



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
23.06.2021 Bulletin 2021/25

(51) Int Cl.:
E04D 3/02 (2006.01) **E04D 3/35 (2006.01)**
E04B 7/02 (2006.01) **E04B 7/22 (2006.01)**

(21) Application number: **20214247.7**

(22) Date of filing: **15.12.2020**

(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 KH MA MD TN

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(30) Priority: **18.12.2019 NL 1043510**

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(54) **METHOD FOR INSTALLING A PITCHED ROOF**

(57) Method for installing a pitched roof on a building with two side walls (1), comprising (I) providing roof elements (3) which are arranged to be mounted on the sloping edge(s) (1a) of both side walls and which have a length and rigidity that is sufficient to be able to span the entire distance (d) between both side walls, and then (II) applying the ends (L, R) of the roof elements to the sloping edge(s) of both side walls. There are at least three types

of roof elements, viz. a base roof element (3a), a middle roof element (3b) and a ridge roof element (3c), each comprising an insulating body covered with, for example, steel sheet. The roof elements have a profile shape on their long edges, whereby successive roof elements interlock, and are preferably already provided with solar panels before the roof elements are installed.

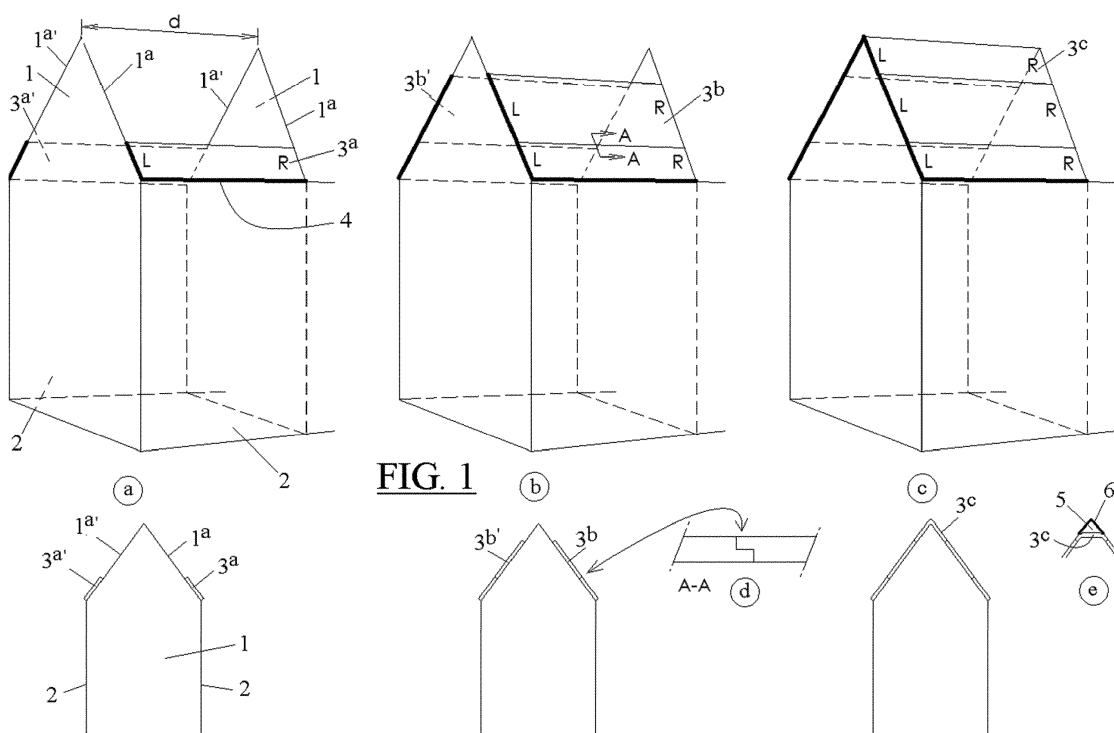


FIG. 1

Description

[0001] The invention relates to a method for installing a pitched roof on a building, in particular a house, including at least two side walls.

[0002] Traditionally, roof constructions (see, for example, https://en.wikipedia.org/wiki/List_of_roof_shapes) are known that use trusses, purlins, rafters, tracks, etc. (see, for example, https://en.wikipedia.org/wiki/Domestic_roof_construction). More modern roof constructions can be formed, for example, by a hinge cover (see for example <https://www.joostdevree.nl/shtmls/scharnierkap.shtml>) and/or by using roof elements of the Unidektype® (see for example <https://www.kingspan.com/nl/nl-nl/producten/geengineerde-con-structieve-houten-systemen/dakelementen>).

[0003] The object of the present invention is to provide a roof construction which is excellently suited for use in "scaffolding-free construction" of a building, in particular a house, wherein the building concept is chosen such that, as the term scaffolding-free indicates, the building is built *without* the use of scaffolding. For at height installing construction components and installation components, only for a short period of time use is being made of, for example, a construction crane and/or telehandler.

[0004] For this purpose, the invention provides a method for installing a pitched roof on a building, in particular a house, the house comprising two side walls, the method comprises the following steps:

- providing roof elements which are arranged to be mounted on the sloping edge(s) of both side walls, for that purpose the elements are provided with a length and a rigidity sufficient to be able to span the entire distance between the two side walls;
- arranging the ends of the roof elements on the sloping edge(s) of both side walls, preferably by starting with the base roof element followed by the next roof elements.

[0005] Preferably, only three types of roof element are provided for (standard) houses: a base roof element, a middle roof element and a ridge roof element.

[0006] Preferably, the roof elements, which are pre-eminently suitable for use in the method according to the invention, comprise an insulating body of foam material, for example expanded polystyrene (EPS), covered on one or both sides with a rigid covering material, for example of metal sheet, in particular of steel sheet.

[0007] Preferably, the roof elements are provided with a profile shape on one or both long edges such that successive roof elements mutually engage (interlock) with their profile shapes.

[0008] Preferably, the roof elements are (already) provided with solar panels, or the roof elements are arranged to be provided with solar panels prior to hoisting and mounting the roof elements with a construction crane.

[0009] Generally, the roof elements are not having an

equal shape, but differ slightly from each other due to different location and functionality.

[0010] Preferably, the roof element intended and arranged as a base roof element on its intended lower long edge is arranged to be able to attach a gutter on that edge, for example, by covering the lower long edge with a rigid covering material, for example of metal sheet, in particular of steel sheet.

[0011] Preferably, the two long edges of the roof element, which is intended and arranged as a middle roof element, are provided with a profile shape such that, as seen in the transverse direction of the roof element, the roof element and the adjacent (the above and below located) roof elements are able to mutually engage (interlock) with their profile shapes.

[0012] Preferably, the roof element that is intended and arranged to function as a ridge roof element for a gable roof (i.e. a roof with a ridge) is arranged and designed to be able to rest with one edge against a lower middle roof element on one gable roof side, and with the other edge against a lower middle roof element on the other gable roof side.

[0013] Optionally, the ridge roof element is provided with, or arranged to co-operate with, an elongated ridge space extending at the upper side of the roof element, in particular intended as a utility space for accommodating utility pipes, etc. Preferably, the ridge roof element and the ridge space are arranged and designed in such a way, that the ridge space is easily accessible from the outside, in particular from above, in particular for providing access to the utility pipes, etc.

[0014] The invention will now be discussed in more detail with reference to the figure description below.

[0015] Figure 1 illustrates, in the form of a double trip-tych, the method according to the invention.

[0016] Figure 1 illustrates the method according to the invention for installing a pitched roof (gable roof) on a building, in particular a house, comprising two side walls 1 (gable walls) and a front and rear wall 2.

[0017] The method comprises the following steps:

- providing roof elements 3a - c (respectively 3a' - c') which are arranged to be mounted on the sloping edge(s) 1a of both side walls 1 and for this purpose have a length and rigidity sufficient to be able to span the entire distance d between both side walls 1.
- arranging the ends L and R of the roof elements 3 or 3' on the sloping edge(s) 1a or 1a' of both side walls, starting with the lower roof element 3a or 3a', and then the next roof element 3b or 3b' and 3c or 3c' respectively.

[0018] Optionally, the roof elements 3a and 3b are firstly installed at the front side of the house and then the roof elements 3a' and 3b' are installed at the rear side of the house, or firstly the roof element 3a at the front side of the house is installed and then the roof element 3a' at the rear side of the house, followed by the roof elements

3b at the front side and the roof elements 3b' at the rear side.

[0019] In the embodiment shown in figure 1, use is made of three types of roof element, a base roof element 3a and 3a'; a center roof element 3b and 3b'; and a ridge roof element 3c and 3c'.

[0020] Preferably, all roof elements 3 and 3' comprise an insulating body of foam material, for example from expanded polystyrene (EPS), covered on one or both sides with a rigid covering material, such as a metal sheet, in particular a steel sheet. Preferable, the roof elements 3 and 3' are provided with a profile shape either on one long edge (the base roof elements 3a and 3a', and the ridge roof elements 3c and 3c') or on both long edges (the middle roof elements 3b and 3b') such that successive roof elements (3a/3b and 3a'/3b', respectively, and 3b/3c and 3b'/3c', respectively) mutually engage (interlock) with their profile shapes, see for example the profile shown in Figure 1d.

[0021] Preferably, the roof elements 3 and/or 3' are already provided with solar panels (not explicitly shown), before installing the elements on the sloping edges (parts) 1a and/or 1a'; this applies in particular to the middle roof elements 3b and 3b'.

[0022] The roof element being arranged as base roof element 3a and 3a', on its (intended) lower long edge 4 is arranged for being able to attach a gutter (not shown) on the lower long edge 4, for which purpose the base roof element 3a and 3a' is provided on the lower long edge 4 with a covering of rigid covering material, such as metal sheet, in particular steel sheet.

[0023] Both long edges (bottom and top) of the middle roof elements 3b and 3b' have such a profile shape that, as seen in the transverse direction A-A of the roof element, the roof elements 3b and 3b', and the adjacent roof elements 3a and 3a' (located below) and 3c and 3c' (located above) mutually engage (interlock) with their profile shapes (see Figure 1d).

[0024] The roof element 3c for a gable roof (a roof shape with a ridge) intended as a ridge roof element is configured to be able to rest with one side (end side) against a lower middle roof element 3b on one sloping edge 1a of the gable wall, and to rest with the other side against the lower middle roof element 3b' on the other sloping edge 1a' of the gable wall.

[0025] Figure 1e shows an optional embodiment of a ridge roof element 3c, in which said ridge roof element 3c is provided with (or is arranged to cooperate with) an elongated ridge space 5 extending at the top of the roof element 3c, in particular intended as a utility space for housing utility pipes, etc. The ridge roof element 3c and the ridge space 5 are preferably arranged and designed in such a way, for example in that the ridge space is covered at the top by a removable ridge cap 6, so that the ridge space is easily accessible from the outside, in particular from above, in particular for granting access to the utility pipes, etcetera, for example for inspection or maintenance.

[0026] The present invention thus provides a roof construction, which is excellently suited for use in the *scaffold-less construction* of a building, in particular a house, in which the building is constructed *without* the use of scaffolding. For bringing the construction and installation components at the required height, only for a short period of time the use of a construction crane is necessary. Moreover, the invention fits in with the concept of "circular construction", in that the roof elements can be entirely removed in a relatively simple manner; in principle in the same way as they are installed, at the end of the lifespan of the building on which they have been installed.

[0027] With regard to the installing of the roof elements 3a and 3b, it is also noted that for this purpose use can be made, for example, of a special hoisting facility comprising a hook-shaped hoisting frame with support beams that are tiltable adjustable at the bottom thereof and which are provided with vacuum suction cups on their top side. Each roof element is placed with its bottom/inner surface (the top/outer surface is then already provided with solar panels) on the suction cups and attached thereto by a vacuum in the suction cups. After that, the hook frame including the (tiltable) support beams is lifted and the roof element is positioned in the correct location on the relevant sloping edge(s) 1a of the side walls 1, after which the vacuum in the suction cups is released and the hoisting frame is firstly lifted above the newly installed roof element 3a or 3b and then is veered downwards along the outside thereof. When lifting the hoisting frame above the mounted roof element, after that roof element has been installed, it may be necessary - in particular when installing the roof elements 3b - to firstly adjust the inclination of the support beams (for example, by orienting the support beams straight up) to be able to lift those support beams upwards, along the installed roof elements. If desired, the hoisting frame can also be provided with other "folding" provisions, such as hinges, etcetera, in order to ensure that the hoisting frame can be hoisted safely and effortlessly along the roof elements already installed.

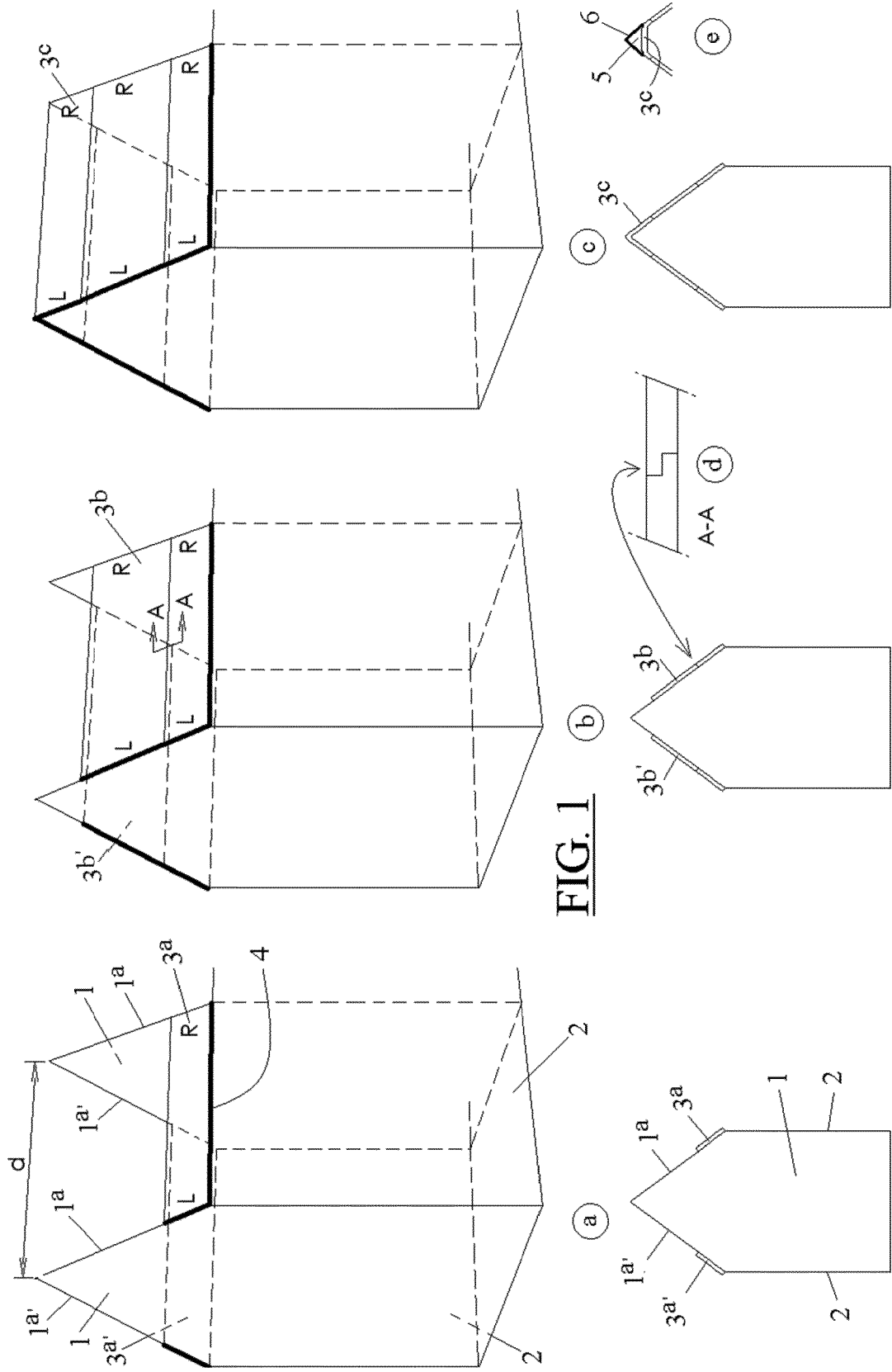
[0028] The ridge roof element 3c can be installed in a conventional manner, without using the special hoisting frame, for example by using hoisting eyes arranged on the top/outside thereof.

Claims

1. Method for installing of a pitched roof on a building, in particular a house, comprising two side walls (1), each provided with at least one sloping edge (1a), which method comprises the following steps:

- providing roof elements (3), which are arranged to be mounted on the at least one sloping edge of both side walls, which elements are provided with a length and a rigidity sufficient to be able to span the entire distance (d) between the two

- side walls;
 - arranging the ends (L, R) of the roof elements on the at least one sloping edge of both side walls, preferably starting with the base roof element (3a) and subsequently the next roof elements (3b, 3c). 5
2. Method according to claim 1, wherein at least three types of roof element are provided: a base roof element (3a), a middle roof element (3b) and a ridge roof element (3c). 10
3. Roof element, which is arranged for use in the method according to claim 1 or 2, comprising an insulating body of foam material, for example EPS, on one or both sides covered with a rigid covering material. 15
4. Roof element according to claim 3, wherein the covering material on at least one side is of metal sheet, particularly of steel sheet. 20
5. Roof element according to claim 3 or 4, wherein the roof elements on one or both long edges are provided with such a profile shape, that successive roof elements mutually engage with their profile shapes. 25
6. Roof element according to claim 3 - 5, provided with solar panels, or arranged to be provided with solar panels prior to mounting the roof element on a sloping edge of the side walls of the building. 30
7. Roof element according to any one of the claims 3 - 6, intended and arranged as base roof element (3a), which intended lower long edge (4) is arranged to be able to attach a roof gutter on that edge. 35
8. Roof element according to any one of the claims 3 - 6, intended and arranged as middle roof element (3b), wherein the two long edges are provided with a profile shape such that, as seen in the transverse direction of the roof element, the roof element and the adjacent roofing elements are able to mutually engage with their profile shapes. 40
9. Roof element according to any one of the claims 3 - 6, intended and arranged as ridge roof element (3c) for a gable roof, wherein one edge is able to rest against a lower middle roof element on one gable roof side, and the other edge is able to rest against a lower middle roof element on the other gable roof side. 45 50
10. Roof element according to claim 9, provided with, or arranged to co-operate with, an elongated ridge space (5), which extends at the upper side of the roof element, in particular intended as a utility space for accommodating utility pipes, etc. 55
11. Roof element according to claim 10, wherein the roof element and the ridge space are arranged and designed such, that the ridge space is easily accessible from the outside, in particular from above, in particular for granting access to the utility pipes, etc.





EUROPEAN SEARCH REPORT

 Application Number
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EPO FORM 1503 03.82 (P04C01)

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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			

**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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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82