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(54) Covering system

(57) The surface covering system comprises: modular covering elements (1,2) that define first juxtaposition edges and second juxtaposition edges that are opposite said first edges and which can be placed alongside and superimposed on said first edges; fixing means (10) of said modular elements to support means, said first juxtaposition edges and second juxtaposition edges having shaped transversal profiles with respective convex profiles (PV2) and concave profiles, said fixing means having retention profiles that can be placed in between, and which are engageable with, said first convex profiles and second concave profiles.

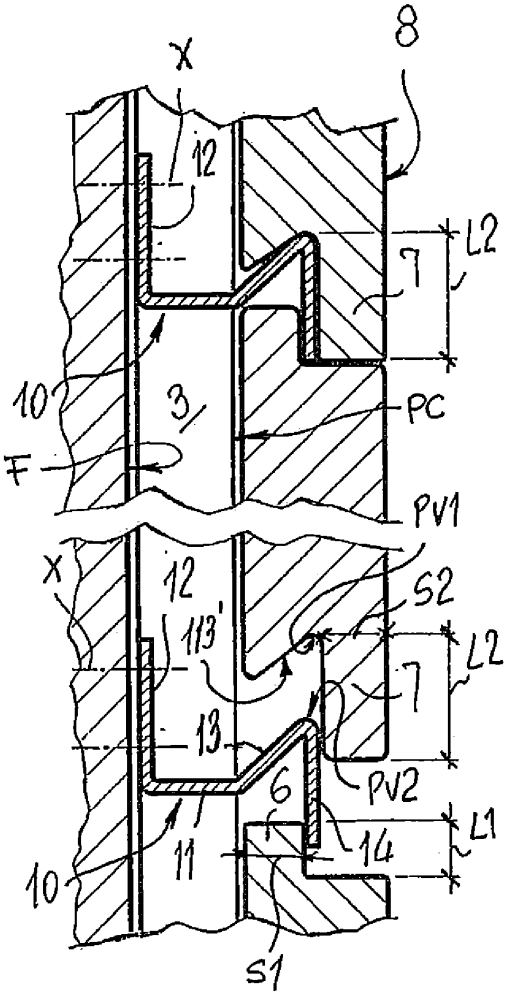

FIG.2

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Description

TECHNICAL FIELD OF THE INVENTION.

[0001] The invention relates to a covering system with integrated anchoring elements, particularly suitable for covering walls with modular sheet elements to obtain ventilated walls.

BACKGROUND ART.

[0002] For some time now, the so-called "ventilated walls" or "ventilated facades" have been known normally used to clad the external facades of buildings of the dwelling or industrial type, for the purpose of obtaining a better heat insulation and a consequent energy saving of these buildings.

[0003] Another function of these ventilated walls is typically aesthetic, i.e., it allows to changing the appearance of a building undergoing, e.g., restoration restructuring.

[0004] In detail, these ventilated walls are made up of a reticular trestlework, made with uprights and crosspieces of mainly metal materials, which is fixed to the facades of the buildings, and of a multiplicity of covering sheets that are fixed to the reticular trestlework using different methods, so as to cover the facades, creating an air space called "chimney" substantially empty between these and the covering sheets.

[0005] This air space, the thickness of which is defined by the thickness of the elements making up the reticular trestlework, acts as a heat insulation chamber and in it air flows circulate by natural convection that maintain the facades and, therefore, the building free of damp and which also form a barrier insulating from the outside.

[0006] Inside this air space, further insulating panels can also be positioned forming a so-called "coat" which is placed directly on the wall surface to be covered and which helps improve the heat insulation of the facade in relation to the heating, with a consequent further energy saving.

[0007] Furthermore, the covering sheets are made with materials that have a specific capacity of their own to provide both heat and sound insulation, and this allows creating a shield which surrounds the building and keeps it insulated.

[0008] The sheets can be fastened to the trestleworks using specific fasteners or adhesive materials, or again using both of these together. In the case of the fasteners, the elements for fastening onto the sheet can be either visible or integrated.

[0009] Nevertheless, this state of the art has a number of drawbacks.

[0010] A first drawback is that the covering sheets and the metal trestleworks which support them have heat expansion coefficients different the one from the other and when the ventilated walls are exposed, e.g., to high temperatures caused by prolonged exposure to the sun, the expansions between sheets and trestleworks are considerably different.

[0011] This creates stresses within the ventilated walls which, over time, can cause fractures in the covering sheets which, therefore, have to be quickly replaced both to ensure the necessary safety binding conditions and to maintain the effectiveness of the building insulation.

[0012] A second drawback is that the sheets are not easy to replace, inasmuch as, above all in the case of sheets with partially superimposed edges, to replace just one sheet, at least a number of adjacent ones have to be removed, and, in some cases, even a whole row, to permit detachment from the trestlework.

OBJECTS OF THE INVENTION.

[0013] One object of the invention is to upgrade the known state of the art.

[0014] Another object of the invention is to make a covering system that allows covering surfaces, in particular building wall facades, in a quick and easy way.

[0015] Another object of the invention is to make a covering system that allows easily regulating the position of the covering sheets even when these are already fitted on the trestlework that supports them.

[0016] A further object of the invention is to make a covering system that permits a free heat expansion of the metal supporting structure without causing any stress to the covering sheets.

[0017] A further object of the invention is to make a covering system that does not allow rainwater to penetrate into the air space defined between the covering and the facade.

[0018] A further object of the invention is to make a covering system that allows removing and fitting covering sheets without necessarily having to remove the adjacent ones.

[0019] A further object of the invention is to make a covering system that hides from view the elements that support and bind the covering sheets to the relevant supporting trestleworks.

[0020] According to the invention, a surface covering system is provided comprising: modular covering elements that define first juxtaposition edges and second juxtaposition edges that are opposite said first edges and which can be placed alongside and superimposed on said first edges; fixing means of said modular elements to support means, **characterized in that** said first juxtaposition edges and second juxtaposition edges have shaped transversal profiles with respective convex profiles and concave profiles, said fixing means having retention profiles that can be placed in between, and which are engageable with, said first convex profiles and second concave profiles.

[0021] The covering system therefore permits covering building surfaces, such as the facades of the latter, in a quick and easy way; regulating the positions of the covering sheets when these are already mounted on the supporting trestleworks; avoiding the creation of stresses

resulting from the heat expansion typical of the metal structure and the consequent, probable fracture of the covering sheets; protecting the internal air space against the entry of rainwater; hiding from view the elements that support and secure the covering sheets to the trestleworks; replacing damaged covering sheets without having to remove the nearby sheets.

BRIEF DESCRIPTION OF DRAWINGS.

[0022] Further characteristics and advantages of the invention will become clearer from the detailed description of a covering system, shown by way of non-limitative example on the attached drawings of which:

Figure 1 is an interrupted section view of a joining area between two covering sheets which are part of the covering system according to the invention, in a configuration fitted with a coupling in a first embodiment;

Figure 2 and Figure 3 show two removal phases of the sheet of Figure 1;

Figure 4 is an interrupted section view of a joining area between two covering sheets which are part of the covering system according to the invention, in which a coupling is used made in an alternative form;

Figure 5 is an interrupted section view of a joining area between two covering sheets which are part of the covering system according to the invention, in which a coupling is used made in a further alternative form;

Figure 6 is a perspective view of a sheet coupling and support element to make the covering system according to the invention;

Figure 7 is a vectorial diagram for the breaking up of the force-weight of each sheet into two component parts having preset directions;

Figure 8 is an interrupted front view of an area of juxtaposition between four corners of four contiguous sheets of a covering system according to the invention.

EMBODIMENTS OF THE INVENTION.

[0023] With reference to the Figure 1, it will be noted that the covering system comprises covering sheets 1 and 2 made from material preferably of the low heat conductivity type.

[0024] The sheets 1 and 2 are intended to be mounted on uprights 3, normally made of metal material, which are in turn attached by means of the use of screw anchors or brackets (not shown), in this case therefore being away from the wall, to a surface to be covered, such as, e.g., a facade F of a building, and which identify a contact plane PC.

[0025] The sheets 1 and 2 have a quadrangular shape, normally square or rectangular, and define front surfaces 8 and 9 and corresponding rear surfaces 8' and 9', as well as respective perimeter faces 4 and 5 intended to be faced and aligned the one with the other when the sheets 1 and 2 are mounted on the uprights 3.

[0026] Normally, these covering systems are mounted vertically and the sheets 1 and 2 are placed aligned one on top of the other, consequently the perimeter faces 4 and 5 coincide respectively with the upper edge of a sheet 1 and the lower edge of a sheet 2.

[0027] As can be seen from the illustrations, both the perimeter faces 4 and 5 have shaped cross sections.

[0028] In detail, the upper perimeter face 4 of a sheet 1 has a profile comprising a first lip 6 in relief that extends towards the perimeter face 5 of a sheet 2 while the latter has a substantially V-shaped concave profile, marked PV1, that re-enters in it and which defines a second lip 7 that extends towards the perimeter face 4 of a sheet 1.

[0029] As can be seen in the Figures 1 and 2, the first lip 6 and the second lip 7, though being substantially parallel, are not aligned with one another, the first lip 6 being closer to the upright 3, while the second lip 7 is moved outwards with respect to this, so that, in a mounted configuration of the two sheets 1 and 2, the second lip 7 is superimposed on the first lip 6.

[0030] The thicknesses S1 and S2 of the first lip 6 and of the second lip 7 are such as to allow, when the sheets 1 and 2 are mounted, maintaining the respective front surfaces 8 and 9 turned outwards substantially aligned and coplanar the one with the other.

[0031] Furthermore, the lengths L1 and L2 of the first lip 6 and of the second lip 7 are such as to allow a partial superimposition of the second lip 7 on the first lip 6, while leaving between an upper perimeter face 4 and a lower perimeter face 5 a space "8" of pre-established size and such as to allow the sliding of a sheet 1 by a number of millimetres with respect to the other adjacent sheet 2.

[0032] To support and fasten the sheets 1 and 2 to the uprights 3 coupling and support means are provided, generally indicated by 10.

[0033] These coupling and support means 10 can be made in a single body piece, as shown in the figures 1-3 or in at least two pieces, as indicated in the Figures 4 and 5.

[0034] In the first case, the coupling and support means 10 comprise a series of fasteners 11 each of which is bent to form two loops defining two supplementary acute angles between at least three consecutive sections, precisely a first extension section 12 which is intended to be fixed to the upright 3 or to the facade F, a second section 13 which forms a supporting surface tilted towards the upright 3 and a second extension section 14 of the supporting surface 13.

[0035] The supporting surface 13 forms a first inclination angle "α" with the contact plane PC, and the third section 14 is bent with respect to this so as to form, in cross section, a second V-shaped convex profile, indicated by PV2, which can be conjugated with the concave profile PV1 obtained in the lower perimeter face 5 of a sheet.

[0036] Furthermore, as can be seen in the illustrations, the second section 14 is substantially parallel to the first section 12 so that it can be fitted over the first lip 6, keeping it rested against the upright 3.

[0037] In other words, each sheet 1 or 2 is bound to the upright 3 by means of the fasteners 11 which operate at the same time on the respective upper perimeter face 4 and lower perimeter face 5.

[0038] On the first lip 6 acts the second section 14 of each fastener 11, which keeps it in contact with the upright 3, while on the lower face 5 acts the supporting surface 13 which, by coupling in a conjugated way with the profile PV1, precisely with the faceable surface 113' thereof which is tilted with respect to the contact plane PC according to a second angle "β" slightly bigger than the first angle "α", performs a double function, i.e., a first supporting function and a second retention function, keeping the resting sheet pushed up against the contact plane PC of the upright 3.

[0039] This second function is obtained in particular by means of the inclination of the supporting surface 13 (tilted according to the first angle "α") and of the faceable surface 113' (according to the second angle "β") of the profile PV1 and which allows, in the point of reciprocal contact, breaking down, according to the known vectorial rule, the force-weight P of each sheet into two parts, one part P_0 directed towards the upright 3 and a part P_1 directed vertically, as schematically indicated in the Figure 7.

[0040] The part P_0 exercises an automatic and constant thrust in the lower area of each sheet keeping it rested against the contact plane PC of the upright 3 when the two profiles PV1 and PV2 are reciprocally engaged, i.e., when a sheet is in mounted configuration.

[0041] With reference to the Figure 6, it will be seen that each fastener 11 comprises at least a supporting and binding wall indicated by 20, the face of which forms the first extension section 12, and two legs bent like hooks 21 and 22 parallel to each other which form the second section 13 and the third section 14, as well as the second convex profile PV2.

[0042] In the wall 20 is defined a window 23 through which can pass a suitable clamp 24 (see the Figure 5) usable instead of screws or rivets, to secure the fasteners 11 along the uprights 3 during the construction of the covering of the facade F.

[0043] With reference to the Figure 4, it will be seen that the fasteners, indicated in this case by 111 to distinguish them from the previous ones, can be made up, according to a further embodiment, of two distinct component parts, and not in a single body piece, but which altogether copy the profile of the fasteners 11 in a single piece, and which, being separated, have distinct functions.

[0044] Precisely, a first component part is provided, indicated by 111A, the purpose of which is to retain the first lip 6 against the upright 3 and a second component part, indicated by 111B the purpose of which is to retain the edge 5, this too in contact with the upright 3.

[0045] In detail, the first component part 111A comprises a first vertical section (not visible in the drawings, that is intended to be rested and fixed to the upright 3 using known means, such as, e.g., screws or rivets), a second substantially straight section 113 which is intended to pass over the first lip 6 and a third section 114 substantially bent at right angle towards the first lip 6, in such a way as to follow its profile and, as said, retain it against the upright 3.

[0046] The second component part 111B on the other hand has substantially the same profile as the previously described fasteners 11, with the only difference that the second section, indicated by 14', is substantially shorter than that of the previous version.

[0047] In this second component part 111B are instead equally present a first section 12', corresponding to the first section 12 of the first version of the fastener 11, a tilted supporting surface 13', corresponding to the supporting surface 13, as well as the profile PV2', corresponding to the second profile PV2.

[0048] This version of the fasteners 111 envisages the separate fixing to the upright 3 of the first component part 111A and of the second component part 111B.

[0049] The covering system is made in the following way: making reference, by way of example, to the covering of a building facade, and therefore to a vertical covering, adjustable brackets with slots are first of all fixed to the facade F by means of mechanical or chemical expansion anchors and such brackets in turn secure the uprights 3 to the facade F by means of screws or rivets, maintaining inter-distances preset according to both the required size of the air space, and to the dimensions of the covering sheets 1 and 2.

[0050] When these uprights 3 are fixed, a first horizontal row of fasteners 11 is positioned and fixed on them, e.g., with screws whose axes are indicated by "X", at a first lower height, envisaged to engage with the lower perimeter faces 5 of the sheets making up the covering system.

[0051] Afterwards, the sheets are fitted, making sure that the first profile PV1 of these engages above the second profile PV2 of the fasteners.

[0052] This way, each sheet is supported by the fasteners 11 and at the same time the lower perimeter face 5 thereof is kept pushed against the upright 3 by the component part P_0 of the force-weight.

[0053] Making sure each sheet adheres well to the contact plane PC of the uprights 3, a second upper row of fasteners 11 is positioned and fixed in such a way that the second extension sections 14 are fitted on the first lips 6 of the first row of supported sheets.

[0054] The fasteners 11 that form this second row are fixed at such a height as to in any case maintain a clearance "8" between the perimeter faces 4 and 5 facing one another and, consequently, between the first lips 6 and the tilted supporting surfaces 13 (or 13').

[0055] Subsequently, a new row of sheets is arranged

on the second row of fasteners 11, as described before, and this procedure is repeated until the entire facade is covered.

[0056] When a covering sheet has to be replaced for any reason whatsoever, e.g. because it is damaged, it is enough to lift up the sheet from the support on the second profile PV2, causing it to slide on the uprights 3 until the two profiles PV1 concave and PV2 convex are completely disengaged from one another, using as lifting space the clearance "8" provided for this purpose (see the Figure 2 showing this condition).

[0057] Subsequently (see the Figure 3), the sheet is turned with the lower perimeter face towards the outside and, therefore, by gradually lowering it, the first lip 6 is removed from the top towards the bottom from its engagement with the second section 13 of the fastener 11 which keeps it in contact with the upright 3.

[0058] This way, the sheet to be replaced is freed and, proceeding in the opposite sequence to that described for removal, a new sheet can be fitted in place of the previous one, without having to remove contiguous sheets to allow the removal of the desired one.

[0059] The sheet fitting and removal procedure is the same when the fasteners are of the two-component type, 111A and 111B with the only difference that these are fixed to the upright 3 independently the one from the other.

Claims

1. Surface covering system comprising:

- modular covering elements (1, 2) having a front surface (8, 9), an opposite rear surface (8', 9') and perimeter faces (4, 5) that can be placed alongside the one with the other;
- a supporting structure (3) of said modular elements (1, 2), that can be secured to a surface (F) to be covered and defining a contact plane (PC) of said opposite rear surface (8', 9');
- support means (10) of said modular elements (1, 2) **characterized in that** said support means comprise fastening elements (11) fixable to said structure (3) and having at least a supporting surface (13, PV2; 13') for supporting said modular elements (1, 2) tilted and converging towards said contact plane (PC) according to a first inclination angle (α), in such a way as to keep said modular elements (1, 2) adherent to said structure (3).

2. System according to the claim 1, wherein said perimeter faces comprise lower perimeter faces (5) having first profiles (PV1) that can be coupled with said supporting surface (13, PV2; 13').

3. System according to the claim 2, wherein said first profiles (PV1) comprise a faceable surface (113') in contact with said supporting surface (13, PV2; 13').

4. System according to the claim 3, wherein said faceable surface (113') is tilted and converges towards said contact plane (PC) according to a second inclination angle (β) slightly bigger than said first inclination angle (α).

5. System according to the claim 2 or 3, wherein said first profiles comprise concave profiles (PV1) that shape said contact surface (113') with said supporting surface (13) and a lip (7) extending said front surface (8, 9) towards a contiguous modular element.

6. System according to the claims 1 and 2, wherein said supporting surface (13, PV2; 13') further comprises at an extremity a first section (12; 12') extending and securing to said structure (3) said section being bent with respect to said supporting surface (13, PV2; 13') according to said first inclination angle (α) and, at an opposite extremity, a second extension section (14; 14'), superimposable on at least a front surface (8, 9) of a contiguous modular element, said section being bent with respect to said supporting surface (13, PV2; 13') in the opposite direction with respect to said first section (12; 12'), according to an acute angle, in such a way as to generally form a Z-shaped transversal profile with said first section (12; 12') and said supporting surface (13, PV2; 13').

7. System according to the claims 1 and 6, wherein said supporting surface (13, PV2; 13') and said second section (14; 14') are in the shape of two brackets separate and parallel the one with the other, joined transversally at said first section (12; 12').

8. System according to the claims 1 and 6, wherein said perimeter faces comprise upper perimeter faces (4) opposite said lower perimeter faces (5) and having relief lips (6) surmountable and retainable against said structure (3) by said second extension section (14; 14').

9. System according to the claims 5 and 8, wherein said extension lip (7) and relief lips (6) have lower thicknesses (S1, S2) compared to the thicknesses of said modular elements (1, 2).

10. System according to the claims 5, 8, 9, wherein said extension lips (7) and relief lips (6) are arranged staggered the one with the other in such a way that in a mounted configuration of said modular elements (1, 2) said extension lips (7) appear superimposed on said relief lips (6).

11. System according to the claim 1, wherein said sup-

porting surface (13, PV2; 13') has, optionally, a portion (113) connecting with said first section (12) substantially perpendicular to said structure (3).

12. System according to any of the claims from 1 to 11, wherein said structure comprises a series of uprights (3) that can be secured substantially parallel the one to the other to said surface (F) to be covered.

13. System according to the claim 1, wherein each fastener means (11) of said fastener means is designed to support pairs of corners of said modular elements (1, 2) converging in a point of convergence.

14. System according to the claim 1, wherein each fastener means (11) of said fastener means is designed to support sets of four numbers of corners of said modular elements (1, 2) converging in a point of convergence.

15. System according to the claim 6, wherein said first section and supporting surface and said second section are obtained in at least two separate elements (111A, 111B) respectively.

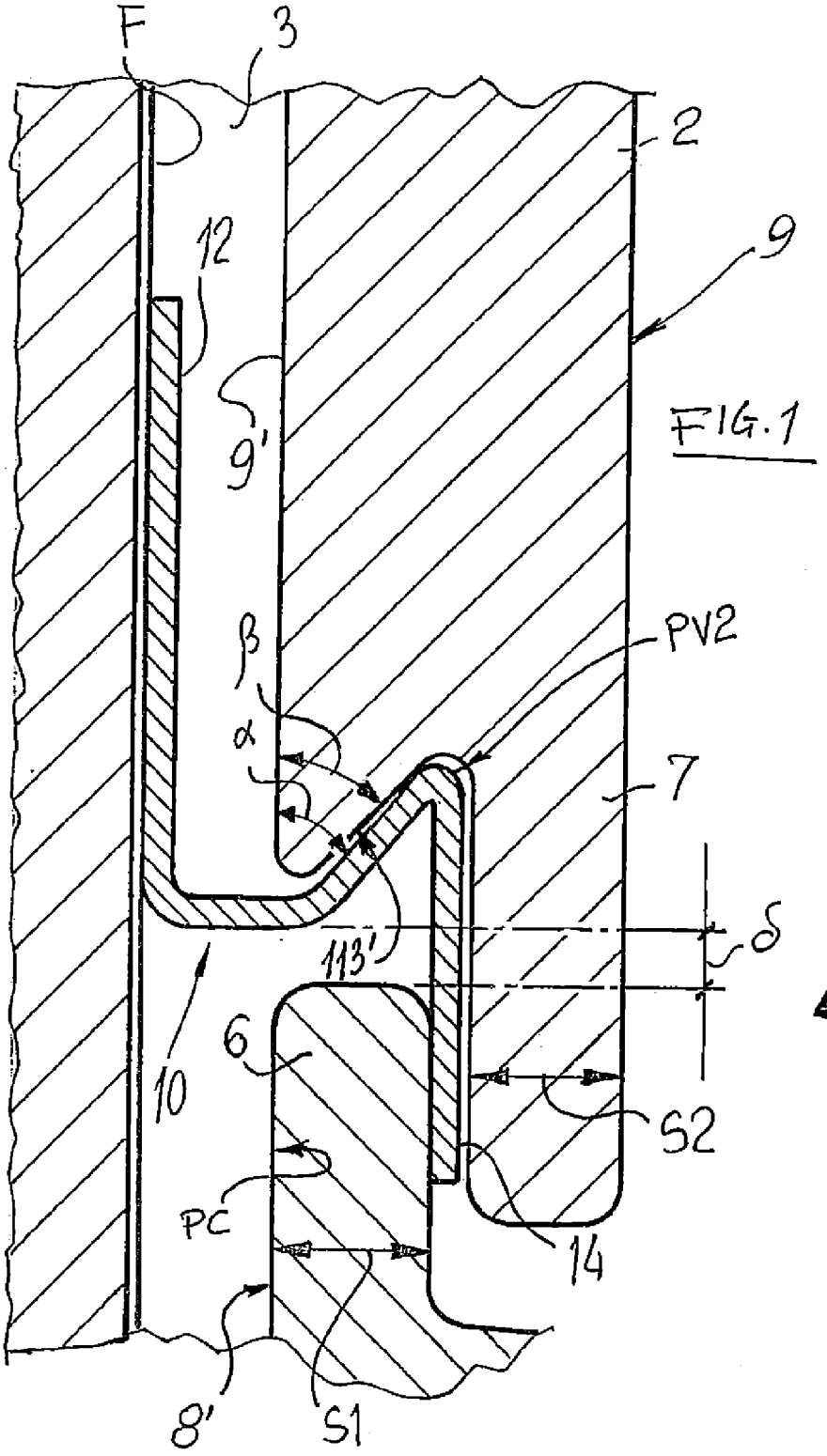
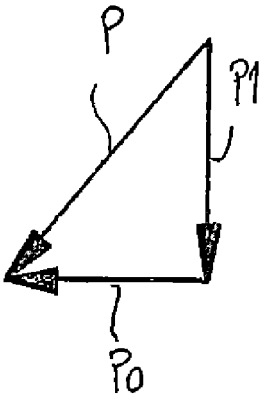


FIG.1

FIG.7



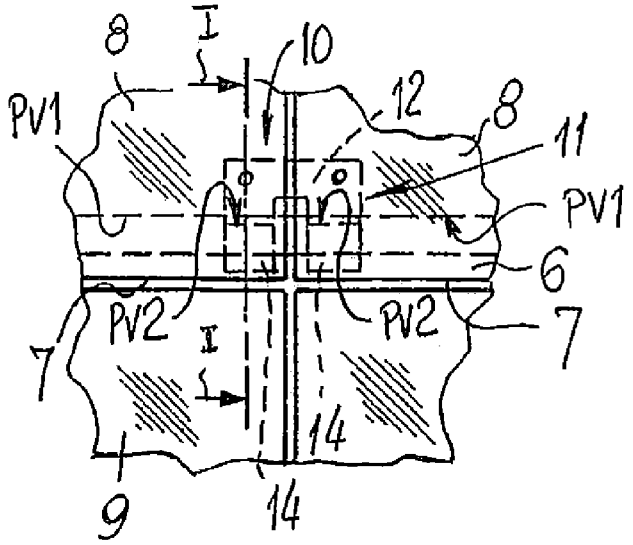


FIG. 8

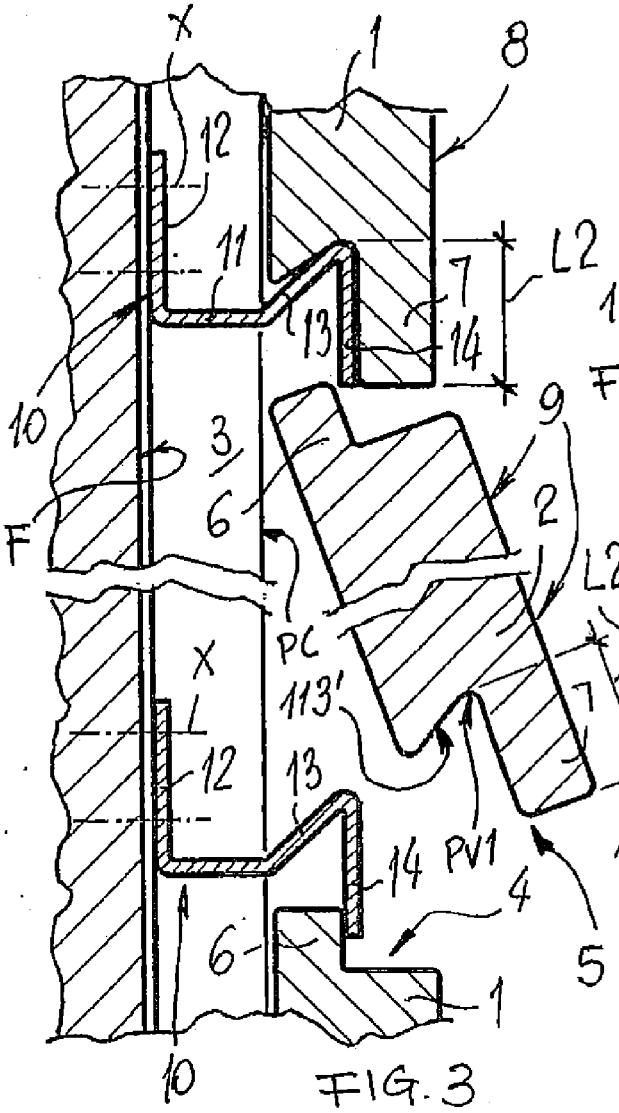


FIG. 3

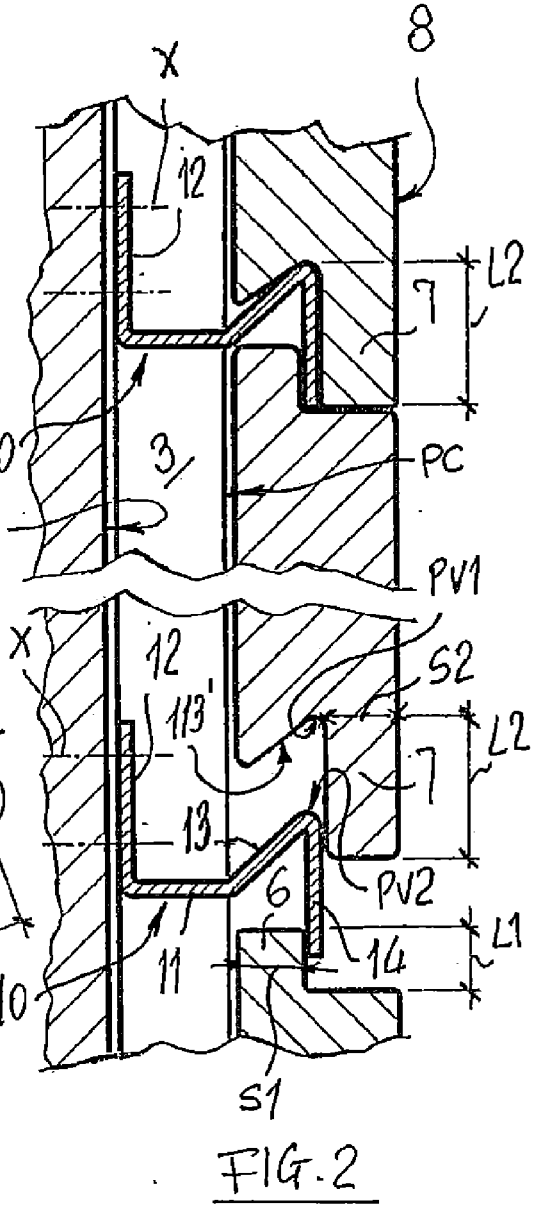


FIG. 2

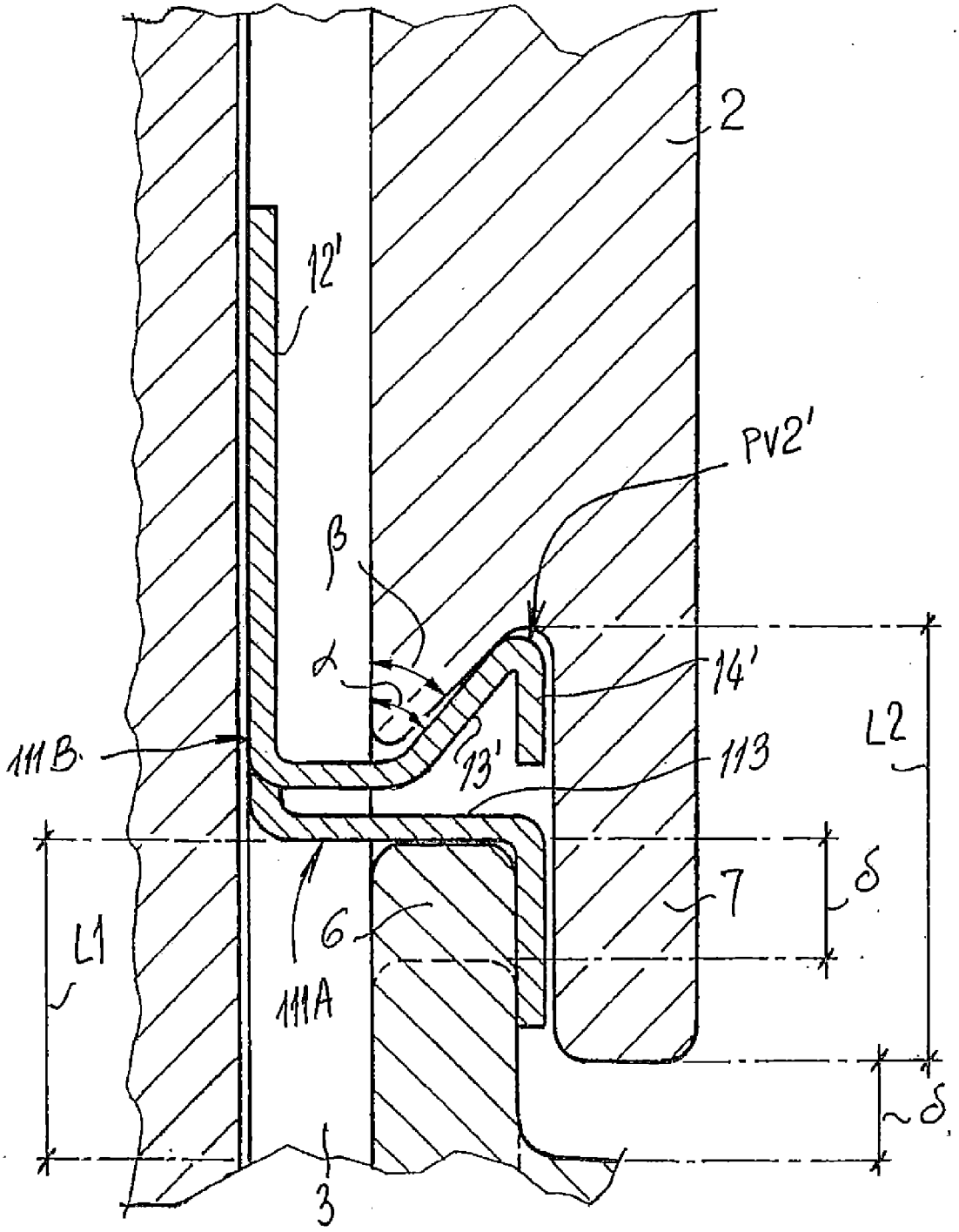
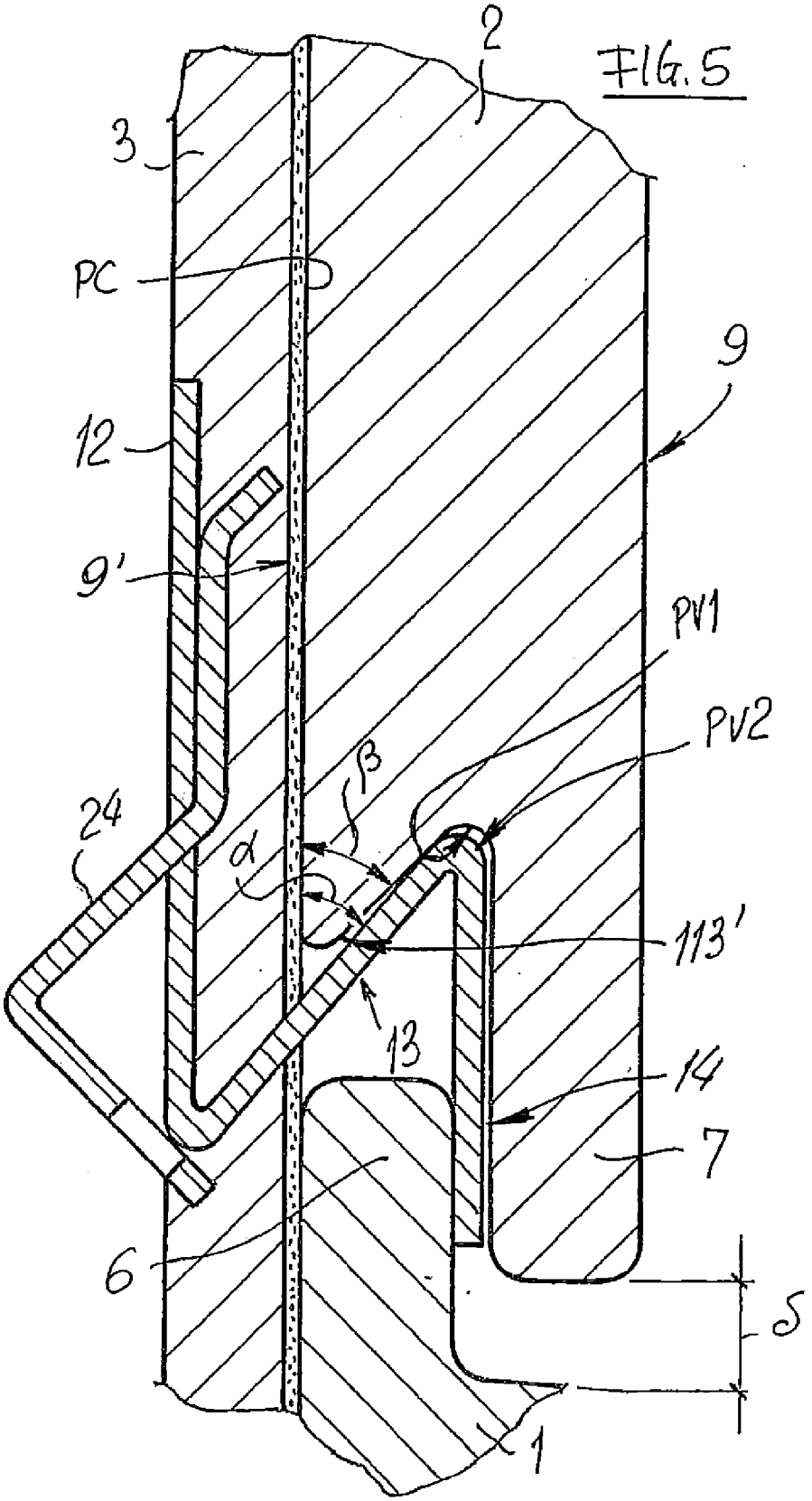


FIG. 4

FIG.5



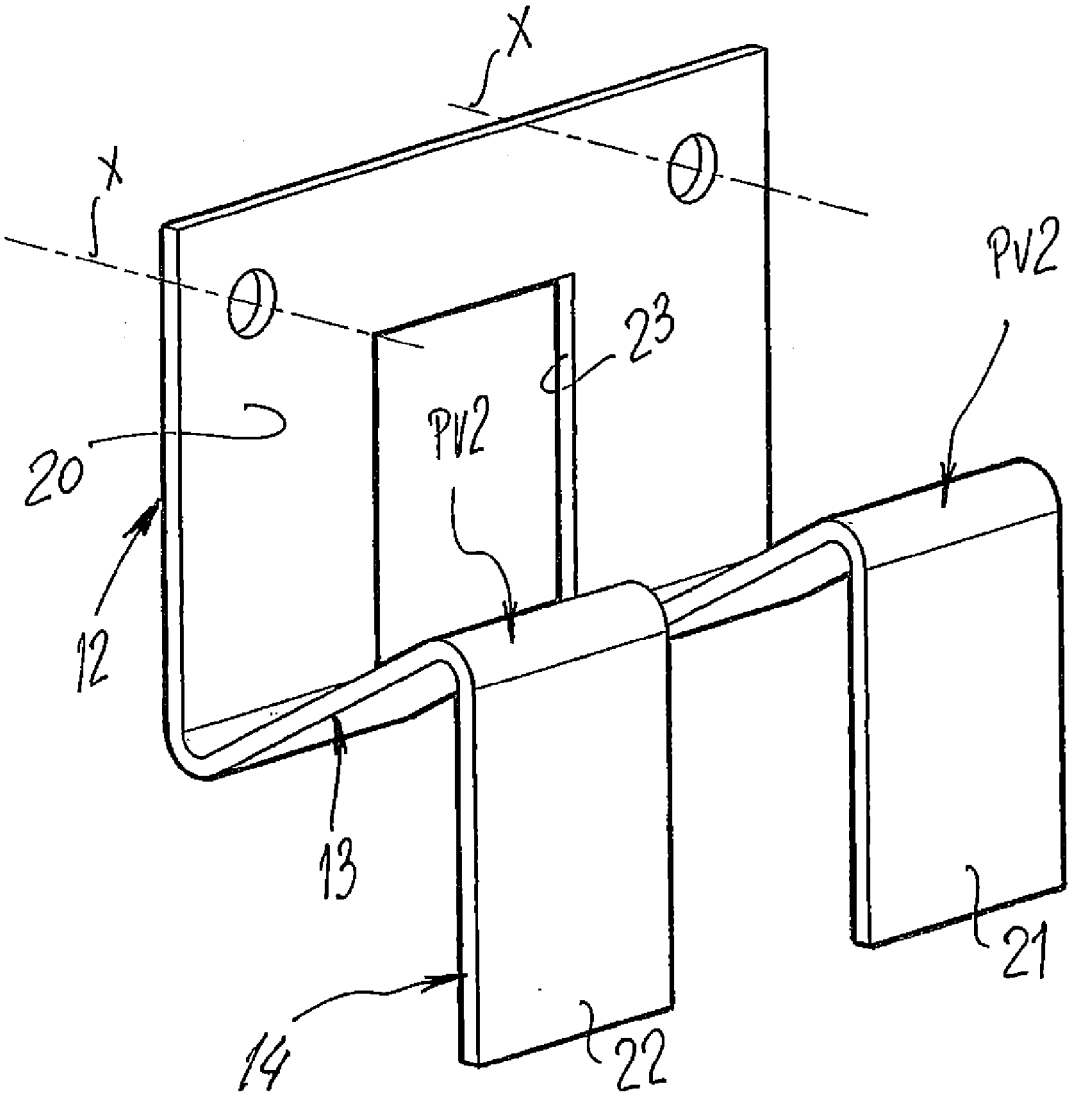


FIG. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 09 16 6321

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	9 December 2009	Severens, Gert

CATEGORY OF CITED DOCUMENTS

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 09 16 6321

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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