



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
08.01.2025 Bulletin 2025/02

(51) International Patent Classification (IPC):
E04F 15/02 ^(2006.01) **E04F 15/10** ^(2006.01)

(21) Application number: **24185242.5**

(52) Cooperative Patent Classification (CPC):
E04F 15/02038; E04F 15/102; E04F 2201/0115;
E04F 2201/0146; E04F 2201/0153; E04F 2201/021;
E04F 2201/025; E04F 2201/0517

(22) Date of filing: **28.06.2024**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL
NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA
Designated Validation States:
GE KH MA MD TN

(72) Inventors:
• **Claerhout, Matthias**
8710 Wielsbeke (BE)
• **Wittevrongel, Arnout**
8710 Wielsbeke (BE)

(74) Representative: **Unilin Technologies**
Patent Department
Ooigemstraat 3
8710 Wielsbeke (BE)

(30) Priority: **03.07.2023 US 202363511689 P**

(71) Applicant: **Unilin, BV**
8710 Wielsbeke (BE)

(54) **FLOOR OR WALL COVERING**

(57) A covering (10) comprising a plurality of rectangular panels (12) is disclosed, wherein the alignment of the panels (12) is enhanced, such that grid-shaped patterns can easily be obtained.

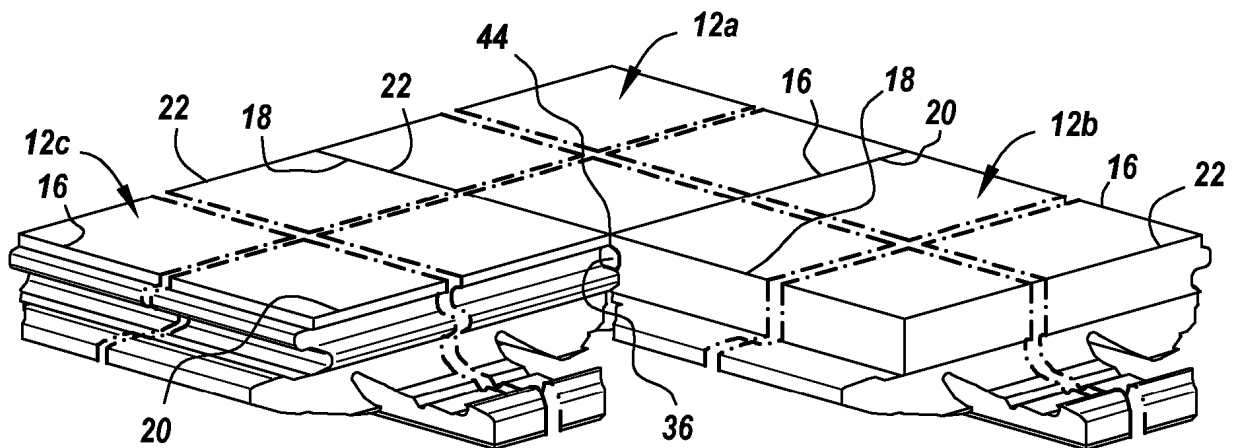


Fig. 5

Description

TECHNICAL FIELD

[0001] The present invention relates to a floor or wall covering comprising rectangular panels having a core and, preferably, a decorative layer. More particularly, the invention pertains to floor coverings of the floating type, i.e. the floor or wall covering rests on, but is not affixed to, a subfloor. If the covering is a wall covering, then it can be affixed to the wall with the aid of glue or connecting members.

BACKGROUND OF THE INVENTION

[0002] Contemporary floor or wall coverings are normally installed by coupling a plurality of rectangular panels together at their short edges to form a first row, and then installing a second row of panels such that the short edges of the panels of the second row are offset in relation to the short edges of the panels in the first row. Subsequent rows of panels are then laid such that their short edges are offset in relation to those of the preceding row.

[0003] Nowadays, panels are predominantly provided with mechanical coupling means along their edges which allow two panels to be joined together without the need for adhesive. As is described in WO 97/47834, mechanical coupling means can be made by milling profiles along the edges of a panel to form coupling parts. Adjacent edges of each panel have a male coupling part in the form of a tongue and the other adjacent edges have a female coupling part in the form of a groove. When two panels are to be joined, the tongue is inserted into the groove and the panels are joined together, either by way of an angling down motion of the tongue panel with respect to the groove panel or by means of a relative horizontal motion. Preferably, the coupling parts are elastically deformed during joining such that a click or snap connection is attained. Another type of connection is described in WO 2010/082171 in which a so-called fold-down system is disclosed. In this respect, reference is also made to WO 2103/102803 and WO2013/118030. Coupling parts which permit panels to be coupled by means of a pushdown movement are known from WO 2021/111210.

[0004] With only a few exceptions, panels are rectangular in shape and may be oblong or square. Normally, oblong panels are laid in rows in which short edges of adjacent panels are connected together. A subsequent row is then laid with its short edges offset from the short edges of the preceding row. Sometimes, however, it is desirable to lay panels in a so-called chessboard pattern/grid pattern in which the short edges of adjacent rows are aligned with each other. This is particularly the case for square panels. Although the provision of mechanical coupling parts on the face of it facilitates the laying of panels in a chess board pattern, it has been found that the coupling motions described above that are needed

to assemble the panels tend to pull already-installed panels out of alignment. This problem is less of an issue when panels are laid in an offset manner since one edge of a panel from a previous row keeps the edges of two panels being installed in the new row in alignment.

[0005] A further problem which may arise when laying panels in a chessboard pattern is that any geometric variations of the panels due to tolerances in the machining, especially imperfect squareness of edges, tend to accumulate during the installation. This is particularly relevant for square panels.

[0006] There is therefore a need to facilitate accurate installing of panels having mechanical coupling means.

[0007] Accordingly, it is an object of the present invention to provide a floor or wall covering made up of rectangular panels in which alignment of the edges of the panels can be facilitated, at the same time that a sufficient locking force can be maintained between the laid panels.

[0008] It is also an object of the invention to provide alternative coupling parts.

SUMMARY OF THE INVENTION

[0009] In accordance with a first aspect of the present invention, the above object may at least in part be achieved by means of a floor or wall covering comprising a plurality of rectangular panels. Each panel may comprise a decorative surface, a first pair of opposite edges consisting of a first edge and a second edge, and a second pair of opposite edges consisting of a third edge and a fourth edge. Each of the first, second, third and fourth edges has a first, second, third and fourth flank, respectively, extending from and substantially perpendicular to the decorative surface. The flanks of adjacent panels are adapted to abut, or at least lie in close proximity, to each other, when the panels form the floor or wall covering. The first edge has a first primary male coupling part extending from the first flank and the second edge has a second primary male coupling part extending from the second flank. The first edge further has a first supplementary male coupling part extending from the first flank at a location between the decorative surface and the first primary male coupling part. The third edge has a first primary female coupling part partially formed in the third flank and the fourth edge has a second primary female coupling part partially formed in the fourth flank. The third edge further has a first supplementary female coupling part at least partially formed in the third flank at a location between the decorative surface and the first primary female coupling part. The first edge of a first panel is adapted to be coupled to the third edge of a second panel and the second edge of the first panel is adapted to be coupled to the fourth edge of a third panel. The first supplementary male coupling part extends at least partially along the first edge to thereby terminate at the fourth flank of the fourth edge.

[0010] Because the first supplementary male coupling part extends from the first flank and along the first edge

up to the fourth flank, the first supplementary male coupling part of the first panel acts as an alignment for a fourth panel which is to be coupled to the second edge of the second panel and the third edge of the third panel. The first supplementary male coupling part may also act on the fourth flank of the fourth panel, to thereby prevent the fourth panel from displacing the second panel along the first edge of the first panel as the panels are being laid to form the floor or wall covering.

[0011] The panels of the floor or wall covering may be installed according to a chessboard pattern and/or grid pattern.

[0012] A first alternative embodiment of the first aspect of the invention relates to a floor or wall covering as described above, with the difference that instead of the first pair of opposite edges comprising said first edge and second edge and said second pair of opposite edges comprising said third edge and said fourth edge, for the first alternative embodiment, one of the below mentioned possibilities is possible:

- the first pair of opposite edges comprises the first edge and the third edge, and the second pair of opposite edges preferably comprises corresponding coupling parts, e.g. the second pair of opposite edges comprises the second edge and the fourth edge or the second pair of opposite edges comprise coupling parts which allow coupling by a downward movement or the second pair of opposite edges comprise coupling parts which allow coupling by a turning movement;
- the first pair of opposite edges comprises the first edge and the third edge and the second pair of opposite edges comprises the first edge and the third edge;
- the first pair of opposite edges comprises the second edge and the fourth edge, and the second pair of opposite edges preferably comprises corresponding coupling parts, e.g. the second pair of opposite edges comprise the first edge and the third edge or the second pair of opposite edges comprise coupling parts which allow coupling by a downward movement or the second pair of opposite edges comprise coupling parts which allow coupling by a turning movement;
- the first pair of opposite edges comprises the second edge and the fourth edge, and the second pair of opposite edges comprises the second edge and the fourth edge.

[0013] The below mentioned preferred and/or specific features for said first, second, third and/or fourth edge apply mutatis mutandis for the first alternative embodiment. With other words, the preferred and/or specific features of the corresponding coupling parts of the first and third edge and the preferred and specific features of the corresponding coupling parts of the second and fourth edge are also an invention as such, and this independent

upon which edge these coupling parts are located.

[0014] A second alternative embodiment of the first aspect of the invention relates to floor or wall covering, preferably comprising a plurality of rectangular panels, each panel comprising:

a decorative surface, and edges wherein;

- at least one of said panels comprises a said first edge and at least one of said panels comprises a said third edge; and/or
- at least one of said panels comprises a said second edge and at least one of said panels comprises a said fourth edge.

[0015] The below mentioned preferred and/or specific features for said first, second, third and/or fourth edge apply mutatis mutandis for the second alternative embodiment. With other words, the preferred and/or specific features of the corresponding coupling parts of the first and third edge and/or the preferred and specific features of the corresponding coupling parts of the second and fourth edge are also an invention as such, and this independent upon which edge and upon which panel these coupling parts are located.

[0016] Optionally, each of the first and second primary male coupling parts are in the form of a tongue and each of the first and second primary female coupling parts are in the form of a groove. The male and female coupling parts may provide for an interlocking in a direction perpendicular to the decorative surface of the floor or wall covering, as well as in a direction perpendicular to the coupled edges and parallel to the decorative surface of the floor or wall covering.

[0017] The invention according to all aspects of the invention may be applied to any type of flooring which employs mechanical coupling means. Thus, the panels may be laminate panels having a core of MDF/HDF material and a thickness of, for example, 6 mm to 15 mm. Alternatively, the panels may be plastic panels having a thickness of e.g. 3.2 mm to 6 mm or more. Examples of such plastic panels include:

- so-called SPC (stone plastic composite) in which the substrate is made of rigid PVC or another plastic material with preferably less than 5 phr plasticizer, and including filler materials such as inorganic fillers such as chalk, CaCO_3 or talc, preferably at a fill ratio of up to 4:1 (filler:PVC);
- WPC (waterproof plastic composite) in which the substrate is a closed cell foamed PVC or another plastic material including filler materials at a fill ratio preferably of up to 2:1, and
- LVT (luxury vinyl tile) in which the substrate is a PVC or another plastic material with preferably more than 5 phr plasticizer, more preferably more than 15 phr, and filler materials such as inorganic fillers such as chalk, CaCO_3 or talc, at a fill ratio preferably of up to 2:1.

[0018] The panels may be mineral based panels for example comprising a mineral based core such as a magnesium oxide board, a plasterboard, a board made of mineral fibres bonded with a binder (for example by means of a thermosetting binder), or a fibre-cement board.

[0019] The panels may be solid wood panels, engineered wood panels, wood veneer panels, etc.

[0020] To facilitate laying of the floor or wall covering, the male and female coupling parts may allow for a mutual connection with an adjacent panel by means of a turning movement and/or a horizontal shifting movement. Optionally, each groove of the first and second primary female coupling parts may be partially delimited by a lower lip that extends beyond the respective edge flank. The provision of a longer lower lip can facilitate the laying of the floor or wall covering in that the tongue of one edge can be brought to rest on the longer lower lip of an adjacent edge before being turned into the groove. The provision of a longer lower lip can enhance the coupling strength.

[0021] In one example, the tongue of the first primary male coupling part may extend beyond the first flank by a first distance and the first supplementary male coupling part extends from the first flank by a second distance, the second distance being between 10 % and 60 %, alternatively between 20 % and 50 %, for example between 30 % and 40 %, of said first distance. Here the length of the first supplementary male coupling part is sufficient to provide good alignment, but not too long such that laying of the floor or wall covering can be done in a good manner. Also the risk of damage to the coupling parts during laying of the floor or wall covering is low. The length of the first supplementary male coupling part is sufficient to enhance the interlocking perpendicular to the decorative surface of the floor or wall covering significantly, but without hindering coupling of said panels.

[0022] In an example, the location of said first supplementary male coupling part may be spaced from the first primary coupling part in a direction along the first flank towards the decorative surface. The spacing may be attained by the provision of a spacing recess, such as for example a supplementary groove, which may extend partially into the first flank.

[0023] In an example, the second edge may have a second supplementary female coupling part at least partially formed in the second flank at a location between the decorative surface and the second primary male coupling part, and the fourth edge may have a second supplementary male coupling part extending from the fourth flank at a location between the decorative surface and the second primary female coupling part. Preferably said second supplementary male coupling part of the fourth edge extends at least partially along the fourth edge to thereby terminate at said first flank of said first edge. In this manner the second supplementary male coupling part also contributes to good alignment of the panels in the floor or wall covering. The second supplementary

male coupling part also contributes to the interlocking perpendicular to the decorative surface of the floor or wall covering.

[0024] In an example, each of said first and second supplementary male coupling parts may be in the form of a tongue and each of said first and second supplementary female coupling parts may be in the form of a groove.

[0025] In one example, a square alignment block can be located in a cavity formed in a lower surface of four connected panels, the four connected panels sharing a common meeting point formed by an edge confluence of the four panels. In this manner, the square alignment block may aid in the alignment of the edges of the four connected panels. Such an alignment block can be used at the start of the installation of the floor or wall covering, such that the alignment at the start of installation is immediately correct.

[0026] Other installation aids can be used, for example one can make use of L-shaped starter tools which have coupling parts corresponding to the coupling parts of the panels and have dimensions of two interconnected panels, and this to connect said panels with starter tools and immediately have panels that are correctly aligned from the start of installation of said floor or wall covering. Said installation tools can also be used for the other aspects of the invention further disclosed.

[0027] Preferably the first and the second primary male coupling parts are located at the same height, more preferably they have similar dimensions. The first and second primary female coupling parts are then also located at the same height as each other and at the same height of the primary male coupling parts, and more preferably the first and second primary female coupling parts have similar dimensions.

[0028] In an example, seen from the bottom to the top of the panel, thus seen from a bottom surface to the decorative surface:

- the first edge comprises said first primary male coupling part in the form of a tongue, an adjacent spacing recess, preferably in the form of a supplementary groove at least partially located in the first flank, an adjacent first supplementary male coupling part in the form of a tongue and an adjacent first flank portion. Said spacing recess is limited at the bottom by an upper side of the first primary male coupling part and is limited at the bottom by an underside of the first supplementary male coupling part.
- the second edge comprises said second primary male coupling part in the form of a tongue and an adjacent second flank portion.
- the third edge comprises said first primary female coupling part in the form of a groove, an adjacent spacing projection, in the form of a supplementary tongue, an adjacent first supplementary female coupling part in the form of a groove and an adjacent third flank portion. The adjacent spacing projection

forms an upper lip of the first primary female coupling part and forms a lower lip of the first supplementary female coupling part.

- the fourth edge comprises the second primary female coupling part in the form of groove and an adjacent fourth flank portion.

More preferably for this example:

- the first supplementary male coupling part of the first edge is at the same height as the first supplementary female coupling part of the third edge, and preferably they have similar thicknesses and complimentary shapes.
- the spacing projection of the third edge is at the same height of the spacing recess of the first edge, and preferably they have similar thicknesses and complimentary shapes.
- the first supplementary male coupling part of the first edge is located above the spacing projection of the third edge.

[0029] In an example, seen from the bottom to the top of the panel, thus seen from the bottom surface to the decorative surface:

- the first edge comprises said first primary male coupling part in the form of a tongue and a first supplementary male coupling part in the form of a tongue, located at a distance from the first primary male coupling part and this by a first flank portion. Above the first supplementary male coupling part another first flank portion is present.
- the second edge comprises said second primary male coupling part in the form of a tongue, an adjacent second supplementary female coupling part at least partially formed in the second flank and in the form of a groove and an adjacent second flank portion.
- the third edge comprises said first primary female coupling part in the form of a groove, and a first supplementary female coupling part formed in the third flank and in the form of a supplementary groove and located at a distance from the first primary female coupling part and this by a third flank portion. Above the first supplementary female coupling part another third flank portion is present.
- the fourth edge comprises the second primary female coupling part in the form of groove, an adjacent second supplementary male coupling part extending from the fourth flank and in the form of a tongue, and an adjacent fourth flank portion.

More preferably for this example:

- the first supplementary male coupling part of the first edge is at the same height as the first supplementary female coupling part of the third edge, and preferably

they have similar thicknesses and complimentary shapes.

- the abovementioned third flank portion of the third edge is at the same height of the second supplementary female coupling part of the second edge.
- the first supplementary male coupling part of the first edge is located above the first supplementary male coupling part of the fourth edge.

[0030] In a second aspect of the present invention, a floor or wall covering is disclosed comprising a plurality of rectangular panels. Each panel comprises a decorative surface and a bottom surface, as well as a substrate between the decorative surface and the bottom surface. Said substrate can or cannot comprise said bottom surface. A first pair of opposite edges of the panel consists of a first edge and a second edge, and a second pair of opposite edges consist of a third edge and a fourth edge. Each of the first, second, third and fourth edges have a first, second, third and fourth flank, respectively, extending from and substantially perpendicular to the decorative surface. The flanks of adjacent panels are adapted to abut, or at least lie in close proximity to, each other when the panels form the floor or wall covering. In accordance with the second aspect, the bottom surface of the panel is provided with a first groove extending from the third edge in a direction parallel to, and at a first distance from, the first edge, and with a second groove extending from the first edge in a direction parallel to, and at a second distance from, the third edge. The first distance and the second distance are chosen such that the first groove and the second groove intersect each other. The floor or wall covering of the second aspect further comprises at least one connector member, the connector member being dimensioned such it can fit in the first groove and simultaneously in the second groove.

[0031] With distance is preferably indicated the minimum distance to the edge measured at the height of the bottom surface, this being the distance from the edge to the flank of the groove being located closest to the edge and this at the location of the bottom surface.

[0032] Preferably the connector comprises or is a frame-shaped part with two pairs of opposite walls, with adjacent walls being able to simultaneously fit in respectively the first groove and the second groove. This frame-shaped part than preferably encloses a rectangular shaped space/plate-shaped space.

[0033] Preferably the distance between said opposite walls substantially equals the sum of first distance and the second distance. It can be exactly the same, slightly larger or slightly smaller to obtain a clamping.

[0034] For example the floor or wall covering of the second aspect comprises at least one connector member defined by two pairs of opposite walls, said walls being adjacent to each other and enclosing a space, the connector member being dimensioned such that a first length of a first wall of the two pairs of opposite walls can fit in a corresponding length of the first groove simultaneously

with a second length of an adjacent second wall of the two pairs of opposite walls fitting in a corresponding length of the second groove.

[0035] Said two pairs of opposite walls preferably form a frame-shaped piece, more preferably a rectangular frame-shaped piece, such that the connector member is frame-shaped or comprises a frame-shaped part, with an open area enclosed between said two pairs of opposite walls.

[0036] The connector member may be used to connect like panels to each other and/or to assist in alignment of the panels.

[0037] In an example, the first length of the first wall of the connector member may correspond to the second distance of the second groove from the third edge of the panel, and the second length of the second wall may correspond to the first distance of the first groove from the first edge of the panel.

[0038] In an alternative example, the first length of the first wall of the connector member may be greater than the second distance of the second groove from the third edge of the panel, and the second length of the second wall may be greater than the first distance of the first groove from the first edge of the panel.

[0039] In various examples, the first wall of the connector member may have a first complete length and the first length may be half the first complete length. The second wall of the connector member may have a second complete length, with the second length being half the second complete length.

[0040] In an example, the first groove in the bottom surface of the panel may extend from the third edge to the fourth edge of the panel and the second groove may extend from the first edge to the second edge.

[0041] In one example, the bottom surface of the panel may be provided with a third groove extending from the third edge in a direction parallel to, and at a third distance from, the second edge, and with a fourth groove extending from the first edge in a direction parallel to, and at a fourth distance from, the fourth edge. The third groove may extend from the third edge to the fourth edge and the fourth groove may extend from the first edge to the second edge of the panel.

[0042] As an example, the first, second, third and fourth distances can be equidistant.

[0043] In an example, each of the grooves in the bottom surface of the panel may have an opening, a base, a first side wall proximate the edges of the panel and a second side wall distal of the edges. The first side wall may taper at a first angle with respect to the bottom surface of the panel such that the opening is wider than the base. The first angle may lie between 3° and 15°, for example about 5°.

[0044] In an example, each of the grooves in the bottom surface of the panel may have an opening, a base, a first side wall proximate the edges of the panel and a second side wall distal of the edges. The second side wall may taper at a first angle with respect to the bottom surface

of the panel such that the opening is wider than the base. The first angle may lie between 3° and 15°, for example about 5°.

[0045] In an example, each of the grooves in the bottom surface of the panel may have an opening, a base, a first side wall proximate the edges of the panel and a second side wall distal of the edges. The first and the second side wall may taper at a first and second angle with respect to the bottom surface of the panel such that the opening is wider than the base. The first and the second angle may lie between 3° and 15°, for example about 5°.

[0046] In examples, the connector member can be moulded from a thermoplastic material, for example from polyvinyl chloride (PVC), polyethylene (PE), polypropylene (PP) or polyethylene terephthalate (PET), or from rubber or another elastic material.

[0047] Rather than being joined solely by means of the connector members, at least the first pair of opposite edges can be provided with mechanical coupling means so that a plurality of the panels can be coupled to one another. The coupling means may provide for an interlocking in a direction perpendicular to the decorative surface of the floor or wall covering, as well as in a direction perpendicular to the coupled edges and parallel to the decorative surface of the floor or wall covering.

[0048] Both pairs of opposite edges may be provided with mechanical coupling means, the mechanical coupling means on the first pair of opposite edges allowing for a mutual connection with an adjacent panel by means of a turning movement and/or a horizontal shifting movement, and the mechanical coupling means on the second pair of opposite edges allowing for a mutual connection with an adjacent panel by means of an essentially vertical movement. Said panels are then of the so-called fold down type.

[0049] In an example, the bottom surface of the panel may be provided with a fifth groove and a sixth groove. The fifth and sixth grooves may extend from the third edge of the panel in a direction parallel to the second edge, with the fifth and sixth grooves being spaced apart by a fifth distance. The fifth distance may be equal to a separation distance between the first pair of opposite walls of the connector member. With the aid of this fifth and sixth groove, said panels can be easily laid in a chessboard pattern but also in other patterns, for example a staggered patterns such as a half-half pattern.

[0050] According to a third aspect, the invention relates to a floor or wall covering comprising a plurality of rectangular panels, each panel comprising:

- a decorative surface,
 - a first pair of opposite edges consisting of a first edge and a second edge, and
 - a second pair of opposite edges consisting of a third edge and a fourth edge,
- each of said first, second, third and fourth edges having a first, second, third and fourth flank, respectively, extending from and substantially perpendicular to

said decorative surface, the said flanks of adjacent panels being adapted to abut when said panels form said floor or wall covering,

wherein preferably at least said first pair of opposite edges, and more preferably both pair of opposite edges, are provided with mechanical coupling means, substantially in the form of male coupling parts and female coupling parts, so that a plurality of said panels can be coupled to one another, said coupling means providing for an interlocking in a direction perpendicular to the decorative surface of the floor or wall covering, as well as in a direction perpendicular to the coupled edges and parallel to the decorative surface of the floor or wall covering;

wherein a recess is provided at the decorative surface of the floor or wall covering between two panels which are preferably mechanically coupled to each other by a said male coupling part and a said female coupling part, and wherein said floor or wall covering has edge confluences where at least three panels meet and where said recesses adjoin in each other and form a joint, wherein said recesses comprise grouting material and wherein at the height of at least one said confluence, the floor or wall covering comprises at least one installation aid which forms said adjoining recesses, seen according to a direction parallel to the decorative surface.

[0051] With form fits is indicated that the installation aid can be placed in said joint. For this it can have similar dimensions seen according to a direction parallel to the decorative surface or it can be a bit bigger such that it is clamped in said joint. With the aid of such an installation aid it is hindered, that installed panels move, for example slide along mechanically coupled edges.

[0052] This installation aid can be made from any suitable resilient material, such as a thermoplastic material, for example polyvinyl chloride (PVC), polyethylene (PE), polypropylene (PP) or polyethylene terephthalate (PET), or rubber or another elastic material.

[0053] Preferably the height of said recesses according to a direction perpendicular to the decorative surfaces, is greater than the corresponding dimension of said installation aid, and wherein said grouting material is located above said installation aid. Said installation aid is not visible in the installed floor or wall covering, since it is also covered by grouting material.

[0054] In a specific embodiment said floor or wall covering comprises at least one confluence of three panels, wherein said corresponding recesses form a T-shaped joint and wherein a said installation aid is T-shaped. Such T-shaped joints are typically for random installation patterns or staggered installation patterns such as half-half installation patterns. Also in other installation patterns, which are a combination of square panels and elongate rectangular panels or a combination of larger and smaller panels, such T-joints can be present.

[0055] In a specific embodiment said floor or wall cov-

ering comprise at least one confluence of four panels, wherein said corresponding recesses form a cross-shaped joint and wherein a said installation aid is cross-shaped. Such cross-shaped joints are typically for grid pattern installation patterns, such as chessboard installation patterns. Also in other installation patterns, which are a combination of square panels and elongate rectangular panels or a combination of larger and smaller panels, such cross-joints can be present. Here the four panels preferably have one common meeting point or area.

[0056] A floor or wall covering can have both above-mentioned cross-shaped joints and T-shaped joints, such that T-shaped installation aids and cross-shaped installation aids can be present.

[0057] Preferably the female and male coupling parts of the third aspect of the invention, and more specifically the shape of the coupled edges with specific recesses to be grouted, can be as described in WO 2021/059062. The coupling parts described in this patent publication and the shapes of the coupled edges, including the possible shapes of the recesses, are incorporated by reference. The female and coupling parts as described in WO 2021/059062 can also be used for the first and the third aspect of the invention, such that also the coupling parts described in this patent publication are incorporated by reference for the first and the second aspect of the invention. For grouted floor or wall coverings, good alignment of the panels ensure a very aesthetic looking floor or wall covering.

[0058] The floor or wall coverings according to all aspects of the invention may be made up of rectangular panels of any length and width, depending essentially on the visual impression that is wished to be created. Typically, though, for a chessboard type of pattern, the panels are square and can have a decorative layer with an edge length of between 300 mm and 1200 mm, preferably about 600 mm. The decorative surface may be provided with lowered edges at one or more sides, for example bevels or grout imitations, or even a space for introducing grout. In the case of bevels, the decorative surface is preferably continuous over the surface of the lowered edge. Herein the decoration may be flat, while the bevel is limited in depth to a wear layer situated above said decoration, or the decoration may be bevelled in itself for example due to a deformation of an underlying portion of the core. It is however not excluded that a separate decoration, such as a paint, a print and/or a lacquer, is provided on the bevelled surface. As an alternative the lowered edge may be free from decoration and extend into a portion of the core, to thereby expose the color of the core. All these decoration options are also available in the case of a lowered edge forming a grout imitation. Such lowered edge preferably has an L-shaped geometry. The bottom of such lowered edge forming a grout imitation may be horizontal or practically horizontal. The proximal wall of the grout imitation may be vertical or practically vertical, whether or not chamfered toward the global upper surface of the panel. As an alternative the

proximal wall may be convex or concave, preferably tangent to said bottom. In general, the decorative surface of the panel may convey any desired pattern, such as a woodgrain pattern, a stone pattern or a fanciful pattern.

[0059] It is clear that the decorative surface is preferably at least formed by means of a decorative layer attached to the core or substrate. It is however also possible that the core or substrate itself has a decorative aspect basically forming said decorative surface. The latter may for example be the case when the core or substrate is a solid wood, or is a compact vinyl. It is of course not excluded, that in such case the decorative aspect of the core or substrate is protected from wear, scratches and other damages by means of a protective lacquer or similar. Where certain aspects of the invention are described in relation to a decorative layer, it is clear that similar preferred examples are available where the core basically forms the decorative surface.

[0060] The floor or wall covering according to the second and the third aspect can have one or more of the following features:

- the panels can comprise a first type of panels being elongate and rectangular panels comprising a pair of long edges and a pair of short edges; wherein both the long and the short edges are provided with mechanical coupling parts which allow the panels from the set to be coupled together; wherein a first long edge is provided with a male coupling part and a second long edge is provided with a female coupling part; wherein a first short edge is provided with a male coupling part and a second short edge is provided with a female coupling part;
- the panels can comprise a second type of panels being square panels comprising a first pair of opposite edges and a second pair of opposite edges; wherein said edges are provided with mechanical coupling parts which allow the panels from the set to be coupled together; wherein a first edge of the first pair of opposite edges is provided with a male coupling part and a second edge of the first pair of opposite edges is provided with a female coupling part; wherein a first edge of the second pair of opposite edges is provided with a male coupling part and a second edge of the second pair of opposite edges is provided with a female coupling part; wherein the dimensions of the first pair and the second pair of opposite edges match the dimensions of the short edges of said first type of panels;
- the panels can comprise a third type of panels being square panels comprising a first pair of opposite edges and a second pair of opposite edges; wherein said edges are provided with mechanical coupling parts which allow the panels from the set to be coupled together; wherein a first edge of the first pair of opposite edges is provided with a male coupling part and a second edge of the first pair of opposite edges is provided with a female coupling part; wherein a

first edge of the second pair of opposite edges is provided with a male coupling part and a second edge of the second pair of opposite edges is provided with a female coupling part; wherein the dimensions of the first pair and the second pair of opposite edges match the dimensions of the long edges of said first type of panels;

- the panels can comprise a fourth type of panels being elongate and rectangular panels comprising a pair of long edges and a pair of short edges; wherein both the long and the short edges are provided with mechanical coupling parts which allow the panels from the set to be coupled together; wherein a first long edge is provided with a male coupling part and a second long edge is provided with a female coupling part; wherein a first short edge is provided with a male coupling part and a second short edge is provided with a female coupling part; and wherein the first and the fourth type of panels have the same dimensions and wherein the coupling parts on the long edges of the first and the fourth type of panels are provided in mirror image;
- the panels of the first type of panels are provided to extend according to a first length direction and the panels of the fourth type of panels are provided to extend according to a second length direction, wherein the second length direction is perpendicular to the first length direction.

[0061] According to a first variant, the invention also concerns a floor or wall covering comprising a plurality of rectangular panels as described in the second aspect of the invention, wherein said connector member is not part of the floor or wall covering as such. All the embodiments and features described for the rectangular panels of the second aspect of the invention apply to this first variant. Said connector member can also be seen as a separate invention.

[0062] According to a second variant, the invention also concerns a floor or wall covering comprising a plurality of rectangular panels as described in the third aspect of the invention, wherein said installation aid not being part of the floor or wall covering as such. All the embodiments and features described for the rectangular panels of the second aspect of the invention apply to this second variant. Said installation aid can also be seen as a separate invention.

[0063] It is to be understood that preferably, in the context of all aspects of the present invention, any beveled edges, chamfers or lowered edges of the decorative surface do not constitute any part of the flanks of the panels that extend from the decorative surface.

BRIEF DESCRIPTION OF THE DRAWINGS

[0064] Examples are described in more detail below with reference to the appended drawings, in which:

Fig. 1 is a schematic perspective view of a floor or wall covering of the present invention;
 Figs. 2A and 2B are perspective views of a panel for use in the floor or wall covering of the present invention;
 Fig. 3A is a cross-sectional view along line IIIa-IIIa of Fig. 2A;
 Fig. 3B is a cross-sectional view along line IIIb-IIIb of Fig. 2A;
 Figs. 4A and 4B are cross-sectional views of two coupled panels at the height of coupled coupling parts;
 Fig. 5 is a perspective view of three coupled panels;
 Fig. 6 is a plan view of nine panels connectable to form a floor or wall covering with a chessboard pattern;
 Figs. 7A and 7B are perspective views of a variant of a panel for use in the floor or wall covering of the present invention;
 Fig. 8A is a cross-sectional view along line VIIIa-VIIIa of Fig. 7A;
 Fig. 8B is a cross-sectional view along line VIIIb-VIIIb of Fig. 7A;
 Figs. 9A and 9B are cross-sectional views of two coupled panels at the height of the coupled coupling parts;
 Fig. 10 is a perspective view of three coupled panels;
 Fig. 11 is a plan view of nine panels connectable to form a floor or wall covering with a chessboard pattern;
 Fig. 12 is a schematic perspective view of four coupled panels, seen from below;
 Fig. 13 is a schematic perspective view of three coupled panels, seen from below, according to a second independent aspect of the present invention;
 Fig. 14A is a cross-sectional view along line XIVa-XIVa of Fig. 13;
 Fig. 14B is a cross-sectional view along line XIVb-XIVb of Fig. 13;
 Fig. 15 is a plan view of the bottom surface of a panel provided with a connector member;
 Fig. 16 is a plan view of an example of a connector member that may be used with the panel of Fig. 15;
 Fig. 17 is an enlarged view of a corner portion of Fig. 15;
 Figs. 18A and 18B illustrate examples of groove profiles, and
 Fig. 19 is a plan view of three connected panels;
 Fig. 20 is a view of four connected panels according to the third aspect of the invention;
 Figs. 21, 22 and 23 are perspective views of panels for use in a floor or wall covering according to the first alternative embodiment of the invention;
 Fig. 24 is a cross-sectional view along line XXIV-XXIV of Fig. 21;
 Fig. 25 is a cross-sectional view along line XXV-XXV of Fig. 21;
 Fig. 26 is a cross-sectional view along line XXVI-

XXVI of Fig. 22;

Fig. 27 is a cross-sectional view along line XXVII-XXVII of Fig. 23.

5 DETAILED DESCRIPTION OF PREFERRED EXAMPLES

[0065] In the drawings, reference number 10 generally denotes a floor or wall covering in accordance with the present invention. In accordance with a first aspect of the invention, and as is depicted in Fig. 1, the floor or wall covering is constituted by a plurality of rectangular, in this case square, panels 12. The panels are laid in rows, with the edges of adjacent panels being aligned to form a grid or "chessboard" effect. Each panel 12 may be provided with a decorative surface 14 on an upper surface, and a lower surface 15 adapted to face a subfloor on which the floor or wall covering rests.

[0066] With reference to Figs. 2A and 2B, each panel 12 has a first pair of opposite edges consisting of a first edge 16 and a second edge 18, and a second pair of opposite edges consisting of a third edge 20 and a fourth edge 22. Each of the first 16, second 18, third 20 and fourth 22 edges has a first 24, second 26, third 28 and fourth 30 flank, respectively, extending from and substantially perpendicular to the decorative surface 14. The flanks of adjacent panels 12 are adapted to abut, or at least lie in close proximity to, each other when the panels form the floor or wall covering 10.

[0067] As is evident from Figs. 3A and 3B, the panels 12 are provided with mechanical coupling parts permitting adjacent panels 12 to be joined together when laying the floor or wall covering 10. Thus, the first edge 16 is provided with a first primary male coupling part 32 extending from the first flank 24 and the second edge 18 has a second primary male coupling part 34 extending from the second flank 26. In accordance with an aspect of the present invention, the first edge 16 further has a first supplementary male coupling part 36 extending from the first flank 24. The first supplementary male coupling part 36 may be provided at a location on the first flank 24 between the decorative surface 14 and the first primary male coupling part 32. As will be explained in the following, the first supplementary male coupling part 36 may, among others, assist in alignment of panel edges during laying of the floor or wall covering 10.

[0068] With reference to Fig. 3B, the third edge 20 of the panel 12 has a first primary female coupling part 38 partially formed in the third flank 28 and the fourth edge 22 has a second primary female coupling part 40 partially formed in the fourth flank 30. The third edge 20 further has a first supplementary female coupling part 42 at least partially formed in the third flank 28. The first supplementary female coupling part 42 is provided at a location on the third flank corresponding to that of the first supplementary male coupling part 36 on the first flank 24. Thus, the first supplementary female coupling part 42 may be provided at a location on the third flank 28 between the

decorative surface 14 and the first primary female coupling part 38.

[0069] With particular reference to Figs. 4A and 4B, it will be apparent that the first edge 16 of a first panel 12a is adapted to be coupled to the third edge 20 of a second panel 12b and the second edge 18 of the first panel 12a is adapted to be coupled to the fourth edge 22 of a third panel 12c. In the coupled condition of the first and second panels, 12a-12b, the first primary male coupling part 32 of the first panel 12a cooperates with the first primary female coupling part 38 of the second panel 12b. At the same time, the first supplementary male coupling part 36 of the first panel 12a cooperates with the first supplementary female coupling part 42 of the second panel 12b. In a similar manner, in the coupled condition of the first and third panels, 12a-12c, the second primary male coupling part 34 of the first panel 12a cooperates with the second primary female coupling part 40 of the third panel 12b.

[0070] The above-described coupled condition of the first panel 12a to the second and third panels 12b-12c is illustrated in Fig. 5. The three panels 12 meet at an edge confluence 44, the edge confluence 44 being the meeting point of the first and fourth edges 16-22 of the first panel 12a and the second and third edges 18-20 of the second and third panels 12b-12c.

[0071] Reverting to Fig. 2A, it will be apparent that the first supplementary male coupling part 36 on the first edge 16 of the panel 12 extends at least partially along the first edge 16 to thereby terminate at the fourth flank 30 of the fourth edge 22. As such, the first supplementary male coupling part 36 effectively forms an extension of, and lies coplanar with, the fourth flank 30. This extension of the fourth flank 30 is visible in Fig. 5 in which the first supplementary male coupling part 36 of the first panel 12a is present at the edge confluence 44.

[0072] The first supplementary male coupling part 36 of the first panel 12a may assist in the alignment of panels 12 during laying of the floor or wall covering 10. Thus, and with particular reference to Fig. 5, a fourth panel 12d (see Fig. 1) can be coupled to the second edge 18 of the second panel 12b and to the third edge 20 of the third panel 12c. Since the fourth edge 22 of the first panel 12a is coupled to the second edge 18 of the third panel 12c, movement of these two panels away from each other is prevented. However, the second panel 12b is coupled to the first edge 16 of the first panel 12a along its third edge 20. This means that the second panel 12b may be inadvertently displaced along the coupling formed between the third edge 20 of the second panel 12b and the first edge of the first panel 12a. Because the first supplementary male coupling part 36 lies coplanar with the fourth flank 30 of the fourth edge 22 of the first panel 12a, the first supplementary male coupling part 36 will act on the fourth flank 30 of the fourth panel 12d as it is being coupled to the second edge 18 of the second panel 12b to thereby prevent the fourth panel 12d from displacing the second panel 12b along the first edge 16 of the first panel 12a. Accordingly, the edge confluence 44 will also in-

clude the meeting point of the first and fourth edges of the fourth panel 12d.

[0073] In the floor or wall covering depicted in Figs. 1 to 6, each of the first and second primary male coupling parts 32-34 are in the form of a tongue 46-48 and each of the first and second primary female coupling parts 38-40 are in the form of a groove 50-52. Irrespective of the actual form of the coupling parts, the male and female coupling parts may provide for an interlocking in a direction V perpendicular to the decorative surface 14 of the floor or wall covering, as well as in a direction H perpendicular to the coupled edges and parallel to the decorative surface of the floor or wall covering 12.

[0074] In an example, the male and female coupling parts allow for a mutual connection with an adjacent panel by means of a turning movement and/or a horizontal shifting movement. In this respect, the coupling parts may have a shape based on the coupling parts disclosed in WO 97/47834, the disclosure of which is hereby incorporated by reference.

[0075] In examples in which the first and second primary female coupling parts 38-40 are grooves 50-52, each groove is partially delimited by a lower lip 54-56 that extends beyond the respective edge flank 28-30. This may assist in the coupling of two adjacent panels to each other. For example, a tongue 46-48 on one edge of one panel may be placed at an angle on the lower lip 54-56 of an adjacent panel and then turned downwards to effect coupling. Alternatively, the lower lip 54, 56 may facilitate the joining of an adjacent panel by means of a horizontal shifting movement in that a longer lower lip is more readily bendable than a shorter lip.

[0076] With reference to Fig. 3A, the tongue 46 of the first primary male coupling part 32 may extend beyond the first flank 24 by a first extension e_1 and the first supplementary male coupling part 36 may extend from the first flank by a second extension e_2 . The second extension e_2 may be between 10 % and 60 %, alternatively between 20 % and 50 %, for example between 30 % and 40 %, of the first extension e_1 . A first supplementary male coupling part 36 extending with a first extension e_1 within these ranges has shown itself to be sufficiently prominent to serve as an alignment and/or blocking aid when laying a floor or wall covering, at the same time that the first supplementary female coupling part 42 need not extend unduly deeply beneath the decorative surface 14.

[0077] Still referring to Fig. 3A, the location of the first supplementary male coupling part 36 may be spaced from the first primary male coupling part 32 in a direction along the first flank 24 towards the decorative surface 14 by means of a spacing recess 58. The spacing recess 58 may extend partially into the first flank 24. An upper surface 60 of the spacing recess 58 may partially delimit the first supplementary male coupling part 36 and a lower surface 62 of the spacing recess may partially delimit the first primary male coupling part 32. Said upper surface 60 preferably extends parallel to the decorative surface 14. Said first supplementary male coupling part is pref-

erably delimited at the top by an inclined surface 132.

[0078] Since the first supplementary male coupling part 36 is spaced from the first primary male coupling part 32 on the first flank 24 of the first edge 16 of the panel 12, a corresponding spacing is provided on the third flank 28 of the third edge 20 of the panel 12. Thus, and with reference to Fig. 3B, a spacing projection 64 separates the first primary female coupling part 38 from the first supplementary female coupling part 42. The spacing projection 64 may extend from the third flank 28 by an amount essentially corresponding to the extension of the spacing recess 58 into the first flank 24. In examples in which the various coupling parts are constituted by tongues and grooves, an upper surface 66 of the spacing projection 64 forms at least a part of a lower wall of the first supplementary female coupling part 42 and a lower surface 68 of the spacing projection 64 forms at least a part of an upper lip of the groove 50 of the first primary female coupling part 38. Said an upper surface 66 of the spacing projection 64 preferably extends parallel to the decorative surface 14. The first supplementary female coupling part 42 is preferably delimited at the top by an inclined surface 131.

[0079] Taking each edge in turn, and starting from the lower surface 15 towards the decorative surface 14, each flank may include the following features.

[0080] The first flank 24 of the first edge 16 includes a first primary male coupling part 32, a spacing recess 58, a first supplementary male coupling part 36 and a vertical flank surface portion.

[0081] The second flank 26 of the second edge 18 includes a second primary male coupling part 34 and a vertical flank surface portion.

[0082] The third flank 28 of the third edge 20 includes a first primary female coupling part 38, a spacing protrusion 64, a first supplementary female coupling part 42 and a vertical flank surface portion.

[0083] The fourth flank 30 of the fourth edge 22 includes a second primary female coupling part 40 and a vertical flank surface portion.

[0084] With particular reference to Fig. 4A, the first supplementary male coupling part 36 on the first edge 16 is at the same distance from the decorative surface 14 as the first supplementary female coupling part 42 on the third edge 20. The spacing projection 64 on the third edge is at the same distance from the decorative surface 14 as the spacing recess 58 on the first edge 16, and the first supplementary male coupling part 36 on the first edge is above the spacing projection 64 on the third edge.

[0085] Fig. 6 illustrates how nine panels are oriented with respect to each other to form part of a floor or wall covering 10. The first panel 12a of Fig. 5 is shown in the centre of the left-hand row, with the second panel 12b to its right and the third panel 12c below the first panel. The arrows indicate which movements are possible or not, wherein the arrows with a cross indicate where no movement is possible and the arrows without a cross show where movement is possible.

[0086] In a development of the first aspect of the present invention, and as is illustrated in Figs. 7A to 11, the fourth edge 22 of the panel 12 may be provided with a second supplementary male coupling part 70 extending from the fourth flank 30. With particular reference to Fig. 8B, the second supplementary male coupling part 70 may be provided at a location on the fourth flank 30 between the decorative surface 14 and the second primary female coupling part 40.

[0087] The second supplementary male coupling part 70 may further assist in alignment of panel edges during laying of the floor or wall covering 10.

[0088] With particular reference to Fig. 8A, the second edge 18 has a second supplementary female coupling part 72 at least partially formed in the second flank 26. The second supplementary female coupling part 72 is provided at a location on the second flank 26 corresponding to that of the second supplementary male coupling part 70 on the fourth flank 30. Thus, the second supplementary female coupling part 72 may be provided at a location on the second flank 26 between the decorative surface 14 and the second primary male coupling part 34. Said second supplementary female coupling part 72 is preferably delimited at the top by a surface 137 extending parallel to the decorative surface 14.

[0089] Each of the first and second supplementary male coupling parts 36-70 may be in the form of a tongue and each of the first and second supplementary female coupling parts 42-72 may be in the form of a groove. When the second primary female coupling part 40 is in the form of a groove 52 having a lower lip 56 and an upper lip 74, the upper lip 74 of the groove 52 extends beyond the fourth flank 30 of the fourth edge 22 to form a lower surface of the second supplementary male coupling part 70. Said first supplementary male coupling part 36 is preferably delimited at the top by an inclined surface 134 and at the bottom by a surface 133 extending substantially parallel to the decorative surface 14. Said second supplementary male coupling part 70 is preferably delimited at the top by a surface 138 extending substantially parallel to the decorative surface 14. Said first supplementary female coupling part 42 is preferably delimited at the top by an inclined surface 135 and delimited at the bottom by a surface 136 extending substantially parallel to the decorative surface 14.

[0090] With reference to Figs. 9A and 9B, it will be apparent that the first edge 16 of a first panel 12a is adapted to be coupled to the third edge 20 of a second panel 12b and the second edge 18 of the first panel 12a is adapted to be coupled to the fourth edge 22 of a third panel 12c. In the coupled condition of the first and second panels, 12a-12b, the first primary male coupling part 32 of the first panel 12a cooperates with the first primary female coupling part 38 of the second panel 12b. At the same time, the first supplementary male coupling part 36 of the first panel 12a cooperates with the first supplementary female coupling part 42 of the second panel 12b. In a similar manner, in the coupled condition of the first and

third panels, 12a-12c, the second primary male coupling part 34 of the first panel 12a cooperates with the second primary female coupling part 40 of the third panel 12c. At the same time, the second supplementary male coupling part 70 of the third panel 12c cooperates with the second supplementary female coupling part 72 of the first panel 12a.

[0091] The above-described coupled condition of the first panel 12a to the second and third panels 12b-12c is illustrated in Fig. 10. The three panels meet at an edge confluence 44, the edge confluence 44 being the meeting point of the second and fourth edges 18-22 of each of the first, second and third panels 12a-12c. In a manner similar to Fig. 6, Fig. 11 illustrates how nine panels are oriented with respect to each other to form part of a floor or wall covering. The first panel 12a of Fig. 10 is shown in the centre of the left-hand row, with the second panel 12b to its right and the third panel 12c below the first panel.

[0092] It will be apparent from Fig. 10 that the second supplementary male coupling part 70 on the fourth flank 30 of the fourth edge 22 extends at least partially along the fourth edge 22 to thereby terminate at the first flank 24 of the first edge 16. As such, the second supplementary male coupling part 70 effectively forms an extension of, and lies coplanar with, the first flank 24. As with the first supplementary male coupling part 36 on the first edge 16, the second supplementary male coupling part 70 will block displacement of a panel during laying of the floor or wall covering.

[0093] Taking each edge of the panels shown in Figs. 7A to 11 in turn, and starting from the lower surface 15 towards the decorative surface 14, each flank may include the following features.

[0094] The first flank 24 of the first edge 16 includes a first primary male coupling part 32, a first vertical flank surface portion 24', a first supplementary male coupling part 36 and a second vertical flank surface portion 24".

[0095] The second flank 26 of the second edge 18 includes a second primary male coupling part 34, a second supplementary female coupling part 72 and a first vertical flank surface portion 26'.

[0096] The third flank 28 of the third edge 20 includes a first primary female coupling part 38, a first vertical flank surface portion 28', a first supplementary female coupling part 42 and a second vertical flank surface portion 28".

[0097] The fourth flank 30 of the fourth edge 22 includes a second primary female coupling part 40, a second supplementary male coupling part 70 and a first vertical flank surface portion 30'.

[0098] With particular reference to Fig. 9A, the first supplementary male coupling part 36 on the first edge 16 is at the same distance from the decorative surface 14 as the first supplementary female coupling part 42 on the third edge 20. With reference to Fig. 9B, the second supplementary male coupling part 70 on the fourth edge 22 is at the same distance from the decorative surface 14 as the second supplementary female coupling part 72 on

the second edge 18. Furthermore, the first supplementary male coupling part 36 on the first edge 16 is located above the second supplementary male coupling part 70 on the third edge.

[0099] The various coupling parts on the edges of the panels 12 may be formed by a milling operation. With reference to Fig. 12, a consequence of the milling operation is that, at the edge confluence 44 of four coupled panels, a cavity 76 is formed in the lower surface 15 of the panels 12a-12d. To further aid in the correct alignment of the panels, and to assist in maintaining the correct alignment, the cavity 76 may accommodate an alignment block 78 sized to be a press fit in the cavity 76. If the cavity 76 is square-shaped then the alignment block 78 is also preferably square-shaped. The alignment block 78 may be made from any suitable resilient material, such as a thermoplastic material, for example polyvinyl chloride (PVC), polyethylene (PE), polypropylene (PP) or polyethylene terephthalate (PET), or rubber or another elastic material.

[0100] A second aspect of the present invention is illustrated in Figs. 13 to 19. Rather than using supplementary coupling parts that are made in the panel material or in addition to these supplementary coupling parts, the floor or wall covering in accordance with the second aspect makes use of a separate part.

[0101] When describing the second aspect, like components and parts to the first aspect will be given like reference numbers.

[0102] Fig. 13 is a perspective view of an underside formed by the bottom surfaces 15 of three connected rectangular panels 12a, 12b and 12c. Each panel has a decorative surface 14 and a bottom surface 15. A substrate 80 is provided between the decorative surface 14 and the bottom surface 15. Each panel 12 further comprises a first pair of opposite edges consisting of a first edge 16 and a second edge 18, and a second pair of opposite edges consisting of a third edge 20 and a fourth edge 22. Each of the first 16, second 18, third 20 and fourth 22 edges has a first 24, second 26, third 28 and fourth 30 flank, respectively, extending from and substantially perpendicular to the decorative surface 14. The flanks of adjacent panels being adapted to abut, or at least lie in close proximity to, each other when the panels form the floor or wall covering 10.

[0103] As is evident from Figs. 14A and 14B, the panels 12 may be provided with mechanical coupling parts permitting adjacent panels to be joined together when laying the floor or wall covering 10. Thus, the first edge 16 is provided with a first primary male coupling part 32 extending from the first flank 24 and the second edge 18 has a first primary female coupling part 38 extending from the second flank 26. With reference to Fig. 14B, the third edge 20 of the panel 12 has a second primary female coupling part 40 partially formed in the third flank 28 and the fourth edge 22 has a second primary male coupling part 34 partially formed in the fourth flank 30.

[0104] The first edge 16 of a first panel 12a is adapted

to be coupled to the second edge 18 of a second panel 12b and the third edge 20 of a third panel 12c is adapted to be coupled to the fourth edge 22 of the first panel 12a. In the coupled condition of the first and second panels, 12a-12b, the first primary male coupling part 32 of the first panel 12a cooperates with the first primary female coupling part 38 of the second panel 12b. In a similar manner, in the coupled condition of the first and third panels, 12a-12c, the second primary male coupling part 34 of the first panel 12a cooperates with the second primary female coupling part 40 of the third panel 12c.

[0105] In the floor or wall covering depicted in Figs. 13 and 14, each of the first and second primary male coupling parts 32-34 are in the form of a tongue 46-48 and each of the first and second primary female coupling parts 38-40 are in the form of a groove 50-52. Irrespective of the actual form of the coupling parts, the male and female coupling parts may provide for an interlocking in a direction V perpendicular to the decorative surface 14 of the floor or wall covering, as well as in a direction H perpendicular to the coupled edges and parallel to the decorative surface of the floor or wall covering 12.

[0106] In an example according to Fig. 14A, the primary male and female coupling parts 32-38 allow for a mutual connection with an adjacent panel by means of a turning movement and/or a horizontal shifting movement. In this respect, the coupling parts may have a shape based on the coupling parts disclosed in WO 97/47834, the disclosure of which is hereby incorporated by reference.

[0107] In one example, and as is the case for the connection shown in Fig. 14B, the secondary male and female coupling parts 34-40 allow for a mutual connection with an adjacent panel by means of an essentially vertical movement. In this respect, reference is made to the so-called fold down systems of WO 2010/082171, WO 2103/102803 and WO2013/118030. Coupling parts which permit panels to be coupled by means of a push-down movement are known from WO 2021/111210.

[0108] Fig. 15 is a plan view of a panel 12 in accordance with the second aspect of the present invention. Thus, the bottom surface 15 of the panel 12 is provided with a first groove 82 extending from the third edge 20 in a direction parallel to, and at a first distance d_1 from, the first edge 16. A second groove 84 extends from the first edge 16 in a direction parallel to, and at a second distance d_2 from, the third edge 20. The first distance d_1 and the second distance d_2 are chosen such that the first groove 82 and the second groove 84 intersect each other at a first intersection point. Together with a first edge portion 16' of the first edge 16 and a second edge portion 20' of the second edge 20, the first and second grooves partially delimit a first connector edge region having a first edge region area A_1 .

[0109] To assist in the alignment of adjacent panels, a connector member 89 is provided. The connector member 89 is defined by two pairs 90-94, 92-96 of opposite walls. The pairs of opposite walls enclose a connector

member open area A_0 . The connector member 89 is dimensioned such that a first length l_1 of a first wall 90 of the two pairs of opposite walls can fit in a corresponding length of the first groove 82 simultaneously with a second length l_2 of an adjacent second wall 92 of the two pairs of opposite walls fitting in a corresponding length of the second groove 84.

[0110] As is apparent from Fig. 15, the connector member open area A_0 is greater than the first edge region area A_1 .

[0111] In the example shown in Fig. 15, the first length l_1 of the first wall 90 of the connector member 89 corresponds to the second distance d_2 of the second groove 84 from the third edge 20, and the second length l_2 of the second wall 92 of the connector member 89 corresponds to the first distance d_1 of the first groove 82 from the first edge 16. As such, the connector member 89 has a rectangular shape, with the first pair of opposite walls 90-94 being separated by a separation distance d_s . For cases in which the first distance d_1 and the second distance d_2 are equal for all panels making up the floor or wall covering 10, the connector member 89 will have a square shape with the walls of both pairs of opposite walls being separated by the same separation distance d_s .

[0112] Fig. 16 illustrates a second example of a connector member 89. Rather than being square-shaped, the example illustrated in Fig. 16 has a rectangular hash-tag-shape. As shown in Fig. 17, when such a connector member 89 is applied to the panel 12 of Fig. 15, the first length l_1 of the first wall 90 will be greater than the second distance d_2 of the second groove 84 from the third edge 20, and the second length l_2 of the second wall 92 will be greater than the first distance d_1 of the first groove 82 from the first edge 16.

[0113] In the example of Fig. 16, the first wall 90 has a first complete length l_{c1} and the first length l_1 is half the first complete length l_{c1} . Similarly, the second wall 92 has a second complete length l_{c2} , with the second length l_2 being half the second complete length l_{c2} .

[0114] Referring again to Fig. 15, in one example the floor or wall covering 10 may be constituted by panels 12 in which the first groove 82 extends from the third edge 20 to the fourth edge 22 and the second groove 84 extends from the first edge 16 to the second edge 18. In a further example, the bottom surface 15 of the panel 12 may be provided with a third groove 98 extending from the third edge 20 in a direction parallel to, and at a third distance d_3 from, the second edge 18. Additionally, a fourth groove 100 may be provided that extends from the first edge 16 in a direction parallel to, and at a fourth distance d_4 from, the fourth edge 22. The third groove 98 may extend from the third edge 20 to the fourth edge 22 and the fourth groove 100 may extend from the first edge 16 to the second edge 18. In this latter manner, the four grooves serve to partially delimit a further three edge region areas A_{2-4} .

[0115] In examples in which the first, second, third and

fourth distances are equidistant, the four edge region areas will have the same area.

[0116] To accommodate the connector member 89, and as is most clearly illustrated in Figs. 18A and 18B, each of the grooves 82, 84, 98, 100 has an opening 102, a base 104, a first side wall 106 proximate the edges of the panel and a second side wall 108 distal of the edges. At least the first side wall 106 may taper at a first angle α with respect to a perpendicular to the bottom surface 15 of the panel 12 such that the opening 102 is wider than the base 104. Not only does this geometry make insertion of the connector member 89 easier, the connector member 89 can also then act on the tapering first side wall 106 and tend to force adjacent panels towards each other. In one example, the first angle may lie between 3° and 15° , for example about 5° .

[0117] Depending on the material of the panel, the grooves 82, 84, 98, 100 may be moulded into the bottom surface 15 or may be removed therefrom by means of a cutting/sawing operation. For example one can easily apply said grooves after or during milling of the coupling parts, and this by transporting the panels according to their length or width direction, and applying straight grooves by a sawing device or knives during said transport. The grooves may have depth D (see Fig. 14B) as measured from the bottom surface 15 of the panel. For a panel having a thickness T, the depth D may be no more than 50 % of T, for example no more than 30 % of T. So as not to unduly compromise the integrity of the panel, particularly along edges provided with female coupling parts, the grooves may terminate at a depth D which is at or below the lowermost point (seen in a direction from the decorative surface 14 towards the bottom surface 15 of the male coupling parts which the female coupling parts are intended to receive).

[0118] The two pairs of opposite walls 90-94, 92-96 of the connector member 89 may have a cross sectional shape as illustrated in Figs. 14A and 14B, namely that of a right-angled trapezium. Thus, each wall may have a top surface 110 intended to face the base 104 of the groove within which the wall is present, a base surface 112 intended to face a subfloor onto which the floor or wall covering 10 is laid, an inwardly directed surface 114 intended to contact the tapering first side wall 106 of the groove, and an outwardly directed surface 116 intended to face the second side wall 108 of the groove. The inwardly directed surface 114 may be tapered, with the surface tending an angle substantially corresponding to that of the first side wall 106 of the groove. In a not-shown example, each wall of the connector member 89 may have an essentially circular cross section.

[0119] The connector member 89 may be moulded, for example injection-moulded. Suitable materials include a thermoplastic material, for example polyvinyl chloride (PVC), polyethylene (PE), polypropylene (PP) or polyethylene terephthalate (PET), or rubber or another elastic material.

[0120] The groove geometry described above allows

panels 12 to be laid in a chessboard pattern (see e.g. Fig. 13). To enable panels to be laid in a staggered arrangement, the bottom surface 15 of the panels 12 may be provided with a fifth groove 118 and a sixth groove 120, with the fifth and sixth grooves extending from the third edge 20 in a direction parallel to the second edge 18. In Fig. 15, the fifth and sixth grooves 118-120 are symmetrically arranged about a centreline CL of the panel 12, though it is to be understood that the location of the fifth and sixth grooves will be dependent on the laying pattern that is desired. Irrespective of the desired laying pattern, the fifth and sixth grooves 118-120 are spaced apart by a fifth distance d_s , the fifth distance d_s being equal to the separation distance d_s between the first pair of opposite walls 90-94 of the connector member 89.

[0121] A staggered arrangement of three panels 12a, 12b, 12c, is illustrated in Fig. 19. Although three connector members 89 are shown, it is to be understood that a floor or wall covering can be accomplished by using connector members 89 only at the meeting point of the three panels. Furthermore, although the panels 12a, 12b and 12c are shown as being square, the skilled person will understand that the illustrated groove geometry means that panels of any rectangular shape may be utilized.

[0122] Fig. 19 shows in dashed lines an example in which the bottom surface 15 of the panels are provided with seventh and eighth grooves 122, 124 running perpendicular to the fifth and sixth grooves 118, 120.

[0123] Fig. 20 shows an embodiment a floor or wall covering according to the third aspect of the invention. This floor covering can also be according to the first and/or second aspect of the invention. Figure 20 shows 4 interconnected panels 12a, 12b, 12c, 12d which are connected to each other according to a chessboard pattern. Recesses 35 are provided at the visible decorative surface of the floor or wall covering between each two panels mechanically coupled to each other. At the height of the edge confluence 44 between said four panels said recesses 35 adjoin in each other and form a joint. As can be seen in figure 20, said recesses 35 have not been grouted yet. Figure 20 therefore shows the panels during installation, since after installation said recesses 35 are fully grouted. The floor or wall covering comprises a cross-shaped installation aid 25 which form fits said adjoining recesses 35. The height of said recesses 35 according to a direction perpendicular to the visible decorative surfaces, is greater than the corresponding dimension of said installation aid 25, such that this installation aid 25 will be grouted over and will not be visible after grouting.

[0124] The figures 21 to 27 relate to the first alternative embodiment of the invention. When describing this first alternative embodiment, like components and parts to the first aspect will be given like reference numbers. The panel 12 shown in figure 21 has a first pair of opposite edges consisting of a first edge 160 and a third edge 200 and a second pair of opposite edges consisting of a second edge 180 and a fourth edge 220. The panel 12 shown

in figure 22 has a first pair of opposite edges consisting of a first edge 160 and a third edge 200 and a second pair of opposite edges consisting of the first edge 160 and the third edge 200. The panel 12 shown in figure 23 has a first pair of opposite edges consisting of a second edge 180 and a fourth edge 220 and a second pair of opposite edges consisting of the second edge 180 and the fourth edge 220. As can be seen in figures 24 and 25, the first edge 160, the second edge 180, the third edge 200 and the fourth edge 220 are similar to the first edge 16, the second edge 18, the third edge 20 and the fourth edge 2 shown in figures 3A and 3B, such that the same reference numbers are used and the same features are present. As can be seen in figures 26 and 27 the first edge 160, the second edge 180, the third edge 200 and the fourth edge 220 are similar to the first edge 16, the second edge 18, the third edge 20 and the fourth edge 2 shown in figures 8A and 8B, such that the same reference numbers are used and the same features are present.

[0125] The invention further relates to various embodiments as presented in the numbered paragraphs hereunder.

1. Floor or wall covering (10) comprising a plurality of rectangular panels (12), each panel (12) comprising:

a decorative surface (14),
a first pair of opposite edges consisting of a first edge (16) and a second edge (18), and
a second pair of opposite edges consisting of a third edge (20) and a fourth edge (22),
each of said first, second, third and fourth edges having a first, second, third and fourth flank, respectively, extending from and substantially perpendicular to said decorative surface (14), the said flanks of adjacent panels (12) being adapted to abut when said panels (12) form said floor or wall covering (10), wherein
said first edge (16) has a first primary male coupling part (32) extending from said first flank (24) and said second edge (18) has a second primary male coupling part (34) extending from said second flank (26), said first edge (16) further having a first supplementary male coupling part (36) extending from said first flank (24) at a location between said decorative surface (14) and said first primary male coupling part (32), and
said third edge (20) has a first primary female coupling part (38) partially formed in said third flank (28) and said fourth edge (22) has a second primary female coupling part (40) partially formed in said fourth flank (22), said third edge (20) further having a first supplementary female coupling part (42) at least partially formed in said third flank (28) at a location between said decorative surface (14) and said first primary female

coupling part (38),
said first edge (16) of a first panel (12a) being adapted to be coupled to said third edge (20) of a second panel (12b) and said second edge (18) of said first panel (12a) being adapted to be coupled to said fourth edge (22) of a third panel (12c),
said first supplementary male coupling part (36) extending at least partially along the first edge (16) to thereby terminate at said fourth flank (30) of said fourth edge (22).

2. The floor or wall covering (10) as in paragraph 1, wherein each of said first and second primary male coupling parts (32, 34) are in the form of a tongue (46, 48) and each of said first and second primary female coupling parts (38, 40) are in the form of a groove (50, 52), said male and female coupling parts providing for an interlocking in a direction perpendicular to the decorative surface (14) of the floor or wall covering (10), as well as in a direction perpendicular to the coupled edges and parallel to the decorative surface (14) of the floor or wall covering (10).

3. The floor or wall covering (10) as in paragraph 1 or paragraph 2, wherein said male and female coupling parts allow for a mutual connection with an adjacent panel (12) by means of a turning movement and/or a horizontal shifting movement.

4. The floor or wall covering (10) as in paragraph 2 or paragraph 3, wherein each groove (50, 52) of said first and second primary female coupling parts (38, 40) is partially delimited by a lower lip (54, 56) that extends beyond the respective edge flank.

5. The floor or wall covering (10) as in any one of paragraphs 2 to 4, wherein said tongue (46) of said first primary male coupling part (32) extends beyond said first flank (24) by a first extension (e_1) and said first supplementary male coupling part (36) extends from said first flank (24) by a second extension (e_2), said second extension (e_2) being between 10 % and 60 %, alternatively between 20 % and 50 %, for example between 30 % and 40 %, of said first extension (e_1).

6. The floor or wall covering (10) as in any of the preceding paragraphs, wherein said location of said first supplementary male coupling part (36) is spaced from said first primary male coupling part (32) in a direction along said first flank (24) towards said decorative surface (14).

7. The floor or wall covering (10) as in any of the preceding paragraphs, wherein said second edge (18) has a second supplementary female coupling part (72) at least partially formed in said second flank

(26) at a location between said decorative surface (14) and said second primary male coupling part (34), and the fourth edge (22) has a second supplementary male coupling part (70) extending from said fourth flank (30) at a location between said decorative surface (14) and said second primary female coupling part (40); and preferably said second supplementary male coupling part (70) of the fourth edge (22) extends at least partially along the fourth edge (22) to thereby terminate at said first flank (24) of said first edge (16).

8. The floor or wall covering (10) as in any of the preceding paragraphs, wherein each of said first and second supplementary male coupling parts (36, 70) is in the form of a tongue and each of said first and second supplementary female coupling parts (42, 72) is in the form of a groove.

9. The floor or wall covering (10) as in any of the preceding paragraphs, wherein a square alignment block (78) is located in a cavity (76) formed in a lower surface of four connected panels (12), said four connected panels (12) sharing a common meeting point.

10. Floor or wall covering (10) comprising a plurality of rectangular panels (12), each panel (12) comprising:

- a decorative surface (14) and a bottom surface (15);
- a substrate between said decorative surface (14) and said bottom surface (15);
- a first pair of opposite edges consisting of a first edge (16) and a second edge (18), and
- a second pair of opposite edges consisting of a third edge (20) and a fourth edge (22),
- each of said first, second, third and fourth edges having a first, second, third and fourth flank, respectively, extending from and substantially perpendicular to said decorative surface (14), the said flanks of adjacent panels (12) being adapted to abut when said panels (12) form said floor or wall covering (10), wherein
- said bottom surface (15) of said panel (12) is provided with a first groove (82) extending from said third edge (20) in a direction parallel to, and at a first distance (d_1) from, said first edge (16), and with a second groove (84) extending from said first edge (16) in a direction parallel to, and at a second distance (d_2) from, said third edge (20), said first distance (d_1) and said second distance (d_2) being chosen such that said first groove (82) and said second groove (84) intersect each other,
- said floor or wall covering (10) further comprising at least one connector member (89), the connector member (89) being dimensioned such it

can fit in the first groove (82) and simultaneously in the second groove (84), the connector member (89) preferably comprising a frame-shaped part with two pairs of opposite walls, with adjacent walls being able to simultaneously fit in respectively the first groove (82) and the second groove (84).

11. The floor or wall covering (10) as in paragraph 10, wherein the distance between said opposite walls substantially equals the sum of first distance (d_1) and the second distance (d_2).

12. The floor or wall covering (10) as in paragraph 10 or 11, wherein a first length (l_1) of a first wall (90) of said two pairs of opposite walls can fit in a corresponding length of said first groove (82) simultaneously with a second length (l_2) of an adjacent second wall (92) of said two pairs of opposite walls fitting in a corresponding length of said second groove (84).

13. The floor or wall covering (10) as in any of the preceding paragraphs 10 to 12, wherein said first length (l_1) of said first wall (90) corresponds to said second distance (d_2) of said second groove (84) from said third edge (20), and said second length (l_2) of said second wall (92) corresponds to said first distance (d_1) of said first groove (82) from said first edge (16).

14. The floor or wall covering (10) as in any of the preceding paragraphs 10 to 12, wherein said first length of said first wall is greater than said second distance (d_2) of said second groove (84) from said third edge (20), and said second length of said second wall is greater than said first distance (d_1) of said first groove (82) from said first edge (16).

15. The floor or wall covering (10) as in any one of paragraphs 10 to 14, wherein said first groove (82) extends from said third edge (20) to said fourth edge (22) and said second groove (84) extends from said first edge (16) to said second edge (18).

16. The floor or wall covering (10) as in paragraph 15, wherein said bottom surface (15) of said panel (12) is provided with a third groove (98) extending from said third edge (20) in a direction parallel to, and at a third distance (d_3) from, said second edge (18), and with a fourth groove (100) extending from said first edge (16) in a direction parallel to, and at a fourth distance (d_4) from, said fourth edge (22), said third groove (98) extending from said third edge (20) to said fourth edge (22) and said fourth groove (100) extending from said first edge (16) to said second edge (18).

17. The floor or wall covering (10) as in paragraph

16, wherein said first, second, third and fourth distances are equidistant.

18. The floor or wall covering (10) as in any one of paragraphs 10 to 17, wherein each of said grooves has an opening (102), a base (104), a first side wall (106) proximate said edges of said panel (12) and a second side wall distal (108) of said edges, said first side wall (106) tapering at a first angle (α) with respect to said bottom surface (15) of said panel (12) such that the opening (102) is wider than the base (104).

19. The floor or wall covering (10) as in paragraph 18, wherein said first angle (α) lies between 3° and 15°, for example about 5°.

20. The floor or wall covering (10) as in any one of paragraphs 10 to 19, wherein said connector member (89) is moulded from a thermoplastic material, for example from polyvinyl chloride (PVC), polyethylene (PE), polypropylene (PP) or polyethylene terephthalate (PET), or from rubber.

21. The floor or wall covering (10) as in any one of paragraphs 10 to 20, wherein at least said first pair of opposite edges are provided with mechanical coupling means so that a plurality of said panels (12) can be coupled to one another, said coupling means providing for an interlocking in a direction perpendicular to the decorative surface (14) of the floor or wall covering (10), as well as in a direction perpendicular to the coupled edges and parallel to the decorative surface (14) of the floor or wall covering (10).

22. The floor or wall covering (10) as in paragraph 21, wherein both pairs of opposite edges are provided with said mechanical coupling means, the mechanical coupling means on said first pair of opposite edges allowing for a mutual connection with an adjacent panel (12) by means of a turning movement and/or a horizontal shifting movement, and the mechanical coupling means on said second pair of opposite edges allowing for a mutual connection with an adjacent panel (12) by means of an essentially vertical movement.

23. The floor or wall covering (10) as in any one of paragraphs 17 to 22, wherein said bottom surface (15) of said panel (12) is provided with a fifth groove (118) and a sixth groove (120), said fifth and sixth grooves extending from said third edge (20) in a direction parallel to said second edge (18), said fifth and sixth grooves being spaced apart by a fifth distance (d_s), said fifth distance being equal to a separation distance between said first pair of opposite walls of said connector member (89).

24. Floor or wall covering (10) comprising a plurality of rectangular panels (12), each panel (12) comprising:

a decorative surface (14),
a first pair of opposite edges consisting of a first edge (16) and a second edge (18), and
a second pair of opposite edges consisting of a third edge (20) and a fourth edge (22),

each of said first, second, third and fourth edges having a first, second, third and fourth flank, respectively, extending from and substantially perpendicular to said decorative surface (14), the said flanks of adjacent panels (12) being adapted to abut when said panels (12) form said floor or wall covering (10),

wherein preferably at least said first pair of opposite edges, and more preferably both pair of opposite edges, are provided with mechanical coupling means, substantially in the form of male coupling parts and female coupling parts, so that a plurality of said panels (12) can be coupled to one another, said coupling means providing for an interlocking in a direction perpendicular to the decorative surface (14) of the floor or wall covering (10), as well as in a direction perpendicular to the coupled edges and parallel to the decorative surface (14) of the floor or wall covering (10);

wherein a recess (35) is provided at the decorative surface (14) of the floor or wall covering (10) between two panels (12) which are preferably mechanically coupled to each other by a said male coupling part and a said female coupling part, and wherein said floor or wall covering (10) has edge confluences (44) where at least three panels (12) meet and where said recesses (35) adjoin in each other and form a joint, wherein said recesses (35) comprise grouting material and wherein at the height of a least one said confluence (44), the floor or wall covering (10) comprises at least one installation aid (25) which form fits said adjoining recesses (35), seen according to a direction parallel to the decorative surface (14).

25. Floor or wall covering (10) according to paragraph 24, wherein the height of said recesses (35) according to a direction perpendicular to the decorative surfaces (14), is greater than the corresponding dimension of said installation aid (25), and wherein said grouting material is located above said installation aid (25).

26. Floor or wall covering (10) according to paragraph 24 or 25, wherein said floor or wall covering (10) comprises at least one confluence of three pan-

els (12), wherein said corresponding recesses (35) form a T-shaped joint and wherein a said installation aid is T-shaped.

27. Floor or wall covering (10) according to any of the preceding paragraphs 24 to 26, wherein said floor or wall covering (10) comprises at least one confluence of four panels (12), wherein said corresponding recesses (35) form a cross shaped joint and wherein a said installation aid (25) is cross-shaped.

[0126] The present invention is by no means limited to the above-described examples, but such panels may be produced according to different variants without departing from the scope of the present invention as defined in the appended claims.

Claims

1. Floor or wall covering (10) comprising a plurality of rectangular panels (12), each panel (12) comprising:

a decorative surface (14),
a first pair of opposite edges consisting of a first edge (16) and a second edge (18), and
a second pair of opposite edges consisting of a third edge (20) and a fourth edge (22),
each of said first, second, third and fourth edges having a first, second, third and fourth flank, respectively, extending from and substantially perpendicular to said decorative surface (14), the said flanks of adjacent panels (12) being adapted to abut when said panels (12) form said floor or wall covering (10), wherein
said first edge (16) has a first primary male coupling part (32) extending from said first flank (24) and said second edge (18) has a second primary male coupling part (34) extending from said second flank (26), said first edge (16) further having a first supplementary male coupling part (36) extending from said first flank (24) at a location between said decorative surface (14) and said first primary male coupling part (32), and
said third edge (20) has a first primary female coupling part (38) partially formed in said third flank (28) and said fourth edge (22) has a second primary female coupling part (40) partially formed in said fourth flank (22), said third edge (20) further having a first supplementary female coupling part (42) at least partially formed in said third flank (28) at a location between said decorative surface (14) and said first primary female coupling part (38),
said first edge (16) of a first panel (12a) being adapted to be coupled to said third edge (20) of a second panel (12b) and said second edge (18)

of said first panel (12a) being adapted to be coupled to said fourth edge (22) of a third panel (12c),
said first supplementary male coupling part (36) extending at least partially along the first edge (16) to thereby terminate at said fourth flank (30) of said fourth edge (22),
wherein preferably said male and female coupling parts allow for a mutual connection with an adjacent panel (12) by means of a turning movement and/or a horizontal shifting movement.

2. The floor or wall covering (10) as in claim 1, wherein each of said first and second primary male coupling parts (32, 34) are in the form of a tongue (46, 48) and each of said first and second primary female coupling parts (38, 40) are in the form of a groove (50, 52), said male and female coupling parts providing for an interlocking in a direction perpendicular to the decorative surface (14) of the floor or wall covering (10), as well as in a direction perpendicular to the coupled edges and parallel to the decorative surface (14) of the floor or wall covering (10).
3. The floor or wall covering (10) as in claim 2, wherein each groove (50, 52) of said first and second primary female coupling parts (38, 40) is partially delimited by a lower lip (54, 56) that extends beyond the respective edge flank.
4. The floor or wall covering (10) as in claim 2 or 3, wherein said tongue (46) of said first primary male coupling part (32) extends beyond said first flank (24) by a first extension (e₁) and said first supplementary male coupling part (36) extends from said first flank (24) by a second extension (e₂), said second extension (e₂) being between 10 % and 60 %, alternatively between 20 % and 50 %, for example between 30 % and 40 %, of said first extension (e₁).
5. The floor or wall covering (10) as in any of the preceding claims, wherein said location of said first supplementary male coupling part (36) is spaced from said first primary male coupling part (32) in a direction along said first flank (24) towards said decorative surface (14).
6. The floor or wall covering (10) as in any of the preceding claims, wherein said second edge (18) has a second supplementary female coupling part (72) at least partially formed in said second flank (26) at a location between said decorative surface (14) and said second primary male coupling part (34), and the fourth edge (22) has a second supplementary male coupling part (70) extending from said fourth flank (30) at a location between said decorative surface (14) and said second primary female coupling part (40); and preferably said second supplementary

male coupling part (70) of the fourth edge (22) extends at least partially along the fourth edge (22) to thereby terminate at said first flank (24) of said first edge (16).

7. The floor or wall covering (10) as in any of the preceding claims, wherein each of said first and second supplementary male coupling parts (36, 70) is in the form of a tongue and each of said first and second supplementary female coupling parts (42, 72) is in the form of a groove.

8. The floor or wall covering (10) as in any of the preceding claims, wherein a square alignment block (78) is located in a cavity (76) formed in a lower surface of four connected panels (12), said four connected panels (12) sharing a common meeting point.

9. Floor or wall covering (10) comprising a plurality of rectangular panels (12), each panel (12) comprising:

a decorative surface (14) and a bottom surface (15);

a substrate between said decorative surface (14) and said bottom surface (15);

a first pair of opposite edges consisting of a first edge (16) and a second edge (18), and

a second pair of opposite edges consisting of a third edge (20) and a fourth edge (22),

each of said first, second, third and fourth edges having a first, second, third and fourth flank, respectively, extending from and substantially perpendicular to said decorative surface (14), the said flanks of adjacent panels (12) being adapted to abut when said panels (12) form said floor or wall covering (10), wherein

said bottom surface (15) of said panel (12) is provided with a first groove (82) extending from said third edge (20) in a direction parallel to, and at a first distance (d_1) from, said first edge (16), and with a second groove (84) extending from said first edge (16) in a direction parallel to, and at a second distance (d_2) from, said third edge (20), said first distance (d_1) and said second distance (d_2) being chosen such that said first groove (82) and said second groove (84) intersect each other,

said floor or wall covering (10) further comprising at least one connector member (89), the connector member (89) being dimensioned such it can fit in the first groove (82) and simultaneously in the second groove (84), the connector member (89) preferably comprising a frame-shaped part with two pairs of opposite walls, with adjacent walls being able to simultaneously fit in respectively the first groove (82) and the second groove (84).

10. The floor or wall covering (10) as in claim 9, wherein the distance between said opposite walls substantially equals the sum of first distance (d_1) and the second distance (d_2).

11. The floor or wall covering (10) as in claim 9 or 10, wherein a first length (l_1) of a first wall (90) of said two pairs of opposite walls can fit in a corresponding length of said first groove (82) simultaneously with a second length (l_2) of an adjacent second wall (92) of said two pairs of opposite walls fitting in a corresponding length of said second groove (84).

12. The floor or wall covering (10) as in any of the preceding claims 9 to 11, wherein said first length (l_1) of said first wall (90) corresponds to said second distance (d_2) of said second groove (84) from said third edge (20), and said second length (l_2) of said second wall (92) corresponds to said first distance (d_1) of said first groove (82) from said first edge (16).

13. The floor or wall covering (10) as in any of the preceding claims 9 to 11, wherein said first length of said first wall is greater than said second distance (d_2) of said second groove (84) from said third edge (20), and said second length of said second wall is greater than said first distance (d_1) of said first groove (82) from said first edge (16).

14. The floor or wall covering (10) as claimed in any one of claims 9 to 13, wherein said first groove (82) extends from said third edge (20) to said fourth edge (22) and said second groove (84) extends from said first edge (16) to said second edge (18), wherein preferably said bottom surface (15) of said panel (12) is provided with a third groove (98) extending from said third edge (20) in a direction parallel to, and at a third distance (d_3) from, said second edge (18), and with a fourth groove (100) extending from said first edge (16) in a direction parallel to, and at a fourth distance (d_4) from, said fourth edge (22), said third groove (98) extending from said third edge (20) to said fourth edge (22) and said fourth groove (100) extending from said first edge (16) to said second edge (18), and wherein more preferably said first, second, third and fourth distances are equidistant.

15. The floor or wall covering (10) as claimed in any one of claims 9 to 14, wherein each of said grooves has an opening (102), a base (104), a first side wall (106) proximate said edges of said panel (12) and a second side wall distal (108) of said edges, said first side wall (106) tapering at a first angle (α) with respect to said bottom surface (15) of said panel (12) such that the opening (102) is wider than the base (104), wherein preferably said first angle (α) lies between 3° and 15° , for example about 5° .

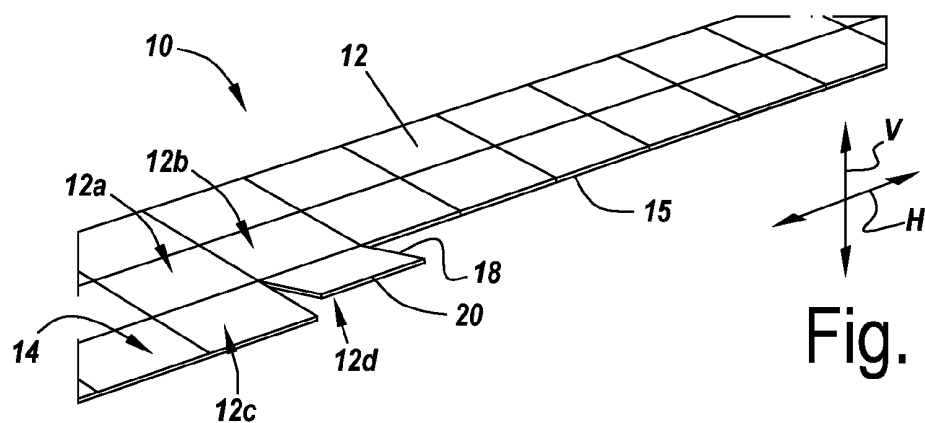


Fig. 1

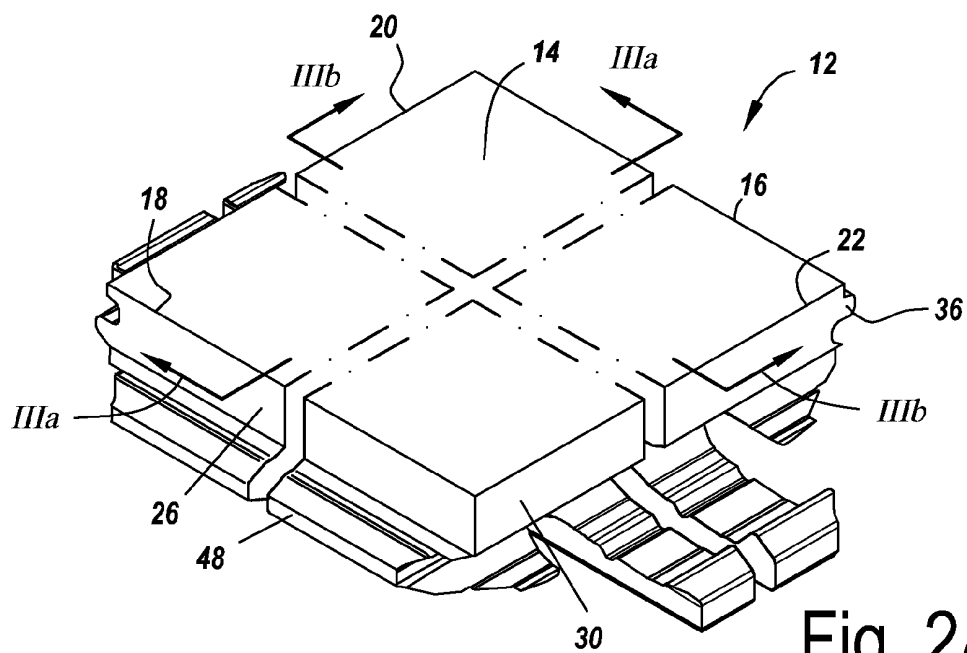


Fig. 2A

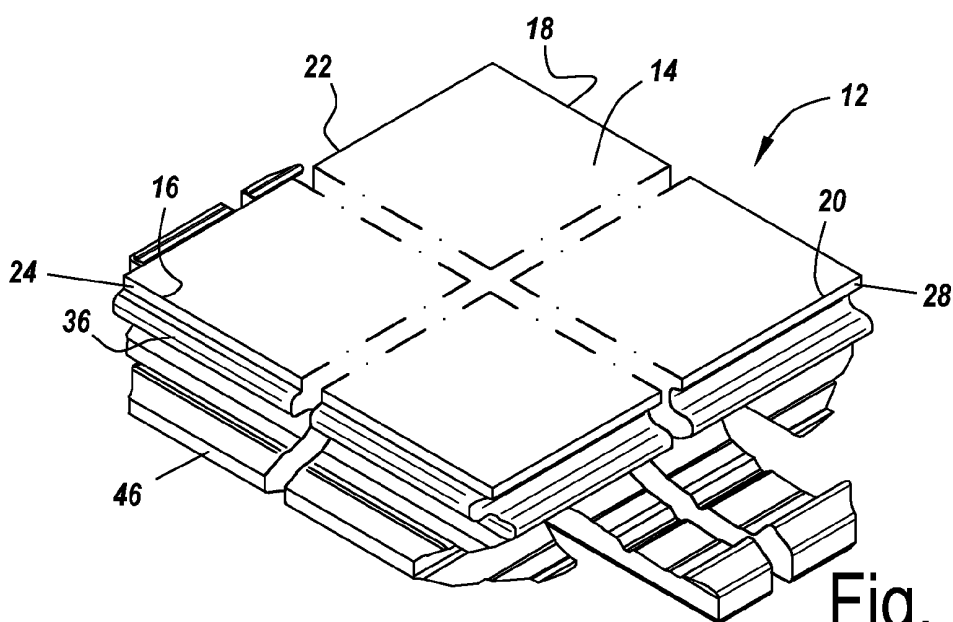


Fig. 2B

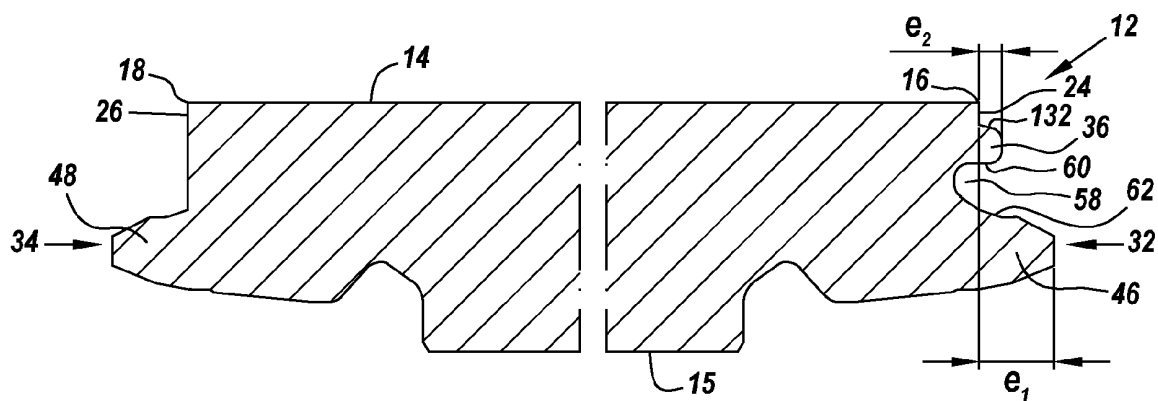


Fig. 3A

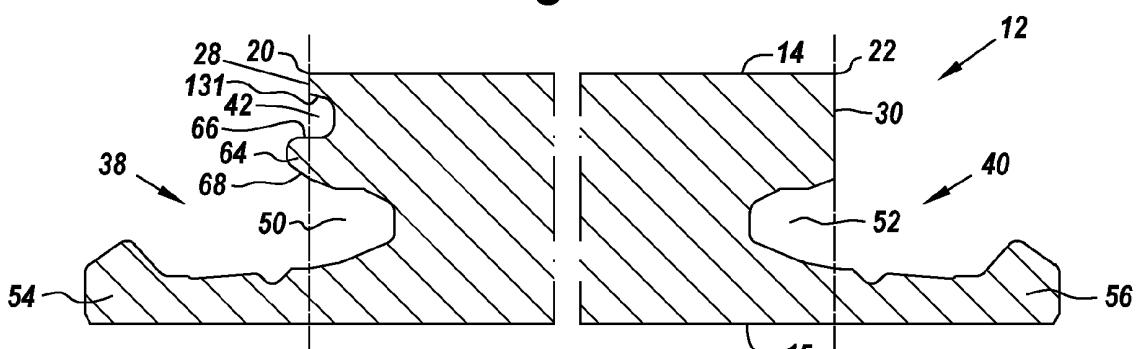


Fig. 3B

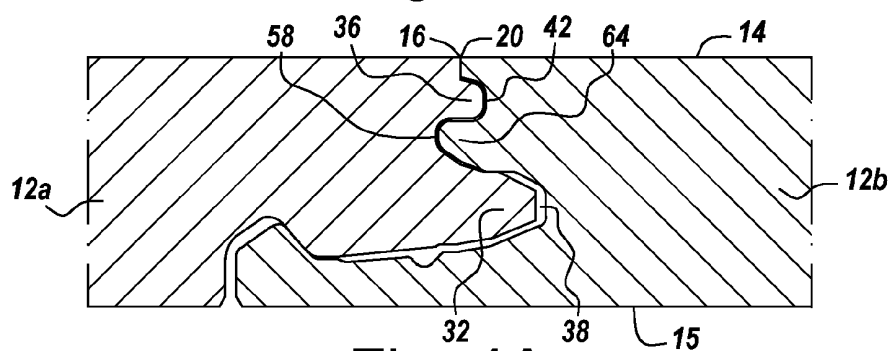


Fig. 4A

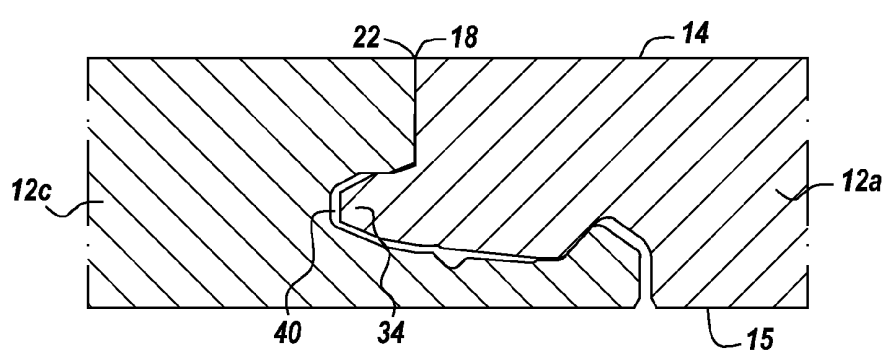


Fig. 4B

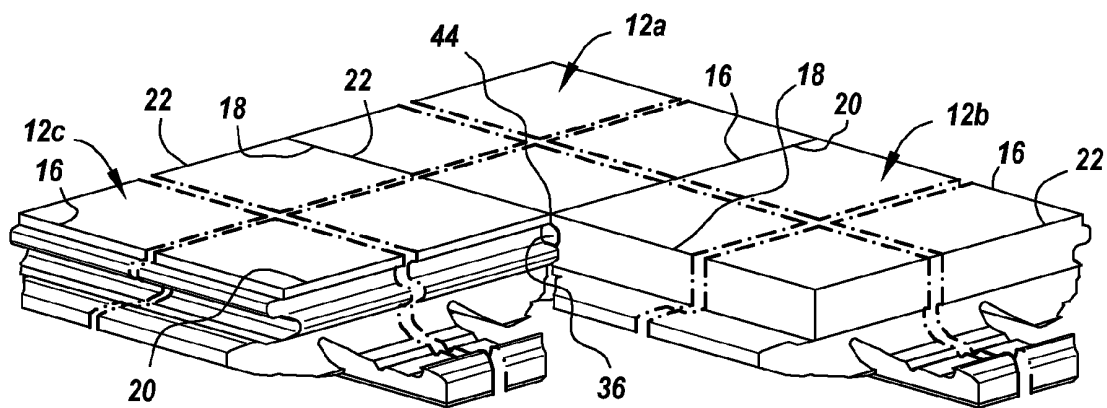


Fig. 5

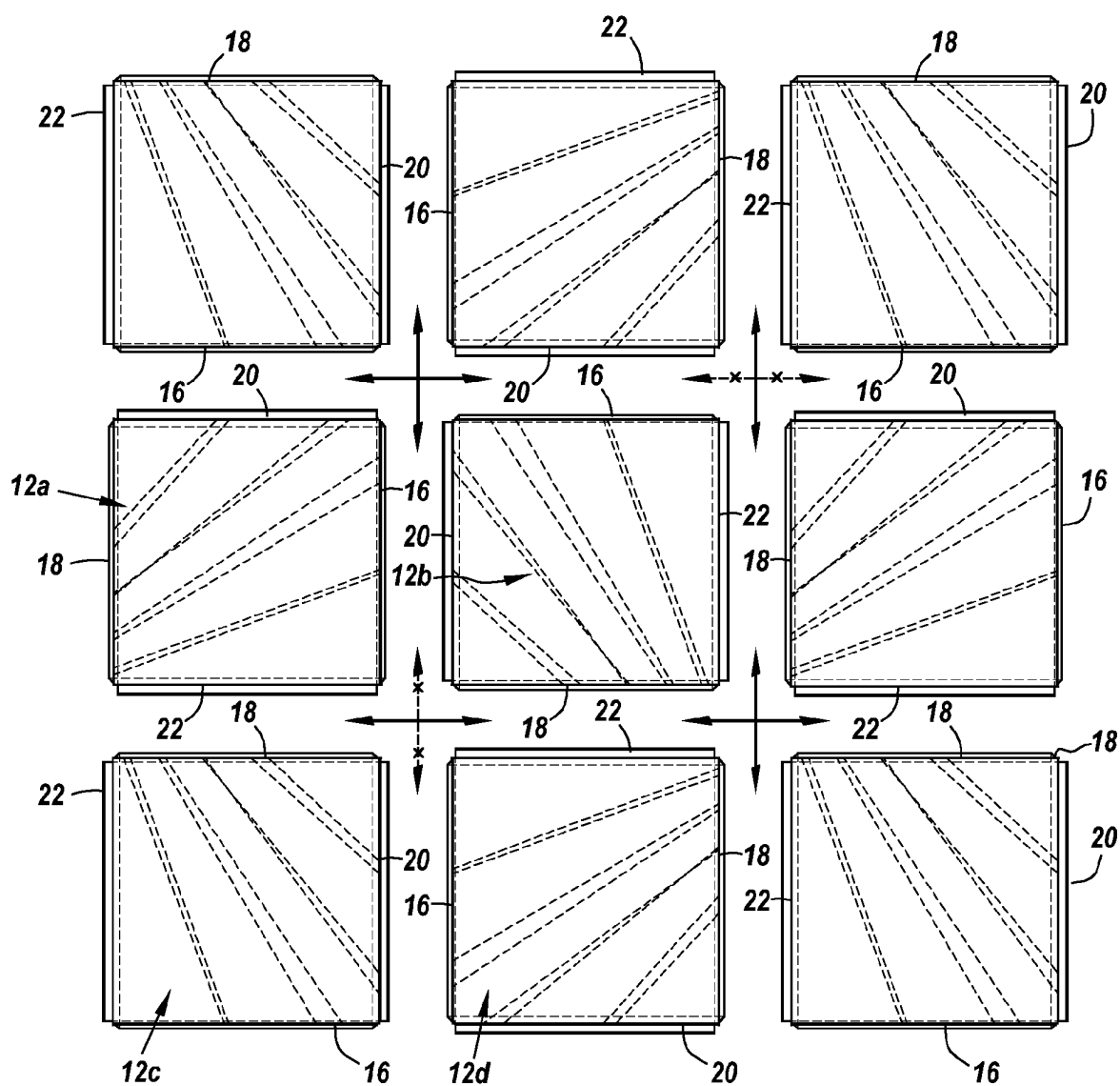


Fig. 6

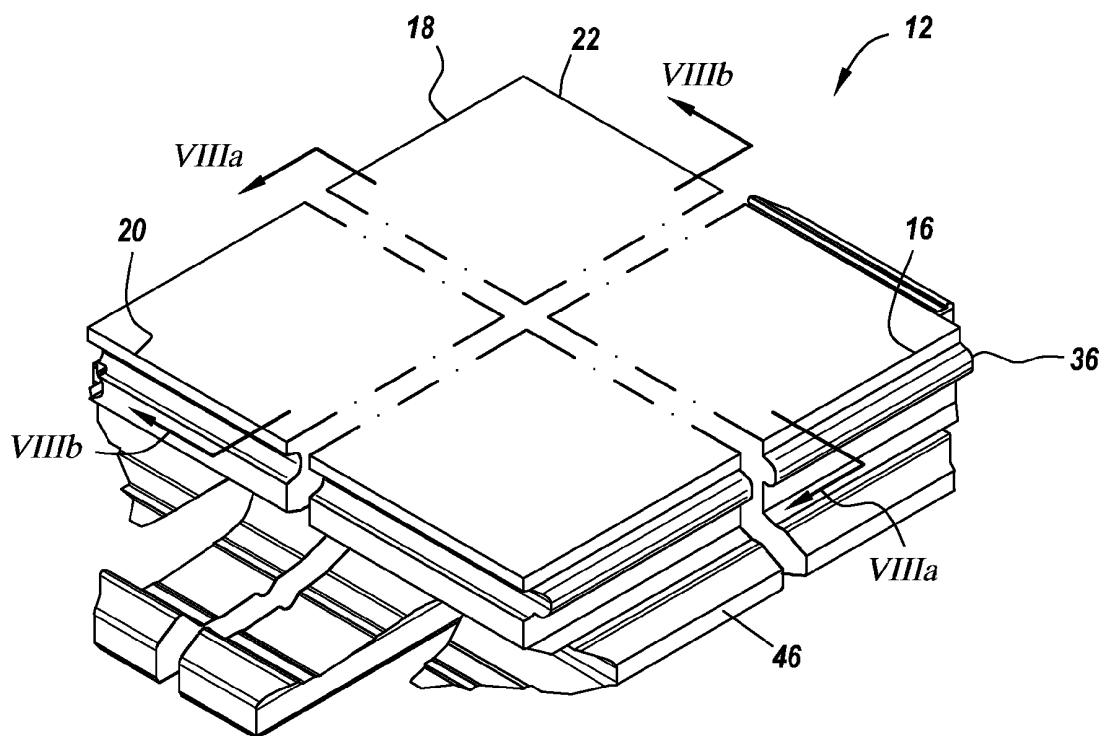


Fig. 7A

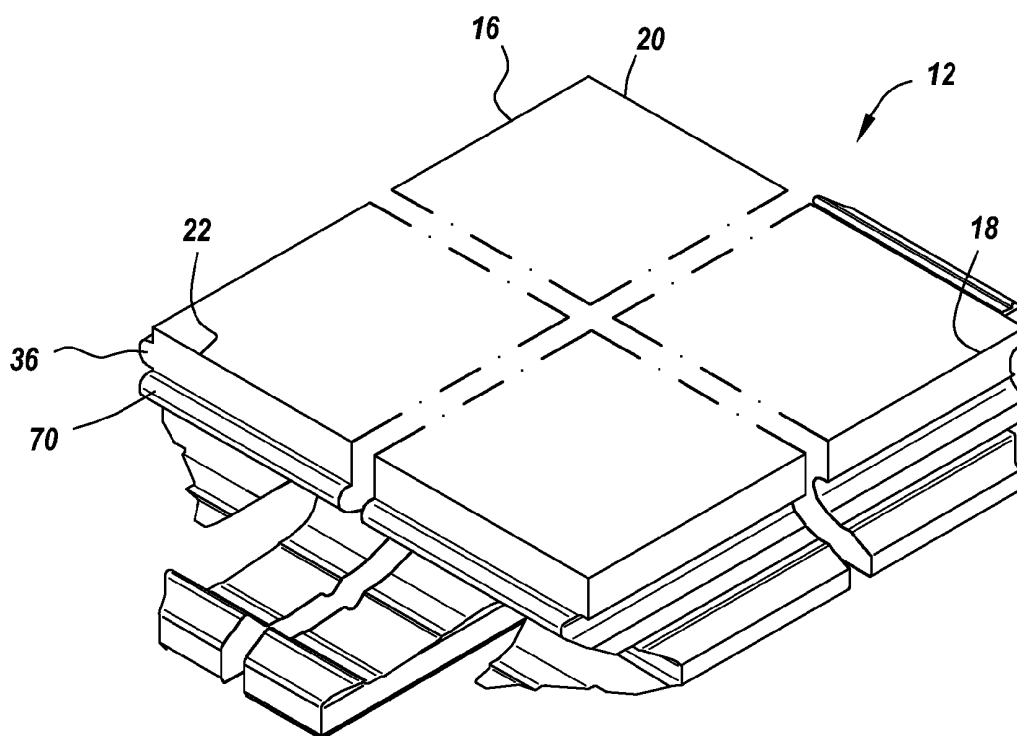


Fig. 7B

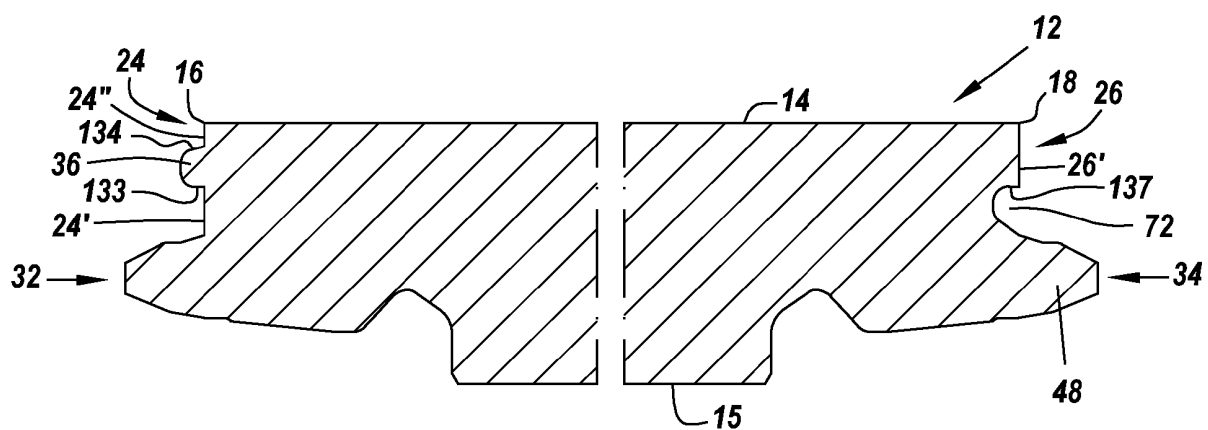


Fig. 8A

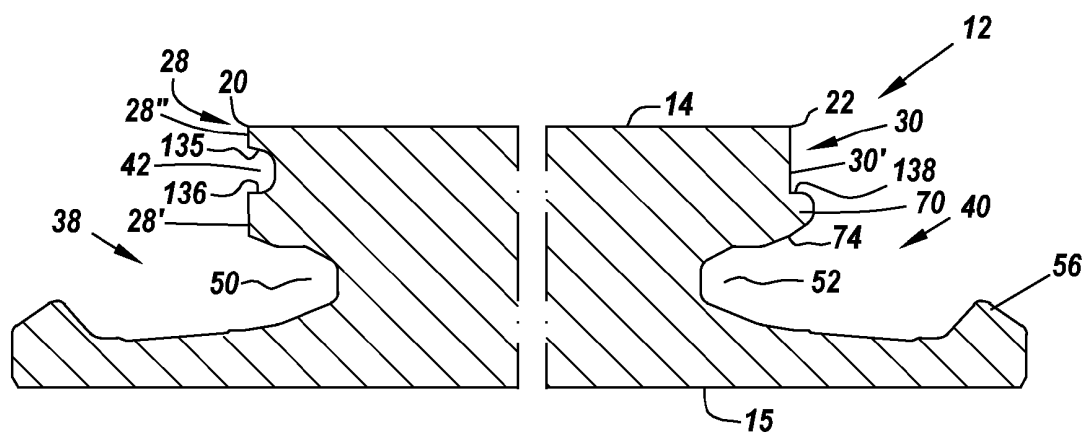


Fig. 8B

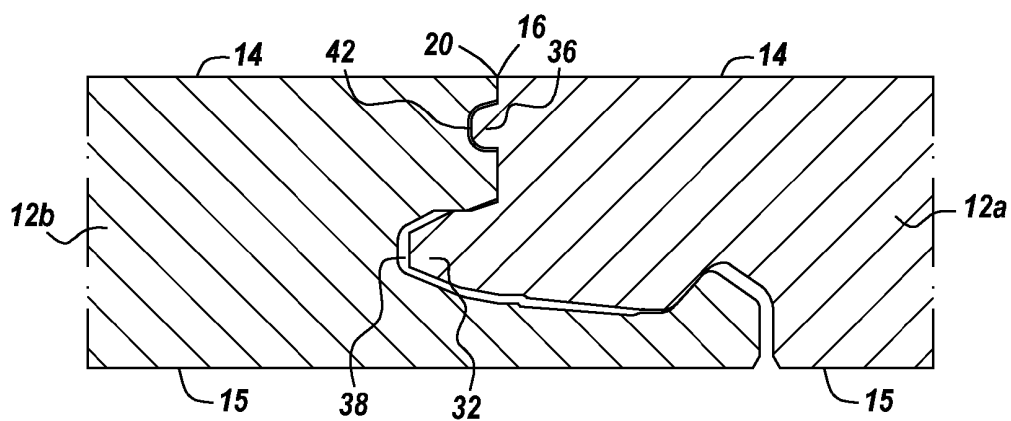


Fig. 9A

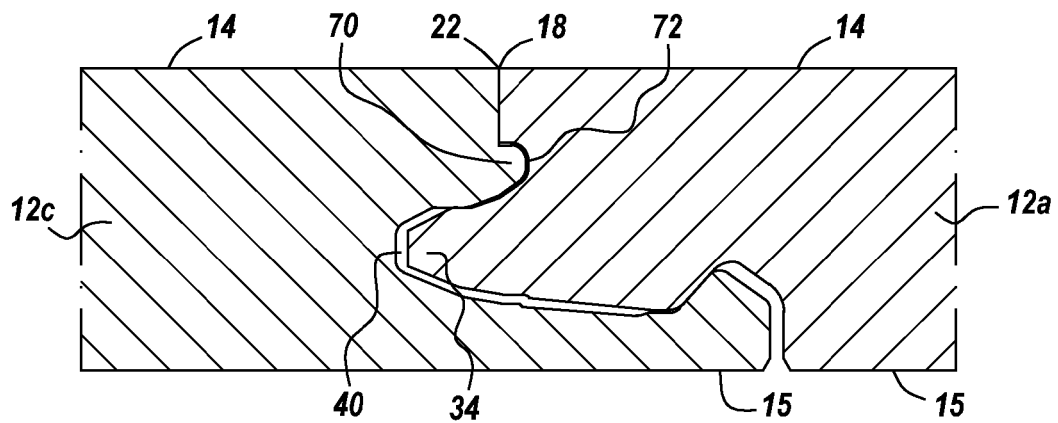


Fig. 9B

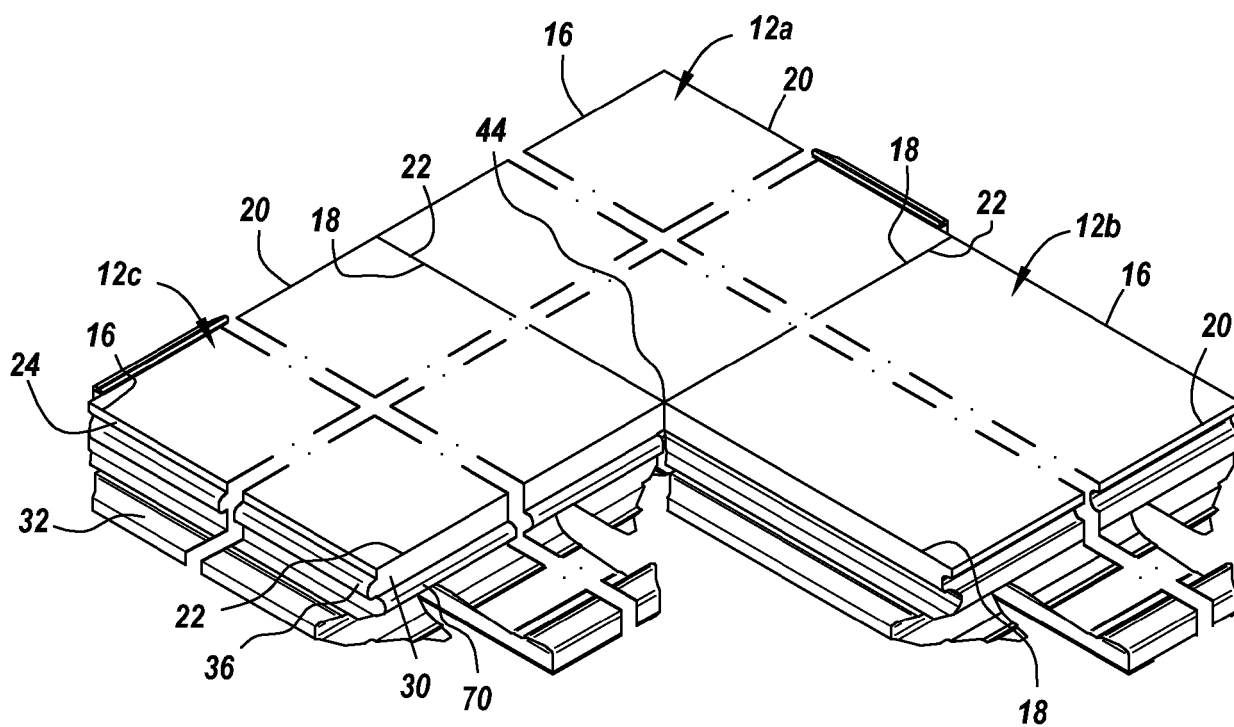


Fig. 10

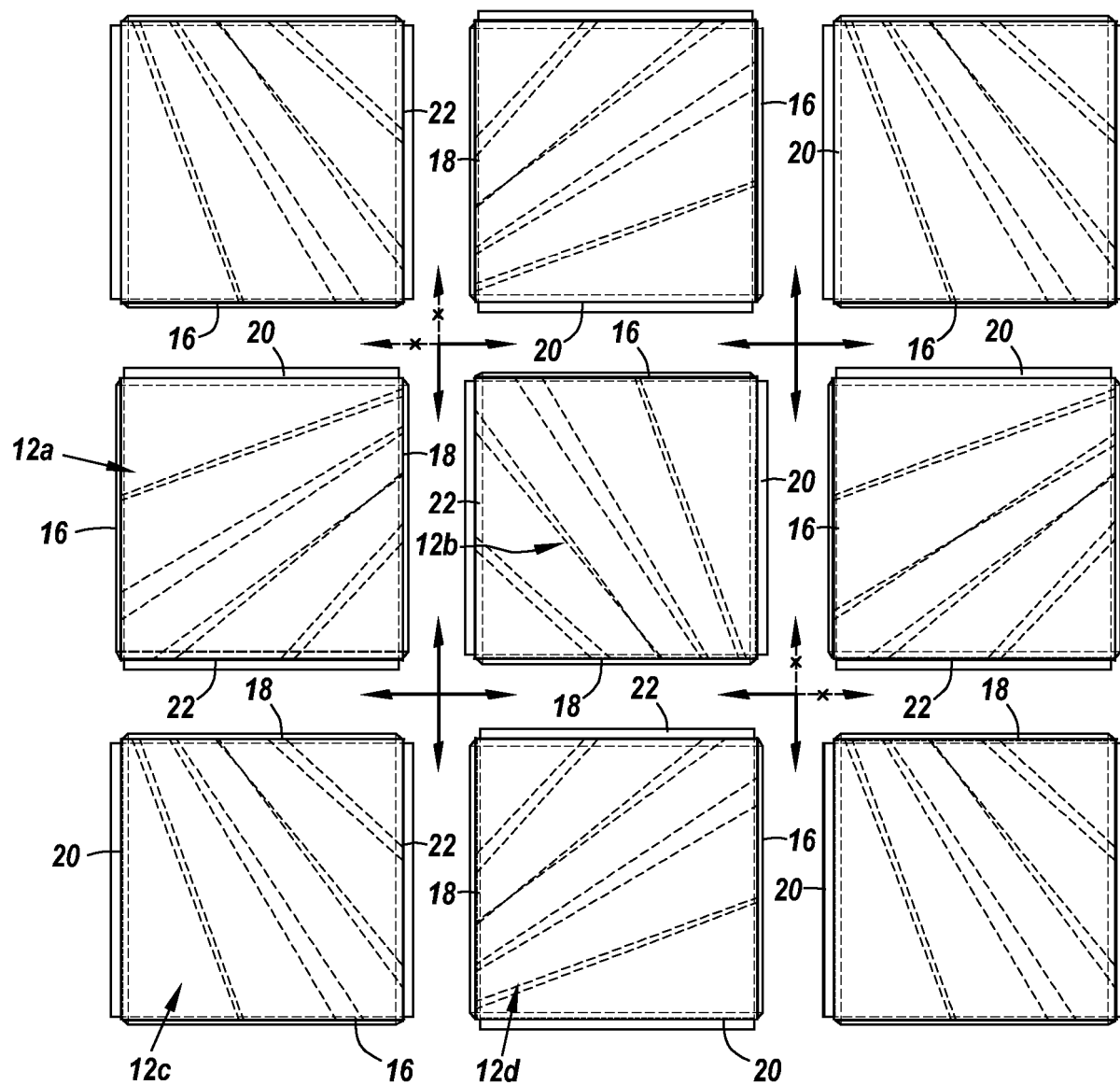


Fig. 11

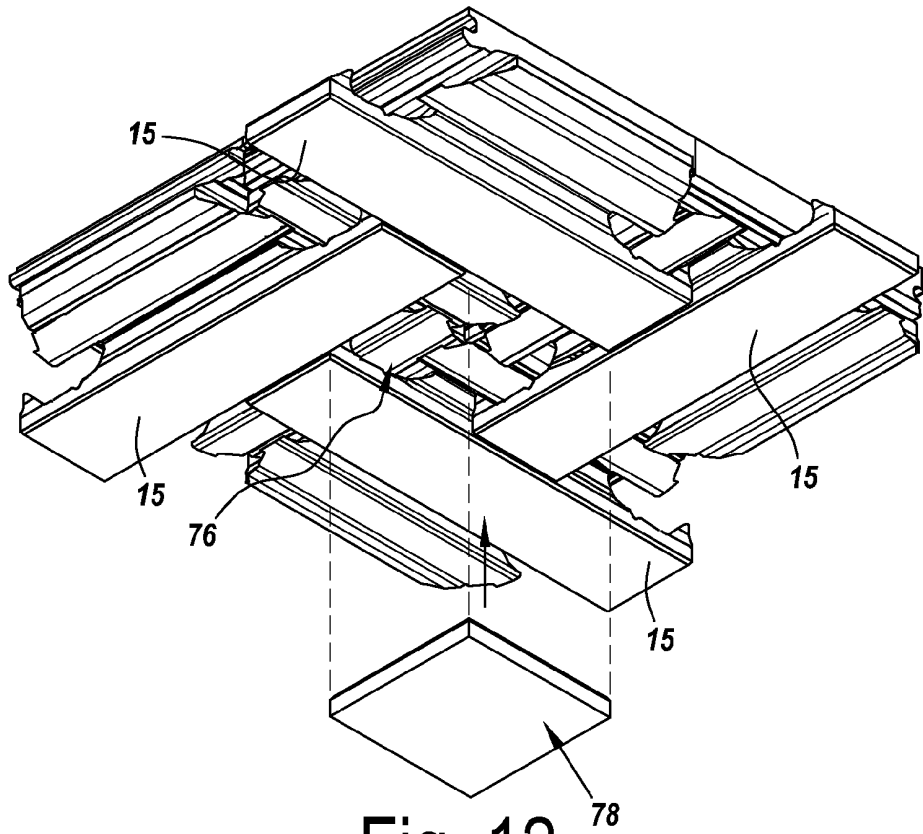


Fig. 12

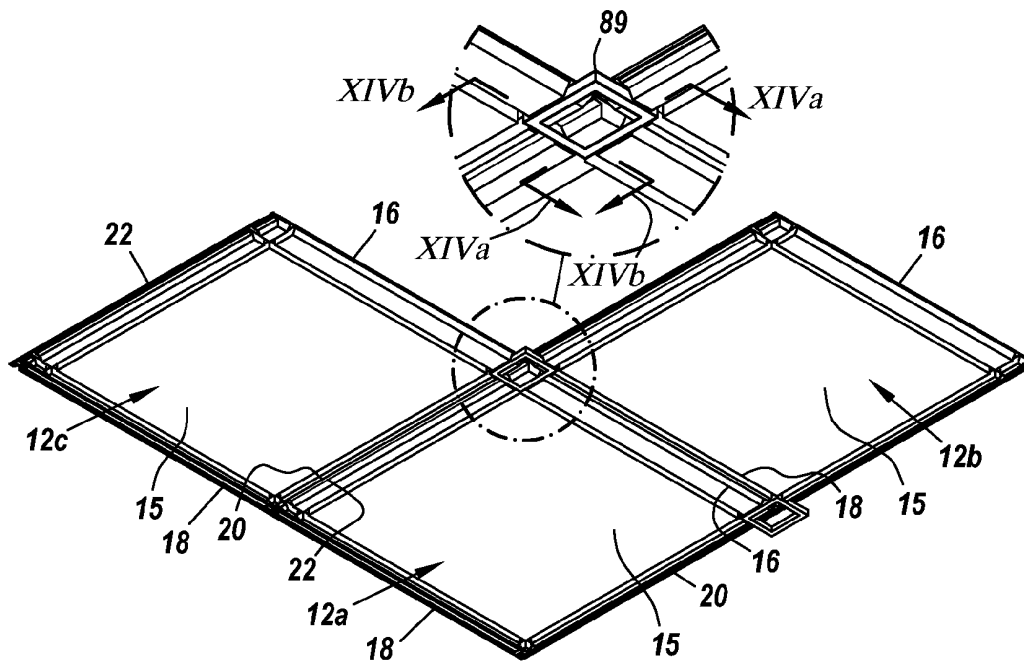


Fig. 13

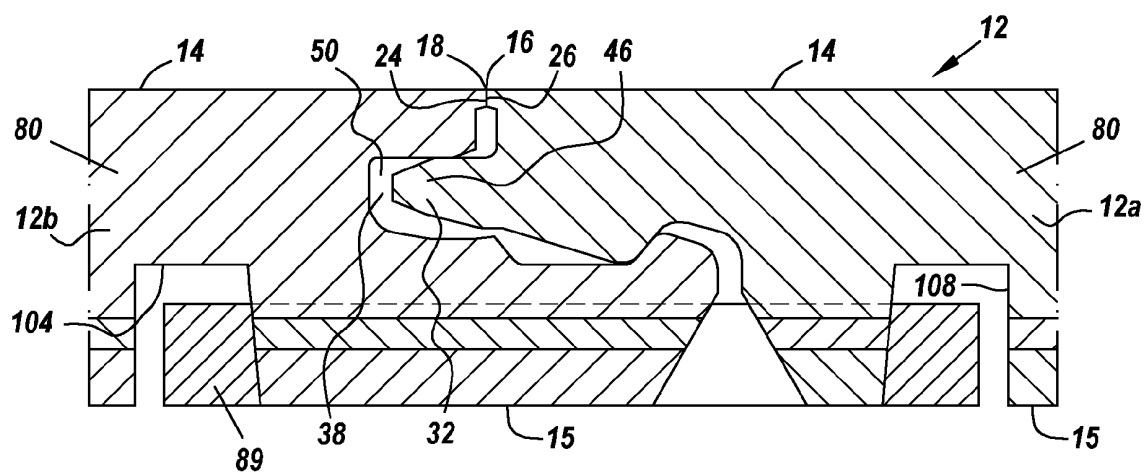


Fig. 14A

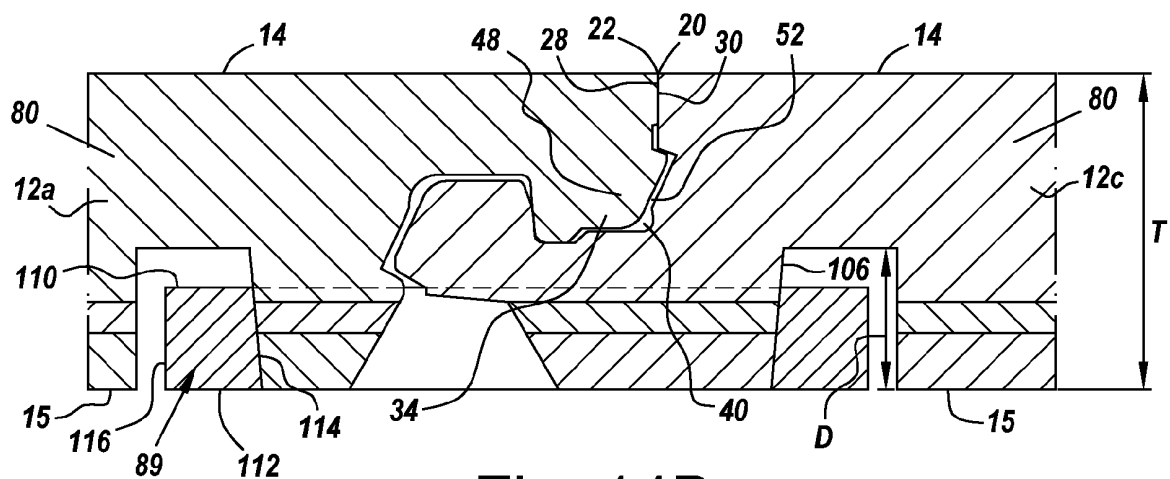


Fig. 14B

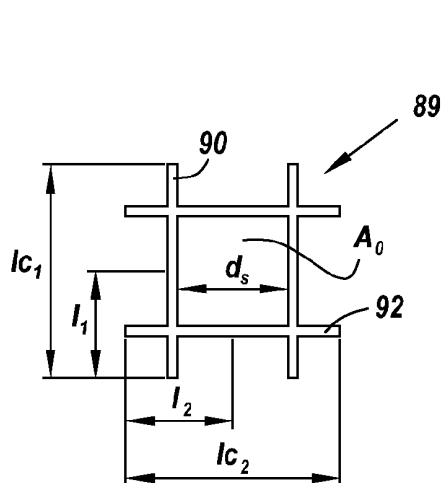


Fig. 16

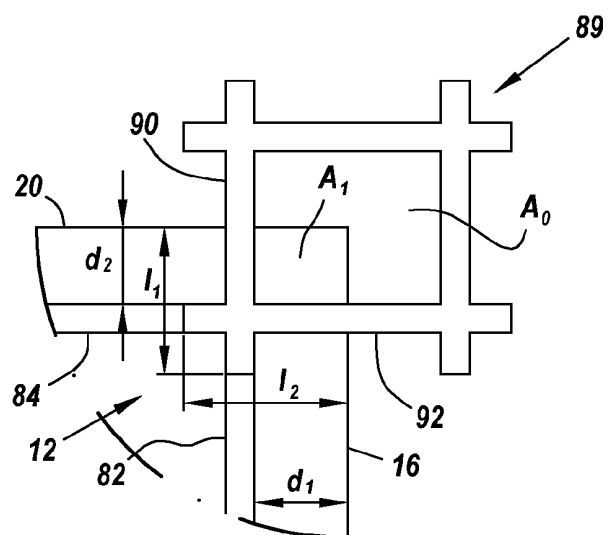


Fig. 17

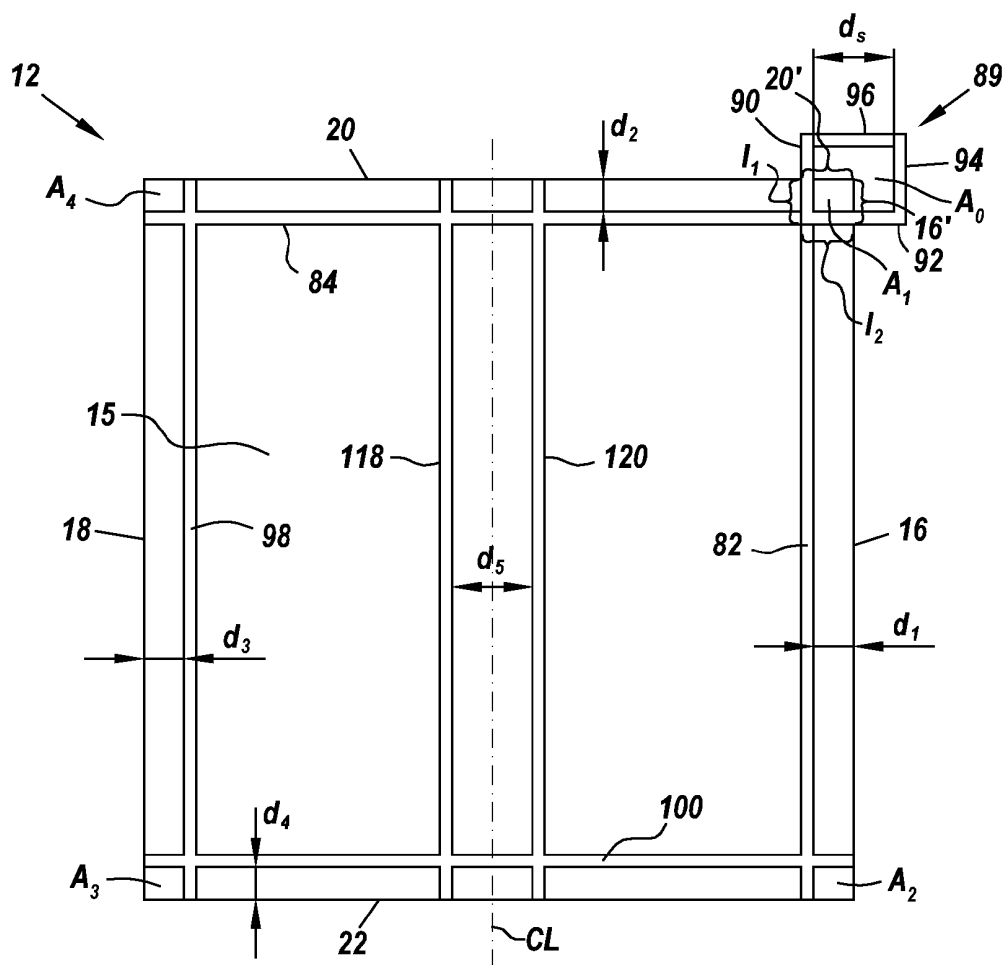


Fig. 15

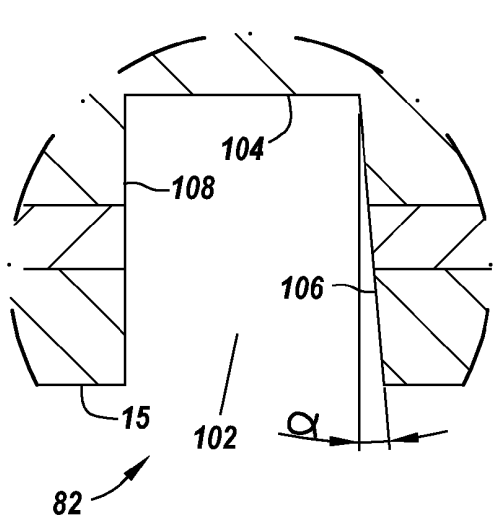


Fig. 18A

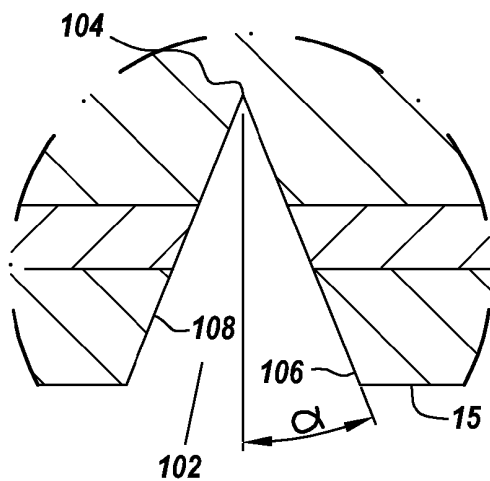


Fig. 18B

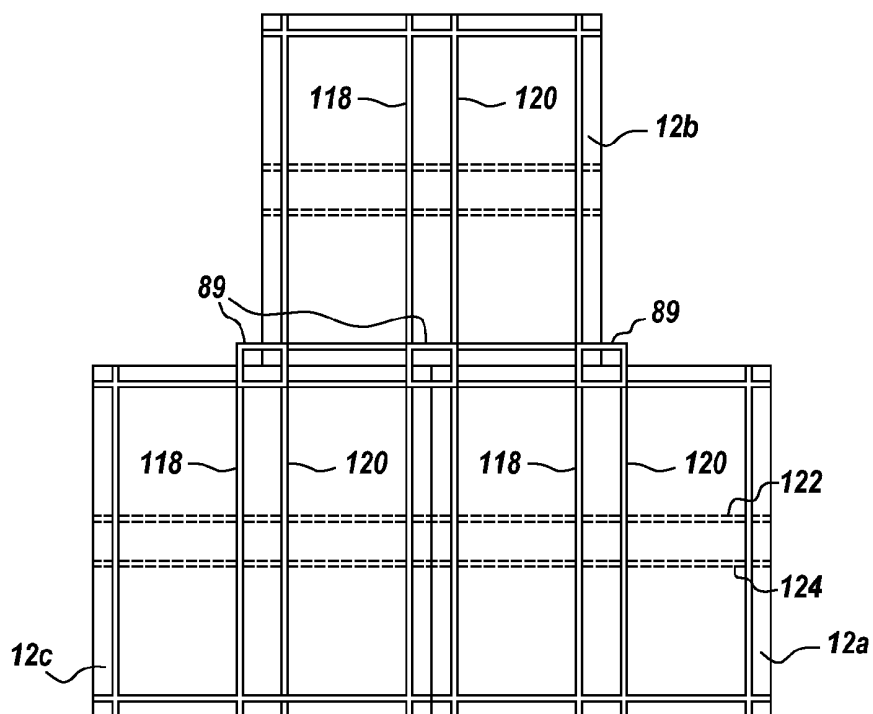


Fig. 19

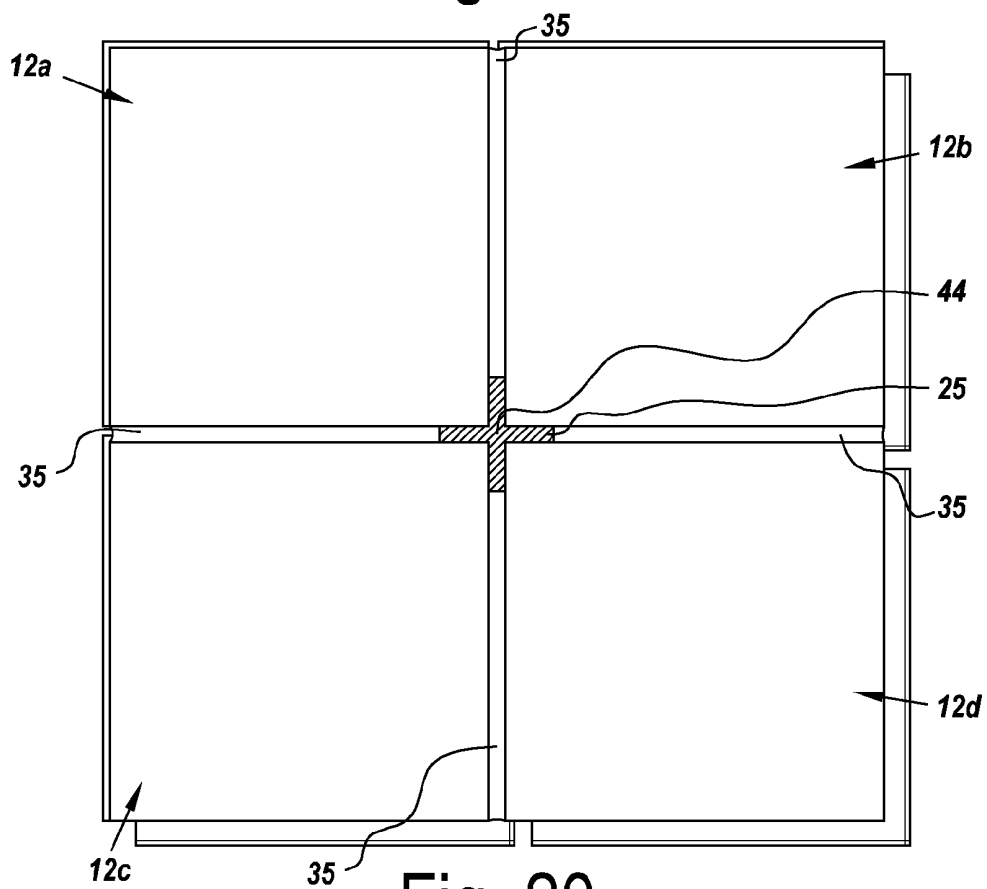


Fig. 20

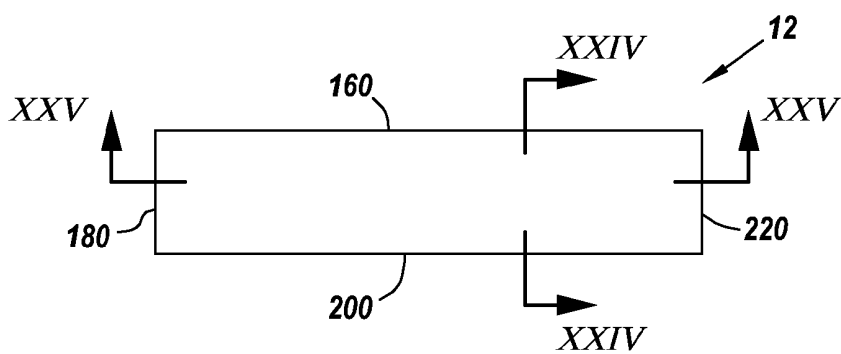


Fig. 21

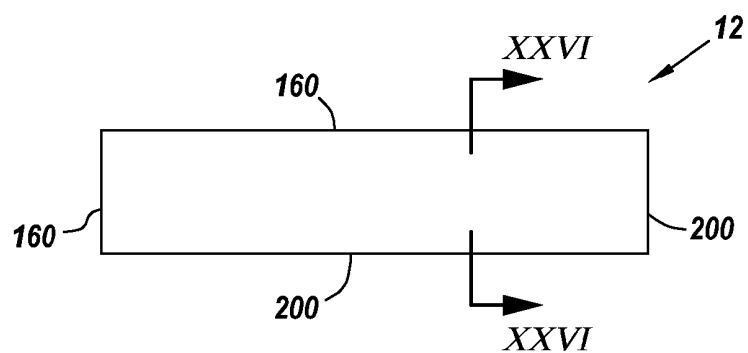


Fig. 22

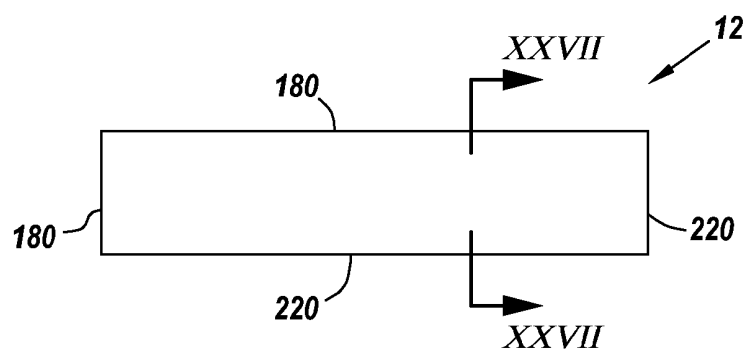


Fig. 23

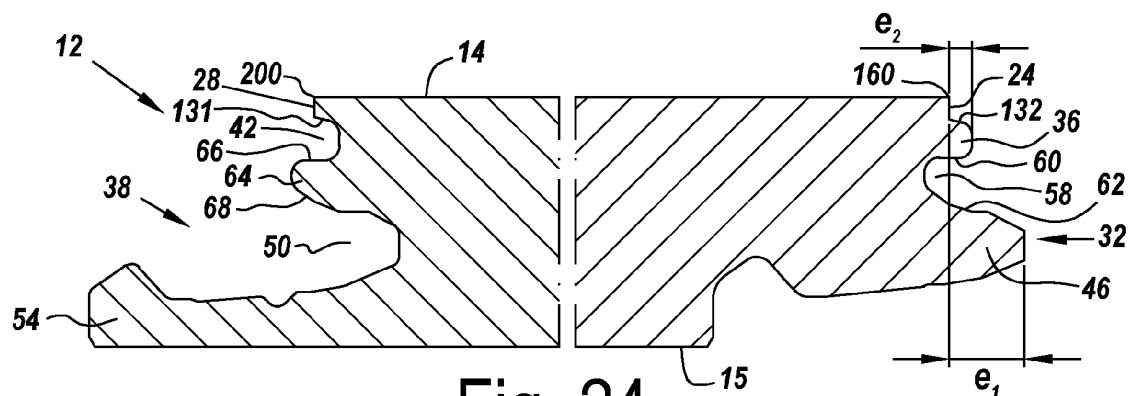


Fig. 24

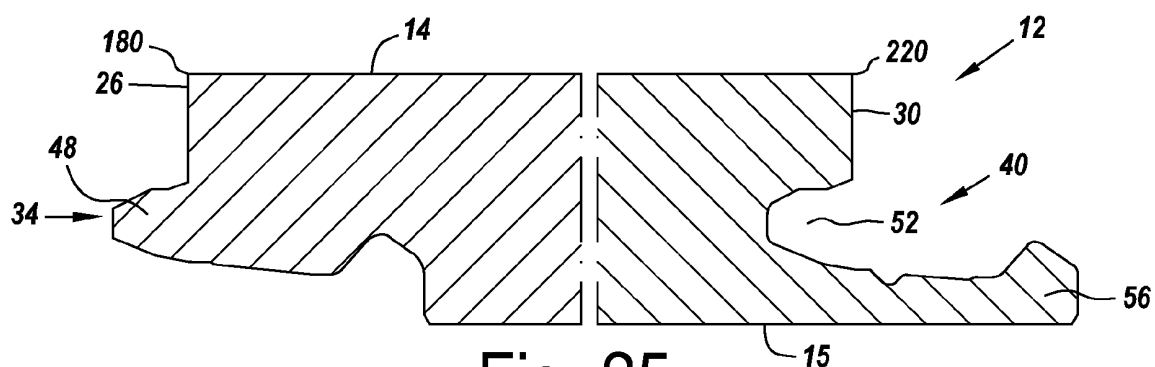


Fig. 25

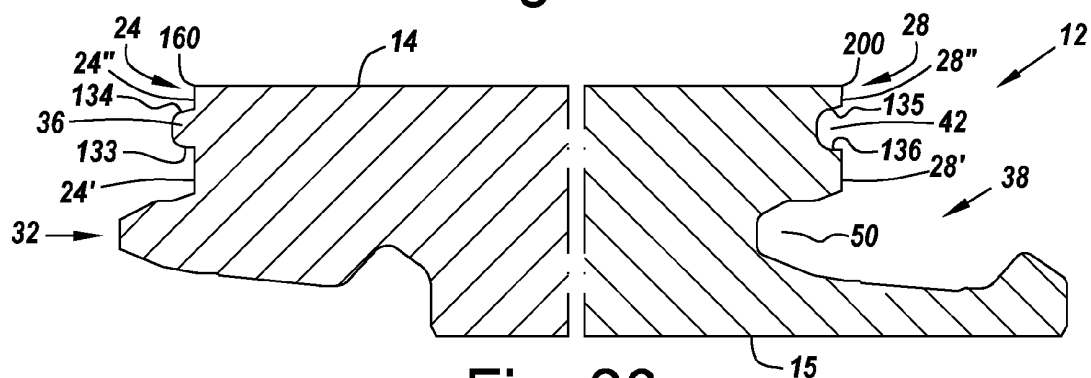


Fig. 26

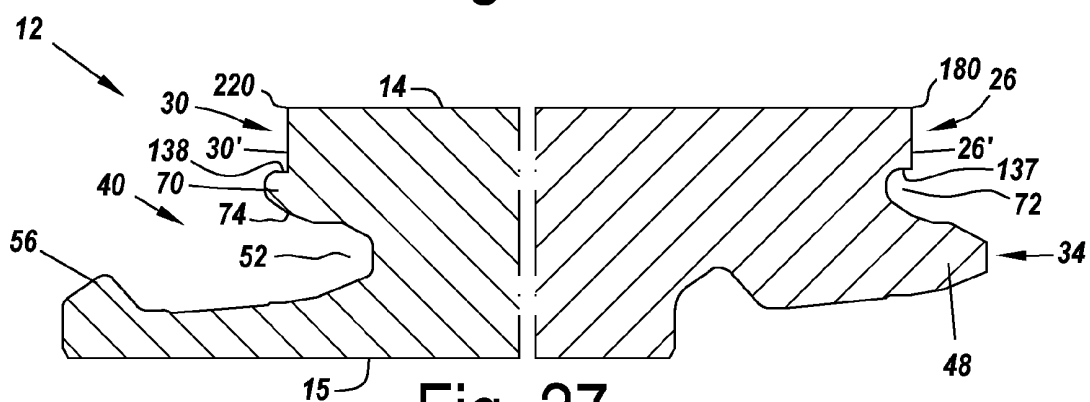


Fig. 27

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- WO 9747834 A [0003] [0074] [0106]
- WO 2010082171 A [0003] [0107]
- WO 2103102803 A [0003] [0107]
- WO 2013118030 A [0003] [0107]
- WO 2021111210 A [0003] [0107]
- WO 2021059062 A [0057]