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(54) Board material on the basis of wood.

(57) Board material, wherein said board material substantially is composed of wood fibers which are bonded by means of a polycondensation glue, wherein the polycondensation glue forms 5 to 20 percent by weight of the board material, characterized in that said wood fibers are formed for at least 40 percent by weight from recycled wood and the board material shows an average density of 300 to 600 kilograms per cubic meter.

EP 2 374 588 A1

Description

[0001] This invention relates to board material, in particular to a wood-based board material.

[0002] More particularly, the invention relates to board material of the type which substantially is composed of wood fibers, which are bonded by means of a polycondensation glue and wherein the polycondensation glue forms 5 to 20 weight percent of the board material. Such board material is widely known as such, for example, from DE 102 32 874 B4 or DE 10 2007 012 691 A1. From this last-mentioned document, also board materials of the above-mentioned type are known, wherein these board materials moreover show a low density, namely, boards having a density between 100 and 600 kilograms per cubic meter. In the traditionally known wood fiberboards (MDF, HDF), wood fibers are applied which are derived from newly felled wood. Such wood is relatively expensive and, although this wood nowadays originates from certified woods or plantations, the environmental impact still is larger than desirable. In particular, this environmental impact is due to felling and transporting this new wood. From DE 10 2007 012 691 A1, it is not known whether the boards having a density between 100 and 600 kilograms per cubic meter are suitable for manufacturing decorative board material. The document does not mention mechanical properties, such as tensile strength and splitting strength. Probably, the low-density boards rather are intended as a filling material, for example, for doors.

[0003] In the meantime, it is known from DE 28 11 833 to use fibers originating from tree bark or waste paper for manufacturing fiberboards with high density, namely, with a density of more than 850 kilograms per cubic meter. From this document, it is also known adding to the fiber mixture, apart from the aforementioned fibers, wood dust obtained from processing wood particle boards. The use of wood dust, however, implicates a high risk of surface defects. A high number of surface defects is inacceptable at the surface of a decorative board, which, for example, is provided with a laminate layer. Namely, such surface defects may lead to air inclusions, or so-called porosity or milkiness, in the synthetic material of the laminate layer; and such in particular in so-called DPL laminate layers (Direct Pressure Laminate). Notwithstanding their high density and thus high cost price, there is a high risk that these boards are not usable in applications having a high added value, such as in an application as a furniture panel or other decorative board material. DE 28 11 833, however, states that boards having interesting surface properties can be achieved when practically the entire part of lignocellulose material consists of bark and waste paper, thus, without wood dust. According to DE 28 11 833, it is started from fibers obtained from the bark of softwood or pine wood, namely, fir wood. The use of bark as such leads to the occurrence of color differences in the obtained board material, which is undesirable. It is also known that the use of bark may lead to the occurrence of bark inclusions in the surface of the board. These are undesirable, for example, when the surface of the board is to be lacquered. Occasionally, the use of pine wood or soft wood may lead to boards having an annoying smell. This phenomenon is known as hydrolysis.

[0004] From US 3,741,863, it is known to use cellulose fibers from communal waste for manufacturing wood fiberboard. The communal waste concerned substantially consists of paper and cardboard.

[0005] Further, it is known to manufacture wood particle board on the basis of at least one fraction of waste wood. Herein, the waste wood is purified from non-wood materials, wherein a residual fraction of non-wood materials may stay present. The purified waste wood then is broken and processed into chips, which, together with polycondensation glue, are composed, this means, compressed, to a wood-based board material. The obtained wood particle board shows a high risk of surface defects. These surface defects may occur by the migration of internal non-wood dust particles towards the surface. However, wood particle boards are much cheaper than the traditional MDF or HDF boards (Medium Density Fiberboard or High Density Fiberboard). In order to restrict the migration of non-wood dust particles to the surface to a certain extent, a thin layer of smaller wood chips, exclusively obtained from newly felled wood, can be applied at the exterior sides of the board. Such board can be provided with an acceptable laminate layer. However, providing milled profiles extending into the depth of the board material and having an acceptable quality remains impossible.

[0006] The present invention primarily relates to an alternative board material, which, according to different preferred embodiments thereof, moreover can offer a solution to the problems with the boards of the state of the art. For example, the board material of the invention may lead to a smaller environmental impact and/or a board material having a low weight, which can be provided with a laminate layer and/or milled profiles in an acceptable manner and still has a limited cost price.

[0007] To this aim, the invention relates to a board material of the above-mentioned type, with as preferred characteristics that said wood fibers are derived for a part, for example, for at least 20 or even for at least 40 percent by weight, of recycled wood and/or that the board material has an average density of 300 to 600 kilograms per cubic meter. Herein, this relates to a wood fiberboard which is manufactured according to the so-called dry process. Preferably, the board material of the invention essentially consists of wood fibers bonded by polycondensation glue.

[0008] Up to the present, amongst others, on the basis of the experiences with wood particle boards, it was assumed that the use of recycled woods for manufacturing wood fiberboards, wherein this recycled wood had been cleaned and fiberized up to the level which is useful for manufacturing such wood fiberboards, held various risks for the machinery and might lead to the occurrence of an

inacceptable high number of surface defects. It was thought that the migration of possible non-wood materials towards the surface possibly, amongst others, might cause damages to the press belts and that such migration might render the board unusable as a substrate for decorative board material. Those skilled in the art are acquainted with the difference between particles or chips and fibers; nevertheless, the inventors surprisingly found that in relation thereto, the geometry of fibers holds various advantages compared to the geometry of particles or chips. Namely, the fibers are very mobile and flexible; in this manner, during pressing, they can completely encapsulate a possible impurity, such that the risk of the occurrence of surface defects can be minimized. The restriction of such risk automatically leads to a restriction of the risk of damaging the press device. Preferably, an average fiber length is used which is situated between 1 and 3 millimeters and still better is situated between 1.5 and 2 millimeters.

[0009] Preferably, possible residual impurities remain relatively small, preferably their average diameter is smaller than 2 times the average fiber length of the applied fibers, or still better smaller than one and a half times this average fiber length. With the diameter of the residual impurities, the largest dimension of such residual impurity is meant.

[0010] The above-described risks can be limited further when the average density of the board material is restricted, for example, up to less than 600 kilograms per cubic meter. In such case, the applied pressure can be diminished, and the risk of migration is lower. Moreover, the above-described encapsulations of possible impurities become much more effective. Preferably, the average density of the board material is minimum 300 kilograms per cubic meter, such that this board material can be applied otherwise than solely as a filling material.

[0011] When combining the above preferred characteristics, a board material can be obtained which shows a fine, uniform and closed surface. Moreover, a board can be obtained which also in its bulk material is free from air inclusions or other holes, such that, when sawing or milling such board, a closed surface will always be maintained. Such closed lateral surfaces are of interest, for example, when the board material finally will serve as a substrate for a furniture panel or other decorative material. Namely, the homogenous lateral surfaces simplify finishing these edges or lateral surfaces with a laminate, or other tape material, for example, so-called ABS edge finishing tape.

[0012] When at least 40 percent by weight of the board material consists of fiberized recycled wood, moreover an environmentally friendly and economically interesting board material is obtained. Thus, it is possible to obtain the beneficial properties of traditional wood fiberboard (MDF or HDF), such as the possibility of providing them with pure laminate layers and/or milled profiles, at economical conditions which can be compared to those of wood particle board. Still better, at least 50 or at least 65 percent by weight of the board material consists of fiberized recycled wood. The inventors do not exclude that the entire weight of wood in the board material may consist of fiberized recycled wood.

[0013] Preferably, the board material has a homogenous composition throughout the thickness. This means that the wood fiber mixture, the polycondensation glue, as well as the amount of polycondensation glue in respect to the amount of wood remains unaltered throughout this thickness. However, it is possible that the board material has a different density at the surface compared to the density internally in the board material. Herein, a density profile similar to the typical density profile of a traditional MDF or HDF board can be obtained, namely, with peak densities next to both surfaces which are 110%, 120% or even more of the average density. Of course, such surfaces of high density, if desired, can be removed on one or both sides of the board material, for example, by means of a sanding operation.

[0014] According to a variant, the board material of the invention in fact may form a central layer of a thicker board material, which then, for example, at one or both sides, shows a layer which is free from recycled wood, or at least contains less recycled wood than the central layer. For example, these surface layers substantially can be composed of fiberized newly felled wood, which is bonded by means of polycondensation glue. However, the invention is intended in particular for boards which entirely consist of the board material of the invention. From an economical and environmental point of view, such boards are most interesting.

[0015] Preferably, the wood part of said board material comprises a mixture of softwood and hardwood. Both wood species have their own specific advantages. Generally, softwood has a thinner fiber, which is more compressible in radial direction than the fiber of hardwood. The thinner fiber of softwood leads to a more homogenous board, whereas the less compressible fiber of hardwood leads to a more dimensionally stable board material. By choosing the mixing ratios between softwood and hardwood, these respective properties can be chosen. Dimensional stability is of interest when the board material is to be applied for providing a laminate layer thereon by means of a press treatment. The mixing ratio preferably is chosen such that the possible reduction of the thickness of the board material when laminating preferably is less than 1 millimeter and still better less than 0.5 millimeters, and such with pressures exerted by the laminate press device up to 20 bar or even with pressures up to 40 bar.

[0016] Preferably, the aforementioned wood fibers consist for at least 24 percent by weight and still better for at least 40 percent by weight of hardwood. Herein, this may relate to the wood fibers originating from the recycled wood material as well as the wood fibers originating from a possible fraction of newly felled wood. Preferably, the fraction of newly felled wood substantially consists of softwood. Softwood mostly is fast-growing and

more readily available. Newly felled hardwood has applications with more added value in the manufacture of furniture. Therefore, the usually more expensive hardwood fibers better can be distilled from waste wood in a more economic manner.

[0017] Preferably, the aforementioned wood fibers consist for at least 25 percent by weight of fibers obtained from wood having a specific weight situated between 350 and 600 kilograms per cubic meter, measured at 12% moisture content, or still better of less than 500 kilograms per cubic meter. Herein, this may relate to the wood fibers originating from recycled wood material as well as to the wood fibers originating from a possible fraction of newly felled wood. By using a fraction of light-weight wood fiber, a homogenous board of low density, for example, a density of 550 kilograms per cubic meter or less, can be achieved in a reliable, stable manner. Preferably, less than 25 percent by weight of the fibers is obtained from wood with a specific weight higher than 700 kilograms per cubic meter, and still better less than 50 percent by weight of the fibers is obtained from wood having a specific weight higher than 600 kilograms per cubic meter.

[0018] Preferably, the aforementioned polycondensation glue relates to a urea formaldehyde resin containing between 1 and 10 percent by weight of melamine. The inventors have found that the use of melamine in a polycondensation glue leads to a stable production process and a higher waterproof quality, such as reduced swelling, of the obtained board material. Preferably, between 2 and 4 percent by weight of melamine is applied.

[0019] Preferably, the aforementioned polycondensation glue relates to a urea formaldehyde resin having a mol ratio U:F situated between 1:1 and 1:1.4, and still better situated between 1:1.05 and 1:1.15. By using low mol ratios, the presence of free formaldehyde in the board material can be restricted.

[0020] Preferably, the aforementioned polycondensation glue contains between 0.3 and 1.5% of hardening agent, for example, ammonium sulfate, ammonium chloride, ammonium nitrate or another salt which reacts acidic and acts as a catalyst for the polycondensation reaction of said glue.

[0021] Preferably, said polycondensation glue contains a paraffin emulsion in such a quantity that a paraffin concentration of 0.3 to 2 parts by weight of paraffin per hundred parts by weight of wood fibers is obtained. Such paraffin concentration can also be obtained in other manners than by blending a paraffin emulsion into the polycondensation glue. The suggested paraffin concentration leads to a better waterproof property of the obtained board material. In particular the possible swelling of the board material as a result of water penetration is restricted hereby.

[0022] Preferably, the aforementioned polycondensation glue comprises lignosulphonate, for example, up to 10 percent by weight or more. Lignosulphonate is a waste product of the paper industry, which may serve as a replacement for resin. The use of lignosulphonate means a further cost price optimization.

[0023] According to a variant, the aforementioned polycondensation glue, apart from the possibility of urea formaldehyde (UF) and melamine urea formaldehyde (MUF), can also be chosen from the list of melamine formaldehyde (MF), phenol formaldehyde (PF) and diphenyl methane diisocyanate (MDI). These alternatives, however, are more expensive variants, which in fact possibly may lead to still better mechanical properties.

[0024] According to a preferred embodiment, the aforementioned board material, apart from said polycondensation glue, can comprise more than 0.5 percent by weight of non-wood materials, however, preferably less than 5 percent by weight. The inventors have found that such quantity of non-wood materials still leads to an acceptable surface quality. Such non-wood materials are, for example, residual impurities of the purified recycled wood. This may relate, for example, to metal particles or synthetic material particles. This tolerance for impurities represents the requirements which can be established for the purification of the waste wood. As still a relatively high percentage of residual impurities can be permitted, the purification of the waste wood remains economically and technically feasible. Preferably, the board material contains between 0.5 and 2 percent by weight of such non-wood materials. Such quality can be obtained by having the waste wood cleaned several times, for example, twice, by a traditional purification installation for wood particle boards. Preferably, the majority of such residual impurities consists of synthetic material particles. These interfere the least with the production process and also are the least interfering during the use or the processing of the final board material. Preferably, the final board material has 1 or less defects per square meter at its surface, which defects originate from the presence of such residual impurities.

[0025] Preferably, for the recycled wood waste wood is used, which is contaminated with non-wood materials. The non-wood materials may be, for example, laminate layers or other decorative layers, or attachment means, such as screws, or synthetic material parts, such as seals and fittings. Such waste wood is cheap and can be purified sufficiently in order to be fiberized.

[0026] Preferably, the board material shows a splitting strength of more than 0.7 Newton per square millimeter and/or a tensile strength of more than 0.25 Newton per square millimeter. Such mechanical properties can be obtained by an appropriate dosing of the polycondensation glue and/or by applying an appropriate wood mixture. As also described above, to this aim preferably melamine is applied in the polycondensation glue (for example, UF) and preferably at least a fraction of hardwood is applied. Further, also a more restricted dimension of possible residual impurities leads to better mechanical properties. Preferably, the above-mentioned values are applied for the average diameter of such impurities. Preferably, the board material is free from residual impurities having an average diameter which is larger than 3 times the aver-

age fiber length.

[0027] Preferably, the board material is provided with a sanded surface. Preferably, the surface is sanded with grain 100, 120 or more. Such sanding operation ensures that possible unevennesses at the surface are removed.

[0028] Preferably, the board material of the invention shows a thickness situated between 10 and 30 millimeters, still better between 12 and 25 millimeters.

[0029] A particularly interesting board material is created when the following characteristics are combined:

- the board material is essentially composed of wood fibers, which are bonded by means of a polycondensation glue;
- the board material shows a homogenous composition throughout its thickness, wherein, however, possible density differences may arise;
- the polycondensation glue forms between 10 and 20 percent by weight of the board material;
- the polycondensation glue is an urea formaldehyde resin, to which between 2 and 5 percent by weight of melamine have been added;
- the aforementioned wood fibers are for at least 40 percent by weight derived from recycled waste wood, wherein said recycled waste wood comprises non-wood materials and wherein the possible other wood fibers are derived for at least 50 percent by weight from newly felled wood having a specific weight situated between 350 and 600 kilograms per cubic meter;
- the board material has an average density between 450 and 575 kilograms per cubic meter;
- the board material shows a closed uniform surface with less than 1 defect per square meter as a result of residual impurities;
- the board material has a thickness between 10 and 30 millimeters;
- the average diameter of possible residual impurities is smaller than 2 times the average fiber length of the applied wood fibers.

[0030] Further, the invention also relates to a decorative board material, with the characteristic that this comprises at least a board material as described above and a decorative layer on the basis of synthetic material, such as a laminate layer or a lacquer layer or a primer foil, provided on top thereof. As explained above, surprisingly it has been found that a board material comprising a fraction of fiberized waste wood still can have a sufficiently low number of surface defects in order to serve as a substrate for a decorative board material.

[0031] Said laminate layer preferably comprises a sheet or decor sheet provided with a thermo-hardening resin, for example, a printed and/or colored decor paper, which is adhered to the surface of the board material by means of a press treatment. Preferably, said laminate layer consists of only one sheet provided with resin. Even in such thin laminate layers, still a good result is obtained. Preferably, the decorative board material relates to a so-called Direct Pressure Laminate, wherein the resin of the decor sheet substantially hardens only in the press treatment by which this sheet is adhered to the board material. The adherence to the board material preferably is also obtained by the thermo-hardening resin which is present on the decor sheet. Preferably, in the same press treatment also a similar laminate layer is realized on the other side of the board. When the laminate layer consists of a plurality of sheets, for example, paper sheets, whether or not all provided with resin, the mutual adherence between these sheets preferably is also obtained in the same press treatment, such that here, too, a Direct Pressure Laminate is concerned.

[0032] It is not excluded that a High Pressure Laminate (HPL) should be applied for the laminate layer, or that, such as with HPL, however, here in general, still one or more intermediate layers would be present between the decor sheet and the board material. The use of such intermediate layers leads to masking of possible remaining surface defects, or defects created by migration of internal impurities. By HPL, a decorative board material with a laminate layer is meant, wherein the laminate layer is formed separately by consolidation of a plurality of paper layers, amongst which a decor sheet, and the obtained laminate board is glued on the substrate of the board material in a separate step.

[0033] In the case of a lacquer layer, preferably at least a layer with filling material is applied as a primer layer.

[0034] Further, the invention also relates to a panel for a piece of furniture, with the characteristic that this panel or furniture panel is obtained starting from a board material having the characteristics of the invention, and that this furniture panel is provided with milled profiles, which extend in the depth of the board material. As also explained above, the board material of the invention can be made sufficiently homogenous in order to allow such milled-in profiles. Moreover, the homogenous implementation enables the finishing of lateral surfaces by means of edge finishing tape of laminate, PVC or ABS.

[0035] Further, the invention also relates to a method for manufacturing board material, preferably the board material of the invention, with the characteristic that this method comprises at least the following steps:

- purifying waste wood, which comprises non-wood materials;
- producing fibers or fiberizing purified waste wood;
- providing said fibers with polycondensation glue;
- strewing a mat consisting at least of a fraction of said glue-provided fibers, preferably of at least 20 or even at least 40 percent by weight of such fibers; and
- compressing said mat.

[0036] Preferably, the aforementioned cleaning is performed until the weight percentage of non-wood materials is less than 5 percent by weight and still better is less than 2 percent by weight. Preferably, herein a double

purification cycle is applied. This means that the wood particles and impurities are treated at least two times in each of the respective devices for removing ferromagnetic metal, non-ferromagnetic metal, synthetic material, small stones. Of course, to this aim use can be made of two or more separate purification devices. It is clear that for performing said purification, the waste wood preferably is cracked into rough chips or flakes.

[0037] In the case that the board material also comprises fibers which are obtained from newly felled wood, this newly felled wood can be fiberized simultaneously with and in the same installation as the fibers of the waste wood, namely, in the same so-called refiner. The mix between newly felled wood and waste wood thus preferably is made before the fibers enter this device.

[0038] In that same case, both types of fibers preferably are glue-treated in the same device and/or with a same type of polycondensation glue, for example, both with MUF glue. Preferably, both types of fibers are glue-treated with a polycondensation glue of identical or approximately identical formulation. Preferably, said glue treatment takes place in the so-called blowline, wherein the fibers are transported by means of air through a tubular conduit and the polycondensation glue is injected into this conduit.

[0039] The strewing of the fibers either can be performed homogenously over the height of the mat, or in a plurality of layers. In the case of, for example, at least three layers, in the lower and upper layers one may work with a smaller fraction of fibers originating from waste wood, or without such fibers. It is possible to control the obtained mat for the presence of possible impurities at the surface thereof, for example, by means of sensors and appropriate information-processing software, such as by means of cameras and suitable image processing. When such impurities are detected, for example, automatically a part of fibers can be scraped from the mat and strewn on additionally afterwards. The removal of the fibers can be performed by means of a roller.

[0040] Compressing said mat preferably is performed in two stages, wherein in a first stage a pre-compression of the mat is performed, in which substantially air is pressed out of the mat without heating it to a considerable extent, and wherein in a second stage, compressing and heating is performed and the polycondensation glue solidifies. Both stages preferably are performed in a continuous press. According to a deviating variant, the invention in an independent manner also relates to a board material, wherein this board material substantially is composed of wood fibers bonded by means of a polycondensation glue, wherein the polycondensation glue forms 5 to 20 percent by weight of the board material, with the characteristic that the board material shows an average density of 300 to 600 kilograms per cubic meter and the board material further shows a provided thereon decorative layer on the basis of synthetic material, such as a laminate layer or a lacquer layer, or a primer foil provided thereon. Preferably, this relates to a layer on the basis of paper, such as primer paper, provided by means of a resin treatment. It is clear that the board material according to this deviating variant does not necessarily comprise wood fibers which are derived from recycled wood. On the contrary, the wood fibers can be derived for more than 70 percent by weight or even entirely from fiberized new felled wood.

[0041] The combination of a board material with a light weight and a layer provided thereon offers the interesting synergetic effect that a practical do-it-yourself board material can be offered, which can be finished in a simple manner and which is ergonomic in trade and use. Moreover, possible surface defects at the surface of the actual board material are smoothed out at least partially or otherwise concealed by means of the aforementioned layer. Also further finishes provided on said layer are less influenced by possible surface defects at the surface of the board material. According to a particular embodiment, such further finishes comprise a print formed directly on the board material, for example, by means of a digital printing process, for example, by means of an inkjet printer, for example, of the single-pass type. Preferably, water-based inks are applied herein.

[0042] Further, the board material of this deviating variant, however, may show similar properties as the above-mentioned board material of the invention, for example, in respect to the type of polycondensation glue, the composition of and/or additives for such polycondensation glue, the dimensions and/or composition of the fibers or fiber mixture, the type of wood, the contents and/or the specific weight thereof, the mechanical and/or dimensional properties of the board material.

[0043] Particular preferred embodiments of the aforementioned deviating variant show one or a combination of two or more of the following features:

- the feature that the board material shows an average density of less than 570 kilograms per cubic meter, wherein a density of approximately 550 kilograms per cubic meter is a good value;
- the feature that said wood fibers consist for at least 50 percent by weight and preferably consist for at least 90 and still better 100 percent by weight of fibers obtained from wood having a specific weight situated between 350 and 550 or between 400 and 500 kilograms per cubic meter, as measured at a 12% moisture content;
- the feature that for said decorative layer or primer foil, it is started from a paper layer having a surface weight of less than 70 grams per square meter, and still better of approximately 60 grams per square meter;
- the feature that said decorative layer or primer foil is provided with resin, for example, with melamine formaldehyde resin and/or urea formaldehyde resin or any other thermo-hardening resin, such that this resin-treated layer, in dry condition, namely, in a condition in which this layer has a residual moisture con-

tent of 7 percent or less, has a surface weight in the range of 80 to 250 grams per square meter, or still better in the range of 100 to 200 grams per square meter;

- the feature that said decorative layer is unsaturated with resin, preferably such that the side of this layer which shall form the surface of the board material is at least partially and still better substantially resin-free; such embodiments allows to provide the board material with a decoration or coloration by means of the most recent techniques.

[0044] The present invention is in no way limited to the above-described embodiments; on the contrary, such board material, panels and methods may be realized according to various variants, without leaving the scope of the present invention.

Claims

1. Board material, wherein said board material substantially is composed of wood fibers which are bonded by means of a polycondensation glue, wherein the polycondensation glue forms 5 to 20 percent by weight of the board material, **characterized in that** said wood fibers are obtained for at least 40 percent by weight from recycled wood and the board material shows an average density of 300 to 600 kilograms per cubic meter.

2. Board material according to claim 1, **characterized in that** said wood fibers consist for at least 25 percent by weight of hardwood.

3. Board material according to any of the claims 1 or 2, **characterized in that** said wood fibers consist for at least 25 percent by weight of fibers obtained from wood having a specific weight situated between 350 and 600 kilograms per cubic meter.

4. Board material according to any of the preceding claims, **characterized in that** said polycondensation glue relates to a urea formaldehyde resin containing between 1 and 10 percent by weight of melamine.

5. Board material according to any of the preceding claims, **characterized in that** said polycondensation glue relates to a urea formaldehyde resin having a mol ratio U: F situated between 1:1 and 1:1.4.

6. Board material according to any of the preceding claims, **characterized in that** said polycondensation glue contains between 0.3 and 1.5% of hardening agent, for example, ammonium sulfate.

7. Board material according to any of the preceding claims, **characterized in that** said board material contains paraffin in a concentration of 0.3 to 2 parts by weight of paraffin per hundred parts by weight of wood fibers.

8. Board material according to any of the preceding claims, **characterized in that** said board material, apart from said polycondensation glue, comprises more than 0.5 percent by weight of non-wood materials.

9. Board material according to any of the preceding claims, **characterized in that** said recycled wood is contaminated by non-wood materials.

10. Board material according to any of the preceding claims, **characterized in that** this board material shows a splitting strength of more than 0.7 Newton per square millimeter and/or a tensile strength of more than 0.25 Newton per square millimeter.

11. Decorative board material, **characterized in that** it comprises at least a board material according to any of the preceding claims and a provided thereon decorative layer on the basis of synthetic material, such as a laminate layer or a lacquer layer.

12. Furniture panel, **characterized in that** this furniture panel is obtained starting from a board material having the characteristics of any of the claims 1 to 11, and that said furniture panel is provided with milled profiles, which extend in the depth of the board material.

13. Method for manufacturing board material, **characterized in that** this method comprises at least the following steps:

    - purifying waste wood which contains non-wood materials;
    - producing fibers or fiberizing purified waste wood;
    - providing the aforementioned fibers with polycondensation glue;
    - strewing a mat consisting of at least a fraction of said glue-provided fibers, preferably consisting of at least 20 or even of at least 40 percent by weight of such fibers; and
    - compressing the aforementioned mat.

14. Method according to claim 13, **characterized in that** it is applied for manufacturing board material having the characteristics of any of the claims 1 to 10.

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 11 16 0012

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 Y	US 3 741 863 A (BROOKS S) 26 June 1973 (1973-06-26) * abstract * * column 5, line 74 - column 6, line 7 * * column 6, lines 52-75 * * column 7, lines 42-54 *	1,3-9, 11-14 2,10	INV. B27N3/00
X Y	US 2003/056873 A1 (NAKOS PANAGIOTIS [GR] ET AL) 27 March 2003 (2003-03-27) * paragraphs [0003] - [0006], [0011] - [0021], [0024]; examples 1,2 *	13,14 10	
Y	US 2006/006564 A1 (MALDAS DEBESH [US] ET AL) 12 January 2006 (2006-01-12) * paragraphs [0007], [0009], [0048] *	2	
A	DE 10 2007 012691 A1 (KRONOTEC AG [CH]) 18 September 2008 (2008-09-18) * paragraphs [0002], [0009], [0015]; examples 1,2 *	1-14	
A	DE 28 11 833 A1 (BAEHRE & GRETEN) 27 September 1979 (1979-09-27) * page 4, paragraph 3 * * page 8, paragraph 5 *	6,12	TECHNICAL FIELDS SEARCHED (IPC) B27N
A	DE 102 32 874 B4 (KUNNEMEYER HORNITEX [DE] GHP GLUNZ HOLZWERKSTOFFPRODUKT [DE]) 28 January 2010 (2010-01-28)	1-14	
A	DE 44 24 419 A1 (NATURALIS AG [CH]) 18 January 1996 (1996-01-18)	1-14	
A	DE 10 2006 062285 A1 (FRITZ EGGER GMBH & CO [AT]) 26 June 2008 (2008-06-26)	1-14	
A	EP 0 324 038 A1 (VD WERKSTATTEN GMBH & CO KG [DE]) 19 July 1989 (1989-07-19)	1-14	

1 The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	19 August 2011	Söderberg, Jan-Eric

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
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