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(54) Title: EDGE INSULATION STRUCTURE

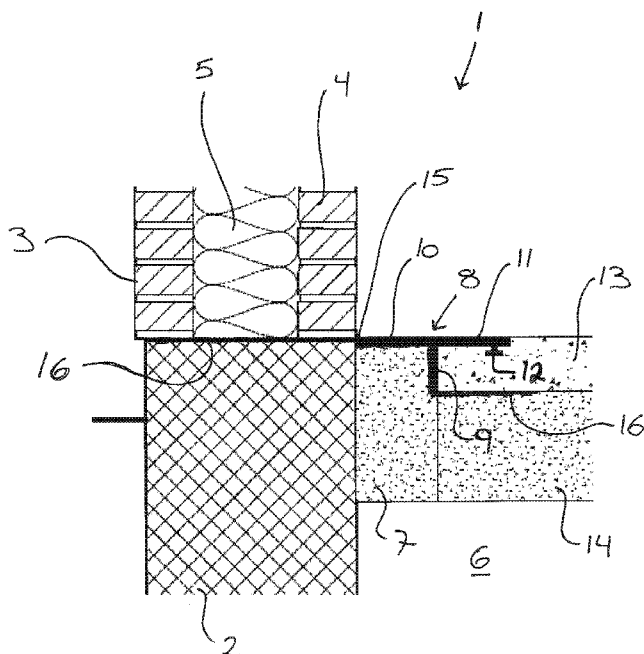


Fig. 1

(57) Abstract: An edge insulation structure (1) comprises an elongated edge insulation (7) and an elongated edge rail (8), wherein said edge insulation comprises a first abutment face for abutting a foundation (2), a second abutment face for partially abutting an underlying insulation (14) and an adjacent cast floor plate (13), wherein the edge insulation (7) extends from a level below said floor plate (13) and up to the surface of the floor plate (13). The edge rail (8) comprises a first flange (10) adapted to cover the upper face of the edge insulation (7), a second flange (11) for abutting the upper surface of the floor plate (13), and a third flange (9) for abutting a side face of the edge insulation (7), wherein the first and second flanges extend from each their side of the third flange (9).

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- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

EDGE INSULATION STRUCTURE

Field of the Invention

5 The present invention relates to an edge insulation structure comprising at least an elongated edge insulation and an at least elongated edge rail, wherein said edge insulation comprises an abutment face for abutting a foundation and a second abutment face for partially abutting an underlying insulation and an adjacent cast floor plate, for instance a concrete floor plate of a suitable
10 thickness, wherein the edge insulation further comprises a face facing downwards and a face facing upwards, the edge insulation extending from a level below said floor plate and substantially up to the surface of the floor plate. The present invention further relates to use of an edge insulation structure and a method for making an edge insulation having an edge insulation structure.

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Background art

In recent years, the insulation standards in connection with the construction of buildings, especially single-family dwellings, have been raised. In order to
20 continuously be able to construct and refurbish dwellings with up-to-date insulation, there is a permanent need for being capable of making an adequate and reasonably future-proof insulation.

In principle, a dwelling is insulated all around, i.e. walls, roof and floor are
25 insulated, and especially insulation in the transition areas between floor and wall has been inadequate for many years. Typically, a foundation is constructed with a concrete base and one or more finishing layers of blocks made of lightweight aggregated concrete and cement, which has been considered to be an adequate solution for many years. Inside the house, the floor is typically made with an
30 insulation and capillary break layer constituted by polystyrene foam, which is perhaps better known under its trade name Flamingo. Other types of insulation material have also been used. Typically, on top of this insulation layer, a 10 – 15 centimetre layer of concrete is applied which then constitutes a floor plate for being covered with suitable and desired flooring. The surface of the cast floor

plate is aligned with the upper edge of the foundation and is thus level with said upper edge of the foundation.

5 Subsequently, the inner and supporting wall – the back wall and the outer wall/or building envelope are positioned on the foundation. Insulation material, for instance glass wool or rock wool, is arranged between the building envelope and the back wall. Further, door and possibly window structures may be placed in certain places on the foundation, replacing the inner and outer walls.

10 Over the years, several optimisation attempts have been made to obtain a better insulation between said floor plate and the foundation. The above-mentioned blocks of lightweight aggregated concrete have been developed to now comprise a layer of insulation material between the outer and the inner sides of the blocks. Also, for a long time it has been common to arrange a strip of insulation material,
15 for instance polystyrene foam between the foundation and the floor plate, which method has a considerable effect. However, it is acknowledged that when such strip of polystyrene foam is arranged between the foundation and the floor plate, there is, in principle, a strip of floor along the entire periphery of the floor plate which is not fixed and to which nothing can be attached, since the underlay is
20 constituted by the insulation material and is not supporting.

DE 29803649 A describes an edge structure comprising an F-shaped edge rail used for levelling out a concrete layer, wherein on one side the edge rail comprises an adhesive layer adhered to the wall, and wherein on the other side
25 the edge rail comprises two horizontal faces. The uppermost face is positioned in the same level as the concrete layer, whereas the lowermost face rests on top of the insulation material, causing the concrete layer to extend over the insulation material. This construction has the disadvantage that the effect of the insulation between the foundation and the concrete layer is practically eliminated, as the
30 concrete layer extends all the way to the foundation, resulting in the thermal bridge barrier only being constituted by the thickness of the adhesive layer. As the edge rail must be attached to the foundation, it is not possible to increase the thickness of the insulation material between the foundation and the concrete layer and hence increase the insulation effect.

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Objective of the invention

5 The objective of the invention is to provide a solution, according to which an insulation material of an unprecedented thickness is arranged between the periphery of a floor plate and a foundation, a fixed and supporting underlay being provided in the transition between the floor plate and this insulation material.

Summary of the invention

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As initially mentioned, the invention relates to an edge insulation structure. The edge insulation structure according to the present invention is novel in that the edge rail comprises a first flange arranged in such a manner that it at least substantially covers the face facing upwards of the elongated edge insulation, a second flange for abutting the surface of the floor plate and a third flange for abutting a side face of the edge insulation, the first and second flanges extending from each their side of the third flange.

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This provides the advantage that the edge insulation may be of an adequate thickness while no "soft" edge appears along one or more edges of a floor plate, resulting in mounting difficulties and other undesired effects. The so-called soft edge is constituted by insulation material which, in order to ensure adequate insulation capabilities, extends all the way up to the level of the surface of the floor plate. Especially, in the event that carpets or other flooring are/is to be mounted directly on the floor plate, this edge insulation poses certain challenges.

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By means of an edge rail according to the present invention, a fixed and not least supporting surface may be established above the edge insulation while a mechanical separation of the edge rail and the inner wall, door and/or window structure is maintained. This separation need not be more than a few millimetres, which is enough to prevent direct heat passage from the edge rail to the inner wall. By means of such edge rail it is possible to make an edge insulation structure with a thickness of 100 to 200 millimetres, if desired. Obviously, edge insulation structures with smaller as well as larger thicknesses may also be made.

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In the following, several different embodiments of the edge insulation structure according to the present invention will be presented

5 In a preferred embodiment of the edge insulation structure according to the present invention, the edge rail comprises anchoring elements, said anchoring elements being arranged to engage said cast floor plate. These anchoring elements may be longitudinal flanges or other protrusions on the faces of the edge rail facing the cast floor plate. Hereby, a reliable connection is made between the edge rail and the floor plate, ensuring that any settlements and
10 movements are followed by both the edge rail and the floor plate.

The edge insulation structure according to the present invention may advantageously be made of metal, plastic, a fibre composite or a wood or cardboard material. Several factors influence the selection of material. Metal or
15 plastic may for instance result in certain advantages, whereas in other circumstances, fibre composite, wood or cardboard may be more desirable.

In a particularly preferred embodiment of the edge insulation structure according to the present invention, the edge rail may advantageously comprise at least one
20 elongated foil path which is flexibly arranged for connection with adjacent building elements and thus constitutes a damp proof layer and/or a radon barrier. The integration of such foil paths into the edge rail provides the evident advantage that the building worker will not have to remember or handle so many different elements, and at the same time the construction process is considerably
25 facilitated, since the mounting is also time-saving compared to the mounting of several consecutive elements.

In an embodiment of an edge insulation structure according to the present invention, the structure may advantageously comprise the edge rail being
30 provided with a longitudinal installation channel arranged between the surface of the edge rail and the edge insulation, said installation channel in the edge rail preferably comprising apertures in the surface for providing access to the installation channel itself. Hence, in one or more apertures access to the installation channel may be provided in order that primarily cables but also other
35 types of installations possibly made after the construction of the building in question may be immediately installed and hidden.

In one embodiment of the invention, the edge insulation structure comprises a detachable edge rail. Such detachable edge rail may be mounted directly on the edge insulation material and may advantageously be levelled to the height of the finished floor prior to final fixation.

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In another and preferred embodiment of the invention, the edge insulation structure comprises an edge rail which is attached to at least one face of the edge insulation. Hence, it is an integrated structure wherein both the insulation material as well as the edge rail are connected and mounted at the same time.

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In yet another embodiment of the edge insulation structure according to the present invention, the edge insulation and the edge rail may constitute a section of an edge insulation, said section comprising means for connection with another section, said connection means comprising e.g. a recess connection, a tongue and groove connection, a dovetail connection or the like. Hence, the individual elements may be connected with a high degree of precision, resulting in the best insulation, which means that no thermal bridges occur between the individual sections of the edge insulation structure.

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A particularly preferred embodiment of the invention relates to use of an edge insulation structure as described above, wherein an edge insulation is attached to the interior side of a foundation, an edge rail being arranged on the face facing upwards of the edge insulation, said edge rail extending from an area near the foundation and away from the foundation and being levelled and mounted at the height of the finished floor, wherein the edge rail is used for determining the height of the floor during casting, and the edge rail is used as abutment for guide rails or other devices in connection with the casting of the floor plate. In this way, the levelling of the floor is facilitated, since the necessary abutments for guide rails, vibration beams and the like are constituted by the guide rails which are part of the edge insulation structure.

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Further, the present invention relates to a method for making edge insulation with an edge insulation structure as specified above, wherein the method at least comprises the steps of: attaching edge insulation to the interior side of a foundation, positioning an edge rail on the face facing upwards of the edge insulation, levelling of the edge insulation as well as the edge rail at height of the finished floor, wherein the edge rail is used to determine the height of the floor

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during casting, and wherein the edge rail is used as abutment for guide rails or other devices in connection with the casting of the floor plate.

5 An edge insulation structure according to the present invention provides both optimal insulation of the transition area between the foundation, the inner wall, door or window structure and a cast floor plate and provides a higher degree of certainty that the structure is effected correctly, and at the same time it becomes easier to do the work with a sufficiently high degree of quality.

10 Brief description of the drawings

In the following, the present invention will be described with reference to the drawings, in which:

15 Fig. 1 shows an embodiment of an edge insulation structure.

Fig. 2 shows an embodiment of an edge insulation structure with an integrated installation channel.

20 In the description of the figures, like elements will be denoted by like reference numbers in the various figures. Hence, no explanation of the details in connection with each figure/embodiment will be given.

Detailed description of the invention

25 Fig. 1 shows an embodiment of the edge insulation structure 1 in connection with a foundation 2 supporting the outer wall 3 and the inner wall 4. Insulation material 5 is arranged between the outer wall 3 and the inner wall 4. On the inner side of the foundation 2, there is a layer of sand 6 at the foot, and an edge insulation structure 1 is mounted on the side of the foundation, said edge
30 insulation structure comprising an elongated edge insulation part 7 and an edge rail 8. In the embodiment shown, the edge rail 8 is T-shaped, the vertical flange 9 and the horizontal flange 10 being arranged on the side and top faces, respectively, of said elongated edge insulation part 7. The second horizontal flange 11 is, on its underside, provided with a longitudinal anchoring element 12
35 for engaging the cast floor plate 13 laid out on the floor insulation material 14.

As it appears from Fig. 1, the upper side of the edge rail 8 is at the same level as the floor plate 13, the upper side of the edge rail being immediately applicable for aligning concrete in connection with the casting of the floor plate 13. A small groove 15 is provided between the flange 10 and the inner wall 4, resulting in improved insulation properties, as there is no direct connection between the flange 10 and the inner wall 4.

Further, a band of foil 16 is arranged on the edge rail 8, which serves as a barrier layer 16 to radon and other harmful gasses capable of, in some geographical areas, penetrating buildings and promoting diseases. Said barrier layer 16 extends from the upper edge of the foundation 2, along the lower edge of the flange 10 and the vertical flange 9 and over the floor insulation material 14. The barrier layer 16 is not defined in more detail in connection with the edge insulation and may be manufactured from various types of material typically used for such barriers.

The edge rail 8 may be manufactured from various suitable materials such as extruded aluminium, bent steel or other metal; cast plastic which is possibly fibre-reinforced, pultruded fibre-reinforced plastics, and cardboard or wood fibres may also be used for manufacturing the edge rail 8. The insulation material may also be made of several different materials, but especially foamed plastics such as polystyrene or polyurethane seem preferable. Similarly, glass or rock wool products are advantageous.

Fig. 2 shows another embodiment of an edge insulation structure 1, wherein an installation channel 17 is installed in the edge rail 8, said installation channel 17 being shown herein as a closed profiled in which installations of any kind may be placed. Here, the closed profile consists of the vertical flange 9 and the flange 10 which are connected to each other with two other flanges 18 and 19. This embodiment also provides a possibility of more optimal insulation of this specific area. The groove between the flange 10 and the foundation 2, or in this case between the flange 18 and the foundation 2, may be filled with an insulation material which is either mounted on the edge rail 8 itself or arranged subsequently to the mounting of the edge insulation. In the event that the edge rail 8 is made of an insulating material, the groove 15 and/or the insulation material filling up the groove may be omitted.

It will be evident for a person skilled in the art that the embodiments described above of an edge insulation structure may also be used in connection with a foundation 2, on which other structures such as door or window structures are mounted.

Claims

1. An edge insulation structure (1) comprising at least an elongated edge insulation (7) and an at least elongated edge rail (8), wherein said edge
5 insulation comprises a first abutment face for abutting a foundation and a second abutment face for partially abutting an underlying insulation (14) and an adjacent cast floor plate (13), for instance a concrete floor plate of a suitable thickness, the edge insulation (7) further comprising a face facing downwards and a face facing upwards, wherein the edge insulation (7) extends from a level below said
10 floor plate (13) and substantially up to the surface of the floor plate (13), **characterised in that** said edge rail (8) comprises a first flange (10) arranged in such a manner that it at least substantially covers the edge facing upwards of the elongated edge insulation (7), a second flange (11) for abutting the surface of the floor plate (13), and a third flange (9) for abutting a side face of the edge
15 insulation (7), wherein the first flange (10) and the second flange (11) extend from each their side of the third flange (9).
2. An edge insulation structure according to claim 1, **characterised in that** the edge rail (8) comprises anchoring elements (12), wherein said anchoring
20 elements (12) are adapted to engage said cast floor plate (13).
3. An edge insulation structure according to claims 1 and 2, **characterised in that** the edge rail (8) is made of plastic, a fibre composite or a wood or
25 cardboard material.
4. An edge insulation structure according to any of the claims 1 to 3, **characterised in that** the edge rail (8) comprises at least one elongated foil path (16), wherein said foil path is flexibly arranged for connecting to adjacent building elements, thus constituting a damp proof layer and/or a radon barrier.
30
5. An edge insulation structure according to any of the claims 1 to 4, **characterised in that** the edge rail (8) comprises a longitudinal installation channel (17), wherein said installation channel (17) is arranged between the surface of the edge rail (8) and the edge insulation (7), wherein said installation
35 channel (17) in the edge rail (8) preferably comprises apertures in the surface for access to the installation channel (17).

6. An edge insulation structure according to any of claims 1 to 5;
characterised in that the edge rail (8) is a detachable edge rail.

7. An edge insulation structure according to any of the claims 1 to 5,
5 **characterised in that** the edge rail (8) is attached to at least one face of the edge insulation (7).

8. An edge insulation structure according to claim 7, **characterised in that**
the edge insulation (7) and the edge rail (8) constitute a section of an edge
10 insulation, wherein said section comprises means for connection to another section, said connection means for example comprising a recess connection, a tongue and groove connection, a dovetail connection or the like.

9. A use of an edge insulation structure according to claims 1 to 8, wherein an
15 edge insulation (7) is attached to the interior side of a foundation (2), wherein an edge rail (8) is arranged on the face facing upwards of the edge insulation (7), said edge rail (8) extending from an area near the foundation (2) and away from the foundation (2), wherein the edge rail (8) is levelled and mounted at the height of the finished floor, said edge rail (8) serving to determine the height of
20 the floor during casting thereof, and wherein the edge rail (8) is used as an abutment to guide rails or other devices in connection with the casting of the floor plate (13).

10. A method for making an edge insulation having an edge insulation structure
25 according to claims 1 to 8, wherein the method at least comprises the steps of:
- attaching edge insulation (7) to the interior side of a foundation (2),
- positioning an edge rail (8) on the face facing upwards of the edge insulation (7),
- levelling the edge insulation (7) as well as the edge rail (8) at the height of the
30 finished floor,
- wherein the edge rail (8) is used to determine the height of the floor during casting, and wherein the edge rail (8) is used as abutment for guide rails or other devices in connection with the casting of the floor plate (13).

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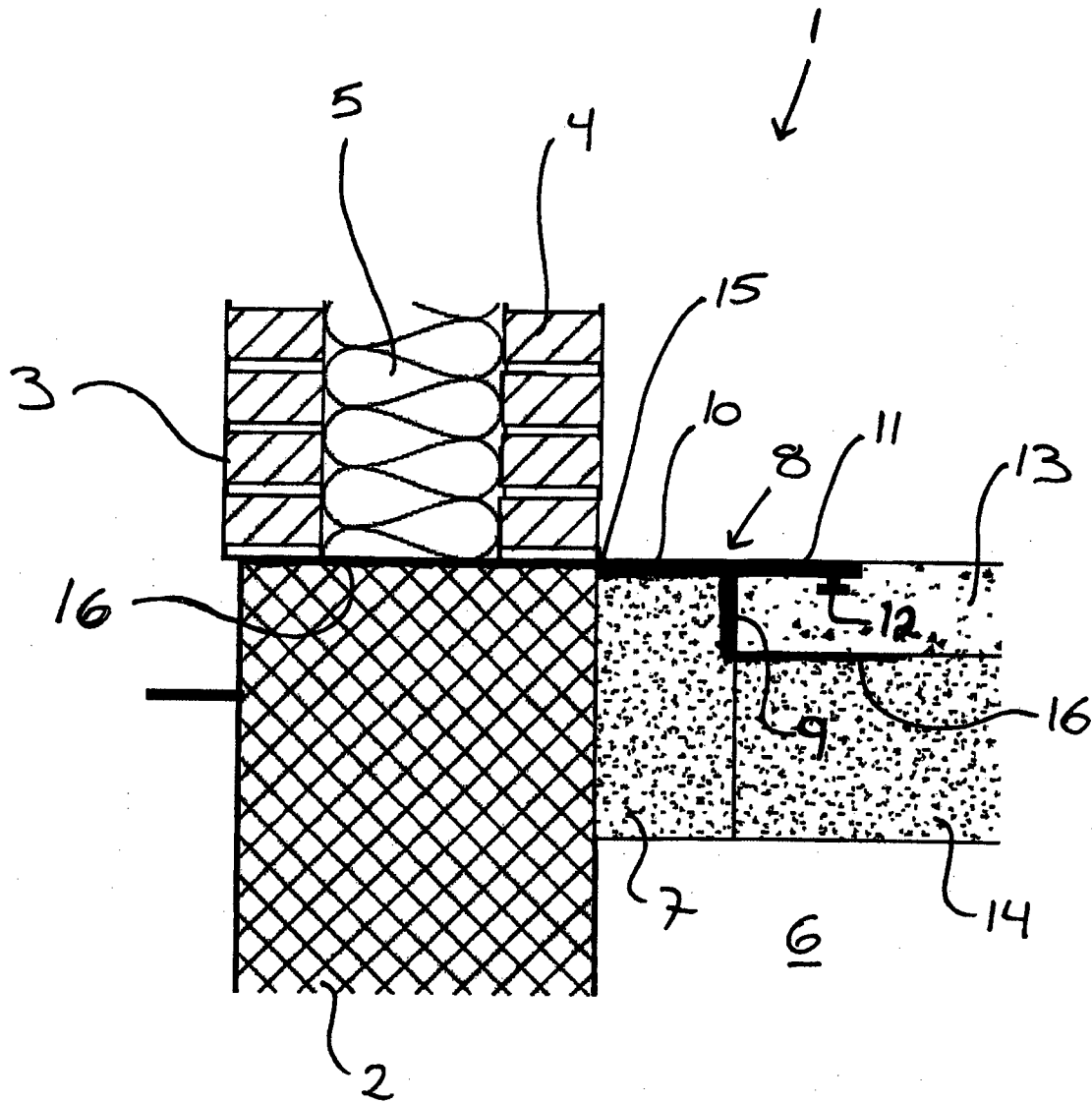


Fig. 1

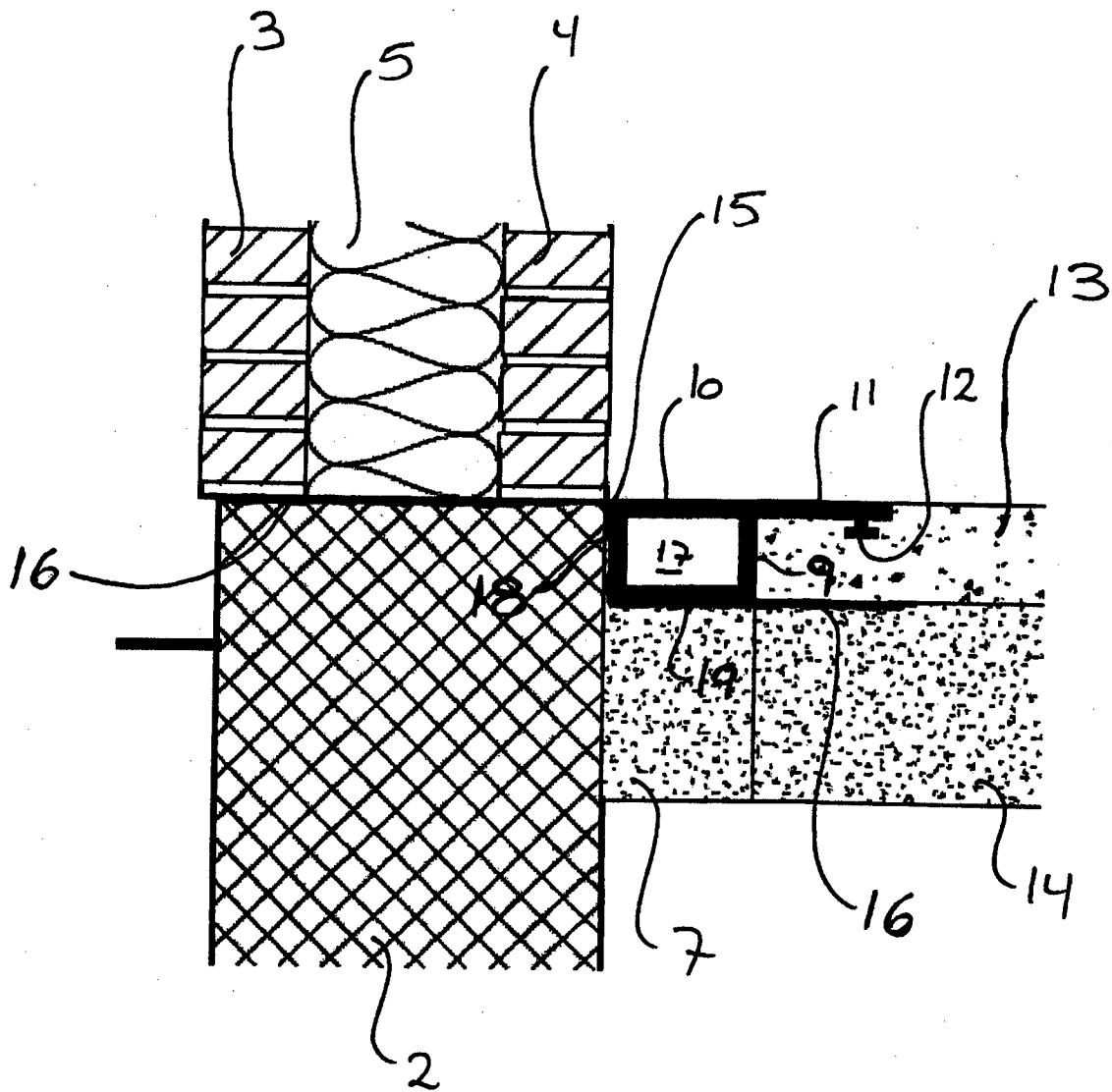


Fig. 2

INTERNATIONAL SEARCH REPORT

International application No PCT/DK2012/050214

A. CLASSIFICATION OF SUBJECT MATTER INV. E04B1/00 E02D27/02 E02D31/02 E04F15/18 E04F15/14 ADD.				
According to International Patent Classification (IPC) or to both national classification and IPC				
B. FIELDS SEARCHED				
Minimum documentation searched (classification system followed by classification symbols) E04B E02D E04F				
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched				
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EPO-Internal, WPI Data				
C. DOCUMENTS CONSIDERED TO BE RELEVANT				
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
A	SE 0 400 037 L (HELLGREN DAVID [SE]) 13 July 2005 (2005-07-13) the whole document -----	1,9,10		
A	EP 2 241 690 A2 (NIELSEN KLAUS [DK] KLAUS NIELSEN RAADGIVENDE INGENIOER F R I I S FA [D] 20 October 2010 (2010-10-20) the whole document -----	1,9,10		
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<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.				
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"A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family			
Date of the actual completion of the international search	Date of mailing of the international search report			
10 October 2012	19/10/2012			
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Bouyssy, Vincent			

INTERNATIONAL SEARCH REPORT

International application No
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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