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(54) MODULAR FLOOR LAID BY MECHANICAL INTERLOCKING, MECHANICAL INTERLOCKING LAYING METHOD FOR A MODULAR FLOOR KIT FOR THE MECHANICAL INTERLOCKING LAYING OF A MODULAR FLOOR

(57) Modular floor (1) laid by mechanical interlocking and having: a plurality of tiles (3); and a plurality of bases (4) of plastic material, each of which is integral with a corresponding tile (3) and provides a supporting base for the tile (3); the outer edge (7) of each tile (3) is at least partially wedge-shaped; and each base (4) has a deformable frame (9) which surrounds the outer edge (7) of the tile (3), is initially vertically arranged, at a certain distance from the outer edge (7) of the tile (3), and is deformed by means of a corresponding locking element (10) forcibly inserted to lean on the wedge-shaped part of the outer edge (7) of the corresponding tile (3) so as to enclose the wedge-shaped part.

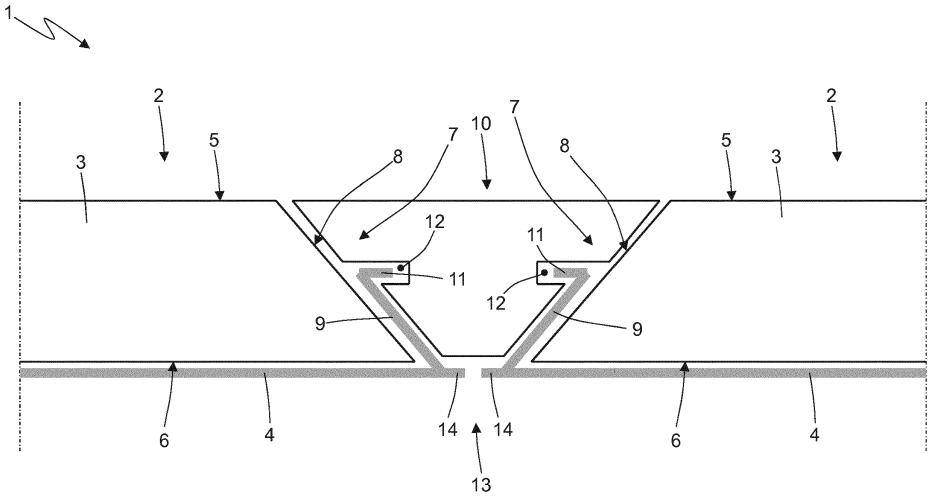

Fig.2

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Description

Technical field

[0001] The present invention relates to a modular floor laid by mechanical interlocking (namely dry-laid), to a mechanical interlocking method for a modular floor, and to a kit for the mechanical interlocking laying of a modular floor.

[0002] The dry-laying of tiles involves laying the tiles on the surface to be tiled without using "wet" adhesives (glue or mortar) which are interposed between the surface to be tiled and the tiles and which dry (solidify) after having been laid, thus determining a permanent and not separable adhesion (if not by an undoing of the tiles) of the tiles to the surface to be tiled.

PRIOR ART

[0003] Commercial building presently makes an increasing use of floors consisting of dry-laid tiles, as these floors allow a quick (and therefore economical) replacement of the tiles. In fact, in commercial real estate most of the buildings are leased by companies with contracts which typically last eight years; at the end of the eight-year period, both the new tenant (if the old tenant has not renewed the lease) or the old tenant (if the old tenant has renewed the lease) are entitled to the replacement of the floor tiles at the expense of the building's owner, regardless of the actual state of wear of the tiles.

[0004] Currently, the dry-laying of tiles uses tiles having a relevant unitary size (and therefore a high unit weight) and simply lays the tiles on the surface to be tiled, without interposing any type of material; in this case the weight of the tiles (which, as previously mentioned, have a high unit weight) and the interlocking joints formed during the laying of the board of tiles should keep the tiles in position without undesired horizontal movements under a horizontal load (i.e. without any small horizontal movement of the tiles when, for example, they are trampled, and because of the thrust generated by walking). However, it has been observed that, after a certain time, the dry-laid tiles tend to move in an undesired way, thus changing their original position due to the mechanical stress generated by walking people.

[0005] The patent application WO0019036A1 describes an outdoor modular floor laid by mechanical interlocking; the modular floor comprises a plurality of supporting elements of plastic material, each of them housing a corresponding ceramic tile arranged above the supporting element. Each supporting element has vertical appendages, which are arranged in correspondence of the outer edge of the corresponding ceramic tile and are adapted to lock, thus mechanically interlocking the ceramic tile to the support element. However, even the modular floor described in the patent application WO0019036A1 does not guarantee an adequate mechanical locking of the tiles with respect to the horizontal load, and therefore, after a certain time, the dry-laid tiles tend to move in an undesired way changing their original position due to the mechanical stress generated by walking people.

DESCRIPTION OF THE INVENTION

[0006] The object of the present invention is to provide a modular floor laid by mechanical interlocking, a mechanical interlocking laying method for a modular floor, and a kit for the mechanical interlocking laying of a modular floor, said modular floor, laying method and laying kit being free of the aforesaid drawbacks and being at the same time easy and economical to manufacture.

[0007] The present invention provides a modular floor laid by mechanical interlocking, a mechanical interlocking laying method for a modular floor, and a kit for the mechanical interlocking laying of a modular floor, as claimed by the appended claims.

BRIEF DESCRIPTION OF DRAWINGS

[0008] The present invention will now be described with reference to the accompanying drawings, which illustrate some examples of non-limiting embodiments, wherein:

- Figure 1 is a top view of part of a modular floor laid by mechanical interlocking and manufactured in accordance with the present invention;
- Figure 2 is a schematic, vertical section view of a detail of the modular floor of Figure 1;
- Figure 3 is a schematic, vertical section and partially exploded view of the detail of Figure 2;
- Figure 4 is a schematic, vertical section and completely exploded view of the detail of Figure 2;
- Figure 5 is a schematic, cross-section view of a locking element of the modular floor of Figure 1;
- Figure 6 is a top view of some bases of the modular floor of Figure 1;
- Figure 7 is a top view of a single base of the modular floor of Figure 1; and
- Figure 8 is a schematic, vertical section view of a detail of an alternative embodiment of the modular floor of Figure 1.

PREFERRED EMBODIMENTS OF THE INVENTION

[0009] In figure 1, number 1 indicates as a whole a modular floor composed of a plurality of flooring modules 2 (only four of which are shown in Figure 1), which have a rectangular shape and are mutually arranged side by side in a checkerboard pattern. The flooring modules 2 are dry-laid on a surface to be tiled; in other words, the flooring modules 2 are arranged on the surface to be tiled without the interposition of "wet" adhesives which dry after the laying, thus determining a permanent and not separable adhesion of the flooring modules 2 to the surface

to be tiled. In the embodiment shown in Figure 1, each flooring module 2 has a rectangular square shape (namely, with all sides having the same size), but in other not shown embodiments each flooring module 2 may have a rectangular, not square shape.

[0010] Each flooring module 2 comprises a rectangular tile 3 (made of ceramic, stone, wood...) and a base 4 made of plastic material (visible in Figures 2-4 and 6-7), having a rectangular shape and being integral with the tile 3. Preferably, each base 4 is composed of a single piece of plastic made by moulding (namely, each base 4 is not formed by several parts, but is formed in one piece by means of a single moulding process).

[0011] Each rectangular tile 3 has a horizontal and walkable upper wall 5 (visible in Figures 1-4) and a horizontal and parallel lower wall 6 (visible in Figures 2, 3 and 4), opposite to the upper wall 5. Furthermore, each rectangular tile 3 is externally delimited by an outer edge 7 (visible in Figures 2, 3 and 4) on which a side wall 8 of the tile 3 is defined.

[0012] As shown in Figures 2, 3 and 4, the outer edge 7 of each tile 3 has at least partially a wedge shape at which the side wall 8 of the tile 3 is inclined relative to the upper and lower walls 5 and 6, thus forming an acute or obtuse angle with the upper and lower walls 5, 6. In particular, in each tile 3, the lower wall 6 is wider than the upper wall 5 and hence the wedge shape of the outer edge 7 tapers from the bottom to the top; consequently, the side wall 8 of each tile 3 forms an acute angle with the lower wall 6 and forms an obtuse angle (complementary with the acute angle) with the upper wall 5 (by way of example, the acute angle formed between the side wall 8 and the lower wall 6 is comprised between 45° and 80°).

[0013] As shown in Figures 2 and 3, each rectangular base 4 of plastic material is integral with the tile 3, and is arranged below the lower wall 6 of the tile 3 to provide a supporting base for the tile 3 (in other words, the lower wall 6 of the tile 3 rests on the underlying base 4).

[0014] As shown in Figures 2, 3 and 4, each base 4 has a deformable frame 9 rising above the base 4 and surrounding the outer edge 7 of the tile 3. Initially, the frame 9 is arranged vertically at a certain distance from the outer edge 7 of the tile 3 (as shown in Figure 3) and is deformed to lean against the wedge-shaped part of the outer edge 7 of the tile 3 so as to enclose said wedge-shaped part (as shown in Figure 2). According to a preferred, but not limitative, embodiment, the frame 9 of each base 4 is elastically deformable to lean against the wedge-shaped part of the outer edge 7 of the tile 3 so as to enclose said wedge-shaped part (as shown in Figure 2).

[0015] As shown in Figures 1-4, it is provided a plurality of locking elements 10, each of which is at least partially wedge-shaped, thus reproducing the shape of the outer edge 7 of the tiles 3, is arranged between two adjacent bases 4 having respective facing frames 9, and presses on the two facing frames 9 to deform the frames 9 against the outer edges 7 of the corresponding tiles 3. In other words, each locking element 10 deforms and keeps deformed the corresponding facing frames 9 of two adjacent bases 4 in order to press and keep pressed said frames 9 against the outer edges 7 of the corresponding tiles 3.

[0016] According to a preferred embodiment shown in Figures 2, 3 and 4, the deformable frame 9 of each base 4 has an anchoring appendage 11, which is arranged at an upper end of the deformable frame 9 and perpendicularly protrudes from the deformable frame 9. Moreover, each locking element 10 has a pair of horizontally arranged slits 12 which can house the corresponding anchoring appendages 11 of the two frames 9 deformed by the locking element 10. In particular, the anchoring appendage 11 of each frame 9 can be locked as a result of a mechanical (generally elastic) deformation inside a horizontally arranged slit 12 of the locking element 10.

[0017] As more clearly shown in Figures 6 and 7, each base 4 has on its four sides a mechanical interlocking system 13 which is externally arranged, on the opposite side with respect to the tile 3, and is adapted to mechanically connect the base 4 with four further adjacent bases 4. In other words, the base 4 of each flooring module 2 has on its four sides an interlocking system 13 that allows the base 4 to be mechanically interlocked with four adjacent bases 4. In the non-limiting embodiment shown in Figures 6 and 7, in each side of a base 4, the interlocking system 13 includes a series of T-shaped (or alternatively dovetail-shaped) interlocking elements 14. The interlocking systems 13 are shaped so as to block all relative horizontal movements between the flooring modules 2 and to allow relative vertical movements between the flooring modules 2; in other words, a flooring module 2 can always be vertically extracted or inserted into the floor 1 in that the mutual coupling between two interlocking systems 13 takes place solely by means of a relative vertical movement between the flooring modules 2. Instead of the interlocking system 13 shown by way of example in Figures 6 and 7, any other type of known interlocking system 13 can be used, both in case it allows the vertical extraction of the single flooring module 2 and also in case it does not allow the vertical extraction of the single flooring module 2 (as it happens in the interlocking systems currently used with parquet strips).

[0018] As shown in Figure 5, a lower part 15 of each locking element 10 deforms the frames 9 of two corresponding bases 4 between which the locking element 10 is inserted, while an upper part 16 of each locking element 10 closes the gap between the two corresponding tiles 3 (i.e. it is a "gasket" sealing the gap between two corresponding tiles 3). According to a possible embodiment, the lower part 15 of each locking element 10 is made of a harder plastic material, thus ensuring a greater mechanical stability by coupling it with the frames 9, while the upper part 16 of each locking element 10 is made of a softer plastic material, thus more easily adapting itself to manufacturing tolerances (i.e. having a better elastic deformation to compensate for any manufacturing toler-

ances). Consequently, each locking element 10 is made of two different plastic materials, different in that the plastic material forming the lower part 15 is harder than the plastic material forming the upper part 16.

[0019] The size limitation of the gaps between adjacent tiles 3 prevents dirt (typically food waste) from nesting (embedding) in the gaps and/or prevents footwear heels (typically, high heels of women's shoes) from being stuck in the joints.

[0020] The locking elements 10 may have a linear shape and have a length substantially equal to the length of a gap (as shown in Figure 1). Alternatively, the locking elements 10 may have a cross shape provided with four branches, each of which has a length substantially equal to half the length of a gap (in other words, instead of completely engaging a single gap, each locking element engages half the length of four different gaps).

[0021] According to the embodiment shown in Figures 1-5, between two adjacent tiles 3 there is a relatively large gap. According to the embodiment shown in Figure 8, the size of the gap between two adjacent tiles 3 can be reduced: actually, only a lower part of the outer edge 7 of each tile 3 is wedge-shaped (and therefore enclosed by the frame 9 of the corresponding base 4), while an upper part of each tile 3 has a parallelepiped shape and is at least partially arranged above the wedge-shaped lower part for partially covering the wedge-shaped lower part.

[0022] Hereinafter it is described the mechanical interlocking laying method of the modular floor 1. At first, the bases 4 covering the surface to be floored and then the bases 4 are connected together by means of mechanical interlocking systems 13 (as shown in Figure 6). Subsequently, a corresponding tile 3 is arranged inside each base 4. Finally, the corresponding locking elements 10 are forcibly inserted among the bases 4, wherein each of the elements is at least partially wedge-shaped, thus reproducing the shape of the outer edge 7 of the tiles 3, is arranged between two adjacent bases 4 having respective facing frames 9, and presses on the two facing frames 9 to deform the frames 9 against the outer edges 7 of the corresponding tiles 3. In other words, by forcibly inserting the corresponding locking elements 10, the frames 9 of the bases 4 are deformed to enclose the outer edges 7 of the corresponding tile 3 so as to achieve a stable mechanical bond between the bases 4 and the corresponding tiles 3.

[0023] The aforesaid flooring module 2 has various advantages.

[0024] Firstly, the aforesaid flooring module 2 allows to obtain a very robust and long-lasting mechanical connection between the tile 3 and the underlying base 4 without using glues. This connection is therefore economical, since glues are relatively expensive, and also completely removable. Consequently, the flooring 1 can be easily and cleanly manufactured even by a non-expert user having a minimal dexterity (typically an occasional user who has purchased the components of the flooring 1 in a "DIY" centre); no glues also means not having to wait for their drying, and therefore significantly reducing the time required to complete the flooring 1.

[0025] Moreover, the aforesaid flooring module 2 can be simply and economically manufactured, since the wedge shape of the outer edge 7 of a tile 3 can be easily obtained by suitably shaping the mould or by simple mechanical milling. With regard to the base 4, it can be easily obtained by simple injection moulding of plastic material.

[0026] The aforesaid flooring module 2 allows to obtain a floor 1 having a high mechanical resistance to horizontal stress (i.e. horizontally directed stress causing the flooring modules 2 to make undesired horizontal movements). This result is achieved thanks to interlocking systems 13 creating a strong mechanical bond between the bases 4, or thanks to frames 9 that, once deformed by locking elements 10, create a very strong mechanical bond between the bases 4 and the corresponding tiles 3.

[0027] Finally, by using the aforesaid flooring module 2, a floor 1 can be easily and quickly manufactured which can subsequently be removed just as easily and quickly without any kind of damage to the tiles 3.

Claims

1. A modular floor (1) for mechanical interlocking laying; the floor (1) comprising:

a plurality of flooring modules (2), having a rectangular shape, mutually arranged side by side in a checkerboard pattern, each of them comprising a tile (3) having a rectangular shape and a base (4) which is made of a plastic material, is integral with the tile (3) and is arranged under the lower wall (6) of the tile (3) so as to provide a support base for the tile (3);

wherein each tile (3) has an upper walkable wall (5) and the lower wall (6) that is parallel and opposite to the upper wall (5), and is externally delimited by an outer edge (7), on which a side wall (8) of the tile (3) is defined;

wherein the outer edge (7) of each tile (3) has at least partially a wedge shape, at which the side wall (8) of the tile (3) is inclined relative to the upper and lower walls (5, 6), thus forming an acute or obtuse angle with the upper and lower walls (5, 6); and

wherein each base (4) has a deformable frame (9) surrounding the outer edge (7) of the tile (3), and is deformed to lean against the wedge-shaped part of the outer edge (7) of the tile (3), so as to enclose the wedge-shaped part;

the modular floor (1) being **characterized in that** it comprises a plurality of locking elements (10), wherein each of them is at least partially wedge-shaped, thus reproducing the shape of the outer edge (7) of the tiles (3), is arranged

between two adjacent bases (4) having respective facing frames (9) and presses on the two facing frames (9) to deform the frames (9) against the outer edges (7) of the corresponding tiles (3).

2. A modular floor (1) according to Claim 1, wherein:

each locking element (10) has a pair of horizontal slits (12) arranged on opposite sides of the locking element (10); and
the deformable frame (9) of each base (4) has an anchoring appendage (11), which is arranged at an upper end of the deformable frame (9), perpendicularly projects from the deformable frame (9) and is suited to be interlocked, thanks to a mechanical deformation, inside the slit (12) of the corresponding locking element (10).

3. A modular floor (1) according to Claim 1 or 2, wherein each base (4) has, on its four sides, a mechanical interlocking system (13), which is arranged on the outside, on the opposite side relative to the tile (3), and is suited to mechanically connect the base (4) to four further adjacent bases (4).

4. A modular floor (1) according to Claim 1, 2 or 3, wherein only a lower part of the outer edge (7) of each tile (3) is wedge-shaped, whereas an upper part of each tile (3) has a parallelepiped the shape and is at least partially arranged on the lower wedge-shaped part so as to partially cover the lower wedge-shaped part.

5. A modular floor (1) according to any one of Claims 1-4, wherein each locking element (10) comprises a lower part (15) and an upper part (16); the lower part (15) of each locking element (10) being made of a plastic material harder than the plastic material forming the upper part (16).

6. A mechanical interlocking laying method for a modular floor (1); the laying method comprising the steps of:

laying on the ground a plurality of bases (4), each of them having a rectangular shape, a deformable frame (9) and, on its four sides, a mechanical interlocking system (13), which is arranged on the outside and is suited to mechanically connect the base (4) to four further adjacent bases (4);
mutually mechanically interlocking the bases (4) by means of the corresponding mechanical interlocking systems (13);
laying inside each base (4) a corresponding tile (3) which has a rectangular shape, has an upper walkable wall (5) and a lower wall (6) that is parallel and opposite to the upper wall (5), and is externally delimited by an outer edge (7), on which a side wall (8) of the tile (3) is defined;
wherein each tile (3) at least partially has a wedge shape at which the side wall (8) of the tile (3) is inclined relative to the upper and lower walls (5, 6), thus forming an acute or obtuse angle with the upper and lower walls (5, 6); and
forcibly inserting among the bases (4) a plurality of corresponding locking elements (10), wherein each of them is at least partially wedge-shaped, thus reproducing the shape of the outer edge (7) of the tiles (3), is arranged between two adjacent bases (4) having respective facing frames (9), and presses on the facing frames (9) so as to deform the frames (9) against the outer edges (7) of the corresponding tiles (3).

7. A laying method according to Claim 6, wherein only a lower part of the outer edge (7) of each tile (3) is wedge-shaped, while an upper part of each tile (3) has a parallelepiped shape and is disposed at least partially above the lower wedge-shaped part for partially covering it.

8. A laying method according to Claim 6 or 7, wherein in each base (4) the corresponding deformable frame (9) is initially vertically arranged.

9. A laying method according to Claim 6, 7 or 8, wherein each locking element (10) comprises a lower part (15) and an upper part (16); the lower part (15) of each locking element (10) being made of a plastic material harder than the plastic material forming the upper part (16).

10. A kit for the mechanical interlocking laying of a modular floor; the kit including:

a plurality of bases (4) of plastic material, wherein each of them is adapted to house a rectangular tile (3) having an outer edge (7) at least partially wedge-shaped to provide a supporting base for the tile (3), has a deformable frame (9) which is adapted to surround the outer edge (7) of the tile (3) and is adapted to be deformed to lean on the wedge-shaped part of the outer edge (7) of the tile (3) so as to enclose the wedge-shaped part; and
a plurality of locking elements (10), wherein each of them is at least partially wedge-shaped thus reproducing the shape of the outer edge (7) of the tiles (3), and is adapted to be arranged between two adjacent bases (4) having respective facing frames (9) in order to press on the two facing frames (9) and then deform said frames (9) against the outer edges (7) of the

corresponding tiles (3).

11. A laying kit according to Claim 10, wherein in each base (4) the corresponding deformable frame (9) is initially vertically arranged.

12. A laying kit according to Claim 10 or 11, wherein each locking element (10) comprises a lower part (15) and an upper part (16); the lower part (15) of each locking element (10) being made of a plastic material harder than the plastic material forming the upper part (16).

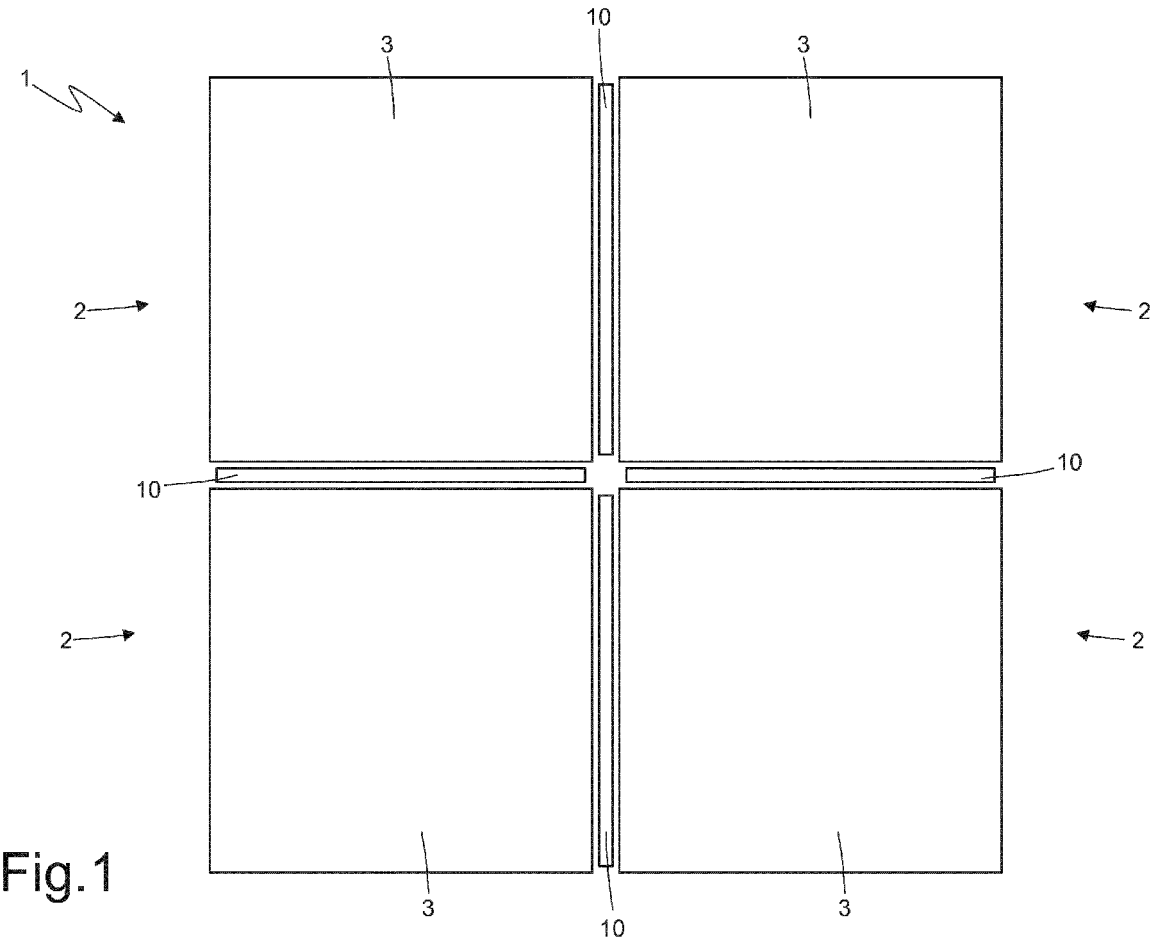


Fig.1

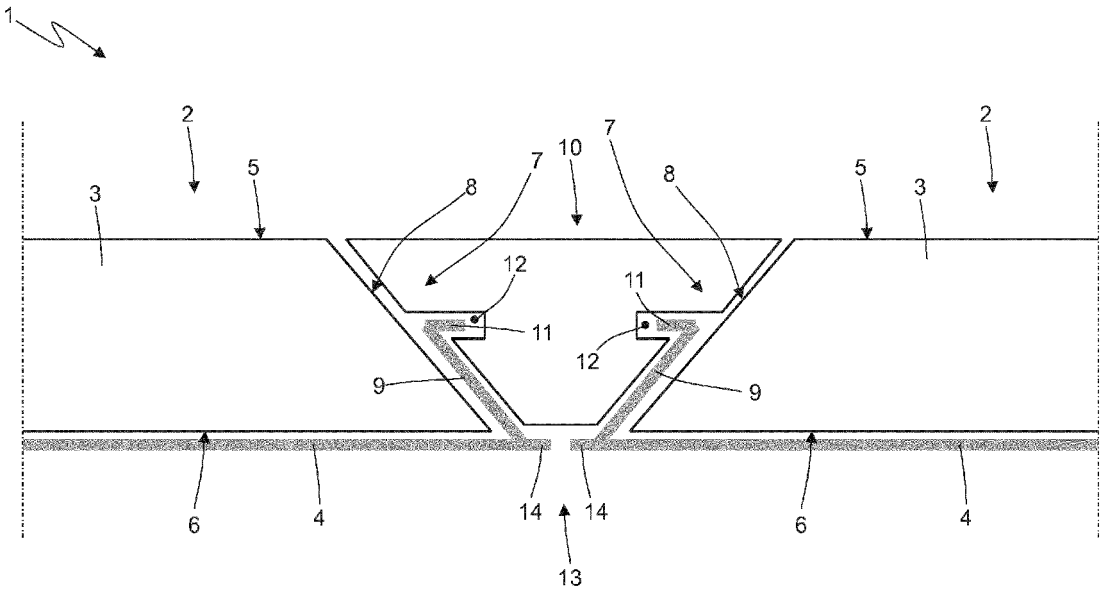


Fig.2

Fig.3

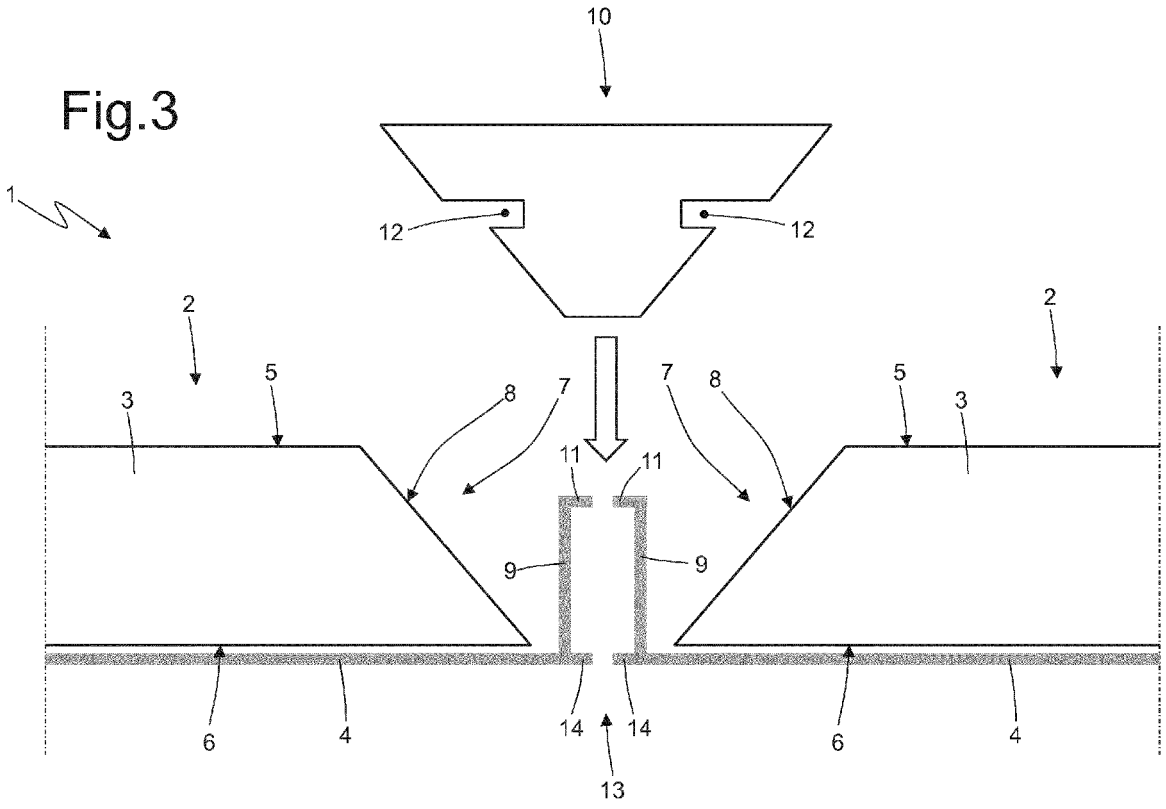
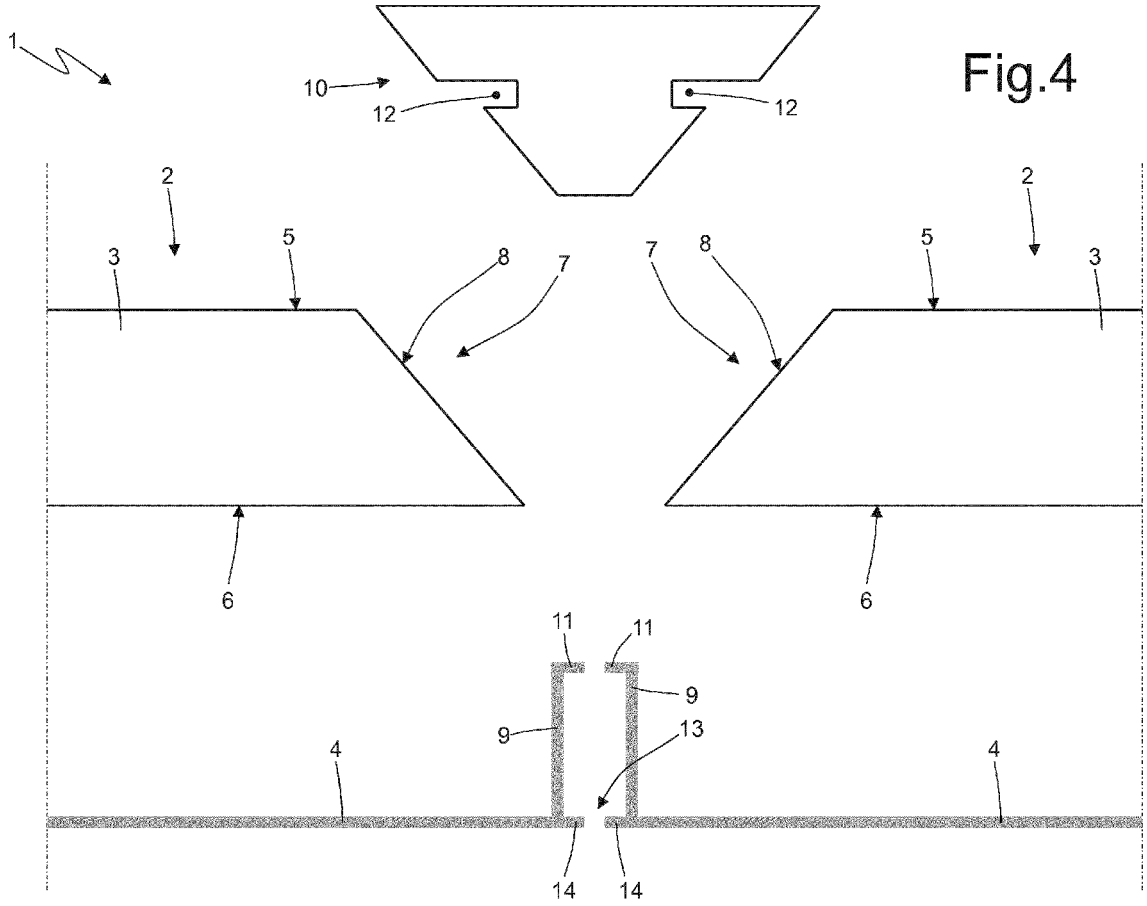


Fig.4



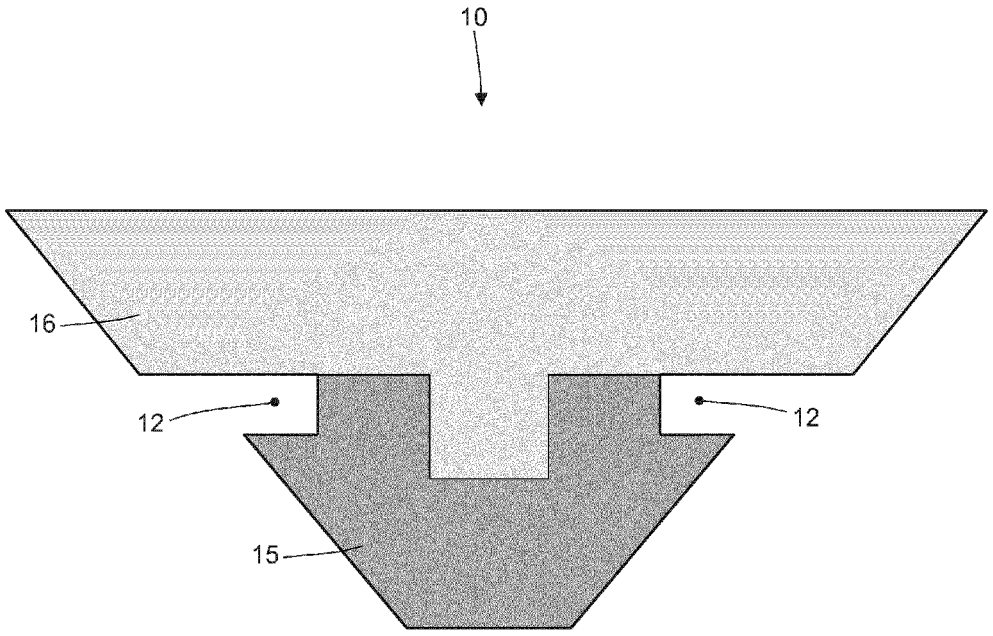


Fig.5

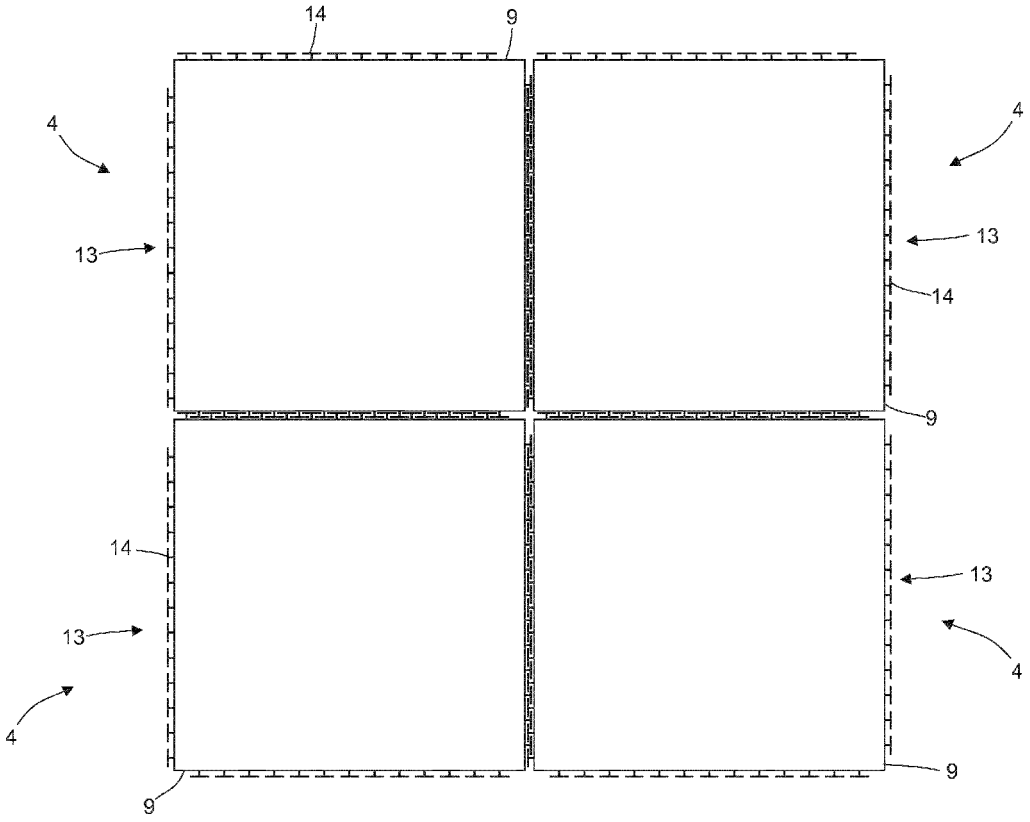


Fig.6

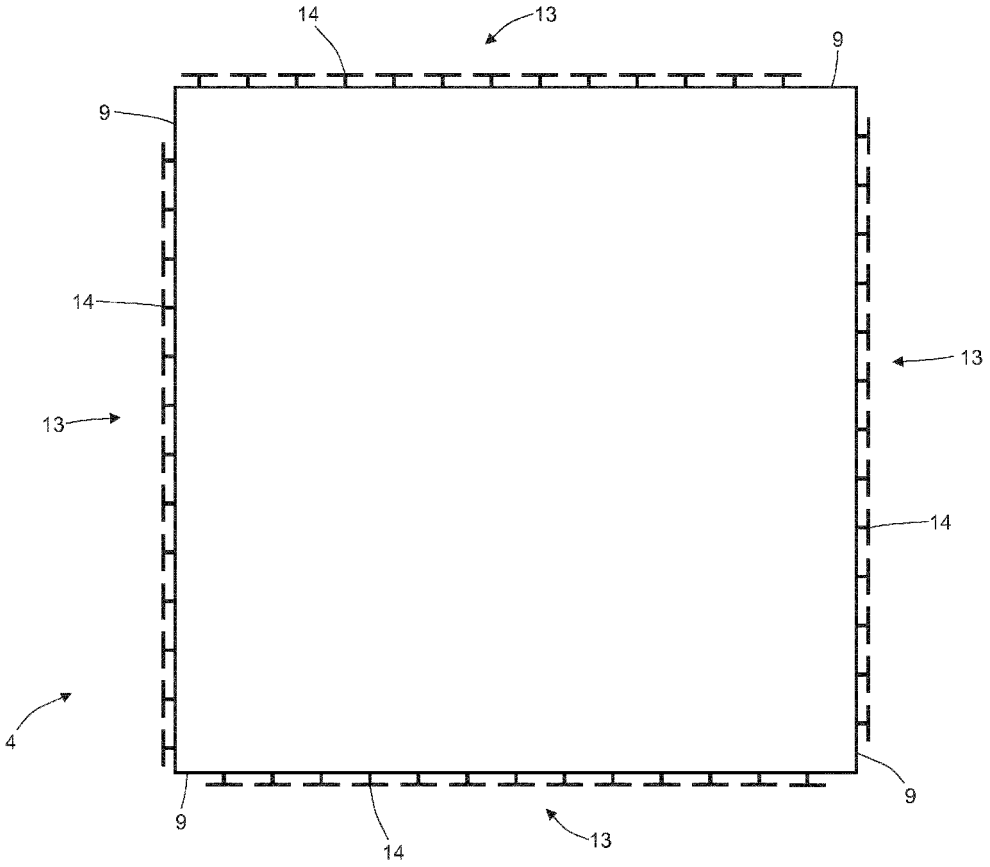


Fig.7

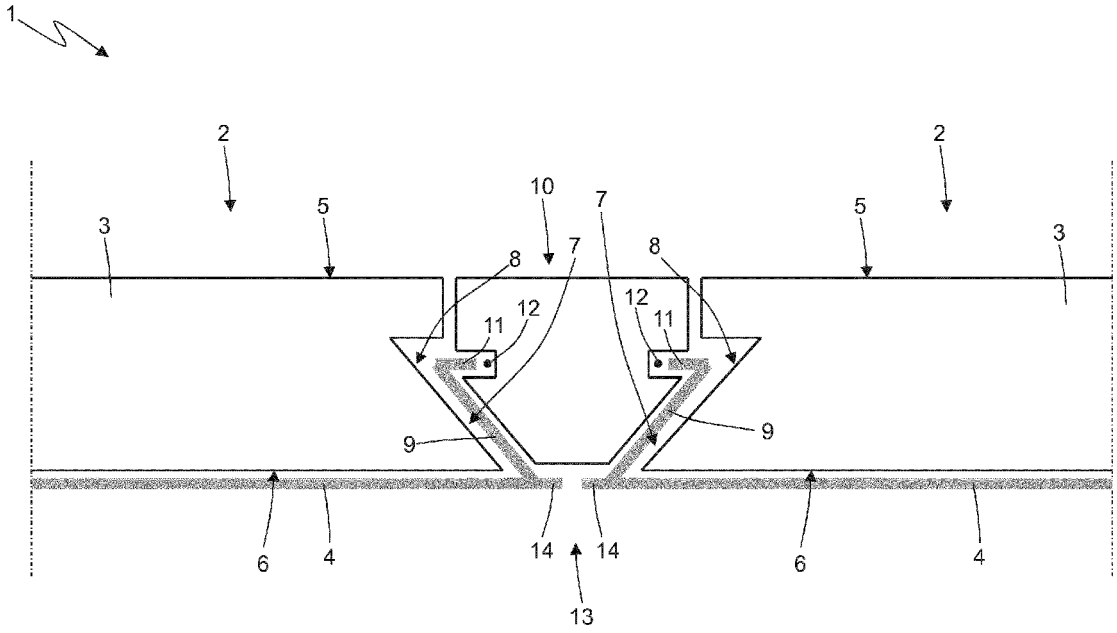


Fig.8

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EUROPEAN SEARCH REPORT

Application Number
EP 15 17 8549

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	21 January 2016	Fournier, Thomas

CATEGORY OF CITED DOCUMENTS

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