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(54) **DECK UNIT FOR DECK FLOORS**

(57) A deck unit (100) intended for a deck floor in which several deck units (100) are locked with each other, said deck unit (100) being made of a bio-composite material comprising a natural material and a plastic material, wherein said deck unit has (100) a first longitudinal side and a first latitudinal side each with a protrusion (115,

215) and a second longitudinal side and a second latitudinal side each comprising a receiving groove (118, 218), wherein the receiving groove 118 of the second longitudinal side has a rubber strip (104) to control expansion and contraction.

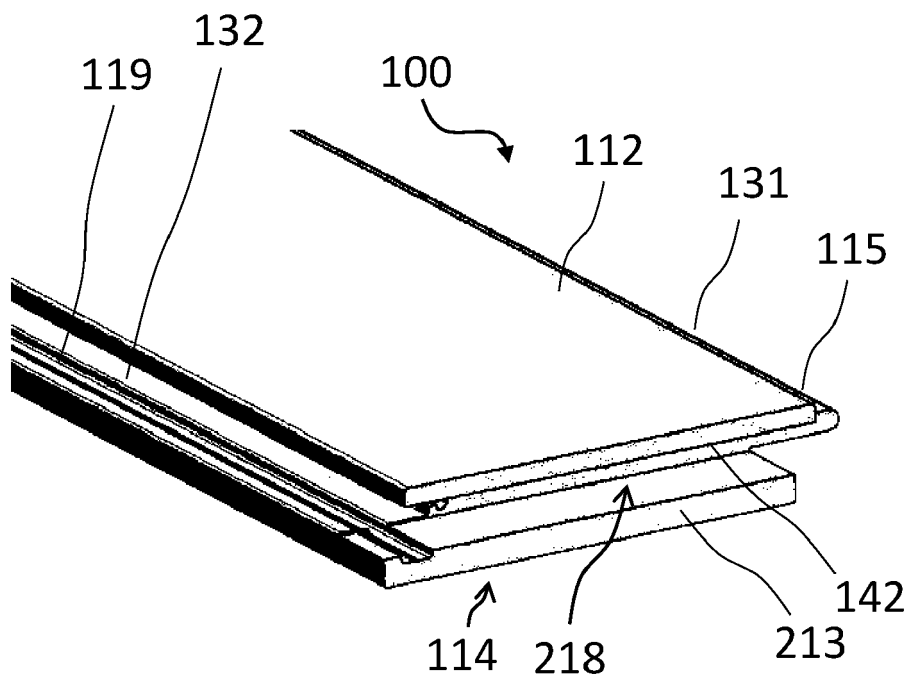


Fig. 1a

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Description

Technical Field

[0001] The present invention relates to a deck unit intended for a deck floor or floor panel, which deck unit has a tongue and groove design.

Background

[0002] There exists many known floor panels today. For instance, US 2007/004416 A1 discloses a cover profile for forming a walking surface, roof surface, wall, wall surface or retaining wall. The cover profile has a hollow profile body with a first longitudinal edge provided with a strip with holes for attachment and a second longitudinal edge provided with a space for accommodating an edge of the longitudinal strip of an adjacent profile element. Hence, the cover profile utilizes a tongue and groove system for enabling simple installation of the cover profile system.

[0003] As is known in the field, from for example US 2007/004416 A1, resilient members may be provided between adjacent profile elements to avoid incorrect installation by installers and to enable traverse expansion to avoid damage or buckling.

[0004] The tongue and groove system implemented in US 2007/004416 A1 provides a tight fit disallowing water from entering the attachment holes of the profile elements and leaking through the profile system to the underlying surface. The resilient member is provided into the groove of the groove and tongue fit, thereby sealing the passage for water to pass through.

[0005] In the field of outdoor floor panels there are challenges associated with providing a deck unit which is capable of handling particularly cold weather conditions. Colder temperature causes water that has accumulated in crevasses or cavities in the deck to freeze resulting in bending, cracking and warping of the deck units. In particular, the inventors have identified a need for a deck unit which is capable of handling colder weather while being easy and cost-efficient to install.

[0006] One aim of the present invention is to provide a deck unit for floor panels, which deck unit has a tongue and groove mechanism and which is easy and cost-effective to install. A further aim of the present invention is to provide a deck unit for floor panels that are less susceptible to undesirable mechanical effects such as warping, bending, cracking etc. due to challenging weather conditions.

Summary

[0007] The stated purpose above is achieved by a deck unit intended for a deck floor in which several deck units are locked with each other, said deck unit comprising a bio-composite material comprising a natural material and a plastic (polymeric) material, wherein said deck unit has a first longitudinal side and a first latitudinal side each

with a protrusion and a second longitudinal side and a second latitudinal side each comprising a receiving groove. The protrusion of the first longitudinal side and the first latitudinal side of one deck unit each has a locking fit into the receiving groove of the second longitudinal side and/or second latitudinal side of another deck unit, respectively. The receiving groove of the second longitudinal side has a rubber strip to control expansion and contraction.

[0008] The deck unit or panel is produced by an extrusion process and is composed of a mixture of materials. The material used is natural material(s), such as wood fibers, wood chips, straw, hay, rice husks or the like, and plastic material(s).

[0009] In an aspect, the plastic material may be in the form of a binder.

[0010] In an aspect, the deck unit may be made of the bio-composite material. A bio-composite is a composite material formed by a matrix (resin) and a reinforcement of natural fibers. These kind of materials often mimic the structure of the living materials involved in the process keeping the strengthening properties of the matrix that was used, but providing biocompatibility. The matrix phase is formed by polymers derived from renewable and nonrenewable resources.

[0011] The present invention has several advantages. First of all, the deck units are possible to put together without any visible fastening means, such as clips or the like. This simplifies the installation, but also reduces material cost. As may be understood from above, each deck unit may be exactly the same which also simplifies installation and reduced the production costs. Furthermore, the locking of deck units one by one according to the invention when mounted together form a smooth but tight fit. This creates a nice walkable surface without gaps on the upper side of a deck floor but also prevents weeds from coming up through such gaps and stops rubbish, like dirt, leaves, food and other debris, from falling into such gaps.

[0012] In an aspect, the stated purpose is achieved without the use of mounting or supporting clips.

[0013] Subject of the present invention is a deck unit and a deck floor having the features set forth in the appended independent claims; preferred embodiments being defined in the related dependent claims.

Brief description of the Drawings

[0014]

Figure 1a-b shows a perspective view of a deck unit according to one specific embodiment of the present invention.

Figure 1b also shows a perspective view of a deck unit according to one specific embodiment of the present invention.

Figure 2a shows a cross sectional view of a deck unit according to one specific embodiment of the

present invention.

Figure 2b shows a detailed cross sectional view of a strip groove of a deck unit according to one specific embodiment of the present invention.

Figure 3 shows a cross-sectional view on part of two deck units according to the present invention, said deck units being connected to each other.

Description of Embodiments

[0015] Below, some specific embodiments of the present invention are disclosed and discussed further.

[0016] As mentioned above, the receiving groove has a rubber strip to control expansion and contraction. The rubber strip may be arranged in different ways, such as glued in place or fixated inside of an extra groove. The latter alternative is shown in the figures where the rubber strip is fixated into a strip groove inside of the larger receiving groove. Such a rubber strip has one portion which is fixated into the strip groove and one part facing out from the groove. This latter part is the one that gets into contact with the protrusion of one deck unit being locked into the receiving groove of another deck unit. Moreover, the rubber strip may have a more or less flexing shape or being of a rubber material having such a property. Preferably the rubber strip is arranged in the innermost of the receiving groove to provide with a strong controlling effect.

[0017] The deck unit may further have a four-sided tongue groove connection. The first longitudinal side and the first latitudinal side of the deck unit may each have the protrusion. The second longitudinal side and the second latitudinal side of the deck unit may each comprise the receiving groove. The protrusion of the first longitudinal side and the latitudinal side of one deck unit may each have a locking fit into the receiving groove of the second longitudinal side and/or second latitudinal side of another deck unit, respectively. The receiving groove of the second longitudinal side has the rubber strip to control expansion and contraction.

[0018] The first and second longitudinal and latitudinal sides may be considered first and second side edges or side edge portions of the deck unit.

[0019] The deck unit may be considered as intended for a deck floor in which several deck units are locked with each other without the use of any mounting or supporting clips.

[0020] In one embodiment, the tongue groove connections of the first and second latitudinal side may be analogous to the tongue groove connection described above with reference to the first and second longitudinal side of the deck profile.

[0021] Having more than two tongue groove connections is particularly challenging in the field of outdoor decks due to the additional contact interfaces increasing the risk for the deck profile bending and cracking due to the contact forces exerted on the deck profile by the adjacent deck profile. With the receiving groove construc-

tion described above the rubber strip may mitigate such effects and further enable easier mounting.

[0022] To allow for a more flexible and easier to mount deck system, the receiving groove of the second longitudinal side and the second latitudinal side may each have locking fit with the protrusion of the first longitudinal side and/or latitudinal side of another deck unit.

[0023] In the past decks with four-sided tongue groove connections without the use of any mounting/supporting clips has not been implemented due to the above described challenges as well as the increased risk for water getting trapped and freezing in the additional crevasses associated with the increased number of contact interfaces between the deck units.

[0024] The rubber strip may be arranged to allow fluid passage through the locking fit of said receiving groove and the protrusion of the other deck unit. Thereby, water is allowed to pass from the deck surface in the space, i.e. through the locking fit, between the deck profiles to the underlying surface underneath the deck. This prevents water from accumulating in the deck since the water is allowed to pass through the deck system. Hence, the risk for the deck profiles bending, cracking and warping due to water inside the deck freezing is substantially reduced.

[0025] The rubber strip blocks or reduces dust and debris from passing through the deck. However, the water is allowed to pass through due to the flexibility of the rubber.

[0026] Accordingly, the locking fit may be arranged to allow fluid passage between the upper surface and the bottom surface.

[0027] The rubber strip may be further arranged to provide a gap between the second longitudinal side and a first longitudinal side and/or the first latitudinal side of another deck profile. Accordingly, the rubber strip may constitute a stop for the insertion of the protrusion of the other deck unit into the groove thereby providing said gap. In other words, the rubber strip may be arranged to abut to the protrusion in the locking fit with another deck unit to provide said gap between the second longitudinal side and the first longitudinal side of the other deck unit.

[0028] To mitigate the risk of accumulating water in the deck profile is particularly important in four-sided tongue groove systems due to such system having additional contact interfaces. Further, due to each side of the deck unit having to provide a locking fit, the deck unit is very susceptible to any undesired changes in the geometry of the deck profile due to water freezing.

[0029] With the aforementioned arrangement of the rubber strip, water is allowed to pass from the deck surface in the space i.e. through the locking fit, between the deck profiles to the underlying surface underneath the deck. This prevents water from accumulating in the deck profiles since the water is allowed to pass through the deck. Hence, the risk for the deck profiles bending, cracking and warping due to water inside the deck freezing is substantially reduced.

[0030] As previously described, the rubber strip may be arranged in the innermost of the receiving groove of the second longitudinal side. The rubber strip may be fixated into a strip groove inside of the receiving groove.

[0031] In one embodiment, the rubber strip has a first portion fixated into the strip groove and a second portion facing out from the strip groove. The strip groove has a retention portion arranged to retain a corresponding retention part of the first portion.

[0032] The retention portion may be a narrow section of the strip groove facing, i.e. adjacent to, the receiving groove. The narrow section may thus be considered an outer section of the strip groove. An innermost section receiving the retention portion of the strip groove may have a rounded inner edge. Alternatively, said innermost section may have a straight inner edge.

[0033] To further enable the rubber strip to allow for fluid passage, the rubber strip may have a rounded outer edge. The rounded outer edge may be arranged to be adjacent to the protrusion of another deck unit in the locking fit with the receiving groove. Hence, rounded outer edge of the rubber strip may be arranged to come into contact with the protrusion of another deck unit.

[0034] The rounded outer edge provides for a smaller contact area between the rubber strip and the protrusion of another deck unit. This allows for the natural flexibility of the rubber to accommodate passage of water through the locking fit with an adjacent deck profile. Preferably, the protrusion of the deck unit has a rounded outer edge. This allows for a small contact interface between the rubber strip and the protrusion that further safeguards the fluid passage between the deck units.

[0035] The rubber strip may further comprise an aperture extending along the rubber strip. The aperture extends through the entire length of the rubber strip. The aperture allows for the rubber strip to deform inwards, i.e. towards the centre of the deck unit, upon coming into contact the protrusion of another deck unit. This makes the rubber strip more susceptible to deformation and softer which increases the ability for the rubber strip to allow for fluid passage between the deck units.

[0036] The second portion of the rubber strip may thus comprise the above described aperture and the rounded outer edge. Further, the aperture may be in the form a slit extending through the second portion along the entirety of the rubber strip.

[0037] The aperture may form a first inner surface closer to the strip groove and an opposite second inner surface distant from the strip groove. The first inner surface of the aperture may be substantially planar and extending along the second longitudinal side. The second inner and opposite surface of the aperture may be arc shaped facing outwardly from the strip groove. Worded differently, the second inner and opposite surface may be rounded in an outward direction. Said second inner and opposite surface may in curvature match the rounded outer edge of the rubber strip. Hence, the aperture may have a substantially D-shaped cross-section. According to one spe-

cific embodiment, the protrusion of the first longitudinal side is longitudinal along the first longitudinal side. Similarly, the protrusion of the first latitudinal side may be longitudinal along the first latitudinal side, i.e. extend along said first latitudinal side. Such an alternative is shown in the figures.

[0038] Furthermore, according to one embodiment of the present invention, the protrusion of the first longitudinal side and/or the first latitudinal side have a cross section which is half oblong and with a round end. This is also seen in the embodiment shown in the figures.

[0039] The deck unit according to the present invention may have different shape. According to one specific embodiment of the present invention, the first and second latitudinal side may have a semi-open cross sectional profile. This implies that it is only the walkable upper surface that is a closed whole surface, i.e. arranged as a solid profile. This is preferable as the use of material and as such material cost is decreased. This semi-open profile structure, as seen in e.g. Figure 2a, also provides for another advantage. With closed chambers there is an evident risk that water inside of these chambers gets frozen during winter time. Ice inside of these chambers put heavy pressure to all sides which may results in cracks of a panel. The decking unit according to the present invention having a semi-open structure solves this problem.

[0040] However, in this context it should be noted that the present invention may also have a different design, such as e.g. having a one or more closed chambers, which may be referred to as a hollow closed shape, even if this is not preferred. According to one specific embodiment, the deck unit has a deck surface, i.e. the walkable upper surface, and wherein the deck unit has extending legs beneath the deck surface. These extending legs are the supporting points of the deck unit.

[0041] According to another specific embodiment, the deck unit has a substantially planar bottom surface.

[0042] The present invention may further have a different design; the deck unit may accordingly have a longitudinal side with a substantially solid cross sectional profile. This mitigates accumulation of water in crevasses or chambers in the cross section, which reduces the risk for cracks, bending and warping due to the accumulated water freezing in cold weather.

[0043] Furthermore, according to one embodiment of the present invention, the deck unit has a support plate being arranged beneath the receiving groove of the first longitudinal and/or latitudinal side and extending out from the deck unit.

[0044] The deck unit may accordingly have a first and a second support plate. The first support plate may be provided along the entire second longitudinal side of the decking unit (see figures). The second support plate may be provided along the entire second latitudinal side of the decking unit (see figures).

[0045] The support plate has several possible functions. Besides being support for the deck floor, this sup-

port plate may be the base for fixating the deck unit into a sub-construction beneath the deck. This sub-construction may e.g. be wooden ribs or aluminium joists or composite based joists or planks or the like, but can of course be of any sort according to the invention. For this fixation, according to one embodiment of the present invention, there is one or more screw holes provided in the support plate. Furthermore, according to another specific embodiment of the present invention, the one or more screw holes are provided in an attachment groove provided in the support plate. Moreover, the screw holes may be arranged along the support plate.

[0046] The screw holes may thus extend along the length of the first support plate arranged beneath the receiving groove of the second longitudinal side and/or along the length of the second support plate arranged beneath the receiving groove of the second latitudinal side, respectively. This fixation provides for a hidden installation without holding clips or other form of connecting means between the deck units.

[0047] In one embodiment, only the first support plate is provided with the screw holes. In one embodiment, only the first support plate is provided with the attachment groove.

[0048] Furthermore, in one embodiment wherein the first support plate has an attachment groove, said attachment groove may be a long groove along the entire second longitudinal side of the decking unit, which is also shown in the figures. In one embodiment wherein the second support plate has an attachment groove, said attachment groove may be a long groove along the entire second latitudinal side of the decking unit. The pre-made attachment groove for installation facilitates control of expansion and contraction. Only regular wooden screws are required to mount the decking units or boards with the sub-construction or sub-structure through pre-made holes provided in the attachment groove.

[0049] The deck unit according to the present invention may also be provided with other additional means and properties. One example is alternatives for the upper walkable side. For instance, anti-slip profiling may be incorporated on this upper side, e.g. by extrusion. Furthermore, the upper side may have a profile with grooves for a better walkable grip.

[0050] As understood from above, the present invention also refers to a deck floor system comprising any number of deck units according to the present invention. Moreover, the decking unit and deck floor system according to the present invention may be provided for outdoor and indoor use.

Detailed description of the drawings

[0051] In Figures 1a-b shows a deck unit 100 according to one specific embodiment of the present invention. The deck unit 100 has a first longitudinal side 131 with a protrusion 115 and a second longitudinal side 132 comprising a receiving groove 118. The deck unit has a first lat-

itudinal side 141 with a protrusion 115 and a second latitudinal side 142 comprising a receiving groove 118.

[0052] The deck unit 100 has a walkable deck surface 112. In this case the shape is semi-open or hollow where the deck unit 100 has a substantially planar bottom surface 114. The deck unit further has a bottom surface 114, which may be a planar bottom surface.

[0053] Furthermore, a first support plate 113, 213 with an attachment groove 119 for fixation with screws is arranged beneath the receiving groove 118 of the second longitudinal side 132 and extends out from the deck unit 100. In further detail, the first support plate 113 extends outwardly from the deck unit 100 in a direction away from the second longitudinal side 132. A second support plate 213 is arranged beneath the receiving groove 218 of the second latitudinal side 142 extending out from the deck unit 100, in a direction away from the second latitudinal side 142. Although not clearly visible in the figure the second support plate 213 may also have an attachment groove for fixation with screws.

[0054] As seen in Figures 2a-b, inside of the receiving groove of the second longitudinal side there a strip groove 111 is arranged. The strip groove 111 is intended for a rubber strip 104 (is visible in Figure 3). The rubber strip 104 is fixated into the strip groove inside of the receiving groove 118, 218. Further referencing Figure 2b, the rubber strip 104 (not shown) has a first portion fixated into the strip groove 111 and a second portion facing out from the strip groove 111. The strip groove 111 has a retention portion 165 arranged to retain a corresponding retention part 167 of the first portion. The retention part 167 is in the form of a protruding part of the first portion of the rubber strip 104 arranged to be inserted and retained into the retention portion 165. As previously described the rubber strip 104 is arranged to allow fluid passage through the locking fit.

[0055] Figure 3 show a cross sectional view on part of two deck units according to the embodiment shown in Figure 1, said deck units being connected to each other. A first portion of the rubber strip 104 is fixated into the strip groove. A second portion faces out from the strip groove 111, i.e. extends from the strip groove out into the receiving groove 118 of the second longitudinal side. The strip groove has a retention portion 165 retaining the retention part 167. The second portion has a rounded outer edge facing outward from the strip groove. The rounded outer edge is arranged to be adjacent to the protrusion of the other deck unit in the locking fit with the receiving groove 118.

[0056] The rubber strip 104, i.e. the second portion of the rubber strip 104, comprises an aperture 163 extending along said rubber strip 104. As further derivable from Figure 3 the walkable deck surface may be ribbed.

[0057] It is noted that although the figures shows that the first and second longitudinal sides are longer than the latitudinal, the deck unit may have any four sided shape, such as for example rectangular or quadractic.

Claims

1. A deck unit (100) intended for a deck floor in which several deck units (100) are locked with each other, said deck unit (100) comprising a bio-composite material comprising a natural material and a plastic material, wherein said deck unit has (100) a first longitudinal side (131) and a first latitudinal side (141) each with a protrusion (115, 215) and a second longitudinal side (132) and a second latitudinal side (142) each comprising a receiving groove (118, 218), wherein the protrusion (115, 215) of the first longitudinal side (131) and the first latitudinal side (141) of one deck unit (100) each has a locking fit into the receiving groove (118, 218) of the second longitudinal side (132) and/or second latitudinal side (142) of another deck unit (100), respectively, and wherein the receiving groove (118) of the second longitudinal side (142) has a rubber strip (104) to control expansion and contraction. 5
2. A deck unit (100) according to claim 1, wherein the receiving groove (118, 218) of the second longitudinal side (132) and the second latitudinal side (142) of the deck unit (100) each have a locking fit with the protrusion (115, 215) of the first longitudinal side (131) and/or latitudinal side (141) of another deck unit (100). 10
3. A deck unit (100) according to claim 2, wherein the rubber strip (104) is arranged to allow fluid passage through the locking fit of the receiving groove (118, 218) and the protrusion (115, 215) of the other deck unit (100). 15
4. A deck unit (100) according to any one of the preceding claims, wherein the rubber strip (104) has a rounded outer edge arranged to be adjacent to the protrusion (115, 215) of another deck unit (100) in the locking fit with the receiving groove (118). 20
5. A deck unit (100) according to any one of the preceding claims, wherein the rubber strip (104) comprises an aperture (163) extending along said rubber strip (104). 25
6. A deck unit (100) according to any one of the preceding claims, wherein the protrusion (115) of the first longitudinal side (131) is longitudinal along the first longitudinal side and the protrusion (215) of the first latitudinal side (141) extends along the first latitudinal side (141). 30
7. A deck unit (100) according to any one of the preceding claims, wherein the protrusion (115, 215) of the first longitudinal side (131) and/or the first latitudinal side (141) have a cross section which is half oblong and with a round end. 35
8. A deck unit (100) according to any one of the preceding claims, wherein the deck unit (100) the first (141) and second (142) latitudinal side has a semi-open cross sectional profile. 40
9. A deck unit (100) according to any one of the preceding claims, wherein the deck unit (100) has a support plate (113, 213) being arranged beneath the receiving groove (118, 218) of the first longitudinal (131) and/or latitudinal (141) side and extending out from the deck unit (100). 45
10. A deck unit (100) according to claim 9, wherein there is one or more screw holes provided in the support plate (113, 213). 50
11. A deck unit (100) according to claim 10, wherein the one or more screw holes are provided in an attachment groove (119) provided in the support plate (113, 213). 55
12. A deck unit (100) according to any of the preceding claims, wherein the rubber strip (104) is arranged in the innermost of the receiving groove (118) of the second longitudinal side (132).
13. A deck unit (100) according to any one of the preceding claims, wherein the rubber strip (104) is fixated into a strip groove (111) inside of the receiving groove (118, 218).
14. A deck unit (100) according to any one of the preceding claims, wherein the rubber strip (104) has a first portion fixated into the strip groove (111) and a second portion facing out from the strip groove (111), wherein the strip groove (111) has a retention portion (165) arranged to retain a corresponding retention part (167) of the first portion.
15. A deck floor system comprising a number of deck units (100) according to any one of claims 1-14.

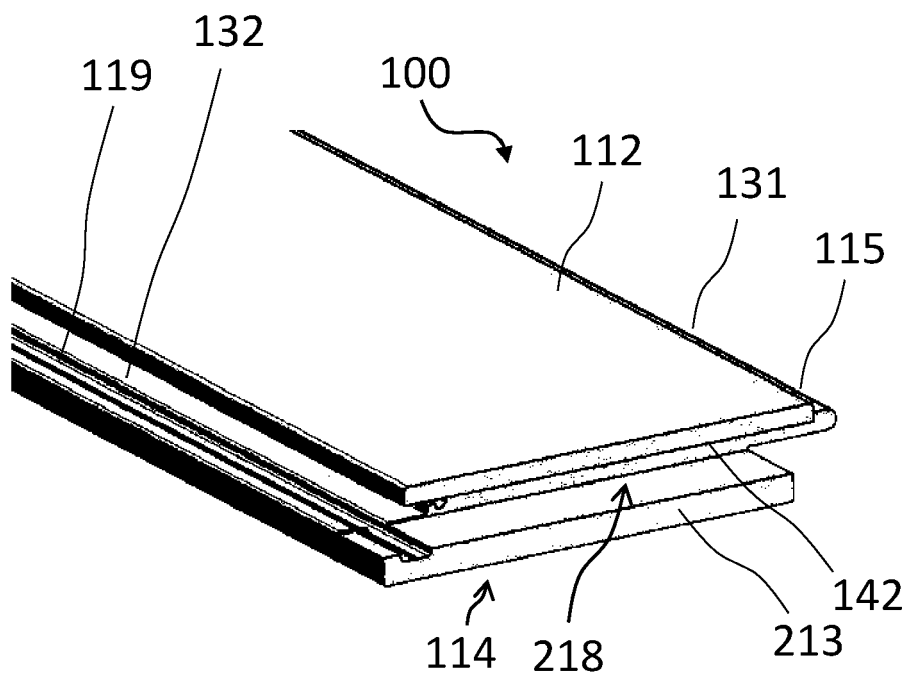


Fig. 1a

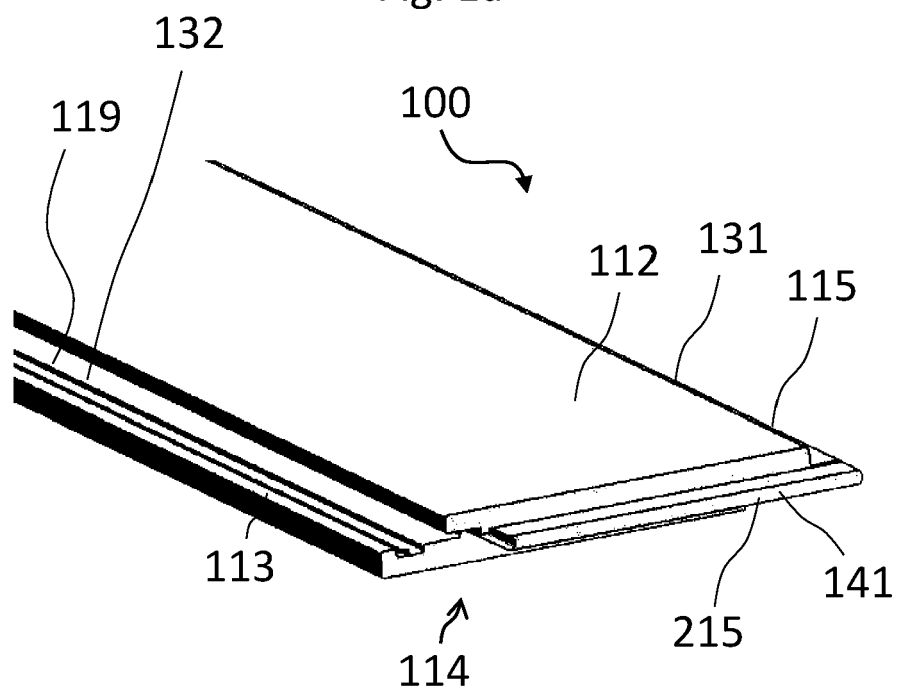
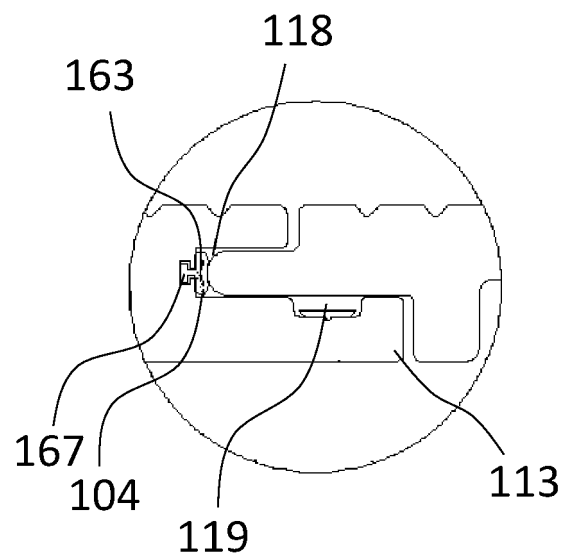
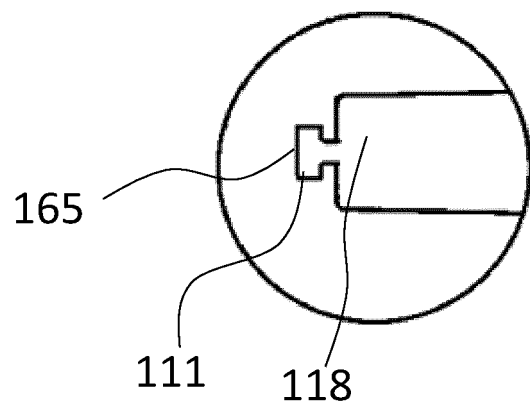
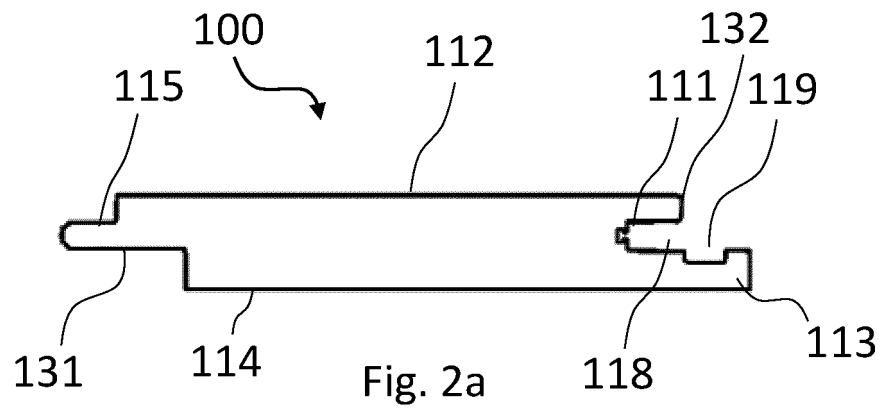


Fig. 1b



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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 20 January 2021	Examiner Estorgues, Marlène
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
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ON EUROPEAN PATENT APPLICATION NO.**

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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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