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(54) **Covering panel with bevelled edges having a cross-section that varies visibly with respect to the extreme edge, and method of making the same**

Verkleidungspaneel mit angefasten Kanten mit einem Querschnitt der bezüglich des äusseren Randes sichtbar variiert und Herstellungsverfahren desselben

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(73) Proprietor: **Spanolux N.V.**
Div. Balterio
8710 Sint-Baafs-Vijve (BE)

(72) Inventors:
• **De Rick, Jan Eddy**
9500 Geraardsbergen (BE)

• **Vermeulen, Bruno Paul Louis**
3680 Aldeneik-Maaseik (BE)

(74) Representative: **Metman, Karel Johannes et al**
De Vries & Metman
Overschiestraat 180
1062 XK Amsterdam (NL)

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Description

[0001] The invention relates to a panel for use in an assembly of panels attached to each other to form a covering, according to the preamble of claim 1.

[0002] The invention also relates to a method of making such panels.

[0003] Such panels are known in various embodiments, for example in the form of laminate floor panels. Such panels are made on a wood basis and have a decorating layer mostly to imitate natural panels made from wood or other natural materials.

[0004] WO 2006/066776 relates to a laminate floor panel which comprises a decor representing a wood pattern. The panel comprises a sloping edge portion of which the shape and/or angle can alter in function of the longitudinal direction of the edge.

[0005] WO 2006/031169 is related to a decorative laminate board having edges, a decorative upper layer and a rear layer. Predetermined portions of the decorative upper layer is provided with an embossed surface through means of a laser beam.

[0006] WO 03/078761 relates to floorboards which consist of a core and a surface layer and are provided with decorative joint edges which are formed by removing the surface layer.

[0007] It is an object of the present invention to provide a panel which imitates a natural panel still better.

[0008] In order to achieve this object the invention provides a panel which has the feature according to the characterising portion of claim 1.

[0009] The lowered part of the panel according to claim 1 has a non-planar structure along the edge, which improves the natural appearance of a panel. The advantage is that the panels according to the invention provide a better imitation of natural panels than those having a flat lowered part.

[0010] The cross-section of the lowered part may vary along the length of the edge in an irregular, preferably random manner, for example a rustical design. This improves the natural appearance of a panel still further.

[0011] The lowered part may have an extreme edge which is intended to be positioned against an extreme edge of an adjacent panel, which extreme edge has a constant position within each cross-section. As a result of this feature the extreme edge of each of the panels in an assembly of panels can be coupled to each other to form the covering such that the covering is sealed between adjacent panels at the extreme edge. This prevents leakage of water or the like between panels. Moreover, this feature has the advantage that it avoids exposing of a portion of the

[0012] edge of the panel if the extreme edge of adjacent panels had varying positions at different locations with respect to each other along the edge.

[0013] The upper surface of the panel may be provided with a surface decoration, whereas the lowered part may be provided with a surface finishing. This provides the

opportunity to apply the production method of providing the surface decoration to the panel such as known in the art, whereas the lowered part can be finished in a separate process.

[0014] Alternatively, a panel for use in an assembly of panels attached to each other to form a covering, comprises an upper surface and a lower surface each extending within a different main plain, and at least an edge between these surfaces comprising coupling means to couple the panel to coupling means of another panel, wherein the upper surface includes a lowered part at said edge of the panel, the lowered part crossing the main plain of the upper surface along a second line and crossing an extreme edge of the panel which is intended to be positioned against an extreme edge of an adjacent panel along a third line, wherein the extent of the second line deviates from the extent of the third line. In this embodiment the second line between the upper surface and the lowered part may be used to improve the natural appearance of a panel.

[0015] The invention also provides a method of making a panel for use in a covering, as defined in claim 7.

[0016] This method may provide panels having the advantages as mentioned hereinbefore.

[0017] The lowered part may be provided with a coating, such as a foil or paint, which has the benefit of protecting the panels against dirt, water and the like. For esthetical reasons it may be of a rustical design, for example.

[0018] In a preferred method the upper surface of the panel is provided with a surface finishing before the coating is provided on the lowered part, wherein the finished upper surface is provided with an anti-adhesive before the lowered part is coated, and any surface finishing which is applied on the anti-adhesive is removed, for example by brushing. The advantage of these steps is that they simplify the method of making panels according to the invention. Since the cross-section of the lowered part along the edge varies, the width of the lowered part as seen in a direction along the edge of the panel may vary. As a consequence, the width of the foil or the amount of paint may vary along the edge of the panel. Due to the application of the anti-adhesive the width of the foil or paint spray may be locally larger than the width of the lowered part as mentioned above, because excessive foil or paint can be removed easily from the upper surface next to the lowered part, for example by brushing. Of course, if no problems are encountered in respect of adherence between the coating and the lowered part other methods of providing a coating on the lowered part are conceivable rather than using an anti-adhesive.

[0019] Preferably, the edge is machined by means of a milling tool, which is either moved in a direction towards and away from the edge during milling of the edge, or the milling is effected by means of a rotary milling tool having teeth around its circumference which have a varying distance from the rotary centre of the tool. The advantage of applying this technique is that it provides the

opportunity of a fast manufacturing process in order to obtain the desired structure of the lowered part as mentioned hereinbefore, hence minimizing production costs.

[0020] The invention will hereafter be elucidated with reference to the very schematic accompanying drawings.

Fig. 1 is a very schematic perspective plan view of two adjacent panels according to the invention.

Fig. 2 is a larger-scale perspective cross-section along the line II-II in Fig. 1.

Fig. 3a is a very schematic side view of a panel, illustrating an alternative machining step, showing the panel upside down.

Fig. 3b is a smaller-scale view as shown in Fig. 2, illustrating adjacent panels which are manufactured according to an alternative single machining step as illustrated in Fig. 3a. The panels are not part of the present invention.

Fig. 3c is a view as shown in Fig. 2, illustrating adjacent panels which are manufactured according to still another alternative machining step as described in Fig. 3a.

Figs. 4a-4c are very schematic sectional views of two panels in different manufacturing steps, showing the panels upside down.

Figs. 5a-5b are very schematic sectional views of a panel and a press tool, illustrating the process of fixing a foil to the lowered part.

Fig. 6a is a very schematic side view of an apparatus for providing and adhering foils on a lowered part of a panel.

Fig. 6b is a view which is partly similar to Fig. 6a, in which the way of pressing two different portions of a panel is illustrated.

Fig. 6c is a very schematic side view of an apparatus nearly similar to that shown in Fig. 6b, but including a single belt.

Fig. 6d is a very schematic side view of an apparatus nearly similar to that shown in Fig. 6c, but including a shorter single belt as seen in a direction of movement, illustrating the way of pressing two different portions of a panel synchronously.

Fig. 7 is a very schematic side view of an embodiment of a milling tool for machining the edge of a panel to form the lowered part.

[0021] Fig. 1 illustrates two adjacent panels 1 of one embodiment of the panel according to the invention. The panels 1 as shown in Fig. 1 are attached to each other and may be part of a covering when a plurality of panels are attached to each other in this way. Generally, the panels will be rectangular, either square or elongated or in between. However, other shapes are conceivable.

[0022] Fig. 2 illustrates a cross-section of the assembly of the panels 1 as shown in Fig. 2 on a larger scale in more detail. Each panel 1 comprises an upper surface 2 and a lower surface 3. These surfaces 2, 3 each extend within different main plains. In the embodiment as shown

in Fig. 2, the main portions of the upper surface 2 and lower surface 3 are parallel to each other and spaced in Y direction. The upper and lower surfaces 2, 3 are substantially flat surfaces. The panel comprises an edge 4 between both surfaces. The edge 4 is provided with coupling means to couple the panel 1 to coupling means of the adjacent panel 1, such as shown in Fig. 2. The coupling means are well-known in the art, for example formed by a tongue 5 and groove 6 and are not part of the present invention. Of course, it is possible to provide the panel 1 with various kinds of coupling means and locking means for attaching the panels 1 to each other.

[0023] The upper surface 2 includes a lowered part 7 on at least one, but preferably all edges 4 of the panel. Fig. 2 shows that the upper surface 2 comprises a substantially flat surface portion 8 and the lowered part 7. The lowered part 7 is located below the flat surface portion 8 of the upper surface 7 as seen in Y direction.

[0024] The upper surface 2 of the panel 1 is provided with a surface decoration which imitates natural materials, such as wood. This surface decoration may include a laminate of paper layers impregnated with resin. The remaining part of the panel 1 below the upper surface 2 may include a core comprising one or more layers of MDF, HDF, HTSP, PVC, composites or the like, and possibly a balancing layer.

[0025] According to the invention the cross-section of the lowered part 7, perpendicular to the edge of the panel, varies along the edge 4. In Fig. 2 the edge 4 extends in Z direction. It can be seen that the lowered part 7 has a non planar structure as seen along the edge 4. This provides a natural appearance of the panels 1. The embodiment of the panel 1 as shown in Fig. 2 has a lowered part 7 of which the cross-section varies in an irregular manner. Preferably, it varies in a random manner so as to provide a most natural look of the panel 1.

[0026] In the embodiment as shown in Fig. 2 the lowered part 7 has an extreme edge 9, which is positioned against an extreme edge 9 of the adjacent panel 1. The extreme edge 9 is straight and therefore has the same position within each cross-section so as to obtain an appropriate sealing between adjacent panels 1. It can be seen in Fig. 2 that the extreme edge 9 has a fixed position with respect to the lower surface 3 since the extreme edge 9 extends parallel to the lower surface 3 and the upper surface 2, whereas the rest of the lowered part 7 varies in a random manner.

[0027] In the embodiment of Fig. 2 the lowered part 7 has an inclined extent as seen from the extreme edge 9 to the upper surface 2. This results in a V-groove between the panels 1 when they are attached to each other. Furthermore, a lower section 10 of the V-groove, which is adjacent to the extreme edge 9 has a planar shape and a constant cross-section along the edge 4. An upper section 11 of the lowered part 7, which is located between the lower section 10 and the flat surface portion 8 of the upper surface 2, has a varying cross-section along the edge 4. The angle of the lower section 10 with respect

to the upper surface 2 is larger than the angle of the upper section 11 with respect to the upper surface 2, for example 35-85° and 15-40°, respectively, but other angles are also possible, of course. The width of the lowered part 7 in the X, Y plane along the edge 4 may vary around 2 mm, for example, but other dimension are conceivable, of course.

[0028] Fig. 2 also shows that the lowered part 7 crosses the upper surface 2 in a second line 12. The extreme edge 9 forms a third line. It can be seen that the extent of the second line 12 deviates from that of the extreme edge 9 so as to form the desired non-planar structure of the lowered part 7.

[0029] According to the invention the panel 1 such as described hereinbefore can be made by the following steps: machining the edge 4 to form coupling means 5, 6; providing the upper surface 2 with a lowered part 7 at the edge 4; and machining the edge 4 such that the lowered part 7 is provided with a varying cross-section perpendicular to the edge 4 of the panel 1. The structure of the lowered part 7 in Fig. 2 can be obtained by performing the following steps: first machining the flat lower section 10 by passing the panel 1 along a milling tool which has a fixed position with respect to the passing panel 1, then passing the panel along a milling tool which is moved in a direction towards and from the panel 1 so as to form the upper section 11.

[0030] Alternatively, the lowered part 7 can be made in a single machining step not forming part of the claimed invention. This is illustrated in Fig. 3a. The lowered part 7 is made by a milling tool 21, which has a fixed position with respect to the position of the extreme edge 9 of the panel 1. The milling tool 21 can be swivelled about the extreme edge 9 such as shown by the double-headed arrow in Fig. 3a. This alternative machining method results in panels having a lowered part 7 which has a non-planar structure between the second line 12 and the extreme edge 9 which has maintained its original shape, in this case a straight line. This machining method results in a panel 1 such as illustrated in Fig. 3b.

[0031] Referring to Fig. 3a, it is also possible to swivel the milling tool 21 about a line extending parallel to the extreme edge 9 between the extreme edge 9 and the upper surface 2. This results in a panel 1 such as illustrated in Fig. 3c. In this case the inclined lower section 10 is machined by a preceding machining step.

[0032] Normally, the upper surface 2 of a large plate of which panels 1 will be sawn off later on, is initially provided with a surface decoration 13 before the panels 1 are sawn off. After machining the edge 4 to make the lowered part 7, the lowered part 7 is preferably provided with a surface finishing, such as a coating 14 comprising a foil 14a or paint. This protects the material of the panel 1 against dirt and liquids or the like which might permeate into the panel 1. It also provides the lowered part 7 with a colour or decoration which is adapted to the decoration of the upper surface of the panel.

[0033] Since the cross-section of the lowered part 7 of

the panel 1 along the edge 4 varies, the required amount of coating 14 or paint per unit of length along the edge 4 to be provided to the lowered part 7 varies along the edge 4, as well. According to the invention the surface finishing can be provided onto the upper surface 2 before the coating 14 is provided onto the lowered part 7, whereas the finished upper surface 2 is provided with an anti-adhesive before the lowered part 7 is coated. After coating the lowered part 7 a part of the coating 14 may have been provided onto the upper surface 2 next to the lowered part 7 (the flat surface portion 8) which was already covered by the anti-adhesive. The remaining coating 14 on the upper surface 2 can be easily removed from the upper surface 2 together with the anti-adhesive by brushing, for example.

[0034] Preferably, the anti-adhesive is provided onto the upper surface 2 before machining the edge to form the lowered part 7, because in this case the lowered part 7 is automatically made free of anti-adhesive during machining, whereas the flat surface portion 8 remains covered with the anti-adhesive. These steps are illustrated in Fig. 4. Fig. 4a shows that the upper surfaces 2 of two panels 1 are covered by anti-adhesive near the edges before machining the edges 4 and forming the lowered part 7 (note that the panels are shown upside down in Fig. 4). The anti-adhesive can be provided onto the upper surface 2 by using a spraying apparatus 15. Fig. 4b illustrates the panels 1 after the coupling means 5, 6 and the lowered part 7 have been provided. Fig. 4c illustrates the process of providing a foil 14a as a coating 14 onto the lowered part 7.

[0035] Figs. 5a and 5b illustrate the process of providing a foil 14a to the lowered surface 7 in more detail. Fig. 5a illustrates the process of pressing the foil 14a onto the panel 1 by two separate pressing tools 15 behind each other as seen in the direction along the edge 4. Each of the pressing tools 15 have substantially flat pressing surfaces 16, which can be angled with respect to each other so as to create a pressing surface 16 corresponding to the shape of the lower part 7. Fig. 5b shows the process of pressing the foil 14a onto the panel 1 by a single pressing tool 15 which has a deformable pressing surface 16 which adapts to the varying shape of the lowered part 7.

[0036] Fig. 6a is a very schematic side view of an apparatus for providing a foil on a lowered part 7 of a panel 1. A foil strip 14a is supplied from the left side by a roller 17 comprising a foil strip 14a. The foil strip 14a has a width of 8-10 mm, for example, but other dimensions are conceivable. The panels 1 are also supplied from the left side (not shown) and are conveyed from left to right at the same speed as the speed of the foil strip 14a. Fig. 6a also shows that the apparatus comprises pressing belts 18 and pressing rollers 19 which press the belt 18 against the foil 14a onto the lowered part 7 of the panel 1. The apparatus also comprises heating elements 20 to support an adhering process of the foil strip 14a to the panel 1. The heating elements 20 are able to keep the

temperature of the foil at a constant level during the adhering process. Furthermore, Fig. 6a shows two belts for the case that the lowered part 7 is provided with a lower section 10 and an upper section 11 each having different angles with respect to the upper surface 2, such as illustrated in Fig. 5a. One belt 18 can be applied for pressing the foil to the lower section 10 and the other belt 18 can be applied for pressing the foil 14a to the upper section 11. This is illustrated in Fig. 6b. Alternatively, the apparatus can be provided with only one deformable endless belt 18 and pressing rollers 19 wherein axes of rotation of the pressing rollers 19 can be tilted with respect to each other such that the belt 18 is pressed on a lowered part 7 of which the lower section 10 and the upper section 11 have different angles with respect to the upper surface 2, such as shown in Fig. 5b. Such an apparatus is illustrated in Fig. 6c. In this apparatus the orientation of a portion of the belt 18 which presses on the foil 14A is changed along its direction of movement between the left set of wheels and the right set of wheels in Fig. 6c.

[0037] Another alternative embodiment of the apparatus comprises a pressing belt 18, which is able to press the foil synchronously on the lower section 10 and the upper section 11 which have different angles with respect to the upper surface 2, such as illustrated in Fig. 6d. In this case the pressing belt 18 is made of a more flexible material.

[0038] According to the invention the non-planar structure of the lowered part 7 is made by machining the edge 4 by a milling tool 21, which can be moved in a direction towards and away from the edge 4, and along the edge 4 at the same time. This method results in a structure of the lowered part 7, such as shown in Fig. 2. An alternative method has been explained above with reference to Fig. 3a. It is also possible to apply a rotary milling tool 21, such as shown in Fig. 7. This embodiment of the milling tool 21 is provided with teeth 22 around its circumference, which have a varying distance d with respect to a rotary centre 23 of the milling tool 21. This provides the possibility to vary the amount of material which is cut by the milling tool by changing the rotational position of the milling tool 21 during passing of a panel 1 along the milling tool 21 while the rotary centre remains at the same location.

[0039] In an alternative embodiment the second line of the panel may be parallel to the extreme edge, whereas a portion of the lowered part between the second line and the extreme edge is provided with a non-planar structure.

[0040] From the foregoing it will be clear that the invention provides a panel which presents a very good imitation of a panel made of natural materials. Furthermore, the invention provides an appropriate method to make such a panel.

[0041] The invention is not restricted to the above-described embodiments, which can be varied in a number of ways within the scope of the claims.

Claims

1. Panel (1) for use in an assembly of panels (1) attached to each other to form a covering, comprising an upper surface (2) and a lower surface (3) each extending within a different main plane, and at least an edge (4) between these surfaces comprising coupling means (5, 6) to couple the panel (1) to coupling means (5, 6) of another panel (1), wherein the upper surface (2) includes a lowered part (7) at said edge (4) of the panel (1), the cross-section of the lowered part (7), perpendicular to the edge (4) of the panel (1), varies along the edge (4), wherein the lowered part (7) has an extreme edge (9) which is intended to be positioned against an extreme edge (9) of an adjacent panel (1), said extreme edge (9) has a constant position within each cross-section, wherein the lowered part (7) has an inclined extent in order to form a V-groove between the panels (1), wherein the V-groove has a lower section (10) and an upper section (11) which has a varying cross-section, and wherein the acute angle of the lower section (10) with respect to the upper surface (2) is larger than the acute angle of the upper section (11) with respect to the upper surface (2), **characterized in that** a line along which the lower section (10) intersects the upper section (11) varies visibly with respect to the extreme edge (9) so as to improve the natural appearance of the panel.
2. Panel (1) of claim 1, wherein the cross-section of the lowered part (7) varies along the length of the edge (4) in an irregular, preferably random manner.
3. Panel (1) according to claim 1 or 2, wherein the upper surface (2) of the panel (1) is provided with a surface decoration (13), whereas the lowered part (7) is provided with a surface finishing (14).
4. Panel (1) of any of the preceding claims, wherein the extent of a second line (12), along which the upper surface (2) intersects the upper section (11), deviates from the extent of the extreme edge (9), so as to form a non-planar structure of the lowered part (7).
5. Panel (1) of any of the preceding claims, wherein the cross-section of the upper section (11) varies parallel to itself along the edge (4).
6. Panel (1) of any of the claims 1-3, wherein a second line (12), along which the upper surface (2) intersects the upper section (11), extends parallel to the extreme edge (9), whereas a portion of the lowered part between the second line and the extreme edge is provided with a non-planar structure.
7. Method of making a panel (1) for use in a covering, including the steps of:

providing a panel (1) comprising an upper surface (2) and a lower surface (3) each extending within a different main plane, and at least an edge (4) between these surfaces (2, 3), machining the edge (4) to form coupling means (5, 6) to couple the panel (1) to coupling means (5, 6) of another panel (1) and to provide the upper surface (2) with a lowered part (7) at said edge (4) of the panel (1),

wherein the edge (4) is machined such that the lowered part (7) is provided with a cross-section perpendicular to the edge (4) of the panel (1) which varies along the edge (4) of the panel (1), wherein the lowered part (7) is formed by first machining a lower section (10) of the lowered part (7) such that the lowered part (7) has an extreme edge (9) which is intended to be positioned against an extreme edge (9) of an adjacent panel (1) and wherein said extreme edge (9) is straight and has the same position within each cross-section, **characterized in that** an upper section (11) having a varying cross-section along the length of the edge (4) is then formed, such that the line along which the lower section (10) intersects the upper section (11) varies visibly with respect to the extreme edge (9) so as to improve the natural appearance of the panel.

8. Method of claim 7, wherein the upper section (11) is machined by means of a milling tool (21), which is either moved in a direction towards and away from the edge (4) during milling of the edge (4), or the milling is effected by means of a rotary milling tool (21) having teeth (22) around its circumference which have a varying distance (d) from the rotary centre (23) of the tool.
9. Method of claim 7, wherein the upper section (11) is machined by means of a milling tool (21) which is swivelled about a line extending parallel to the extreme edge (9) between the extreme edge (9) and the upper surface (2).
10. Method of one of the claims 7-9, wherein the lowered part (7) is provided with a coating (14), such as a foil (14a) or paint.
11. Method of claim 10, wherein the upper surface (2) of the panel (1) is provided with a surface finishing (13) before the coating (14) is provided on the lowered part (7), the finished upper surface (2) being provided with an anti-adhesive before the lowered part (7) is coated, and any coating (14) which is applied on the anti-adhesive is removed, for example by brushing.

Patentansprüche

1. Paneel (1) zur Verwendung in einer Anordnung von Paneelen (1), die zur Bildung einer Verkleidung miteinander verbunden sind, wobei das Paneel (1) eine obere Oberfläche (2) und eine untere Oberfläche (3) aufweist, die sich jeweils in unterschiedlichen Hauptebenen erstrecken, sowie zwischen diesen Oberflächen mindestens eine Kante (4) mit Verbindungseinrichtungen (5,6) aufweist, um das Paneel (1) mit Verbindungseinrichtungen (5,6) eines anderen Paneels (1) zu verbinden, wobei die obere Oberfläche (2) an der Kante (4) des Paneels (1) einen vertieften Teil (7) aufweist, wobei der zur Kante (4) senkrechte Querschnitt des vertieften Teils (7) des Paneels (1) entlang der Kante (4) variiert, wobei der vertiefte Teil (7) einen äußeren Rand (9) hat, der an einem äußeren Rand (9) eines benachbarten Paneels (1) anzuordnen ist, wobei in jedem Querschnitt der äußeren Rand (9) eine konstante Position hat, wobei der vertiefte Teil (7) ein geneigtes Maß hat, um eine V-Rille zwischen den Paneelen (1) zu bilden, wobei die V-Rille einen unteren Abschnitt (10) und einen oberen Abschnitt (11) hat, der einen variierenden Querschnitt hat, und wobei der spitze Winkel des unteren Abschnitts (10) bezüglich der oberen Oberfläche (2) größer ist als der spitze Winkel des oberen Abschnitts (11) bezüglich der oberen Oberfläche (2), **dadurch gekennzeichnet, dass** eine Linie, entlang welcher der untere Abschnitt (10) und der obere Abschnitt (11) zusammentreffen, bezüglich des äußeren Randes sichtbar variiert, um das natürliche Aussehen des Paneels zu verbessern.
2. Paneel (1) nach Anspruch 1, wobei entlang der Kante (4) der Querschnitt des vertieften Teils (7) auf unregelmäßige, bevorzugt zufällige Weise variiert.
3. Paneel (1) nach Anspruch 1 oder 2, wobei die obere Oberfläche (2) des Paneels (1) mit einer Oberflächendekoration (13) versehen ist, während der vertiefte Teil (7) mit einem Oberflächenfinish (14) versehen ist.
4. Paneel (1) nach einem der vorstehenden Ansprüche, wobei das Maß einer zweiten Linie (12), entlang welcher die obere Oberfläche (2) und der obere Abschnitt (11) zusammentreffen, abweicht vom Maß des äußeren Randes (9), um so eine nicht planare Struktur des vertieften Teils (7) zu bilden.
5. Paneel (1) nach einem der vorstehenden Ansprüche, wobei entlang der Kante (4) der Querschnitt des oberen Abschnitts (11) parallel zu sich selbst variiert.
6. Paneel (1) nach einem der Ansprüche 1 bis 3, wobei sich eine zweite Linie (12), entlang welcher die obere Oberfläche (2) und der obere Abschnitt (11) zusam-

mentreffen, parallel zum äußeren Rand (9) erstreckt, während ein Teil des vertieften Teils zwischen der zweiten Linie und dem äußeren Rand mit einer nicht planaren Struktur versehen ist.

7. Verfahren zur Herstellung eines Paneels zur Verwendung in einer Verkleidung mit den folgenden Schritten:

Bereitstellen eines Paneels (1) mit einer oberen Oberfläche (2) und einer unteren Oberfläche (3), die sich jeweils in unterschiedlichen Hauptebenen erstrecken, sowie mit mindestens einer Kante (4) zwischen diesen Oberflächen (2,3), Bearbeiten der Kante (4), um Verbindungseinrichtungen (5,6) zum Verbinden des Paneels (1) mit Verbindungseinrichtungen (5,6) eines anderen Paneels (1) zu bilden und um an der Kante (4) des Paneels (1) die obere Oberfläche (2) mit einem vertieften Teil (7) zu versehen, wobei die Kante (4) so bearbeitet wird, dass der vertiefte Teil (7) mit einem Querschnitt senkrecht zur Kante (4) des Paneels (1) versehen wird, der entlang der Kante (4) des Paneels (1) variiert, wobei der vertiefte Teil (7) dadurch gebildet wird, dass zuerst ein unterer Abschnitt (10) des vertieften Teils (7) gearbeitet wird, so dass der vertiefte Teil (7) einen äußeren Rand (9) hat, der an einem äußeren Rand (9) eines benachbarten Paneels (1) anzuordnen ist, und wobei der äußere Rand (9) gerade ist und in jedem Querschnitt die gleiche Position hat, **dadurch gekennzeichnet, dass** dann ein oberer Abschnitt (11), dessen Querschnitt entlang der Länge der Kante (4) variiert, gebildet wird, so dass die Linie, entlang welcher der untere Abschnitt (10) und der obere Abschnitt (11) zusammenreffen, bezüglich des äußeren Rands (9) sichtbar variiert, um das natürliche Aussehen des Paneels zu verbessern.

8. Verfahren nach Anspruch 7, wobei der obere Abschnitt (11) mit Hilfe eines Fräswerkzeugs (21) gearbeitet wird, das während des Fräsens der Kante (4) in eine Richtung zur Kante (4) hin und von dieser weg bewegt wird, oder das Fräsen mit Hilfe eines rotierenden Fräswerkzeugs (21) durchgeführt wird, das an seinem Umfang Zähne (22) hat, die einen variierenden Abstand (d) zum Drehzentrum (23) des Werkzeugs haben.
9. Verfahren nach Anspruch 7, wobei der obere Abschnitt (11) mit Hilfe eines Fräswerkzeugs (21) gearbeitet wird, welches um eine sich parallel zum äußeren Rand (9) erstreckende Linie zwischen dem äußeren Rand (9) und der oberen Oberfläche (2) hin und her bewegt wird.

10. Verfahren nach einem der Ansprüche 7 bis 9, wobei der vertiefte Teil (7) mit einer Beschichtung (14), beispielsweise einer Folie (14) oder einem Anstrich, versehen wird.

11. Verfahren nach Anspruch 10, wobei die obere Oberfläche (2) des Paneels (1) mit einem Oberflächenfinish (13) versehen wird, bevor auf dem vertieften Teil (7) die Beschichtung (14) aufgebracht wird, wobei die mit einem Finish versehene obere Oberfläche (2) mit einem Antihafmittel versehen wird, bevor der vertiefte Teil (7) beschichtet wird, und jegliche Beschichtung (14), die auf dem Antihafmittel aufgebracht worden ist, zum Beispiel mittels Bürsten entfernt wird.

Revendications

1. Panneau (1) destiné à être utilisé dans un assemblage de panneaux (1) fixés les uns aux autres afin de former un revêtement, comprenant une surface supérieure (2) et une surface inférieure (3) s'étendant chacune dans un plan principal différent et au moins un bord (4) entre ces surfaces comprenant des moyens de couplage (5, 6) pour coupler le panneau (1) aux moyens de couplage (5, 6) d'un autre panneau (1), dans lequel la surface supérieure (2) comprend une partie abaissée (7) au niveau dudit bord (4) du panneau (1), la section transversale de la partie abaissée (7), perpendiculaire au bord (4) du panneau (1), varie le long du bord (4), dans lequel la partie abaissée (7) a un bord extrême (9) qui est prévu pour être positionné contre un bord extrême (9) d'un panneau (1) adjacent, ledit bord extrême (9) a une position constante dans chaque section transversale, dans lequel la partie abaissée (7) a une étendue inclinée afin de former une rainure en forme de V entre les panneaux (1), dans lequel la rainure en forme de V a une section inférieure (10) et une section supérieure (11) qui a une section transversale variable et dans lequel l'angle aigu de la section inférieure (10) par rapport à la surface supérieure (2) est plus grand que l'angle aigu de la section supérieure (11) par rapport à la surface supérieure (2), **caractérisé en ce qu'une ligne le long de laquelle la section inférieure (10) coupe la section supérieure (11), varie visiblement par rapport au bord extrême (9) afin d'améliorer l'apparence naturelle du panneau.**

2. Panneau (1) selon la revendication 1, dans lequel la section transversale de la partie abaissée (7) varie le long de la longueur du bord (4) d'une manière irrégulière, de préférence aléatoire.
3. Panneau (1) selon la revendication 1 ou 2, dans lequel la surface supérieure (2) du panneau (1) est

prévue avec une décoration de surface (13), alors que la partie abaissée (7) est prévue avec une finition de surface (14).

4. Panneau (1) selon l'une quelconque des revendications précédentes, dans lequel l'étendue d'une seconde ligne (12) le long de laquelle la surface supérieure (2) coupe la section supérieure (11), dévie de l'étendue du bord extrême (9), afin de former une structure non plane de la partie abaissée (7). 5 10
5. Panneau (1) selon l'une quelconque des revendications précédentes, dans lequel la section transversale de la section supérieure (11) varie parallèlement à elle-même le long du bord (4). 15
6. Panneau (1) selon l'une quelconque des revendications 1 à 3, dans lequel une seconde ligne (12) le long de laquelle la surface supérieure (2) coupe la section supérieure (11), s'étend parallèlement au bord extrême (9), alors qu'une partie de la partie abaissée entre la seconde ligne et le bord extrême est prévue avec une structure non plane. 20
7. Procédé pour fabriquer un panneau (1) destiné à être utilisé dans un revêtement, comprenant les étapes consistant à: 25

prévoir un panneau (1) comprenant une surface supérieure (2) et une surface inférieure (3) s'étendant chacune dans un plan principal différent, et au moins un bord (4) entre ces surfaces (2, 3), 30

usiner le bord (4) afin de former des moyens de couplage (5, 6) pour coupler le panneau (1) aux moyens de couplage (5, 6) d'un autre panneau (1) et pour doter la surface supérieure (2) d'une partie abaissée (7) au niveau dudit bord (4) du panneau (1), 35

dans lequel le bord (4) est usiné de sorte que la partie abaissée (7) est prévue avec une section transversale perpendiculaire au bord (4) du panneau (1) qui varie le long du bord (4) du panneau (1), dans lequel la partie abaissée (7) est formée en usinant dans un premier temps une section inférieure (10) de la partie abaissée (7) de sorte que la partie abaissée (7) a un bord extrême (9) qui est prévu pour être positionné contre un bord extrême (9) d'un panneau (1) adjacent et dans lequel ledit bord extrême (9) est droit et a la même position dans chaque section transversale, 40

caractérisé en ce qu'une section supérieure (11) ayant une section transversale variable le long de la longueur du bord (4) est ensuite formée, de sorte que la ligne le long de laquelle la section inférieure (10) coupe la section supérieure (11), varie visiblement par rapport au bord extrême (9) afin d'améliorer l'apparence natu- 45 50 55

relle du panneau.

8. Procédé selon la revendication 7, dans lequel la section supérieure (11) est usinée au moyen d'un outil de fraisage (21) qui est déplacé dans une direction vers et à distance du bord (4) pendant le fraisage du bord (4) ou bien le fraisage est effectué au moyen d'un outil de fraisage rotatif (21) ayant des dents (22) autour de sa circonférence qui ont une distance variable (d) depuis le centre de rotation (23) de l'outil. 5 10
9. Procédé selon la revendication 7, dans lequel la section supérieure (11) est usinée au moyen d'un outil de fraisage (21) qui est pivoté autour d'une ligne s'étendant parallèlement au bord extrême (9) entre le bord extrême (9) et la surface supérieure (2). 15
10. Procédé selon l'une quelconque des revendications 7 à 9, dans lequel la partie abaissée (7) est prévue avec un revêtement (14), tel qu'une feuille (14a) ou une peinture. 20
11. Procédé selon la revendication 10, dans lequel la surface supérieure (2) du panneau (1) est prévue avec une finition de surface (13) avant que le revêtement (14) ne soit appliqué sur la partie abaissée (7), la surface supérieure (2) finie étant prévue avec un antiadhésif avant que la partie abaissée (7) ne soit recouverte, et tout revêtement (14) qui a été appliqué sur l'antiadhésif est retiré, par exemple par brossage. 25 30 35 40 45 50 55

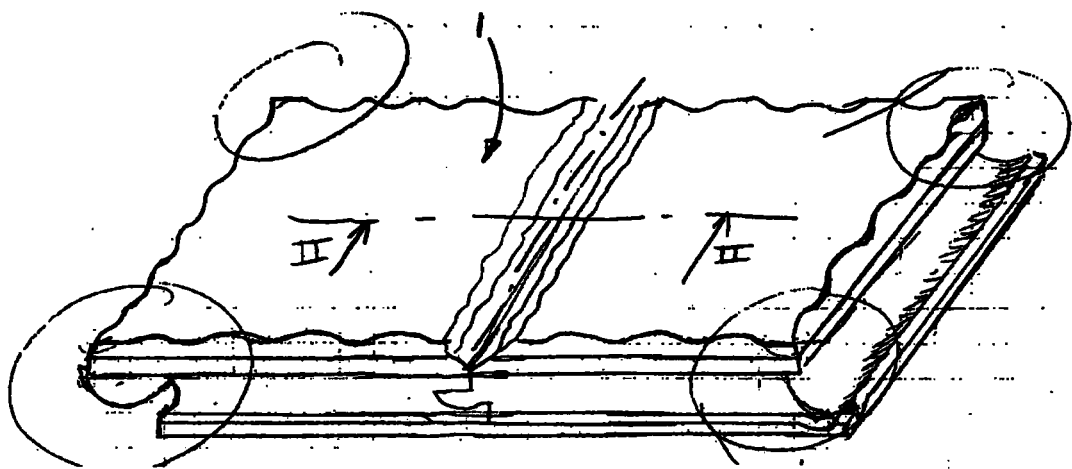


Fig. 1

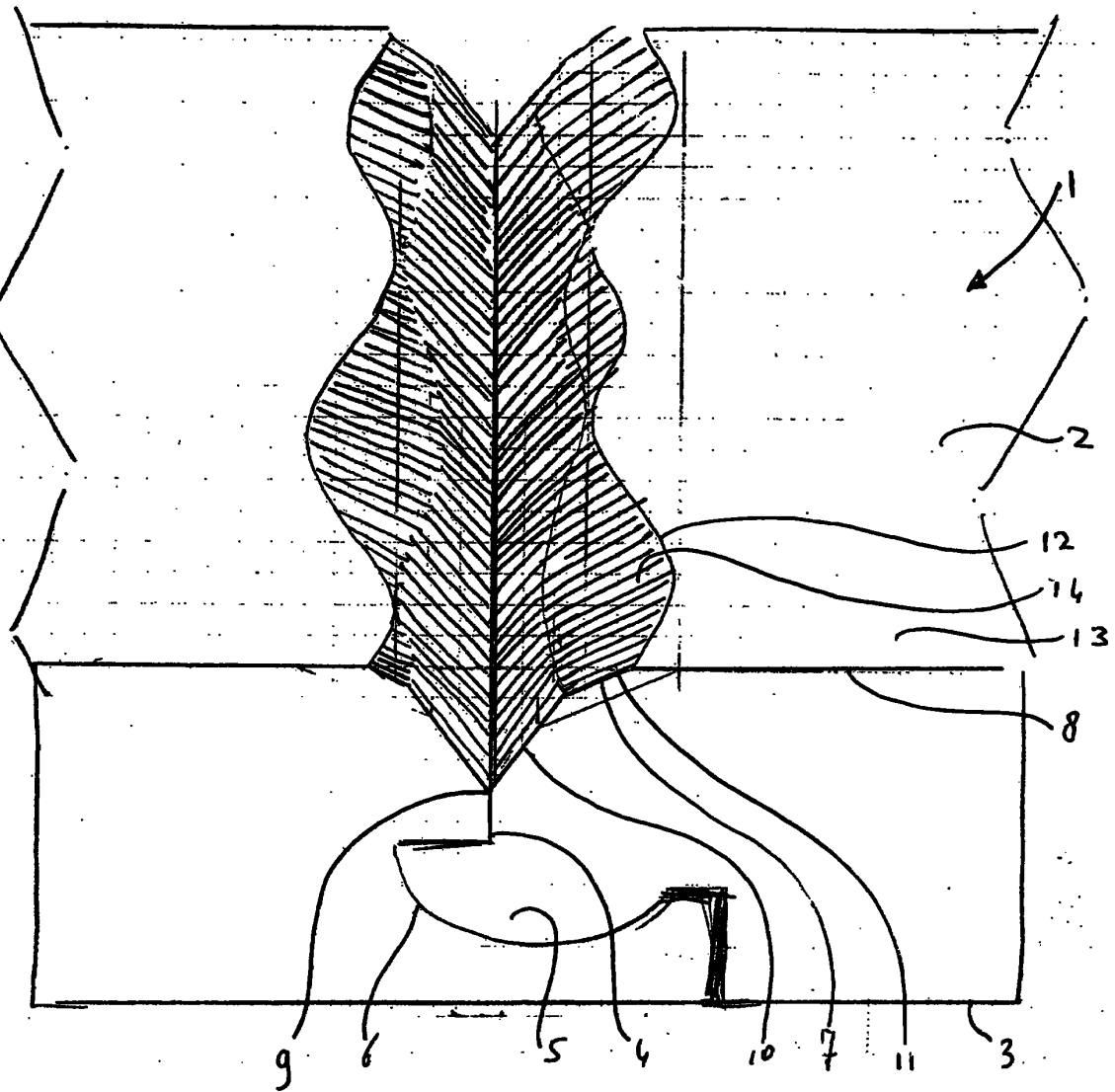
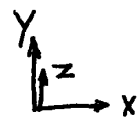


Fig. 2



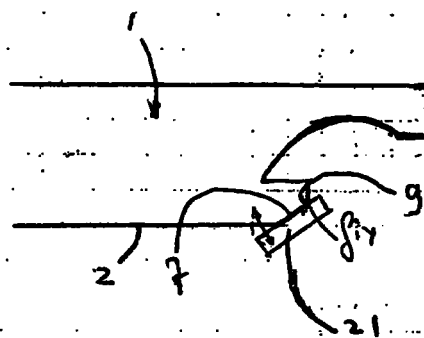


Fig. 3a

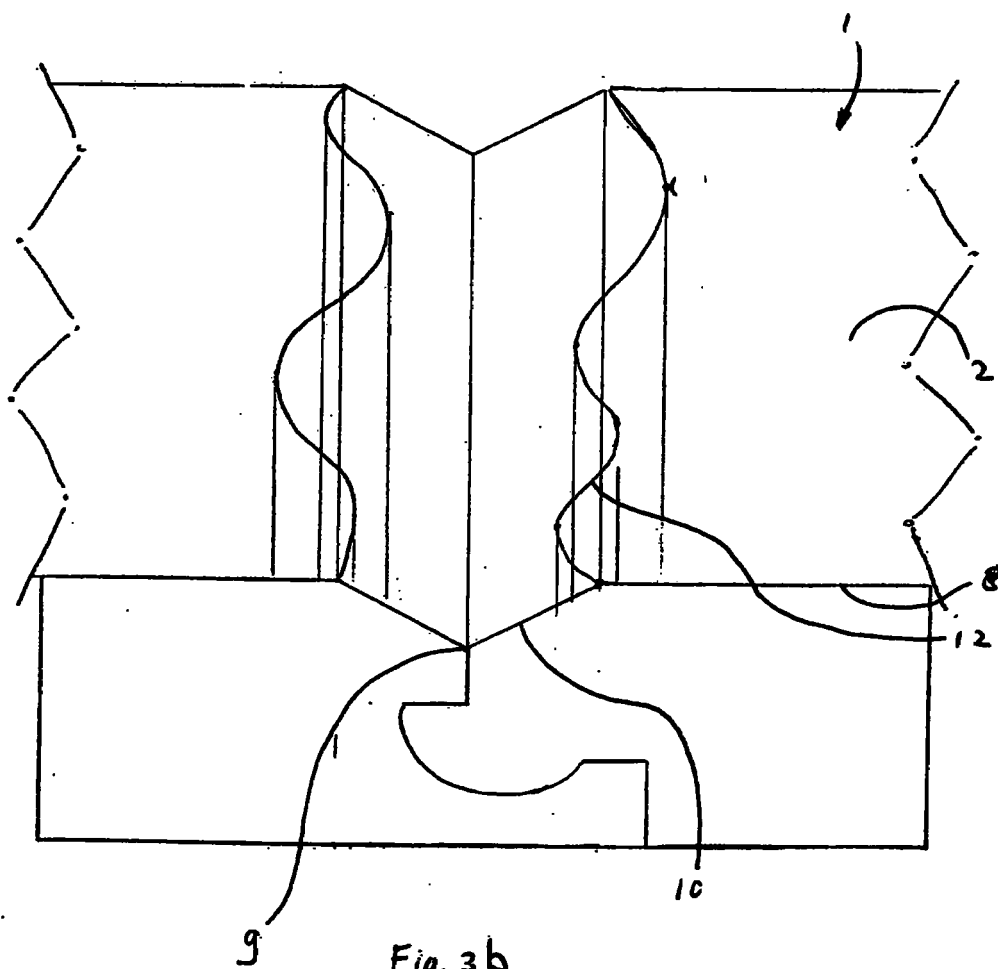


Fig. 3b

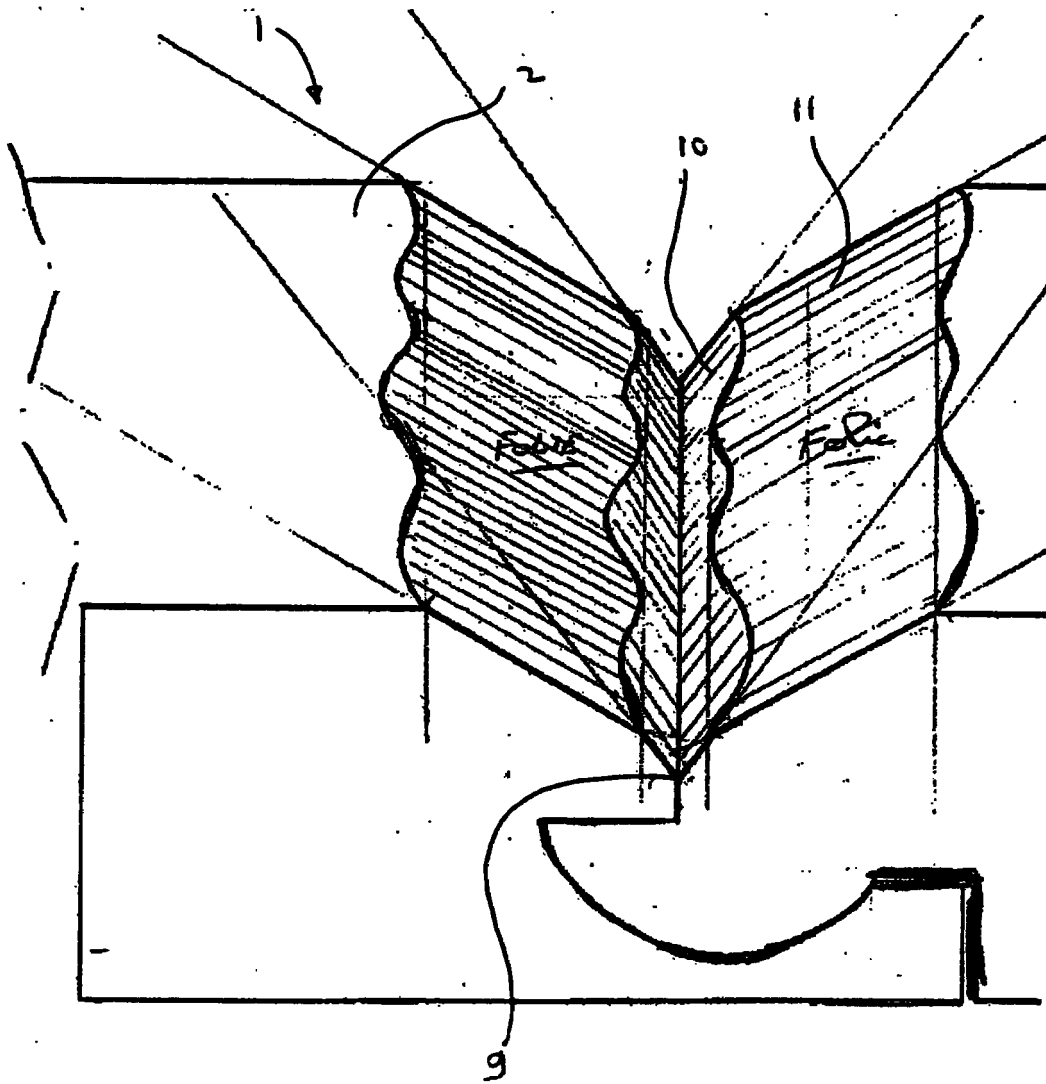


Fig. 3c

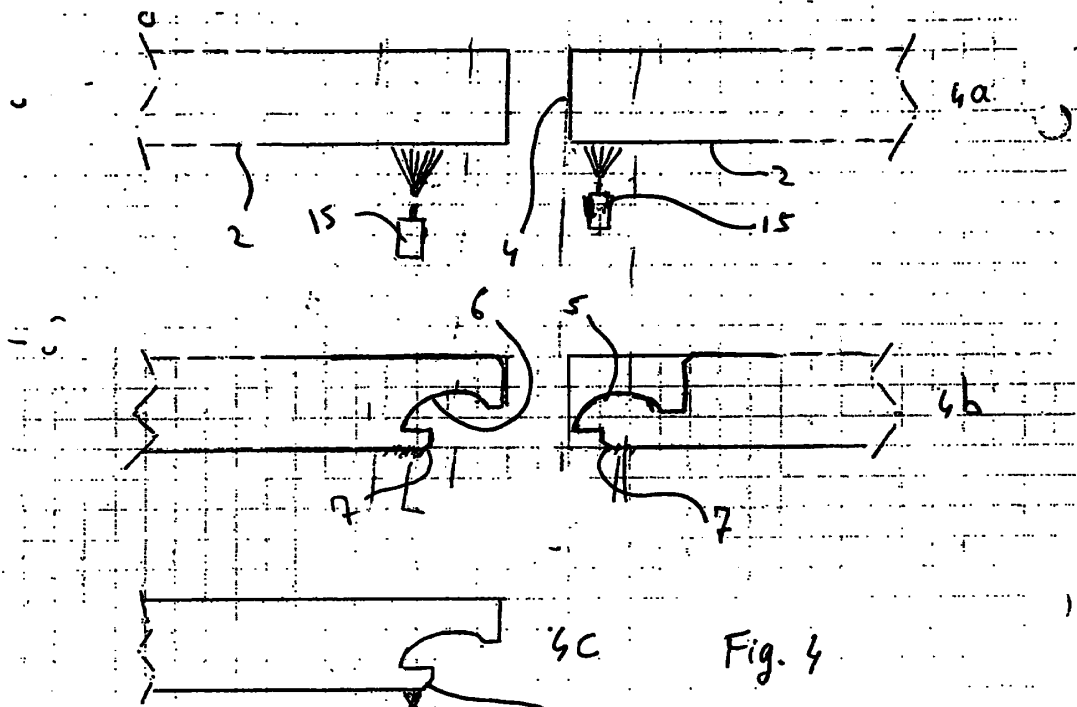
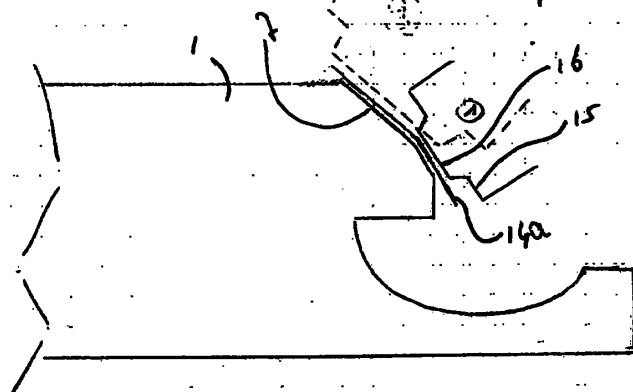
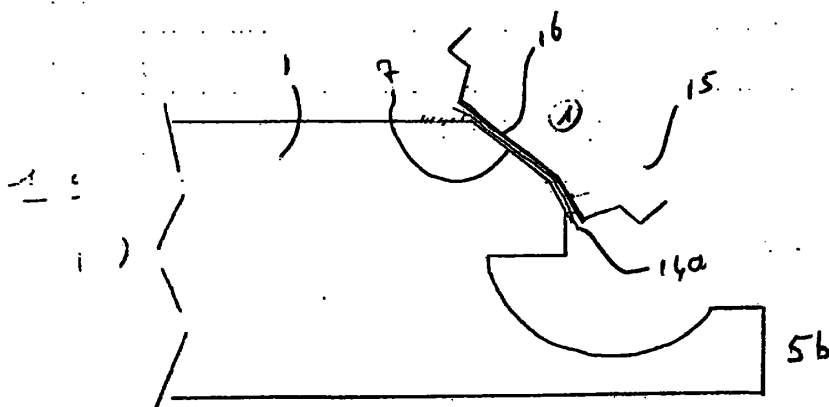


Fig. 4

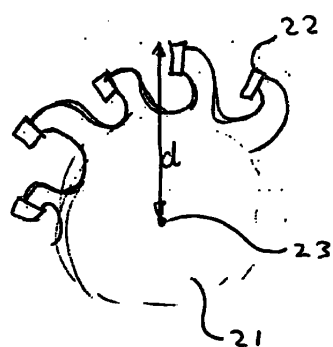
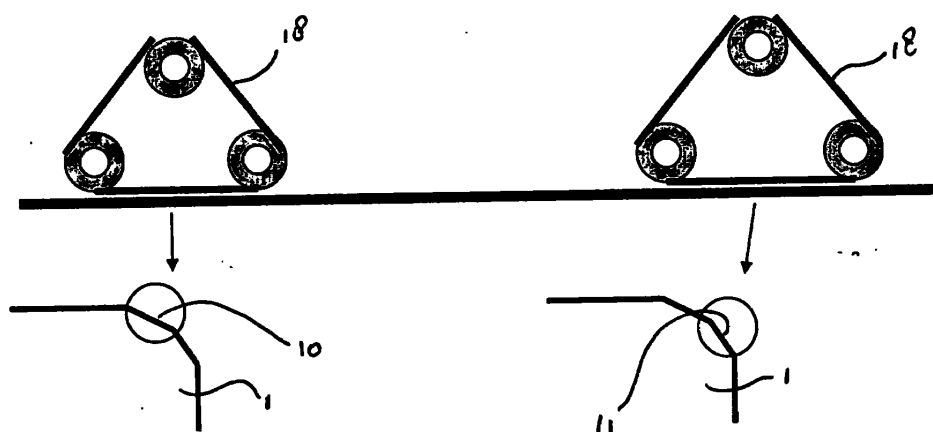
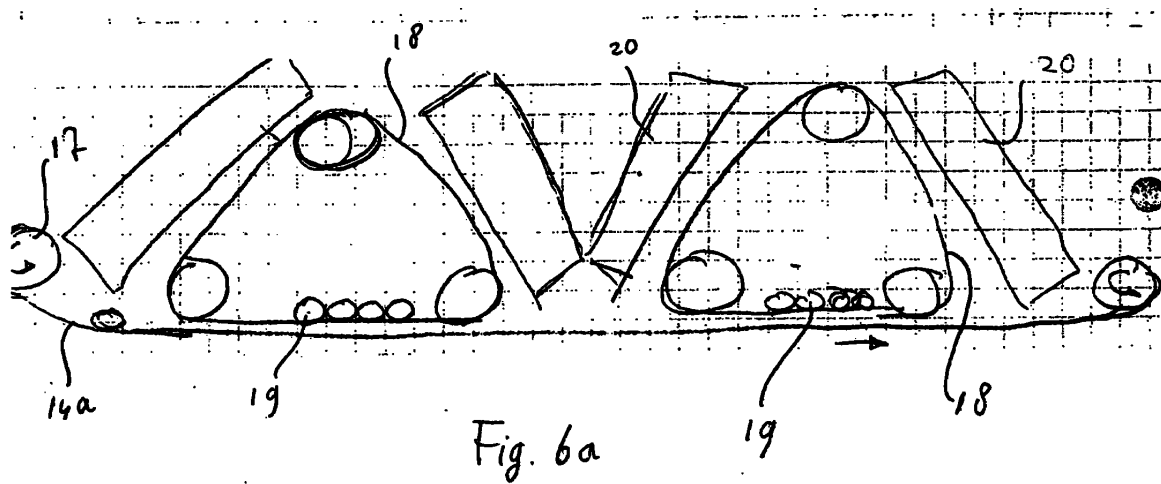


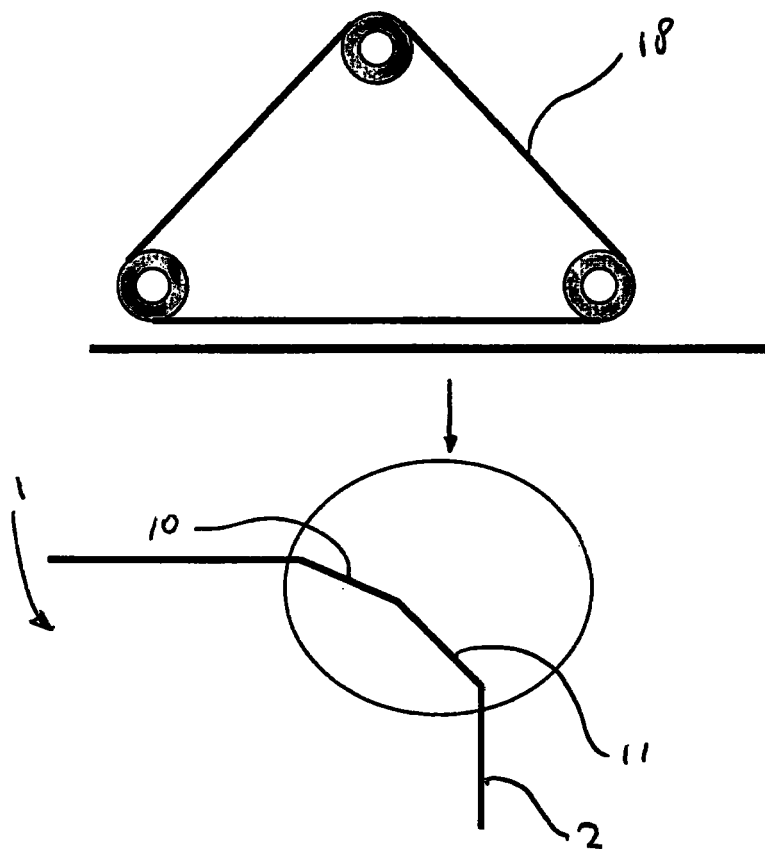
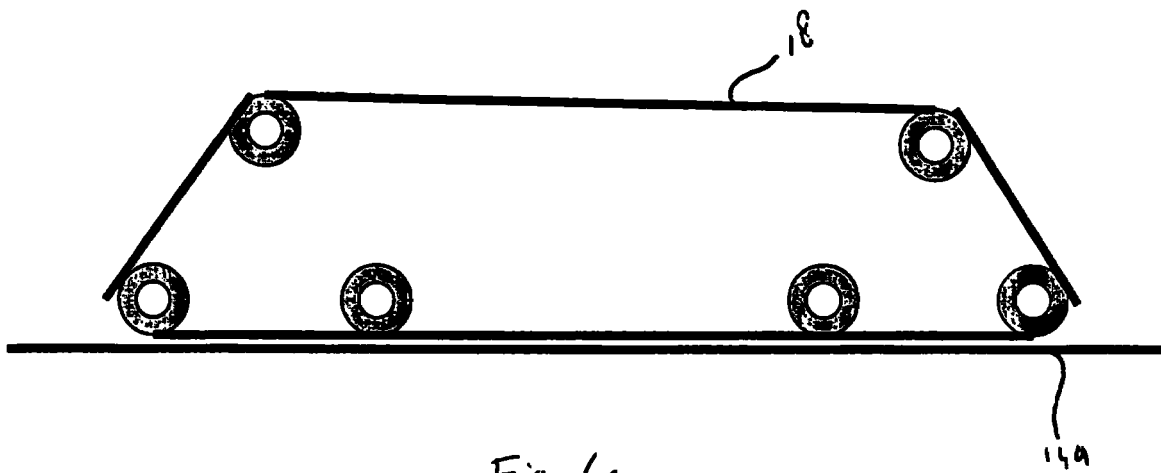
5a



5b

Fig. 5





REFERENCES CITED IN THE DESCRIPTION

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