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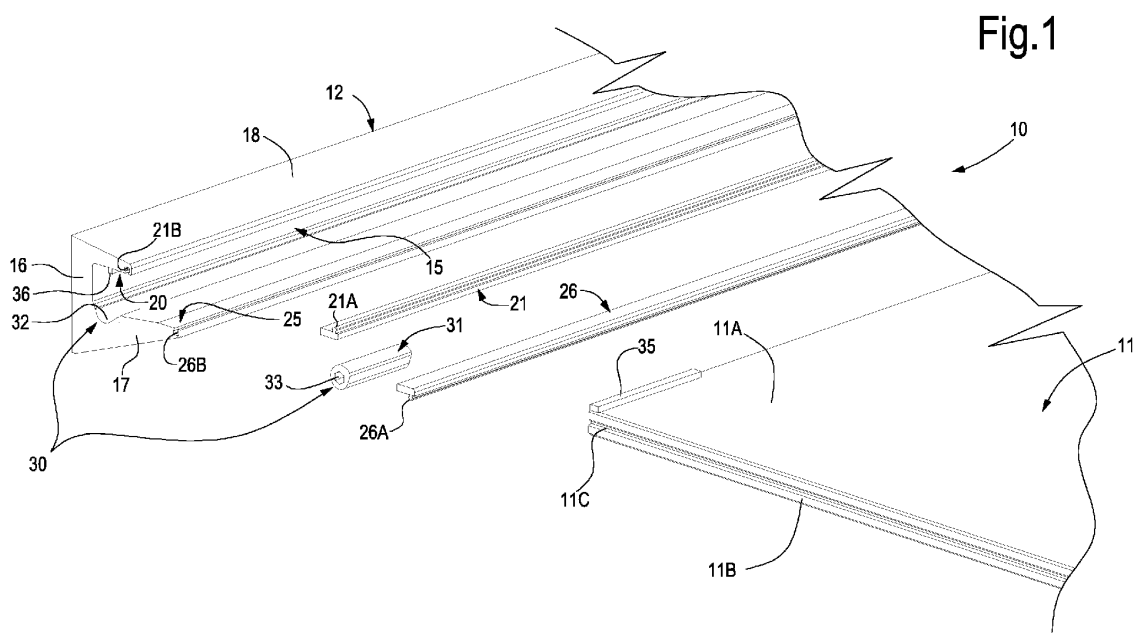
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(54) **CANTILEVER PANEL SUPPORT APPARATUS**

(57) Cantilever panel support apparatus, comprising
- a longitudinal body made from an extruded metal profile, to be fixed to a bearing structure, defining a laterally-open longitudinal seat, into which an end of the panel to be supported is adapted to be inserted, said longitudinal seat being delimited by a sidewall to be fixed to the bearing structure, a base extending in a cantilevered fashion with respect to said sidewall, and a ceiling which also extends in a cantilevered fashion from said side, placed

above said base,
- a first contact zone with the upper face of the panel, provided on said ceiling,
- a second contact zone with the lower face of the panel, provided on said base,
- a panel locking device comprising at least one pressing element adapted to press, when the panel is put into place, against the lower face of the panel, so that the panel is pushed towards said ceiling;



Description

Technical field

[0001] The present invention refers to the field of locking systems for glazed panels, and has as its object a cantilever panel support apparatus, such as, preferably, a covering panel, and more preferably a covering panel made of glass, crystal, etc.

[0002] An object of the invention is also a covering structure that uses said apparatus and a method of assembling a panel with said apparatus.

State of the art

[0003] As is known, glass coverings require heavy and dedicated support structures that have the disadvantages of complicated and expensive execution and installation steps.

[0004] For example, in the case of canopies, the glazed coverings are mostly sustained by heavy frames supported by large brackets to be fixed to a support structure.

[0005] As well as the problems of production and installation cost, these types of covering envisage long maintenance times when replacing spoiled or damaged parts and in general, they are not equipped with safety systems that guarantee the safety of panels both during the use phase and during the period of use.

Aim and summary of the invention

[0006] The purpose of the present invention is to solve the problems associated with panel support structures of a known type.

[0007] Within said purpose, an important aim of the present invention is to create a cantilever panel support apparatus that allows rapid assembly of the panel.

[0008] Another important aim of the present invention is to create a cantilever panel support apparatus that also allows rapid dismantling of the panel in the event of maintenance.

[0009] A further important aim of the present invention is to create a cantilever panel support apparatus that allows the integrity of the panel to be ensured both during the installation phase and during the period of use.

[0010] Another important aim of the present invention is to create a cantilever panel support apparatus that allows the panel to be blocked in the required configuration in a stable and firm manner, so that it is able to stand up to any external stress.

[0011] Not the last important aim of the present invention is to create a cantilever panel support apparatus that allows rapid installation of the panel.

[0012] These and other aims, which will be clarified in the following, are achieved by means of a cantilever panel support apparatus comprising

- a longitudinal body made from a metal profile, for

example extruded or drawn, to be fixed to a bearing structure, defining a laterally-open longitudinal seat, into which an end of the panel to be supported is adapted to be inserted, said longitudinal seat being delimited by a sidewall to be fixed to the bearing structure, a base extending in a cantilevered fashion with respect to said sidewall, and a ceiling which also extends in a cantilevered fashion from said side, placed above said base,

- a first contact zone with the upper face of the panel, provided on said ceiling,
- a second contact zone with the lower face of the panel, provided on said base,
- a panel locking device comprising at least one pressing element adapted to press, when the panel is put into place, against the lower face of the panel, so that the panel is pushed towards said ceiling;

when put into place, the panel supported by said apparatus having its center of gravity external to said longitudinal body and having one end in said seat, said panel resting in a cantilevered fashion with one face on said second contact zone, and striking with the opposing face against said first contact zone, said first contact zone being adapted to act as opposition element to the rotation of the panel around said second contact zone. Appropriately, the panel locking device comprises at least one cam body placed in a corresponding niche formed on said base and opened on said seat, said cam body being rotatable so as to take on at least two positions, a first position in which it does not interfere with the panel, and a second position in which one of its parts is in contact with said panel, pushing it towards said ceiling.

[0013] Preferably, the first contact zone with the upper face of the panel, provided on said ceiling, may comprise a first non-slip or friction element adapted to come into contact with the upper face of the panel.

[0014] Preferably, the second contact zone with the lower face of the panel, provided on said base, may comprise a second non-slip or friction element adapted to come into contact with the lower face of the panel.

[0015] Preferably, the panel locking device is placed between the sidewall and said second contact zone.

[0016] Preferably, the panel locking device, when in place, is adapted to press in a zone of the lower face of the panel that is closer to said sidewall than to said first contact zone.

[0017] Preferably, said cam body is rotatable on an axis parallel to the direction in which the longitudinal body extends, preferably, when in place, a substantially horizontal axis.

[0018] Preferably, the cam body is adapted to be inserted in said niche after said panel has been positioned in said seat.

[0019] Preferably, the niche is formed on said base in a position comprised between said sidewall and said second contact zone, preferably adjacent to said sidewall.

[0020] Preferably, when in place, the cam body pro-

trudes upwards outside said niche.

[0021] Preferably, the cam body has a cylindrical structure wherefrom extends an eccentric part, with said cylindrical part adapted to be housed in said niche, said niche having at least in part a cylindrical cradle shape to allow the rotational housing of said cylindrical structure, and with said eccentric part adapted to come into contact with the lower face of the panel.

[0022] Preferably, the cam body has an imprint for insertion of a movement tool.

[0023] Preferably at least two cam bodies are present, placed at opposite ends of the longitudinal body.

[0024] Preferably, the base protrudes from said side-wall further with respect to said ceiling, there therefore being defined a space, above said base, free from said ceiling, to facilitate maneuvers to insert the panel into the seat.

[0025] Preferably, the first contact zone and more preferably the first non-slip element, is placed in an end portion of said ceiling.

[0026] Preferably, the second contact zone and more preferably the second non-slip element, is placed in an end portion of said base.

[0027] Preferably, the first non-slip or friction element is in the form of a continuous or discontinuous strip of non-slip material, such as preferably a plastic material.

[0028] Preferably, the second non-slip or friction element is in the form of a continuous or discontinuous strip of non-slip material, such as preferably a plastic material.

[0029] Preferably, the apparatus according to the invention comprises

- an anti-extraction element adapted to be glued to the upper face of the panel, corresponding with its side edge to be inserted in said seat, and
- an abutting element for said anti-extraction element, protruding towards the inside of said seat from said ceiling, adapted to define, when the panel is put in place, an anti-extraction undercut in the direction of extraction of the panel for said anti-extraction element.

[0030] Preferably, the apparatus according to the invention comprises means for fixing said longitudinal body to said support structure, preferably comprising through-holes made through said longitudinal body with respective housings for fastening screw heads.

[0031] According to a further aspect, the invention refers to an assembly method for a support apparatus as described above according to one or more preferred embodiments, comprising the following steps:

- fixing said longitudinal body to a bearing structure, preferably in a horizontal direction,
- inserting an end edge of the panel into said seat, with a downward insertion movement,
- turning the panel so that the lower face rests on the second non-slip or friction element and the upper

face strikes against the first non-slip element,

- inserting said cam body into said niche,
- turning said cam body so as to bring it into contact with the lower face of the panel so that it is pushed towards the ceiling of the seat.

[0032] Preferably, prior to insertion of the panel into the seat, there is a step of gluing said anti-extraction element on to the upper face of the panel, and a step of rotating the panel so that said anti-extraction element is somewhere between said side and said abutting element for said anti-extraction element.

[0033] According to a further aspect, the invention also refers to a covering structure, comprising a covering panel and a support apparatus for said panel as described above, according to one or more preferred embodiments.

[0034] Preferably, the panel is of a glazed type, and preferably a double-glazed type.

Brief description of the drawings

[0035] Further characteristics and advantages of the invention will be more apparent from the description of a preferred but not exclusive embodiment thereof, shown by way of non-limiting example in the attached drawings, in which

figure 1 shows an exploded, axonometric view of an apparatus according to the invention;

figures 2 to 6 show a cross-section side view of a support according to the invention, fixed to a bearing structure, in the various steps of panel assembly.

Detailed description of an embodiment of the invention

[0036] With reference to the figures mentioned above, a cantilever panel support apparatus according to the invention is indicated as a whole with the number 10.

[0037] More specifically, in this example the apparatus 10 is a canopy with a glass panel, the latter being indicated with 11 (for example made from two sheets of glass 11' and 11") bonded face to face with each other, according to known methods).

[0038] The cantilever support apparatus 10 for the panel 11 comprises a longitudinal body 12 made from a straight metal profile, for example extruded or drawn, for example in aluminium, to be fixed to a bearing structure 13.

[0039] For example, fixing of the longitudinal body 12 (hereinafter also indicated as "profile") to the bearing structure is using fixing means, such as for example screws 14 arranged in through-holes (not shown in the figures) formed through the profile 12 (obviously with the option of providing enlarged housings for the heads of the screws), and connected to the bearing structure 13 (for example a wall).

[0040] The longitudinal body or profile 12 defines a laterally-open longitudinal seat 15, into which an end 11C

of the panel 11 is adapted to be inserted. Said longitudinal seat 15 is delimited by a sidewall 16 to be fixed to the bearing structure, a base 17 extending in a cantilevered fashion with respect to said sidewall 16, and a ceiling 18 which also extends in a cantilevered fashion from said side, placed above said base 17.

[0041] In this example, the base 17 protrudes from the sidewall 16 further with respect to said ceiling; this means that a space 19 is defined, from said base 17, free from said ceiling 18; this fact, as well as clearly defining the panel support torque, also facilitates maneuvers to insert the panel into the seat 15, as will be made clearer hereafter.

[0042] On the free end portion of the ceiling 18, on its lower part, there is a first contact zone 20 with the upper face 11A of the panel 11. Appropriately, said first contact zone 20, provided on said ceiling, comprises a first non-slip or friction element 21, adapted to come into contact with the upper face 11A of the panel. Said first element 21 is, in this example, a fitting in the form of a continuous strip of plastic material fixed to the profile 12 by means of a corresponding connection rib 21A inserted in a slot 21 B in the profile.

[0043] In other examples, the first element 21 may be fixed to the profile 12 in another manner, for example by gluing. In other examples, said first non-slip or friction element 21 may be a discontinuous strip of non-slip or friction material.

[0044] On the free end portion of the base 17, on its upper part, there is a second contact zone 25 with the lower face 11 B of the panel 11. Appropriately, said second contact zone 25, provided on said base, comprises a second non-slip or friction element 26, adapted to come into contact with the upper face 11 B of the panel. Said second element 26 is, in this example, a continuous strip of plastic material fixed to the profile 12 by means of a corresponding connection rib 26A inserted in a slot 26B in the profile.

[0045] In other examples, the second element 26 may be fixed to the profile 12 in another manner, for example by gluing. In other examples, said non-slip or friction element 26 may be a discontinuous strip of non-slip or friction material.

[0046] The apparatus 10 also comprises a device 30 locking the panel 11, which comprises, in this example, a pair of pressing elements 31 (only one of which is visible in the figures), placed at opposite ends of the profile 12 (in other embodiments a single pressing element may be present, for example along the whole, or almost the whole length of the niche, namely of the longitudinal body; in other embodiments there may be a single pressing element with a length lower than the length of the niche, placed in an intermediate position thereto).

[0047] Each pressing element 31 is adapted to press, when the panel is put into place, against the lower face 11 B of the panel, so that the panel is pushed towards the ceiling 18.

[0048] For example, each pressing element 31 is a

cam body placed in a corresponding niche 32 formed on the base 17 and open on the seat 15, and rotatable so as to take on at least two positions, a first position in which it does not interfere with the panel, as shown in figure 5, and a second position in which one of its parts is in contact with the panel, pushing it towards the ceiling 18, as shown in figure 6.

[0049] In particular, in this example the niche 32 is made in the profile and is therefore continuous over the whole length thereof, and is in practice a depressing formed on the flat extension of the base. More specifically, said niche is a cradle with an at least partially cylindrical shape to house the cam body 31, which in turn is formed by a cylindrical structure from which develops an eccentric part 31A (the latter adapted to come into contact with the lower face of the panel), with the cylindrical part adapted to be housed in the cylindrical part of the niche 32 to allow rotation of the cam body 31. The axis of rotation of the cam body 31 is therefore parallel to the longitudinal development of the profile.

[0050] The niche 32 is formed on the base 17 in a position comprised between the sidewall 16 and the second non-slip element, preferably adjacent to the sidewall 17.

[0051] From an operating point of view, as better described below, the cam body 31 is adapted to be inserted into the niche 32 after the panel 11 has been positioned in the seat 15. When in place, the cam body 31 protrudes upwards outside the niche 32.

[0052] Appropriately, the cam body 31 presents, at one end, an imprint 33 for insertion of a movement tool, such as, for example, a hexagon wrench.

[0053] Appropriately, the apparatus in this example comprises an anti-extraction element 35 adapted to be glued to the upper face 11A of the panel 11, corresponding with its side edge to be inserted in the seat 15, and a abutting element 36 (suitably formed as one piece during extrusion of the profile 12) for the anti-extraction element 35, protruding towards the inside of the seat 15 from the ceiling 18, adapted to define, when the panel 11 is put in place, an anti-extraction undercut in the direction f of extraction of the panel for the anti-extraction element 36 itself.

[0054] The anti-extraction element 35 is a safety element that distinguishes itself with respect to existing solutions in that it does not require any machining operations on the panel. This element is in fact applied, preferably by means of adhesive, to the glass panel; it is commonly known that machining operations of any type on the panel weaken its structure, thus reducing the performance of the product.

[0055] Assembly of the covering structure, such as a canopy, with the apparatus described herein, is carried out as follows.

[0056] There is a phase wherein the longitudinal body 12 is fixed to the bearing structure 13, preferably in a horizontal direction, for example by means of screws 14.

[0057] There is a phase wherein the abutting element 36 is fixed, for example by gluing, to the side edge of the

portion 11C of the panel to be inserted in the seat 15 (figure 2).

[0058] There is then a phase wherein the side edge 11C of the panel 11 is inserted into the seat 15, with a downward insertion movement (f1) (figure 3). It should be noted that the space 19 over the base 17 facilitates insertion of the panel into the seat 15. Furthermore, the presence of the niche 32 means that there is additional space to avoid impacting the seat with the edge of the panel.

[0059] Then (figure 4) the panel 11 is turned (f2) so that the lower face 11 B rests on the second non-slip or friction element 26 and the upper face 11A backs against the first non-slip or friction element 21, making sure that the anti-extraction element 35 is positioned between the anti-extraction abutting element 36 and the sidewall 16.

[0060] The cam bodies 31 are then inserted, from opposite sides of the profile, into the niche 32, with their axis of rotation parallel to the profile (figure 5).

[0061] Finally, using a hexagon wrench, each cam body 31 is turned (figure 6) so as to bring it into contact with the lower face 11 B of the panel so that it is pushed towards the ceiling 18 of the seat 15. It must be noted that the panel locking device presses in a zone of the lower face of the panel that is closer to the sidewall than the first contact zone.

[0062] When put into place, the panel 11 supported by the apparatus 10 has its center of gravity external to the longitudinal body 12.

[0063] The two fittings (the non-slip or friction elements) 21 and 26 are arranged in such a way as to generate a torque acting on the panel with dual functions: to keep the panel in position, and to generate a friction necessary and sufficient to avoid any type of movement in the panel when in its operating conditions.

[0064] In practice, the panel 11 is mainly locked by its own weight and the cam bodies are not therefore necessary to lock it at the time the profile is inserted, but can be inserted subsequently, thus facilitating the assembly steps.

[0065] It is understood that what is depicted only represents possible, non-limiting embodiments of the invention, which may vary in its forms and arrangements without departing from the basic scope of the invention. The presence of any reference numbers in the attached claims merely has the purpose of facilitating their reading in light of the preceding description and the attached drawings, and does not restrict the scope of protection.

Claims

1. Cantilever panel support apparatus (10), comprising

- a longitudinal body (12) made from a metal profile, to be fixed to a bearing structure, defining a laterally-open longitudinal seat (15), into which an end (11C) of the panel (11) to be supported

is adapted to be inserted, said longitudinal seat (15) being delimited by a sidewall (16) to be fixed to the bearing structure, a base (17) extending in a cantilevered fashion with respect to said sidewall (16), and a ceiling (18) which also extends in a cantilevered fashion from said side (16), placed above said base (17),

- a first contact zone (20) with the upper face (11A) of the panel, provided on said ceiling (18),
- a second contact zone (25) with the lower face (11B) of the panel, provided on said base (17),
- a device (30) locking the panel (11) comprising at least one pressing element (31) adapted to press, when the panel is put into place, against the lower face (11 B) of the panel, so that the panel is pushed towards said ceiling (18); said pressing element (31) being a cam body housed in a corresponding niche (32) formed on said base (17) and open onto said seat (15), said cam body (31) being rotatable so as to take on at least two positions, a first position in which it does not interfere with the panel, and a second position in which one of its parts is in contact with said panel, pushing it towards said ceiling;

when put into place, the panel (11) supported by said apparatus (10) having its center of gravity external to said longitudinal body (12) and having one end (11C) in said seat (15), said panel resting in a cantilevered fashion with one face on said second contact zone (25), and striking with the opposing face against said first contact zone (20), said first contact zone being adapted to act as opposition element to the rotation of the panel around said second contact zone (25).

2. Support apparatus according to claim 1, wherein

- said first contact zone (20) with the upper face (11A) of the panel, provided on said ceiling (18), comprises a first non-slip or friction element (21) adapted to come into contact with the upper face of the panel (11A) and/or
- said second contact zone (25) with the lower face of the panel (11 B), provided on said base (17), comprises a second non-slip or friction element (26) adapted to come into contact with the lower face of the panel (11 B).

3. Support apparatus according to one or more of the preceding claims, wherein said niche (32) is formed on said base (17) in a position comprised between said sidewall (16) and said second contact zone (25), preferably in a position closer to said sidewall with respect to said second contact zone.

4. Support apparatus according to one or more of the preceding claims, wherein there are at least two cam

bodies (31), located at opposite ends of the longitudinal body (12).

5. Support apparatus according to one or more of the preceding claims, wherein said cam body (18) can swivel on an axis parallel to the direction in which the longitudinal body (12) extends.

6. Support apparatus according to one or more of the preceding claims, wherein, when in place, said cam body (31) protrudes upwards outside said niche (32).

7. Support apparatus according to one or more of the preceding claims, wherein said cam body (18) has a cylindrical structure wherefrom extends an eccentric part, with said cylindrical part adapted to be housed in said niche (32), said niche having at least in part a cylindrical cradle shape to allow the rotational housing of said cylindrical structure, and with said eccentric part adapted to come into contact with the lower face (11 B) of the panel.

8. Support apparatus according to one or more of the previous claims, wherein said base (17) protrudes from said sidewall (16) further with respect to said ceiling (18), there therefore being defined a space (19), above said base (17), free from said ceiling (18), to facilitate maneuvers to insert the panel (11) into the seat (15).

9. Support apparatus according to one or more of the previous claims, wherein

- said first contact zone (20) is placed in an end portion of said ceiling (18) and/or
- said second contact zone (25) is placed in an end portion of said base (17).

10. Support apparatus according to one or more of the previous claims, wherein

- said first non-slip element (21) is in the form of a continuous or discontinuous strip of non-slip material, such as preferably a plastic material.
- said second non-slip element (25) is in the form of a continuous or discontinuous strip of non-slip material, such as preferably a plastic material.

11. Support apparatus according to one or more of the previous claims, comprising

- an anti-extraction element (35) adapted to be glued to the upper face (11A) of the panel, corresponding with its side edge to be inserted in said seat (15), and
- an abutting element (36) for said anti-extraction element (35), protruding towards the inside of said seat (15) from said ceiling (18), adapted to

define, when the panel is put in place, an anti-extraction undercut in the direction of extraction of the panel for said anti-extraction element (35).

12. Support apparatus according to one or more of the previous claims, comprising means (14) for fixing said longitudinal body (12) to said support structure; said means preferably comprising through-holes made through said longitudinal body with respective housings for fastening screw heads; said profile being preferably extruded or drawn.

13. Support apparatus according to one or more of the previous claims, provided with an assembly method comprising the following steps:

- fixing said longitudinal body (12) to a bearing structure, preferably in a horizontal direction,
- inserting an end edge (11 C) of the panel (11) into said seat (15), with a downward insertion movement,
- turning the panel so that the lower face (11 B) rests on the second non-slip element (25) and the upper face (11A) strikes against the first non-slip element (20),
- inserting said cam body (31) into said niche (32),
- turning said cam body (31) so as to bring it into contact with the lower face (11 B) of the panel so that it is pushed towards the ceiling (18) of the seat (15).

14. Support apparatus according to claims 11 and 13, wherein prior to insertion of the panel (11) into the seat (15), there is a step of gluing said anti-extraction element (35) on to the upper face (11 A) of the panel (11), and a step of rotating the panel so that said anti-extraction element (35) is somewhere between said side (16) and said abutting element (36) for said anti-extraction element.

15. Covering structure, comprising a covering panel (11) and a support apparatus (10) for said panel according to one or more of the previous claims; preferably said panel is of a glazed type, and preferably a double-glazed type.

Fig.1

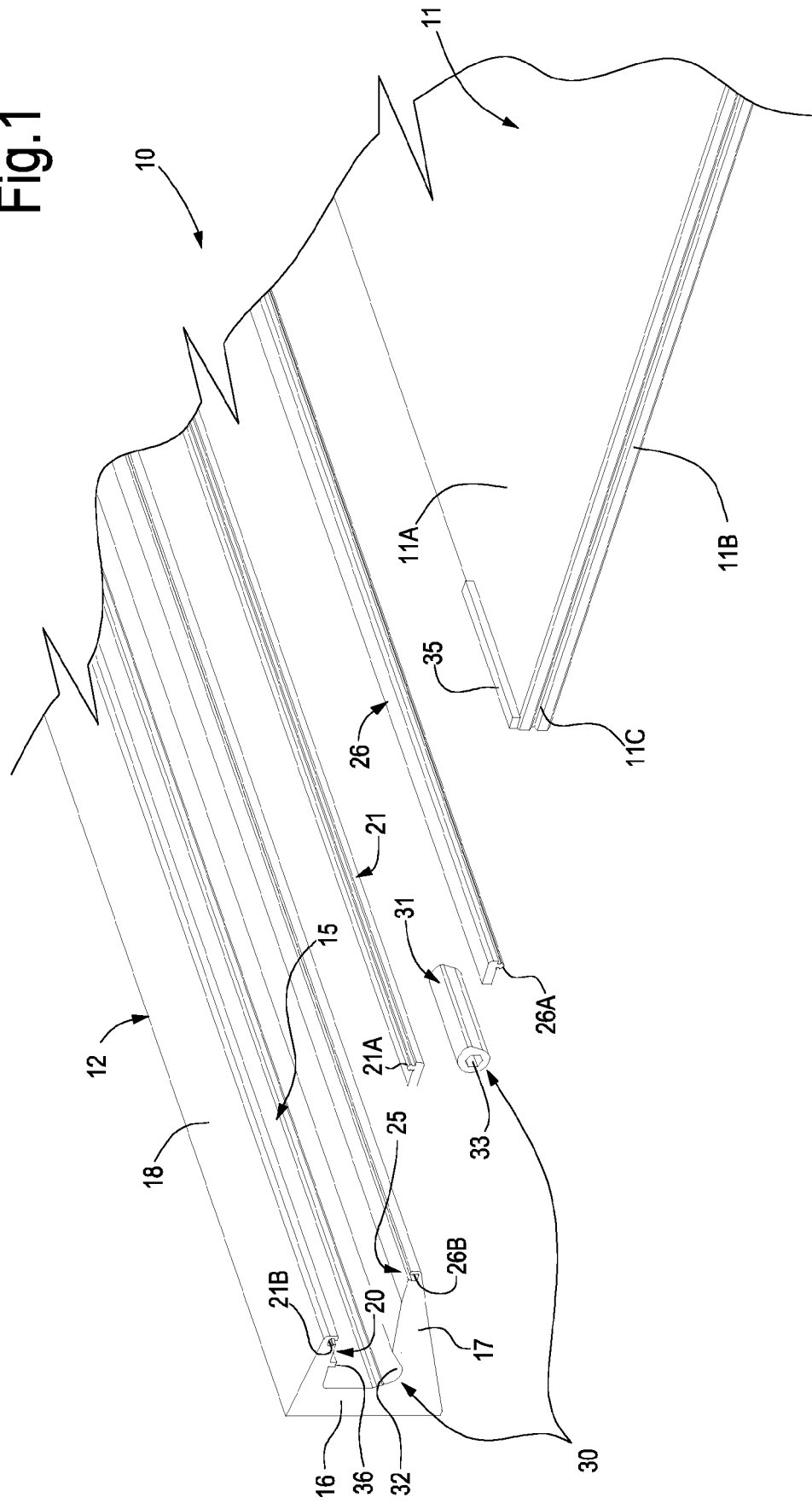


Fig.2

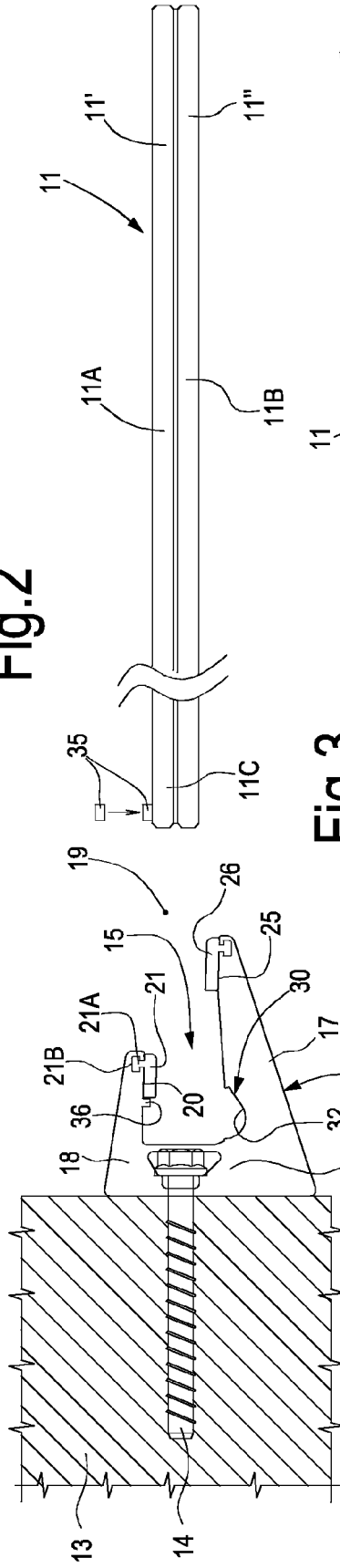


Fig.3

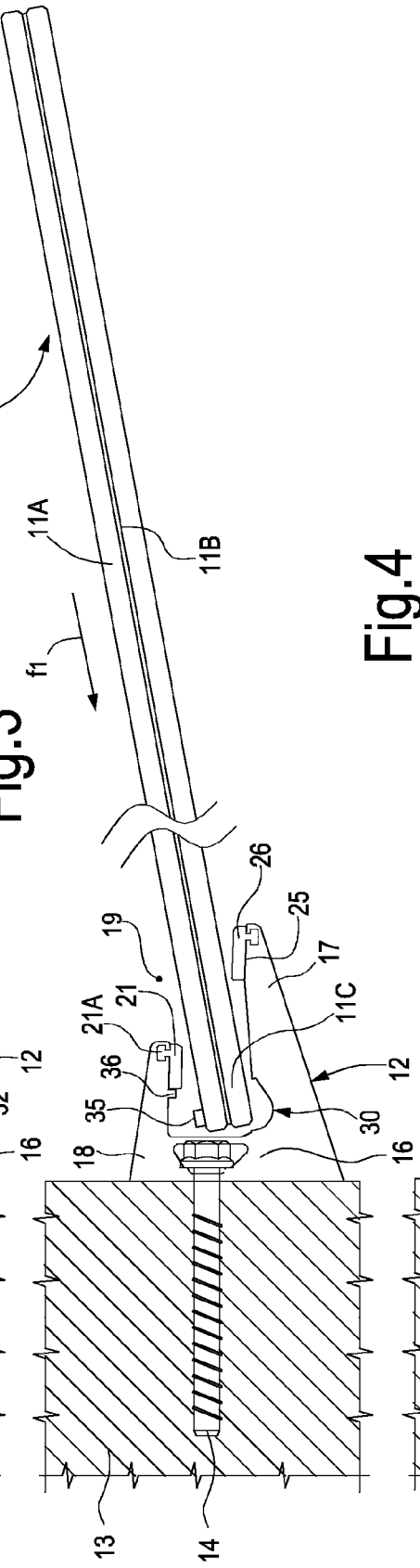


Fig.4

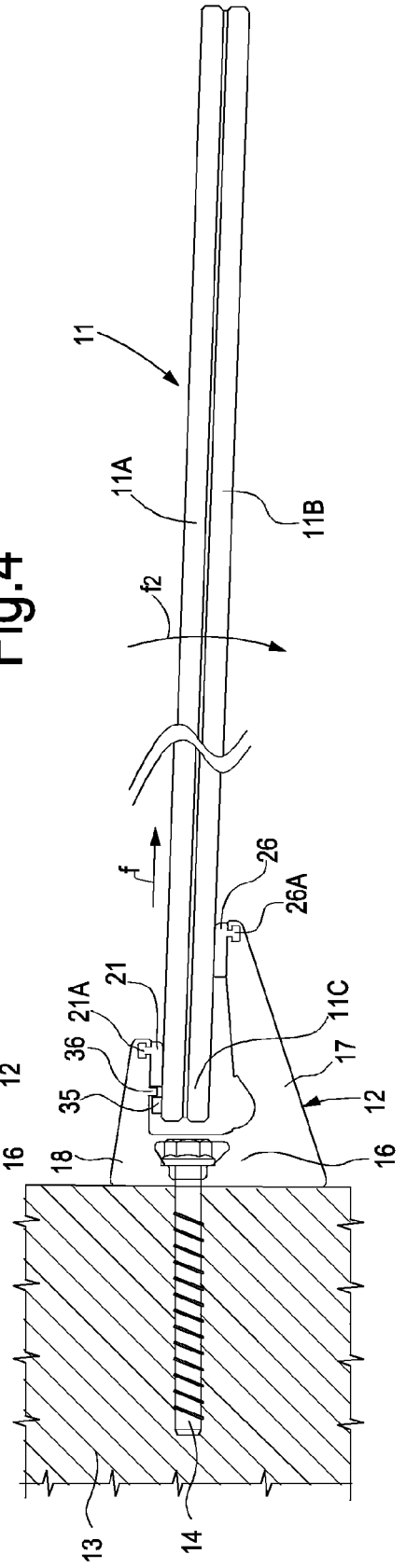


Fig.5

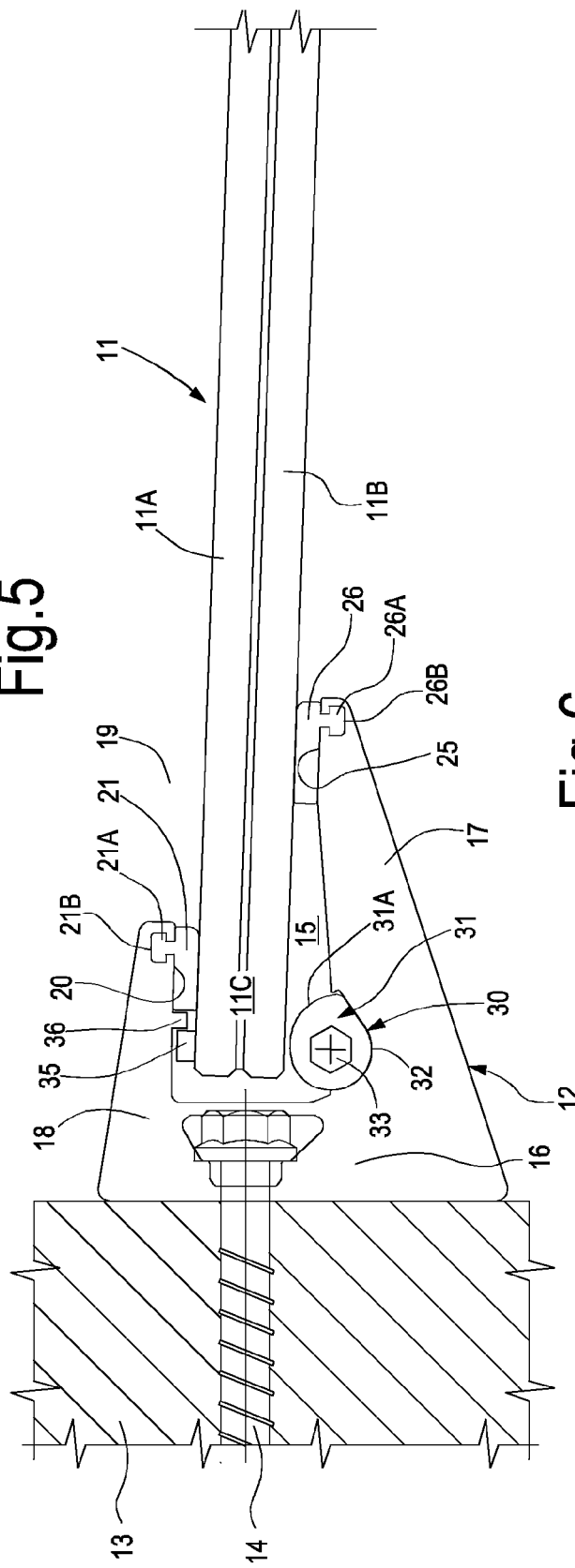
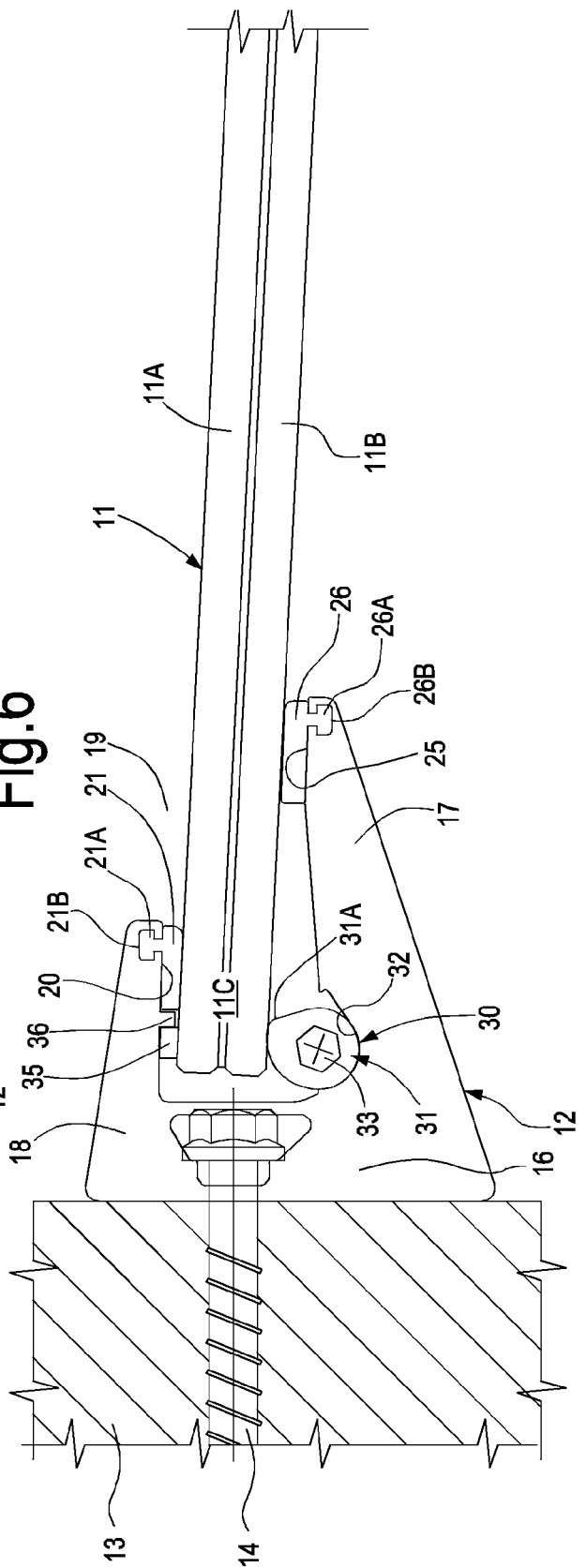


Fig.6





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Application Number
EP 18 15 7459

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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 12 April 2018	Examiner Leroux, Corentine
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EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 18 15 7459

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