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Panel and covering

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Interconnectable panels, such as interconnectable floor panels, are generally joined mechanically at edges of the panels by using complementary coupling profiles at opposite edges. Traditionally, rectangular floor panels are connected at the long edges by means of a traditional angling method. The invention relates to an interconnectable panel, in particular a floor panel.

Panel and covering

The invention relates to an interconnectable panel, in particular a floor panel. The invention also relates to a covering, in particular a floor covering, comprising a
5 plurality of interconnected panels according to the invention.

Interconnectable panels, such as interconnectable floor panels, are generally joined mechanically at edges of the panels by using complementary coupling profiles at opposite edges. Traditionally, rectangular floor panels are connected at the long
10 edges by means of a traditional angling method. On the short side, the different coupling mechanisms can be applied, wherein a short edge coupling mechanism may, for example, be based upon vertical folding, also referred to as a drop down, wherein a downward tongue located at a short edge of a panel to be coupled is moved in downward direction, such that said downward tongue is inserted into an
15 upward groove located at a short edge of a panel already installed. An example of such a panel is disclosed in US7896571, wherein a short edge coupling mechanism is shown being configured to vertically lock mutually coupled short edges of adjacent panels. Although this aimed vertical locking effect at the short edges is intended to stabilize the coupling between floor panels at the short edges,
20 in practice often breakages, due to coupling edges being put under tension both during assembly and during practical use, occur at the coupling edges, which affects the reliability and durability of this type of drop down coupling.

A first objection of the invention is to provide an improved panel which can be
25 coupled in improved manner to an adjacent panel.

A second objection of the invention is to provide an improved panel comprising an improved, in particular relatively reliable, drop down coupling mechanism.

30 A third objection of the invention is to provide an improved panel comprising an improved drop down coupling mechanism, wherein the risk of damaging, in particular breakage of, the drop down coupling mechanism is reduced.

In order to achieve at least one of the above objects, the invention provides a panel
35 according to claim 1.

The panel according to the invention is provided with an improved drop down coupling mechanism with respect to known drop down coupling mechanisms. More in particular, the coupling mechanism is still configured to lock coupled panels both in horizontal and vertical direction due to the presence of the upward tongue having an inclined (inner) side facing toward the upward flank, and due to the presence of an inclined side of the downward tongue facing toward the downward flank, as a result of which the downward tongue will be secured within the upward groove. This first locking mechanism is also referred to as an inner lock. In order to prevent damaging of the profiles and/or in order to realize a coupling between two panels in a relatively controlled (and predictable) manner, the at least one upper elongated slot is applied in the resilient upper bridge part.

The elongated slot provided in the upper bridge part typically defines a weakened area (weakened zone) of said upper bridge part, and therefore defines the location of (maximum) material deformation of the bridge part. Due to the resiliency of the (upper) bridge part, in combination with the upper elongated slot position-selectively weakening the bridge part, deformation of said bridge part will take place in a controlled and facilitated manner, which significantly reduces the change of damaging and breaking (parts of) of the coupling parts, which is in favour of the reliability and durability of the connection between the panels, and hence of the panels as such.

The bridge part of the second coupling part according to the invention may for instance be understood as (merely) a part of the bridge (also referred to as shoulder) connecting the downward tongue to the core, and being provided with the at least one upper elongated slot. However, the bridge part may also be understood as being the complete bridge connected the downward tongue to the core. The bridge part may be the part of the coupling part which is extending from the top of the downward flank or from the second closed end of the elongated slot, up to the downward tongue. The slot is an elongated slot meaning that the slot length is greater than the slot width. Typically, the slot width is small, preferably smaller than or equal to 5 millimetre, more preferably smaller than or equal to 3 millimetre, and most preferably smaller than or equal to 1.5 millimetre. Typically, the slot length is larger than 1.5 millimetre, and commonly larger than 2.5 millimetre. Dependent on the panel thickness and the material used, the slot length may even exceed 5

millimetre. The maximum slot length is limited in order to secure that the bridge parts remains sufficiently strong to stay intact during coupling and uncoupling. The first coupling part and the second coupling part preferably form an integral part of the core. From a structural, production engineering and logistics viewpoint this

5 integral connection between the core and the coupling parts is generally recommended. However, it is also imaginable that the first coupling part and/or the second coupling part (or parts thereof) are separate components which are connected, for example glued and/or mechanically attached, as separate components to the core.

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The slot may have a longitudinal axis having at least a component extending in a direction perpendicular to a (virtual) plane defined by the core. For instance, when the panel is a floor panel lying on a floor which extends horizontally, the slot may have a longitudinal axis having at least a vertical component. The vertical

15 component provides for a local thinning of the bridge part, and thus formation of a weakened area, and preferably the weakest area, of the bridge part, formed in between the (closed) end of the elongated slot and an upper side of the panel. The thinnest part of the second coupling part, measured from the upper side of the panel to the downward groove, is commonly located at the end of the elongated

20 slot. The thinnest part of the second coupling part, measured from the upper side of the panel to the downward groove, is commonly located at the end of the elongated slot. The thinnest part of the second coupling part, measured (as shortest distance) from the upper side of the panel to the (closed) end of the elongated slot, has a thickness which is preferably less than half (50%) the thickness of the core of the

25 panel, in particular less than a third (33%) of the thickness of the core of the panel. At the other hand, the thinnest part of the second coupling part, measured from the upper side of the panel to the (closed) end of the elongated slot, has a thickness which is preferably more than 10% of the thickness of the core of the panel, in particular more than 20% of the thickness of the core of the panel, in order to

30 secure sufficient robustness to the bridge part.

The slot may have a longitudinal axis having a direction with a component extending in a direction perpendicular to the abovementioned plane of the core and a component extending in the direction of the plane of the core, wherein the angle

35 enclosed by the longitudinal axis and the direction perpendicular to the plane of the

core lies between 0 and 85 degrees, in particular lies between 25 and 60 degrees, and is in particular is about 45 degrees. For instance, when the panel is a floor panel lying on a floor which extends horizontally, the elongated slot may have a longitudinal axis having at least a vertical component and a horizontal component.

- 5 The component extending in the direction of the (virtual) plane of the core is preferably directed towards the core of the panel, or is directed inwardly. This will result in an inwardly extending elongated slot. Here, the horizontal component is used to position the (closed) end of the elongated slot inwardly compared to the downward flank, which would elongate the bridge part between the core and the
- 10 downward tongue. When forces are to be applied to the tongues during coupling, the elongated bridge part creates a longer arm for applying this force, and furthermore limits the amplitude of the deformation (in a direction perpendicular to the plane of the panel). This will be reduce material stress during coupling and uncoupling, which will be in favour of the reliability and durability of the panel
- 15 connection.

- The upper elongated slot may also have a longitudinal axis having a direction with a component extending in a direction perpendicular to the plane of the core and a component extending in the direction of the plane of the core (i.e. parallel to the
- 20 core), wherein the angle enclosed by the longitudinal axis and the upper side of the core lies between 2 and 90 degrees, in particular lies between 25 and 60 degrees, and in particular is about 45 degrees. For instance, when the panel is a floor panel lying on a floor which extends horizontally, the slot may have a longitudinal axis having at least a vertical component and a horizontal component. The component
- 25 extending in the direction of the plane of the core may for instance be directed towards the core of the panel, or is directed inwardly. The horizontal component may thus be used to place the (closed) end of the elongated slot inwardly compared to the downward flank. This elongates the bridge part between the core and the downward tongue. When forces are to be applied to the tongues during
- 30 coupling, the elongated bridge part creates a longer arm for applying this force, and furthermore limits the amplitude of the deformation (in a direction perpendicular to the plane of the panel).

- The longitudinal axis of the slot may be directed towards the direction perpendicular
- 35 to the plane of the core, such that the direction perpendicular to the plane defined

by the core and the longitudinal axis intersect. This way, the slot is, from its open end to its closed end, directed towards the core of the panel, which results in an inward direction of the slot. By directing the slot inwardly, the distance between (an upper part of) the core and the downward tongue may be increased, which
5 provides a longer arm for applying a coupling force, and limits the amplitude of the deformation, and hence limits material stress during coupling and/or uncoupling. The open first end of the slot may be arranged at the transition between the bridge part and the core, or at the transition between the bridge part and the downward flank. By providing the slot at the transition, the slot may be used to prolong, or
10 elongate, the bridge part.

At least a part of a side of the upward tongue facing toward the upward flank may form an upward aligning edge for the purpose of coupling the first coupling part to a second coupling part of an adjacent panel. The aligning edge aids in the mutual
15 alignment of two panels (to be coupled). This aligning edge may help to guide the downward tongue towards the upward groove, which groove initially is too narrow to allow insertion of the downward tongue, before deformation of the upper bridge part. The upward aligning edge is preferably flat (non-curved and non-profiled) and/or inclined to provide an improved sliding surface.

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At least a part of a side of the upward tongue facing away from the upward flank may be provided with a first locking element, and the downward flank may be provided with a second locking element, wherein each locking element may be adapted to co-act with another locking element of an adjacent panel. The locking
25 elements may be used to provide a locking against vertical and/or rotational uncoupling of two coupled floor panels. In another embodiment variant the first locking element comprises at least one outward bulge, and the second locking element comprises at least one recess, which outward bulge is adapted to be at least partially received in a recess of an adjacent coupled floor panel for the
30 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.

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In an embodiment of the floor panel according to the invention the first locking element is positioned at a distance from an upper side of the upward tongue.

Positioning the first locking element at a distance from the upper side of the upward tongue has a number of advantages. A first advantage is that this positioning of the first locking element can facilitate the coupling between adjacent floor panels, since the first locking element will be positioned lower than (a lower part of) the aligning edge of the upward tongue, whereby the coupling between two coupling parts can be performed in stages. During the coupling process the tongue sides facing toward the associated flanks will first engage each other, after which the locking elements engage each other, this generally requiring a less great maximum pivoting (amplitude), and thereby deformation of a second coupling part of an adjacent floor panel, than if the first aligning edge and the first locking element were to be located at more or less the same height. A further advantage of positioning the first locking element at a distance from an upper side of the upward tongue is that the distance to the resilient connection between each coupling part and the core, generally formed by the resilient bridge of each coupling part, is increased, whereby a torque exerted on the coupling parts can be compensated relatively quickly by the locking elements, which can further enhance the reliability of the locking.

The elongated slot may be provided with an elastic insert, such as a rubber insert. Such elastic insert may be used to provide a waterproof seal between the coupling parts in coupled condition. The insert may also be used to prevent closing of the elongated slot through deformation of the bridge part, which insert does not impede opening of the elongated slot through deformation. This way, unintentional closing and thus hindering of coupling of two panels, can be prevented. In coupled condition, the elongated slot may be essentially free of (tongue) material of another panel, which prevents hindering of deformation of the bridge part. The insert may for instance be formed of silicon, (natural) rubber, EPDM, PU, PVC, or a thermoplastic material. Preferably, the elastic insert co-acts in a sealing manner with an upward tongue of an adjacent panel (in coupled condition).

The open first end of the elongated slot may be located at a distance from both the downward flank and the downward tongue. More in particular the open end of the elongated slot may be situated in between the top of the downward flank and a

position halfway between the top of the downward flank and the side of the downward tongue facing toward the downward flank. The open end of the elongated slot may thus be located on the first half of the bridge part closest to the core of the panel. By having the open end of the slot relatively close to the core of the panel, the length of the coupling part following the slot towards the outside is also relatively large, which provides a relatively long arm facilitating deformation of the bridge part of the second coupling part.

The elongated slot may have a length which is at least two times the width of the slot, preferably at least three times the width of the slot. The elongated slot may be considered a long slit or slot, which function is to locally interrupt the material of the panel to create a weakest, or thinnest, area in the bridge part to facilitate deformation at this weakest, or thinnest, area.

The closed second end of the elongated slot may be rounded. Having a rounded end of the slot may be used to distribute forces exerted on the panel, for instance when walked upon, equally and gradually over the material beneath the slot. A sharp transition for instance would increase the risk of tearing or splitting because peak forces may occurs at the sharp angles of the transition.

A lower side (lower surface) of the bridge part of the second coupling part defining an upper side (upper surface) of the downward groove may be at least partially inclined, and preferably extends downward towards the core of the panel. The upper side (upper surface) of the upward tongue may, as well, be at least partially inclined, wherein the inclination of this upper side of the upward tongue and the inclination of the bridge part of the second coupling part may be identical, though wherein it is also imaginable that both inclinations for instance mutually enclose an angle between 0 and 5 degrees. The inclination of the bridge part of the second coupling part creates a natural weakened area of the bridge part, where deformation is likely to occur. This weakened area may for instance be the location where the elongated slot is provided, which increases or enlarges the weakened area. Alternatively, the slot may be provided on a different location, to distribute weakened zones over the bridge part and distribute deformation over the bridge part. This decreases the chances of the bridge part being damaged or fails upon coupling of the panels.

The first coupling part may also comprise a resilient lower bridge part connecting the upward tongue to the core of the panel, wherein the bridge part may be configured to deform during coupling of the panels, to widen the upward groove temporarily, facilitating introduction of the downward tongue in the widened upward groove, and said lower bridge part may be provided with at least one lower elongated slot, wherein the elongated slot may have an open first end connecting to the upward groove, and a closed second end, wherein the second closed end may define a weakened area, preferably the weakest area, of said lower bridge part, such that deformation of the bridge is facilitated at that location of the slot. Similarly to the upper bridge part of the second coupling part, the lower elongated slot on the first coupling part serves a similar purpose. It is imaginable that, at least in an uncoupled condition and possibly also in a coupled condition, at least a part of the first coupling part is situated at a higher level than the lower side of the panel (facing the core). Here, at least a part of the first coupling part be inclined upwardly in uncoupled condition, which may additionally facilitate bending down (downward deformation) during coupling, leading to less material stress both in the first coupling part (of a first panel) and the second coupling part (of a second panel) during coupling. In an embodiment of the panel according to the invention, it is imaginable that the lower bridge part (of the first coupling element) is provided with at least lower elongated slot, while the upper bridge part (of the second coupling element) is not provided with an upper elongated slot.

The panel may be elongated, in particular rectangular, wherein the first and second coupling parts are provided on the short sides of the panel. On the long sides of the panel in that case typically an angling in profile is present. Coupling of panels, and floor panels in particular, is typically done by angling a new panel in a groove of an existing, already laid, panel. Difficulty in these situations lies in providing a relatively strong connecting on the short sides of the panels, which is preferably obtained during the same angling motion along the long sides. In that case, first and second coupling parts can be configured to be coupled with a zipping motion, wherein the first and second coupling parts are particularly configured to be coupled during an angling movement on one of the long sides of the panel.

Alternatively, the panel may be elongated, wherein the first and second coupling parts are provided on the long sides of the panel, and wherein the first and second coupling parts are configured to be coupled with a zipping motion, wherein the first and second coupling parts are particularly configured to be coupled during an angling movement on one of the short sides of the panel.

In an embodiment a plurality of sides of the floor panel comprise the first coupling part, and a plurality of other sides of the floor panel comprise the second coupling part. Each first coupling part and each second coupling part are preferably situated on opposite sides of the floor panel. By positioning the first coupling part and the second coupling part on opposite sides it will be relatively simple for a user to lay a floor formed by floor panels according to the invention, since each floor panel can be formed in the same way. However, it is also conceivable that a first coupling part is situated on a side of the panel, wherein a second coupling part is situated on an adjacent side of said panel. In this way each side of the floor panel can be provided with a (first or second) coupling part, this increasing the coupling options of the floor panel. Each panel can have exactly the same configuration. However, it is also imaginable that different types of panels according to the invention, for example a first type A and a second type B, are used. The two types are in this embodiment identical except that the location of the coupling parts is mirror-inverted. Several variants may be used. The two types of panels need not be of the same format, and the coupling parts can also be of different shapes provided that they can be joined. Hence, this may lead to a flooring according to the invention, comprising two (or more) different types of floorboards (A and B respectively), wherein the coupling part of one type of floorboard (A) along one pair of opposite edge portions are arranged in a mirror-inverted manner relative to the coupling parts along the same pair of opposite edge portions of the other type of floorboard (B).

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

5 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

10 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

15 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, and may be part of a composite material to be used as core material. 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,

20 cork dust, or non-wood dust, like mineral dust, 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

25 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 at least one mineral, ceramics and/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.

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

The invention will be elucidated on the basis of non-limitative exemplary

35 embodiments shown in the following figures. Herein:

- Figure 1 schematically shows a panel according to the present invention;
 - Figure 2 schematically shows a panel according to the present invention;
 - Figure 3 schematically shows the coupling parts of two panels in coupled condition according to the present invention;
 - 5 - Figures 4A-4C schematically show the coupling of two coupling parts according to the present invention; and
 - Figures 5A-5C schematically show different locations of the elongated slot in a panel according to the present invention.
- 10 Figure 1 schematically shows a panel (1), comprising a centrally located core (2) provided with an upper side (2a) and a lower side (2b), which core defines a plane. The panel (1) is further provided with a first coupling part (3) and second resilient coupling part (4) connected respectively to opposite edges of the core (2). The first coupling part (3) comprises an upward tongue (5), an upward flank (6) lying at a
- 15 distance from the upward tongue (5) and an upward groove (7) formed between the upward tongue (5) and the upward flank (6) wherein the upward groove (7) is adapted to receive at least a part of a downward tongue (9) of an adjacent panel (1). A part of a side (8) of the upward tongue (5) facing toward the upward flank (6) extends towards the core (2) of the panel (1). The angle (α) enclosed by on the one
- 20 hand the direction in which the side (8) of the upward tongue (5) extends and on the other a direction (N1, N2) perpendicular to the plane of the core (2) lies between 1 and 5 degrees. The direction perpendicular to the plane of the core (2) is defined by the upper normal (N1) and the lower normal (N2) of the core (2).
- 25 The second coupling part (4) comprises a downward tongue (9), a downward flank (10) lying at a distance from the downward tongue (9), and a downward groove (11) formed between the downward tongue (9) and the downward flank (10), wherein the downward groove (11) is adapted to receive at least a part of an upward tongue (5) of an adjacent panel (1). A part of a side (12) of the downward tongue (9) facing
- 30 toward the downward flank (10) extends towards the core (2). The angle (β) enclosed by on the one hand the direction in which the side (12) of the downward tongue (9) extends and on the other a direction (N1, N2) perpendicular to the plane of the core (2) lies between 1 and 5 degrees. The direction perpendicular to the plane of the core (2) is defined by the upper normal (N1) and the lower normal (N2)
- 35 of the core (2).

The second coupling part (4) comprises a resilient bridge part (13) connecting the downward tongue (9) to the core (2) of the panel (1), wherein the bridge part (13) is configured to deform during coupling of adjacent panels (1), to widen the downward groove (11), facilitating introduction of the upward tongue (5) in the widened downward groove (11). The bridge part (13) is thereto provided with an elongated slot (14), wherein the elongated slot (14) has an open first end (15) connecting to the downward groove (11), and a closed second end (16), wherein the closed second end (16) defines a weakest area (17) of said bridge part (13), where the bridge part (13) has the smallest (material) thickness, such that deformation of the bridge (13) is facilitated at that location of the slot (14), in particular the location of the closed second end (16) of the slot (14).

The slot (14) in figure 1 has a longitudinal axis (L) having a direction with a component in a direction (N1) perpendicular to the plane of the core (2) and a component in the direction of the plane of the core (2), wherein the angle (γ_1) enclosed by the longitudinal axis (L) and the direction (N1) perpendicular to the plane of the core (2) is about 45 degrees. In figure 1, the upper side (2a) of the core (2) is flat, such that the angle (γ_1) enclosed by the longitudinal axis (L) and the upper side (2a) of the core also is about 45 degrees.

Figure 2 schematically shows the panel of figure 1, wherein the coupling parts (3, 4) are embodied slightly different. Another side (17) of upward tongue (5) facing toward upward flank (6) forms an aligning edge (17) enabling facilitated realization of a coupling to an adjacent panel (1). As shown, this side (17) functioning as aligning edge (17) is directed away from the normal N1 of upper side (2a) of the core (2). An upper side (18) of upward tongue (18) extend in the direction of the normal N1 of upper side (2a) of core (2), and runs inclining downward in the direction of the side (19) of upward tongue (5) facing away from upward flank (6). This chamfering provides the option of giving the complementary second coupling part (4) a more robust and therefore stronger form. The side (19) of upward tongue (5) facing away from upward flank (6) is oriented substantially vertically and is moreover provided with a locking element (20), shown as an outward bulge (20). A lower part (21) of upward flank (6) is oriented diagonally, while an upper part (22) of upward flank (6) is shown to be substantially vertical and forms a stop surface for

second coupling part (4). A lower wall part (23) of upward groove (7) is oriented substantially horizontally in this exemplary embodiment. A bridge (24) lying between lower wall part (23) of upward groove (7) and a lower side (2b) connects the upward tongue (5) and the core (2).

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A side (25) facing away from downward flank (10) is diagonally oriented, but may have a flatter orientation than the complementary side (21) of upward flank (6), whereby a gap (air space) will be formed in the coupled position. The inclining side (25) of downward tongue (9) also functions as aligning edge (25) for the purpose of further facilitating coupling between two panels (1). Another side (26) facing away from downward flank (10) takes a substantially vertical form and forms a complementary stop surface (26) to the stop surface (22) of upward flank (6) of an adjacent panel (1). Downward tongue (9) is further provided with a side (27) which is facing toward downward flank (10) and which functions as aligning edge (27) for first coupling part (3) of an adjacent panel (1). Because upper side (18) of upward tongue (5) has an inclining orientation, an upper side (28) of downward groove (11) has a similar inclining orientation, whereby the (average) distance between upper side (28) of downward groove (11) and an upper side (18) of second coupling part (4) is sufficiently large to impart sufficient strength to second coupling part (4) as such. Downward flank (10) is oriented substantially vertically and is provided with a locking element (29), embodied as a recess (29) adapted to receive the outward bulge (20) of the upward tongue (5) of an adjacent panel (1).

Figure 3 schematically shows the coupling parts (3, 4) of two panels as shown for instance in figure 1, in coupled condition. The elongated slot (14), in coupled condition, is free of any material of the tongues (5, 9).

Figures 4A-4C schematically show the coupling of two coupling parts, for instance as shown in figures 1 or 3. In figure 4A, two adjacent panels (1) are close together, but uncoupled. The downward tongue (9) of one panel (1) is located above the upward groove (7) of another panel (1). Since the side (8) of the upward tongue (5) facing towards the upward flank (6) is directed towards the core (2), or inwardly, the coupling parts require deformation for coupling. In

In figure 4B the deformation of the bridge part (13) of the second coupling part of one of the panels (1) is shown. At the location of the closed end (16) of the elongated slot (14) the bridge part (13) is thinnest, and thus weakest. At that location, the bridge part (13) pivots, wherein the downward tongue (9) is turned
5 upwards slightly. This pivots the downward tongue (9) slightly such that the downward tongue (9) can be placed into the upward groove (7). The deformation widens the elongated slot (14), at least temporarily.

In figure 4C, the panels (1) are coupled. The elongated slot (14) returned to its
10 original shape and dimension, while the sides (8, 12) of the tongues (5, 9) grip behind each other, forming both a horizontal as vertical locking of the panels (1).

Figures 5A-5C schematically show different locations of the elongated slot (14) in a panel (1). In all embodiments the slot (14) is located in the bridge part (13) of the
15 second coupling part of the panel (1).

It will be apparent that the invention is not limited to the working examples shown and described herein, but that numerous variants are possible within the scope of the attached claims that will be obvious to a person skilled in the art.

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The above-described inventive concepts are illustrated by several illustrative embodiments. It is conceivable that individual inventive concepts may be applied without, in so doing, also applying other details of the described example. It is not necessary to elaborate on examples of all conceivable combinations of the above-
25 described inventive concepts, as a person skilled in the art will understand numerous inventive concepts can be (re)combined in order to arrive at a specific application.

The verb "comprise" and conjugations thereof used in this patent publication are
30 understood to mean not only "comprise", but are also understood to mean the phrases "contain", "substantially consist of", "formed by" and conjugations thereof.

Conclusies

1. Paneel, in het bijzonder een vloerpaneel, omvattende:
 - een centraal gelegen kern voorzien van een bovenzijde en een onderzijde,
- 5 waarbij de kern een vlak definieert;
 - ten minste één eerste koppeldeel en ten minste één tweede verend koppeldeel, respectievelijk gekoppeld aan tegenovergelegen zijden van de kern,
 - o welk eerste koppeldeel een opwaartse tong, ten minste één opwaartse flank gelegen op een afstand van de opwaartse tong en een opwaartse groef
 - 10 gevormd tussen de opwaartse tong en de opwaartse flank omvat, waarbij de opwaartse groef is ingericht voor opname van ten minste een deel van een neerwaartse tong van een tweede koppeldeel van aan naastgelegen paneel, waarbij:
 - ten minste een deel van een naar de opwaartse flank toegekeerde
 - 15 zijde van de opwaartse tong richting de opwaartse flank neigt
 - o welk tweede koppeldeel een neerwaartse tong, ten minste één neerwaartse flank gelegen op een afstand van de neerwaartse tong en een neerwaartse groef gevormd tussen de neerwaartse tong en de neerwaartse flank omvat, waarbij de neerwaartse groef is ingericht voor opname van ten minste een
 - 20 deel van een opwaartse tong van een eerste koppeldeel van aan naastgelegen paneel, waarbij:
 - ten minste een deel van een naar de neerwaartse flank toegekeerde
 - zijde van de neerwaartse tong richting de neerwaartse flank neigt, waarbij het tweede koppeldeel een verende bovenste brugdeel omvat, welke de
 - 25 neerwaartse tong met de kern van het paneel verbindt, waarbij het brugdeel is ingericht om te deformeren tijdens koppeling van naastgelegen panelen, om de neerwaartse groef te verbreden en invoegen van de opwaartse tong in de verbreedde neerwaartse groef te helpen; en
 - waarbij het gegeven brugdeel is voorzien van ten minste één langwerpige bovenste
 - 30 sleuf, waarbij de langwerpige sleuf een eerste open einde heeft, verbonden met de neerwaartse groef, en een tweede gesloten eind heeft, zodanig dat een verzwakt gebied wordt gevormd in het gegeven bovenste brugdeel tussen het gegeven gesloten eind van de gegeven langwerpige sleuf en een bovenzijde van het gegeven bovenste brugdeel, om deformatie van het gegeven brugdeel te helpen.

2. Paneel volgens conclusie 1, waarbij de sleuf een langwerpige as heeft met ten minste een component die zich uitstrekt in een richting loodrecht op een door de kern gedefinieerd vlak.
- 5 3. Paneel volgens conclusie 1 of 2, waarbij de sleuf een langwerpige as heeft met een component die zich uitstrekt in een richting loodrecht op een door de kern gedefinieerd vlak en een component die zich parallel aan het door de kern gedefinieerde vlak uitstrekt, waarbij de hoek ingesloten door de langwerpige as en de richting loodrecht op het gegeven door de kern gedefinieerde vlak tussen de 0
10 en 85 graden is gelegen, in het bijzonder tussen de 25 en 60 graden is gelegen en meer in het bijzonder ongeveer 45 graden is.
4. Paneel volgens conclusie 3, waarbij de component van de langwerpige as die zich parallel aan het door de kern gedefinieerde vlak uitstrekt richting de kern is
15 gericht en/of inwaarts is gericht.
5. Paneel volgens één van de voorgaande conclusies, waarbij de langwerpige as van de sleuf richting een richting loodrecht op een door de kern gedefinieerd vlak is gericht, zodanig dat de richting loodrecht op het door de kern gedefinieerd
20 vlak en de langwerpige as snijden.
6. Paneel volgens één van de voorgaande conclusies, waarbij het eerste open einde van de sleuf is voorzien bij de overgang tussen het brugdeel en de kern, of bij de overgang tussen het brugdeel en de neerwaartse flank.
25
7. Paneel volgens één van de voorgaande conclusies, waarbij een deel van een zijde van de opwaartse tong welke richting de opwaartse flank gekeerd is een opwaartse zoekrand vormt, in het bijzonder een vlakke, hellende opwaartse zoekrand, voor koppeling van het eerste koppeldeel met een tweede koppeldeel
30 van een naastgelegen paneel.
8. Paneel volgens één van de voorgaande conclusies, waarbij ten minste een deel van een zijde van de opwaartse tong welke richting de opwaartse flank is gekeerd is voorzien van een eerste vergrendelelement, en waarbij de neerwaartse

flank is voorzien van een tweede vergrendelelement ingericht om samen te werken met een eerste vergrendelelement van een naastgelegen paneel.

5 9. Paneel volgens één van de voorgaande conclusies, waarbij de langwerpige sleuf is voorzien van een elastisch invoegsel, zoals een rubberen invoegsel, bij voorkeur ingericht om op een afdichtende wijze samen te werken met een opwaartse tong van een naastgelegen paneel.

10 10. Paneel volgens één van de voorgaande conclusies, waarbij het verzwakte gebied van het brugdeel gevormd tussen het gesloten tweede eind van de langwerpige sleuf en een bovenzijde van het brugdeel het zwakste deel van het brugdeel vormt.

15 11. Paneel volgens één van de voorgaande conclusies, waarbij de afstand tussen het gesloten tweede einde van de langwerpige sleuf en een bovenzijde van het brugdeel minder is dan de helft van de dikte van de kern van het paneel, in het bijzonder minder is dan een derde van de dikte van de kern van het paneel.

20 12. Paneel volgens één van de voorgaande conclusies, waarbij in gekoppelde toestand van twee panelen de langwerpige sleuf van het tweede koppeldeel van een eerste paneel in hoofdzaak vrij is van materiaal van een tweede paneel.

25 13. Paneel volgens één van de voorgaande conclusies, waarbij het eerste open einde van de langwerpige sleuf is gelegen op een afstand van zowel de neerwaartse flank als de neerwaartse tong.

30 14. Paneel volgens één van de voorgaande conclusies, waarbij de langwerpige sleuf een lengte heeft welke ten minste tweemaal de breedte van de sleuf is, in het bijzonder ten minste driemaal de breedte van de sleuf.

15. Paneel volgens één van de voorgaande conclusies, waarbij het gesloten tweede eind van de langwerpige sleuf een afgeronde vorm heeft.

35 16. Paneel volgens één van de voorgaande conclusies, waarbij een onderzijde van het brugdeel van het tweede koppeldeel een bovenzijde van de neerwaartse

groef definieert, waarbij de onderzijde van het brugdeel ten minste gedeeltelijk hellend is, en zich bij voorkeur uitstrekt richting de kern van het paneel.

5 17. Paneel volgens conclusie 16, waarbij de bovenzijde van de opwaartse tong ten minste gedeeltelijk geheld is, waarbij de helling van de bovenzijde van de opwaartse tong en de gelling van het brugdeel van het tweede koppeldeel is hoofdzakelijk vergelijkbaar zijn, waarbij beide hellingen bij voorbeeld onderling een hoek tussen de 0 en 5 graden insluiten.

10 18. Paneel volgens één van de voorgaande conclusies, waarbij het eerste koppeldeel een verende onderste brugdeel omvat, welke de opwaartse tong met de kern van het paneel verbindt, waarbij het brugdeel is ingericht om te deformeren tijdens koppeling van naastgelegen panelen, om de opwaartse groef tijdelijk te verbreden en invoegen van de opwaartse tong in de verbreedde neerwaartse groef
15 te helpen; en waarbij het gegeven onderste brugdeel is voorzien van ten minste één langwerpige onderste sleuf, waarbij de langwerpige sleuf een eerste open einde heeft, verbonden met de opwaartse groef, en een tweede gesloten einde heeft, zodanig dat een verzwakt gebied wordt gevormd in het gegeven onderste brugdeel tussen het gegeven gesloten einde van de gegeven langwerpige sleuf en
20 een onderzijde van het gegeven onderste brugdeel, om deformatie van het gegeven onderste brugdeel te helpen.

19. Paneel volgens één van de voorgaande conclusies, waarbij het paneel langwerpig is, en waarbij de eerste en tweede koppeldelen zijn voorzien op de
25 korte zijden van het paneel en waarbij, bij voorkeur, de tegenoverliggende lange zijden van het paneel zijn voorzien van koppeldelen in hoofdzakelijk in de vorm van een tong en een groef, welke groef wordt begrenst door een bovenlip en een onderlip, waarbij deze koppeldelen koppeling van twee van zulke panelen toestaan door middel van een draaiende beweging, waarbij elk volgende paneel lateraal in
30 de vorige kan worden gevoegd.

20. Paneel volgens conclusie 19, waarbij de eerste en tweede koppeldelen van een eerste en tweede paneel zijn ingericht om te worden gekoppeld met een zippende beweging, waarbij de eerste en tweede koppeldelen zijn het bijzonder zijn
35 ingericht om te worden gekoppeld tijdens het koppelen van een tweede en een

derde paneel langs de lange zijdes door middel van de gegeven draaiende beweging.

21. Paneel volgens één van conclusies 1-18, waarbij het paneel langwerpig is,
5 en waarbij de eerste en tweede koppeldelen zijn voorzien op de lange zijden van het paneel en waarbij, bij voorkeur, de tegenoverliggende korte zijden van het paneel zijn voorzien van koppeldelen in hoofdzaak in de vorm van een tong en een groef, welke groef wordt begrenst door een bovenlip en een onderlip, waarbij deze koppeldelen koppeling van twee van zulke panelen toestaan door middel van een
10 draaiende beweging, tijdens welke draaiende beweging de eerste koppeldelen van het tweede paneel en de tweede koppeldelen van het derde paneel zijn ingericht om te worden gekoppeld met een zippende beweging.

22. Bedekking, in het bijzonder een vloerbedekking, omvattende meerdere
15 onderling gekoppelde panelen volgens één van de voorgaande conclusies.

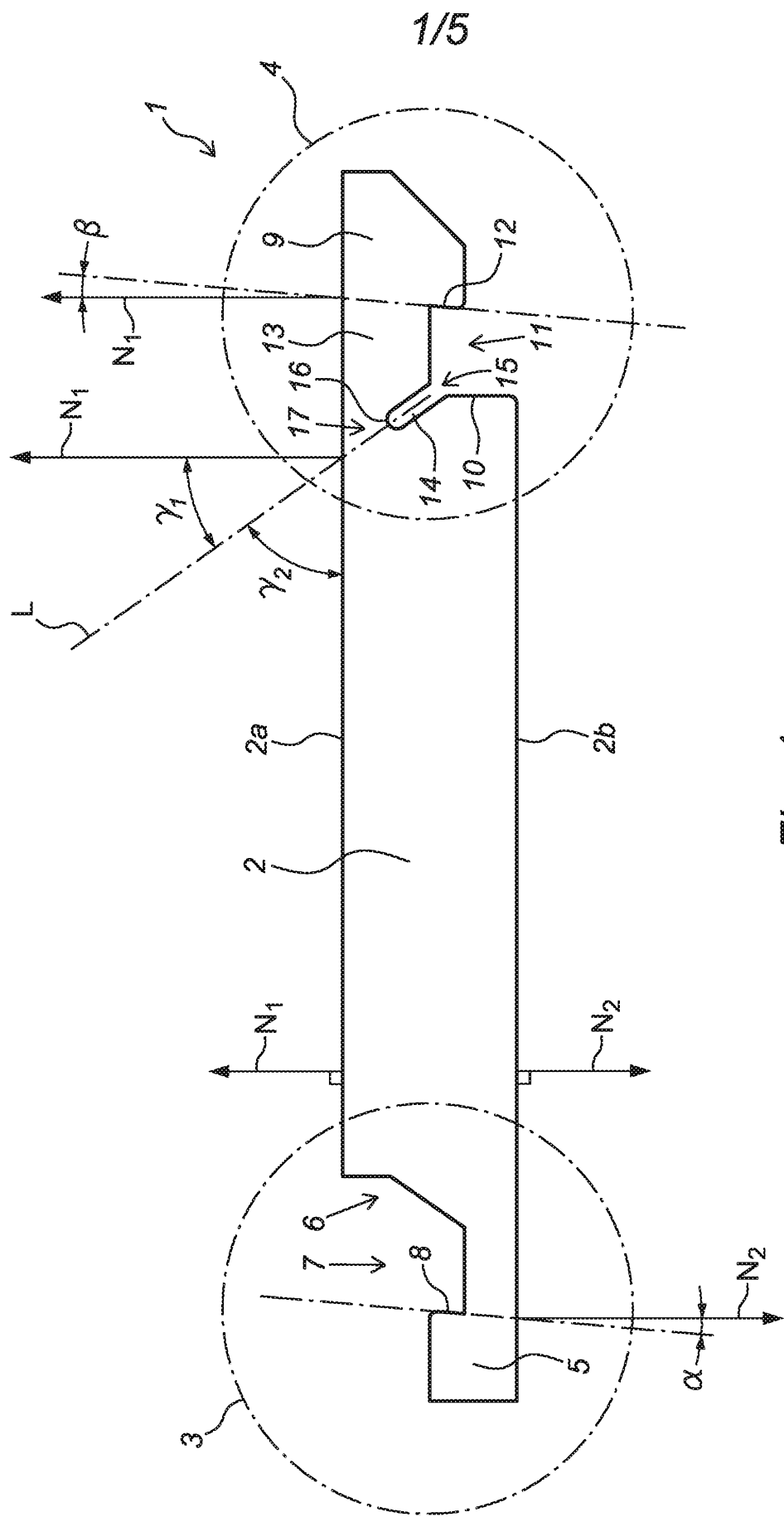


Fig. 1

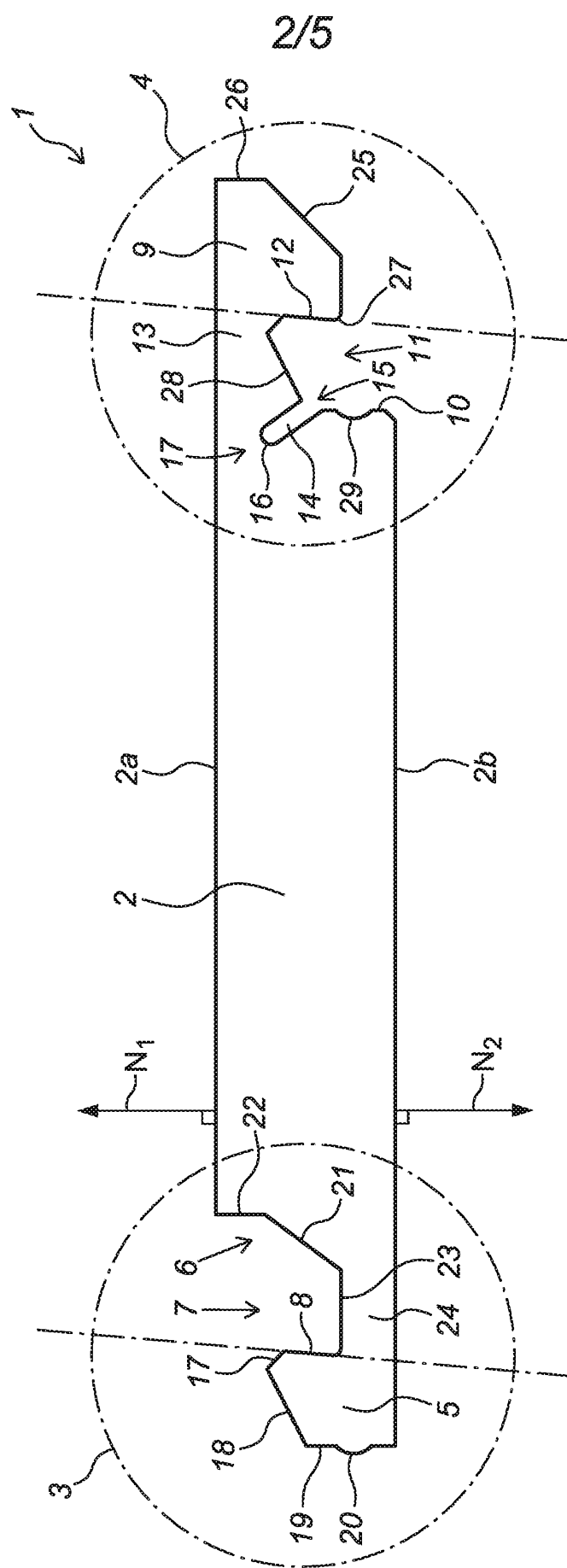


Fig. 2

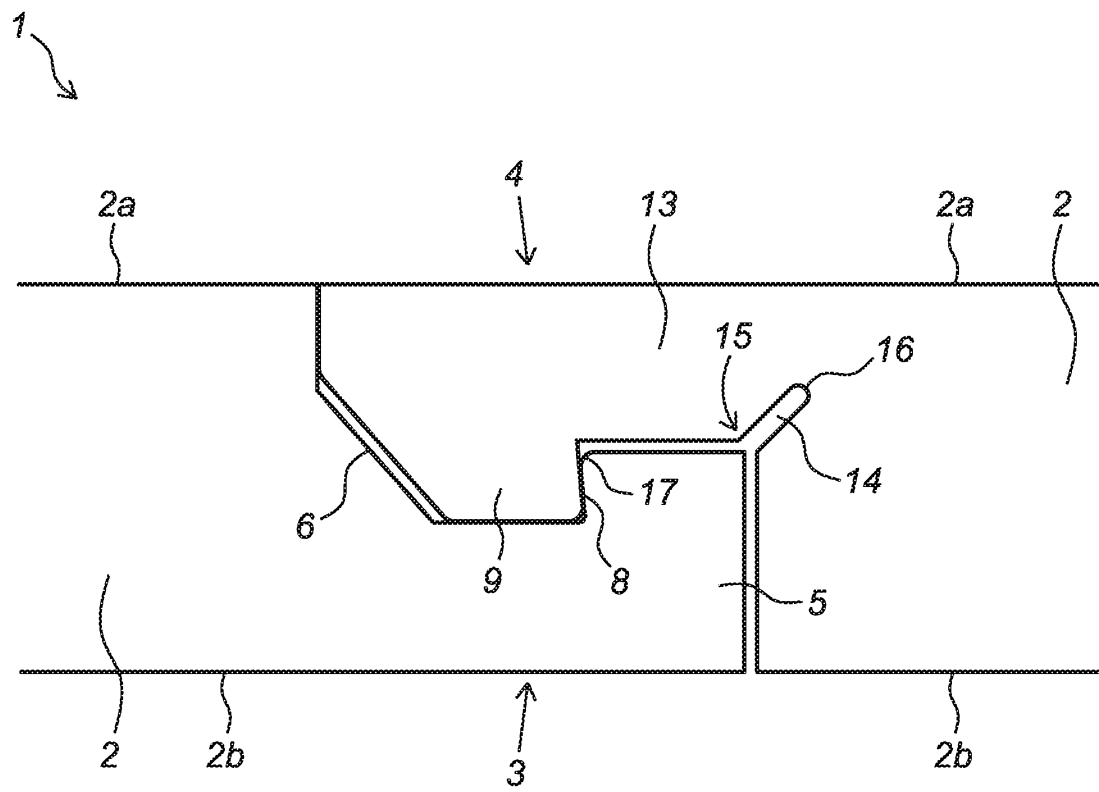


Fig. 3

4/5

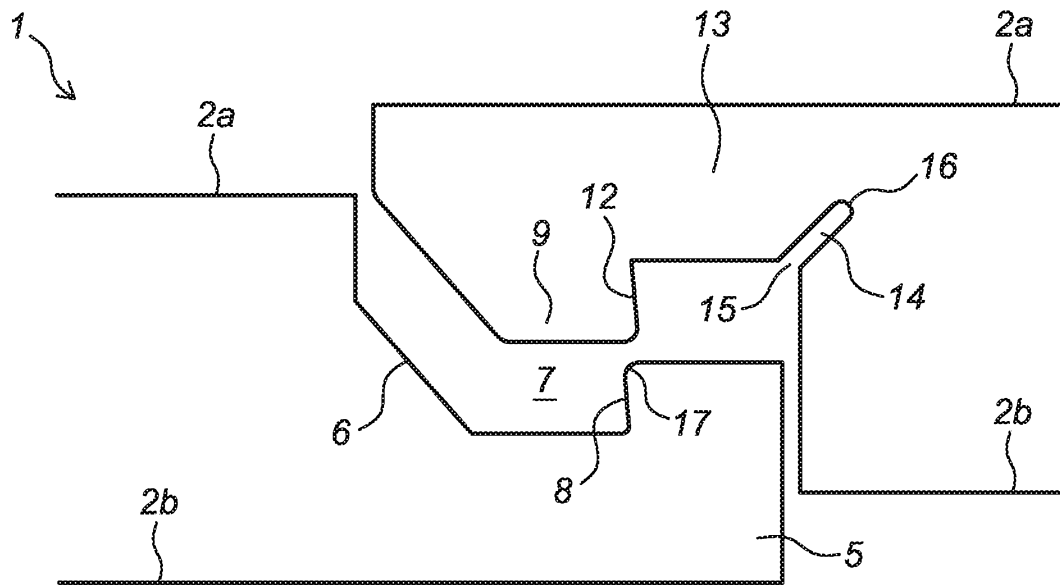


Fig. 4A

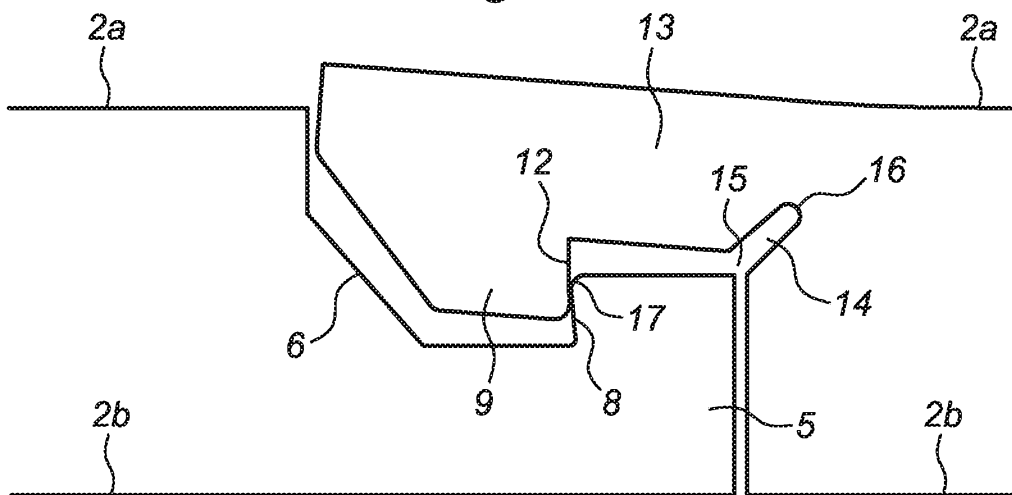


Fig. 4B

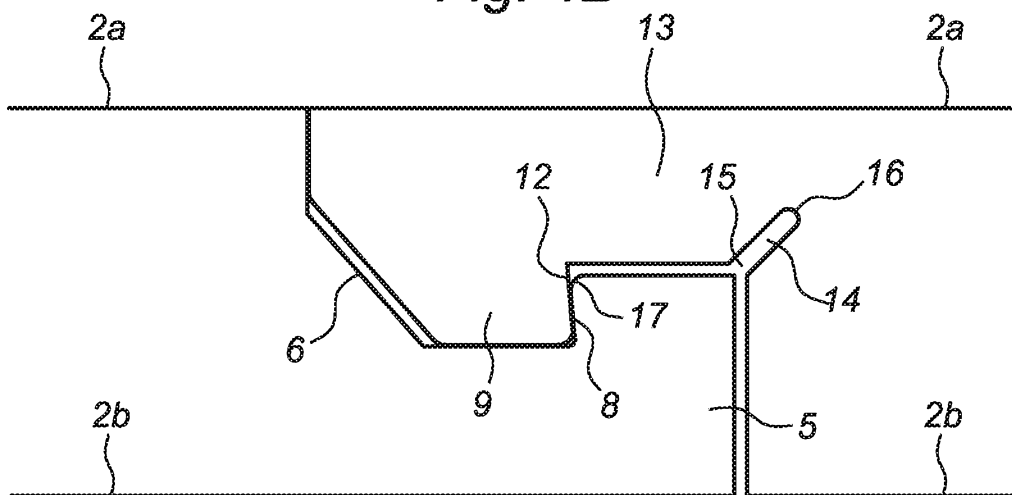


Fig. 4C

5/5

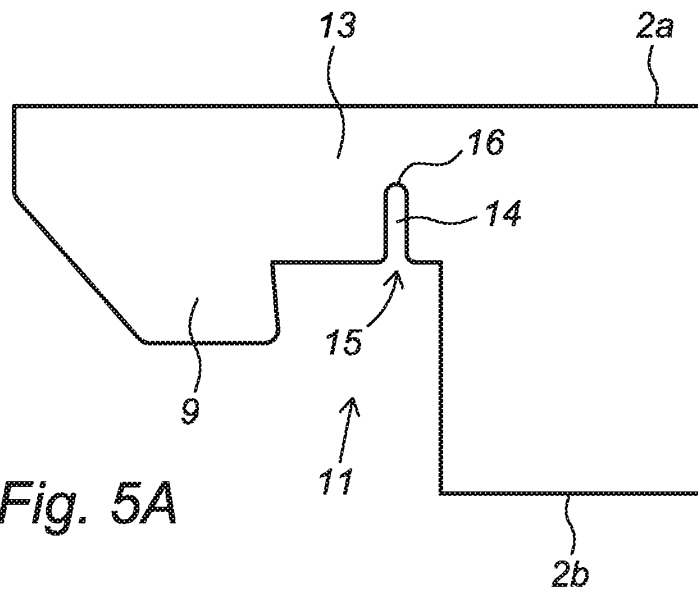


Fig. 5A

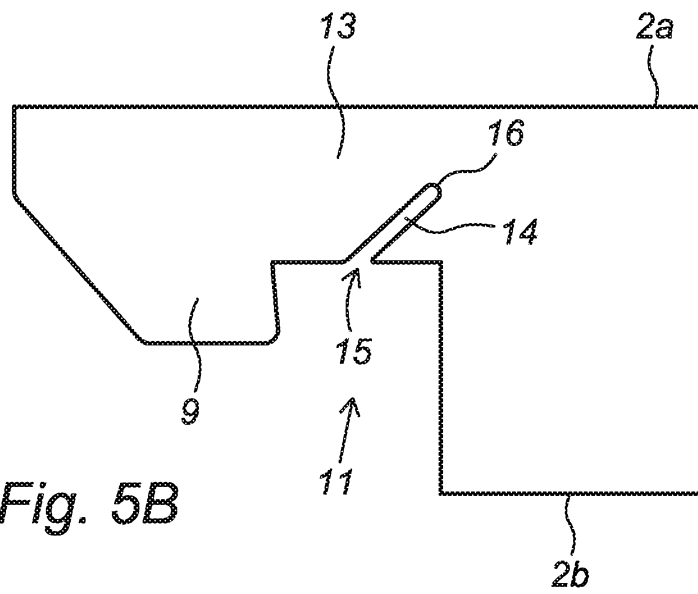


Fig. 5B

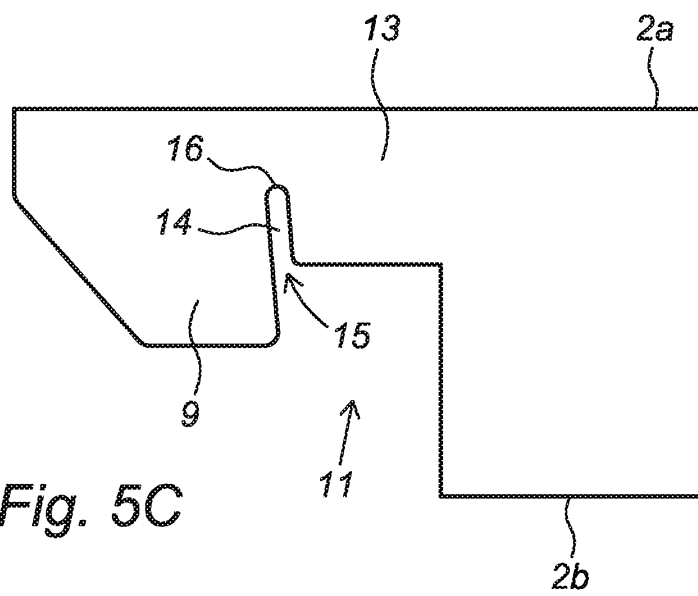


Fig. 5C

Abstract

Interconnectable panels, such as interconnectable floor panels, are generally joined mechanically at edges of the panels by using complementary coupling profiles at
5 opposite edges. Traditionally, rectangular floor panels are connected at the long edges by means of a traditional angling method. The invention relates to an interconnectable panel, in particular a floor panel.

SAMENWERKINGSVERDRAG (PCT)

RAPPORT BETREFFENDE NIEUWHEIDSONDERZOEK VAN INTERNATIONAAL TYPE

IDENTIFICATIE VAN DE NATIONALE AANVRAGE	KENMERK VAN DE AANVRAGER OF VAN DE GEMACHTIGDE
	1.133.094 NL
Nederlands aanvraag nr.	Indieningsdatum
2018781	26-04-2017
	Ingeroepen voorrangsdatum
Aanvrager (Naam)	
INNOVATIONS4FLOORING HOLDING CURAÇAO N.V.	
Datum van het verzoek voor een onderzoek van internationaal type	Door de instantie voor Internationaal Onderzoek aan het verzoek voor een onderzoek van internationaal type toegekend nr.
08-07-2017	SN69257
I. CLASSIFICATIE VAN HET ONDERWERP (bij toepassing van verschillende classificaties, alle classificatiesymbolen opgeven)	
Volgens de internationale classificatie (IPC)	
E04F15/02;E04F15/10	
II. ONDERZOCHE GEBIEDEN VAN DE TECHNIEK	
Onderzochte minimumdocumentatie	
Classificatiesysteem	Classificatiesymbolen
IPC	E04F
Onderzochte andere documentatie dan de minimum documentatie, voor zover dergelijke documenten in de onderzochte gebieden zijn opgenomen	
III.	☐ GEEN ONDERZOEK MOGELIJK VOOR BEPAALDE CONCLUSIES (opmerkingen op aanvullingsblad)
IV.	☐ GEBREK AAN EENHEID VAN UITVINDING (opmerkingen op aanvullingsblad)

**ONDERZOEKSRAPPORT BETREFFENDE HET
RESULTAAT VAN HET ONDERZOEK NAAR DE STAND
VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE**

Nummer van het verzoek om een onderzoek naar
de stand van de techniek

NL 2018781

A. CLASSIFICATIE VAN HET ONDERWERP INV. E04F15/02 E04F15/10 ADD.		
Volgens de internationale Classificatie van octrooien (IPC) of zowel volgens de nationale classificatie als volgens de IPC.		
B. ONDERZOCHE GEBIEDEN VAN DE TECHNIEK Onderzochte minimum documentatie (classificatie gevolgd door classificatiesymbolen) E04F		
Onderzochte andere documentatie dan de minimum documentatie, voor dergelijke documenten, voor zover dergelijke documenten in de onderzochte gebieden zijn opgenomen		
Tijdens het onderzoek geraadpleegde elektronische gegevensbestanden (naam van de gegevensbestanden en, waar uitvoerbaar, gebruikte trefwoorden) EPO-Internal, WPI Data		
C. VAN BELANG GEACHTE DOCUMENTEN		
Categorie	Geciteerde documenten, eventueel met aanduiding van speciaal van belang zijnde passages	Van belang voor conclusie nr.
X	FR 2 826 392 A1 (BECKER ARNAUD [FR]) 27 december 2002 (2002-12-27)	1-14, 16, 17, 22
Y	* bladzijde 6, regels 15-29; figuur 2 *	19-21
X	WO 2012/126046 A1 (INOTEC INTERNAT PTY LTD [AU]; KELL RICHARD WILLIAM [AU]) 27 september 2012 (2012-09-27) * bladzijde 45, regels 5-17; figuren 23a-23c * * bladzijde 46, regels 11-17 * * bladzijde 18, regels 6-18 *	1, 2, 7-13, 15-18, 22
Y	DE 202 03 311 U1 (HUELSTA WERKE HUELS KG [DE]) 8 mei 2002 (2002-05-08) * figuren 1, 2 *	19-21
	-/-	
☒ Verdere documenten worden vermeld in het vervolg van vak C. ☒ Leden van dezelfde octrooifamilie zijn vermeld in een bijlage		
* Speciale categorieën van aangehaalde documenten "A" niet tot de categorie X of Y behorende literatuur die de stand van de techniek beschrijft "D" in de octrooiaanvraag vermeld "E" eerdere octrooi(aanvraag), gepubliceerd op of na de indieningsdatum, waarin dezelfde uitvinding wordt beschreven "L" om andere redenen vermelde literatuur "O" niet-schriftelijke stand van de techniek "P" tussen de voorrangsdatum en de indieningsdatum gepubliceerde literatuur "T" na de indieningsdatum of de voorrangsdatum gepubliceerde literatuur die niet bezwarend is voor de octrooiaanvraag, maar wordt vermeld ter verheldering van de theorie of het principe dat ten grondslag ligt aan de uitvinding "X" de conclusie wordt als niet nieuw of niet inventief beschouwd ten opzichte van deze literatuur "Y" de conclusie wordt als niet inventief beschouwd ten opzichte van de combinatie van deze literatuur met andere geciteerde literatuur van dezelfde categorie, waarbij de combinatie voor de vakman voor de hand liggend wordt geacht "Z" lid van dezelfde octrooifamilie of overeenkomstige octrooipublicatie		
Datum waarop het onderzoek naar de stand van de techniek van internationaal type werd voltooid 12 januari 2018		Verzenddatum van het rapport van het onderzoek naar de stand van de techniek van internationaal type
Naam en adres van de instantie European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040 Fax: (+31-70) 340-3016		De bevoegde ambtenaar Fournier, Thomas

**ONDERZOEKSRAPPORT BETREFFENDE HET
RESULTAAT VAN HET ONDERZOEK NAAR DE STAND
VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE**

Nummer van het verzoek om een onderzoek naar
de stand van de techniek

NL 2018781

C. (Vervolg). VAN BELANG GEACHTE DOCUMENTEN

Categorie *	Geciteerde documenten, eventueel met aanduiding van speciaal van belang zijnde passages	Van belang voor conclusie nr.
A	EP 2 390 437 A2 (HAMBERGER INDUSTRIEWERKE GMBH [DE]) 30 november 2011 (2011-11-30) * figuren 1, 2 *	1-22
A	----- DE 103 05 695 A1 (COORS STEFAN [DE]; HAENSEL ULLRICH [DE]; REISNER MARKUS [DE]) 16 september 2004 (2004-09-16) * figuur 3 *	1-22
A	----- WO 2015/130169 A1 (INNOVATIONS 4 FLOORING HOLDING N V) 3 september 2015 (2015-09-03) * het gehele document *	1-22

**ONDERZOEKSRAPPORT BETREFFENDE HET
RESULTAAT VAN HET ONDERZOEK NAAR DE STAND
VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE**

Informatie over leden van dezelfde octrooifamilie

Nummer van het verzoek om een onderzoek naar
de stand van de techniek

NL 2018781

In het rapport genoemd octrooi geschrift	Datum van publicatie	Overeenkomend(e) geschrift(en)	Datum van publicatie
FR 2826392	A1	27-12-2002	GEEN
WO 2012126046	A1	27-09-2012	BR 112013023790 A2 06-12-2016 CA 2866109 A1 27-09-2012 CN 103547749 A 29-01-2014 EP 2686502 A1 22-01-2014 JP 6254519 B2 27-12-2017 JP 2014513757 A 05-06-2014 KR 20140050596 A 29-04-2014 RU 2013146212 A 27-04-2015 SG 193535 A1 30-10-2013 WO 2012126046 A1 27-09-2012
DE 20203311	U1	08-05-2002	GEEN
EP 2390437	A2	30-11-2011	DE 102010021436 A1 01-12-2011 EP 2390437 A2 30-11-2011
DE 10305695	A1	16-09-2004	GEEN
WO 2015130169	A1	03-09-2015	AU 2015223563 A1 06-10-2016 CA 2940587 A1 03-09-2015 CN 106164393 A 23-11-2016 DE 202015009173 U1 07-11-2016 DK 3105392 T3 03-07-2017 EP 3105392 A1 21-12-2016 EP 3219870 A1 20-09-2017 ES 2628220 T3 02-08-2017 HR P20170862 T1 08-09-2017 HU E033147 T2 28-11-2017 JP 2017511851 A 27-04-2017 KR 20160146670 A 21-12-2016 LT 3105392 T 25-07-2017 PL 3105392 T3 29-09-2017 PT 3105392 T 26-06-2017 SI 3105392 T1 31-08-2017 US 2017037640 A1 09-02-2017 WO 2015130169 A1 03-09-2015

WRITTEN OPINION

File No. SN69257	Filing date (day/month/year) 26.04.2017	Priority date (day/month/year)	Application No. NL2018781
International Patent Classification (IPC) INV. E04F15/02 E04F15/10			
Applicant INNOVATIONS4FLOORING HOLDING CURAÇAO N.V.			

This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the application
- ☒ Box No. VIII Certain observations on the application

Examiner Fournier, Thomas

WRITTEN OPINION

Application number

NL2018781

Box No. I Basis of this opinion

1. This opinion has been established on the basis of the latest set of claims filed before the start of the search.
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ on paper
 - ☐ in electronic form
 - c. time of filing/furnishing:
 - ☐ contained in the application as filed.
 - ☐ filed together with the application in electronic form.
 - ☐ furnished subsequently for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty	Yes: Claims	19-21
	No: Claims	1-18, 22
Inventive step	Yes: Claims	
	No: Claims	1-22
Industrial applicability	Yes: Claims	1-22
	No: Claims	

2. Citations and explanations

see separate sheet

WRITTEN OPINION

Application number

NL2018781

Box No. VII Certain defects in the application

see separate sheet

Box No. VIII Certain observations on the application

see separate sheet

- 1 In the following an English translation of the claims wording has been adopted.

The valid wording is nevertheless the filed dutch claim wording.

Re Item VIII

Clarity

- 2 Following slight ambiguities have been observed.

- 2.1 Claim 1, refers to "a second coupling part of an adjacent panel" instead of "**the** second coupling part of an adjacent panel **of the same type**".

- 2.2 Claim 8 defines that "at least a part of a side of the upward tongue **facing toward the upward flank** is provided with a first locking element".

Nevertheless, page 5, lines 21-22 and figure 2 discloses that "least a part of a side of the upward tongue **facing away from the upward flank** may be provided with a first locking element".

- 2.3 Claim 9, refers to "an upward tongue of an adjacent panel" instead of "**the** upward tongue of an adjacent panel **of the same type**".

- 2.4 Claim 17 as well as page 7, lines 25-26 refers to "the inclination of the bridge part of the second coupling part".

Nevertheless, it is clear from page 7, lines 21-23 and from figure 2 that claim 17 should refer to "the inclination **of the lower side** of the bridge part of the second coupling part".

- 2.5 Claim 18 defines "facilitating introduction of the **upward tongue** in the widened **downward groove**".

Nevertheless, the description on page 8, lines 3-5 discloses "facilitating introduction of the **downward tongue** in the widened **upward groove**".

Furthermore, claim 18 refers to "the bridge part" instead of "the **lower** bridge part" (the "bridge part" being defined in claim 1 as the bridge part of the second coupling part).

Furthermore, claim 18 refers to "the elongated slot" instead of "the elongated **lower** slot" (the "elongated slot" being defined in claim 1 as the elongated slot in the second coupling part).

- 2.6 For the search and in the following the claims have been interpreted accordingly.

Re Item V

Novelty and Inventive Step

- 3 Reference is made to the following documents:

- D1 FR 2 826 392 A1 (BECKER ARNAUD [FR]) 27 december 2002 (2002-12-27)
- D2 WO 2012/126046 A1 (INOTEC INTERNAT PTY LTD [AU]; KELL RICHARD WILLIAM [AU]) 27 september 2012 (2012-09-27)
- D3 DE 202 03 311 U1 (HUELSTA WERKE HUELS KG [DE]) 8 mei 2002 (2002-05-08)
- D4 EP 2 390 437 A2 (HAMBERGER INDUSTRIEWERKE GMBH [DE]) 30 november 2011 (2011-11-30)
- D5 DE 103 05 695 A1 (COORS STEFAN [DE]; HAENSEL ULLRICH [DE]; REISNER MARKUS [DE]) 16 september 2004 (2004-09-16)
- D6 WO 2015/130169 A1 (INNOVATIONS 4 FLOORING HOLDING N V) 3 september 2015 (2015-09-03)

- 4 **Furthermore, the above-mentioned lack of clarity notwithstanding, the subject-matter of claims 1-18, 22 is not new and the subject-matter of claims 19-21 does not involve an inventive step.**

- 4.1 The subject-matter of **claims 1-8, 1-14, 16, 17 and 22 is not new** in view of **D1, figure 2 and page 6, lines 15-29**, disclosing

a panel 1 showing a first coupling part 2 with upward tongue 2' and first locking element 12", and a second resilient coupling part with downward groove 3 co-acting with the first locking element,

wherein the second coupling part comprises a resilient bridge part, connecting the downward tongue to the core of the panel, wherein the bridge part is configured to deform during coupling of adjacent panels, to widen the downward groove, and facilitate introduction of the upward tongue 2' in the widened downward groove 3; and

wherein the given bridge part is provided with at least one elongated upper slot 5, wherein the elongated slot 5 has a first open end, connected to the downward groove 3, and has a second closed end, such that a weakened area is formed in the given upper bridge part between the given closed end of the given elongated slot 5 and an upper side of the given upper bridge part, to facilitate deformation of the given bridge part. *(see page 6, lines 24-29)*

Note: A further slot 4 is formed in the upward tongue, but not in the lower bridge part.

- 4.2 The subject-matter of **claims 1, 2, 7-13, 15-18 and 22 is not new** in view of **D2, figure 23a-23c, page 18, lines 6-18 and page 45, lines 5-17, page 46, lines 11-17**, disclosing

a panel 12a, 12b showing a first coupling part with upward tongue Pf, upward groove Rf and first locking element Cm2, and a second resilient coupling part with downward tongue Pm, downward groove Rm and second locking element Cm1.

The bridge part is provided with at least one elongated upper slot 42c, wherein the elongated slot has a first open end, connected to the downward groove Rm, and has a second closed end, such that a weakened area is formed in the given upper bridge part between the given closed end of the given elongated slot and an upper side of the given upper bridge part.

It is not disclosed that the bridge part of the second coupling part is configured to deform during coupling of adjacent panels, but the tongues and grooves Pm, Pf, Cm, Cf show a certain compressibility, so that the downward groove widens and facilitate introduction of the upward tongue in the widened downward groove.

Nevertheless, although the resiliency of the bridge part is not explicitly disclosed, all technical features are present. The resulting panel thus implicitly also comprises a resilient bridge part as the elongated slot 42c leads to a resiliency of the bridge part, allowing for deformation during coupling of adjacent panels.

- 4.3 The subject-matter of **claims 19-21 does not involve an inventive step**.

It is well known to the skilled person, e.g. from **D3**, to provide a panel with long sides coupled by means of a rotating movement and short sides coupled with a zipping motion, or vice versa.

Starting from **D1** as closest prior art and in combination with the teaching of **D3**, it is obvious to the skilled person to replace the coupling means along the long or short edge known from D1 by coupling means coupled by means of a rotating movement, thereby arriving at the subject matter of claims 19-21 without involving an inventive step.

Re Item VII

Certain defects

- 5 The following defects have been observed
- 5.1 The relevant background art disclosed in **D1-D6** is not mentioned in the description, nor are these documents identified therein.
- 5.2 Following rule applies: if the application contains drawings, and the comprehension of the claims would be improved by establishing the connection between the features mentioned in the claims and the corresponding reference signs in the drawings, then appropriate **reference signs should be placed in parentheses after the features mentioned in the claims**. Reference signs should not however be seen as limiting the extent of the matter protected by the claims; their sole function is to make claims easier to understand. If text is added to reference signs in parentheses in the claims, lack of clarity can arise.
- 5.3 On page 1, lines 24, 27, 30 of the description reference is made to the "**objection**" of the invention.
Nevertheless, it seems that the "**object**" of the invention is meant.
- 5.4 Page 14, lines 21-27 of the description leads to a doubt about the definition of the invention and should be removed.