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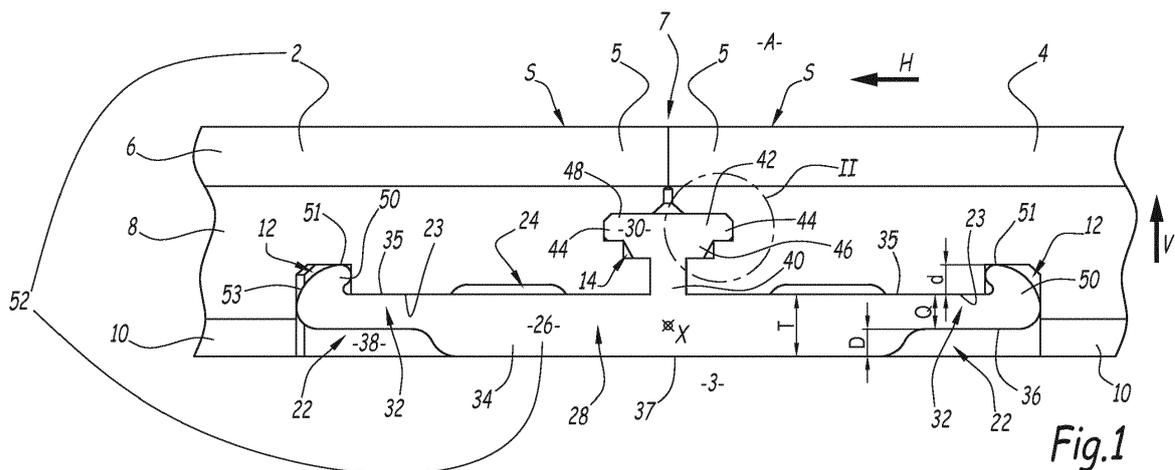
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(54) **JOINING PROFILE AND TILING ASSEMBLY FOR HORIZONTAL LAYING**

(57) A joining profile (26) for joining tiles (2, 4) comprising a central supporting section (28), a central tongue (30) projecting from the central supporting section to be received in grooves (14) of adjoining tiles for locking the tiles (2, 4) in the vertical direction (V), and two tongues (32) extending on opposite sides of the central supporting section (28), each tongue having a locking lip (50) to be received in a groove (12) of a tile for locking in the horizontal direction (H). Each locking lip (50) is displaceable in the vertical direction relative to the central supporting section (28) between a locking and release position, and the central supporting section (28) has a protruding base (34) ensuring a clearance (38) between each locking lip (50) and a subsurface (3), each locking lip occupying the clearance in its release position and leaving the clearance (38) open in its locking position.

horizontal direction (H). Each locking lip (50) is displaceable in the vertical direction relative to the central supporting section (28) between a locking and release position, and the central supporting section (28) has a protruding base (34) ensuring a clearance (38) between each locking lip (50) and a subsurface (3), each locking lip occupying the clearance in its release position and leaving the clearance (38) open in its locking position.



Description

[0001] The present invention concerns a joining profile according to the preamble of claim 1.

[0002] Such a joining profile is known from Fig. 2c of document WO 00/20705 A1. This joining profile is used for joining one particular type of tiles, namely floor elements.

[0003] The drawback of this joining profile is that it limits the laying freedom of the laying specialist. Indeed, once a first floor element has been joined to the joining profile, the second floor element can only be joined thereto by obliquely inserting the second floor element from above and then pivoting the second floor element downwards into its final position. This angling method for laying the floor elements is not well suited for the installation of flooring under radiators or door frames. Also, the laying of specific patterns (for example the so called "fishbone", "French fishbone" or mosaic patterns) with the floor elements is hard to do with this angling method.

[0004] Two other joining profiles are disclosed in document WO 94/26999 A1. One of them, shown in Figs. 3a to 3c and Fig. 6, has a resilient locking element 8, which can be urged downwards. This allows horizontal joining of floor elements, as shown in Figs. 3a to 3c. However, to that effect, as shown in Fig. 3b, the joining profile 6 and the two floor elements 1, 2 need to be lifted off the subfloor 12, which is a complicated procedure.

[0005] A floor panel connector 112 is disclosed by document US 9,441,379. As shown in Figs. 3 to 5, floor panels 108 are connected by an angling method to the floor panel connector 112, which has the above-mentioned drawbacks.

[0006] It is therefore an object of the present invention to provide a joining profile that ensures a large laying freedom for the laying specialist. Also, the joining of tiles, and in particular floor elements, with the joining profile should be as simple as possible.

[0007] According to the invention, this object is achieved with the joining profile according to claim 1.

[0008] By making the locking lip displaceable relative to the central supporting section, the locking lip can move out of the way when joining tiles. The tiles can thus be joined by horizontal movement and not only with an angling motion.

[0009] By providing a clearance below each locking lip, moving the locking lip away to put the tiles in place is made very easy.

[0010] Thanks to the dimensional requirement that the height (vertical distance) d of the locking lip must not be larger than the height (vertical distance) D of the clearance, i.e. that $d \leq D$, the locking lip can completely move out of the way of a tile that approaches horizontally. Accordingly, tiles can be connected to the inventive joining profile by a pure horizontal translational movement.

[0011] According to preferred embodiments, the inventive joining profile has one, several or all the following features, in all technically possible combinations as de-

fining in the dependent claims of the joining profile.

[0012] The invention also relates to a tiling assembly according to claim 11.

[0013] Preferably, the tiling assembly has the features of claim 12.

[0014] A non-limiting embodiment of the invention will now be described in detail with reference to the attached drawings, wherein:

Figure 1 is a cross-sectional view of the joining area of two floor planks, which are joined to each other with the help of a joining profile according to the present invention;

Figure 2 is an enlarged view of the circular area II identified in Figure 1;

Figures 3 to 5 show the joining of two planks via the inventive joining profile using an angling method; Figures 6 to 15 show various examples of differently shaped tilings in which the inventive joining profile may be implemented, and

Figures 16 and 17 are each cross-sectional views of the joining area of two floor planks, the joining area comprising joining profiles according to variants of the present invention.

[0015] The aim of the present invention is to provide a versatile connecting or joining system for interconnecting tiles such as floor elements of various shapes and sizes. The inventive joining system should give the laying specialist a lot of freedom when laying and joining the tiles. At the same time, the inventive joining system should be quick and easy to install. The industrial efficiency in manufacturing the joining profile shall be high.

[0016] The inventive joining system is in particular suited for interconnecting floor planks, floor tiles or similar floor elements to obtain a floor. It may also be used for interconnecting wall or ceiling tiles to obtain a wall or ceiling cladding. Another application is the assembly of furniture walls or parts thereof.

[0017] The tiles may have different geometries, such as rectangular, square, triangles or other polygons as well as rounded shapes like circles, ellipses and irregular and uneven shapes. The tiles may be made of various materials, such as wood, metal, plastic or ceramics.

[0018] Turning now to Fig. 1, there is shown, in cross-section, the joining area A of two interconnected tiles, namely parquet planks 2 and 4. The two parquet planks 2 and 4 are shown in a laid state in which they rest on a subfloor 3. The vertical direction V is defined as the direction perpendicular to the subfloor 3. The horizontal direction H is defined as a direction parallel to the subfloor 3.

[0019] Fig. 1 only shows a fragment of each plank 2 and 4, namely the cross-section of one peripheral longitudinal side 5 of each plank. The peripheral longitudinal sides 5 are used to interconnect the planks 2 and 4. Each plank 2 and 4 has a top surface S. This top surface is an aspect or wear surface, which means that it is visible

when the plank lays on the subfloor 3. The aspect surface S is the plank's surface which is walked upon in the laid state. The two planks 2 and 4 are joined together at a longitudinal joint 7. The joint 7 is defined by the contact zone of the two peripheral longitudinal sides 5.

[0020] Each parquet plank 2, 4 is a sandwich of three layers, namely a top aspect layer 6 followed by an intermediate core layer 8 followed by a bottom base layer 10. The planks may of course have a different structure. They may be made of solid wood, have only two layers, etc.

[0021] Since the two planks 2 and 4 are identical (apart, possibly, from their overall shape and size), the following description equally applies to both planks.

[0022] The core layer 8 has a pair of longitudinal joining grooves 12, 14 for joining the plank to another plank. One joining groove is a horizontal locking groove 12 for locking the plank in the horizontal direction H. The other joining groove is a vertical locking groove 14 for locking the plank in the vertical direction V. The horizontal locking groove 12 extends vertically into the core layer 8. The vertical locking groove 14 extends horizontally into the core layer 8. The horizontal locking groove 12 is set back horizontally relative to the joint 7. The vertical locking groove 14 opens out directly into the joint 7.

[0023] The horizontal locking groove 12 preferably has a u-shaped cross-section. The vertical locking groove 14 preferably has a landing 16, as shown in Fig. 2. The landing 16 is arranged between a first receiving channel 18 and a second receiving channel 20. The cross-section of the second receiving channel 20 may be L-shaped. The cross-section of the first receiving channel 18 may be U-shaped. The first receiving channel 18 is set back further away from the joint 7 than the second receiving channel 20.

[0024] The plank 2, 4 also has a longitudinal recess 22 below the core layer 8 and next to the base layer 10. The recess 22 has a ceiling 23. The horizontal locking groove 12 opens out into the recess 22, preferably at the far side of the recess 22 from the joint 7. Preferably, the recess 22 has a cavity 24 in its ceiling 23. The cavity 24 is formed into the core layer 8.

[0025] Both longitudinal sides of each plank 2, 4 are identical. In other words, the opposite longitudinal side of each plank 2, 4, which is not shown in Fig. 1, has the same grooves and recesses as the longitudinal side 5. More generally, all sides of a floor element preferably have exactly the same locking profile, no matter what the shape of the floor element is.

[0026] With reference to Fig. 1, the two planks 2, 4 are joined together and locked in place by a joining profile 26. This joining profile is preferably made of a polymer. Polylactic acid (PLA) is a preferred polymer because it is recyclable and is sourced from renewable sources. The joining profile 26 may be an integral piece. It may be obtained by an extrusion process or by means of injection moulding. The joining profile 26 has an elongate shape, which defines a longitudinal main axis X.

[0027] The joining profile 26 includes a central support-

ing section 28, a central tongue 30 projecting from the central supporting section 28, and two peripheral tongues 32 each extending on opposite sides of the central supporting section 28 along the longitudinal main axis X.

[0028] Each peripheral tongue 32 has an upper tongue surface 35 for facing a tile and a lower tongue surface 36 for facing the subsurface 3.

[0029] The central supporting section 28 has a protruding base 34. The base 34 protrudes below the lower tongue surfaces 36 of the peripheral tongues 32. The base 34 has a lower base surface 37 facing the subfloor 3 and resting thereon.

[0030] Due to the protruding base 34, the thickness T of the central supporting section 28 is larger than the thickness Q of the peripheral tongues 32. Accordingly, there is a clearance 38 between each peripheral tongue 32 and the subfloor 3, when the joining profile 26 rests on the subfloor 3.

[0031] The central tongue 30 has a rib 40 supporting a joining ridge 42. Preferably, the opposite lateral sides 44 of the joining ridge 42 jut out beyond the rib 40. The cross-section of the joining ridge 42 may comprise a trapezoidal segment 46 followed by a rectangular segment 48.

[0032] Each peripheral tongue 32 ends with a locking lip 50. Each locking lip 50 can move in the vertical direction V relative to the central supporting section 26 between a locking position shown in Fig. 1 and a release position before joining (not shown). To that effect, each peripheral tongue 32 is elastic such that it can bend downwards, whereby the corresponding locking lip 50 is moved from the locking position shown in Fig. 1 into the release position. In the release position, the locking lip 50 occupies the clearance 38. In the locking position, the locking lip 50 leaves the clearance 38 open.

[0033] Each locking lip 50 may be hook-shaped. Each locking lip has a tip 51. Each locking lip 50 also features a rounded outer guiding edge 53.

[0034] One may also provide a thickening at the outer end of each locking lip 50. The thickening creates a bigger contact surface of the locking lip 50 with the floor element. As a consequence, the relative pressure exerted by the locking lip 50 on the floor element 2, 4 is decreased, which reduces the compression of the floor element material at the contact point with the outer end of the locking lip 50. As a result, the joining profile may also be used on the short end of a parquet flooring without the need for plywood or other additional materials like HDF, OSB or others.

[0035] In one aspect, the composition of the material of the joining profile 26 may vary throughout the profile. For example, the central supporting section 28 may be made of stiffer plastic than the peripheral tongues 32. This ensures a good structural integrity of the joining profile 26 due to the high tensile strength of the central supporting section 28, while keeping the flexibility of the peripheral tongues 32 needed for the locking operation.

[0036] The horizontal laying of the planks 2, 4 on the

subfloor 3 and the joining thereof are done as follows. The laying specialist starts with a pair of tiling assemblies 52. Each tiling assembly 52 comprises one plank 2, 4 and a joining profile 26 connected to one longitudinal side of the plank 2, 4. The other longitudinal side of the plank 2, 4 does not have a joining profile attached thereto.

[0037] Each joining profile 26 is connected to its plank 2, 4 in that a lateral side 44 of the joining ridge 42 is received in the vertical locking groove 14 of the plank 2, 4, and in that one of the two locking lips 50 is received in the horizontal locking groove 12 of the plank 2, 4.

[0038] The laying specialist then lays a first tiling assembly 52 onto the subfloor 3. The second tiling assembly 52 is put onto the subfloor 3 next to the first tiling assembly, with the longitudinal side of the plank 4 lacking a joining profile facing the joining profile 26 of the first tiling assembly. The longitudinal side 5 of the second tiling assembly is then moved horizontally towards the locking lip 50 of the joining profile 26 until it comes into contact with the locking lip 50.

[0039] As a next step, the second tiling assembly is pushed horizontally over the locking lip 50. Thanks to the rounded guiding edge 53, the peripheral tongue 32 is pushed downwards by the horizontal approach of the second tiling assembly. This depresses the locking lip 50. Due to the fact that the lip height d is not larger than the recess height D , the locking lip 50 can move completely out of the way of the plank 4. Then, the second tiling assembly is moved further in the horizontal direction H towards the first tiling assembly until the locking lip 50 snaps upwards into the horizontal locking groove 12 and the other lateral side 44 of the joining ridge 42 is fully inserted in the vertical locking groove 14 of the second tiling assembly. As illustrated in Fig. 2, the trapezoidal segment 46 is received in the second receiving channels 20. The rectangular segment 48 is received in the first receiving channels 18.

[0040] After this operation, the two tiling assemblies are safely joined together. The locking lips 50 in cooperation with the horizontal locking grooves 12 prevent any horizontal relative movement of the two planks 2, 4. The central tongue 30 in cooperation with the vertical locking grooves 14 prevents any vertical relative movement of the two planks 2, 4. The central tongue 30 acts as a locking key, which locks the adjoining laid planks 2, 4 together in the vertical direction V , thus preventing any relative vertical movement between the two planks 2, 4.

[0041] One will note that the inventive joining profile 26 allows for a joining of two tiles by horizontal displacement of the tiles only. No angling, tilting or lifting of the tiles is necessary during the joining process.

[0042] In one embodiment, the central tongue 30 may extend up to and be flush with the aspect surface S of the planks 2, 4. In this way, one can create a floor with a ship deck optic. On top of that, the central tongue 30 may then act as a seal to prevent the ingress of liquid into the joint 7.

[0043] Thanks to the cavities 24, the laying specialist

can insert a tool between the joining profile 26 and the planks 2, 4 to detach the joining profile from the planks.

[0044] The oblique or angular laying of the planks 2, 4 on the subfloor 3 and the joining thereof are shown in Figs. 3 to 5. As shown in Fig. 3 by the arrow, one first inserts the joining profile 26 into the first plank 4. The result is shown in Fig. 4. Then, the second plank 2 is approached at an angle to the joining profile 26 and snapped into place, cf. Fig. 5. As indicated by the arrows in Fig. 5, the angling movement corresponds to a vertical lowering movement and a concurrent horizontal approaching movement.

[0045] Figs. 6 to 15 provide examples of the multitude of tiling patterns that may be assembled with the inventive joining system.

[0046] The different patterns are as follows:

Fig. 6: mosaic pattern;

Fig. 7: combined French fishbone and mosaic pattern;

Fig. 8: fishbone pattern;

Fig. 9: hexagon pattern;

Fig. 10: cross pattern;

Fig. 11: mosaic pattern;

Fig. 12: ship deck optic;

Fig. 13: concentric circles;

Fig. 14: irregular shapes;

Fig. 15: irregular curved planks.

[0047] In Figures 16 and 17, two variants of joining profiles 26 are shown, together with planks 2 and 4. In the variant of Fig. 16, each peripheral tongue 32 has a depression 54 extending along the longitudinal main axis X . In the variant of Fig. 17, each peripheral tongue 32 has an undercut or oblique groove 56 extending along the longitudinal main axis X .

[0048] The depressions 54 and the undercuts 56 make the joining profile 26 more flexible during installation.

[0049] The inventive joining profile 26 and tiling assembly 52 have in particular the following advantages:

- The tiles can be installed by horizontal displacement and not only with an angling process. This makes installation under radiators or doorframes much easier. It also simplifies the creation of all kinds of patterns with the tiles;
- If the joining profile is made of PLA, recycling of worn out tiling assemblies is much easier.
- Installing by horizontal displacement will allow for pattern installations which are very hard to do or even impossible by angling.

Claims

1. A joining profile (26) for joining tiles (2, 4), the joining profile (26) having a longitudinal main axis (X), the joining profile comprising:

- a central supporting section (28);
 - a central tongue (30) projecting from the central supporting section to be received in corresponding grooves (14) of adjoining laid tiles for locking the adjoining laid tiles (2, 4) in the vertical direction (V); and
 - two peripheral tongues (32) each extending on opposite sides of the central supporting section (28) along the longitudinal main axis (X), each tongue (32) having an upper tongue surface (35) for facing a tile and a lower tongue surface (36) for facing a subsurface (3), and each tongue ending with a locking lip (50), each locking lip being adapted to be received in a corresponding groove (12) of a laid tile for locking the laid tile in the horizontal direction (H), each locking lip (50) having a tip (51);

characterised in that:

- each locking lip (50) is adapted to be displaced in the vertical direction (V) relative to the central supporting section (28) between a locking position and a release position;
 - the central supporting section (28) has a protruding base (34) with a lower base surface (37) for facing the subsurface (3), the protruding base (34) being adapted to ensure a clearance (38) between each locking lip (50) and the subsurface (3) in the laid state of the joining profile (26), each locking lip occupying the clearance in its release position and leaving the clearance (38) open in its locking position; and
 - the vertical distance (d) between the upper tongue surface (35) of each tongue (32) and the tip (51) of each locking lip (50) is smaller than or equal to the vertical distance (D) between the lower tongue surface (36) of each tongue (32) and the lower base surface (37).
2. The joining profile (26) of claim 1, wherein each peripheral tongue (32) is elastic such that it can bend in the vertical direction (V) and thereby displace its locking lip (50) between the locking position and the release position.
 3. The joining profile (26) of any one of the previous claims, wherein the joining profile is made of plastic material, such as polylactic acid, also known as PLA.
 4. The joining profile (26) of any one of the previous claims, wherein the joining profile is obtained by extrusion, injection moulding or 3D-printing.
 5. The joining profile (26) of any one of the previous claims, wherein each locking lip (50) is hook-shaped.
 6. The joining profile (26) of any one of the previous

claims, wherein each locking lip (50) has a rounded outer guiding edge (53), said guiding edge ensuring a vertical deflection of the locking lip (50) into the release position as a tile (2, 4) is brought into contact with the locking lip (50) and moved horizontally over the locking lip (50).

7. The joining profile (26) of any one of the previous claims, wherein each locking lip (50) has a thickening at its outer end.
8. The joining profile (26) of any one of the previous claims, wherein the central tongue (30) has a rib (40) supporting a joining ridge (42), wherein the opposite lateral sides (44) of the joining ridge jut out beyond the rib.
9. The joining profile (26) of claim 7, wherein the cross-section of the joining ridge (42) comprises a trapezoidal segment (46) followed by a rectangular segment (48).
10. The joining profile of claim 8 or 9, wherein the joining ridge (42) is a locking key for locking adjoining laid tiles (2, 4) together in the vertical direction (V).
11. A tiling assembly (52) comprising a tile (2, 4) and a joining profile (26) according to any one of the previous claims connected to the tile.
12. The tiling assembly (52) of claim 11, wherein the central tongue (30) extends up to and is essentially flush with an aspect surface (S) of the tile (2, 4).

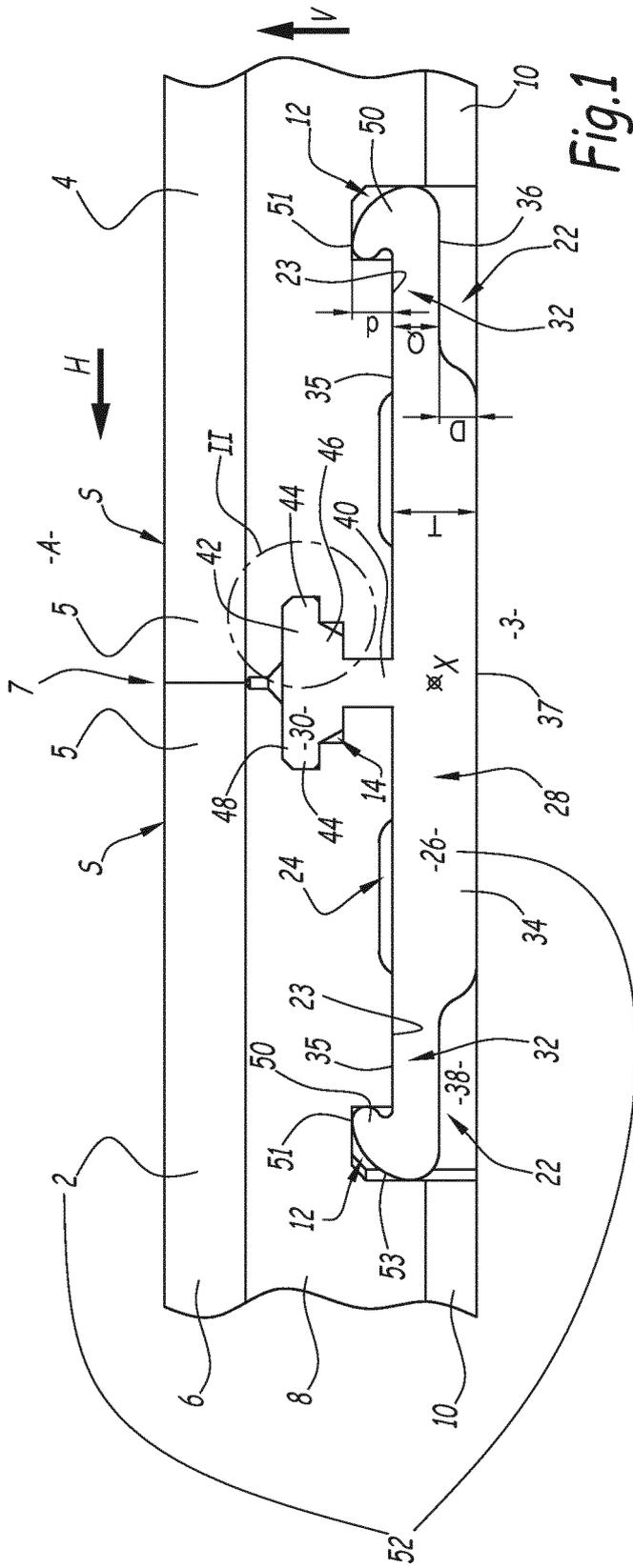


Fig. 1

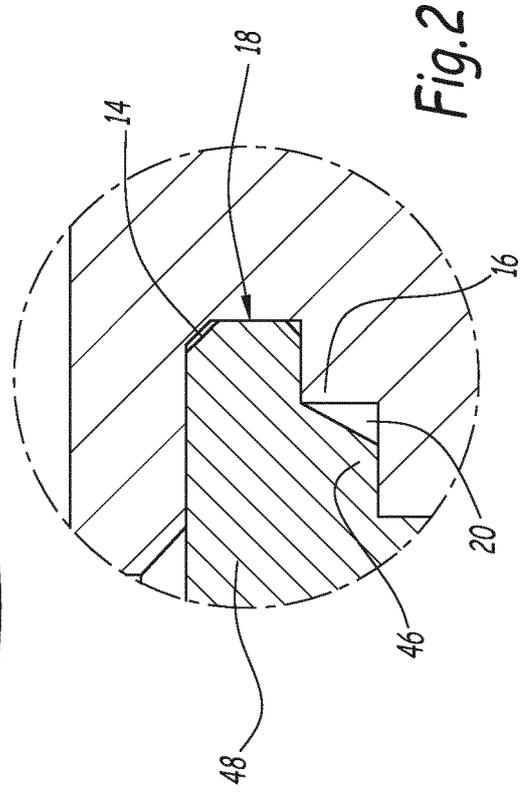
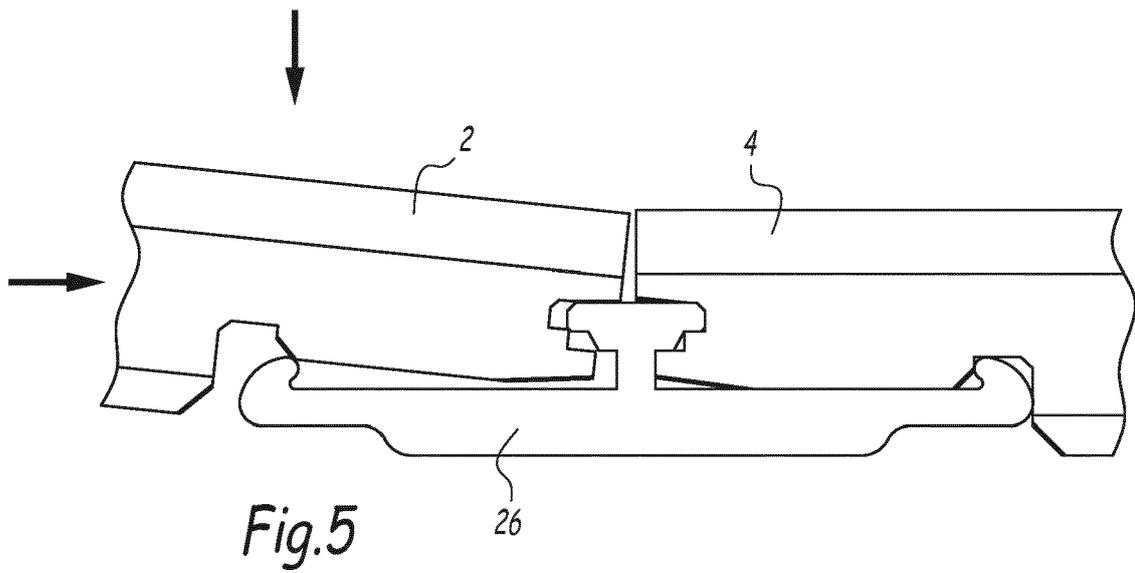
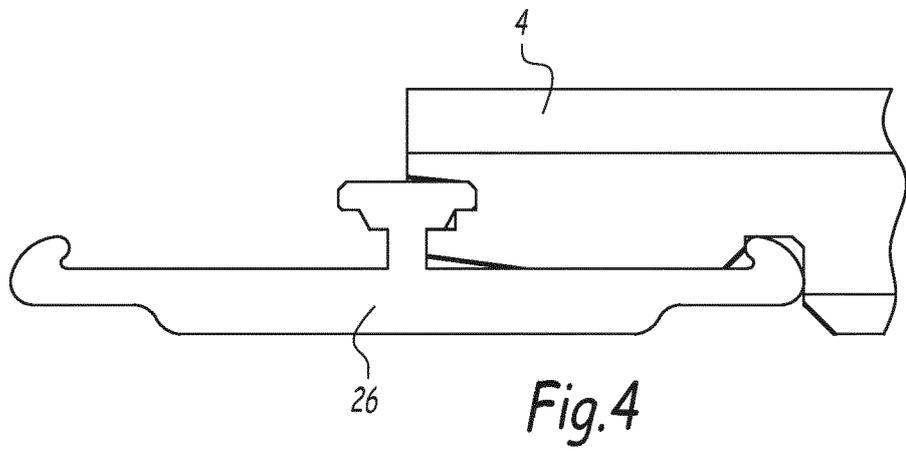
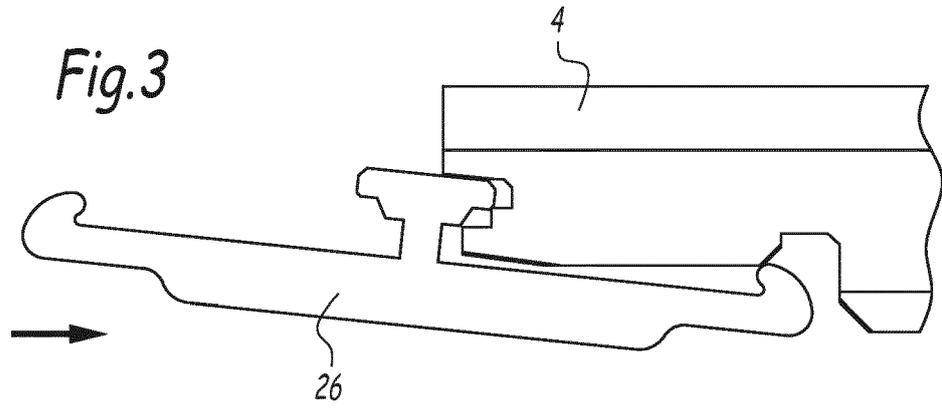


Fig. 2



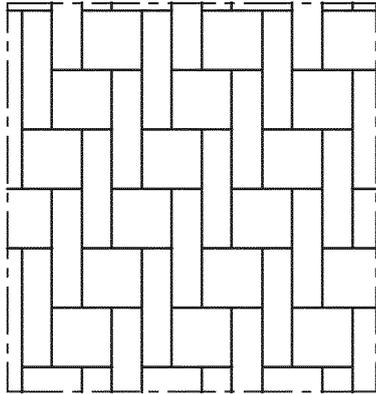


Fig. 6

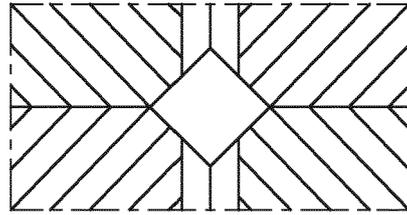


Fig. 7

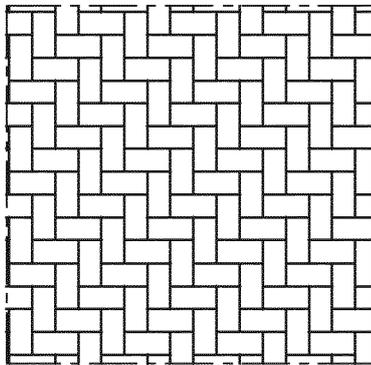


Fig. 8

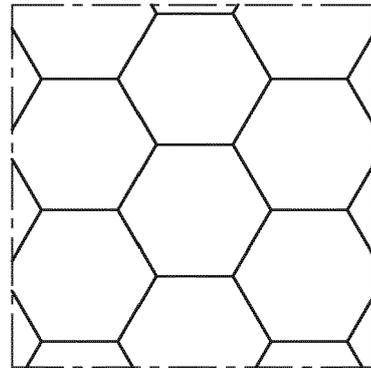


Fig. 9

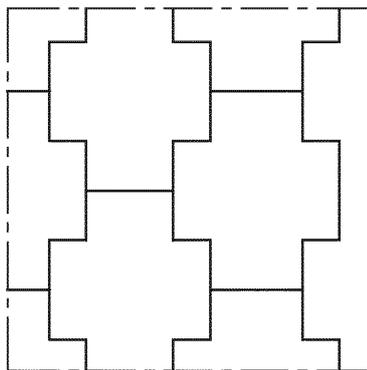


Fig. 10

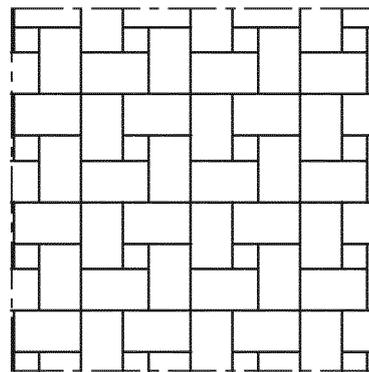


Fig. 11

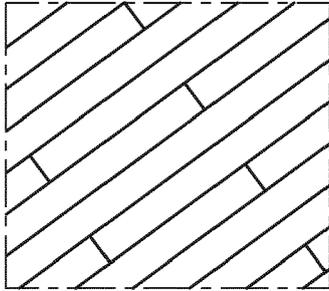


Fig.12

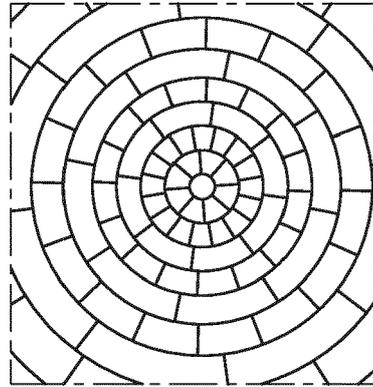


Fig.13

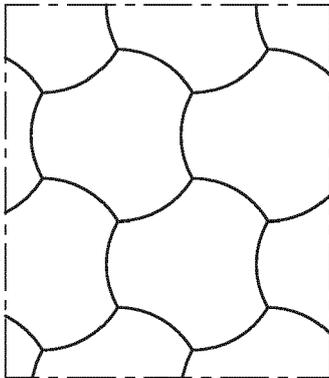


Fig.14

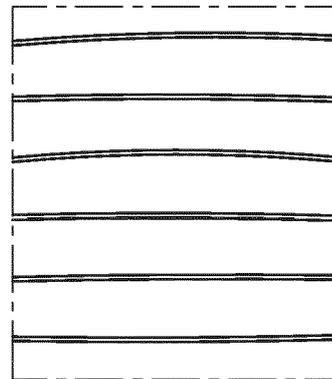


Fig.15

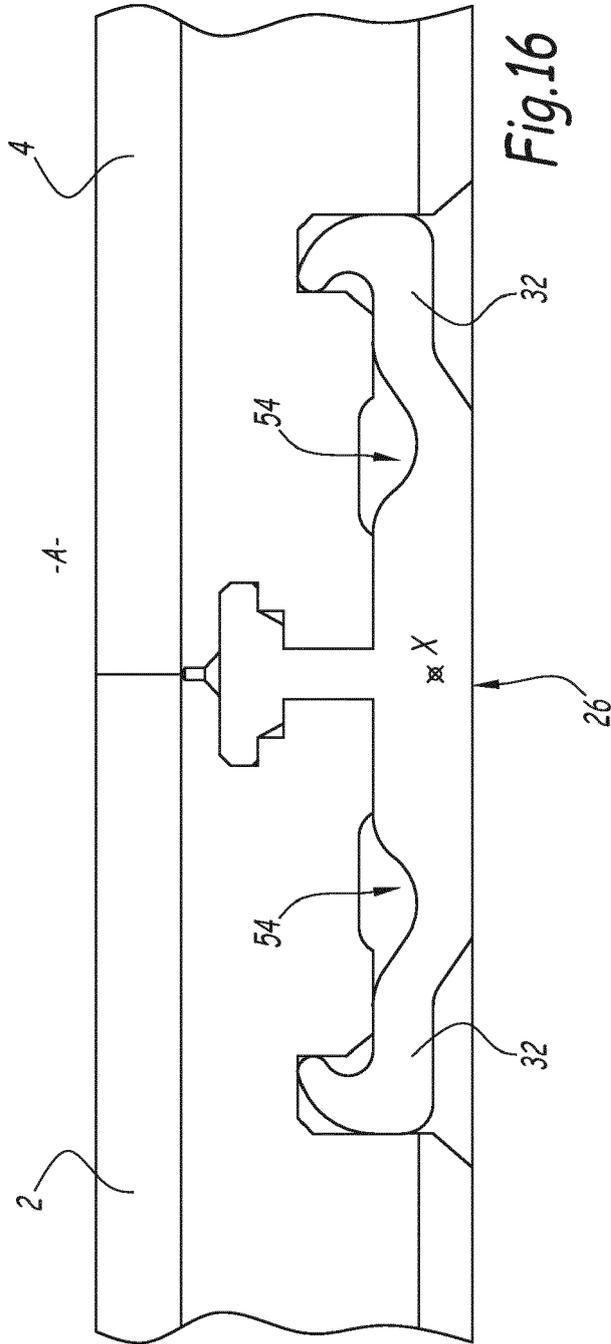


Fig.16

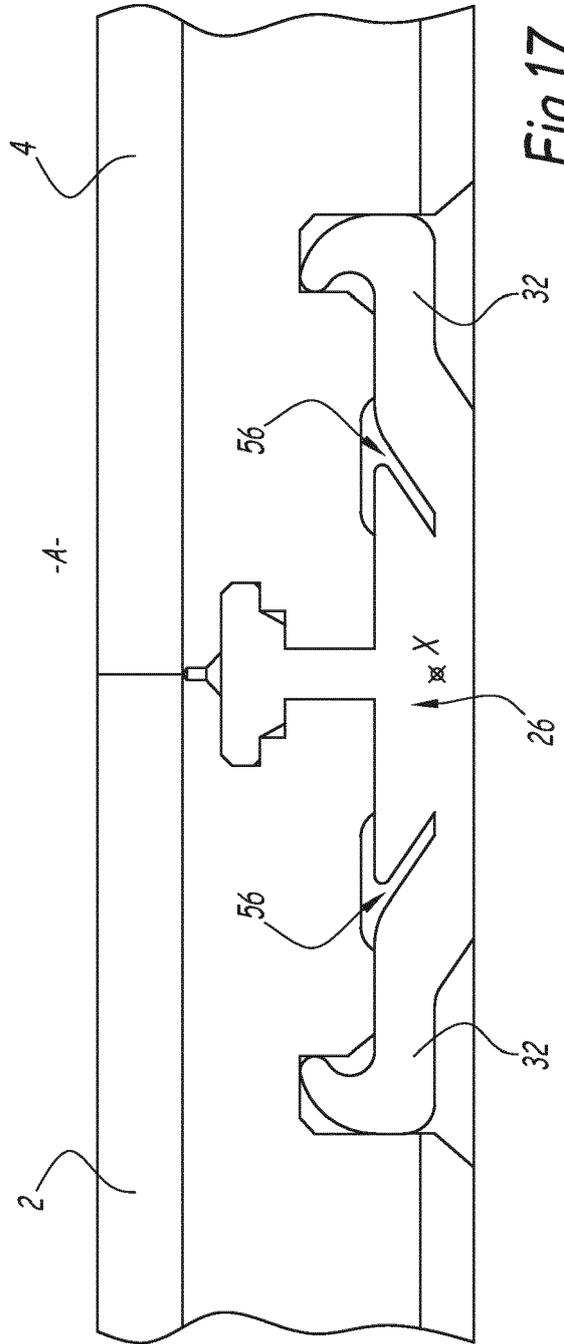


Fig.17



EUROPEAN SEARCH REPORT

Application Number
EP 16 20 0976

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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			TECHNICAL FIELDS SEARCHED (IPC)
			E04F
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 30 May 2017	Examiner Warthmüller, Almut
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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 16 20 0976

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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30-05-2017

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WO 2007142589 A1	13-12-2007	NONE	

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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