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(54) **SELF-SUPPORTING ROOF CONSTRUCTION FOR NON-LOAD-BEARING FACADE OF A BUILDING**

(57) The invention relates to a building comprising a main building and a roof construction. The present invention further relates to a roof construction that is mounted to a non-load-bearing façade wall of a main building.

According to the invention, the building comprising a main building and a roof construction such as a sun porch, roof, terrace roof, porch, conservatory or veranda, fixedly connected to a façade wall of the main building, wherein the roof construction comprises an outer section projecting from the façade wall of the main building, wherein the roof construction comprises fastening means that fasten the outer section to the main building in an at least partly thermally insulating manner, wherein the roof construction is self-supporting.

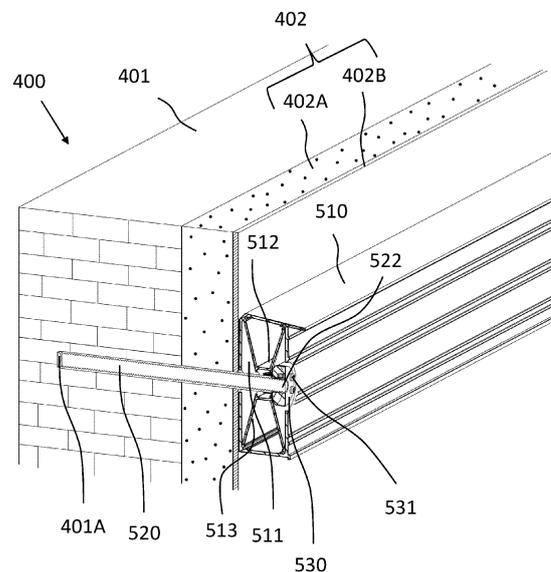


FIG. 4

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## Description

**[0001]** The invention relates to a building comprising a main building and a roof construction. The present invention further relates to a roof construction that is mounted to a façade wall of a main building.

**[0002]** Roof constructions such as a sun porch, roof, terrace roof, porch, conservatory or veranda are very popular these days. A roof construction is usually of substantial weight, especially when provided with glass panels, has a relatively large surface and is subject to all kinds of weather conditions, including strong winds or storms. The roof construction therefore has to be securely connected to a fixed object in order not to be blown away. Currently, roof constructions such as verandas are therefore directly mounted to a load-bearing façade wall of a building.

**[0003]** A problem occurs when the wall to which the veranda is mounted is not solid or load-bearing. Façade walls of modern buildings are more and more provided with an extra layer outside of the load-bearing facade wall. Typically, some kind of cladding is used to cover the load-bearing façade wall that serves two functions, the first being aesthetical reasons and the second being thermal insulation reasons. By leaving a space between cladding and the load-bearing façade wall, a body of trapped air may be created which serves as a good insulator. Having a good insulation of the façade wall reduces the energy consumption of a building. To increase the insulation properties even more, especially in conditions where air cannot be trapped easily, a separate insulating layer may be provided between the load-bearing façade wall and the cladding. The insulating layer may also be used instead of a cladding. For this purpose, the insulating layer may be finished with a coating or other cover layer to withstand weather conditions. In any case, insulating layers, cover layers and/or cladding are usually not load-bearing, because there is no need to add an additional load-bearing wall in front of an existing load-bearing wall.

**[0004]** Mounting of a roof construction directly and solely to cladding or to the insulating layer would be very unreliable and therefore undesirable. Cladding materials and insulation materials are usually not suitable to carry high loads. Even if fastening means to the cladding hold when a strong wind pulls on the roof construction, the cladding itself may be torn of the building with dramatic consequences.

**[0005]** It is an object of the present invention to provide a secure and reliable roof construction which is stable even when mounted to a building which is provided with an insulating layer and/or cladding outside of a load bearing wall.

**[0006]** The object is realized by the building as defined in claim 1 which comprises a main building and a roof construction such as a sun porch, roof, terrace roof, porch, conservatory or veranda fixedly connected to a façade wall of the main building, wherein the roof con-

struction comprises an outer section projecting from the façade wall of the main building, wherein the roof construction comprises fastening means that fasten the outer section to the main building in an at least partly thermally insulating manner, wherein the roof construction is self-supporting.

**[0007]** The outer section may comprise a wall-side construction element, preferably made of metal, wherein one end of the fastening means is fixedly connected to the main building and wherein an opposing end of the fastening means is fixedly connected to the wall-side construction element, wherein the fastening means comprise at least partly thermally insulating fastening means. The façade wall of the main building may comprise a load-bearing façade wall that is covered by a non-load-bearing façade wall, wherein the fastening means fasten the wall-side construction element to the load-bearing façade wall while bridging the non-load-bearing façade wall. Additionally or alternatively, the fastening means may have an elongated part that is partially arranged in a hole in the façade wall of the main building, and wherein the wall-side construction element comprises a first wall segment configured to be arranged against the façade wall of the building and having a first opening, and a connection segment arranged spaced apart from and fixedly connected to the first wall segment, wherein the connection segment is provided with a second opening, wherein the hole, the first opening, and the second opening are aligned, and wherein the fastening means extend through the first and second openings. In this case, the elongated part has a first end that is fixedly arranged in the hole and an opposing second end that is fixedly connected to the connection segment. When the building has a non-load-bearing façade wall as described above, the hole extends in the load-bearing façade wall and through the non-load-bearing façade wall.

**[0008]** The first end may be provided with means to secure the fastening means in the hole, such as protrusions, dents, holes circumferential ribs, serrations. The fastening means may comprise a sleeve part fixedly arranged in the hole, wherein the first end of the elongated part is fixedly arranged in the sleeve. For example, the sleeve can be fixedly connected in the hole using an adhesive or a solidified paste such as mortar. In this case, the sleeve may be configured to evenly distribute the adhesive or paste before curing or solidification. Generally, the sleeve is made of polymeric material.

**[0009]** The elongated part may comprise a rod having at least a threaded end forming the second end. In this case, the fastening means may further comprise a coupling element having a threaded inner opening, wherein the coupling element is mounted on the threaded end using the threaded inner opening, and wherein the coupling element is fixedly connected to the connection segment using further fastening means such as screws, more in particular self-tapping screws.

**[0010]** At least the elongated part among the elongated part, sleeve part, and coupling element may consist of a

material of the group comprising fiberglass, a composite of fiberglass and a resin, a reinforced polyester resin, a composite material of a resin and E-glass, i.e. aluminoborosilicate glass with less than 1 % w/w alkali oxides, polyamide, aramide, Nylon, Kevlar, acrylonitrile butadiene styrene (ABS), carbon fibers, and cotton fibers, or any combination thereof.

**[0011]** The non-load-bearing façade wall may comprise a cladding or cover layer of the main building. Furthermore, the non-load-bearing façade wall may further comprise a thermally insulating layer for thermally insulating the main building, the thermally insulating layer being arranged between the cladding or cover layer and the load-bearing wall, wherein the fastening means bridge the thermally insulating layer to substantially maintain insulating characteristics of the thermally insulating layer.

**[0012]** The roof construction may comprise at least one upright that supports the outer section.

**[0013]** According to a second aspect, the present invention provides a roof construction such as a sun porch, roof, terrace roof, porch, conservatory or veranda, configured to be fixedly connected to a façade wall of a main building, wherein the roof construction comprises an outer section configured to project from the façade wall of the main building, and fastening means, whereby the outer section is configured to be fastened to the main building with fastening means in an at least partly thermally insulating manner, wherein the roof construction is self-supporting. Here, the roof construction can be configured as described above.

**[0014]** The present invention particularly relates to an embodiment of a roof construction configured to be fixedly connected to a façade wall of a main building, wherein the façade wall of the main building comprises a load-bearing façade wall that is covered by a non-load-bearing façade wall, wherein the roof construction comprises an outer section projecting from the non-load-bearing façade wall of the main building, and wherein the roof construction comprises fastening means that fasten the outer section to the main building in an at least partly thermally insulating manner, wherein the roof construction is self-supporting. Furthermore, in this embodiment, the outer section comprises a wall-side construction element, preferably made of metal, wherein one end of the fastening means is fixedly connected to the load-bearing façade wall of the main building and wherein an opposing end of the fastening means is fixedly connected to the wall-side construction element. In this embodiment, the fastening means have an elongated part that is partially arranged in a hole that extends in the façade wall and through the non-load-bearing façade wall. Furthermore, the wall-side construction element comprises a first wall segment configured to be arranged against the non-load-bearing façade wall of the building and having a first opening, and a connection segment arranged spaced apart from and fixedly connected to the first wall segment, wherein the connection segment is provided with a sec-

ond opening, wherein the hole, the first opening, and the second opening are aligned, and wherein the fastening means extend through the first and second openings. The elongated part has a first end that is fixedly arranged in the hole and an opposing second end that is fixedly connected to the connection segment. Moreover, the elongated part comprises a rod having at least a threaded end forming the second end, the fastening means further comprising a coupling element having a threaded inner opening, wherein the coupling element is mounted on the threaded end using the threaded inner opening, and wherein the coupling element is fixedly connected to the connection segment using further fastening means.

**[0015]** The roof construction may comprise at least one upright that supports the outer section.

**[0016]** Next, the present invention will be described in more detail referring to the appended drawings, wherein:

Figure 1 shows a perspective view of an embodiment of a roof construction in accordance with the present invention when placed against a cladding of a building;

Figure 2 shows a sectional side view of the roof construction of figure 1.

Figure 3 shows a detail of fastening means in accordance with the present invention for securing the invented roof construction;

Figure 4 illustrates a perspective view of an outer section of a further embodiment of a roof construction in accordance with the present invention that is fixedly attached to a non-load bearing façade of a main building; and

Figures 5A and 5B describe details of fastening the roof construction of figure 4.

**[0017]** Figure 1 shows a perspective view of a roof construction 100 when placed against a cladding 201 of a building. Roof construction 100 is self-supporting, and rests on front posts 103 and rear posts 104. The roof protrudes from the building with roof beams 101. The roof itself may be provided with horizontal or sloping panels to provide shelter against e.g. rain or light. Roof panels 102 may for example comprise glass or plastic (polycarbonate) panels. A horizontal rear beam 105, which forms an outer section of roof construction 100, is mounted to the building. Additionally, rear posts 104 and front posts 103 may provide additional stability and a secure fixing of the veranda, when connected to foundation 200.

**[0018]** Figure 2 shows a sectional side view of roof construction 100. Roof construction 100 is configured such that at a high point i.e. at the position of rear beam 105, a fastening means i.e. a pin, pen, or rod 300, is provided that passes through rear beam 105, cladding 201, insulating layer 202 and into load-bearing wall 203. Cladding 201 and insulating layer 202 are separately or together also referred to as non-load-bearing façade wall, whereas the load-bearing wall is also referred to as load-bearing façade wall.

**[0019]** Figure 3 shows a detail of fastening means 300 for securing roof construction 100. The invention proposes to use fastening means 300 which are suitable to bridge cladding 201 and/or insulating layer 202 and to mount roof construction 100 effectively to the load-bearing wall 203 directly. For this purpose, a pin, pen, or rod 300 of substantial length and strength, and which is optionally provided with a threading, can be used to fasten rear beam 105 to the building. Pin, pen, or rod 300 passes through rear beam 105, then through cladding 201 and insulating layer 202 and into a cavity 302 of load-bearing wall 203. Cavity 302 may be drilled right through cladding 201, insulating layer 202, and load-bearing wall 203, whereas a hole fitting for pin, pen, or rod 300 may be prepared in the factory of the roof construction. By filling cavity 302 at least partly with a resin or mortar (such as a two-components resin), a filler or glue which is suitable to hold pin, pen, or rod 300 securely after curing, pin, pen, or rod 300 forms a strong anchor to which the veranda may be mounted. To secure roof construction 100 with rear beam 105 to the building, nut 301 is screwed tight over pin, pen, or rod 300. This nut is also attached to the rear beam 105 to prevent a pushing wind to drive the rear beam 105 into the cladding 201 and thus damaging it.

**[0020]** In roof construction 100 described above, only little force is exerted on cladding or insulating layer 202 when the veranda is subject to pulling forces. As the fastening means created in this way mainly serve to withstand pulling forces exerted on the top of the veranda (where the panels are mounted) away from the building, they can be designed especially for the purpose for withstanding tensile forces. Pin, pen, or rod 300 does not need to be able to withstand high bending forces, because roof construction 100 is self-supporting as described above.

**[0021]** Figure 4 illustrates a perspective view of an outer section of a further embodiment of a roof construction in accordance with the present invention that is fixedly attached to a non-load bearing façade of a main building, and figures 5A and 5B describe details of fastening the roof construction of figure 4. Here, main building 400 comprises a load-bearing façade wall 401 that is covered with a thermally insulating layer 402A and cladding 402B, which are jointly referred to as non-load-bearing façade wall 402.

**[0022]** The roof construction of figure 4 comprises an outer section 510, which is provided with a wall segment 511 and a connection segment 512 that is connected to wall segment 511 using connecting walls 513. Outer section 510 can be an extrusion profile having an essentially constant cross section along its longitudinal axis.

**[0023]** Here, the fastening means comprise an elongated rod 520 which is arranged in a hole 401A of load-bearing façade wall 401. Elongated rod 520 has a threaded second end 522. A coupling element 530 having an inner threaded opening 533 is mounted to second end 522. In turn, coupling element 530 is coupled to connec-

tion segment 512 using self-tapping screws 531 that are arranged through openings 532 of coupling element 530.

**[0024]** The fastening means may also comprise a sleeve 521, only shown in figure 5A, made of plastic material in which elongated rod 520 is fixedly arranged using injection mortar or the like.

**[0025]** In the roof construction a tight placement of wall segment 511 against non-load-bearing façade wall 402 can be guaranteed while at the same time preventing that a strong fixation of the roof construction relative to building 400 would damage relatively sensitive non-load-bearing façade wall 402. This is achieved due to the fact that fixation of roof the construction is not achieved by means of clamping wall segment 511 against non-load-bearing façade wall 402 using a nut or the like. Rather, the fixation of the roof construction is achieved through the connection between elongated rod 520, which is fixed relative to building 400, and coupling element 530. Accordingly, the force between non-load-bearing façade wall 402 and wall segment 511 can be decoupled from the strength by which the roof construction is coupled to building 400.

**[0026]** For mounting the roof construction to building 400, a hole 401A is drilled through non-load-bearing façade wall 402 into load-bearing façade wall 401. Next, a plastic sleeve 521 is inserted into hole 401A, which sleeve is provided with a movable brim 522. As a next step, brim 522 is moved towards connection segment 512. More in particular, connection segment 512 is shaped as a beam having a back side parallel to wall segment 511, a front side parallel to wall segment 511 and facing away from building 400, and two side walls. Openings are provided in the back side, the front side, and in wall segment 511. These openings are aligned with hole 401A. Typically, these openings are pre-fabricated. Furthermore, it is preferred to drill hole 401A through these openings.

**[0027]** After arranging sleeve 521 through the openings and into hole 401A, brim 522 is moved towards the front side of connection segment 512. Thereafter, sleeve 521 is removed from hole 401A and the openings and is cut using the adjusted position of brim 522.

**[0028]** Next, elongated rod 520 is arranged in sleeve 521. Elongated rod 520 is then cut using sleeve 521, leaving a small amount of threaded end protruding from sleeve 521.

**[0029]** As a next step, sleeve 521 is arranged in hole 401 through the abovementioned openings. Hole 401A is then injected with chemical mortar. Quickly thereafter, elongated rod 520 is inserted into hole 401A and sleeve 521 using a rotating motion. After the mortar has cured, elongated rod 520 is fixedly attached to load-bearing façade wall 401.

**[0030]** As a next step, coupling element 530 is screwed onto the threaded end of elongated rod 520 until it lies against the front side of connection segment 512. Thereafter, coupling element 530 is fixedly attached by mounting self-tapping screws (not shown) through openings

532 in coupling element 530.

**[0031]** When implementing the invented solution, there are four challenges. The first challenge comprises that pin or pen 300 or elongated rod 520 mainly has to withstand tensile and shear forces and to a lesser extent bend forces. The second challenge is that pin or pen 300 or elongated rod 520 needs to be durable, and especially resistant to corrosion, because it is a structural important part of the roof construction. The third challenge comprises that a cold bridge is created between load-bearing wall 203, 401 and rear beam 105 or wall segment 511 when a metal pin or pen or rod is used. Typically, outer section 510 or rear beam 105 are made of a material having a high coefficient of thermal conduction such as metal, preferably aluminum. Consequently, heat can be transferred from the building through the metal pin or pen or rod to the outside via the roof construction. This will, at least partly decrease the insulating efforts put in by adding insulating layer 202, any may result in increased costs, and condensation related problems such as the growth of mold. One way to prevent or reduce the cold-bridge is to insulate pin or pen 300. This could be partly done by choosing a temperature insulating kit as a filler in cavity 302 or hole 401A. Nevertheless, still heat may leak through pin or pen 300 or rod 520 through conduction.

**[0032]** According to the invention, the pin or pen or elongated rod can be advantageously made of reinforced fiber plastic. The fibers are oriented in a multitude of directions but primarily in the longitudinal direction and provide excellent tensile strength. In order to hold the fibers together and to reinforce them, the fibers can be mixed with a resin, such as an (two-components) epoxy resin. The resin also provides some or even considerable bend and shear resistance, which is also important for supporting a straight driving of pin or pen 300 or rod 520 through rear beam 105, cladding 201 and/or insulation 202 and into the cavity 302 or hole 401A, and at the same time provides support for vertical stability of the roof construction. Now, by not using a metal screw or elongated rod, but a durable fiber/resin combination, corrosion or deterioration of the screw's or rod's quality is not an issue anymore, thereby meeting the second challenge. The same combination of materials proved to be highly temperature insulating as well, thereby also meeting the third challenge. Last but not least, the reinforced fibers have low shrinkage and expansion values. The fibers may comprise glass fibers, Aramid fibers or any fiber having similar mechanical strength and a very low heat transfer coefficient.

**[0033]** Although the abovementioned fiber pin or pen or elongated rod is especially useful for the present invention, the screw or rod may also be applied in other roof constructions or mounting systems of roof constructions. The screw or rod may in general be applied in a wide variety of applications where a light weight, durable, temperature insulating, stainless, tensile-, shear- and bend forces resistant fastening means is needed.

**[0034]** It should be noted that the above-mentioned embodiments illustrate rather than limit the invention, and that a person skilled in the art will be able to design many alternative embodiments without departing from the scope of the appended claims. In the claims, any reference signs placed between parentheses shall not be construed as limiting the claim.

#### REFERENCE SIGNS

#### **[0035]**

100	roof construction
101	roof beam
102	roof panel
103	front post
104	rear post
105	rear beam
200	foundation
201	cladding
202	insulation layer
203	bearing wall
300	pin, pen, or rod
301	nut
302	cavity
400	building
401	load-bearing façade wall
401A	hole
402	non-load-bearing façade wall
402A	insulating layer
402B	cladding
510	outer section
511	wall segment
512	connecting segment
513	connecting walls
520	elongated rod
521	sleeve
522	brim
530	coupling structure
531	screw
532	opening for screw
533	threaded inner opening

#### **Claims**

1. A roof construction such as a sun porch, roof, terrace roof, porch, conservatory or veranda, configured to be fixedly connected to a façade wall of a main building (400), wherein the roof construction comprises an outer section configured to project from the façade wall of the main building, and fastening means, whereby the outer section is configured to be fastened to the main building with said fastening means in an at least partly thermally insulating manner, wherein the roof construction is self-supporting;

wherein the façade wall of the main building

comprises a load-bearing façade wall (401) that is covered by a non-load-bearing façade wall (402), wherein the outer section is configured for projecting from the non-load-bearing façade wall of the main building;

wherein the outer section comprises a wall-side construction element, preferably made of metal, wherein one end of the fastening means is fixedly connected to the load-bearing façade wall of the main building and wherein an opposing end of the fastening means is fixedly connected to the wall-side construction element;

wherein the fastening means have an elongated part that is partially arranged in a hole that extends in the façade wall and through the non-load-bearing façade wall;

wherein the wall-side construction element comprises a first wall segment (511) configured to be arranged against the non-load-bearing façade wall of the building and having a first opening, and a connection segment (512) arranged spaced apart from and fixedly connected to the first wall segment, wherein the connection segment is provided with a second opening, wherein the hole, the first opening, and the second opening are aligned, and wherein the fastening means extend through the first and second openings;

wherein the elongated part has a first end that is fixedly arranged in the hole and an opposing second end that is fixedly connected to the connection segment, wherein the elongated part comprises a rod (520) having at least a threaded end (522) forming the second end, the fastening means further comprising a coupling element (530) having a threaded inner opening (533), wherein the coupling element is mounted on the threaded end using the threaded inner opening, and wherein the coupling element is fixedly connected to the connection segment using further fastening means (531).

2. The roof construction according to claim 1, further comprising at least one upright that supports the outer section.

3. A building comprising a main building (400) and the roof construction according to claim 1 or 2 fixedly connected to a façade wall of the main building.

4. The building according to claim 3, wherein the first end is provided with means to secure the fastening means in said hole, such as protrusions, dents, holes circumferential ribs, serrations.

5. The building according to claim 3 or 4, wherein the fastening means comprise a sleeve part (521) fixedly arranged in the hole, wherein the first end of the elon-

gated part is fixedly arranged in the sleeve.

6. The building according to claim 5, wherein the sleeve is fixedly connected in the hole using an adhesive or a solidified paste such as mortar.

7. The building according to any of the claims 3-6, wherein at least the elongated part among the elongated part, the sleeve part, and the coupling element consists of a material of the group comprising fiberglass, a composite of fiberglass and a resin, a reinforced polyester resin, a composite material of a resin and E-glass, i.e. alumino-borosilicate glass with less than 1% w/w alkali oxides, polyamide, such as Twaron, aramide, Nylon, Kevlar, Acrylonitrile butadiene styrene (ABS), carbon fibers, and cotton fibers, or any combination thereof.

8. The building according to any one of the claims 3-7, wherein the non-load-bearing façade wall comprises a cladding (402B) or cover layer of the main building.

9. The building according to claim 8, wherein the non-load-bearing façade wall further comprises a thermally insulating layer (402A) for thermally insulating the main building, said thermally insulating layer being arranged between the cladding or cover layer and the load-bearing wall, wherein the fastening means bridge the thermally insulating layer to substantially maintain insulating characteristics of the thermally insulating layer.

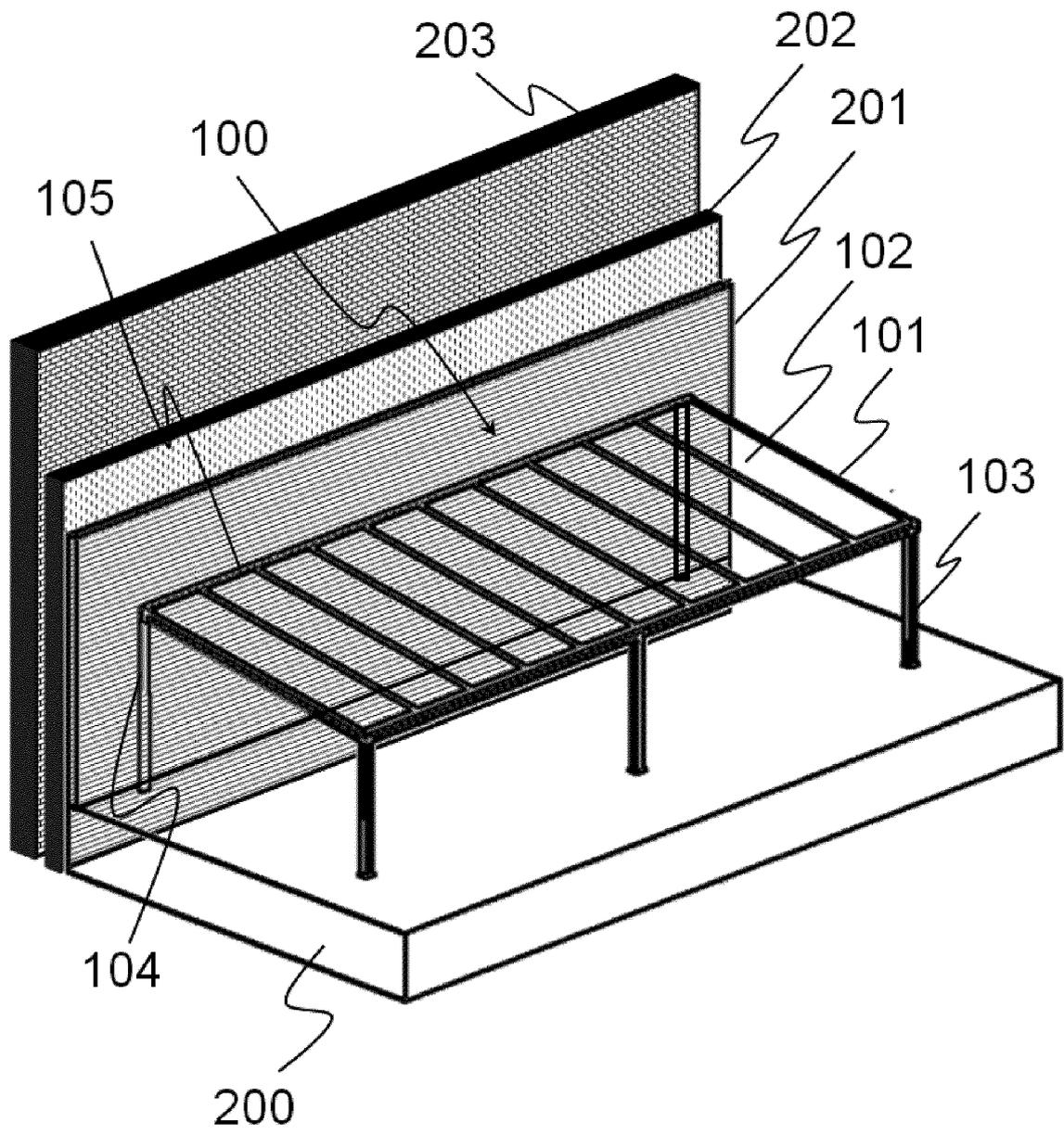


FIG. 1

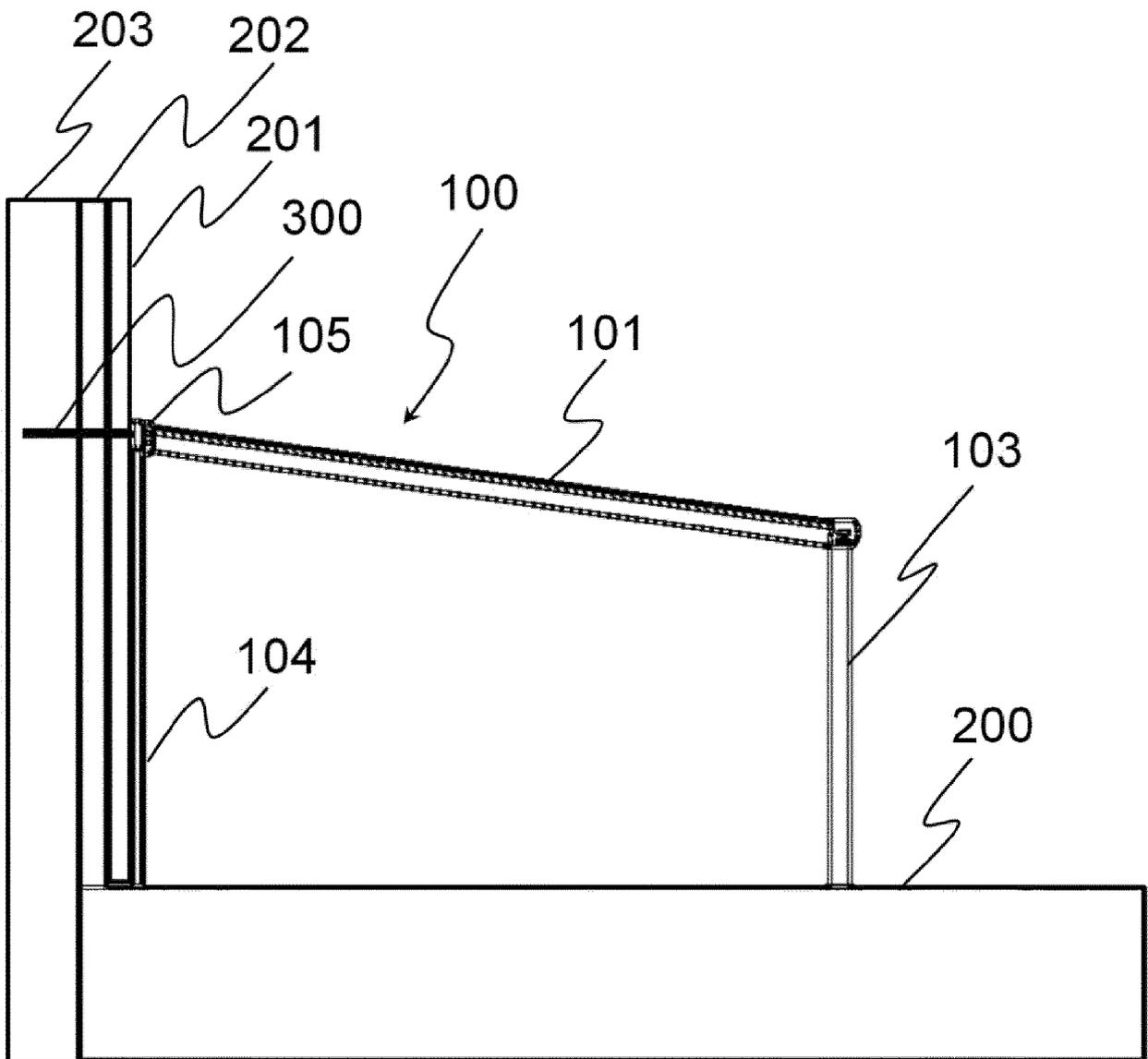


FIG. 2

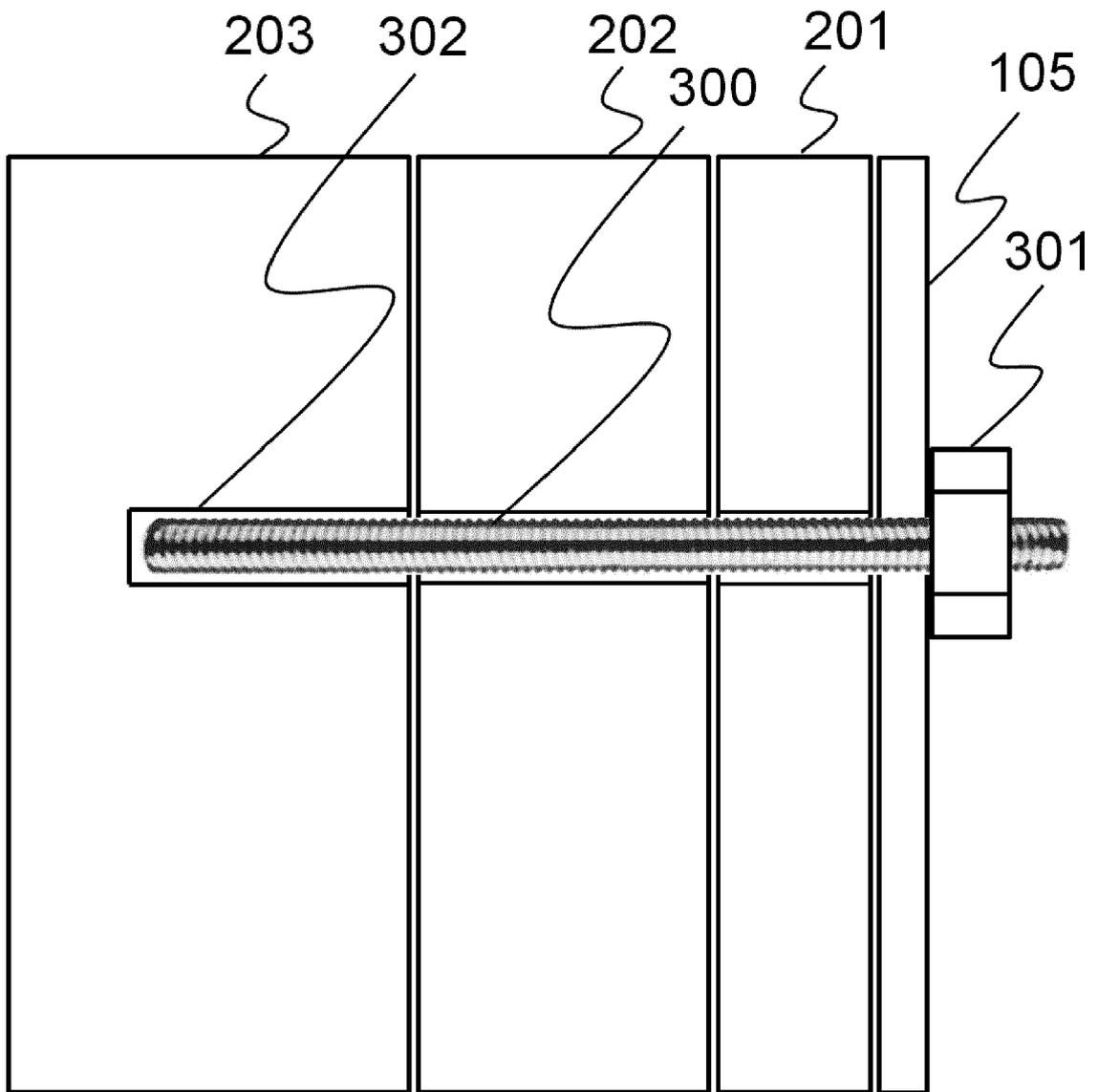


FIG. 3

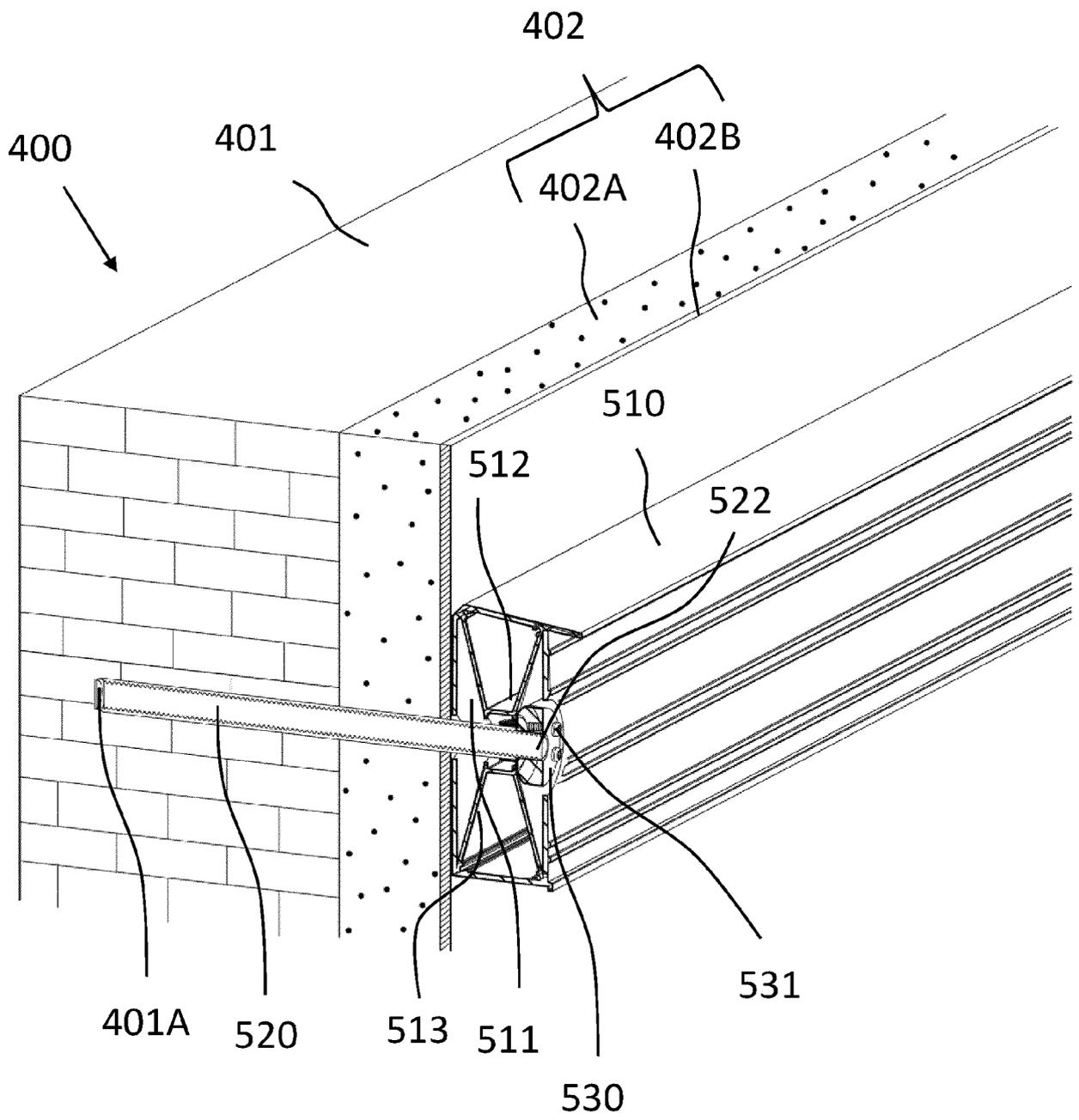


FIG. 4

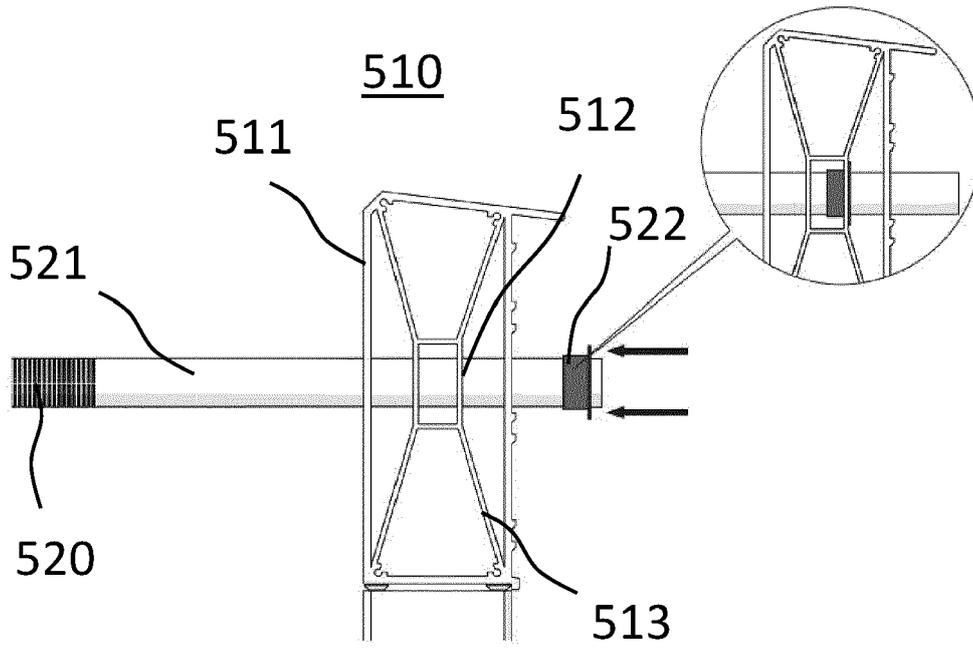


FIG. 5A

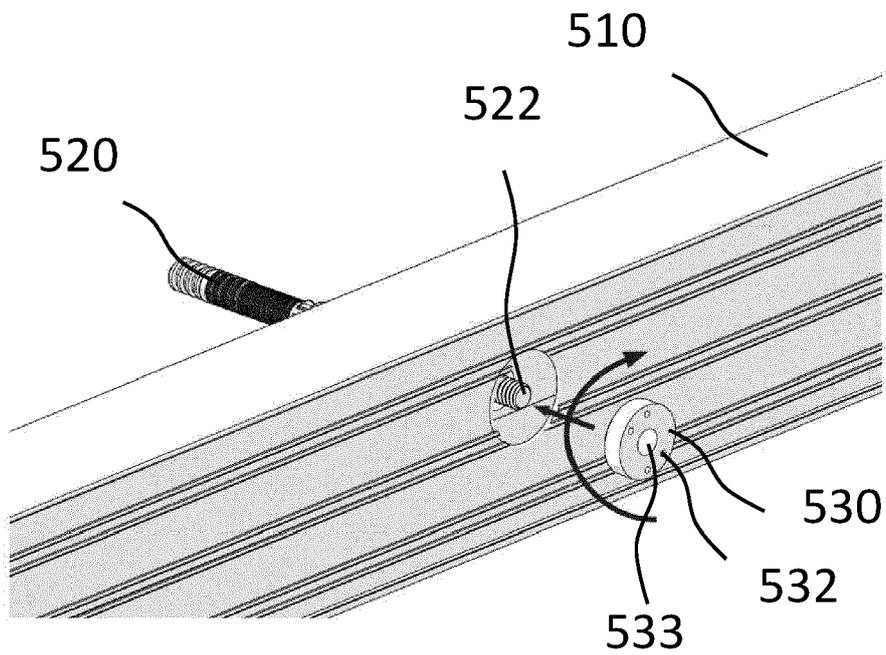


FIG. 5B



EUROPEAN SEARCH REPORT

Application Number

EP 23 18 9968

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	DE 20 2013 105729 U1 (HEIM & HAUS HOLDING GMBH [DE]) 18 March 2015 (2015-03-18) * paragraph [0012] - paragraph [0031] * * paragraph [0040] - paragraph [0046]; figure 1 *	1-9	INV. E04B1/00 E04B1/76
X	US 4 884 376 A (DEBLOCK DAVID A [US] ET AL) 5 December 1989 (1989-12-05) * column 10, line 19 - column 15, line 14; figures 1, 9, 11, 15 *	1-9	
A	DE 20 2014 101907 U1 (HEIM & HAUS HOLDING GMBH [DE]) 24 July 2015 (2015-07-24) * the whole document *	1-9	
A	DE 10 2007 001426 A1 (STICH FRIEDRICH [AT]) 2 August 2007 (2007-08-02) * the whole document *	1-9	
			TECHNICAL FIELDS SEARCHED (IPC)
			E04B
The present search report has been drawn up for all claims			
Place of search <b>The Hague</b>		Date of completion of the search <b>31 October 2023</b>	Examiner <b>Galanti, Flavio</b>
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31-10-2023

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 202013105729 U1	18-03-2015	NONE	
US 4884376 A	05-12-1989	NONE	
DE 202014101907 U1	24-07-2015	NONE	
DE 102007001426 A1	02-08-2007	AT 502190 A4 DE 102007001426 A1	15-02-2007 02-08-2007

EPO FORM P0459

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