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(54) **A FASTENING MEMBER FOR FASTENING ELONGATED ELEMENTS AND AN ARRANGEMENT COMPRISING THE SAME**

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Description

Technical field

[0001] This invention relates to a fastening member for elements such as boards. In addition, the invention relates to a set comprising a fastening member and a support rail, to a method for fastening a fastening member to a support rail, to a flooring comprising fastening members, support rails and decking boards, and to a method for forming a flooring comprising fastening members, support rails and decking boards.

Background

[0002] Decking boards may be used as boards for flooring such as a terrace. The flooring may also be called as decking. Fastening of the decking boards and/or rail-step boards may be implemented by screwing screws through the elements to a supporting structure. Such supporting structure may also be called as a substructure. Screws, while penetrating through the elements may both deteriorate the visual appearance and also provide a leakage for fluids, e.g. water, and moisture to penetrate into the element. This may reduce the service life of decking boards.

[0003] The US patent application US 2014/096469 A1 discloses fastening means for use in fastening building parts to one another. The fastening means has a joist and a locking member. The locking member has a base and a T-shaped upstand. The locking member can be slid into a channel of the joist and rotated therein to a locking position. The locking member may be fastened to the joist by screwing a screw through a hole in the middle of the upstand.

[0004] The international patent application WO 2015/140475 A1 discloses a system for removably securing planks or boards juxtaposed to form a deck. The system comprises fasteners disposed in rows on level floor or joist or beam structure supports oriented perpendicular to the axis of the planks or boards. The fasteners comprise a base part and a fastening portion. The upper part of the fastening portion comprises oblique lateral flaps in the form of an arrow in cross-section. The fastening portion is shaped to snap into recesses of corresponding shapes provided in the lower surface of the planks or boards.

[0005] The European patent application EP 2 369 094 A1 discloses fastening systems of planks or boards on a structure for producing floors or floor or wall covering. The system comprises a device which has a non-extensible support that is unrolled axially on a joist or sleeper, where the support is a sealed tape having flexibility during rolling process. A fixing unit fixes the support to a structure. Assembling units assemble the support at a coating blade. The assembling units include a central protrusion that is provided for its fixation by elastic deformation in recesses in the coating blade. The assembling units in-

clude a base resting on the support. Another fixing unit fixes the assembling units to the support.

[0006] The international patent application WO 2011/149371 A1 discloses an accessory for fixing profiles and a profile fixing system using the accessory. The profile fixing system comprises base profiles onto which main profiles (decking boards) may be installed and fixed by the fixing accessory. The fixing accessory has lock fit flaps in a V shape that make a spring effect ensuring a constant pressure between two adjacent main profiles. The fixing accessory may be screwed to the base profile.

[0007] The international patent application WO 2010/004539 A1 discloses a decking assembly and securing clips for securing decking planks to a support element. The securing clips comprise a base engageable in one channel of a joist and a central support element extending upwardly from the base. The central support element supports a top plate extending on opposite sides of the central support element thereof parallel to the base. The top plate defines with the base opposite grooves for engaging lips of adjacent decking planks.

Summary

[0008] There is disclosed embodiments of a fastening member for fastening elongated elements. There is further disclosed an arrangement wherein elements, such as boards, are fastened using one or more fastening members. Additionally, there is disclosed a use of the fastening member for fastening elongated elements. The elongated element, such as a board may comprise one or more grooves. The fastening member comprises a respective extension, adapted to the groove. However, the manufacturing tolerance of the groove is reasonably large. Therefore, in order to fit the fastening member to many grooves have different heights, a part of the fastening member is deformable.

[0009] According to a first aspect there is provided a fastening member as defined by claim 1.

[0010] According to a second aspect there is provided a set as defined by claim 6.

[0011] According to a fourth aspect there is provided a method as defined by claim 10.

[0012] According to a fifth aspect there is provided a flooring as defined by claim 12.

[0013] According to a sixth aspect there is provided a method for forming a flooring as defined by claim 15.

Brief description of the drawings

[0014]

Fig. 1a depicts as a perspective view from one direction a fastening member, in accordance with an embodiment;

Fig. 1b depicts a top view of the fastening member of Fig. 1a;

			<u>Detailed description</u>
Fig. 1c	depicts as a perspective view from another direction of the fastening member of Fig. 1a;		[0015] In the following embodiments of a fastening member 1, support rails 2 and flooring 3 made by using the fastening members 1 and support rails 2 will be described in more detail. The fastening member 1 may be used for fastening, for example, elongated decking boards 4 such as terrace elements. An elongated terrace element may be used for terrace flooring 3, and may have a length that is considerably (at least ten times) larger than the width. Such elements are generally fastened to a support structure 6. The support structure 6 is generally on another level than the element 4 itself, i.e. the support may e.g. be located under the element 4. The element 4 may be e.g. a panel or a board such as a decking board or a railstep board. Such elements may comprise at least one groove, for example at least two grooves; one on a first edge and another on an opposite edge.
Fig. 1d	depicts a side view of the fastening member of Fig. 1a;	5	
Fig. 1e	shows an end view of the fastening member of Fig. 1a;		
Fig. 1f	depicts another side view of the fastening member of Fig. 1a;	10	
Fig. 1g	depicts a bottom view of the fastening member of Fig. 1a;	15	
Fig. 2a	depicts, in a perspective view, an example of a fastener for attaching two support rails of a support structure to each other and a part of the support rail, in accordance with an embodiment;	20	
Figs. 2b and 2c	depict an example of attaching an intermediate support rail between two support rails by using fasteners of Figure 2a, in accordance with an embodiment;	25	
Fig. 2d	depicts an example of a support structure for a flooring, in a perspective view, before attaching support rails to each other, in accordance with an embodiment;	30	
Figs. 3a to 3d	depict some construction steps of attaching a decking board to the support structure, in accordance with an embodiment;	35	
Fig. 4	depicts a section of a flooring, in accordance with an embodiment;	40	
Fig. 5a	depicts as a perspective view, a finished flooring, in accordance with an embodiment;	45	[0016] In accordance with an embodiment, the elements 4 or a part of them may be made of a composite comprising natural fibres and polymer, such as thermoplastic polymer, polyoxymethylen and/or polyolefin such as polyethylene, polypropylene, or copolymer thereof. However, instead of or in addition to composite material, the elements 4 or a part of them may be made of wood, metal or another appropriate material. [0017] Figure 1a shows in a perspective view from a first direction a fastening member 1, in accordance with an embodiment. Figures 1b-1g show a top view, a perspective view from a second direction, a side view, an end view, another side view, and a bottom view of the fastening member of Fig. 1a, respectively. The fastening member 1 comprises a foot part 1.1 which is adapted to face a groove 2.1 of a support rail 2 when attached with the support rail 2. The foot part 1.1 may be a solid, sheet like structure or it may comprise one or more holes so that two or more bridge-like sections 1.2, 1.3 are formed, as is illustrated in Figures 1a, 1b and 1e. The bridge-like sections 1.2, 1.3 may increase flexibility of the foot part 1.1 when desired. In the embodiment of Figures 1a to 1e of the fastening member 1 a wall 1.4 is formed in the middle of the foot part 1.1 extending upwards from the foot part 1.1. The wall 1.4 need not be a plate like element but may also be constructed of one or more pillars or other supporting elements. The wall 1.4 may have a curved section 1.5 preferably in the middle. Furthermore, in accordance with an embodiment the wall 1.4 is designed so that when the fastening member 1 is installed to a support rail 2 and there is a longitudinal element 4 on both sides of the fastening member 1, one side of the wall 1.4 provides two distant support points to one longitudinal element 4 and one support point (for example by the curved section 1.5) on the other side of the wall to an adjacent longitudinal element 4. Hence, this arrangement may improve flexibility of the wall 1.4 as will be explained later in this specification. The foot part 1.1 may also have two grooves 1.6, 1.7 near both longitudinal edges of the foot part 1.1, a protrusion 1.8 such as a pin,
Fig. 5b	depicts a side view of the finished flooring of Figure 5a;	50	
Fig. 6	depicts a support rail in accordance with another embodiment; and		
Fig. 7	depicts an example of an anti-skid device attached with the support structure, in accordance with an embodiment.	55	

and a guide 1.9.

[0018] In accordance with an embodiment, the curved section 1.5 and the protrusion may be located at the same location but directed to opposite directions with respect to the foot part 1.1. This is illustrated in Figures 1d-1f.

[0019] In the embodiment of Figures 1a to 1d the outer circumference of the foot part 1.1 has two curved sections at opposite corners and two angular sections at other two opposite corners. One purpose of the curved sections is to only allow limited rotation of the fastening element in a groove 2.1 of a support rail 2 (Figures 3a and 3b). For example, the fastening element may only be rotated about 90° in a groove 2.1 of a support rail 2. In other words, when the fastening element 1 is inserted into the groove 2.1, the form and dimensions of the outer circumference of the fastening element 1 may allow rotation in only one direction to set the fastening element 1 from an installation position into a locking position. This is illustrated in Figure 3b. The fastening member 1 on the left is in the installation position and the fastening member 1 on the right is in the locking position. The diagonal from a first corner 1.12 (Figure 1g) to a third corner 1.14 may be sized so that it is longer than the distance between walls 2.3 of the groove 2.1 and the other diagonal from a second corner 1.13 to a fourth corner 1.15 may be sized so that it is shorter than the distance between walls 2.3 of the groove 2.1 but longer than the distance between edges of the tongues 2.4 of the support rail 2. This may be achieved by forming curved corners or by some other means.

[0020] However, the diagonal from a first corner 1.12 to a third corner 1.14 and the other diagonal from a second corner 1.13 to a fourth corner 1.15 may be sized so that they are shorter than the distance between walls 2.3 of the groove 2.1. Hence, even 360° rotation of the fastening element in a groove 2.1 of a support rail 2 may be possible. This may be achieved by, for example, forming curved sections at each corner 1.12-1.15.

[0021] Dimensions of the foot part 1.1 of the fastening member 1 are such that in a first position the foot part 1.1 is able to be entered in the groove 2.1 of the support rail 2 and in a second position the foot part 1.1 is not able to be drawn away from the groove 2.1 of the support rail 2. In Figure 3a the fastening element 1 on the top-right corner illustrates this first position and the fastening element 1 on the bottom-left corner illustrates this second position, in accordance with an embodiment.

[0022] The fastening member 1 also comprises a first locking section 1.10 and a second locking section 1.11 at the top of the wall 1.4. The first locking section 1.10 and the second locking section 1.11 are adapted to lock a decking board 4 with the support rail 2. The wall 1.4 keeps the foot part 1.1 at a distance from the first locking section 1.10 and the second locking section 1.11. This distance may depend on the thickness of longitudinal elements 4 for which the fastening member 1 has been designed. In this embodiment the second locking section 1.11 is divided into two parts to improve flexibility of the

second locking section 1.11 (marked with references 1.11a and 1.11b in Figure 1f). In other words, the locking sections 1.10, 1.11 need not form a single entity but one or both of the first locking section 1.10 and the second locking section 1.11 may comprise two or more subsections. Furthermore, when the curved section 1.5 is located between the subsections 1.11a, 1.11b of the second locking section 1.11, the subsections 1.11a, 1.11b may be able to bend more compared to the situation in which the second locking section 1.11 were a single-part locking section. In other words, bending of the second locking section 1.11, when not divided into two (or more) parts, could be restricted by the curved section 1.5.

[0023] However, in accordance with another embodiment, the second locking section 1.11 may be formed so that it only comprises one of the two subsections 1.11a, 1.11b of Figure 1f (e.g. only the first subsection 1.11a or only the second subsection 1.11b), wherein the curved section 1.5 may not restrict bending of the second locking section 1.11.

[0024] The second locking section 1.11 is preferably on the same side of the wall 1.2 than the curved section 1.5. The first locking section 1.10 and the second locking section 1.11 are resilient so that they can be bent by an external force and when the force is released they will bend backwards towards the original position. The locking sections 1.10, 1.11 may also be called as claw couplings because they function is similar to a claw coupling when they are used to lock longitudinal elements 4 to support rails 2, as will be explained later in this specification.

[0025] Next, some details of the support rail 2 will be described in more detail with reference to Figures 2a and 2b, in accordance with an embodiment. The support rail 2 has a groove 2.1 for receiving fastening members 1. The groove 2.1 is formed of a bottom 2.2, two longitudinal side walls 2.3 and tongues 2.4 extending from one end of the side walls 2.3. The tongues 2.4 are, for example, substantially parallel to the bottom 2.2 whereas the side walls 2.3 may be perpendicular to the bottom 2.2 or at another angle with respect to the bottom 2.2. In other words, the side walls 2.3 are not parallel to the bottom 2.2. The side walls 2.3 continue beneath the bottom 2.2 to give more stiffness to the support rail 2 in a longitudinal direction and to make the support rail 2 higher. There may also be a wall 2.5 between another end of the side walls 2.3. The cross section of the support rail 2 need not be exactly similar to the form depicted in Figure 2a. The tongues 2.4 may have a longitudinal shoulder ridge 2.6 for example near the edge of the tongue 2.4. The bottom 2.1 may have through holes 2.7, pits or other such formations at regular intervals. One or both of the tongues 2.4 may have notches 2.11 which may be adapted to receive an edge of the wall 1.4 of the fastening member 1 when the fastening member 1 has been installed in connection with the support rail 2 as illustrated in Figures 3a and 3b. In other words, the edge may be partly in the notch when the fastening member 1 is in the locking po-

sition.

[0026] The interval between the holes 2.7 may be selected to correspond the mutual distance of the longitudinal elements 4 in the finished flooring 3. For example, the width of the longitudinal element may be 90 mm, 120 mm or 150 mm and a slit between two adjacent longitudinal elements may be about 5 mm. Hence, the distance between the holes 2.7 might be 95 mm, 125 mm or 155 mm, respectively. In accordance with another embodiment, support rails 2 may be provided with two or more different sets of holes so that each set is meant to be used with different widths of longitudinal elements 4. As an example, one set may comprise holes having mutual distance of 95 mm and another set may comprise holes having mutual distance of 125 mm.

[0027] The holes 2.7 may be formed during manufacturing of the support rails 2 or at a later stage. In the latter case, it may be possible to form small indications on the surface of the groove of the support rail 2 to indicate correct locations for the holes to be drilled later.

[0028] Fastening elements 1 may be attached with the support rail 2 as follows, for example. The fastening element 1 is put above the groove 2.1 at a location of a hole 2.7 of the support rail 2 in the first position. In this example the first position may be deduced on the basis of the direction the guide 1.9 is pointing. For example, the guide 1.9 may point towards a first side wall 2.3 when the fastening member 1 is in the first position. Now, the fastening member 1 can be put on the surface of the groove 2.1 so that the protrusion 1.8 of the fastening member 1 enters the hole 2.7 of the support rail 2. Then, the fastening member 1 can be rotated to a first direction until the fastening member 1 is in the second position. This is illustrated in Figure 3b, where the fastening element on the left is in the first position and the arrow indicates the rotation direction, and the fastening element 1 on the right illustrates a fastening element 1 rotated to the second position, in accordance with an embodiment. In the example of Figures 1a-1e, 3a and 3b the rotation direction is clockwise and the amount of rotation is approximately 90 degrees. In accordance with an embodiment, in the second position the grooves 1.6, 1.7 of the fastening member 1 are at the same location than the shoulder ridges 2.6 of the support rail 2. Thus, the grooves 1.6, 1.7 and the shoulder ridges 2.6 may make it easier to detect when the fastening member 1 is correctly in the second position. For example, they may produce a sound such as a click when the fastening member 1 enters the second position. In this second position both longitudinal edges of the foot part 1.1 are located below the tongues 2.4 of the support rail 2 which prevent drawing the fastening member 1 away from the groove 2.1.

[0029] The fastening member 1 may be released from the support rail 2 by rotating the fastening member 1 into the first position. If the foot part 1.1 of the fastening member 1 has the above described angular sections at two opposite corners, it may only be possible to rotate the fastening member 1 counter-clockwise from the second

position to the first position. However, in accordance with an embodiment, the foot part 1.1 has a form which allows both clockwise and counter-clockwise rotation to move the fastening member 1 from the second position to the first position.

[0030] The material of the fastening member 1 may comprise polymer, such as thermoplastic polymer, spring metal or other material which may provide high enough stiffness and dimensional stability. For example, the fastening member 1 may comprise polyoxymethylen and/or polyolefin such as polyethylene, polypropylene, or copolymer thereof. The fastening member may be made of a composite comprising polyolefin and natural fibres. In accordance with an embodiment the whole fastening member is made of the same material.

[0031] Fig. 2a depicts, in a perspective view, an example of a fastener 5 for attaching two support rails 2 of a support structure to each other and Figure 2b shows how the fastener 5 may be installed in connection with the support rail 2, in accordance with an embodiment. The fastener 5 may, for example, be installed in connection with a second groove 2.8 of the support rail 2. The second groove 2.8 may comprise one of the side walls 2.3 as a bottom of the second groove 2.8, two or more longitudinal side walls 2.9 and a tongue 2.10 extending from one end of the side wall 2.9. Figures 2a and 2b show that the tongue 2.10 has a kind of a step 2.10a. The purpose of the step 2.10a is to provide a support for the fastener 5 when it has been attached with the support rail 2, as can be seen from the lower part of Figure 2b. As the distance between the step 2.10a and the other longitudinal side wall 2.9 is approximately the same or slightly greater than the width of the side section 5.1b of the fastener 5, rotation of the fastener 5 is prevented. This kind of step-wise structure also makes it easier to insert the side section 5.1b within the second groove 2.8, because one edge of the side section 5.1b can first be set towards the longitudinal side wall 2.9, as is illustrated in the upper part of Figure 2b, and then the fastener 5 can be tilted so that the side section 5.1b becomes substantially parallel to the bottom of the second groove. The fastener 5 can then be lifted so that the edge of the side section 5.1b is resting on the step 2.10a, as is illustrated in lower part of Figure 2b.

[0032] The fastener 5 has two side sections 5.1a, 5.1b at an angle with each other, preferably at a right angle. Both side sections 5.1 may have one or more threaded holes 5.2a, 5.2b for a screw 5.3a, 5.3b. The screw 5.3a, 5.3b may be, for example, an allen screw, but also another kinds of screws may be used. In accordance with an embodiment, the screws 5.3a, 5.3b may have been installed to the threaded holes 5.2a, 5.2b of the support rail 2 in connection with manufacturing the support rail 2 or before providing the support rail 2 for purchasing. Hence, construction persons need not install the screws 5.3 a, 5.3b at a construction site.

[0033] The fastener 5 may be made of steel, aluminium or plastics which is stiff enough so that the side walls

5.1a, 5.1b of the fastener 5 will not easily bend with respect to each other. In other words, the angle between the side walls 5.1a, 5.1b of the fastener 5 should not easily change.

[0034] In the following the installation of the flooring 3 will be described in more detail with reference to Figures 2a to 5b, in accordance with an embodiment. Figure 2d shows an example of a support structure 6 for the flooring 3, in a perspective view, before attaching support rails 2 to each other, in accordance with an embodiment. For clarity, this example of Figure 2d shows only three support rails 2a, 2b, 2c with which longitudinal elements 4 will be fastened and two support rails 2d, 2e to be attached with both ends of the three support rails 2a-2c to form the support structure 6. In the following, those three support rails 2a-2c with which longitudinal elements 4 will be fastened will also be called as transversal support rails because they are substantially in a transversal direction with respect to the longitudinal elements 4, and, respectively, those support rails 2d, 2e which will be attached to the ends of the transversal support rails 2a-2c will also be called as longitudinal support rails.

[0035] It should be noted here that the number of transversal support rails 2a-2c may be different from three and the number of longitudinal support rails 2d, 2e may be different from two in practical implementations. Also the length and other dimensions of the parts of the support structure 6 and longitudinal elements 4 may vary.

[0036] The support rails 2a-2e may be prepared on a desk or on another applicable work stand so that the working position of a worker may be convenient for the worker. For example, fastening members 1 may be attached with the transversal support rails 2a-2c at appropriate locations and fasteners 5 may be fixed to the longitudinal support rails 2d, 2e at appropriate locations. Hence, the parts of the support structure may look like as is illustrated in Figure 2d. However, the fasteners 5 may alternatively be fixed at both ends of the transversal support rails 2a-2c.

[0037] Next, the prepared support rails 2a-2e may be positioned to the place where the flooring 3 will be located. There may be some kind of foundations on a ground or the support structure 6 may be located upon a ground, a floor or some other flat base. The support rails 2a-2e may be assembled to each other for example as follows. First, the transversal support rails 2a-2c are positioned to correct locations. Then, one longitudinal support rail 2d is attached with one end of the transversal support rails 2a-2c so that the other, free side section 5.1 of the fastener 5 will enter the groove of the transversal support rail 2a-2c. The screws 5.3 of the other side section 5.1 may now be screwed in so that the tip of the screws 5.3 become in contact with the bottom of the groove of the transversal support rail 2a-2c. The other longitudinal support rail 2e may be attached with the other end of the transversal support rails 2a-2c in the same way. Hence, the longitudinal support rails 2d, 2e are fixed with the transversal support rails 2a-2c and quite a stiff support

structure 6 for the flooring 3 has been obtained. In accordance with an embodiment, the tip of the screw 5.3 is conical.

[0038] In the following the usage of the fastening member 1 to install elements 4 to support rails 2 will be described in more detail with reference to Figures 4, 5a and 5b. Setting-up of the longitudinal elements 4 may be started from one end of the support structure 6. There may be special fastening elements 8 (Figure 4) at this end because there will not be another longitudinal element 4 on the other side of the fastening member. Figure 4 shows examples of such fastening members 1a, 1b for a higher profile support rails and for a lower profile support rails, respectively, in accordance with an embodiment. One edge of a first longitudinal element 4a may be pushed at an angle towards the special fastening element 8. Then, the first longitudinal element 4a may be pushed downwards towards the transversal support rail 2a-2c. Due to the force created by pushing the first longitudinal element 4a towards the first locking section 1.10 of the fastening elements 1, the first locking section 1.10 bends and allows the other end of the first longitudinal element 4a fall down towards the surface of the transversal support rail 2a-2c. When the upper surface of the tongue 4.2 of the first longitudinal element 4a is below the lower edge of the first locking section 1.10, the first locking section 1.10 is not anymore affected by the force and thus may bend backwards to the original position. At this stage at least the lower edge of the first locking section 1.10 is inside the groove 4.1 of the first longitudinal element 4a and prevents the first longitudinal element 4a rising upwards. In other words, the first longitudinal element 4a is locked to the transversal support rail 2a-2c by the first locking section 1.10. This operation may be repeated to each fastening member 1 along the longitudinal element 4. For example, the operation described above may be started from one end of the longitudinal element 4 and after that the installer (or another person) may walk on the longitudinal element 4 to the other end, wherein due to the weight of the person the remaining part of the longitudinal element 4 will be pushed towards the support rails 2 and locked by the fastening members 1.

[0039] The next element 4 i.e. the second longitudinal element 4b may be installed beside the first longitudinal element 4a quite in the same way. One edge of the second longitudinal element 4b is pushed towards wall 1.4 of fastening members 1 so that the edge of the second longitudinal element 4b touches the wall 1.4. Then, the second longitudinal element 4a may be pushed downwards towards the transversal support rail 2a-2c. The first locking section 1.10 bends and allows the other end of the second longitudinal element 4b fall down towards the surface of the transversal support rail 2a-2c. When the upper surface of the tongue 4.2 of the second longitudinal element 4b is below the lower edge of the first locking section 1.10, the first locking section 1.10 is not anymore affected by the force and thus may bend backwards to the original position. At this stage the lower edge

of the first locking section 1.10 is inside the groove 4.1 of the second longitudinal element 4b and the lower edge of the second locking section 1.11 is inside the other groove 4.2 of the second longitudinal element 4b and thus prevent the second longitudinal element 4b rising upwards. In other words, the second longitudinal element 4b is locked to the transversal support rail 2a-2c by the first locking section 1.10 and the second locking section 1.11.

[0040] The next element 4 i.e. the third longitudinal element 4c may be installed beside the first longitudinal element 4 quite in the same way. This procedure may be repeated until all longitudinal elements 4 has been installed to the support structure 6. The last element may be different from the other elements if the outer edge of the flooring 3 remains visible. Then, an element 7 having a top surface and a side surface may be used. An example of such element 7 is illustrated in Figures 5a and 5b. When such an element 7 is used, it may need to be fixed to the other support rail 2a with additional fastening member, which may differ from the fastening member 1. For example, a clip (not shown) may be used at the other (lower) edge of the element 7, which fixes the lower edge with the support rail 2a. It may also be possible to use this kind of a special element 7 or another kind of special element in one or more other ends of the flooring 3. For example, in the example of Figure 5a, the bottom and/or top ends of the elements 4 may be covers by such a special element 7, or they may remain visible as in Figure 5a.

[0041] Figure 3c illustrates when an element 4 is pushed towards the fastening member 1, and Figure 3d illustrates when the element 4 has been pushed between two fastening members 1 to the surface of the support rail 2.

[0042] Instead of the groove 1.6, 1.7 in the fastening element 1 and the shoulder ridge 2.6 in the support rail 2, the fastening element may comprise a shoulder ridge and the support rail 2 may comprise a corresponding groove. Furthermore, instead of or in addition to the groove and shoulder ridge -pair it may be possible to use a pit and a corresponding tip -pair in the fastening element 1 and the support rail 2 to provide similar mutual operation.

[0043] Releasing an elongated element 4 from the flooring 3 may be performed, for example, as follows. A screwdriver, a plate or another appropriate tool is put in the slit between the upper tongue of the longitudinal element 4 and the first locking section 1.10 of the fastening member 1 at one end of the longitudinal element 4. Another screwdriver, a plate or another appropriate tool is put in the slit between the upper tongue of the longitudinal element 4 and the first locking section 1.10 of the adjacent fastening member 1. Then, the edge of the longitudinal element 4 is lifted by the first tool and simultaneously the second tool is used to bent the first locking section 1.10 of the adjacent fastening member 1 so that the longitudinal element 4 is no longer locked by the first locking

section 1.10 of the adjacent fastening member 1 and the edge of the longitudinal element 4 can be lifted upwards. This operation may be repeated to the remaining fastening members 1 along the length of the longitudinal element 4 until the longitudinal element 4 is fully released from the support structure.

[0044] By using the fastening members 1 described above it is possible to install and releasing the elements 4 without screwing. Only the construction of the support structure and possibly the foundations may need to use screws and screwing.

[0045] The fastening member 1 described above may also decrease possible effects due to thermal expansion of the elements 4. If an element 4 is slightly expanded due to temperature changes, the width of the element may change. If the width increases, the edge of the tongue 4.2 of the element 4 (Figure 3d) moves towards the fastening member 1 and may push the protrusion 1.9. Due to the flexibility of the protrusion and/or the wall 1.2, the protrusion 1.9 and/or the wall 1.2 may slightly move. However, the movement does not affect to the next element because the locking section 1.10, 1.11 which is towards the adjacent element is also capable of bending when necessary.

[0046] Thermal expansion may also affect the length of the elements 4. The fastening members 1 are not screwed or attached with an adhesive with the elements 4, wherein the fastening members 1 allow the elements 4, wherein the fastening members 1 allow the elements 4 to slightly "slide" in the longitudinal direction. To better assure that the mutual location of the longitudinal elements 4 does not significantly change in the long run due to the thermal expansion and shrinkage, some means may be provided. For example, a tape 9 (Figures 3a and 3b) having a frictional surface may be fixed on one transversal support rail 2a-2c, wherein the elements 4 are installed on the frictional surface of the tape 9. An advantageous location for such tape 9 is in the middle of the elements 4 in the longitudinal direction i.e. on the surface of the transversal support rail 2b in the middle of the support structure, a tape having a surface with less friction may be attached with the other transversal support rails 2a, 2c to improve the slideability of the elements 4 on the surface of the support rails 2. This kind of arrangement may assure that the middle of the elements 4 remains at substantially the same location despite of the thermal expansion whereas the ends of the elements 4 may move more easily.

[0047] The tape may also improve the locking effect because the tape may be slightly elastic so that it can be compressed when inserting an element under the locking section 1.10, 1.11 and decompressed when the element 4 has been inserted. Moreover, manufacturing tolerances of the elements 4 may cause that the height of the tongue of the element 4 may vary in the longitudinal direction of the element 4. Thus, the tape may reduce a possible effect of this variation.

[0048] In accordance with an embodiment, one or more pieces of tape may be installed on one or more

support rails 2a-2c to dampen sound i.e. to be used as a sound insulation irrespective of whether the above mentioned friction effect is utilized or not.

[0049] In accordance with an embodiment, one or more anti-skid devices 10 may be used to prevent or reduce sliding of the elements 4, as is illustrated in Figure 7. The anti-skid device 10 may comprise a bottom section 10.1 and one or more side sections 10.2a, 10.2b. The side section(s) 10.2a, 10.2b may have a toothed edge or similar structure which is adapted to make a contact with the element 4 which is installed above the anti-skid device 10. Hence, the toothed edge grips to the bottom surface of the element 4 and therefore prevents or at least reduces lateral movement of the element 4 with respect to the support rail 2. The anti-skid device 10 may be attached with the support rail 2 with one or more screws, for example.

Claims

1. A fastening member (1), comprising

- a foot part (1.1) adapted to attach the fastening member to a support rail (2);
- a supporting element (1.4) attached to the foot part (1.1) at a first end of the supporting element (1.4);
- a first locking section (1.10) attached to a second end of the supporting element (1.4), wherein the first locking section (1.10) is at an angle with respect to the supporting element (1.4) and extends towards the foot part (1.1);
- a second locking section (1.11) attached to a second end of the supporting element (1.4), wherein the second locking section (1.11) is at an angle with respect to the supporting element (1.4) and extends towards the foot part (1.1) at the side of the supporting element (1.4) opposite to the side on which the first locking section is located;
- a protrusion (1.8) in the foot part (1.1) directed in an opposite direction to the supporting element (1.4) and adapted to be positioned in a hole (2.7) of the support rail (2); and
- the foot part (1.1) is further adapted to face a bottom (2.2) of a groove (2.1) of the support rail (2) when attached to the support rail (2) **characterized in that**
- an outer circumference of the foot part (1.1) has two curved sections at diagonally opposite corners (1.13, 1.15) and two angular sections at the other two diagonally opposite corners (1.12, 1.14).

2. The fastening member of claim 1, wherein the second locking section (1.11) is divided into at least two subsections (1.11a, 1.11b) to improve flexibility of

the second locking section (1.11).

3. The fastening member (1) of claim 1 or 2, the foot part (1.1) comprising:

- a first section (1.2); and
- a second section (1.3);

wherein the first end of the supporting element (1.4) is located between the first section (1.2) and the second section (1.3), and further wherein the foot part (1.1) comprises one or more holes between the first section (1.2) and the first end of the supporting element (1.4) and between the first end of the supporting element (1.4) and the second section (1.3) to increase flexibility of the foot part (1.1).

4. The fastening member (1) of any of the claims 1 to 3, the supporting element (1.4) of the foot part (1.1) comprising:

- a curved section (1.5) to increase flexibility of the supporting element (1.4).

5. The fastening member (1) of any of the claims 1 to 4, the foot part (1.1) comprising:

- a groove (1.6, 1.7) near a longitudinal edge of the foot part (1.1) adapted to receive a tongue (2.4) of a side wall (2.3) of a first groove (2.1) of the support rail (2).

6. A set comprising the fastening member (1) of any of the claims 1 to 5 and a support rail (2) comprising

- a first groove (2.1) for receiving said fastening members (1), the first groove comprising:
 - a bottom (2.2);
 - two or more longitudinal side walls (2.3); and
 - a tongue (2.4) extending from one end of each longitudinal side wall (2.3) of the first groove (2.1);
- a second groove (2.8) for receiving a fastener (5), the second groove (2.8) comprising:
 - a bottom (2.3);
 - two or more longitudinal side walls (2.9); and
 - a tongue (2.10) extending from one end of each longitudinal side wall (2.9) of the second groove (2.8); and
- one or more holes (2.7) in a bottom (2.2) of the first groove (2.1) adapted to receive said protrusion (1.8) of said fastening member (1).

7. The set according to claim 6, wherein one of the two or more longitudinal side walls (2.3) forms the bottom of the second groove (2.8).
8. The set according to claim 6 or 7, wherein at least one of the tongues (2.4) comprises:
- a notch (2.11) adapted to receive an edge of the wall (1.4) of the fastening member (1), when the fastening member (1) has been installed in connection with the support rail (2).
9. The set of any of the claims 6 to 8 further comprising a fastener (5) for fixing said support rails (2) to each other, said fastener (5) comprising:
- two side sections (5.1) at an angle with each other, wherein each side section (5.1) is adapted to be inserted in the second groove (2.8) of the support rail (2);
 - each side section (5.1) comprising a threaded hole (5.2) for a screw (5.3), said threaded hole (5.2) positioned such that a screw (5.3) is adapted to be screwed against a bottom (2.3) of the second groove (2.8) of the support rail (2) to fix the fastener (5) with the support rail (5).
10. A method of using the set of any of claims 6 to 8 for fastening said fastening member (1) to said support rail (2), the method comprising:
- setting the foot part (1.1) of the fastening member (1) to the groove (2.1) of the support rail (2) in a first position;
 - setting the protrusion (1.8) of the foot part (1.1) into a hole (2.7) of the support rail (2); and
 - rotating the fastening member (1) so that the foot part (1.1) moves in the groove (2.1) to a second position and the foot part (1.1) is partly between the tongue (2.4) and the bottom (2.2) of the groove (2.1).
11. The method according to claim 10, wherein rotating the fastening member (1) comprises:
- rotating the fastening member (1) until a groove (1.6, 1.7) of the foot part (1.1) is at the location of and parallel to a longitudinal shoulder ridge (2.6) of the support rail (2).
12. A flooring (3) constructed from a plurality of sets as defined in claim 9, comprising:
- a support structure (6) constructed from a plurality of support rails (2) of said sets and a plurality of fasteners (5) of said sets, said fasteners (5) being adapted to connect two support rails (2) with each other;
- a plurality of fastening members (1) of said sets, wherein each fastening member (1) is attached to one support rail (2); and
 - a plurality of decking boards (4) supported by the fastening members (1) in connection with the support structure (6).
13. The flooring (3) according to claim 13, wherein the plurality of decking boards (4) comprises decking boards (4) made of at least one of:
- a composite comprising natural fibres and polymer;
 - wood;
 - metal.
14. The flooring (3) according to claim 12 or 13, wherein an upper surface of one or more support rails (2) has a tape the friction of which is higher than the friction of the upper surface of the one or more support rails (2).
15. A method for forming a flooring (3) from a plurality of sets as defined in claim 9, comprising:
- forming a support structure (3) by:
 - attaching one or more fasteners (5) of said sets of claim 9 to a first set of support rails (2) of said sets of claim 9 by inserting a first side section (5.1a) of the fastener (5) to a groove (2.8) of one support rail (2) of the first set of support rails (2) and fixing the first side section (5.1a) to the groove (2.8) by a first screw (5.3a) installed to a hole (5.2a) in the first side section (5.1a) of the fastener (5);
 - attaching the one or more fasteners (5) to a second set of support rails (2) by inserting a second side section (5.1b) of the fastener (5) to a groove (2.8) of one support rail (2) of the second set of support rails (2) and fixing the second side section (5.1b) to the groove (2.8) by a second screw (5.3b) installed to a hole (5.2b) in the second side section (5.1b) of the fastener (5); and
 - fastening a plurality of fastening members (1) of said sets of claim 9 to the first set of support rails (2) making use of the method according to claim 10;
 - attaching a plurality of decking boards (4) to the support structure (3) by using the fastening members (1).
16. The method according to claim 15, wherein the step of attaching a plurality of decking boards (4) further comprises:

- pushing one edge of peach decking board (4) towards the fastening member (1) so that an upper surface of a tongue (4.2) of the decking board (4) is below a lower edge of a first locking section (1.10) of the fastening member (1); and
 - pushing another edge of the decking board (4) downwards towards the support structure (3) so that an upper surface of another tongue (4.2) of the decking board (4) is below a lower edge of a first locking section (1.10) of the another fastening member (1).

Patentansprüche

1. Befestigungselement (1), umfassend

- ein Fußteil (1.1), das geeignet ist, das Befestigungselement an einer Stützschiene (2) zu befestigen;
 - ein Stützelement (1.4), das an einem ersten Ende des Stützelements (1.4) am Fußteil (1.1) befestigt ist;
 - einen ersten Verriegelungsabschnitt (1.10), der an einem zweiten Ende des Stützelements (1.4) befestigt ist, wobei der erste Verriegelungsabschnitt (1.10) gegenüber dem Stützelement (1.4) abgewinkelt ist und sich zum Fußteil (1.1) hin erstreckt;
 - einen zweiten Verriegelungsabschnitt (1.11), der an einem zweiten Ende des Stützelements (1.4) angebracht ist, wobei der zweite Verriegelungsabschnitt (1.11) in Bezug auf das Stützelement (1.4) abgewinkelt ist und sich zum Fußteil (1.1) an der Seite des Stützelements (1.4) erstreckt, die der Seite gegenüberliegt, auf der sich der erste Verriegelungsabschnitt befindet;
 - einen Vorsprung (1.8) im Fußteil (1.1), der in eine entgegengesetzte Richtung zum Stützelement (1.4) gerichtet und in einem Loch (2.7) der Stützschiene (2) positionierbar ist; und
 - das Fußteil (1.1) ferner angepasst ist, um einem Boden (2.2) einer Nut (2.1) der Stützschiene (2) zugewandt zu sein, wenn es an der Stützschiene (2) befestigt ist,
dadurch gekennzeichnet, dass
 - ein Außenumfang des Fußteils (1.1) an diagonal gegenüberliegenden Ecken (1.13, 1.15) zwei gekrümmte Abschnitte und an den anderen beiden diagonal gegenüberliegenden Ecken (1.12, 1.14) zwei abgewinkelte Abschnitte aufweist.

2. Befestigungselement nach Anspruch 1, wobei der zweite Verriegelungsabschnitt (1.11) in mindestens zwei Unterabschnitte (1.11a, 1.11b) unterteilt ist, um die Flexibilität des zweiten Verriegelungsabschnitts

(1.11) zu verbessern.

3. Befestigungselement (1) nach Anspruch 1 oder 2, wobei das Fußteil (1.1) Folgendes umfasst:

- einen ersten Abschnitt (1.2); und
- einen zweiten Abschnitt (1.3);

wobei sich das erste Ende des Stützelements (1.4) zwischen dem ersten Abschnitt (1.2) und dem zweiten Abschnitt (1.3) befindet, und
 wobei das Fußteil (1.1) ein oder mehrere Löcher zwischen dem ersten Abschnitt (1.2) und dem ersten Ende des Stützelements (1.4) und zwischen dem ersten Ende des Stützelements (1.4) und dem zweiten Abschnitt (1.3) umfasst, um die Flexibilität des Fußteils (1.1) zu erhöhen.

4. Befestigungselement (1) nach einem der Ansprüche 1 bis 3, wobei das Stützelement (1.4) des Fußteils (1.1) Folgendes umfasst:

- einen gebogenen Abschnitt (1.5) zur Erhöhung der Flexibilität des Stützelements (1.4).

5. Befestigungselement (1) nach einem der Ansprüche 1 bis 4, wobei das Fußteil (1.1) Folgendes umfasst:

- eine Nut (1.6, 1.7) nahe einer Längskante des Fußteils (1.1) zur Aufnahme einer Zunge (2.4) einer Seitenwand (2.3) einer ersten Nut (2.1) der Stützschiene (2).

6. Satz bestehend aus dem Befestigungselement (1) nach einem der Ansprüche 1 bis 5 und einer Stützschiene (2), umfassend

- eine erste Nut (2.1) zum Aufnehmen der Befestigungselemente (1), wobei die erste Nut Folgendes umfasst:

- einen Boden (2.2);
- zwei oder mehr Längsseitenwände (2.3); und
- eine Zunge (2.4), die sich von einem Ende jeder Längsseitenwand (2.3) der ersten Nut (2.1) erstreckt;

- eine zweite Nut (2.8) zum Aufnehmen eines Befestigungselements (5), wobei die zweite Nut (2.8) Folgendes umfasst:

- einen Boden (2.3);
- zwei oder mehr Längsseitenwände (2.9); und
- eine Zunge (2.10), die sich von einem En-

- de jeder Längsseitenwand (2.9) der zweiten Nut (2.8) erstreckt; und
- ein oder mehrere Löcher (2.7) in einem Boden (2.2) der ersten Nut (2.1), die geeignet sind, den Vorsprung (1.8) des Befestigungselements (1) aufzunehmen.
7. Satz nach Anspruch 6, **dadurch gekennzeichnet, dass** eine der zwei oder mehreren Längsseitenwände (2.3) den Boden der zweiten Nut (2.8) bildet.
8. Satz nach Anspruch 6 oder 7, wobei mindestens eine der Zungen (2.4) Folgendes umfasst:
- eine Kerbe (2.11), die geeignet ist, eine Kante der Wand (1.4) des Befestigungselements (1) aufzunehmen, wenn das Befestigungselement (1) in Verbindung mit der Stützschiene (2) installiert wurde.
9. Satz nach einem der Ansprüche 6 bis 8, ferner umfassend ein Befestigungselement (5) zum Befestigen der Stützschiene (2) aneinander, wobei das Befestigungselement (5) Folgendes umfasst:
- zwei Seitenprofile (5.1) im Winkel zueinander, wobei jedes Seitenprofil (5.1) in die zweite Nut (2.8) der Stützschiene (2) einsteckbar ist;
- jeden Seitenabschnitt (5.1), der ein Gewindeloch (5.2) für eine Schraube (5.3) umfasst, wobei das Gewindeloch (5.2) so positioniert ist, dass eine Schraube (5.3) gegen einen Boden (2.3) der zweiten Nut (2.8) der Stützschiene (2) geschraubt werden kann, um das Befestigungselement (5) mit der Stützschiene (5) zu fixieren.
10. Verfahren zum Verwenden des Satzes nach einem der Ansprüche 6 bis 8 zum Befestigen des Befestigungselements (1) an der Stützschiene (2), wobei das Verfahren Folgendes umfasst:
- Einstellen des Fußteils (1.1) des Befestigungselements (1) auf die Nut (2.1) der Stützschiene (2) in einer ersten Position;
- Setzen des Vorsprungs (1.8) des Fußteils (1.1) in ein Loch (2.7) der Stützschiene (2); und
- Drehen des Befestigungselements (1), so dass sich das Fußteil (1.1) in der Nut (2.1) in eine zweite Position bewegt und das Fußteil (1.1) teilweise zwischen der Zunge (2.4) und dem Boden (2.2) der Nut (2.1) liegt.
11. Verfahren nach Anspruch 10, wobei das Drehen des Befestigungselements (1) Folgendes umfasst:
- Drehen des Befestigungselements (1), bis eine Nut (1.6, 1.7) des Fußteils (1.1) an der Stelle
- und parallel zu einer Längsschulterkante (2.6) der Stützschiene (2) steht.
12. Bodenbelag (3), der aus einer Vielzahl von Sätzen nach Anspruch 9 aufgebaut ist, umfassend:
- eine Stützstruktur (6), die aus einer Vielzahl von Stützschiene (2) der Sätze und einer Vielzahl von Befestigungselementen (5) der Sätze aufgebaut ist, wobei die Befestigungselemente (5) geeignet sind, zwei Stützschiene (2) miteinander zu verbinden;
- eine Vielzahl von Befestigungselemente (1) der Sätze, wobei jedes Befestigungselement (1) an einer Stützschiene (2) befestigt ist; und
- eine Vielzahl von Terrassendielen (4), die von den Befestigungselementen (1) in Verbindung mit der Stützstruktur (6) getragen werden.
13. Bodenbelag (3) nach Anspruch 13, wobei die Vielzahl von Terrassendielen (4) Terrassendielen (4) umfasst, die aus mindestens einem der folgenden bestehen:
- einen Verbundstoff aus Naturfasern und Polymer;
- Holz;
- Metall.
14. Bodenbelag (3) nach Anspruch 12 oder 13, wobei eine Oberseite einer oder mehrerer Stützschiene (2) ein Band aufweist, dessen Reibung höher ist als die Reibung der Oberseite der einen oder mehreren Stützschiene (2) .
15. Verfahren zum Bilden eines Bodenbelags (3) aus einer Vielzahl von in Anspruch 9 definierten Sätzen, umfassend:
- Bilden einer Stützstruktur (3) durch:
- Anbringen eines oder mehrerer Befestigungselemente (5) der Sätze von Anspruch 9 an einem ersten Satz von Stützschiene (2) der Sätze von Anspruch 9 durch Einsetzen eines ersten Seitenabschnitts (5.1a) des Befestigungselements (5) in eine Nut (2.8) einer Stützschiene (2) des ersten Satzes von Stützschiene (2), und Befestigen des ersten Seitenabschnitts (5.1a) an der Nut (2.8) durch eine erste Schraube (5.3a), die in einem Loch (5.2a) in dem ersten Seitenabschnitt (5.1a) des Befestigungselements (5) installiert ist;
- Anbringen eines oder mehrerer Befestigungselemente (5) an einem zweiten Satz von Stützschiene (2) durch Einsetzen eines zweiten Seitenabschnitts (5.1b) des

- Befestigungsmittels (5) in eine Nut (2.8) einer Stützschiene (2) von dem zweiten Satz von Stützschiene (2), und Befestigen des zweiten Seitenabschnitts (5.16) an der Nut (2.8) durch eine zweite Schraube (5.3b), die in einem Loch (5.2b) in dem zweiten Seitenabschnitt (5.1b) des Befestigungselements (5) installiert ist; und
- Befestigen einer Vielzahl von Befestigungselementen (1) der Sätze von Anspruch 9 an dem ersten Satz von Stützschiene (2) unter Verwendung des Verfahrens nach Anspruch 10;
 - Anbringen mehrerer Terrassendielen (4) an der Stützstruktur (3) unter Verwendung der Befestigungselemente (1).
16. Verfahren nach Anspruch 15, wobei der Schritt des Anbringens einer Vielzahl von Terrassendielen (4) ferner Folgendes umfasst:
- Schieben einer Kante jeder Terrassendiele (4) in Richtung des Befestigungselements (1), so dass eine obere Fläche einer Zunge (4.2) der Terrassendiele (4) unter einer unteren Kante eines ersten Verriegelungsabschnitts (1.10) des Befestigungselements (1) liegt; und
 - eine andere Kante der Terrassendiele (4) nach unten in Richtung der Stützstruktur (3) schieben, so dass eine obere Fläche einer anderen Zunge (4.2) der Terrassendiele (4) unter einer unteren Kante eines ersten Verriegelungsabschnitts (1.10) des anderen Befestigungselements (1) liegt.
- ### Revendications
1. Élément de fixation (1), comprenant
 - une partie pied (1.1) conçue pour fixer l'élément de fixation à un rail de support (2) ;
 - un élément de support (1.4) fixé à la partie pied (1.1) au niveau d'une première extrémité de l'élément de support (1.4) ;
 - une première section de verrouillage (1.10) fixée à une seconde extrémité de l'élément de support (1.4), dans lequel la première section de verrouillage (1.10) se situe à un angle par rapport à l'élément de support (1.4) et s'étend en direction de la partie pied (1.1) ;
 - une seconde section de verrouillage (1.11) fixée à une seconde extrémité de l'élément de support (1.4), dans lequel la seconde section de verrouillage (1.11) se situe à un angle par rapport à l'élément de support (1.4) et s'étend en direction de la partie pied (1.1) au niveau du côté
 2. Élément de fixation selon la revendication 1, dans lequel la seconde section de verrouillage (1.11) est divisée en au moins deux sous-sections (1.11a, 1.11b) pour améliorer la flexibilité de la seconde section de verrouillage (1.11).
 3. Élément de fixation (1) selon la revendication 1 ou 2, la partie pied (1.1) comprenant :
 - une première section (1.2) ; et
 - une seconde section (1.3) ;
 dans lequel la première extrémité de l'élément de support (1.4) est située entre la première section (1.2) et la seconde section (1.3), et en outre dans lequel la partie pied (1.1) comprend un ou plusieurs orifices entre la première section (1.2) et la première extrémité de l'élément de support (1.4) et entre la première extrémité de l'élément de support (1.4) et la seconde section (1.3) pour augmenter la flexibilité de la partie pied (1.1).
 4. Élément de fixation (1) selon l'une quelconque des revendications 1 à 3, l'élément de support (1.4) de la partie pied (1.1) comprenant :
 - une section incurvée (1.5) pour augmenter la flexibilité de l'élément de support (1.4).
 5. Élément de fixation (1) selon l'une quelconque des revendications 1 à 4, la partie pied (1.1) comprenant :
 - une rainure (1.6, 1.7) à proximité d'un bord longitudinal de la partie pied (1.1) conçue pour recevoir une languette (2.4) d'une paroi latérale (2.3) d'une première rainure (2.1) du rail de support (2).
 6. Ensemble comprenant l'élément de fixation (1) selon

l'une quelconque des revendications 1 à 5 et un rail de support (2) comprenant

- une première rainure (2.1) pour recevoir lesdits éléments de fixation (1), la première rainure comprenant :

- un fond (2.2) ;
- deux parois latérales longitudinales (2.3) ou plus ; et
- une languette (2.4) s'étendant depuis une extrémité de chaque paroi latérale longitudinale (2.3) de la première rainure (2.1) ;

- une seconde rainure (2.8) pour recevoir une attache (5), la seconde rainure (2.8) comprenant :

- un fond (2.3) ;
- deux parois latérales longitudinales (2.9) ou plus ; et
- une languette (2.10) s'étendant depuis une extrémité de chaque paroi latérale longitudinale (2.9) de la seconde rainure (2.8) ; et

- un ou plusieurs orifices (2.7) dans un fond (2.2) de la première rainure (2.1) conçus pour recevoir ladite saillie (1.8) dudit élément de fixation (1).

7. Ensemble selon la revendication 6, dans lequel l'une des deux parois latérales longitudinales (2.3) ou plus forme le fond de la seconde rainure (2.8).

8. Ensemble selon la revendication 6 ou 7, dans lequel au moins une des languettes (2.4) comprend :

- une encoche (2.11) conçue pour recevoir un bord de la paroi (1.4) de l'élément de fixation (1), lorsque l'élément de fixation (1) a été installé en liaison avec le rail de support (2).

9. Ensemble selon l'une quelconque des revendications 6 à 8, comprenant en outre une attache (5) pour fixer lesdits rails de support (2) les uns aux autres, ladite attache (5) comprenant :

- deux sections latérales (5.1) formant un angle l'une avec l'autre, dans lequel chaque section latérale (5.1) est conçue pour être insérée dans la seconde rainure (2.8) du rail de support (2) ;

- chaque section latérale (5.1) comprenant un orifice fileté (5.2) pour une vis (5.3), ledit orifice fileté (5.2) étant positionné de sorte qu'une vis (5.3) est conçue pour être vissée contre un fond (2.3) de la seconde rainure (2.8) du rail de support (2) afin de fixer l'attache (5) avec le rail de

support (5).

10. Procédé d'utilisation de l'ensemble selon l'une quelconque des revendications 6 à 8 pour fixer ledit élément de fixation (1) audit rail de support (2), le procédé comprenant :

- le positionnement de la partie pied (1.1) de l'élément de fixation (1) sur la rainure (2.1) du rail de support (2) dans une première position ;
- le positionnement de la saillie (1.8) de la partie pied (1.1) dans un orifice (2.7) du rail de support (2) ; et
- la rotation de l'élément de fixation (1) de sorte que la partie pied (1.1) se déplace dans la rainure (2.1) vers une seconde position et que la partie pied (1.1) se situe en partie entre la languette (2.4) et le fond (2.2) de la rainure (2.1).

11. Procédé selon la revendication 10, dans lequel la rotation de l'élément de fixation (1) comprend :

- la rotation de l'élément de fixation (1) jusqu'à ce qu'une rainure (1.6, 1.7) de la partie pied (1.1) se situe au niveau de l'emplacement et parallèlement à une arête d'épaulement longitudinale (2.6) du rail de support (2) .

12. Revêtement de sol (3) construit à partir d'une pluralité d'ensembles tels que définis dans la revendication 9, comprenant :

- une structure de support (6) construite à partir d'une pluralité de rails de support (2) desdits ensembles et d'une pluralité d'attaches (5) desdits ensembles, lesdites attaches (5) étant conçues pour relier deux rails de support (2) entre eux ;
- une pluralité d'éléments de fixation (1) desdits ensembles, dans lequel chaque élément de fixation (1) est fixé à un rail de support (2) ; et
- une pluralité de planches de terrasse (4) supportées par les éléments de fixation (1) en liaison avec la structure de support (6).

13. Revêtement de sol (3) selon la revendication 13, dans lequel la pluralité de planches de terrasse (4) comprend des planches de terrasse (4) constituées d'au moins l'un des éléments parmi :

- un composite comprenant des fibres naturelles et un polymère ;
- le bois ;
- le métal.

14. Revêtement de sol (3) selon la revendication 12 ou 13, dans lequel une surface supérieure d'un ou plusieurs rails de support (2) a une bande dont le frot-

tement est supérieur au frottement de la surface supérieure des un ou plusieurs rails de support (2).

rouillage (1.10) de l'autre élément de fixation (1).

15. Procédé de formation d'un revêtement de sol (3) à partir d'une pluralité d'ensembles tels que définis dans la revendication 9, comprenant :

- la formation d'une structure de support (3) par :

- la fixation d'une ou plusieurs attaches (5) desdits ensembles selon la revendication 9 à un premier ensemble de rails de support (2) desdits ensembles selon la revendication 9 en insérant une première section latérale (5.1a) de l'attache (5) dans une rainure (2.8) d'un rail de support (2) du premier ensemble de rails de support (2) et en fixant la première section latérale (5.1a) à la rainure (2.8) par une première vis (5.3a) installée dans un orifice (5.2a) dans la première section latérale (5.1a) de l'attache (5) ;
- la fixation des une ou plusieurs attaches (5) à un second ensemble de rails de support (2) en insérant une seconde section latérale (5.1b) de l'attache (5) dans une rainure (2.8) d'un rail de support (2) du second ensemble de rails de support (2) et en fixant la seconde section latérale (5.1b) à la rainure (2.8) par une seconde vis (5.3b) installée dans un orifice (5.2b) dans la seconde section latérale (5.1b) de l'attache (5) ; et
- la fixation d'une pluralité d'éléments de fixation (1) desdits ensembles selon la revendication 9 au premier ensemble de rails de support (2) en utilisant le procédé selon la revendication 10 ;

- la fixation d'une pluralité de planches de terrasse (4) à la structure de support (3) en utilisant les éléments de fixation (1).

16. Procédé selon la revendication 15, dans lequel l'étape de fixation d'une pluralité de planches de terrasse (4) comprend en outre :

- la poussée d'un bord de chaque planche de terrasse (4) en direction de l'élément de fixation (1) de sorte qu'une surface supérieure d'une languette (4.2) de la planche de terrasse (4) se situe en dessous d'un bord inférieur d'une première section de verrouillage (1.10) de l'élément de fixation (1) ; et
- la poussée d'un autre bord de chaque planche de terrasse (4) vers le bas en direction de la structure de support (3) de sorte qu'une surface supérieure d'une autre languette (4.2) de la planche de terrasse (4) se situe en dessous d'un bord inférieur d'une première section de ver-

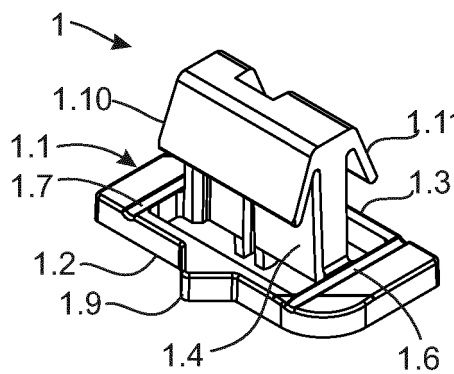


Fig. 1a

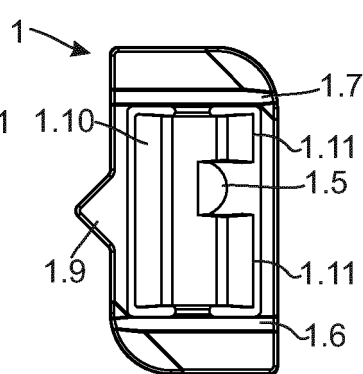


Fig. 1b

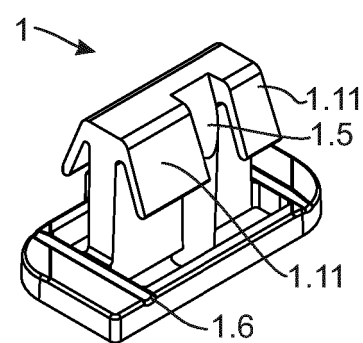


Fig. 1c

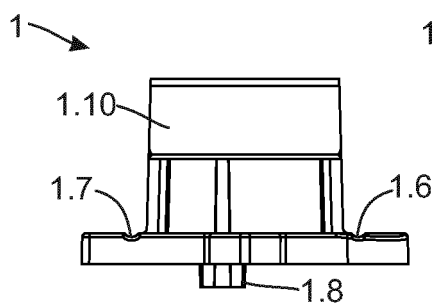


Fig. 1d

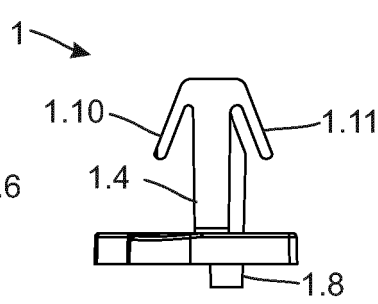


Fig. 1e

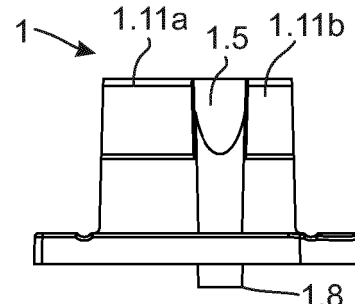


Fig. 1f

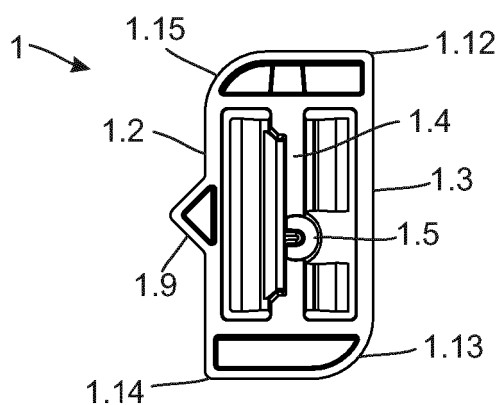


Fig. 1g

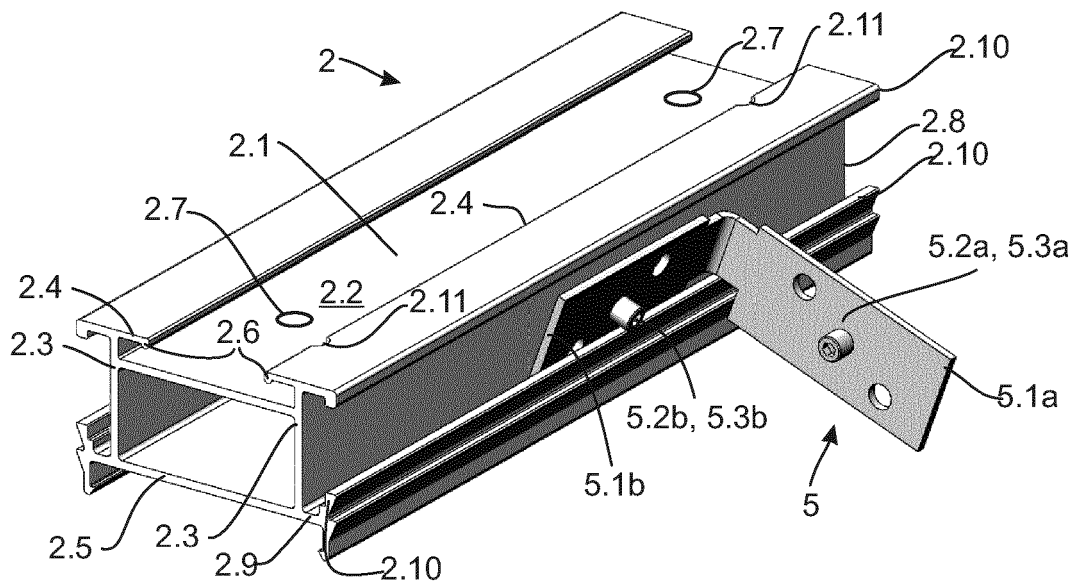


Fig. 2a

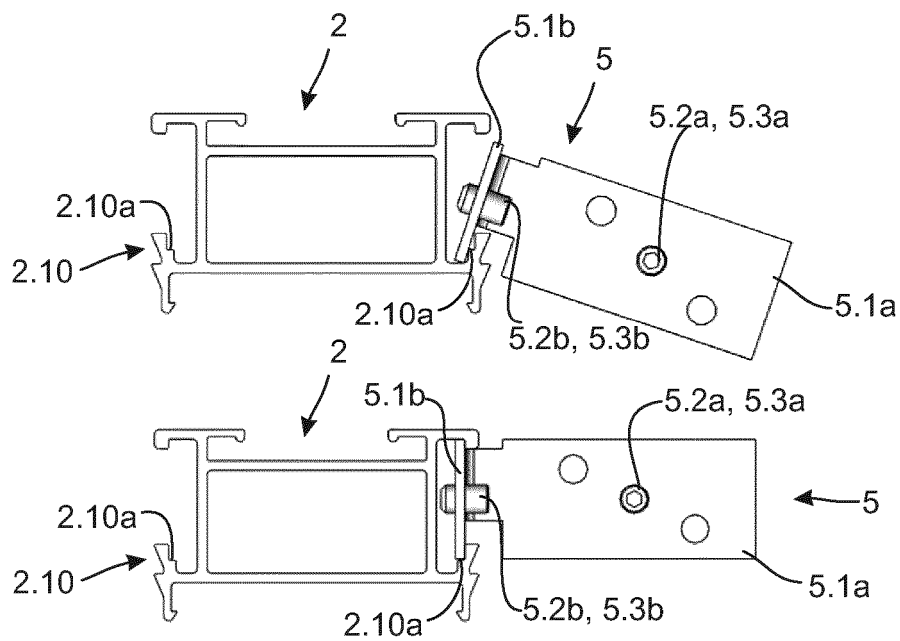


Fig. 2b

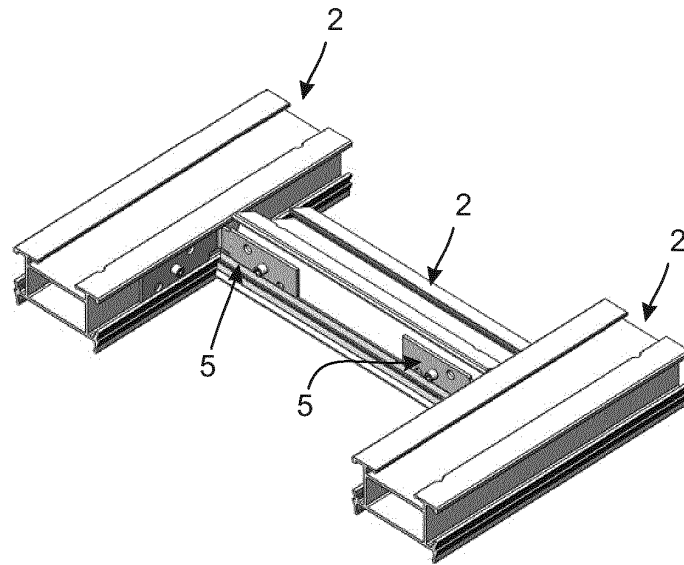


Fig. 2c

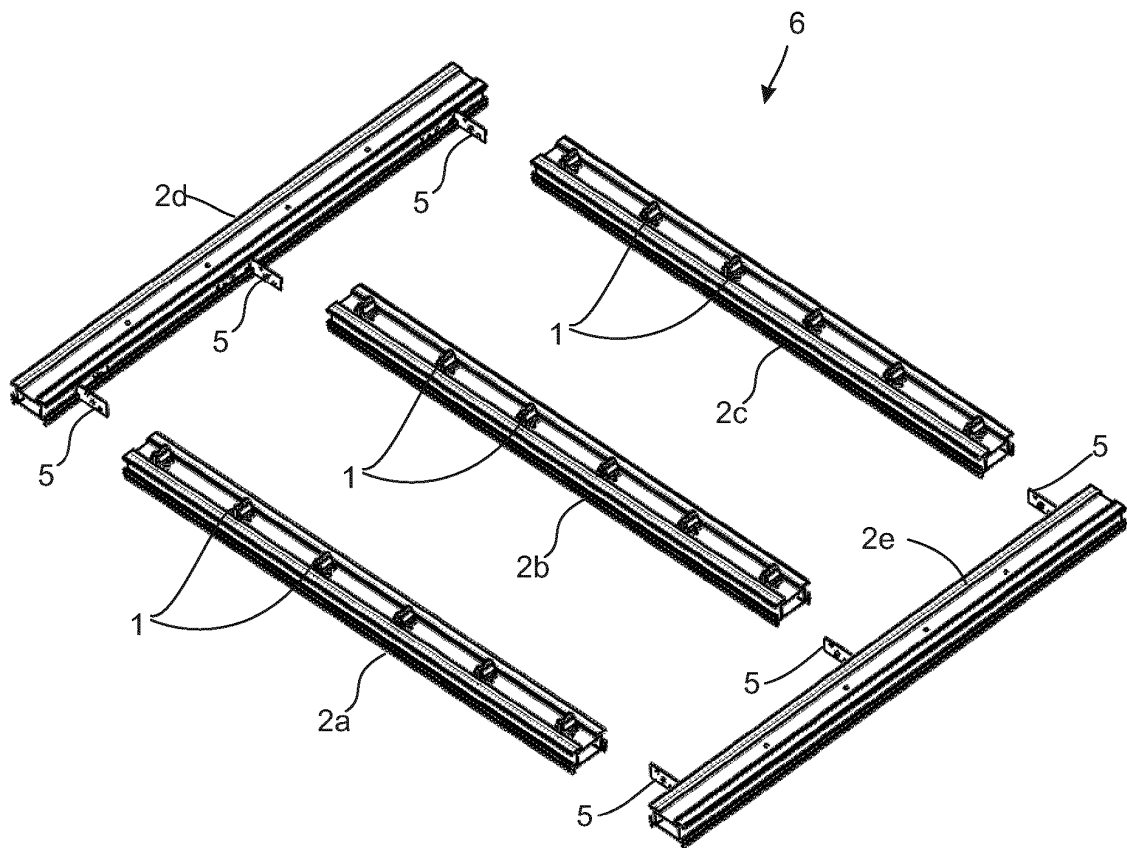


Fig. 2d

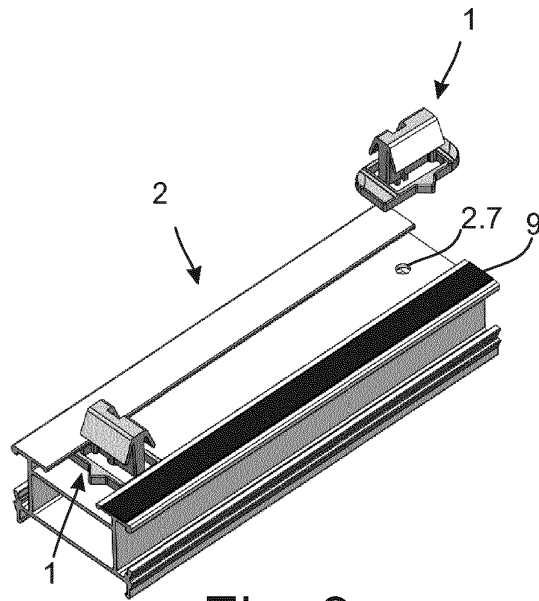


Fig. 3a

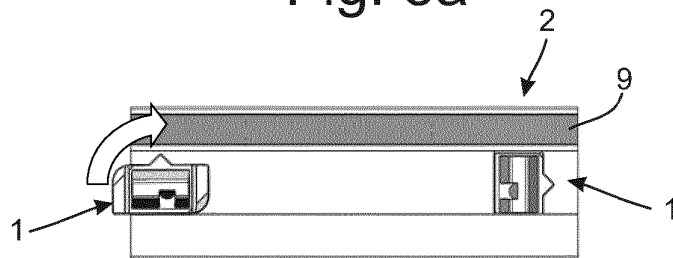


Fig. 3b

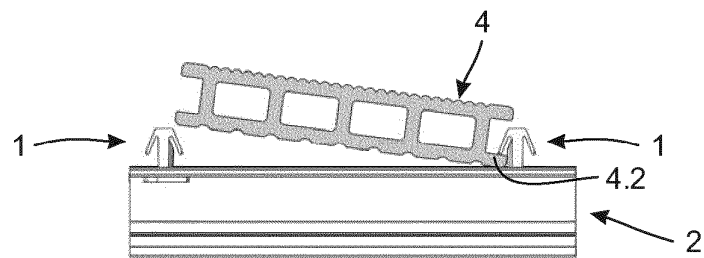


Fig. 3c

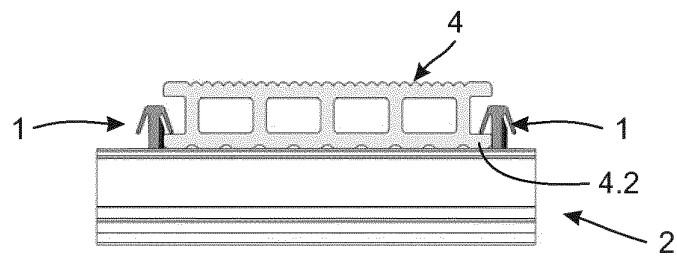


Fig. 3d

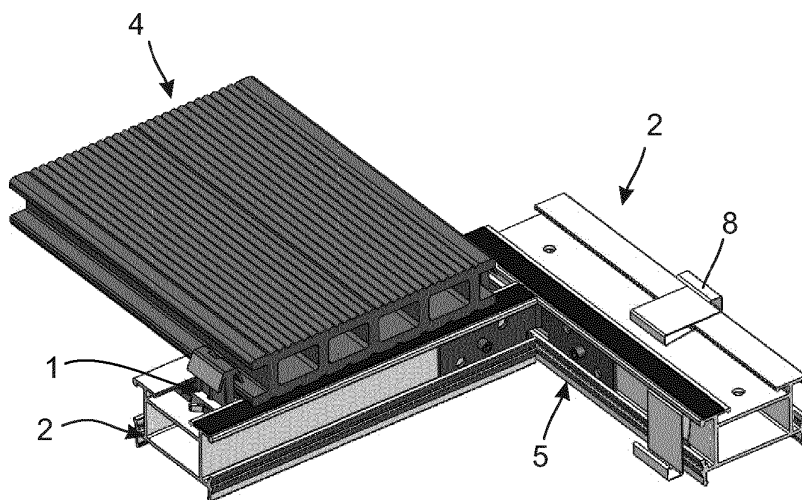


Fig. 4

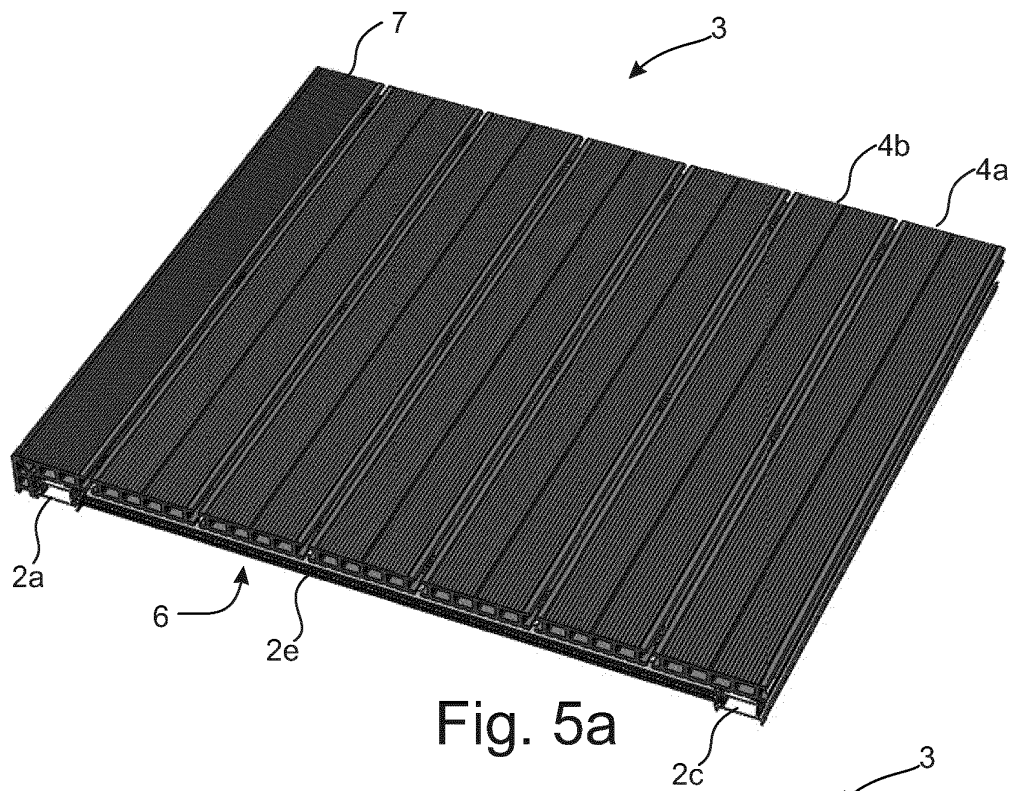


Fig. 5a

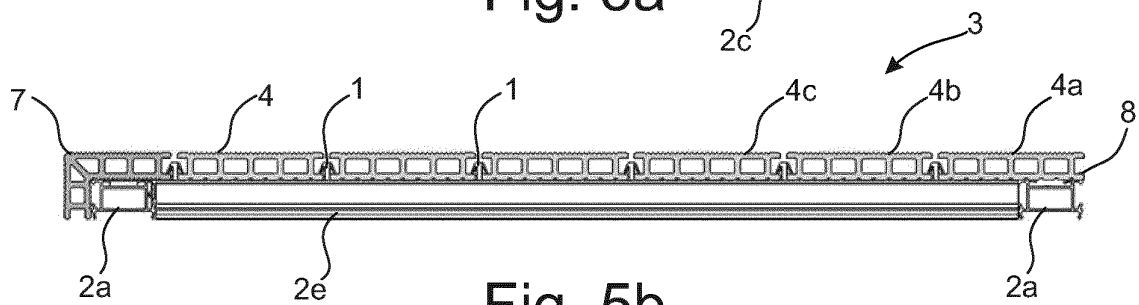


Fig. 5b

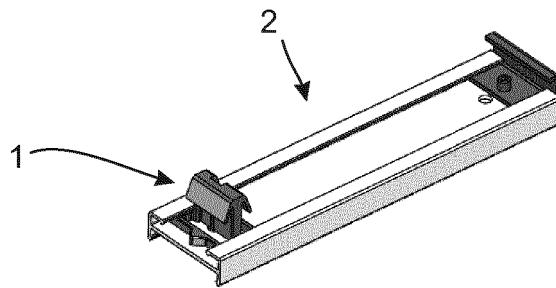


Fig. 6

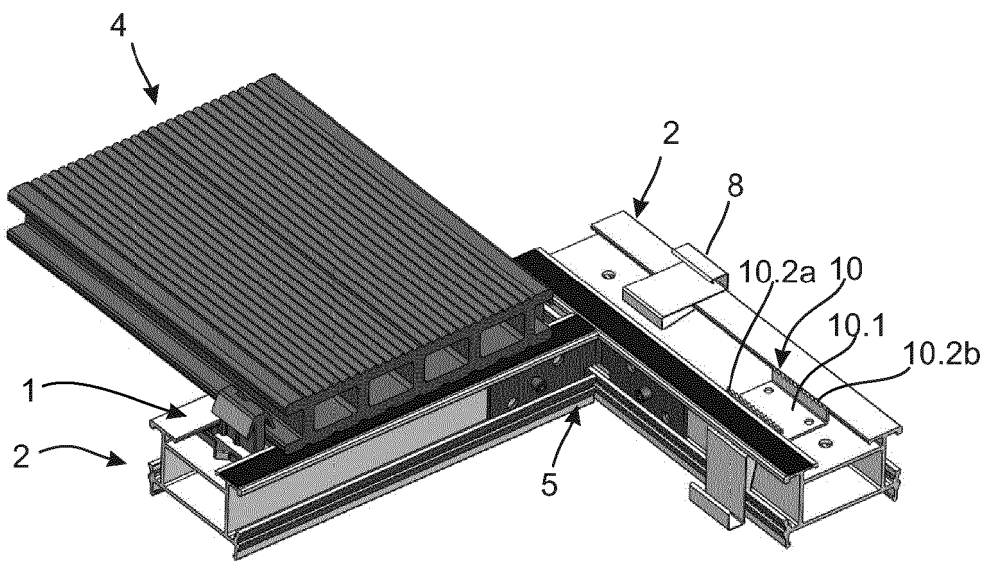


Fig. 7

REFERENCES CITED IN THE DESCRIPTION

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