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(54) **INSULATION PANEL WITH INTEGRATED ANCHORING MEANS**

(57) Insulation panel configured to serve as a substrate for attaching brick slips (5) to a wall, which panel comprises a longitudinal slot with undercut and one or more dovetailed anchoring ribs (2), wherein the anchor-

ing ribs (2) protrude from the insulation panel surface in a direction facing away from the wall and cooperate with undercut slots provided in rear of the brick slips.

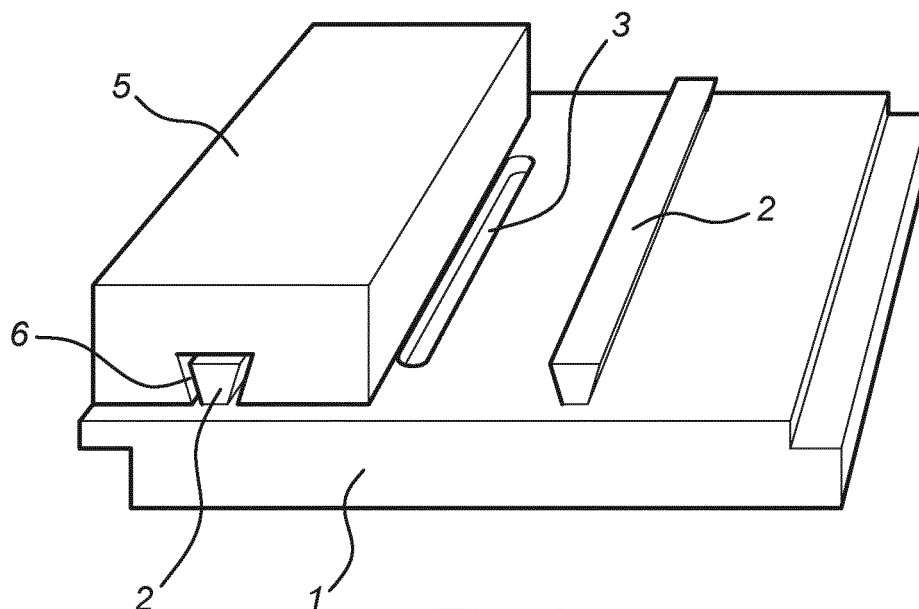


Fig. 2

Description

[0001] The present invention relates to a panel of insulating material, which comprises means for anchoring brick slips to be attached to the panel and of the joints to be arranged between the brick slips. The panel further comprises means, circumferentially on one or more sides, which means ensure a good connection to and engagement of one or more adjacent panels of the same type.

[0002] In the construction industry, insulation material, hereafter also referred to as insulation panels, have been used for a long time, which include positioning means for attaching, for example, brick slips to the insulation panel. Well-known insulation panels include those in which the panel includes ridges at the intended longitudinal joints between the brick slips to be applied to the panel, which, when bonded to the insulation panel with adhesive, ensure that the brick slips cannot shift under the influence of gravity before the adhesive has cured. In addition, the ridge acts as a spacer between two rows of brick slips so that all longitudinal joints to be applied between the brick slips have a uniform width and a wall covered with the insulation panel with attached brick slips acquires a taut and neat appearance. An insulation material often used for such panels is EPS, an abbreviation of the English term Expanded Polystyrene, or expanded polystyrene, also known in everyday language as styrofoam. A disadvantage of the insulation panels according to the state of the art is the fact that in the unlikely event of loosening, for example when the adhesive loses its adhesion to the insulation material, brick slips can fall off a wall, with considerable risks for people in the vicinity of that wall. Another disadvantage of known insulation panels is that they do not comprise means to ensure a secure connection between the brick slips and the insulation panel material.

[0003] The insulation panel according to the present invention comprises means which eliminate the aforementioned disadvantages of the known insulation panels. The invention thereto provides an insulation panel which is configured to serve as a substrate for attaching brick slips to a wall, which panel comprises a longitudinal slot with undercut, characterized in that the insulation panel comprises one or more anchoring ribs, wherein the anchoring ribs are protruding from the insulation panel surface in a direction facing away from the wall.

In an embodiment, the insulation panel is provided with one more recessed anchoring slotted holes (3), which anchoring slotted holes (3) face away from the wall in relation to the surface of the insulation panel., for anchoring joints to be applied.

Preferably, the anchoring rib is configured to cooperate with a longitudinal slot with an undercut of a brick slip, wherein the anchoring rib comprises two protruding parts, which two protruding parts are flared surfaces, flared in a direction away from the panel . Due to the two

protruding parts, flared in a direction away from the panel, the anchoring rib widens from the surface that is facing away from the wall, so that this shape is at least partially form-fitting with the undercut of the longitudinal slot in the brick slip. This is advantageous because it creates at least a partial form-fitting connection after the brick slip has been placed on the insulation panel. In order to further facilitate the placement of the brick slip on the insulation panel, it is possible that the insulation panel is configured, such that the two protruding flared surfaces, flared in the direction facing away from the panel are movable towards each other, in order to allow placement of the brick slip.

The advantage of this is that it creates a click mechanism for easy application of the brick slip to the insulation panel. The parts that are movable towards each other facilitate to apply the brick slip in a transverse direction to the insulation panel. This is usually done in the direction perpendicular to the wall after the insulation panel has been attached to the wall. The anchoring rib of the insulation panel is hereto configured for an essentially form-fitting connection to the longitudinal slot with the undercut of the brick slip.

[0004] In a construction variant at least one of the projecting parts is flexible, where either both parts are flexible, or one of the two parts is flexible, and the other part is rigidly connected to the insulation panel. Flexible means that the material is shaped in such a way that it can move with the application of a force, to facilitate a click connection with a brick slip with a longitudinal slit with undercut. In this embodiment, , a hinge is not meant with "wherein at least one of the projecting parts is flexible".

[0005] It is possible that the anchoring ribs and/or the anchoring slotted holes comprise a trapezoidal cross-section.

[0006] In a preferred embodiment a longitudinal slot is provided between the surfaces, for lowering the necessary force for placing a brick slip on the insulation panel. In this embodiment the at least one anchoring rib comprises at least one longitudinal slot, which is provided in between two flared surfaces in the anchoring rib. The at least one longitudinal slot in the anchoring rib can be applied substantially centered or more off-centered in the anchoring rib. This longitudinal slot has as a second advantage that the connection between the insulation panel and the brick slip can be reinforced by filling the longitudinal slot in the anchoring rib with a filler. The filler can harden and thus strengthen the connection and keep the connection moisture-free.

[0007] It is also possible to use an impressionable filler, that for example may comprise a coating, a rubber-like material or a rock wool. It is also possible to provide the entire insulation panel with a coating, in particular a coating that has the appearance of a joint, so that joints can be omitted if desired. One can think of one grout coloured, for example light grey, joint.

[0008] The longitudinal slot in the anchoring rib can

have different shapes. The at least one longitudinal slot in the anchoring rib preferably has a maximal width between 6 and 8 mm. This distance provides good flexibility and firmness of the two protruding parts. It is possible that the longitudinal slot in the anchoring rib has a rectangular shape, however a trapezoidal, triangular or v-shaped longitudinal slot in the anchoring rib can also be considered. In addition, the anchoring rib preferably has such a depth that the at least one longitudinal slot in the anchoring rib extends through the surface facing away from the wall. Because the longitudinal slot in the anchoring rib extends through the surface facing away from the wall, it facilitates the freedom of movement of the at least one flexible protruding part and it enables the use of a filler that can be applied more easily, because there is sufficient space.

[0009] Besides the insulation panel with the distinguishing features as shown and discussed, the present invention comprises also a system comprising a combination of the insulation panel according to the present invention and brick slips to be attached to the insulation panel, which brick slips comprise a longitudinal slot with an undercut and preferably wherein the anchoring rib comprises a form-fitting engagement with the brick slip with the longitudinal slot.

In an embodiment the system is configured for effecting a forced engagement between the protruding anchoring rib of the insulation panel and the longitudinal slot of a brick slip. This is the case when some deformation of the material of the insulation panel is required to realize the engagement.

[0010] In another embodiment the system according to the present invention is provided with at least one anchoring slotted hole which comprises an undercut for anchoring the to be applied joints between the brick slips. Said anchoring slotted holes run substantially parallel with respect to each other, such that after the establishment of an engagement between the brick slip and the insulation panel the anchoring slotted holes establish a parallel anchoring and are configured to run substantially parallel with and adjacent to one side of the brick slip. In this embodiment of the system it is quite possible to apply and anchor joints between the brick slips. These anchoring slotted holes prevent the joints from falling out of the wall during a storm or other circumstances. This provides a safer environment.

[0011] The present invention also comprises a method for cladding a wall, comprising applying of an insulation panel according to the present invention to a wall, moving towards each other of the two protruding flared surfaces, flared in a direction facing away from the panel to allow placement of the brick slip, and placement of the brick slip. In this method, the brick slips are placed on the insulation panel spring mounted or while pushing the rib. In said placement of brick slips on the insulation panel the undercut of the longitudinal slot cooperates with the anchoring rib on the insulation panel. For non-bricklayers it is possible to clad a wall with stone/bricks by applying

this method with the insulation panel according to the present invention. This is advantageous because the availability of good bricklayers is becoming more difficult.

[0012] In an embodiment the method can also comprise the following steps; filling of the longitudinal slot in the insulation panel with a filler, applying of joints between the brick slips, such that these are anchored in the anchoring slotted holes in the insulation panel. Advantage of the use of a filler is an increased firmness and stiffness of the material and that the risk of moisture accumulation between the brick slip and the insulation panel decreases.

[0013] The manner in which the insulation panel according to the invention achieves this, will now be elucidated with reference to a number of figures. Thereby shows:

- fig. 1 a schematic perspective top view of a part of an embodiment of the insulation panel according to the invention;
- fig. 2 a schematic perspective top view of the in fig. 1 shown part of a brick slip positioned on an insulation panel according to the invention;
- fig. 3 a schematic vertical cross-section through a part of an insulation panel according to the invention;
- fig. 4 the in fig. 3 schematically shown vertical cross-section through a part of the insulation panel according to the invention with two brick slips attached to the insulation panel including an applied joint, which joint is applied between the brick slips;
- fig. 5 a schematic view of a brick slip and an insulation panel according to the present invention wherein the anchoring rib comprises two protruding parts, which two protruding parts are flared surfaces, flared in a direction facing away from the panel.

[0014] In the figures, equal or similar parts have equal or similar reference numbers.

[0015] Fig. 1 is a schematic perspective top view of a part of the embodiment of the insulation panel according to the present invention. In the shown embodiment the insulation panel comprises as main component a plate-shaped part 1. Furthermore, in various embodiments, the insulation panel comprises a plurality of anchoring ribs 2, which anchoring ribs are located on the top surface of the plate-shaped part 1 substantially straight, positioned parallel to each other. For being able to fulfil the function intended according to the invention, the anchoring ribs 2 must comprise an undercut. In the shown embodiment, the ribs have a cross-section mainly in the shape of a trapezium. The so-called small base of said trapezium coincides with the surface of the insulation panel 1. This cross-sectional shape of the ribs can also be referred to in the further description and in the claims as a dovetail or dovetail-shaped. Since Fig. 1 shows only two short anchoring ribs 2, because fig. 1 shows only a small part of an embodiment of the insulation panel according to the invention. The in fig. 1 shown embodiment of the in-

insulation panel also comprises an anchoring slotted hole 3, which is located substantially centered between both anchoring ribs 2 and substantially parallel to the anchoring ribs. The anchoring slotted holes 3 have a length which is preferably only a few centimetres, while the anchoring ribs 2 have a length, which is at least substantially equal to the width of the entire insulation panel in various embodiments of the insulation panel according to the invention. In an embodiment of the insulation panel according to the invention, the length of the anchoring slotted holes 3 is substantially equal to the head size, being the width of a brick slip plus the width of a butt joint. Because the anchoring ribs 2 cut through the butt joints perpendicular to the longitudinal direction, the undercut of the anchoring ribs ensures anchoring or storage of the butt joints.

[0016] Fig. 2 shows a schematic perspective view of the in fig. 1 shown part of an insulation panel 1 according to the invention with a brick slip 5 positioned thereon. The brick slips suitable for attachment to the shown exemplary embodiment of the insulation panel according to the invention comprise an substantially centred longitudinal slot 6 applied in the substantially longitudinal direction of the brick slip 5 at the rear, being the side turned facing towards the insulation panel 1. The cross-section of the longitudinal slot 6, like that of the anchoring ribs 2, is trapezoidal. In a preferred embodiment, the trapezoidal cross-section of the longitudinal slot 6 has a small base which is approximately 2 to 4 millimetres smaller than the large base of the trapezoidal cross-section of the anchoring ribs 2. In such embodiment, the height of the anchoring ribs 2 is substantially equal to the depth of the longitudinal slot 6 in the brick slips and this depth is approximately 8 millimetres. In this embodiment the large base of the trapezoidal shape of the cross-section of the anchoring ribs 2 has a length of approximately 15 millimetres. The large base of the trapezoidal cross-section of the longitudinal slot 6 in the brick slips also has a length of approximately 15 millimetres in such preferred embodiment. This means that the angles of the sloping sides of the respective trapezoidal cross-section of the anchoring ribs 2 and the trapezoidal cross-section of the longitudinal slot 6 are different in a small extent. The invention provides in that the wedge-shaped space thus available between the sloping sides of an anchoring rib 2 and the sloping sides of the anchoring slot 6 in a brick slip 5 is filled with, for example, a cement-bound glue or other type, preferably curing adhesive or filler when attaching an associated brick slip to an insulation panel according to the present invention. Since the small base of the trapezoidal cross section of the longitudinal slot 6 is shorter than the large base of the trapezoidal cross-section of the anchoring ribs 2, the anchoring rib must be slightly deformed when applying a brick slip around the longitudinal slot 6 to receive the anchoring rib 2 in the longitudinal slot. This engagement between an anchoring rib of the insulation panel and a longitudinal slot 6 of a brick slip can furthermore also be referred to as a forced en-

gagement, since some deformation of the material of the insulation panel is required to realize the engagement. In view of the fact that the insulation panel and therefore the anchoring ribs 2 comprise a relatively easily deformable material in various embodiments, such as, for example EPS (expanded polystyrene) or XPS (extruded polystyrene), the required low deformation does not have to pose any problem or serious delay when attaching brick slips to the insulation panel according to the invention.

[0017] Fig. 3 shows a schematic vertical cross-section through a part of an insulation panel according to the present invention at a location where there is also an anchoring slotted hole 3 substantially perpendicular to the longitudinal direction. As clearly shown in the in fig. 3 shown embodiment of the insulation panel according to the present invention, the anchoring slotted hole 3 also has a trapezoidal cross-section, wherein the small base of the trapezium substantially coincides with the surface of the insulation panel, whereby the anchoring slotted hole 3 comprises an undercut on either side.

[0018] Fig. 4 shows the in fig. 3 schematically shown vertical cross-section through a part of the insulation panel according to the invention with two brick clips 5 attached to the insulation panel, including a joint 7 applied between the brick slips. In fig. 3 it is also schematically shown that the material of the joint 7 between the two brick slips has also filled the anchoring slot hole 3, which anchoring slotted hole 3 is located between the two brick slips 5. Due to the fact that the anchoring slotted hole 3 in the insulation panel extends wide, the joint 7 cannot accidentally fall out of the joint gap even if there is insufficient adhesion between the joint material and the material of the insulation panel and/or from the brick slips. The joint is therefore anchored or secured. The joint 7 is shown here as a thick black line or black block. The undercut in the form of the cross-section of the anchoring slotted hole 3 provides anchoring of the joint. Because such anchoring is not necessarily necessary along the entire length of a joint, it is sufficient to use separate anchoring slotted holes, instead of a continuous anchoring slit, as shown schematically in Fig. 1 and Fig. 2. To illustrate the concept, in Fig. 1 and Fig. 2 the anchoring slotted hole 3 is shown in a position located at least substantially about halfway along the length of a brick slip. The invention provides that the positioning of the anchoring slotted holes may comprise any pattern desired or useful. In an embodiment of such a pattern, the anchoring slotted holes jump respectively below and above a brick slip in relation of each other. In Fig. 4 the adhesive or filler 6a is also shown, the adhesive or filler 6a is located in the wedge-shaped gaps between the anchoring ribs 2 and the walls of the longitudinal slot in the brick slips, and is shown by means of a black colouring. The invention also provides anchoring ribs and/or anchoring slotted holes with undercuts in any other possible shape, even though in the shown embodiments of the insulation panel according to the present invention the anchoring ribs 2 and

anchoring slotted holes 3 comprise undercuts with a trapezoidal or dovetail shape. The further use in this description and in the claims of the terms anchoring ribs and/or anchoring slotted holes comprise one or more undercuts comprising anchoring means.

[0019] Figure 5 shows an embodiment wherein the insulation panel 1 comprises an anchoring rib 2, which is configured for cooperation with a longitudinal slot 6 with undercut of a brick slip 5, wherein the anchoring rib 2 comprises two protruding parts 2a,2b, two flared surfaces 2c,2d, flared in a direction facing away from the panel. The anchoring rib 2 widens from the surface facing away from the wall, due to the two protruding parts 2a,2b in a direction facing away from the panel, so that this shape is at least partially form-fitting with the undercut of the longitudinal slot 6 in the brick slip. This is advantageous because then a form-fitting connection is created after placement of the brick slip on the insulation panel. To further facilitate the placement of the brick slip on the insulation panel, the insulation panel as shown is constructed with two protruding flared surfaces 2c,2d that are movable to each other and flared facing away from the panel, to allow placement of the brick slip 5. In figure 5 a rectangular longitudinal slot 8 in the anchoring rib 2 is shown, this longitudinal slot 8 may also comprise, for example, a trapezoidal, triangular or v-shaped longitudinal slot 8 in the anchoring rib 2. The anchoring slotted holes 3 for anchoring later applied joints are also shown.

[0020] In the accompanying figures, only a small part of an insulation panel is shown. The present invention comprises insulation panels with any desired or useful length and width. The insulation panel according to the present invention also comprises in various embodiments coupling means which establish a connection between two adjacent insulation panels. Such coupling means may for instance be a dovetail joint, or a keyhole connection, which among other things ensure that two adjacent insulation panels cannot move in a direction in a plane of the panels away from each other. With regard to attaching the insulation panel to a wall, the present invention provides that this can take place in any feasible manner.

The insulation panel according to the present invention in the claims may also be indicated as a substrate for attaching brick slips to a wall.

[0021] Where the term 'brick slips' is used in this description and in the claims, it may also refer to decorative slips and/or strips or tile slips/strips or any other strip-and/or slip-shaped element of a ceramic or other type of material that may be used as wall coverings.

[0022] The term "comprise" in an embodiment may have the meaning of "consist of", but in another embodiment can also be interpreted as "at least containing the defined part and optionally one or more other parts".

The term "and/or" mainly refers to one or more of the items mentioned before and after "and/or". For example, a phrase "item 1 and/or item 2" (and similar phrases) may refer to item 1 and item 2, or to item 1 or to item 2.

[0023] The embodiments of the method and the device according to the present invention discussed in this description are only some of the many embodiments possible within the scope of the present invention and therefore serve to be considered as non-limitative.

Claims

1. Insulation panel configured to serve as a substrate for attaching brick slips (5) to a wall, which panel comprises a longitudinal slot with undercut, **characterized in that** the insulation panel
 - comprises one or more anchoring ribs (2), wherein the anchoring ribs (2) are protruding from the insulation panel surface in a direction facing away from the wall.
2. Insulation panel according to claim 1, provided with one or more recessed anchoring slotted holes (3), which anchoring slotted holes (3) face away from the wall in relation to the surface of the insulation panel.
3. Insulation panel according to one or more of the preceding claims, wherein the anchoring rib (2) is configured for cooperation with a longitudinal slot (6) with undercut of a brick slip, wherein the anchoring rib (2) comprises two protruding parts, which two protruding parts are flared surfaces, flared in a direction facing away from the panel.
4. Insulation panel according to claim 3, wherein the two protruding flared surfaces, flared in the direction facing away from the panel are movable towards each other to allow placement of the brick slip (5).
5. Insulation panel according to claim 3 or 4, wherein at least one of the two protruding parts is flexible.
6. Insulation panel according to one or more of the preceding claims, **characterized in that** the anchoring ribs (2) and/or anchoring slotted holes (3) comprise a trapezoidal cross section.
7. Insulation panel according to one or more of the preceding claims, wherein the at least one anchoring rib (2) comprises at least one longitudinal slot, which is provided in between two flared surfaces in the anchoring rib (2).
8. Insulation panel according to claim 7, wherein the at least one longitudinal slot in the anchoring rib (2) has a maximal width between 6 and 8 mm.
9. Insulation panel according to claim 7 or 8, wherein the at least one longitudinal slot in the anchoring rib (2) extends through the surface facing away from

the wall.

10. Insulation panel according to one or more of the preceding claims, **characterised in that**, that the insulation panel comprises coupling means, for coupling of two adjacent insulation panels. 5
11. Insulation panel according to one of the preceding claims, provided with a coating, in particular a coating with optical properties of a joint, like a light, in particular grey, colour. 10
12. System for cladding a wall, **characterised in that**, the system comprises an insulation panel according to one or more of preceding claims and a brick slip (5) with a longitudinal slot (6) with an undercut, preferably wherein the anchoring rib (2) comprises a form-fitting engagement with the brick slip (5) with the longitudinal slot (6). 15
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13. System according to claim 12, **characterised in that**, the system is configured for effecting a forced engagement between the protruding anchoring rib (2) of the insulation panel and the longitudinal slot (6) of the brick slip (5). 25
14. System according to claim 12 or 13, wherein the insulation panel is provided with at least one anchoring slotted hole (3) which comprises an undercut for anchoring the to be applied joints between the brick slips (5), wherein the anchoring slotted holes run substantially parallel with respect to each other, such that after the establishment of an engagement between the brick slip (5) and the insulation panel, the anchoring slotted holes establish a parallel anchoring and are configured to run substantially parallel with and adjacent to one side of the brick slip (5). 30
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15. Method for cladding a wall, comprising: 40
 - applying of an insulation panel according to claims 1-10 to a wall;
 - moving towards each other of the two protruding flared surfaces, flared in a direction facing away from the panel, to allow placement of the brick slip (5), and placement of the brick slip, and in particular comprising;
 - filling of the longitudinal slot in the insulation panel with a filler;
 - applying of joints between the brick slips (5), so that these are anchored in the anchoring slotted holes (3) in the insulation panel. 45
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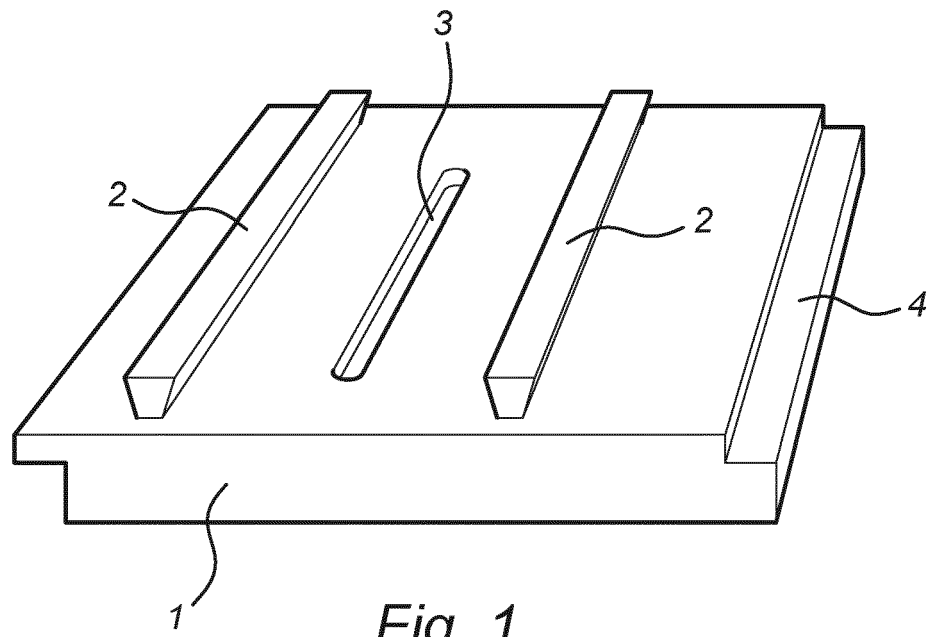


Fig. 1

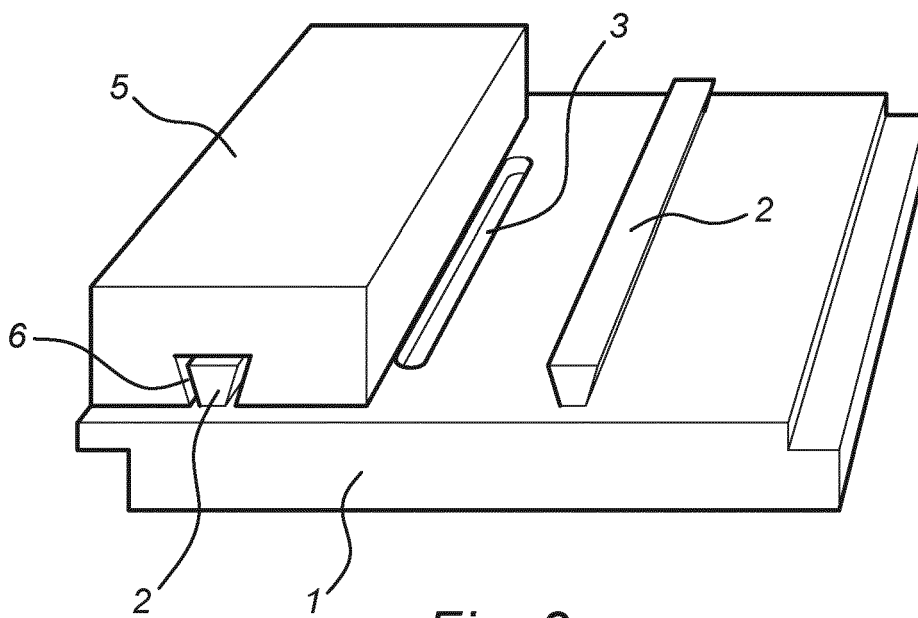


Fig. 2

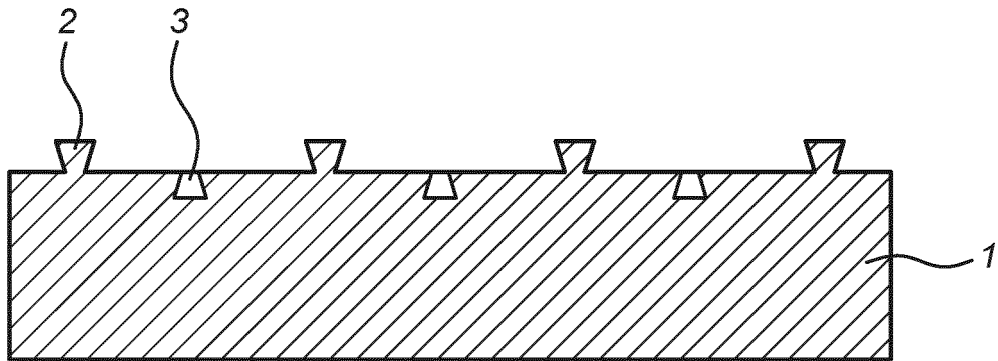


Fig. 3

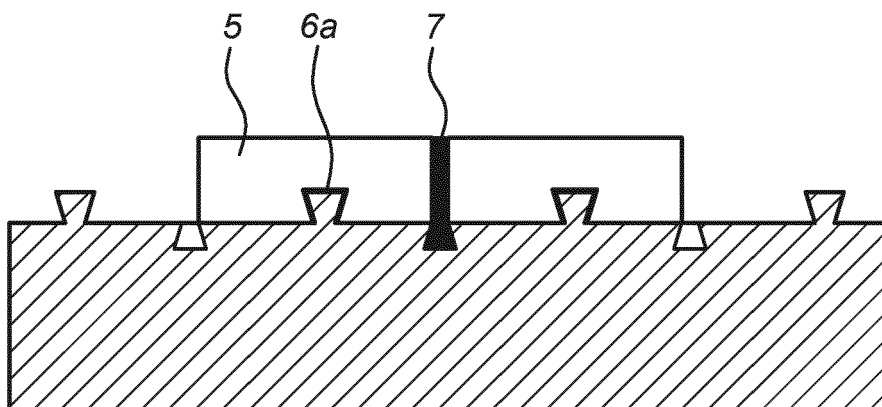


Fig. 4

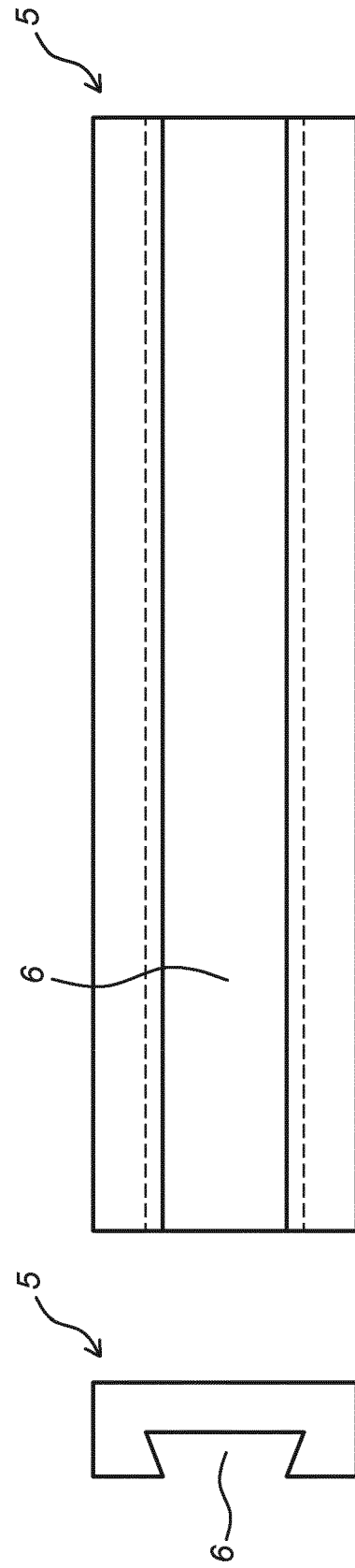
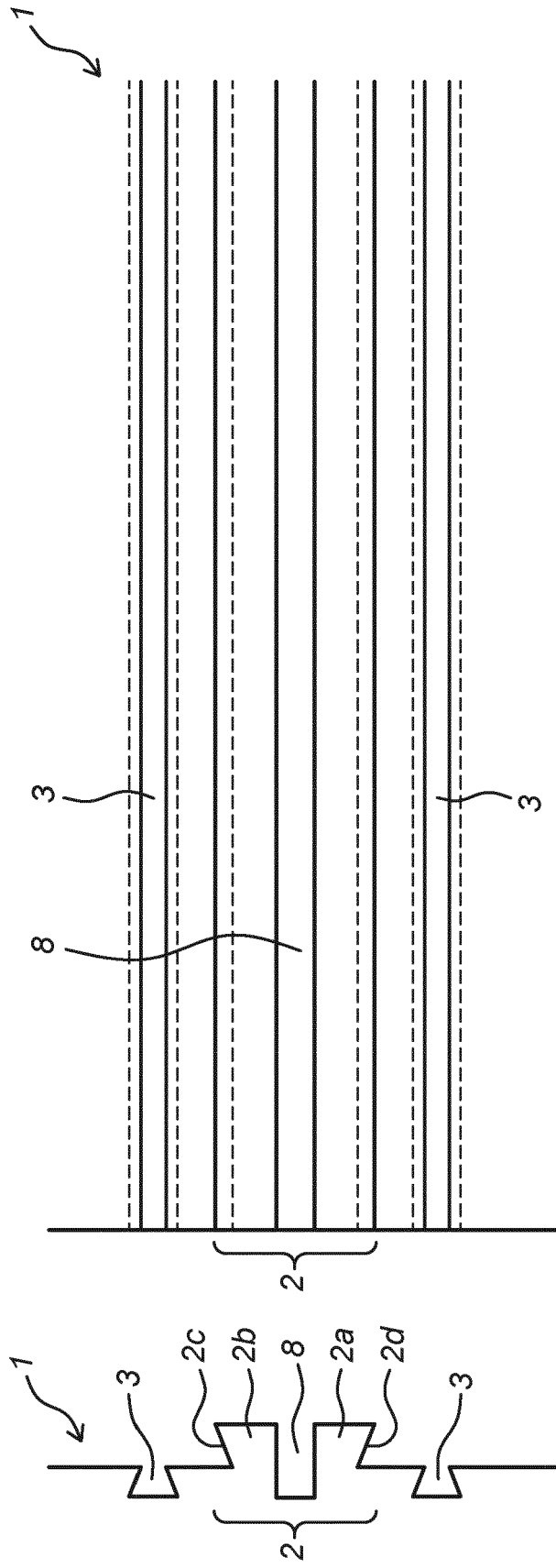


Fig. 5



EUROPEAN SEARCH REPORT

Application Number
EP 20 16 4953

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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)
X	DE 20 2011 004626 U1 (ROSTAK SYSTEM GMBH [DE]) 18 August 2011 (2011-08-18)	1,2,6,10	INV. E04F13/08
Y	* paragraph [0023] - paragraph [0027]; figures 1,2 *	8,11,14, 15	E04F13/14
X	DE 88 09 461 U1 (SCHRÖTER RUPRECHT) 27 October 1988 (1988-10-27)	1-5,7,9, 12,13	
Y	* the whole document *	8,11,14, 15	
X	DE 296 12 810 U1 (ROSTAK ANTON [DE]) 14 November 1996 (1996-11-14)	1,2	
Y	* paragraph [0025] - paragraph [0031]; figure 1 *	8,11,14, 15	
			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 3 August 2020	Examiner Khera, Daljit
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.

EP 20 16 4953

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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03-08-2020

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 202011004626 U1	18-08-2011	NONE	
DE 8809461 U1	27-10-1988	NONE	
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82