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(54) **Fastening arrangement**

(57) The invention relates to a fastening arrangement used in connection with multilayer building units. The units (1a, 1b) comprise a core part (10) of thermal insulation material and surface plates (11a, 12a; 11b, 12b) covering it on both sides, the surface plates having a tongue (7) on one longitudinal edge and a groove (8) on the opposite edge. The short sides (16) between the tongue-and-groove edges are straight, the building units being intended to be joined with one another by means of a tongue-and-groove joint to form a row of successive units and the said rows to be positioned adjacent to one another in such a way that a joint seam (5) is formed between the rows, at the point between the short straight sides of adjacent units (1a, 1b) positioned opposite one another. The units are secured to the framework (13) at least at the short sides by screws or similar fastening means. The arrangement comprises a first fastening strip (20) which is mountable on the short side of the unit, in the edge area of the unit, and can be secured in place in the framework (13) by screws or similar fastening means (14), at the same time securing the first building unit (1a) underneath the strip in place. The second fastening strip (21) which can be joined by one edge to the first fastening strip (20) and extends across the joint seam (5) to the edge area of the short side of the second adjacent building unit (1b) and can be secured in place in the framework (13) by screws or similar fastening means (14), at the same time securing the second building unit (1b) underneath the strip in place. On the surface of each fastening strip (20, 21) to be placed against the outer surface of the building unit is integrated a sealing means (22) which is placed against the said outer surface.

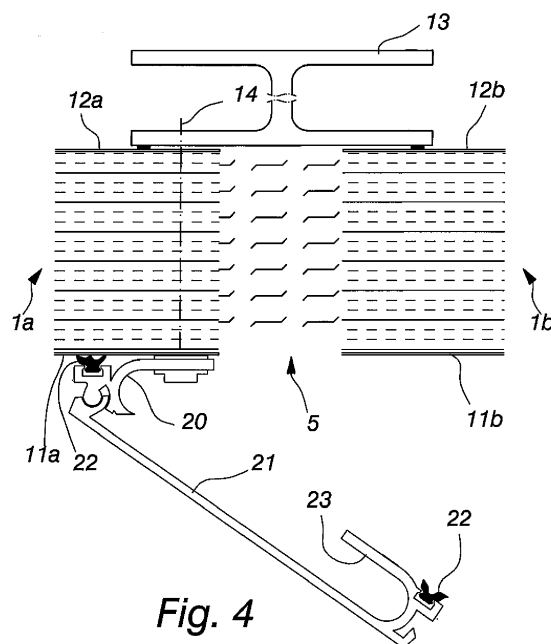


Fig. 4

Description

[0001] The present invention relates to a fastening arrangement used in connection with multilayer building units, the units comprising a core part of thermal insulation material and surface plates covering it on both sides, the surface plates having a tongue on one longitudinal edge and a groove on the opposite edge, in which units the short sides between the tongue-and-groove edges are straight, the building units being intended to be joined with one another by means of a tongue-and-groove joint to form a row of successive units and the said rows to be positioned adjacent to one another in such a way that a joint seam is formed between the rows, at the point between the short straight sides of adjacent units positioned opposite one another, which units are secured to the framework at least at the said short sides by screws or similar fastening means.

[0002] The aim of the present invention is to provide a relatively simple fastening arrangement for fastening multilayer building units (sandwich units) to frameworks and at the same time to provide sealing of the not tongued and grooved joint seam between the short straight sides. To achieve this aim, the fastening arrangement according to the invention is characterised in that the arrangement comprises:

- a first fastening strip which is mountable on the short side of the first unit, in the edge area of the unit, and can be secured in place in the framework by screws or similar fastening means, at the same time securing the first building unit underneath the strip in place,
- a second fastening strip which can be joined by one edge to the first fastening strip and extends across the joint seam to the edge area of the short side of the adjacent second building unit and can be secured in place in the framework by screws or similar fastening means, at the same time securing the second building unit underneath the strip in place,

and that on the surface of each fastening strip to be placed against the outer surface of the building unit is integrated a sealing means which is placed against the said outer surface.

[0003] The solution according to the invention makes possible rapid mounting of the units and sealing of the not tongued and grooved joint seam between the short straight sides of adjacent units in the same work phase. Furthermore, the fixing screws exert a more uniform pressure on the surface plate of the unit through the fastening strip and provide uniform and good compression on the seal.

[0004] The invention is described in greater detail in the following, with reference to the appended drawings, in which:

Figure 1 shows a diagrammatic front view of the positioning of the multilayer building units on

top of one another and in adjacent rows,

Figure 2 shows a diagrammatic cross-section of the tongue-and-groove joint of the multilayer building units according to Figure 1,

Figure 3 shows the joining point between the straight sides of the adjacent multilayer building units of Figure 1 in horizontal section,

Figure 4 shows an example of an embodiment of the arrangement according to the invention as a diagrammatic horizontal section such as shown in Figure 3, with one fastening strip mounted in place,

Figure 5 shows an embodiment according to Figure 4 with both fastening strips mounted in place,

Figure 6 shows a top view of a sealing positioned between two fastening strips mounted on top of one another in vertical direction when positioned inside the fastening strip, and

Figure 7 shows a front view of the sealing according to Figure 6.

[0005] In Figure 1, reference numerals 1a-3c designate multilayer building units comprising a core part of, for example, mineral wool and surface plates covering it on both sides. The core part may also be of other thermal insulation material, such as polyurethane. The units are in adjacent rows, the rows including several units placed on top of one another, in the example of Figure 1 there being three units 1a-3a, 1b-3b and 1c-3c in each row. Between the rows of units is in each case formed an essentially vertical joint 5. Figure 2 shows a vertical section of a joint between two units 1a, 2a which are on top of one another. The core part of the units is designated by reference numerals 10 and 10' and the outer surface plate by reference numerals 11a and 11a'. The units to be positioned on top of one another are joined together by a tongue-and-groove joint which, according to Figure 2, comprises a tongue 7 formed on the upper edge of the surface plate 11a' of the lower unit 2a and a groove 8 formed on the lower edge of the surface plate 11a of the upper unit 1a, the said tongue and groove being designed in the embodiment shown in such a way that when the units are positioned on top of one another, an outwards opening, clearly distinguished V-shaped groove at the joint 9 is formed at the tongue-and-groove joint. The groove at the joint 9 may also be designed in many other ways, for example, so as to have a square, rectangular or curved cross-section or a combination of these. The groove at the joint may also be a less distinctive line-like groove.

[0006] Figure 3 shows the joining point between adjacent building units 1a and 1b in horizontal section. Each

unit is secured by its short side 16, which is not tongued and grooved, between the grooves at the joints 9 between its lower edge and upper edge to the framework, the framework in the embodiment in Figure 3 being an I-beam 13, to which the unit is secured by means of the fastening means designated by reference numeral 14, such as self-drilling screws. The inner, framework-side surface plate of the units 1a 1b is designated by reference numerals 12a and 12b, and the outer surface plate by reference numerals 11a and 11b, respectively. Between the adjacent units 1a and 1b remains a joint seam 5, which is preferably filled with a layer of insulating wool which is softer than the relatively hard mineral wool that forms the core part 10. To prevent the entry of moisture, this joint seam 5 is usually covered with a covering strip which is typically secured to the surface of the units by using separate mechanical fasteners, such as screws or rivets, and sealed, for example, with a sealing compound or sealing strip. The material of the covering strip is typically sheet steel.

[0007] According to the present invention, the fastening takes place in accordance with the embodiment of Figures 4 and 5 by using fastening strips placed in the edge area of the short side, against the outer surface 11a, 11b of the unit, and secured to the framework 13 with fastening means 14, for example self-drilling screws, which simultaneously penetrate the unit 1a, 1b underneath the strip. The fastening arrangement comprises a first fastening strip 20, which is secured in the edge area of the short side of the first unit 1a, and a second fastening strip 21, which can be joined by one edge in a pivoting manner to the first fastening strip 20, and extends across the joint 5 to the edge area of the short side of the adjacent second building unit 1b and can be secured in place by screws or similar fastening means 14, the said means extending through the second building unit 1b underneath to the framework 13. The second fastening strip 21 is designed so as to cover the fixing screws 14 in the first strip 20 and is essentially J-shaped in cross-section on one edge, in such a way that the shorter branch of the J is placed against the outer surface 11b of the unit 1b. In the longer branch of the J extending across the joint 5 are formed openings 26 (Figure 7) through which the fastening means can be led and secured to the framework in such a way that their outer ends are placed against the inner surface 23 of the short branch of the J. The through holes may preferably be covered by separate sealing plugs.

[0008] On the surface of each fastening strip 20, 21 placed against the outer surface 11a, 11b of the building unit 1a, 1b is integrated a sealing means 22 to be placed against the said outer surface. Each strip 20, 21 preferably extends essentially over the entire length of the short side of the unit, but they may also be arranged to be shorter or to extend across two or more units and also to be of different lengths. Between the fastening strips 21, 21' to be mounted on top of one another in vertical direction is preferably arranged a sealing means 25 in

accordance with Figures 6 and 7, to ensure the tightness of the joint 5 against external moisture. This type of sealing means 25 between the fastening strips is preferably designed to correspond in cross-section to the shape of the interior formed by the first and second fastening strips, as appears from the embodiment of Figure 6, and to extend across the joint seam 27 between the strips on top of one another over some distance inside the interior, as shown in Figure 7.

[0009] The fastening arrangement according to the invention forms a watertight joint directly, as regards the joint 5 and, if desired, makes possible the use of separate decoration strips (not shown), which do not need to be watertight. This type of decoration strip can be fastened, for example, by forming a fastening groove 24 in the fastening strip 21, to which one edge of the decoration strip can be secured and by placing the opposite edge of the decoration strip in the gap between the outer edge on the sealing 22 side of the first fastening strip 20 and the surface plate 11a of the unit 1a.

Claims

1. A fastening arrangement used in connection with multilayer building units, the units (1a, 1b) comprising a core part (10) of thermal insulation material and surface plates (11a, 12a; 11b, 12b) covering it on both sides, the surface plates having a tongue (7) on one longitudinal edge and a groove (8) on the opposite edge, in which units the short sides (16) between the tongue-and-groove edges are straight, the building units being intended to be joined with one another by means of a tongue-and-groove joint to form a row of successive units and the said rows to be positioned adjacent to one another in such a way that a joint seam (5) is formed between the rows, at the point between the short straight sides of adjacent units (1a, 1b) positioned opposite one another, which units are secured to the framework (13) at least at the said short sides by screws or similar fastening means, **characterised in that** the arrangement comprises:

- a first fastening strip (20) which is mountable on the short side of the first unit, in the edge area of the unit, and can be secured in place in the framework (13) by screws or similar fastening means (14), at the same time securing the first building unit (1a) underneath the strip in place,
- a second fastening strip (21) which can be joined by one edge to the first fastening strip (20) and extends across the joint seam (5) to the edge area of the short side of the adjacent second building unit (1b) and can be secured in place in the framework (13) by screws or similar fastening means (14), at the same time securing the second building unit (1b) underneath the

strip in place,

and that on the surface of each fastening strip (20, 21) to be placed against the outer surface of the building unit is integrated a sealing means (22) which is placed against the said outer surface.

2. A fastening arrangement as claimed in claim 1, **characterised in that** the first (20) and/or second fastening strip (21) extends essentially over the whole length of the short side.
3. A fastening arrangement as claimed in claim 1 or 2, **characterised in that** a sealing means (25) is provided between the fastening strips (21, 21') mounted on top of one another.

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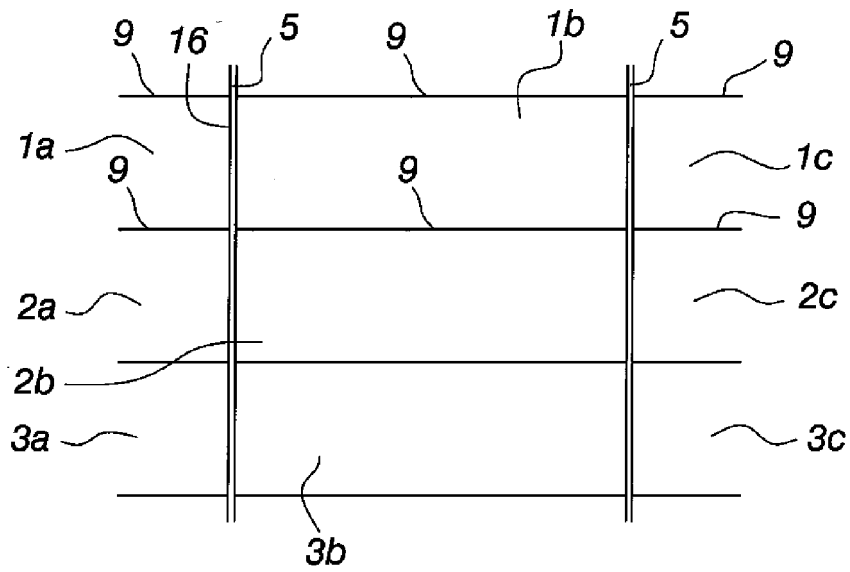


Fig. 1

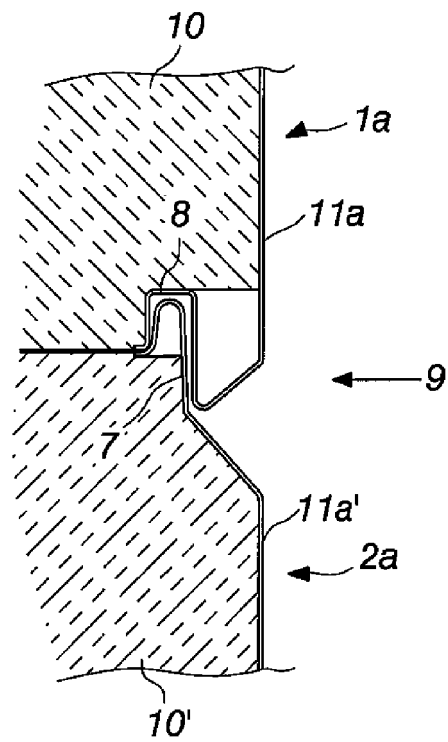


Fig. 2

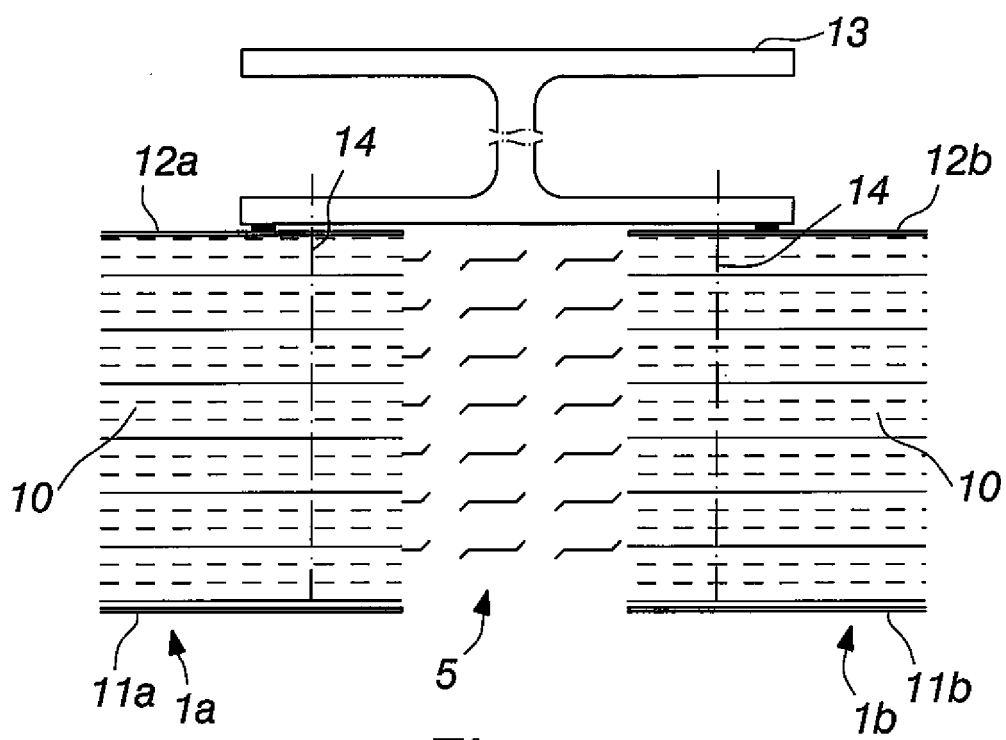
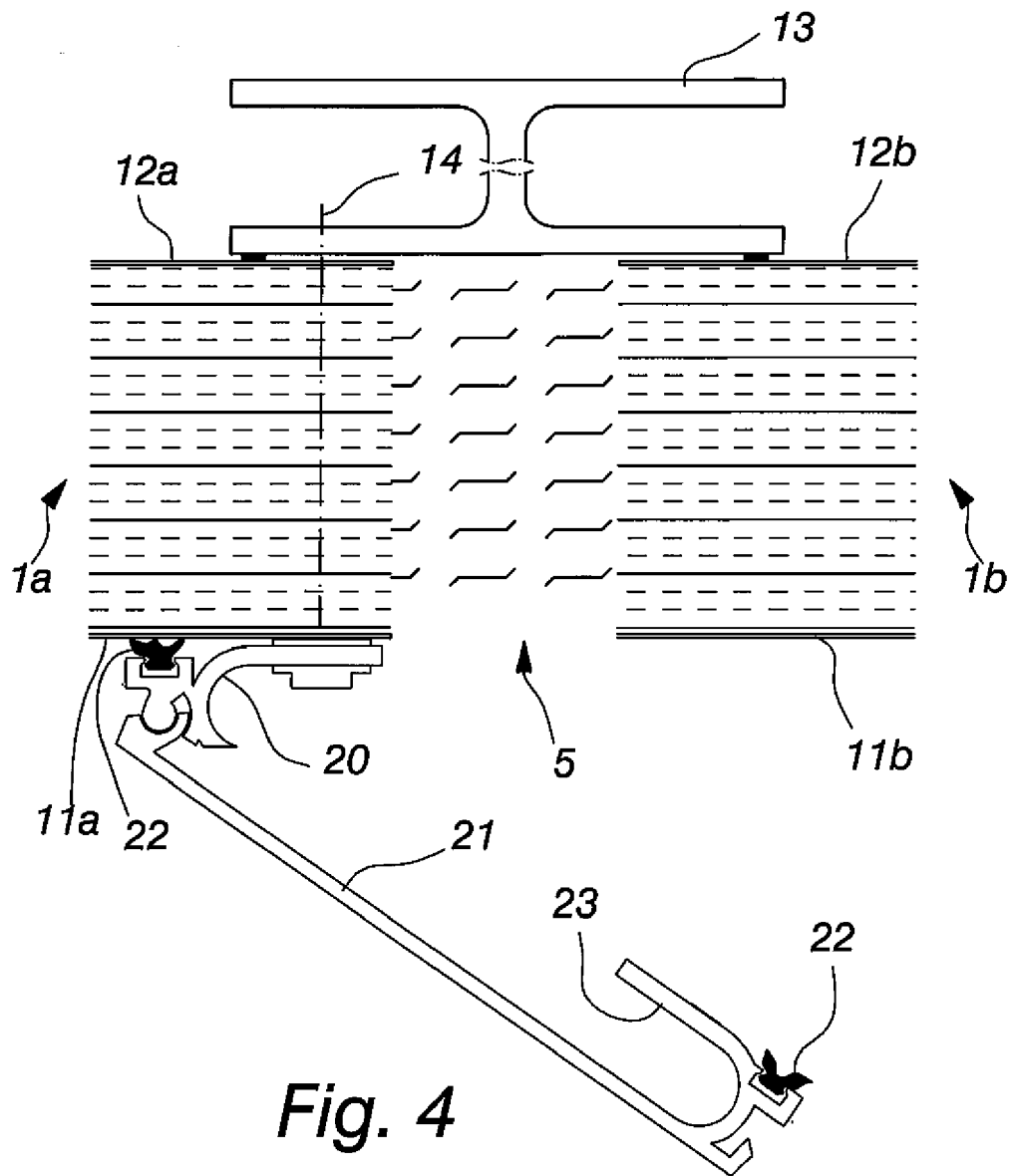


Fig.3



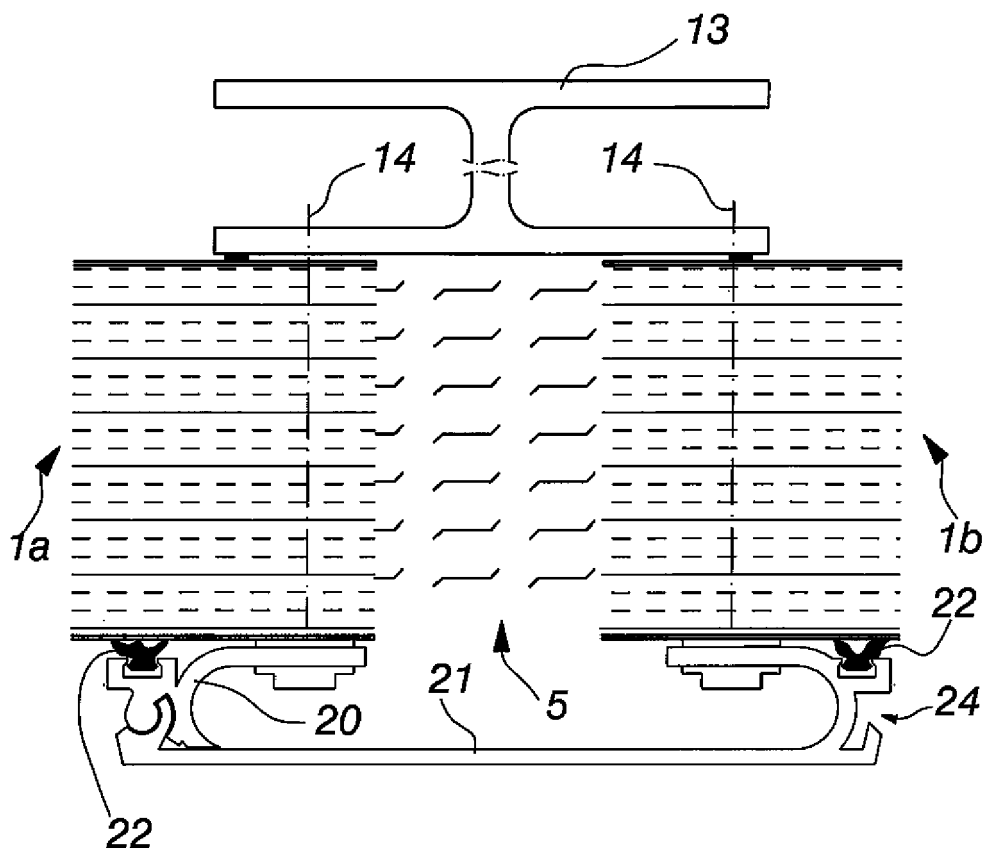


Fig. 5

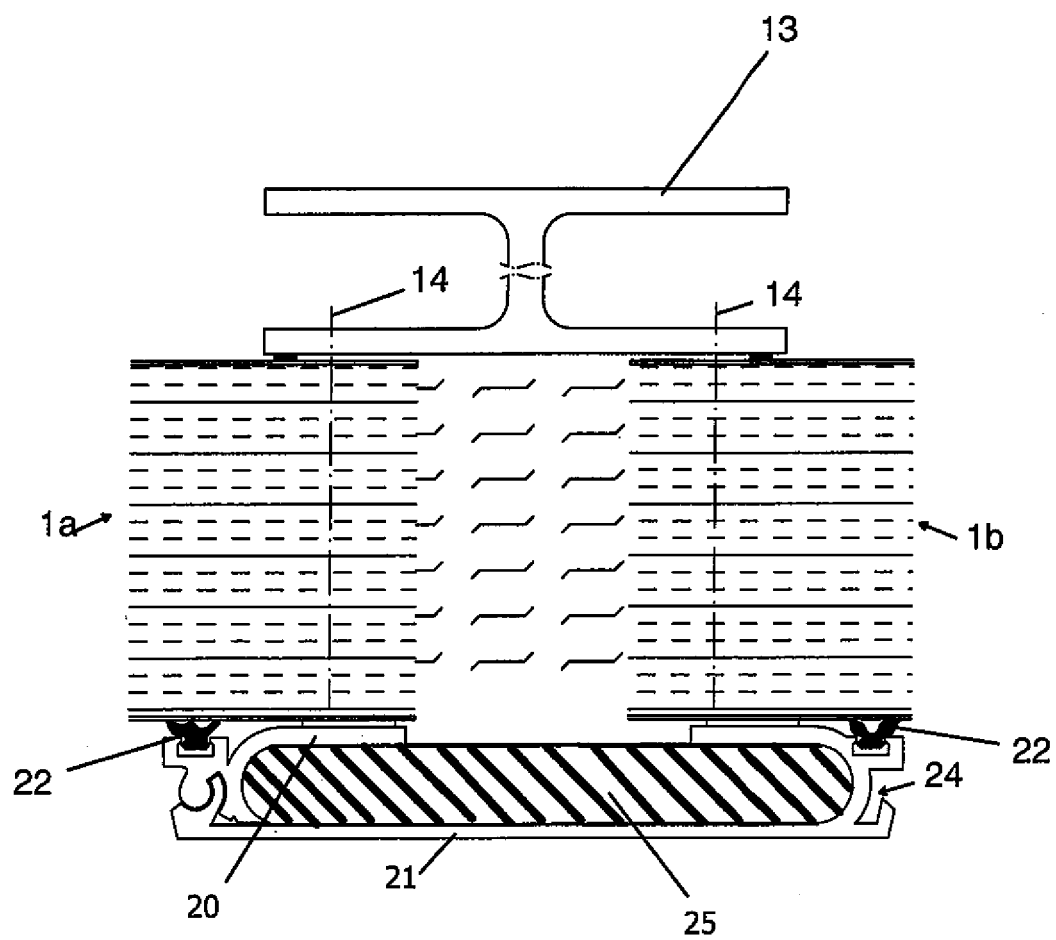


Fig. 6

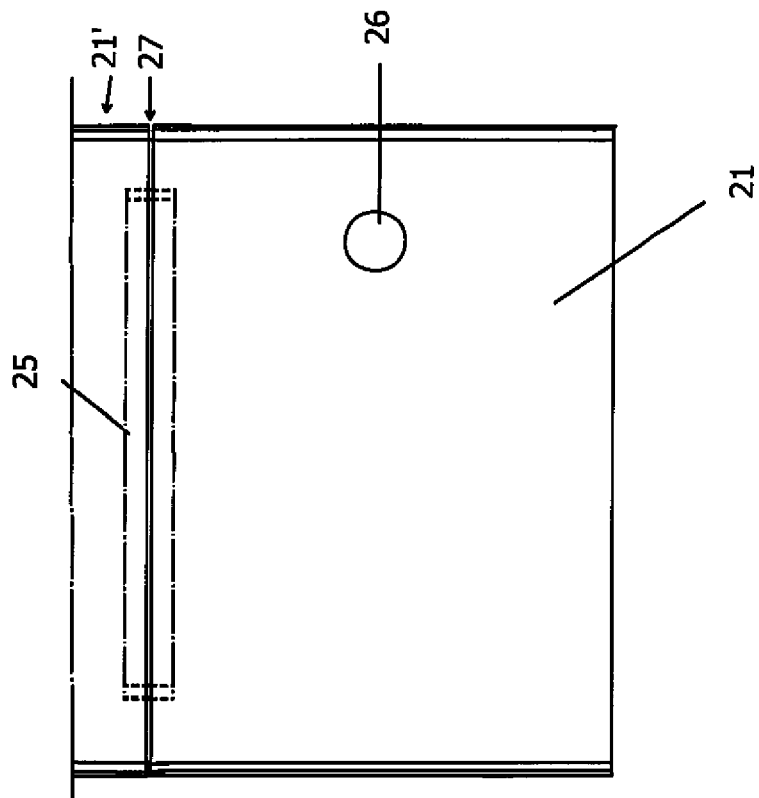


Fig. 7