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**(54) PREFABRICATED EXTENSION MODULE AND COMPLEMENTARY ANCHORAGES FOR CANTILEVER ATTACHMENT TO A BUILDING FACADE AND METHOD OF INSTALLATION**

VORGEFERTIGTES ERWEITERUNGSMODUL UND KOMPLEMENTÄRE VERANKERUNGEN ZUR FREITRAGENDEN BEFESTIGUNG AN EINER GEBÄUDEFASSADE UND INSTALLATIONSVERFAHREN

MODULE D'EXTENSION PRÉFABRIQUÉ ET DES ANCRAGES COMPLÉMENTAIRES ACCOUPlable EN PORTE-À-FAUX À UNE FAÇADE D'UN ÉDIFICE ET PROCÉDÉ D'INSTALLATION

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(72) Inventor: **SARRABLO MORENO, Vicenç**  
**08017 Barcelona (ES)**

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(74) Representative: **Torner, Juncosa I Associats, SL**  
**C / Pau Claris, 108, 1r 1a**  
**08009 Barcelona (ES)**

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(73) Proprietor: **Universitat Internacional De Catalunya,**  
**Fundació Privada**  
**08017 Barcelona (ES)**

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## Description

### Field of the Art

**[0001]** The present invention relates to a prefabricated extension module and complementary anchorages for cantilever attachment to a building façade in order to increase its useful surface area.

**[0002]** Typically, said prefabricated extension module can constitute an exterior space such as a balcony, terrace, garden area, or can also constitute a closed interior space.

**[0003]** The proposed prefabricated extension module is foldable, forming a flat and compact element to facilitate transport, allowing a plurality of said prefabricated extension modules to be transported in an efficient and cost-effective manner.

### Prior Art

**[0004]** Adding a cantilever prefabricated extension module such as, for example, a balcony or terrace, to a building façade is known.

**[0005]** For example, prefabricated balconies provided with a floor panel and integrating brackets hanging below said floor panel, allowing the floor panel and the brackets to be fixed to a building façade, are known.

**[0006]** However, this solution complicates the transport of a plurality of prefabricated balconies, since the protruding brackets prevent the compact stacking of several floor panels. Limiting the height of the brackets to facilitate transport also presents a problem because brackets with a small size cause very high traction and compressive forces on the building façade to which they are anchored compared with the stresses caused by brackets with a larger size.

**[0007]** The use of ties, normally metal cables, arranged diagonally to provide additional support to the floor panel integrated in the extension module is also known; however, metal cables require a precise *in situ* length adjustment, may have certain, possibly unpleasant, elasticity that can be perceived by the users of the extension module, and require periodic inspection of their tautness as they tend to become loose. Furthermore, they condition the design of the extension module.

**[0008]** Document JPH0649893A is known, said document describing a prefabricated extension module for cantilever attachment to a building façade, which includes a floor panel directly screwable to the façade, and side panels hinged by means of hinges to the floor panel which act as side railings and can be folded to facilitate transport, but do not perform any structural function in the fixing of the module to the façade. This solution only allows for modules that project a small distance from the façade and apply extremely significant forces on the anchorages as a result of the bending moment caused by the cantilever and the short lever arm existing between the top and bottom screws of the anchorages, compli-

cating the installation and maintenance of the module and limiting its strength and dimensions. Furthermore, this solution requires a crane to keep each module elevated while the operators make holes on the façade and screw the module thereto, with the subsequent associated risk and cost.

**[0009]** Furthermore, this document describes the inclusion of lifting points of the module in the floor panel, in the area of the hinge with the side panels, which prevents the base panel from being lifted with the side panels in the vertical position.

**[0010]** Document US2016215491A1 describes an extension module que which can be fixed to a façade through coupling configurations fixed to the façade and insertable into receiving configurations provided in the module in the form of holes; however, this document only foresees the fixing of a floor panel to the façade, having the same structural problems discussed in relation to the preceding document.

**[0011]** Document JPH07127126A describes a prefabricated extension module comprising a floor panel, a ceiling panel coupled by means of two side panels. The module described in this document can be fixed to a façade by means of anchorages coupled to the floor panel and to the ceiling panel; however, but it is not foreseen that it can be foldable, with the module therefore being a rigid assembly that is difficult and expensive to transport.

**[0012]** Documents US3849952A and GB2160851A describe foldable modules which are, however, foreseen for the cantilever fixing thereof to a façade, so their structural behavior is completely different, and these documents do not provide any teaching which allows improving the construction of an extension module for cantilever attachment to a building façade.

**[0013]** The present invention is proposed for solving the foregoing and other problems of the known extension modules.

### Brief Description of the invention

**[0014]** The present invention relates to a prefabricated extension module and complementary anchorages for cantilever attachment to a building façade. The proposed prefabricated extension module comprises, as is known, a rigid floor panel integrating a structural floor frame, and including a flat top surface, an inner edge provided to be arranged facing the building façade when the module is attached thereto, two side edges perpendicular to the inner edge, and an outer edge comprised between the side edges.

**[0015]** In the context of this document, the expression rigid panel shall be understood to refer to a panel which, except at intended hinge points, cannot lose its initial shape or undergo a deformation discernible to the naked eye under the stresses expected for its intended use.

**[0016]** It is also understood that the floor panel is a three-dimensional element with a width defined by the distance between the side edges, a depth defined by the

distance between the inner and outer edges, and a thickness defined by the height of the side, inner, and outer edges.

**[0017]** The invention proposes that the prefabricated extension module further includes:

- two rigid side panels each integrating a structural side frame, and being provided with a bottom edge, a top edge, and an inner edge provided to be arranged facing the building façade when the module is attached thereto, each of said side panels having the bottom edge thereof hinged to the floor panel about an axis parallel to the side edges thereof by means of a rotary hinge coincident with or adjacent to one of the side edges, allowing the side panels to be positioned in a horizontal position parallel to the flat top surface of the floor panel and in a vertical position perpendicular to the flat top surface of the floor panel;

**[0018]** Therefore, the side panels are coupled and hinged on the bottom edge thereof to the side edges of the floor panel, which allows said side panels to be lowered, leaving them in the horizontal position, forming a compact assembly to facilitate transport and reduce its cost.

**[0019]** It will be understood that the direction of the side edges is defined by their length, and that said hinge of the side panels is therefore parallel to the length of the side edges.

**[0020]** The present invention furthermore proposes, in a manner not known in the prior art, that the complementary anchorages include at least one first anchorage and at least one second anchorage, wherein:

- the at least one first anchorage is screwable to a building façade and is provided with first protruding coupling configurations insertable into and complementary to first receiving configurations contained in the floor panel and accessible through the inner edge thereof, structurally integrated with the structural floor frame;
- the at least one second anchorage is screwable to the building façade above the first anchorage, and is provided with second coupling configurations connectable directly and/or through an interposed element to the two side panels by means of second receiving configurations complementary to and insertable into said second coupling configurations, said side panels being in the vertical position; and wherein
- each hinge is structurally fixed to the structural floor frame and to the structural side frame and sized for the transmission of structural stresses between them.

**[0021]** It will be understood that structural stresses are those stresses which allow transmitting the weight of the

module to the building façade, supporting the module, and this also allows transmitting the overloading typical of the use of said module to the façade.

**[0022]** For its installation, the floor panel is fixed to said at least one first anchorage, previously screwed to the façade, through the insertion of the first coupling configurations provided in said first anchorage into first receiving configurations contained in the floor panel.

**[0023]** Preferably, the first coupling can withstand and transmit to the façade the bending moment generated by the actual weight of the extension module, allowing the extension module to be supported on the façade only by means of the first coupling.

**[0024]** In order to reduce said bending moments, the panels forming the extension module will preferably be hollow panels, provided with lightweight resistant elements such as, for example, metal profiles or solid or laminated wood struts.

**[0025]** Said first coupling can be sized to withstand the moment generated not only by the weight of the extension module, but also by the loads provided thereon as a result of use or of exposure to the elements, thereby allowing said extension module to be supported in cantilever fashion only by means of said first anchorage.

**[0026]** Alternatively, it is also contemplated to include at least one second anchorage screwable to the building façade, above the first anchorage, connectable directly and/or through an interposed element to the top edge of the two side panels, said side panels being in the vertical position.

**[0027]** The side panels are placed in the vertical position fixing a top edge of said side panels also to the building façade through second anchorages which would also be screwed to the façade.

**[0028]** Since the first anchorages and the second anchorages are at different heights and since the side panels are rigid panels coupled such that they are hinged to the floor panel at the bottom edge thereof, said side panels act as structural ties. This allows, after fixing the first anchorage and the second anchorage to the extension module, the bending stresses experienced by the first anchorage to be virtually eliminated, replacing same with compressive stresses on the first anchorages and tensile stresses on the second anchorages which, together with shear stresses transmitting the vertical load of the extension module to the structure of the building, allow the support of said cantilever prefabricated extension module, adding little bending loads to said structure.

**[0029]** In this case, it is contemplated that the first anchorage is sized to only withstand the bending moments generated by the weight of the extension module, but not the bending moments generated by use or exposure to the elements. This allows the strength requirements of the first anchorage to be reduced. In this scenario, the first anchorage will serve to support the cantilever extension module only during the initial step of installation, before proceeding to fix the side panels to the second anchorage, thereby facilitating installation tasks without

requiring an oversizing of the first anchorage which may represent an unreasonable extra cost.

**[0030]** Said at least one first and second anchorages will be fixed on a building façade by means of screws, typically using chemical dowels and preferably fixing said screws directly to structural elements of the building. Stresses produced by the extension module can thus be transmitted directly to the structure of the building.

**[0031]** According to a preferred embodiment, said at least one first anchorage will be fixed to the border of a concrete slab of the building.

**[0032]** Said at least one second anchorage will preferably be fixed to structural columns of the building or to the border of a top concrete slab of the building.

**[0033]** The distance between the first anchorage and the second anchorage will be at least 90 cm, and preferably more than 200 cm.

**[0034]** The floor panel will be placed with its flat transitable top surface in a horizontal position and with its inner edge facing the façade, said at least one first anchorage being comprised between the façade and the mentioned inner edge of the floor panel. This allows the at least one first anchorage to be concealed by the floor panel. Preferably, the thickness of the floor panel will be the same as or greater than the height of said at least one first anchorage.

**[0035]** The mentioned at least one first anchorage includes first protruding coupling configurations, formed by multiple elongated profiles, projecting from the first anchorage in a direction almost parallel, or with a slight upward inclination, with respect to the side edges of the floor panel.

**[0036]** It will be understood that an upward inclination is an inclination according to which the end of each first coupling configuration farthest away from the first anchorage is at a height greater than the base thereof, at least on a top face of said first coupling configuration, with the first anchorage being fixed to the façade.

**[0037]** The upward inclination allows the floor panel to be pushed against the façade by gravity, preventing the accidental removal thereof, for example, in the event of strong winds or an earthquake.

**[0038]** The first coupling configurations are snugly inserted into first receiving configurations complementary to the coupling configurations, which are elongated housings or aligned successions of housings, contained in the floor panel and accessible through the inner edge of the floor panel. Said elongated housings or aligned successions of housings will extend from the inner edge towards the outer edge of the floor panel in a direction almost parallel, or with a slight upward inclination, with respect to the side edges of the floor panel.

**[0039]** It will be understood that an upward inclination is an inclination according to which the end of each first receiving configuration farthest away from the inner edge is at a height greater than the entry thereof into the inner edge, at least on a top inner face of said first receiving configuration.

**[0040]** Despite the fixing of the floor panel to first coupling configurations with an upward inclination, this upward inclination ensures that the flat transitable top surface will remain horizontal or even with a slight downward inclination towards the outer edge, to ensure the proper draining of the floor panel to the outside. Therefore, it is contemplated that the upward inclination of the first receiving configurations is the same as or greater than the upward inclination of the first coupling configurations.

**[0041]** It is also contemplated that the connection between the first coupling configurations and the first receiving configurations includes a tightening device configured for pulling the first coupling configurations, compressing at least part of the floor panel which contains the first receiving configurations against said at least one first anchorage and/or against the façade. This tightening device causes an effect equivalent to post-tensioning, allowing the strength of the anchoring of the extension module to the building façade to be increased.

**[0042]** The tightening device can consist, for example, of an element screwed onto the first coupling configurations supported on a wear surface of the floor panel perpendicular to the elongated profiles constituting the first coupling configurations.

**[0043]** The side panels will also be anchored to the façade through at least one second anchorage. Said second anchorage can simply consist of anchorage points that are provided in an area of the side panels adjacent to or coincident with their top edge and will be screwed directly onto the facade, or alternatively it can be an independent element of the side panel provided with second coupling configurations complementary to second receiving configurations contained in each side panel, in a position adjacent to its top edge.

**[0044]** Said second anchorage may have all the features described in relation to the first anchorage.

**[0045]** Alternatively, each side panel will not be fixed directly to the façade through the second anchorage, but rather to the second anchorage through an interposed element.

**[0046]** It is contemplated that the mentioned interposed element located between the second anchorage and the side panels can be a rigid ceiling panel, parallel to the floor panel.

**[0047]** Said ceiling panel will include an inner edge, two side edges perpendicular to the inner edge, and an outer edge comprised between the side edges, with each of said top edges of the side panels being hinged to the ceiling panel about an axis parallel to the side edges thereof by means of a rotary hinge coincident with or adjacent to one of the side edges.

**[0048]** In other words, the floor panel, side panel, and ceiling panel assembly forms a hinged quadrilateral which can be folded, flattening same to facilitate transport.

**[0049]** The ceiling panel can simply act as the ceiling of the floor panel to offer protection against the sun or weather, or can also include a flat transitable top surface

which can be used as an extension module of a top floor of the building to which said extension module is fixed.

**[0050]** In this example, the second anchorages can be fixed to the ceiling panel in exactly the same manner in which the first anchorages are fixed to the floor panel. The side panels, by means of their hinges, will transmit stresses between the floor panels and the ceiling panel, reinforcing the assembly and increasing its strength.

**[0051]** Therefore, said at least one second anchorage can be provided with second coupling configurations, preferably elongated profiles, complementary to and insertable into second receiving configurations, preferably elongated housings or aligned successions of housings, contained in the side panels and accessible through the inner edge of said side panels and/or contained in the ceiling panel and accessible through the inner edge of said ceiling panel.

**[0052]** According to another envisaged embodiment, each of the two rigid side panels includes a bottom half and a top half which are hinged about an axis parallel to the side edges by means of an intermediate hinge, allowing the side panels to be positioned in a folded position, in which the bottom and top halves are facing and superimposed on one another, and in an extended position, in which the bottom and top halves are aligned and coplanar one after another. This allows the assembly to be folded even when the side panels have a height greater than half the length of the floor panel, measured between the side edges thereof.

**[0053]** It is also contemplated that said at least one second anchorage can also be connected to the bottom half of each side panel, in a position adjacent to the intermediate hinge.

**[0054]** Furthermore, an outer panel provided with a bottom edge, a top edge, can also be included, with the bottom edge of said outer panel being hinged to the floor panel about an axis parallel to the outer edge of the floor panel by means of a rotary hinge coincident with or adjacent to the outer edge, allowing the outer panel to be positioned in a horizontal position parallel to the flat top surface of the floor panel and in a vertical position perpendicular to the flat top surface of the floor panel.

**[0055]** Typically, said outer panel will be a railing, when the extension module acts as an outdoor space, for example, a balcony or terrace.

**[0056]** It is also contemplated that the outer panel is a curtain wall, for example, a glazed curtain wall, which completely closes an opening demarcated by the floor panel, the side panels, and the ceiling panel, converting the extension module into a closed interior space protected from the elements.

**[0057]** Particularly in this case, the floor panel, side panels, and/or ceiling panel will be solid panels, i.e., without openings, although they can be hollow, and they may include thermal insulation in most of their surface area.

**[0058]** It is also proposed for the floor panel and/or the ceiling panel to contain a windable curtain wall wound about a windable curtain wall drum, which will be rota-

tional about an axis parallel to the outer edge of the corresponding floor panel and/or ceiling panel and adjacent thereto.

**[0059]** In other words, the extension module may integrate a shutter, awning, or blinds wound about a windable curtain wall drum, where said drum can be contained inside the floor panel or the ceiling panel or fixed to the floor panel or the ceiling panel in front of, below, or above the outer edge, thereby allowing said windable curtain wall to be unwound to offer a certain degree of solar protection to the extension module or to a space located below same. This allows the extension module to be installed with said solar protection already integrated.

**[0060]** Each side panel can include a vertical guide for guiding an end of the windable curtain wall when it is in the vertical position.

**[0061]** Preferably, the side panels are triangular open-worked panels. Typically, each side panel will have a rectangular frame and at least one diagonal resistant element which will convert the frame into a rigid frame. Said rectangular frame and said diagonal resistant elements can be made, for example, of metal or solid or laminated wood.

**[0062]** Alternatively, it is proposed for each side panel to be a solid panel, i.e., without openings, although it can have a hollow interior to reduce the weight thereof.

**[0063]** Preferably, the floor panel, side panels, and/or ceiling panel include metal structural profiles at least in the perimeter thereof. The floor panel shall include also at least one confined space which defines said flat top surface so as to make it transitable.

**[0064]** The floor panel can include filtering perforations or grooves for draining rainwater, with said perforations or grooves being small enough to allow said flat top surface to be safely transitable, typically equal to or less than 1 cm.

**[0065]** Said at least one first anchorage and said at least one second anchorage can further include, on a surface intended for being arranged against the façade, a layer of insulating material to break the thermal bridge.

**[0066]** The floor panel, side panels, and/or ceiling panel can also include, on a surface of their inner edge intended for being arranged against the façade, a layer of insulating material to break the thermal bridge.

**[0067]** At least some of the hinged couplings can include a locking device locking same in the deployed position for lifting the deployed module.

**[0068]** The module can also include lifting points located in the side panels and/or in the ceiling panel, allowing the lifting of the module in the deployed position.

**[0069]** The present invention also covers a method of installation of a prefabricated extension module such as the one described up until now. The proposed method includes:

screwing the at least one first anchorage to the building façade and screwing the at least one second anchorage to the building façade above the first an-

chorage;

transporting the module in the folded position to the building,

deploying the module by placing the side panels in the vertical position,

lifting the deployed module and fixing the first coupling configurations to the first receiving configurations, and the second coupling configurations to the second receiving configurations.

**[0070]** This method therefore allows said first and second anchorages to be previously installed on the façade, which can be performed by operators without requiring heavy machinery, since the first and second anchorages can be readily handled by one or two operators, and the façade can be accessed by means of small lifting platforms, fixed or mobile scaffolds, or even with the operators hanging from the façade or installing the anchorages from the actual openings of the façade. To that end, this part of the installation can be performed in a cost-effective manner and without causing too much alteration.

**[0071]** When the first and second anchorages are already installed, modules which have been prefabricated in a workshop are brought to the installation site. Transport is performed with the modules folded, taking up little space and therefore minimizing logistic costs.

**[0072]** Each module is deployed and a crane proceeds to lift it to the installation position and the first and second coupling configurations are fixed with the first and second receiving configurations. This allows a quick installation of the modules, which minimizes the time of using heavy machinery for lifting the modules, reducing costs.

**[0073]** The fixing of the first and second coupling configurations to the first and second receiving configurations will be preferably performed by means of a movement in a direction almost perpendicular to the façade.

**[0074]** It will be understood that references to geometric position such as, for example, parallel, perpendicular, tangent, etc., allow deviations of up to  $\pm 5^\circ$  with respect to the theoretical position defined by said nomenclature.

**[0075]** Other features of the invention will be evident from the following detailed description of an embodiment.

#### Brief Description of the Figures

**[0076]** The foregoing and other advantages and features will be more fully understood based on the following detailed description of an embodiment in reference to the attached drawings which must be interpreted in a non-limiting illustrative manner, in which:

Figures 1A and 1B show a perspective view of the proposed extension module from its inner edge according to a first embodiment, with the side panels being shown in the extended position and in the hor-

izontal position;

Figures 2A and 2B show a perspective view of the proposed extension module from its inner edge according to a second embodiment, with the side panels being shown in the extended position and in the horizontal position;

Figures 3A and 3B show a perspective view of the proposed extension module from its inner edge according to a third embodiment, with the side panels being shown in the extended position and in the horizontal position;

Figure 4 shows a vertical section view of a building façade with four different extension modules fixed thereto;

Figure 5A and 5B show an enlarged view of a detail of the first anchorage fixed to the façade and of the floor panel fixed to the first anchorage;

Figure 6 shows an enlarged view of a detail of an embodiment according excluded from the scope of the present document, where the first anchorage is fixed to the façade with a first coupling configuration in the form of an angled configuration and of the floor panel including a first receiving configuration in the form of a vertical housing.

#### Detailed Description of an Embodiment

**[0077]** The attached figures show non-limiting illustrative embodiments of the present invention.

**[0078]** In the first embodiment shown in Figures 1A and 1B, the proposed extension module only consists of a floor panel 30, two side panels 40, a first coupling 10 which allows fixing the floor panel 30 to a building façade, and two second couplings 20 which allow fixing the two side panels 40 to the building façade.

**[0079]** The floor panel 30 is a panel with a rectangular outline that defines a flat transitable top surface 34 and is demarcated by an inner edge 31, intended for being arranged facing the building façade and placed against same through the first coupling 10, an outer edge 33 parallel to the inner edge 31, and two side edges 32 perpendicular to the inner edge 31. The floor panel 30 also has a certain thickness corresponding to the height of each of the four edges defined above.

**[0080]** Each side panel 40 also has a rectangular geometry defined between an inner edge 41 intended for being arranged facing the building façade and placed against same, a bottom edge 42 parallel and adjacent to a side edge 32 of the floor panel 30, and a top edge 43 parallel to the bottom edge 42.

**[0081]** The bottom edge 42 of each side panel 40 is hinged to the floor panel 30 through a hinge 50 which allows the rotation of the side panel 40 with respect to

the floor panel 30 about an axis parallel to the side edge 32 of the floor panel 30, and which is sized for the transmission of structural stresses between the side panel 40 and the floor panel 30.

**[0082]** For example, said hinge 50 can consist of flats perpendicular to said axis of rotation and protruding from the floor panel 30, at least partially inserted into each side panel 40, or part of the side panel 40 being contained between said flats, the flats being hinged to the side panel 40 by means of a pin concentric to the axis of rotation traversing holes provided in said flats.

**[0083]** According to another similar embodiment, said flats protrude from the side panel 40 and are at least partially inserted into the floor panel 30, or part of the floor panel 30 is comprised between said flats, with the flats being hinged to the floor panel 30 by means of a pin traversing same.

**[0084]** According to another embodiment, the flats protrude both from the floor panel 30 and from the side panel 40, with said flats being connected and hinged to one another by means of a pin concentric to the axis of rotation traversing same.

**[0085]** Other embodiments of the hinge 50 are also contemplated.

**[0086]** In this embodiment, the first anchorage 10 consists of a horizontally elongated vertical flat provided to be arranged with one of its main faces facing the building façade and being placed against same and fixed thereto through a plurality of screws traversing said vertical flat anchored to the building, and preferably to a structural element thereof, for example, by means of chemical dowels.

**[0087]** The other main face of the vertical flat, opposite the main face facing the façade and placed against same, has a plurality of first coupling configurations 11 in the form of protruding tubular profiles parallel to one another and substantially perpendicular to said main face of the vertical flat, or defining a slight upward inclination. Said elongated profiles will preferably be hollow profiles welded to the vertical flat.

**[0088]** The floor panel 30 integrates first receiving configurations 12 which, in this embodiment, consist of a plurality of elongated holes or aligned successions of holes, each elongated hole or each aligned succession of holes being sized and located to allow the snug insertion of one of the elongated profiles constituting the first coupling configuration 11, thereby connecting the floor panel 30 to the façade, supporting the floor panel 30.

**[0089]** Said first receiving configurations 12 are within the thickness of the floor panel 30 and accessible through inlet holes provided on the inner edge 31 of said floor panel 30, such that, in a position fixed to the façade, the inner edge 31 of the floor panel 30 will be facing the vertical flat.

**[0090]** Preferably, the size of the vertical flat will be the same as or smaller than the size of the inner edge 31 of the floor panel, such that, in a position fixed to the façade, the floor panel 30 will conceal the first anchorage 10.

**[0091]** In this embodiment shown in Figure 1A, the second anchorages 20 are two independent anchorages, one for each side panel 40, which are the same as the first anchorage 10 but have a smaller horizontal length.

**[0092]** The vertical flat of each second anchorage 20 is an approximately square-shaped flat provided with a second coupling configuration 21 in the form of a single elongated profile protruding from said vertical flat, intended for being inserted into a second receiving configuration 22 contained in each side panel 40, in a position adjacent to its top edge 43.

**[0093]** The second receiving configuration 22 will be the same as the first receiving configuration 12, i.e., it will be formed by an elongated hole or an aligned succession of elongated holes complementary to the elongated profile, accessible through an inlet hole provided on the inner edge 41 of the side panel 40.

**[0094]** First, this arrangement allows fixing the first anchorage 10 and the second anchorages 20 in the intended positions on the façade, and then transporting the extension module with the side panels 40 in the horizontal position, shown in Figure 1B, lifting the side panels 40 to the vertical position, shown in Figure 1A, and proceeding to engage the first and second receiving configurations 12, 22 with the first and second coupling configurations 11, 21.

**[0095]** Figures 2A and 2B show a second embodiment which is the same as the first embodiment described above, but in which each side panel 40 is divided into a bottom half 40a and a top half 40b coupled to one another by means of an interposed intermediate hinge 51, which allows the rotation of the top half 40b with respect to the bottom half 40a about an axis parallel to the side edge 32 of the floor panel 30, i.e., the intermediate hinge 51 is parallel to the hinge 50 coupling the side panel 40 to the floor panel 30.

**[0096]** Said intermediate hinge 51 will be sized for the transmission of structural stresses between the top and bottom halves 40a and 40b.

**[0097]** Said intermediate hinge 51 may have a constitution similar to the hinge 50 described above.

**[0098]** According to one embodiment, the bottom half 40a and the top half 40b will consist of separate vertical struts. One end of the vertical struts constituting the bottom half 40a will be inserted between the struts constituting the top half 40b, which will be located in a staggered manner, with all the struts of the two halves being connected and hinged to one another by means of a pin. This embodiment allows the top half 40b and the bottom half 40a to be inserted one into the other when the side panels are placed in the folded position, reducing the thickness of the assembly.

**[0099]** In the first embodiment, the height of the side panels 40 must be the same as or smaller than half the length of the floor panel 30 in the direction of the inner edge 31 so as to allow a proper folding. However, this second embodiment allows the side panels 40 to have a height which can be the same as or smaller than the full

length of the floor panel 30.

**[0100]** The greater the height of the side panels 40 the greater the distance between the first anchorage 10 and the second anchorage 20, which translates into lower stresses on said anchorages.

**[0101]** In addition to the second anchorages 20 described in the first embodiment which are arranged adjacent to the top edge 43 of each side panel 40, the possible of existence other two second anchorages 20 identical to the preceding ones, but located in a lower position, is envisaged in this embodiment. In this case, the bottom half 40a of each side panel 40 will have a receiving configuration 22, also accessible through the inner edge 41 of the side panel 40, in a position adjacent to the intermediate hinge 51.

**[0102]** Figures 3A and 3B show a third embodiment which is the same as the second embodiment, but in which a ceiling panel 60 coupled such that it is hinged, by means of a top hinge 52, to the top edge 43 of each side panel 40, has been included.

**[0103]** Said hinge 52 allows the rotation of the side panel 40 with respect to the ceiling panel 60 about an axis parallel to the side edge 32 of the floor panel 30, i.e., it is a hinge parallel to the other hinges 50, 51 of the side panel 40.

**[0104]** The ceiling panel 60 may be used merely for protection against the sun or other adverse weather conditions, or alternatively may also be fixed to the façade through said second anchorages 20, collaborating structurally in the structural support of the extension module, in which case said top hinge 52 will be sized for the transmission of structural stresses between the ceiling panel 60 and the side panel 40.

**[0105]** In the embodiment shown in Figure 3A, the second anchorage 20 is identical to the first anchorage 10 described above, and the ceiling panel 60 has second receiving configurations 22 identical to the first receiving configurations 12 contained in the floor panel 30 described above.

**[0106]** In this third embodiment, it is optionally contemplated that the side panels 40 lack second receiving configurations 22 and the corresponding second couplings 20. In such case, the side panels 40 will be fixed to the façade only through the ceiling panel 60 that will be the interposed element located between the second couplings 20 and the side panels 40.

**[0107]** The extension module can also include an outer panel 80, which is located adjacent to the outer edge 33 of the floor panel 30, and above same, acting as a railing or curtain wall for the space defined by the extension module.

**[0108]** The outer panel 80 is provided with a bottom edge and a top edge. The bottom edge will preferably be hinged to the floor panel 30 about an axis parallel to the outer edge 33 thereof by means of a rotary hinge coincident with or adjacent to the outer edge 33, allowing the outer panel 80 to be positioned in a horizontal position parallel to the flat top surface 34 of the floor panel 30,

and in a vertical position perpendicular to the flat top surface 34 of the floor panel 30.

**[0109]** The side panels 40 can be solid panels, i.e., lacking openings, although it is contemplated that they can be hollow in order to reduce their weight.

**[0110]** Alternatively, it is contemplated that the side panels 40 are triangular openworked panels, i.e., panels with openings but provided with diagonal struts.

**[0111]** Typically, each side panel 40 will consist of a structural perimetral frame formed, for example, by welded metal profiles, and at least one diagonal profile which allows reinforcing said structural perimetral frame.

**[0112]** Figure 4 shows different embodiments of triangular openworked side panels 40.

**[0113]** When the side panel 40 consists of an intermediate hinge 51, a diagonal traversing the assembly consisting of the bottom and top halves 40a, 40b can be included, or at least one diagonal can be included in each of the two halves.

**[0114]** Figures 5a and 5b shows an enlarged detail of the floor panel 30 and of the connection thereof with the first anchorage 10, according to a proposed embodiment.

**[0115]** According to this embodiment, the floor panel 30 consists of a structural frame, for example, a metal, solid wood, or laminated wood structural frame. Said structural frame can also include intermediate cross members.

**[0116]** In this example illustrated in the figures, the structural frame is formed by C-shaped metal profiles and by two I-shaped intermediate cross members.

**[0117]** In this embodiment, the first coupling configuration 11 is a cylindrical elongated profile with the end beveled to facilitate its insertion, and each first receiving configuration 12 consists of an aligned succession of holes provided through the metal structural frame constituting the inner edge 31 of the floor panel 30 and through the two cross members mentioned above.

**[0118]** In this example, the elongated profile has a slight upward inclination, i.e., the end of the elongated profile farthest away from the vertical flat is higher than its base, typically with an inclination of less than 10°.

**[0119]** In this embodiment, each of the aligned holes constituting the first receiving configuration 12 includes a rotary bushing with an eccentric hole, which allows the alignment of the holes with the inclination of the elongated profile.

**[0120]** The detail shown in Figure 5b also shows two optional characteristics of what is being proposed, i.e., the inclusion of a tightening device 70 to press the floor panel 30 against the façade, preventing the accidental removal thereof, and the inclusion of a windable curtain wall 90 wound about a windable curtain wall drum 91 included inside the floor panel 30.

**[0121]** In this embodiment, the tightening device 70 consists of a nut screwed onto the end of the elongated profile constituting the first coupling configuration 11. When said elongated profile is inserted into the holes constituting the first receiving configuration 12, said nut

screwed onto the elongated profile may be supported on a wear surface typically provided around one of the holes constituting the first receiving configuration 12. The tightening of the nut will pull the elongated profile and compress part of the floor panel 30 against the vertical flat of the first coupling or against the façade, ensuring the firm and immovable attachment thereof.

**[0122]** The drum 91 about which the windable curtain wall 90 is wound will be parallel to the outer edge 33 of the floor panel 30 and will allow winding or unwinding the windable curtain wall 90 by means of the rotation thereof.

**[0123]** It will be understood that the different parts constituting the invention described in one embodiment can be freely combined with the parts described in other different embodiments even though said combination has not been explicitly described, provided that the result of said combination is within the scope of the claims and provided that there is no incompatibility in the combination.

## Claims

1. A prefabricated extension module and complementary anchorages for cantilever attachment to a building façade, comprising:

a rigid floor panel (30) integrating a structural floor frame, and including a flat top surface (34), an inner edge (31) provided to be arranged facing the building façade when the module is attached thereto, two side edges (32) perpendicular to the inner edge (31) and an outer edge (33) comprised between the side edges (32); two rigid side panels (40), each integrating a structural side frame, and being provided with a bottom edge (42), a top edge (43), and an inner edge (41) provided to be arranged facing the building façade when the module is attached thereto, each of said side panels (40) having the bottom edge (42) thereof hinged to the floor panel (30) about an axis parallel to the side edges (32) of the floor panel (30) by means of a hinge (50) coincident with or adjacent to one of the side edges (32), allowing the side panels (40) to be positioned in a horizontal position parallel to the flat top surface (34) of the floor panel (30) and in a vertical position perpendicular to the flat top surface (34) of the floor panel (30); whereby the complementary anchorages are at least one first anchorage (10) and at least one second anchorage (20), and wherein the at least one first anchorage (10) is screwable to a building façade;

### characterized in that

the at least one first anchorage (10) is provided with first coupling configurations (11), formed by multiple

parallel elongated profiles projecting from the first anchorage in an direction almost parallel with respect to the side edges of the floor panel or forming an upward inclination, the first coupling configurations (11) being complementary to and insertable into first receiving configurations (12) contained in the floor panel (30) and accessible through the inner edge (31) thereof, the first receiving configurations (12) are elongated housings or aligned successions of housings structurally integrated with the structural floor frame, each elongated housing or aligned succession of housings are configured for the tight insertion of an elongated profile of the first coupling configurations (11) in a direction perpendicular to the façade; the at least one second anchorage (20) is screwable to the building façade above the first anchorage (10), and is provided with second coupling configurations (21) connectable directly and/or through an interposed element to the two side panels (40) by means of second receiving configurations (22) complementary to said second coupling configurations (21) and into which the second coupling configurations (21) are insertable when the side panels (40) are in the vertical position; and wherein each hinge (50) is structurally fixed to the structural floor frame and to the structural side frame and sized for the transmission of structural stresses between them.

2. The prefabricated extension module according to claim 1, wherein the second coupling configurations (21) are multiple elongated profiles projecting from the second anchorage, or projecting from the second anchorage forming an upward inclination and wherein the second receiving configurations (22) are elongated housings or aligned successions of housings, each elongated housing or aligned succession of housings being configured for the tight insertion of an elongated profile or being configured for the tight insertion of an elongated profile forming an upward path, with the same or greater inclination with respect to the elongated profiles.
3. The prefabricated extension module according to claim 1 or 2, wherein the connection between the first coupling configurations (11) and the first receiving configurations (12) includes a tightening device (70) which pulls the first coupling configurations (12) compressing at least part of the floor panel (30) which contains the first receiving configurations (12) against said at least one first anchorage (10) and/or against the façade; and/or the connection between the second coupling configurations (21) and the second receiving configura-

- tions (22) includes a tightening device which pulls the second coupling configurations (21) compressing at least part of the panel which contains the second receiving configurations (22) against said at least one second anchorage (20) and/or against the façade.
4. The prefabricated extension module according to claim 3, wherein the tightening device (70) comprises an element screwed onto the first coupling configurations (11) and supported on a wear surface of the floor panel (30) perpendicular to the elongated elements constituting the first coupling configuration (11).
  5. The prefabricated extension module according to any one of the preceding claims, wherein each structural side frame includes a bottom half (40a) and a top half (40b) which are hinged about an axis parallel to the side edges (32) of the floor panel (30) by means of an intermediate hinge (51) structurally coupled to the portion of the structural side frame constituting the bottom half (40a) and to the portion constituting the top half (40b), sized for the transmission of structural stresses between them, allowing the side panels (40) to be positioned in a folded position, in which the bottom and top halves (40a, 40b) are facing and superimposed on one another, and in an extended position, in which the bottom and top halves (40a, 40b) are aligned and coplanar one after another.
  6. The prefabricated extension module according to any one of the preceding claims, wherein the mentioned interposed element located between the second anchorage (20) and the side panels (40) is a rigid ceiling panel (60), integrating a structural ceiling frame parallel to the floor panel (30), and including an inner edge (61) provided to be arranged facing the building façade when the module is attached thereto, two side edges (62) perpendicular to the inner edge (61) and an outer edge (63) comprised between the side edges (62), each of said top edges (43) of the side panels (40) being hinged to the ceiling panel (60) about an axis parallel to the side edges (62) of the ceiling panel (60) by means of a hinge (52) structurally fixed to the structural ceiling frame and to the structural side frame and sized for the transmission of structural stresses between them.
  7. The prefabricated extension module according to any one of the preceding claims, wherein the second receiving configurations (22) are contained in the side panels (40), structurally coupled to the structural side frame, and accessible through the inner edge (41) of said side panels (40), and/or contained in the ceiling panel (60), structurally coupled to the structural ceiling frame, and accessible through the inner edge (61) of said ceiling panel (60).
  8. The prefabricated extension module according to any one of the preceding claims, wherein it further includes an outer panel (80) provided with a bottom edge, a top edge, with the bottom edge of said outer panel (80) being hinged to the floor panel (30) about an axis parallel to the outer edge (33) thereof by means of a rotary hinge coincident with or adjacent to the outer edge (33), allowing the outer panel (80) to be positioned in a horizontal position parallel to the flat top surface (34) of the floor panel (30) and in a vertical position perpendicular to the flat top surface (34) of the floor panel (30).
  9. The prefabricated extension module according to any one of the preceding claims, wherein the floor panel (30) and/or the ceiling panel (60) contains a windable curtain wall (90) wound about a windable curtain wall drum (91), which is rotational about an axis parallel to the outer edge (33, 63) of the corresponding floor panel (30) and/or ceiling panel (60) and adjacent thereto.
  10. The prefabricated extension module according to claim 9, wherein each side panel (40) includes a vertical guide for guiding an end of the windable curtain wall.
  11. The prefabricated extension module according to any one of the preceding claims, wherein a surface intended for being arranged against the façade of said at least one first anchorage (10) and/or of said at least one second anchorage (20), and/or a surface of the inner edge (31, 41, 61) of the floor panel (30), side panels (40), and/or ceiling panel (60), include a layer of insulating material to break the thermal bridge.
  12. The prefabricated extension module according to any one of the preceding claims, wherein at least some of the hinged couplings (50, 51, 52) include a locking device locking same in the deployed position for lifting the deployed module.
  13. The prefabricated extension module according to any one of the preceding claims, wherein the module includes lifting points located in the side panels and/or in the ceiling panel.
  14. A method of installation of a prefabricated extension module and complementary anchorages according to any one of the preceding claims, wherein the method includes:
    - screwing the at least one first anchorage (10) to the building façade, and screwing the at least one second anchorage (20) to the building façade above the first anchorage (10);
    - transporting the module, in the folded position,

to the building,  
 deploying the module by placing the side panels  
 in the vertical position,  
 lifting the deployed module and fixing the first  
 coupling configurations (11) to the first receiving  
 configurations (12), and the second coupling  
 configurations (21) to the second receiving con-  
 figurations (22).

15. The method according to claim 14, wherein the fixing  
 of the first and second coupling configurations (11,  
 21) to the first and second receiving configurations  
 (12, 22) is performed by means of a movement in a  
 direction almost perpendicular to the façade.

### Patentansprüche

1. Vorgefertigtes Erweiterungsmodul und komplemen-  
 täre Verankerungen zur freitragenden Befestigung  
 an einer Gebäudefassade, umfassend:

eine starre Bodenplatte (30), die einen struktu-  
 rellen Bodenrahmen integriert und eine flache  
 obere Oberfläche (34), eine Innenkante (31), die  
 bereitgestellt wird, um der Gebäudefassade zu-  
 gewandt angeordnet zu werden, wenn das Mo-  
 dul daran befestigt ist, zwei Seitenkanten (32)

senkrecht zu der Innenkante (31) und eine zwi-  
 schen den Seitenkanten (32) umfasste Außen-  
 kante (33) beinhaltet;  
 zwei starre Seitenplatten (40), die jeweils einen  
 strukturellen Seitenrahmen integrieren und mit  
 einer Unterkante (42), einer Oberkante (43) und  
 einer Innenkante (41) bereitgestellt werden, die  
 bereitgestellt werden, um der Gebäudefassade  
 zugewandt angeordnet zu werden, wenn das  
 Modul daran befestigt ist, wobei jede der Sei-  
 tenplatten (40) die Unterkante (42) davon mit  
 der Bodenplatte (30) um eine Achse parallel zu  
 den Seitenkanten (32) der Bodenplatte (30) mit-  
 tels eines Gelenks (50) angelenkt hat, das mit  
 einer der Seitenkanten (32) zusammenfällt oder  
 ihr benachbart ist, wobei die Seitenplatten (40)  
 in einer Horizontalposition parallel zu der fla-  
 chen oberen Oberfläche (34) der Bodenplatte  
 (30) und in einer Vertikalposition senkrecht zu  
 der flachen oberen Oberfläche (34) der Boden-  
 platte (30) positioniert werden können;

wobei die komplementären Verankerungen  
 mindestens eine erste Verankerung (10) und  
 mindestens eine zweite Verankerung (20) sind,  
 und wobei die mindestens eine erste Veranke-  
 rung (10) an einer Gebäudefassade anschraub-  
 bar ist;

**dadurch gekennzeichnet, dass** die mindes-  
 tens eine erste Verankerung (10) mit ersten  
 Kopplungskonfigurationen (11) bereitgestellt

wird, die durch mehrere parallele langgestreckte  
 Profile gebildet werden, die von der ersten Ver-  
 ankerung in einer Richtung nahezu parallel zu  
 den Seitenkanten der Bodenplatte hervorste-  
 hen oder eine Aufwärtsneigung bilden, wobei  
 die ersten Kopplungskonfigurationen (11) kom-  
 plementär zu ersten Aufnahmekonfigurationen  
 (12) sind, die in der Bodenplatte (30) enthalten  
 und durch die Innenkante (31) davon zugänglich  
 sind, und in diese einsetzbar sind,  
 die ersten Aufnahmekonfigurationen (12) lang-  
 gestreckte Gehäuse oder ausgerichtete Abfol-  
 gen von Gehäusen sind, die strukturell mit dem  
 strukturellen Bodenrahmen integriert sind,  
 jedes langgestreckte Gehäuse oder jede aus-  
 gerichtete Abfolge von Gehäusen für das dichte  
 Einsetzen eines langgestreckten Profils der ers-  
 ten Kopplungskonfigurationen (11) in einer  
 Richtung senkrecht zur Fassade konfiguriert ist;  
 die mindestens eine zweite Verankerung (20)  
 oberhalb der ersten Verankerung (10) an der  
 Gebäudefassade anschraubbar ist und mit  
 zweiten Kopplungskonfigurationen (21) bereit-  
 gestellt wird, die direkt und/oder über ein zw-  
 schengeschaltetes Element mit den beiden Sei-  
 tenplatten (40) mittels zweiter, zu den zweiten  
 Kopplungskonfigurationen (21) komplementä-  
 rer Aufnahmekonfigurationen (22) verbindbar  
 sind und in welche die zweiten Kopplungskon-  
 figurationen (21) einsetzbar sind, wenn sich die  
 Seitenplatten (40) in der Vertikalposition befin-  
 den; und wobei  
 jedes Gelenk (50) strukturell am strukturellen  
 Bodenrahmen und am strukturellen Seitenrah-  
 men fixiert und für die Übertragung struktureller  
 Spannungen zwischen ihnen dimensioniert ist.

2. Vorgefertigtes Erweiterungsmodul gemäß Anspruch  
 1, wobei die zweiten Kopplungskonfigurationen (21)  
 mehrere langgestreckte Profile sind, die aus der  
 zweiten Verankerung hervorstehen oder aus der  
 zweiten Verankerung hervorstehen und eine Auf-  
 wärtsneigung bilden, und wobei die zweiten Aufnah-  
 mekonfigurationen (22) langgestreckte Gehäuse  
 oder ausgerichtete Abfolgen von Gehäusen sind,  
 wobei jedes langgestreckte Gehäuse oder jede aus-  
 gerichtete Abfolge von Gehäusen für das dichte  
 Einsetzen eines langgestreckten Profils konfiguriert  
 ist oder für das dichte Einsetzen eines langgestreckten  
 Profils konfiguriert ist, das einen Aufwärtspfad bildet,  
 mit derselben oder einer größeren Neigung in Bezug  
 auf die langgestreckten Profile.
3. Vorgefertigtes Erweiterungsmodul gemäß Anspruch  
 1 oder 2, wobei die Verbindung zwischen den ersten  
 Kopplungskonfigurationen (11) und den ersten Auf-  
 nahmekonfigurationen (12) eine Spannvorrichtung  
 (70) beinhaltet, welche die ersten Kopplungskonfi-

- gurationen (12) zieht, wobei mindestens ein Teil der Bodenplatte (30), welche die ersten Aufnahmekonfigurationen (12) enthält, gegen die mindestens eine erste Verankerung (10) und/oder gegen die Fassade komprimiert wird; und/oder die Verbindung zwischen den zweiten Kopplungskonfigurationen (21) und den zweiten Aufnahmekonfigurationen (22) eine Spannvorrichtung beinhaltet, welche die zweiten Kopplungskonfigurationen (21) zieht, wobei mindestens ein Teil der Platte, welche die zweiten Aufnahmekonfigurationen (22) enthält, gegen die mindestens eine zweite Verankerung (20) und/oder gegen die Fassade komprimiert wird.
4. Vorgefertigtes Erweiterungsmodul gemäß Anspruch 3, wobei die Spannvorrichtung (70) ein Element umfasst, das auf die ersten Kopplungskonfigurationen (11) geschraubt ist und auf einer Verschleißoberfläche der Bodenplatte (30) senkrecht zu den langgestreckten Elementen, welche die erste Kopplungskonfiguration (11) ausmachen, abgestützt ist.
5. Vorgefertigtes Erweiterungsmodul gemäß einem der vorhergehenden Ansprüche, wobei jeder strukturelle Seitenrahmen eine untere Hälfte (40a) und eine obere Hälfte (40b) beinhaltet, die um eine Achse parallel zu den Seitenkanten (32) der Bodenplatte (30) mittels eines Zwischengelenks (51) angelenkt sind, das strukturell mit dem Abschnitt des strukturellen Seitenrahmens, der die untere Hälfte (40a) ausmacht, und mit dem Abschnitt, der die obere Hälfte (40b) ausmacht, gekoppelt ist, dimensioniert für die Übertragung von strukturellen Spannungen zwischen ihnen, wobei die Seitenplatten (40) in einer gefalteten Position, in der die untere und die obere Hälfte (40a, 40b) einander zugewandt sind und übereinander liegen, und in einer ausgezogenen Position positioniert werden können, in der die untere und die obere Hälfte (40a, 40b) nacheinander ausgerichtet und koplanar sind.
6. Vorgefertigtes Erweiterungsmodul gemäß einem der vorhergehenden Ansprüche, wobei das erwähnte zwischengeschaltete Element, das sich zwischen der zweiten Verankerung (20) und den Seitenplatten (40) befindet, eine starre Deckenplatte (60) ist, die einen strukturellen Deckenrahmen parallel zur Bodenplatte (30) integriert und eine Innenkante (61), die dazu bereitgestellt ist, der Gebäudefassade zugewandt angeordnet zu werden, wenn das Modul daran befestigt ist, zwei Seitenkanten (62) senkrecht zur Innenkante (61) und eine zwischen den Seitenkanten (62) umfasste Außenkante (63) beinhaltet, wobei jede der Oberkanten (43) der Seitenplatten (40) an der Deckenplatte (60) um eine zu den Seitenkanten (62) der Deckenplatte (60) parallele Achse mittels eines Gelenks (52) angelenkt ist, das strukturell am strukturellen Deckenrahmen und am strukturellen Seitenrahmen fixiert und für die Übertragung von strukturellen Spannungen zwischen ihnen dimensioniert ist.
7. Vorgefertigtes Erweiterungsmodul gemäß einem der vorhergehenden Ansprüche, wobei die zweiten Aufnahmekonfigurationen (22) in den Seitenplatten (40) enthalten sind, die strukturell mit dem strukturellen Seitenrahmen gekoppelt und über die Innenkante (41) der Seitenplatten (40) zugänglich sind, und/oder in der Deckenplatte (60) enthalten sind, die strukturell mit dem strukturellen Deckenrahmen gekoppelt und über die Innenkante (61) der Deckenplatte (60) zugänglich ist.
8. Vorgefertigtes Erweiterungsmodul gemäß einem der vorhergehenden Ansprüche, wobei es ferner eine Außenplatte (80) beinhaltet, die mit einer Unterkante und einer Oberkante bereitgestellt wird, wobei die Unterkante der Außenplatte (80) an der Bodenplatte (30) um eine Achse parallel zu der Außenkante (33) davon mittels eines Drehgelenks angelenkt ist, das mit der Außenkante (33) zusammenfällt oder ihr benachbart ist, wobei die Außenplatte (80) in einer Horizontalposition parallel zu der flachen oberen Oberfläche (34) der Bodenplatte (30) und in einer Vertikalposition senkrecht zu der flachen oberen Oberfläche (34) der Bodenplatte (30) positioniert werden kann.
9. Vorgefertigtes Erweiterungsmodul gemäß einem der vorhergehenden Ansprüche, wobei die Bodenplatte (30) und/oder die Deckenplatte (60) eine wickelbare Vorhangwand (90) enthält, die um eine wickelbare Vorhangwandtrommel (91) gewickelt ist, die um eine Achse parallel zur Außenkante (33, 63) der entsprechenden Bodenplatte (30) und/oder Deckenplatte (60) und benachbart zu dieser rotierbar ist.
10. Vorgefertigtes Erweiterungsmodul gemäß Anspruch 9, wobei jede Seitenplatte (40) eine Vertikalführung zur Führung eines Endes der wickelbaren Vorhangwand beinhaltet.
11. Vorgefertigtes Erweiterungsmodul gemäß einem der vorhergehenden Ansprüche, wobei eine Oberfläche, die dazu bestimmt ist, gegen die Fassade der mindestens einen ersten Verankerung (10) und/oder der mindestens einen zweiten Verankerung (20) angeordnet zu werden, und/oder eine Oberfläche der Innenkante (31, 41, 61) der Bodenplatte (30), der Seitenplatten (40) und/oder der Deckenplatte (60) eine Schicht aus Isoliermaterial zum Unterbrechen der Wärmebrücke beinhaltet.
12. Vorgefertigtes Erweiterungsmodul gemäß einem der vorhergehenden Ansprüche, wobei mindestens

einige der angelenkten Kupplungen (50, 51, 52) eine Verriegelungsvorrichtung beinhalten, die sie in der entfalteten Position verriegelt, um das entfaltete Modul anzuheben.

13. Vorgefertigtes Erweiterungsmodul gemäß einem der vorhergehenden Ansprüche, wobei das Modul Hebepunkte beinhaltet, die sich in den Seitenplatten und/oder in der Deckenplatte befinden.

14. Installationsverfahren eines vorgefertigten Erweiterungsmoduls und komplementärer Verankerungen gemäß einem der vorhergehenden Ansprüche, wobei das Verfahren beinhaltet:

Anschrauben der mindestens einen ersten Verankerung (10) an der Gebäudefassade und Anschrauben der mindestens einen zweiten Verankerung (20) an der Gebäudefassade oberhalb der ersten Verankerung (10);  
Transportieren des Moduls in der gefalteten Position zu dem Gebäude,  
Entfalten des Moduls durch Platzieren der Seitenplatten in der Vertikalposition,  
Anheben des entfalteten Moduls und Fixieren der ersten Kopplungskonfigurationen (11) an den ersten Aufnahmekonfigurationen (12) und der zweiten Kopplungskonfigurationen (21) an den zweiten Aufnahmekonfigurationen (22).

15. Verfahren gemäß Anspruch 14, wobei das Fixieren der ersten und zweiten Kopplungskonfigurationen (11, 21) an den ersten und zweiten Aufnahmekonfigurationen (12, 22) mittels einer Bewegung in einer Richtung nahezu senkrecht zur Fassade durchgeführt wird.

## Revendications

1. Module d'extension préfabriqué et des ancrages complémentaires accouplable en porte-à-faux à une façade d'un édifice, comprenant :

un panneau de plancher rigide (30) intégrant un cadre de plancher structurel et comprenant une surface supérieure plane (34), un bord intérieur (31) destiné à être placé face à la façade de l'édifice lorsque le module y est couplé, deux bords latéraux (32) perpendiculaires au bord intérieur (31) et un bord extérieur (33) compris entre les bords latéraux (32) ;  
deux panneaux latéraux rigides (40), intégrant chacun un cadre latéral structurel et dotés d'un bord inférieur (42), d'un bord supérieur (43) et d'un bord intérieur (41) destiné à être placé face à la façade de l'édifice lorsque le module y est couplé, chacun desdits panneaux latéraux (40)

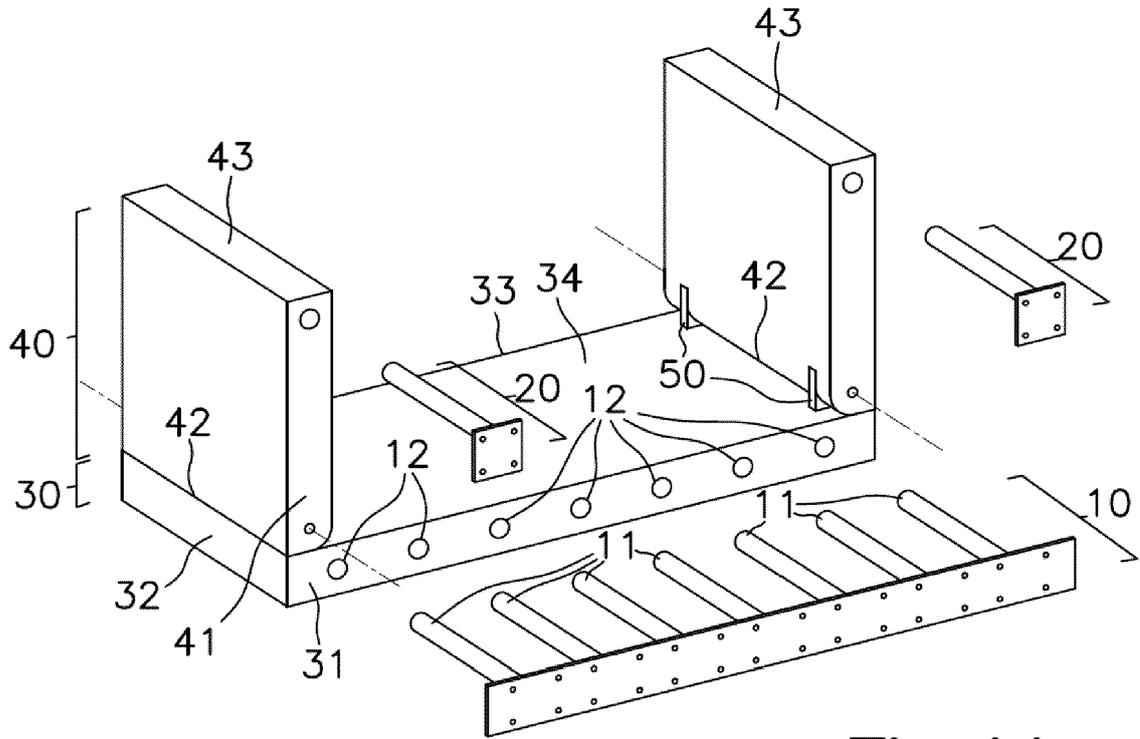
ayant son bord inférieur (42) articulé au panneau de plancher (30) autour d'un axe parallèle aux bords latéraux (32) du panneau de plancher (30) au moyen d'une charnière (50) coïncidant avec ou adjacente à l'un des bords latéraux (32), permettant aux panneaux latéraux (40) d'être positionnés dans une position horizontale parallèle à la surface supérieure plane (34) du panneau de plancher (30) et dans une position verticale perpendiculaire à la surface supérieure plane (34) du panneau de plancher (30) ;  
où les ancrages complémentaires sont au moins un premier ancrage (10) et au moins un deuxième ancrage (20), et dans lequel l'au moins un premier ancrage (10) peut être vissé à la façade d'un édifice ;

**caractérisé en ce que** l'au moins un premier ancrage (10) est pourvu de premières configurations de couplage (11), formées par des multiples profils allongés parallèles faisant saillie à partir du premier ancrage dans une direction presque parallèle par rapport aux bords latéraux du panneau de plancher ou formant une inclinaison vers le haut, les premières configurations de couplage (11) étant complémentaires, et pouvant être insérées dans, des premières configurations de réception (12) contenues dans le panneau de plancher (30) et accessibles par le bord intérieur (31) de celui-ci,  
les premières configurations de réception (12) sont des logements allongés ou des successions alignées de logements structurellement intégrés au cadre de plancher structurel, chaque logement allongé ou succession alignée de logements est configuré pour l'insertion serrée d'un profil allongé des premières configurations de couplage (11) dans une direction perpendiculaire à la façade ;  
l'au moins un deuxième ancrage (20) peut être vissé sur la façade de l'édifice au-dessus du premier ancrage (10) et est pourvu de deuxièmes configurations de couplage (21) pouvant être connectées directement et/ou par l'intermédiaire d'un élément interposé aux deux panneaux latéraux (40) au moyen de deuxièmes configurations de réception (22) complémentaires auxdites deuxièmes configurations de couplage (21) et dans lesquelles les deuxièmes configurations de couplage (21) peuvent être insérées lorsque les panneaux latéraux (40) sont en position verticale ; et dans lequel  
chaque charnière (50) est structurellement fixée au cadre de plancher structurel et au cadre latéral structurel et est dimensionnée pour la transmission des contraintes structurelles entre eux.

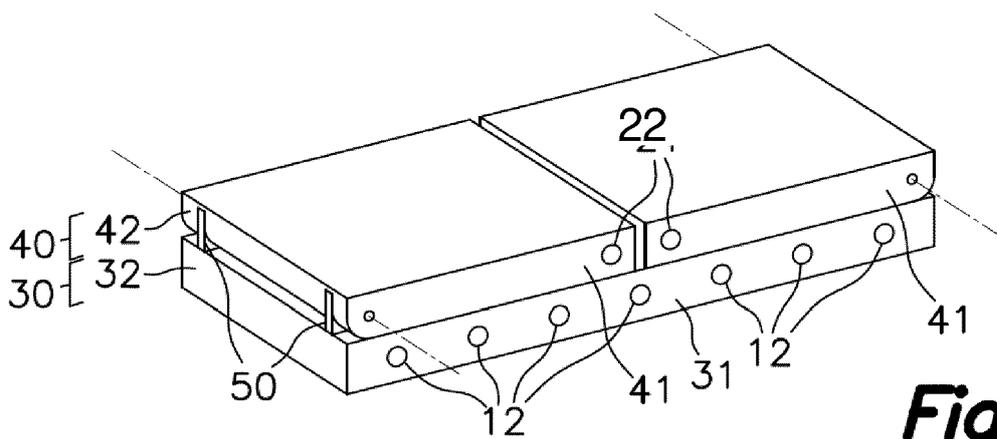
2. Module d'extension préfabriqué selon la revendica-

- tion 1, dans lequel les deuxièmes configurations de couplage (21) sont des multiples profils allongés faisant saillie à partir du deuxième ancrage, ou faisant saillie à partir du deuxième ancrage en formant une inclinaison vers le haut et dans lequel les deuxièmes configurations de réception (22) sont des logements allongés ou des successions alignées de logements, chaque logement allongé ou succession alignée de logements étant configuré pour l'insertion serrée d'un profil allongé ou étant configuré pour l'insertion serrée d'un profil allongé formant une trajectoire ascendante, avec une inclinaison identique ou supérieure par rapport aux profils allongés.
3. Module d'extension préfabriqué selon la revendication 1 ou 2, dans lequel la connexion entre les premières configurations de couplage (11) et les premières configurations de réception (12) comprend un dispositif de serrage (70) qui tire sur les premières configurations de couplage (12) en comprimant au moins une partie du panneau de plancher (30) qui contient les premières configurations de réception (12) contre ledit au moins un premier ancrage (10) et/ou contre la façade ; et/ou la connexion entre les deuxièmes configurations de couplage (21) et les deuxièmes configurations de réception (22) comprend un dispositif de serrage qui tire sur les deuxièmes configurations de couplage (21) en comprimant au moins une partie du panneau qui contient les deuxièmes configurations de réception (22) contre ledit au moins un deuxième ancrage (20) et/ou contre la façade.
  4. Module d'extension préfabriqué selon la revendication 3, dans lequel le dispositif de serrage (70) comprend un élément vissé sur les premières configurations de couplage (11) et supporté sur une surface d'usure du panneau de plancher (30) perpendiculaire aux éléments allongés constituant la première configuration du couplage (11).
  5. Module d'extension préfabriqué selon l'une quelconque des revendications précédentes, dans lequel chaque cadre latéral structurel comprend une moitié inférieure (40a) et une moitié supérieure (40b) qui sont articulées autour d'un axe parallèle aux bords latéraux (32) du panneau de plancher (30) au moyen d'une charnière intermédiaire (51) structurellement couplée à la partie du cadre latéral structurel constituant la moitié inférieure (40a) et à la partie constituant la moitié supérieure (40b), dimensionnée pour la transmission des contraintes structurelles entre eux, permettant aux panneaux latéraux (40) d'être positionnés dans une position pliée, dans laquelle les moitiés inférieure et supérieure (40a, 40b) se font face et se superposent, et dans une position déployée, dans laquelle les moitiés inférieure et supérieure (40a, 40b) sont alignées et coplanaires l'une par rapport à l'autre.
  6. Module d'extension préfabriqué selon l'une quelconque des revendications précédentes, dans lequel l'élément interposé mentionné, situé entre le deuxième ancrage (20) et les panneaux latéraux (40), est un panneau de plafond rigide (60), intégrant un cadre de plafond structurel parallèle au panneau de plancher (30), et comportant un bord intérieur (61) prévu pour être disposé face à la façade de l'édifice lorsque le module y est couplé, deux bords latéraux (62) perpendiculaires au bord intérieur (61) et un bord extérieur (63) compris entre les bords latéraux (62), chacun desdits bords supérieurs (43) des panneaux latéraux (40) étant articulé au panneau de plafond (60) autour d'un axe parallèle aux bords latéraux (62) du panneau de plafond (60) au moyen d'une charnière (52) structurellement fixée au cadre de plafond structurel et au cadre latéral structurel et dimensionnée pour la transmission des contraintes structurelles entre eux.
  7. Module d'extension préfabriqué selon l'une quelconque des revendications précédentes, dans lequel les deuxièmes configurations de réception (22) sont contenues dans les panneaux latéraux (40), structurellement couplées au cadre latéral structurel, et accessibles par le bord intérieur (41) desdits panneaux latéraux (40), et/ou contenues dans le panneau de plafond (60), structurellement couplées au cadre de plafond structurel, et accessibles par le bord intérieur (61) dudit panneau de plafond (60).
  8. Module d'extension préfabriqué selon l'une quelconque des revendications précédentes, dans lequel il comprend en outre un panneau extérieur (80) pourvu d'un bord inférieur, d'un bord supérieur, le bord inférieur dudit panneau extérieur (80) étant articulé au panneau de plancher (30) autour d'un axe parallèle à son bord extérieur (33) au moyen d'une charnière rotative coïncidant avec le bord extérieur (33) ou adjacente à celui-ci, permettant au panneau extérieur (80) d'être positionné dans une position horizontale parallèle à la surface supérieure plane (34) du panneau de plancher (30) et dans une position verticale perpendiculaire à la surface supérieure plane (34) du panneau de plancher (30).
  9. Module d'extension préfabriqué selon l'une quelconque des revendications précédentes, dans lequel le panneau de plancher (30) et/ou le panneau de plafond (60) contient une paroi de rideau enroulable (90) autour d'un tambour de paroi de rideau enroulable (91), qui tourne autour d'un axe parallèle au bord extérieur (33, 63) du panneau de plancher (30) et/ou du panneau de plafond (60) correspondant et adjacent à celui-ci.

10. Module d'extension préfabriqué selon la revendication 9, dans lequel chaque panneau latéral (40) comprend un guide vertical pour guider une extrémité de la paroi de rideau enroulable. 5
11. Module d'extension préfabriqué selon l'une quelconque des revendications précédentes, dans lequel une surface destinée à être disposée contre la façade dudit au moins un premier ancrage (10) et/ou dudit au moins un deuxième ancrage (20), et/ou une surface du bord intérieur (31, 41, 61) du panneau de plancher (30), des panneaux latéraux (40), et/ou du panneau de plafond (60), comprend une couche de matériau isolant pour rompre le pont thermique. 10  
15
12. Module d'extension préfabriqué selon l'une quelconque des revendications précédentes, dans lequel au moins certains des couplages articulés (50, 51, 52) comportent un dispositif de verrouillage qui les bloque en position déployée pour soulever le module déployé. 20
13. Module d'extension préfabriqué selon l'une quelconque des revendications précédentes, dans lequel le module comprend des points de levage situés dans les panneaux latéraux et/ou dans le panneau de plafond. 25
14. Procédé d'installation d'un module d'extension préfabriqué et des ancrages complémentaires selon l'une quelconque des revendications précédentes, dans lequel le procédé comprend : 30
- visser l'au moins un premier ancrage (10) à la façade de l'édifice, et visser au moins un deuxième ancrage (20) à la façade de l'édifice au-dessus du premier ancrage (10) ; 35
- transporter le module, en position pliée, jusqu'à l'édifice,
- déployer le module en plaçant les panneaux latéraux en position verticale, 40
- soulever le module déployé et fixer les premières configurations de couplage (11) aux premières configurations de réception (12), et les deuxièmes configurations de couplage (21) aux deuxièmes configurations de réception (22). 45
15. Procédé selon la revendication 14, dans lequel la fixation des première et deuxième configurations de couplage (11, 21) aux première et deuxième configurations de réception (12, 22) est effectuée au moyen d'un mouvement dans une direction presque perpendiculaire à la façade. 50  
55

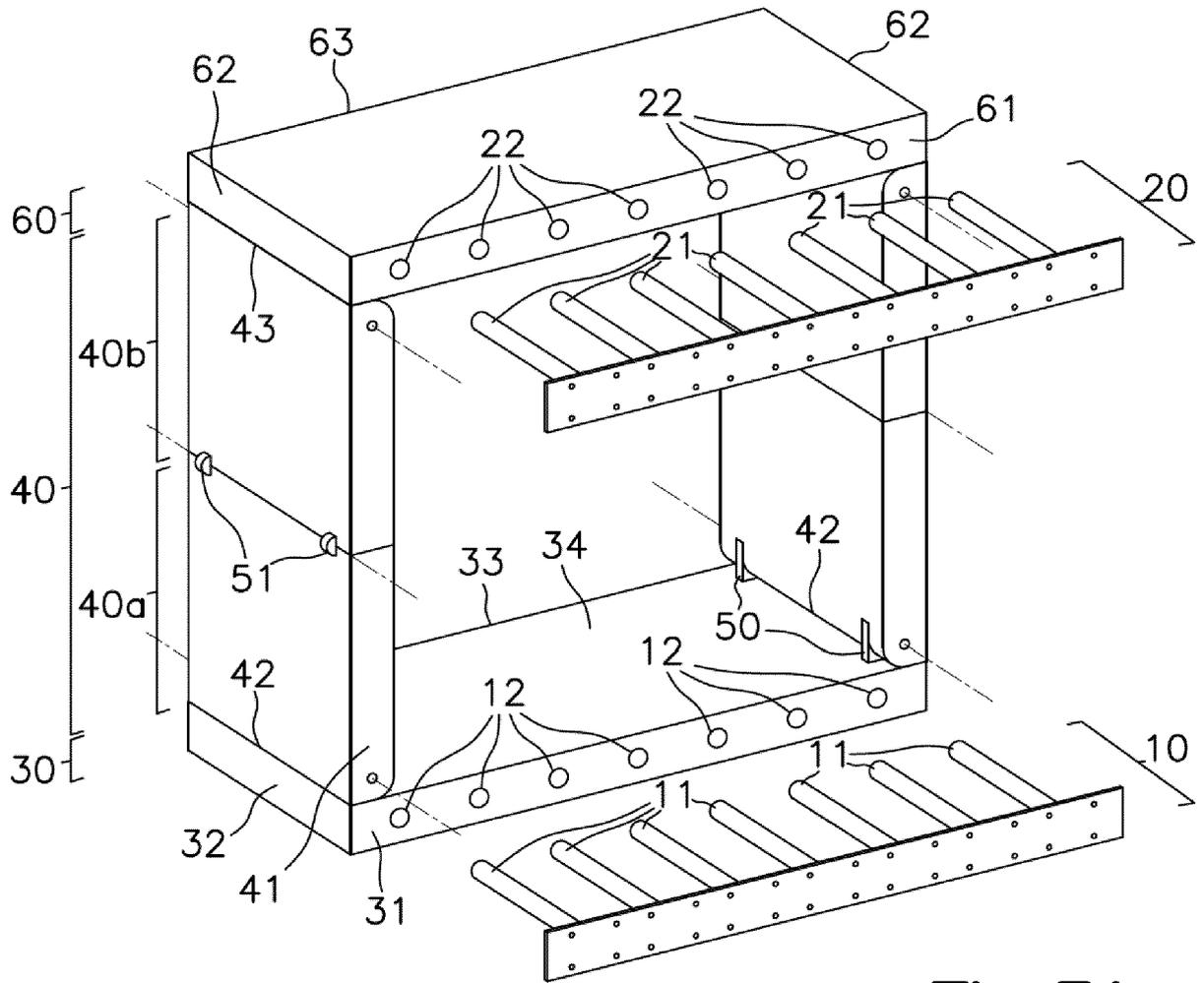


**Fig. 1A**

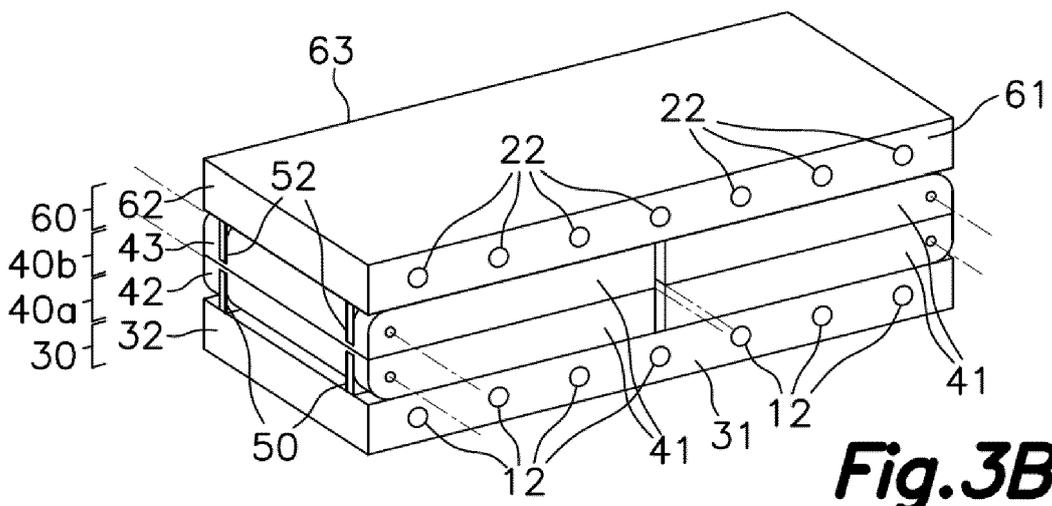


**Fig. 1B**

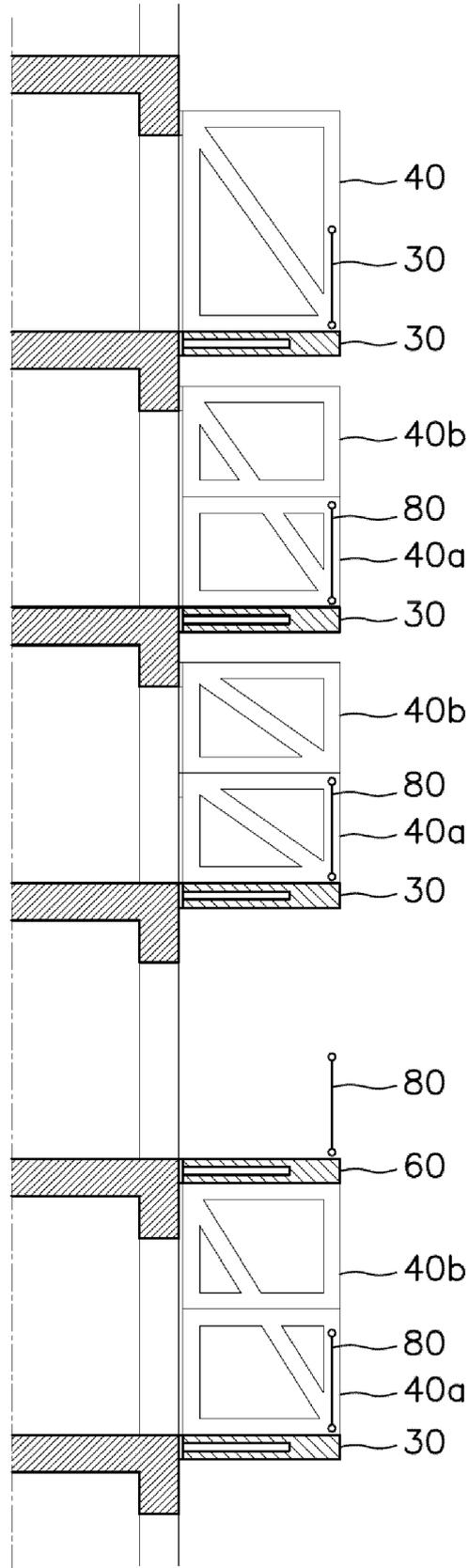




**Fig. 3A**



**Fig. 3B**



**Fig.4**

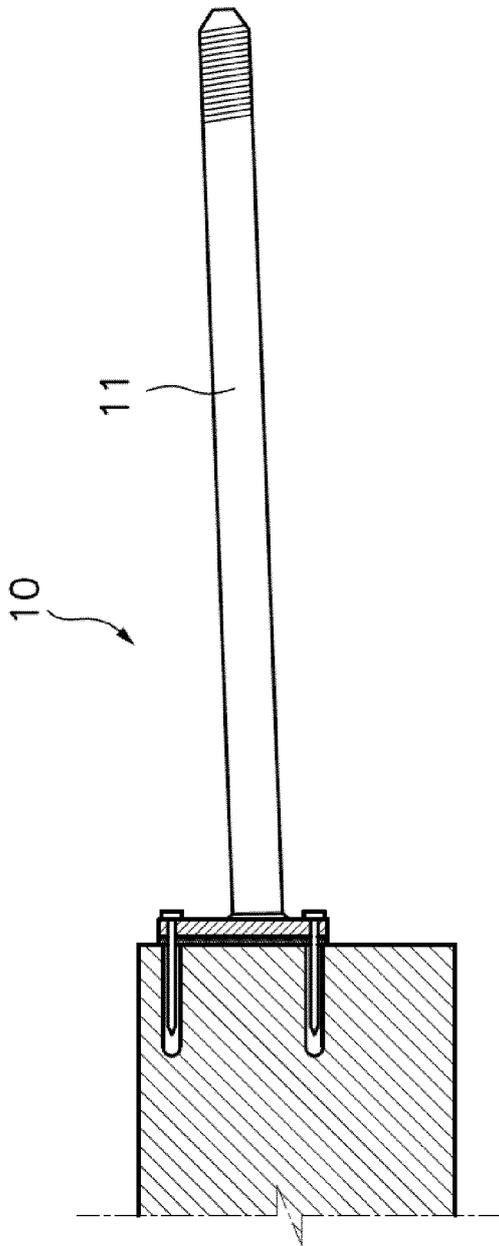


Fig. 5A

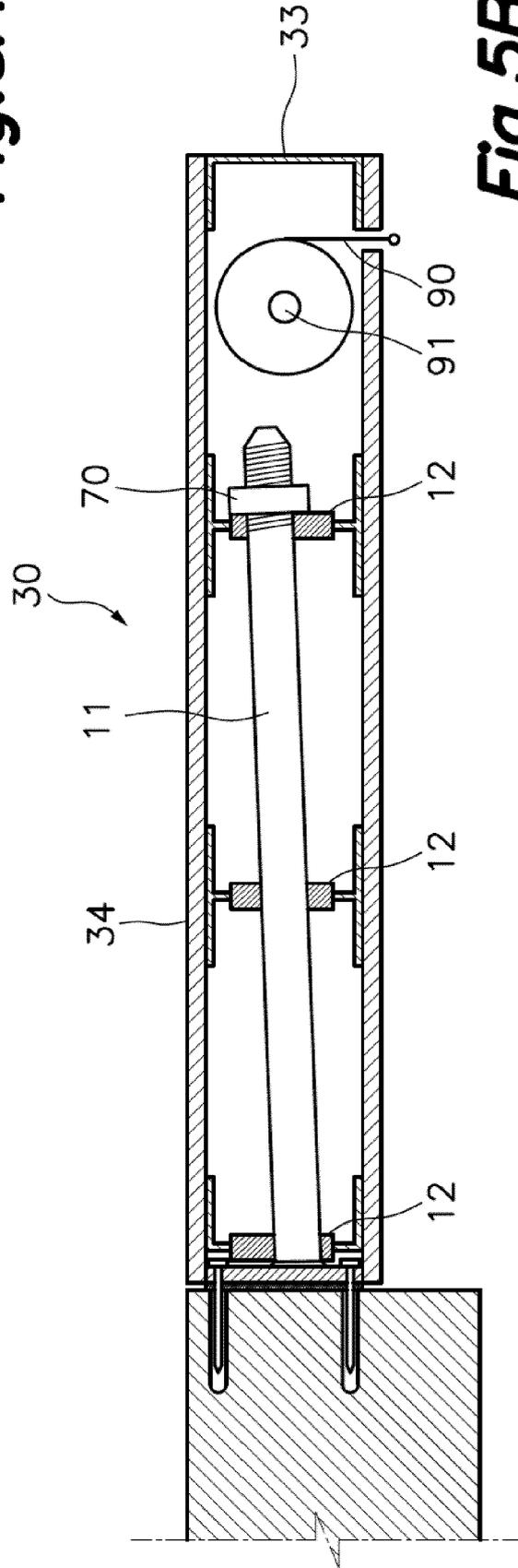
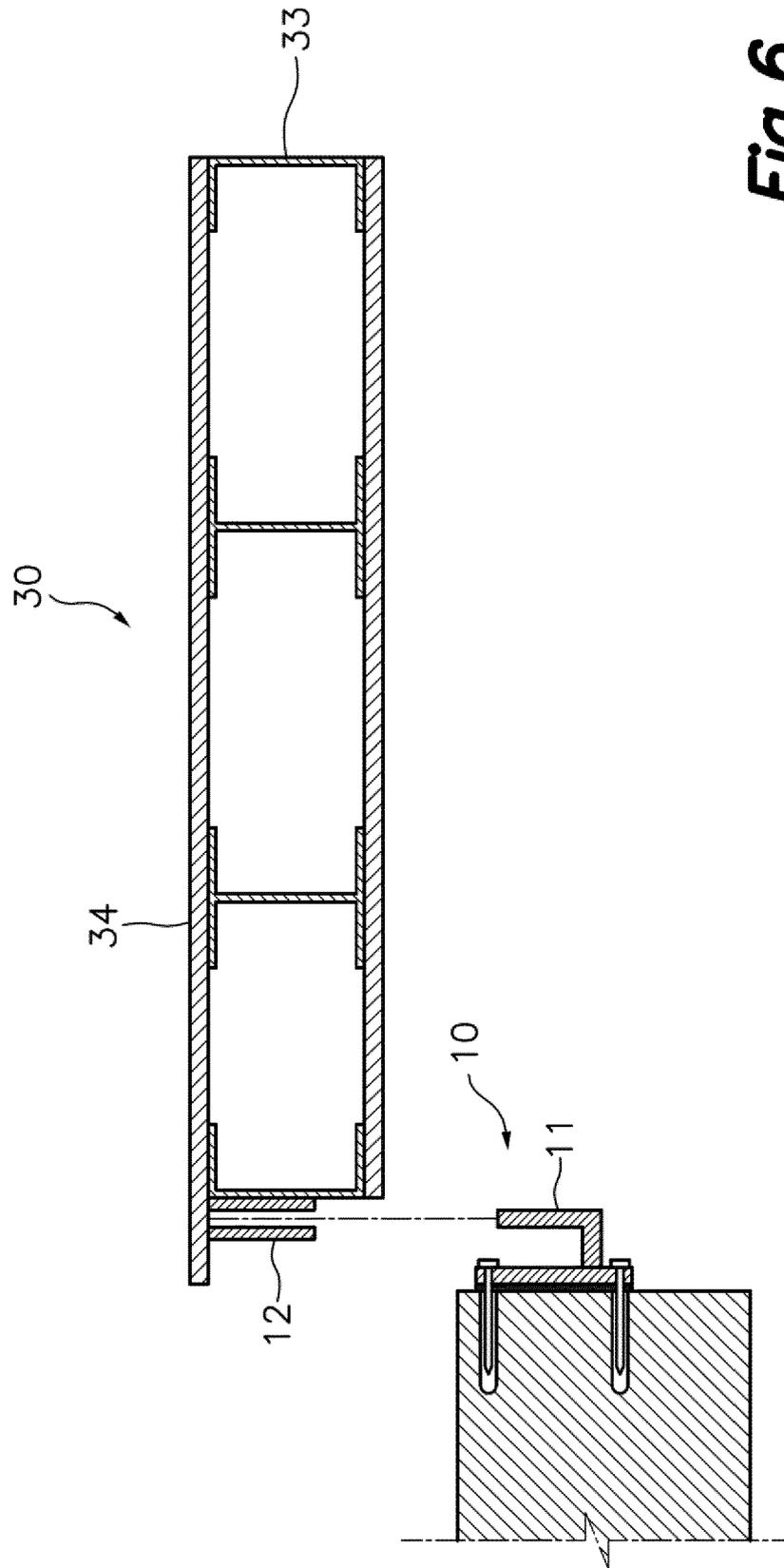


Fig. 5B



**Fig. 6**

**REFERENCES CITED IN THE DESCRIPTION**

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