the best of my knowledge and belief the attached document is a true and correct translation into English made by me of:

International Patent Application No. PCT/DE 2006/001248

Dated this 2nd day of January 2008

Gerhard Kopprasch
(Signature of translator)

Decorative Wood-Based Board Panel and Method of Panel Production

The invention relates to a preferably panel-like, manufactured wood-based material
5 for furniture and interior construction offering attractive, decorative alternatives to
conventionally applied finishings in numerous possible variations.

In addition to solid wood, glass and steel, wood-based material such as particle
board, oriented strand board (OSB), or board featuring a homogeneous structure in
10 all directions and known as high-density fibre board (HDF) or medium-density fibre
board (MDF), is the material in widest use in furniture and interior completion work
but also for fair, scenery and shop equipment as well as building construction
purposes. Usually such panels, which contain wood shavings or wood fibres or both,
are produced by means of a dry method in which binders are added the type of which
15 depends on the intended use. By adding special additives, the materials may be
imparted properties like reduced water absorption and thus reduced thickness
swelling, low flammability and/or a certain resistance to biological parasites and
environmental damage.

20 In contrast to these application-specific advantages, especially particle board and
medium-density fibre board panels have a distinctly unattractive surface so that they
are usually faced or coated with other materials, preferably veneers, plastics and
varnishes. Recently, producers succeeded in making fully imbued MDF that features
a very good reproducibility of all quality parameters (see on the Internet: Masterwood
25 black, *Hornitex*; TOPAN black/brown, *Glunz*; TOPAN colour FF, *BASF/Glunz*). The
melanine resin coated *Hornitex* product „M.D.F. Masterwood black“, for example, is
considered a full substitute for solid wood and base material for direct varnishing,
foiling, coating, encasing and veneering, with the proper bonding between foil and
melamine now being ensured from the front and rear faces up to the corpus, edge
30 and layer material.

However, the imbued MDF can meet the architects' and designers' requirements for
showing the existing material texture without any subsequent decorative coating and
letting the material take effect by itself, to a limited degree only; in this respect, major
35 progress has recently been made with the OSB panels introduced in Europe in the

early nineties. These multi-layer panels, consisting of 12 cm long, thin, longitudinally oriented strands of a pre-defined form and thickness, are characterized in that they do not only have a higher bending strength as compared to standard flat pressed boards (particle boards) but also a characteristic appearance which is due to the bonding and strand structure. Owing to its "woody" appearance, the typical OSB structure (large-sized structure of the wood shavings) is appreciated as a decorative element.

Furthermore, OSB panels can now be produced with their surfaces dyed (see on the Internet: Agepan OSB colour, *Glunz*; Eurostrand OSB Dekorativ, *Egger*). By applying a number of special UV varnish layers (*Eggers*: eight layers), the entire surface is uniformly covered to an intensity allowing the chosen colour to bring forth the intended effect on the one hand, but without blotting out the arbitrary beauty of the long strands on the other. The natural characteristic of the board material will, however, only take the desired effect if the strands are light-coloured.

US patent 4,109,041 describes a construction panel in which elastomeric particles, preferably rubber grindings and buffings produced in vehicular tire manufacturing and recapping operations, are incorporated into at least one surface of particle board panels. Although it is the objective of the invention to increase the surface friction of the panels so that they can be stacked without any problems, tools can be safely placed on the panels, and workmen do not slip on them, the addition of elastomeric particles also creates (unintentionally) a new, decorative construction panel that differs from the conventional structure of particle board panels. In this context, it is an essential factor that the surface of the construction panel is smooth and, in particular, that the elastomeric particles are uniformly distributed. Thus this "decorative" panel, which was exclusively developed for use as a construction panel with a non-skid property, can by no means meet the above-mentioned requirements for a decorative wood-based panel intended for furniture and interior construction purposes.

Furthermore, US patent 3,887,415 discloses a wood-based panel which has a protective layer made of bark shavings. Its surface is harder than the natural, weather-worn bark of a tree and gives the panel a veined and structured surface with a decorative appearance. It is of importance to the invention that the bark shavings

are bonded under pressure to form a single layer of material which is then ground to remove any projections. As a whole, due to the fact that the process comprises two stages, the effort required to make such a panel is comparatively high, so that this proposal remained on the paper and has not been translated into practice.

5

Thus, in the case of decorative unfaced wood-based panel products, the state of the art is in practice characterized by dyeing the surface when it comes to OSB panels, and by imbuing board in a single colour when it comes to MDF panels; despite their advantages, the two methods are expensive and costly. Unfaced wood-based panel materials featuring a decoratively structured surface that would exceed the (moderately satisfactory) effects achieved by means of light-coloured strands, are not known. The solutions described in the above-mentioned US patents either do not satisfy the aesthetic requirements because they were developed for other purposes (4,109 041) and permit a bark-type decoration only (3,887,415), or are technologically very costly.

15

Therefore, it was the objective of the invention to sustainably improve the decorative properties of unfaced wood-based panels; in particular, the task consisted in developing a comparatively cost-effective method.

20

This task is solved by the features referred to in claims 1 and 12; for the practical implementation of the invention see claims 2 to 11 and 1 to 16, respectively.

25

According to the invention, the wood-based panel manufacturing process begins with the spreading or inserting of foreign material into or onto the uppermost particle or fibre fleece material layer before the panel is pressed so that the panel formation process, which is based on the well-known technology, results in a decorative panel surface. Depending on the material used, the panel surface structure so obtained is given a relief pattern, or is smooth. For the relief pattern, materials are used that are highly resilient; in the other case, materials are chosen which are not, or negligibly, resilient. According to the invention, the panel can be provided with the described decorative structure on one side or on both sides. To the inventor's surprise, almost all of these foreign materials have proved to be usable without any adhesives and have good bonding properties in the panel material.

30

Furthermore, the invention provides that these foreign materials are covered by a transparent protective coat, e.g. clear varnish (liquid paint, scumble, powder coat, dry coat).

5

Preferably, the foreign material is a natural material - cork, for example, is used to obtain a raised texture, whereas hemp shives may be used to get a smooth panel surface.

10 With regard to a pleasant appearance and optimum technical characteristics, a good bonding strength can also be easily achieved with other natural materials such as straw, tree needles, natural fibres and imbued OSB strands. Leaves, twigs, branches and wool, too, offer certain advantages.

15 It is another objective of the invention to use plastics, metal or recycled material as foreign materials, for instance granular plastics, metal powder, metal foil, metal chippings, or paper in the form of hole-punch residue.

The board material so produced has a highly decorative, structured surface which
20 makes it especially suitable for imposing and/or natural applications as referred to at the beginning (in particular, furniture production and interior finishing purposes).

Two embodiments of the invention will be described below in more detail. In this context,

25

- Figs. 1 to 3 show the manufacture of a decoratively structured particle board panel with a smooth surface, and
- Figs. 4 to 6 show the manufacture of a decorative MDF panel with a relief-type surface.

30

In the first embodiment, a particle fleece is formed of wood shavings and adhesive in a process that has been applied for a long time in industry. According to the invention, evenly and deeply dyed hemp shives are distributed over the upper surface of that particle fleece.

Thereafter, the particle fleece inclusive of the applied imbued hemp shive particles is first pre-compacted at ambient temperature and then fed to a hot press. In the press, the structured wood-based material is subjected to a conventional hot press process.

5 In dependence of the desired board thickness, raw density and properties, the particle fleece with the incorporated dyed hemp shive particles are compressed at defined pressures and temperatures, whereby the glue-free hemp shive particles are cross-linked with the particles to which glue was applied.

10 After the hot pressing process, the board so produced is conditioned in a stack, then ground and sealed with clear varnish.

The finished particle board panels have on one side a colour-structured, attractively decorated and smooth surface, and are immediately ready for use after the

15 application of the protective coat.

Figures 1 to 3 depict the incorporation of non-resilient decorative particles 1 - here in the form of hemp shives, the particle fleece 2 - here in the form of wood shaving particles, the upper pressed surface 3, the lower pressed surface 4, the smooth
20 board surface 5, and the manufacturing sequence.

In the second embodiment, which is also based on the conventional process traditionally applied in industry, the first step is making a fibre mat of wood-based material to which glue is applied.

25

In accordance with the invention, coarse granular cork material is evenly spread over the upper surface of the fibre mat. Thereafter, the fibre mat and applied granular cork material are first pre-compacted at ambient temperature and then fed to a hot press where they are compressed in a way analogous to that described above, and where
30 the preferably glue-free cork particles are cross-linked with the wood shavings to which glue was applied.

Following the hot pressing process, the boards so produced are stacked and conditioned.

When the press is opened, the granular cork particles, due to the high elasticity of cork and its resultant high resilient capacity, return to their original form to a great extent, and consequentially protrude from the otherwise plane board. The particle
5 board so produced has a structured, attractive, decorative surface with a relief pattern on one side, and is immediately ready for use after the application of a protective coat - here, too, preferably a clear varnish.

Figures 4 to 6 depict the described construction of, and manufacturing process for,
10 the decorative panels of the invention. In detail, the panel construction comprises the particle fleece 2 - here a wood fibre mat, the upper pressed surface 3, the lower pressed surface 4, the resilient decorative particles 6 - here in the form of cork, and finally the panel 7 featuring a relief pattern.

15 **List of reference designations used**

- 1 Non-resilient decorative particles
- 2 Particle fleece
- 20 3 Upper pressed surface
- 4 Lower pressed surface
- 5 Plane board surface
- 6 Resilient decorative particles
- 7 Relief-patterned panel

25 **Summary**

The invention relates to a preferably panel-like, manufactured wood-based material
30 for furniture and interior construction offering attractive, decorative alternatives to conventionally applied finishings in numerous possible variations. It is the objective of the invention to cost-effectively produce wood-based board panels for decorative purposes without using additional facings and without costly dyeing processes. According to the invention, the surfaces of wood-based board panels of basically
35 known construction are provided on one or on both sides with particle- or small-sized

foreign materials which define the surface structure such that the foreign materials are irregularly distributed under a protective layer and cover more than 10% of the panel surface. The foreign materials, preferably natural materials like cork or hemp shives, but also plastics, metal particles or recycling material, are incorporated in a way that they either protrude from the panel surface proper to form a relief pattern, or are embedded in the wood-based material to form a uniform, smooth panel surface. An embodiment of a relief-patterned wood-based panel is depicted in Fig. 6.

Claims

1. Decorative wood-based panel of basically known construction, whose surface is provided on one or on both sides with particle- or small-sized foreign materials
5 which define the surface structure and are covered by a transparent protective coat, characterized in that the foreign materials are not fire retardant, are irregularly distributed relative to each other, and cover 10% to 75% of the panel surface, whereby the foreign materials are embedded exclusively in the uppermost material layer of the panel which is produced by means of a primary forming process.
10
2. Wood-based panel according to Claim 1 characterized in that the protective layer is a clear varnish coat.
3. Wood-based panel according to Claims 1 and 2 characterized in that the
15 foreign materials protrude in form of a relief pattern from the panel surface proper.
4. Wood-based panel according to Claims 1 and 2 characterized in that the foreign materials are incorporated in the panel material such that they form a uniform, smooth panel surface.
20
5. Wood-based panel according to Claims 1 to 4 characterized in that the foreign materials are natural materials.
6. Wood-based panel according to Claims 1 to 4 characterized in that the foreign
25 materials are plastic materials.
7. Wood-based panel according to Claims 1 and 2, and/or 3, 4 and 5, characterized in that straw and/or strands of various fractions, leaves, tree needles, twigs, branches or wool are used.
30
8. Method for producing a decorative wood-based panel characterized in that the basically known manufacturing process comprises the spreading or inserting of non-fire retardant, particle- or small-sized, natural or plastic foreign materials onto or into the uppermost particle or fibre fleece material layer before the panel is pressed so

that the panel formation process results in a decorative panel surface, whereby the foreign materials are irregularly distributed relative to each other, cover 10% to 75% of the panel surface, and are embedded exclusively in the uppermost layer of the panel.

5

9. Method according to Claim 8 characterized in that foreign materials of a high resilience are used for producing a relief-patterned surface structure.

10. Method according to Claims 8 and 9 characterized in that cork is used as the
10 foreign material.

11. Method according to Claim 8 characterized in that foreign materials of no resilience at all, or of a negligible resilience, are used for producing a smooth surface structure.

15

12. Method according to Claim 11 characterized in that deeply dyed hemp shives are used as the foreign material.

13. Method according to Claims 8 to 12 characterized in that the foreign materials
20 are spread or inserted into the wood-based panel on both sides of the panel.

14. Method according to Claims 8 to 13 characterized in that the wood-based panel surface is provided with a transparent protective coat after the panel has been conditioned.

25

15. Method according to Claim 8 or one of the above claims characterized in that the foreign materials are glue-free when embedded.

16. Method according to Claim 8 or one of the above claims characterized in that
30 glue is applied to the foreign materials before they are embedded.

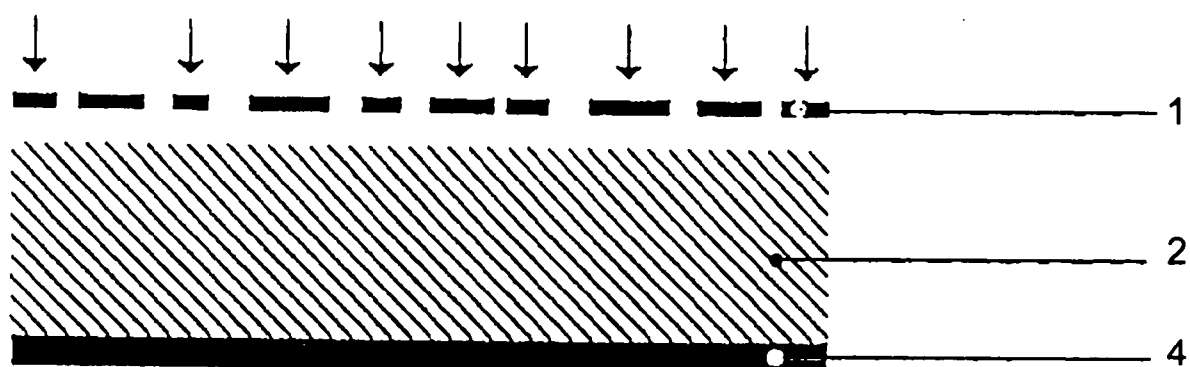


Fig. 1

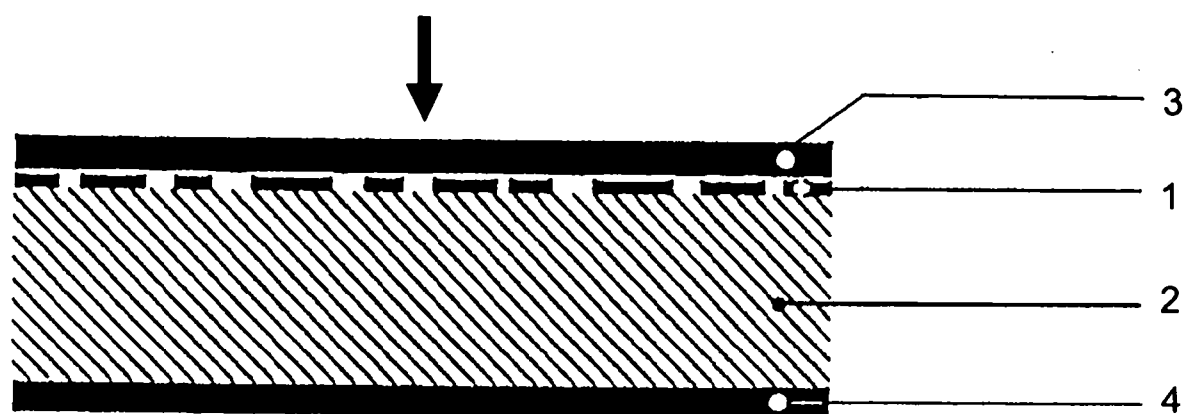


Fig. 2



Fig. 3

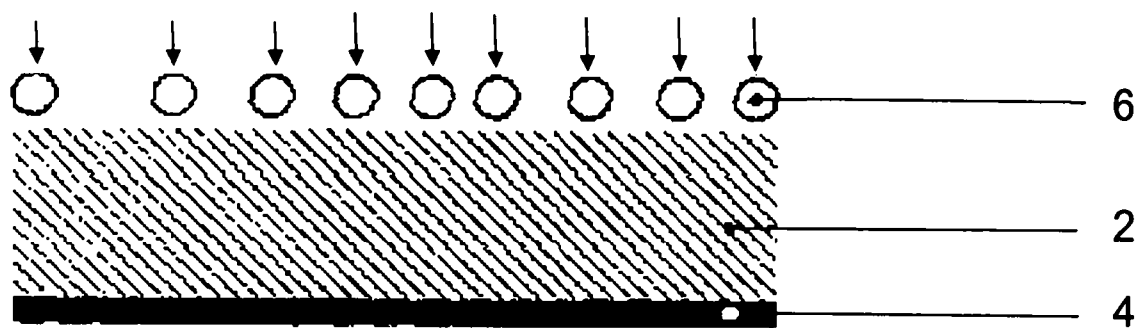


Fig. 4

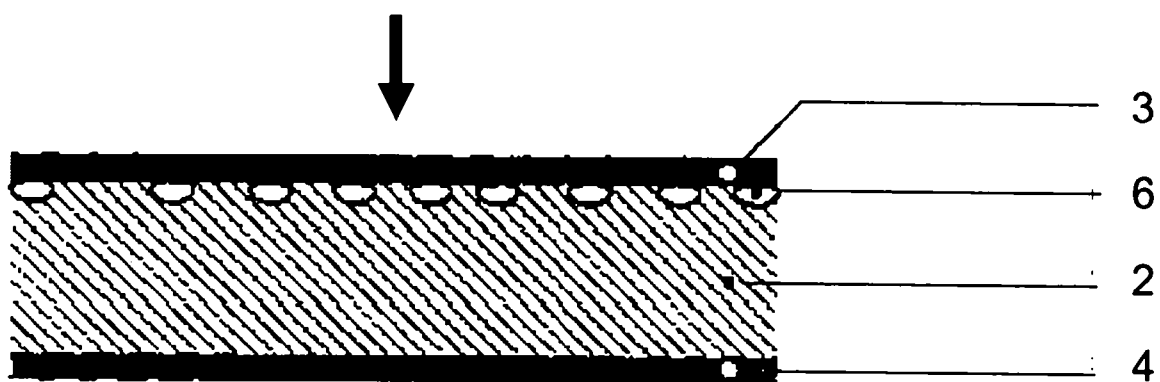


Fig. 5



Fig. 6