US 20090249730A1

(19) **United States**

(12) **Patent Application Publication**

VIBIANO

(10) **Pub. No.: US 2009/0249730 A1**

(43) **Pub. Date: Oct. 8, 2009**

(54) **LAMINATE FLOORING WITH COUPLING STEM**

(76) Inventor: **Flavia Athayde VIBIANO**, Sao Paulo (BR)

Correspondence Address:
STITES & HARBISON PLLC
1199 NORTH FAIRFAX STREET, SUITE 900
ALEXANDRIA, VA 22314 (US)

(21) Appl. No.: **12/418,210**

(22) Filed: **Apr. 3, 2009**

(30) **Foreign Application Priority Data**

Apr. 3, 2008 (BR) MU8800835-5
Aug. 26, 2008 (BR) MU8801875-0

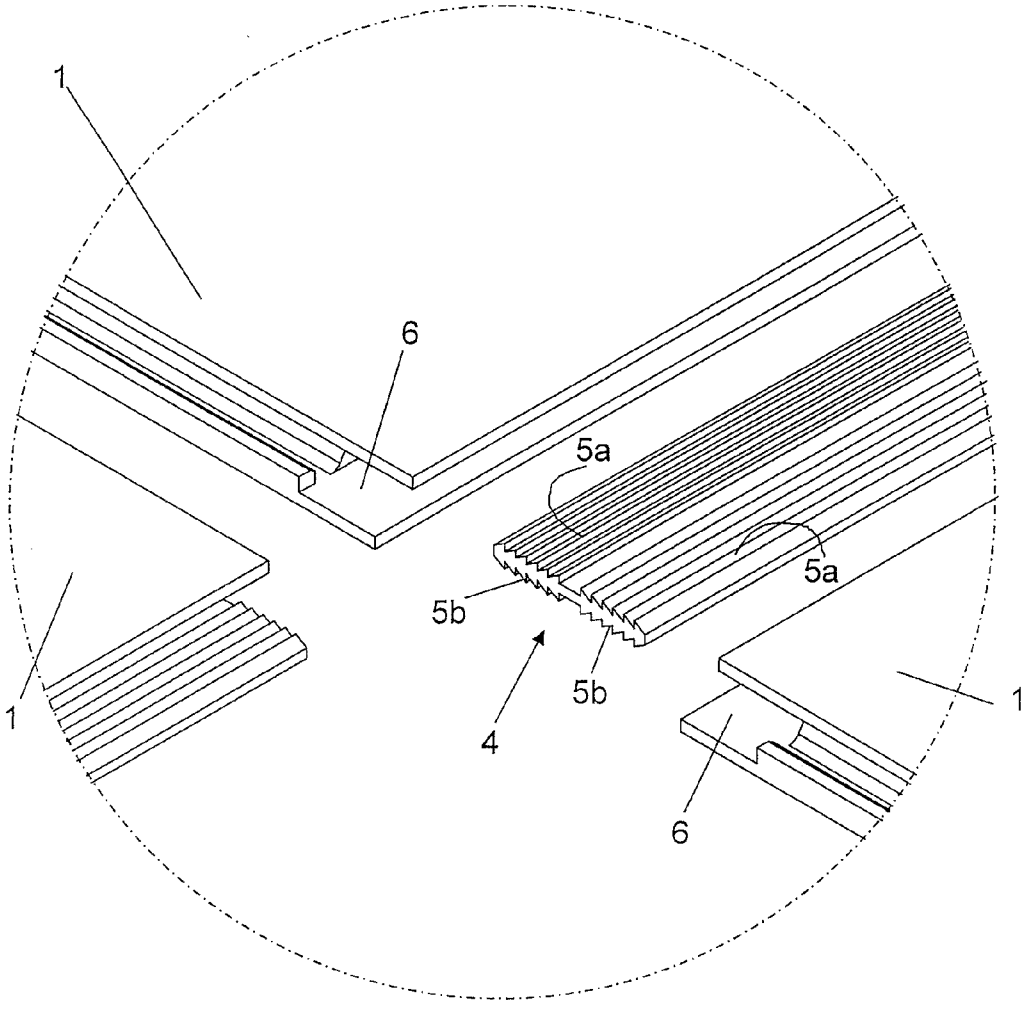
Publication Classification

(51) **Int. Cl.**
E04B 5/00 (2006.01)
E04C 2/38 (2006.01)
E04B 1/41 (2006.01)

(52) **U.S. Cl.** **52/586.2**; 52/782.1

(57) **ABSTRACT**

Laminate flooring with coupling stem comprising long rectangular planks with two types of couplings, wherein the first is carried out by their longitudinal edges equally equipped with male/female hooks-type profiles configured for angular penetration, where the hook from a plank can penetrate into the corresponding hook of the other plank, the planks placed in a coplanar position, whereas the second coupling allows the joinery of the tops using a mechanical coupling comprising an engagement stem divided into two longitudinal halves, whose upper and lower faces equally have longitudinal microteeth, where the teeth on one side are slanted towards the center of the stem, such that each longitudinal half of said profile can be penetrating and self-locking in the grooves on the transversal edges the planks, thus finalizing the side by side engagement between the two planks.



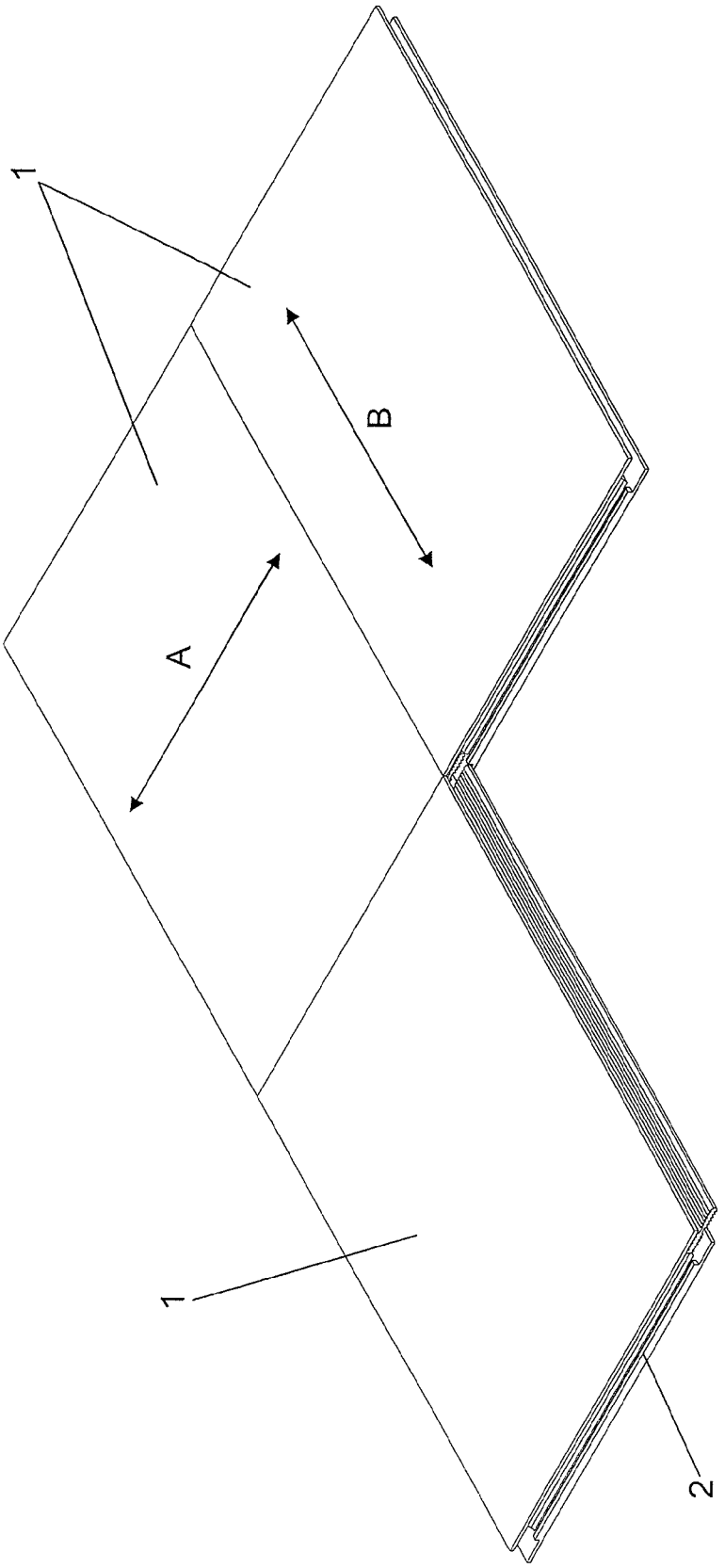


FIG. 1

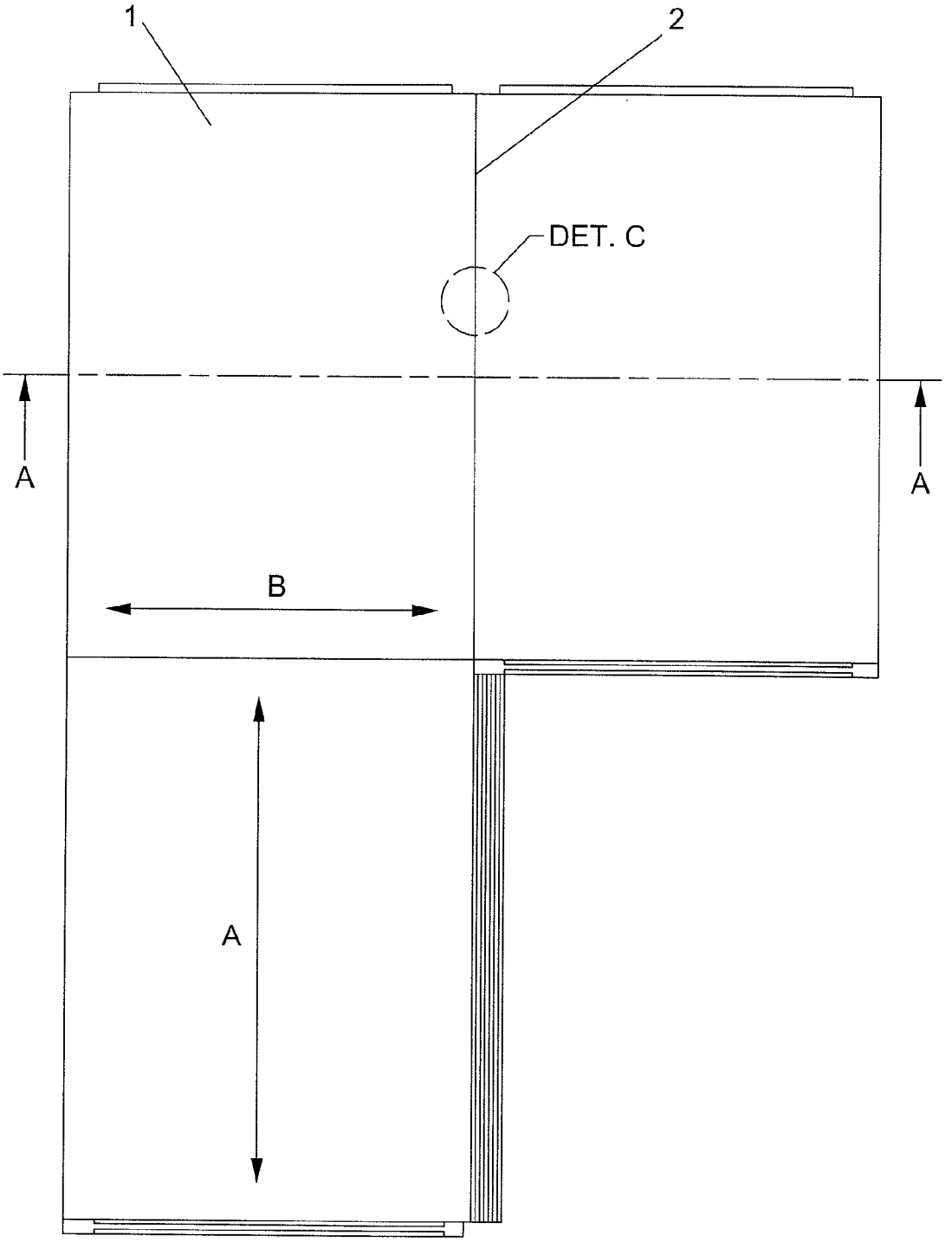


FIG. 2

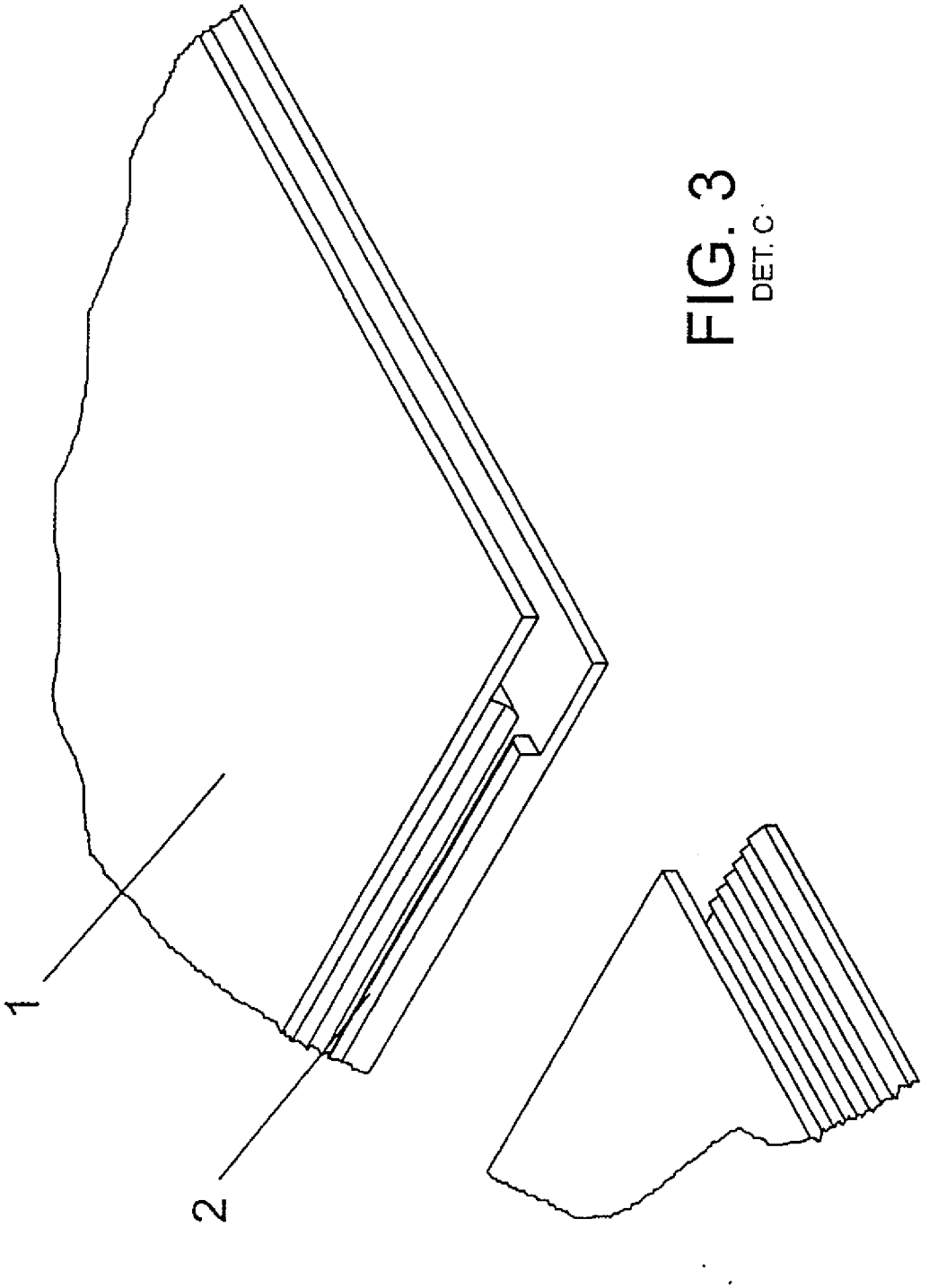


FIG. 3
DET. C

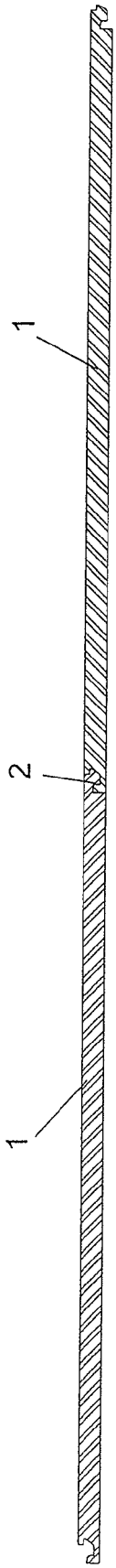


FIG. 4
Corte A-A

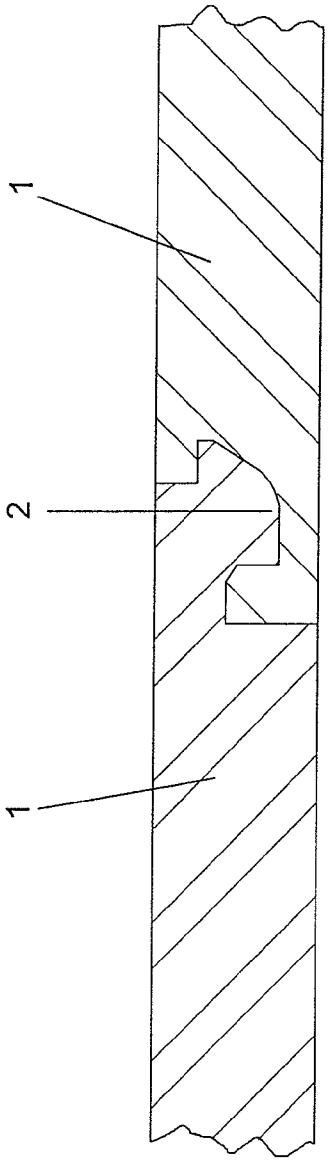


FIG. 5

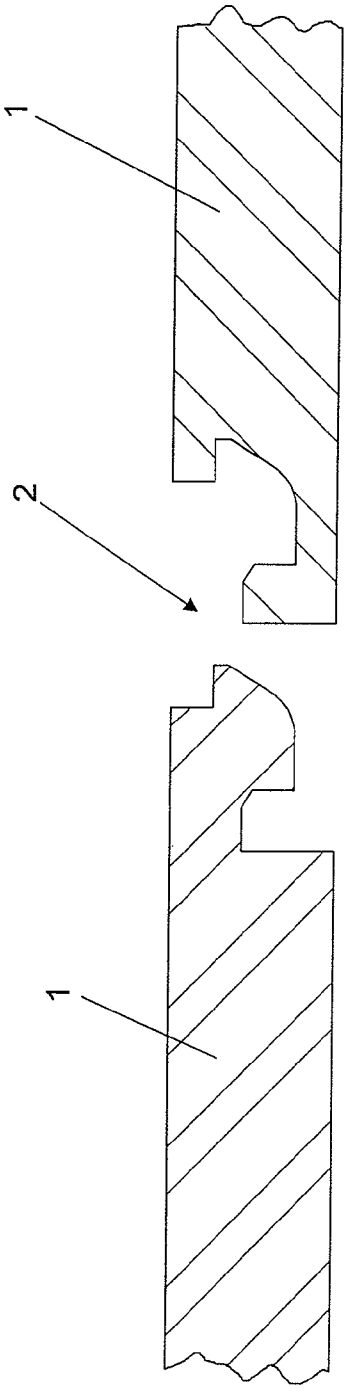


FIG. 6

FIG. 7

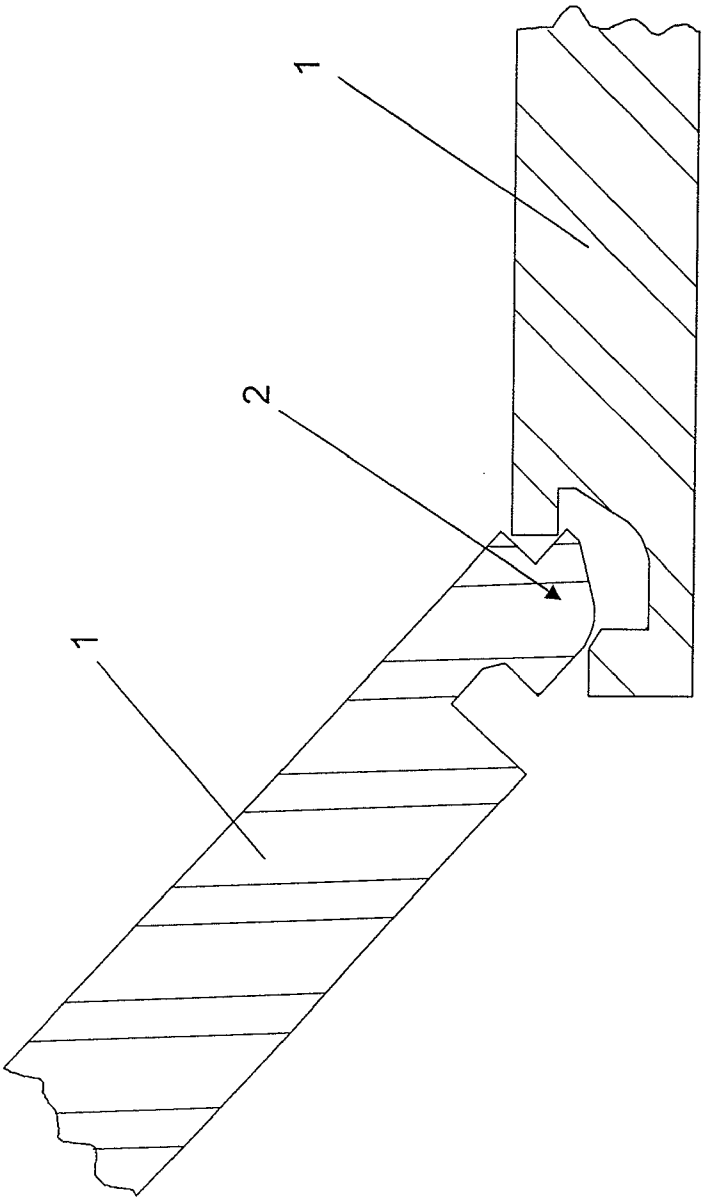
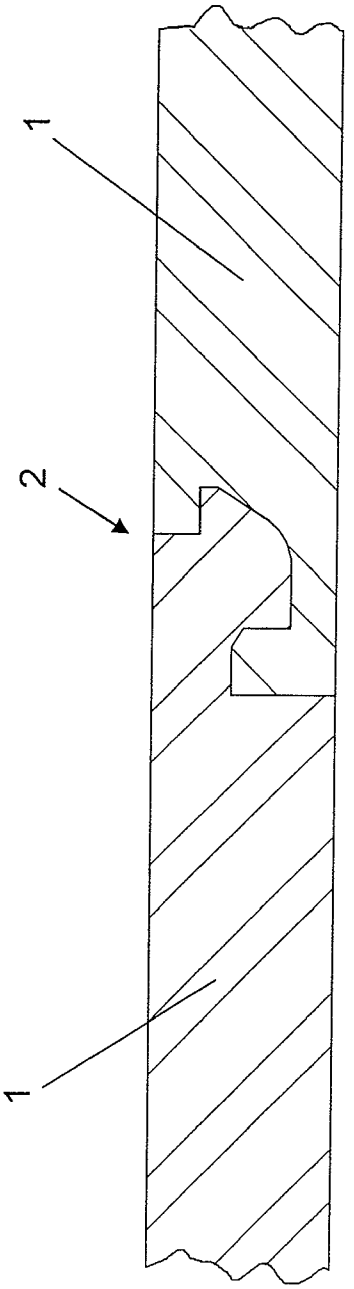


FIG. 8



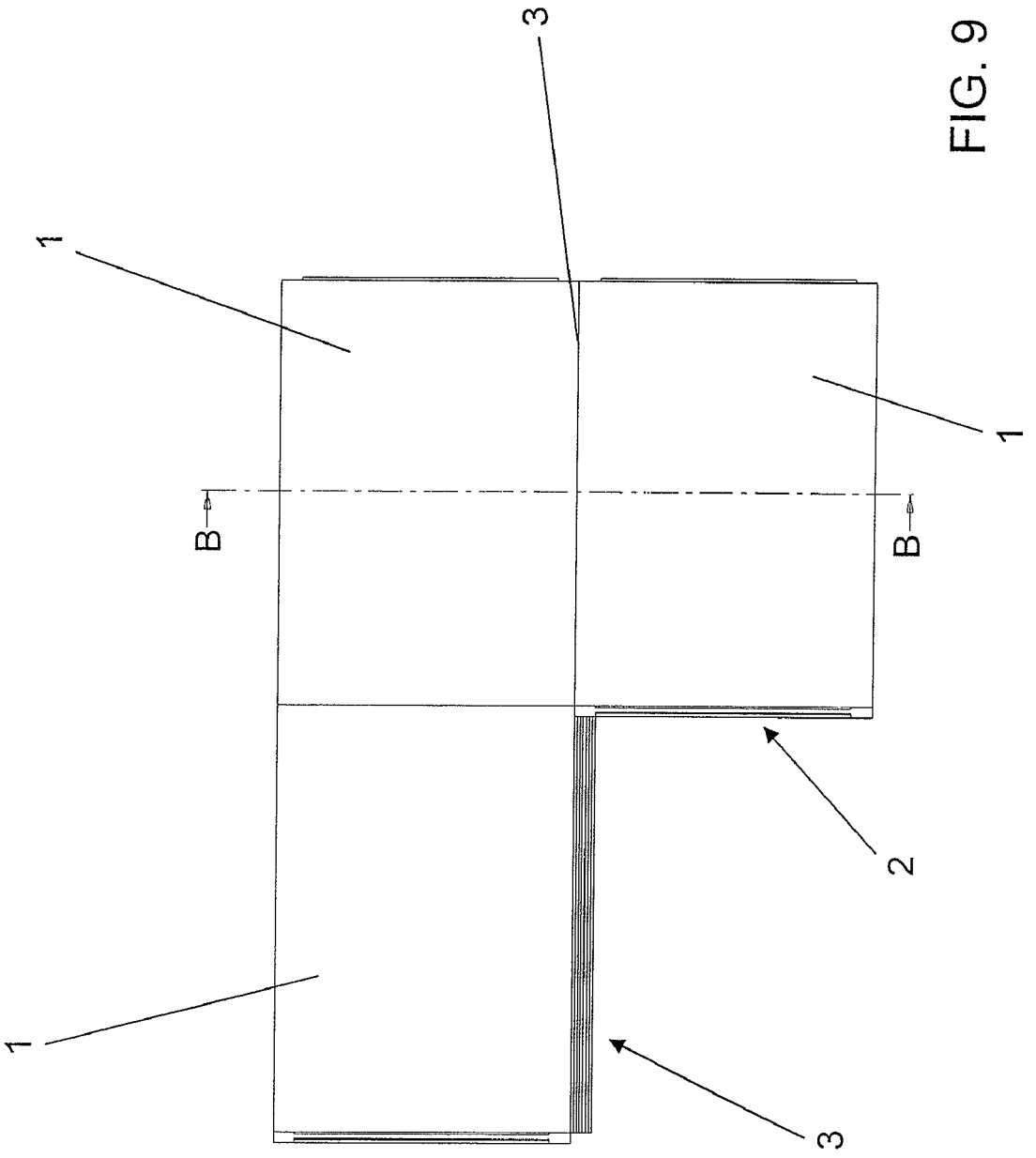


FIG. 9

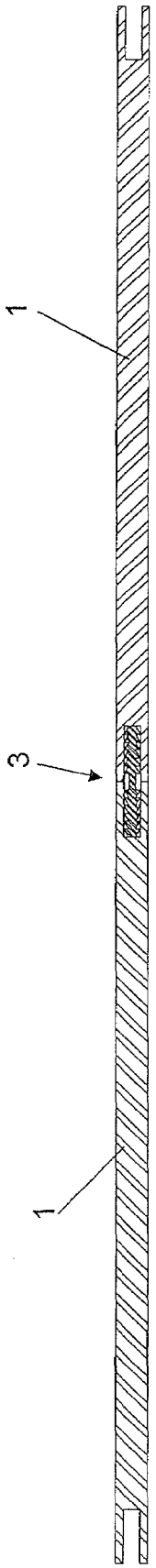


FIG. 10
Corte B-B

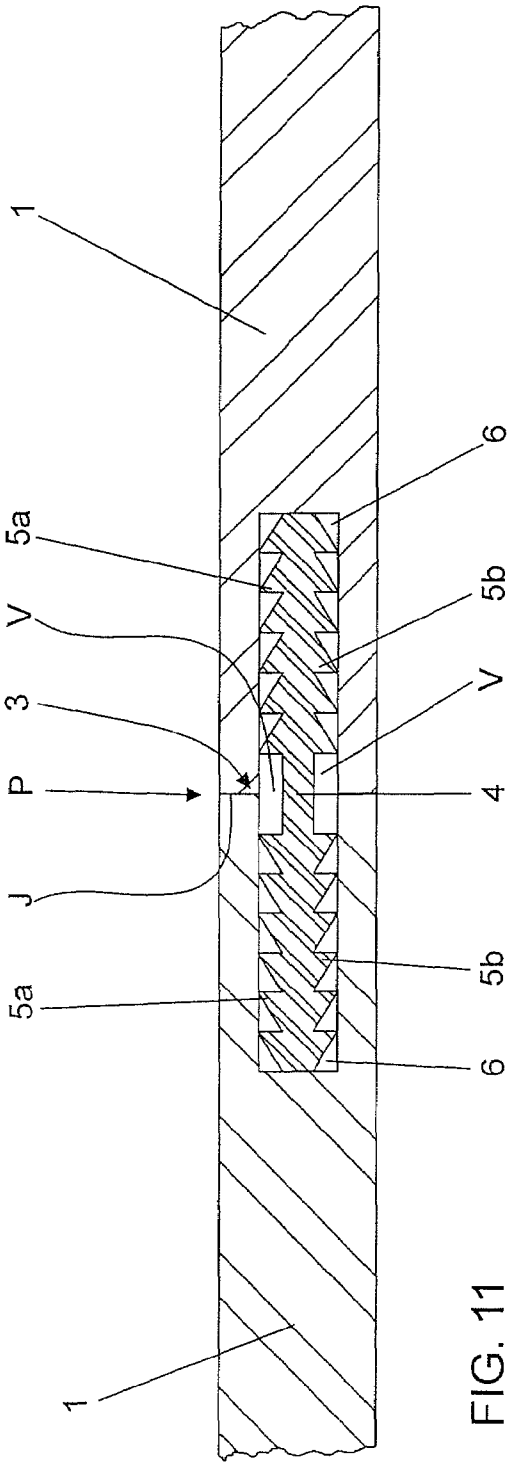


FIG. 11

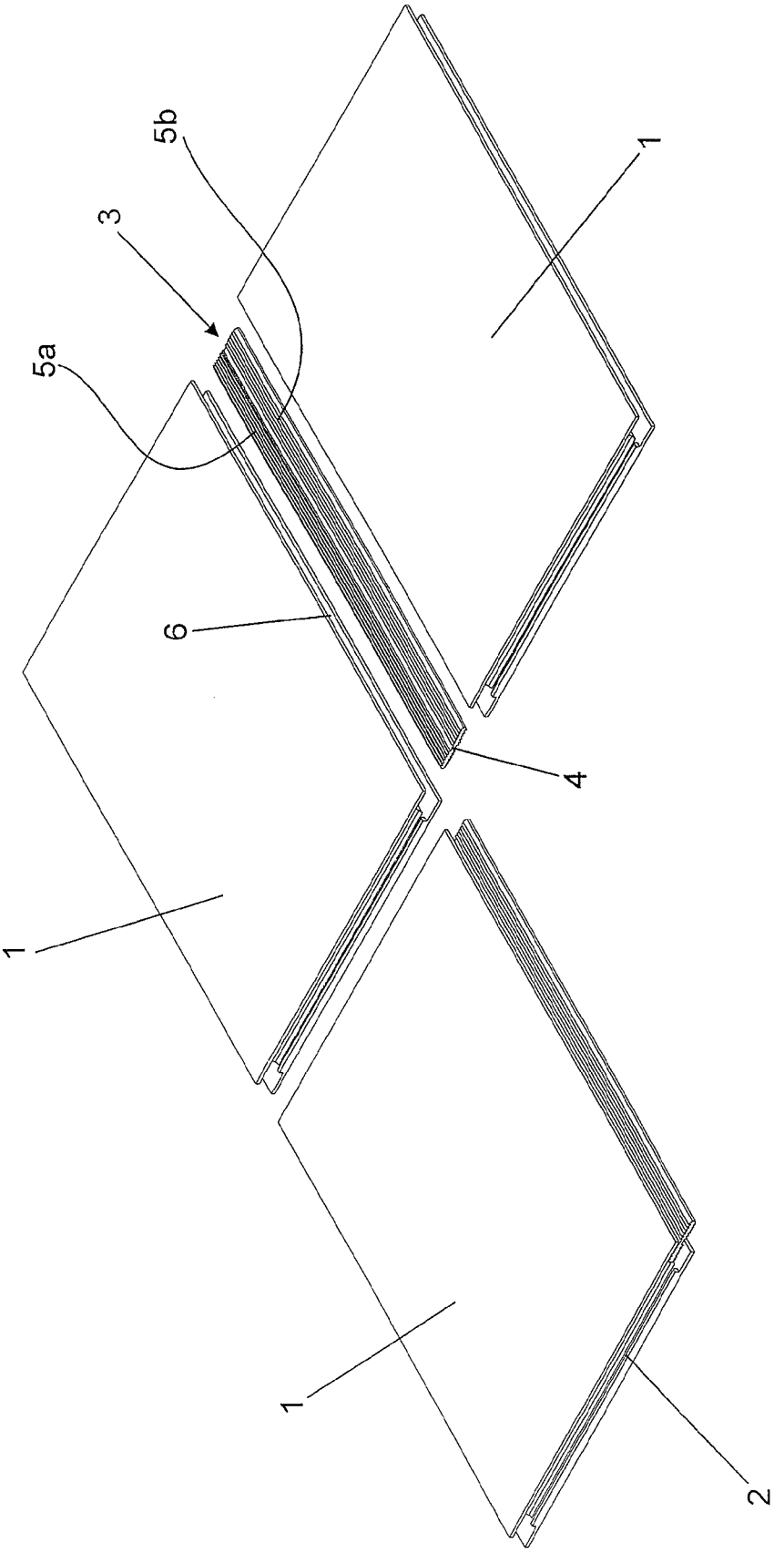


FIG. 12

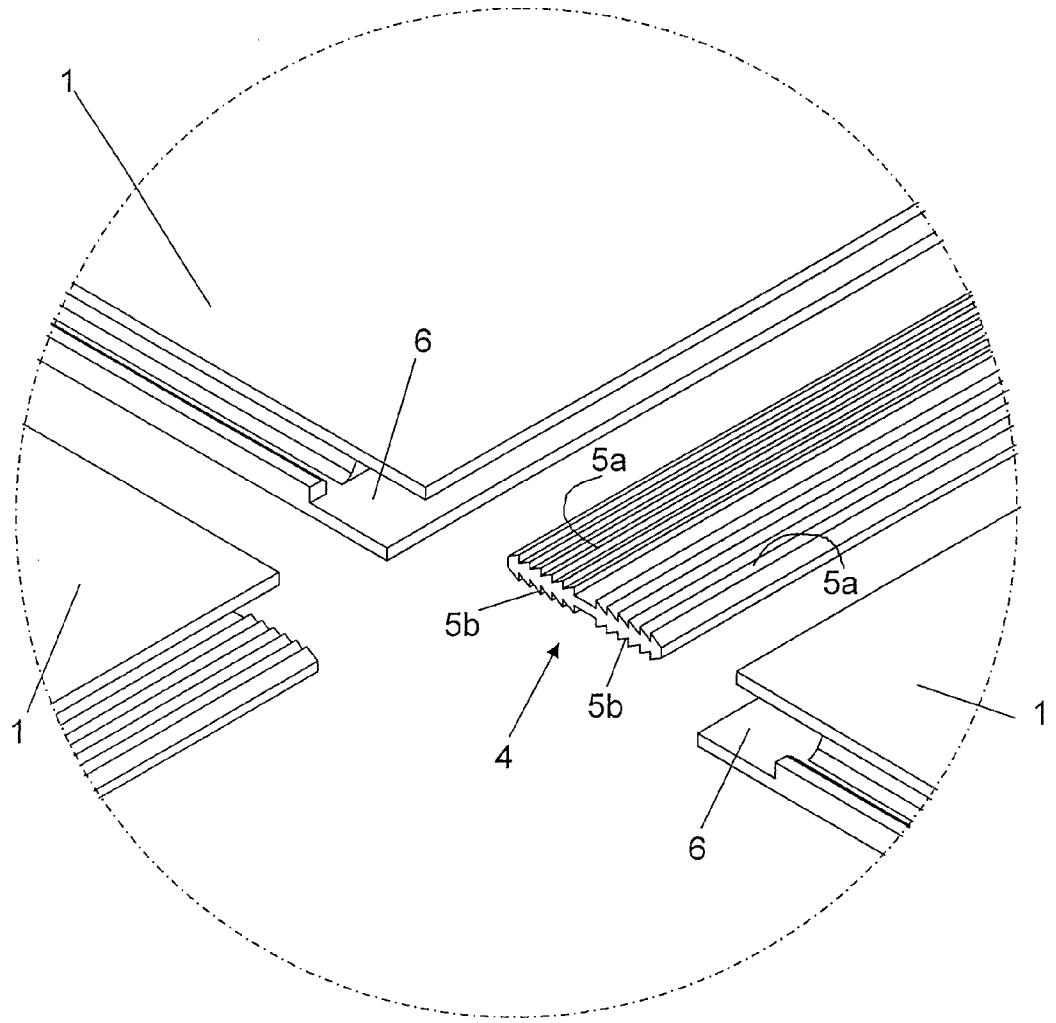


FIG. 13

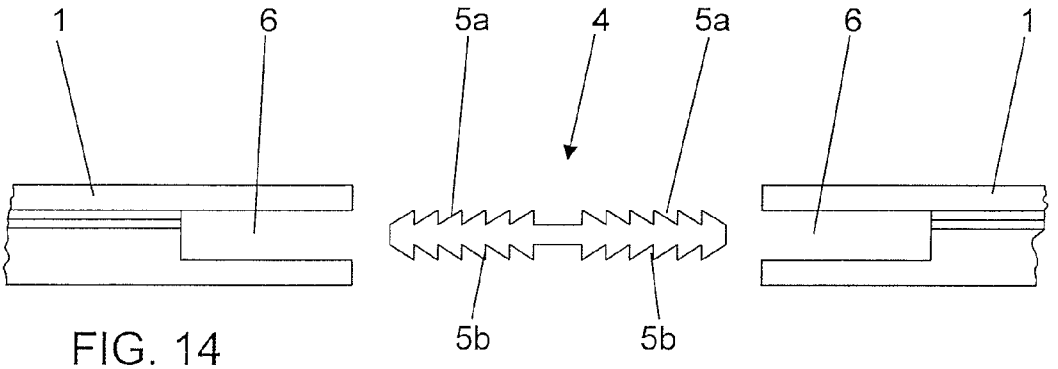


FIG. 14

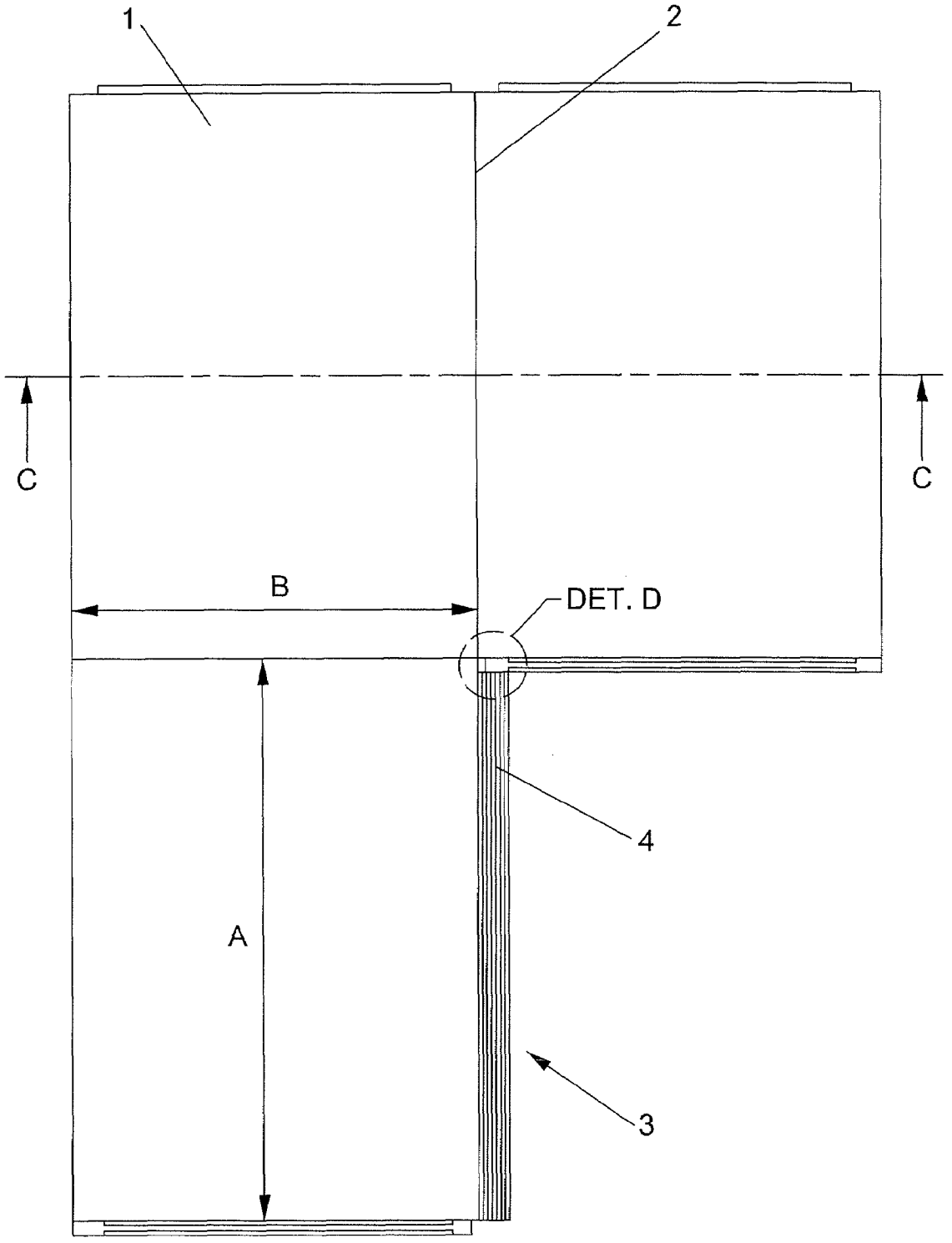


FIG. 15

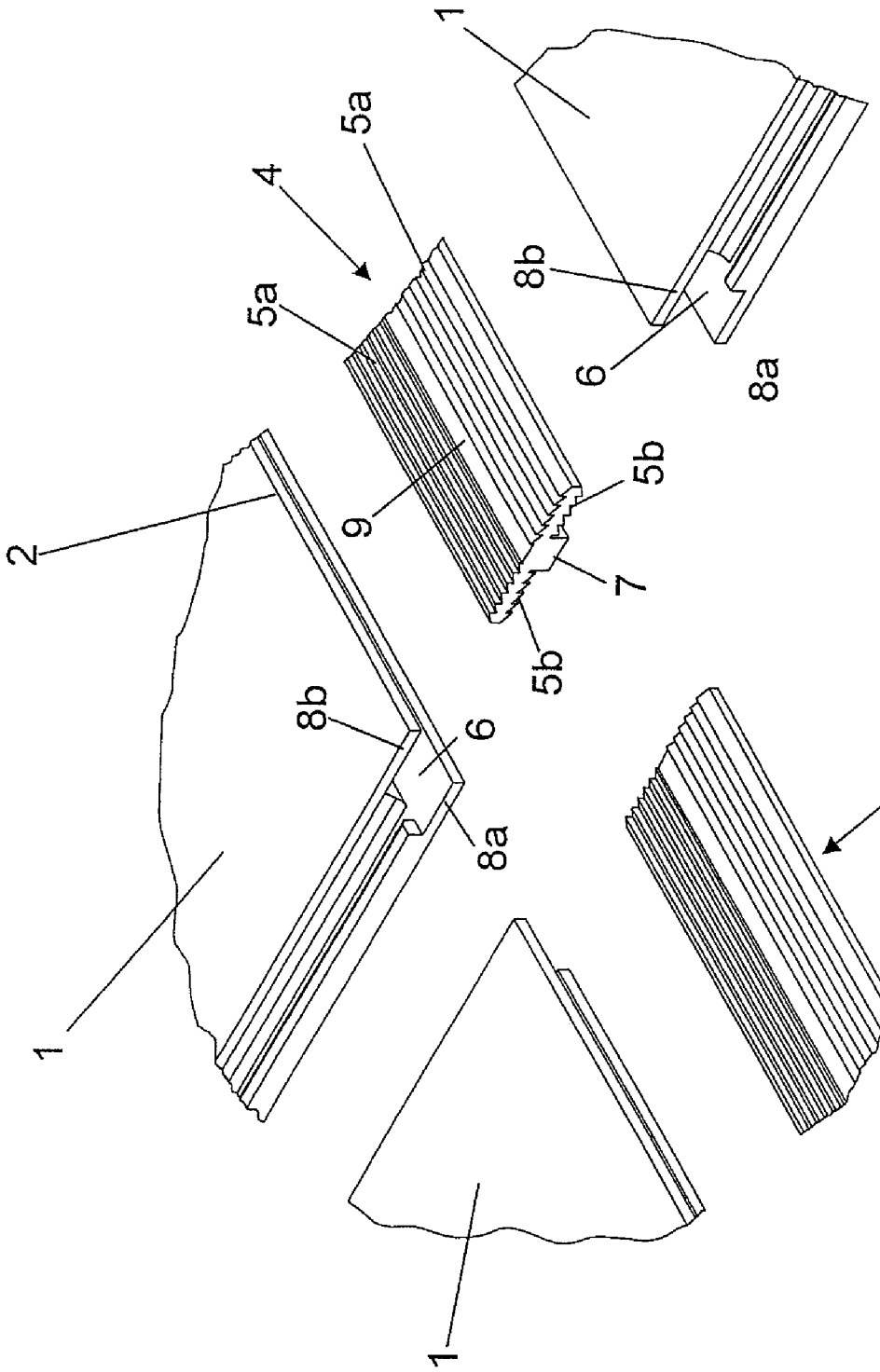


FIG. 16
DET. D

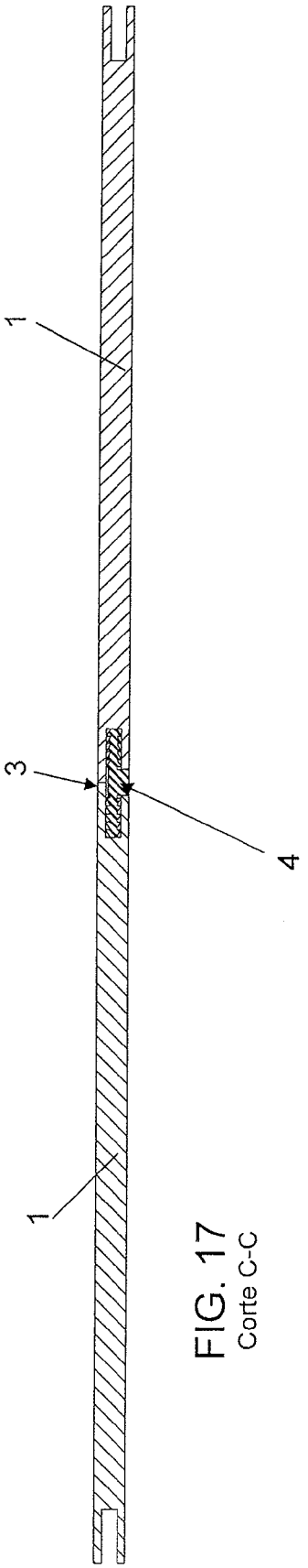


FIG. 17
Corte C-C

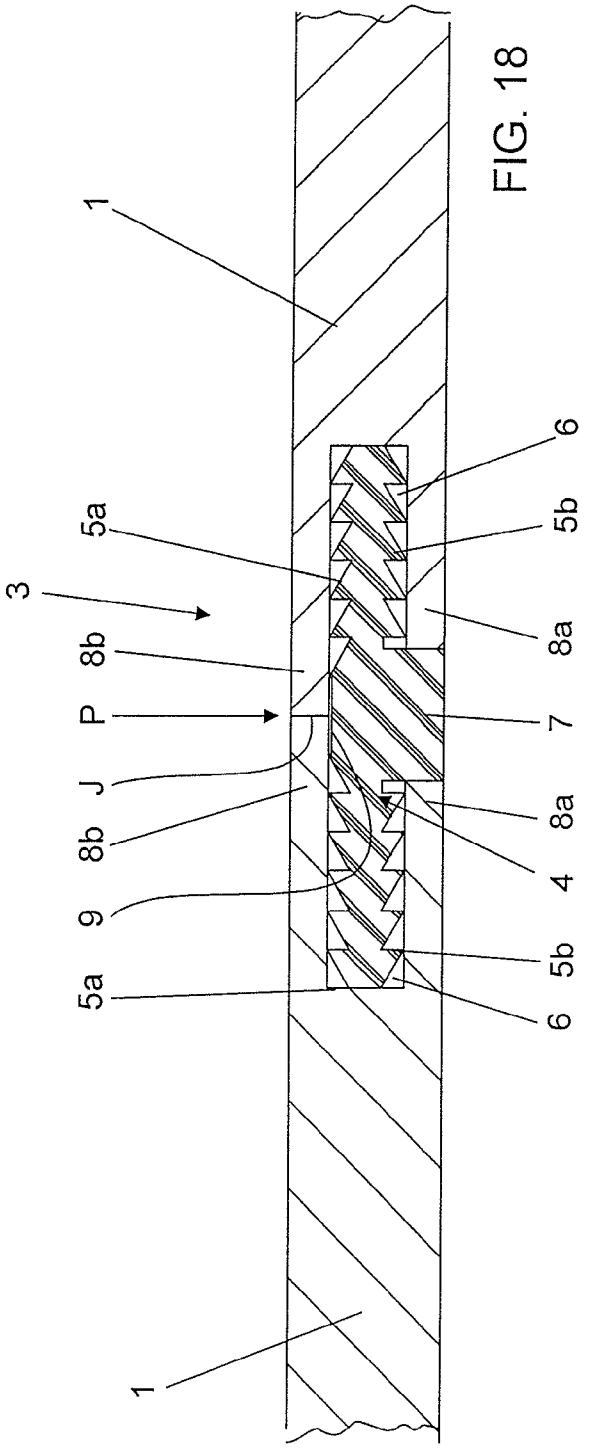


FIG. 18

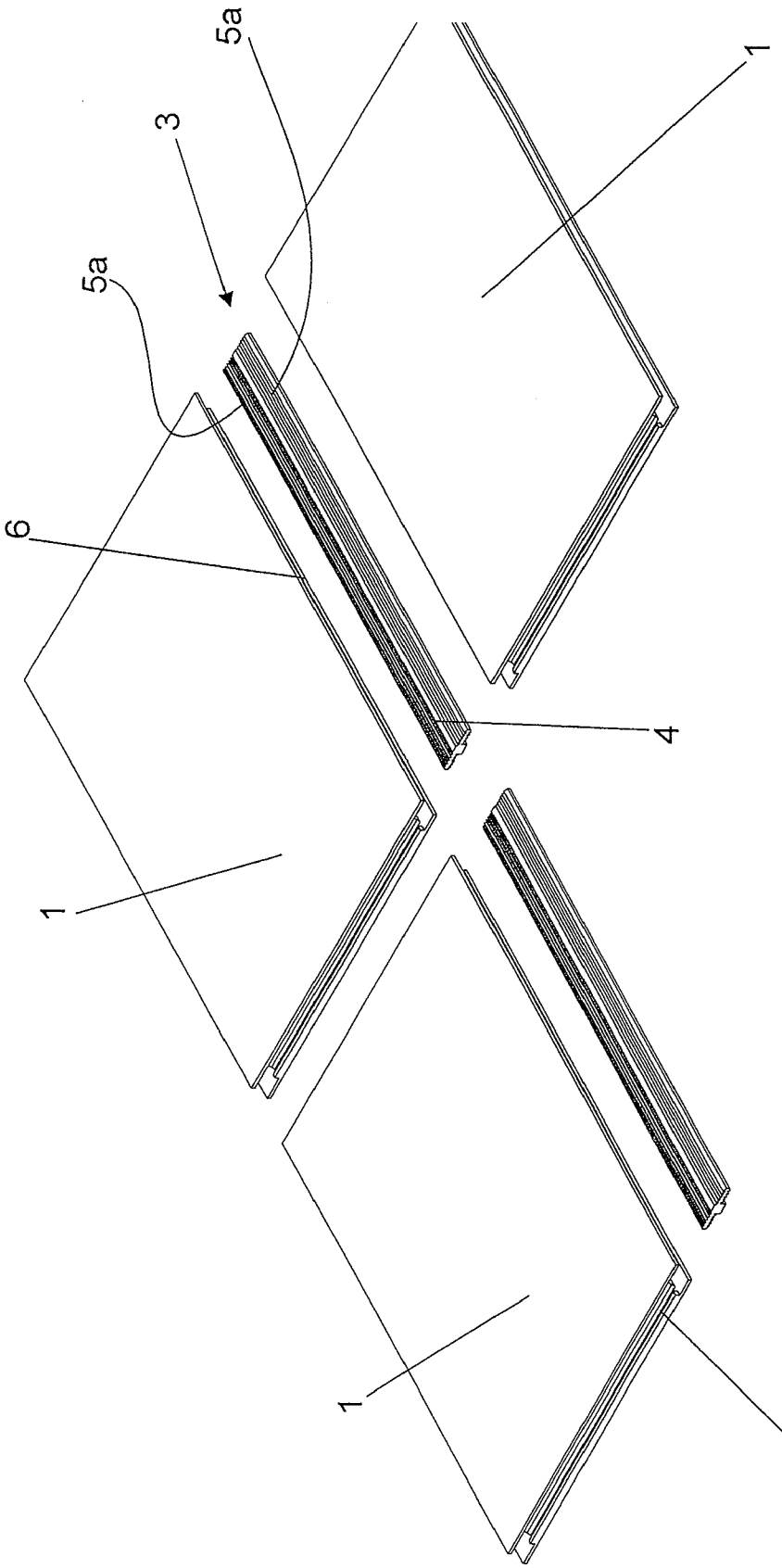


FIG. 19

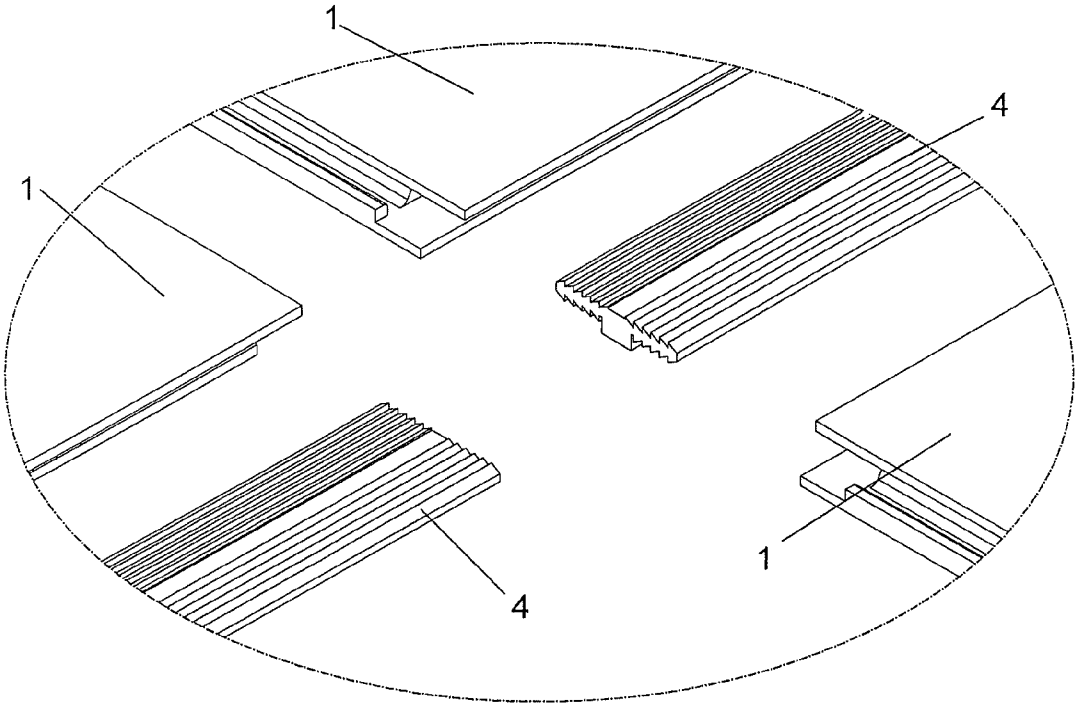


FIG. 20

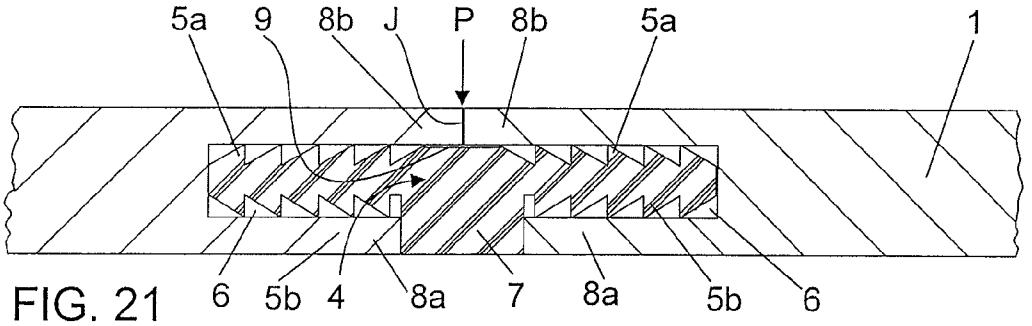


FIG. 21

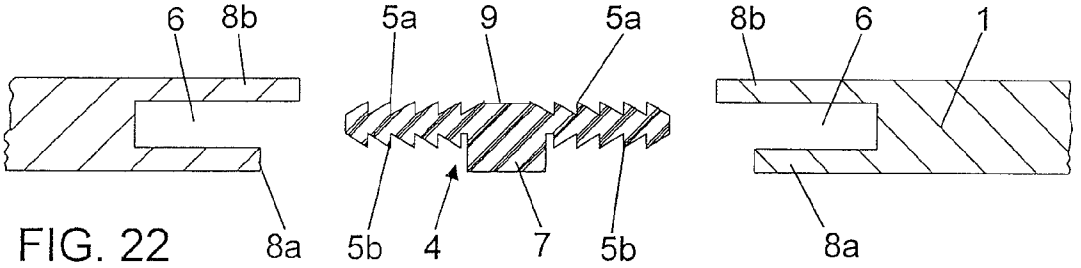


FIG. 22

LAMINATE FLOORING WITH COUPLING STEM

FIELD OF THE INVENTION

[0001] The present invention relates to the field of civil construction and environment decoration, more specific to laminate floors and mechanical means for coplanar coupling of planks, without the use of glue.

BACKGROUND OF THE INVENTION

[0002] As it is known, today there are various and different types of floorings, including those traditionally called as high resistance laminate floor or simply floating floor. The main characteristic of these floors is the fact that it is formed by planks that combine different synthetic and natural materials. These planks, in general, are assembled on a previously prepared surface. To carry out the assembly on a surface, innumerous planks are set together side by side and, accordingly, their longitudinal edges have a suitable type of fitting. This type of fitting may vary in two basic types. One of them is the male/female type requiring the use of glue, whereas the other type is a self-locking kind, which does not require the use of glue.

[0003] It is desirable that a plank be fitted side by side with others by a simple self-locking engagement, thus not requiring the use of glue. Although the use of glue assures an efficient joint, it adds to the arrangement a component that increases the cost of the overall assembly, not only because of the additional material, but also due to the considerable manpower required to apply it.

[0004] It is desirable that the planks of a laminate floor are coupled with self-locking means in order to eliminate the use of glue. Some solutions to meet this objective already exist, such as those taught in document WO 2007/093019. This technology, such as some others, found an efficient technical solution for coupling together on a side by side and coplanarly manner, different floating floors or high resistance laminates without the use of glue. This solution is carried out by self-locking fit, having jaw-type or engageable fittings along the longitudinal edges of each plank, as if they were veritable hooks that once coupled remain completely built-in. The fittings further provide highly efficient coupling, even when the planks support opposite forces, thus characterizing the ideal assembly form and without the use of glue. The advantages of this coupling are incontestable because it eliminates the use of chemical joining and, thus, eliminates the manpower for such application.

[0005] Clearly, the use of glueless coupling known in the state of the art has already been proven in different types of laminate floors; however, they all have only one kind of coupling on the sides and tops of the planks. When the tops of the planks are installed, this type of coupling or hook presents considerable difficulty, because the movement necessary to fit them has to be executed simultaneously with the fitting of the sides as well, which for a non-flexible product makes this application almost impossible, or at least very difficult. Accordingly, it is known that in this operation, the coupling systems are withdrawn and glue is often used.

[0006] Therefore, the term "glueless assembly" currently used by manufacturers of floors does not reflect the reality, since glue is actually used in different situations.

[0007] It can be stated that the current technology for assembling laminate floors without the use of glue is only restricted to the side by side, longitudinal coupling of the planks, whereas fixing the tops (the transversal coupling) of the planks is mostly carried out with the use of glue. To make real the expression "glueless assembly", an efficient form is also needed to fix or couple the top between the planks without the use of glue.

[0008] In view of the drawbacks discussed above, the present invention provides a new constructive arrangement that makes possible to characterize mechanical coupling means, without the use of glue, also for the ends and tops of two planks (longitudinal and transversal couplings) of high resistance laminate floor or simply floating floor.

SUMMARY OF THE INVENTION

[0009] The present invention initially foresees a component in the form of a stem, preferably extruded into plastic material, with a rectangular cross profile or section including small, slanted teeth on opposite sides. This profile or stem is introduced up to half way into a channel previously made on the transversal edge of the plank, whereas the other half similarly penetrates the transversal edge of the other plank to be coupled. In this condition, the slanted teeth are inserted into grooves formed at those transversal edges, by the upper and lower surfaces of the laminate floor plank; consequently, coplanar fixing occurs between the two planks without the use of glue. Additionally, the cross profile or section may include solid protrusions in a central section positioned between the ends or edges of the stems.

[0010] The present invention seeks to provide a laminate flooring, comprising: (1) multiple rectangular planks, the planks having: (1a) a first and a second longitudinal edges having sidelong longitudinal coupling profile comprising a male kind hook on the first edge and a female kind hook on the second edge, the profiles constructed and arranged for angular coupling penetration; (1b) a first and a second transversal edges having sidelong transversal coupling profile comprising a lower and an upper horizontal walls of same length, defining a groove; (2) multiple coupling stems for coupling the transversal edges of the multiple planks, the stems of a length similar to the transversal length of the planks to be coupled and having a substantially rectangular shape, and having: (2a) a flat central section having two opposite sides; (2b) two longitudinal opposite sidelong edges, each edge integrally attached to one of the opposite sides of the central section, and each edge having un upper and a lower surfaces having equal longitudinal opposite microteeth slanted towards the center of the stem; wherein, in the angular coupling penetration the male kind hook on the first edge of one plank is positioned at a slant such that the male hook penetrates into the corresponding female hook of the second edge of another plank and, the one plank placed on a coplanar position in relation to the another plank, finalizing the longitudinal engagement between planks, and wherein, each longitudinal opposite sidelong edges of the coupling stems penetrate the grooves of each of the first and the second transversal edges, coupling the transversal edges of the planks, and wherein the longitudinal coupling of the planks together with the transversal coupling of the planks allows for a complete assembly of the laminate flooring.

[0011] The present invention also seeks to provide a laminate flooring, comprising: (1) multiple rectangular planks, the planks having: (1a) a first and a second longitudinal edges having sidelong longitudinal coupling profile comprising a male kind hook on the first edge and a female kind hook on the

second edge, the profiles constructed and arranged for angular coupling penetration; (1b) a first and a second transversal edges having sidelong transversal coupling profile comprising a shorter lower horizontal wall and a longer upper horizontal wall, defining a groove; (2) multiple coupling stems for coupling the transversal edges of the multiple planks, the stems of a length similar to the transversal length of the planks to be coupled and having a substantially rectangular shape, and having: (2a) a central section having un upper surface and a lower surface and two opposite sides; the upper surface including an upper tapered protrusion with a flat upper edge and the lower surface including a lower protrusion with two straight lateral sides and one straight lower side; (2b) two longitudinal opposite sidelong edges, each edge integrally attached to one of the opposite sides of the central section, each edge having un upper and a lower surfaces having equal longitudinal opposite microteeth slanted towards the center of the stem; wherein, in the angular coupling penetration the male kind hook on the first edge of one plank is positioned at a slant such that the male hook penetrates into the corresponding female hook of the second edge of another plank and, the one plank placed on a coplanar position in relation to the another plank, finalizing the longitudinal engagement between planks, and wherein, each longitudinal opposite sidelong edge of the coupling stems penetrate the grooves of each of the first and a second transversal edges of the planks, the upper tapered protrusion of the upper surface substantially filling the upper space between the planks, the flat upper edge of the tapered protrusion touching the longer upper walls of the planks; the lower protrusion of the lower surface completely filling the lower empty space between the planks, the two straight lateral sides touching the edges of the shorter lower walls of the planks, and the straight lower side of the lower protrusion, placed coplanar in relation to the lower walls of the planks; coupling the transversal edges of the planks, and wherein the longitudinal coupling of the planks together with the transversal coupling of the planks allows for a complete assembly of the laminate flooring.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] FIG. **1** is a schematic perspective view partially showing a laminate floor with some planks arranged and coupled side by side, each plank showing out of scale reduced length.

[0013] FIG. **2** is a plant view of the planks shown in FIG. **1**, indicating section "A-A" and detail "C".

[0014] FIG. **3** is a view of detail "C" expanded and in perspective showing the side by side coupling in the form of hooks existing along the longitudinal edges of each panel.

[0015] FIG. **4** is a sectional view of "A-A" of FIG. **2**, showing the assembly or the male/female hook coupling between two panels.

[0016] FIG. **5** shows an expanded and sectional view "A-A" of the male/female hook coupling of FIG. **4**.

[0017] FIG. **6** is an exploded sectional view of "A-A" shown in FIG. **5**.

[0018] FIGS. **7** and **8** are exploded sectional view of "A-A" of FIG. **6**, illustrating the movement of one of the panels so that it is coupled to the other panel by the engagement of male/female hooks.

[0019] FIG. **9** is an upper view of a partial floor with the indication of section "B-B".

[0020] FIG. **10** is a sectional view of "B-B" of FIG. **9**.

[0021] FIG. **11** is an expanded view the sectional view of "B-B" of FIG. **10**.

[0022] FIG. **12** is an exploded perspective view of the planks and the coupling stems.

[0023] FIG. **13** is an expanded view of the planks and the coupling stems.

[0024] FIG. **14** is an exploded side view of the planks and the coupling stems.

[0025] FIG. **15** is an upper view of the planks and coupling stem, indicating section "C-C" and detail "D".

[0026] FIG. **16** is an expanded and exploded view of detail "D".

[0027] FIG. **17** is a view of section "C-C" of FIG. **15**.

[0028] FIG. **18** is an expanded view of section "C-C" of FIG. **17**.

[0029] FIG. **19** is an exploded perspective view of the planks and the coupling stems.

[0030] FIG. **20** is an expanded view detail of the exploded perspective view of the planks and the coupling stems of FIG. **19**.

[0031] FIG. **21** is an expanded view of the planks and the coupling stems, on coupling position.

[0032] FIG. **22** is an exploded side view of the planks and the coupling stems, not on coupling position.

DETAILED DESCRIPTION OF THE INVENTION

[0033] FIGS. **1-8** show the longitudinal coupling, where substantially long rectangular planks (**1**) (usually referred to as high resistance laminate floor or simply floating floor, normally produced by combining different synthetic and natural materials generally, assembled on a previously prepared surface) are arranged side by side by their longitudinal edges, such as schematically exemplified in FIG. **1**, where arrow (A) indicates the length and arrow (B) the width. In the drawing, the length was deliberately reduced out of scale in relation to the width, merely for an improved visualization of the coupling side by side, which is also illustrated in FIGS. **2** to **8**. It can be noted that the side by side coupling is carried out by engagement without the use of glue and the longitudinal edges of the planks (**1**) are equally equipped with male/female hook-type profiles (**2**), and said profiles, as shown in FIG. **7**, are configured for angular penetration. In the penetration, a panel is positioned at a slant such that a hook (**2**), in this case a male from one plank, can penetrate into the corresponding hook (**2**), in this case a female hook from another plank, thereafter, the slanted plank is placed on the horizontal and coplanar position in relation to the other, thus finalizing the longitudinal engagement between the two planks. This engagement can only be undone by reversing the movements above, and consequently, when all planks are coplanarly matched, it is impossible to undo the engagement, even when the planks undergo efforts in different directions. The hooks (**2**) provide for means so that a plank (**1**) may be coupled side by side with another identical one, thus rendering an efficient and glueless fixing.

[0034] On a first embodiment for the transversal coupling, the present invention provides for a component in the form of a small stem with a plurality of opposite microteeth, which self-lockingly penetrate into the grooves existing in the transversal edges of two planks coplanarly arranged, keeping them fixed together without the use of glue

[0035] FIGS. **9**, **10** and **11** show that the transversal coupling (joinery) between the planks (**1**) is carried out by mechanical coupling (**3**) without the use of glue. The

mechanical coupling (**3**) is illustrated in details in FIGS. **11** to **14**, where it can be seen that it comprises at least one coupling stem (**4**) for coupling the two laminate planks (**1**), and the coupling stem (**4**) is usually substantially rectangular having a cross section formed by a profile divided into two longitudinal halves, or edges. The planks transversal edges comprise a lower and an upper horizontal wall of same length defining a groove (**6**). The upper and lower surfaces of the coupling stem (**4**) have equal longitudinal opposite microteeth (**5***a* and **5***b*), where the microteeth on one side are slanted towards the center of the part, which also occurs with the teeth on the other side, such that each crossectional half of the coupling stem can penetrate and be self-locking in the grooves (**6**) on the transversal edges, along the width of the planks (**1**).

[0036] FIG. **11** shows an amplification of the transversal coupling between two planks (**1**) using the coupling stem (**4**), where it can be noted that half of its width is inserted in the groove (**6**) of a transversal edge of one plank (**1**), whereas the other half is equally inserted into the other groove (**6**) of the transversal edge of the other plank (**1**), thus providing an efficient and glueless mechanical coupling, or interlink.

[0037] The longitudinal coupling with the male/female hook-type engagement (**2**) together with the transversal coupling with the coupling stem having equal longitudinal opposite microteeth (**5***a* and **5***b*) on opposite edges, of the present invention, allows for a complete assembly of a laminate or floating floor, having planks, without the use of glue, resulting in technical, practical and economic advantages, eliminating a manpower operation and also lowers the cost thereof in the final combination.

[0038] On a second embodiment for the transversal coupling the present invention provides a component in the form of a small stem with a plurality of opposite microteeth, which self-lockingly penetrate into grooves existing in the transversal edges of the two planks coplanarly arranged, keeping them fixed together without the use of glue. The component is also constructed and arranged to eliminate the need for using glue. The joinery point (J) between the two planks (**1**), as illustrated in FIGS. **17-18**, shows a mechanical joint between two planks by the use of a coupling stem (**4**) with longitudinal microteeth (**5***a* and **5***b*). Differently from the previous embodiment, the coupling stem (**4**) in this embodiment includes a filler in a central section to avoid any upper and lower spaces located above and below the central part of the stem (**4**), when these spaces are not desired. In the upper part, the empty space is entirely filled, and the upper surfaces of the planks, are joint without the surfaces being spaced apart from those which touches the plank (1) at the joinery point (J), whereas in the lower part the stem includes a spacing protrusion with three straight sides. This is the most suitable coupling for floors under successive pressures (P). The spacing protrusion completely fills the lower empty space, and is located between the opposite sides of the joinery (J), thus finalizing the means necessary to avoid deformation at the joinery point (J), even when the joinery is under constant pressures (P).

[0039] As it can be seen in FIGS. **15** to **22**, the central section of the coupling stem (**4**) has a bottom surface, which protrudes downwards forming a spacing protrusion (**7**) having three straight sides, two lateral straight sides and one straight lower side. During coupling, the protrusion is positioned between the ends of shorter, lower horizontal walls (**8***a*) that form the grooves (**6**), with the longer upper horizontal wall, where the lower side of the spacing protrusion (**7**) is coplanar in relation to the lower walls of the planks (**1**). From the upper surface, a short horizontal zone, has a tapered spacing protrusion (**9**), having a flat upper edge, on which a joinery or meeting point (J) or matching of the two planks (**1**) is rested, or more precisely, the point of joinery of the ends of the longer, upper horizontal walls (**8***b*) which form the grooves (**6**).

[0040] The tapered spacing protrusion (**9**) is slightly recessed in relation to the upper plane defined by the tips of the microteeth (**5***a*), which recess is preferably less than 0.5 mm, appropriate to compensate for insertion of the microteeth into the corresponding parts of the planks (**1**).

[0041] The spacing protrusion (**7**) and the tapered protrusion (**9**) enables for the perfect joinery meeting (J), eliminating any empty spaces. The spacing protrusion (**7**) also acts as a veritable support pillar, avoiding that portions of the walls (**8***a*) and (**8***b*) flex against each other, since the pressure (P) exerted on the joinery (J) is entirely absorbed by the spacing protrusion (**7**), consequently, the load applied does not interfere with the integrity of the connection between the two planks (**1**), thus resulting in a durable joinery (J) that does not alter during the use of the assembly.

[0042] The longitudinal coupling with the male/female hook-type engagement (**2**) together with the transversal coupling with the coupling stem having equal longitudinal opposite microteeth (**5***a* and **5***b*), the spacing protrusion (**7**) and the tapered protrusion (**9**), allows for a complete assembly of a laminate or floating floor, with planks, without the use of glue, resulting in technical, practical and economic advantages, eliminating a manpower operation and also lowers the cost thereof in the final combination.

1. A laminate flooring, comprising:

(1) multiple rectangular planks, the planks having:

(1a) a first and a second longitudinal edges having sidelong longitudinal coupling profile comprising a male kind hook on the first edge and a female kind hook on the second edge, the profiles constructed and arranged for angular coupling penetration;

(1b) a first and a second transversal edges having sidelong transversal coupling profile comprising a lower and an upper horizontal walls of same length, defining a groove;

(2) multiple coupling stems for coupling the transversal edges of the multiple planks, the stems of a length similar to the transversal length of the planks to be coupled and having a substantially rectangular shape, and having:

(2a) a flat central section having two opposite sides;

(2b) two longitudinal opposite sidelong edges, each edge integrally attached to one of the opposite sides of the central section, and each edge having un upper and a lower surfaces having equal longitudinal opposite microteeth slanted towards the center of the stem;

wherein, in the angular coupling penetration the male kind hook on the first edge of one plank is positioned at a slant such that the male hook penetrates into the corresponding female hook of the second edge of another plank and, the one plank placed on a coplanar position in relation to the another plank, finalizing the longitudinal engagement between planks, and

wherein, each longitudinal opposite sidelong edge of the coupling stems penetrate the grooves of each of the first and the second transversal edges of the planks, coupling the transversal edges of the planks, and

wherein the longitudinal coupling of the planks together with the transversal coupling of the planks allows for a complete assembly of the laminate flooring.

2. A laminate flooring, comprising:

(2) multiple rectangular planks, the planks having:

(1a) a first and a second longitudinal edges having sidelong longitudinal coupling profile comprising a male kind hook on the first edge and a female kind hook on the second edge, the profiles constructed and arranged for angular coupling penetration;

(1b) a first and a second transversal edges having sidelong transversal coupling profile comprising a shorter lower horizontal wall and a longer upper horizontal wall, defining a groove;

(2) multiple coupling stems for coupling the transversal edges of the multiple planks, the stems of a length similar to the transversal length of the planks to be coupled and having a substantially rectangular shape, and having:

(2a) a central section having un upper surface and a lower surface and two opposite sides; the upper surface including an upper tapered protrusion with a flat upper edge and the lower surface including a lower protrusion with two straight lateral sides and one straight lower side;

(2b) two longitudinal opposite sidelong edges, each edge integrally attached to one of the opposite sides of the central section, each edge having un upper and a lower surfaces having equal longitudinal opposite microteeth slanted towards the center of the stem;

wherein, in the angular coupling penetration the male kind hook on the first edge of one plank is positioned at a slant such that the male hook penetrates into the corresponding female hook of the second edge of another plank and, the one plank placed on a coplanar position in relation to the another plank, finalizing the longitudinal engagement between planks, and

wherein, each longitudinal opposite sidelong edge of the coupling stems penetrate the grooves of each of the first and a second transversal edges of the planks, the upper tapered protrusion of the upper surface substantially filling the upper space between the planks, the flat upper edge of the tapered protrusion touching the longer upper walls of the planks; the lower protrusion of the lower surface completely filling the lower empty space between the planks, the two straight lateral sides touching the edges of the shorter lower walls of the planks, and the straight lower side of the lower protrusion, placed coplanar in relation to the lower walls of the planks; coupling the transversal edges of the planks, and

wherein, the longitudinal coupling of the planks together with the transversal coupling of the planks allows for a complete assembly of the laminate flooring.

* * * * *