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(54) THERMALLY INSULATED WALL

(57) A thermally insulated wall (10, 110) applied to a masonry support (11, 111), comprising, arranged in the following order:
- a layer (12, 112) of thermal insulation which is fixed to the masonry support (11, 111),
- a plurality of profiles (13, 113) which are connected to at least one between the masonry support (11, 111) and the layer (12, 112) of thermal insulation,
- a plurality of finishing panels (14, 114) associated with the plurality of profiles (13, 113).

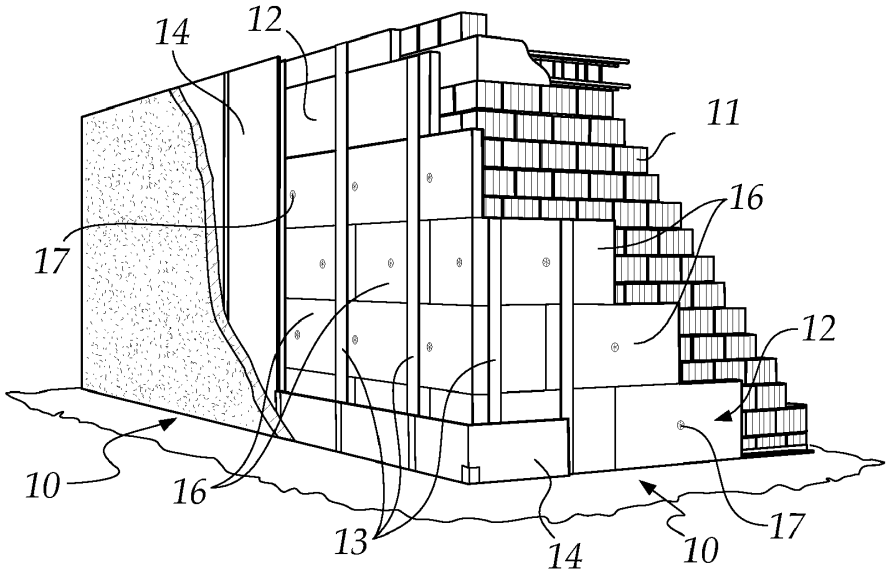

Fig.1

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Description

[0001] The present invention relates to a thermally insulated wall.

[0002] The invention also relates to a ventilated thermally insulated wall.

[0003] The invention can be applied in the field of construction for providing walls having thermal insulation.

[0004] Currently, in order to build a building with thermally insulated walls, of the ETICS (External Thermal Insulation Composite System) type, the following operations are performed:

- the masonry supports are provided, generally in brickwork and/or with lightweight panels, for example made of wood and/or cement and/or concrete,
- multiple thermal insulation slabs are fixed on the surface of said supports that is external to the building and are arranged so that the edges match up as much as possible, by means of adhesives and/or wall anchors,
- the thermal insulation slabs are smoothed over and leveled so as to obtain a uniformly leveled surface,
- the leveled surface is grouted and/or plastered in order to provide the finish.

[0005] The slabs of thermal insulation are optionally arranged so as to be offset between the horizontal rows, with offset vertical joints, in order to reduce surface tensions.

[0006] The so-called "dry thermally insulated wall" is also known.

[0007] In order to provide a dry thermally insulated wall, a metallic structure is installed by using horizontal guide profiles arranged at the base and on the false ceiling and multiple vertical upright profiles are installed. Multiple panels of thermal insulation are inserted in the structure thus provided.

[0008] Multiple finishing panels (for example made of plasterboard) are fixed on the structure.

[0009] In order to provide a ventilated wall, spacer elements are fixed to the structure, then multiple panels of thermal insulation are laid, and a ventilation chamber is created by fixing multiple horizontal and/or vertical profiles to the spacer elements. Multiple finishing panels are fixed to the substructure thus arranged.

[0010] These known techniques have some drawbacks.

[0011] In order to be able to provide a thermally insulated wall, the laying of the slabs of thermal insulation must be very precise; furthermore, the slabs must be subsequently smoothed over and leveled so as to create a uniformly leveled surface to be grouted and plastered.

[0012] This leads to a long and inconvenient method for providing the wall and to the use of specialized workers.

[0013] In order to be able to smooth over the slabs of thermal insulation it is essential to wait for the reaction times of the adhesive and this entails a considerable time and costs. This aspect is exacerbated even more in historical city centers, in which there are also costs linked to the scaffold and to its installation time on public property.

[0014] Furthermore, in order to build a ventilated thermally insulated wall it is necessary to associate the vertical and/or horizontal profiles of the substructure with the masonry support and in order to do this the thermal insulation panel is excavated, generating however thermal and acoustic bridges.

[0015] In order to limit the forming of thermal and acoustic bridges it is necessary to resort to the injection of an insulating filler in these holes, with the result of an uneven insulation and the need for a significant number of steps for providing the wall.

[0016] In order to provide a dry thermally insulated wall there must be a metallic structure, which entails the presence of thermal and acoustic bridges, which reduce the thermal insulation efficiency of said wall.

[0017] The laying of the insulation must be very precise and all the free spaces between the vertical upright profiles must be filled, an operation that is not always easy and also requires the use of expanded foams.

[0018] The aim of the present invention is to provide a thermally insulated wall that is capable of improving the background art in one or more of the above mentioned aspects.

[0019] Within the scope of this aim, an object of the invention is to provide a thermally insulated wall capable of reducing times and costs for its provision.

[0020] Another object of the invention is to provide a thermally insulated wall in which smoothing over the covering slabs in order to finish the surface is not necessary or is minimally necessary.

[0021] Another object of the invention is to provide a thermally insulated wall in which it is not necessary to arrange the slabs of thermal insulation with their edges perfectly matching and/or offset.

[0022] Another object of the invention is to provide a ventilated thermally insulated wall in which the thermal and acoustic bridges between the external surface of the building and the masonry support are reduced, with respect to ventilated thermally insulated walls of the known type.

[0023] Yet another object of the invention is to provide a thermally insulated wall that can be used inside buildings.

[0024] Another object of the invention is to provide a thermally insulated wall that is highly reliable, relatively easy to provide and at competitive costs.

[0025] This aim and these and other objects that will become better apparent hereinafter are achieved by a thermally insulated wall applied to a masonry support, characterized in that it comprises, arranged in the following order:

- a layer of thermal insulation which is fixed to said

masonry support,

- a plurality of profiles which are connected to at least one between said masonry support and said layer of thermal insulation,
- a plurality of finishing panels associated with said plurality of profiles.

[0026] Further characteristics and advantages of the invention will become better apparent from the description of some preferred but not exclusive embodiments of the thermally insulated wall according to the invention, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is a partially sectional view of a building with a thermally insulated wall according to the invention;
Figure 2 is a sectional view of a thermally insulated wall according to the invention in a first embodiment thereof;
Figure 3 is a sectional view of a ventilated thermally insulated wall according to the invention;
Figures 4a and 4b are views of two embodiments of a first detail of a ventilated thermally insulated wall, according to the invention;
Figures 5a, 5b and 5c are views of three different embodiments of a second detail of a ventilated thermally insulated wall, according to the invention;
Figure 6 is a perspective view of a portion of a ventilated thermally insulated wall according to the invention.

[0027] With reference to the cited figures, a thermally insulated wall according to the invention is generally designated by the reference numeral 10.

[0028] The wall 10 is applied to a masonry support 11 and comprises, arranged in the following order:

- a layer 12 of thermal insulation which is fixed to the masonry support 11,
- a plurality of profiles 13 facing the layer 12 of thermal insulation, which are connected and fixed to at least one between the masonry support 11 and the layer 12 of thermal insulation,
- a plurality of finishing panels 14 associated with the plurality of profiles 13.

[0029] In particular, the profiles 13, in the example shown in Figures 1 and 2, are fixed to the masonry support 11 through the layer 12 of thermal insulation.

[0030] The masonry support 11 is provided, for example, in brickwork and/or in light panels made of wood and/or cement and/or concrete and/or fiber cement, and/or the like.

[0031] The masonry support 11 is, for example, a rough perimetric wall of a building, or one of its rough internal partition walls. In the case of a masonry support 11 made of brickwork, a layer 15 of plaster can be present, for example, in the case of historical buildings, which the layer 12 of thermal insulation faces.

[0032] The masonry support 11 can be also made of another material such as, for example, wood or cement.

[0033] The layer 12 of thermal insulation is provided, for example, by means of the arrangement of a plurality of insulating panels 16, of a per se known type.

[0034] Said panels 16 are, for example, sandwich panels comprising a polyurethane foam such as those known by the trade name Stiferite FIRE B, CLASS SK, CLASS S, GT, GTE, VV, ISOVENTILATO or CLASS SH, manufactured by the same Applicant.

[0035] These panels 16 are fixed to the masonry support 11 by means of adhesives and/or first fixing elements 17, such as for example wall anchors.

[0036] In the example shown in Figure 1, the profiles 13 have a vertical extension in the configuration for use; however, they can also have advantageously other extensions.

[0037] Said profiles 13 are made of metallic material, advantageously made of steel, but they can also be made of plastic material.

[0038] The profiles 13 are fixed to at least one between the layer 12 of thermal insulation and the masonry support 11 by means of second fixing elements 18, such as for example wall anchors.

[0039] Said first fixing elements 17 and second fixing elements 18 can coincide.

[0040] Multiple finishing panels 14, adapted to define a substantially leveled surface for the wall, are fixed on said profiles 13.

[0041] The panels 14 have, for example, a water-repellent coating and comprise a core of calcium sulfate dihydrate reinforced with glass fibers and biocides and a thickness on the order of 10 -30 mm, preferably 12.5 mm.

[0042] The finishing panels 14 are anchored to the profiles 13 with fixing elements of a known type, such as for example screws, not shown in the figures.

[0043] The panels 14 can also be made, for example, of plasterboard and/or ceramics and/or metallic material and/or marble and/or wood and/or the like.

[0044] In some cases, but not necessarily, a layer 19 of finishing plaster and/or finishing coating is arranged on the external surface, which is obtained and constituted by the arrangement of these panels 14.

[0045] Said layer 19 is adapted to make some types of panel 14 impermeable, for example those made of plasterboard.

[0046] It should be noted that it is not necessary to smooth over or level the insulating panels 16 that compose the layer 12 of thermal insulation in order to obtain a uniformly leveled surface, since this can be obtained by applying the finishing panels 14.

[0047] This allows to reduce considerably the construction times of the thermally insulated wall and at the same time determines an easier, cheaper and quicker provision thereof.

[0048] Furthermore, it is not necessary to offset the

insulating panels.

[0049] In a constructive variation, not shown in the figures, the masonry support 11 is out of plumb. In this constructive variation, it is possible to interpose between the plurality of profiles 13 and the layer 12 of thermal insulation a layer of glue and/or mortar with the purpose of making it plumb.

[0050] Figure 3 shows a ventilated thermally insulated wall 110 according to the invention.

[0051] The wall 110 is applied to a masonry support 111 and, similarly to the case shown in Figures 1 and 2, comprises:

- a layer 112 of thermal insulation which is fixed to the masonry support 111,
- multiple profiles 113 which are connected to at least one between the masonry support 111 and the layer 112 of thermal insulation,
- multiple finishing panels 114 associated with the plurality of profiles 113.

[0052] The masonry support 111 is provided similarly to the previously described variation.

[0053] Multiple means 120, adapted to create a ventilation chamber 121 for the wall and at the same time connect the profiles 113 to the layer 112 of thermal insulation, are arranged between the layer 112 of thermal insulation and each one of the profiles 113.

[0054] The layer 112 of thermal insulation is provided, similarly to the previous embodiment, for example, by means of the arrangement of a plurality of insulating panels 116, of a per se known type.

[0055] These panels 116 are fixed to the masonry support 111 by means of adhesives and/or first fixing elements 117, such as for example wall anchors.

[0056] The spacer means 120 are made of metal and are fixed to at least one between the layer 112 of thermal insulation and the masonry support 111 by means of second fixing elements 118, such as for example wall anchors.

[0057] Said first fixing elements 117 and said second fixing elements 118 can coincide.

[0058] Said means 120 comprise, for example, a plate 122 and a spacer 123, constituted by a bracket with an L-shaped cross-section.

[0059] The plate 122 has a substantially flat body, is arranged on the layer 112 of thermal insulation and is fixed to the masonry support 111 through the layer 112, by means of one of these second fixing elements 118, such as for example a wall anchor.

[0060] The plate 122 is substantially quadrangular with a side on the order of 10-15 cm.

[0061] In constructive variations, not shown in the figures, the plate 122 can have different shapes and measurements.

[0062] Figures 5a to 5c show some embodiments of the plate 122.

[0063] The spacer 123 is associated, by means of one of its portions, with the plate 122 by means of said fixing element 118.

[0064] Figures 4a and 4b are views of two different embodiments of the spacer 123.

[0065] The portion of the spacer 123 that is not associated with the plate 122 is associated with a corresponding portion of a profile 113.

[0066] Each profile 113 can have a T-shaped or L-shaped cross-section.

[0067] The finishing panels 114 are anchored to the profiles 113 with fixing elements of a known type, such as for example screws, not shown in the figures.

[0068] The panels 114 have, for example, a water-repellent cover and comprise a core of calcium sulfate dihydrate reinforced with glass fibers and biocides and a thickness on the order of 10-30 mm, preferably 12.5 mm.

[0069] The finishing panels 114 are anchored to the profiles 113 with fixing elements of a known type, such as for example screws, not shown in the figures.

[0070] The panels 114 can be made also, for example, of plasterboard and/or ceramics and/or metallic material and/or marble and/or wood and/or the like.

[0071] In some cases, but not necessarily, a layer 119 of finishing plaster and/or finishing coating is arranged on the external surface, which is obtained and constituted by the arrangement of these panels 114.

[0072] Said layer 119 is adapted to make some types of panel 114 impermeable, for example those made of plasterboard.

[0073] In Figure 6, said means 120 are shown in a perspective view in a configuration for use.

[0074] With reference to Figure 5c, the plate 122 can have a C-shaped section with the corresponding portions, in cross-section, at the two opposite sides of the C-shape, which penetrate the layer 112 of thermal insulation, but without passing fully through it, generating friction therein.

[0075] In this manner, thermal and acoustic bridges between the external surface of the building and the masonry support are not created.

[0076] Likewise, with reference to Figure 5b, the plate 122 can have a substantially quadrangular flat body, with corners folded so as to obtain teeth 127 adapted to penetrate, partially, the layer 112 of thermal insulation.

[0077] It should be noted that the plate 122 shown in Figures 5b and 5c can be inserted in the layer 112 of thermal insulation simply by applying a manual pressure.

[0078] With reference to Figures 5a to 5c, at least one hole 224 for inserting a fixing element 118 for fixing both the plate 122 to the masonry support 111 and the plate 122 to the spacer 123, which in turn has at least one corresponding hole 226, is provided on the flat body of the plate 122.

[0079] The hole 224 has a circular profile; however, in constructive variations not shown in the figures, the hole 224 can have a different profile.

[0080] It should be noted that in this embodiment the means 120 do not require further elements for fixing to

the layer of thermal insulation or to the masonry support. The plate 122 is made of metallic material, preferably steel.

[0081] The spacer 123 has one portion associated with the plate 122 and the other portion fixed to a profile 113 by means of a plurality of fixing elements, not shown in the figures, that pass through corresponding second holes 228, shown in Figures 4a and 4b.

[0082] Similarly to what occurs in the embodiment described above, but not shown in the figures, the finishing panels, for example, made of plasterboard and/or ceramics and/or metallic material and/or marble and/or wood and/or the like, are anchored to the profiles with fixing elements of a known type, and on the external surface, obtained from the arrangement of these finishing panels, a layer of finishing plaster and/or finish coating as described above is, if necessary, arranged.

[0083] In one embodiment, not shown in the figures, the spacer means 120 are constituted only by the spacers 123 that are inserted inside the layer 112 of thermal insulation after partially excavating grooves therein. The grooves are then filled with a thermally insulating foam of a known type, after the insertion of the spacers 123 that are perpendicular to the layer 112 of thermal insulation.

[0084] It should be noted that a wall according to the invention allows a higher laying rate than a traditional ETICS wall.

[0085] It should also be noted that a wall according to the invention allows easy recover and recycling of the individual layers and the possibility to separate the various layers in a selective manner.

[0086] Furthermore, it should be noted that a wall according to the invention can be used also inside buildings, for example in cellars. In this case, the slabs of thermal insulation are fixed on the surface of the masonry supports that is internal to the building.

[0087] In practice it has been found that the invention achieves the intended aim and objects, providing a thermally insulated wall capable of reducing costs and times for its provision, and a ventilated thermally insulated wall capable of also reducing the thermal and acoustic bridges between the masonry support and the external surface.

[0088] The invention, thus conceived, is susceptible of numerous modifications and variations, all of which are within the scope of the accompanying claims; all the details may furthermore be replaced with other technically equivalent elements.

[0089] In practice, the materials used, so long as they are compatible with the specific use, as well as the contingent shapes and dimensions, may be any according to the requirements and the state of the art.

[0090] The disclosures in Italian Patent Application No. 102018000010419, from which this application claims priority, are incorporated by reference.

[0091] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A thermally insulated wall (10, 110) applied to a masonry support (11, 111), **characterized in that** it comprises, arranged in the following order:

   - a layer (12, 112) of thermal insulation which is fixed to said masonry support (11, 111),
   - a plurality of profiles (13, 113) which are connected to at least one between said masonry support (11, 111) and said layer (12, 112) of thermal insulation,
   - a plurality of finishing panels (14, 114) associated with said plurality of profiles (13, 113).

2. The wall (10, 110) according to claim 1, **characterized in that** said layer (12) of thermal insulation is provided with a plurality of insulating panels (16, 116).

3. The wall (10, 110) according to one or more of the preceding claims, **characterized in that** said panels (16, 116) are fixed to said masonry support (11, 111) by means of adhesives and/or first fixing elements (17, 117).

4. The wall (10) according to one or more of the preceding claims, **characterized in that** said profiles (13) face said layer (12) of thermal insulation and are fixed to at least one between said layer (12) of thermal insulation and said masonry support (11) by means of second fixing elements (18).

5. The wall (110) according to one or more of the preceding claims, **characterized in that** a plurality of means (120) for providing a ventilation chamber is arranged between said layer (112) of thermal insulation and each one of said profiles (113).

6. The wall (110) according to one or more of the preceding claims, **characterized in that** said means (120) are fixed to at least one between said layer (112) of thermal insulation and said masonry support (111).

7. The wall (110) according to one or more of the preceding claims, **characterized in that** said spacer means (120) comprise a plate (122) and a spacer (123).

8. The wall (110) according to one or more of the pre-

ceding claims, **characterized in that** said spacer (123) is constituted by a bracket with an L-shaped cross-section, said spacer (123) being associated by means of one of its portions with said plate (122) and by means of the other portion with a corresponding portion of one of said profiles (113).

9. The wall (110) according to claim 8, **characterized in that** said plate (122) has a substantially flat body.

10. The wall (110) according to claim 9, **characterized in that** said plate (122) is provided with portions (127) which penetrate said layer (112) of thermal insulation but without passing through it.

11. The wall (10, 110) according to one or more of the preceding claims, **characterized in that** it comprises a layer (19, 119) of finishing plaster and/or finishing covering.

12. The wall (110) according to one or more of claims 1 to 6, 8 and 11, **characterized in that** said spacer means (120) are constituted by a plurality of spacers (123), said spacers (123) being inserted within grooves which are partially excavated within said layer (112) of thermal insulation, said grooves being filled with a thermally insulating foam.

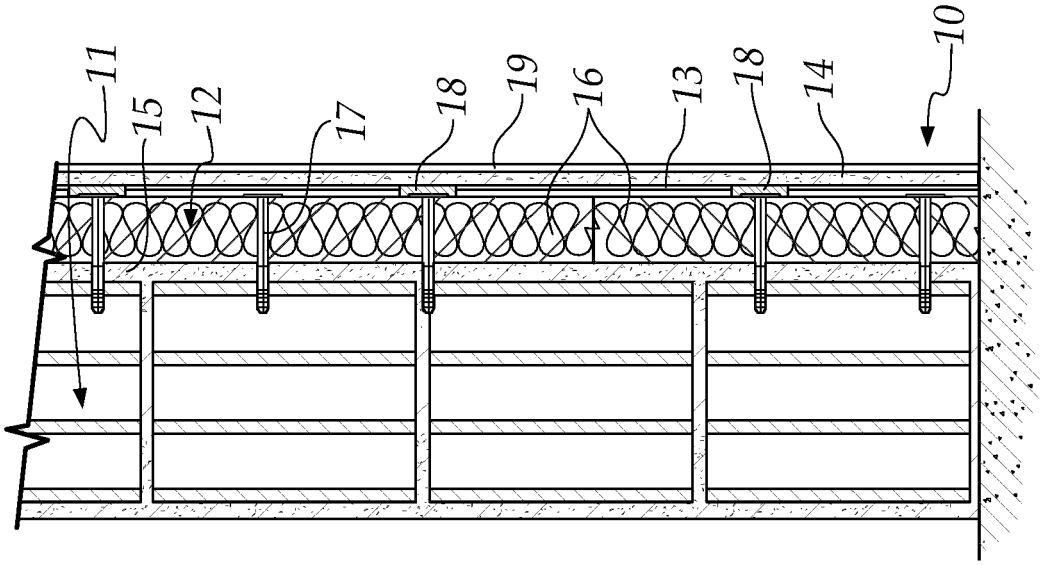

Fig.2

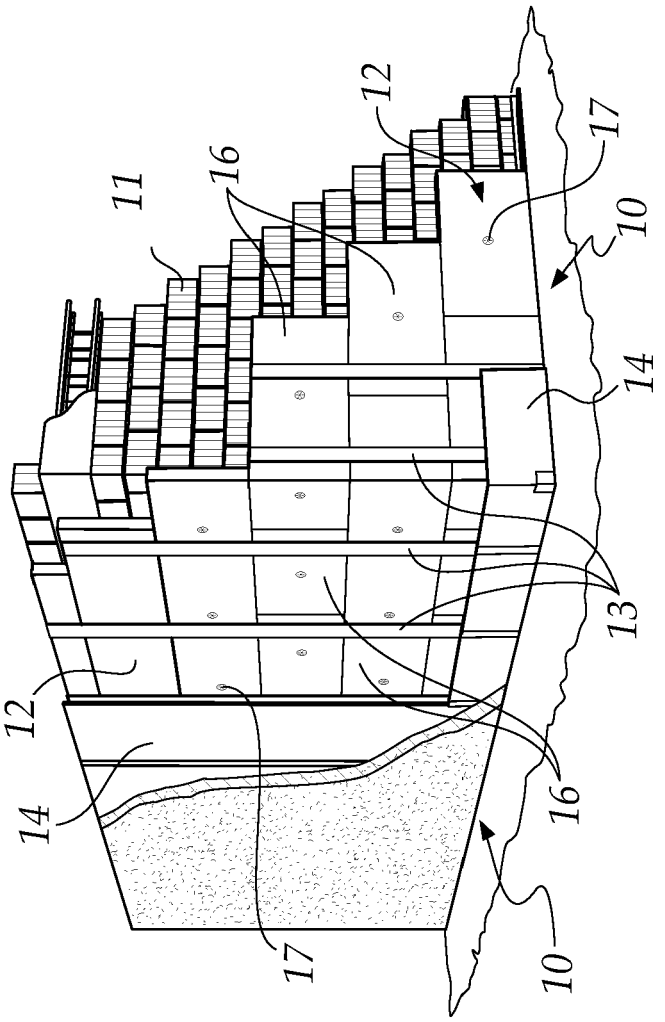

Fig.1

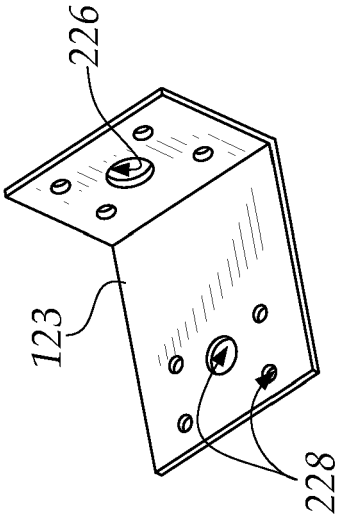

Fig.4a

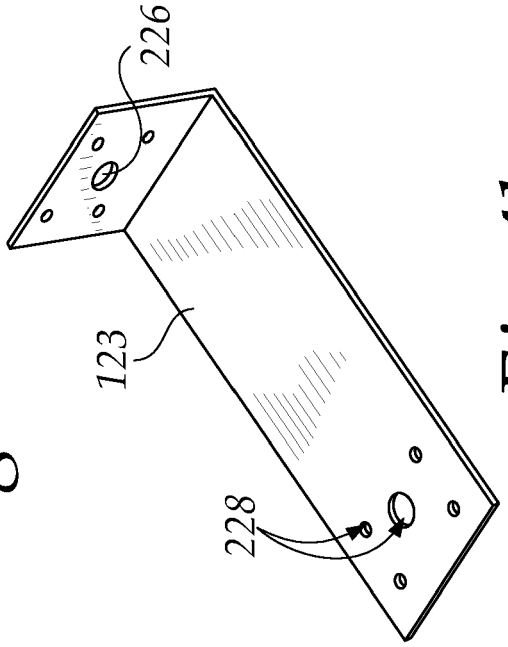

Fig.4b

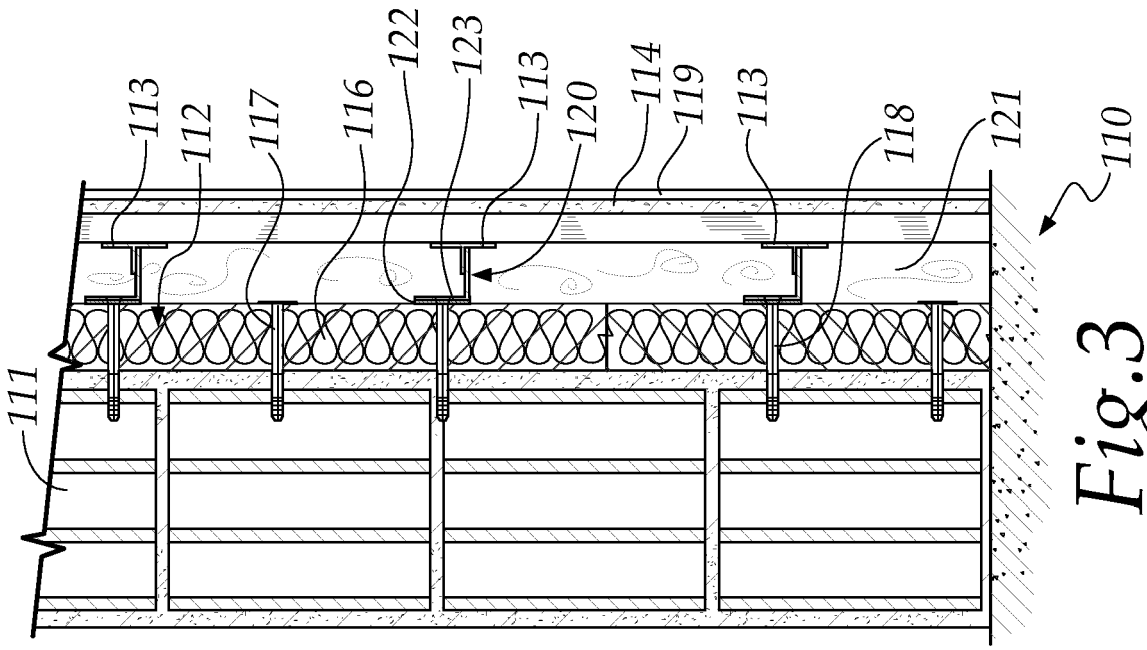

Fig.3

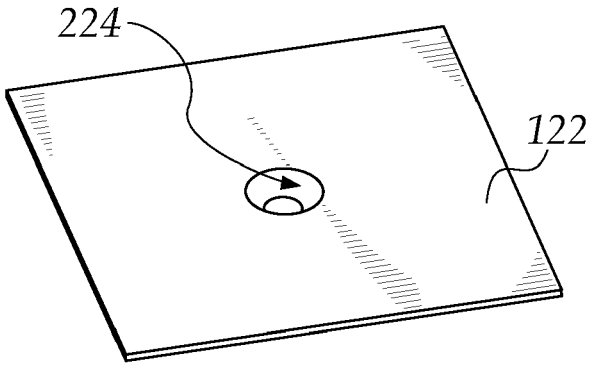

Fig.5a

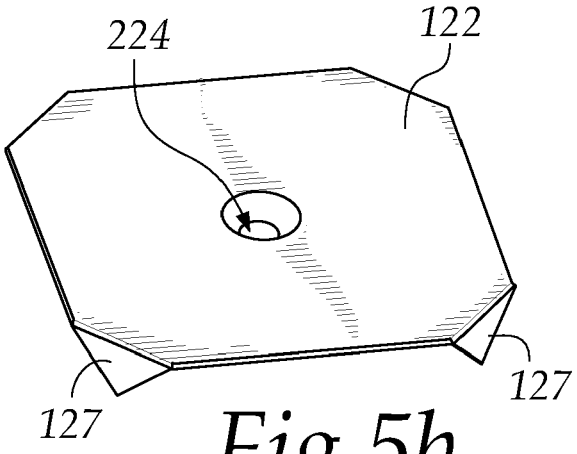

Fig.5b

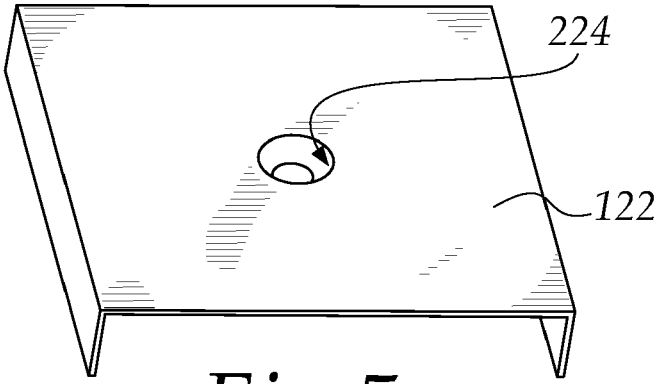

Fig.5c

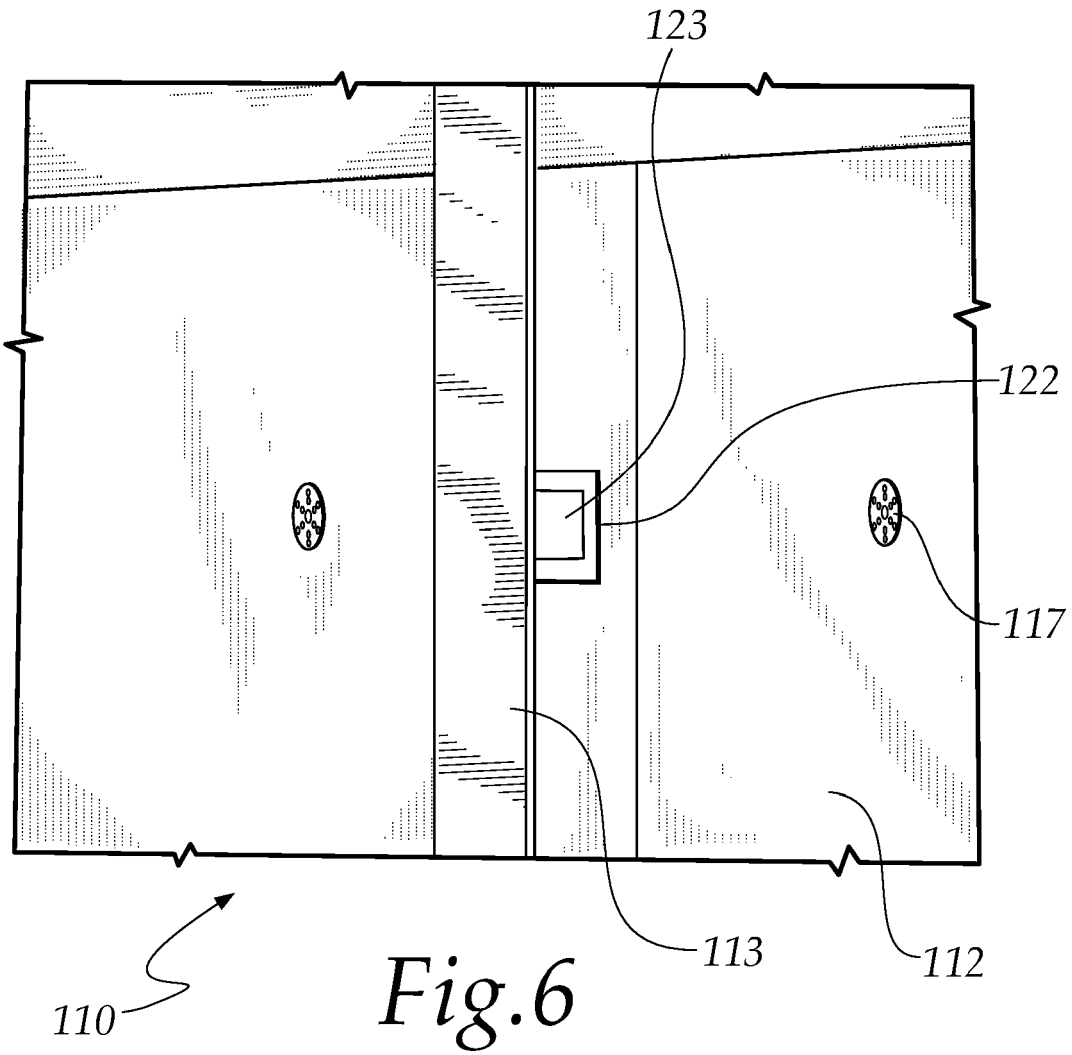

Fig.6

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EUROPEAN SEARCH REPORT

Application Number
EP 19 20 9945

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	IT UB20 156 835 A1 (TECNOPROOF S R L) 10 June 2017 (2017-06-10) * page 3, line 34 - page 4, line 30; figures *	1-12	INV. E04F13/04 E04B1/76 E04F13/00 E04F13/08
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A	EP 0 829 593 A1 (STO VEROTEC GMBH [DE]) 18 March 1998 (1998-03-18) * column 2, line 58 - column 4, line 18; figures *	3,4	

TECHNICAL FIELDS SEARCHED (IPC)

E04F
E04B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	11 March 2020	López-García, G

CATEGORY OF CITED DOCUMENTS

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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 19 20 9945

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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11-03-2020

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

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