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(54) **Panel attachment assembly**

(57) The invention relates to a panel attachment assembly comprising a panel which on one side is provided with a panel rail that is continuous in the longitudinal direction and comprises a longitudinal groove comprising an undercut, a suspension rail that comprises a panel

attachment end that is adapted for being accommodated in the panel rail and for engaging said undercut, and a locking part for extending in said panel rail for preventing said suspension rail from disengaging from said undercut.

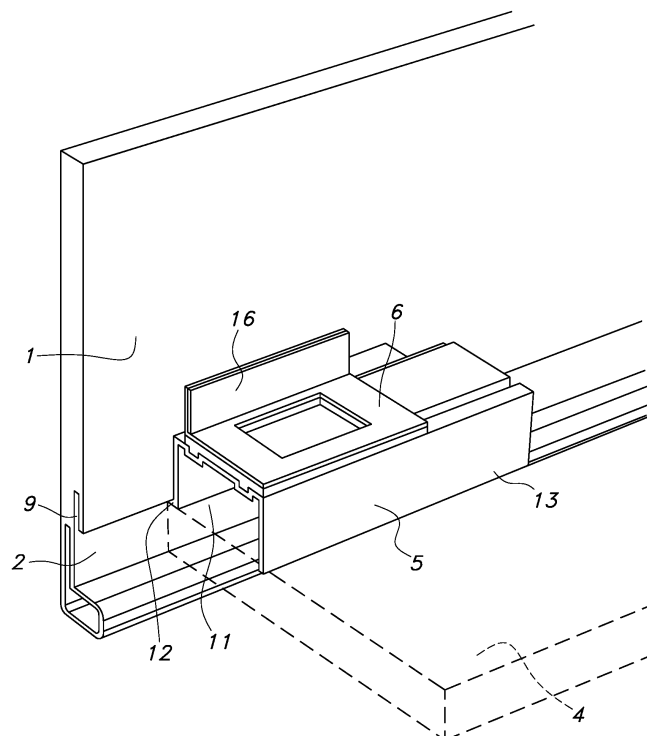


FIG. 1

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Description

BACKGROUND OF THE INVENTION

[0001] The invention relates to a panel attachment assembly.

[0002] In the state of the art different ways and means are known for attaching panels to buildings. In the embodiments the panels are for instance attached to battens. Most known attachment systems are hard to use, especially on locations that are hard to reach such as eaves. The use in the outside air sometimes during cold weather conditions has not proved to be easy.

[0003] GB-2251004 for instance mentions various attachments and known synthetic snap systems for attaching a roof gutter. Such connections may be difficult to use when it is too cold or too hot.

[0004] WO94/19561 describes a panel provided with grooves and a profile provided with grooves, and an attachment member that is adapted for on the one hand extending into the grooves of the panel and on the other hand extending into the grooves of the profile. Detaching the panel after attaching does not seem to be easy.

[0005] FR2814184 shows assemblies of panels provided with undercut grooves, special fastening clips, and beams provided with grooves on the opposite sides and in which the fastening clips are able to clamp into with resilient legs. In addition the resilient legs extend around the beam. Permanent attachment depends on the (permanent) resilience of the resilient legs of the fastening clips.

[0006] JP60148421 U1 describes specific means for the attachment of a corrugated plate.

[0007] DE102004036328 describes an attachment member for cladding elements provided with a T-groove. The attachment members are provided with a head having swivelling arms which by means of resilient clamping can be brought into position in which they clamp in the T-groove. The resilient clamping is provided with a carrying bar which in case of clamping in a hole should drop into the supporting structure. In addition clamping is possible at positions of a hole in the supporting structure.

[0008] Therefore there is room for improvement of this attachment of panels that has been known per se for a long time.

SUMMARY OF THE INVENTION

[0009] It is an object of the invention to provide an improved panel attachment assembly.

[0010] It is a further or additional object of the invention to provide a panel assembly with which a panel can easily be mounted to a building, for instance in less-favourable weather conditions.

[0011] For that purpose the invention provides a panel attachment assembly according to claim 1.

[0012] The suspension rail can be mounted to a building, providing a solid attachment provision. The attach-

ment panel end easily engages the panel rail, and after that the locking can be done. Thus, it is easy to attach the panel for instance the outer surface of a building.

[0013] In an embodiment the panel rail comprises an undercut groove having at least one undercut. In that way it is easy to attach a further part to it. Such a groove can be an L-groove.

[0014] In an embodiment the panel attachment end in the mounted condition extends in the undercut of the undercut groove, in one embodiment clamping in the undercut. In that way a panel attachment end can reliably and easily be arranged. In one embodiment the undercut groove has a substantially rectangular cross-section. In a further embodiment the cross-section of the panel attachment end is adapted thereto.

[0015] In an embodiment panel rail is a continuous, longitudinal groove extending in said panel. In this way, a compact end easy-to-mount panel is provided, for instance for a fascia board, a water board, or in general a plate or panel for cladding a building.

[0016] In an embodiment said panel attachment end comprises an edge having a thickness dimensioned for fitting tightly into undercut. The panel thus can be firmly attached.

[0017] In an embodiment said locking part has a length for extending in at least a part of said groove. It allows a simple way of securing the panel to the suspension rail.

[0018] In an embodiment said panel attachment end has a panel attachment end width (h1) which is smaller than an entry width (h3) of said groove or said panel rail for allowing said panel attachment end to enter said groove for engaging said undercut, and wherein a sum of said panel attachment width (h1) and a locking part thickness (h2) is equal to or smaller than a sum (h4) of said entry width (h3) and an undercut depth. In fact, the locking part substantially fills the remaining space of the groove after the panel attachment end engages the undercut. In that way, the panel can not be removed from the suspension rail.

[0019] In an embodiment the panel attachment end comprises a hook member adapted for being able to hook into the undercut. In an embodiment, in particular said hook member extends along a length of said suspension rail. In an embodiment, said hook member is integrated in said suspension rail and extends along said extension rail. Thus, in an embodiment in fact an extrusion profile can be provided.

[0020] In an embodiment the panel attachment end comprises a rail hook that is continuous in the longitudinal direction. In an embodiment, such a panel hook has a U-shaped cross-section. In an embodiment, the panel hook has a rectangular, U-shaped cross section. This makes it easier to lock using a locking part.

[0021] In an embodiment said suspension rail has an abutment end at a distance in the normal direction of said panel from said panel attachment end and substantially in a plane with a lower end of said panel attachment end for providing abutments for maintaining said locking part

in said groove. In an embodiment said suspension rail has a U-shaped cross section with a leg providing said abutment end. In an embodiment, the abutment end provides an abutment against a motion in a direction in-plane with respect to the panel, in particular substantially across the panel rail. Furthermore, in an embodiment the abutment end is provided at the at the undercut side of the panel rail. The abutment end may, in fact, be provided in-line with a groove edge at the undercut side. In an embodiment, the abutment end comprises a continuous abutment end extending along the suspension rail. The abutment can assist in preventing the locking part from rotating out of the panel rail.

[0022] In an embodiment a cross section of said groove and said undercut substantially matches a cross section of said panel attachment end together with a cross section of said locking part.

[0023] In an embodiment said suspension rail comprises an abutment for said panel at a transverse distance from said panel rail. In an embodiment said abutment extending in longitudinal direction.

[0024] In an embodiment the panel attachment assembly further comprises a ventilation part mountable on the suspension rail, for providing ventilation of a further construction part to which the suspension rails can be fixed. In an embodiment said ventilation part comprising an abutment for maintain a distance between said construction part and said panel. Using the ventilation part, ventilation space is provided around the panel.

[0025] The invention further relates to the use of a suspension rail intended and suitable for a panel attachment assembly as described.

[0026] The invention further relates to a device provided with one or more of the characterising measures described in the attached description and/or shown in the attached drawings.

[0027] It will be clear that the various aspects mentioned in this patent application can be combined and each individually are eligible for a divisional patent application.

SHORT DESCRIPTION OF THE FIGURES

[0028] In the attached figures an embodiment of a panel attachment assembly according to the invention is shown in which:

- Figure 1 shows a view in perspective of an embodiment of a panel attachment assembly from the rear side of a panel that can be used as fascia;
- Figure 2 shows a view in perspective of the embodiment of figure 1, from a lower point of view;
- Figure 3 shows a cross section of part of the assembly of figures 1 and 2.

DESCRIPTION OF THE EMBODIMENTS

[0029] Figure 1 shows a view in perspective of a panel attachment assembly which is provided with a panel 1. In this embodiment panel 1 is a façade finishing panel, such as a fascia of fascia board. At a longitudinal edge the panel 1 is provided with a slot or groove 2 which is undercut, here having one undercut 9. Such a slot can also be called an L-groove. The slot 2 runs substantially along the length or in longitudinal direction of panel 1. Often, the slot or groove 2 runs in longitudinal direction and is provided near the longitudinal center line, thus balancing the panel. Slot or groove 2 has an upper edge at the side of the undercut and a lower edge opposite the upper edge. In a simple embodiment, shown in the drawings, slot or groove 2 has a rectangular cross section.

[0030] Panel 1 may be a solid panel, a hollow panel, or even a foamed polymer panel, for instance provided with a durable foil. The panel in an embodiment is made from a polymer material. This polymer material may be provided with a filler. Such a filler can be cellulose based, for instance wood fibers or sawdust. Alternatively, such a filler may be stone-based, like sand-based or even chalk-based.

[0031] The panel attachment assembly comprises a suspension rail 5, from which the panel 1, in the attached condition, is actually hung. This suspension rail engages into the slot 2. Only a part of the suspension rail 5 is shown in the figures. This suspension rail 5 is rigid. In one embodiment the suspension rail 5 is for instance made of aluminium, or fiber-reinforced polymer. The object of a rigid profile such as suspension rail 5 is providing a properly level basis to which panel 1 can be attached level. The continuous suspension rail 5 is provided with a panel attachment end 11, here rail hook 11. In figures 2 and 3 an embodiment of the rail hook 11 can be seen better. In the embodiment, the rail hook 11 in this case may be indicated to have a substantially L-shaped cross-section resulting in a rectangular gutter. It may also be said to have a U-shaped cross section.

[0032] Panel attachment end 11 as regards shape and dimensions is adapted for fitting in the slot 2. Particularly, the panel attachment end 11 fits in the undercut slot 2 to be able to slide in the longitudinal direction of the slot 2. Furthermore, the panel attachment end and the slot are mutually dimensioned such as to allow the panel to be detached therefrom. In figures 2 and 3 panel attachment end 11 can be seen better. Figure 3 shows a cross-section of panel attachment end 11, when discussing said figure its particular effect will be explained.

[0033] In order to prevent that panel attachment end 11 after hooking into the continuous slot 2 from getting detached from slot 2, the suspension assembly further comprises a locking part 4. Locking part 4 here is a panel edge extending into slot 2. Furthermore, locking part 4 is positioned below the panel attachment end 11. The thickness of the edge of locking part 4 is such that it prevents the panel attachment end 11 from exiting the slot

2. In this embodiment, locking part 4 fills remaining space between panel attachment end 11 and slot 2.

[0034] In figure 3 the panel attachment end 11 is shown in cross-section in groove or slot 2 that is undercut. In this figure and in figure 2, various dimensions h1, h2, h3 and h4 are indicated, which will be explained below.

[0035] First, panel attachment end width h1 should be such that the panel attachment end 11 can exit slot 2 via the entry of slot 2. Slot 2 has an entry width h3. If the thickness of the panel attachment end 11 and of the undercut 9 differ considerably (undercut 9 being wider), the panel attachment end may enter and exit slot 2 even if the panel attachment end width h1 is equal to entry width h3. In order to allow easy placement and to allow confinement of the panel attachment end 11 in slot 2, it is selected that panel attachment end width h1 is smaller than entry width h3. Here, furthermore panel attachment end 11 fits tightly in undercut 9.

[0036] The locking part 4, here the edge of a board covering the overhang of a roof, has an edge thickness h2. Furthermore, the sum of the entry width h3 and the depth of undercut 9 is indicated with h4.

[0037] In order to prevent the panel attachment end 11 from exiting slot 2, locking part 4 substantially fills the remaining space in slot 2. In the embodiment shown in the drawings, locking part 4 fits tightly in the remaining space in slot 2. In general, the sum of h1 and h2 should be larger than h3. Furthermore, h4 should be larger than the sum of h1 and h2.

[0038] Just to give the skilled person an indication, in practise h1 can be 1-4 cm, h2 can be 0.5-3 cm. The slot 2 then has an entry width h3 of 1.6-8 cm, depending as indicated. Often, the entry width h3 is 0.1-1 cm larger than the sum of h1 and h2, depending amongst others on amount of clearance between the width of the undercut 9 and the thickness of the panel attachment end 11 that enters the undercut 9. Also, the cross-sectional shape of the panel attachment end 11 may be of influence: A rounder shape may require the entry width to be less larger. The mutual dimensions are to be selected in such a way that when the locking part 4 is placed in slot 2 as indicated in the drawings, panel attachment end 11 can no longer exit slot 2.

[0039] Often, the depth of the undercut 9 (i.e., h4-h3 in this embodiment) is between 0.5 and 2 cm.

[0040] The suspension rail 5 usually is a continuous rail of a rigid material, so that the rail is able to form a flat and straight basis on a sometimes not flat base of a building. Suitable material for the suspension rail may for instance be aluminium. An alternative may be an extrusion profile of a relative rigid synthetic material, for instance a fibre-reinforced synthetic material.

[0041] The suspension rail 5 in the embodiment has a U-shaped hook member 11 extending along the length or the suspension rail 5. The suspension rail 5 has a U-shaped beam. One leg of the U-shaped beam continues in the U-shaped the hook member 11. The other leg, with reference number 13, of the U-shaped beam and the

lower part 12 of the U-shaped hook member are here substantially in one plane. Thus, the board or locking panel 4 can abut against these two abutments and is further prevented from leaving the slot or groove 2, but substantially via an in-plane motion. This means that the board 4 can only be removed from its locking position in the groove 2 by moving it substantially normal to the panel 1.

[0042] The height of the one leg is more that the depth of the undercut 9. In this way, a further abutment is provided for supporting panel 1 against a force normal to the panel 1.

[0043] In this embodiment, the hook member 11 and the undercut 9 are both substantially rectangular. Furthermore, their dimensions are mutually adapted such that an edge or leg of hook member 11 fits tightly in the undercut 9. In this embodiment, furthermore, locking part 4 together with hook member 11 fit tightly into the groove 2 with undercut 9. In particular, when the hook member 11 engages undercut 9, a rectangular groove remains. Locking part 4 had an edge with a rectangular cross section which fits tightly into this remaining rectangular groove. Thus, a perfect locking of panel 1 onto suspension rail 5 is possible.

[0044] On top of the suspension rail 5, one or more a ventilation parts 6 can be snapped or slid. The ventilation part provides a space between op suspension rail 5 and a construction part 14 onto which the suspension rail is attached via attachment provision 15, for instance a screw. Furthermore, abutment 16 prevents that the further construction part 14 abuts or rests against the surface of panel 1. Thus, ventilation is provided between the further construction and the panel 1.

[0045] The other parts of the assembly, such as locking part 4 and ventilation part 6 may for instance be injection moulded parts of a synthetic material that is suitable for such use, usually outdoors. Suitable synthetic materials may be HDPE, polypropene, polyamide or nylon. Locking part 4 as explains may be the edge of a board or panel. Such a board may even be a wooden board.

[0046] In use the panel 1 is attached to a building in the following manner. First several ventilation parts are snapped into suspension rail 5. Next, the suspension rail 5 is positioned on the building so that it is at the wanted location. In figure 3, the suspension rail 5 is shown attached to a building construction part 14. After that the panel 1 can be hung from suspension rail 5, wherein the hook member 11 of suspension rail 5 hooks into the undercut 9. In other words, On the suspension rail 5, next the panel 1 is suspended by hooking the undercut 9 on the hook member 11 of suspension rail 5. Next, and edge of board 4 is inserted into groove 2, confining the hook member 11 into the groove 2. Panel 1 is now secured.

[0047] The suspension assembly with suspension rail 5 makes it possible to easily hang a panel such that positioning is possible. After that the position can be fixated by means of the locking part 4 in a manner that is easy to perform in a construction situation. The suspension

rail 5 can form a good reference for attaching the panel at its correct position.

[0048] It will be clear that the above description is included to illustrate the working of preferred embodiments, and not to limit the scope of the invention. Starting from the above explanation many variations that fall within the spirit and scope of the present invention will be evident to an expert.

Claims

1. Panel attachment assembly comprising:

- a panel (1) which on one side is provided with a panel rail (2) that is continuous in the longitudinal direction and comprises a longitudinal groove comprising an undercut (9);
- a suspension rail (5) that comprises a panel attachment end (11) that is adapted for being accommodated in the panel rail (2) and for engaging said undercut (9), and
- a locking part (4) for extending in said panel rail (2) for preventing said suspension rail (5) from disengaging from said undercut (9).

2. The panel attachment assembly of claim 1, wherein panel rail (2) is a continuous, longitudinal groove extending in said panel.

3. The panel attachment assembly of claim 1 or 2, wherein said panel attachment end (11) comprises an edge having a thickness dimensioned for fitting tightly into undercut (9).

4. The panel attachment assembly according to one or more of the preceding claims, wherein said locking part (4) has a length for extending in at least a part of said groove.

5. The panel attachment assembly according to one or more of the preceding claims, wherein said panel attachment end (11) has a panel attachment end width (h1) which is smaller than an entry width (h3) of said groove or said panel rail (2) for allowing said panel attachment end to enter said groove for engaging said undercut (9), and wherein a sum of said panel attachment width (h1) and a locking part thickness (h2) is equal to or smaller than a sum (h4) of said entry width (h3) and an undercut (9) depth.

6. The panel attachment assembly according to one or more of the preceding claims, wherein the panel attachment end (11) comprises a hook member adapted for being able to hook into the undercut (9), in particular said hook member extends along a length of said suspension rail (5), more in particular said hook member is integrated in said suspension rail

(5) and extends along said extension rail (5).

7. The panel attachment assembly according to any one of the preceding claims, wherein the panel attachment end (11) comprises a rail hook that is continuous in the longitudinal direction, in particular having a U-shaped cross-section, specifically having a rectangular, U-shaped cross section.

8. The panel attachment assembly according to any one of the preceding claims, wherein said suspension rail (5) has an abutment end at a distance in the normal direction of said panel (1) from said panel attachment end (11) and substantially in a plane with a lower end (12) of said panel attachment end (11) for providing abutments for maintaining said locking part (4) in said groove, in particular said suspension rail has a U-shaped cross section with a leg (13) providing said abutment end.

9. The panel attachment assembly according to any one of the preceding claims, wherein a cross section of said groove and said undercut (9) substantially matches a cross section of said panel attachment end (11) together with a cross section of said locking part (4).

10. The panel attachment assembly according to any one of the preceding claims, wherein said suspension rail (5) comprises an abutment for said panel (1) at a transverse distance from said panel rail (2), in particular said abutment extending in longitudinal direction.

11. The panel attachment assembly according to any one of the preceding claims, further comprising a ventilation part (16) mountable on the suspension rail (5), for providing ventilation of a further construction part (14) to which the suspension rails (5) can be fixed, in particular said ventilation part (6) comprising an abutment (16) for maintain a distance between said construction part (14) and said panel (1).

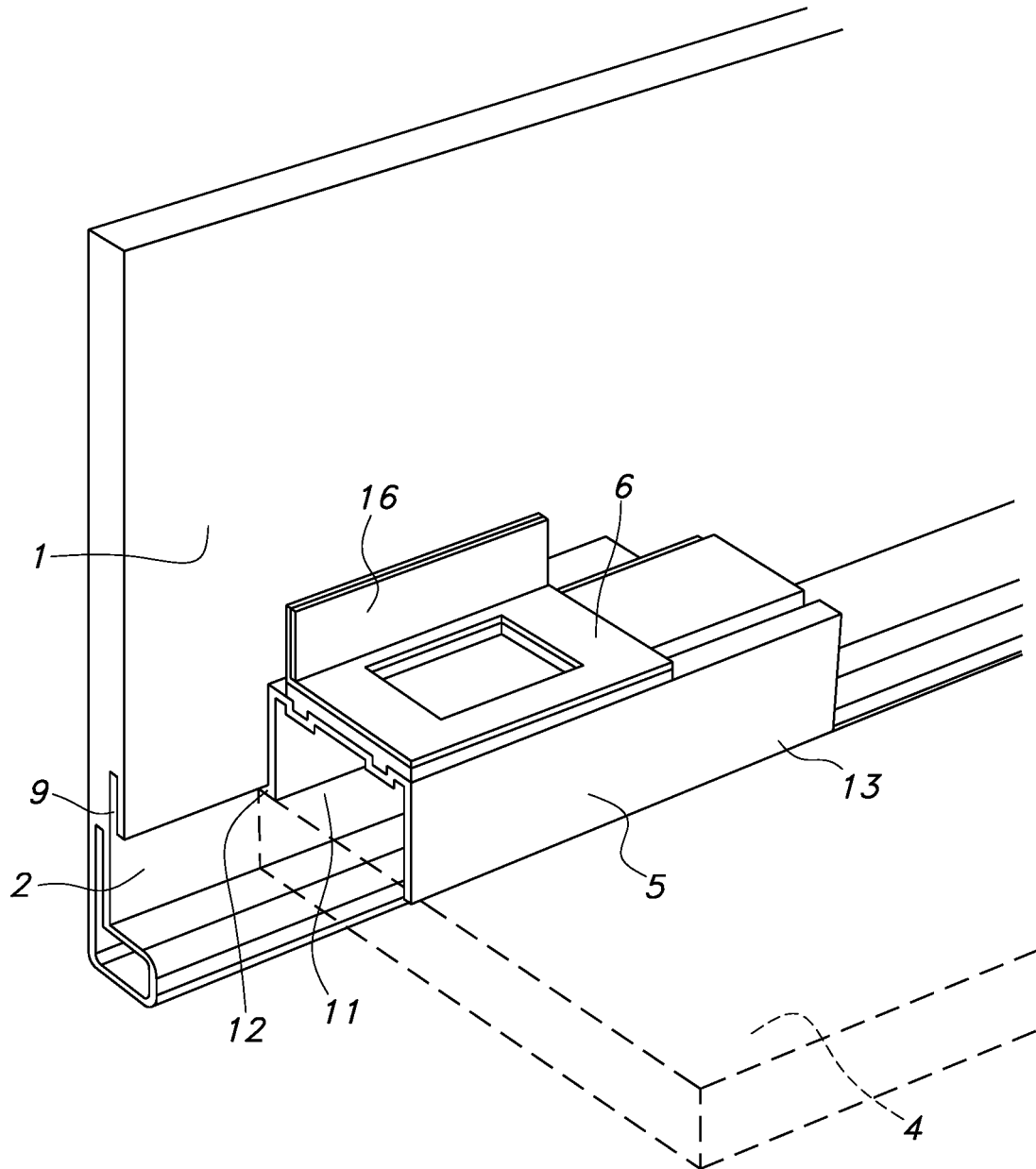


FIG. 1

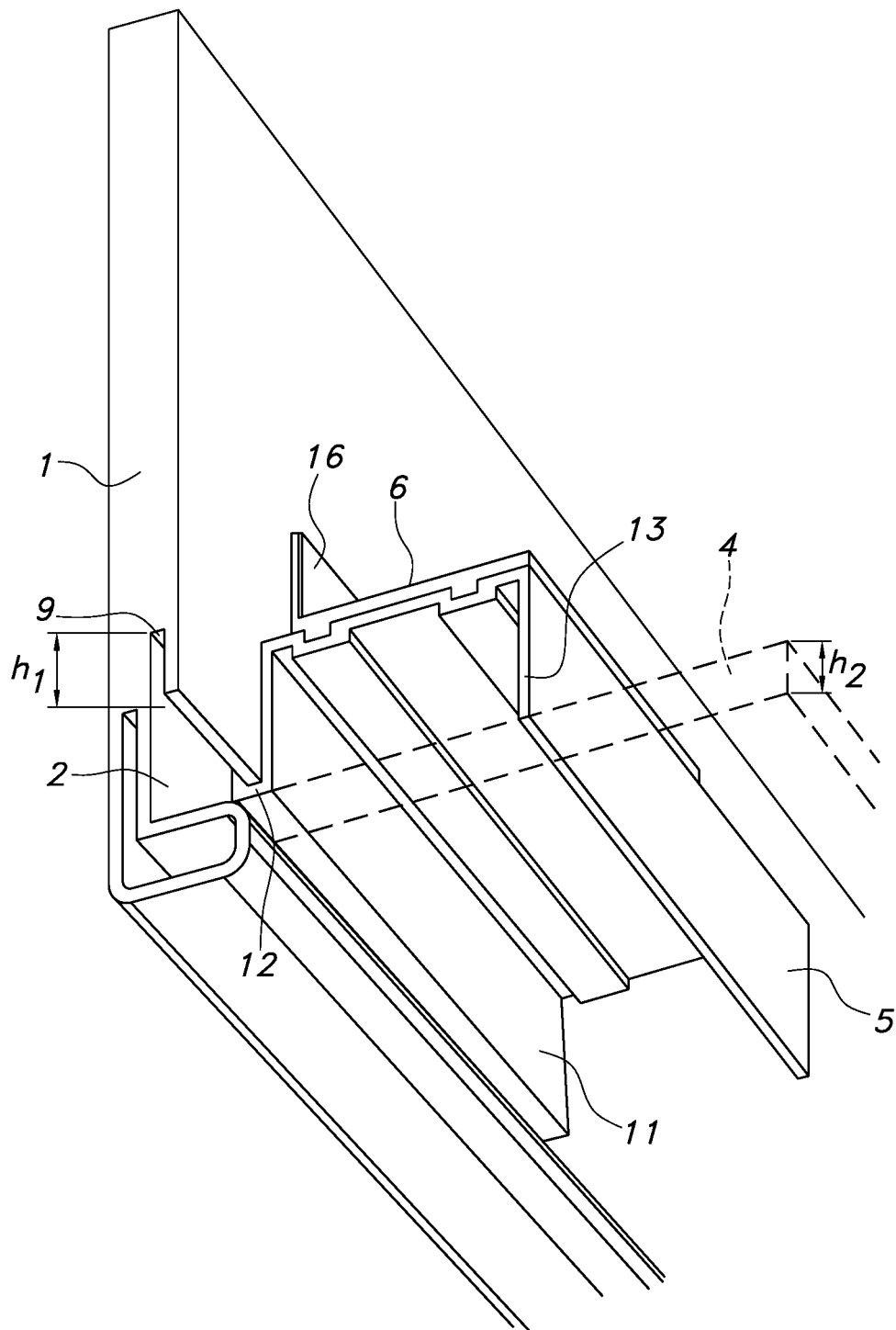


FIG. 2

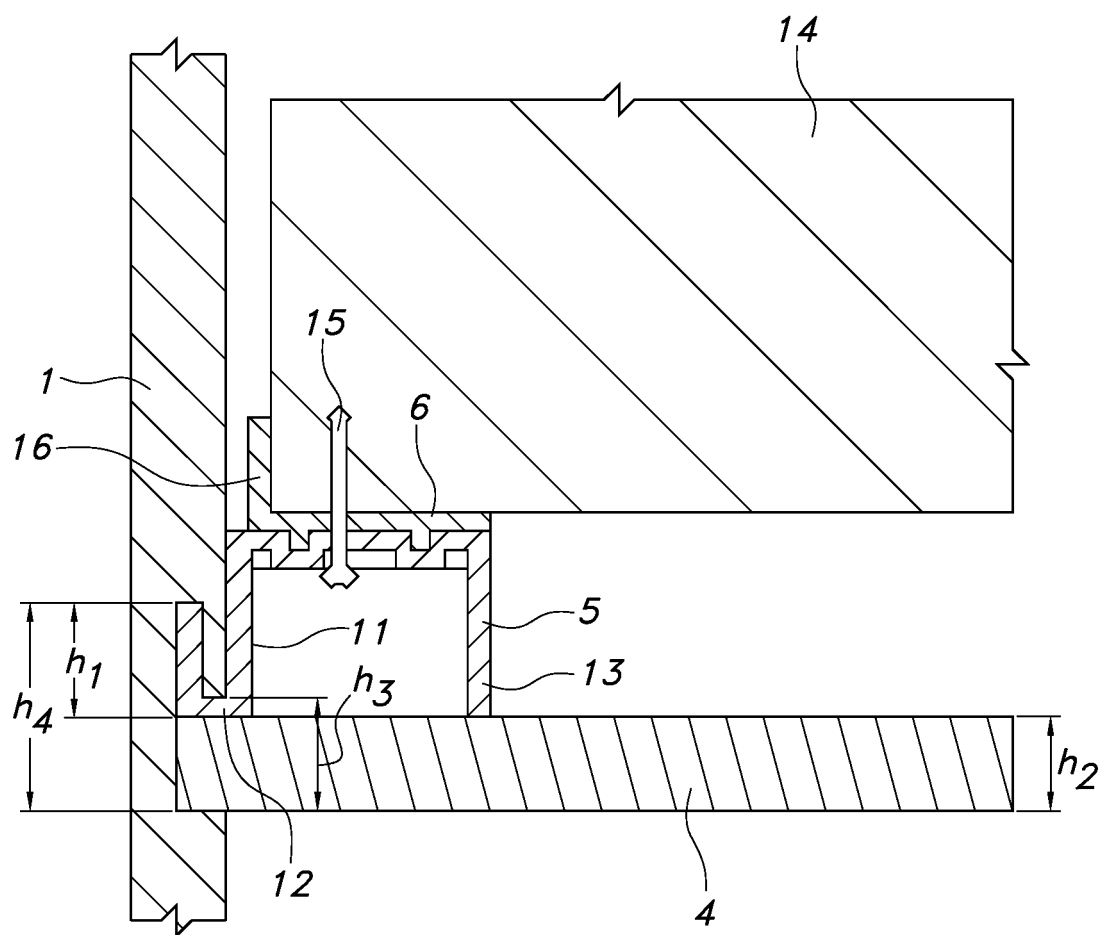


FIG. 3



EUROPEAN SEARCH REPORT

Application Number
EP 12 19 9233

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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 16 May 2013	Examiner Tran, Kim Lien
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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