(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 397 620 A2**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
21.12.2011 Bulletin 2011/51

(21) Application number: **11168069.0**

(22) Date of filing: **30.05.2011**

(51) Int Cl.:
E04C 3/14 *(2006.01)* ***E04C 3/29*** *(2006.01)*
E04C 1/40 *(2006.01)* ***E04C 2/24*** *(2006.01)*
E04B 2/70 *(2006.01)*

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(30) Priority: **15.06.2010 FI 20105688**

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(54) **Laminated beam construction**

(57) The invention relates to a laminated beam construction (1, 1', 1") comprising surface layers (2a, 2b) of wood material and between them an inner part (3) of insulating material. The insulating material is structural wool glued to the surface layers. In the structural wool (3), the fibres are essentially perpendicular to the surfaces of the surface layers (2a, 2b) directed at one another.

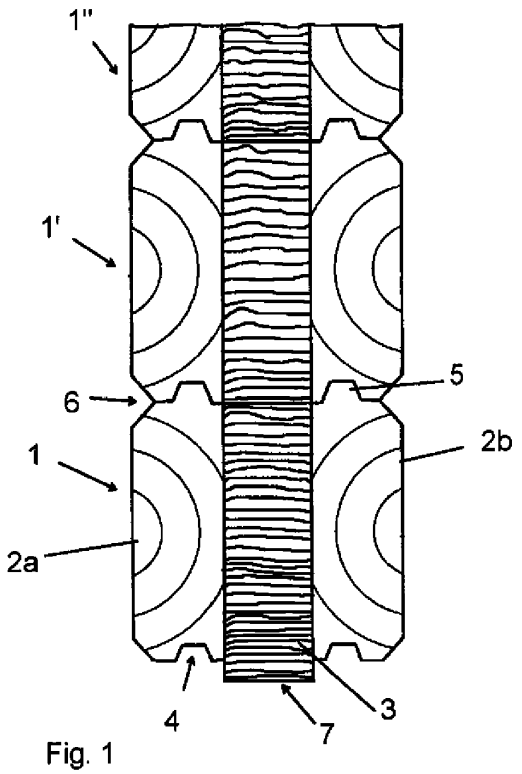

Fig. 1

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Description

[0001] The present invention relates to a laminated beam construction comprising surface layers of wood material and between them an inner part of insulating material.

[0002] A laminated beam construction with an inner part of timber glued to the surface layer has as such been known for a long time. The problem with this type of laminated beam construction, as with a traditional beam construction, is its insufficient heat insulation capacity with respect to current regulations. In addition, with these beam constructions problems are caused by the subsiding of the beams by as much as several centimetres per metre of height during the first years.

[0003] In Swedish patent publication no. 457456 is disclosed a timber element, wherein the outer panels made of wood are provided with longitudinal grooves in which spacers are arranged. In this construction, the empty space between the wood panels and the spacers is intended to be filled with thermal insulation material, for example foamed polyurethane. In the construction, holes are in addition formed at certain points in the spacers for positioning vertical rods in them at the height of a completed wall, whereupon the said rods form the load-bearing elements of the wall. In the publication SE 303580 is described a beam of laminated construction with wooden sidewalls, which are attached to one another firmly by means of an insulating intermediate layer of foamed plastic, and where there may optionally be a waterproof layer between the panel board and the layer of foamed plastic. The disadvantage of this construction is, however, that the plastic material is relatively easily combustible and rather expensive. Another disadvantage of this construction is that between such beams must in practice be placed a separate caulking layer to seal the gap between the beams against heat loss.

[0004] The aim of the present invention is to provide an improved laminated beam construction which has good thermal insulation properties and functions well also when the beam construction subsides during the first years. To achieve this aim, the laminated beam construction is characterised in that in the structural wool, the fibres are essentially perpendicular to the surfaces of the surface layers directed at one another, and that the structural wool extends on at least one of its edges outwards from the surface layers, forming a thermal insulation layer which fills the seam between the laminated beams to be placed on top of one another at the structural wool layer.

[0005] The structural wool preferably used in the interior has a thickness greater than the height of the surface layers, whereupon when the laminated beams are placed on top of one another, the structural wool forms the insulation layer between the beams directly without a separate addition of insulating material. Other preferred embodiments of the invention are disclosed in dependent claims 2 to 6.

[0006] The invention is described in the following with reference to the accompanying drawing, the single Figure 1 of which shows diagrammatically the cross-section of a laminated beam construction according to the invention when the laminated beams are mounted on top of one another.

[0007] Figure 1 shows laminated beams 1, 1' and 1" when mounted on top of one another, the topmost laminated beam 1" being shown only partly. Each laminated beam 1, 1', 1" comprises surface layers 2a, 2b of wood material and a thermal insulation layer 3 of structural wool placed between them which is glued to the surface layers 2a, 2b. The fibres of the structural wool 3 are essentially perpendicular to the surfaces of the surface layers 2a, 2b directed at one another, as shown diagrammatically in the Figure by horizontal lines. The surface layers 2a, 2b may be, for example, of timber or wood panels laminated with each other. The properties of the structural wool layer make it possible to bind the surface layers directly with each other by means of the structural wool layer without using separate trusses between the surface layers. The thickness of the surface layers 2a, 2b is typically within the range from approximately 50 to 100 mm, but their thickness may deviate considerably from this. The thickness of the surface layers may be different on the inner and outer surface and the minimum value for thickness is determined mainly by whether the said surface layer is a wall-bearing structural element or not.

[0008] The surface layers of the laminated beams are preferably made tongued and grooved on the edges of the laminated beams to be mounted on top of one another which are directed at each other, whereupon on the upper edge of the lower laminated beam is preferably a tongue 5 and on the lower edge of the upper laminated beam is the corresponding groove 4. There may be one or more grooves 4 and corresponding tongues 5 adjacent to one another on the edge of each surface layer 2a, 2b. The laminated beam construction is in addition preferably provided with sealing means (not shown) on that side of it which comes inside the building, which sealing means seal the gap between the laminated beams to be placed on top of one another to prevent excess humidity from transferring to the insulating material. The sealing means may be, for example, a strip of plywood board which is positioned, for example, in a mounting slot (not shown) formed in the edge parts of the surface structures of the laminated beams mounted on top of one another, which are positioned opposite one another. As sealing means may also be used, for example, various elastic sealing tapes, which may conceivably be placed, for example, at the bottom of the groove of a laminated beam. The outer surface may also be provided with sealing means (not shown), to secure, e.g. rainwater from entering between the laminated beams.

[0009] The structural wool layer 3 preferably extends at least on one of its edges outwards from the surface layers 2a, 2b in elevation, as indicated by reference numeral 7 in Figure 1 on the lower edge of the lowest laminated beam. Layer 3 extends preferably on both edges

outwards from the surface layers 2a, 2b, whereupon in the example of Figure 1, on the upper edge of the laminated beam, the extension may extend, for example, to the elevation plane determined by the tongues 5 or beyond it. Such extending outwards of the structural wool causes the gap 6 between the laminated beams 1 mounted on top of one another to be efficiently filled with thermal insulation material. The structural wool may extend outwards from the surface layer on one of its edges, for example, within the range from 5 to 20 mm. By positioning the structural wool in such a way that the fibres contained in it are essentially perpendicular to the inner surfaces of the wooden surface layers 2a, 2b which are against one another, a construction is achieved which receives wind loads well and on the other hand forms a flexible construction in elevation which allows the laminated beams to settle against one another and their natural subsiding during the first years without deteriorating their thermal insulation properties.

Claims

1. A laminated beam construction (1, 1', 1") comprising surface layers (2a, 2b) of wood material and between them an inner part (3) of insulating material, where the insulating material is structural wool glued to the surface layers, **characterised in that** in the structural wool (3), the fibres are essentially perpendicular to the surfaces of the surface layers (2a, 2b) directed at one another, and that the structural wool (3) extends at least on one of its edges (7) outwards from the surface layers (2a, 2b), forming a thermal insulation layer which fills the seam (6) between the laminated beams to be mounted on top of one another at the structural wool layer (3).

2. A laminated beam construction as claimed in claim 1, **characterised in that** the laminated beam construction is provided with sealing means at least on one side, which ensure the sealing of the gap (6) between the laminated beams (1, 1', 1") mounted on top of one another to prevent excess humidity from transferring to the insulating material.

3. A laminated beam construction as claimed in claim 2, **characterised in that** the sealing means are located on the surface layer which comes inside the building.

4. A laminated beam construction as claimed in any of the above claims, **characterised in that** the surface layers (2a, 2b) are preferably made tongued and grooved (4, 5) on the edges of the laminated beams to be mounted on top of one another which are directed at each other.

5. A laminated beam construction as claimed in any of the claims 1 to 4, **characterised in that** the surface layers (2a, 2b) are made of timber.

6. A laminated beam construction as claimed in any of the claims 1 to 4, **characterised in that** the surface layers (2a, 2b) are made of wood panels laminated with each other.

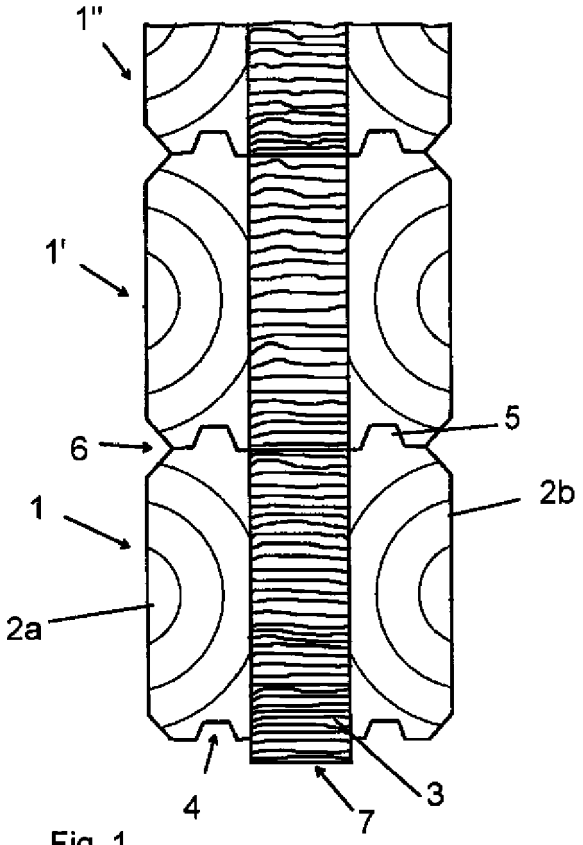

Fig. 1

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- SE 457456 **[0003]**
- SE 303580 **[0003]**