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

(11) **EP 2 251 500 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
17.11.2010 Bulletin 2010/46

(51) Int Cl.:
E04F 13/08 *(2006.01)*

(21) Application number: **09006334.8**

(22) Date of filing: **11.05.2009**

(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 TR
Designated Extension States:
AL BA RS

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(54) Wall panel for a façade element

(57) Wall panel (1) for a facade element of a building comprising a plurality of successive wall panels wherein the wall panel is provided with a first (2) and a second (3) profiled edge at opposite sides of an intermediate part (10) of the wall panel wherein the first profiled edge is shaped into a male portion and the second profiled edges into a mating female portion, wherein the profiled edges are shaped to provide a good interlock between the profiled edges.

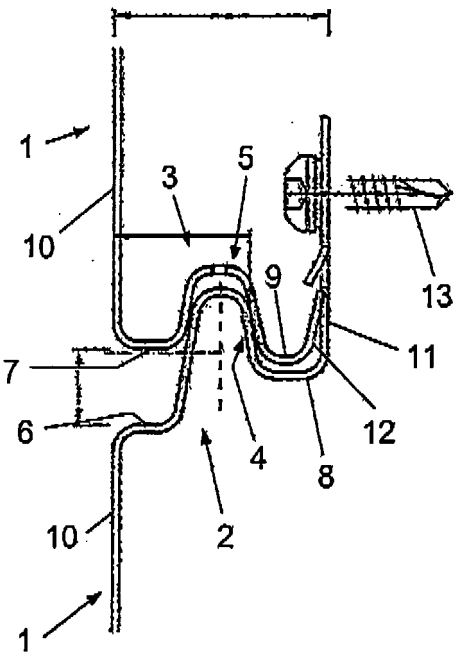

Fig. 1

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Description

[0001] The invention relates to a wall panel for a façade element of a building, the façade element comprising a plurality of successive wall panels wherein the wall panel is provided with a first and a second profiled edge at opposite sides of an intermediate part of the wall panel wherein the first profiled edge is shaped into a male portion and the second profiled edges into a mating female portion.

[0002] Such wall panels are often used with new buildings or with the renovation of old buildings, especially office buildings and the like. These wall panels, which usually will be metal panels, are fixed to a sub-construction. Dependent on the scale of a project the wall panels will either be fixed directly to a sub-construction for instance by means of screws or with larger projects the wall panels will be supported by modular slotted rails that are connected to a sub-construction. The use of modular slotted rails improves the accuracy of panel alignment and the speed of installation.

[0003] The known wall panels, sub-constructions, modular rails and means of fixation of the wall panels to sub-constructions and/or modular rails have a number of drawbacks, such as only one possible direction of mounting, complicated mounting of wall panels directly to a sub-construction, limited installation possibilities with modular slotted rails. Moreover, the design of modular rails and wall panels will often result in additional forces acting on the sub-construction.

[0004] It is an object of the present invention to provide a wall panel for a façade element of a building which allows the mounting of the wall panels in a first direction and a second opposite direction.

[0005] It is a further object of the invention to provide a wall panel with safety locking means between the wall panels.

[0006] It is a further object of the invention to provide a wall panel with a limited contact area between two successive wall panels to reduce friction between wall panels when positioning the wall panels with respect to each other.

[0007] It is a further object of the invention to provide a wall panel that allows a faster and more accurate mounting of the wall panel.

[0008] It is a further object of the invention to provide a wall panel in which ice forming between male and female portions of successive wall panels is prevented.

[0009] It is a further object of the invention to provide a wall panel suitable to be mounted to a sub-construction by means of screws and brackets.

[0010] It is a further object of the invention to provide a mounting bracket for a wall panel.

[0011] It is a further object of the invention to provide a mounting bracket for a wall panel that is suitable to be used with mounting the wall panels in a direction from bottom to top and from top to bottom.

[0012] One or more of these objects are realized by providing a wall panel for a façade element of a building comprising a plurality of successive wall panels wherein the wall panel is provided with a first and a second profiled edge at opposite sides of an intermediate part of the wall panel wherein the first profiled edge is shaped into a male portion and the second profiled edges into a mating female portion, wherein

- the first profiled edge has an edge portion connected to the intermediate part of the wall panel, said edge portion comprising a protruding part pointing away from the first edge portion, and
  a flanged edge portion connected to the edge portion and extending in a direction away from the first edge portion and the second profiled edge,
  and in that
- the second profiled edge has an edge portion connected to the intermediate part of the wall panel, said edge portion comprising a protruding part pointing in the direction of the first edge portion, and
  a flanged edge portion connected to the edge portion and extending in the space between the first and second edge portions.

[0013] The profiled edges of successive wall panels provide an interlock between the panels and the flanged edge portion of the first profiled edge extends over a distance which is sufficient to be able to secure that flanged edge portion of the wall panel to a sub-construction by means of a screw fixing. With these measures the wall panels can be mounted in a safe and fast way to the sub-construction.

[0014] According to a further embodiment it is provided that the edge portions of the first and second profiled edges comprise a first and second edge part with the protruding part between the first and second edge part, the first edge part connecting the protruding part to the intermediate part of the wall panel and the second edge part connecting the protruding part to a flanged edge portion. With this embodiment the interlocking of the profiled edges is further improved.

[0015] It is preferably provided that respective sides of the protruding part that connect to the first and second edge part are of different length. Preferably the side of the protruding part that connects to the first edge part of the first profiled edge is longer than the corresponding leg of the protruding part of the second profiled edge. Herewith a gap between the first edge parts of the first and second profiled edge of two successive wall panels is realized, which besides a certain visual effect, provides that rainwater will not get easily in between the further part of the profiles edges. Any water enclosed between the profiles edges could cause damage to the profiled edges in particular with icing up of the water.

[0016] However, this does not work if the wall panels are mounted in an opposite direction with the male portion pointing downward, in which position rainwater will easily get in the space between the two protruding parts. To

overcome this problem a drainage hole is provided in the protruding part of the second profiled edge to drain any water between the profiled edges.

[0017] According to a preferred embodiment the geometry of the first and second profiled edges is such that mounted successive wall panels contact each other at the sides of the protruding parts connected to the second edge parts and at the flanged edge portions. The geometry is defined by different inclinations of the sides of the protruding parts and the flanged edge portions as a result of which the contact zones between the profiled edges is kept to a minimum. This will give the wall panels a certain freedom of movement with respect to each other therewith preventing that as a result of for example wind load additional forces will remain to act on the sub-structure. A further advantage is that it will facilitate the mounting of the wall panels since the profiled edges can be slid easily into place.

[0018] According to a further embodiment it is provided that the wall panel is provided with locking means to lock mating male and female portion of successive wall panels in connection. According to a further elaboration the locking means are realized by providing the flanged edge portion of the first profiled edge with one or more spring clips. These spring clips are for example cut out of the flanged edge portion. After a flanged edge portion of the first profiled edge is fixed to the sub-construction, either in upward or downward direction, the next wall panel is placed by inserting the second profiled edge into the first profiled edge wherein, due to the resilient properties of the flanged edge and/or the clips, the flanged edge portion can be slid over the clips of the first profiled edge. There after the flanged edge portion and/or the clips spring back, therewith locking the flanged edge portion behind the clips. This not only facilitates the mounting of the wall panels it also provides an additional safeguard to keep the profiled edges of the wall panels in engagement.

[0019] According to a further embodiment the invention provides for a mounting bracket for the wall panel which bracket is provided with a first and a second support structure, which respectively are complementary to the shape of part of the sides of the first and second profiled edges facing each other. The bracket is to be fixed to the sub-structure after which a wall panel is placed over the bracket. With the bracket no further means are used to fix the flanged edge portion of the first profiled edge to the sub-structure. With a wall panel with the first profiled edge at the top the first support structure of the bracket is used wherein the first support structure corresponds to at least part of the inside of the protruding part of the first profiled edge.

[0020] If the second profiled edge of the wall panel is at the top than the second support structure of the bracket is used wherein the second support structure corresponds to part of the second profiled edge defined by the flanged edge portion, the second edge portion and the side of the protruding part connected to the second edge portion. In this orientation it will be necessary to cut the flanged edge portion of the first profiled edge at the location corresponding with that of the mounted bracket, since here the first profiled edge is brought into place only after the previous wall panel with the second profiled edge is positioned.

[0021] The invention also provides a method of mounting the wall panels for a façade element of a building, wherein the wall panels are mounted to the building or to a substructure of the façade structure, comprising the steps of

- mounting a first wall panel by attaching the second profiled edge to the building or to a substructure and
- fixing the flanged edge portion of the first profiled edge to the building or the substructure,
- mounting a subsequent wall panel by placing the female portion over the male portion of the first wall panel till at least the flanged edge portion of the second profiled edge snaps behind the clip or clips provided in the flanged edge portion of the first profiled edge of the first wall panel, and
- fixing the flanged edge portion of the first profiled edge of the subsequent wall panel to the building or to the substructure.

[0022] According to a further elaboration the second profiled edge of the first wall panel is attached by hooking the second profiled edge on to one or more mounting brackets fixed to the building or to the substructure. The flanged edge portion of the first profiled edge can be fixed to the building or the substructure with screws or by using brackets. If the wall panels are mounted in upward direction the first profiled edge is positioned above the second profiled edge and if mounted in downward direction the second profiled edge is positioned above the first profiled edge.

[0023] If the shape of the profiled edges is such that only a narrow gap remains between the first edge parts of the profiled edges of successive wall panels, the gap may be sealed by applying sealing means between the first edge parts of the first and second profiled edges of successive wall panels. With this measure it is prevented that water can get in between the profiled edges.

[0024] The wall panel according to the invention is further elucidated on hand of the examples shown in the drawing, in which:

fig.1 a first and second profiled edge of successive wall panels mounted with screws in bottom-to-top direction,

fig.2 a first and second profiled edge of successive wall panels mounted with brackets in bottom-to-top direction,

fig.3 a first and second profiled edge of successive wall panels mounted with screws in top-to-bottom direction,

fig.4 a first and second profiled edge of successive

wall panels mounted with brackets in top-to-bottom direction,

fig.5 a first and second profiled edge of successive wall panels mounted with screws in bottom-to-top direction with a narrow gap between the first edge parts, and

fig.6 a first and second profiled edge of successive wall panels mounted with brackets in bottom-to-top direction with a narrow gap between the first edge parts.

[0025] In fig. 1 two successive wall panels 1 are shown with interlocking first and second profiled edges 2, 3. The first profiled edge 2 has a protruding part 4 that is designed to fit in the protruding part 5 of the second profiled edge 3. These protruding parts 4, 5 of the profiled edges 2, 3 have at either side a first edge part 6, 7 and a second edge part 8, 9. The first edge parts 6, 7 connect protruding parts 4, 5 to an intermediate part 10 of the respective wall panels 1. In the figures the intermediate part 10 is a flat plane, however other forms are possible, which may be at different angles to the first edge parts 6, 7 than shown. The second edge parts 8, 9 connect the protruding parts 4, 5 to respective flanged edge portions 11, 12. The flanged edge portion 11 abuts a sub-structure fixed to a building or directly to a building, which for the sake of clarity are not shown in the drawing. In the example of fig.1 the flanged edge portion 11 is fixed with a screw 13 to a sub-structure.

[0026] In the configuration of fig. the lower wall panel is fixed to the sub-construction before the upper wall panel is put with the profiled edge 3 over profiled edge 2 of the lower wall panel, where after the upper wall panel is fixed to the substructure with a screw 13 through the flanged edge portion 11 of that upper wall panel. The profiled edge 3 of the first mounted wall panel is fixed to the sub-structure by means of special fixation means, for example by means of a bracket specially adapted for the purpose.

[0027] The protruding parts 4, 5 have approximately a U-shape or V-shape. The legs of the protruding parts have different lengths, wherein of the legs 14, 15 of protruding part 4 the outside leg 14 is longer than the inside leg 15 in the embodiment shown in figs. 1-4. In the embodiment according to figs.5, 6 the outside leg 14 is shorter than the inside leg. In all embodiments the outside leg 16 of protruding part 5 of the second profiled edge 3 is shorter than the inside leg 16. The variation in the length of the outside leg 14 of protruding part 4 of the first profiled edge 2 determines the width of the gap 18 between the first edge parts 6, 7. In the embodiment according to figs. 1-4 the gap 18 is far wider than in the embodiment according figs.5, 6. Variation in the width of gap 18 in combination with the size and shape of the intermediate part 10 of the wall panels results in certain visual effects.

[0028] The length of the legs 14-17, the angles at which these legs meet and the dimensions and the angle at which the flanged edge portions meet are chosen such that the contact areas between the profiled edges are small. This results in that the wall panels can easily be slid over each other into the right position with respect to each other and/or with respect to the sub-structure.

[0029] The protruding parts touch each other over an area between the inner legs 15 and 17, the outside legs 14, 16 do not touch each other. This is accomplished by choosing the outside dimensions of protruding part 4 smaller than the inside dimensions of protruding part 5 at least for the portion of protruding part 4 that will be inserted in the protruding part 5 and in that the flanged edge portion 12 of the second profiled edge 3 is at an angle with respect to the flanged edge portion 11 of the first profiled edge 2. This results in that only the rim 19 of the flanged edge portion 12, see fig.3, abuts the flanged edge portion 11. As a result the profiled edges 2, 3 only touch at legs 15, 17 and with rim 19 of flanged edge portion 12 against the flanged edge portion 11. Since the material used for the wall panels, for example steel or aluminium, has resilient properties there is a certain play in how far a profiled edge of one panel can be slid over another wall panel while keeping the contact area small and preventing that the outside legs 14, 16 come into contact.

[0030] In the flanged edge portion 11 spring clips 28 are provided at a distance with respect of each other, which are used to lock flanged edge portion 12 and therewith successive wall panels with respect to each other. When a second profiled edge 3 is slid over a first profiled edge 2, flanged edge 12 and clips 28 will give way and spring back when the flanged edge portion passes clips 28. This very useful when mounting the wall panels to a substructure because the wall panel is secured when moved over the clips 28. The fixing screws 13 can than be placed without having to fear that the wall panel will fall out of position which especially with wall panels of great length could easily happen.

[0031] In fig.2 the first profiled edge 2 is fixed to the sub-structure by means of a bracket 20 instead of a screw 13 as in fig.1. Bracket 20 is fixed to the sub-structure by means of a rivet 21. Bracket 20 is provided with a first support 22 and a second support 23, wherein the first support 22 is at a larger distance from side 24 of the bracket, with which it abuts the sub-structure, than support 23. The first support 22 has a shape that is at least partly complementary to the inside of protruding part 4 of the first profiled edge 2. The second edge part 8 comes to rest on support plane 25 of the bracket to provide further support.

[0032] When mounting in top-down direction and using bracket 20 instead of screws 13 than the support 23 is to be used, see fig. 4. The support 23 is shaped to support the second edge part 9 between leg 17 and flanged edge portion 12, while keeping enough space between the support 23 and leg 17 and flanged edge portion 12 to allow for a certain movement of leg 17 and flanged edge portion 12 to be able to bring a wall panel in its final position with respect to another wall panel.

[0033] In the embodiment according to fig.4 the flanged edge portion 11 of the first profiled edge 2 has to be cut off to a length extending over the length of the flanged edge portion 12 in order to have rim 19 of flanged edge portion 12 touch the flanged edge 11. The plane 26 of bracket 20 should be at a distance from the outer ends of flanged edge portions 11,12 to allow movement of flanged edge portion 12.

[0034] The protruding part 5 of the second profiled edge 3 is provided with a drainage hole 27 to prevent any water remaining in between the protruding parts 4, 5. This is only relevant when mounting the wall panels in top-down direction as in figs. 3, 4, where rain water can flow downward between the outside legs 14, 16 of protruding parts 4, 5.

[0035] In the embodiment according figs.5, 6 the gap 18 between the first edge parts 6, 7 is considerably smaller than with the embodiment of figs.1-4 which is the result of a shorter outside leg 14 of the first profiled edge 2. This embodiment has because of the narrow gap quite a different appearance than the other embodiment. Because of the narrow gap 18 it might be possible that water infiltrates between the profiled edges 2, 3. In the position of the wall panels mounted in down-top direction the drainage hole 27 provided in the protruding part 5 of the second profiled edge 3 is in the topmost position and cannot function as such. To prevent water infiltration with such narrow gaps a sealant can be brought into gap 18.

Claims

1. Wall panel for a façade element of a building comprising a plurality of successive wall panels wherein the wall panel is provided with a first and a second profiled edge at opposite sides of an intermediate part of the wall panel wherein the first profiled edge is shaped into a male portion and the second profiled edges into a mating female portion, wherein

   - the first profiled edge has an edge portion connected to the intermediate part of the wall panel, said edge portion comprising a protruding part pointing away from the first edge portion, and a flanged edge portion connected to the edge portion and extending in a direction away from the first edge portion and the second profiled edge,

   and in that

   - the second profiled edge has an edge portion connected to the intermediate part of the wall panel, said edge portion comprising a protruding part pointing in the direction of the first edge portion, and a flanged edge portion connected to the edge portion and extending in the space between the first and second edge portions.

2. Wall panel according to claim 1 wherein the edge portions of the first and second profiled edges comprise a first and second edge part with the protruding part between the first and second edge part, the first edge part connecting the protruding part to the intermediate part of the wall panel and the second edge part connecting the protruding part to a flanged edge portion.

3. Wall panel according to claim 2, wherein respective sides of the protruding part that connect to the first and second edge part are of different length.

4. Wall panel according to claim 3, wherein the side of the protruding part that connects to the first edge part of the first profiled edge is longer than the corresponding leg of the protruding part of the second profiled edge.

5. Wall panel according to claim one or more of claims 1-4, wherein the geometry of the first and second profiled edges is such that mounted successive wall panels contact each other at the sides of the protruding parts connected to the second edge parts and at the flanged edge portions.

6. Wall panel according to claim one or more of claims 1-5, wherein the wall panel is provided with locking means to lock mating male and female portion of successive wall panels in connection.

7. Wall panel according to claim 6, wherein the flanged edge portion of the first profiled edge is provided with one or more spring clips.

8. Wall panel according to claim 7, wherein the spring clips are cut out of the flanged edge portion.

9. Wall panel according to one or more of claims 1-8, wherein drainage holes are provided in the protruding part of the second profiled edge.

10. Wall panel according to one or more of claims 1-9, wherein the protruding part is a V- or U-shaped part.

11. Mounting bracket for a wall panel according to one or more of claims 1-10, wherein the bracket is provided with a first and a second support structure, which respectively are complementary to the shape of part of the sides of the first and second profiled edges facing each other.

12. Mounting bracket according to claim 11, wherein the first support structure corresponds to the inside of the protruding part of the first profiled edge.

13. Mounting bracket according to claim 11 or 12, wherein the second support structure corresponds to part

of the second profiled edge defined by the flanged edge portion, the second edge portion and the side of the protruding part connected to the second edge portion.

14. Method of mounting wall panels according to one or more of claims 1-10 for a façade element of a building, wherein the wall panels are mounted to the building or to a substructure of the façade structure, comprising the steps of

- mounting a first panel by attaching the second profiled edge to the building or to a substructure and
- fixing the flanged edge portion of the first profiled edge to the building or the substructure,
- mounting a subsequent wall panel by placing the female portion over the male portion of the first wall panel till at least the flanged edge portion of the second profiled edge snaps behind the clip or clips provided in the flanged edge portion of the first profiled edge of the first wall panel, and
- fixing the flanged edge portion of the first profiled edge of the subsequent wall panel to the building or to the substructure.

15. Method according to claim 14 wherein the second profiled edge is attached by hooking the second profiled edge on to one or more mounting brackets fixed to the building or to the substructure.

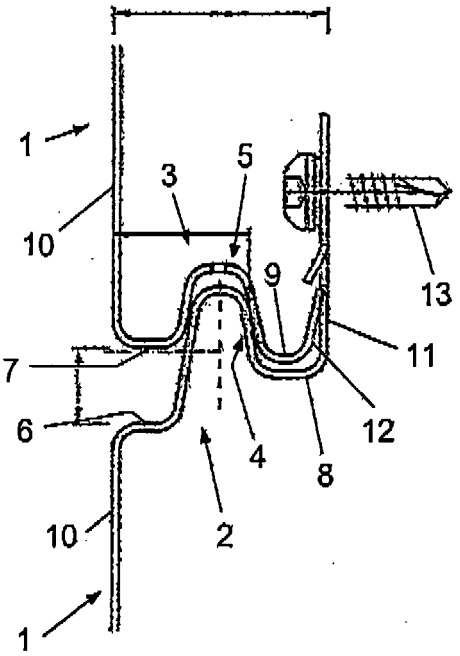

Fig. 1

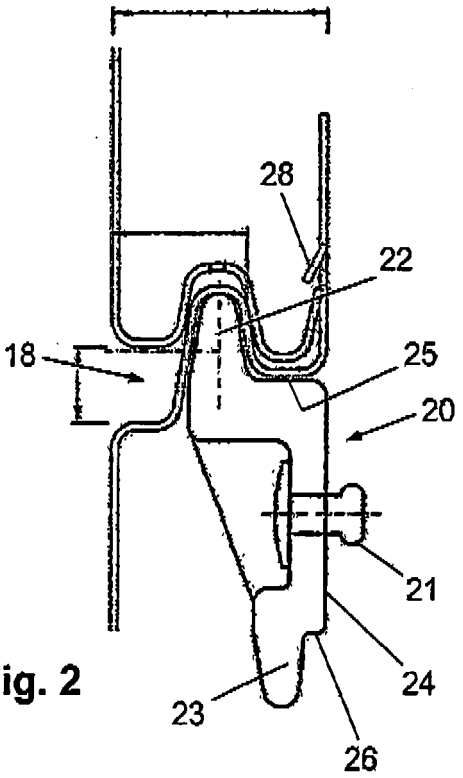

Fig. 2

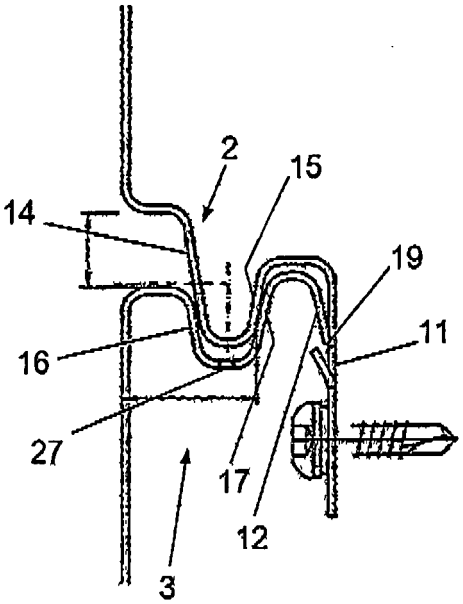

Fig. 3

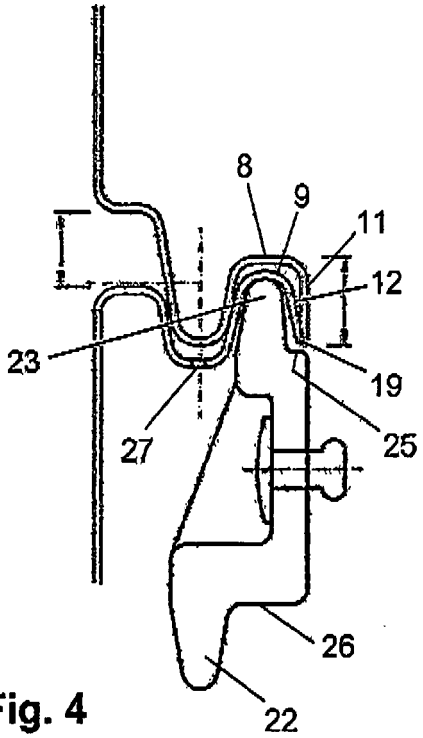

Fig. 4

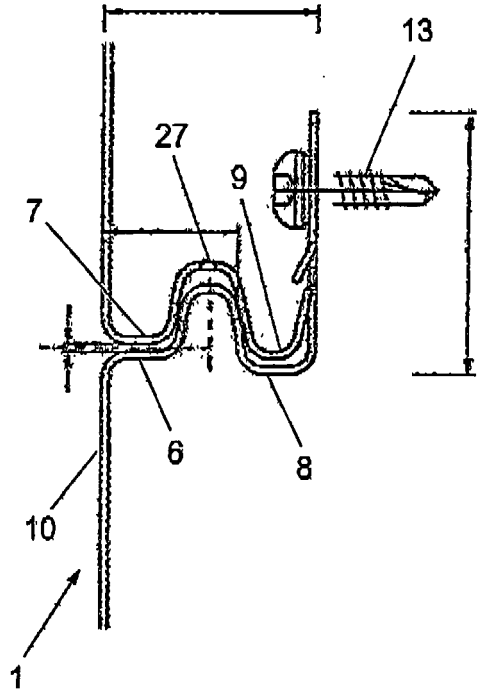

Fig. 5

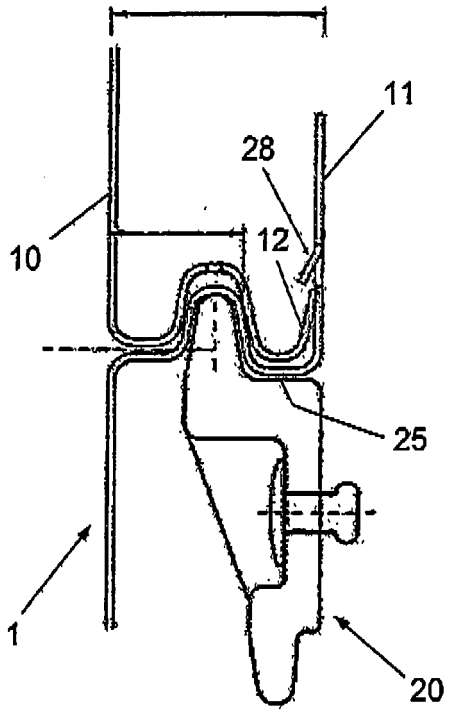

Fig. 6

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EUROPEAN SEARCH REPORT

Application Number
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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	7 October 2009	Severens, Gert

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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A : technological background
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EUROPEAN SEARCH REPORT

Application Number
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DOCUMENTS CONSIDERED TO BE RELEVANT

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