



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
28.04.2010 Bulletin 2010/17

(51) Int Cl.:
E04C 2/06 (2006.01) E04C 2/38 (2006.01)

(21) Application number: **09382195.7**

(22) Date of filing: **05.10.2009**

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

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(30) Priority: **22.10.2008 ES 200802972**

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(54) **Mortar panel with reduced thickness and process for manufacturing the same**

(57) The invention relates to a panel (1) of a resistant and settable material with reduced thickness, provided with reinforcing filiform elements (2,3) embedded therein and with a plurality of anchors intended for the securing of the panel (1) by its non-visible face (5) to a supporting structure (16), and to a process for the manufacture thereof. The reinforcing filiform elements (2,3) are made

of stainless steel and are arranged in the form of a grid in two layers. The anchors comprise metal tubular elements (16), with open ends and with a general rectangular cross-section, provided with two opposite and essentially rectangular or square bases, in which the outer base is flush with the non-visible face (5) of the panel (1), and at least one of the side faces of the tubular element (16) is integrally attached to a first filiform element (2).

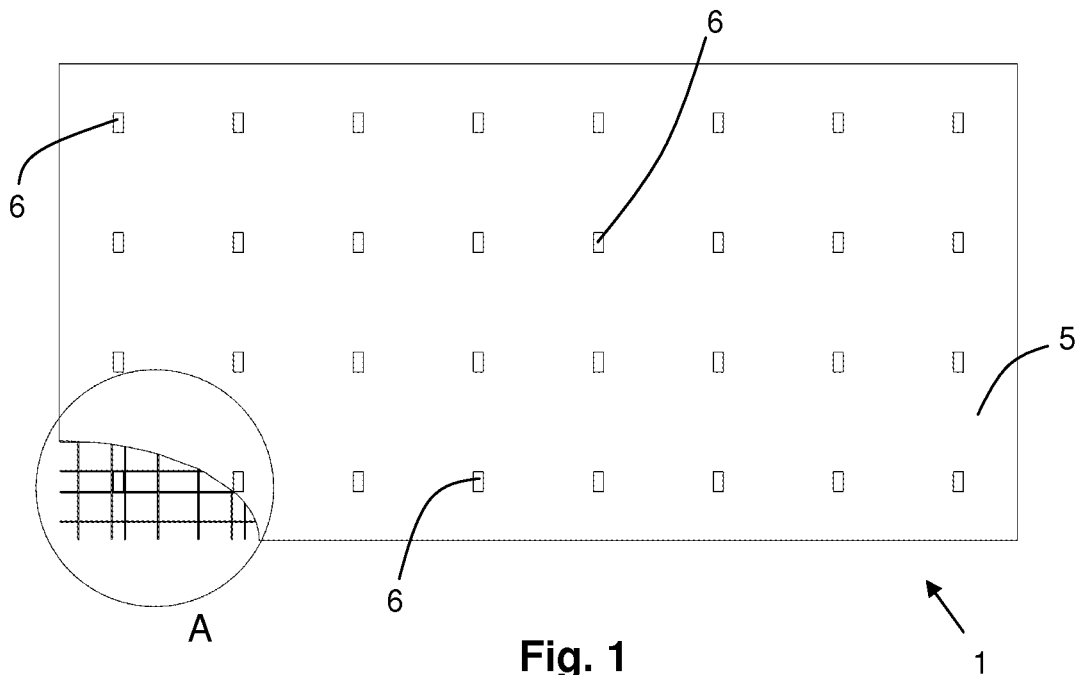


Fig. 1

Description

Technical Field of the Invention

[0001] The invention relates to a process for the manufacture of a lightweight panel of a resistant and settable material, with reduced thickness, as well as to the panel obtained by said process.

[0002] The lightweight panel is provided with reinforcing filiform elements embedded therein as well as with a plurality of anchoring elements for securing the panel, by its non-visible face, to a supporting structure, being suitable for the construction of outdoor (façades) and indoor enclosures, for the covering of walls, the formation of raised floors, of street furniture, etc.

Background of the Invention

[0003] There is currently a large variety of large format panels used to form facades of buildings and industrial premises, manufactured in a resistant and settable material such as concrete or cement mortar. In order to be able to withstand the stresses to which said panels are subjected, for example, the force of the wind, the resistant panels are provided with reinforcements embedded therein.

[0004] United States patent US 6711866 describes a prestressed concrete panel with a thickness of approximately 1.5 inches. The prestressed tendons extend in two perpendicular directions, like a grid, placed on each side of the mid-plane of the panel and spaced from said mid-plane so as to increase the strength of the panel and prevent its warping. For the securing of the panel to a metal structure of posts arranged in the facade line or to a concrete wall, the panel is provided with anchors or connectors embedded in the panel and provided with an internally threaded hollow cylindrical body the open end of which is communicated with the outer surface of the non-visible face of the panel. The securing of the panel to a structure of the building is carried out by interposing a metal strip between the surface of the non-visible face of the panel and the outer surface of said structure, said strip being bent like a bar, establishing a separation distance between both surfaces. The bar is fixed at one end to the structure, by means of a fixing screw, and at the other end to the non-visible face of the panel, by means of a lock screw the outer thread of which is suitable for fitting in the inner thread of the cylindrical body embedded in the panel. In turn, for the cylindrical body to remain in a fixed position within the actual panel during the pouring of the concrete of the panel, the cylindrical body is partially introduced traversing a plate two of the edges of which are inwardly bent to engage a pair of prestressed parallel tendons of the panel.

[0005] Another example of a mortar panel with reduced thickness is the one described in Spanish utility model ES 1065420U, biaxially reinforced by means of two bands of prestressed rods which orthogonally cross one

another forming a grid, at the crossing points of which the rods of one band are not joined with those of the other band. Said panel comprises securing means for its securing to the structure of the building which are occluded in the mortar mass and intercalated in the space of any of the squares of the grid. Said securing means are made up of parts formed by a disc-shaped base, followed by a cylindrical segment internally provided with a threaded blind hole. The base in the form of a flange acts as a retainer of the securing means in the settable mass, whereas the cylindrical segment acts as an anchor since it can attach the panel to the structure of the building when a correspondingly threaded fixing screw is inserted. During the manufacture of the panel, before pouring the mortar, it is necessary to position the parts in the form of a flange of the securing means centred in some of the squares of the reinforcement and to support said means by holding means through anchoring stems screwed in the holes, such that the free end of the cylindrical segment is flush with what will be the surface of the non-visible face of the panel.

[0006] According to Spanish utility model ES 1066496U, the previously described securing means are manufactured in a material of the group comprising cement compounds and compounds used in ceramics.

[0007] Although the previously described securing means assure the reliability of the securing of the panel, they give rise to high costs in the manufacture thereof as well as costs derived from the process for manufacturing the panel since, in the case of metal securing means, a precise machining process is necessary, and in the case of ceramic securing means, the intervention of a machine holding said means in the centred position in the squares and at a certain distance from the base of the mould (visible face of the panel), before the pouring and during the material setting process, is necessary.

[0008] Therefore, it becomes evident the need for a panel with reduced thickness as an alternative to the previous panels, which, offering the same structural safety assurances, involves lower manufacturing costs.

Disclosure of the Invention

[0009] The panel object of the invention is made of a resistant and settable material, has a reduced thickness, and is provided with reinforcing filiform elements embedded therein and with a plurality of anchors intended to secure the panel, by its non-visible face, to a supporting structure.

[0010] The panel is essentially **characterized in that** the reinforcing filiform elements are made of stainless steel and are arranged in the form of a grid in two layers, and in that the anchors comprise metal tubular elements, with open ends and with a general rectangular cross-section, provided with two opposite and essentially rectangular or square bases, in which the outer base is flush with the non-visible face of the panel, and at least one of the side faces of the tubular element is integrally joined

to a first reinforcing filiform element. The fact that the reinforcement is not prestressed is in itself a saving of material and machinery as well as of labour in the manufacturing process. Furthermore, the anchors and their positioning within the panel have been considerably simplified, since they can be easily obtained from conventional metal tubes with a rectangular section, without needing to carry out precise machining operations or mould parts with singular shapes.

[0011] According to another feature of the invention, the two side faces of each tubular element are integrally joined to respective first filiform elements.

[0012] According to another feature of the invention, the integral joint between the tubular elements and the first filiform elements is a joint by welding. This considerably simplifies the manufacturing method of the panel, since it allows positioning the anchors for the securing to the actual reinforcement without having to use auxiliary machinery keeping them in position during the pouring of the settable material of the panel and its setting process.

[0013] According to another feature of the invention, each tubular element is framed by two first filiform elements and by two second filiform elements.

[0014] According to another feature of the invention, the two layers forming the reinforcing filiform elements are integral at their crossing points, forming an electrowelded mesh.

[0015] According to another feature of the invention, the tubular elements are made of stainless steel.

[0016] According to another feature of the invention, the thickness of the panel is comprised between 12 and 25 mm, the resistant and settable material being a high-strength mortar with a minimum strength value of 50 N/mm².

[0017] According to another feature of the invention, the tubular elements have a cavity at least partially occupied by a plastic foam material.

[0018] According to another feature of the invention, the cavity of the tubular elements is partially occupied by a plastic foam material and the rest of the cavity, i.e., the areas close to the open ends of the tubular elements, is occupied by the resistant and settable material of the panel.

[0019] According to another feature of the invention, some of the anchors comprise suspending means provided with a sheet metal strip provided with a step, supported on and fixedly attached to the outer base of the tubular element, and a sheet metal or self-tapping screw traversing said strip and the outer base of the tubular element, being introduced in the plastic foam material of the inside of the cavity of the tubular element, such that between the sheet strip and the outer base of the tubular element there is a space suitable for receiving the end of a profile of the supporting structure from which the panel is suspended in its placement. The panel thus constructed allows being stacked one on top of the other before the fixing to the anchors of the sheet metal strip

by means of the sheet metal screw, saving space in the transport of several units of panels, since there is no element projecting from the non-visible face. The placement of the mentioned sheet strip can be carried out subsequently, even on-site. Said sheet metal or self-tapping screws are furthermore self-drilling screws, which facilitates the placement of the sheet metal strip and its fixing to the supporting structure.

[0020] According to another aspect of the invention, a process for the manufacture of the panel object of the invention described above is disclosed, which is essentially **characterized in that** it comprises the following steps:

- a) attaching by welding a plurality of anchoring tubular elements to an electrowelded mesh of stainless steel, distributing said tubular elements in the electrowelded mesh, such that each tubular element is welded at its side faces to respective first reinforcing filiform elements and its open ends are limited by respective second reinforcing filiform elements, each tubular element being framed by two first and two second filiform elements;
- b) placing the assembly formed by the tubular elements welded to the mesh between the space comprised between two half-moulds separated a distance equivalent to that of the thickness of the panel to be manufactured, supporting the outer bases of the tubular elements against the inner wall of the half-mould forming the non-visible face of the panel and fixing the assembly to the mould in said position;
- c) injecting under pressure the resistant and settable material through at least one inlet opening provided in the mould, until completely filling the entire inner space between the two half-moulds;
- d) setting the injected resistant material, until the latter acquires enough strength to allow its demoulding, said strength being at least 15 N/mm²; and
- e) demoulding the panel by uncoupling the two half-moulds.

[0021] The mentioned process allows a quick and clean manufacture of the panel object of the invention without needing to use complex machinery. Furthermore, the injection under pressure of the settable material favours the compactability of the panel and prevents small unfilled spaces from remaining inside it, overcoming the structural problems that this would involve.

[0022] According to another feature of the invention, the anchoring tubular elements are partially filled with a plastic foam material, before or after they are attached by welding to the filiform elements of the mesh, leaving the areas close to the open ends of the tubular elements unfilled so that the resistant material injected in step c) penetrates through said open ends in the tubular elements.

[0023] According to another feature of the invention, step d) is carried out in a setting chamber at a temperature

comprised between 40 $\pm$ C and 60 $\pm$ C.

[0024] According to another feature of the invention, after step e), sheet metal strips are attached to the outer bases of some tubular elements by means of respective sheet metal or self-tapping (and optionally, self-drilling) screws, which sheet metal strips are provided with a step, such that between the sheet strips and the mentioned outer bases there is a space suitable for receiving the end of a profile of the supporting structure from which the panel will be suspended in its placement and fixing.

Brief Description of the Drawings

[0025] The attached drawings show, by way of a non-limiting example, three embodiments of the panel object of the invention. In said drawings:

Fig. 1 is a plan view of the panel object of the invention, from which part of the settable material of the bottom left corner has been removed;

Fig. 2 is an elevational view of the panel of Fig. 1;

Fig. 3 is an enlarged view of detail A of Fig. 1;

Fig. 4 is a perspective view of one of the anchors of Fig. 3;

Fig. 5 is a perspective view of the panel object of the invention secured to a supporting structure placed between two contiguous slabs;

Fig. 6 is a side view of the assembly of Fig. 5;

Fig. 7 is a front view of the assembly of Fig. 5;

Fig. 8 is an enlarged view of detail B of Fig. 6, showing the section of the panel according to a vertical section;

Fig. 9 is an enlarged view of detail C of Fig. 7;

Figs. 10 and 11 are, respectively, a side view and a front view of the suspending means of the panel and of one of the profiles of the supporting structure shown in Fig. 9;

Figs. 12 and 13 are, respectively, a side view and a front view of a profile of the supporting structure from which the upper part of the panel object of the invention is suspended;

Fig. 14 is a sectional view of the panel of Fig. 1 secured to a supporting structure according to a vertical section;

Fig. 15 is an enlarged view of detail E of Fig. 14 minutes before it is secured to the supporting structure;

Fig. 16 is a sectional view according to a longitudinal section of a second embodiment of the panel according to the invention; and

Fig. 17 is a sectional view according to a cross-section of a third embodiment of the panel according to the invention, in this case a corner panel.

Detailed Description of the Drawings

[0026] Figs. 1 and 2 show the high-strength mortar panel 1 with reduced thickness, comprised between 12

and 25 mm from the visible face 4 to the non-visible face 5 of said panel 1. Specifically, the depicted panel 1 measures 2400 x 1200 mm, with a thickness of 20 mm. Due to its technical features, which will be described below, said panel 1 is indicated for the covering of outdoor (facades) and indoor enclosures, as shown in Figs. 5 to 7, of walls, for the formation of raised floors, of street furniture, etc. The configurations of the panel 1 are varied according to the use and location thereof. Thus, for example the panel 1 depicted in Fig. 17 corresponds to a corner panel, therefore it has a curved shape.

[0027] The panel 1 of Fig. 1 has been depicted with the bottom left corner lacking the settable material, high-strength mortar, for the purpose of being able to see the reinforcement of said panel 1. As observed in Fig. 3, an enlargement of detail A of Fig. 1, the panel 1 is reinforced with a plurality of first filiform elements 2, arranged parallel to the shortest side of the panel 1, and by a plurality of second filiform elements 3 perpendicular to the first ones, forming a grid of two layers which are integrally joined at the crossing points of the filiform elements 2 and 3. Specifically, the mentioned filiform elements 2 and 3 are made of stainless steel and form an electrowelded mesh, preventing corrosion problems and saving labour costs in the manufacturing process, since there is no prestressed or post-stressed reinforcement which usually increases the cost of the end product due to the operations and control that it involves.

[0028] Fig. 1 shows the distribution of a plurality of anchors, separated every 300 mm, intended to secure the panel 1 by its non-visible face 5 to a supporting structure 16 (see Figs. 5 to 7). These anchors comprise metal tubular elements 6 made of stainless steel, with open ends and an essentially rectangular cross-section, as can be seen in Fig. 4. Each of said tubular elements 6 has two opposite rectangular bases, in which the outer base 7 is flush with the non-visible face 5 of the panel 1, whereas the inner base 8 is oriented towards the visible face 4 of the panel 1 (Fig. 2). Each of the side faces 9 of the tubular element 6 is integrally attached, by means of welding, to a respective first filiform element 2, whereby the position of the tubular element 6 is assured with respect to the mesh of the reinforcement of the panel 1. Both Fig. 3 and Fig. 4 show that the separations between the reinforcing bars forming the mesh have been adjusted so that each tubular element 6 is framed by two first filiform elements 2 (welded to the side faces 9) and by two second filiform elements 3. The mentioned pair of second filiform elements 3 is arranged flanking the two open ends of the tubular element 6 and, optionally, can be attached to said ends by means of spot welds in those segments of contact.

[0029] Although the preferred embodiment of the arrangement of the tubular elements 6 is the one described previously, another example of panel 1, in which the tubular elements 6 are also made of steel, with a rectangular cross-section, and have their outer bases 7 flush with the non-visible face 5 of the panel 1, has been con-

templated in Fig. 16. On this occasion, the inner base 8 of each tubular element 6 is integrally attached to a first filiform element 2, in a segment close to the crossing of the latter with a second filiform element 3, and one of the side faces 9 of said tubular element 6 is integrally attached by welding to a second filiform element 3 (see detail F).

[0030] Returning to Fig. 4, it is observed that the inside of the tubular elements 6 is occupied by a plastic foam material 10, for example expanded polystyrene, whereas the ends of said tubular elements 6 are occupied by the resistant and settable material of the panel 1, in this case, a high-strength mortar with a minimum strength value of 50 N/mm². The integration of the tubular elements 6 as a part forming the body of the panel 1 is thus further reinforced.

[0031] In addition to the mentioned tubular elements 6, the anchors of the panel 1 also comprise suspending means formed by a sheet metal strip 11 provided with a step. Each strip 11 is supported on the outer base 7 of a tubular element 6 and is fixedly attached to said tubular element 6 by means of two sheet metal or self-tapping screws 12, preferably self-drilling ones, which, traversing the outer base 7, are introduced in the plastic foam material 10 of the inside of the cavity of the tubular element 6. Said assembly is observed in detail in Figs. 8, 9, in detail E of Fig. 14 and in Fig. 15; as can be seen in said figures, the stepped shape of the strip 11 creates a space between the outer base 7 of the tubular element 6 and said strip 11 that is suitable for receiving the end of a profile 13 of the supporting structure 16 from which the panel 1 is suspended, with the interposition of an adjustment portion 14 manufactured in an elastomeric material which, in addition to adjusting the assembly, prevents the transmission of vibrations and favours the electric insulation between the parts involved.

[0032] For the securing of the panel 1 to the supporting structure 16, formed by a series of vertical posts 17 secured to the edges of slabs 15 (see Figs. 5 to 7), it is not necessary to place a strip 11 in all the tubular elements 6 arranged flush with the non-visible face 5 of the panel 1. Depending on the dimensions of the panel 1 and on the height at which the panel 1 is located, it is enough to fix a series of strips 11 in some of the tubular elements 6 of a horizontal alignment (the panel 1 being in an operative assembly position, as in Figs. 5 to 7 and 14) and thus make the end of the profile 13 fit in the space left between said strips 11 and the outer bases 7 of these tubular elements 6. In fact, it is not necessary to have a profile 13 in each of the posts 17 either, but rather they can be alternated with one another, placing for example a profile 13 every two or three posts 17, making them coincide with the strips 11 which have been fixed in the corresponding tubular elements 6.

[0033] Fig. 8, corresponding to detail B of Fig. 6, shows how two panels 1 are secured at the lower and upper part. For the securing of a panel 1, such as those depicted in Figs. 1, 2 and 5 to 7, to a supporting structure 16, strips

11 fixed with sheet metal screws 12 in the outer bases 7 of some of the tubular elements 6 of a lower horizontal alignment of the panel 1 will be placed. The strips 11 will be placed, for example, every two tubular elements 6. Likewise, respective "omega" profiles 13 of a small depth (see Figs. 8, 10, 11, 14 and 15) will be fixed in the corresponding vertical posts 17. For the placement and fixing of the panel 1 to the profiles 13 of the supporting structure 16, the panel 1 must simply be raised, such that the alignments of strips 11 are above the upper ends of the profiles 13, as shown Fig. 15, and subsequently be lowered such that said ends occupy the space existing between the steps of the strips 11 (free ends surrounded by the adjustment portions 14) and the outer bases 7 of the tubular elements 6, until it abuts (see detail E of Fig. 14).

[0034] Then, to finish securing the panel 1 to the supporting structure 16, it is fixed at the upper part (see the fixing of the lower panel 1 of Fig. 8 as well as detail D of Fig. 14). As observed in Fig. 14, and particularly in detail D, for this upper fixing, a series of "omega" profiles 18 of a small depth (see Figs. 12, 13 and detail D of Fig. 14) have been fixed by means of sheet metal or self-tapping screws 19 to the outer bases 7 of some of the tubular elements 6 which are located in the upper alignment of the panel 1 in question. For the sake of consistency, if the strips 11 have been fixed every two tubular elements 6, the profiles 18 will also be placed every two tubular elements 6, making use of the same posts 17 in which the profiles 13 have already been fixed previously. Once the mentioned profiles 18 are fixed to the tubular elements 6, said profiles 18 are also fixed by means of sheet metal or self-tapping screws 19 to the corresponding posts 17. In order to prevent confusion, reference number 12 has been used to refer exclusively to the sheet metal or self-tapping screws fixing the strips 11 to the tubular elements 6 of the panels 1, whereas reference number 19 has been used to refer to the sheet metal or self-tapping screws fixing the profiles 13 and 18 to the posts 17 of the supporting structure 16 (detail E of Fig. 14) and to those fixing the profiles 18 to the tubular elements 6 of the panels 1 (see detail D of Fig. 14).

[0035] Thus, the pair of upper sheet metal screws 19 of Fig. 13 correspond to those fixing the profile 18 to a post 17, whereas the pair of lower sheet metal screws 19 correspond to those fixing said profile 18 to the outer base 7 of a tubular element 6 of the panel 1, as observed in detail D of Fig. 14. The upper fixing (detail D of Fig. 14) of the panel 1 assures that the latter will not be able to turn over with respect to the lower fixing (detail E of Fig. 14).

[0036] The process for manufacturing a panel 1 with reduced thickness such as the one described previously is explained below.

[0037] Firstly, the inside of the cavity of the anchoring tubular elements 6 is filled with a plastic foam material 10, such that the only segments of the tubular elements 6 without filling are those of the areas close to their open

ends.

[0038] Then, a plurality of anchoring tubular elements 6 are attached by welding to an electrowelded mesh of stainless steel, uniformly distributing said tubular elements 6 in the electrowelded mesh, for example according to the arrangement shown in Fig. 1. The number of tubular elements 6 and their distribution will obviously depend on the dimensions of the panel 1 (length, width and thickness).

[0039] In each tubular element 6 there is distinguished an outer base 7, which will be flush with the non-visible face 5 of the panel 1, and at least one of the side faces 9 of the tubular element 6 which will be integrally attached to a first filiform element 2. In the preferred embodiment, the panel 1 has all its tubular elements 6 framed by two first filiform elements 2, to which they are welded, and by two second filiform elements 3 in a perpendicular direction. The electrowelded mesh forms the reinforcement of the panel 1 since it must take into account the separations between the first filiform elements 2 and the second filiform elements 3 so that the tubular elements 6 can be fixed by welding in some of the grids thereof, welding the side faces 9 to the first filiform elements 2 of said grids.

[0040] Optionally, the second filiform elements 3 of said grids are also welded to the open ends of the tubular elements 6 at those points in which they make contact.

[0041] Once all the anchoring tubular elements 6 are welded to the electrowelded mesh, the assembly thus formed is placed between the space comprised between two half-moulds separated a distance equivalent to that of the thickness of the panel 1 to be manufactured, which for the case of the panel 1 depicted in Figs. 1 and 2 is 20 mm. The outer bases 7 of the tubular elements 6 are placed supported against the inner wall of the half-mould which will form the non-visible face 5 of the panel 1, and then the assembly of mesh and anchors is fixed to the mould in said position.

[0042] Instead of pouring the resistant and settable material, cement mortar with a minimum strength of 50 N/mm², said material is injected under pressure through one or more inlet openings provided in the mould, the injection ending when the entire inner space between the two half-moulds is completely full. The injection favours that the panel 1 with reduced thickness is very compact, reducing to a minimum the possibilities of any small hollow remaining unfilled inside any segment of the panel 1.

[0043] Subsequently, the cement mortar is allowed to set in a setting chamber at a temperature comprised between 40 °C and 60 °C, until it acquires a enough strength to allows its demoulding, having acquired a value of at least 15 N/mm².

[0044] After demoulding the panel 1 by decoupling it from the two half-moulds, said panel 1 can be stored on top of other panels 1, since there is no element projecting from the surface thereof which hinders stacking.

[0045] When the panel 1 has acquired its final strength, at least 50 N/mm², the anchoring accessories can now

be placed, which accessories will allow the panel 1 to be secured and fixed to a supporting structure 16 which normally is usually formed by a series of metal posts 17 and metal crosspieces placed in the façade line, attached to the edges of the slabs. Figs. 5 to 7 show part of said supporting structure 16, provided with posts 17 to which profiles 13 and 18 are fixed, to which profiles the panels 1 are anchored.

[0046] Specifically, the panels 1 are suspended from the upper ends of the profiles 13, since they are inserted within the spaces left between the sheet metal strips 11 attached by means of corresponding sheet metal or self-tapping screws 12 to the outer bases 7 of some tubular elements 6 and their corresponding fillings of plastic foam material 10.

[0047] The mentioned sheet metal strips 11 as well as the respective sheet metal or self-tapping screws 12 thus form the suspending means for the anchors of the panel 1 (see detail E of Fig. 14), although these suspending means are not present in all the tubular elements 6, but rather only in some of them. More or less suspending means will be placed in the anchors depending on the dimensions, weight and stresses of the panel 1.

[0048] Finally, the panel 1 is securely fixed at the upper part, according to its upper horizontal alignment of tubular elements 6, to the profiles 18, with an inverted section with respect to that of the profiles 13. Thus, the outer base 7 of each tubular element 6 of the mentioned alignment will be fixedly attached, for example by means of two sheet metal or self-tapping screws 19, to the central segment of said section, as observed in detail D of Fig. 14.

[0049] The simplicity and placement of these suspending means makes the panel 1 have a great flexibility at the time of its placement in the facade, since complex installations or tools are not required, and the placed panels 1 can be removed and placed again, if any change has to be made, without any complication, simply pushing the panel 1 upwards until the steps of the strips 11 leave the ends of the profiles 13, after removing the upper fixing elements.

Claims

1. A panel (1) of a resistant and settable material with reduced thickness, provided with reinforcing filiform elements (2, 3) embedded therein and with a plurality of anchors intended for the securing of the panel by its non-visible face (5) to a supporting structure (16), **characterized in that** the reinforcing filiform elements are made of stainless steel and are arranged in the form of a grid in two layers; and **in that** the anchors comprise metal tubular elements (6), with open ends and with a general rectangular cross-section, provided with two opposite and essentially rectangular or square bases, in which the outer base (7) is flush with the non-visible face of the panel, and at least one of the side faces (9) of the tubular ele-

- ment is integrally attached to a first filiform element (2).
2. The panel (1) according to claim 1, **characterized in that** the two side faces (9) of each tubular element (6) are integrally attached to respective first filiform elements (2).
 3. The panel (1) according to claim 1 or 2, **characterized in that** the integral attachment between the tubular elements (6) and the first filiform elements (2) is an attachment by welding.
 4. The panel (1) according to claim 2 or 3, **characterized in that** each tubular element (6) is framed by two first filiform elements (2) and by two second filiform elements (3).
 5. The panel (1) according to claim 3 or 4, **characterized in that** the two layers forming the reinforcing filiform elements (2, 3) are integral at their crossing points, forming an electrowelded mesh.
 6. The panel (1) according to any one of the previous claims, **characterized in that** the tubular elements (6) are made of stainless steel.
 7. The panel (1) according to any one of the previous claims, **characterized in that** the thickness of the panel is comprised between 12 and 25 mm, the resistant and settable material being a high-strength mortar with a minimum strength value of 50 N/mm².
 8. The panel (1) according to any one of the previous claims, **characterized in that** the tubular elements (6) have a cavity at least partially occupied by a plastic foam material (10).
 9. The panel (1) according to claim 8, **characterized in that** the cavity of the tubular elements (6) is partially occupied by a plastic foam material (10) and the rest of the cavity i.e., the areas close to the open ends of the tubular elements, is occupied by the resistant and settable material of the panel.
 10. The panel (1) according to claims 8 or 9, **characterized in that** some of the anchors comprise suspending means provided with a sheet metal strip (11) provided with a step supported and fixedly attached to the outer base (7) of the tubular element (6), and a sheet metal or self-tapping screw (12) traversing said strip and the outer base of the tubular element, being introduced in the plastic foam material (10) of the inside of the cavity of the tubular element, such that between the sheet strip and the outer base of the tubular element there is a space suitable for receiving the end of a profile (13) of the supporting structure from which the panel is suspended in its placement.
 11. The panel (1) according to claim 10, **characterized in that** the sheet metal or self-tapping screw (12) is furthermore a self-drilling screw.
 12. A process for the manufacture of a panel (1) defined in any one of claims 7 to 11, **characterized in that** it comprises the following steps:
 - a) attaching by welding a plurality of anchoring tubular elements (6) to an electrowelded mesh of stainless steel, distributing said tubular elements in the electrowelded mesh, such that each tubular element is welded at its side faces (9) to respective first filiform elements (2) and its open ends are limited by respective second filiform elements (3), each tubular element being framed by two first and two second filiform elements;
 - b) placing the assembly formed by the tubular elements welded to the mesh between the space comprised between two half-moulds separated a distance equivalent to that of the thickness of the panel to be manufactured, supporting the outer bases (7) of the tubular elements against the inner wall of the half-mould forming the non-visible face (5) of the panel and fixing the assembly to the mould in said position;
 - c) injecting under pressure the resistant and settable material through at least one inlet opening provided in the mould, until completely filling the entire inner space between the two half-moulds;
 - d) setting the injected resistant material, until the latter acquires enough strength to allow its demoulding, said strength being at least 15 N/mm²; and
 - e) demoulding the panel by uncoupling the two half-moulds.
 13. The process according to claim 12, **characterized in that** the anchoring tubular elements (6) are partially filled with a plastic foam material (10) before or after they are attached by welding to the filiform elements (2, 3) of the mesh, leaving the areas close to the open ends of the tubular elements unfilled so that the resistant material injected in step c) penetrates through said open ends in the tubular elements.
 14. The process according to claim 12 or 13, **characterized in that** step d) is carried out in a setting chamber at a temperature comprised between 40 °C and 60 °C.
 15. The process according to any one of claims 12 to 14, **characterized in that** after step e), sheet metal strips (11) are attached to the outer bases (7) of some tubular elements (6) by means of respective sheet metal or self-tapping screws (12), which sheet metal

strips are provided with a step, such that between the sheet strips and the mentioned outer bases there is a space suitable for receiving the end of a profile (13) of the supporting structure (16) from which the panel (1) will be suspended in its placement and fixing.

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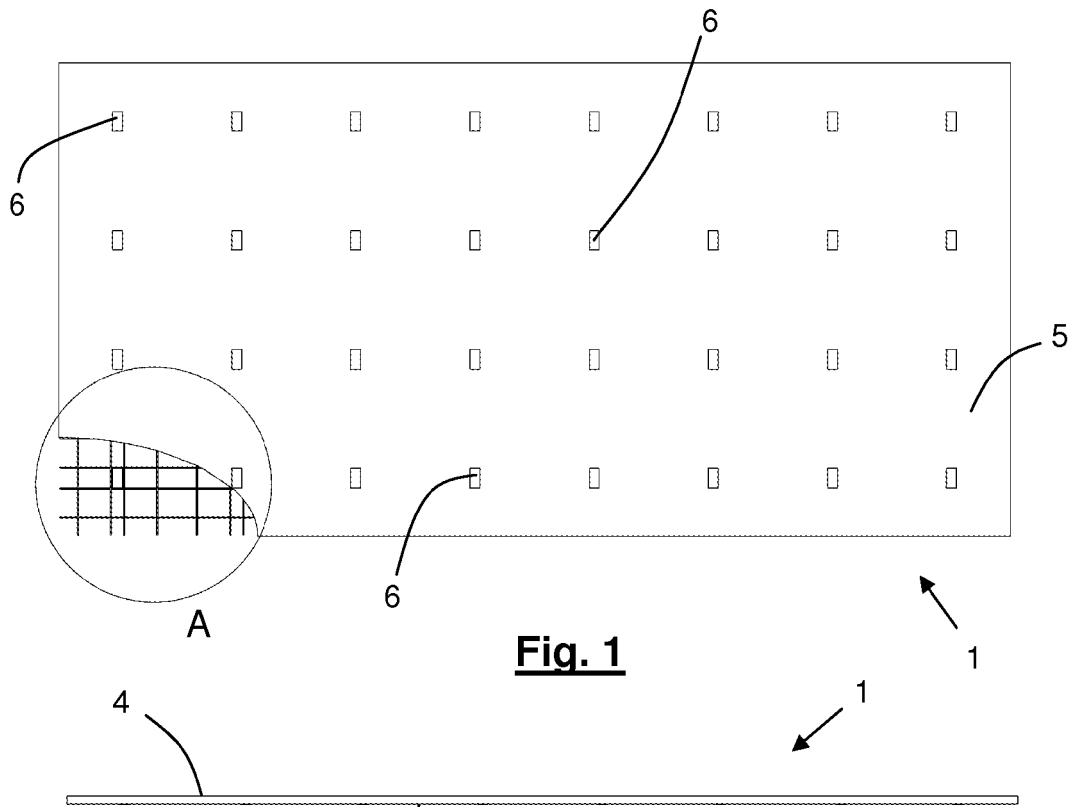
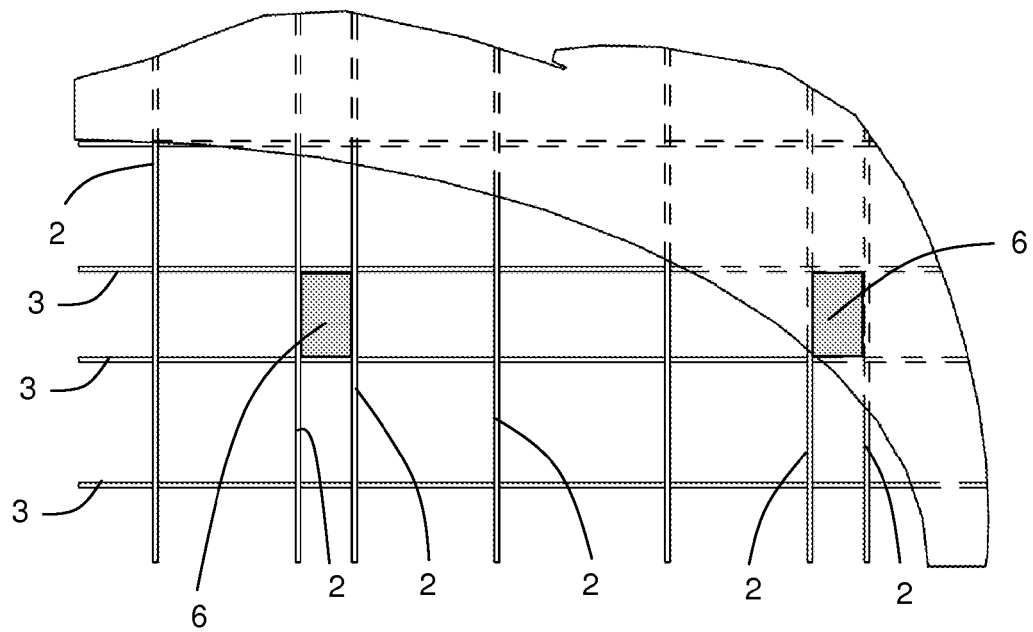


Fig. 2



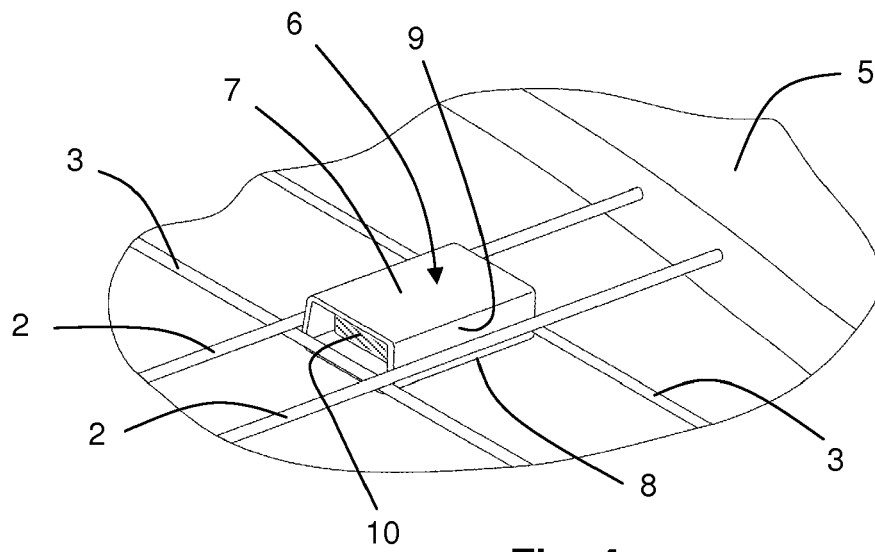


Fig. 4

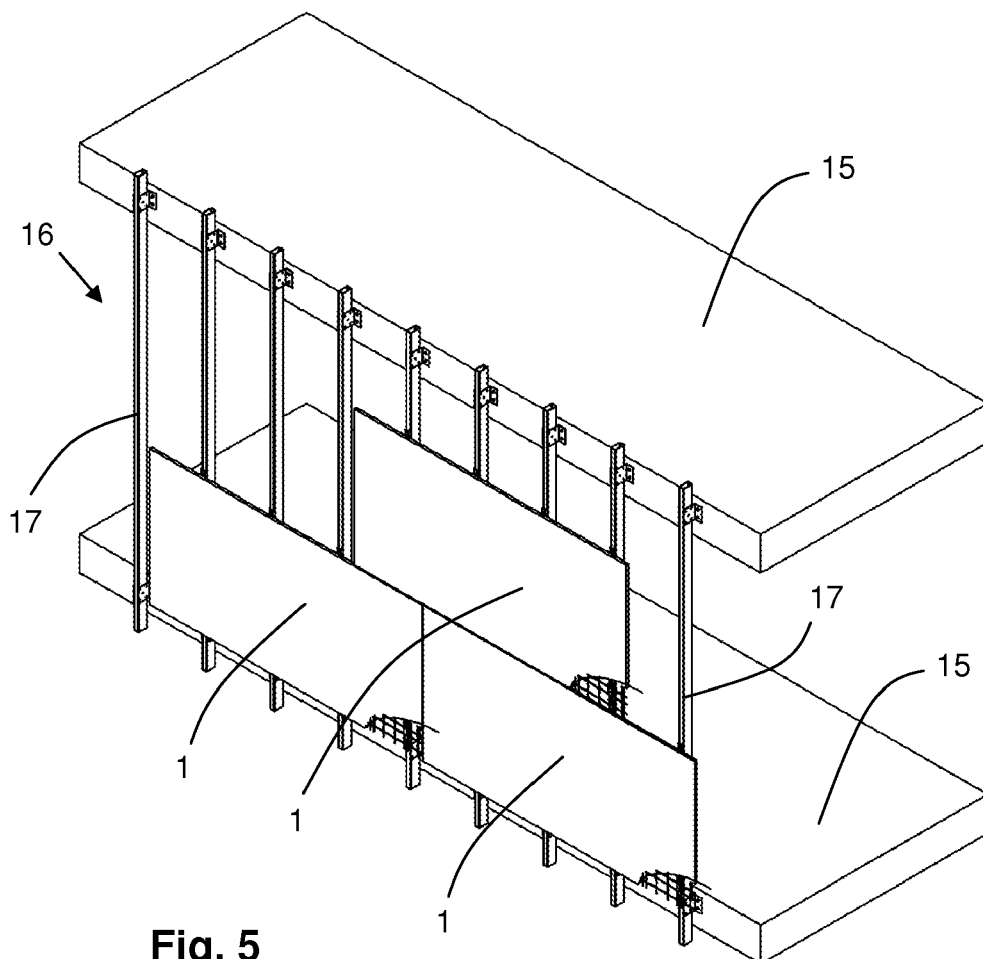


Fig. 5

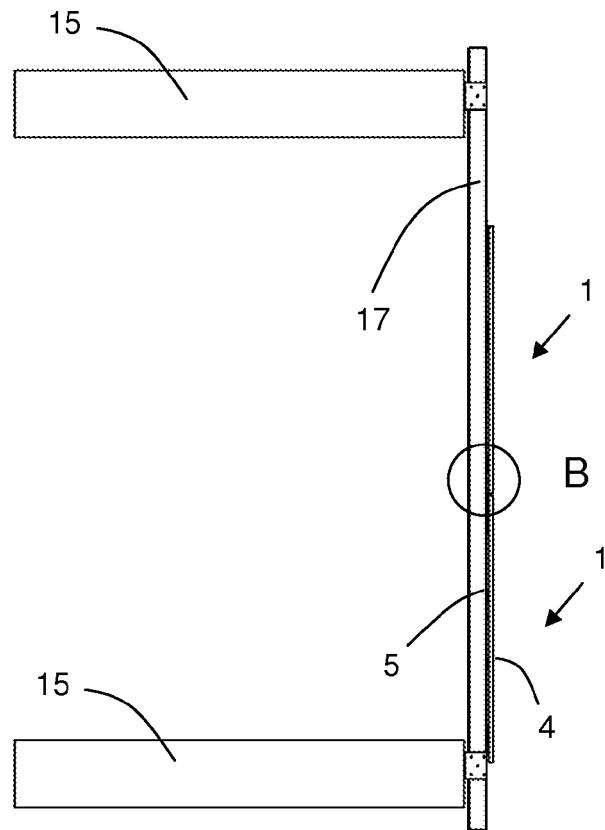


Fig. 6

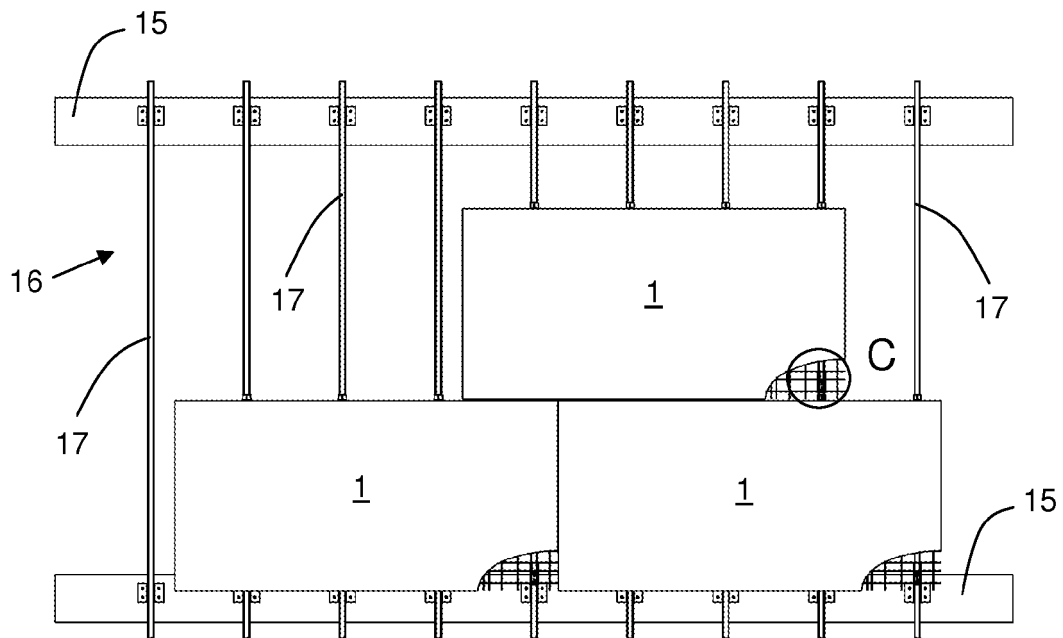


Fig. 7

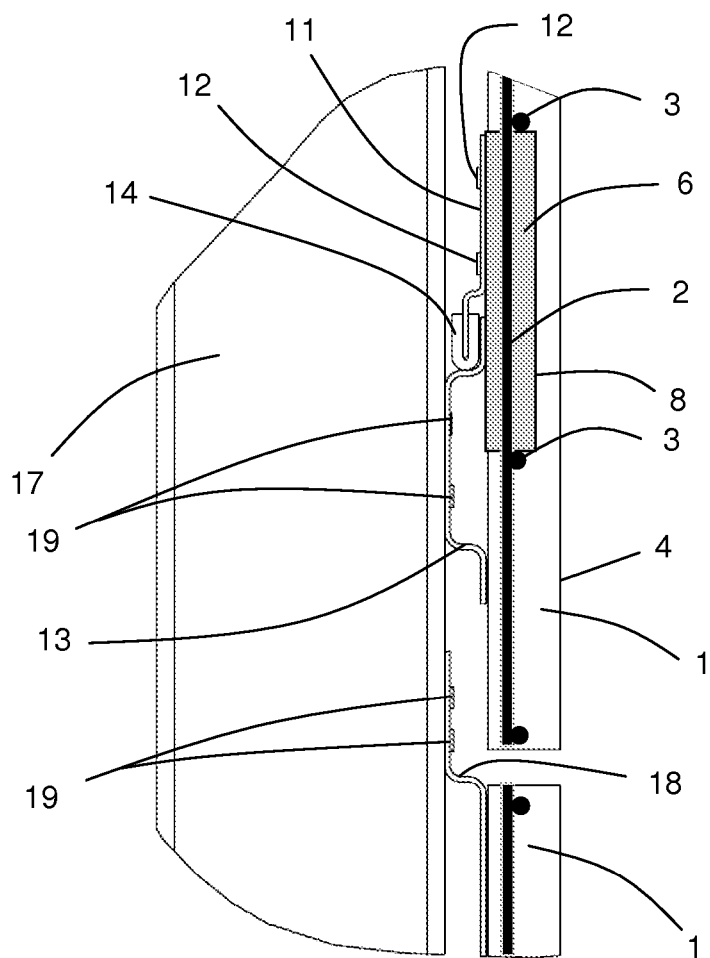


Fig. 8

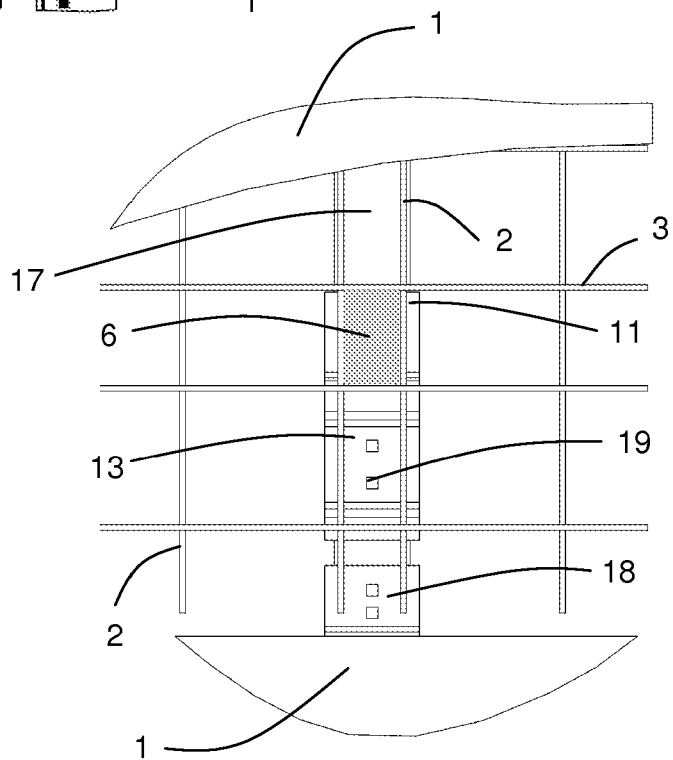


Fig. 9

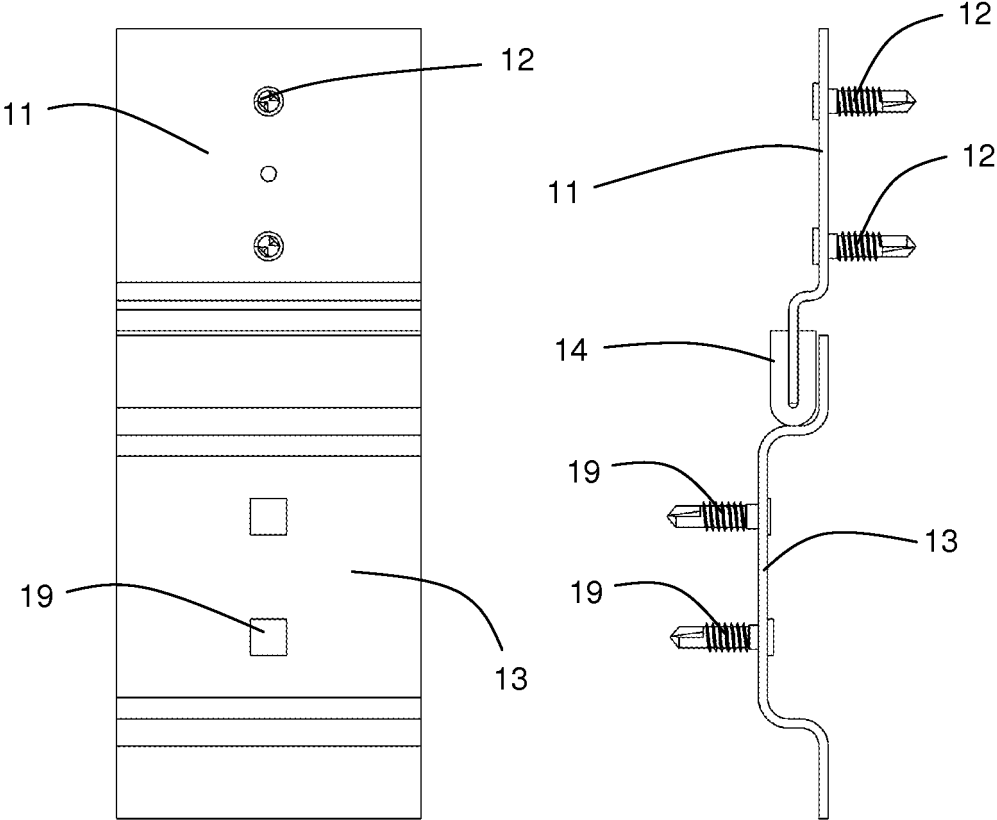
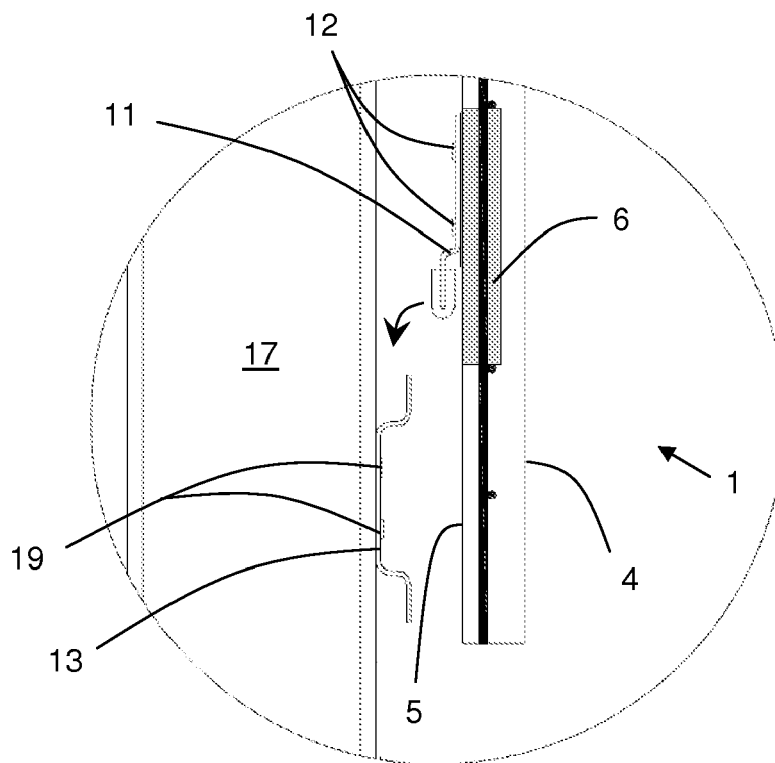
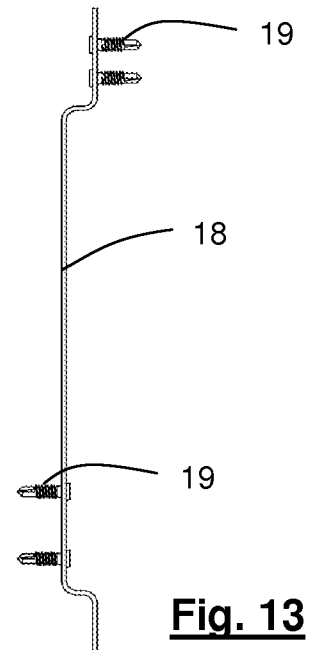
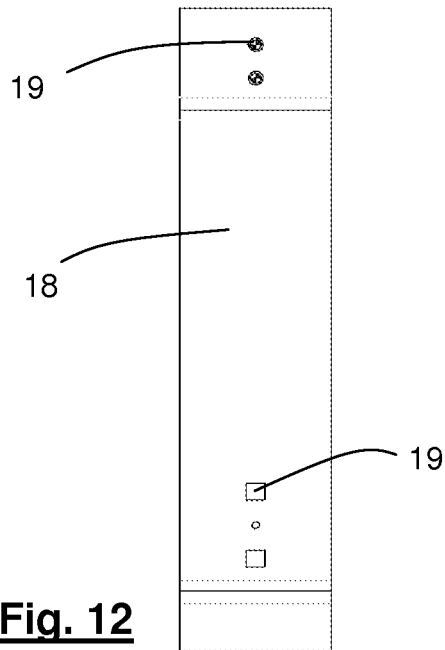


Fig. 10

Fig. 11



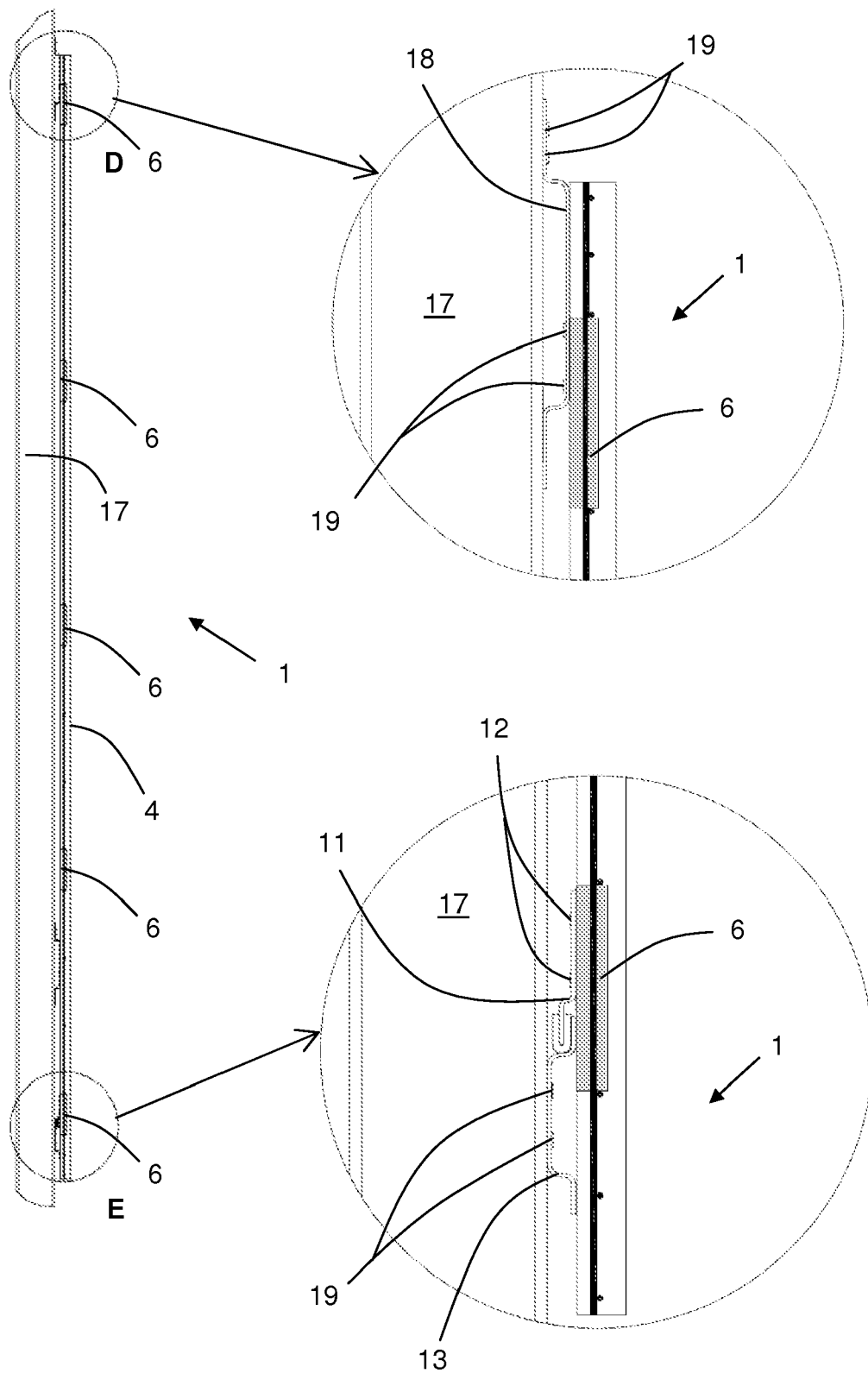


Fig. 14

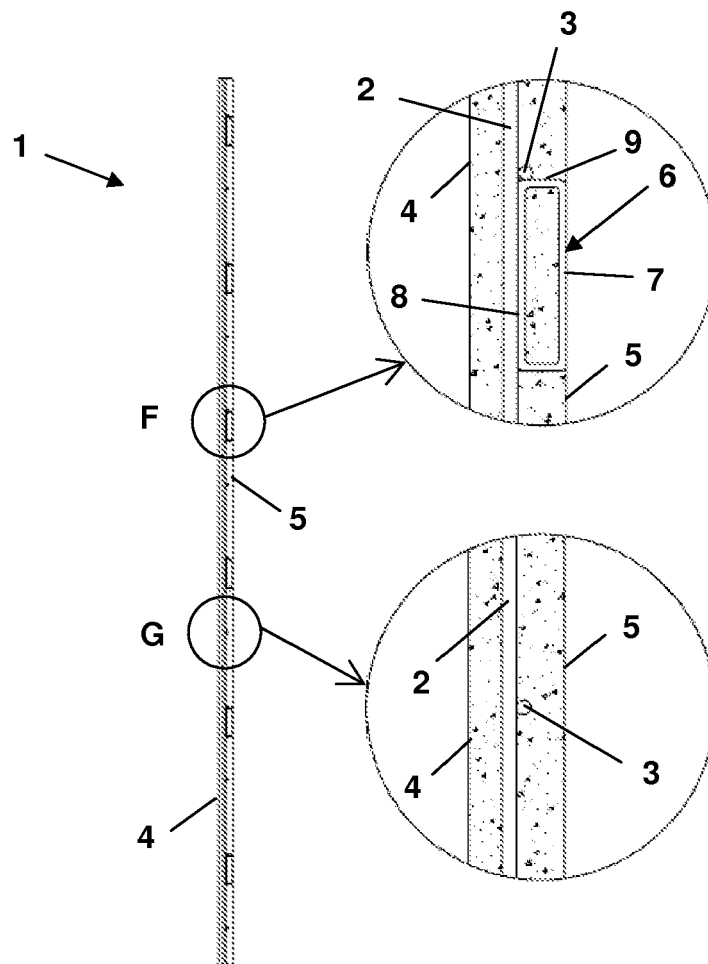


Fig. 16

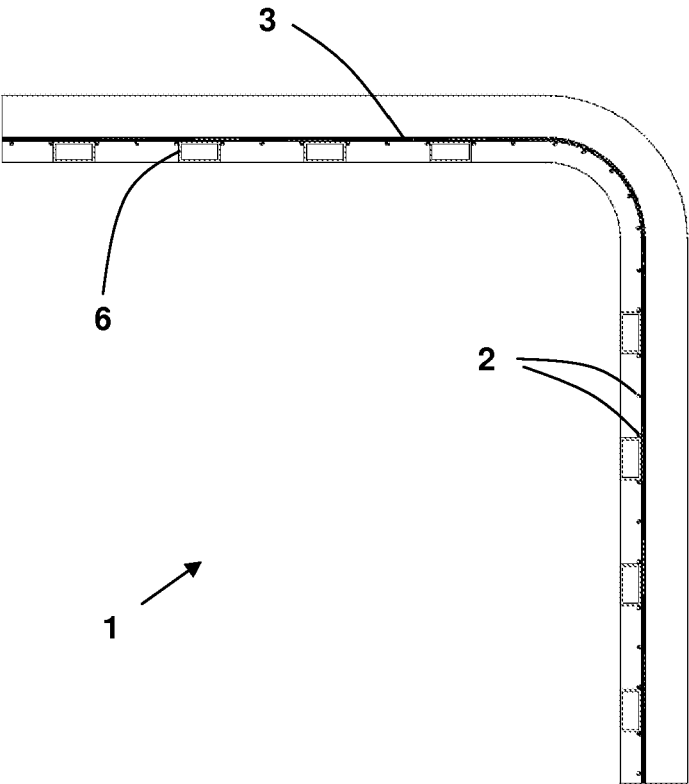


Fig. 17

REFERENCES CITED IN THE DESCRIPTION

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