(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 4 424 485 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
**04.09.2024 Bulletin 2024/36**

(21) Application number: **23159093.6**

(22) Date of filing: **28.02.2023**

(51) International Patent Classification (IPC):
***B28B 23/00*** *(2006.01)* ***E04B 1/41*** *(2006.01)*
***E04C 5/00*** *(2006.01)* ***E04F 11/18*** *(2006.01)*

(52) Cooperative Patent Classification (CPC):
**B28B 23/005; E04C 5/168;** E04B 1/4107;
E04F 11/1812; E04F 11/1853

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL NO PL PT RO RS SE SI SK SM TR**
Designated Extension States:
**BA**
Designated Validation States:
**KH MA MD TN**

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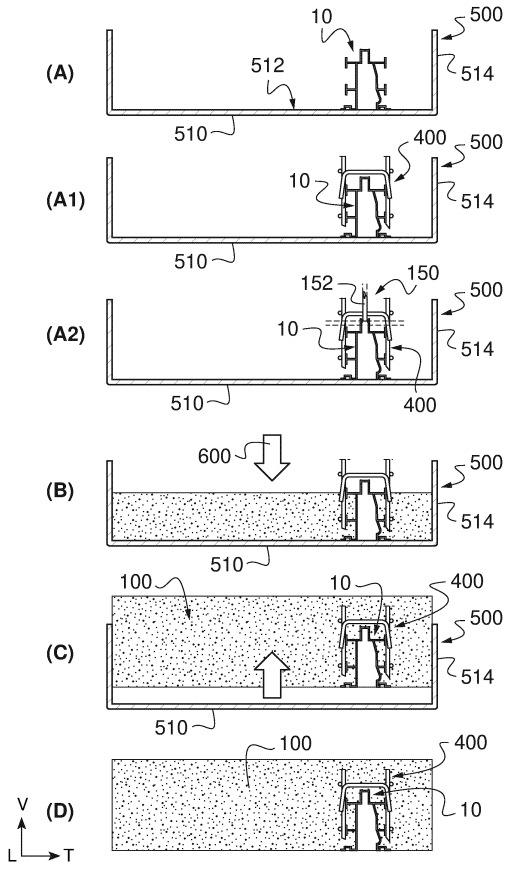
# (54) METHOD FOR THE OFF-SITE CONSTRUCTION OF A PREFABRICATED CONSTRUCTION ELEMENT IN CONCRETE COMPRISING A PROFILE EMBEDDED THEREIN

(57) The invention concerns a method for off-site construction of a prefabricated construction element (100) in poured concrete (600) comprising a profile (10) embedded therein, said profile (10) defining a recessed groove (120) intended to receive a blocking device (200) for the mounting of a glass panel (300), and further concerns such a profile (10) especially configured to be embedded in poured concrete (600) of a prefabricated construction element (100) obtained by off-site construction method.

**Fig.1**

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## Description

### Technical field

**[0001]** The invention relates to a prefabricated construction element in concrete comprising a profile embedded therein and to a method for the off-site construction to obtain same.

**[0002]** The invention relates more particularly to a method for the off-site construction of a prefabricated construction element in concrete comprising a profile embedded therein, said profile being configured to provide a support base defining a recessed groove intended to receive a panel which can be either flat or curved.

**[0003]** The invention relates also to a profile configured to be embedded in a prefabricated construction element in concrete.

### State of the art

**[0004]** In the construction field, supports such as point-fixing means, vertical bars, and U-shaped clamps or profiles are commonly used to provide balustrades made of flat or curved panels, typically glass panels. However, these prior art solutions require on-site installation, which can be time-consuming and labor-intensive. In addition, they often lack convenience and practicality during adjustment and clamping of the panels, resulting in potential installation errors and safety hazards.

**[0005]** EP-3.762.561 discloses by example a support for a panel which provides for a base, defining an open seat where the edge area of the panel is housed, and for a device, interposed between the panel and the base, for blocking the panel, or adjusting the inclination thereof, with respect to the base.

**[0006]** The support comprises a supporting base made of a profile in metal, for example in aluminum or steel, which being in U-shape open at top comprises two sidewalls, thick and reinforced by an alveolar structure for greater stiffness and strength, and connected to each other by a seat for inserting the edge area of a panel to be arranged vertically.

**[0007]** Such a support allows easy installation and adjustment of the tilt of the panel, and advantageously a stable and lasting clamping of the panel is obtained.

**[0008]** However, it requires adjustments at both side of the panel and that can be uncomfortable when the adjustment shall be made on a particularly exposed side, as protective measures shall be adopted to operate on the side to be adjusted.

**[0009]** EP-3.816.362 discloses an improvement of such a support according to which an easy installation and adjustment of the panel by acting on only one side is possible. Indeed, the support allows the panel to be easily blocked and that in a stable and durable way.

**[0010]** Nevertheless, even innovative and appreciated by the marked, these both supports still require a lot of time for manual mounting operations (drilling the construction element, fixing the support, etc.), even by experienced workers. Indeed, the supports are fixed on the upper surface of the construction element.

**[0011]** Therefore, the implementation of such supports for panels on site remains costly and are unable to satisfy the needs of the off-site construction market.

**[0012]** One object of the present invention is to overcome at least some of the drawbacks of the supports for panels according to prior art, particularly for glass panels forming a balustrade, which are respectively conceived for on-site construction.

### Object and summary of the invention

**[0013]** To this end the invention provides for a prefabricated construction element in concrete comprising an embedded profile configured to provide a support base defining a recessed groove intended to receive a panel and a method for off-site construction for obtaining the same, as defined in one or more of the appended claims.

**[0014]** Indeed, the present invention overcomes the drawbacks of prior art supports by providing a prefabricated construction element in concrete that comprises an embedded profile with a recessed groove designed to receive a panel.

**[0015]** The profile allows for easy and stable installation and adjustment of the panel, and the prefabricated element reduces on-site labor and time requirements.

**[0016]** The invention concerns a method for off-site construction of a prefabricated construction element in concrete comprising a profile embedded therein, said profile being configured to provide a support base defining a recessed groove intended to receive an edge of a panel, the method comprising at least the following steps:

(A) - positioning at least the profile into a mold corresponding to the desired shape of the construction element to be prefabricated;

(B) - pouring concrete in the mold comprising the profile for obtaining said prefabricated construction element with the profile embedded therein;

(C) - removing from the mold, upon drying of the concrete, as one piece the prefabricated construction element with the profile embedded therein;

(D) - transporting the prefabricated construction element with the profile embedded therein to a site of construction where said prefabricated construction element can be assembled with one or more construction elements.

**[0017]** Advantageously, the profile is configured to be easily and quickly positioned in the mold before the pouring of the concrete.

**[0018]** According to the method for off-site construction of the invention, a prefabricated construction element such as a wall or a slab is obtained with a profile embedded therein and ready to use for the mounting of a panel.

**[0019]** Indeed, the prefabricated construction element

and the profile forming one piece together is then delivered on a construction site (different from the off-site construction) where the panel is mounted in the recessed groove of the profile, by example a glass panel forming a balustrade.

**[0020]** In the present invention, the panel is a thin panel, usually with a thickness between 10 mm and 20 mm. The panel can be made of glass (such as laminated glass) or any suitable material for forming a balustrade and further can be either flat or curved.

**[0021]** Advantageously, at least one blocking device is arranged in the recessed groove of the profile for mounting the panel. Also, in the case of panels made of fragile materials, gaskets made with plastic or rubber can be installed in the recessed groove, to avoid contact of the fragile materials with the surface of the recessed groove.

**[0022]** Preferably, the blocking device is arranged in the profile during the off-site construction so that only the mounting of the panel is to be done on site after the transporting step of the prefabricated construction element.

**[0023]** The main principles with off-site construction according to the invention are to reduce time, materials and human resources compared to traditional on-site construction, as well as to increase the quality level and to standardize the fabrication.

**[0024]** Thus, one of the aims of the invention is to provide a profile which is specifically designed to be implemented off-site in a prefabricated construction element, following all these principles.

**[0025]** Advantageously, a reinforcement mesh is used aiming not only to reinforce the poured concrete of the prefabricated construction element but also to immobilize the profile in position in the mold during the steps of the off-site construction method according to the invention.

**[0026]** According to the invention, the panel is still installed on-site but easier and much faster than with the methods of prior art and that thanks to the profile embedded in the prefabricated construction element which is to be used in the construction of any type of building.

**[0027]** As most traditional techniques for installing panels in a construction element for obtaining a balustrade require access from both sides, that is to say respectively from the inner part of the building comprising the construction element and from the outer part of said building, usually with scaffolding or similar provisional on-site supports, the prefabricated construction element of the invention is preferably equipped with one or more blocking devices that allow an easy installation and adjustment of the panel by acting on only one side.

**[0028]** Advantageously, the profile according to the invention and the blocking device preferably arranged therein are integrated in the prefabricated construction element to be almost invisible from outside, allowing a more aesthetic result to be achieved as only the panel is projecting out from said construction element.

**[0029]** Advantageously, the upper part of the profile is flush with the surface of the prefabricated construction element.

**[0030]** Advantageously, after the mounting of the panel is complete, the upper part of the embedded profile is configured to receive some covers which, extending longitudinally along the panel, are respectively arranged either at one side or at both sides of said panel to close the recessed groove of the profile.

**[0031]** Preferably, sealing means could be carried by the covers or by the profile and arranged to be in contact with the panel to prevent water from getting inside the recessed groove defined by the profile embedded in the prefabricated construction element.

**[0032]** Advantageously, the prefabricated construction element according to the invention comprises drainage means connected to the lower part of the profile for draining out water or equivalent that could penetrated in the recessed grove of the profile.

**[0033]** Advantageously, the prefabricated construction element according to the invention can comprise a removable cover to protect temporarily the recessed groove of the profile at least during transporting step and until the mounting of the panel.

**[0034]** According to other characteristics of the off-site construction method according to the invention:

- the profile is arranged, preferably vertically upside down or horizontally, in contact with a surface of the mold during the positioning step to prevent the concrete poured from above in the mold from entering in the recessed groove of the profile;
- the profile is arranged for embedding anchoring means of the profile in the poured concrete after the pouring step;
- the method further comprises an immobilizing step of the profile to ensure immobilization of the profile in a position of use during the pouring step of the concrete;
- the immobilizing step is obtained by arranging a reinforcement mesh around the profile in the mold for immobilizing the profile in said position of use, said reinforcement mesh being intended like the profile to be embedded in the poured concrete;
- the method comprises an additional connecting step to the positioning step of the profile consisting of connecting drainage means to at least a drain hole of the profile to be able in use to drain water out of the profile, said drainage means being intended to be embedded in the concrete of the prefabricated construction element;
- the drainage means are configured to drain water directly out of the prefabricated construction element and/or to be connected to a water collection network of a building comprising said prefabricated construction element;
- at the latest on the site of construction, at least one or more blocking device are arranged in the recessed groove of the profile embedded in the concrete of the prefabricated construction element for the

mounting of panel.

**[0035]** The invention also concerns a profile which is configured to be embedded during off-site construction in a prefabricated construction element in poured concrete for providing a support base defining a recessed groove intended to receive a panel to be mounted therein.

**[0036]** According to other characteristics of the profile:

- the profile comprises anchoring means extending out from the profile, opposite to the recessed groove, to be embedded in the poured concrete;
- the anchoring means of the profile is configured to cooperate with a reinforcement mesh arranged around the profile, preferably the anchoring means comprises a lateral surface in contact with the reinforcement mesh;
- the profile comprises at least one drain hole, arranged in an under part of the profile, intended to be connected from below and/or from the side of the under part with drainage means configured to drain water out of the profile;
- the under part of the profile is configured to form a gutter able to collect the water by gravity;
- the profile is made of a metal, preferably in aluminum, or plastic.

**[0037]** According to the invention, a prefabricated construction element made of poured concrete embedding a profile is obtained according to the method for off-site construction, preferably with a profile according to the above recited characteristics.

**[0038]** Advantageously, the profile embedded in the prefabricated construction element comprises a blocking device for the mounting of a panel, preferably a blocking device configured to allow an installation and adjustment of the panel by acting on only one side.

## Brief description of the drawings

**[0039]** The invention will be better understood by following the description below and the attached drawings, showing a non-limiting embodiment of the invention.

**[0040]** In the following detailed description, the longitudinal, vertical and transverse orientations are used in a non-limiting manner in reference to the trihedron (L, V, T) depicted in the figures.

**[0041]** By convention, the description will use the terms "under" or "upper" in reference to the vertical orientation to describe the profile by reference to its final position of use on site, as embedded in the prefabricated construction element, and thus not during the off-site construction method steps, particularly when the profile is arranged either upside down vertically or horizontally in the mold.

**[0042]** More specifically, in the drawing:

- Figure 1 is a schematic transversal cross-sectional view illustrating the main steps (A) to (D), with optionally steps (A1) and (A2), of the method for off-site construction according to the invention for obtaining a prefabricated construction element comprising a profile embedded therein;
- Figure 2 is a cross-sectional view, showing a part of figure 1, illustrating in detail the profile according to the embodiment of figure 1 arranged upside down in the mold after the positioning step (A);
- Figure 3 is a cross-sectional view, showing a part of figure 1, illustrating in detail a reinforcement mesh arranged around the profile according to immobilizing step (A1) for immobilizing the profile in position of use before pouring the concrete in the mold;
- Figure 4 is a cross-sectional view, showing a part of figure 1, illustrating in detail drainage means connected to the under part of the profile according to connecting step (A2) for draining water out of the profile;
- Figure 5 is a cross-sectional view, showing a part of figure 1, illustrating in detail the profile together with the reinforcement mesh embedded in the concrete after the pouring step (B) of the method for off-site construction of the invention;
- Figure 6 is a cross-sectional view illustrating more in detail the prefabricated construction element embedding the profile as obtained according to off-site construction method whose steps are shown on figure 1, an example of a laminated glass panel being mounted on site in the recessed groove of the profile, after a blocking device was arranged therein.

## Detailed description of an embodiment of the invention

**[0043]** The invention concerns a prefabricated construction element 100 in poured concrete 600 comprising a profile 10 embedded therein and a method for off-site construction for obtaining same whose steps (A) to (D) are illustrated by figure 1.

**[0044]** Further, figures 2 to 5 illustrate more in detail the profile 10 successively during said steps (A) to (D) of the method for off-site construction according to the invention. Optionally, the method for off-site construction comprises further steps (A1) and/or (A2) in a preferred embodiment of the invention.

**[0045]** Figure 6 illustrates a prefabricated construction element 100 obtained by said method for off-site construction and shows, after a transport on site, an example of use to provide a balustrade.

**[0046]** The term "off-site construction" is used here according to its general meaning in the construction field in which this term refers usually to structures or components built at a different site than the site of use where they will be later installed.

**[0047]** Typically, these structures or components, such as prefabricated construction element obtained according to the invention, are realized in purpose-built off-site factories and then transported to site to be used for the

construction of any type of building, by example a house.

**[0048]** On site, the prefabricated construction element on poured concrete is then assembled with one or more other prefabricated construction element(s) to construct the building.

**[0049]** Advantageously, the off-site construction method allows more economic and faster construction, further being notably safer and immune to weather delays given its reliance on indoor construction.

**[0050]** According to the invention, the profile 10 is configured to be embedded in poured concrete during off-site construction of the prefabricated construction element 100, such as a wall or horizontal slab.

**[0051]** The method for off-site construction comprises a positioning step (A) illustrated by figure 1 consisting in positioning at least the profile 10 into a mold 500 corresponding to the construction element 100 to be prefabricated.

**[0052]** The mold 500 is by example parallelepipedal in shape. The mold 500 comprises a bottom 510, here flat, having an upper surface 512 extending horizontally and a side wall 514 extending vertically all around.

**[0053]** Advantageously, the profile 10 is arranged upside down as illustrated by figure 1 and that by comparison with its position of use later on site as shown on figure 6.

**[0054]** Thus, the profile 10 is preferably directly in contact with the upper surface 512 of the mold 500 after the positioning step (A), notably to prevent the concrete 600 to be poured from above in the mold 500 from entering in a recessed groove 120 of the profile 10.

**[0055]** Advantageously, the profile 10 is made of a material that can be produced by extrusion, preferably metal such as aluminum.

**[0056]** By comparison with supports of the prior art reinforced by an alveolar structure, the profile 10 can be thinner since the forces transmitted in use to the profile 10 (after the mounting of the panel 300) will be advantageously taken up by the concrete 600.

**[0057]** In alternative embodiment, the profile 10 can be made of plastic, fully or at least partially while the profile 10 is reinforced by any suitable means such as metal inserts therein.

**[0058]** As illustrated by figure 2, the profile 10 comprises anchoring means 110 extending out from the profile, opposite to the recessed groove 120, configured to be embedded in poured concrete 600.

**[0059]** Advantageously, the anchoring means 110 are integral with the profile 10, in other words in one piece with the profile 10.

**[0060]** Advantageously, the anchoring means 110 of the profile 10 comprise at least two anchoring pad 112 on each side of the profile, preferably four or more anchoring pad 112 which are preferably arranged symmetrically around the perimeter of the profile 10.

**[0061]** Advantageously, each anchoring pad 112 has a T-shape in transversal cross-section, said anchoring pad 112 comprising a first part 114 extending horizontally out of the recessed groove 120 of the profile 10 and a second part 116 extending vertically at the end of the first part 114 opposite to other end connected to the profile 10.

**[0062]** According to a preferred embodiment, the anchoring means 110 of the profile 10 are configured to cooperate with a reinforcement mesh 400 arranged around the profile 10.

**[0063]** Advantageously, the reinforcement mesh 400 is arranged in the mold 500 for immobilizing the profile 10 thanks to the cooperation with the anchoring means 110.

**[0064]** Further, the reinforcement mesh 400 will also reinforce the prefabricated construction element 100, at least locally in the part comprising the embedded profile 10.

**[0065]** In alternative embodiment, the prefabricated construction element 100 could of course do not comprise such reinforcement mesh 400 used in combination with the profile 10.

**[0066]** The second part 116 of the anchoring pad 112 is configured to define a lateral surface 118, especially able to be in contact with the reinforcement mesh 400 as illustrated by figure 3.

**[0067]** Indeed, the profile 10 according to the invention is configured to provide a support base defining the recessed groove 120 intended to receive a blocking device 200 for a panel 300, both to be mounted therein as illustrated by figure 6 for providing balustrades made of middle or full height panels.

**[0068]** Therefore, the reinforcement mesh 400 will participate with the concrete 600 embedding the anchoring means 100 of the profile 10 to taken up the forces to be transmitted in use by the panel 300.

**[0069]** The profile 10 comprises two side walls respectively 124 and 126 which are connected by an under part 130, by example in V-shape or U-shape, and an upper part 140 which, opposite to this under part 130, delimits an opening 125 in communication with the recessed groove 120.

**[0070]** Preferably, the side wall 124 of the profile 10 extends vertically straightforward while the opposite side wall 126 is configured to present a shape designed to be complementary with the blocking device 200 which will be described more in detail later by reference to figure 6.

**[0071]** The upper part 140 of the profile 10 comprises a rim 142 on each side of the opening 125, said rim 142 extending globally horizontally out of the profile 10 delimiting internally the recessed groove 120.

**[0072]** Advantageously, each rim 142 of the profile 10 is configured to extend at least partially straightforward to provide a surface 144 able to be in contact with the upper surface 512 of the mold 500 after the positioning step (A) illustrated by figure 1.

**[0073]** Preferably, each rim 142 further comprises a housing 146 intended to receive part of a cover and/or sealing means as illustrated by figure 6.

**[0074]** As previously described and illustrated by figure 2, the profile 10 is preferably arranged upside down to

have the surface 144 of the rim 142 to be in contact with the surface 512 for closing the recessed groove 120 and advantageously preventing introduction of concrete 600 therein, as said concrete being poured from above in the mold 500 upwardly open.

**[0075]** In an alternative embodiment, the profile 10 can be also arranged horizontally, oriented with the recessed groove 120 face to face with the internal surface of the side wall 514 of the mold 500.

**[0076]** However, according to an alternative embodiment, the profile 10 can be also arranged vertically with the recessed groove 120 oriented upward (and not downward as illustrated).

**[0077]** Especially but even if not exclusively in such alternative embodiment, a removable cover (not shown) can be attached to the upper part 140 of the profile 10 before the positioning step (A), particularly to rigidify the profile 10. Then, such a removable cover can be kept in place as long as necessary to protect the recessed groove 120, until the mounting of the panel 300 on site.

**[0078]** Advantageously, the housing 146 arranged in each rim 142 can then be used to attach temporally such a removable cover to the upper part 140 of the profile 10.

**[0079]** Advantageously, the removable cover is configured to close completely the recessed groove 120 of the profile 10, at least during the steps (A) to (D) of the method for off-site construction.

**[0080]** In a further alternative embodiment, the profile 10 can also be arranged horizontally to be in contact with the internal surface of the side wall 514 of the mold 500, depending on whether the prefabricated construction element 100 is a wall or a horizontal slab by example.

**[0081]** After the positioning step (A) of the profile 10, the method for off-site construction illustrated by figure 1 comprises a pouring step (B) consisting in pouring concrete 600 in the mold 500 comprising the profile 10 for obtaining said prefabricated construction element 100 with the profile 10 embedded therein.

**[0082]** Advantageously and before this pouring step (B) of concrete 600, the method further comprises an immobilizing step (A1) of the profile 10 to ensure that the profile 10 will stay in a position corresponding to a defined position of use, the profile 10 will not move especially due to forces applied on during the pouring step (B) of concrete 600 from above in the mold 500.

**[0083]** In the preferred embodiment, the immobilizing step of the profile 10 is obtained by arranging said reinforcement mesh 400 around the profile 10 in the mold 500 for immobilizing the profile 10 in said position of use, said reinforcement mesh 400 being intended, as the profile 10, to be embedded in the poured concrete 600.

**[0084]** However, in an alternative embodiment and especially when no such reinforcement mesh 400 is to be used, the immobilizing step of the profile 10 can be obtained by arranging an immobilization system (not shown) for immobilizing the profile 10 in said position of use, said immobilization system being able to be then removed to allow a removing step (C) upon drying of the concrete 600.

**[0085]** By example, such immobilization system of the profile 10 can comprise an insert fixed to the bottom 510 of the mold 500 and having preferably a shape complementary to the one of the recessed groove 120 in which it is intended to be inserted.

**[0086]** Nevertheless, many other suitable immobilization systems could be designed such as a system arranged out of - but close to - the mold 500 comprising immobilization means fixed temporally, directly or not, to a part of the profile 10 to be integrally removable or with a part of these means of the immobilization system intended to be embedded in concrete 600 too.

**[0087]** According to another feature of the preferred embodiment of the invention illustrated by figure 4, the profile 10 comprises at least one drain hole 132 arranged in its under part 130 for being connected with drainage means 150, such as a pipe 152, configured to drain water out of the profile 10.

**[0088]** Advantageously and before the pouring step (B) of concrete 600, the method further comprises a connecting step (A2) consisting in connecting drainage means 150 to the profile 10.

**[0089]** Advantageously, the profile 10 comprises one or more drain hole 132 arranged for connecting drainage means 150 from below and/or from the side of the under part 130.

**[0090]** Figure 4 illustrates as example of drainage means 150, a pipe 152 connected from below to a drain hole 132 arranged in the bottom of the under part 130 of the profile 10, said end of the pipe 152 to be connected extending vertically.

**[0091]** Further, figure 4 illustrates also in dotted line two pipes arranged to be connected at least on one or both sides of the under part 130 of the profile 10 which then comprises one or two drain holes 132 accordingly.

**[0092]** The drainage means 150 can comprise one or more pipes 152 connected to corresponding drain holes 132 arranged in the under part 130 of profile 10 depending on how water is expected to be drained after construction on site while using the prefabricated construction element 100.

**[0093]** Preferably, the under part 130 of the profile 10 is configured to form a gutter, by example here being U-shape in cross-section, to collect by gravity the water that could get inside the recessed groove 120, said water being then able to be evacuated by the drainage means 150.

**[0094]** Indeed, the under part 130 of the profile 10 defines a volume 134 under the blocking device 200 supporting the panel 300 for collecting said water before its evacuation by drainage means 150 out of the profile 10.

**[0095]** After the pouring of concrete 600 according to pouring step (B), the method for off-site construction comprises a removing step (C) illustrated by figure 1 consisting in removing as one piece the prefabricated construction element 100 with the profile 10 embedded therein from the mold 500, of course upon drying of the

concrete 600.

**[0096]** According to the preferred embodiment, the reinforcement mesh 400 and/or the drainage means 150 are embedded too in said prefabricated construction element 100 comprising the profile 10.

**[0097]** After the removing step (C), a prefabricated construction element 100 according to the invention is obtained by off-site construction.

**[0098]** Hence, the method for off-site construction comprises finally a transporting step (D) consisting in transporting the prefabricated construction element 100 with at least the profile 10 embedded therein to a given site of construction where said prefabricated construction element 100 is usually intended to be assembled with one or more construction elements.

**[0099]** Preferably before the transporting step (D) but at the latest on the site of construction after transport, at least one or more blocking device 200 are arranged in the recessed groove 120 of the profile 10 embedded in poured concrete 600 of the prefabricated construction element 100 for the mounting of panel 300.

**[0100]** As illustrated by figure 6, the blocking device 200 is preferably a blocking device like the one described in EP-3.816.362 which is hereby incorporated by reference.

**[0101]** Nevertheless, in an alternative embodiment, the blocking device 200 could be of course different, by example a blocking device according to EP-3.762.561. In this case, the shape of the profile 10 is preferably modified accordingly.

**[0102]** Advantageously, the profile 10 comprise a blocking device 200 according to EP-3.816.362 that allows an easy installation and adjustment of the panel 300 by acting on only one side is possible. As it will be described hereafter, the blocking device 200 allows the panel 300 to be easily blocked and that in a stable and durable way.

**[0103]** One or more blocking devices 200 may be provided along the profile 10 depending upon the length of the panel 300 to be blocked, being noted that only one blocking device 200 is shown in the cross-section of figure 6.

**[0104]** By comparison with prior art support, the profile 10 embedded in the prefabricated construction element 100 does not require any operations on site such as fixing since it is already embedded in the prefabricated construction element 100, ready to use thanks to the off-site construction method according to the invention.

**[0105]** As previously described, the profile 10 is delimiting the recessed groove 120, more precisely the profile 10 comprising respectively the side walls 124 and 126 connected at the bottom by the under part 130 and at the opposite defined the opening 125.

**[0106]** Thus, said profile 10 defines a seat, open upward at the opening 125 for inserting the edge area 310 of the panel 300 to be installed vertically or almost vertically. The panel 300 defines two opposite surfaces 312 and 313 corresponding respectively to a first side and a second side of the panel.

**[0107]** The profile 10 is therefore asymmetrical with respect to a longitudinal vertical plane passing through the centerline of the under part 130.

**[0108]** Preferably, the panel 300 illustrated by figure 6 is a laminated glass panel comprising a first glass sheet and a second glass sheet adhesively assembled by an interlayer (usually made of at least a sheet of polyvinyl butyral).

**[0109]** Advantageously, the side wall 126 of the profile 10 comprises an undercut portion 128 having a concave curved shape, and more precisely a shape with mainly constant radius, thus with a cross-section mainly shaped like an arc of a circle.

**[0110]** The undercut portion 128 is intended to cooperate with at least one intermediate blocking elements 226 of a side blocking unit 220 that will be described hereafter.

**[0111]** As illustrated by figure 6, the blocking device 200 is interposed between the surface 313 of the glass panel 300 and the side wall 126 of the profile 10, that is to say on the first side.

**[0112]** Therefore, the installation and adjustment of the glass panel 300 is to be done on the side of the blocking device 200, by facing the surface 313 of glass panel 300, advantageously only on oneside corresponding to the first side.

**[0113]** As described in EP-3.816.362, the blocking device 200 further comprises a concave cradle 217 for housing the edge area 310 of the glass panel 300. The cradle 217 comprises a bottom and a flank side element 230 (made for example of plastic, such as POM) adapted to come into contact, with the portion thereof, with the surface 313 of the glass panel 300.

**[0114]** Preferably, the cradle 217 is made in two pieces, i.e. a rest body 217A and the flank side element 230, to the advantage of easiness of installation and of support capability of blocking the glass panel 300.

**[0115]** Advantageously, the blocking device 200 comprises the side blocking unit 220 for blocking the glass panel 300, which is interposed on the first side between the flank side element 230 and the side wall 126 of the profile 10, whilst on the second side at least one fixed abutment element 240 is arranged so that the surface 313 of the glass panel 300 abuts, the glass panel 300 being therefore blocked on both sides.

**[0116]** The blocking unit 220 comprises a wedge-shaped element 221 (made for example of steel or aluminum), provided with a first face 221A and a second face 221 B. The first face 221A abuts on the flank side element 230, so that the wedge-shaped element is slidable, in a sliding guide 222 defined on the outside of the flank side element 230 of the cradle 217, according to a direction from the under part 130 towards the opening 215 and vice versa.

**[0117]** The opposite second face 221B of the wedge-shaped element 221 is inclined relative to the sliding direction of the wedge-shaped element.

**[0118]** Further, the blocking unit 220 comprises at least one preferably two intermediate blocking elements 226 adapted to be arranged between the inclined second faces 221B of the wedge-shaped element 221 and the undercut portion 128 provided on the side wall 126 of the profile 10.

**[0119]** As illustrated, the intermediate blocking elements 226 are cylinders (made for example of plastic, for instance POM), whose radius substantially matches the radius of curvature of the undercut portion 128, in other words they have complementary shape.

**[0120]** The blocking unit 220 further comprises an adjustment screw 227, screwed in a specifically threaded hole, provided through the wedge-shaped element 221. The screw 227 (made for example of steel) has an end, adapted to abut against a portion of the flank side element 230, and an opposite end, provided with a control head for a tool.

**[0121]** The rotation of the screw 227 in a first direction causes the wedge-shaped element 221 to slide towards the opening 125, so that the intermediate blocking elements 226 (the cylinders) push against respective undercut portions 218 of the side wall 126, and thus the flank side element 230 pushes the surface of the glass panel 300, pushing this latter and blocking it against the gasket 240. The rotation of the screw 227 in opposite direction causes the wedge-shaped element 221 to slide in opposite direction and thus releasing it.

**[0122]** During installation on site, the glass panel 300 is inserted into the profile 10 and abuts against the gasket 240 in the final vertical position. By acting only on the blocking units 220 on the first side of the panel, the glass panel 300 is blocked, without the need for acting on the opposite side.

**[0123]** The profile 10 is also able to receive on each side, in housing 146 of the upper part 140 as illustrated by figure 6, a cover 160 which is extending longitudinally and is configured to close the gap of the opening 215 remaining open when the panel 300 is inserted into the profile 10 embedded in the prefabricated construction element 100, so as to have an aesthetic finish after installation.

**[0124]** The cover 160 could comprise sealing means, for example a longitudinal gasket adapted to come in contact with the surface of the glass panel 300 to prevent water to get inside the recessed groove 120.

**[0125]** Further, EP-3.816.362 describes a transverse displacement apparatus (not shown here), by example integrated in the cradle 217, for transversally displacing the edge area of the glass panel, allowing to change and adjust the inclination of said panel.

**[0126]** To adjust the inclination of the panel through the transverse displacement apparatus, it is necessary to loosen the blocking device 200 and then to act with the tool U on the pinion, which in turn translates a lateral displacement of the movable body along the rest body 217A of the cradle 217, thus pushing and moving the panel in transverse direction.

**[0127]** It is understood that what is illustrated purely represents possible non-limiting embodiments of the invention, which may vary in forms and arrangements without departing from the scope of the concept, on which the invention is based.

**[0128]** Any reference numerals in the appended claims are provided for the sole purpose of facilitating the reading thereof in the light of the description above and the accompanying drawings and do not in any way limit the scope of protection.

**[0129]** To sum up, the invention concerns a method for off-site construction of a prefabricated construction element 100 in poured concrete 600 comprising a profile 10 embedded therein, said profile 10 being configured to provide a support base defining a recessed groove 120 intended to receive a blocking device 200 for the mounting of a panel 300, and concerns also such a profile 10 especially configured to be embedded in poured concrete 600 of a prefabricated construction element 100 obtained by off-site construction method.

## Claims

1. Method for off-site construction of a prefabricated construction element (100) in concrete (600) comprising a profile (10) embedded therein, said profile (10) being configured to provide a support base defining a recessed groove (120) intended to receive an edge (310) of a panel (300), the method comprising at least the following steps:

   (A) - positioning at least the profile (10) into a mold (500) corresponding to the desired shape of construction element (100) to be prefabricated;
   (B) - pouring concrete (600) in the mold (500) comprising the profile (10) for obtaining said prefabricated construction element (100) with the profile (10) embedded therein;
   (C) - removing from the mold (500) as one piece, upon drying of the concrete (600), the prefabricated construction element (100) with the profile (10) embedded therein;
   (D) - transporting the prefabricated construction element (100) with the profile (10) embedded therein to a site of construction where said prefabricated construction element (100) can be assembled with one or more construction elements.

2. Method according to claim 1, **characterized in that** the profile (10) is arranged, preferably vertically upside down or horizontally, in contact with a surface (512, 514) of the mold (500) during the positioning step (A) to prevent the concrete (600) poured from above in the mold (500) from entering in the recessed groove (120) of the profile (10).

3. Method according to claim 1 or 2, **characterized in that** the profile (10) is arranged for embedding anchoring means (110) of the profile (10) in the poured concrete (600) after the pouring step (B).

4. Method according to one of claims 1 to 3, **characterized in that** the method further comprises an immobilizing step (A1) of the profile (10) to ensure immobilization of the profile (10) in a position of use during the pouring step (B) of the concrete (600).

5. Method according to claim 4, **characterized in that** the immobilizing step (A1) is obtained by arranging a reinforcement mesh (400) around the profile (10) in the mold (500) for immobilizing the profile (10) in said position of use, said reinforcement mesh (400) being intended like the profile (10) to be embedded in the poured concrete (600).

6. Method according to one of claims 1 to 5, **characterized in that** the method comprises an additional connecting step (A2) to the positioning step (A) of the profile (10) consisting of connecting drainage means (150) to at least a drain hole (132) of the profile (10) to be able in use to drain water out of the profile (10), said drainage means (150) being intended to be embedded in the concrete (600) of the prefabricated construction element (100).

7. Method according to claim 6, **characterized in that** the drainage means (150) are configured to drain water directly out of the prefabricated construction element (100) and/or to be connected to a water collection network of a building comprising said prefabricated construction element (100).

8. Method according to one of claims 1 to 7, **characterized in that**, at the latest on the site of construction, at least one or more blocking device (200) are arranged in the recessed groove (120) of the profile (10) embedded in the concrete (600) of the prefabricated construction element (100) for the mounting of panel (300).

9. Profile for the mounting of panel (300), **characterized in that** the profile (10) is configured to be embedded during off-site construction in a prefabricated construction element (100) in poured concrete (600) for providing a support base defining a recessed groove (120) intended to receive a panel (300) to be mounted therein.

10. Profile according to claim 9, **characterized in that** the profile (10) comprises anchoring means (110) extending out from the profile (10), opposite to the recessed groove (120), to be embedded in the poured concrete (600).

11. Profile according to claim 10, **characterized in that** the anchoring means (110) of the profile (10) is configured to cooperate with a reinforcement mesh (400) arranged around the profile (10), preferably the anchoring means (110) comprises a lateral surface (118) in contact with the reinforcement mesh (400).

12. Profile according to one of claims 9 to 11, **characterized in that** the profile (10) comprises at least one drain hole (132), arranged in an under part (130) of the profile (10), intended to be connected from below and/or from the side of the under part (130) with drainage means (150) configured to drain water out of the profile (10).

13. Profile according to claim 12, **characterized in that** the under part (130) of the profile (10) is configured to form a gutter able to collect the water by gravity.

14. Profile according to one of claims 9 to 13, **characterized in that** the profile (10) is made of a metal, preferably in aluminum, or plastic.

15. Prefabricated construction element (100), **characterized in that** the prefabricated construction element (100) made of poured concrete (600) embedding a profile (10) is obtained according to the method for off-site construction of claims 1 to 8, preferably with a profile (10) according to one of claims 9 to 14.

16. Prefabricated construction element (100) according to claim 15, **characterized in that** the profile (10) embedded in the prefabricated construction element (100) comprises a blocking device (200) for the mounting of a panel (300), preferably a blocking device (200) configured to allow an installation and adjustment of the panel (300) by acting on only one side.

Fig.1

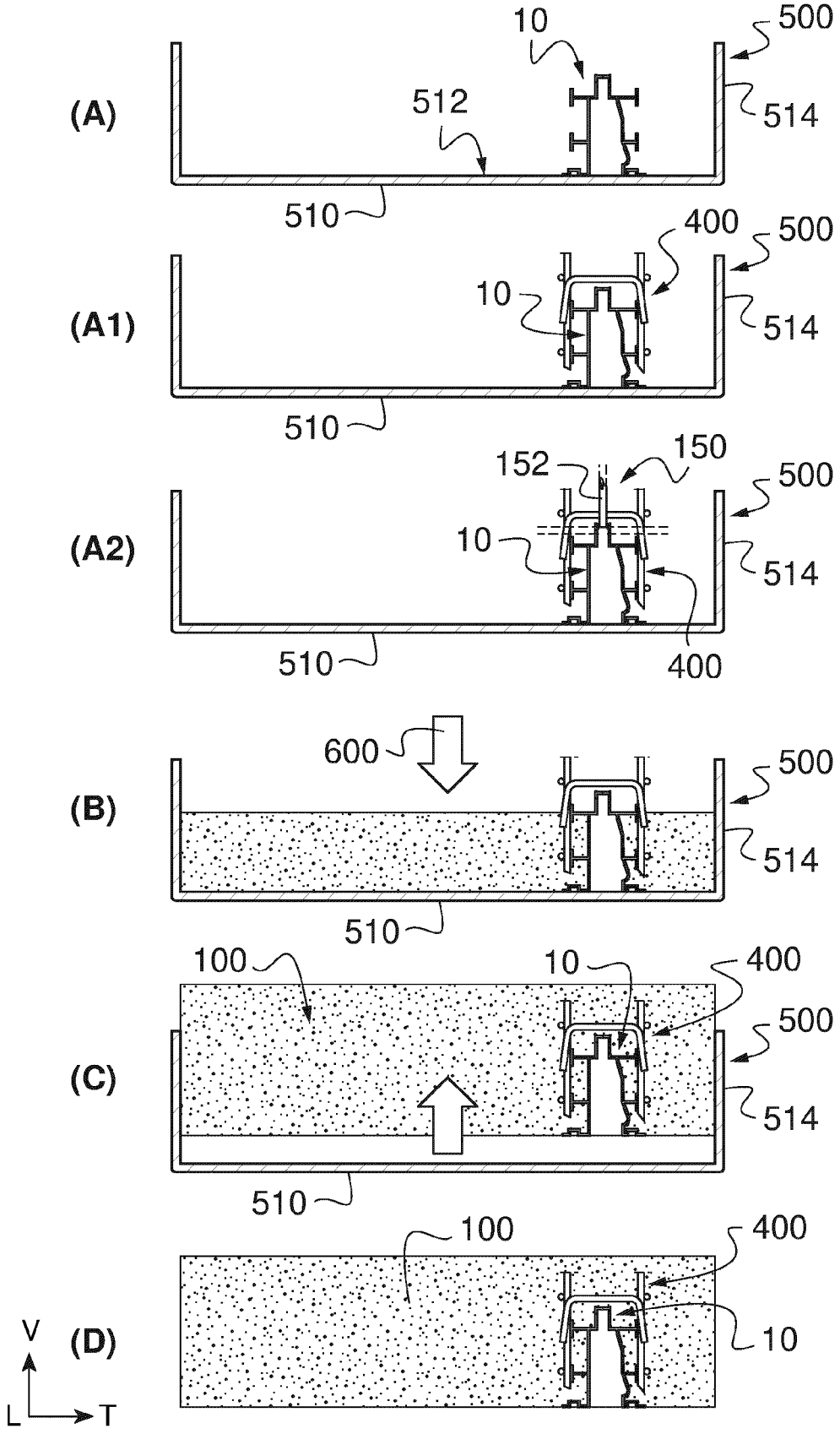
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Fig.2

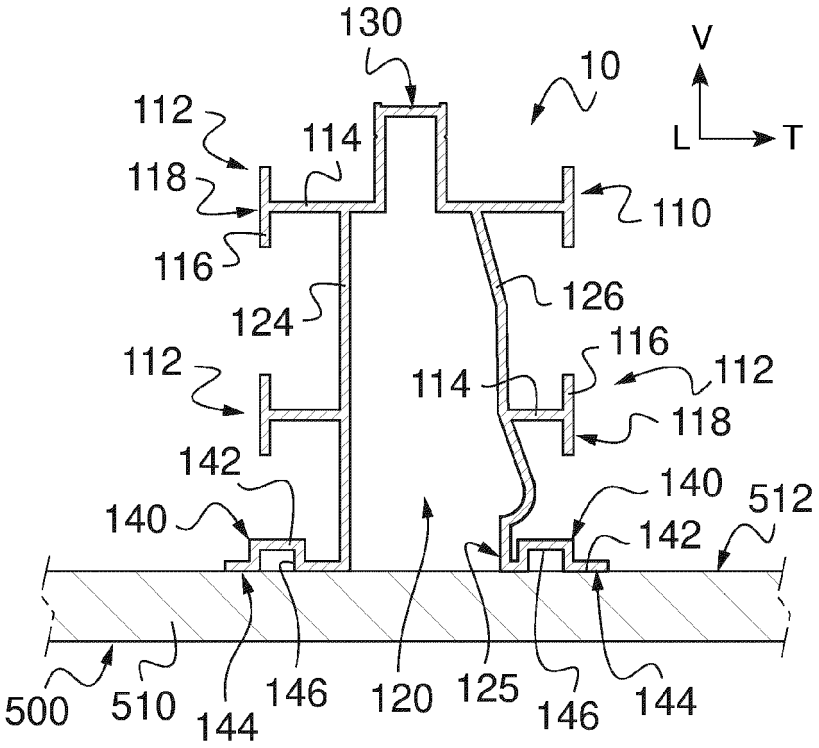
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Fig.3

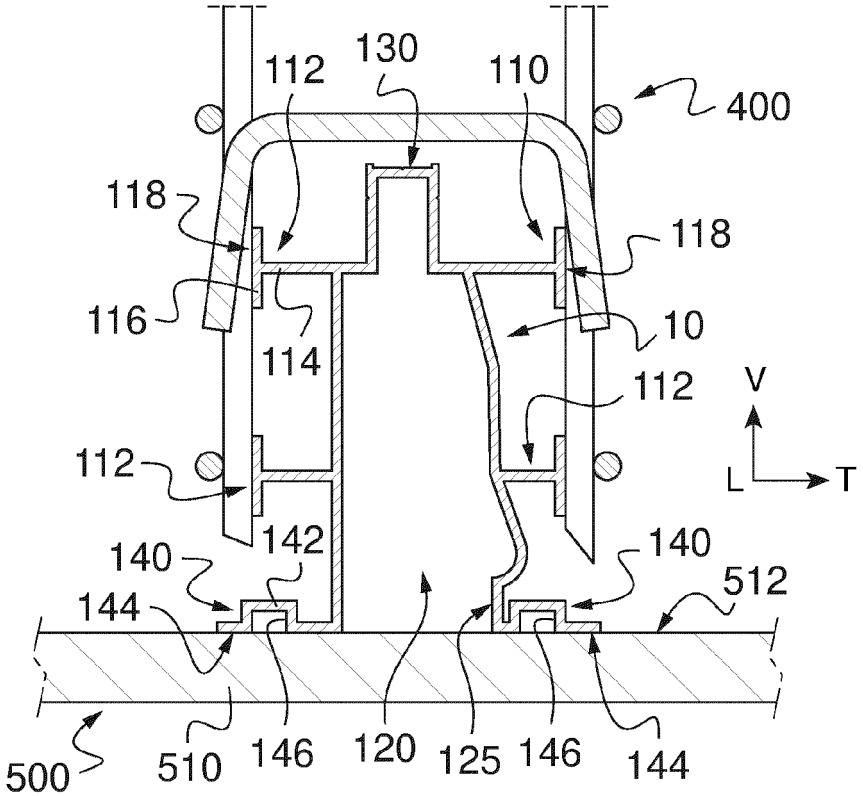
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Fig.4

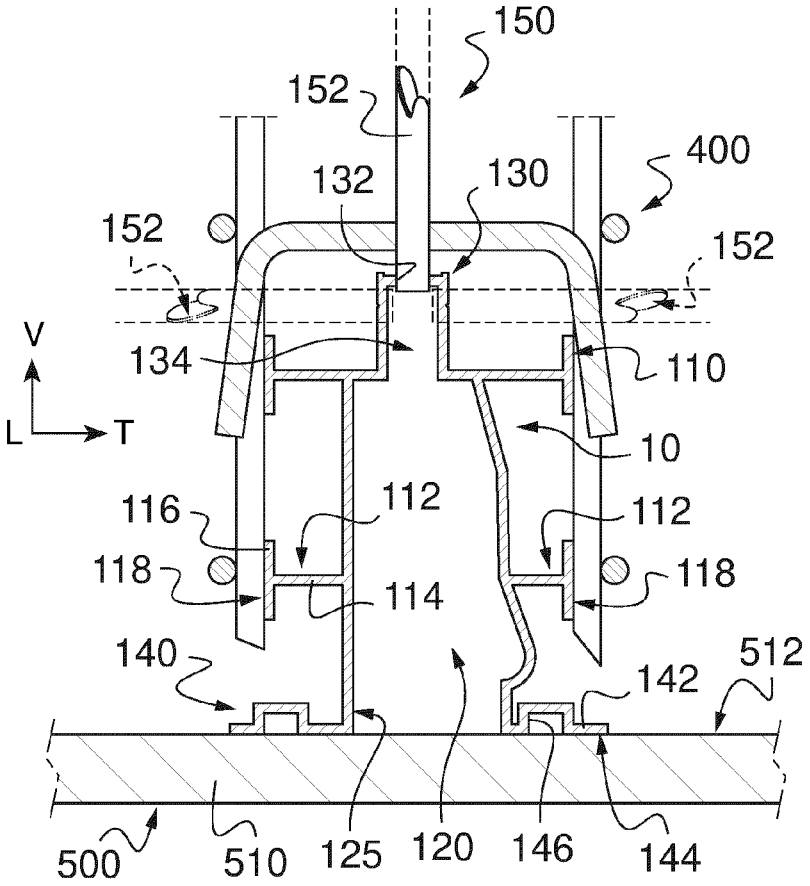
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Fig.5

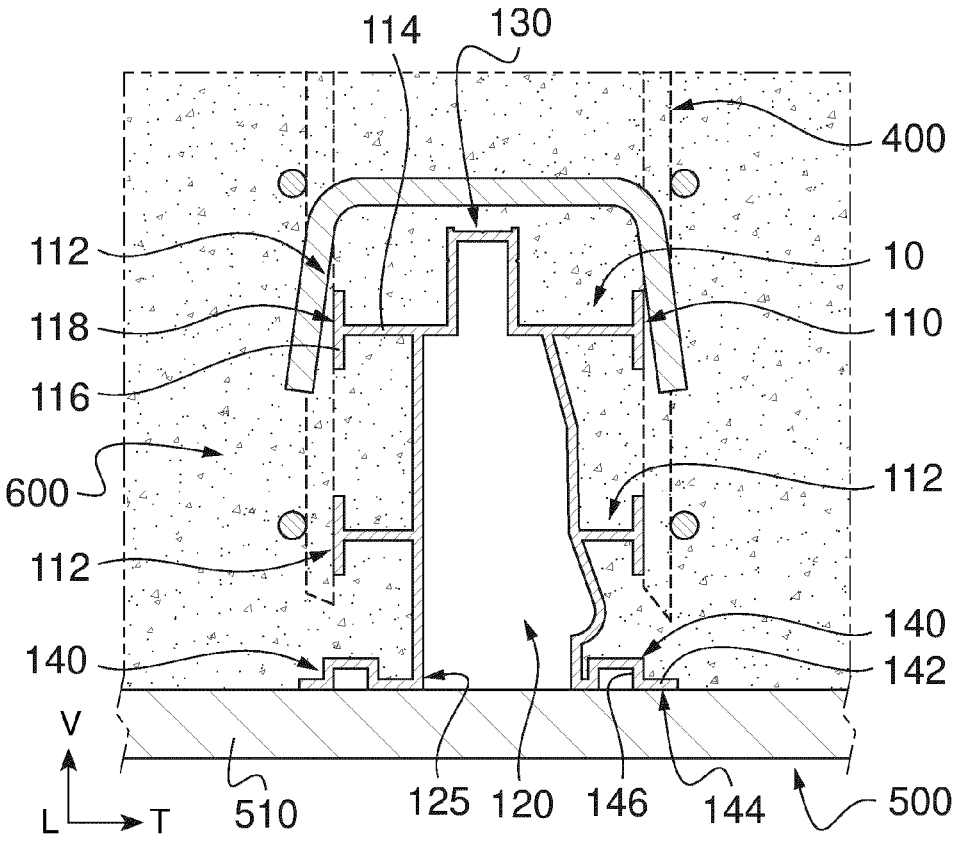
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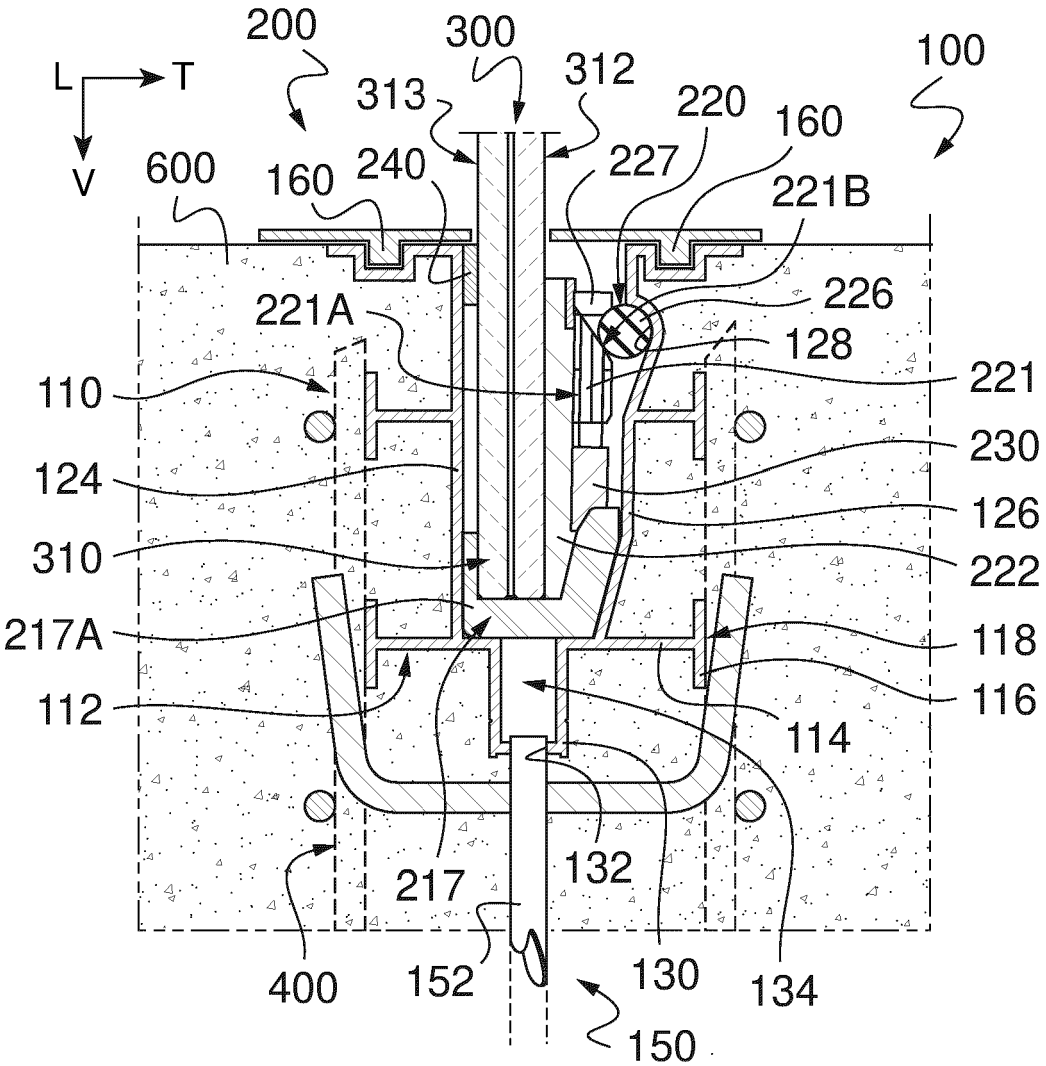
Fig.6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# EUROPEAN SEARCH REPORT

Application Number
EP 23 15 9093

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B28B
E04B
E04F
E04C

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
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| The Hague | 28 June 2023 | Orij, Jack |

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28-06-2023

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