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Method for producing a printable single or multi-layered material web and an associated coating and/or printing installation

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The invention relates to a method for producing a printable single or multi-layer material web according to the preamble of claim 1, and to an associated coating and/or printing installation for producing a printable or printed single or multi-layer material web according to claim 12.

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In order to produce decorative surfaces (for example by imitating real wood structures, stone and other natural patterns, or artistic imaginative patterns), printed paper, specifically what are referred to as decorative films, is used within the context of industrial manufacturing. In this case, this paper is generally printed by means of an intaglio printing process.

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The print quality, here, depends on various factors. As well as the quality of the printing material used, for example the paper printing web used, the quality primarily also depends on the surface structure of the printing rollers.

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Decorative films of this kind, which are often printed with imitations of wood, are used for producing printed or printable components of various kinds, specifically in particular for producing furniture applications, but also for producing floor, ceiling and/or wall applications.

Furniture applications using decorative wood patterns are known for example. In this case,

corresponding decorative paper printed with imitations of wood and/or pre-impregnated

25 decorative paper is glued to corresponding base panels which may consist, for example, of a

medium-density or high-density fibreboard, in particular wood fibreboard. Since

corresponding panels provided with decorative paper or pre-impregnated decorative paper,

for example in the form of a furniture application or laminate flooring, have to withstand high stresses, laminate flooring must comprise an additional protective layer as the top layer, i.e.

30 a corresponding plastics material layer, which is also referred to as an overlay layer.

What is referred to as decorative paper is used for the printed material webs, which paper can, in advance, be in part provided with a corresponding suitable synthetic resin

impregnation (pre-impregnated paper = PI-paper). In the process, it should be ensured that the resin penetrates the paper layer as evenly as possible.

5 In practice, however, when printing pre-impregnated paper of this kind, problems arise relating to the achievable print quality.

Similar problems also arise when material webs are to be used which for example comprise a plastics film layer as the top layer or consist of a plastics film.

10 In general, the mentioned material webs to be printed can be not only single-layer but also multi-layer, it being possible for the bottom layer to consist for example of a decorative paper web and the layers positioned thereon to consist of other materials and to in addition comprise adhesive intermediate layers. In the same way, in multi-layer material webs to be printed, the top layer may consist of plastics material.

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A category-defining method for coating a moving material web is known from DE 26 37 840 A1. The method is designed such that both sides of the moving material web, preferably in the form of a paper web, can be coated. Here, a doctor blade is used to scrape off the resulting excess of the agent applied in order to determine the thickness of the liquid material layer to be applied. In addition, the doctor blade is oriented at a specific orientation angle relative to the planes of the material web.

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The distinctive feature of this previously published method and of the associated previously published device consists in that, during the coating process, the material web to be coated is brought into contact with the surface of a rotating roller and is held against this surface of the roller by means of the doctor blade. The paper web is then moved forwards and withdrawn, the doctor blade always holding the paper web against the surface of the rotating roller in order to scrape off the excess material.

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30 EP 0 889 168 A2 further discloses a method for producing a pre-impregnate, and the use thereof for producing decorative composite objects. This prior publication therefore describes a method for producing a pre-impregnate which contains an aqueous dispersion based on an acrylic-acid-ester/styrene copolymer, includes a drying strength agent based on a copolymer made of acrylamide and acrylic acid, and contains water, approximately 0.30 to 35 13 parts by weight of dry acrylic-acid-ester/styrene copolymer being used per parts by

weight of dry copolymer made of acrylamide and acrylic acid. The pre-impregnate obtainable using the method is intended to be used to produce decorative composite objects, such as decorative laminates and various furniture parts.

- 5 Lastly, a publication which was not previously published, namely WO 2013/169128 A1, again generally describes a method and a device for applying an agent to a material web.

Only for the sake of completeness, reference is to be further made to a method for producing a paper layer for a planar printed or printable component, for example in the form of a floor,
10 wall, ceiling and/or furniture panel, which is known from WO 2009/097986 A1 for example.

According to this prior publication, it is proposed to proceed for example from (untreated) decorative paper and to cover the printing side of the decorative paper with a dye-absorbing substance prior to printing. As a result of the application of this dye-absorbing substance, on
15 the printing side, the fibres or the fibre structure of the decorative paper should be encased by the dye-absorbing substance and/or cavities between the fibres should be filled completely or in part, so as to thereby improve the printing.

Once the printing process has been carried out, the printed decorative paper can then be
20 resin-treated. This is generally and preferably carried out in that the printed decorative paper web is guided through an appropriate vat containing resin and subsequently dried under the influence of heat. The printed paper web which has been treated and saturated with resin in this way can then be applied to wood panels by means of heating, for which reason a resin which can be re-activated under the influence of heat, such as amino resin, melamine resin
25 or the like, is preferably proposed.

It can thus be seen from the above description that, according to the prior publication in question, decorative paper is to be used which has not been resin-treated and which is to be coated on the printing side with a dye-absorbing material, subsequently printed and then
30 saturated by means of resin. In principle, however, it should also be possible for the paper layer to be resin-treated from the underside prior to printing in a defined manner such that the upper region of the fibre structure having a low or no resin content preferably extends over a maximum of 30 % of the thickness of the fibre structure. In other words, according to this prior publication, it is essential for there to be no resin present on the printing side prior
35 to printing. For this purpose, the printed decorative paper web is preferably only resin-treated

after the printing process has been carried out. If resin treatment occurs prior to printing, however, then only the underside of the decorative paper web should be saturated with resin, and specifically without resin reaching the printing side.

- 5 It is also known from this prior publication that the dye-absorbing substance used can be applied to the decorative paper web by various methods. It is mentioned that the dye-absorbing substance can be applied separately or together with a sealing liquid, by means of rollers, sprays, doctor blades, blade coating methods, airbrushes, cast coating methods, film pressing methods, cloth pressing methods, curtain coating methods and/or by means of application using a slotted nozzle.
- 10

The design and use of doctor blades for paper, cardboard, finishing or tissue machines is further known, for example, from WO 2008/037850 A1.

- 15 This prior publication discloses a doctor blade which has a specific construction so as to be usable for as long as possible. In this case, the doctor blade described in this prior publication is arranged such that the free forward-moving end of the doctor blade is in contact with a surface of a roll or of a cylinder. It is further mentioned that doctor blades of the kind described in WO 2008/037850 A1 can be used in various manners. The described doctor blades can be used, for example, as scraper blades. In this case, the doctor blade points counter to the direction of rotation of the roll. The doctor blade described in the document can, however, also be used as a coating blade. In this case, the doctor blade points in the direction of rotation of the roll.
- 20

- 25 Proceeding therefrom, the object of the present invention is that of providing an improved method and an improved device for producing printable or printed single or multi-layer material webs, in particular for further processing to form printed base panels or construction materials, for example in the form of furniture, floor, ceiling and/or wall elements.

- 30 The object is achieved according to the invention in accordance with the features of claim 1 regarding the method and in accordance with the features specified in claim 12 regarding a corresponding coating and/or printing installation. Advantageous embodiments of the invention are specified in the dependent claims.

It has to be said to be extremely surprising that significantly improved printing results are achievable within the scope of the solution according to the invention.

5 The present invention assumes, in the same way as the prior art, that the material web to be printed should be provided with a primer layer prior to printing.

In order to achieve an improved printing result, first, specific pre-treatment must be carried out on a material web to be printed, by a specific substance being applied to the material web, which is to be printed later, in a specific layer thickness which can be pre-selected and
10 optimised for the specific printing.

For this purpose, initially, within the context of the invention, a primer layer is applied, in an excess amount, to the printing side of the material web. In order to then remove the excess amount not required from the printing side of the material web, what is known as a doctor
15 knife is used, which will also be referred to hereinafter as a doctor blade. The spacing and preferably the orientation position of this doctor blade relative to the material web which is guided past can be adjusted such that the free-flowing or viscous material of the primer to be used runs onto this doctor knife and can be transferred in an adhesive manner from the doctor knife to the material web to be printed only in the desired pre-set layer thickness. The
20 excess material is then removed and collected.

In this case it is important, within the context of the solution according to the invention, for the doctor blade, and particularly the tip thereof, to be arranged for example between two rollers which are spaced apart (i.e. in general between two contact lines which are spaced
25 apart and between which the material web is guided), such that the tip of the doctor blade lifts up from the coated material web, in the form of a hydrodynamic high pressure zone established between the doctor blade and the material web. Direct contact between the tip and the material web is thus interrupted. The mentioned hydrodynamic high pressure zone, which is similar to what is known as the aquaplaning effect, ensures an interruption-free start
30 of the primer material on the entire width of the material web, in the exact pre-set layer thickness and at optimal quality.

However, this can only be achieved within the context of the invention in that the doctor blade, and thus the doctor blade tip thereof, does not interact with the surface of the material
35 web 1 at the point at which the material web rests on the roller drum of a roller. According to

the invention, the doctor blade is arranged such that the tip thereof is spaced apart from the deflection rollers which may be present, i.e. outside what is known as the wrap region, on a roller on which the material web is in contact with the surface of a rotating roller.

- 5 Finally, a primer material is used which has properties relating to the solids content and relating to the runout time which are also defined within the context of the invention.

Particularly good results can be achieved when, on the one hand, the values specified within the context of the dependent claims are used for adjusting the doctor blade and, on the other
10 hand, a primer material is used which has the characteristic values found in the claims and the description.

The invention will be described in more detail in the following, with reference to the drawings, in which:

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Fig. 1 is a schematic side view of a press according to the invention for pre-treating a material web to be printed; and

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Fig. 2 is an enlarged detail of the doctor knife in the orientation position thereof relative to the material web guided past said knife.

Fig. 1 and 2 schematically show how a material web 1 to be printed can be coated with a free-flowing, i.e. at least viscous, material.

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The material web 1 may be a film-like material web 1 of a pre-determined width. In this case, the width corresponds to the use (not shown in the drawings) in typical printing cylinders of a printing press. In this case, it may for example be an intaglio printing process, an inkjet printing process or another common printing process. The detail of the press shown in the drawings may, in this case, be part of an entire printing press, since the method according to
30 the invention can also preferably be carried out in what is known as an online process, i.e. the material web to be printed is continuously first coated and then correspondingly printed. Likewise, it is also possible that the material web to be printed is first appropriately pre-treated within the context of the invention, and then for example wound onto a winding station in order to be printed later, in a second separate step at a different time and
35 optionally also a different location.

The mentioned material web may for example be a pre-impregnated paper web, specifically pre-impregnated decorative paper 1'. Likewise, a plastics film or plastics film web 1'' can optionally also be used. The material webs may be single-layer or multi-layer and, for example, the layer closer to the printing side 1a may consist of or comprise decorative paper 5 1' or a plastics film 1'' and the other layers may consist of or comprise comparable or other materials. Thus, a multi-layer decorative paper web can also comprise plastics film layers and, vice versa, a plastics film can comprise at least one paper layer on the side remote from the printing. Likewise, bonding agents or adhesive layers for example can also be provided between the individual layers. There are no restrictions in this respect.

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The main use within the context of the invention is the preparatory treatment of a pre-impregnated paper layer, specifically what is known as pre-impregnated decorative paper. In this case, "decorative papers" should be understood as meaning all pre-impregnates, film papers, thin films in a wide range of colour combinations, etc.

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In this case, the material web 1 for example, in particular in the form of the decorative paper 1', can be saturated using a wide range of resin solutions, for example melamine resins and urea resins in a wide variety of compositions, plastics acrylate compounds (e.g. Acronal, Acrodur mixed with various chemical additives), paper sized using starch sizing, AKD sizing 20 or sizing agents in combination with acrylates etc.

The preferred application amount of the above-mentioned options can be for example between 10 % and 50 %, based on the basis weight of the material web 1, in particular the decorative paper web 1', it being possible for the basis weight of said material web 1, and in 25 particular of said decorative paper web 1', to usually be between 30 g/m² and 100 g/m².

A material web of this kind is moved through the press by means of an appropriate drive means using one or more driven rollers and rolls, feed, support and/or guide rollers generally being used, which are correspondingly caused to rotate, i.e. are actively driven. 30 Furthermore, idling rollers may also be provided, over which the material web 1 is guided at a predetermined wrap angle corresponding to the travel path, and in the process also sets into rotation the corresponding rollers which are not actively driven.

As can further be seen from Fig. 1, an application roller 2 and a feed roller 3 are also 35 provided in the press, the scraper 4, i.e. the so-called doctor scraper or doctor blade 4'

provided within the context of the invention, being positioned between these two rollers 2 and 3.

5 Said scraper 4, for example in the form of the doctor blade 4', is arranged directly in the removal direction A of the material web 1, in front of the feed or drive roller 3, i.e. before the material web 1 touches the peripheral wall 3a of the feed roller 3, i.e. outside what is known as the wrap region of said drive roller 3. The application roller 2 is arranged above a primer vat 5 which is filled with the primer material 6 to be used. Said primer vat 5 is therefore located directly below the material web 1 in the removal direction A and in front of the doctor
10 blade arrangement.

In addition, both feed and application modules having additional guide or support rollers are provided.

15 The mentioned scraper 4 is fixed to an adjustment mechanism 7, by means of which a position and/or orientation of the scraper 4 can be adjusted, and thus in particular the doctor blade tip 44 can be correspondingly adjusted relative to the material web 1.

Thus, the doctor blade 4' can be adjusted, by means of the adjustment mechanism 7, at an
20 appropriate angle α relative to the material web 1, i.e. in particular the pre-impregnated paper web 1' or paper layer 1' or a plastics film or plastics film web 1'', i.e. at an appropriate angle relative to the plane of the material web 1. Said angle α should preferably be between 25° and 75°. These values are in part also dependent on the primer material used, which will be described in more detail in the following. However, it has been found that the smallest
25 angle 1α between the plane of the doctor blade 4' and the plane of the material web 1 should be greater than 30°, in particular greater than 35°, 40°, 45°, 50°, 55° or 60°. On the other hand, the angle α should generally be less than 70°, 65°, 60°, 55°, 50°, 45° or 40°. In other words, optimal angular ranges are between 35° and 55°, in particular between 40° and 50°, above all approximately 45°.

30 In practice, the scraper 4, i.e. the doctor blade 4', is adjusted in an appropriate manner relative to the material web 1 which is correspondingly guided, and tensioned and coated by the rotary rollers during the production process, resulting in a hydrodynamic high pressure zone 8 (Fig. 2) being established in the angular range between the doctor blade 4' and the
35 material web 1. A specific stable hydrodynamic surface overpressure of the primer material,

i.e. the liquid, free-flowing or at least viscous primer material, which overpressure also depends on the primer material, is established in this hydrodynamic high pressure zone 8, as a result of which said primer material is evenly applied over the entire surface 1a of the material web 1. This is a similar effect to that known by the term "aquaplaning".

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Regulation of the doctor blade adjustment angle α relative to the surface of the material web 1 in the form of the pre-impregnated paper web 1' or the plastics film web 1'' in conjunction with correspondingly selected parameters regarding the feed speed of the web, the material tension, the amount of primer used, finally also leads to self-cleaning of the doctor blade 4' used. The way in which the corresponding parameters can be adjusted in view of the feed speed of the material web, the build-up of the necessary web tension and the web proofing is sufficiently known from corresponding presses which are known in principle. Reference is made in this respect to known presses of this kind.

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15 In summary, therefore, it can be noted that, during application of the primer material to the material web 1 following the forward movement A of the material web 1 through the press, the mentioned hydrodynamic high pressure zone 8 is established in the shape of a "wedge" in front of the blade of the doctor blade 7 by the liquid or free-flowing primer material applied to the material web 1, as a result of which high pressure zone the tip 44 of the doctor blade 4 lifts off the coated material web 1. Thus, direct contact between the tip 44 and the material web 1 is interrupted. As a result of the mentioned hydrodynamic high pressure zone 8, which is similar to what is known as the aquaplaning effect, interruption-free application of the primer material over the entire width of the material web 1 in the exact pre-set layer thickness and at optimal quality is ensured.

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It can also be seen from Fig. 1 that the film web is supported between two rolls, in this case between a contact line (in parallel with the axis of rotation) on the application roller 2 and on the feed roller 3. The doctor blade 4', and thus the blade of the doctor blade 4', is arranged in this case in such a way that the material web 1 extends here in a slightly angled manner between the contact line on the roller 2 and the roller 3, as can be seen in Fig. 1. As a result, a corresponding pressure is indirectly exerted on the material web, via the doctor blade, since the corresponding primer material layer is still passing through, in the corresponding thickness, between the passing blade 44 and the material web 1.

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In this case, the entire arrangement is such that the application roller 2 removes the corresponding primer material from the vat 5 during the rotational movement and applies said material to the printing side 1a of the material web 1, this application occurring on the underside of the material web 1 which, in this region, is moved forwards, at least
5 approximately horizontally between the rollers 2 and 3, i.e. by means of at least predominantly horizontal movement components, such that the excess primer material running onto the doctor blade 4' and removed in part falls downwards under the effect of gravity and is collected in a vat collecting portion 55 and can be returned to the vat 5.

10 The improved printing results described have been found to be achievable, for example, when using a doctor blade 4 which consists for example of stainless steel, plastics material or other materials also coated and is designed in the shape of a panel or slat. The panel-shaped or slat-shaped stainless steel doctor blade extends perpendicularly to the feed
15 movement A of the material web, i.e. in parallel with the respective axes of rotation of the rollers. The doctor blade thickness, i.e. the thickness of the doctor blades transversely to the longitudinal extension thereof, may vary within wide ranges, for example it may be between 0.1 mm and 15 mm. Preferred values are above 0.2 mm, 0.3 mm or 0.4 mm and/or 0.5 mm. Likewise, preferred values should be below 15 mm, for example below 12.5 mm, 10 mm, 7.5
20 mm or 5 mm. Corresponding values can also be present for the phase width D at the doctor blade cutting edge (Fig. 2).

For the sake of completeness, it should be mentioned that typical press speeds at which a decorative paper or decorative film of this kind should be coated with the mentioned primer, described in the following, may be between 100 m/min and 350 m/min. In general, optimal
25 values may also extend into intermediate ranges, i.e. may also have press speeds which are greater than 100 m/min, specifically for example 110 m/min, 120 m/min, 130 m/min, 140 m/min, 150 m/min, 160 m/min, 170 m/min, 180 m/min, 190 m/min, 200 m/min, 210 m/min, 220 m/min, 230 m/min, 240 m/min, 250 m/min. On the other hand, the press speeds are preferably not above 350 m/min, and lower than this value for many uses, specifically lower
30 than 340 m/min, 330 m/min, 320 m/min, 310 m/min, 300 m/min, 290 m/min, 280 m/min, 270 m/min, 260 m/min, 250 m/min, 240 m/min, 230 m/min, 220 m/min, 210 m/min or lower than 200 m/min.

In the following, the primer solution will be described and should preferably be used as a
35 layer to be applied. The primer material is a water-based synthetic resin or acrylate resin

dispersion. In other words, the primer material is not a varnish. Rather, a varnish-free primer material is used.

5 The primer material should be selected so as to have, for example, a viscosity (kinematic at 20 °C) of between 10 seconds and 30 seconds according to DIN standard 53211/4. In other words, the runout time of the primer material (primer solution) from the DIN measuring beaker is from 10 seconds to approximately 30 seconds.

10 For achieving optimal printing results, it has further proven favourable for the primer material to have pH values of between 5 and 9, preferably between 6.5 and 8, in particular approximately 7.5.

15 In addition, the primer material has a solids content of 20 % or more, in particular of at least 25 %, 30 %, 35 %, 40 %, 45 % or at least 50 %. On the other hand, good and adequate values are also achieved when the solids content is less than or equal to 70 %, 65 %, 60 %, 55 %, 50 % or less than 45 %. A value of from approximately 45 % to 55 % is optimal in many cases.

20 Finally, it is also favourable for the primer material used to be miscible with or soluble in water. In this case, a preferred primer material should be entirely miscible with water or soluble in water. Finally, the primer material should have a low solvent content of less than 3 %, in particular of less than 2 %, 1 % or even 0.5 %. If the primer material in addition has a flash point of over 100 °C, there are generally no problems even if the material has to undergo heat treatment prior to printing.

25 By using a primer material of this kind, it is possible to print a printable material web 1, in particular a printable pre-impregnated paper layer or pre-impregnated decorative paper in an optimal manner, which makes it possible to achieve far better printing results, in particular in an intaglio printing process (although an inkjet process or other printing processes can in principle also be considered).

35 Thus, after the material web 1 which is pre-impregnated in particular on the printing side 1a, which web is in particular in the form of a pre-impregnated paper web 1', has been coated with the mentioned primer, and once the primer has undergone at least an adequate drying or surface drying phase, the correspondingly pre-treated material web 1 can then be printed.

Preferably, water-based intaglio inks having a solids content of from 5 % to 35 %, in particular of from 10 % to 30 % or of from 15 % to 25 % are used during the mentioned subsequent printing. The preferably water-based intaglio inks should for example have a pH value of between 7 and 9, in particular a value of from 7.5 to 8.5. Particularly good results can be achieved when the printing inks have a flow rate of from 13 seconds to 30 seconds according to DIN standard 53211/4, already described with reference to the primer material. Preferred values are, for example, of between 18 seconds and 25 seconds.

The printing inks may further comprise binders. The binder of the individual basic colours preferably consists of casein. Furthermore, a blend of the binder casein or other binders common in ink production can also be added to the printing inks.

It has been explained, within the context of the invention, that the use of the primer ultimately makes it possible above all to also smooth the paper and/or film web to be printed. In this respect, this is also a layer which is applied and which smooths unevenness in the decorative paper web. In addition, the material used is also a type of bonding agent, which acts as a bonding agent for the printing ink which is to be applied. The significantly improved printing results can thereby be achieved.

PATENTKRAV

1. Fremgangsmåde til fremstilling af en påtrykbar eller påtrykt et- eller flerlaget materialebane (1), der omfatter i det mindste en materialebane (1) af imprægneret dekorations-

5 papir (1'), normalt dekorationspapir (1) eller i det mindste en materialebane (1) i form af en kunststoffolie (1''), især til videre forbindelse med en bærerplade eller et bærerelement til møbel, gulv- loft- eller væganvendelse, med følgende kendetegn:

- 10 - på den til påtrykning tilvejebragte side af materialebanen (1a) påføres der forud for påtrykningen et primerlag (6) med et primermateriale, der omfatter en faststofandel,

kendetegnet ved følgende yderligere kendetegn

- 15 - primerlaget (6) påføres med en overskudsmængde på påtrykningssiden (1a) af materialebanen (1),
- via en aftrækningsretning eller fremføringsretning (A) efter materialebanen (1) følgende rakelafstryger (4) afstryges overskydende primermateriale, hvortil planet for aftrækningsraklen (4) kan indstilles i dens orienteringsvinkel (α) i forhold til planet for materialebanen (1) og i dens relativposition og/eller dens afstand til planet for materialebanen (1),
- 20 - aftrækningsraklen (4) positioneres med sin rakelspids (44) mellem to med afstand liggende valser og/eller to med afstand liggende anlægslinjer, hvorpå materialebanen (1) støttes,
- 25 - der anvendes et primermateriale, der har en udløbstid ifølge DIN-standard 53211/4 mellem 10 sek. og 30 sek., og/eller
- der anvendes et primermateriale, der udviser en faststofandel mellem 20% og 70%.

30 2. Fremgangsmåde ifølge krav 1, **kendetegnet ved, at** der anvendes et primermateriale,

- der består af en vandbaseret kunstharpiks- eller acrylharpiksdispersion eller omfatter denne, og/eller

- hvis pH-værdi ligger mellem 5 og 9 eller mellem 6,5 og 8 eller omkring 7,5, og/eller
- der er fuldstændigt opløseligt i vand eller kan blandes med vand, og/eller
- hvis flammepunkt ligger over 100°C.

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3. Fremgangsmåde ifølge et af kravene 1 til 2, **kendetegnet ved, at** der anvendes en afstrygningsrakel (4), der har en rakelstyrke eller rakeltykkelse mellem 0,1 mm og 15 mm eller en tykkelse, der er større end eller lig med 0,2 mm, 0,3 mm, 0,4 mm eller 0,5 mm.

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4. Fremgangsmåde ifølge et af kravene 1 til 3, **kendetegnet ved, at** der anvendes en afstrygningsrakel (4), der har en rakelstyrke eller rakeltykkelse, der er mindre end 12,5 mm, 10 mm, 7,5 mm, 5 mm eller mindre end 2,5 mm.

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5. Fremgangsmåde ifølge et af kravene 1 til 4, **kendetegnet ved, at** afstrygningsraklen (4), der anvendes, består af ædelstål eller af kunststof eller er beklædt med eller omsluttet af ædelstål.

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6. Fremgangsmåde ifølge et af kravene 1 til 5, **kendetegnet ved, at** afstrygningsraklen (4), dvs. planet for afstrygningsraklen (4) indstilles i en vinkel (α) på opløbssiden af materialebanen (1), der ligger mellem 25° og 75° eller mellem 30° og 65°, 35° og 55° eller mellem 40° og 50° eller omkring 45°.

25

7. Fremgangsmåde ifølge et af kravene 1 til 6, **kendetegnet ved, at** der som materialebane (1) anvendes dekorationspapir, præimprægnerede materialer, foliepapirer eller tynde folier, hvis arealvægtmål ligger mellem 30 g/m² og 100 g/m² eller mellem 40 g/m² og 90 g/m², mellem 50 g/m² og 80 g/m² eller mellem 60 g/m² og 70 g/m².

30

8. Fremgangsmåde ifølge et af kravene 1 til 7, **kendetegnet ved, at** der anvendes en materialebane (1) der består af præimprægneret dekorationspapir (1) eller omfatter dette, som er mættet ved hjælp af harpiksopløsninger eller kunststofacrylatforbindelser eller består af limede papirer eller omfatter disse.

9. Fremgangsmåde ifølge krav 7 eller 8, **kendetegnet ved, at** det præimprægnerede materiale påføres på materialebanen (1) med en påføringsmængde, der ligger mellem 10

g/m² og 50 g/m² af arealvægten af det anvendte dekorpapir (1'), hvor arealmålene af det anvendte dekorpapir (1') ligger mellem 30 g/m² og 100 g/m².

5 10. Fremgangsmåde ifølge et af kravene 1 til 9, **kendetegnet ved**, at den med et primermateriale (6) beklædte materialebane (1) påtrykkes med vandbaserede trykfarver eller vandbaserede dybtrykfarver.

10 11. Fremgangsmåde ifølge krav 10, **kendetegnet ved**, at der anvendes trykfarver,
15 - der har en faststofandel mellem 5% og 35%, og/eller
- der har en pH-værdi mellem 7 til 9 eller mellem 8 til 8,5, og/eller
- hvis strømningshastighed ligger mellem 13 sek. og 30 sek., og/eller
- nemlig i blandinger, hvis strømningshastighed ligger mellem 15 sek. og 30 sek.,
- ved hvilke der til de enkelte grundfarver anvendes bindemiddel i form af kasein,
15 og/eller
- der er tilsat et bindemiddel i form af soja og/eller kasein.

20 12. Beklædnings- og/eller trykanlæg til fremstilling af en påtrykbar eller påtrykt et- eller flerlaget materialebane (1) ifølge et af kravene 1 til 11, med følgende kendetegn:

25 - med en primerpåføringsindretning til påføring af et primerlag på en påtryknings-
side (1a) af en materialebane (1),
- med en til primerpåføringsindretningen i aftræknings- eller fremføringsretning
(A) efter materialebanen (1) følgende rakelafstryger (4), der er tilvejebragt til
afstrygning af overskydende primermateriale,
25 - planet for aftrækningsraklen (4) kan indstilles i dens orienteringsvinkel (α) i
forhold til planet for materialebanen (1) og dermed i dens relativposition og/eller
i dens afstand til planet for materialebanen (1), og
- aftrækningsraklen (4) er med sin rakelspids (44) positioneret mellem to med
30 afstand liggende valser og/eller to med afstand liggende anlægslinjer, hvorpå
materialebanen (1) støttes.

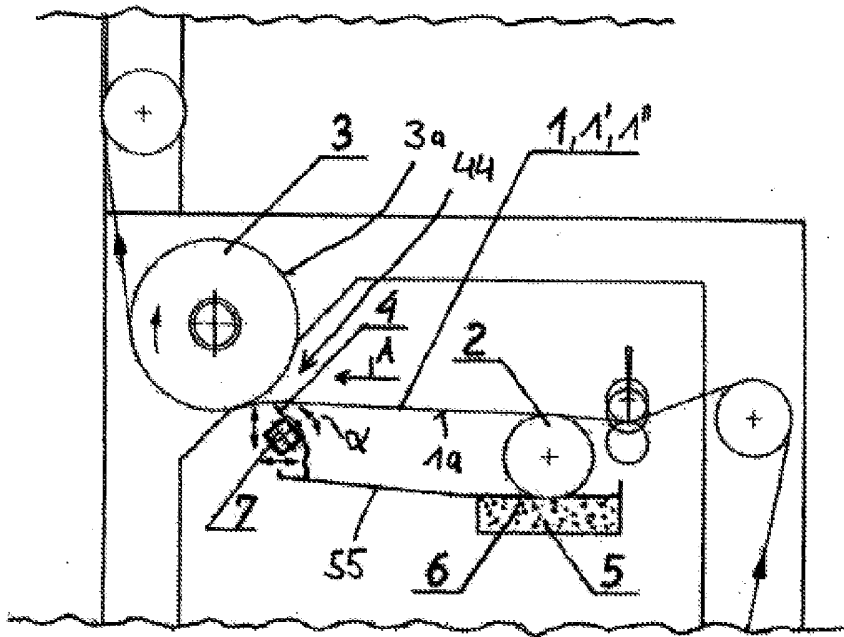


Fig. 1

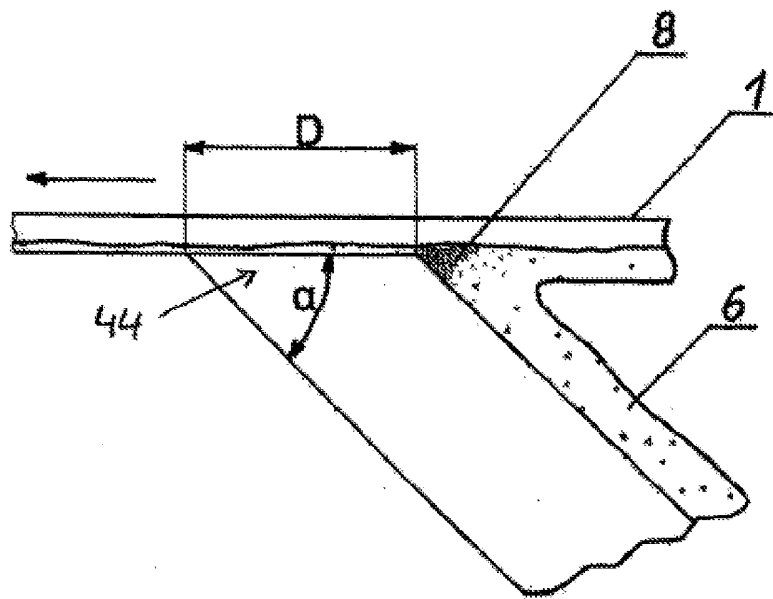


Fig.2