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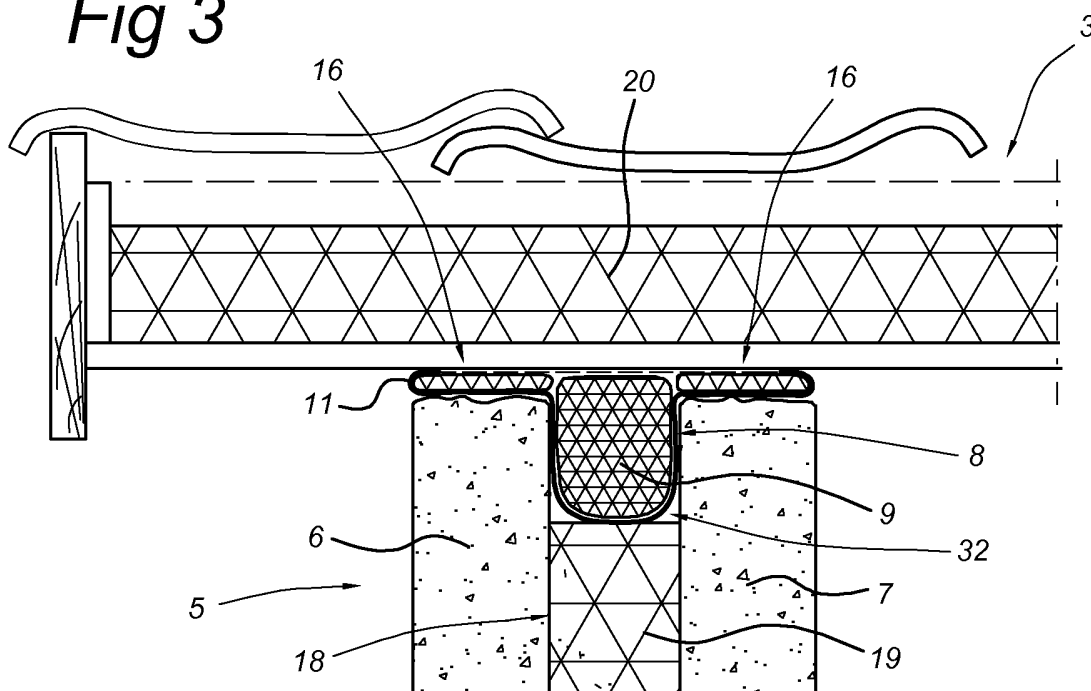
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(54) **Building structure with an elongated insulating body between two panels**

(57) In order to improve the insulation of a building structure, it is proposed to place an elongate insulating body between adjoining façade panels. Such façade panels as such are generally provided with insulation, but when these are fitted together, thermal bridges occur at the junction. It is proposed to use an insulating body in said locations which is suitable for general use as much as possible and which consists of an elongate portion of insulating material which has a compact shape in the

non-loaded state. From said compact shape, one or more wings of insulating material extend which can be placed between supporting beams and the like and the respective panel. Such wings allow great flexibility with regard to installation. The insulating material of the insulating body is enclosed by a sleeve which, on the one hand, partly consists of vapour-impermeable material and, on the other hand, partly consists of vapour-permeable material. The vapour-impermeable material is fitted as much as possible facing the inner side of the building structure.

Fig 3



Description

[0001] The present invention relates to a building structure comprising two panels adjoining one another.

[0002] Such a structure is known, for example, from WO 99/39059, which describes a wall produced by means of a skeleton construction and containing insulating panels. This is a continuous wall. In other publications, such as CH 687932, insulating panels are described which are incorporated in a sleeve which is vapour permeable.

[0003] Increasingly often, building structures are erected in modular form. This means that as large a part as possible of the building structure is prefabricated under optimum circumstances in factories or other locations and the various parts are then assembled at the building site. One example thereof are roof panels which are produced as large units in factories, in which the insulation is already present. At the building site, these are then combined with a façade panel which may optionally be produced in situ and which is also already provided with insulating material. The insulating material in both the roof panels and the façade panels meets very stringent quality demands. Once they have been installed in the correct position with respect to one another on a building site, a gap remains between the various panels which, according to the prior art, is manually filled with a filler foam, such as PUR foam. In this case, it is essential that all the spots where the two parts are to be connected to one another are accessible. This is often a problem with crossing beams and the like and, moreover, the quality of the insulation at the boundary between the two panels to a large degree depends on the skill (and motivation) of the respective workmen at the building site. It is therefore a regular occurrence that the insulation at the location of the connection between the panels, which have already been insulated as such, is insufficient as a result of excessive heat transfer due to thermal conduction and even the formation of passages, resulting in draught. In addition, the connection between the panels is generally the spot where movement occurs due to the stresses between the panels which occur over the course of time. Hardening foam is a material which is not able to withstand significant deformation and will therefore crack quickly, resulting in undesired ventilation of the building structure in spite of the foam having been applied professionally. When such passages occur, significant amounts of air will pass through, leading to condensation in those locations and all the adverse effects for the structure this entails. In addition, this may lead to sound leaks.

[0004] Due to the ever increasing demands on the insulation of building structures (energy efficiency coefficient), there is a significant need to improve the sealing between adjoining panels in a building structure. The term panels is understood to mean façades, roofs and the like.

[0005] With the present invention, this object is achieved by a building structure having the features of

Claim 1.

[0006] According to the present invention, a prefabricated elongate insulating body is provided which consists of an insulating material composed of fibrous particles and which is resilient. A sleeve surrounds the insulating material, so that the insulating material cannot disintegrate unlike the prior art. This sleeve makes the insulating material windproof while the flexible insulating material itself prevents heat transfer due to conduction as much as possible. Slight subsequent mutual displacement of the panels can be absorbed by the flexible insulating material. The insulating material also provides sound insulation. A distinction needs to be drawn between the above-described elongate insulating body and the insulation which (generally) is already present in the respective panels. The latter preferably extends across the entire surface area thereof. In the respective panels, both hard (foam) insulation and resilient insulation may be present. The present invention relates to the connection between two panels which are installed at an angle to one another, wherein the panels already having been insulated as such. According to the present invention, a solution is provided for providing sufficient insulation at the critical connection region. Since the respective panels at the connection region are subject to slight movements with respect to one another caused by differences in temperature and moisture, that is to say move with respect to one another, the material according to the invention makes it possible to absorb such slight movements and thus ensure a sufficient degree of insulation under all circumstances.

[0007] In order to prevent certain insulating materials from becoming wetted and thus causing a reduction in the insulation value, the sleeve comprises a water-impermeable and vapour-permeable part. In practice, this part will be turned towards the outer side of the building structure. According to a preferred embodiment of the invention, the remaining part of the sleeve is designed to be impermeable to vapour. This part is situated on the inner side of the building structure in the position of use and mainly ensures that the insulating material is windproof.

[0008] The vapour-permeable part may be embodied in any conceivable way. A plastic film provided with microperforations can be used, as a result of which no water can pass to the inside, but vapour can pass to the outside. In addition or alternatively, a textile material can be used as vapour-permeable part. The use of a textile material is preferred in those cases where the microperforations are at risk from becoming closed due to the growth of organisms. According to a particular embodiment of the invention, there is a clearly visible difference between the vapour-permeable and vapour-impermeable part, so that it is clear to the person installing it, which part of the insulating material has to be turned to the outer side of the building structure and which part has to be turned to the inner side.

[0009] The insulating material used preferably has a

compact shape in its non-loaded state. The expression compact shape is understood to mean a shape in which the insulating material has a relatively large volume but a relatively small periphery, such as for example a circle, square and the like.

[0010] According to a further advantageous embodiment, a wing extends from the insulating material. This wing has a relatively small cross section/dimension and consists either of the same resilient insulating material or of an even more resilient, preferably even more insulating material than the insulating material of the core. Such an insulating material may comprise polyester wool, which is a very inexpensive and extremely elastic insulating material. Such a wing functions to be introduced into small gaps and the like. Placing a wing on a supporting beam onto which a roof panel is then installed, is mentioned by way of example. Due to the large degree of deformability of the material in the wing, such a roof panel will not or only slightly come to lie higher on the respective beam, a fixing point of the insulating body with respect to the structure being provided by the presence of the wing and resulting in windtightness. Depending on the structure, one or more wings may be present. In the case of two wings, these are preferably on opposite sides of the compact shape of the insulating material.

[0011] Preferably, the above-described insulating body is supplied in rolls and the sleeve and/or the insulating material are provided with weakened parts so that it is readily possible to produce a shortened section of insulating material on the building site. Preferably, the insulating body is embodied to be suitable for general use. However, for certain applications, the insulating body may be embodied in a particular way.

[0012] Connecting a vertical façade and a (pitched) roof panel is mentioned as an example of adjoining panels. This vertical façade may be provided, for example, with a cavity, with insulation being present in the cavity. This insulation ends just before the end of the boundary walls of the cavity and a significant part of the insulating material of the insulating body can be placed in the space which is present there. The part which protrudes beyond seals against the roof panel in a resilient manner. Any wings which may be present can be used to secure the insulating body, for example by fitting them between a beam which supports the roof panel and the roof panel. In addition, the above-described insulating body can also be used for attaching two roof panels, in particular two pitched roof panels. The insulating body according to the invention can be placed in the ridge construction thereof, in which case the wings then extend in the direction of both roof panels.

[0013] The angle between the adjoining panels is preferably between 35 and 155°.

[0014] In this application, the term panel is understood to mean a construction unit, such as a roof panel, wall panel and the like. This is different from the subparts which together form a panel, such as a wall and the like, as illustrated for example in WO 99/39059.

[0015] In addition, the present invention relates to a building structure comprising adjoining façade portions of considerable dimensions. In this case, the respective panels are already provided with insulation, but the structure thereof is such that a recess is present for receiving the above-described elongate insulating body.

[0016] The invention will be described in more detail with reference to the exemplary embodiments illustrated in the drawing, in which:

Fig. 1 diagrammatically shows a building structure; Fig. 2 diagrammatically shows a perspective view of the insulating body according to the invention; Fig. 3 shows the connection between a roof panel and a façade end; Fig. 4 shows the connection between two pitched façade panels; and Fig. 5 shows the connection between a side wall and a pitched roof panel.

[0017] Fig. 1 shows a building structure which is denoted overall by reference numeral 1. The house or the like which is shown here, is provided with side walls 4, a façade end 3 and a roof 2 placed on top thereof. The roof 2 consists of two adjoining pitched roof panels 3.

[0018] One embodiment of the insulating body according to the invention is illustrated in Fig. 2 in perspective. It is denoted overall by reference numeral 8 and consists of a central compact insulating body 9. This insulating body 9 is composed of a resilient fibre material, such as rock wool material, glass wool material, polyester wool and the like. In the condition illustrated in Fig. 2, the compact part of insulating material 9 is not compressed. However, due to the significant proportion of cavities between the fibres, it is possible to compress this compact part considerably. Due to the resilience, a substantial return to the original state can be achieved under all circumstances.

[0019] Two wings adjoin the compact insulating material 9, both of which are denoted by reference numeral 16. They also comprise insulating material which is denoted by reference numeral 10. This insulating material is more deformable than the insulating material 9. A sleeve 11 is provided around the insulating material which is arranged in this manner. This sleeve 11 partly consists of vapour-impermeable (and water-proof) material 12 and partly of water-proof vapour-permeable material 13. The vapour-permeable material 13 consists of a textile material which is provided with openings 14. The sleeve is preferably made from plastic film material which is flexible and can also stretch considerably under stress. On the wings, for example, a particularly adhesive bituminous material 31 can be provided which may, if desired, also be provided with a covering strip which is to be removed before use. As a result thereof, bonding to the structure parts at a later stage can be ensured.

[0020] Figs. 3-5 show some exemplary embodiments of the present invention, in which, except for Fig. 4, the

insulating body 11 from Fig. 2 is always used. Fig. 4 shows that in certain circumstances, it has been found that it is more advantageous to use an insulating body which is specifically adapted to the application.

[0021] Fig. 3 shows the connection between the façade end 5 shown in Fig. 1 and the pitched roof panel 3. As can be seen in Fig. 3, the façade end 5 is a cavity wall comprising panels 6 and 7 and insulation 19 arranged in the cavity 18 delimited by the latter. This insulation ends just before the free ends of the panels 6 and 7, thus delimiting a recess 32 for the elongate insulating body.

[0022] As can be seen in Fig. 3, the roof element 3 is placed on the cavity wall panels 6 and 7, with the insulating body 11 according to the invention and comprising wings 16 having been fitted first on top of the panels 6 and 7. The portion of insulating material 9 is partly in the cavity 18 directly adjoining insulation 19 and partly adjoining the roof panel 3 provided with insulation 20. The wings 16 provide a windtight sealing between the roof panel 3 and the panels 6 and 7. Due to the high deformability of the insulating material 9, uneven structures in the gap between the panels 6 and 7 and the roof panel 3 can be absorbed. Due to the high deformability, the thickness of the wings 16 hardly matters.

[0023] The structure illustrated in Fig. 3 ensures a windproof connection between the roof panel 3 and the façade end 5. Even when the roof panel 3 is displaced with respect to the façade 5, the resilience of the insulating material used and the sleeve 11 provided around the latter will still ensure satisfactory sealing. A corresponding structure can of course also be used for the dividing walls of several terraced or semi-detached houses. In that case, it may be necessary to provide further insulation in the optional break in the roof panels, as is illustrated by dashed lines 30 in Fig. 1. Such a break is provided in order to avoid structure-borne sound.

[0024] A further example of the use of the elongate insulating body according to the invention is illustrated in Fig. 4, which shows the connection between two roof panels 3. These are supported near the top by a ridge purlin 20. According to the present invention, the elongate insulating body 11 according to the invention is placed in the gap which exists between the roof panels, in which case the wings 16 are arranged between the respective roof panels and the ridge purlin 20. These wings 16 are positioned differently compared to the earlier embodiment. Fig. 5 shows the connection between a roof element 3 and façade 4. Reference numeral 28 denotes the outer panel of the façade and reference numeral 27 the inner panel. Just like in the previous example, which was discussed with reference to Fig. 3, insulation is present between the panels and the insulating material 9 from the elongate insulating body 11 according to the invention adjoins it. The wings 16 may extend, on the one hand, between the connection of the outer panel 28 and the roof panel 3 and, on the other hand, between the connection of the roof panel 3 and the end beam 25.

[0025] As is clear from the above, there are numerous applications for the elongate insulating body according to the invention. It can be fitted on the building site after the first respective panel, such as the façade, has been put in place. It can be shortened to the desired length in situ, following which the next panel, such as a roof panel 3, can be installed. Due to the fact that the insulating material extends across the entire length of the building structure, it is impossible to miss out any sections.

[0026] Upon reading the above description, those skilled in the art will immediately be able to think of variants which are obvious in light of the above and which fall within the scope of the attached claims.

Claims

1. Building structure (1) comprising two adjoining panels which are at an angle with respect to one another, wherein each panel is provided with an insulation which extends across the panel surface thereof and with an elongate insulating body (8) which is provided in the connection between said panels and comprises an elongate portion of insulating material (9), said insulating material comprising a resilient compressible fibre structure, and a flexible sleeve (11) which encloses the insulating material, said sleeve comprising a water-impermeable/vapour-permeable part.
2. Building structure according to Claim 1, wherein said insulations of said panels are installed at an angle to one another and said insulating body is arranged in between.
3. Building structure according to Claim 1, wherein said angle between said panels is between 35 and 155°.
4. Building structure according to Claim 1, wherein said panels comprise a roof panel (3) and an adjoining façade panel (4,5).
5. Building structure according to one of the preceding claims, wherein said panels comprise two adjoining roof panels (3).
6. Building structure according to one of the preceding claims, wherein a panel (4, 5) comprises a cavity structure and the insulating material of the insulating body is partly placed in said cavity.
7. Building structure according to one of the preceding claims, wherein said insulating material has a compact shape in the non-loaded state, wherein a wing (16) comprising insulating material extends from said compact shape.
8. Building structure according to Claims 6 and 7,

wherein said wing (16) is arranged between the cavity wall panel and said other panel.

9. Building structure according to Claim 7, wherein said panel comprises a pitched roof panel (3) which is supported by a beam (21,25), wherein said wing extends between said beam and said panel. 5
10. Building structure according to one of the preceding claims, wherein said vapour-permeable part is turned towards the outer side (exterior) of said building structure. 10
11. Building structure according to one of the preceding claims, wherein one of said panels is provided with a recess (32) near the connecting side for receiving said elongate body. 15
12. Building structure according to one of Claims 9-11, wherein a panel (4, 5) comprises a cavity wall structure and the insulating material of the insulating body is partly placed in said cavity. 20

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Fig 1

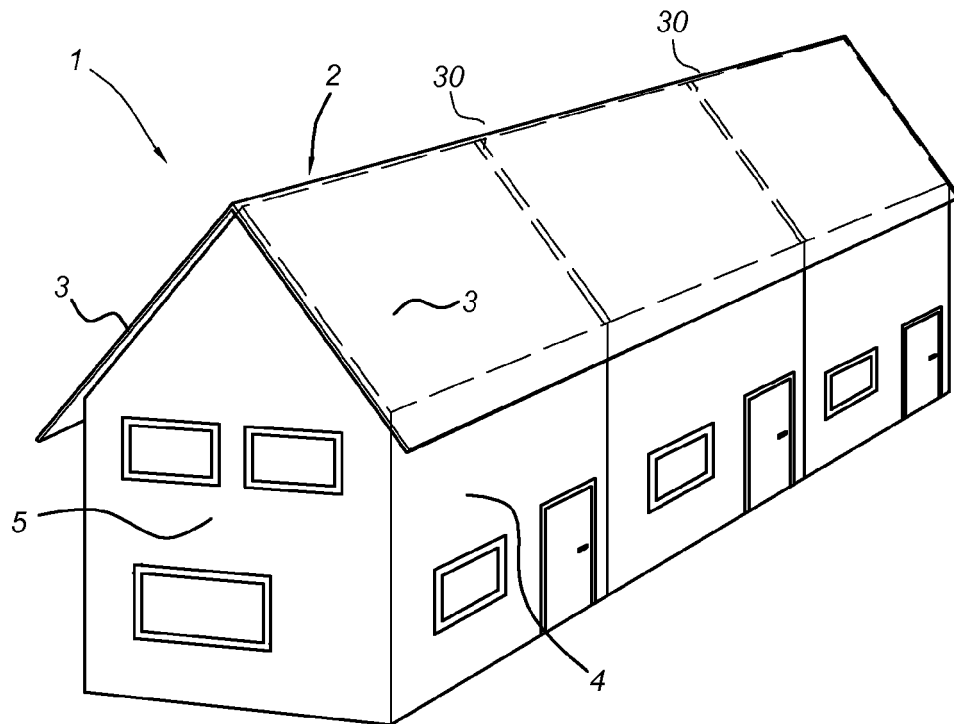


Fig 2

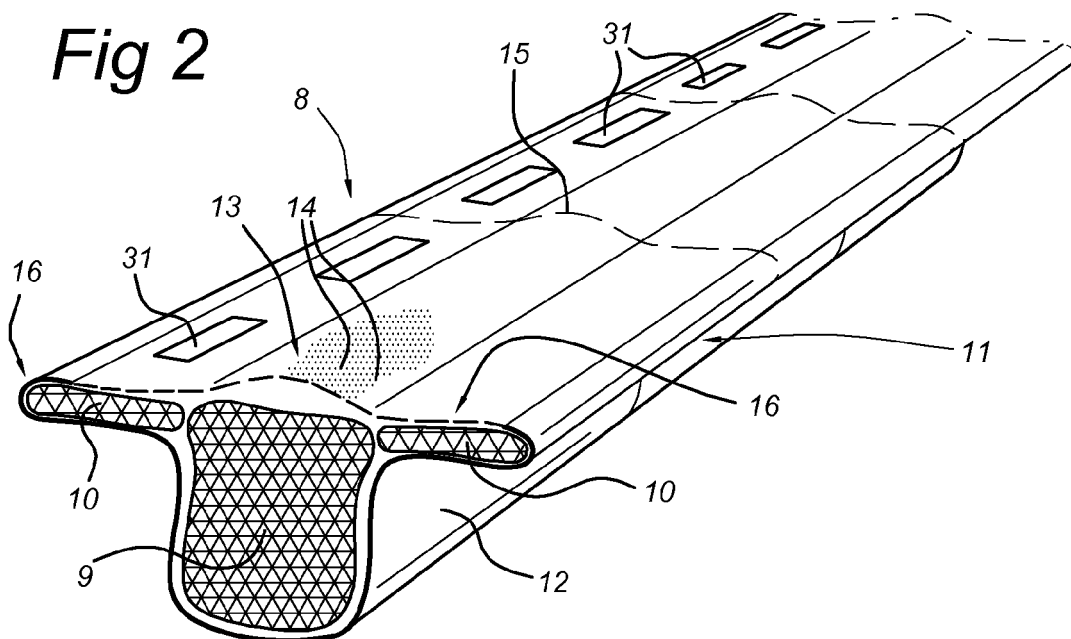


Fig 3

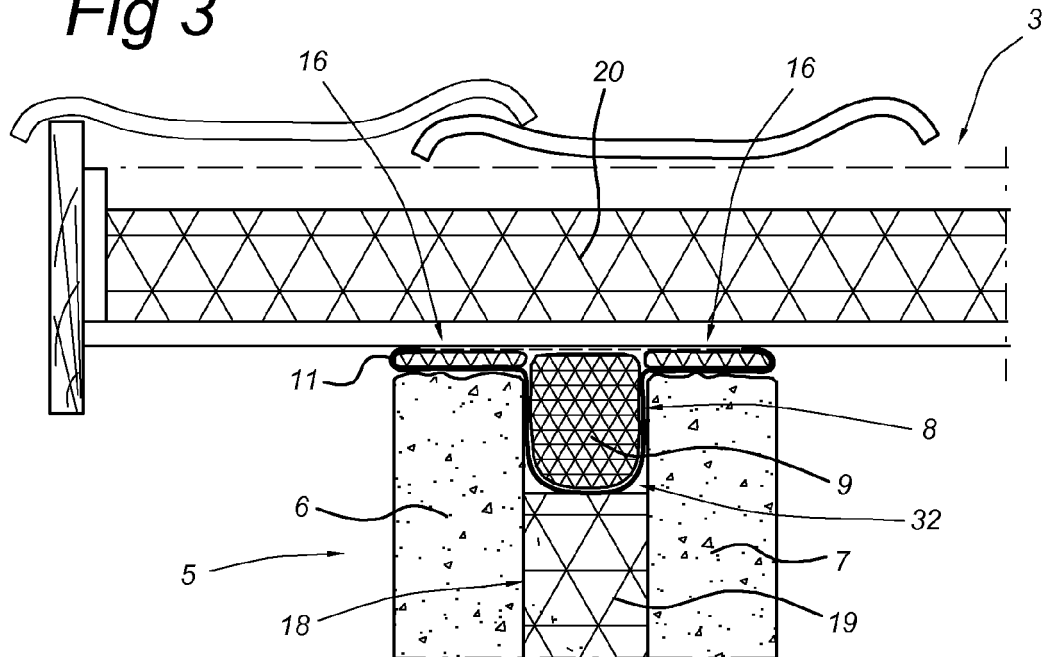


Fig 4

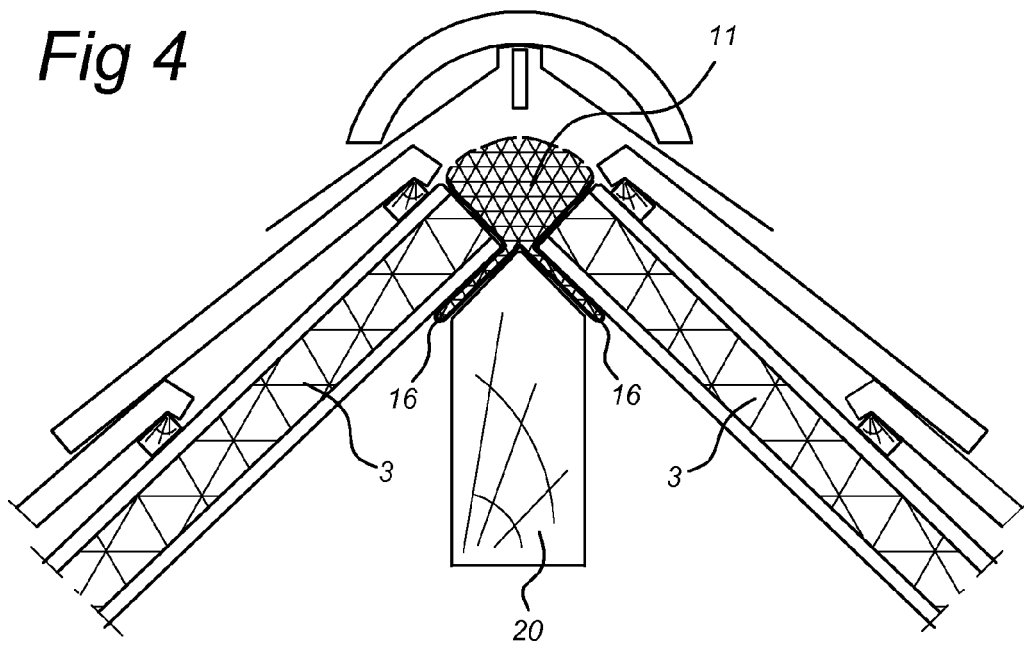
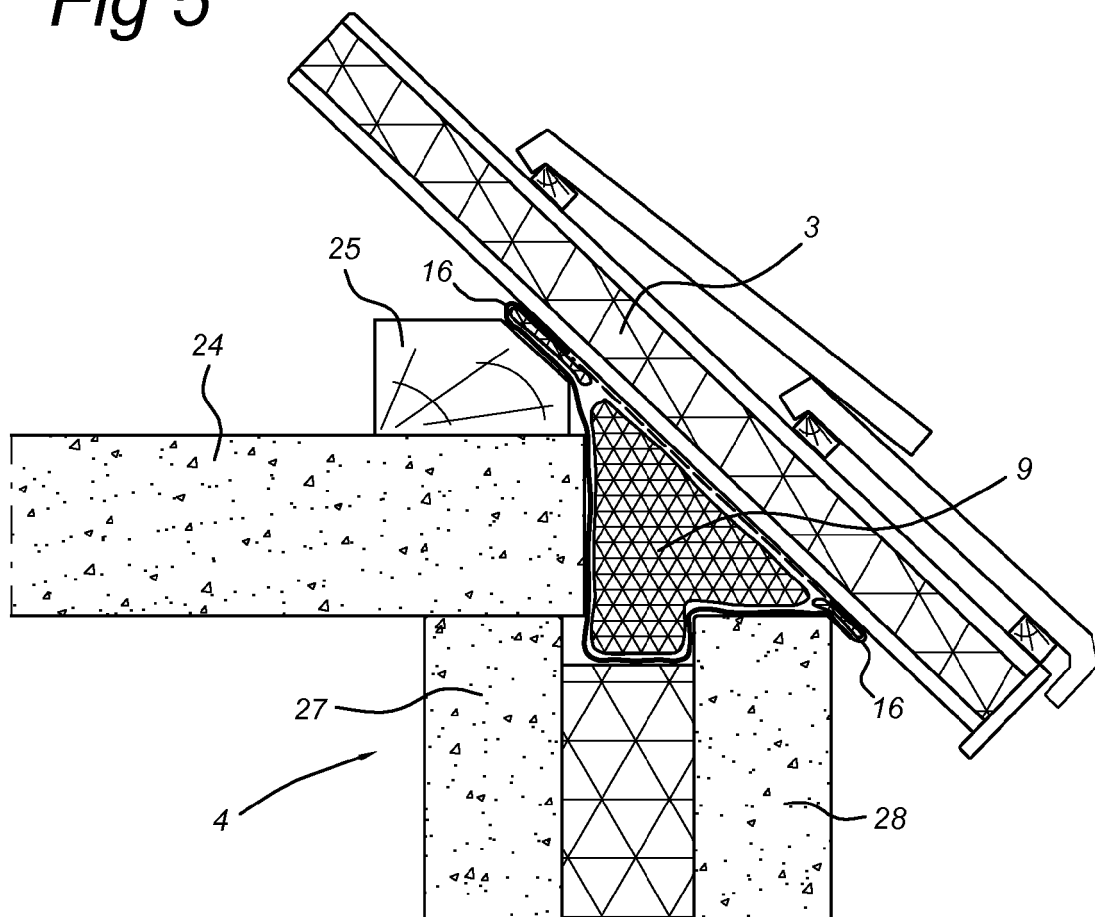


Fig 5





EUROPEAN SEARCH REPORT

Application Number
EP 10 17 7100

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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Y	US 6 141 930 A (ALLWEIN ROBERT JOHN [US] ET AL) 7 November 2000 (2000-11-07) * column 1, line 11 - line 22; figures * * column 4, line 4 - line 24 *	1-6, 10-12	
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 6 January 2011	Examiner Demeester, Jan
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
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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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