

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
16 December 2004 (16.12.2004)

PCT

(10) International Publication Number
WO 2004/108436 A2

(51) International Patent Classification⁷: **B44C 5/04**,
B32B 3/30, E04F 15/04

(21) International Application Number:
PCT/EP2004/006082

(22) International Filing Date: 2 June 2004 (02.06.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
2003/0339 4 June 2003 (04.06.2003) BE
60/477,326 11 June 2003 (11.06.2003) US
2003/0585 31 October 2003 (31.10.2003) BE

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

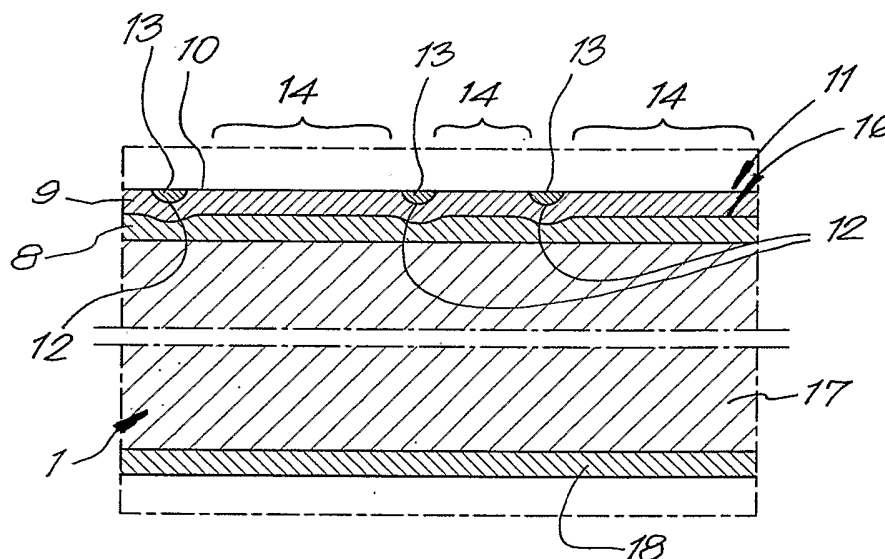
(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU,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

Declaration under Rule 4.17:

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM,

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(54) Title: FLOOR PANEL AND METHOD FOR MANUFACTURING SUCH FLOOR PANEL



(57) Abstract: Floor panel, of the type consisting of a laminate panel which comprises at least a printed decorative layer (8) and a top layer (9) forming the upper surface (10) of the floor panel (1), more particularly a so-called overlay, whereby this top layer (9), or, thus, overlay, is realized on the basis of a thermosetting resin, characterized in that in the upper side (11) of the floor panel (1), indentations (12) are formed and in that at last in a number of these indentations (12), a component (13) is provided, which is obtained in that it has been provided in those indentations (12) after the provision of the indentations (12).



PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

Published:

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

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

Floor panel and method for manufacturing such floor panel.

5 This invention relates to a floor panel, as well as to a method for manufacturing such floor panel.

In particular, the invention relates to so-called laminate panels for forming a floor covering.

10 It is known that in such laminate panels for floors, the appearance of wood, more particularly parquetry or the like, or the appearance of stones or ceramic tiles, is imitated by providing the floor panels, in the proximity of their upper surface, with a decorative layer printed
15 with a pattern, for example, a wood pattern or tile pattern, over which a transparent synthetic layer is provided.

Usually, the printed decorative layer consists of printed
20 paper, whereas the clear synthetic layer normally consists of a synthetic resin or one or more transparent or clear resin-impregnated material layers, for example, paper layers, in which possibly also products can be incorporated in order to enlarge, for example, the wear
25 and tear resistance of the final upper surface. Generally, said synthetic layer, at least when it also forms the top layer or, thus, uppermost layer of the floor panel, is named "overlay".

30 It is also known to provide certain laminate panels with indentations and to provide an amount of paint, printing ink or the like in these indentations, in order to underline certain aspects of the pattern to be imitated.

A known technique for realizing this is described in DE 29 26 983. According to this known technique, a layer, impregnated in resin, is provided on top of the decorative layer, and subsequently the whole assembly is brought into a press, on one hand, in order to let the whole already partially harden, and, on the other hand, to realize indentations in the upper side during pressing. Subsequently, an amount of paint is doctored into the indentations, after which again a resin-impregnated layer is provided on top of the whole, and finally the whole is hardened completely by the influence of pressure and temperature. This technique has the disadvantage that it is complex and, consequently, time-consuming and that it must be performed rather precisely, in consideration of the fact that two layers must be provided on top of each other and care must be taken in particular that the intermediate hardening is performed to a proper degree. Another disadvantage consists in that one always has to work with at least two top layers, which can exert a disadvantageous influence on the clearness with which the pattern of the printed decorative layer finally is visible, and by which the pattern, formed by the paint in the indentations, is softened.

Thus, the complex and rather expensive procedure described in the German DE 29 26 983 is less suitable for producing larger volumes at a minimum cost price, as desirable in the production of floor panels.

Another known technique, which, amongst others, is described in GB 2,054,458, consists in that, during the formation of the indentations, also an amount of colour product, more particularly, ink, is printed onto the

laminate, possibly into the indentations, by means of the press with which the indentations are formed. This known technique requires particularly expensive equipment for, during pressing the laminate panels, simultaneously performing a printing action, which renders this technique thus little suitable for the production of floor panels. As the colour product is provided during the formation of the indentations, as well as is formed by means of a printing process, moreover an appearance similar to printed matter is obtained, which renders the imitation effect less than optimum, at least for certain applications. As the ink is provided in the indentations during pressing, only very thin coatings can be obtained. Also, this technique is exclusively suitable for printing of larger deepened parts.

Further, it is also known to apply techniques whereby the application of colour products on certain locations in recesses is coupled specifically to particular surface treatments, as a consequence of which the typical characteristics of the normal panel surface can not be guaranteed any longer.

According to a first aspect, the present invention aims at a floor panel whereby, on one hand, the advantages of classical laminate panels for floors are maintained, however, on the other hand, additional components can also be incorporated in the surface in an optimum manner. Furthermore, the invention aims at a floor panel which can be realized smoothly, with minimum production costs.

To this aim, according to a first aspect, the invention relates to a floor panel of the type consisting of a laminate panel which comprises at least a printed

decorative layer and a top layer forming the top surface of the floor panel, more particularly a so-called overlay, whereby this top layer is realized on the basis of a thermosetting resin, with the characteristic that in the upper side of the floor panel, indentations are formed and in that at least in a number of these indentations, a component is provided, which component has been obtained in that it has been provided in those indentations after the provision of the indentations.

As the indentations are situated in the upper side of the floor panel, and this upper side, with the exception of the indentations, remains unchanged, the floor panels will keep their classical advantages in respect to wear resistance, cleaning features and the like at their surface which is walked upon. As said component is provided in the indentations, the former is little or not at all subject to wear and tear, in particular when said indentations are realized with relatively small dimensions. Due to the fact that said component is no longer covered by an additional overlay, the clarity of the pattern or such formed by said component, in the case such component consists of a colour product, is not affected by such overlay.

Preferably, the invention is applied in combination with floor panels, said top layer of which being a layer based on melamine resin, because such top layer as such, as is known, is very suitable for floor panels.

Although the invention can be applied in combination with different kinds of patterns for the printed decorative layer, it offers in particular special advantages in embodiments in which the printed decorative layer

represents a wood pattern, as in such manner particularly good imitations of post-treated, in particular coloured, for example, lime-treated, wooden floor parts or parquetry parts, sometimes also called "patinated" oder
5 "cerused" floor parts or parquetry, often in short denominated with the French term "cerusé", can be realized.

An obvious solution for imitating such coloured or
10 "patinated" floor by means of laminate panels consists in providing the decorative layer with a printed pattern representing a patinated wooden floor part or parquetry part and subsequently applying a classical overlay on top thereof. Practice has shown that in such specific
15 application, it is difficult to arrive at a good imitation of a really coloured wooden floor.

However, by providing the floor panels, in accordance with the present invention, on one hand, with a
20 decorative layer printed with a wood pattern, and, on the other hand, with indentations in which a colour product is provided, a considerably better imitation can be realized. Hereby, the printed wood pattern either may consist of a traditional print, as the one applied for
25 imitating a non-coloured floor, whereby the imitation effect of the coloration then is exclusively obtained by the colour product in the indentations, as well as of a particular print which indeed represents certain aspects of the coloration, whereby the imitation effect of the
30 coloration then is obtained by the combination of the special print and the colour product in the indentations. According to the latter manner, by means of the print of the decorative layer at least the discoloration of a treated wood surface can be imitated, whereas by means of

the colour product in the indentations, residual colour materials, which remain in the real pores or other recesses in the wood in a treatment of a real wooden floor, can be imitated.

5

Preferably, in order to imitate coloured, "patinated" or lime-treated wood, said component will consist of a colour product with a light colour, in particular white. However, colour products of another colour are not
10 excluded. These colour products as such preferably are little or not at all transparent.

When imitating wood, it is preferred that said indentations are provided in function of the wood
15 pattern, and even better follow the lines of the wood pattern. In the case that said component then consists of a colour product, it is obtained that the pattern created by this colour product is optimally adapted to the underlying printed pattern of the decorative layer. In
20 the case that said component does not consist of a colour product, but, as will be explained in the following, has other purposes, and, for example, consists of a colourless or almost colourless agent, the advantage is created that the presence of such component will be less
25 apparent, as said agent is distributed over the surface of the floor panel in accordance with the underlying printed pattern.

The foregoing does not exclude that such colour
30 component, provided in indentations, can also be applied in combination with patterns other than a wood pattern.

It is noted that the floor panels according to the invention can be provided at one or more of their upper

edges with a cut-away material part in order to create a particular profile at those edges. By means of such cut-away part, for example, a so-called "chamfer" can be formed, or simply a rectangular recess, which, when
5 laying several floor panels adjacent to each other, forms a groove. According to a particular embodiment of the present invention, in such case the surface created by cutting away said material part is provided, at least partially, with a finish, such that the appearance of the
10 surface is adapted to the effect obtained by the colour product in said indentations.

Adapting the colour of the surface at the location where a part has been cut away to the colour of the applied
15 component can be performed in any manner. To this aim, for example, a covering layer can be provided on this surface, said covering layer showing a matching colour or a matching pattern. For providing such covering layer, for example, use can be made of transfer printing, as
20 described, amongst others, in the international patent application WO 01/96688.

According to a particular variant, however, said surface will be coloured at least partially with a colour product
25 having the same tint or almost the same tint as the colour product used for said component. In a particular form of embodiment, even the same agent, for example, the same paint, shall be applied to this aim. The advantage of this technique consists in that the finish of said
30 surface, in other words, the finish of the "chamfer", automatically is adapted to the upper surface of the floor panel in an optimum manner, contrary to a coating provided by means of transfer printing, as with transfer printing, separate materials are used which then

specifically must be adapted to the upper surface of the floor panel.

According to a particular characteristic of the invention, said floor panel is provided with a coloured transparent top layer, in other words, a coloured "overlay".

Up to the present, overlays, at least in case they are applied in combination with a printed decorative layer, always are realized such that they, after the floor panel has been formed, thus, after curing, are as transparent as possible and also as colourless as possible, in order to thereby render the printed decorative layer optimally visible. To this aim, "overlays" then are formed of an in its turn very pure paper which is impregnated with resin. The pure paper itself as such is white, however, after impregnation with resin and after pressing the overlay, it becomes almost colourless.

By using, according to the invention, as aforementioned, a coloured "overlay", particular new effects can be realized. By a "coloured overlay", hereby an "overlay" is to be understood which, in applied condition, clearly gives the floor panel a certain tint, in other words, is not colourless. Hereby, such tint can be of any colour, including black or white.

Basically, such tint in the top layer or, thus, overlay, can be realized by using coloured paper for the paper carrier of the overlay, however, preferably the overlay or, thus, top layer shall be coloured in that this layer is formed on the basis of coloured resin. By colouring the resin itself, on one hand, a tint is obtained,

however, on the other hand, the transparency of the overlay is little or not affected.

5 According to a particular form of embodiment, the coloured overlay is chosen such that, on one hand, this overlay, by means of its tint, and, on the other hand, said colour product present in the indentations, commonly contribute to a "patinating" or "colouring" effect. In such case, a classical imitated wood pattern can be used
10 for the printed decorative layer; the coloured tint to be imitated, which is present over the entire surface, can be obtained by means of the coloured overlay; and the colour product present in the indentations can be used as an imitation of the colour product which normally in
15 reality remains in the wood pores and the like.

Of course, such coloured overlay also can be used for creating other particular effects.

20 It is noted that the use of such coloured "overlays" allows to realize different final results, starting from one and the same printed decorative layer. In the case of the imitation of parquetry or wooden floor parts, for example, an imitation of a non-coloured floor then can be
25 realized by means of a printed decorative layer with a clear overlay only, whereas, in case of an imitation of a coloured embodiment, one starts with one and the same printed decorative layer, which, however, in that case will be provided with a coloured overlay.

30

Preferably, the coloured overlay hereby is monochromatic and thus free of any well-defined fixed pattern, with the advantage that, when forming the boards of which the floor panels are realized, the overlay must not be

especially positioned in respect to the possible pattern of the printed decorative layer.

Preferably, said indentations have a small dimension in at least one direction, more particularly a width which, for the major part of such indentations, is less than 2 mm and even better less than 1 mm. By using relatively small indentations, the component present in the indentations is not or almost not strained during the use of the floor panels.

According to an important variant of the invention, said component comprises at least one active agent. By an active agent, each product has to be understood which renders well-defined features, other than features exclusively aiming at determining the appearance or forming a top layer. To this aim, products can be applied having, for example, one or more of said features: anti-bacterial, anti-static, dirt-repellent, mildew-repellent. The application of other active agents is not excluded. Another application consists, for example, in applying materials creating a certain optical effect, such as materials having reflecting and/or fluorescent and/or phosphorescent features. This may be for decorative purposes as well as practical purposes, for example, as an emergency lighting in corridors or passages and/or for indicating an emergency exit on the floor and the like. So, for example, micro-indentations can be provided in the surface, which represent an arrow or another symbol and are filled with a component lighting up in darkness, whereas with normal light conditions, this arrow is not visible.

The component in the indentations may also comprise particles which enhance wear resistance, such as corundum.

5 It is clear that according to the present invention, such products can be optimally utilized in combination with floor panels, on one hand, because said component is little or not at all strained when using the floor panel and thus is very little subject to wear and tear, and, on
10 the other hand, the respective component still can be freely present at the upper surface and consequently can be optimally active.

It is clear that the application of an active agent for
15 said component provided in the indentations also can be combined with a colour product, for example, in that active ingredients, such as anti-bacterial products, anti-static products or the like, are blended into the colour product.

20 The floor panels of the invention preferably are realized as DPL (Direct Pressure Laminate).

Said component present in the indentations preferably
25 consists of a cured matter, such as a paint paste, a hardenable product containing active agents or the like, which matter preferably is created as a consequence of the fact that a certain amount thereof is brought into the indentations in that it is deposited therein, for
30 example, rolled thereinto, wiped thereinto, doctored thereinto, sprayed thereinto or the like, contrary to high-pressure printing techniques.

It is noted that the above-described possibility of imitating a post-treated wooden floor or parquetry floor, more particularly, a wooden floor or parquetry floor coloured with colour substance or the like, by means of laminate panels, according to which use is made of a decorative layer printed with a wood pattern and of indentations provided with a colour product, also can be utilized in other kinds of laminate panels, regardless whether further intermediate layers and additional covering overlays are applied, regardless of how the component is provided in the indentations, regardless of the material of which the possible overlay consists, and regardless of the fact whether an overlay is applied or not.

According to a second aspect, the invention thus also relates to a floor panel, of the type consisting of a laminate panel comprising a decorative layer which is printed and/or provided with a pattern, with the characteristic that the floor panel is provided with a coloured or "patinated" appearance, which is realized at least by means of indentations in which a component in the form of a colour product is provided.

Further is noted that for laminate panels, also the use of an active component, provided in parts which are deepened in respect to the upper surface, regardless whether those are indentations or not, and regardless of the further composition of the laminate panel, can be advantageous, as such deepened parts often allow the application of such active component in a better manner than in case such active component must be provided over the entire surface. In consideration thereof, the invention, according to a third aspect, also relates to a

floor panel of the type consisting of a laminate panel with a top layer based on synthetic material, whereby this floor panel shows deepened parts at its upper side, with the characteristic that, substantially at the
5 deepened parts, a component comprising at least one active agent is provided.

As already discussed, the deepened parts may consist of indentations, preferably local indentations of small
10 dimensions. According to another important possibility, such deepened parts are formed by the surface of parts which are formed in that at the upper side of the floor panels, whether at the edge thereof or not, material parts have been removed, for example, the surface of a
15 so-called "chamfer", the surface of a rectangular recess, and so on.

Also, the use of a coloured so-called overlay in combination with a printed decorative layer in its turn
20 offers important advantages, amongst others, in that thereby a new technical construction is obtained which allows to realize new creations, more particularly patterns, appearances and the like, independent of possible other characteristics. Also, the use of a
25 coloured overlay offers the advantage that certain decors, the practical realization of which had been problematical before, now can be realized more adequately.

30 So, for example, it is known that it is difficult to realize very light decors, for example, so-called "cérusé", as well as very dark decors in a proper manner, as with the techniques known up to now, whereby the decor is determined substantially by the printed decorative

layer, the richness of the obtained decor often is considerably less than intended.

Also, it is known that with very light or very dark
5 decors, a large quantity of printing ink or other
printing medium must be applied on the decorative layer
in order to arrive at a proper appearance. On one hand,
this poses the problem that such thick printing is
difficult to perform. On the other hand, such thick
10 printing results in that the decorative layer hardly
takes up any resin and the necessary resin treatment or
impregnation is rendered difficult. Also, this results in
that more or less a layered structure is formed, as a
lesser adhesion between the decorative layer and the
15 overlay occurs, whereby, when milling the edges of the
floor panels, pieces of the upper side may come off.

In consideration of the above, according to a fourth
aspect the invention thus also relates to a floor panel
20 of the type consisting of a laminate panel comprising at
least a decorative layer provided with a certain pattern,
with the characteristic that the floor panel also
comprises at least a so-called overlay, which is
coloured, but transparent. This overlay is of course
25 situated above the decorative layer, however, according
to the fourth aspect of the invention, must not
necessarily form the uppermost layer of the panel. In
fact, it is not excluded to provide a clear colourless
overlay on top of the coloured overlay.

30

This technique creates new possibilities.

One of those possibilities consists in that light or dark
decors can be produced with a greater richness and with

less problems by colouring the overlay with a light tint, for example, a white colour product, in the case of a light decor and colouring the overlay with a dark tint in the case of a dark decor. The inventor has found out that
5 thereby rich decors can be realized without necessitating an extra thick print on the decorative layer, as a consequence of which the aforementioned disadvantages can be excluded.

10 According to a variant of the invention, instead of the aforementioned coloured overlays, also coloured resins can be used for impregnating the decorative layer, by which similar effects as described above can be realized. Also, a combination of, on one hand, the use of a
15 decorative layer resin-treated with a coloured resin, and, on the other hand, the use of one or more coloured overlays is possible.

A fifth independent aspect of the invention relates to
20 laminate tiles imitating stone tiles, in other words, which have a decorative layer with an image imitating the surface of such stone tiles, whereby by "stone tiles" ceramic tiles as well as tiles of natural stone or other stone-material tiles have to be understood.

25 Laminate tiles imitating a stone tile are already well-known. As aforementioned, these laminate tiles comprise at least a core consisting, for example, of MDF, HDF or another material, and a printed decorative layer.
30 Further, they are preferably also provided with an overlay and a backing layer.

In the known embodiments, when imitating stone tiles, it is common to represent wide joints with a width of

approximately 1 cm between the imitated tiles, such by means of the print on the decorative layer. These imitated joints, which mostly imitate a cement joint, either may coincide with the peripheral edge of the floor panel or not. Also, the panel, and more particularly the top layer, can be somewhat indented at the location of the printed joints in order to even better imitate a real joint. Also, it is known to have the surface of such floor panel correspond in size either to the surface of one tile to be imitated, or to the surface of several tiles to be imitated.

As a consequence of the fact that relatively wide joints are imitated, the advantage is created that differences which inevitably occur, on one hand, as a result of extension and crimping in the printed paper of the decorative layer before this is provided on the core material, and, on the other hand, as a result of production tolerances when processing the pressed basic boards to form floor panels, will be less apparent. When a wide joint is imitated by representing half a joint at the respective edges of adjoining floor panels, whereby such half joint also is rather wide, it will be less apparent if the pattern is somewhat shifted in respect to the edge of the floor panel, as such shifting only results in that the half joint, at one side, will become somewhat narrower than it should be, whereas, on the other side, it will become somewhat too wide. Also when the imitated joints are not situated at the edges, but extend transversely over the floor panels, differences will hardly show, as the imitated joints, in view of their width, will still be at least partially aligned, even with a mutual shifting.

Nowadays, there is a tendency to apply very fine joints for real stones, for example, with a width of several millimetres to less than 1 mm, or even to lay the stones directly against each other, whereby in the last case, due to the irregularity of the edge of a real stone tile, still a tiny joint remains visible. With laminate tiles, it is rather difficult to imitate thin joints by means of printing, in particular when joints of half the width must be provided along the peripheral edge of a floor panel. The least divergence between the printed pattern and the real edge of the floor panel then results in that the printed joint either completely drops off the floor tile, or appears completely on the floor tile, at a distance to the edge of the floor tile, which renders such floor tiles unusable. Also if the printed joints are provided such that they extend transversely over such final floor tile, the application of such printed narrow joints results in that divergences, more particularly a shifting of the printed pattern in respect to the edge of the floor panel, will be very apparent, such because then it may occur that the printed joints of adjoining floor tiles are shifted completely in respect to each other, which is experienced as very annoying.

Basically, the laminate floor tiles might be realized without printed joint and, during laying, might be placed with their flat upper sides directly against each other. Tests, however, have shown that this leads to a very bad optical result. Furthermore, when wet-cleaning such tiles, moisture might penetrate between the floor tiles, which then is immediately taken up under the decorative layer into the core material, which results in that the core material swells up and pushes the decorative layer, as well as the top layer present thereabove, upward. This

results in that the upper surface, at the location of the upwardly pushed edges, wears faster, which finally leads to the occurrence of ugly edges. Hereby, it is noted that this risk is rather high with laminate tiles imitating
5 stone tiles, as the users of such laminate tiles often have the habit to regularly wet-clean these tiles, just as real stone floor tiles.

Thus, the present invention aims at a laminate tile
10 whereby the aforementioned disadvantages are excluded. To this aim, the invention, according to a fifth aspect, relates to a floor panel of the type consisting of a laminate panel which comprises at least a printed decorative layer which is provided with a pattern
15 imitating a stone floor tile, characterized in that this floor panel, at its upper edge, is provided with a chamfer. When such floor panels according to the fifth aspect of the invention are installed adjacent to each other, the chamfer results in that an effect is created
20 as if real stone floor tiles were concerned which are laid against each other with a narrow joint. It is clear that hereby, it is no longer necessary to print joints on the decorative layer and that consequently the aforementioned problems, which are created by divergences
25 in the position of these printed joints, will not occur.

Preferably, the chamfer consists of a material part which has been removed along the respective upper edge, more particularly, milled off. In the most preferred form of
30 embodiment, this chamfer is formed by a bevel or bevelled edge, for example, at 45 degrees, or a rounding, however, other shapes of removed material parts, for example, a small rectangular recess, are not excluded.

Said chamfer preferably extends along the entire periphery of the floor panel. Furthermore, one floor panel imitates preferably only one real tile. According to another possibility, one floor panel also may imitate a plurality of stone floor tiles, whereby the chamfer then preferably is provided along the entire periphery of the floor panel, whereas the intermediate joints extending transversely over the floor panel are obtained by a print on the decorative layer or by means of a locally milled-in groove or in any other manner.

It is clear that the floor panels, more particularly floor tiles, which are realized according to the fifth aspect of the invention, may have different forms and dimensions and thus may be square as well as rectangular as have any other shape, although the square embodiment is preferred.

Preferably, on the surface of the chamfer, a coating, more particularly decorative coating, is provided, which preferably also offers a protection against moisture penetration and which, for example, is formed by a print, layer of paint or other hardening substance, or an impregnating agent or a strip, possibly glued onto the surface. In case of a print, this latter can be realized by means of transfer printing or any other printing process. In case of a layer of paint or an impregnating agent, or another liquid component, this latter can be provided, for example, by means of small paint rollers, by means of a spraying or sputtering technique or any other technique. Also, dry techniques, such as powder coating, are not excluded. According to another possibility, the groove formed by the chamfer at two

adjoining panels also might be filled with a strip or jointing material.

5 According to an important preferred characteristic of floor panels according to the fifth aspect of the invention, the coating on said chamfer shall either imitate a jointing material, for example, cement joint, or be adapted, at least in respect to the colour, to the colour of the upper surface of the floor panel, more
10 particularly, show the same or approximately the same tint.

According to another important preferred characteristic, the chamfer, measured at the upper side of the floor
15 panel, shall extend over a distance which is of the order of magnitude of 1 millimetre or smaller.

By providing a coating on the chamfer, the immediate penetration of moisture under the decorative layer into
20 the core is prevented, which minimizes the above-mentioned disadvantage connected therewith.

It is clear that the floor panels which are realized according to the fifth aspect of the invention, at their
25 edges preferably also are provided with coupling means, by which adjoining panels can be coupled to each other, preferably glueless.

According to a sixth independent aspect, the invention
30 relates to a floor panel, of the type consisting of a laminate panel, with a resin-based top layer, with the characteristic that it is provided with a polished glossy surface. The inventor has found that by polishing such top layer, surprisingly beautiful glossy surfaces can be

realized, such contrary to the general expectance that such top layer, when being excessively polished, would be removed and/or damaged.

5 By panels with "a resin-based top layer", in particular laminate panels with a top layer based on thermosetting resin, for example, melamine resin, are meant.

10 According to a diverging form of embodiment of the invention, polishing is also applied to panels which, at their upper side, are provided with a lacquer, varnish or the like, whether resin-based or not. The applied technique then consists in successively providing the respective lacquer, drying, and polishing by means of
15 brushing, possibly preceded by roughening.

By a glossy surface is understood that there is a clearly higher degree of gloss than such top layer shows after having been provided on the floor panel or the basic
20 board, of which such floor panel is manufactured, thus, before being polished.

According to an important preferred characteristic, the glossy effect is realized by first roughening said top
25 layer and then finishing, more particularly polishing it. By means of the preceding step of roughening, it was found, rarely enough, that afterwards, good and even very good degrees of gloss can be obtained by a rather short finishing process, more particularly polishing process,
30 which renders this technique optimally applicable at an industrial level.

The roughening can be performed in any manner, however, of course is performed such that the top layer will not

be really damaged. According to a practical form of embodiment, this can be realized by means of a rotating brush or a rotating brush-like element provided with an abrasive material at the parts which come into contact
5 with the top layer. For example, a brush-like element can be used, with bristles in which abrasive granules are incorporated, or a brush-like element whereby instead of bristles, lip-shaped sheets of abrasive paper are used.

10 The finishing or polishing is preferably performed by means of a rotating brush with bristles, although other techniques are not excluded, for example, by means of flat rotating polishing wheels.

15 It is clear that the sixth aspect of the invention relates to the floor panels themselves as well as to the aforementioned methods which can be applied therewith.

It is clear that according to the sixth aspect, a smooth
20 method for realizing a glossy surface is offered, which is considerably easier to realize than trying to realize a gloss by means of an adapted press plate.

Such glossy surface is optimum for imitating, for
25 example, a waxed marble floor, however, can also be employed in combination with any pattern.

It is noted that all characteristics of floor panels according to the first, second, third, fourth, fifth and
30 sixth aspects can be combined at random.

Also, at random one or more of all subordinate characteristics which are described in respect to the floor panel according to the first aspect of the

invention, can be applied in combination with the main characteristics of the floor panels according to the second, third, fourth, fifth and sixth aspects, thus, without having to apply all main characteristics of the first aspect.

Also, the subordinate features of floor panels, described above or in the following, according to one of the aforementioned aspects, can be applied at random in floor panels according to another of said aspects, without also applying the main characteristic of the first-mentioned aspect, such of course inasmuch the application of such subordinate feature does not contradict the other features.

Finally, the invention also relates to a method for manufacturing a floor panel according to the invention, with the characteristic that this method comprises at least two main steps, on one hand, a first step wherein one or more basic layers, a decorative layer and a transparent so-called overlay, by means of a thermosetting synthetic material, are pressed together to a whole in a heated press, whereby, preferably simultaneously with pressing together, indentations are formed in the upper side, and, on the other hand, a second step, whereby said component is brought into the indentations. This method allows for a particularly smooth production, with relatively low production costs and in a manner suitable for mass production.

It is clear that this method can be applied for manufacturing floor panels according to the different aforementioned aspects, at least inasmuch as indentations are used when realizing them.

It is also clear that the decorative layer and overlay possibly can be united beforehand.

5 In a diverging form of embodiment of the aforementioned method, the overlay to be pressed is omitted and whether or not replaced by another layer, whereby the indentations then are formed in the resin of the resin-treated decorative layer or in said other layer. This
10 other layer can be of any kind, for example, a transparent layer of lacquer.

Generally, the invention does not exclude that apart from the described layers, additional other layers can be
15 applied.

With the intention of better showing the characteristics of the invention, hereafter, as an example without any limitative character, several preferred forms of
20 embodiment are described, with reference to the accompanying drawings, wherein:

Figure 1 schematically represents a part of a floor covering which is composed of floor panels according
25 to the invention;

figure 2 represents a floor panel according to the invention in plan view;

figures 3 and 4, at a larger scale, represent cross-sections according to lines III-III and IV-IV,
30 respectively, in figure 2;

figure 5, at a larger scale, represents the part indicated by F5 in figure 3;

figures 6 to 11 represent different steps of the method according to the invention;

figure 12 schematically represents an entire process for realizing floor panels according to the invention; figures 13 to 16 represent a number of variants of the invention;

5 figure 17 in perspective represents another floor panel according to the invention;

figure 18, at a larger scale, represents a cross-section according to line XVIII-XVIII in figure 17;

10 figure 19, at a larger scale, represents the part indicated by F19 in figure 18, however, in a condition in which the panel is coupled to another similar panel;

figure 20 schematically represents a floor covering formed of floor panels according to figure 17;

15 figure 21 schematically represents a particular technique for treating laminate floor panels.

As represented in figures 1 and 2, the invention relates to floor panels 1, more particularly laminate panels, for
20 forming a floor covering 2.

In the represented example, the floor panels 1 are rectangular, however, it is clear that according to variants not represented, they also can have another
25 shape and can be, for example, square or polygonal, such as hexagonal or octagonal.

Preferably, the floor panels 1 are provided at least at two opposite edges 3-4, and even better, as represented
30 in figures 2 to 4, at both pairs of edges 3-4, 5-6,, respectively, with coupling means 7, by which several of such floor panels 1 can be mutually coupled, such that these coupling means 7, in coupled condition, offer a locking in vertical as well as horizontal directions.

Such coupling means 7, which, as known, allow to couple the floor panels 1 without glue, as well as uncouple them again, as such are well known from the state of the art and are described, amongst others, in the international patent applications WO 97/47834 and WO 94/26999. Also, it is known that such coupling means 7 can be realized in different forms and that in function of the applied form, the coupling of the floor panels 1 can be realized in different manners, for example, in such a manner that such floor panels 1 can be mutually coupled by means of translation movements T1 and/or T2 and/or T3 and/or turning movements W1 and/or W2, as schematically indicated in figure 1.

It is noted that the present invention, however, is not limited to floor panels 1 with coupling means 7 providing in a mechanical locking in the direction R1 and R2, however, as a matter of fact also can relate to floor panels 1 which, at one or more edges, are provided with other coupling means, for example, with a classical tongue and groove, which possibly can be glued into each other, or even can relate to floor panels 1 comprising no coupling means at one or more edges.

As explained in the introduction and as is shown in detail in the enlarged illustration of figure 5, the floor panel 1, according to a first aspect of the present invention, is formed of a laminate panel comprising at least a printed decorative layer 8, as well as a top layer 9 forming the upper surface 10 of the floor panel 1, more particularly a so-called overlay, whereby this top layer or overlay 9 is realized on the basis of a thermosetting resin, and this floor panel further is

characterized in that in the upper side 11 of the floor panel 1, indentations 12 are formed and that at least in a number of these indentations 12, a component 13 is provided, said component being obtained by having been
5 deposited in these indentations 12 after the provision of the indentations 12 themselves.

It is clear that in this manner, a floor panel 1 is obtained of which large parts 14 of the upper surface 10
10 still are formed by a top layer 9 which is realized on the basis of thermosetting resin, as a consequence of which the important advantages thereof are maintained, whereas, meanwhile, also an additional component 13 can be incorporated in the upper surface in an optimum
15 manner, such for the purpose of realizing different effects, as described in the introduction.

The top layer 9 preferably is a layer based on melamine resin, which, for example, is formed of a carrier
20 impregnated with such resin, such as a resin-impregnated paper.

It is noted that, according to a variant of the invention, it is also possible to make no use of a
25 separate overlay. The top layer 9, in which the indentations are provided, then, for example, is formed by the resin with which the decorative layer itself is impregnated.

30 The printed decorative layer 8 preferably is printed with a pattern 15, whereby this pattern then is situated at the upper side 16 of the decorative layer 8, or at least at the upper side of the carrier of this decorative layer 8.

The indentations 12 can have different forms and dimensions. Depending on the intended effect, these indentations 12 either can be provided in function of the printed pattern 15 or not. By "provided in function of the printed pattern 15" is meant that the form and/or dimensions and/or direction according to which these indentations 12 extend, are adapted to the printed pattern 15, which does not necessarily mean that they specifically have to follow this pattern 15 or must be aligned with this pattern 15. In the case that the pattern 15 consists of a wood pattern, this, amongst others, may mean that the indentations 12 follow the wood pattern, or follow it to a certain extent, as described in the WO 01/96689, as well as that the indentations 12 consist of randomly provided oblong indentations which, globally, seen, extend in the longitudinal direction of the imitated wood nerves, as this traditionally is applied for laminate parquetry.

20

The application of indentations 12 which are adapted to the pattern 15, in particular offers important utilization possibilities in the case that the aforementioned component 13 consists of a colour product. By a "colour product", each agent is to be understood which is not colourless transparent, but results in a certain colour effect, including white or black. For such colour product, for example, use can be made of a paint, more particularly a water-based paint, or a paint in the form of an UV-hardening varnish. Also, it is not excluded to apply other substances, such as, for example, lime or the like.

30

As aforementioned, an important application of this invention consists in imitating coloured or post-treated wooden floor parts or parquetry parts, often also called "patinated" wood or parquetry, in an efficient manner. In such case, the printed decorative layer 8 represents a wood pattern 15, whereas in the indentations 12, which preferably are adapted to the wood pattern 15, a colour product is provided. Hereby, as schematically indicated in figure 2, it is obtained that the wood pattern 15 is visible through the transparent top layer 9 and possible other intermediate layers, whereas the component 13, which is situated in the proximity of the upper side 11 and which, in figure 2, is schematically indicated by a thicker kind of line, imitates a colour substance, comparable to a real colour substance, lime or such of a coloured, for example, lime-treated real wooden floor.

In the case that a lime-treated floor must be imitated, for the component 13 a colour product of a light colour, and in particular white, is applied.

According to a variant, the component 13 can also comprise an active agent, whether or not in combination with a colour product. As explained in the introduction, such agent may possess, for example, anti-bacterial and/or anti-static and/or dirt-repelling and/or mildew-repelling and/or fluorescent and/or phosphorescent features.

Such products, and possible carriers to apply the former thereon, in their turn are sufficiently known from the state of the art and thus will not be described here in detail.

In general, it is preferred that the indentations 12, at least in one direction, show a small dimension, for example, a width which, for the majority of the indentations 12, is less than 2 mm, and even better less than 1 mm. Also, the majority of these indentations 12 preferably is oblong, with a length varying between some millimetres and some centimetres, the latter in particular in applications whereby the floor panel 1 is provided with a decorative layer 8 with a wood pattern 15. The depth of the indentations is random, however, of course is chosen such that no undesired damages of the surface occur during the formation thereof.

The top layer or overlay 9 may consist of a classical colourless transparent overlay. According to a particular embodiment of the invention, however, also a coloured transparent top layer or overlay 9 can be applied, as a consequence of which, as already explained, particular effects can be created.

In figures 6 to 11, schematically a method is represented for realizing a floor panel 1 according to the first aspect of the invention, at least for realizing the indentations and providing the component 13 therein.

In the represented form of embodiment of this method, the floor panel 1 is realized as so-called Direct Pressure Laminate (DPL). This technique allows for a smooth production, whereby in one pressing cycle, boards can be realized which already show the complete or almost complete layer structure of the end product, thus, of the floor panels 1 to be formed. This, however, does not exclude that the invention also can be applied in

combination with other techniques than those applied for manufacturing DPL.

5 In the method represented in the figures, first, as represented in figure 6, the different layers with which one starts, are provided on top of each other. Hereby, this relates to a basic layer 17, which in its turn may consist of several layers or composite parts or not, a printed decorative layer 8, a top layer 9 and preferably also a backing layer 18. The basic layer 17 consists, for example, of a MDF/HDF board, particle board, so-called blockboard or the like. The decorative layer 8 may simply consist of printed paper, however, preferably has already been impregnated with resin beforehand. As
10
15
15 aforementioned, the top layer 9 consists of a carrier, such as a sheet of paper, impregnated with thermosetting resin. The backing layer 18, too, consists of a resin-impregnated carrier.

20 Of course, also other intermediate layers can be provided, such as, for example, additional resin-impregnated layers.

As represented in figure 7, the obtained stack of layers
25 is brought into a heated press 19, preferably a flat press, with a lower plate 20 upon which the aforementioned stack is placed, and an upper plate 21, between which the whole is compressed. The upper plate 21 is provided with protrusions 22 or such for forming said
30 indentations 12.

These indentations 12 are formed at that moment when the press, as illustrated in figure 8, is closed, whereas the thermosetting resin of the decorative layer 8 and the top

layer 9 melt together and harden to a whole, adhered to the basic plate 17.

From the press 19, a composite board 23 is obtained as represented in figure 9, wherein, in the upper side 11, indentations 12 are present.

Subsequently, the component 13 is brought into these indentations. This bringing-in preferably takes place by depositing an amount of this component 13 in the indentations 12, for example, by wiping it into the indentations 12, for example, by means of doctoring, rubbing or rolling it in. Figure 10 shows how such component 13 can be provided in the indentations 12 by means of a doctor blade 24. Figure 11 shows a variant, whereby a component 13 is rolled into the indentations 12 by means of a roll 25.

Figure 12 represents a global survey of the method. In a first step 26, a stack 27 of different layers, as aforementioned, is brought into a press 19, whereby, as explained above with reference to figures 7 to 9, boards 23 are formed which, at their surface, are provided with indentations 12. In a subsequent step 28, the component 13 is deposited in the indentations 12, which in figure 12 is indicated schematically by means of a doctor blade 24. Subsequently, the component 13 can be subjected to a drying in a forced manner, for example, by means of infrared radiation in case of thermal drying or by means of ultraviolet radiation in case of curing, for example, by means of lamps 29, which step is indicated schematically by reference 30 in figure 12. Subsequently, the boards 23 are sawn into floor panels 1, as schematically represented in step 31, after which

coupling means 7 can be formed at these floor panels 1, for example, by means of the milling cutters 33 schematically represented in step 32.

5 It is clear that the application of the component 13 in a suitable manner possibly may be performed in several steps. So, for example, in a first step the component 13 may be excessively provided on the respective surface by means of a roll, doctor blade or the like, whereas in a
10 second step, the excess amount, or at least a part thereof, is removed, for example, by means of a take-up roll or wiping roll. In a practical embodiment, the boards or panels are transported by means of a transport system along an entrained applicator roll and a removing
15 roll rotating in countersense.

The applicator roll preferably has a soft surface consisting, for example, of natural rubber. At the surface of the applicator roll, a film of liquid
20 component 13 is provided, for example, by means of a dosage roll installed next thereto, whereby this latter is situated next to the surface of the applicator roll in such a manner that an amount of liquid component can be deposited between both rolls which is carried along at
25 the surface of the applicator roll in the form of a film. By the contact between the applicator roll and the boards or panels, the component is forced into the indentations, and part of it also remains present at the surface.

30 The removing roll preferably has a hard smooth surface and rotates in countersense over the boards or panels. Preferably, to this aim use is made of a chromium-plated and/or polished metal roll. Hereby, the component 13 which is situated out of the indentations substantially

is taken along and finally removed from the removing roll by means of a doctor blade.

5 Also, a removing roll can be used which is permanently rinsed with solvent and thereby moves in countersense with a solvent film along the treated boards or panels in order to remove excess component.

10 It is obvious that one or more removing rolls can be used. Preferably, however, successively two removing rolls are used, namely a first conventional removing roll and a second, solvent-rinsed removing roll.

15 In case that a UV drying is applied, preferably Ga lamps as well as Hg lamps are applied for realizing a drying in depth as well as at the surface.

20 Also, after drying, a post-treatment may follow, whereby remaining component 13, which is present on the surface between the indentations, is wiped away dry, for example, brushed away. Such post-treatment is especially useful for removing a remaining tinge, formed by component 13. The brushing-off of said tinge may, for example, be performed by means of rotating brushes. Hereby, brushes
25 provided with bristles as well as with other parts with a brushing function, such as, for example, lips of abrasive paper, may be concerned.

30 Possibly, one or more additional measures can be taken in order to enhance the adhesion of component 13.

One measure consists, for example, in making the upper surface of the boards or panels dust-free, for example, by means of a brushing process.

Another measure consists, for example, in heating the upper surface of the boards or panels, such that this surface becomes somewhat softer and a better adhesion is realized.

Still another measure consists in adapting the position of the tear-resistant particles in the top layer such that these particles, for example, corundum particles, will be situated closer to the surface than this usually is the case. Hereby, an improvement of the adhesion was stated which presumably is the consequence of the fact that the indentations then extend between said particles, whereby the adjoining particles then realize a better adhesion, as well as offer protection for the component 13 situated in between.

Hereby, it is advantageous to make use of an overlay of the type whereby the tear-resistant particles are incorporated in the paper instead of in the resin. Obviously, the particles hereby have the tendency to sit at one side of the paper. Usually, the overlay is placed with this side of the paper downward. By now applying the overlay, however, reversed, the particles will be situated closer to the upper surface, by which, as aforementioned, a better adhesion of the component 13 is obtained. Because a film of resin is present around the paper of the overlay, the tear-resistant particles do not border the surface, as a result of which the press plates still remain more or less protected against the abrasive effect of the tear-resistant particles.

Figure 13 illustrates that, as already described in the introduction, such floor panel 1, at one or more upper

edges, in this case, the upper edge 34, can be provided with a cut-away material part, whereby the surface 35, which is created by the cutting away of this material part, is at least partially provided with a finish, in such a manner that the appearance of the surface 35 matches the effect which is obtained by the colour product applied in said indentations 12. In figure 13, this is a separate covering layer 36 provided on the surface 35, for example, by means of transfer print.

According to a variant, instead of using transfer print, also a coating can be applied whereby the surface 35 is treated by means of a colouring substance, such as a paint, varnish, coloured impregnating agent or the like, whereby this can be provided on the surface 35 in any manner, for example, by atomising, sputtering, spraying, by means of a roll or by means of a felt-tip pencil.

Preferably, in the latter case the surface 35 is coloured with a colouring product of the same colour, or almost the same colour, as the colouring product used for said component 13, or even component 13 itself can be used for the colouring thereof.

The aforementioned is particularly useful in combination with floor panels 1 whereby, by the cut-away parts, a so-called "chamfer" is formed. The cut-away parts, however, also may have another shape, for example, a rectangular shape, as indicated in dash-dotted line 37, for imitating a groove between the laid floor panels 1.

Finally, it is again underlined that the floor panels 1 which are in accordance with said second or third or fourth aspect of the invention, do not necessarily have

to possess all characteristics of the floor panels 1 which are realized in accordance with the first aspect, which hereafter is illustrated by means of a number of examples.

5

The second aspect, for example, relates to the fact that a laminate panel, realized as a floor panel 1, is provided with a "coloured" or "patinated" effect, which is realized by combining a printed decorative layer with indentations in which a component in the form of a colour product is provided. This means, for example, that it is not necessarily required to make use of said top layer 9, that said indentations 12 do not necessarily have to be situated in the uppermost layer, and that, if a top layer 15 9 is applied, this latter not necessarily has to consist of a thermosetting resin.

So, for example, the aforementioned indentations to be coloured can be provided in a transparent lacquer layer or the like, which is situated directly or indirectly 20 above the printed decorative layer.

Generally, it is noted that the provision of indentations in said layers does not explicitly mean that these 25 indentations thereby extend exclusively in said layer. In fact, the indentations may extend throughout different layers and/or create deformations therein. In case of layers pressed upon each other, such as the aforementioned decorative layer and overlay, such layers, 30 during pressing, flow into each other, such that in the end product, so to speak, one layer is obtained and, thus, it becomes difficult to determine up to which layer the indentations are extending.

According to the third aspect, the invention relates to a floor panel with a top layer based on synthetic material, whereby this floor panel, at its upper side, whether in said synthetic material or not, shows deepened parts, at which a component is provided which comprises an active agent. These deepened parts may consist exclusively of indentations 12, as illustrated in figure 14, or exclusively of surfaces 35 which are obtained by cut-away parts, for example, as illustrated in figures 15 and 16, or also by a combination of these two possibilities.

According to the fourth aspect, use is made of a coloured top layer or overlay in combination with an underlying printed decorative layer. According to this fourth aspect, the indentations 12 and the deepened parts are optional.

It is clear that, when, in accordance with the second or third aspect of the invention, use is made of indentations wherein a component, according to the second aspect a colouring agent and according to the third aspect an active agent, is provided, the forming of the indentations and the application of the component in this indentations may be performed in a manner analogous to that described by means of figures 5 to 12. However, other techniques are not excluded.

Another technique for providing a component 13 in indentations 12, after these indentations 12 have been formed, according to the present invention consists in that the entire surface of the boards 23, or at least major parts thereof, are covered entirely or almost entirely with the component 13 and subsequently these boards 23 are cleaned such that the component 13

substantially remains present in the indentations 12 only, whereas the component 13 situated on the intermediate parts 14 substantially is removed. This cleaning can be realized in different manners, for example, by wiping off, brushing or the like.

According to a variant of this technique, one will work in at least two steps, whereby in the first step, one provides for that a first agent remains exclusively, or almost exclusively, in the indentations 12 and subsequently, in the second step, a second agent is provided on the surface which can react and/or which properly adheres to the first agent, however, reacts little or not at all or adheres little or not at all to the parts 14 situated between the indentations 12. These technique is particularly advantageous when using two-component resins to this aim. In such case, the board 23 first can be covered with the first component, which preferably is clear transparent, with the result that the layer formed by this agent is thicker at the location of the indentations 12 than at the location of the parts 14. Subsequently, this first component can be partially evaporated, such that the thinner quantities on the parts 14 are completely or almost completely removed, whereas a certain amount of the thicker quantities at the location of the indentations 12 still remains present. Thereafter, the second component, of the resin which only reacts with the first component, is applied on the board 23 and the resin is cured. Hereby, a curing is exclusively obtained at the locations where the first as well as the second components are present, i.e. only, or almost only, in the indentations 12. Subsequently, the amount of second component which has not reacted with the first component

can simply be removed by washing off, wiping off, scraping off or the like.

5 It is clear that the reacted first and second components of the two-component resin then together form the intended component 13.

Also, it is not excluded to apply a component 13 in the indentations 12, which component, exclusively at the location of the indentations 12, is covered with an additional layer. So, for example, may a colouring product be provided at the bottom of the indentations 12, whereas thereabove a transparent layer is deposited in order to give additional characteristics to the whole.
15 Such additional characteristics may consist, for example, in that a protective layer is formed over the colouring product or that an active component is integrated in the transparent layer.

20 The invention does not exclude that in embodiments according to the first, second or third aspect component 13 is not only present in the indentations. According to these aspects, the product 13 may be present on the parts 14 to a restricted extent, for example, in the form of small component residues which have remained on the surface.
25

The present invention is in no way limited to the forms of embodiment described by way of example and represented in the figures, however, such floor panel, as well as the method for manufacturing such floor panel, can be realized according to various variants, without leaving the scope of the invention.
30

So, for example, it is not excluded to apply the component 13 in the indentations after the sawing of the boards 23, and even after milling or the like, as a consequence of which the extent of the equipment required to this aim can be restricted. If this takes place after milling, or in between certain milling cycles, an already formed possible "chamfer" or, thus, bevelled edge, or another deepened part can be provided with a component 13 at the same time as the indentations.

10

By first sawing or cutting the boards 23 into floor panels and by providing the component 13 before the forming of the coupling means, it is excluded that component 13 lands onto the coupling means.

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It is noted that in case that the component 13 first is provided at the boards and only afterwards floor panels are produced thereof, it is not excluded that the boards are cut to smaller boards preceding to the application of the component.

20

Also, the invention relates to a „method“ for imitating a coloured surface in laminate panels, more particularly for imitating coloured wood, whereby one proceeds as described in the foregoing.

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In figures 17 to 20, laminate panels are represented which are realized in accordance with the aforementioned fifth aspect of the invention. These floor panels 1 are provided with a printed decorative layer 8 having a pattern which imitates the appearance of a stone floor tile, either a ceramic tile, or a natural stone tile. The pattern 38 in its turn does not have a printed joint, however, the imitation of a joint is obtained in that at

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the floor panels 1 a chamfer 39 is provided at the upper edge, which chamfer, in the represented example, is formed by an inclination at 45 degrees. Preferably, the distance Z over which this inclination extends, is very limited, as discussed in the introduction.

At the surface of the chamfer 39, as represented, preferably a coating 40 is provided which is realized in accordance with the description in the introduction.

Figure 19 also shows that such floor panels 1 preferably are provided with coupling means by means of which they can be locked to each other in a glue-free manner. It is, however, clear that the invention is not limited to the represented form of such coupling means.

In figure 21 is schematically represented how floor panels according to the sixth aspect of the invention can be provided with a surface with an enhanced gloss degree. As represented, the floor panels 1, or the basic boards from which they are sawn, for this purpose preferably first are roughened, which is schematically represented by means of the illustrated tool 41, after which the top layer is finished, which is schematically represented by means of the illustrated tool 42. Hereby, tool 41, as aforementioned, consists of a rotating element which is provided with lips 43 formed by abrasive paper, whereas tool 42 consists of a brush with bristles 44. It is noted that hereby, an intensive brushing process is concerned, which can not be compared to the brushing process which, as aforementioned, is applied for removing the tinge of component 13 from the floor panels. However, this does not exclude that the same brush might be used, such on one and the same floor panel, whereby in a first phase

said tinge and/or excess remainders are removed, whereas in a next phase, whether following immediately or not, a polishing process is realized.

- 5 It is clear that all aspects of the invention are intended in particular for being used in combination with floor panels of the type consisting of so-called DPL (Direct Pressure Laminate).

Claims.

- 1.- Floor panel, of the type consisting of a laminate panel which comprises at least a printed decorative layer (8) and a top layer (9) forming the upper surface (10) of the floor panel (1), more particularly a so-called overlay, whereby this top layer (9), or, thus, overlay, is realized on the basis of a thermosetting resin, characterized in that in the upper side (11) of the floor panel (1), indentations (12) are formed and in that at last in a number of these indentations (12), a component (13) is provided, which is obtained in that it has been provided in those indentations (12) after the provision of the indentations (12).
- 2.- Floor panel according to claim 1, characterized in that said top layer (9) is a layer based on melamine resin.
- 3.- Floor panel according to claim 1 or 2, characterized in that the printed decorative layer (8) represents a wood pattern.
- 4.- Floor panel according to claim 3, characterized in that said indentations (12) are provided in function of the wood pattern, and more particularly follow the lines of the wood pattern and/or represent the wood pores.
- 5.- Floor panel according to any of the preceding claims, characterized in that said component (13) is formed at least of a colour product, more particularly a paint or the like.

6.- Floor panel according to claim 5, characterized in that the printed decorative layer (8) represents a pattern (15) and that said component (13) is chosen such that it gives a "colouring" or so-called "patinating" effect to the pattern (15) of the printed decorative layer (8).

7.- Floor panel according to claim 6, characterized in that it imitates a "coloured" wooden surface (35), to which aim the floor panel (1) comprises, on one hand, a wood pattern represented on the decorative layer (8), and, on the other hand, a component (13) in the indentations (12), said component consisting of a colour product.

8.- Floor panel according to any of the claims 5 to 7, characterized in that the floor panel (1), at least at one upper edge (34), is provided with a cut-away material part, whereby the surface (35) which is created by cutting away this material part is provided, at least partially, with a finish, as a consequence of which the appearance of the surface (35) is adapted to the effect obtained by the colour product in said indentations (12).

9.- Floor panel according to claim 8, characterized in that said surface (35) is coloured at least partially with a colour product of the same colour, or almost the same colour, as the colour product used for said component (13).

10.- Floor panel according to any of the preceding claims, characterized in that it comprises a coloured transparent overlay, which then preferably forms said top layer (9).

11.- Floor panel according to claim 10, characterized in that said overlay is coloured in that it is formed on the basis of coloured resin.

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12.- Floor panel according to any of the claims 6 to 9 and according to any of the claims 10 or 11, characterized in that the coloured overlay, together with said colour product, commonly contribute to an imitation of a "coloured" or "patinated" floor.

10

13.- Floor panel according to any of the preceding claims, characterized in that the indentations (12) show a small dimension in at least one direction, more particularly a width which, for the major part of such indentations (12), is less than 2 mm, and even better less than 1 mm.

15

14.- Floor panel according to any of the preceding claims, characterized in that said component (13) comprises at least one active agent.

20

15.- Floor panel according to claim 14, characterized in that the active agent is a product with one or more of the following features: anti-bacterial, anti-static, dirt-repellent, mildew-repellent, fluorescent, phosphorescent.

25

16.- Floor panel according to any of the preceding claims, characterized in that it is realized as DPL (Direct Pressure Laminate).

30

17.- Floor panel according to any of the preceding claims, characterized in that said component (13) is

present in the indentations (12) in the form of an amount
wiped into the indentations (12) and cured, more
particularly an amount which is brought into the
indentations (12) in that it is rolled thereinto, wiped
5 thereinto, doctored thereinto or the like.

18.- Floor panel according to any of the preceding
claims, characterized in that said component (13) is
situated at the location of the indentations (12), at the
10 exterior of the floor panel (1), in other words, is not
covered by means of possible further layers.

19.- Floor panel, of the type consisting of a laminate
panel which comprises a decorative layer (8) which is
15 printed and/or provided with a pattern (15),
characterized in that the floor panel (1) is provided
with a coloured or "patinated" appearance, which is
realized at least by means of indentations (12), in which
a component (13) in the form of a colour product is
20 provided.

20.- Floor panel according to claim 19, characterized in
that the printed decorative layer (8) represents a wood
pattern.

21.- Floor panel according to claim 19 or 20,
characterized in it that has a coloured transparent
overlay, whether or not forming the uppermost layer of
the floor panel (1).

22.- Floor panel according to claim 21, characterized in
that the top layer (9) is realized on the basis of a
thermosetting resin and that this overlay is coloured in
that use is made of coloured resin.

23.- Floor panel, of the type consisting of a laminate panel with a top layer (9) on the basis of synthetic material, whereby this floor panel (1) shows deepened parts at its upper side (11), characterized in that at least at the location of the deepened parts, a component (13) comprising at least an active agent is provided.

24.- Floor panel according to claim 23, characterized in that the deepened parts are formed by local indentations (12) of small dimensions and/or by the surface (35) of parts which are formed by removing material parts at the upper side (11) of the floor panel (1), whether or not at the edge thereof.

25.- Floor panel of the type consisting of a laminate panel which comprises at least one decorative layer (8) which is provided with a certain pattern (15), characterized in that the floor panel (1) also comprises at least a so-called overlay, which is coloured, but transparent, whether or not forming the uppermost layer of the floor panel (1).

26.- Floor panel according to claim 25, characterized in that said overlay is realized on the basis of a resin, whereby the resin is coloured.

27.- Floor panel of the type consisting of a laminate panel which comprises at least a decorative layer (8) which is provided with a pattern (38) imitating a stone floor tile, characterized in that this floor panel, at its upper edge, is provided with a chamfer (39).

28.- Floor panel according to claim 27, characterized in that the chamfer (39) consists of a material part which has been removed along the respective upper edge, more particularly a bevel or rounding.

5

29.- Floor panel according to claim 27 or 28, characterized in that said chamfer (39) extends along the entire periphery of the floor panel (1).

10

30.- Floor panel according to any of the claims 27 to 29, characterized in that the floor panel (1) imitates precisely one tile, whereby the pattern (38) of the decorative layer (8) is free of printed joints.

15

31.- Floor panel according to any of the claims 27 to 30, characterized in that a coating (40) is provided on the surface of the chamfer.

20

32.- Floor panel according to claim 31, characterized in that the coating (40) on said chamfer (39) either imitates a joint material, for example, cement joint, or, at least in respect to the colour, is adapted to the colour of the upper surface of the floor panel, more particularly, shows the same or approximately the same tint.

25

33.- Floor panel of the type consisting of a laminate panel, with a resin-based top layer, characterized in that it is provided with a polished glossy surface.

30

34.- Floor panel according to claim 33, characterized in that it has a glossy surface, whereby the gloss is the result of a process whereby said top layer first has been roughened and afterwards has been polished.

35.- Floor panel, characterized in that it shows a combination of characteristics, as described in two or more of the preceding claims.

5

36.- Method for manufacturing a floor panel (1) according to any of the preceding claims, characterized in that this method comprises at least two main steps, on one hand, a first step wherein one or more basic layers, a decorative layer (8) and a transparent so-called overlay, by means of a thermosetting synthetic material, are pressed together to a whole in a heated press, whereby, simultaneously with the pressing, indentations (12) are formed in the upper side (11), and, on the other hand, a second step whereby said component (13) is brought into the indentations (12).

10

15

37.- Method according to claim 36, characterized in that said component (13) is brought into the indentations (12) in the form of an amount deposited therein.

20

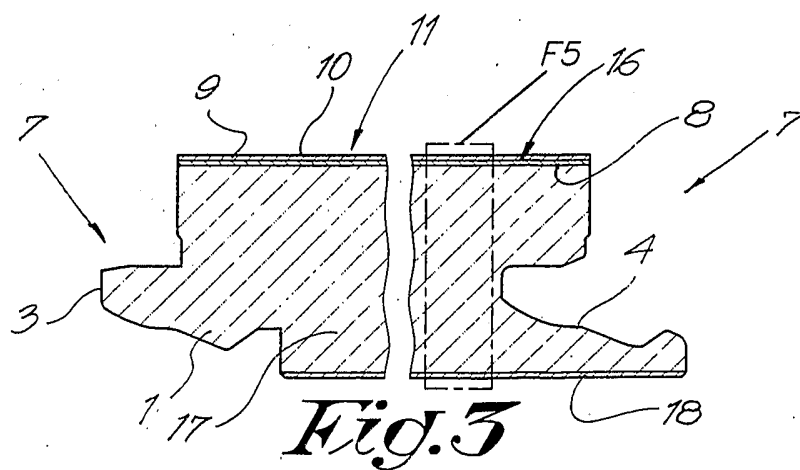
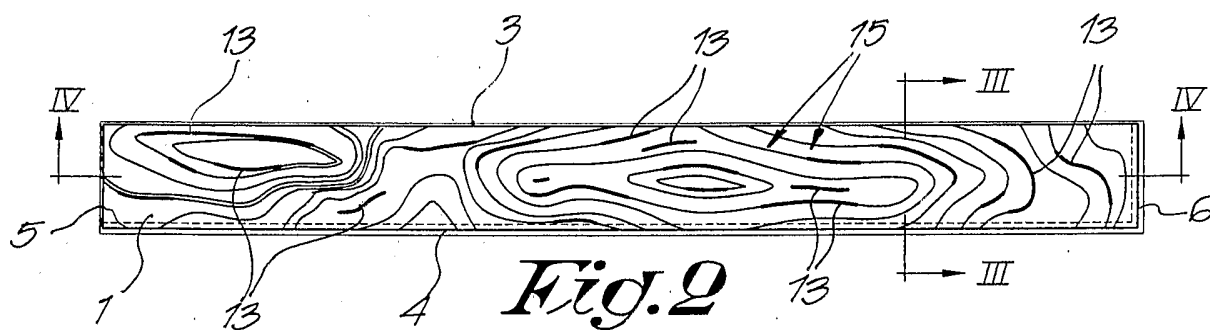
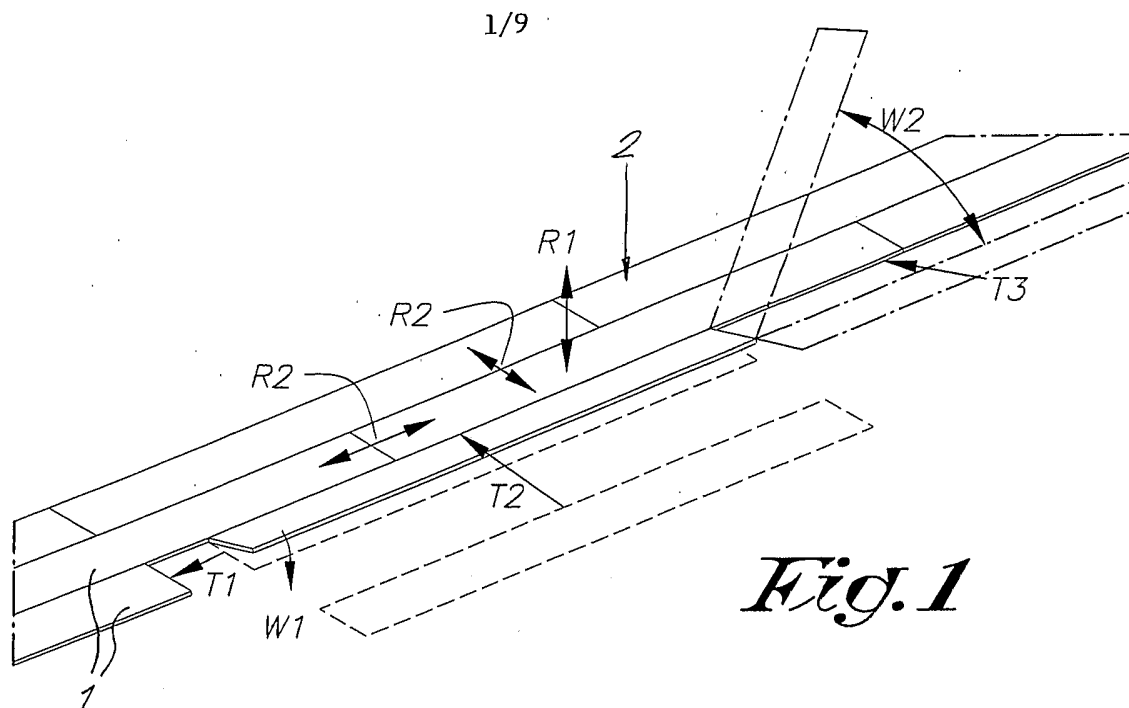
38.- Method according to claim 36 or 37, characterized in that one starts with larger boards (23), in other words, boards (23) from which several floor panels can be manufactured; that first these boards (23) are formed and provided with indentations (12); that subsequently said component (13) is brought into the indentations (12); and that only afterwards separate floor panels are formed from the boards (23).

25

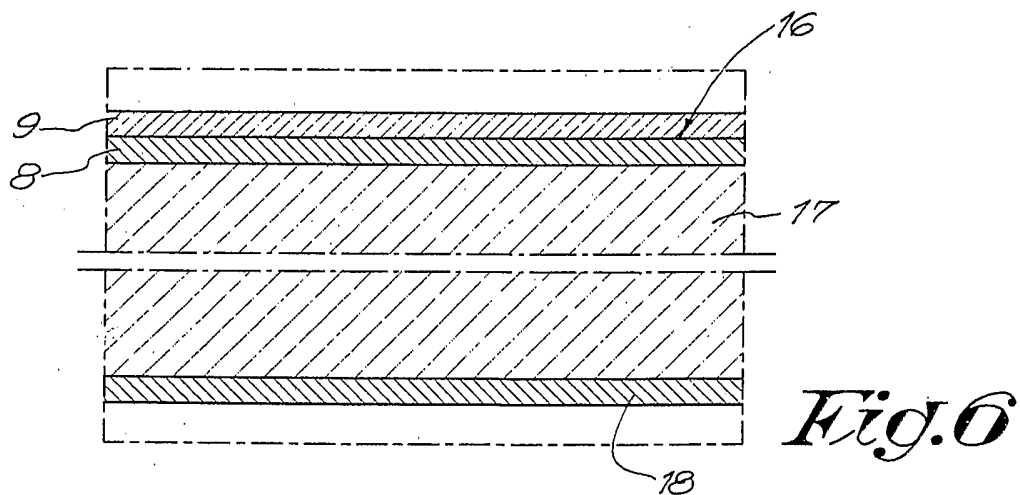
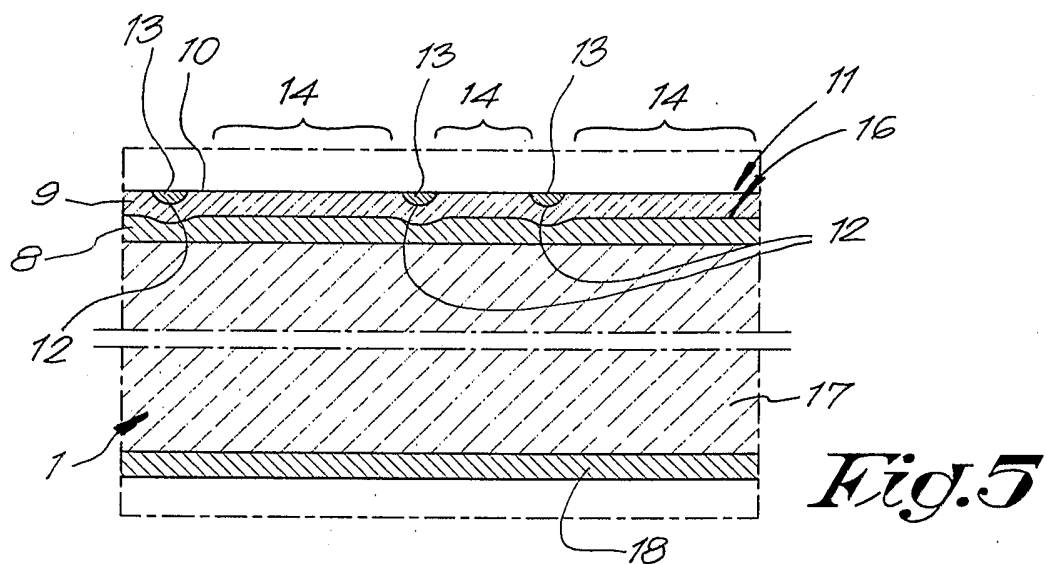
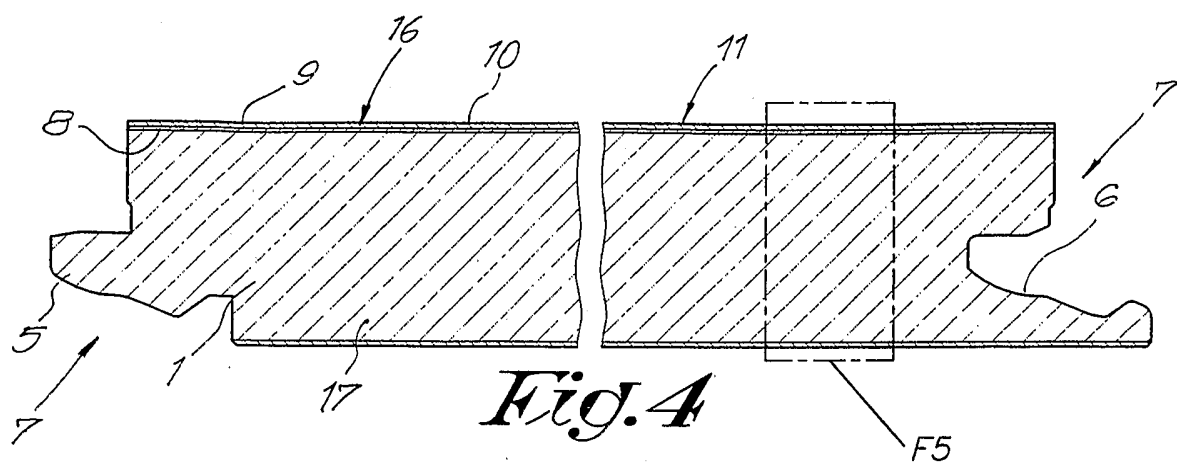
30

39.- Method according to claim 36 or 37, characterized in that one starts with larger boards (23), in other words, boards (23) from which several floor panels can be manufactured; that first these boards (23) are formed and

provided with indentations (12); that subsequently separate floor panels are formed from the boards (23), after which a component (13), as aforementioned, is brought into the indentations (12).



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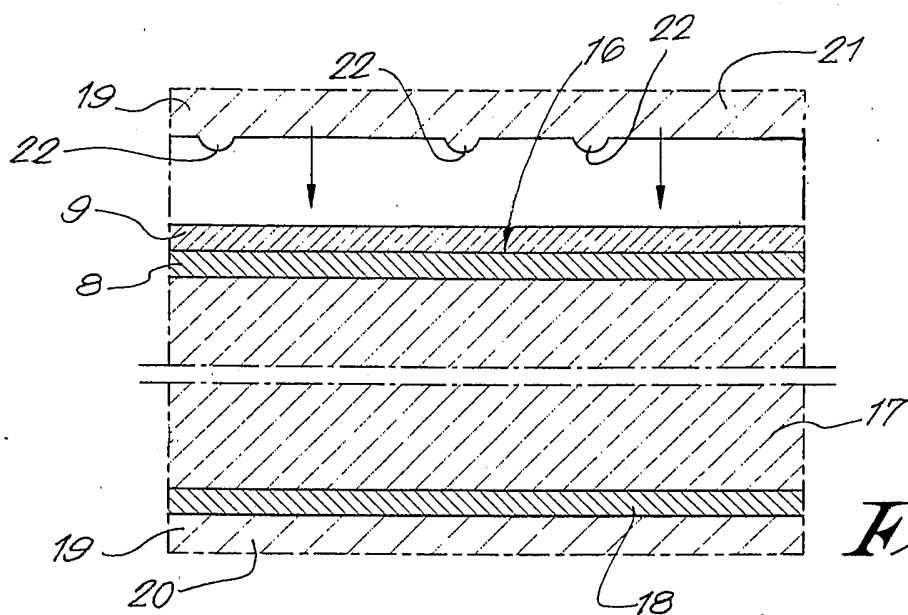


Fig. 7

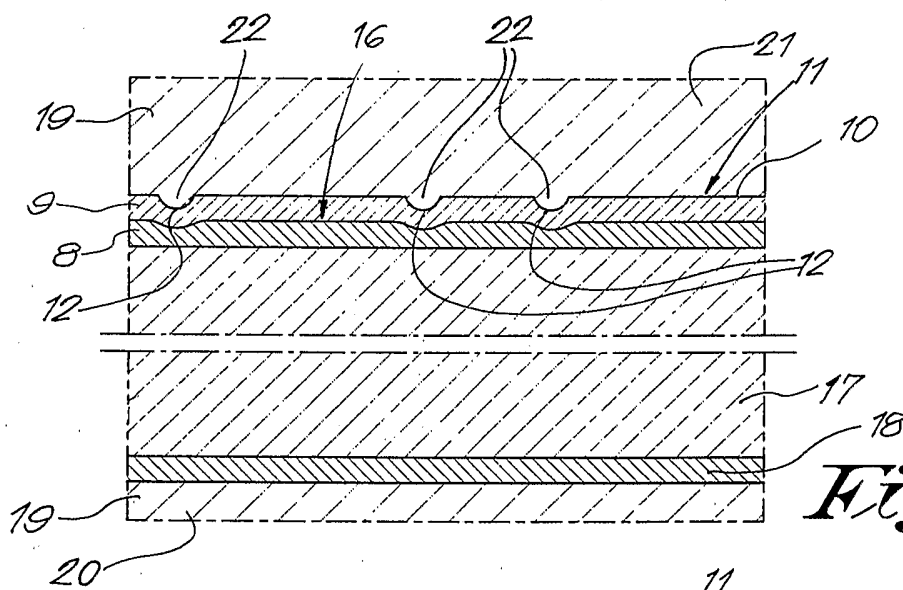


Fig. 8

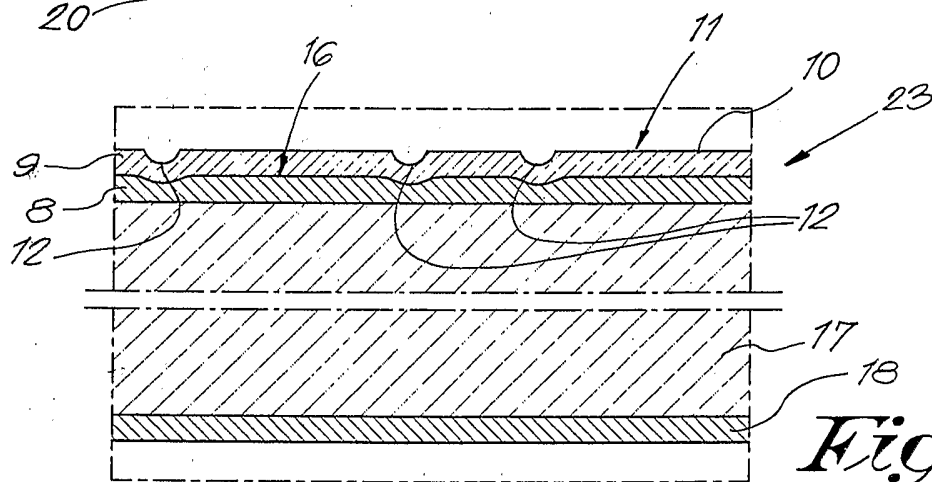


Fig. 9

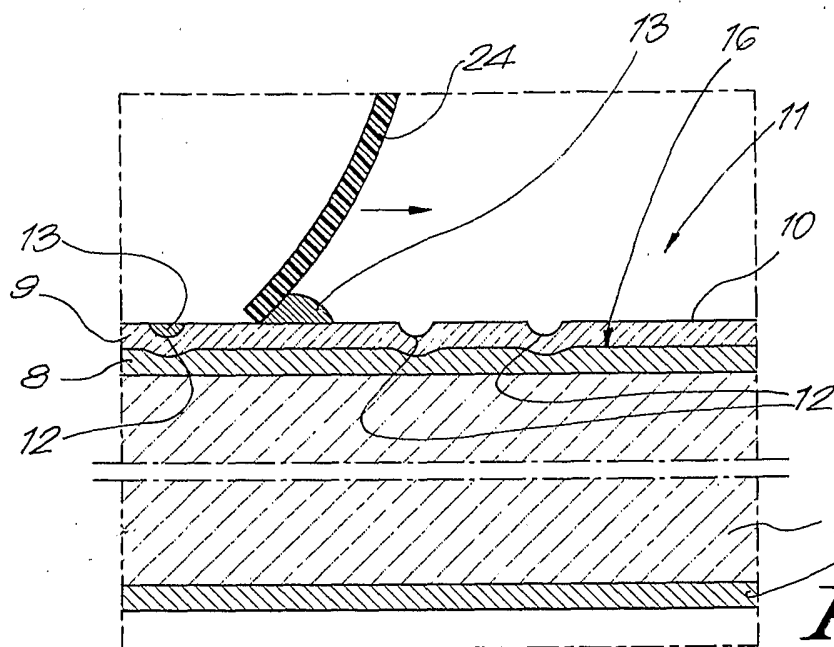


Fig.10

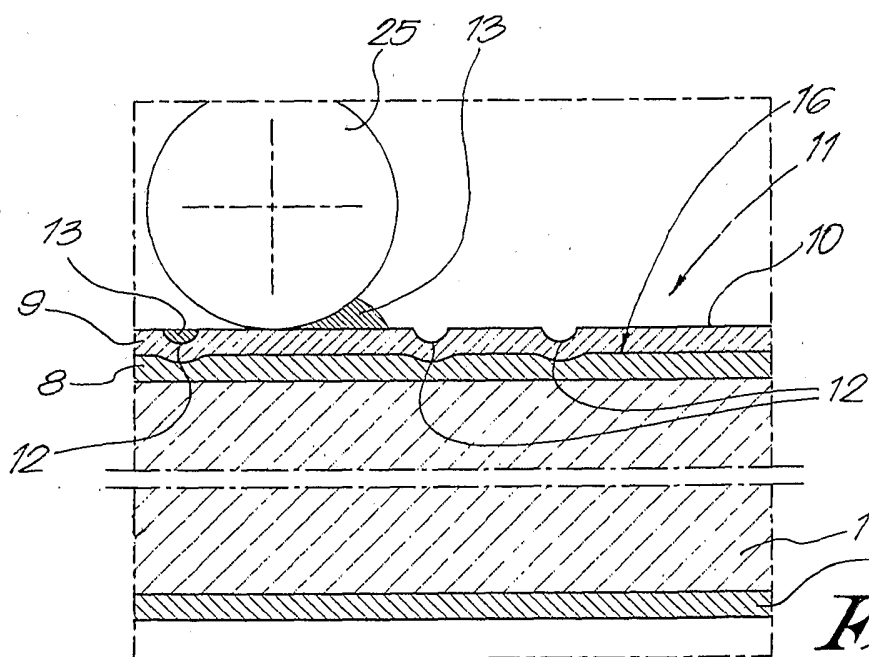
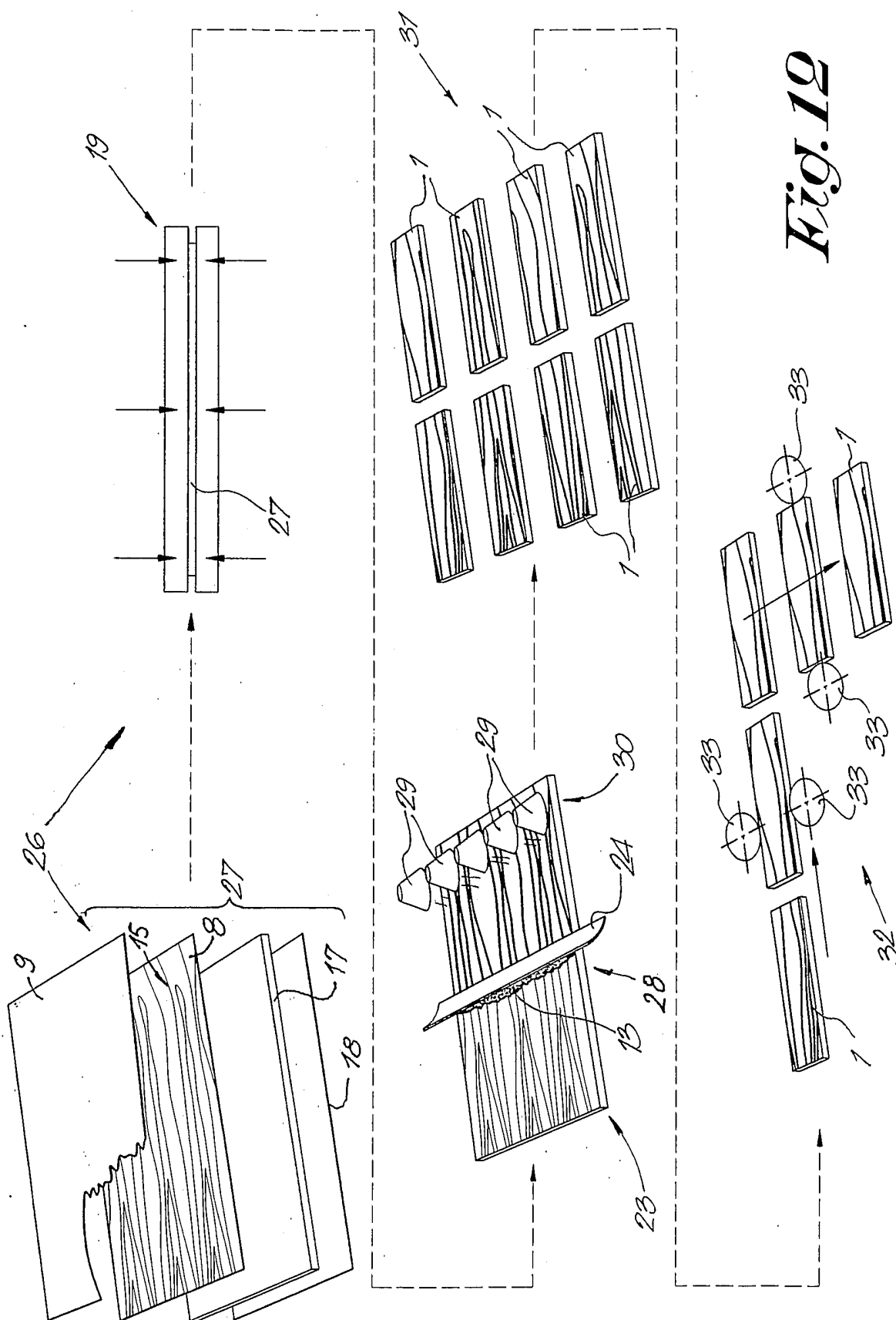
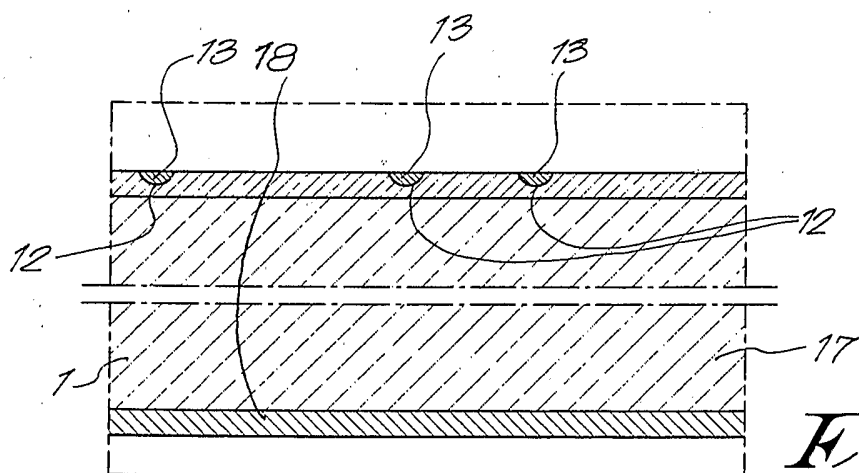
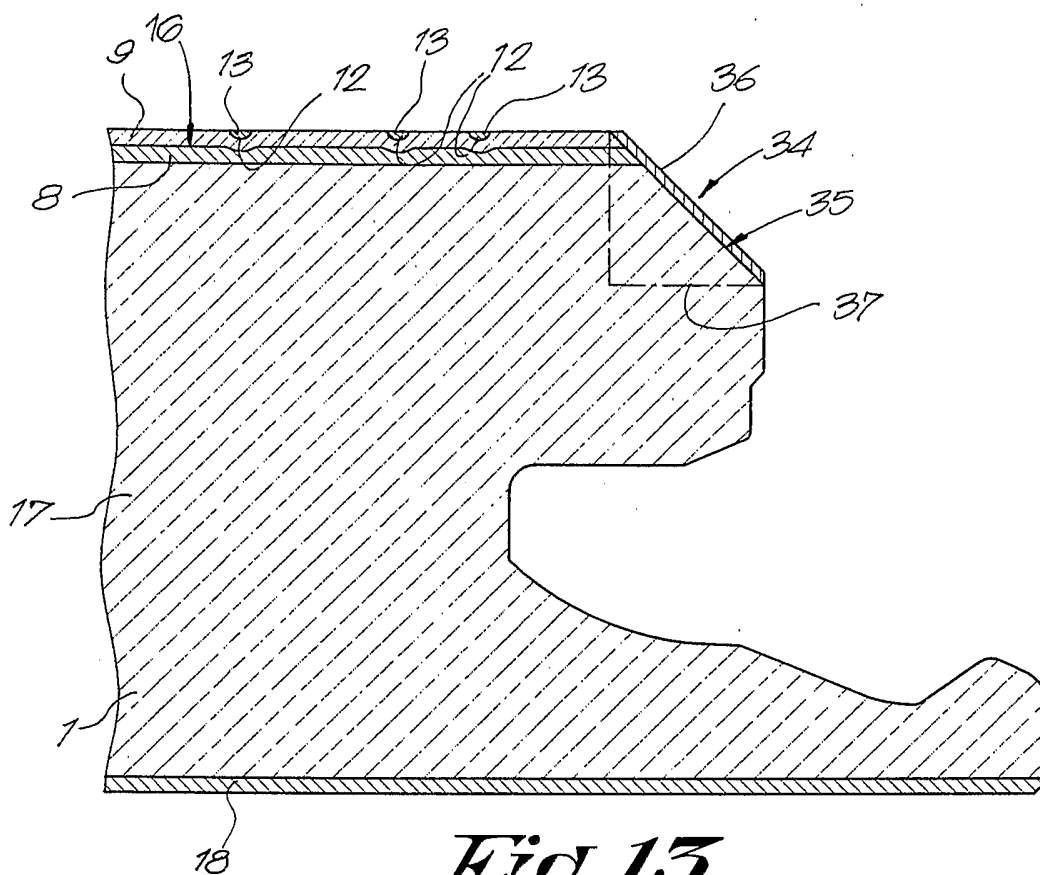


Fig.11

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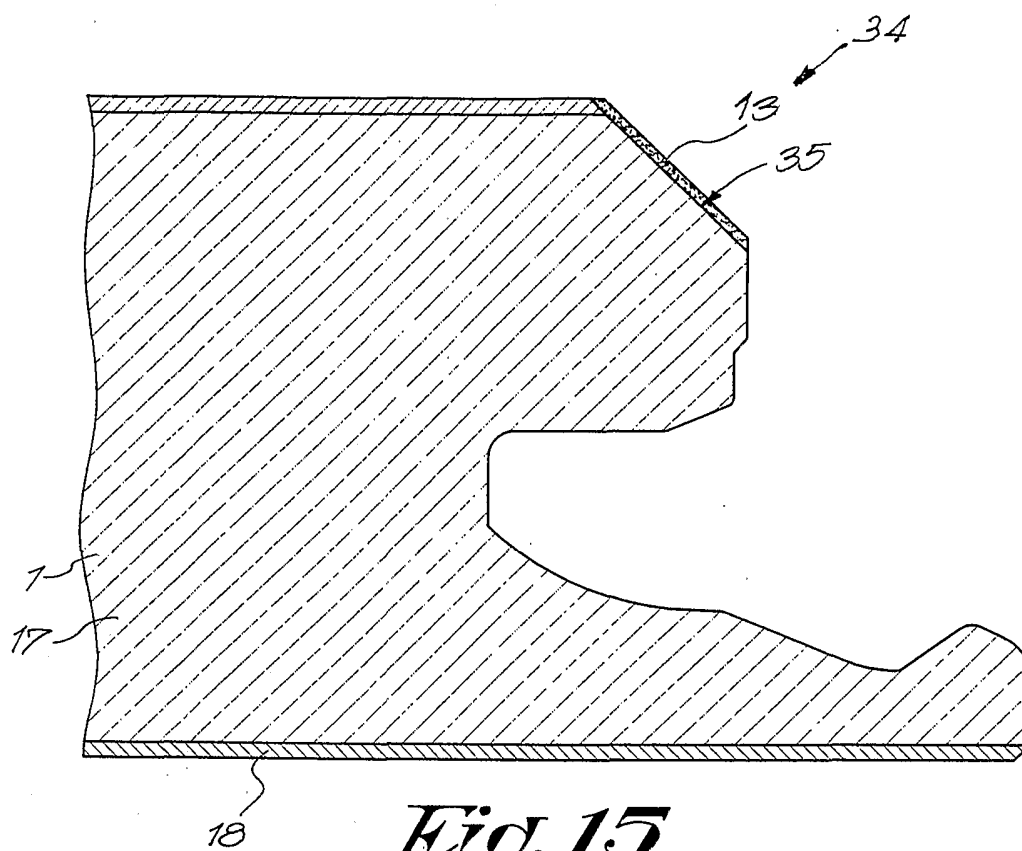


Fig. 15

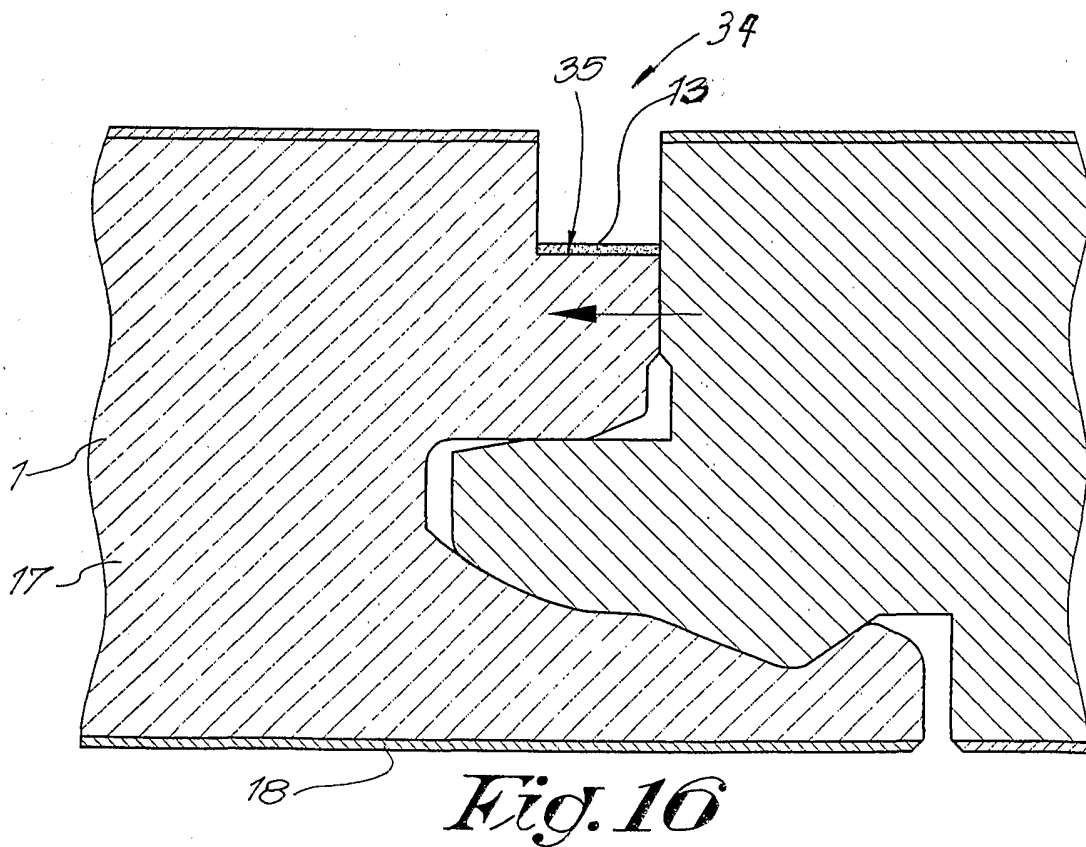
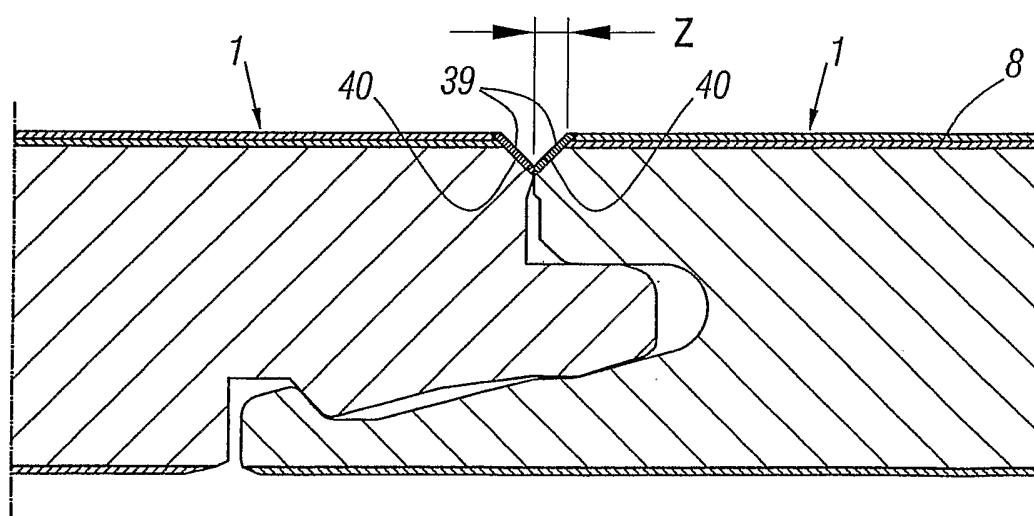
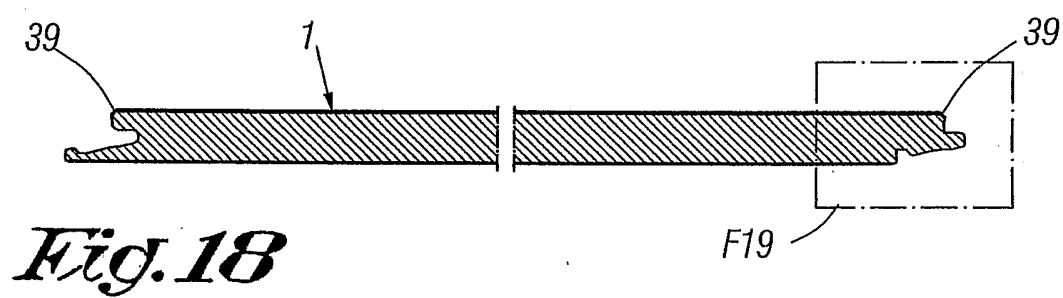
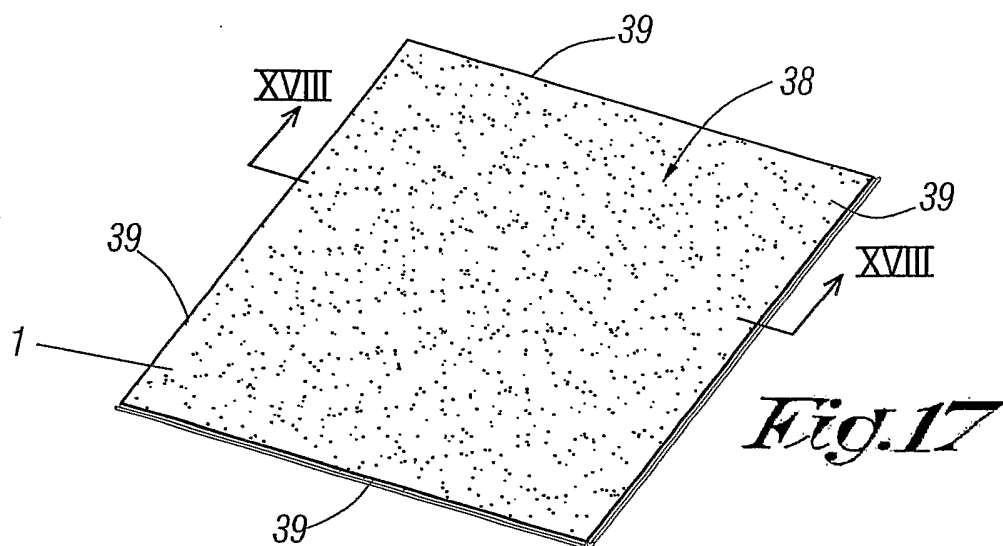
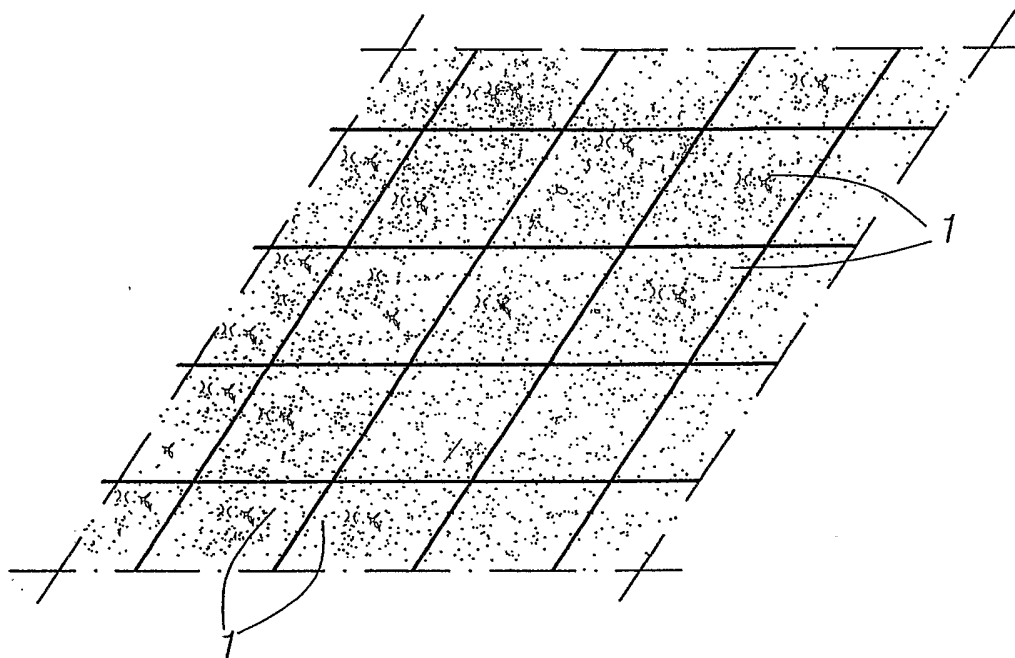
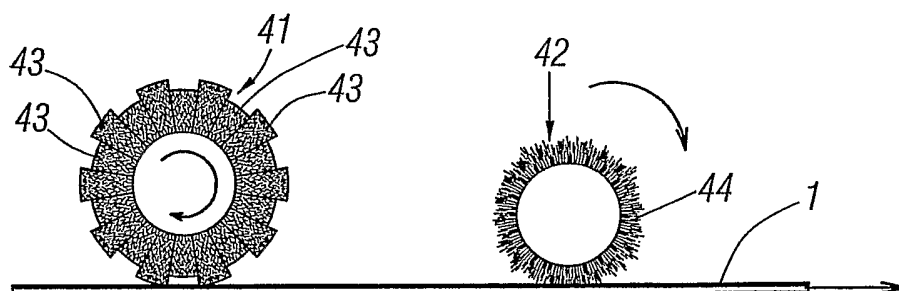


Fig. 16



*Fig. 20**Fig. 21*