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(54) **Joint sealing for thermal insulation elements for roofs**

(57) A method is presented for protecting a joint formed by at least two thermal insulation elements (1) with joint protections (21). In the method, the joint protections (21) are formed by cutting the side protection (1) of the first thermal insulation element (21) into two joint protections (21a,21b) which are attached to the second thermal insulation element (1).

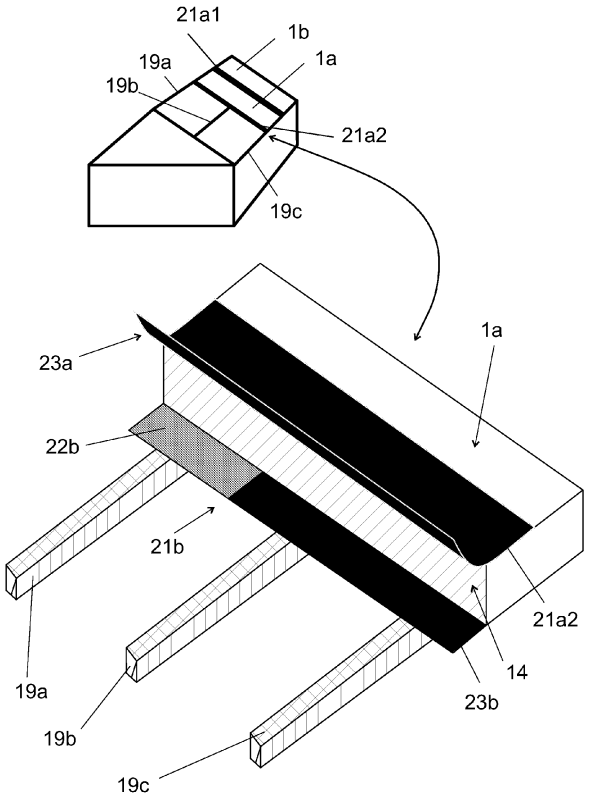

Fig. 6

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Description

Field of the invention

[0001] The invention relates to a thermal insulation element whose one side is protected with a side protection, by which it is possible to make a joint protection that is impermeable to water and permeable to vapour, or impermeable to water and vapour, for a joint between thermal insulation elements at the stage of installation of the thermal insulation elements. Furthermore, the invention relates to a method for fastening at least two thermal insulation elements to each other by using side protected thermal insulation elements.

Background of the invention

[0002] It is known to use porous materials having a light weight and excellent thermal insulation properties, as thermal insulation materials. Such materials include, for example, expanded polystyrene (EPS), mineral wool, polyurethane, and extruded polystyrene (XPS). These materials are used for making thermal insulation elements which are relatively rigid. The thermal insulation elements are used in buildings to insulate heat, among other things, in the base floor, walls, intermediate floors, and the flat roof, or the roof. In many cases, the insulation elements are coated with a surface component or surface components, because of the appearance as well as strength, moisture resistance and other properties required of the surface.

[0003] It is difficult to fasten such rigid insulation elements to each other in a sealed manner. According to prior art, the elements are placed accurately next to each other, and the joint formed at the contact point of the adjacent insulation elements is filled with a joint sealing compound, such as polyurethane foam. A sealing strip can also be used for fastening, as described, for example, in publication GB 2283084A. In addition to the sealing, the edges of the insulation boards may comprise various tongues and grooves, as disclosed, for example, in publications FI U6019, FI U2575, DE 403071 OA1, and IE 20040846A. If the tongue is a large one, it is also possible to use a sealing strip in the tongue to secure the joint, as presented in document US 5,394,672 A. The use of such joint sealing compounds increases the number of work stages at the site and thereby increases the building costs. Moreover, it is difficult to form a sufficiently impermeable joint at the supporting structures under the thermal insulation elements. In some cases, a building insulation strip for the joint to be formed between insulation elements is integrated in the thermal insulation element already at the factory. Such a strip is made of a soft heat-insulating material which is easily damaged at the site. The protection of the building insulation strip is conventionally implemented with protective plastics which are removed from the element at the installation stage. In many cases, waste from such work stages also litters the environment, causing cleaning costs to the builder.

Brief summary of the invention

[0004] It is an aim of this invention to present a side-protected thermal insulation element and a method for sealing joints between thermal insulation elements, whereby the above-mentioned drawbacks of prior art are eliminated or at least reduced. The thermal insulation element according to the invention is characterized in what will be presented in the characterizing part of claim 1. The method according to the invention for fastening thermal insulation elements to each other is, in turn, characterized in what will be presented in the characterizing part of claim 9.

Brief description of the drawings

[0005] In the following, the invention will be described in more detail with reference to the appended drawings, in which

- Fig. 1a shows a method of prior art for protecting a joint between thermal insulation elements with polyurethane foam and covering sheet material,
- Fig. 1 b shows another method of prior art for protecting a joint between thermal insulation elements with polyurethane foam and a sealing strip,
- Fig. 2a shows a thermal insulation element according to a first embodiment of the invention, seen in an end view,
- Fig. 2b shows the thermal insulation element of Fig. 2 in a side view,
- Fig. 2c shows an end view of the thermal insulation element of Fig. 2a, after the side protection has been divided into two joint protections,
- Fig. 2d shows an end view of the thermal insulation element of Fig. 2c, after the protective film of the adhesive surface of the lower joint protection has been removed,
- Fig. 2e shows an end view of the fastening of a second thermal insulation element to the first thermal insulation element of Fig. 2a,
- Fig. 2f shows an end view of the fastening of Fig. 2e, after the protective film of the adhesive surface of the upper joint protection has been removed,
- Fig. 2g shows an end view of a joint formed by a meth-

od according to the invention,

Fig. 3 shows the use of an insulation element according to the first embodiment of the invention as a wall element,

Fig. 4a shows a thermal insulation element according to a second embodiment of the invention,

Fig. 4b shows a joint formed by a method according to the invention and by applying a thermal insulation element according to the second embodiment of the invention,

Fig. 5a shows a thermal insulation element according to a third embodiment of the invention,

Fig. 5b shows a joint formed by the method according to the invention and by applying a thermal insulation element according to the third embodiment of the invention,

Fig. 6 shows a thermal insulation element according to one embodiment of the invention in its use,

Fig. 7a shows a first side protection blank,

Fig. 7b shows a first side protection blank, from which a part of the protective films of the adhesive surface have been removed,

Fig. 7c shows another side protection blank, and

Fig. 7d shows a blank which will be divided into two side protection blanks.

[0006] In Figures 1 to 7, the same numerals or symbols are used for corresponding parts.

Detailed description of the invention

[0007] Figure 1 a shows two thermal insulation elements 1 according to the prior art, joined together according to the prior art. The thermal insulation elements comprise at least a heat insulating core 10 and in many cases surface components 11 and 12. Being a planar piece, the insulation element comprises a first surface and an opposite second surface, of which the first surface is formed by either a surface component 11 or a first surface of the core 10, and the second surface is formed by a surface component 12 or a second surface of the core 10. The function of the core 10 is to insulate heat as well as possible, whereas the function of the surface components 11, 12 may be, among other things, to protect the core from moisture, to protect it from mechanical impacts, to reinforce it, or to improve the appearance of the thermal insulation element. As the material of the core 10, it is known to use, for example, expanded polystyrene (EPS), mineral wool, polyurethane, or extruded polystyrene (XPS). As the surface components 11 and 12, in turn, it is possible to use, for example, plaster board, laminated veneer lumber board, plywood, wood fibre board, or plastic. Furthermore, the surface component may be provided with a laminated protective film of metal or plastic, or such a protective film may be laminated on paperboard, the laminate being connected to the surface component. Advantageously, the surface components are made of waterproof laminated veneer lumber boards, in which case additional coatings are not needed. Furthermore, the surface components 11 and 12 can be made of different materials, and they may be provided with supporting components 13.

[0008] A building insulation strip 14 is provided on one side of the first thermal insulation element, for the joint. The building insulation strip 14 is slightly lower in height than the insulation element, so that applying a joint sealing compound would be possible in such a way that the surface of the joint will not be higher than the surface of the insulation element. The building insulation strip 14 is substantially parallel to the element and equal to the element in length. This side of the thermal insulation element is protected at the factory with, for example, a plastic film which is removed before attaching the second thermal insulation element. After the second thermal insulation element has been attached to the first element, the joints 15a and 15b formed are filled with a joint sealing compound, for example polyurethane foam. At the installation stage, the thermal insulation elements are placed on top of supporting beams 19. Exterior sealing is easier than interior sealing, wherein an exterior joint 15a can be sealed more easily than an interior joint 15b. Sealing is particularly difficult at the supporting beams, as indicated by the reference numeral 15b in Fig. 1a. Figure 1a, like the other figures, shows the use of an insulation element in a flat roof, in which the exterior side is the upper side of the element, and the interior side is the lower side of the element. In a base floor or in walls, the concepts of exterior side and interior side have different meanings. Furthermore, in a flat roof, in a base floor or in an intermediate floor, the lower side of the element is supported to a supporting beam.

[0009] If the surface component 11 is not waterproof, in some cases a covering sheet 16a, 16b is needed in addition to the insulation element, for example in a flat roof. The first thermal insulation element may be provided with a covering sheet 16a at the factory, or it can be attached first at the site. Similarly, the second thermal insulation element may be provided with a covering sheet 16b, or it can be attached first at the site. The covering sheet should be larger than the insulation element, so that the skirt of the covering sheet 16a of the first thermal insulation element can be used to cover the joint 15a between the elements. The covering sheet 16a is normally fixed by gluing onto the joint 15a and also slightly onto the second element. The skirt of the covering sheet

can be provided with an adhesive surface and a protective film which is removed before the gluing. Such skirts of covering sheets hamper the manipulation of elements at the site, particularly when it is windy. Moreover, the protective films litter the site.

[0010] Figure 1b shows another joint according to prior art. Here, the surface component 11 is made of a waterproof material, wherein a separate covering sheet is not needed. After the attachment of the thermal insulation elements, the joint is filled with a joint sealing compound, and the joint is protected with a sealing strip or a covering sheet 18 attached to the surface component by means of adhesive 17. Such sealing involves additional work stages at the site, because the adhesive 17 and the sealing strip or covering sheet 18 must be brought to the location separately, after the sealing of the joint. The additional work stages cause additional costs.

[0011] The new insulation element differs from the prior art for example in that the protection for the side of the insulation element, the side protection, is utilized in the sealing by forming two joint protections from it. The side protection may, for example, protect a building insulation strip, or its only function may be to act as a protection of the joints in a way to be described below. Figure 2a shows a thermal insulation element according to a first embodiment in an end view. Because no separate joint sealing compound is used in the method for sealing the insulation elements, the height of the building insulation strip 14 corresponds, in this embodiment, to the size of the insulation element 1, as shown in Fig. 2a. The insulation element according to a first embodiment is provided with a side protection 21, whose length corresponds substantially to the length of the insulation element 1, and which has a uniform or non-uniform adhesive surface 22, part of the adhesive surface being equipped with a protective film 23. The side protection is attached to the first surface of the insulation element 1 by a part 22c of the adhesive surface, and to the second surface of the insulation element 1 by a part 22d of the adhesive surface. The parts 22c and 22d of the adhesive surface are advantageously uniform and equal in length to the side protection 21. The protective film 23 of the adhesive surface 22 is substantially provided over the whole area of the adhesive surface which is not attached to the insulation element. The size of the side protection 21 in the width direction of the insulation element 1 is determined by the use and by the sizes of the materials used. In the width direction, the side protection may extend even over the whole insulation element, wherein the side protection also protects the surface of the element, or it may be relatively narrow, as shown in Fig. 2a. However, the width of the side protection should be sufficient so that the side protection can be attached sufficiently tightly to the insulation element. By way of example, the side protection 21 may have a width of about 100 mm on each surface of the insulation element.

[0012] Advantageously, the side protection 21 is made of a covering sheet material, which is characterized in that it is not permeable to water but is permeable to vapour. Such covering sheet materials are made, for example, in the form of PE/PP fabric or with a bitumen base, and they are marketed, for example, under the trade names Tyvek Pro, RoofTX, and Katepal. Furthermore, in some uses, it is advantageous to use such an adhesive that the adhesive surface 22 is not permeable to water nor steam. The protective film 23 may be plastic or siliconized paper suitable for the purpose, and it should be at least partly removable from the adhesive surface 22. The protective film 23 is provided between the adhesive surface 22 and the building insulation strip 14. The function of the protective film is to prevent the adhesive surface 22 from adhering to the building insulation strip 14 or, if no building insulation strip 14 is used, the side of the thermal insulation element 1, before the use of the side-protected insulation element. The adhesive surface 22 is not necessarily uniform, wherein there are several (uniform) adhesive surfaces 22. A non-adhesive zone 25 or several non-adhesive zones 25 are left between these adhesive surfaces.

[0013] In the method for protecting joints, the side protection is divided into two joint protections in the longitudinal direction of the element. When the side protection is divided, its parts make up the joint protection for the top and the underside of the element. Depending on the use, it is possible first to remove the protective film from the lower joint protection and to fix the second insulation element in its place adjacent to the first insulation element, and then to remove the protective film from the upper joint protection and to fix the upper joint protection by gluing. These steps can be taken in situations in which the supporting structures are below the insulation element. However, the supporting structures for walls are not below the insulation elements, so that in walls, the elements can be installed in place already before the removal of the protective films of the adhesive surfaces of the joint protections. After this, the protective films are removed from both joint protections, and the joint protections are fixed. In the following, the method for protecting the joints between insulation elements in the flat roof will be described in more detail with reference to drawings. For a person skilled in the art, it will be obvious, on the basis of this and the above description, to apply the solution also in a base floor, an intermediate floor or a wall.

[0014] Figure 2b shows the thermal insulation element of Fig. 2a in a side view. This view shows a side protection 21, a supporting component 13 as far as it is higher than the side protection, and a supporting structure 19. As shown in the figure, the length of the side protection 21 is substantially equal to the length of the thermal insulation element 1 in its longitudinal direction. In the method for protecting joints, the side protection 21 is divided into two joint protections in the longitudinal direction of the thermal insulation element. The division can be made, for example, with a tool suitable for this purpose, for example with a knife, wherein the joint protection is cut in two parts. According to one embodiment, the side pro-

tection 21 is equipped with a tear strip 24, by which the side protection 21 can be divided in two parts. The cutting location can also be marked in the side protection 21, for example with a cutting line 24. Consequently, the reference numeral 24 can indicate, for example, a cutting line printed on the side protection, or a tear strip provided in the side protection. The cutting location can also be left unmarked, and the builder can be instructed to perform the cutting in the middle of the side protection 21.

[0015] Figure 2c shows an end view of the thermal insulation element of Fig. 2a, after the side protection has been divided in two parts in the longitudinal direction of the thermal insulation element. By the division, two joint protections are formed: an upper joint protection 21 and a lower joint protection 21 b. The adhesive surface 22a of the upper joint protection is protected by a protective film 23a, and the adhesive surface 22b of the lower joint protection is protected by a protective film 23b. When the thermal insulation element is used in a flat roof, the protective film 23b protecting the adhesive surface 22b of the lower joint protection 21 b can then be removed. Figure 2d shows joint protections, from which the protective film 23b of the adhesive on the lower joint protection has been removed. Figure 2e shows a second insulation element placed adjacent to the first insulation element. The building insulation strip 14 attached to the first insulation element is left between the elements. When the second element is in place, the lower joint protection 21 b can be attached to the second insulation element by means of the adhesive surface 22b, by pressing the adhesive surface 22b of the lower joint protection 21 b onto the second surface of the second insulation element. After this, the protective film 23a of the adhesive surface 22a of the upper joint protection 21 a can be removed, wherein the situation corresponds to that shown in Fig. 2f. Finally, the upper joint protection 21 a can be fixed by means of the adhesive surface 22a by pressing the adhesive surface 22a of the upper joint protection 21 a onto the first surface of the second insulation element. The joint formed in this way, and its protections, are shown in Fig. 2g.

[0016] In one embodiment, the adhesive surface 22 is not uniform, or several adhesive surfaces are used in the side protection. For example, it is possible that the adhesive surface 22 comprises discontinuities, at which non-adhesive zones 25 are formed in the joint protection. It is also possible that the side protection 21 comprises several adhesive surfaces 22, wherein a non-adhesive zone 25 is also left between them, having the length of the side protection. In one embodiment, at least one non-adhesive zone 25 is placed in at least one joint protection 21 a, 21 b exactly on top of the joint, as illustrated in Fig. 2g. In the thermal insulation element, before dividing the side protection, such a non-adhesive zone 25 is provided on the side surface of the element, close to the first or second surface of the element. In addition to the non-adhesive zones 25, the joint protections 21 a, 21 b also comprise the adhesive surfaces 22a, 22b and their protective films 23a, 23b for attaching the joint protections 21 a, 21 b to the second insulation element. In one embodiment according to the above description, the material of the side protection is permeable to vapour but not water, and the adhesive surface is permeable to neither water nor vapour. In this way, the technical advantage is achieved that the joint protection of the exterior joint of the element is not vapour-proof but is water-proof. In Fig. 2g, the exterior side is the upper side of the element, and the upper joint protection 21 a of the joint shown in the figure is not provided with an adhesive surface 22a exactly at the joint. In this way, moisture that has possibly entered the insulation element can be aired at the joints, at the non-adhesive zones 25 of the joint protection, to the outside of the element and the building. The protection for the joint inside the building is, on purpose, also vapour-proof, so that vapour contained in warm indoor air would not enter the joint and the element. The impermeability to vapour has been achieved by applying a uniform adhesive surface 22b, 22d to attach the lower joint protection to both insulation elements. Furthermore, it is possible to apply a different adhesive at the joint than in the attachment of the joint protection at the element. Furthermore, the adhesive surface 22c, 22a to be attached to the first surface of the insulation element may consist of a different adhesive than the second adhesive surface 22d, 22b to be attached to the second surface, for example if the surface components of the insulation element are made of different materials.

[0017] Figure 3 shows the use of an insulation element according to a first embodiment as a wall element, when the side protection 21 has been divided into two joint protections. In this embodiment of the method for protecting the joints, the second insulation element can be positioned before the removal of the protective film 23b. This is because in a wall the element is used in the vertical direction, wherein neither planar surface of the (planar) element is supported to bearing structures. Thus, the joint protection 21 is not, in any location, left between a bearing structure 19 and the insulation element 1. In the solution of Fig. 3, the upper side is the exterior side of the building, and the lower side is the interior side of the building. Thus, the above-described vapour barrier of the joint is only provided in the interior joint in the building.

[0018] Figure 4a shows a thermal insulation element according to a second embodiment. In this embodiment, the side protection 21 is provided with a uniform adhesive surface 22 on its whole surface, and a uniform protective film 23 on the adhesive surface for that part of the adhesive surface 22 which is not attached to the insulation element. It is possible that the protective film 23 also extends between the side protection 21 and the first or second surface of the insulation element, or, in the embodiment of Fig. 4a, also between the side protection 21 and the building insulation strip 14 on the surface along the first or second surface of the insulation element, wherein the side protection 21 is not even partly attached to the building insulation strip 14. In such an embodiment, only

part of the protective film 23 would be between the side protection 21 and the side surface of the insulation element (not shown in the figure). In a way similar to the preceding embodiment, the side protection may be equipped with a tear strip, a cutting mark or the like, or none of these. Figure 4b shows a joint formed by the method for protecting a joint and with a thermal insulation element according to the embodiment shown in Fig. 4a. Compared with the above-presented solution, the difference here is that both seams have been made vapour-proof and water-proof by means of the adhesive surfaces 22a and 22b. Joints of this kind can be used, for example, in cold storages where moisture contained in warm outdoor air should not pass through the joint protection 21 a or 21 b into the insulation element, and not into the cold storage either.

[0019] Figure 5a shows a thermal insulation element according to a third embodiment, provided with a side protection. In this embodiment, the thermal insulation element is provided with a tongue 51 and a groove 52. Another difference to the first and second embodiments is that no building insulation strip is applied. In countries warmer than Finland, such as many Central European countries, sufficient thermal insulation is achieved with the insulation elements without a building insulation strip, by using tongues 51 and grooves 52. The size and shape of the tongues and grooves used may vary, as is known to a person skilled in the art. In side protected thermal insulation elements provided with a tongue and/or a groove, the side protection is advantageously placed on the side of the groove 52, as shown in Fig. 5a, and it can also be installed on the side of the tongue 51. Because no building insulation strip is used in this embodiment, the adhesive surface 22 and the respective protective film 23 are provided between the side protection 21 and the side surface of the insulation element 1. Figure 5b shows the joint of a thermal insulation element according to a third embodiment to another similar element, as well as the joints formed and the joint protections 21 a, 21 b.

[0020] Figure 6 illustrates the use of a thermal insulation element according to an embodiment in its use in a roof. The upper part of the figure shows a principle layout of thermal insulation elements on top of supporting beams. The thermal insulation elements are indicated with reference numerals 1 a and 1 b.

[0021] The supporting beams are, in this case, a ridge support 19a, an intermediate support 19b, and a wall 19c. Furthermore, a joint protection 21a1, protecting a joint already made, and the location of the joint of the next element, to be protected by a joint protection 21 a2, are shown. A more detailed drawing of this joint is shown in the lower part of the figure. From the lower joint protection 21 b, the protective film 23b of the adhesive surface, under which the adhesive surface 22b is left, has been partly removed. The insulation element has been placed on top of supporting structures 19a, 19b, 19c, wherein the lower joint protection is also on top of the supporting structures. In the upper joint protection 21a2, the protective film 23a for the adhesive surface remains in place, and a building insulation strip 14 attached to the insulation element 1 a is provided between the joint protections.

[0022] The side-protected thermal insulation element according to some embodiments and Figs. 2a, 4a and 5a can be advantageously made from a side protection blank 71 shown in Fig. 7a. The side protection blank 21 can be provided in material rolls, from which the side protection blanks 71 are detached by cutting the rolled material to a fixed length. The side protection blank is a sheet made of the material of the side protection 21, coated with an adhesive surface 22 and a respective protective film 23 in the required zones. Part of the side protection blank can be left uncoated by adhesive. This zone is the above-described zone 25 which is advantageously permeable to vapour. Advantageously, a cut 72 is scored in the protective film 23 of the adhesive surface to divide the protective film 23 of the adhesive surface into parts. Part 23c of the protective film 23 protects that part 22c of the adhesive surface 22, by means of which the side protection blank is attached to the first surface of the thermal insulation element. Part 23d of the protective film 23 protects that part 22d of the adhesive surface 22, by means of which the side protection blank is attached to the second surface of the thermal insulation element. The parts 23c and 23d of the protective film are removed from the side protection blank, exposing the adhesive surfaces 22c and 22d, by means of which the side protection blank is attached to the thermal insulation element. Figure 7b shows a side protection blank, from which said parts 23c and 23d of the protective film have been removed. The side protection blank of Fig. 7b can be glued by the adhesive surfaces 22c and 22d by pressing them onto the surface components 11 and 12 of the thermal insulation element, to form a side protected thermal insulation element of Fig. 2a in an obvious way. In the embodiments of Figs. 4a or 5a, the side protection blank 71 would not be provided with a non-adhesive zone 25. Figure 7c illustrates another possibility of providing the side protection with non-adhesive zones which are permeable to vapour. In this case, the non-adhesive zones 25 and the adhesive surface 22, as well as its protective film 23, alternate at that part of the side protection which will come precisely on top of the joint in the joint protection. In this case, several zones which are permeable to vapour are formed in the side protection, instead of a single non-adhesive zone along the length of the whole insulation element.

[0023] By way of example, it can be noted that the length of a thermal insulation element used in a flat roof is typically several meters, for example 5 to 8 m, and its width is, for example, 1200 or 2400 mm. The thickness of the core 10 of the thermal insulation element may be, for example, 150 to 500 mm, and the thickness of the surface components 11, 12 may be, for example, 12 to 30 mm. Advantageously, the total thickness of the thermal insulation element (including the core 10 and the surface components 11, 12) is 200 to 500 mm. Thus, the

width w of the side protection blank may be, for example, 600 mm, which is a standard width for a covering sheet material. The length l of the side protection blank is substantially equal to the length of a roof element, that is, for example 5 to 8 m. Another standard width for covering sheet materials is 1200 mm, wherein a blank of such a width can be used, as shown in Fig. 7d, to make two side protection blanks 71 a and 71 b having a width of 600 mm, by dividing the blank at the cutting zone 73. Furthermore, the side protection 21 may be installed on two opposite sides of the element, wherein it is possible to use both insulation elements protected from several sides, and unprotected insulation elements of prior art, at the site. It is obvious that these examples do not, in any way, limit the application of the invention also in other uses and the application of side protection blanks of other widths.

Claims

1. A thermal insulation element comprising a planar first surface and an opposite planar second surface, **characterized in that** it further comprises at least one side protection (21) which is placed on at least one side surface of the element, is attached to the first surface and the second surface, and the side protection (21) comprising at least one adhesive surface (22) and a protective film (23) covering the adhesive surface (22), which are at least between the side protection and the side surface.

2. The thermal insulation element according to claim 1, **characterized in that** the side protection (21) comprises at least one non-adhesive zone (25) which is placed on the side surface of the element, close to the first or second surface of the element.

3. The thermal insulation element according to claim 1 or 2, **characterized in that** the side protection (21) is made of a water-proof or vapour-proof material.

4. The thermal insulation element according to any of the claims 1 to 3, **characterized in that** at least one adhesive surface (22) of the side protection (21) contains adhesive that is impermeable to vapour.

5. The thermal insulation element according to any of the claims 1 to 4, **characterized in that** the side protection (21) comprises a tear strip (24) or a cutting line (24) for dividing the side protection.

6. The thermal insulation element according to any of the claims 1 to 5, **characterized in that** it comprises a building insulation strip (14) which is provided between the protective film (23) for the adhesive surface (22) of the side protection (21) and the thermal insulation element.

7. The thermal insulation element according to any of the claims 1 to 6, **characterized in that** it comprises at least one surface component (11, 12), and the surface component comprises at least one of the following materials:

   plaster board, laminated veneer lumber board, plywood, wood fibre board, plastic, paperboard.

8. The side protected thermal insulation element according to any of the claims 1 to 7, **characterized in that** the side protection (21) consists of covering sheet material.

9. A method for joining a first thermal insulation element and a second thermal insulation element, in which method the first thermal insulation element is placed in position, **characterized in that** the first thermal insulation element comprises at least a first side protection (21) which is placed on at least one side surface of the element, is connected to the first surface and the opposite second surface, and the side protection (21) comprising at least one adhesive surface (22) and a protective film (23) for protecting the adhesive surface (22), which are between at least the side protection and the side surface, and in which method:

   - at least one side protection (21) is divided into two joint protections (21 a, 21 b);
   - the second thermal insulation element is placed in position adjacent to the first thermal insulation element;
   - the protective films (23a, 23b) of the adhesive surfaces (22a, 22b) are removed from the joint protections (21 a, 21 b); and
   - the upper joint protection (21 a) and the lower joint protection (21 b) are attached to the second thermal insulation element by means of the adhesive surfaces (22a, 22b).

10. The method according to claim 9, **characterized in that** the second thermal insulation element is placed in position adjacent to the first thermal insulation element after the removal of the protective film (23b) for the adhesive surface (22b) of the lower joint protection (21) of the first thermal insulation element.

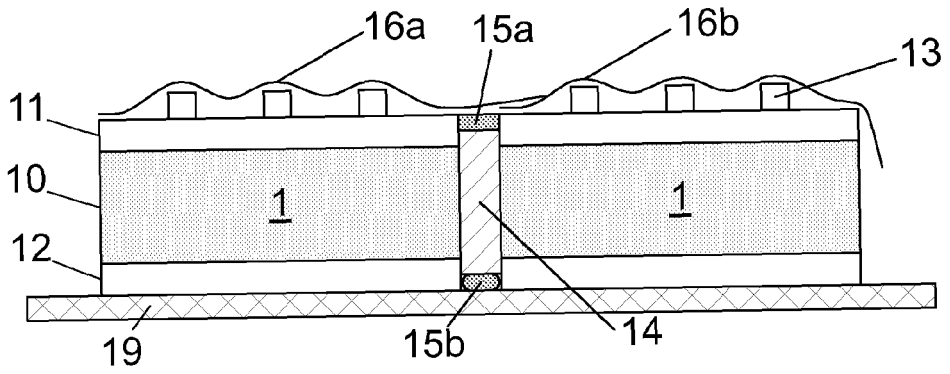


Fig. 1a PRIOR ART

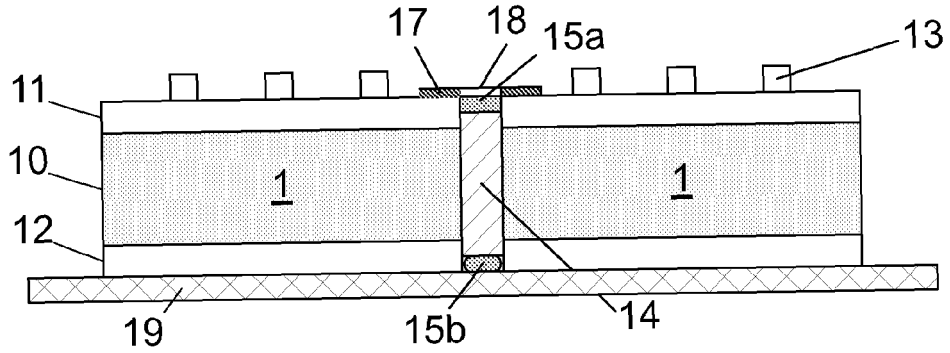


Fig. 1b PRIOR ART

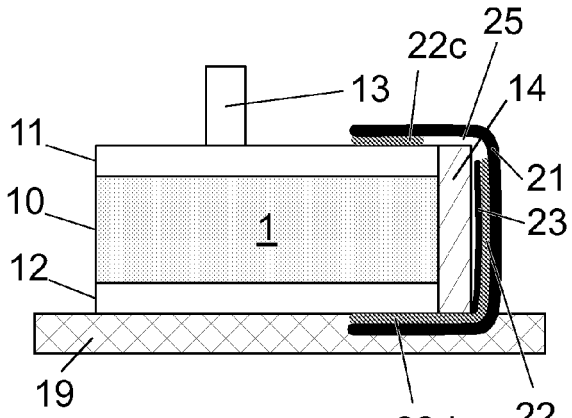


Fig. 2a

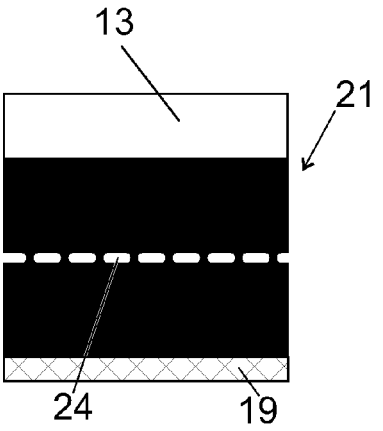


Fig. 2b

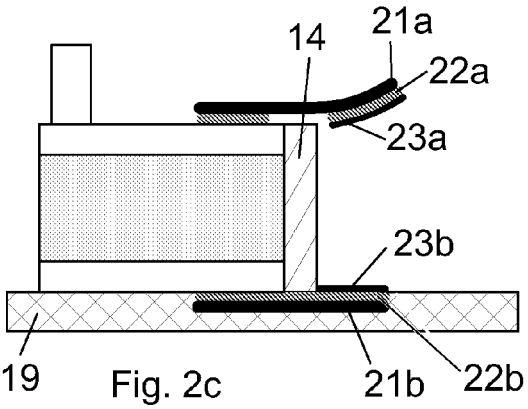


Fig. 2c

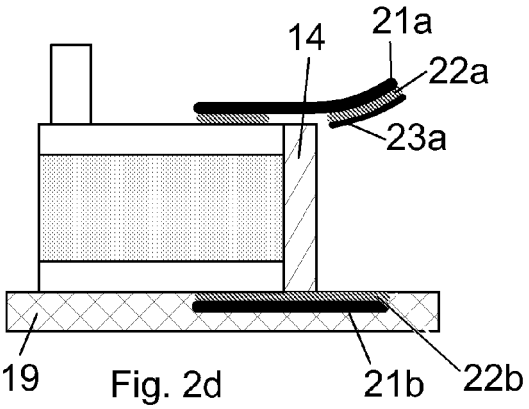
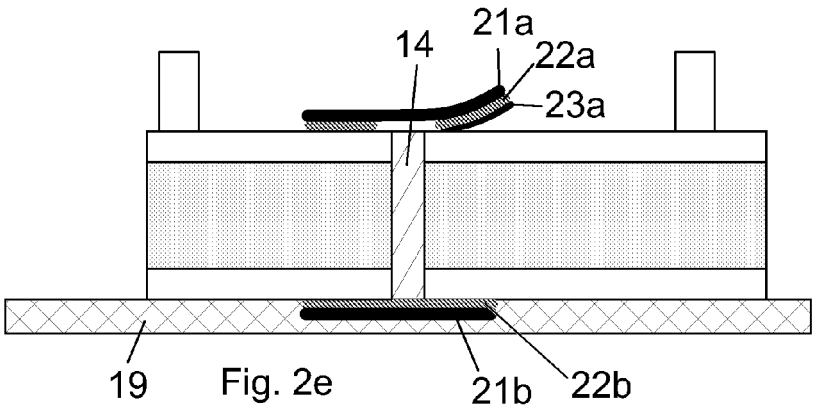


Fig. 2d



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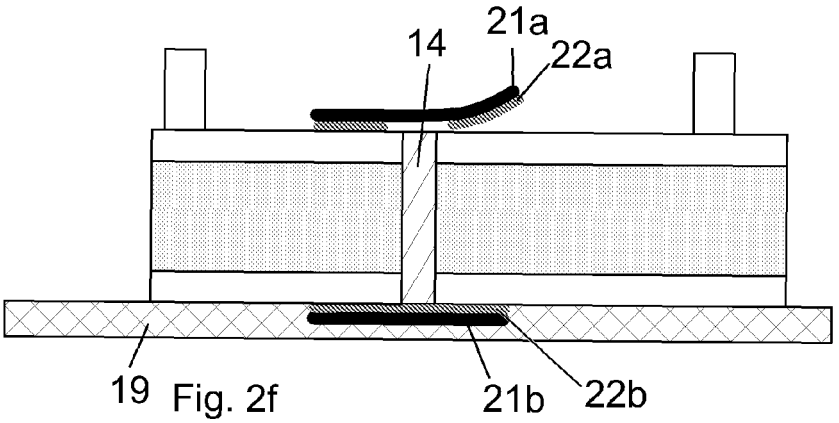

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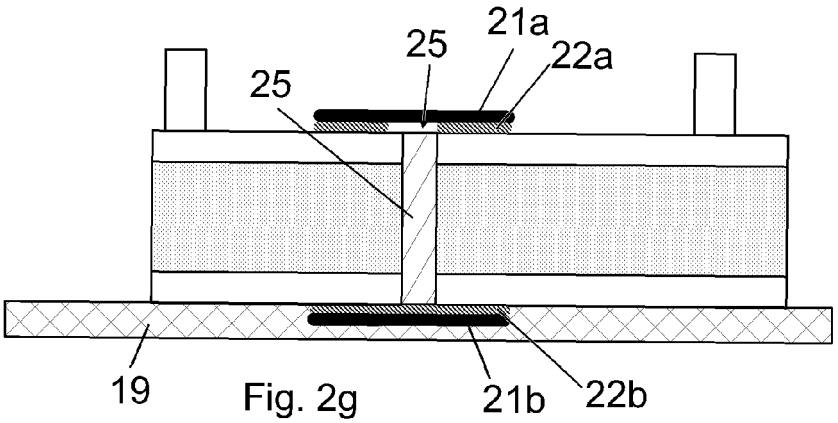


Fig. 2g

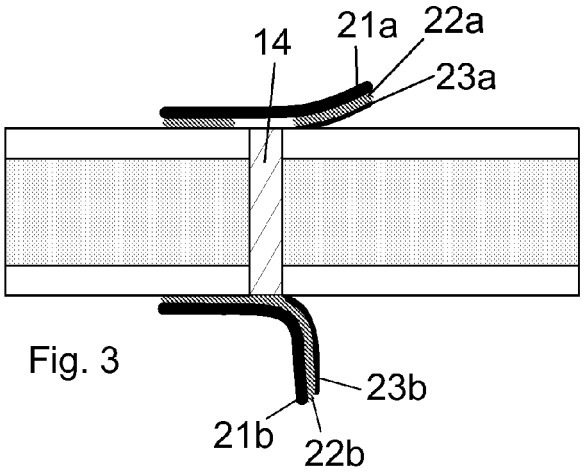


Fig. 3

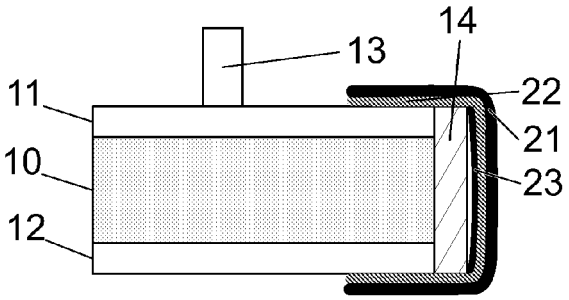


Fig. 4a

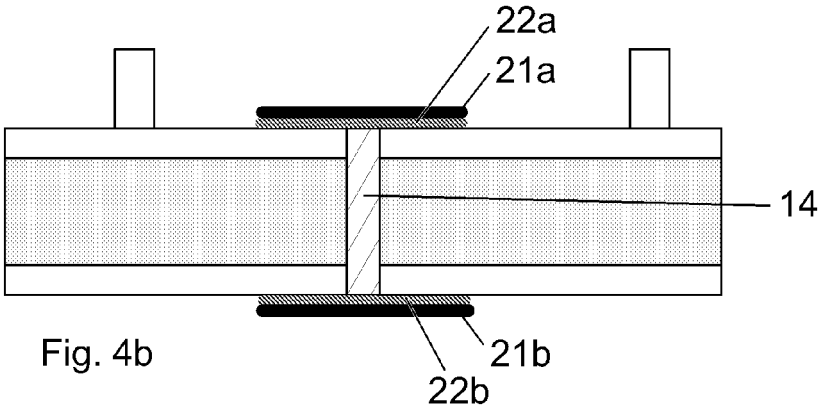


Fig. 4b

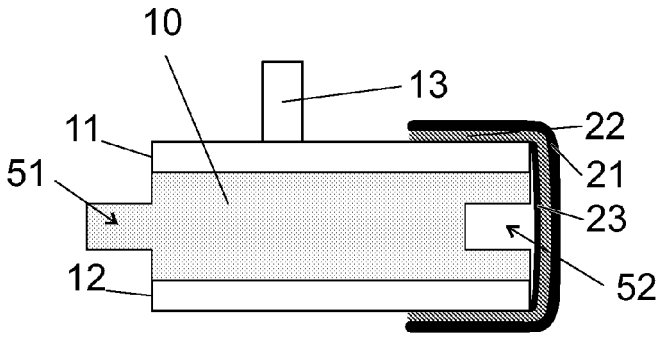


Fig. 5a

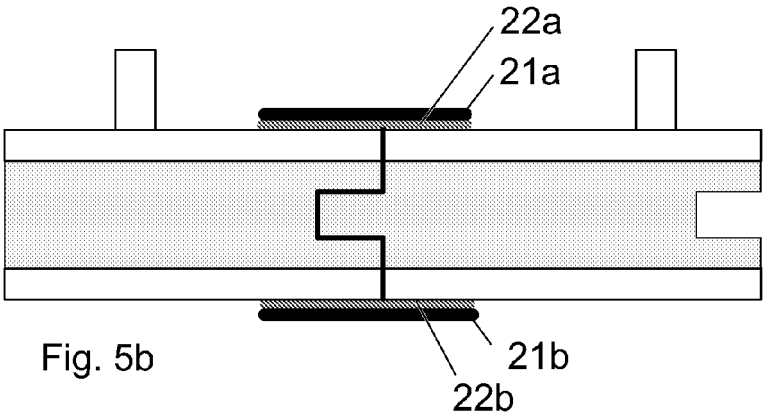
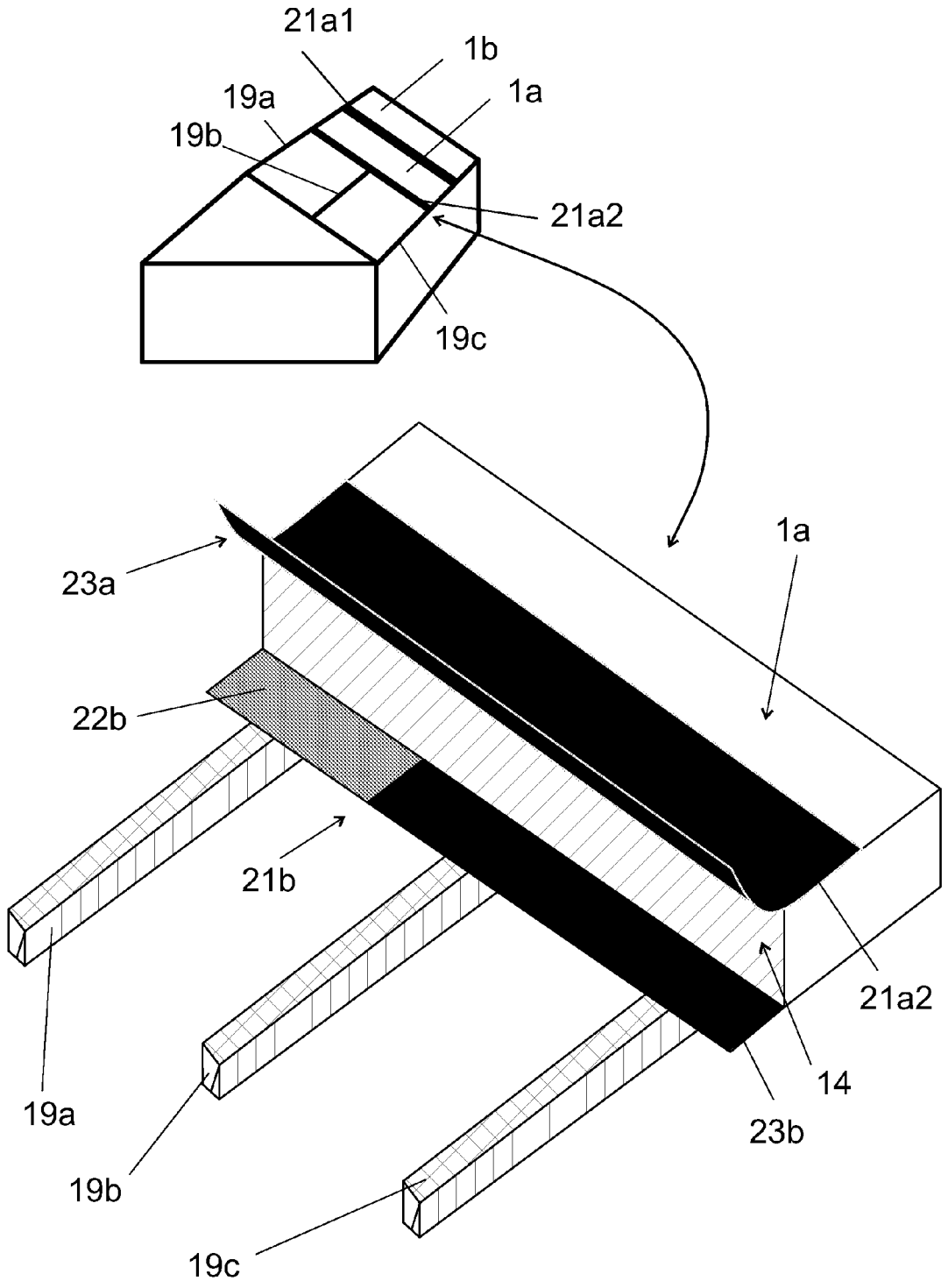


Fig. 5b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19a
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19a
14
23b
19b
19c

Fig. 6

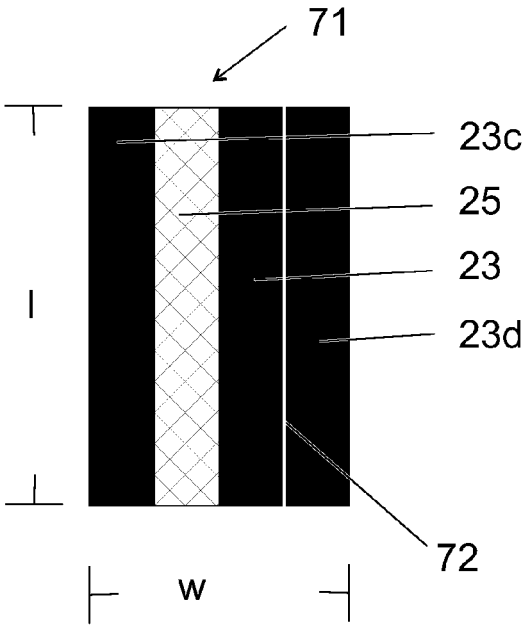

Fig. 7a

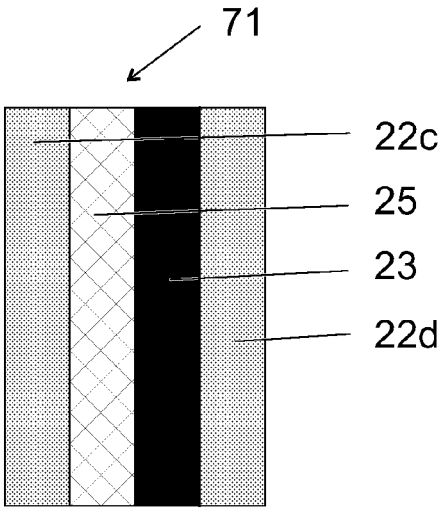

Fig. 7b

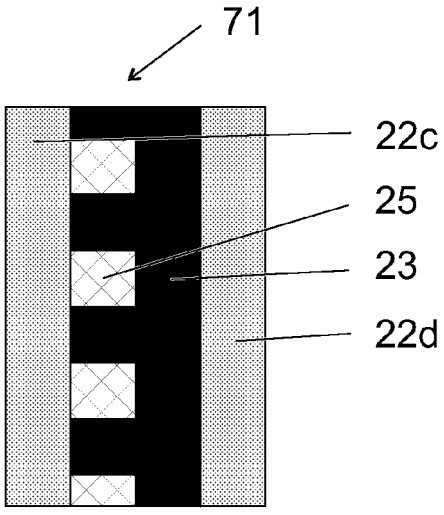

Fig. 7c

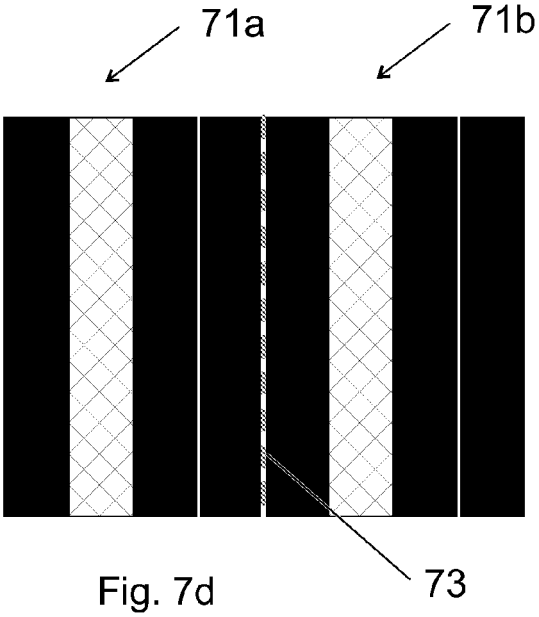

Fig. 7d

REFERENCES CITED IN THE DESCRIPTION

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