

(19)



(11)

EP 4 534 775 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
09.04.2025 Bulletin 2025/15

(51) International Patent Classification (IPC):
E04F 13/08^(2006.01) E04F 13/00^(2006.01)

(21) Application number: **23201320.1**

(52) Cooperative Patent Classification (CPC):
**E04F 13/0807; E04F 13/0853; E04F 13/086;
E04F 13/007**

(22) Date of filing: **02.10.2023**

(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 ME MK MT NL
NO PL PT RO RS SE SI SK SM TR**
Designated Extension States:
BA
Designated Validation States:
KH MA MD TN

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(54) VENTILATED FAÇADE ATTACHMENT SYSTEM

(57) A holding arrangement for attaching flat, plate-like substrates to a support wall comprises several structural elements: Firstly, at least one bracket, designed to be attached to a support wall and secondly an adapter plate construed to be slid on said bracket. The adapter plate will clamp said flat substrate via said bracket to the support wall.

The bracket again exhibits essentially an L-shape with a (short) fixing base and an (extended) horizontal arm. This horizontal arm again has an essentially flat, plate-like, rectangular shape and the fixing plate is ar-

ranged at a right angle to it.

The adapter plate again comprises an essentially flat, plate-shaped base plate with an upper side and a lower side. At least three tongue-shaped lobes are protruding from the surface of the upper side. The fixed end of each lobe is connected to the base plate. The free end of it has an end section. Said end section is at least partially exhibiting an essentially flat contact area and assumes essentially a 90° angle with respect to the base plate. It serves as fixing point between bracket and adapter plate.

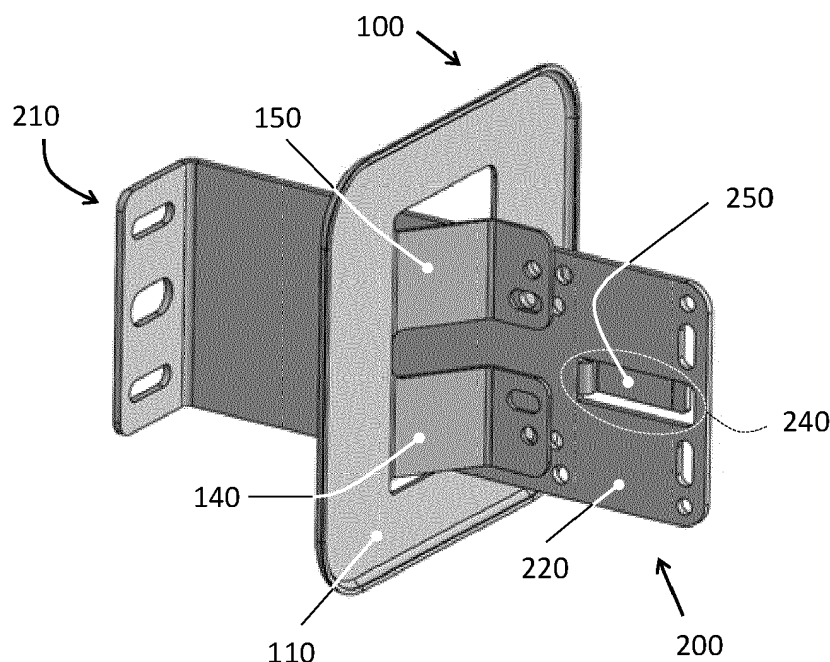


Fig. 4 B

Description

FIELD OF THE INVENTION

[0001] This invention relates in general to devices for connecting a façade wall (also called a mounted façade, hanging façade or curtain façade) and more specifically to ventilated rainscreen façades or rainscreen façades to a support wall. It further refers to a solution for tightly attaching insulation panels to the support wall in the ventilated interspace between support wall and façade. It also refers to a holding arrangement comprising at least a bracket and an adapter plate useful for mounting such façade panels.

BACKGROUND OF THE INVENTION

[0002] The use of continuous insulation on buildings is required for many countries in the world. The purpose of such insulation on buildings in general is to minimize thermal conduction between a support wall and a curtain façade nowadays widely used for office buildings and production facilities.

[0003] A curtain façade can be placed over rigid insulation boards or foam that are placed on the surface of a structural load bearing wall / support wall. The use of continuous insulation with paneling requires the paneling to be connected to the support wall. Ties that pass through the continuous insulation however result in thermal leaks that reduce the efficiency of the continuous insulation.

[0004] It is the goal of this invention to present a simple solution allowing for attaching flat, plate like substrates such as insulation boards to a support wall without many additional components.

DESCRIPTION OF THE INVENTION

[0005] The solution in principle is based on an adapter plate that can be fixedly connected to the bracket to be used anyway to carry the curtain façade itself. Therefore, the term "holding arrangement" is appropriate to describe such a combination.

[0006] A holding arrangement for attaching flat, plate-like substrates to a support wall will comprise several structural elements: Firstly, at least one bracket, designed to be attached to a support wall and secondly an adapter plate construed to be slid on said bracket. The adapter plate will clamp said flat substrate via said bracket to the support wall.

[0007] The bracket again exhibits essentially an L-shape with a (short) fixing base and an (extended) horizontal arm. This horizontal arm again has an essentially flat, plate-like, rectangular shape and the fixing plate is arranged at a right angle to it.

[0008] The term "horizontal" refers to the bracket's orientation when correctly mounted to a support wall. Any designation like "upper", "lower", "vertical", "horizon-

tal", "upright" or alike addresses a properly mounted component, unless specified differently.

[0009] The adapter plate again comprises an essentially flat, plate-shaped base plate with an upper side and a lower side. At least three tongue-shaped lobes are protruding from the surface of the upper side. The fixed end of each lobe is connected to the base plate. The free end of it has an end section. Said end section is at least partially exhibiting an essentially flat contact area and assumes essentially a 90° angle with respect to the base plate.

[0010] In other words, the three lobes are curving away from the upper side of the base plate in the same direction. The lobes are arranged in that specific way to form a channel or guide funnel. This channel or guide slot extends at a right angle from and through the base plate - said base plate exhibits a respective opening for said channel. Specifically, the three lobes are arranged in a "two opposite one" manner. This means the second and third lobes are arranged in parallel but separated from each other by a gap and the first lobe is placed opposite the second and third lobes, facing, but not filling said gap. The guide slot is then being defined by the end sections of said lobes and confined by the contact areas of their respective end sections. The width of that guide slot is chosen to essentially meet the thickness d of the horizontal arm of the bracket. It goes without saying, that the size of the adapter plate will be chosen such that it can exert sufficient surface pressure to said plate-like substrate to safely secure it in its intended position. The fixation of the adapter plate is being realized between the end-sections of the lobes and the bracket's horizontal arm, so there is no need to drill additional holes through the substrates (insulation boards) to secure them to the support wall. If the bracket already has insulation between its fixing base and the support wall, no further thermal bridge is being established.

[0011] In a useful variant each of the lobes may comprise a spacer section arranged between the base plate and the end sections. The spacer section has the effect, that the distance between the end sections and the plane of the base plate is being increased. This is convenient for the fixation between adapter plate / bracket since it simplifies the fixation when using mechanical tools.

[0012] This distancing can be accomplished e.g. by arranging the spacer section of each of the lobes directly adjacent to the base plate and to include an angle α with the plane of the base plate, with $\alpha < 90^\circ$. A further preferred range for α shall be $10^\circ < \alpha < 50^\circ$; most preferably α equating to 35° (within the limits of manufacturing accuracy).

[0013] Alternatively, the spacer section can also be realized as a 90° curve. All of these embodiments have in common that the arrangement of spacer section and subsequent end section establish a guide funnel for easier insertion of the horizontal arm of the bracket.

[0014] To accomplish the fixation between the lobes and the horizontal arm, the end section of at least one of

the lobes exhibits a combination of at least one regular and/or one oblong through holes. This again improves the handling during mounting the insulation boards.

[0015] In a further embodiment, the end section of the first lobe exhibits a cutout. The cutout is preferably fore-
seen for the first (=central) lobe. The cutout is a notch
arranged longitudinally and extending at least over the
contact area. Its functional purpose is to allow the central
lobe to easily slid over the bracket, which exhibits in many
cases a spring-loaded clamp at its open end. That again
is intended to accept further structural elements such as
vertical beams or other attachments required for support-
ing the façade itself.

[0016] As mentioned before, the size of the base plate
will be chosen to match its purpose but also not to overly
compress an insulation board. The shape of the base
plate itself can be chosen to be one of a square, a
rectangle, a circle, an oval, an irregular shape. Besides
functional considerations also manufacturing constraints
will be considered.

[0017] In the terminology of this disclosure a mounting
arrangement for plate-shaped panels such as insulation
panels or similar substrates shall include a holding ar-
rangement as described above plus at least one insula-
tion panel. Consequently, the insulation layer of a building
will comprise a support wall of a building; a plurality of
holding arrangements as described herein and brackets
which are being fixedly attached to the support wall via
their fixing base(s). Of course, a plurality of insulation
panels to form a first layer of insulation will be clamped
between the support wall and a plurality of adapter plates.

[0018] This will be accomplished by sliding the adapter
plates on the horizontal arms of the mounted brackets,
until the insulation panels are sandwiched between the
lower side of the adapter plates and the support wall.
Then the adapter plates will be secured by means of
fixings to the horizontal arms of the brackets.

[0019] The invention also allows for creating an insula-
tion of a building comprising two layers of insulation
panels. The first insulation layer will be mounted as
described above. The second layer with a plurality of
insulation panels forming a second layer of insulation are
being clamped between the first layer of insulation and a
plurality of adapter plates. Those additional adapter
plates are being sled on the horizontal arms of the ex-
isting mounted brackets; until the insulation panels are
sandwiched between the lower side of the adapter plates
and the first layer of insulation. The adapter plates can be
secured by means of fixings to the horizontal arms of the
existing brackets. As a result, the horizontal arm of the
bracket serves twice as mounting point for adapter
plates.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020]

FIG. 1 is a perspective view of an adapter plate

according to the invention.

FIG. 2 is a side view of the adapter plate of FIG. 1.

FIG. 3 is a perspective view of a bracket in a mounted
state.

FIG. 4 A and B are perspective side views of an
adapter plate having been slid onto a bracket.

FIG. 4 C is a side view of an adaptor plate on a
bracket fixed in a tilted manner.

FIG. 5 is a sectional view of a bracket, mounted to a
support wall with a single layer of insulation panels
held by an adapter plate.

FIG. 6 is a sectional view of a bracket, mounted to a
support wall with a double layer of insulation panels
held by individual adapter plates.

DETAILED DESCRIPTION OF THE DRAWINGS

[0021] The following description is presented to enable
any person skilled in the art to make and use the inven-
tion. While the present invention is susceptible of embo-
diment in many different forms, there are shown in the
drawings and will be described herein in detail, specific
embodiments thereof with the understanding that the
present description of the figures is to be considered
as an exemplification of the principles of the invention
and is not intended to limit the invention to the specific
embodiments illustrated.

[0022] Figure 1 shows an adapter plate 100 to be used
in conjunction with a bracket 200 (FIG. 3, 4) for fixedly
mounting an insulation panel 320 to a support wall 300
(FIG. 5+6).

[0023] The man skilled in the art will readily understand
that an adapter plate 100 as shown will be capable of
fastening similar flat, plate-shaped objects to a support
wall such as noise absorbing panels or alike.

[0024] The adapter plate 100 exhibits an essentially
flat base plate 100 with an upper side 112 and a lower side
114. The lower side 114 is provided to be the (later)
contact surface with an insulation panel. From the sur-
face of the upper side 112 there are protruding preferably
(and at least) three holding / clamping structures, here-
inafter designated as lobes 130, 140, 150. Each of the
lobes has a tongue-shape with one end connected to the
base plate 110 and a free end. The embodiment shown in
Fig. 1 and Fig. 2 exhibits two sections 160, 170 for each
lobe.

[0025] A first section or spacer section 160 directly
adjacent to the base plate 110 is angled under an angle
 α , to be chosen between $10^\circ < \alpha < 50^\circ$, preferably around
 35° . The second section 170 (end section) of each lobe is
again angled resulting in the end section 170 being
essentially arranged in a 90° angle towards the base

plate 110. Lengths and angles of spacer section 160 and end section 170 may be chosen differently than shown in Fig. 2 without changing the gist of the invention. Spacer section 160 may for example be realized as a 90° curve.

[0026] The three lobes are arranged in such a way, that second and third lobes 140, 150 are arranged side by side but distanced from each other. The first lobe 130 is arranged such that it is facing, but not filling the gap between second and third lobes 140, 150. The result of said arrangement can be seen in Figure 2: The end sections 170 of the lobes 130, 140, 150 form a guide slot 120 defined by the surfaces of the end sections 170. The width of that gap is chosen such it can (later) accommodate a bracket's 200 horizontal arm 220.

[0027] The reason for that 2 vs. 1 arrangement of the lobes 130, 140, 150 can be understood with a view on Fig 4 A and B: When the horizontal arm 220 of a bracket 200 is inserted into the guide slot 120, the adapter plate cannot rotate around the longitudinal axis of the horizontal arm 220. If one tentatively omits second lobe 140 in Fig. 1, it can be readily understood that such a simplified arrangement would be less secure.

[0028] With Fig. 4 further in mind, the purpose of angled spacer sections 160 becomes clear: They form a funnel or guidance for the horizontal arm 220 when adapter plate 100 is properly connected to bracket 200. For that reason, any shape of spacer section 160 deviating from the described preferred embodiment shall be regarded equivalent if it serves the same purpose. However, having a funnel or guidance as described is a by far preferred embodiment, but not an essential one.

[0029] As exhibited in Fig. 1 the end sections of lobes 130, 140, 150 are equipped with regular and oblong through holes allowing for fixings such as screws, rivets or alike to be set through them to connect said adapter plate 100 with a bracket 200. Lobe 130 exhibits a cutout 180, which has been specifically provided for allowing the clamp section 240 to pass when the adapter plate 100 is being slid onto a bracket 200.

[0030] An adapter plate 100 can be manufactured from metal or injection molded from plastic. The applicability of material depends on the technical application and specific regulations such fire safety regulations. If made from metal, aluminium or steel are preferred. Manufacturing may use known techniques such as punching, bending, cold forming or alike.

[0031] The shape of the adapter plate as shown is square or rectangular, but may be realized as circle, oval or of irregular shape. Since the adapter plate has also the function of a load distribution plate (when used to press an insulation panel to a support wall), dimensions of the plate, especially its effective surface, will be determined based on considerations of material savings (weight, cost) and the required holding surface. It will be designed by the man skilled in the art based on specifications and his/her experience. As an example, adapter plates between 10cm x 10cm and 13cm x 20cm have been realized with rounded corners.

[0032] Figure 3 shows a so-called bracket 200, which is a load bearing part known in the art. In the embodiment shown, the bracket 200 has an essential L-shape with a fixing base 210 and a horizontal arm 220. "Horizontal" in this case refers to the positioning of the arm when the bracket 200 has been properly attached to a support wall 300. Here, fasteners 310 such as screws have been used to attach the bracket to such a wall. The bracket's horizontal arm 220 is here shown as an essentially flat rectangle with rounded corners with its base plane oriented vertically in its mounted position. Mounting holes 230 may be provided to allow fixings, such as a nut & bolt connection, blind rivets or alike between them and the adapter plate's mounting holes. In a variant, the bracket's mounting holes are optional, because it may be preferred to use self-cutting and self-tapping screws.

[0033] The embodiment of bracket 200 as shown in Fig. 3 exhibits a clamp 240 with a spring-loaded tongue 250 at the free end of the horizontal arm 220. This clamp 240 is provided to attach a further rail-profile connecting a plurality of brackets attached to a support wall 300, thus defining a plane for the rainscreen facade. Said rail profile may come in variants depending on the type of façade and has therefore been omitted in the figures.

[0034] The arrangement of mounting holes 230 shown in Fig. 3 is exemplary and not imperative. The pattern shown allows for a tilted fixture of an adapter plate 100 and is being further shown and described with respect to FIG. 4C.

[0035] Fig. 4 A and B show an arrangement of a (short) bracket 200 with its fixing base 210 and an adapter plate 100 pushed over the bracket's horizontal arm 220 from two different perspectives (left and right). In this depiction it becomes clear, that the flexible tongue 250 of clamp 240 can pass through the gap between the second and third lobe 140, 150 or through the cutout 180 (FIG. 4B) in the first lobe 130. This way the orientation of adapter plate 100 when pushed on bracket 200 can be chosen freely. Usability is vastly improved this way.

[0036] In Fig. 4C the end sections 170 or free end of lobes 140, 150 (cf. FIG. 1) exhibit a combination of at least one round and one oblong hole. They can be aligned with the mounting holes 230 (cf. FIG. 3) in different combinations or arrangements to allow for a certain tilting of the adapter plate 100 with respect to the plane of fixing base 210.

[0037] Figures 5 and 6 are now being discussed together, exhibiting inter alia a major advantage of the design of said adapter plate 100 in combination with the bracket 200. Both Fig. 5 and 6 show the bracket 200 mounted to the support wall 300 as shown in Fig. 3.

[0038] Fig. 5 shows a single layer of insulation panels 320 arranged around the horizontal arm 220 of bracket 200. The slim silhouette of horizontal arm 220 is a major advantage when arranging insulation panels 320, because depending on the material the insulation plate may directly be placed over the bracket - the insulation material being cut through by the horizontal arm. Even if

this is not possible, the geometrically simple outline of the horizontal arm does not require elaborate cut-out operations. To temporarily fix the insulation plate(s) 320 the slid-on adapter plate 100 may be used such that the lobes clamp the horizontal arm 220. After the adapter plate 100 has been placed in its designated position, screws arranged transversely to the bracket arm 220 can be used to connect adapter plate's end section 170 to the bracket 200. No screwing through the insulation panel 320 is required.

[0039] An additional advantage of the adapter plate 100 according to the invention is, that (a) further layer(s) of insulation 330 can be arranged atop insulation panel 320, as shown in Fig. 6. Insulation panels 330 require only small cut-outs around the adapter plates 100 fixed to bracket 200. Mounting of those further panels 330 happens the same way as the first layer 320 arranged directly on the support wall 300.

Claims

1. Holding arrangement for attaching flat, plate-like substrates to a support wall (300), comprising at least a bracket (200) designed to be attached to said support wall (300) and an adapter plate (100) construed to be slid on said bracket (100) and to clamp said flat substrate via said bracket (200) to the support wall (300);

the bracket (200) exhibiting an essential L-shape with a fixing base (210) and a horizontal arm (220); the horizontal arm (220) having an essentially flat, plate-like, rectangular shape and the fixing plate (210) being arranged at a right angle to it;

characterized in that the adapter plate comprises:

- an essentially flat, plate-shaped base plate (110) with an upper side (112) and a lower side (114);
- at least three tongue-shaped lobes (130, 140, 150) protruding from the surface of the upper side (112) with one fixed end of each lobe connected to the base plate (110) and a free end with an end section (170);
- the end section (170) at least partially exhibiting an essentially flat contact area (175)
- the end section (170) of each lobe assuming essentially a 90° angle with respect to the base plate (110); and
- the second (140) and third lobe (150) are arranged in parallel but separated from each other by a gap and
- the first lobe (130) is placed opposite the second and third lobes (140, 150) and fa-

cing said gap; and

- the end sections (170) of the lobes (130, 140, 150) form a guide slot (120) between them defined by the contact areas (175) of their respective end sections (170); and
- the width of that guide slot (120) is chosen to essentially meet the thickness d of the horizontal arm (220) of the bracket (200).

2. The holding arrangement of claim 1, **wherein** each of the lobes (130, 140, 150) comprises a spacer section (160) arranged between the base plate (110) and the end sections.
3. The holding arrangement of claim 2, **characterized in that** the spacer section (160) of each of the lobes (130, 140, 150) directly adjacent to the base plate (110) includes an angle α with the plane of the base plate (110) with $\alpha < 90^\circ$.
4. The holding arrangement of claim 3, **characterized in that** for α shall be valid $10^\circ < \alpha < 50^\circ$; preferably α equating to 35° .
5. The holding arrangement according to claim 2, **wherein** the spacer section (160) is being realized as a 90° curve.
6. The holding arrangement according to claims 2-5, **wherein** the arrangement of spacer section (160) and subsequent end section (170) establish a guide funnel for easier insertion of the horizontal arm (220) of the bracket (200).
7. The holding arrangement according to claim 1-6, **wherein** the end section (170) of at least one of the lobes (130, 140, 150) exhibits a combination of at least one regular and/or one oblong through holes.
8. The holding arrangement according to claim 1-7, **wherein** the end section (170) of the first lobe (130) exhibits a cutout (180).
9. The holding arrangement according to claim 1-8, **wherein** the shape of the base plate (110) is chosen to be one of a square, a rectangle, a circle, an oval, an irregular shape.
10. A mounting arrangement for plate-shaped panels such as insulation panels (320) or similar substrates comprising a holding arrangement according to claim 1-9 and at least one insulation panel (320).
11. An insulation layer of a building comprising
 - a support wall (300) of a building;
 - a plurality of holding arrangements according to claims 1-9, wherein

- the brackets (200) are being fixedly attached to the support wall (300) via their fixing base(s) (210); and
- a plurality of insulation panels (320) forming a first layer of insulation are being clamped between the support wall (300) and a plurality of adapter plates (100); accomplished by
- sliding the adapter plates (100) on the horizontal arms (220) of the mounted brackets (200); until
- the insulation panels (320) are sandwiched between the lower side (114) of the adapter plates (100) and the support wall (300); and
- the adapter plates (100) have been secured by means of fixings to the horizontal arms (220) of the brackets (200).

12. An insulation layer of a building comprising two layers of insulation comprising a first insulation layer according to claim 11 and

- a plurality of insulation panels (320) forming a second layer of insulation by being clamped between the first layer of insulation and a plurality of adapter plates (100); accomplished by
- sliding the additional adapter plates (100) on the horizontal arms (220) of the existing mounted brackets (200); until
- the insulation panels are sandwiched between the lower side (114) of the adapter plates (100) and the first layer of insulation; and
- the adapter plates (100) have been secured by means of fixings to the horizontal arms (220) of the existing brackets (200).

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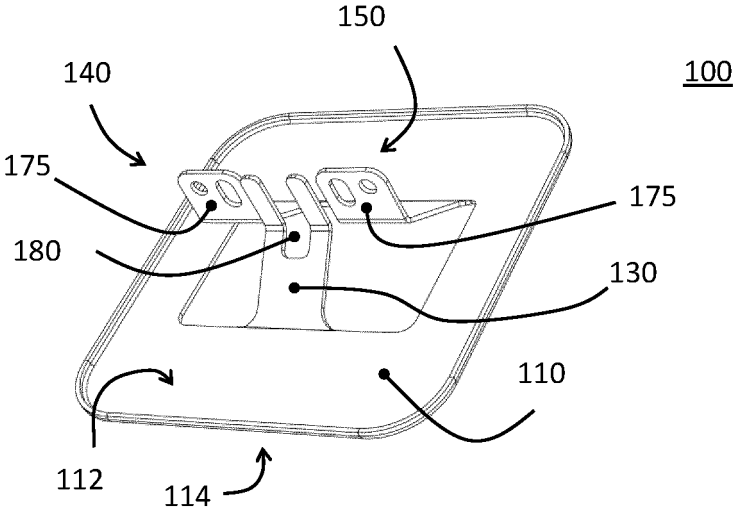


Fig. 1

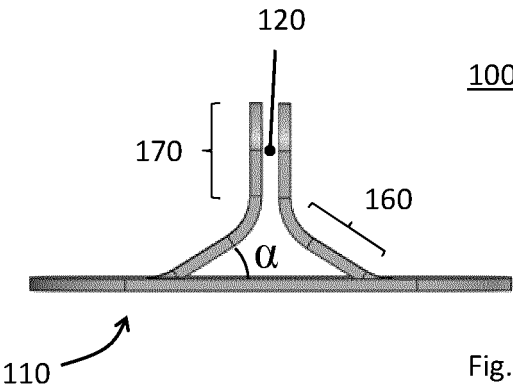


Fig. 2

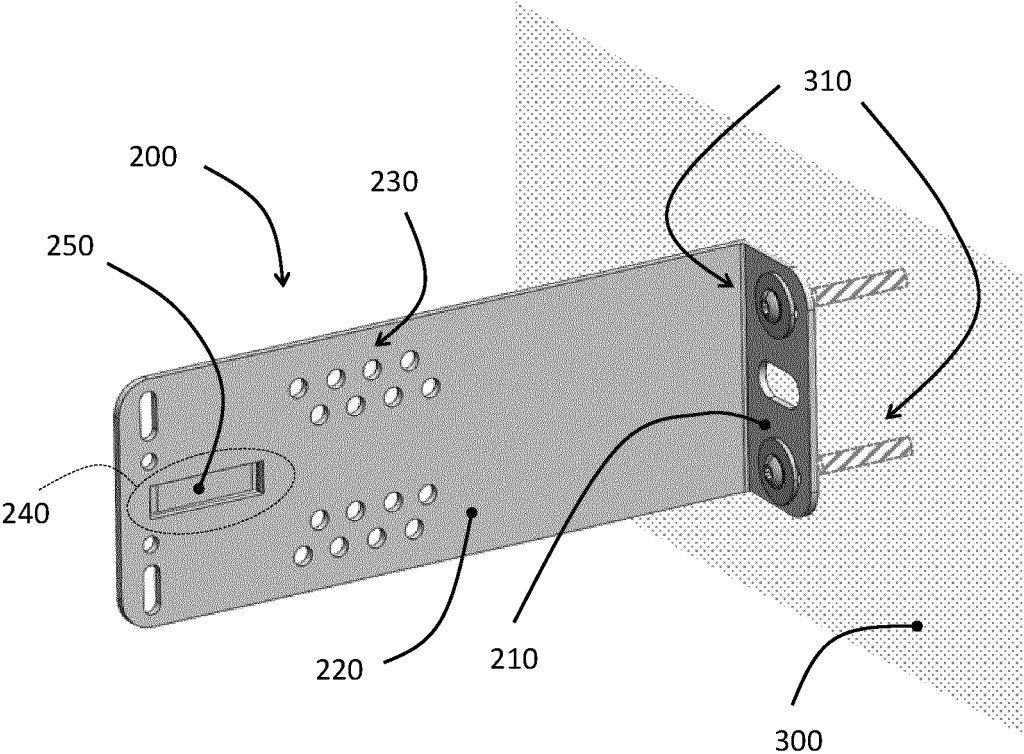


Fig. 3

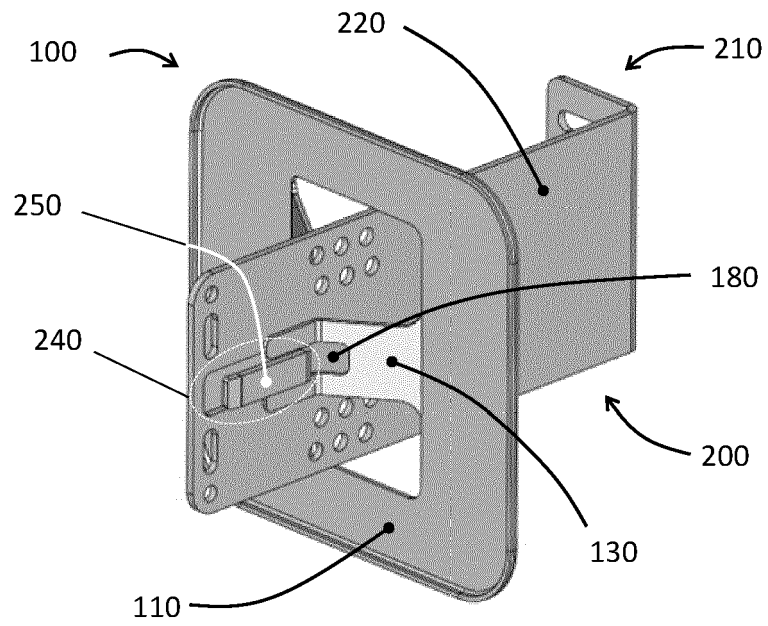


Fig. 4 A

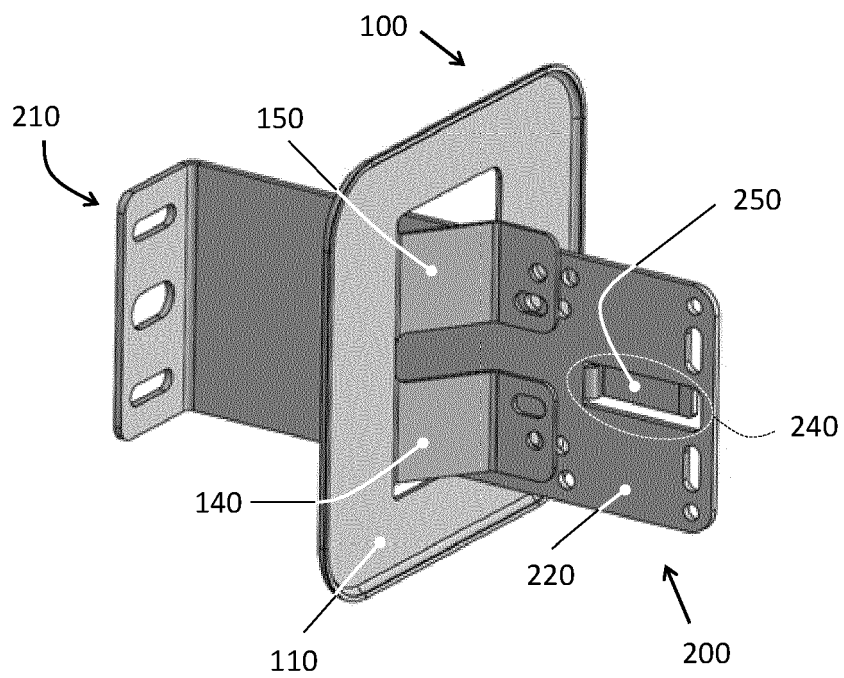
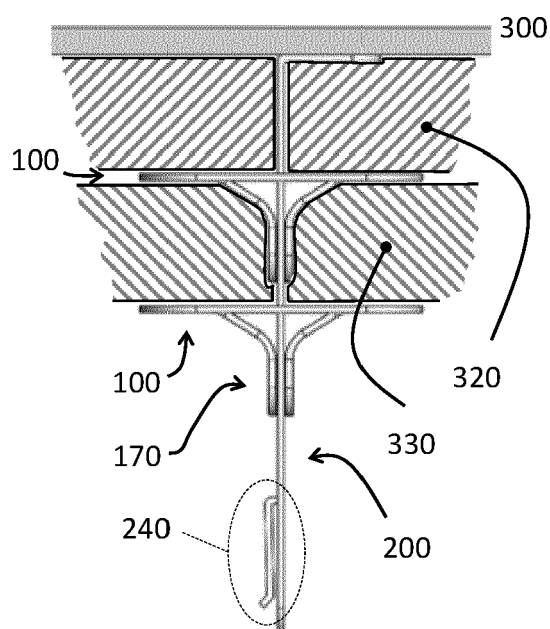
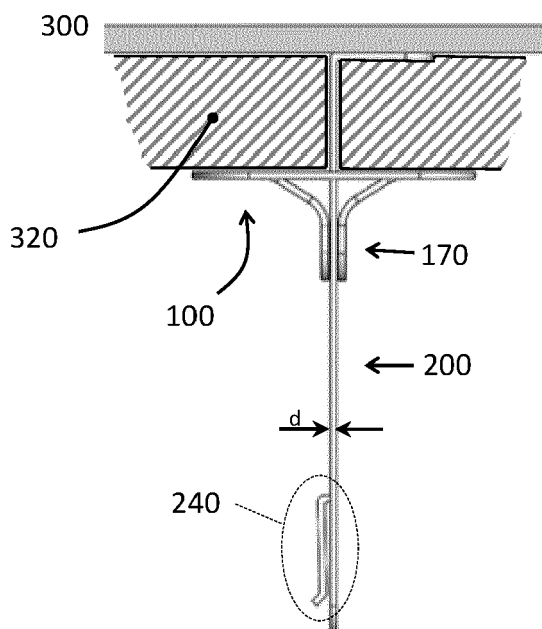
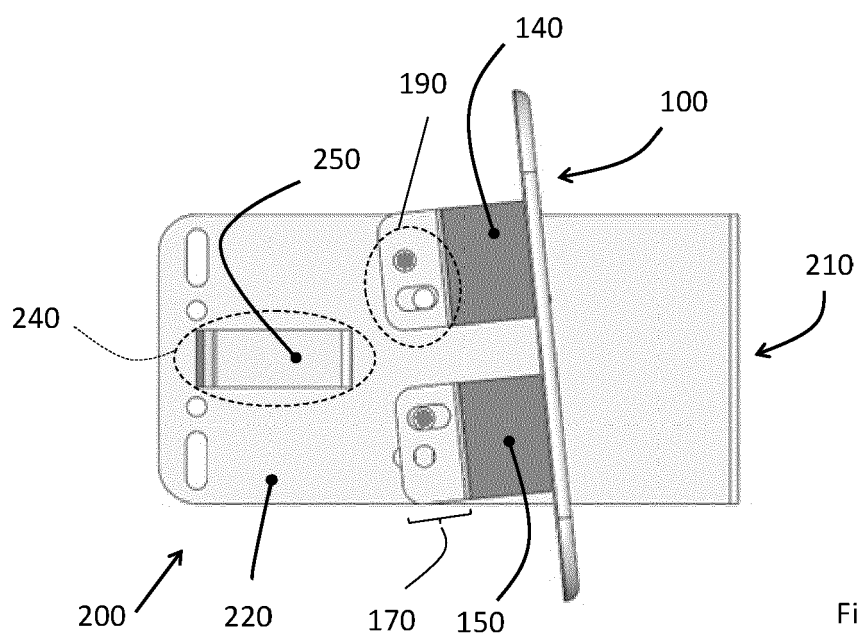


Fig. 4 B





EUROPEAN SEARCH REPORT

Application Number

EP 23 20 1320

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	US 3 019 864 A (LESTER HARRY R) 6 February 1962 (1962-02-06)	1-7, 9-12	INV.
A	* figures 1-2 * * column 2, line 22 - line 38 * * column 3, line 1 - line 3 * -----	8	E04F13/08 E04F13/00
Y	DE 10 56 349 B (ECKEL OLIVER C) 30 April 1959 (1959-04-30) * figure 1 * * column 3, line 28 - line 29 * -----	1-7, 9-12	
Y	EP 3 783 166 A1 (SAINT GOBAIN ISOVER [FR]) 24 February 2021 (2021-02-24) * figures 3-4 * * paragraph [0040] - paragraph [0041] * -----	7, 11, 12	
			TECHNICAL FIELDS SEARCHED (IPC)
			E04F
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
Munich		19 March 2024	Estorgues, Marlène
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			

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.

EP 23 20 1320

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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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19-03-2024

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 3019864	A	06-02-1962	NONE
DE 1056349	B	30-04-1959	NONE
EP 3783166	A1	24-02-2021	EP 3783166 A1 24-02-2021
		FR 3100041 A1	26-02-2021

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