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SBGK Szabadalmi Ügyvivői Iroda, Budapest(54) **Panel, amely összekapcsolható hasonló panelokkal padlóburkolat létrehozása céljából**

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(54) PANEL INTERCONNECTABLE WITH SIMILAR PANELS FOR FORMING A COVERING

PANEEL, DAS MIT ÄHNLICHEN PANEELN VERBINDBAR IST, ZUR FORMUNG EINER
ABDECKUNG

PANNEAU EMBOÎTABLE AVEC DES PANNEAUX SIMILAIRES POUR FORMER UN REVÊTEMENT
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Description

[0001] The invention relates to a panel, in particular a floor panel, more in particular laminated floor panel, interconnectable with similar panels for forming a covering. The invention also relates to a covering consisting of mutually connected floor panels according to the invention. The invention further relates to a method of assembling multiple floor panels for forming a covering.

[0002] The last ten years has seen enormous advance in the market for laminate for hard floor covering. It is known to install floor panels on a underlying floor in various ways. It is, for example, known that the floor panels are attached at the underlying floor, either by glueing or by nailing them on. This technique has a disadvantage that is rather complicated and that subsequent changes can only be made by breaking out the floor panels. According to an alternative installation method, the floor panels are installed loosely onto the subflooring, whereby the floor panels mutually match into each other by means of a tongue and groove coupling, whereby mostly they are glued together in the tongue and groove, too. The floor obtained in this manner, also called a floating parquet flooring, has as an advantage that it is easy to install and that the complete floor surface can move which often is convenient in order to receive possible expansion and shrinkage phenomena. A disadvantage with a floor covering of the above-mentioned type, above all, if the floor panels are installed loosely onto the subflooring, consists in that during the expansion of the floor and its subsequent shrinkage, the floor panels themselves can drift apart, as a result of which undesired gaps can be formed, for example, if the glue connection breaks. In order to remedy this disadvantage, techniques have already been through of whereby connection elements made of metal are provided between the single floor panels in order to keep them together. Such connection elements, however, are rather expensive to make and, furthermore, their provision or the installation thereof is a time-consuming occupation. There is a need to improve the coupling profiles of panels, in particular floor panels, which lead to a relatively reliable and durable connection at all edges, and which can be installed relatively easily, preferably without needing additional connection means, such as glue or metal connection elements.

[0003] Floor panels and their coupling is for instance known from WO03/016654, which discloses a fastening system for floor panels. The system comprises retaining profiles disposed on the small faces of the panels, wherein opposite retaining profiles match said retaining profiles in such a manner that similar panels can be interlinked. The panels are provided with opposite first retaining profiles that are configured in such a manner that on a panel being in first line a new panel can be locked in second line by attaching the new panel to the installed panel at a temporary angle relative to the installed panel and then swiveling it down into the plane of the installed panel. The panel further comprises opposite second retaining

elements that comprise corresponding hook elements. A hook connection can be established by means of one of the hook elements of the new panel and a hook element of a panel that is already installed in second line by swiveling down the new panel. Every hook connection is associated with an additional locking element that prevents, in the hooked state of two panels, the hook connection from being released in a direction perpendicular to the plane of the installed panels.

[0004] US2011/056167 discloses a method of assembling resilient floorboards including the step of bending an edge of a floorboard during the assembling. The bending reduces the force required for connection of the edge to another edge of a juxtaposed floorboard.

[0005] It is an object of the invention to provide an improved floor panel, which can be coupled in an improved manner to other panels, and whereby preferably one or more of the aforementioned disadvantages are excluded.

[0006] It is a further object of the invention to provide an improved panel, in particular floor panel, which can be connected to similar panels in a relatively easy manner while leading to a relatively reliable and firm connection between panels.

[0007] The invention provides for this purpose a panel, in particular a floor panel, more in particular a laminated floor panel, interconnectable with similar panels for forming a covering, comprising:

- a centrally located core provided with an upper side and a lower side, said core being provided with:

◦ a first pair of opposite edges, comprising:

■ a first edge comprising a sideward tongue extending in a direction substantially parallel to the upper side of the panel, the bottom front region of said sideward tongue being rounded at least partly and preferably substantially completely, the bottom back region of said tongue being configured as bearing region, wherein the bottom back region is located closer to the level of the upper side of the panel than a lowest part of the bottom front region,

■ an opposite, second edge comprising a recess for accommodating at least a part of the sideward tongue of a further panel, said recess being defined by an upper lip and a lower lip, said lower lip being provided with an upwardly protruding shoulder for supporting and/or facing the bearing region of the sideward tongue,

■ the sideward tongue being designed such that locking takes place by an introduction movement into the recess of the sideward tongue of a further panel and an angling down movement about an axis par-

allel to the first edge, as a result of which a top side of the sideward tongue will engage the upper lip and the bearing region of the sideward tongue will be supported by and/or facing the shoulder of the lower lip, leading to locking of adjacent panels at the first and second edges in both horizontal direction and vertical direction; and

◦ a second pair of opposite edges, comprising:

- a third edge comprising a single upward tongue, at least one upward flank lying at a distance from the upward tongue and a single upward groove formed between the upward tongue and the upward flank, wherein at least a part of a side of the upward tongue facing toward the upward flank is inclined toward the upward flank and wherein at least a part of a side of the upward tongue facing away from the upward flank comprises a substantially rigid first locking element, and
- a fourth edge comprising a single downward tongue, at least one downward flank lying at a distance from the downward tongue, and a single downward groove formed between the downward tongue and the downward flank, wherein at least a part of a side of the downward tongue facing toward the downward flank is inclined toward the downward flank, and wherein the downward flank comprises a, preferably substantially rigid, second locking element adapted for co-action with the first locking element of a third edge of yet a further panel,
- the third and fourth edges being designed such that locking takes place during angling down of a panel to be coupled at a first edge to a second edge of a further panel, wherein the fourth edge of a panel to be coupled makes a scissoring movement toward a third edge of yet another panel, such that the downward tongue of the fourth edge of the panel to be coupled will be forced into the upward groove of the third edge of said other panel and the upward tongue of said other panel will be forced into the downward groove of the panel to be coupled, by deformation of the third edge and/or the fourth edge, leading to locking of adjacent panels at the third and fourth edges in both horizontal direction, vertical direction, and leading to the first locking element to co-act with the second locking element to realise an additional locking in vertical direction as well as a locking rotational direction.

[0008] The panel according to the invention comprises at a first pair of opposing edges a first set of complementary coupling profiles and at a second pair of opposing edges a distinctive second set of complementary coupling profiles. The first and second edges facilitate an easy installation of a panel by inserting the sideward tongue of the first edge of the panel to be coupled in an inclined position into the recess of the second edge of an already installed panel, after which that panel will be angled (pivoted) downwardly until both panels are situated in the same plane. Although this angling down process leads to locking of both panels at the first and second edges both in horizontal direction and in vertical direction, a substantially improved locking will be realized due to the presence of the third and fourth edges, and more in particular by forcing the fourth edge of the panel to be coupled to snap into the third edge of another panel during the angling down movement of the panel to be coupled, wherein the downward tongue is snapped into the closed upward groove, and wherein the first locking element is brought into contact with the second locking element to provide an additional locking at a distance from the upward groove. Coupling of the third edge and the complementary fourth edge of adjacent panels leads to a triple lock at between said panels, in particular (i) a locking in horizontal direction, (ii) a locking in vertical direction, and (iii) a locking in rotational direction. The locking in horizontal direction is caused by the substantially vertical orientation of the tongues of the third and the fourth edges, which act as hook-shaped elements preventing drifting apart (in horizontal direction) of third edge and the fourth edge in a coupled state. The vertical locking is firstly caused by the application of said closed upward groove (due to aforementioned inclined side surface (inner surface) of the upward tongue) and said closed downward groove (due to the aforementioned inclined side surface (inner surface) of the downward tongue, which leads to a snapping action during coupling and an enclosing of at least a part of the downward tongue by the upward groove as well as an enclosing of at least a part of the upward tongue by the downward groove after coupling, resulting in a locking in vertical direction. Hence, since the third profile is provided with a closed upward groove, whereas at least a part of a side of the upward tongue facing toward the upward flank extends in the direction of the normal of the upper side of the core, and since the fourth profile is provided with a closed downward groove, whereas at least a part of a side of the downward tongue facing toward the downward flank extends in the direction of the normal of the lower side of the core, an interconnection of the third and fourth edges of adjacent panels can only be established after a (temporary), preferably resilient, deformation of the third edge and/or the fourth edge leading. This vertical locking is secondly caused and assisted by the co-action between the first locking element and the second locking element in the coupled state of the third edge and the fourth edge. Due to both vertical locking effects the real-

ised vertical locking as such is relatively firm. Commonly the second vertical locking effect - caused by the co-action between the first locking element and the second locking element - is required to realise a vertical locking between adjacent panels as such, though this depends on the degree of inclination of the (inner) side surfaces of the upward tongue and the downward tongue respectively. Since this inclination is commonly and preferably restricted to an extent of between 1 and 10 degrees, more preferably between 1 and 5 degrees, with respect to a vertical plane, which secures easy coupling of the third edge and the fourth edge, this inclination as such renders uncoupling of coupled panels somewhat more difficult though will commonly not lead to an aimed (stable) vertical locking between the panels as such, wherein the aimed (stable) vertical locking is merely realised by additionally allowing the first locking element and second locking element to co-act. The rotational locking prevents, or at least hinders, pivoting between panels connected at a third edge and fourth edge respectively. This rotation locking is mainly caused by the application of the first locking distant from the upward groove and the second locking element positioned inside the downward groove. Due to this triple locking mechanism a relatively firm, reliable, and durable connection can be realised between the third edge and the fourth edge of adjacent panels, which allows, moreover, easy coupling of the third edge and the fourth edge. The connection between the third edge and the fourth edge is therefore preferably free of play. Since the third and fourth edges are commonly perpendicular to the first and second edge, a scissoring movement will occur during angling down of a panel to be coupled, leading to snapping or zipping of the fourth edge of a panel to coupled and the third edge of an already installed panel into each other. Hence, the panel according to invention can be assembled in a relatively easy manner, without the need of additional connection elements, while leading to a firm and durable connection.

[0009] At the first and second edges, a locking in horizontal direction between two panels is established by the presence of upwardly protruding shoulder, which prevents the bottom front region of the sideward tongue (male part) to be displaced in a horizontal direction with respect to the complementary recess (female part) and the upwardly protruding shoulder. Hence, the shoulder locks the bottom front region of the sideward tongue in place. Preferably, the shoulder has a substantially flat upper surface. An upper surface of the shoulder is preferably oriented substantially horizontally. A shoulder wall facing or directed towards the panel core is preferably sufficiently inclined (steep) to act as locking surface for locking connected panels in horizontal direction. Preferably, at least an upper end part of said (inner) shoulder wall, connecting to an upper shoulder surface, extends in a direction of at least 45 degrees, more preferably at least 60 degrees with respect to a horizontal plane, which will secure a firm locking in horizontal direction. Said shoulder wall can be flat though is preferably curved,

since a curved shoulder wall facilitates insertion of a sideward tongue of a first panel into the recess of the second edge of a second panel. Preferably, a bottom region of the lower lip extending between the core and the shoulder is at least partially curved (rounded), wherein more preferably the shape of said bottom region of the lower lip is substantially complementary to the shape of the at least partially rounded bottom front region of the sideward tongue. The complementary rounded surfaces will act as sliding surfaces during coupling of the panels. The upper surface has a substantially complementary shape with respect to a corresponding bottom region of the lower lip. A locking in vertical direction at the first and second edges of two panels is established by the engagement of a top surface of the sideward tongue to a bottom surface of the upper lip acting as locking surface. In fact, the upper lip prevents the inserted sideward tongue to be displaced in vertical direction. After coupling, a top surface of the sideward tongue preferably at least partially engages a bottom surface of the upper lip. After coupling, a top surface of the sideward tongue preferably engages the complete bottom surface of the upper lip. This partial or complete engagement prevents play between coupled panels. Hence, panels can be coupled free of play at the first edge and the second edge.

[0010] At the third and fourth edges, a locking in horizontal direction between two panels is established by the presence of the upward tongue at the third edge which engages to the downward tongue at the fourth edge (of another panel), which prevents the two panels to be drifted apart. At the third and fourth edges, a locking in vertical direction between two panels is established by the application of the closed grooves as indicated above, and moreover, due to the presence of the additional first and second locking elements. Moreover, due to the particular shape of the third and fourth edges, a locking in rotational directional will commonly also be established. The third and fourth edges can be mutually connected either by a scissoring action (zipping action) during angling down of a panel to be coupled, although it is also conceivable to connect the third and fourth edges by vertical displacement, wherein the downward tongue (as a whole) is downwardly pushed into the upward groove. Regardless of the installation method, either the third edge and/or fourth edge will slightly deform during coupling to allow the tongues to be inserted into the complementary closed grooves. After establishment of the coupling, both the third edge and the fourth edge preferably have their original shape again and will no longer be deformed. Preferably, the third edge and the fourth edge have substantially complementary shapes, such that none of the third edge and the fourth edge will exert (compression) forces onto each other once coupled. The absence of any (pre)tension in the coupled state of the third and fourth edge will reduce the material stress to practically zero in the coupled state, which will be in favour of the durability of the third edge as such, the fourth edge as such, and consequently to the connection between these edges in the

coupled state. Preferably, (also) the third edge and the fourth edge can be connected free of play.

[0011] The (floor) panel according to the invention is primarily intended for so-called laminated floors, but generally it can also be applied for other kinds of covering, consisting of hard floor panels, such as veneer parquet, prefabricated parquet, or other floor panels which can be compared to laminated flooring. Hence, the floor panel according to the invention is preferably a laminated floor panel. A laminated floor panel is considered as a floor panel comprising multiple material layers. A typical laminated floor panel comprises at least one central core layer, and at least one further layer attached to either at a bottom surface and/or top surface of said core layer. A backing layer attached to at least a part of a bottom surface is also referred to as a balancing layer. This backing layer commonly covers the core of the panel, and optionally, though not necessarily, one or more edges of the panel. On top of the core, commonly one or more additional layers are applied, including at least one design layer (decorative layer) which is preferably covered by a substantially transparent protective layer. The decorative layer may be formed by a paper layer onto which a decorative pattern is printed, though it is also thinkable that the decorative design is directly printed onto the core or onto a core coating. The protective layer may have a profiled top surface, which may include an embossing which corresponds to the decorative pattern (design) visualised underneath the protective layer, to provide the floor panel an improved feel and touch. Different materials may be used for the layers. The core, for example, can be formed of a MDF or HDF product, provided with a protective layer. The core could also be formed of a synthetic material, such as a thermoplastic like polyvinyl chloride (PVC), and/or a thermoplastic material which is enriched with one or more additives. The thermoplastic material may be fibre reinforced and/or dust reinforced. To this end, a dust-(thermo)plastic-composite may be used as core material. The expression "dust" is understood is small dust-like particles (powder), like wood dust, cork dust, or non-wood dust, like stone powder, in particular cement. By combining bamboo dust, wood dust, or cork dust, or combination thereof, with for example high density polyethylene (HDPE), or polyvinylchloride (virgin, recycled, or a mixture thereof), a rigid and inert core is provided that does not absorb moisture and does not expand or contract, resulting in peaks and gaps. An alternative material which may be used to manufacture at least a part of the floor panel according to the invention, in particular the core layer, is ceramics or cement. Instead of a laminated floor panel, the floor panel according to the invention may also be formed by a single layer floor panel, which may for example be made of wood. Preferably, the edges are integrally connected to the core.

[0012] The panel according to the invention can also be applied to form an alternative covering, for example a wall covering or a ceiling covering.

[0013] The recess is preferably terminated by the

shoulder. By using this definition, the recess will be configured to accommodate that front region of the tongue, while the back region acting as bearing region will be positioned outside the recess. The recess will therefore in vertical direction be limited and defined by the upper lip and the lower lip, and will in horizontal direction be limited and defined by the core and the shoulder. As indicated above, a bottom surface of the front region of the sideward tongue is at least partly rounded, which facilitates angling down of the panel, wherein a more or less central part of the front region of the sideward tongue will act as pivoting axis. Since the sideward tongue is inserted into the recess during angling down, the pivoting axis will be displaced slightly during the angling down process. Commonly, the shape of a bottom surface of the lower lip defining the recess, configured for supporting the front region of the sideward tongue, is preferably complementary to the shape of the bottom front region of the sideward tongue. In this manner, the number of gaps between the sideward tongue and the bottom surface of the lower lip defining the recess can be kept to a minimum, which will commonly be in favour of the prevention of play between the edges, and hence to the solidness of the connection. Therefore, the bottom surface of the recess is preferably also at least partly rounded. The roundness of the matching surface can be either smooth or (somewhat) hooked, for example by hooked surface segments, to form a rounded shape. Alternatively, the bottom surface of the lower lip defining the recess can also be given another shape, for example a substantially flat shape, which could be in favour of minimizing the resistance between two panels during the angling down process, which could facilitate the installation process.

[0014] The upper lip and the lower lip are connected to the core, and preferably extend in a direction which is substantially parallel to the upper side of the core. Preferably, the lower lip is substantially longer than the upper lip, more preferably at least four times longer. In between the upper lip and the lower lip a cavity is created, which cavity makes part of the recess. This cavity will commonly act as locking part of the recess, wherein a top surface of said locking part acts as locking surface and is configured to co-act with a top surface of the front region of the sideward tongue of a further panel. This locking surface preferably has an inclined orientation, and wherein at least a front region of the top surface of the sideward tongue has a corresponding inclined orientation. An inclined orientation of the locking surface commonly facilitates coupling of panels at the first and second edge.

It is commonly advantageous in case a side of the shoulder facing the core has an inclined orientation for forcing two panels, in an assembled state, toward each other. Preferably a complementary surface of the bearing region of the sideward tongue has a substantially identical inclined orientation. This inclination preferably runs downward from the shoulder in the direction of the core. By applying such an inclined orientation a driving surface will be created for driving (forcing) an inserted sideward

tongue in the direction of the core of the panel, which will be in favour of the firmness of the coupling at the first and second edges.

[0015] In a preferred embodiment, the width of the bearing region of the sideward tongue is greater than the width of the shoulder. The width is perpendicular to the length of the sideward tongue and the shoulder, and hence perpendicular to the longitudinal axis of the first and second edge. By applying a bearing region having a greater width than the width of the shoulder, a gap will be created between the shoulder and the core of an adjacent panel. This gap will commonly facilitate the angling down process, since more space during the angling down process.

[0016] The panel according to the invention can either have a square shape or a rectangular shape. The first pair of opposite edges have a substantially parallel orientation. The same applies to the second pair of opposite edges which also have a mutually substantially parallel orientation. The angle enclosed by the first pair of edges and the second pair of edges is substantially perpendicular. In a preferred embodiment the panel has a substantially rectangular shape, wherein the first pair of opposite edges are located on the long sides of the panel, and the second pair of opposite edges are located on the short sides of the panel. This orientation allows the long edges of a first panel and a second panel to be engaged first, after which the short edges of the first panel and a third panel will be connected during lowering (angling down) of the first panel. It is imaginable to modify this embodiment by applying the first and second edges to the short edges, and the third and fourth edges to the long edges. In this latter embodiment, first the short edges of different panels will be brought in contact with each other, after which during angling down of one of the panels the long sides of the panel will be connected to another panel.

[0017] In a preferred embodiment at least a part of a side of the upward tongue facing toward the upward flank forms an (inclined) upward aligning edge for the purpose of coupling the third edge to a fourth edge of an adjacent panel. This upward aligning edge can be flat and/or rounded. The upward aligning edge facilitates a correct positioning (alignment) of the fourth edge of a panel with respect to a third edge of an adjacent panel which will commonly facilitate mutual coupling of the third edge and the fourth edge. The upward aligning edge can be considered as being a part of the (inner) side wall of the upward tongue. The upward aligning edge is preferably (substantially) smaller than an inclined remaining portion of the (inner) side wall of the upward tongue. More preferably, the upward aligning edge and the remaining portion of the upper surface of the upward tongue mutually enclose an angle, preferably an angle between 75 and 165 degrees. The upward aligning edge adjoins an upper surface of the upward tongue. Preferably, this upper surface substantially completely faces away from the upward flank. Preferably, this (complete) upper surface has

an inclined orientation, wherein more preferably this upper surface runs downwardly in a direction away from the upward flank. Hence, this inclined upper surface may also act as (outer) upward aligning edge adjacent to the (inner) upward aligning edge as specified above, which further facilitates coupling of panels at the third edge and the fourth edge. The wording "aligning edge" can be replaced by the wording "guiding edge" or "guiding surface". The upper surface of the upward tongue adjoins at an outer side surface of the upward tongue, said outer side surface being provided with the first locking element. Said outer side surface preferably has a substantially vertical orientation. Thus, preferably the first locking element is located on a substantially vertical part of the upward tongue, such that above and below the locking element the upward tongue has a substantially vertically orientated surface. The inclination of the upper surface of the upward tongue is preferably situated between 15 and 45 degrees, more preferably between 25 and 35 degrees, and is most preferably about 30 degrees, with respect to a horizontal plane. The inclination of the upper surface of the upward tongue is preferably constant, which means the upper surface has a flat orientation. Preferably, an upper side of the downward groove has a, preferably likewise (compared to the inclination of the upper surface of the upward tongue (if applied)), inclining orientation, which is more preferably upward in the direction of the side of the downward tongue facing towards to downward flank. A lower surface of a bridge connecting the downward tongue to the core is formed by the upper surface of the downward groove. Applying an inclined upper surface of the downward groove will result in a varying thickness of the bridge, as soon from the core to the outer end of the third edge. As aforementioned, the upper surface of the downward groove preferably runs inclining upward in the direction of the side of the downward tongue facing towards to downward flank, which results in the fact that the bridge thickness decreases in the direction of the downward tongue. This position-dependent bridge thickness, wherein the bridge thickness is relatively large close to the core and relatively small close to the downward tongue, bridge thickness has multiple advantages. The thicker part of the bridge, close to the core, provides the bridge more and sufficient strength and robustness, while the thinner part of the bridge, close to the downward tongue, forms the weakest point of the bridge and will therefore be decisive for the location of first deformation (pivoting point) during coupling. Since this point of deformation is located close to the downward tongue the amount of material to be deformed to be able to insert the downward tongue into the upward groove can be kept to a minimum. Less deformation leads to less material stress which is in favour of the life span of the coupling part(s) and hence of the floor panel(s). In the coupled state of adjacent floor panels, the upper surface of the downward groove is preferably at least partially, and preferably substantially completely, supported by the upper surface of the upward tongue, which pro-

vides additionally strength to the coupling as such. To this end, it is advantageous that the inclination of the upper surface of the downward groove substantially corresponds to the inclination of the upper surface of the upward tongue. This means that the inclination of the upper surface of the downward groove is preferably situated between 15 and 45 degrees, more preferably between 25 and 35 degrees, and is most preferably about 30 degrees, with respect to a horizontal plane. As already mentioned, this inclination may be either flat or rounded, or eventually hooked.

[0018] The floor panel comprises a single upward tongue and a single downward tongue. The expression "single tongue" means that merely a clearly recognizable single-piece, non-segmented tongue is applied rather than multiple tongues and/or rather than a segmented (fork-like) tongue having tines or prongs (parallel or branching spikes) enclosing one or more accommodating spaces for dust and/or separate sealing elements. Each of the upward tongue and the downward tongue is preferably substantially rigid, which means that the tongues are not typically configured to be subjected to deformation. The tongues as such are preferably relatively stiff and hence practically non-flexible, also due to their relatively robust design. Moreover, the tongues are preferably substantially solid, which means that the tongues are substantially massive and thus completely filled with material and are therefore not provided with grooves at an upper surface which would weaken the construction of the tongue and hence of the floor panel connection to be realised. By applying a rigid, solid tongue a relatively firm and durable tongue is obtained by means of which a reliable and the durable floor panel connection can be realised without using separate, additional components to realise a durable connection. Just like the downward tongue being connected to the core by means of a bridge, as mentioned above, also the upward tongue is connected to the core by means of a (noth-er) bridge. Preferably, at least a part of the bridges, due to their limited thickness, are resilient to some extent to allow slight and commonly temporary deformation of the third and fourth edges during coupling of these edges. Preferably, the thickness of at least the bridge connecting the downward tongue to the core varies in a direction perpendicular to the fourth edge. More preferably, the thickness of at least the bridge connecting the downward tongue to the core decreases in a direction perpendicular to the fourth edge and toward the downward tongue. This, preferably continuous, decreasing thickness of the bridge has two advantages; a thicker part of the bridge provides the bridge sufficient robustness, while a thinner part of the bridge will become the weakest point and will therefore be able to deform most easily during coupling of the panels. Preferably, this deformation point (or pivoting point) is located close to the downward tongue. The core of the floor panel is preferably also substantially rigid, which means that the core is not configured to be subjected to deformation. By applying a rigid panel a rel-

atively firm and durable panel can be obtained without using separate, additional components to realise a durable connection.

[0019] Preferably, at least a part of a side of the downward tongue facing away from the downward flank forms an inclined downward aligning edge for the purpose of coupling the fourth edge to a third edge of an adjacent panel. Also this inclined aligning edge, which may also be flat and/or rounded, also serves to facilitate a correct mutual positioning of the fourth and third edges, and therefore the ease of mutual coupling of both edges. Preferably the upward and/or downward aligning edge is substantially flat and forms a linear aligning surface. This surface can, in turn, be rounded off on the edges. A substantially flat and linear aligning edge facilitates a correct positioning of different floor panels upon coupling. In yet another embodiment the effective height of the inclined downward aligning edge is larger than the effective height of the upward tongue. This commonly results in the situation that the downward aligning edge of a floor panel does not engage another floor panel in case of a pre-aligned state (intermediate state). The position-selective contactless pre-alignment does prevent or counteract forcing the downward aligning edge of a floor panel along the upper surface of another floor panel, which could damage the floor panels.

[0020] In an embodiment of the floor panel, at least a part of the upward flank adjoining the upper side of the floor panel is adapted to make contact with at least a part of the downward tongue adjoining the upper side of another floor panel in a coupled state of these floor panels. Engagement of these surfaces will lead to an increase of the effective contact surface between the coupling elements and hence to an increase of stability and sturdiness of the connection between two floor panels. In a favourable embodiment the upper side of the floor panel is adapted to engage substantially seamless to the upper side of another floor panel, as a result of which a seamless connection between two floor panels, and in particular the upper surfaces thereof, can be realised.

[0021] In another embodiment the first locking element is positioned at a distance from an upper side of the upward tongue. This is favourable, since this will commonly result in the situation that the first locking element is positioned at a lower level than the upward aligning edge of the floor panel, which has the advantage that the maximum deformation of the fourth edge can be reduced, whereas the connection process and deformation process can be executed in successive steps. Less deformation leads to less material stress which is in favour of the life span of the coupling part(s) and hence of the floor panel(s). In this embodiment the second locking element is complementary positioned at a distance from an upper side of the downward groove. In an alternative embodiment, the first locking element is positioned at a distance from a lower side of the upward tongue, which may also facilitate coupling. The positioning of the complementary second locking element will be such that both locking

element will co-act in the coupled state of the third and fourth edge. Preferably the first locking element is located on a substantially vertical part of the upward tongue, such that above and below the locking element the upward tongue has a substantially vertically orientated surface. This allows for a clear distinguishing between the locking element(s) and the tongue, and for a clean coupling of two floor panels. The substantially vertical surface above the first locking element allows a complementary counter profile to be aligned more easily into a relatively stable intermediate coupling position (see also figure 7c). Moreover, positioning the first locking element at a distance from the upper surface of the upward tongue reduces the maximum deformation the profiles have to be subjected to, which reduces the risk of breakage, and which improves the durability of the profiles and their connection. Additionally, positioning the first locking element at a distance from the upper surface of the upward tongue improves at least the rotational locking effect caused by the co-action between the first locking element and the second locking element.

[0022] In an embodiment the mutual angle enclosed by at least a part of a side of the upward tongue facing toward the upward flank and the normal of the upper side of the core is substantially equal to the mutual angle enclosed by at least a part of a side of the downward tongue facing toward the downward flank and the normal of the lower side of the core. A close-fitting connection of the two tongue parts to each other can hereby be realized, this generally enhancing the firmness of the coupling between the two floor panels. In an embodiment variant the angle enclosed by on the one hand the direction in which at least a part of a side of the upward tongue facing toward the upward flank extends and on the other the normal of the upper side of the core lies between 0 (or 1) and 60 degrees, in particular between 0 (or 1) and 45 degrees, more particularly between 0 (or 1) and 10 degrees. In a particular embodiment this angle lies between 0.5 and 5 degrees. In another embodiment variant the angle enclosed by on the one hand the direction in which at least a part of a side of the downward tongue facing toward the downward flank extends and on the other the normal of the lower side of the core lies between 0 and 60 degrees, in particular between 0 and 45 degrees, more particularly between 0 and 10 degrees. In a particular embodiment this angle lies between 0.5 and 5 degrees. The eventual inclination of the tongue side facing toward the flank usually also depends on the production means applied to manufacture the floor panel. In an embodiment inclination of the downward aligned edge is less than the inclination of at least an upper part of the upward flank, as result of which an expansion chamber will be formed between both surface which will be favourable to allow play and to compensate expansion, e.g. due to moist absorption by the floor panels.

[0023] In another embodiment variant at least a part of the aligning edge of the fourth edge has a substantially flatter orientation than at least a part of the upward flank

of the third edge. By applying this measure there is generally created in a coupled position an air gap between the aligning edge of the fourth edge and a flank of the third edge. This clearance intentionally created between the two coupling parts is usually advantageous during coupling of adjacent floor panels, since this clearance does not prevent a temporary deformation of the coupling parts, this facilitating coupling of the coupling parts. Furthermore, the created clearance is advantageous for the purpose of absorbing expansion of the floor panel, for instance resulting from moisture absorption, this not being inconceivable when the floor panel is at least partially manufactured from wood. The created clearance may also act as dust chamber.

[0024] In an embodiment variant a part of the upward flank of the third edge connecting to the core forms a stop surface for at least a part of the side of the downward tongue facing away from the downward flank. In this way a close fitting of at least the upper side of the floor panels can be realized, this usually being advantageous from a user viewpoint. A part of the upward flank of the third edge connecting to the core is here preferably oriented substantially vertically. At least a part of the side of the downward tongue facing away from the downward flank is here also preferably oriented substantially vertically. Applying substantially vertical stop surfaces in both coupling parts has the advantage that in the coupled position the coupling parts can connect to each other in relatively close-fitting and firm manner.

[0025] It is generally advantageous for the upward groove to be adapted to receive with clamping fit a downward tongue of an adjacent panel. Receiving the upward groove, or at least a part thereof, with clamping fit in the downward tongue has the advantage that the downward tongue is enclosed relatively close-fittingly by the upward groove, this usually enhancing the firmness of the coupled construction. The same applies for the embodiment variant in which the downward groove is adapted to receive with clamping fit an upward tongue of an adjacent panel.

[0026] In an embodiment variant the upward flank and the downward flank extend in a substantially parallel direction. This makes it possible to connect the flanks, as well as the locking elements, relatively closely to each other in a coupled position, this generally enhancing the locking effect realized by the locking elements.

[0027] In another embodiment variant the first locking element comprises at least one outward bulge, and the second locking element comprises at least one recess, or vice versa, which outward bulge is adapted to be at least partially received in a recess of an adjacent coupled floor panel for the purpose of realizing a locked coupling. This embodiment variant is generally advantageous from a production engineering viewpoint. The first locking element and the second locking element preferably take a complementary form, whereby a form-fitting connection of the locking elements of adjacent floor panels to each other will be realized, this enhancing the effectiveness

of the locking. The fact that the first locking element preferably comprises a bulge obviously also means that the first locking element could be formed by a bulge, and the fact that the second locking element preferably comprises a recess obviously also means that the second locking element could be formed by a recess.

[0028] The third edge and the fourth edge are preferably integrally connected to the core. The same applies to the first and second edges, which are preferably also integrally connected to the core. From a structural, production engineering and logistics viewpoint this integral connection between the core and the edges to form a single piece panel is generally recommended.

[0029] In an embodiment variant the panel is manufactured at least partially from wood. The floor panel can herein form a wooden plank and/or a parquet floor panel. The panel according to the invention is however also exceptionally suitable for application as laminated floor panel, wherein the floor panel comprises a laminate of a balancing layer (backing layer), a core layer comprising a wood and/or plastic product and at least one top structure arranged on an upper side of the carrier layer. The top structure commonly comprises a decorative layer on top of which a transparent protective layer is applied. The top structure commonly comprises a multiple layers having different properties. A wood or tile structure can further be pressed into the protective layer, whereby the top layer in fact also forms an embossed layer. The decorative layer is generally formed by a photo of wood or of tiles printed on paper usually saturated in melamine resin. It is also possible these days to print a decorative pattern directly onto the core layer by using dedicated printing devices. The core layer generally comprises a wood fibreboard, in particular an MDF board (Medium Density Fibreboard) or HDF board (High Density Fibreboard). It is also possible to envisage the floor panel being manufactured wholly from metal and/or textile instead of being manufactured from wood and/or plastic. In a preferred embodiment variant the panel is manufactured at least partially from plastic, in particular thermoplastic, preferably polyvinylchloride (PVC). It is possible here to envisage the floor panel according to the invention being manufactured substantially wholly from plastic. Preferably, the core is made of a laminate of material layers, wherein a central layer is made of at least one thermoplastic material, wherein the core has a top surface and a bottom surface. Affixed to the top surface of the core is print layer, wherein the print has a top surface and a bottom surface. Also, an overlay layer can be affixed directly to the top surface of the core, or affixed to the top surface of the print layer. The panel can optionally contain an underlay layer located and affixed between the bottom surface of the print layer and the top surface of the core. In more detail, the core in the thermoplastic laminate panel preferably comprises at least one thermoplastic material, the at least one thermoplastic material being polyvinyl chloride. Generally, any combinations thereof, alloys thereof, or mixtures of two or more thermoplastics where-

in at least one thermoplastic material is polyvinyl chloride can be used to form the core, or at least a central layer thereof. Generally, such thermoplastic materials include, but are not limited to, vinyl containing thermoplastics such as polyvinyl acetate, polyvinyl alcohol, and other vinyl and vinylidene resins and copolymers thereof; polyethylenes such as low density polyethylenes and high density polyethylenes and copolymers thereof; styrenes such as ABS, SAN, and polystyrenes and copolymers thereof; polypropylene and copolymers thereof; saturated and unsaturated polyesters; acrylics; polyamides such as nylon containing types; engineering plastics such as acetyl, polycarbonate, polyimide, polysulfone, and polyphenylene oxide and sulphide resins and the like. One or more conductive polymers can be used to form the plank, which has applications in conductive flooring and the like. More preferably, the thermoplastic material is a rigid polyvinyl chloride but semi-rigid or flexible polyvinyl chloride may also be used. The flexibility of the thermoplastic material can be imparted by using at least one liquid or solid plasticizer which is preferably present in an amount of less than about 20 phr (parts per hundred parts of resin), and more preferably, less than 1 phr. A typical rigid PVC compound used in the present invention to form the core can also include, but is not limited to, pigments, impact modifiers, stabilizers, processing aids, lubricants, fillers, wood flours, other conventional additives, and the like.

[0030] The invention also relates to a covering, in particular a floor covering, consisting of mutually coupled panels consisting of mutually coupled floor panels according to the invention.

[0031] The invention further relates to a method of assembling interconnectable panels, in particular panels according to the invention, for forming a covering, comprising the steps of:

- A) providing a first panel,
- B) inserting a sideward tongue of a first edge of a second panel in an inclined position into a recess of a second edge of the first panel,
- C) angling down the second panel with respect to the first panel, until both panels are situated in the same plane,
- D) inserting a sideward tongue of a first edge of a third panel in an inclined position into a recess of a second edge of the first panel, and
- E) angling down the third panel with respect to the first and second panels, until the panels are situated in the same plane, wherein a downward tongue of a fourth edge of the third panel will zip into an upward groove of a third edge of the second panel, wherein an upward tongue of the third edge of the second panel will snap into a downward groove of the fourth edge of the third panel, leading to locking of third panel with respect to the first panel at the first and second edges and with respect to the second panel at the third and fourth edges in both horizontal direc-

tion and vertical direction.

[0032] Advantages and further aspects of the method according to the invention have been described above already in a comprehensive manner.

[0033] It will be apparent that the invention is not limited to the exemplary embodiments shown and described here, but that within the scope of the appended claims numerous variants are possible which will be self-evident to the skilled person in this field.

[0034] The invention will be elucidated on the basis of non-limitative exemplary embodiments shown in the following figures. Herein:

- Figure 1 shows a rectangular floor panel according to the present invention;
- Figure 2 is a cross-sectional view indicated by section A-A in Figure 1;
- Figure 3 is a cross-sectional view indicated by section B-B in Figure 1;
- Figures 4a-4f show different views of the successive steps for interconnecting multiple floor panels according to Figures 1-3 for forming a floor covering;
- Figures 5a-5e show different embodiments of the first and second edges of a floor panel according to the invention; and
- Figure 6 shows a different embodiment of the third and fourth edges of a floor panel according to the invention.

[0035] Figure 1 shows a rectangular floor panel 1 according to the present invention. The panel 1 is interconnectable with similar panels for forming a covering, as will be shown in further figures. The floor panel 1 can be made of any material, though typical materials are wood, in particular HDF, MDF, and LDF, and plastic, in particular thermoplastic, more in particular PVC. Commonly, the floor panel 1 is made of a laminate comprising a central layer (core layer) enclosed by a backing structure and a top structure (not shown). The top structure commonly comprises a decorative layer, which may be printed onto the central layer, on top of which a protective layer is applied. The panel 1 comprises a centrally located core 2 provided with an upper side 3 and a lower side 4. The core 2 is integrally connected with a first pair of opposite edges, in particular a first edge 5 and a complementary second edge 6, located at the long lateral sides of the panel 1. The core is also integrally connected with a second pair of opposite edges, in particular a third edge 7 and a complementary fourth edge 8, located at the short sides of the panel 1 in this exemplary embodiment.

[0036] Figure 2 is a cross-sectional view indicated by section A-A in Figure 1. In this cross-section, the shape of the complementary first edge 5 and second 6 edge are shown in detail. The first edge 5 comprises a sideward tongue 9 which is integrally connected to the core 2. By means of the vertical dashed line the border between the sideward tongue 9 and the core 2 is visualised. A front

region 9a of the sideward tongue 9 is provided with a rounded bottom surface 10. An outer end of the rounded bottom surface 10 adjoins an inclined locking surface 11. An opposite end of the rounded bottom surface 10 adjoins a bearing surface 12 making part of a back region 9b of the sideward tongue 9. The second edge 6 of the panel 1 comprises an upper lip 13 and a lower lip 14 defining a recess 15. Both lips 13, 14 are integrally connected to the core 2. By means of the vertical dashed line the border between the lips 13, 14 and the core is visualised. As shown in Figure 2, the width of the upper lip 13 is substantially smaller than the width of the lower lip 14. The recess 15 has a shape which is complementary to the shape of the sideward tongue 9. More in particular, a top surface 16 of a back region 14a of the lower lip 14 has a (complementary) rounded shape, configured to co-act with the rounded front region 9a of the sideward tongue 9, while a front region 14b of the lower lip 14 is provided with an upwardly protruding shoulder 17, configured to co-act with the bearing surface 12 of the sideward tongue 9. A lower surface 18 of the upper lip 13 is inclined and corresponds to the locking surface 11 of the sideward tongue 9. Locking at the first edge 5 and the second edge 6 of adjacent panels 1 by insertion of the sideward tongue 9 of a panel 1 to be coupled into the recess 15, wherein said panel 1 is initially held in an inclined position. After insertion of the sideward tongue 9 into the recess, the panel 1 to be coupled will be pivoted (angled) in downward direction about an axis parallel to the first edge 5 until both panels 1 are positioned in the same - commonly horizontal - plane, wherein the locking surface 11 of the sideward tongue 9 will engage the locking surface of the upper lip 18, and wherein at least a bottom front part is accommodated substantially form-fittingly in the recess 15, and wherein the bearing surface 12 is supported by the shoulder 17. Locking at the first edge 5 and the second edge 6 leads to locking of the connected panels 1 in both horizontal direction and vertical direction. The angling down locking principle of the first and second edges 5, 6 is a relatively easy locking principle which facilitates mutual coupling of panels at these edges 5, 6 tremendously. Further details relating to this locking mechanism are visualised in Figures 4 and 5.

[0037] Figure 3 is a cross-sectional view indicated by section B-B in Figure 1. In this cross-section, the shape of the complementary third edge 7 and second 8 edge are shown in detail. The third edge 7 comprises an upward tongue 19, an upward flank 20 and an upward groove 21 formed between upward tongue 19 and upward flank 20. The upward tongue 19 is connected to the core 2 by means of a bridge 22, which is preferably resilient to some extent. A side 19a of upward tongue 19 facing toward upward flank 20 extends in the direction of the normal N_1 of the upper side 3 of the core 2. The tangent R_1 and the normal N_1 of the upper side 3 of the core 2 are thus directed toward each other (converging orientation), wherein the angle enclosed by R_1 and N_1 is preferably between 0 and 10 degrees in this exemplary

embodiment. Due to the converging orientation of the upward flank 20 and the side 19a of the upward tongue 19 facing toward to the upward flank 20, the upward groove 22 is a closed groove, which is only accessible to a complementary counterpart by deformation of the upward tongue 19 and/or bridge 22. Another side 19b of upward tongue 19 facing toward upward flank 20 forms an aligning edge enabling facilitated realization of a coupling to an adjacent floor panel 1. As shown, this side 19b functioning as aligning edge is directed away from the normal N_1 of upper side 3 of the core 2. An upper side 19d of upward tongue 19 does however extend in the direction of the normal N_1 of the upper side 3 of the core 2, and runs inclining downward in the direction of the side 19e of upward tongue 19 facing away from upward flank 20. This chamfering provides the option of giving the complementary fourth edge 8 a more robust and therefore stronger form. A part of the side 19e of upward tongue 19 facing away from upward flank 20 is oriented substantially vertically and is moreover provided with an outward bulge 23. A lower part 20a of upward flank 20 is oriented diagonally, while an upper part 20b of upward flank 20 is shown to be substantially vertical and forms a stop surface for fourth edge 8. In between the inclined part 20a and the substantially vertical part 20b of the upward flank an additional coupling element, in particular an additional bulge 24, is provided. A lower wall part 21a of upward groove 21 is oriented substantially horizontally in this exemplary embodiment.

The fourth edge 8 is substantially complementary to third edge 7. The fourth edge 8 comprises a downward tongue 25, a downward flank 26 and a downward groove 27 formed between downward tongue 25 and downward flank 26. The downward tongue 25 is connected to the core 2 by means of a bridge 28, which is preferably resilient to some extent. A side 25a of downward tongue 25 facing toward downward flank 26 lies in the direction of the normal N_2 of the lower side 4 of the core 2. This means that a tangent R_2 of side 25a of downward tongue 25 and the normal of the lower side 4 of the core 2 are mutually converging, wherein the angle enclosed by R_2 and N_2 is preferably between 0 and 10 degrees in this exemplary embodiment. More preferably, the inclination of R_1 is identical to the inclination of R_2 ; hence, R_1 and R_2 are preferably parallel. Due to the converging orientation of the downward flank 26 and the side 25a of the downward tongue 25 facing toward to the downward flank 26, the downward groove 27 is a closed groove, which is only accessible for the upward tongue 19 of an adjacent panel 1 by deformation of the downward tongue 25 and/or bridge 28, as a result of which the entrance of the downward groove can be widened (temporary).

A side 25b of the downward tongue 25 facing away from downward flank 26 is diagonally oriented, but has a flatter orientation than the complementary side 20a of upward flank 20, whereby a gap (air space) will be formed in the coupled position, which will generally facilitate coupling between two floor panels 1. The inclining side 25b of

downward tongue 25 also functions as aligning edge for the purpose of further facilitating coupling between two floor panels 1. Another side 25c facing away from downward flank 26 takes a substantially vertical form, though is provided with a small cavity 29 configured to co-act with the additional bulge 24 of another panel 1. A top part of the side 25c facing away from downward flank 26 forms a complementary stop surface for stop surface 20b of upward flank 20 (of an adjacent floor panel). Downward flank 26 is oriented substantially vertically and is provided with a recess 30 adapted to receive the outward bulge 23 of the upward tongue 19 (of an adjacent floor panel).

[0038] Figures 4a-4f show different views of the successive steps for interconnecting multiple floor panels 1 according to Figures 1-3 for forming a floor covering 31. Figures 4a and 4b relate to the first step of the installation process, wherein a first row of floor panels 1 is generated by connecting the third edge 7 of a panel 1 to the fourth edge 8 of an adjacent panel, by pressing - in a substantially vertical direction (as indicated by the arrow) - the fourth edge 8 of a panel 1 to be coupled onto and into the third edge 7 of an already installed panel 1. Due to the vertical displacement, the third edge 7 and/or the fourth edge 8 will be deformed slightly, such that the downward tongue 25 will be pushed into the upward groove 21, and the upward tongue 19 will be pushed into the downward groove 27. Moreover, the bulges 23, 24 will be positioned in the corresponding recesses 29, 30 to better secure the floor panels 1 with respect to each other. Due to this temporary deformation, wherein both the upward groove 21 and the downward groove 27 will be widened temporary for the insertion of the downward tongue 25 and the upward tongue 19 respectively, both edges 7, 8 will snap into each other. Figures 4c and 4d relate to the second step of the installation process, wherein a second row of floor panels 1 is created which is connected to the first row of floor panels. To this end, a first edge 5 of a floor panel 1 to be coupled is positioned in an inclined orientation against a second edge 6 of an already installed panel 1, such that the sideward tongue 9 is at least partially inserted in the complementary recess 15 of the second profile 6. After this partial insertion the inclined panel is pivoted (angled) down - see arrow - around an axis parallel to the first edge 5, until the panel 1 is located in the same plane as defined by the first row of panels, as a result of which the sideward tongue 9 will be locked into the recess 15 both in at least one horizontal direction and in vertical direction.

The first two steps as shown in Figures 4a-4d are preparatory steps for installation of one or more subsequent panels 1 which are to be coupled at multiple edges instead of only at a single edge. Installation of a subsequent floor panel 1 is visualised in Figures 4e and 4f. Again, a floor panel 1 to be coupled is held at inclined position, wherein the sideward tongue 9 of the floor panel 1 is inserted partially into the corresponding recess 15 of a second edge of at least one floor panel already installed. The fourth edge 8 of the floor panel 1 to be installed is

positioned substantially above the third edge 7 of the panel 1 already installed in the second row, wherein the fourth edge 8 and the third edge 7 mutually enclose an angle (being the inclination angle of the panel to be coupled). During angling down of the panel 1 to be coupled (see arrow) both the first edge 5 and the fourth edge 8 of the panel 1 will be connected to adjacent panels 1. More in particular, during angling down of the panel 1, the front region of the sideward tongue 9 will be accommodated in the recess 15, and will be held in position by means of the limiting shoulder 17 and the limiting locking surface 18 of the upper lip 13 of the second edge 6 of the panel(s) already installed in the first row. Moreover, simultaneously the fourth edge 8 of the panel 1 to be coupled will make a downward scissoring movement with respect to the underlying third edge 7 and will zip (snap) into the third edge 7 and vice versa, leading to a firm and durable connection between the panels 1.

[0039] Figures 5a-5e show different embodiments of the first and second edges of a floor panel according to the invention. In Figure 5a the embodiment according to Figures 1-4f is shown, while in Figures 5b-5e alternative embodiments of these edges are shown. More in particular,

[0040] Figure 5b shows a first and second edge 40, 41 of a floor panel 42, wherein, instead of a smoothly rounded bottom portion a more hooked (segmented rounded) bottom portion is shown. In Figure 5c, an embodiment of a floor panel 43 is shown which is almost identical to the floor panel shown in Figure 5a, though wherein the first and second edges 44, 45 are provided with horizontal locking surfaces 44a, 45b instead of inclined locking surfaces. In Figure 5d, an alternative embodiment of a floor panel 46 is shown, wherein the first and second edges 47, 48 are shaped such that a bottom contact portion between the two edges 47, 48 is partially smoothly rounded and partially discontinuously rounded (segmented rounded). Locking surfaces 50, 51 of a sideward tongue 49 of the first edge 47 and of an upper lip 52 of the second edge have a substantially horizontal orientation. In Figure 5e, an embodiment of a floor panel 53 almost identical to the floor panel 46 as shown in Figure 5d is shown, with the difference that a front bottom part 54a of a sideward tongue 54 is not smoothly rounded, but flat giving a bottom portion of the sideward tongue 54 as such a segmented rounded (hooked) shape.

[0041] Figure 6 shows a different embodiment of the third and fourth edges of a floor panel 57 according to the invention. Floor panel 57 comprises a core 58 provided with an upper side 58a and a lower side 58b, and coupling parts 59, 60 positioned on opposite longitudinal sides of core 58 and connected integrally to core 58. A first coupling part 59 comprises an upward tongue 61, an upward flank 62 and an upward groove 63 formed between upward tongue 61 and upward flank 62. A side 61a of upward tongue 61 facing toward upward flank 62 is inclined and extends in the direction of the normal N1 of the upper side 58a of core 58. The tangent R1 and the

normal N1 of upper side 58a of core 58 are thus directed toward each other (converging orientation), wherein the angle enclosed by R1 and N1 amounts to 3-5 degrees. On top of side 61a, a substantially flat upward aligning edge 61b of the upward tongue 61 is positioned, which faces toward upward flank 62 and which enables facilitated realization of a coupling to an adjacent floor panel. The inclined surface 61a, acting as locking surface, and the adjoining upward aligning edge 61b together form the inner side surface of the upward tongue 61. As shown, this side 61b functioning as upward aligning edge is substantially flat and, moreover, directed away from the normal N1 of upper side 58a of the core. A (single) upper side 61d of upward tongue 61 does however extend in the direction of the normal N1 of upper side 58a of core 58, and runs inclining downward in the direction of the side 61e of upward tongue 61 facing away from upward flank 62. The angle of inclination is about 30 degrees. This chamfering provides the option of giving the complementary second coupling part 60 a more robust and therefore stronger form, as will be elucidated below. The side 61e of upward tongue 61 facing away from upward flank 62 is oriented substantially vertically and is moreover provided with an outward bulge 64 which clearly extends with respect to vertically oriented parts of the outer side wall 61 of the upward tongue 59. A lower part 62a of upward flank 62 is oriented diagonally, while an upper part 62b of upward flank 62 is shown to be substantially vertical and forms a stop surface for second coupling part 60. A lower wall part 63a of upward groove 43 is oriented substantially horizontally in this exemplary embodiment. A bridge 65 lying between lower wall part 63a of upward groove 63 and a lower side 59a has a somewhat elastic nature and is adapted to allow upward tongue 61 to slightly pivot relative to upward flank 62, this resulting in a (temporary) widening of upward groove 63, whereby coupling of floor panel 57 to an adjacent floor panel can be facilitated. Second coupling part 60 is substantially complementary to first coupling part 59. Second coupling part 60 comprises a downward tongue 66, a downward flank 67 and a downward groove 68 formed between downward tongue 66 and downward flank 67. A side 66a of downward tongue 66 facing toward downward flank 67 is inclined and extends in the direction of the normal N2 of the lower side 58b of core 58. This means that a tangent R2 of side 66a of downward tongue 66 and the normal of the lower side 58b of core 58 are mutually converging. In this exemplary embodiment the tangent R2 and the normal N2 enclose a mutual angle of 3-5 degrees. A side 66b facing away from downward flank 67 is diagonally oriented, but has a flatter orientation than the complementary side 62a of upward flank 62, whereby a gap (air space) will be formed in the coupled position, which will generally facilitate coupling between two floor panels 57. The inclining side 66b of downward tongue 66 also functions as aligning edge for the purpose of further facilitating coupling between two floor panels 57. Another side 66c facing away from downward flank

67 takes a substantially vertical form and forms a complementary stop surface for stop surface 62b of upward flank 62 (of an adjacent floor panel). Downward tongue 66 is further provided with a small aligning edge 66d which is facing toward downward flank 67. Because upper side 61d of upward tongue 61 has an inclining orientation, an upper side 68a of downward groove 68 likewise can be given, and in this embodiment has, a corresponding inclining orientation, whereby the (average) distance between upper side 68a of downward groove 68 and an upper side 60a of second coupling part 60 is sufficiently large to impart sufficient strength to second coupling part 60 as such. Downward flank 67 is oriented substantially vertically and is provided with a recess 69 adapted to receive the outward bulge 64 of upward tongue 61 (of an adjacent floor panel).

[0042] A bridge 70 lying between upper side 68a of downward groove 68 and upper side 60a has a somewhat elastic nature due its reduced thickness close to the downward tongue 66 (and possibly also due to material characteristics), and is adapted to allow downward tongue 66 to slightly pivot relative to downward flank 67, this resulting in a (temporary) widening of downward groove 68, whereby coupling of floor panel 67 to an adjacent floor panel can be facilitated. This pivoting point (point of deformation) is typically formed by the weakest point in the bridge 70, which is indicated by the sign "P". The shown floor panel 67 can form a parquet floor panel, a plank, a laminated floor panel and/or a plastic floor panel. The coupling parts 59, 60 and the core 58 are preferably integrally connected.

[0043] This summary is meant to provide an introduction to the concepts that are disclosed within the specification without being an exhaustive list of the many teachings and variations upon those teachings that are provided in the extended discussion within this disclosure. Thus, the contents of this summary should not be used to limit the scope of the claims that follow.

[0044] Inventive concepts are illustrated in a series of examples, some examples showing more than one inventive concept. Individual inventive concepts can be implemented without implementing all details provided in a particular example. It is not necessary to provide examples of every possible combination of the inventive concepts provide below as one of skill in the art will recognize that inventive concepts illustrated in various examples can be combined together in order to address a specific application.

[0045] Other panel constructions, assembling methods, features and advantages of the disclosed teachings will be or will become apparent to one with skill in the art upon examination of the following figures and detailed description. It is intended that all such additional panel constructions, assembling methods, features and advantages be included within the scope of and be protected by the accompanying claims.

Claims

1. Panel (1, 42, 43, 46, 53, 57), in particular a floor panel (1, 42, 43, 46, 53, 57), interconnectable with similar panels (1, 42, 43, 46, 53, 57) for forming a covering, comprising:

- a centrally located core (2, 58) provided with an upper side (3, 58a) and a lower side (4, 58b), said core (2, 58) being provided with:

◦ a first pair of opposite edges (5, 6, 40, 41, 44, 45, 47, 48), comprising:

▪ a first edge (5, 40, 44, 47) comprising a sideward tongue (9, 49, 54) extending in a direction substantially parallel to the upper side (3, 58a) of the panel (1, 42, 43, 46, 53, 57), the bottom front region of said sideward tongue (9, 49, 54) being rounded at least partly, the bottom back region of said tongue being configured as bearing region (12), wherein the bottom back region is located closer to the level of the upper side (3, 58a) of the panel (1, 42, 43, 46, 53, 57) than a lowest part of the bottom front region,

▪ an opposite, second edge (6, 41, 45, 48) comprising a recess (15) for accommodating at least a part of the sideward tongue (9, 49, 54) of a further panel (1, 42, 43, 46, 53, 57), said recess (15) being defined by an upper lip (13, 52) and a lower lip (14), said lower lip (14) being provided with a upwardly protruding shoulder (17) for supporting the bearing region (12) of the sideward tongue (9, 49, 54),

▪ the sideward tongue (9, 49, 54) being designed such that locking takes place by an introduction movement into the recess (15) of the sideward tongue (9, 49, 54) of a further panel (1, 42, 43, 46, 53, 57) and a angling down movement about an axis parallel to the first edge (5, 40, 44, 47), as a result of which a top side of the sideward tongue (9, 49, 54) will engage the upper lip (13, 52) and the bearing region (12) of the sideward tongue (9, 49, 54) will be supported by and/or facing the shoulder (17) of the lower lip (14), leading to locking of adjacent panels at the first (5, 40, 44, 47) and second (6, 41, 45, 48) edges in both horizontal direction and vertical direction; and

o a second pair of opposite edges (7, 8), comprising:

- a third edge (7) comprising a single upward tongue (19, 61), at least one upward flank (20, 62) lying at a distance from the upward tongue (19, 61) and a single upward groove (21, 63) formed between the upward tongue (19, 61) and the upward flank (20, 62), and wherein at least a part of a side (19e, 61 e) of the upward tongue (19, 61) facing away from the upward flank (20, 62) comprises a substantially rigid first locking element (23, 64), and
- a fourth edge (8) comprising a single downward tongue (25, 66), at least one downward flank (26, 67) lying at a distance from the downward tongue (25, 66), and a single downward groove (27, 68) formed between the downward tongue (25, 66) and the downward flank (26, 67), and wherein the downward flank (26, 67) comprises a, preferably substantially rigid, second locking element (30, 69) adapted for co-action with the first locking element (23, 64) of a third edge (7) of yet a further panel (1, 42, 43, 46, 53, 57),
- the third (7) and fourth (8) edges being designed such that locking takes place during angling down of a panel (1, 42, 43, 46, 53, 57) to be coupled at a first edge (5, 40, 44, 47) to a second edge (6, 41, 45, 48) of a further panel (1, 42, 43, 46, 53, 57), wherein the fourth edge (8) of a panel (1, 42, 43, 46, 53, 57) to be coupled makes a scissoring movement toward a third edge (7) of yet another panel (1, 42, 43, 46, 53, 57), such that the downward tongue (25, 66) of the fourth edge (8) of the panel (1, 42, 43, 46, 53, 57) to be coupled will be forced into the upward groove (21, 63) of the third edge (7) of said other panel (1, 42, 43, 46, 53, 57) and the upward tongue (19, 61) of said other panel (1, 42, 43, 46, 53, 57) will be forced into the downward groove (27, 68) of the panel (1, 42, 43, 46, 53, 57) to be coupled, by deformation of the third edge (7) and/or the fourth edge (8), leading to locking of adjacent panels (1, 42, 43, 46, 53, 57) at the third (7) and fourth (8) edges in both horizontal direction and vertical direction,
- **characterized in that** at least a part of a side (19a, 61a) of the upward

tongue (19, 61) facing toward the upward flank (20, 62) is inclined toward the upward flank (20, 62), and

- **in that** at least a part of a side (25a) of the downward tongue (25, 66) facing toward the downward flank (26, 67) is inclined toward the downward flank (26, 67).
2. Panel (1, 42, 43, 46, 53, 57) according to one of the foregoing claims, wherein a side of the shoulder (17) facing the core (2, 58) has an inclined orientation for forcing two panels (1, 42, 43, 46, 53, 57), in an assembled state, toward each other.
 3. Panel (1, 42, 43, 46, 53, 57) according to one of the foregoing claims, wherein the panel (1, 42, 43, 46, 53, 57) has a substantially rectangular shape, wherein the first pair of opposite edges (5, 6, 40, 41, 44, 45, 47, 48) are located on the long sides of the panel (1, 42, 43, 46, 53, 57), and the second pair of opposite edges (7, 8) are located on the short sides of the panel (1, 42, 43, 46, 53, 57).
 4. Panel (1, 42, 43, 46, 53, 57) according to one of the foregoing claims, wherein at least a part of a side (19b) of the upward tongue (19, 61) facing toward the upward flank (20, 62) forms an upward aligning edge (19b) for the purpose of coupling the third edge (7) to a fourth edge (8) of an adjacent panel (1, 42, 43, 46, 53, 57) and/or wherein at least a part of a side (25b) of the downward tongue (25, 66) facing away from the downward flank (26, 67) forms an inclined downward aligning edge (25b) for the purpose of coupling the fourth edge (8) to a third edge (7) of an adjacent panel (1, 42, 43, 46, 53, 57).
 5. Panel (1, 42, 43, 46, 53, 57) according to one of the foregoing claims, wherein each of the upward tongue (19, 61) and the downward tongue (25, 66) is substantially rigid and/or substantially solid.
 6. Panel (1, 42, 43, 46, 53, 57) according to one of the foregoing claims, wherein at least a part of the upward flank (20, 62) adjoining the upper side (3, 58a) of the panel (1, 42, 43, 46, 53, 57) is adapted to make contact with at least a part of the downward tongue (25, 66) adjoining the upper side (3, 58a) of another panel (1, 42, 43, 46, 53, 57) in an assembled state.
 7. Panel (1, 42, 43, 46, 53, 57) according to one of the foregoing claims, wherein the upper side (3, 58a) of the panel (1, 42, 43, 46, 53, 57) is adapted to engage substantially seamless to the upper side (3, 58a) of another panel (1, 42, 43, 46, 53, 57).
 8. Panel (1, 42, 43, 46, 53, 57) according to one of the foregoing claims, wherein the first locking element

(23, 64) is positioned at a distance from an upper side of the upward tongue (19, 61) and/or wherein the first locking element (23, 64) is positioned at a distance from an lower side of the upward tongue (19, 61).

9. Panel (1, 42, 43, 46, 53, 57) according to one of the foregoing claims, wherein the second locking element (30, 69) is positioned at a distance from an upper side of the downward groove (27, 68) and/or wherein the second locking element (30, 69) is positioned at a distance from an lower side of the downward groove (27, 68).
10. Panel (1, 42, 43, 46, 53, 57) according to one of the foregoing claims, wherein the angle enclosed by on the one hand the direction in which at least a part of a side (19a, 61a) of the upward tongue (19, 61) facing toward the upward flank (20, 62) extends and on the other the normal (N₁) of the upper side (3, 58a) of the core (2, 58) lies between 0 and 60 degrees, in particular between 0 and 45 degrees and/or wherein the angle enclosed by on the one hand the direction in which at least a part of a side (25a) of the downward tongue (25, 66) facing toward the downward flank (26, 67) extends and on the other the normal (N₂) of the lower side (4, 58b) of the core lies between 0 and 60 degrees, in particular between 0 and 45 degrees.
11. Panel (1, 42, 43, 46, 53, 57) according to one of the foregoing claims, wherein at least a part of an upper side (19d, 61d) of the upward tongue (19, 61) runs inclining downward in the direction of the side (19e) of the upward tongue (19, 61) facing away from upward flank (20, 62), and wherein an upper side (68a) of the downward groove (27, 68) having a likewise inclining orientation upward in the direction of the side (25a) of the downward tongue (25, 66) facing towards to downward flank (26, 67).
12. Panel (1, 42, 43, 46, 53, 57) according to one of the foregoing claims, wherein at least a part of the aligning edge (66b) of the fourth edge (8) has a substantially flatter orientation than at least a part of the upward flank (20, 62) of the third edge (7).
13. Panel (1, 42, 43, 46, 53, 57) according to one of the foregoing claims, wherein a part of the upward flank (20, 62) of the third edge (7) connecting to the core (2, 58) forms a stop surface (20b) for at least a part of the side of the downward tongue (25, 66) facing away from the downward flank (26, 67).
14. Panel (1, 42, 43, 46, 53, 57) according to one of the foregoing claims, wherein a part of the upward flank (20, 62) of the third edge (7) connecting to the core (2, 58) is oriented substantially vertically and/or

wherein at least a part of the side of the downward tongue (25, 66) facing away from the downward flank (26, 67) is oriented substantially vertically.

15. Panel (1, 42, 43, 46, 53, 57) according to one of the foregoing claims, wherein the upward groove (21, 63) is given a form such that this upward groove (21, 63) is adapted for receiving in locked manner at least a part of a downward tongue (25, 66) of an adjacent panel (1, 42, 43, 46, 53, 57) wherein the upward groove (21, 63) is preferably adapted to receive with clamping fit a downward tongue (25, 66) of an adjacent panel (1, 42, 43, 46, 53, 57) and wherein the downward groove (27, 68) is preferably adapted to receive with clamping fit an upward tongue (19, 61) of an adjacent panel (1, 42, 43, 46, 53, 57).
16. Panel (1, 42, 43, 46, 53, 57) according to one of the foregoing claims, wherein the upward flank (20, 62) and the downward flank (26, 67) extend in a substantially parallel direction.
17. Panel (1, 42, 43, 46, 53, 57) according to one of the foregoing claims, wherein the first locking element (23, 64) comprises at least one outward bulge (23, 64), and that the second locking element (30, 69) comprises at least one recess (30, 69), which outward bulge (23, 64) is adapted to be at least partially received in a recess (30, 69) of an adjacent coupled panel (1, 42, 43, 46, 53, 57) for the purpose of realizing a locked coupling.
18. Panel according to one of the foregoing claims, wherein the second locking element (30, 69) comprises at least one outward bulge, and that the first locking element (23, 64) comprises at least one recess, which outward bulge is adapted to be at least partially received in a recess of an adjacent coupled panel (1, 42, 43, 46, 53, 57) for the purpose of realizing a locked coupling.
19. Panel (1, 42, 43, 46, 53, 57) according to one of the foregoing claims, wherein a side (25c) of the downward tongue (25, 66) facing away from the downward flank (26, 67) is provided with a third locking element (24), and wherein the upward flank (20, 62) is provided with a fourth locking element (29), said third locking element (24) being adapted to cooperate with a fourth locking element (29) of another panel (1, 42, 43, 46, 53, 57).
20. Panel (1, 42, 43, 46, 53, 57) according to one of the foregoing claims, wherein the edges (5, 6, 7, 8) are integrally connected to the core (2, 58).
21. Panel (1, 42, 43, 46, 53, 57) according to one of the foregoing claims, wherein the panel (1, 42, 43, 46, 53, 57) is manufactured at least partially from wood

and/or from plastic, in particular a thermoplastic, preferably polyvinylchloride (PVC).

22. Panel (1, 42, 43, 46, 53, 57) according to one of the foregoing claims, wherein the panel (1, 42, 43, 46, 53, 57) comprises a laminate of a balancing layer, a core layer, and a top structure arranged on top of the core layer wherein the top structure preferably comprises a decorative layer and a protective layer arranged on top of said decorative layer.

23. Panel (1, 42, 43, 46, 53, 57) according to one of the foregoing claims, wherein the first locking element (23, 64) is positioned at a lower level than the upward aligning edge (19b, 61b) of the upward tongue (19, 61).

24. Covering, in particular a floor covering, consisting of mutually coupled panels (1, 42, 43, 46, 53, 57) as claimed in any of the foregoing claims.

25. Method of assembling interconnectable panels (1, 42, 43, 46, 53, 57) as claimed in any of the claims 1-23, for forming a covering, comprising the steps of:

A) providing a first panel (1, 42, 43, 46, 53, 57),
B) inserting a sideward tongue (9, 49, 54) of a first edge (5, 40, 44, 47) of a second panel (1, 42, 43, 46, 53, 57) in an inclined position into a recess (15) of a second edge (6, 41, 45, 48) of the first panel (1, 42, 43, 46, 53, 57),

C) angling down the second panel (1, 42, 43, 46, 53, 57) with respect to the first panel (1, 42, 43, 46, 53, 57), until both panels (1, 42, 43, 46, 53, 57) are situated in the same plane,

D) inserting a sideward tongue (9, 49, 54) of a first edge (5, 40, 44, 47) of a third panel (1, 42, 43, 46, 53, 57) in an inclined position into a recess (15) of a second edge (6, 41, 45, 48) of the first panel (1, 42, 43, 46, 53, 57), and

E) angling down the third panel (1, 42, 43, 46, 53, 57) with respect to the first and second panels (1, 42, 43, 46, 53, 57), until the panels (1, 42, 43, 46, 53, 57) are situated in the same plane, wherein a downward tongue (25, 66) of a fourth edge (8) of the third panel (1, 42, 43, 46, 53, 57) will zip into an upward groove (21, 63) of a third edge (7) of the second panel (1, 42, 43, 46, 53, 57), and wherein an upward tongue (19, 61) of the third edge (7) of the second panel (1, 42, 43, 46, 53, 57) will snap into a downward groove (27, 68) of the fourth edge (8) of the third panel (1, 42, 43, 46, 53, 57), leading to locking of third panel (1, 42, 43, 46, 53, 57) with respect to the first panel (1, 42, 43, 46, 53, 57) at the first and second edges (5, 6, 40, 41, 44, 45, 47, 48) and with respect to the second panel (1, 42, 43, 46, 53, 57) at the third and fourth

edges (5, 6, 40, 41, 44, 45, 47, 48) in both horizontal direction and vertical direction.

5 Patentansprüche

1. Paneel (1, 42, 43, 46, 53, 57), insbesondere Bodenpaneel (1, 42, 43, 46, 53, 57), das zur Bildung eines Belags mit ähnlichen Paneelen (1, 42, 43, 46, 53, 57) verbindbar ist, umfassend:

- einen mittig positionierten Kern (2, 58), der mit einer Oberseite (3, 58a) und einer Unterseite (4, 58b) versehen ist, wobei der Kern (2, 58) mit Folgendem versehen ist:

- einem ersten Paar einander gegenüberliegenden Ränder (5, 6, 40, 41, 44, 45, 47, 48), umfassend:

- einen ersten Rand (5, 40, 44, 47), der eine seitliche Zunge (9, 49, 54) umfasst, die sich in einer im Wesentlichen parallel zur Oberseite (3, 58a) des Paneels (1, 42, 43, 46, 53, 57) verlaufenden Richtung erstreckt, wobei der untere Vorderbereich der seitlichen Zunge (9, 49, 54) zumindest teilweise abgerundet ist, wobei der untere Hinterbereich der Zunge als Lagerbereich (12) konfiguriert ist, wobei der untere Hinterbereich näher zur Höhe der Oberseite (3, 58a) des Paneels (1, 42, 43, 46, 53, 57) positioniert ist als ein unterster Teil des unteren Vorderbereichs,

- einen gegenüberliegenden, zweiten Rand (6, 41, 45, 48), der eine Aussparung (15) zur Aufnahme mindestens eines Teils der seitlichen Zunge (9, 49, 54) eines weiteren Paneels (1, 42, 43, 46, 53, 57) umfasst, wobei die Aussparung (15) durch eine obere Lippe (13, 52) und eine untere Lippe (14) definiert wird, wobei die untere Lippe (14) mit einer nach oben ragenden Schulter (17) zur Abstützung des Lagerbereichs (12) der seitlichen Zunge (9, 49, 54) versehen ist,

- wobei die seitliche Zunge (9, 49, 54) so ausgeführt ist, dass durch eine Einführungsbewegung der seitlichen Zunge (9, 49, 54) eines weiteren Paneels (1, 42, 43, 46, 53, 57) in die Aussparung (15) und eine winkelförmige Abwärtsbewegung um eine parallel zum ersten Rand (5, 40, 44, 47) verlaufende Achse, wodurch eine Oberseite der seitlichen Zunge (9, 49, 54) die obere Lippe (13, 52) in Eingriff nimmt und der Lagerbereich (12) der seitlichen Zunge (9, 49, 54) durch die Schulter (17) der unteren Lippe (14) gestützt wird und/oder ihr zugekehrt ist, was zu einem Verriegeln benachbarter

Paneele am ersten (5, 40, 44, 47) und zweiten (6, 41, 45, 48) Rand sowohl in horizontaler Richtung als auch in vertikaler Richtung führt, eine Verriegelung erfolgt; und
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 - einem zweiten Paar einander gegenüberliegender Ränder (7, 8), umfassend:
 - einen dritten Rand (7), der eine einzige nach oben verlaufende Zunge (19, 61), mindestens eine nach oben verlaufende Flanke (20, 62), die in einem Abstand von der nach oben verlaufenden Zunge (19, 61) liegt, und eine einzige nach oben verlaufende Nut (21, 63), die zwischen der nach oben verlaufenden Zunge (19, 61) und der nach oben verlaufenden Flanke (20, 62) ausgebildet ist, umfasst, und wobei mindestens ein Teil einer Seite (19e, 61e) der nach oben verlaufenden Zunge (19, 61), der von der nach oben verlaufenden Flanke (20, 62) weg weist, ein im Wesentlichen starres erstes Verriegelungselement (23, 64) umfasst, und
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 - einen vierten Rand (8), der eine einzige nach unten verlaufende Zunge (25, 66), mindestens eine nach unten verlaufende Flanke (26, 67), die in einem Abstand von der nach unten verlaufenden Zunge (25, 66) liegt, und eine einzige nach unten verlaufende Nut (27, 68), die zwischen der nach unten verlaufenden Zunge (25, 66) und der nach unten verlaufenden Flanke (26, 67) ausgebildet ist, umfasst, und wobei die nach unten verlaufende Flanke (26, 67) ein vorzugsweise im Wesentlichen starres zweites Verriegelungselement (30, 69) umfasst, das zum Zusammenwirken mit dem ersten Verriegelungselement (23, 64) eines dritten Rands (7) noch eines weiteren Paneels (1, 42, 43, 46, 53, 57) ausgeführt ist,
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 - einen dritten (7) und vierten (8) Rand, die so ausgeführt sind, dass während des Abwinkeln eines an einem ersten Rand (5, 40, 44, 47) an einen zweiten Rand (6, 41, 45, 48) eines weiteren Paneels (1, 42, 43, 46, 53, 57) zu koppelnden Paneels (1, 42, 43, 46, 53, 57) eine Verriegelung erfolgt, wobei der vierte Rand (8) eines zu koppelnden Paneels (1, 42, 43, 46, 53, 57) eine Scherbewegung zu einem dritten Rand (7) noch eines anderen Paneels (1, 42, 43, 46, 53, 57) durchführt, so dass die nach unten verlaufende Zunge (25, 66) des vierten Rands (8) des zu koppelnden Paneels (1, 42, 43, 46, 53, 57) in die nach oben verlaufende Nut (21, 63) des dritten Rands (7) des anderen Paneels (1, 42, 43, 46, 53, 57) ge-
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zwungen wird und die nach oben verlaufende Zunge (19, 61) des anderen Paneels (1, 42, 43, 46, 53, 57) in die nach unten verlaufende Nut (27, 68) des zu koppelnden Paneels (1, 42, 43, 46, 53, 57) gezwungen wird, was auf Verformung des dritten Rands (7) und/oder des vierten Rands (8) zurückzuführen ist, was zu einer Verriegelung benachbarter Paneele (1, 42, 43, 46, 53, 57) am dritten (7) und vierten (8) Rand sowohl in horizontaler als auch in vertikaler Richtung führt,
 - **dadurch gekennzeichnet, dass** mindestens ein Teil einer Seite (19a, 61a) der nach oben verlaufenden Zunge (19, 61), der zu der nach oben verlaufenden Flanke (20, 62) weist, zu der nach oben verlaufenden Flanke (20, 62) geneigt ist und sich in Richtung der Normalen (N_1) der Oberseite (3, 58a) des Kerns (2, 58) erstreckt, und
 - dass mindestens ein Teil einer Seite (25a) der nach unten verlaufenden Zunge (25, 66), der zu der nach unten verlaufenden Flanke (26, 67) weist, zu der nach unten verlaufenden Flanke (26, 67) geneigt ist und sich in Richtung der Normalen (N_2) der Unterseite (4, 58b) des Kerns (2, 58) erstreckt.

2. Paneel (1, 42, 43, 46, 53, 57) nach einem der vorhergehenden Ansprüche, wobei eine Seite der Schulter (17), die zu dem Kern (2, 58) weist, eine geneigte Ausrichtung zum Zueinanderzwingen von zwei Paneelen (1, 42, 43, 46, 53, 57) in einem zusammengefügt Zustand aufweist.
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3. Paneel (1, 42, 43, 46, 53, 57) nach einem der vorhergehenden Ansprüche, wobei das Paneel (1, 42, 43, 46, 53, 57) eine im Wesentlichen rechteckige Form hat, wobei das erste Paar einander gegenüberliegender Ränder (5, 6, 40, 41, 44, 45, 47, 48) an den Längsseiten des Paneels (1, 42, 43, 46, 53, 57) positioniert ist und das zweite Paar einander gegenüberliegender Ränder (7, 8) an den kurzen Seiten des Paneels (1, 42, 43, 46, 53, 57) positioniert ist.
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4. Paneel (1, 42, 43, 46, 53, 57) nach einem der vorhergehenden Ansprüche, wobei mindestens ein Teil einer Seite (19b) der nach oben verlaufenden Zunge (19, 61), der zu der nach oben verlaufenden Flanke (20, 62) weist, zum Koppeln des dritten Rands (7) an einen vierten Rand (8) eines benachbarten Paneels (1, 42, 43, 46, 53, 57) einen nach oben verlaufenden Ausrichtungsrand (19b) bildet und/oder wobei mindestens ein Teil einer Seite (25b) der nach unten verlaufenden Zunge (25, 66), der von der nach unten verlaufenden Flanke (26, 67) weg weist, zum Koppeln des vierten Rands (8) an einen dritten Rand (7) eines benachbarten Paneels (1, 42, 43, 46, 53, 57) einen nach unten verlaufenden Ausrichtungsrand (25b) bildet.
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57) einen geneigten nach unten verlaufenden Ausrichtungsrand (25b) bildet.

5. Paneel (1, 42, 43, 46, 53, 57) nach einem der vorhergehenden Ansprüche, wobei sowohl die nach oben verlaufende Zunge (19, 61) als auch die nach unten verlaufende Zunge (25, 66) im Wesentlichen starr und/oder im Wesentlichen massiv sind.
6. Paneel (1, 42, 43, 46, 53, 57) nach einem der vorhergehenden Ansprüche, wobei mindestens ein Teil der nach oben verlaufenden Flanke (20, 62), der an der Oberseite (3, 58a) des Paneels (1, 42, 43, 46, 53, 57) angrenzt, dazu ausgeführt ist, in einem zusammengefügt Zustand mit mindestens einem Teil der nach unten verlaufenden Zunge (25, 66), der an der Oberseite (3, 58a) eines anderen Paneels (1, 42, 43, 46, 53, 57) angrenzt, in Berührung zu kommen.
7. Paneel (1, 42, 43, 46, 53, 57) nach einem der vorhergehenden Ansprüche, wobei die Oberseite (3, 58a) des Paneels (1, 42, 43, 46, 53, 57) dazu ausgeführt ist, im Wesentlichen nahtlos mit der Oberseite (3, 58a) eines anderen Paneels (1, 42, 43, 46, 53, 57) in Eingriff zu gelangen.
8. Paneel (1, 42, 43, 46, 53, 57) nach einem der vorhergehenden Ansprüche, wobei das erste Verriegelungselement (23, 64) in einem Abstand von einer Oberseite der nach oben verlaufenden Zunge (19, 61) positioniert ist und/oder wobei das erste Verriegelungselement (23, 64) in einem Abstand von einer Unterseite der nach oben verlaufenden Zunge (19, 61) positioniert ist.
9. Paneel (1, 42, 43, 46, 53, 57) nach einem der vorhergehenden Ansprüche, wobei das zweite Verriegelungselement (30, 69) in einem Abstand von einer Oberseite der nach unten verlaufenden Nut (27, 68) positioniert ist und/oder wobei das zweite Verriegelungselement (30, 69) in einem Abstand von einer Unterseite der nach unten verlaufenden Nut (27, 68) positioniert ist.
10. Paneel (1, 42, 43, 46, 53, 57) nach einem der vorhergehenden Ansprüche, wobei der einerseits durch die Richtung, in der sich mindestens ein Teil einer Seite (19a, 61a) der nach oben verlaufenden Zunge (19, 61), der zu der nach oben verlaufenden Flanke (20, 62) weist, erstreckt, und andererseits die Normale (N_1) der Oberseite (3, 58a) des Kerns (2, 58) eingeschlossene Winkel zwischen 0 und 60 Grad, insbesondere 0 und 45 Grad, liegt und/oder wobei der einerseits durch die Richtung, in der sich mindestens ein Teil einer Seite (25a) der nach unten verlaufenden Zunge (25, 66), der zu der nach unten verlaufenden Flanke (26, 67) weist, erstreckt, und

andererseits durch die Normale (N_2) der Unterseite (4, 58b) des Kerns eingeschlossene Winkel zwischen 0 und 60 Grad und insbesondere 0 und 45 Grad liegt.

11. Paneel (1, 42, 43, 46, 53, 57) nach einem der vorhergehenden Ansprüche, wobei mindestens ein Teil einer Oberseite (19d, 61d) der nach oben verlaufenden Zunge (19, 61) nach unten geneigt in Richtung der Seite (19e) der nach oben verlaufenden Zunge (19, 61), die von einer nach oben verlaufenden Flanke (20, 62) weg weist, verläuft, und wobei eine Oberseite (68a) der nach unten verlaufenden Nut (27, 68) ebenfalls eine geneigte Ausrichtung aufweist, die nach oben in Richtung der Seite (25a) der nach unten verlaufenden Zunge (25, 66), die zu der nach unten verlaufenden Flanke (26, 67) weist, verläuft.
12. Paneel (1, 42, 43, 46, 53, 57) nach einem der vorhergehenden Ansprüche, wobei mindestens ein Teil des Ausrichtungsrands (66b) des vierten Rands (8) eine im Wesentlichen flachere Ausrichtung als mindestens ein Teil der nach oben verlaufenden Flanke (20, 62) des dritten Rands (7) aufweist.
13. Paneel (1, 42, 43, 46, 53, 57) nach einem der vorhergehenden Ansprüche, wobei ein Teil der nach oben verlaufenden Flanke (20, 62) des dritten Rands (7), der mit dem Kern (2, 58) verbunden ist, eine Anschlagfläche (20b) für mindestens einen Teil der Seite der nach unten verlaufenden Zunge (25, 66), die von der nach unten verlaufenden Flanke (26, 67) weg weist, bildet.
14. Paneel (1, 42, 43, 46, 53, 57) nach einem der vorhergehenden Ansprüche, wobei ein Teil der nach oben verlaufenden Flanke (20, 62) des dritten Rands (7), der mit dem Kern (2, 58) verbunden ist, im Wesentlichen vertikal ausgerichtet ist, und/oder wobei mindestens ein Teil der Seite der nach unten verlaufenden Zunge (25, 66), die von der nach unten verlaufenden Flanke (26, 67) weg weist, im Wesentlichen vertikal ausgerichtet ist.
15. Paneel (1, 42, 43, 46, 53, 57) nach einem der vorhergehenden Ansprüche, wobei der nach oben verlaufenden Nut (21, 63) eine solche Form verliehen wurde, dass diese nach oben verlaufende Nut (21, 63) zur verriegelnden Aufnahme mindestens eines Teils einer nach unten verlaufenden Zunge (25, 66) eines benachbarten Paneels (1, 42, 43, 46, 53, 57) ausgeführt ist, wobei die nach oben verlaufende Nut (21, 63) vorzugsweise zur Aufnahme einer nach unten verlaufenden Zunge (25, 66) eines benachbarten Paneels (1, 42, 43, 46, 53, 57) mit Klemmpassung ausgeführt ist und wobei die nach unten verlaufende Nut (27, 68) vorzugsweise zur Aufnahme einer nach oben verlaufenden Zunge (19, 61) eines benachbar-

ten Paneels (1, 42, 43, 46, 53, 57) mit Klemmpassung ausgeführt ist.

16. Paneel (1, 42, 43, 46, 53, 57) nach einem der vorhergehenden Ansprüche, wobei sich die nach oben verlaufende Flanke (20, 62) und die nach unten verlaufende Flanke (26, 67) in einer im Wesentlichen parallelen Richtung erstrecken. 5
17. Paneel (1, 42, 43, 46, 53, 57) nach einem der vorhergehenden Ansprüche, wobei das erste Verriegelungselement (23, 64) mindestens eine nach außen verlaufende Ausbauchung (23, 64) umfasst und dass das zweite Verriegelungselement (30, 69) mindestens eine Aussparung (30, 69) umfasst, wobei die nach außen verlaufende Ausbauchung (23, 64) dazu ausgeführt ist, zur Realisierung einer verriegelten Kopplung zumindest teilweise in einer Aussparung (30, 69) eines benachbarten gekoppelten Paneels (1, 42, 43, 46, 53, 57) aufgenommen zu werden. 10 15 20
18. Paneel (1, 42, 43, 46, 53, 57) nach einem der vorhergehenden Ansprüche, wobei das zweite Verriegelungselement (30, 69) mindestens eine nach außen verlaufende Ausbauchung umfasst und das erste Verriegelungselement (23, 64) mindestens eine Aussparung umfasst, wobei die nach außen verlaufende Ausbauchung dazu ausgeführt ist, zur Realisierung einer verriegelten Kopplung zumindest teilweise in einer Aussparung eines benachbarten gekoppelten Paneels (1, 42, 43, 46, 53, 57) aufgenommen zu werden. 25 30
19. Paneel (1, 42, 43, 46, 53, 57) nach einem der vorhergehenden Ansprüche, wobei eine Seite (25c) der nach unten verlaufenden Zunge (25, 66), die von der nach unten verlaufenden Flanke (26, 67) weg weist, mit einem dritten Verriegelungselement (24) versehen ist, und wobei die nach oben verlaufende Flanke (20, 62) mit einem vierten Verriegelungselement (29) versehen ist, wobei das dritte Verriegelungselement (24) dazu ausgeführt ist, mit einem vierten Verriegelungselement (29) eines anderen Paneels (1, 42, 43, 46, 53, 57) zusammenzuwirken. 35 40 45
20. Paneel (1, 42, 43, 46, 53, 57) nach einem der vorhergehenden Ansprüche, wobei die Ränder (5, 6, 7, 8) integral mit dem Kern (2, 58) verbunden sind. 50
21. Paneel (1, 42, 43, 46, 53, 57) nach einem der vorhergehenden Ansprüche, wobei das Paneel (1, 42, 43, 46, 53, 57) zumindest teilweise aus Holz und/oder aus Kunststoff, insbesondere einem Thermoplast, vorzugsweise Polyvinylchlorid (PVC), hergestellt ist. 55
22. Paneel (1, 42, 43, 46, 53, 57) nach einem der vor-

hergehenden Ansprüche, wobei das Paneel (1, 42, 43, 46, 53, 57) ein Laminat aus einer Ausgleichsschicht, einer Kernschicht und einer oben auf der Kernschicht angeordneten Deckstruktur umfasst, wobei die Deckstruktur vorzugsweise eine Zierschicht und eine oben auf der Zierschicht angeordnete Schutzschicht umfasst.

23. Paneel (1, 42, 43, 46, 53, 57) nach einem der vorhergehenden Ansprüche, wobei das erste Verriegelungselement (23, 64) auf einer niedrigeren Höhe als der nach oben verlaufende Ausrichtungsrand (19b, 61b) der nach oben verlaufenden Zunge (19, 61) positioniert ist. 10 15
24. Belag, insbesondere Bodenbelag, der aus miteinander gekoppelten Paneelen (1, 42, 43, 46, 53, 57) nach einem der vorhergehenden Ansprüche besteht. 20
25. Verfahren zum Zusammenfügen miteinander verbindbarer Paneele (1, 42, 43, 46, 53, 57) nach einem der Ansprüche 1 - 23 zum Bilden eines Belags, das die folgenden Schritte umfasst:
 - A) Bereitstellen eines ersten Paneels (1, 42, 43, 46, 53, 57),
 - B) Einführen einer seitlichen Zunge (9, 49, 54) eines ersten Rands (5, 40, 44, 47) eines zweiten Paneels (1, 42, 43, 46, 53, 57) in einer geneigten Position in eine Aussparung (15) eines zweiten Rands (6, 41, 45, 48) des ersten Paneels (1, 42, 43, 46, 53, 57),
 - C) Abwinkeln des zweiten Paneels (1, 42, 43, 46, 53, 57) bezüglich des ersten Paneels (1, 42, 43, 46, 53, 57), bis sich beide Paneele (1, 42, 43, 46, 53, 57) in der gleichen Ebene befinden,
 - D) Einführen einer seitlichen Zunge (9, 49, 54) eines ersten Rands (5, 40, 44, 47) eines dritten Paneels (1, 42, 43, 46, 53, 57) in einer geneigten Position in eine Aussparung (15) eines zweiten Rands (6, 41, 45, 48) des ersten Paneels (1, 42, 43, 46, 53, 57), und
 - E) Abwinkeln des dritten Paneels (1, 42, 43, 46, 53, 57) bezüglich des ersten und des zweiten Paneels (1, 42, 43, 46, 53, 57), bis sich die Paneele (1, 42, 43, 46, 53, 57) in der gleichen Ebene befinden, wobei eine nach unten verlaufende Zunge (25, 66) eines vierten Rands (8) des dritten Paneels (1, 42, 43, 46, 53, 57) in eine nach oben verlaufende Nut (21, 63) eines dritten Rands (7) des zweiten Paneels (1, 42, 43, 46, 53, 57) einrastet und wobei eine nach oben verlaufende Zunge (19, 61) des dritten Rands (7) des zweiten Paneels (1, 42, 43, 46, 53, 57) in eine nach unten verlaufende Nut (27, 68) des vierten Rands (8) des dritten Paneels (1, 42, 43, 46, 53, 57) einschnappt, was zum Verriegeln

des dritten Paneels (1, 42, 43, 46, 53, 57) bezüglich des ersten Paneels (1, 42, 43, 46, 53, 57) am ersten und zweiten Rand (5, 6, 40, 41, 44, 45, 47, 48) und bezüglich des zweiten Paneels (1, 42, 43, 46, 53, 57) am dritten und vierten Rand (5, 6, 40, 41, 44, 45, 47, 48) sowohl in horizontaler Richtung als auch in vertikaler Richtung führt.

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Revendications

1. Panneau (1, 42, 43, 46, 53, 57), en particulier un panneau de sol (1, 42, 43, 46, 53, 57), emboîtable avec des panneaux similaires (1, 42, 43, 46, 53, 57) pour former un revêtement de sol, comprenant:

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- un noyau agencé de façon centrale (2, 58) pourvu d'un côté supérieur (3, 58a) et d'un côté inférieur (4, 58b), ledit noyau (2, 58) comprenant:

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- une première paire de bords opposés (5, 6, 40, 41, 44, 45, 47, 48), comprenant:

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- un premier bord (5, 40, 44, 47) comprenant une languette latérale (9, 49, 54) s'étendant dans une direction sensiblement parallèle au côté supérieur (3, 58a) du panneau (1, 42, 43, 46, 53, 57), la région avant inférieure de ladite languette latérale (9, 49, 54) étant arrondie au moins partiellement, la région arrière inférieure de ladite languette étant configurée comme une région de support (12), dans lequel la région arrière inférieure est située plus près du niveau du côté supérieur (3, 58a) du panneau (1, 42, 43, 46, 53, 57) qu'une partie la plus basse de la région avant inférieure,

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- un deuxième bord opposé (6, 41, 45, 48) comprenant un évidement (15) pour recevoir au moins une partie de la languette latérale (9, 49, 54) d'un panneau supplémentaire (1, 42, 43, 46, 53, 57), ledit évidement (15) étant défini par une lèvre supérieure (13, 52) et une lèvre inférieure (14), ladite lèvre inférieure (14) étant pourvue d'un épaulement faisant saillie vers le haut (17) pour supporter la région de support (12) de la languette latérale (9, 49, 54),

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- la languette latérale (9, 49, 54) étant conçue de telle sorte qu'un verrouillage soit réalisé par un mouvement d'introduction dans l'évidement (15) de la languette latérale (9, 49, 54) d'un panneau

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supplémentaire (1, 42, 43, 46, 53, 57) et par un mouvement d'inclinaison vers le bas autour d'un axe parallèle au premier bord (5, 40, 44, 47), à la suite de quoi un côté supérieur de la languette latérale (9, 49, 54) engagera la lèvre supérieure (13, 52) et la région de support (12) de la languette latérale (9, 49, 54) sera supportée par et/ou fera face à l'épaulement (17) de la lèvre inférieure (14), entraînant le verrouillage de panneaux voisins aux premier (5, 40, 44, 47) et deuxième (6, 41, 45, 48) bords à la fois dans la direction horizontale et dans la direction verticale; et

- une deuxième paire de bords opposés (7, 8), comprenant:

- un troisième bord (7) comprenant une seule languette supérieure (19, 61), au moins un flanc supérieur (20, 62) se trouvant à une distance de la languette supérieure (19, 61) et une seule rainure supérieure (21, 63) formée entre la languette supérieure (19, 61) et le flanc supérieur (20, 62), et dans lequel au moins une partie d'un côté (19e, 61e) de la languette supérieure (19, 61) qui tourne le dos au flanc supérieur (20, 62) comprend un premier élément de verrouillage sensiblement rigide (23, 64), et

- un quatrième bord (8) comprenant une seule languette inférieure (25, 66), au moins un flanc inférieur (26, 67) se trouvant à une distance de la languette inférieure (25, 66), et une seule rainure inférieure (27, 68) formée entre la languette inférieure (25, 66) et le flanc inférieur (26, 67), et dans lequel le flanc inférieur (26, 67) comprend un deuxième élément de verrouillage de préférence sensiblement rigide, ledit deuxième élément de verrouillage (30, 69) étant apte à interagir avec le premier élément de verrouillage (23, 64) d'un troisième bord (7) d'encore un panneau supplémentaire (1, 42, 43, 46, 53, 57),
- les troisième (7) et quatrième (8) bords étant conçus de telle sorte qu'un verrouillage soit réalisé pendant une inclinaison vers le bas d'un panneau (1, 42, 43, 46, 53, 57) à coupler par un premier bord (5, 40, 44, 47) à un deuxième bord (6, 41, 45, 48) d'un panneau supplémentaire (1, 42, 43, 46, 53, 57), dans lequel le quatrième bord (8) d'un pan-

neau (1, 42, 43, 46, 53, 57) à coupler exécute un mouvement de ciseau en direction d'un troisième bord (7) d'en-
 core un autre panneau (1, 42, 43, 46, 53, 57), de telle sorte que la languette inférieure (25, 66) du quatrième bord (8) du panneau (1, 42, 43, 46, 53, 57) à coupler soit poussée dans la rainure supérieure (21, 63) du troisième bord (7) dudit autre panneau (1, 42, 43, 46, 53, 57) et que la languette supérieure (19, 61) dudit autre panneau (1, 42, 43, 46, 53, 57) soit poussée dans la rainure inférieure (27, 68) du panneau (1, 42, 43, 46, 53, 57) à coupler, par déformation du troisième bord (7) et/ou du quatrième bord (8), entraînant le verrouillage de panneaux voisins (1, 42, 43, 46, 53, 57) aux troisième (7) et quatrième (8) bords à la fois dans la direction horizontale et dans la direction verticale,

■ **caractérisé en ce qu'**au moins une partie d'un côté (19a, 61a) de la languette supérieure (19, 61) qui fait face au flanc supérieur (20, 62) est inclinée en direction du flanc supérieur (20, 62) et s'étend dans la direction de la normale (N_1) du côté supérieur (3, 58a) du noyau (2, 58), et

■ **en ce qu'**au moins une partie d'un côté (25a) de la languette inférieure (25, 66) qui fait face au flanc inférieur (26, 67) est inclinée en direction du flanc inférieur (26, 67) et s'étend dans la direction de la normale (N_2) du côté inférieur (4, 58b) du noyau (2, 58).

2. Panneau (1, 42, 43, 46, 53, 57) selon l'une des revendications précédentes, dans lequel un côté de l'épaule (17) qui fait face au noyau (2, 58) présente une orientation inclinée pour pousser deux panneaux (1, 42, 43, 46, 53, 57), dans un état assemblé, l'un vers l'autre.
3. Panneau (1, 42, 43, 46, 53, 57) selon l'une des revendications précédentes, dans lequel le panneau (1, 42, 43, 46, 53, 57) présente une forme sensiblement rectangulaire, dans lequel la première paire de bords opposés (5, 6, 40, 41, 44, 45, 47, 48) est située sur les côtés longs du panneau (1, 42, 43, 46, 53, 57), et la deuxième paire de bords opposés (7, 8) est située sur les côtés courts du panneau (1, 42, 43, 46, 53, 57).
4. Panneau (1, 42, 43, 46, 53, 57) selon l'une des revendications précédentes, dans lequel au moins une partie d'un côté (19b) de la languette supérieure (19,

61) qui fait face au flanc supérieur (20, 62) forme un bord d'alignement supérieur (19b) dans le but de coupler le troisième bord (7) à un quatrième bord (8) d'un panneau voisin (1, 42, 43, 46, 53, 57) et/ou dans lequel au moins une partie d'un côté (25b) de la languette inférieure (25, 66) qui tourne le dos au flanc inférieur (26, 67) forme un bord d'alignement inférieur incliné (25b) dans le but de coupler le quatrième bord (8) à un troisième bord (7) d'un panneau voisin (1, 42, 43, 46, 53, 57).

5. Panneau (1, 42, 43, 46, 53, 57) selon l'une des revendications précédentes, dans lequel chacune de la languette supérieure (19, 61) et de la languette inférieure (25, 66) est sensiblement rigide et/ou sensiblement solide.
6. Panneau (1, 42, 43, 46, 53, 57) selon l'une des revendications précédentes, dans lequel au moins une partie du flanc supérieur (20, 62) contiguë au côté supérieur (3, 58a) du panneau (1, 42, 43, 46, 53, 57) est apte à entrer en contact avec au moins une partie de la languette inférieure (25, 66) contiguë au côté supérieur (3, 58a) d'un autre panneau (1, 42, 43, 46, 53, 57) dans un état assemblé.
7. Panneau (1, 42, 43, 46, 53, 57) selon l'une des revendications précédentes, dans lequel le côté supérieur (3, 58a) du panneau (1, 42, 43, 46, 53, 57) est apte à engager de façon sensiblement continue le côté supérieur (3, 58a) d'un autre panneau (1, 42, 43, 46, 53, 57).
8. Panneau (1, 42, 43, 46, 53, 57) selon l'une des revendications précédentes, dans lequel le premier élément de verrouillage (23, 64) est positionné à une distance d'un côté supérieur de la languette supérieure (19, 61) et/ou dans lequel le premier élément de verrouillage (23, 64) est positionné à une distance d'un côté inférieur de la languette supérieure (19, 61).
9. Panneau (1, 42, 43, 46, 53, 57) selon l'une des revendications précédentes, dans lequel le deuxième élément de verrouillage (30, 69) est positionné à une distance d'un côté supérieur de la rainure inférieure (27, 68) et/ou dans lequel le deuxième élément de verrouillage (30, 69) est positionné à une distance d'un côté inférieur de la rainure inférieure (27, 68).
10. Panneau (1, 42, 43, 46, 53, 57) selon l'une des revendications précédentes, dans lequel l'angle délimité par d'une part la direction dans laquelle au moins une partie d'un côté (19a, 61a) de la languette supérieure (19, 61) qui fait face au flanc supérieur (20, 62) s'étend et d'autre part la normale (N_1) du côté supérieur (3, 58a) du noyau (2, 58) est compris entre 0 degrés et 60 degrés, en particulier entre 0

degré et 45 degrés et/ou dans lequel l'angle délimité par d'une part la direction dans laquelle au moins une partie d'un côté (25a) de la languette inférieure (25, 66) qui fait face au flanc inférieur (26, 67) s'étend et d'autre part la normale (N_2) du côté inférieur (4, 58b) du noyau est compris entre 0 degrés et 60 degrés, en particulier entre 0 degré et 45 degrés.

11. Panneau (1, 42, 43, 46, 53, 57) selon l'une des revendications précédentes, dans lequel au moins une partie d'un côté supérieur (19d, 61d) de la languette supérieure (19, 61) est inclinée vers le bas dans la direction du côté (19e) de la languette supérieure (19, 61) qui tourne le dos au flanc supérieur (20, 62), et dans lequel un côté supérieur (68a) de la rainure inférieure (27, 68) présente une orientation inclinée similaire vers le haut dans la direction du côté (25a) de la languette inférieure (25, 66) qui fait face au flanc inférieur (26, 67).

12. Panneau (1, 42, 43, 46, 53, 57) selon l'une des revendications précédentes, dans lequel au moins une partie du bord d'alignement (66b) du quatrième bord (8) présente une orientation sensiblement plus plate qu'au moins une partie du flanc supérieur (20, 62) du troisième bord (7).

13. Panneau (1, 42, 43, 46, 53, 57) selon l'une des revendications précédentes, dans lequel une partie du flanc supérieur (20, 62) du troisième bord (7) qui se connecte au noyau (2, 58) forme une surface d'arrêt (20b) pour au moins une partie du côté de la languette inférieure (25, 66) qui tourne le dos au flanc inférieur (26, 67).

14. Panneau (1, 42, 43, 46, 53, 57) selon l'une des revendications précédentes, dans lequel une partie du flanc supérieur (20, 62) du troisième bord (7) qui se connecte au noyau (2, 58) est orientée sensiblement verticalement et/ou dans lequel au moins une partie du côté de la languette inférieure (25, 66) qui tourne le dos au flanc inférieur (26, 67) est orientée sensiblement verticalement.

15. Panneau (1, 42, 43, 46, 53, 57) selon l'une des revendications précédentes, dans lequel la rainure supérieure (21, 63) présente une forme telle que sa rainure supérieure (21, 63) soit apte à recevoir d'une manière verrouillée au moins une partie d'une languette inférieure (25, 66) d'un panneau voisin (1, 42, 43, 46, 53, 57), dans lequel la rainure supérieure (21, 63) est de préférence apte à recevoir avec un ajustement serré une languette inférieure (25, 66) d'un panneau voisin (1, 42, 43, 46, 53, 57) et dans lequel la rainure inférieure (27, 68) est de préférence apte à recevoir avec un ajustement serré une languette supérieure (19, 61) d'un panneau voisin (1, 42, 43, 46, 53, 57).

16. Panneau (1, 42, 43, 46, 53, 57) selon l'une des revendications précédentes, dans lequel le flanc supérieur (20, 62) et le flanc inférieur (26, 67) s'étendent dans une direction sensiblement parallèle.

17. Panneau (1, 42, 43, 46, 53, 57) selon l'une des revendications précédentes, dans lequel le premier élément de verrouillage (23, 64) comprend au moins un renflement saillant vers l'extérieur (23, 64), et en ce que le deuxième élément de verrouillage (30, 69) comprend au moins un évidement (30, 69), ledit renflement saillant vers l'extérieur (23, 64) étant apte à être au moins partiellement reçu dans un évidement (30, 69) d'un panneau couplé voisin (1, 42, 43, 46, 53, 57) dans le but de réaliser un couplage verrouillé.

18. Panneau selon l'une des revendications précédentes, dans lequel le deuxième élément de verrouillage (30, 69) comprend au moins un renflement saillant vers l'extérieur, et en ce que le premier élément de verrouillage (23, 64) comprend au moins un évidement, ledit renflement saillant vers l'extérieur étant apte à être au moins partiellement reçu dans un évidement d'un panneau couplé voisin (1, 42, 43, 46, 53, 57) dans le but de réaliser un couplage verrouillé.

19. Panneau (1, 42, 43, 46, 53, 57) selon l'une des revendications précédentes, dans lequel un côté (25c) de la languette inférieure (25, 66) qui tourne le dos au flanc inférieur (26, 67) est pourvu d'un troisième élément de verrouillage (24), et dans lequel le flanc supérieur (20, 62) est pourvu d'un quatrième élément de verrouillage (29), ledit troisième élément de verrouillage (24) étant apte à coopérer avec un quatrième élément de verrouillage (29) d'un autre panneau (1, 42, 43, 46, 53, 57).

20. Panneau (1, 42, 43, 46, 53, 57) selon l'une des revendications précédentes, dans lequel les bords (5, 6, 7, 8) sont intégralement connectés au noyau (2, 58).

21. Panneau (1, 42, 43, 46, 53, 57) selon l'une des revendications précédentes, dans lequel le panneau (1, 42, 43, 46, 53, 57) est fabriqué au moins partiellement à partir de bois et/ou à partir de plastique, en particulier d'un thermoplastique, de préférence le polychlorure de vinyle (PVC).

22. Panneau (1, 42, 43, 46, 53, 57) selon l'une des revendications précédentes, dans lequel le panneau (1, 42, 43, 46, 53, 57) comprend un stratifié d'une couche d'équilibrage, une couche de noyau, et une structure supérieure agencée au-dessus de la couche de noyau dans lequel la structure supérieure comprend de préférence une couche décorative et une couche de protection agencée au-dessus de ladite couche décorative.

23. Panneau (1, 42, 43, 46, 53, 57) selon l'une des revendications précédentes, dans lequel le premier élément de verrouillage (23, 64) est positionné à un niveau inférieur au bord d'alignement supérieur (19b, 61b) de la languette supérieure (19, 61). 5
24. Revêtement, en particulier un revêtement de sol, constitué de panneaux couplés mutuellement (1, 42, 43, 46, 53, 57) selon l'une quelconque des revendications précédentes. 10
25. Procédé d'assemblage de panneaux emboîtables (1, 42, 43, 46, 53, 57) selon l'une quelconque des revendications 1 à 23, afin de former un revêtement de sol, comprenant les étapes suivantes: 15
- A) fournir un premier panneau (1, 42, 43, 46, 53, 57),
- B) insérer une languette latérale (9, 49, 54) d'un premier bord (5, 40, 44, 47) d'un deuxième panneau (1, 42, 43, 46, 53, 57) dans une position inclinée dans un évidement (15) d'un deuxième bord (6, 41, 45, 48) du premier panneau (1, 42, 43, 46, 53, 57), 20
- C) incliner vers le bas le deuxième panneau (1, 42, 43, 46, 53, 57) par rapport au premier panneau (1, 42, 43, 46, 53, 57), jusqu'à ce que les deux panneaux (1, 42, 43, 46, 53, 57) soient situés dans le même plan, 25
- D) insérer une languette latérale (9, 49, 54) d'un premier bord (5, 40, 44, 47) d'un troisième panneau (1, 42, 43, 46, 53, 57) dans une position inclinée dans un évidement (15) d'un deuxième bord (6, 41, 45, 48) du premier panneau (1, 42, 43, 46, 53, 57), et 30
- E) incliner vers le bas le troisième panneau (1, 42, 43, 46, 53, 57) par rapport aux premier et deuxième panneaux (1, 42, 43, 46, 53, 57), jusqu'à ce que les panneaux (1, 42, 43, 46, 53, 57) soient situés dans le même plan, dans lequel 40
- une languette inférieure (25, 66) d'un quatrième bord (8) du troisième panneau (1, 42, 43, 46, 53, 57) se glissera dans une rainure supérieure (21, 63) d'un troisième bord (7) du deuxième panneau (1, 42, 43, 46, 53, 57), et dans lequel 45
- une languette supérieure (19, 61) du troisième bord (7) du deuxième panneau (1, 42, 43, 46, 53, 57) s'engagera dans une rainure inférieure (27, 68) du quatrième bord (8) du troisième panneau (1, 42, 43, 46, 53, 57), réalisant le verrouillage du troisième panneau (1, 42, 43, 46, 53, 57) par rapport au premier panneau (1, 42, 43, 46, 53, 57) aux premier et deuxième bords (5, 6, 40, 41, 44, 45, 47, 48) et par rapport au deuxième panneau (1, 42, 43, 46, 53, 57) aux troisième et quatrième bords (5, 6, 40, 41, 44, 45, 47, 48) à la fois dans la direction horizontale et dans la direction verticale. 50 55

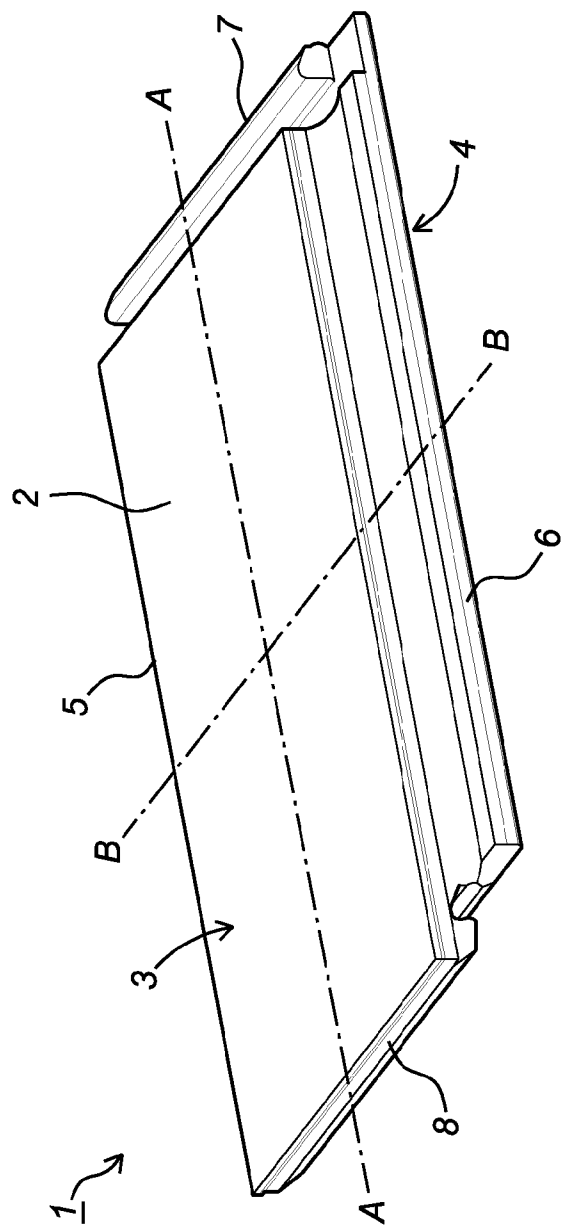
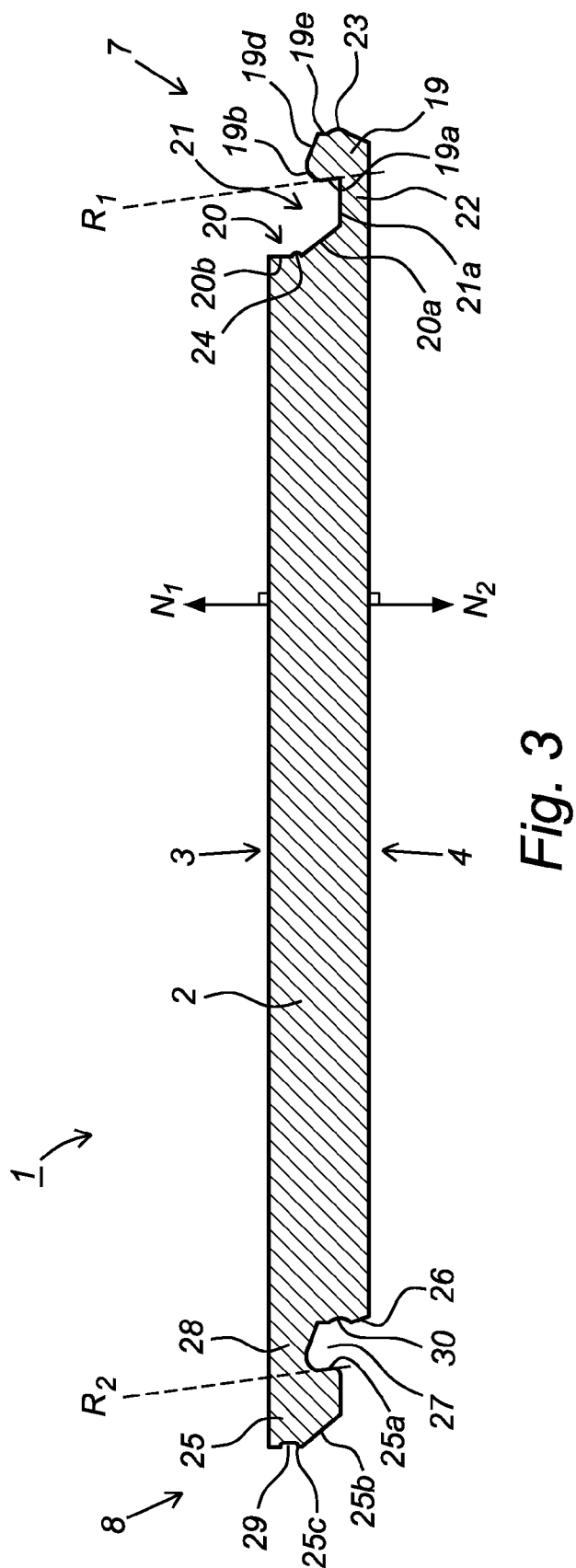
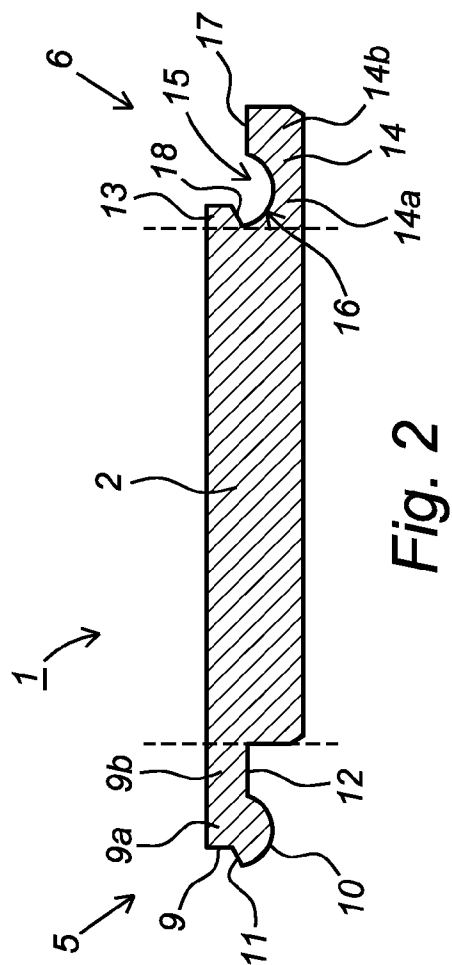
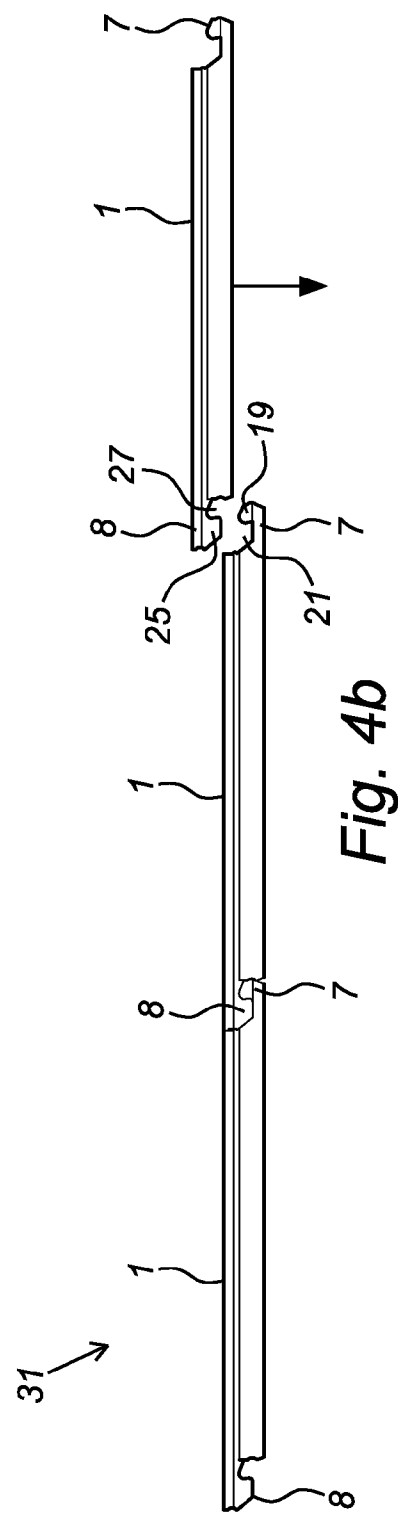
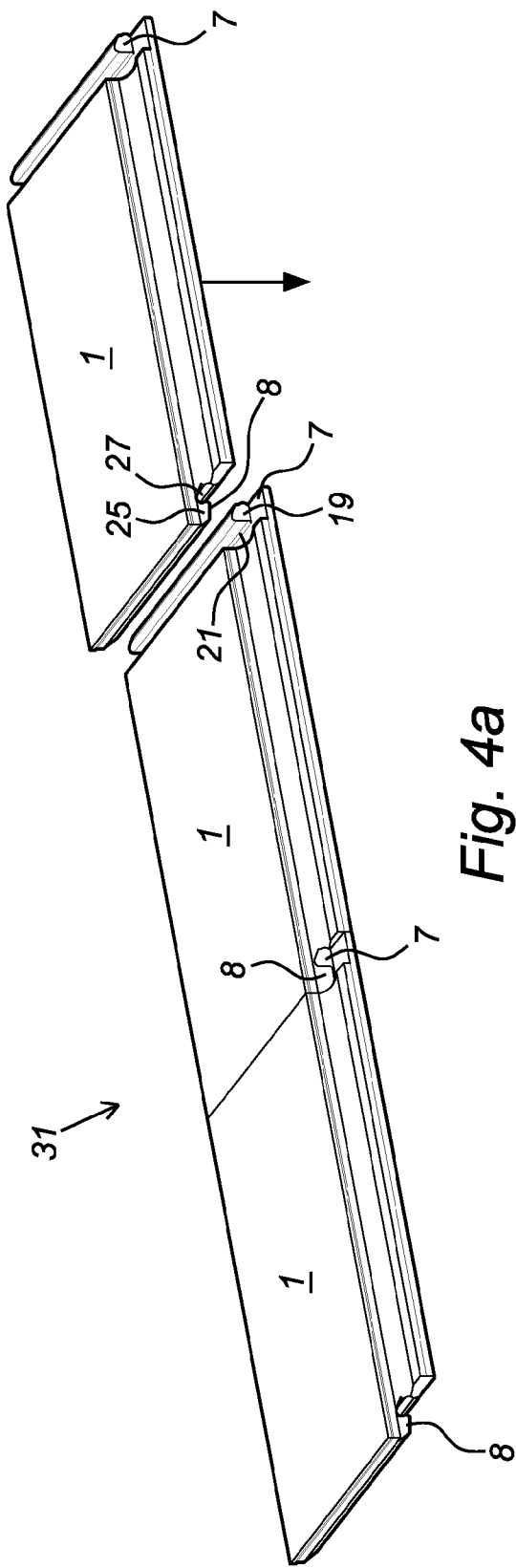


Fig. 1





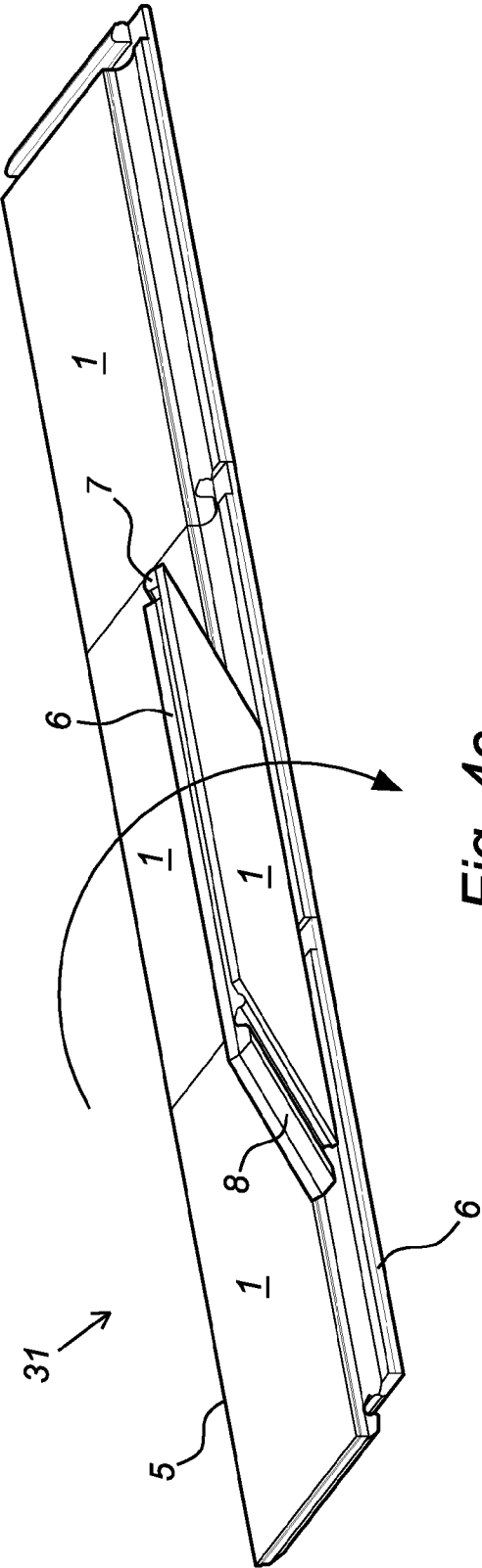


Fig. 4c

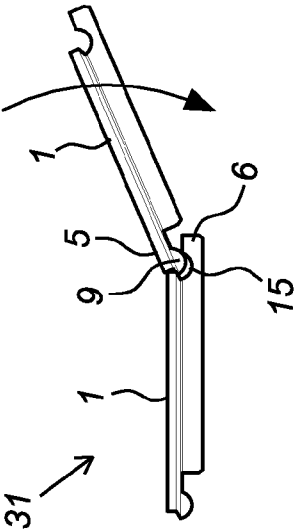


Fig. 4d

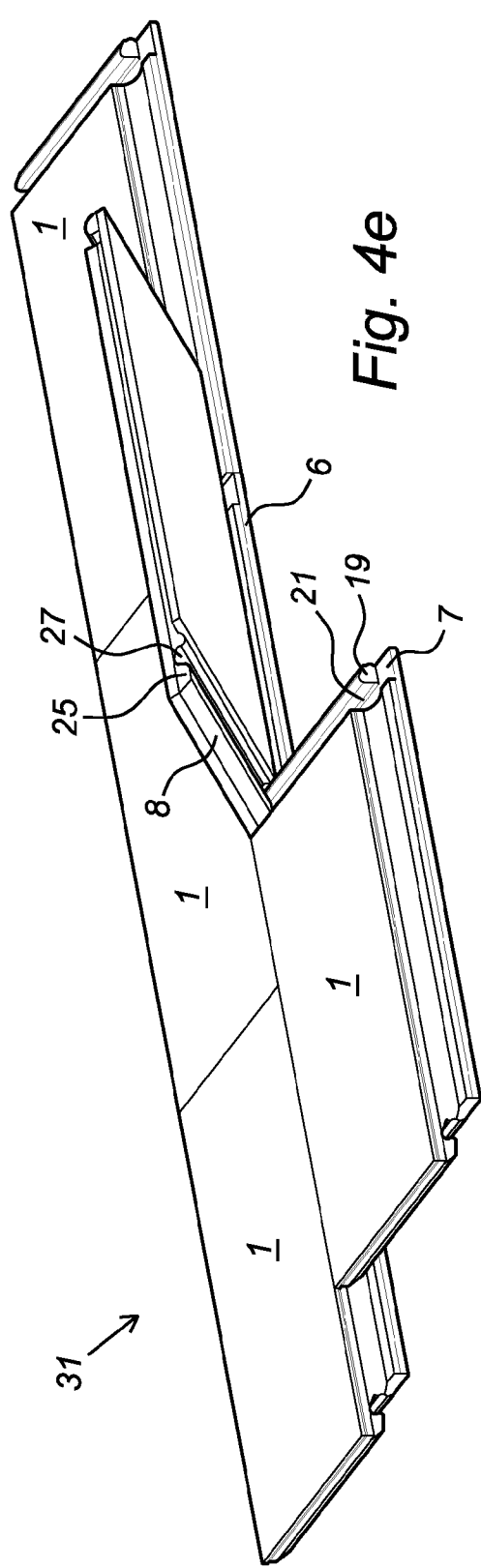


Fig. 4e

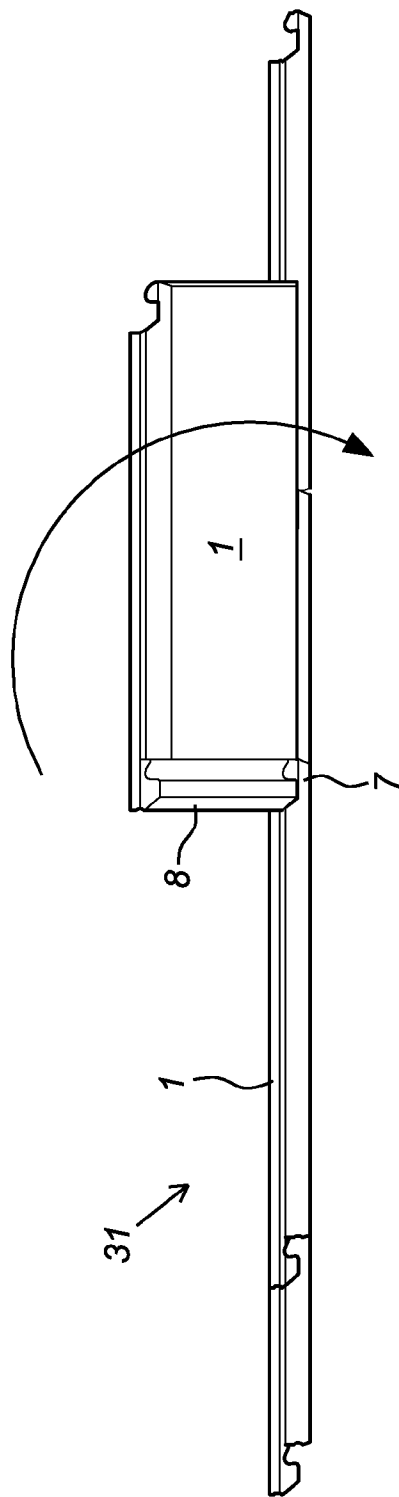


Fig. 4f

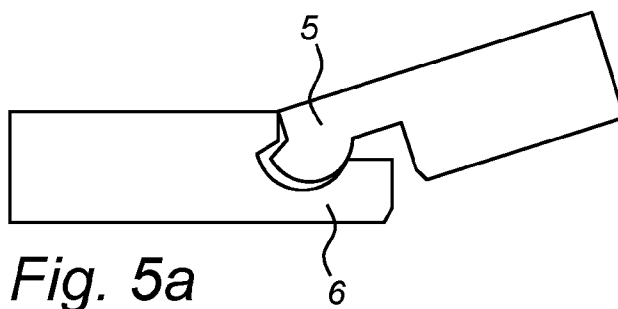


Fig. 5a

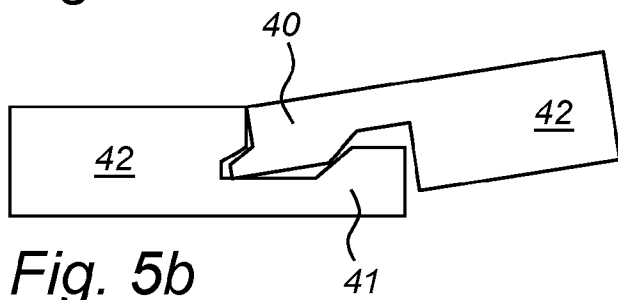


Fig. 5b

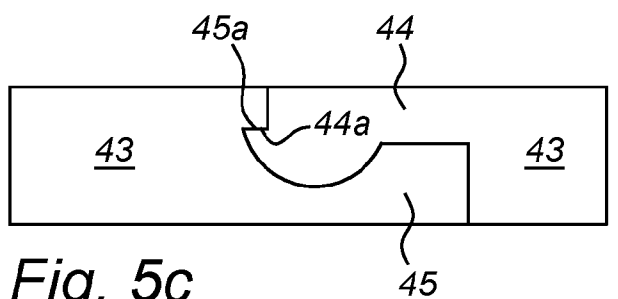


Fig. 5c

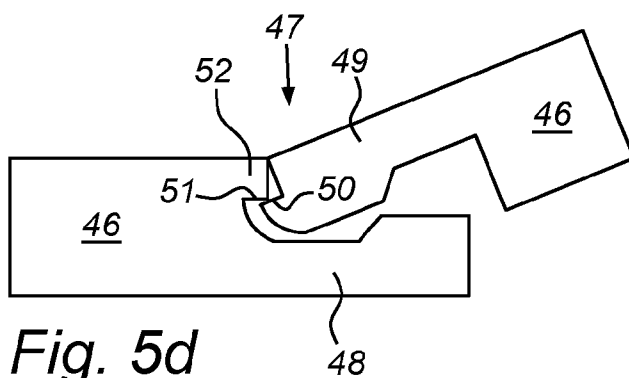


Fig. 5d

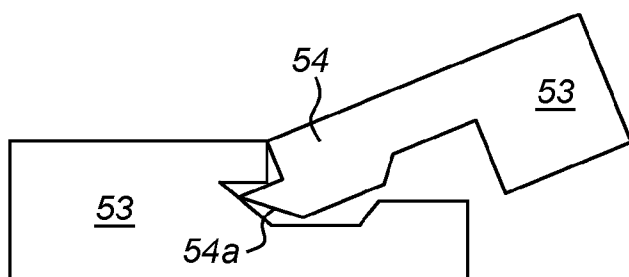


Fig. 5e

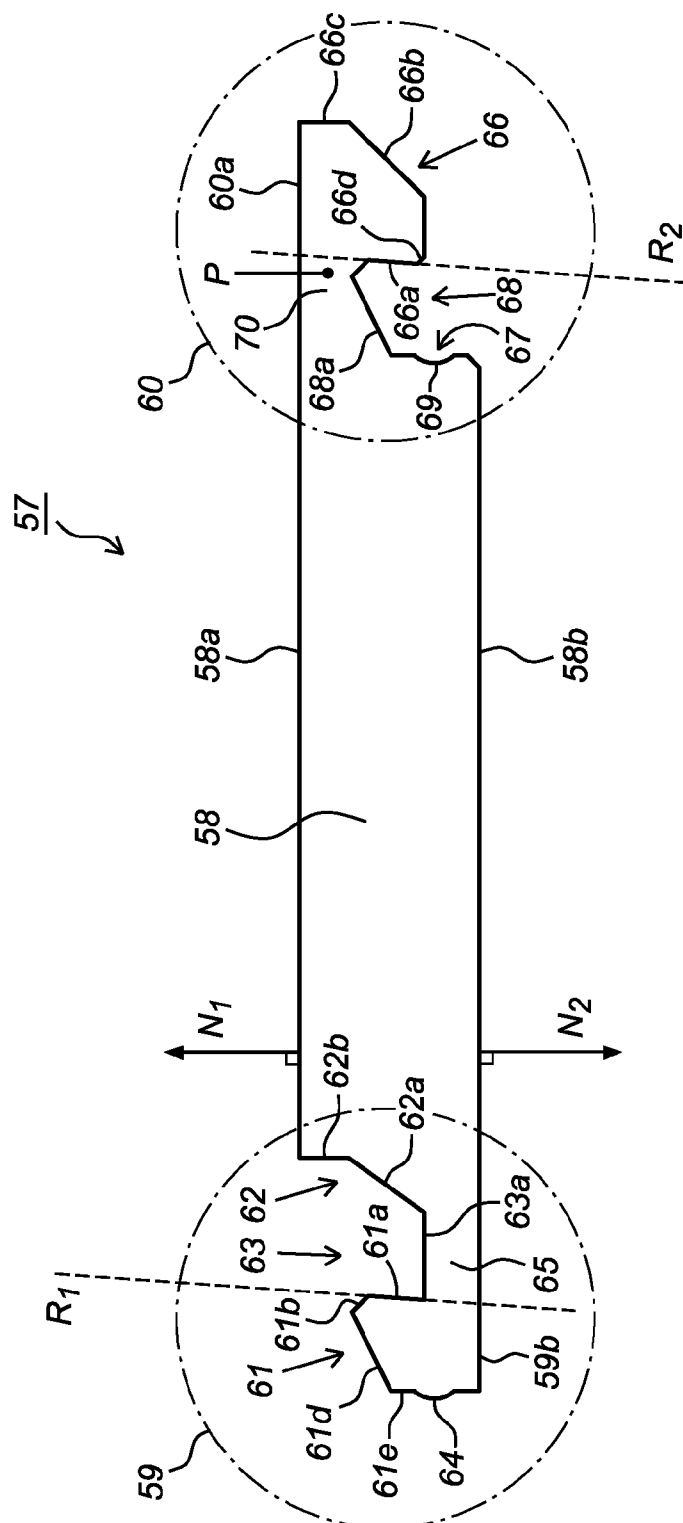


Fig. 6

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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- US 2011056167 A [0004]

PANEL, AMELY ÖSSZEKAPCSOLHATÓ HASONLÓ PANELOKKAL PADLÓBURKOLAT
LÉTREHOZÁSA CÉLJÁBÓL

SZABADALMI IGÉNYPONTOK

1. Panel (1, 42, 43, 46, 53, 57), különösen padlópanel (1, 42, 43, 46, 53, 57), amely összekapcsolható hasonló panelekkel (1, 42, 43, 46, 53, 57) burkolat létrehozása céljából, amely panel magában foglal:

- egy központosan elhelyezkedő középrészt (2, 58), amelynek van egy felső oldala (3, 58a) és egy alsó oldala (4, 58b), amely középrész (2, 58) el van látva:
 - o egymással szemközti élek (5, 6, 40, 41, 44, 45, 47, 48) egy első párjával, amely magában foglal:
 - egy első élt (5, 40, 44, 47), amely magában foglal egy, a panel (1, 42, 43, 46, 53, 57) felső oldalával (3, 58a) gyakorlatilag párhuzamos irányban kiterjedő, oldalirányú eresztéket (9, 49, 54), amely oldalirányú eresztéknek (9, 49, 54) az alsó elülső területe legalább részben le van kerekítve, az eresztéknek az alsó hátulsó területe teherviselő területként (12) van kialakítva, amely alsó hátulsó terület közelebb helyezkedik el a panel (1, 42, 43, 46, 53, 57) felső oldalának (3, 58a) szintjéhez, mint az alsó elülső terület legalsó része,
 - egy szemközti, második élt (6, 41, 45, 48), amely magában foglal egy mélyedést (15) egy további panelhoz (1, 42, 43, 46, 53, 57) tartozó oldalirányú ereszték (9, 49, 54) legalább egy részének a befogadására, amely mélyedést (15) egy felső szegély (13, 52) és egy alsó szegély (14) határozza meg, amely alsó szegély (14) el van látva egy felfelé kiálló vállal (17) az oldalirányú ereszték (9, 49, 54) teherviselő területének (12) megtámasztása céljából,
 - az oldalirányú ereszték (9, 49, 54) úgy van kialakítva, hogy egy további panel (1, 42, 43, 46, 53, 57) oldalirányú eresztékének (9, 49, 54) a mélyedésbe (15) való behelyező mozgatása és egy, az első éllel (5, 40, 44, 47) párhuzamos tengely körül, szögben lefelé fordító mozgatása révén reteszelés jön létre, aminek következtében az oldalirányú ereszték (9, 49, 54) felső oldala bekapcsolódik a felső szegélybe (13, 52), és az oldalirányú ereszték (9, 49, 54) teherviselő területe (12) megtámaszkodik az alsó szegély (14) vállán (17), és/vagy afelé néz, ami előidézi a szomszédos

panelek reteszelését az első (5, 40, 44, 47) és a második (6, 41, 45, 48) élénél mind vízszintes, mind függőleges irányban; és

- egymással szemköztli élek (7, 8) egy második párjával, amely magában foglal:

- egy harmadik élt (7), amely magában foglal egyetlen felfelé irányuló eresztéket (19, 61), legalább egy, a felfelé irányuló eresztéktől (19, 61) bizonyos távolságra lévő felfelé irányuló oldalperemet (20, 62) és egyetlen, a felfelé irányuló ereszték (19, 61) és a felfelé irányuló oldalperem (20, 62) között kialakított, felfelé irányuló hornyot (21, 63) továbbá a felfelé irányuló ereszték (19, 61) annak az oldalának (19e, 61e), amely a felfelé irányuló oldalperemtől (20, 62) elfelé néz, legalább egy része magában foglal egy gyakorlatilag merev első reteszelőelemet (23, 64), és
- egy negyedik élt (8), amely magában foglal egyetlen lefelé irányuló eresztéket (25, 66), legalább egy, a lefelé irányuló eresztéktől (25, 66) bizonyos távolságra lévő lefelé irányuló oldalperemet (26, 67) és egyetlen, a lefelé irányuló ereszték (25, 66) és a lefelé irányuló oldalperem (26, 67) között kialakított, lefelé irányuló hornyot (27, 68), továbbá a lefelé irányuló oldalperem (26, 67) magában foglal egy – előnyös módon gyakorlatilag merev – második reteszelőelemet (30, 69), amely alkalmas arra, hogy együttműködjön egy még további panel (1, 42, 43, 46, 53, 57) harmadik élének (7) első reteszelőelemével (23, 64),
- amely harmadik (7) és negyedik (8) él úgy van kialakítva, hogy reteszelés jön létre egy, az első élénél (5, 40, 44, 47) egy további panel (1, 42, 43, 46, 53, 57) második éléhez (6, 41, 45, 48) csatlakoztatandó panelnek (1, 42, 43, 46, 53, 57) a szögben lefelé való fordításakor, és a csatlakoztatandó panel (1, 42, 43, 46, 53, 57) negyedik éle (8) ollózó mozdulatot végez egy további másik panel (1, 42, 43, 46, 53, 57) harmadik éle (7) felé, úgyhogy a csatlakoztatandó panel (1, 42, 43, 46, 53, 57) negyedik élének (8) lefelé irányuló eresztéke (25, 66) bekényszerül a másik panel (1, 42, 43, 46, 53, 57) harmadik élének (7) felfelé irányuló hornyába (21, 63), és ennek a másik panelnek (1, 42, 43, 46, 53, 57) a felfelé irányuló eresztéke (19, 61) a harmadik él (7) és/vagy a negyedik él (8) deformálódása révén bekényszerül a csatlakoztatandó panel (1, 42, 43, 46, 53, 57) lefelé irányuló hornyába (27, 68), ami előidézi a szomszédos panelek (1, 42, 43, 46, 53, 57) reteszelését a harmadik (7) és a negyedik (8) élénél mind vízszintes, mind függőleges irányban,
- azzal jellemezve, hogy a felfelé irányuló ereszték (19, 61) annak az oldalának (19a, 61a), amely a felfelé irányuló oldalperem (20, 62) felé néz,

legalább egy része a felfelé irányuló oldalperem (20, 62) felé döntött, és

- azzal, hogy a lefelé irányuló eresztéknek (25, 66) a lefelé irányuló oldalperem (26, 67) felé néző oldalának (25a) legalább egy része a lefelé irányuló oldalperem (26, 67) felé döntött.

2. Az előző igénypontok egyike szerinti panel (1, 42, 43, 46, 53, 57), amelyben a vállnak (17) a középrész (2, 58) felé néző oldala döntött irányultsággal rendelkezik, hogy két panel (1, 42, 43, 46, 53, 57) – összerakott állapotban – egymás felé kényszerüljön.

3. Az előző igénypontok egyike szerinti panel (1, 42, 43, 46, 53, 57), amely panel (1, 42, 43, 46, 53, 57) gyakorlatilag téglalap alakú, továbbá az egymással szemkötti élek (5, 6, 40, 41, 44, 45, 47, 48) első párja a panel (1, 42, 43, 46, 53, 57) hosszú oldalain helyezkedik el, az egymással szemkötti élek (7, 8) második párja pedig a panel (1, 42, 43, 46, 53, 57) rövid oldalain helyezkedik el.

4. Az előző igénypontok egyike szerinti panel (1, 42, 43, 46, 53, 57), amelyben a felfelé irányuló ereszték (19, 61) annak az oldalának (19b) legalább egy része, amely a felfelé irányuló oldalperem (20, 62) felé néz, egy felfelé irányuló beállító élet (19b) képez a harmadik élnek (7) egy szomszédos panel (1, 42, 43, 46, 53, 57) negyedik éléhez (8) való csatlakoztatása céljából, és/vagy amelyben a lefelé irányuló ereszték (25, 66) annak az oldalának (25b) legalább egy része, amely a lefelé irányuló oldalperemtől (26, 67) elfelé néz, egy lefelé döntött beállító élet (25b) képez a negyedik élnek (8) egy szomszédos panel (1, 42, 43, 46, 53, 57) harmadik éléhez (7) való csatlakoztatása céljából.

5. Az előző igénypontok egyike szerinti panel (1, 42, 43, 46, 53, 57), amelyben a felfelé irányuló ereszték (19, 61) is és a lefelé irányuló ereszték (25, 66) is gyakorlatilag merev és/vagy gyakorlatilag tömör.

6. Az előző igénypontok egyike szerinti panel (1, 42, 43, 46, 53, 57), amelyben a panel (1, 42, 43, 46, 53, 57) felső oldalával (3, 58a) határos, felfelé irányuló oldalperemnek (20, 62) legalább egy része alkalmas arra, hogy érintkezésbe kerüljön egy másik panel (1, 42, 43, 46, 53, 57) felső oldalával (3, 58a) határos, lefelé irányuló ereszték (25, 66) legalább egy részével összerakott állapotban.

7. Az előző igénypontok egyike szerinti panel (1, 42, 43, 46, 53, 57), amelyben a panel (1, 42, 43, 46, 53, 57) felső oldala (3, 58a) alkalmas arra, hogy gyakorlatilag hézagmentesen kapcsolódjon egy másik panel (1, 42, 43, 46, 53, 57) felső oldalához (3, 58a).

8. Az előző igénypontok egyike szerinti panel (1, 42, 43, 46, 53, 57), amelyben az első reteszelőelem (23, 64) bizonyos távolságra van elhelyezve a felfelé irányuló ereszték (19, 61) felső oldalától, és/vagy amelyben az első reteszelőelem (23, 64) bizonyos távolságra van elhelyezve a felfelé irányuló ereszték (19, 61) alsó oldalától.

9. Az előző igénypontok egyike szerinti panel (1, 42, 43, 46, 53, 57), amelyben a

második reteszelőelem (30, 69) bizonyos távolságra van elhelyezve a lefelé irányuló horony (27, 68) felső oldalától, és/vagy amelyben a második reteszelőelem (30, 69) bizonyos távolságra van elhelyezve a lefelé irányuló horony (27, 68) alsó oldalától.

10. Az előző igénypontok egyike szerinti panel (1, 42, 43, 46, 53, 57), amelyben az a szög, amelyet egyrészt az az irány, amelyben a felfelé irányuló ereszték (19, 61) annak az oldalának (19a, 61a) legalább egy része terjed ki, amely a felfelé irányuló oldalperem (20, 62) felé néz, másrészt az az egyenes (N1) zár be, amely a középrész (2, 58) felső oldalára (3, 58a) merőleges, 0 és 60 fok között, különösen 0 és 45 fok között van, és/vagy amelyben az a szög, amelyet egyrészt az az irány, amelyben a lefelé irányuló ereszték (25, 66) annak az oldalának (25a) legalább egy része terjed ki, amely a lefelé irányuló oldalperem (26, 67) felé néz, másrészt az az egyenes (N2) zár be, amely a középrész alsó oldalára (4, 58b) merőleges, 0 és 60 fok között, különösen 0 és 45 fok között van.

11. Az előző igénypontok egyike szerinti panel (1, 42, 43, 46, 53, 57), amelyben a felfelé irányuló ereszték (19, 61) felső oldalának (19d, 61d) legalább egy része lefelé dőlve halad a felfelé irányuló ereszték (19, 61) annak az oldalának (19e) az irányában, amely a felfelé irányuló oldalperemtől (20, 62) elfelé néz, és amelyben a lefelé irányuló ereszték (27, 68) felső oldalának (68a) hasonló dőlési irányultsága van felfelé a lefelé irányuló ereszték (25, 66) annak az oldalának (25a) az irányában, amely a lefelé irányuló oldalperem (26, 67) felé néz.

12. Az előző igénypontok egyike szerinti panel (1, 42, 43, 46, 53, 57), amelyben a negyedik él (8) beállító élének (66b) legalább egy része gyakorlatilag laposabb irányultsággal rendelkezik, mint a harmadik él (7) felfelé irányuló oldalperemének (20, 62) legalább egy része.

13. Az előző igénypontok egyike szerinti panel (1, 42, 43, 46, 53, 57), amelyben a középrészhez (2, 58) kapcsolódó harmadik él (7) felfelé irányuló oldalperemének (20, 62) egy része ütközőfelületet (20b) képez a lefelé irányuló ereszték (25, 66) annak az oldalának legalább egy része számára, amely a lefelé irányuló oldalperemtől (26, 67) elfelé néz.

14. Az előző igénypontok egyike szerinti panel (1, 42, 43, 46, 53, 57), amelyben a középrészhez (2, 58) kapcsolódó harmadik él (7) felfelé irányuló oldalperemének (20, 62) egy része gyakorlatilag függőleges irányultságú, és/vagy amelyben a lefelé irányuló ereszték (25, 66) annak az oldalának legalább egy része, amely a lefelé irányuló oldalperemtől (26, 67) elfelé néz, gyakorlatilag függőleges irányultságú.

15. Az előző igénypontok egyike szerinti panel (1, 42, 43, 46, 53, 57), amelyben a felfelé irányuló horony (21, 63) olyan formát kap, hogy ez a felfelé irányuló horony (21, 63) alkalmas arra, hogy reteszelt módon befogadja egy szomszédos panel (1, 42, 43, 46, 53, 57) lefelé irányuló eresztékének (25, 66) legalább egy részét, és amely felfelé

irányuló horony (21, 63) előnyös módon alkalmas arra, hogy szorító illesztéssel befogadja egy szomszédos panel (1, 42, 43, 46, 53, 57) lefelé irányuló eresztékét (25, 66), továbbá a lefelé irányuló horony (27, 68) előnyös módon alkalmas arra, hogy szorító illesztéssel befogadja egy szomszédos panel (1, 42, 43, 46, 53, 57) felfelé irányuló eresztékét (19, 61).

16. Az előző igénypontok egyike szerinti panel (1, 42, 43, 46, 53, 57), amelyben a felfelé irányuló oldalperem (20, 62) és a lefelé irányuló oldalperem (26, 67) gyakorlatilag párhuzamos irányban terjed ki.

17. Az előző igénypontok egyike szerinti panel (1, 42, 43, 46, 53, 57), amelyben az első reteszelőelem (23, 64) magában foglal legalább egy kifelé irányuló domborulatot (23, 64), és hogy a második reteszelőelem (30, 69) magában foglal legalább egy mélyedést (30, 69), amely legalább egy kifelé irányuló domborulat (23, 64) alkalmas arra, hogy egy szomszédos csatlakoztatott panel (1, 42, 43, 46, 53, 57) mélyedése (30, 69) legalább részben befogadja reteszelt csatlakoztatás megvalósítása céljából.

18. Az előző igénypontok egyike szerinti panel, amelyben a második reteszelőelem (30, 69) magában foglal legalább egy kifelé irányuló domborulatot, és hogy az első reteszelőelem (23, 64) magában foglal legalább egy mélyedést, amely kifelé irányuló domborulat alkalmas arra, hogy egy szomszédos csatlakoztatott panel (1, 42, 43, 46, 53, 57) mélyedése legalább részben befogadja reteszelt csatlakoztatás megvalósítása céljából.

19. Az előző igénypontok egyike szerinti panel (1, 42, 43, 46, 53, 57), amelyben a lefelé irányuló eresztéknek (25, 66) a lefelé irányuló oldalperemtől (26, 67) elfelé néző oldala (25c) el van látva egy harmadik reteszelőelemmel (24), és amelyben a felfelé irányuló oldalperem (20, 62) el van látva egy negyedik reteszelőelemmel (29), amely reteszelőelem (24) alkalmas arra, hogy együttműködjön egy másik panel (1, 42, 43, 46, 53, 57) negyedik reteszelőelemével (29).

20. Az előző igénypontok egyike szerinti panel (1, 42, 43, 46, 53, 57), amelyben az élek (5, 6, 7, 8) a középrészhez (2, 58) azzal egy darabból kialakítva kapcsolódnak.

21. Az előző igénypontok egyike szerinti panel (1, 42, 43, 46, 53, 57), amely panel (1, 42, 43, 46, 53, 57) legalább részben fából és/vagy műanyagból, különösen hőre lágyuló anyagból, előnyös módon polivinil-kloridból (PVC) kerül előállításra.

22. Az előző igénypontok egyike szerinti panel (1, 42, 43, 46, 53, 57), amely panel (1, 42, 43, 46, 53, 57) egy kiegyenlítő rétegből, egy középrétegből és egy, a középréteg tetején elhelyezett fedőszerkezetből álló laminátumot foglal magában, amely fedőszerkezet előnyös módon magában foglal egy dekorációs réteget és egy, a dekorációs réteg tetején elhelyezett védőréteget.

23. Az előző igénypontok egyike szerinti panel (1, 42, 43, 46, 53, 57), amelyben az első reteszelőelem (23, 64) alacsonyabb szinten van elhelyezve, mint a felfelé irányuló

ereszték (19, 61) felfelé irányuló beállító éle (19b, 61b).

24. Burkolat, különösen padlóburkolat, amely az előző igénypontok bármelyike szerinti, kölcsönösen csatlakoztatott panelekből (1, 42, 43, 46, 53, 57) áll.

25. Eljárás az 1-23. igénypontok bármelyike szerinti, összekapcsolható panelek (1, 42, 43, 46, 53, 57) összerakására burkolat létrehozása céljából, amely eljárás magában foglalja azokat a lépéseket, hogy:

A) rendelkezésre bocsátunk egy első panelt (1, 42, 43, 46, 53, 57),

B) döntött helyzetben beillesztjük egy második panel (1, 42, 43, 46, 53, 57) első élének (5, 40, 44, 47) oldalirányú eresztékét (9, 49, 54) az első panel (1, 42, 43, 46, 53, 57) második élének (6, 41, 45, 48) mélyedésébe (15),

C) szögben lefelé fordítjuk a második panelt (1, 42, 43, 46, 53, 57) az első panelhoz (1, 42, 43, 46, 53, 57) képest, amíg a két panel (1, 42, 43, 46, 53, 57) ugyanabban a síkban nem helyezkedik el,

D) döntött helyzetben beillesztjük egy harmadik panel (1, 42, 43, 46, 53, 57) első élének (5, 40, 44, 47) oldalirányú eresztékét (9, 49, 54) az első panel (1, 42, 43, 46, 53, 57) második élének (6, 41, 45, 48) mélyedésébe (15), majd

E) szögben lefelé fordítjuk a harmadik panelt (1, 42, 43, 46, 53, 57) az első és a második panelhoz (1, 42, 43, 46, 53, 57) képest, amíg a panelek (1, 42, 43, 46, 53, 57) ugyanabban a síkban nem helyezkednek el, és a harmadik panel (1, 42, 43, 46, 53, 57) negyedik élének (8) lefelé irányuló eresztéke (25, 66) beugrik a második panel (1, 42, 43, 46, 53, 57) harmadik élének (7) felfelé irányuló hornyába (21, 63), a második panel (1, 42, 43, 46, 53, 57) harmadik élének (7) felfelé irányuló eresztéke (19, 61) pedig becsappan a harmadik panel (1, 42, 43, 46, 53, 57) negyedik élének (8) lefelé irányuló hornyába (27, 68), ami előidéz a harmadik panelnek (1, 42, 43, 46, 53, 57) a reteszeldődését az első panelhez (1, 42, 43, 46, 53, 57) viszonyítva az első és a második (5, 6, 40, 41, 44, 45, 47, 48) élénél, valamint a második panelhez (1, 42, 43, 46, 53, 57) viszonyítva a harmadik és a negyedik (5, 6, 40, 41, 44, 45, 47, 48) élénél mind vízszintes irányban, mind függőleges irányban.