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(54) **MULTILAYERED RENOVATION BUILDING ELEMENT AND OUTER SURFACE OF BUILDING**

MEHRSCHICHTIGES SANIERUNGSBAUELEMENT UND ÄUSSERE OBERFLÄCHE EINES GEBÄUDES

ÉLÉMENT DE CONSTRUCTION DE RÉNOVATION MULTICOUCHE ET SURFACE EXTÉRIEURE DE BÂTIMENT

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Description

[0001] The invention relates to a multilayered renovation building element having a core part of thermal insulation material and surface panels covering it on both sides, the surface panels having a tongue on one longitudinal edge and a groove on the opposite edge.

[0002] In Finland, as in many other countries, there are many buildings in need of renovation. To repair these, various renovation elements have been developed, which are suspended, for example by means of fasteners, on load-bearing structures. However, these known solutions are generally compromises between thermal insulation and, on the other hand, adequate ventilation in order to avoid moisture problems.

[0003] Publication WO9522670 discloses an element having a metal outer surface and thermal insulation attached to this surface, the thermal insulation being adapted to settle directly against the substructure to be covered. This requires the use of a separate fastening strip, which extends from the metal outer surface to the substructure. Also from publication CH525359 is known a covering element having a metal outer surface and thermal insulation layer attached to this surface. Publication GB1468534 discloses an insulation solution for cold storage rooms, which has a thermal insulation layer and surface panels on both of its sides. Publication GB2306984 discloses a building element having a surface panel of plywood or the like and studs attached therein. The surface panel is perforated. Insulation material is added at the worksite between the surface panel and an opposite surface panel, which is e.g. plasterboard, to be attached at the worksite. JP2004092312 discloses an insulation panel of polystyrene or the like, having on one surface ventilation grooves and a fabric covering these grooves, on top of which is arranged a plaster layer. CA2614522 discloses an element made of polystyrene, on the surface of which is arranged a coating containing cement. The surface to be placed against the substructure is provided with ventilation grooves. The state of the art is also known from the documents JP H08 218596 A and GB 1 468 534 A.

[0004] The object of the present invention is to provide a reliable renovation element for the renovation of old buildings, especially the facades of office buildings, the element enabling good thermal insulation and tightness as well as, at the same time, providing good ventilation.

[0005] To achieve this object, a renovation building element according to claim 1 is provided.

[0006] A solution according to the invention allows the moisture in a building to escape through the water vapour-permeable membrane and further through the insulation material into the ventilation channel, which leads the moisture either directly or through the connecting channel to the outside air, thus drying the building. When renovating exceptionally wet structures, a temporary ventilation gap can be arranged between the renovation building element and the old structure, the gap being to be closed once the structure has adequately dried in order to maintain the thermal insulation capability as high as possible.

[0007] In the following, the invention is described by referring to the accompanying drawings, in which

Fig. 1 shows a diagrammatic principle illustration of the placement of the renovation building elements in a vertical installation,

Fig. 2 shows a diagrammatic principle illustration of the placement of the renovation building elements in a horizontal installation, and

Fig. 3 shows a partial section of the horizontal installation according to Fig. 1 as an isometric view in the direction indicated by the arrows III-III.

[0008] Fig. 1 shows the placement of the renovation building elements 2 in a vertical installation. The height h of the renovation building elements 2 is typically 3-12 m and the width 1.2 m. The ventilation channel is preferably arranged at the joint 10 between the elements, the channel opening from its upper end to the outside air as protected from the rain, for example, by a protection plate (not shown). When the elements are installed vertically, there can be in the vertical direction one or more elements installed one on top of the other. If the building is, for example, 20 m high, there can be 2 units of 10 meter high elements. In this case, ventilation occurs at the top and bottom edges of each element, i.e. ventilation occurs also in the joint between the elements.

[0009] Fig. 2 shows the placement of the renovation building elements 2 in a horizontal installation. The length L of the renovation building elements 2 is typically 3-12 m and the width W 1.2 m. The ventilation channel is preferably arranged at the horizontal joint 11 between the elements, the channel opening into the connecting channel arranged in connection with the vertical joint 12 between the elements, the connecting channel opening from its upper end to the outside air as protected from the rain, for example, by a protection plate.

[0010] Fig. 3 shows an embodiment example of the renovation building element 2 in a horizontal installation. The renovation building element 2 preferably comprises a core part 2c of mineral wool, to both main surfaces of which are fastened, preferably by gluing, the surface panels 2a, 2b, which are preferably of plastic-coated sheet steel. The mineral wool layer is preferably formed from structural wool lamellae, in which the fibres are substantially perpendicular in relation to the surface panels 2a, 2b. In the horizontal bottom edge of the surface panels has been made a groove 4 and in the upper edge a tongue 5. In the embodiment shown, in the inner surface panel has been made an opening 7, which is covered by a water vapour-permeable membrane 6 fastened to the outer surface of the inner surface panel. The membrane can be, for example, a TYVEK ® membrane, which is preferably fastened by gluing to the outer surface of the inner surface panel. The fastening of the membrane can also

be performed mechanically. There can be a plurality of openings 7 and among them can be various shapes and various sizes in surface area. The total surface area of the openings is preferably approx. 10% of the surface area of the inner surface panel, the minimum being approx. 5%. The surface area of the openings can, depending on the situation, also be larger, for example, from 15% up to 80%, provided that the strength of the inner surface panel permits this. When gluing the core part 2c to a surface panel 2b having an opening, the core part remains without the adhesive layer at the openings 7 in the surface panel, wherein moisture is allowed to move at the openings through the mineral wool relatively easily to the ventilation channel 9. In the embodiment shown, the ventilation channel 9 is arranged near the outermost surface panel 2a of the renovation building element 2 in the vicinity of the groove 4. The placement of the ventilation channel 9 to open at the joint between the renovation building elements to be placed one on top of the other makes preparation of the ventilation channel relatively easy. It can be performed, for example, by milling a groove of the desired depth and width in the edge of the core part in connection with the manufacture of the renovation building element. There can be more than one ventilation channel 9 and it can also be located elsewhere than at the site shown. In the embodiment shown, the shape of the ventilation channel is a rectangle, but its shape can also be something other, for example, semicircular.

[0011] The renovation building element 2 is preferably fastened by means of separate fasteners (not shown) to the old load-bearing wall 1. To compensate for unevennesses of the wall 1, an insulation layer 8 of soft mineral wool can be placed between the renovation building element 2 and the wall 1. The insulation layer can be attached ready to the inner surface panel 2b of the renovation building element or it can be installed at the worksite to the wall 1 before installing the renovation building element into place. If the wall to be renovated is extremely wet, the soft wool can be left out at least partially such that between the renovation building element 2 and the wall 1 is formed one or more temporary vertical ventilation channels 13, which is/are closed from the bottom and top ends when the moisture content has adequately decreased. In this case, the thermal insulation capability improves after the initial drying, when heat is not allowed to escape from the wall 1 of the building via the temporary ventilation channel.

Claims

1. A multilayered renovation building element (2), comprising:

   a first outer surface panel (2a) and a second inner surface panel (2b) and a core part (2c) of thermal insulation material, the core part being sandwiched between the first outer surface panel and the second inner surface panel,
   the surface panels each having a tongue (5) on one longitudinal edge and a groove (4) on the opposite longitudinal edge, the thermal insulation material of the core part (2c) of the renovation building element (2) comprising a ventilation channel (9),
   the inner surface panel (2b) of the renovation building element comprising at least one opening (7) formed therein, **characterised in that** the opening is covered by a water vapour-permeable membrane material (6),
   and **in that** said ventilation channel (9) opens directly or via a separate connecting channel to the outside air, the thermal insulation material allowing the movement of moisture between said at least one opening (7) and the ventilation channel (9).

2. The renovation building element (2) according to claim 1, wherein the ventilation channel (9) is formed in the edge on the side of the groove (4) of the core part (2c) of the renovation building element and opens at the joint to be formed together with the edge on the side of the tongue (5) of an adjacent renovation building element (2).

3. The renovation building element (2) according to claim 1 or 2, wherein said at least one ventilation channel (9) is formed near the outer surface panel (2a) of the renovation building element.

4. The renovation building element (2) according to any one of the preceding claims, wherein the inner surface panel (2b) of the renovation building element (2) is fastenable to an insulation layer (8) of soft mineral wool.

5. The renovation building element (2) according to any one of the preceding claims, wherein the material of the surface panels (2a, 2b) comprises plastic-coated sheet steel.

6. The renovation building element (2) according to any one of the preceding claims, wherein the thermal insulation material of the core part (2c) comprises mineral wool, in which the fibres are substantially perpendicular in relation to the surface panels (2a, 2b).

7. The renovation building element (2) according to any one of the preceding claims, wherein the inner surface panel comprises a plurality of openings.

8. The renovation building element (2) according to any one of the preceding claims, wherein the total surface area of the one or plurality of openings arranged in the inner surface panel is in the range of approx.

5% - approx. 80% of the surface area of the inner surface panel.

9. The renovation building element (2) according to claim 8, **characterized in that** the total surface area of said opening or openings is approx. 10% of the surface area of the inner surface panel.

10. An outer surface of a building comprising an external wall (1), a renovation building element according to any of claims 1 to 9 and an insulation layer (8) arranged between the external wall (1) and the renovation building element.

Patentansprüche

1. Ein mehrschichtiges Renovierungsbauelement (2), das Folgendes aufweist:

ein erstes, äußeres Oberflächenpaneel (2a) und ein zweites, inneres Oberflächenpaneel (2b) und einen Kernteil (2c) aus Wärmeisolationsmaterial, wobei der Kernteil zwischen dem ersten, äußeren Oberflächenpaneel und dem zweiten, inneren Oberflächenpaneel sandwich-artig aufgenommen ist,
wobei die Oberflächenpaneele jeweils eine Feder (5) an einer Längskante und eine Nut (4) an der gegenüberliegenden Längskante aufweisen,
wobei das Wärmeisolationsmaterial des Kernteils (2c) des Renovierungsbauelements (2) einen Lüftungskanal (9) aufweist,
wobei das innere Oberflächenpaneel (2b) des Renovierungsbauelements mindestens eine Öffnung (7) darin ausgebildet aufweist,
dadurch gekennzeichnet,
dass die Öffnung von einem wasserdampfdurchlässigen Membranmaterial (6) abgedeckt ist, und
dass sich der Lüftungskanal (9) direkt oder über einen separaten Verbindungskanal zur Außenluft öffnet, wobei das Wärmeisolationsmaterial die Bewegung von Feuchtigkeit zwischen der mindestens einen Öffnung (7) und dem Lüftungskanal (9) gestattet.

2. Das Renovierungsbauelement (2) nach Anspruch 1, wobei der Lüftungskanal (9) in dem Rand auf der Seite der Nut (4) des Kernteils (2c) des Renovierungsbauelements ausgebildet ist und sich an der zusammen mit dem Rand auf der Seite der Feder (5) des benachbarten Renovierungsbauelements (2) zu bildenden Verbindung öffnet.

3. Das Renovierungsbauelement (2) nach Anspruch 1 oder 2, wobei der mindestens eine Lüftungskanal (9) nahe dem äußeren Oberflächenpaneel (2a) des Renovierungsbauelements ausgebildet ist.

4. Das Renovierungsbauelement (2) nach einem der vorhergehenden Ansprüche, wobei das innere Oberflächenpaneel (2b) des Renovierungsbauelements (2) an einer Dämmschicht (8) aus weicher Mineralwolle befestigbar ist.

5. Das Renovierungsbauelement (2) nach einem der vorhergehenden Ansprüche, wobei das Material der Oberflächenpaneele (2a, 2b) kunststoffbeschichtetes Stahlblech ist.

6. Das Renovierungsbauelement (2) nach einem der vorhergehenden Ansprüche, wobei das Wärmeisolationsmaterial des Kernteils (2c) Mineralwolle aufweist, bei dem die Fasern im Wesentlichen senkrecht zu den Oberflächenpaneelen (2a, 2b) stehen.

7. Das Renovierungsbauelement (2) nach einem der vorhergehenden Ansprüche, wobei das innere Oberflächenpaneel eine Vielzahl von Öffnungen aufweist.

8. Das Renovierungsbauelement (2) nach einem der vorhergehenden Ansprüche, wobei die Gesamtfläche der einen oder mehreren in dem inneren Oberflächenpaneel angeordneten Öffnungen im Bereich von ungefähr 5% bis ungefähr 80% der Fläche des inneren Oberflächenpaneels liegt.

9. Das Renovierungsbauelement (2) nach Anspruch 8, wobei die Gesamtfläche der Öffnung(en) ungefähr 10% der Fläche des inneren Oberflächenpaneels beträgt.

10. Eine Außenoberfläche eines Gebäudes, das eine Außenwand (1), ein Renovierungsbauelement nach einem der Ansprüche 1 bis 9, sowie eine zwischen der Außenwand (1) und dem Renovierungsbauelement angeordnete Dämmschicht (8) aufweist.

Revendications

1. Elément de construction de rénovation multicouche (2) comprenant :

un premier panneau de surface externe (2a) et un deuxième panneau de surface interne (2b) et une partie centrale (2c) d'un matériau isolant thermique, la partie centrale étant interposée entre le premier panneau de surface externe et le deuxième panneau de surface interne,
les panneaux de surface comportant chacun une languette (5) sur un bord longitudinal et une rainure (4) sur le bord longitudinal opposé, le

matériau isolant thermique de la partie centrale (2c) de l'élément de construction de rénovation (2) comprenant un canal de ventilation (9), le panneau de surface interne (2b) de l'élément de construction de rénovation comprenant au moins une ouverture (7) formée en lui, **caractérisé en ce que** l'ouverture est recouverte d'un matériau (6) de membrane perméable à la vapeur d'eau, et **en ce que** ledit canal de ventilation (9) ouvre directement ou par l'intermédiaire d'un canal de connexion séparé sur l'air extérieur, le matériau d'isolation thermique permettant le mouvement d'humidité entre ladite au moins une ouverture (7) et le canal de ventilation (9).

2. Elément de construction de rénovation (2) selon la revendication 1, dans lequel le canal de ventilation (9) est formé dans le bord du côté de la rainure (4) de la partie centrale (2c) de l'élément de construction de rénovation et s'ouvre au niveau du joint à former avec le bord du côté de la languette (5) d'un élément de construction de rénovation adjacent (2).

3. Elément de construction de rénovation (2) selon la revendication 1 ou 2, dans lequel ledit au moins un canal de ventilation (9) est formé à proximité du panneau de surface externe (2a) de l'élément de construction de rénovation.

4. Elément de construction de rénovation (2) selon l'une quelconque des revendications précédentes, dans lequel le panneau de surface interne (2b) de l'élément de construction de rénovation (2) peut être fixé à une couche isolante (8) de laine minérale douce.

5. Elément de construction de rénovation (2) selon l'une quelconque des revendications précédentes, dans lequel le matériau des panneaux de surface (2a, 2b) comprend une tôle d'acier revêtue de plastique.

6. Elément de construction de rénovation (2) selon l'une quelconque des revendications précédentes, dans lequel le matériau d'isolation thermique de la partie centrale (2c) comprend de la laine minérale dont les fibres sont sensiblement perpendiculaires par rapport aux panneaux de surface (2a, 2b).

7. Elément de construction de rénovation (2) selon l'une quelconque des revendications précédentes, dans lequel le panneau de surface interne comporte une pluralité d'ouvertures.

8. Elément de construction de rénovation (2) selon l'une quelconque des revendications précédentes, dans lequel la surface totale de ladite une ou pluralité d'ouvertures est dans la plage allant d'environ 5 % à environ 80 % de la surface du panneau de surface interne.

9. Elément de construction de rénovation (2) selon la revendication 8, dans lequel la surface totale de ladite une ou pluralité d'ouvertures est d'environ 10 % de la surface du panneau de surface interne.

10. Surface externe d'une construction comprenant un mur extérieur (1), un élément de construction de rénovation selon l'une quelconque des revendications 1 à 9 et une couche d'isolation (8) interposée entre le mur extérieur (1) et l'élément de construction de rénovation.

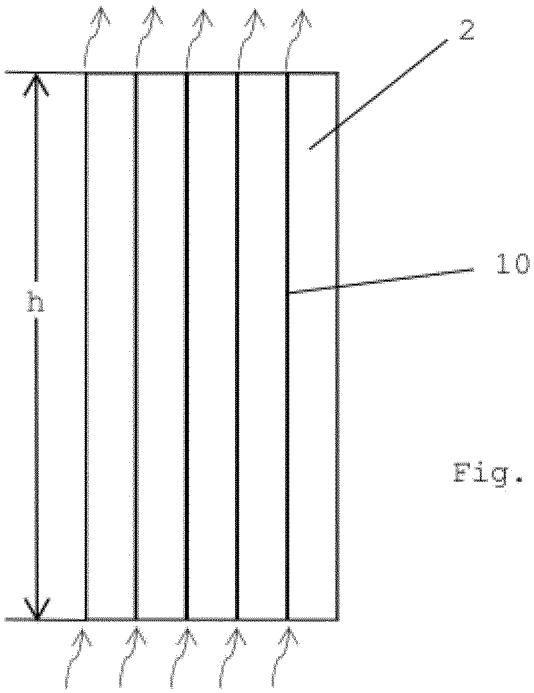

Fig. 1

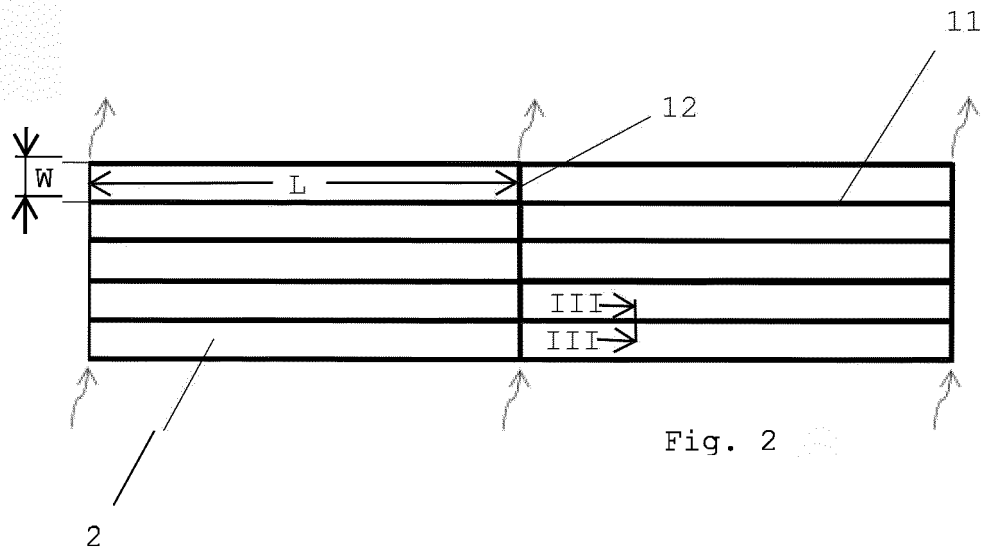

Fig. 2

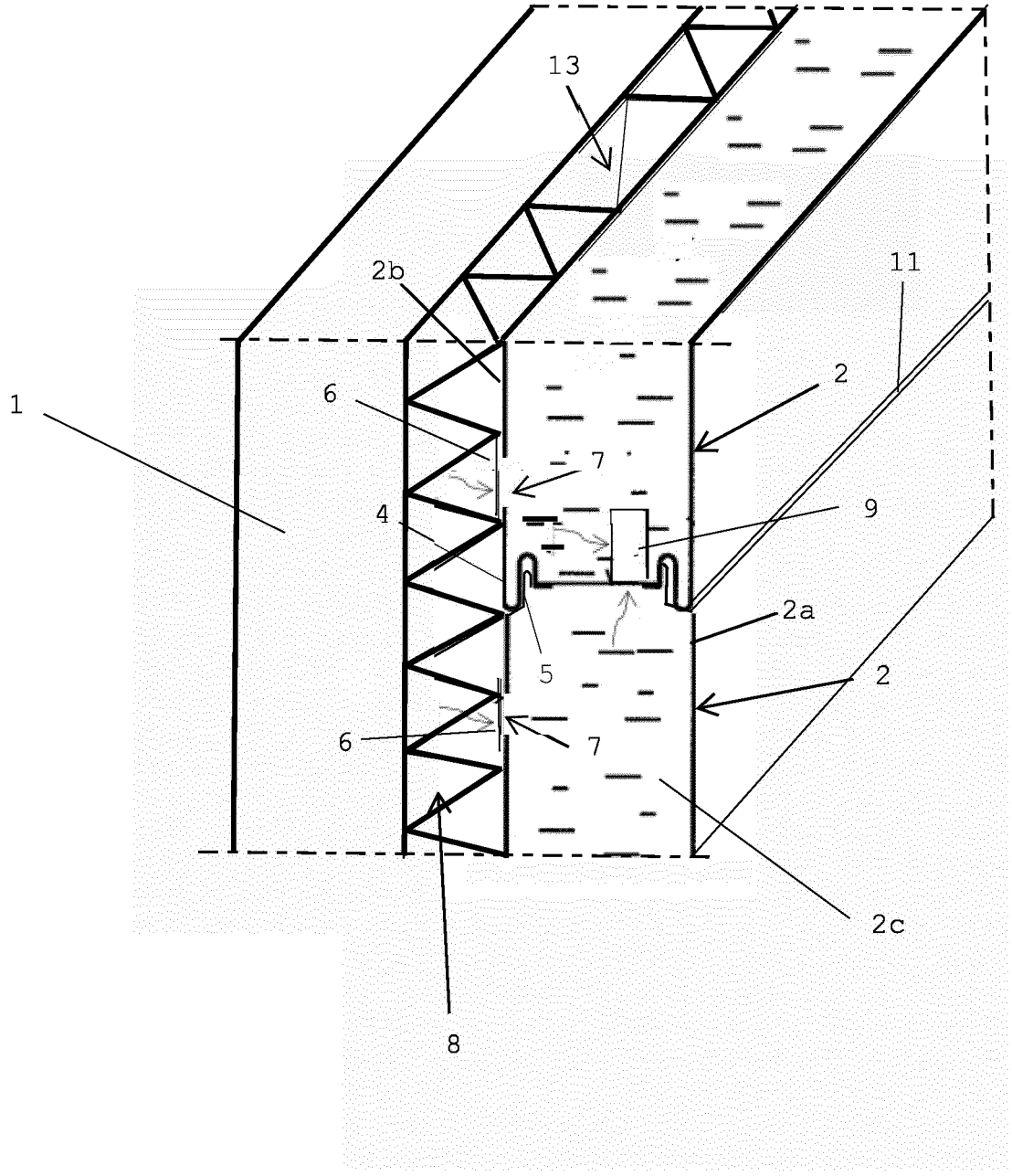

FIG. 3

REFERENCES CITED IN THE DESCRIPTION

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