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(54) Fenestration products

(57) A cladding assembly for a fenestration product comprises a core element (2) and a cladding element (7,8), a first attachment formation comprising a projection (15), a second attachment formation comprising at least one engagement surface (22-24) that at least partly surrounds an open ended recess(25). The recess (25) has an enlarged portion and a narrowed portion. The projection (15) is configured to be at least partly received in the recess (25) to releasably or permanently attach the first attachment formation to the second attachment formation. The core element (2) carries one of the attachment formations and the cladding element (7, 8) carries the other attachment formation such that the cladding element (7, 8) can be releasably or permanently attached to the core element (2) by the first and second attachment formations.

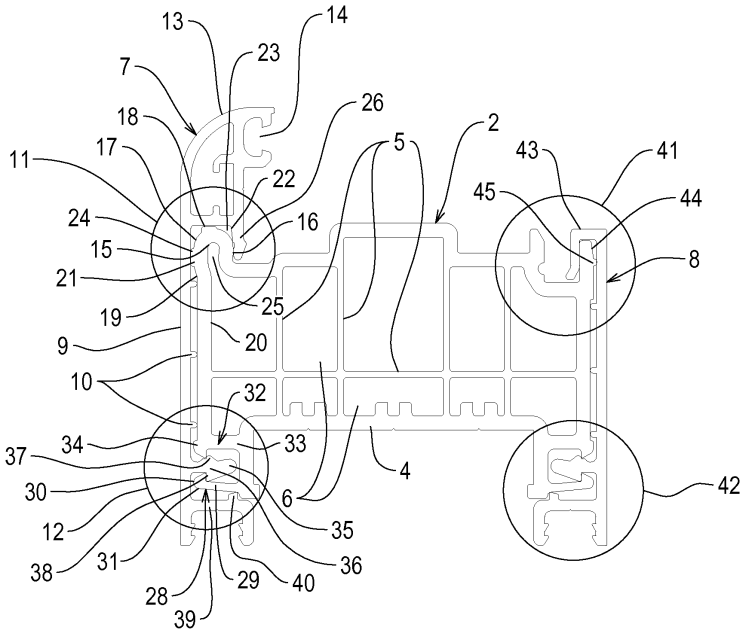

Figure 2

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Description

[0001] The present invention relates to fenestration products, and more particularly relates to systems and methods for assembling fenestration products and systems and methods for cladding fenestration products.

[0002] It is desirable for a fenestration product (such as a window, door or bi-folding door) to be constructed from metal in order to maximise the durability and aesthetic appeal of the product. However, metal has a high thermal conductivity which allows heat to be conducted easily through the profile of the fenestration product and lost to the surrounding environment. This waste of energy is undesirable, particularly in modern buildings where good thermal insulation and high energy efficiency are of paramount importance.

[0003] It has been proposed to reduce the overall thermal conductivity of a fenestration product by constructing the main core of the product from a low thermal conductivity material, such as un-plasticised polyvinyl chloride (PVC-U). A metal facia is usually attached to the core to improve the outward appearance and durability of the product. The metal facia is typically clipped onto the core by clip formations provided on the facia and the core. One problem with conventional arrangements of this type is that the clip formations can be difficult to assemble and the attachment between the facia and the core can be unreliable.

[0004] There is a need for an improved system and method for cladding a fenestration product.

[0005] Fenestration products usually comprise multiple frames that are hinged to one another. The conventional technique for assembling a hinged fenestration product is to install a first frame in position in a building and then attach hinges to the first frame using bolts or screws. A second frame is then attached to the hinges by bolts or screws to enable the second frame to pivot about the hinges relative to the first frame. This conventional assembly technique can be problematic if the second frame is not aligned precisely with the first frame and the hinges during assembly. The misalignment can prevent the frames from closing tightly against one another.

[0006] There is a need for an improved system and method for assembling a fenestration product.

[0007] In one aspect of the invention, we provide a cladding assembly for a fenestration product, the assembly comprising:

a core element,
a cladding element,
a first attachment formation comprising a projection,
a second attachment formation comprising at least one engagement surface that at least partly surrounds an open ended recess, the recess having an enlarged portion and a narrowed portion, wherein the projection is configured to be at least partly received in the recess to releasably or permanently attach the first attachment formation to the second attachment formation, and wherein the core element carries one of the attachment formations and the cladding element carries the other attachment formation such that the cladding element can be releasably or permanently attached to the core element by the first and second attachment formations.

[0008] Preferably, the core element carries the first attachment formation and the cladding element carries the second attachment formation.

[0009] Preferably, the core element comprises a material which is of a lower thermal conductivity than a material of the cladding element.

[0010] Preferably, the core element comprises unplasticised polyvinyl chloride (PVC-U).

[0011] Preferably, the cladding element comprises aluminium.

[0012] Preferably, the projection of the first attachment formation is an elongate ridge element which incorporates a substantially rounded portion.

[0013] Preferably, the projection of the first attachment formation comprises a deformable pip element which is configured to deform when a biasing force in excess of a predetermined level is exerted on the pip element by the engagement surface of the second attachment formation as the cladding element is releasably or permanently attached to the core element.

[0014] Preferably, the engagement surface comprises a first surface, a second surface extending substantially perpendicularly from the first surface and a third surface extending substantially perpendicularly from the second surface, the first surface being offset at an offset angle relative to a substantially perpendicular plane extending from the base surface to provide the recess with the enlarged and narrowed portions.

[0015] Preferably, the offset angle is in the range of about 0.5 to about 10 degrees.

[0016] Preferably, the offset angle is, or is substantially, two degrees.

[0017] Preferably, the assembly comprises:

a third attachment formation comprising a first retaining member, the first retaining member comprising an elongate body with a latch arrangement substantially at or adjacent one end.

[0018] Preferably, the third attachment formation comprises a second retaining member which is spaced apart from the first retaining member, the second retaining member comprising an elongate body with a latch arrangement substantially at or adjacent one end.

[0019] Preferably, the assembly further comprises:

a fourth attachment formation comprising a third retaining member, the third retaining member comprising an elongate body with a latch arrangement substantially at or adjacent one end.

[0020] Preferably, the third retaining member comprises two latch arrangements, one latch arrangement being positioned on each side of the elongate body of the third retaining member.

[0021] Preferably, the fourth attachment formation comprises a retainer surface which is configured to contact the first retaining member on the opposite side of the first retaining member to the latch arrangement of the first retaining member, the retainer surface providing a barrier which at least partly blocks movement of the first retaining member to retain the third and fourth attachment formations in engagement with one another.

[0022] Preferably, the or each latch arrangement is a latch projection which extends from one side of the respective retaining member.

[0023] Preferably, the or each latch arrangement comprises at least one further latch projection extending from a further side of each respective retaining member.

[0024] Preferably, the or each latch arrangement comprises a recess provided in each respective retaining member.

[0025] Preferably, the core element carries the third attachment formation and the cladding element carries the fourth attachment formation.

[0026] The invention may relate to a fenestration product comprising the cladding assembly as described above, and/or a method of assembling a fenestration product, the method comprising:

providing the cladding assembly as described above and releasably or permanently attaching the cladding element to the core element using the first and second attachment formations.

[0027] Preferably, the method comprises releasably or permanently attaching the cladding element to the core element using the third and fourth attachment formations.

[0028] Preferably, the method comprises pivoting the cladding element about the projection when the cladding element is being releasably or permanently attached to the core element.

[0029] In a second aspect of the invention, we provide a cladding assembly for a fenestration product, the assembly comprising:

a core element,
a cladding element,
a first attachment formation incorporating a first retaining member, the first retaining member comprising an elongate body with a latch arrangement, and a second attachment formation comprising a second retaining member, the second retaining member comprising an elongate body with a latch arrangement, the latch arrangements of the first and second retaining members being configured to latch onto one another, wherein the second attachment formation further comprises a retainer surface which at least partly blocks movement of the first retaining member to retain the latch arrangements of the first and second retaining members in a latched engagement with one another, and wherein the core element carries one of the attachment formations and the cladding element carries the other attachment formation such that the cladding element can be releasably or permanently attached to the core element by the first and second attachment formations.

[0030] Preferably, the core element comprises a material which is of a lower thermal conductivity than a material of the cladding element.

[0031] Preferably, the core element comprises unplasticised polyvinyl chloride (PVC-U).

[0032] Preferably, the cladding element comprises aluminium.

[0033] Preferably, the core element carries the first attachment formation and the cladding element carries the second attachment formation.

[0034] Preferably, the second retaining member comprises two latch arrangements, one latch arrangement being positioned on each side of the elongate body of the second retaining member.

[0035] Preferably, the or each latch arrangement is a latch projection which extends from one side of the respective retaining member.

[0036] Preferably, the or each latch arrangement comprises a recess provided in each respective retaining member.

[0037] Preferably, the assembly further comprises:

a third attachment formation comprising a projection, a fourth attachment formation comprising at least one engagement surface that at least partly surrounds an open ended recess, the recess having an enlarged portion and a narrowed portion, wherein the projection is configured to be at least partly received in the recess to releasably or permanently attach the third attachment formation to the fourth attachment formation, and wherein the core element carries one of the attachment formations and the cladding element carries the other attachment formation such that the cladding element can be releasably or permanently attached to the core element by the third and fourth attachment formations.

[0038] Preferably, the projection of the third attachment formation is an elongate ridge element which incorporates a rounded or substantially rounded portion.

[0039] Preferably, the projection of the third attachment formation comprises a deformable pip element which is configured to deform when a biasing force in excess of a predetermined level is exerted on the pip element by the engagement surface of the fourth attachment formation as the cladding element is releasably or permanently attached to the core element.

[0040] Preferably, the engagement surface comprises a first surface, a second surface extending substantially

perpendicularly from the first surface and a third surface extending substantially perpendicularly from the second surface, the first surface being offset at an offset angle relative to a substantially perpendicular plane extending from the base surface to provide the recess with the enlarged and narrowed portions.

[0041] Preferably, the offset angle is in the range of about 0.5 to about 10 degrees.

[0042] Preferably, the offset angle is, or is substantially, two degrees.

[0043] The invention may relate to a fenestration product comprising the cladding assembly as described above, and/or a method of assembling a fenestration product, the method comprising:

providing the cladding assembly as described above and releasably or permanently attaching the cladding element to the core element using the first and second attachment formations.

[0044] Preferably, the method comprises releasably or permanently attaching the cladding element to the core element using the third and fourth attachment formations.

[0045] Preferably, the method comprises pivoting the cladding element about the projection when the cladding element is being releasably or permanently attached to the core element.

[0046] In a third aspect of the invention, we provide a method of assembling a fenestration product, the method comprising:

providing first and second portions of a fenestration product,
providing an attachment device, the attachment device comprising a first part which is moveably attached to a second part,
attaching the first part of the attachment device to the first portion of the fenestration product with the second part of the attachment device in a first position relative to the first part of the attachment device,
providing a retention element and attaching the retention element to the second part of the attachment device,
moving the second part of the attachment device relative to the first part of the attachment device from the first position to a second position, and
attaching the second portion of the fenestration product to the second part of the attachment device using the retention element.

[0047] Preferably, the attachment device is a hinge.

[0048] Preferably, the hinge is in an open configuration when the second part is in the first position relative to the first part and the hinge is in a closed configuration when the second part is in the second position relative to the first part.

[0049] Preferably, the second part of the attachment device is provided with a mounting aperture and the second portion of the fenestration product is provided with a further mounting aperture, wherein the method comprises attaching the retention element to the second part of the attachment device by inserting part of the retention element through the mounting aperture provided in the second part of the attachment device, and wherein the step of attaching the second portion of the fenestration product to the second part of the attachment device comprises inserting the retention element through the further mounting aperture provided in the second portion of the fenestration product.

[0050] Preferably, the retention element is an elongate element which comprises an enlarged end, and wherein the step of attaching the retention element to the second part of the attachment device comprises inserting the retention element through the mounting aperture until the enlarged is positioned adjacent to the mounting aperture.

[0051] Preferably, the retention element comprises a retention aperture, and wherein the step of attaching the second portion of the fenestration product to the second part of the attachment device comprises inserting the retention element into the further mounting aperture until the retention aperture extends at least partly through the further mounting aperture.

[0052] Preferably, a width of a portion of the retention element increases progressively along the length of the portion of the retention element.

[0053] Preferably, the width of the portion of the retention element increases to a dimension which is larger than a dimension of the retention aperture, and the step of attaching the second portion of the fenestration product to the second part of the attachment device comprises exerting a force on the retainer member to retain the retainer member in the retention aperture.

[0054] Preferably, the method further comprises:

moving the second part of the attachment device and the attached second portion of the fenestration product from the second position to the first position and attaching the second portion of the fenestration product to the second part of the attachment device using a fixing element.

[0055] Preferably, the method further comprises:

removing the retention element from the second portion of the fenestration product and the second part of the attachment device after the second portion of the fenestration product is attached to the second part of the attachment device using the fixing element.

[0056] Preferably, the method comprises:

providing at least one further retention element and attaching the second portion of the fenestration product to the second part of the attachment device using the at least one further retention element.

[0057] In a fourth aspect of the invention, we provide a kit for assembling a fenestration product, the kit comprising:

first and second portions of a fenestration product,
an attachment device comprising a first part which is movably attached to a second part, the first part of the attachment device being configured to attach to the first portion of the fenestration product when the second part of the attachment device is in a first position relative to the first part of the attachment device, and
a retention element which is configured to be attached to the second part of the attachment device, the second portion of the fenestration product being configured to be attached to the second part of the attachment device using the retention element when the second part of the attachment device is in a second position relative to the first part of the attachment device.

[0058] Preferably, the kit is configured to be assembled according to the method described above.

[0059] In a fifth aspect of the invention, we provide a method of assembling a fenestration product, the method comprising:

providing first and second portions of a fenestration product,
providing an attachment device, the attachment device comprising a first part which is moveably attached to a second part,
attaching the first part of the attachment device to the first portion of the fenestration product with the second part of the attachment device in a first position relative to the first part of the attachment device,
moving the second part of the attachment device relative to the first part of the attachment device from the first position to a second position, and
attaching the second portion of the fenestration product to the second part of the attachment device by a snap-fit or interference-fit.

[0060] In a sixth aspect of the invention, we provide a kit for assembling a fenestration product, the kit comprising:

first and second portions of a fenestration product,
an attachment device comprising a first part which is movably attached to a second part, the first part of the attachment device being configured to attach to the first portion of the fenestration product when the second part of the attachment device is in a first position relative to the first part of the attachment device, and
the second part of the attachment device being configured to attach to the second portion of the fenestration product by a snap-fit or interference-fit.

[0061] Preferably, the first and/or second portions of the fenestration product are provided with detent formations that engage with corresponding detent formations of the attachment device so as to permit a snap-fit engagement when the first and/or second portions of the fenestration product is attached to the attachment device.

[0062] Preferably, the kit is configured to be assembled according to the method described above.

[0063] Further features of the various aspects of the invention are set out in the dependent claims thereto which are appended hereto.

[0064] So that the present invention may be more readily understood, embodiments of the present invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a schematic diagram of a fenestration product in the form of a window,

Figure 2 is a diagrammatic cross-sectional view of a cladding assembly of a preferred embodiment of the invention,

Figures 3-4 are views of the cladding assembly of figure 1 during two different stages of assembly,

Figures 5-7 are diagrammatic cross-sectional views of a cladding assembly of a further embodiment of the invention during three different stages of assembly,

Figure 8 is a diagrammatic cross-sectional view of part of a fenestration product of a further embodiment of the invention with a hinge attached to a first frame,

Figure 9 is a view corresponding to figure 8 showing retention pegs being fitted to the hinge,

Figure 10 is a view corresponding to figure 9, showing the hinge in a closed position,

Figure 11 is a view corresponding to figure 10, showing a second frame being fitted to the hinge,

Figure 12 a diagrammatic perspective view of the fenestration product shown in figure 11, with fixing wedges being inserted into the retention pegs,

Figure 13 is a diagrammatic cross-sectional view of the fenestration assembly during a final stage of the assembly process, and

Figure 14 is a diagrammatic cross-sectional view of part of a fenestration product of a further embodiment of the invention.

[0065] Referring initially to figure 1 of the accompany-

ing drawings, a fenestration product for use with an embodiment of the invention is, in one embodiment, in the form of a window 1. However, it is to be appreciated that other embodiments of the invention are for use with other fenestration products that cover or close an opening of a building, such as panels, doors, folding/sliding doors, bi-fold doors and inline sliding doors. Embodiments of the invention are also for use with roofing products that preferably incorporate a glazing unit, such as conservatory roofing panels, products or skylights.

[0066] Further embodiments of the invention are for use with fenestration products which do not incorporate a glazing unit but instead incorporate an opaque cover panel.

[0067] The window 1 of one preferred embodiment comprises a generally rectangular frame incorporating a core element 2. The core element 2 supports a glazing assembly 3. In other embodiments, the fenestration product may comprise a differently shaped frame.

[0068] The core element 2 comprises a material of low thermal conductivity, such as un-plasticised polyvinyl chloride (PVC-U). In a preferred embodiment of the invention substantially all of the core element 2 is constructed from a material of low thermal conductivity, such as PVC-U. The window 1 further comprises a cladding element which is releasably attached to the core element 2. The cladding element comprises a material which has a higher thermal conductivity than the material of the core element 2. In a preferred embodiment of the invention, substantially all of the cladding element is constructed from a high thermal conductivity material, such as aluminium.

[0069] Referring now to figure 2 of the accompanying drawings, the core element 2 which forms part of the core of the frame 1 comprises an outer body 4 which is of generally rectangular cross-section. A plurality of interconnected dividing struts 5 are provided within the outer body 4. The dividing struts 5 each connect an opposing wall of the outer body 4 and define inner chambers 6 which are bounded by the divider struts 5 and/or the outer body 4. The divider struts 5 strengthen the core element 2 by minimising lateral or torsional deformation of the outer body 4.

[0070] The divider struts 5 and the inner chambers 6 provide a thermal insulation barrier within the core element 2 which minimises the overall thermal conductivity through the profile of the core element 2. This provides the core element 2 with a relatively low overall thermal conductivity across its profile which minimises heat loss through the profile of the core element 2.

[0071] A first cladding element 7 is releasably attached to one side of the core element 2 and a second cladding element 8 is attached to the other side of the core element 2. The first and second cladding elements 7, 8 are each of a material having a higher thermal conductivity than the material of the core element 2. In a preferred embodiment of the invention, the first and second cladding elements 7, 8 comprise aluminium. The first and second cladding elements 7, 8 provide durable and aesthetically pleasing outer surfaces that clad the faces of the core element 2.

[0072] The first cladding element 7 comprises a generally planar elongate body 9 which is dimensioned to cover a portion of the core element 2 to clad the core element 2. The first cladding element 7 incorporates reinforcement ridges 10 which extend at least partly along the length of the planar elongate body 9 to increase the rigidity of the planar body portion 9.

[0073] The first cladding element 7 is releasably attached to the core element 2 by a first attachment arrangement 11 and a second attachment arrangement 12. The first and second attachment arrangements 11, 12 are described in more detail below.

[0074] The first cladding element 7 comprises a glazing assembly support formation 13. In other embodiments the glazing assembly support formation 13 is omitted. The glazing assembly support formation 13 comprises a seal recess 14 which is configured to receive a seal. The seal contacts a glazing assembly which is installed adjacent the core element 2 when the fenestration product is fully assembled.

[0075] The first attachment arrangement 11 comprises a first attachment formation which comprises a projection 15. In this embodiment, the first attachment formation is provided on the core element 2. However, in other embodiments, the first attachment formation is provided on the first cladding element 7.

[0076] In this embodiment, the projection 15 is formed integrally with the cladding element 2 as a ridge that extends from a surface of the outer wall 4 of the cladding assembly 2. The projection comprises a first, generally planar side wall 16 and a rounded top surface 17 which extends from the upper end of the first side wall 16. The rounded upper surface 17 is provided with a flattened portion 18 at least partly along its length. The rounded upper surface 17 is connected to a second side wall 19 which extends from the rounded surface 17 to join a substantially planar first side face 20 of the core element 2.

[0077] The second side wall 19 of the projection 15 comprises a pip element 21 which projects outwardly from the side of the second side wall 19. In this embodiment, the pip element 21 is deformable and the pip element 21 is configured to deform when a force in excess of a predetermined level is applied to the pip element 21.

[0078] The first attachment arrangement 11 comprises a second attachment formation which, in this embodiment, is provided on the cladding element 7. However, it is to be appreciated that in other embodiments the first attachment formation is provided on the cladding element 7 and the second attachment formation is provided on the core element 2.

[0079] The second attachment formation comprises at least one engagement surface that at least partly surrounds an open ended recess. In this embodiment, the second attachment formation comprises three engagement surfaces 22-24 that at least partly surround an open

ended recess 25.

[0080] The first engagement surface 22 comprises one wall of a hook member 26 which is provided on the cladding element 7. The second engagement surface 23 provides a generally planar base of the recess 25. The hook member 26 extends from the second engagement surface 23 at an offset angle relative to a substantially perpendicular plane extending from the base engagement surface 23. In the preferred embodiment, the offset angle is substantially two degrees. In some embodiments, the offset angle may be in the range of about 0.5 to about 10 degrees, such as about 0.5 to about 5 degrees, such as about 0.5 to about 4 degrees, *e.g.* about 1 to about 3 degrees. The hook member 26 provides the first engagement surface 22 at an offset lead-in angle relative to the planar body 9 of the cladding element 7.

[0081] The second engagement surface 23 extends from one end of the hook member 26 to the third engagement surface 24. The third engagement surface 24 extends substantially perpendicularly from the second engagement surface 23 to join the planar body portion 9 of the cladding element 7.

[0082] The offset angle of the first engagement surface 22 provides the recess 25 with an enlarged portion at or adjacent to the second engagement surface 23 and a narrowed portion which is positioned closer to the open end of the recess 25.

[0083] Referring now to figure 3 of the accompanying drawings, the first attachment arrangement 11 permits the cladding element 7 to be releasably attached to the core element 2 by initially hooking the hook member 26 partly over the projection 15, with the planar body 9 of the cladding element 7 at an angle relative to the planar body 20 of the core element 2. The angle of the cladding element 7 is then adjusted by pivoting the cladding element 7 about the projection 15 in an arc in the direction indicated by arrow 27 in figure 3.

[0084] Referring now to figure 4 of the accompanying drawings, as the cladding element 7 continues to pivot about the projection 15, the third engagement surface 24 engages the pip element 21. The offset angle of the hook member 26 causes the third engagement surface 24 to exert a force on the pip element 21 which is in excess of a predetermined level required to deform the pip element 21. Consequently, as the cladding element 7 to rotates about the projection 15 until the planar body 9 of the cladding element 7 is substantially parallel to the planar face 20 of the cladding element 2, the pip element 21 is at least partly deformed. The deformation ensures a tight fit between the projection 15 and the engagement surfaces 22-24. This, in combination with the lead-in angle of the hook member 26 creates a secure attachment between the attachment formations which provides a reliable and strong connection that attaches the cladding element 7 to the core element 2.

[0085] Referring again to figure 2 of the accompanying drawings, the second attachment arrangement 12 comprises third and fourth attachment formations. One of the third and fourth attachment formations is provided on the core element 2 and the other is provided on the cladding element 7.

[0086] In this embodiment, the third attachment formation is provided on the core element 2. The third attachment formation comprises a first retaining member 28 which comprises an elongate body 29 with a latch arrangement 30 provided substantially at or adjacent one end. In this embodiment, the latch arrangement 30 is a rounded end with a projecting engagement face.

[0087] A biasing surface 31 is provided on the one side of the first retaining member, opposite the latch arrangement 30.

[0088] The third attachment formation comprises a second retaining member 32 which is spaced apart from the first retaining member 28. The second retaining member 32 comprises an elongate body 33 with a latch arrangement 34 provided substantially at or adjacent one end. It is, however, to be appreciated that in other embodiments of the invention, the second retaining member 32 may be omitted.

[0089] In this embodiment, the fourth attachment arrangement is provided on the cladding element 7. The fourth attachment formation comprises a third retaining member 35 which comprises an elongate body 36 with two latch arrangements 37, 38 which are positioned on each side of the elongate body 36 at or adjacent one end.

[0090] In embodiments where the second retaining member 32 is omitted, only one respective latch arrangement 37, 38 is provided on the third retaining member 35.

[0091] The fourth attachment formation comprises a retainer surface 39 which extends generally perpendicularly from the planar body 9 of the cladding element 7 at a position which is spaced apart from the third retaining member 35. The retainer surface 39 preferably incorporates a ridge element 40 which protrudes from the retainer surface 39.

[0092] Referring now to figure 3 of the accompanying drawings, the third and fourth attachment formations of the second attachment arrangement 12 are releasably attached to one another as the cladding element 7 pivots about the projection 15 in the direction indicated generally by arrow 27. The third retaining member 35 is moved to a position which is adjacent the first retaining member 29. The latch arrangements 37, 38 on the third retaining member 35 deform the latch arrangements on the first and second retaining members 28, 32. The latch arrangements on the first and third retaining members 28, 35 latch onto one another with an interference fit to resist movement of the cladding element 7 away from the core element 2.

[0093] The retainer surface 39 and the ridge element 40 exert a biasing force against the biasing surface 31 of the first retaining member 29 which biases the latch arrangement of the first retaining member 29 into engagement with one of the latch arrangements on the third retaining member 35. The biasing force strengthens the interference fit by which the second attachment arrange-

ment releasably attaches the cladding element 7 to the core element 2.

[0094] In a further embodiment of the invention, some of the latch arrangements are replaced with recesses that are configured to at least partly receive a corresponding latch arrangement. The recess and latch arrangement configurations of this embodiment enable the portions of the core element 2 and the cladding element 7 to be releasably attached to one another with an interference fit.

[0095] Referring again to figure 2 of the accompanying drawings, the second cladding element 8 is releasably attached to the core element 2 by a first attachment arrangement 41 and a second attachment arrangement 42.

[0096] The first attachment arrangement 41 comprises a hook member 43 which is provided on the second cladding element 8. The hook member 43 defines an open ended recess 44 which receives at least part of a projection 45 which is provided on the core element 2.

[0097] The second attachment arrangement 42 is identical to the second attachment arrangement 12 which releasably attaches the first cladding element 7 to the core element 2. The second attachment arrangement 42 of the second cladding element 8 comprises the same components as the second attachment arrangement 12 of the first cladding element 7.

[0098] Referring to figure 3 of the accompanying drawings, the second cladding element 8 is releasably attached to the core element 2 by initially hooking the hook member 43 over the projection 45. The second cladding element 8 is then pivoted about the projection 45 in the direction indicated generally by arrow 46 in figure 3.

[0099] As the second cladding element 8 pivots about the projection 45, the second attachment arrangement 42 releasably attaches the second cladding element 48 to the core element 2 in the manner described above regarding the second attachment arrangement 12 of the first cladding element 7.

[0100] It is to be appreciated that in further embodiments of the invention, a fenestration product comprises either one of the first and second attachment arrangements 11, 12 along with a further attachment arrangement to releasably attach a cladding element to a core element.

[0101] Referring to figure 5 of the accompanying drawings, a further embodiment of the invention comprises a first cladding element 47 and a second cladding element 48 which are each releasably attached to a respective side of a core element 49. In this embodiment, each of the first and second cladding elements 47, 49 are releasably attached to the core element 49 by first attachment arrangements 50, 51 which incorporate the same components as the first attachment arrangements 11, 12 of the embodiment described above.

[0102] The first and second cladding elements 47, 48 are releasably attached to the core element 49 by second attachment arrangements 52, 53 which comprise the same components as the second attachment arrangement 12 of the embodiment described above.

[0103] The hook member of each of the first attachment arrangements 50, 51 is hooked partly over the projection provided on the core element 49. The first and second cladding elements 47, 48 are then pivoted about the projection in the directions indicated generally by arrow 54, 55 in figure 5. The first and second cladding elements 47, 48 pivot until the components of the second attachment arrangements 52, 53 on the cladding elements 47, 48 and the core element 49 contact one another, as shown in figure 6. The second attachment arrangements 52, 53 attach the first and second elements 47, 48 to the core element 49 when the planar portions of the cladding elements 47, 48 sit flush against the planar side portions of the core element 49, as shown in figure 7.

[0104] Embodiments of the invention have been described in a manner that the cladding elements are releasably attached to the core element. In some embodiments, however, the cladding elements may be permanently attached to the core element, without departing from the scope of the present invention. The permanent attachment may be as a result of the mechanical fit between the cladding elements and the core element, or the permanent attachment may be achieved by providing additional bonding, such as an adhesive.

[0105] A method of assembly a fenestration product of an embodiment of the invention will now be described with reference to figures 8 to 13 of the accompanying drawings.

[0106] Referring to figure 8 of the accompanying drawings, a first portion 56 of a fenestration product comprises a core element 57 and two cladding elements 58, 59. The fenestration product may be any type of fenestration product. In this embodiment, the core element 57 and the cladding elements 58, 59 are identical to the core element 49 and the cladding elements 47, 48 of the embodiment described above and shown in figure 7.

[0107] The first portion 56 of the fenestration product is assembled as described above with reference to and as shown in figures 5 to 7. It is, however, to be appreciated that the core element 57 and the cladding elements 58, 59 may be different configurations to those described above. In further embodiments, one or both of the cladding elements 58, 59 are omitted.

[0108] The fenestration product comprises an attachment device which, in this embodiment, is a hinge 60. The hinge 60 comprises a first part 61 which is shaped to fit against a corresponding portion of the core element 57. The first part 61 of the hinge 60 is provided with a female of a sealing arrangement 62.

[0109] The first part 61 of the hinge 60 is attached to the first portion 56 of the fenestration product by two fixing screws 63, 64 which are screwed through portions of the hinge 60 and the core element 57. The first part 61 of the hinge 60 is thus attached to the first portion 56 of the fenestration product.

[0110] The hinge 60 comprises a second part 65 which is pivotally connected to the first part 61 by a pivot ar-

rangement 66. In a further embodiment of the invention, the pivot arrangement 66 is an elastically deformable element which deforms to allow the first and second parts 61, 61 of the hinge 60 to move relative to one another.

[0111] The second part 65 of the hinge 60 is shaped to fit to the surface of a second portion of the fenestration product which is described below. The second part 65 of the hinge 60 comprises a male sealing member 67 which is configured to engage and seal with the female sealing member 62 on the first part 61 of the hinge 60.

[0112] The first and second parts 61, 65 of the hinge 60 are movable relative to one another about the pivot arrangement 66. The second part 65 of the hinge 60 can be moved to a first position, as shown in figure 8 with the hinge 60 being open. In this embodiment, the first and second parts 61, 65 of the hinge 60 are generally parallel to one another when the first and second parts 61, 65 are in the first position.

[0113] Referring now to figure 9 of the accompanying drawings, once the first part 61 of the hinge 60 is attached to the first portion 56 of the fenestration product, a retention element is attached to the second part 65 of the hinge 60. In this embodiment, two retention elements 68, 69 are attached to the second part 65 of the hinge 60. The retention elements 68, 69 are each elongate elements which comprise an enlarged end 70, 71. The retention elements 68, 69 comprise generally frusto-conical ends 72, 73 which are remote from the enlarged ends 70, 71.

[0114] The retainer elements 68, 69 each incorporate a respective retention aperture 74, 75 at or adjacent the frusto-conical shaped ends 72, 73. In this embodiment, the retention apertures 74, 75 are each elongate slot-shaped apertures which are formed through part of the length of each retention element 68, 69.

[0115] The retention elements 68, 69 are attached to the second part 65 of the hinge 60 by being inserted through respective apertures 76, 77 provided in the second part 65 of the hinge 60. The retention elements 68, 69 are inserted through the apertures 76, 77 until the enlarged ends 70, 71 are adjacent to the apertures 76, 77.

[0116] Referring now to figure 10 of the accompanying drawings, once the retention elements 68, 69 are attached to the second part 65 of the hinge 60, the second part 65 is moved relative to the first part 61 to a second position, as shown in figure 10. The second part 65 is moved relative to the first part 61 by pivoting the second part 65 about the pivot arrangement 66 until the second part 65 is superimposed on the first part 61. In this embodiment, the hinge 60 is closed when the first and second part 61, 65 are in the second position.

[0117] The male sealing member 67 engages the female sealing member 62 when the first and second parts 61, 65 are in the second position. The male and female sealing members 67, 62 provide a sealing arrangement between the first and second parts 61, 65 of the hinge 60, when the hinge is closed in the second position.

[0118] The retention elements 68, 69 extend perpendicularly outwardly from the second part 65 of the hinge 60. The retention elements 68, 69 are each substantially parallel to the screws 63, 64 that attach the first part 61 of the hinge 60 to the first portion 56 of the fenestration product.

[0119] Referring now to figure 11 of the accompanying drawings, a second portion 78 of the fenestration product is attached to the second part 65 of the hinge 60 using the retention elements 68, 69. In this embodiment, the second portion 78 of the fenestration product comprises the cladding assembly described above and shown in figures 2-4. However, it is to be appreciated that the second portion 78 of the fenestration product may comprise a different core element and/or cladding assembly arrangement.

[0120] The second portion 78 of the fenestration product is attached to the hinge 60 by inserting the second portion 78 of the fenestration product over the retention elements 68, 69. At least part of the elongate body of each retention element 68, 69 extends through a respective aperture 79, 80 provided in the second portion 78 of the fenestration product.

[0121] Each aperture 79, 80 extends through the entire profile of the second portion 78 of the fenestration product. The retention elements 68, 69 are of sufficient length so that an end portion of each of the retention elements 68, 69 extends from the end of each respective aperture 79, 80, as shown in figure 11. The retention apertures 74, 75 in each of the retention elements 68, 69 extend out through each respective aperture 79, 80. Part of each of the retention apertures 79, 80 remains within the core of the second portion 78 of the fenestration product.

[0122] Referring now to figure 12 of the accompanying drawings, a retainer member 81, 82 is inserted through each respective aperture 74, 75 in each retention element 68, 69. In this embodiment, each retainer member 81, 82 comprises an elongate base 83, 84 which sits flush against the core of the second portion 78 of the fenestration product. Each retainer member 81, 82 comprises an enlarged end 85, 86 which protrudes away from the base 83, 84. Each retainer member 81, 82 comprises an elongate body 87, 88 which has a width that generally increases along the length of part of the retainer member 81, 82 towards to the enlarged end 85, 86.

[0123] In this embodiment, each retainer member 81, 82 performs the function of a wedge element that is wedged into one of the retention apertures 74, 75 in each retention element 68, 69.

[0124] The width-increasing profile of each retainer member 81, 82 ensures that each retainer member 81, 82 exerts a biasing force on the respective retention element 68, 69 as the retainer member 81, 82 is pushed into the retention aperture 74, 75. The biasing force acts to pull each retainer element 68, 69 in a direction away from the second part 65 of the hinge 60. The biasing force acts to pull the second portion 78 of the fenestration product into a secure attachment with the hinge 60.

[0125] The retainer members 81, 82 are attached to each respective retention element 68, 69 when the first

and second portions 56, 78 of the fenestration product are positioned adjacent one another when the hinge 60 is closed. The assembly method enables the second portion 78 of the fenestration product to be closed against the first portion 56 and to align relative to the first portion 56 before the second portion 78 is securely attached to the hinge 60 by inserting the retainer members 81, 82 into the retention apertures 74, 75. The first and second portions 56, 78 of the fenestration product are thus aligned correctly for closure relative to one another.

[0126] The second portion 78 of the fenestration product can remain attached to the hinge 60 using the retention elements 68, 69 and the retainer members 81, 82. The second portion 78 of the fenestration product can be pivoted about the pivot arrangement 66 of the hinge 60 to move the second portion 65 of the hinge 60 relative to the first part 61 to the first position, as shown in figure 13. Further fixings can then the used to attach the second part 65 of the hinge 60 to the second portion 78 of the fenestration product. For instance, screws can be screwed through the hinge 60 and the second portion 78 of the fenestration product to securely attach the two to one another. If necessary, the retainer members 81, 82 can be removed from the retention elements 68, 69 and the retention elements 68, 69 can be removed from the fenestration product.

[0127] It is to be appreciated that the retention elements 68, 69 and the retainer members 81, 82 provide a releasable attachment between the hinge 60 and the second portion 78 of the fenestration product. The temporary attachment enables the first and second portions 56, 78 of the fenestration product to be assembled whilst minimising the possibility of the first and second portions 56, 78 of the fenestration product from becoming misaligned during assembly.

[0128] Methods of assembly of fenestration products of further embodiments of the invention will now be described with reference to figure 14 of the accompanying drawings.

[0129] Referring now to figure 14 of the accompanying drawings, there is shown a simplified diagram of the first and second portions 56, 78 of the fenestration product and the hinge 60. It will be appreciated that the first and second portions 56, 78 of the fenestration product include respective pairs of detent formations 100a, 100b which define apertures within which the respective first and second parts 61, 65 of the hinge 60 are receivable. The first and second parts 61, 65 of the hinge 60 also include pairs of detent formations 101 a, 101 b which correspond with the pairs of detent formations 100a, 100b on the first and second portions 56, 78, so as to provide a snap-fit arrangement as the first and second parts 61, 65 of the hinge 60 are received by the first and second portions 56, 78 of the fenestration product.

[0130] It is to be appreciated that in place of the detent formations 100a, 100b; 101 a, 101 b, the first and second portions 56, 78 of the fenestration product may be configured to receive the respective first and second parts 61, 65 of the hinge 60 by an interference fit (not shown).

[0131] The snap-fit or interference fit arrangements may be utilised as an alternative or in addition to utilising the retention elements 68, 69 as described above with reference to figures 8 to 13 to attach the first and second portions 56, 78 of the fenestration product to the respective first and second parts 61, 65 of the hinge 60.

[0132] The retention elements 68, 69, snap-fit or interference fit arrangements are advantageous since they provide an interim fix between the first and second portions 56, 78 of the fenestration product and the respective first and second parts 61, 65 of the hinge 60, to enable an assembler to easily assemble the fenestration product before applying all of the permanent fixings. The inventors have discovered that a single assembler can assemble such a product, whereas prior art products require two or more assemblers.

[0133] When used in this specification and the claims, the term "comprises" and "comprising" and variations thereof mean that specified features, steps or integers and included. The terms are not to be interpreted to exclude the presence of other features, steps or compounds.

[0134] The features disclosed in the foregoing description, or the following claims, or the accompanying drawings, expressed in their specific forms or in terms of a means for performing the disclosed function, or a method or process for attaining the disclosed result, as appropriate, may, separately, or in any combination of such features, be utilised for realising the invention in diverse forms thereof.

Claims

1. A cladding assembly for a fenestration product, the assembly comprising:

   a core element,
   a cladding element,
   a first attachment formation comprising a projection,
   a second attachment formation comprising at least one engagement surface that at least partly surrounds an open ended recess, the recess having an enlarged portion and a narrowed portion, wherein the projection is configured to be at least partly received in the recess to releasably or permanently attach the first attachment formation to the second attachment formation, and wherein the core element carries one of the attachment formations and the cladding element carries the other attachment formation such that the cladding element can be releasably or permanently attached to the core element by the first and second attachment formations.

2. The cladding assembly of claim 1, wherein the core

element carries the first attachment formation and the cladding element carries the second attachment formation.

3. The cladding assembly of any one of the preceding claims, wherein the projection of the first attachment formation is an elongate ridge element which incorporates a substantially rounded portion.

4. The cladding assembly of any one of the preceding claims, wherein the projection of the first attachment formation comprises a deformable pip element which is configured to deform when a biasing force in excess of a predetermined level is exerted on the pip element by the engagement surface of the second attachment formation as the cladding element is releasably or permanently attached to the core element.

5. The cladding assembly of any one of the preceding claims, wherein the engagement surface comprises a first surface, a second surface extending substantially perpendicularly from the first surface and a third surface extending substantially perpendicularly from the second surface, the first surface being offset at an offset angle relative to a substantially perpendicular plane extending from the base surface to provide the recess with the enlarged and narrowed portions.

6. The cladding assembly of claim 5, wherein the offset angle is in the range of about 0.5 to about 10 degrees.

7. The cladding assembly of claim 5 or claim 6, wherein the offset angle is, or is substantially, two degrees.

8. The cladding assembly of any one of the preceding claims, wherein the assembly comprises:

a third attachment formation comprising a first retaining member, the first retaining member comprising an elongate body with a latch arrangement substantially at or adjacent one end.

9. The cladding assembly of claim 8, wherein the third attachment formation comprises a second retaining member which is spaced apart from the first retaining member, the second retaining member comprising an elongate body with a latch arrangement substantially at or adjacent one end.

10. The cladding assembly of claim 8 or claim 9, wherein the assembly further comprises:

a fourth attachment formation comprising a third retaining member, the third retaining member comprising an elongate body with a latch arrangement substantially at or adjacent one end.

11. The cladding assembly of claim 10, wherein the third retaining member comprises two latch arrangements, one latch arrangement being positioned on each side of the elongate body of the third retaining member.

12. The cladding assembly of claim 10 or claim 11, wherein the fourth attachment formation comprises a retainer surface which is configured to contact the first retaining member on the opposite side of the first retaining member to the latch arrangement of the first retaining member, the retainer surface providing a barrier which at least partly blocks movement of the first retaining member to retain the third and fourth attachment formations in engagement with one another.

13. The cladding assembly of any one of claims 8 to 12, wherein the or each latch arrangement is a latch projection which extends from one side of the respective retaining member AND/OR wherein the or each latch arrangement is a latch projection which extends from one side of the respective retaining member and wherein the or each latch arrangement comprises at least one further latch projection extending from a further side of each respective retaining member.

14. The cladding assembly of any one of claims 8 to 13, wherein the or each latch arrangement comprises a recess provided in each respective retaining member.

15. A fenestration product comprising the cladding assembly of any one of the preceding claims.

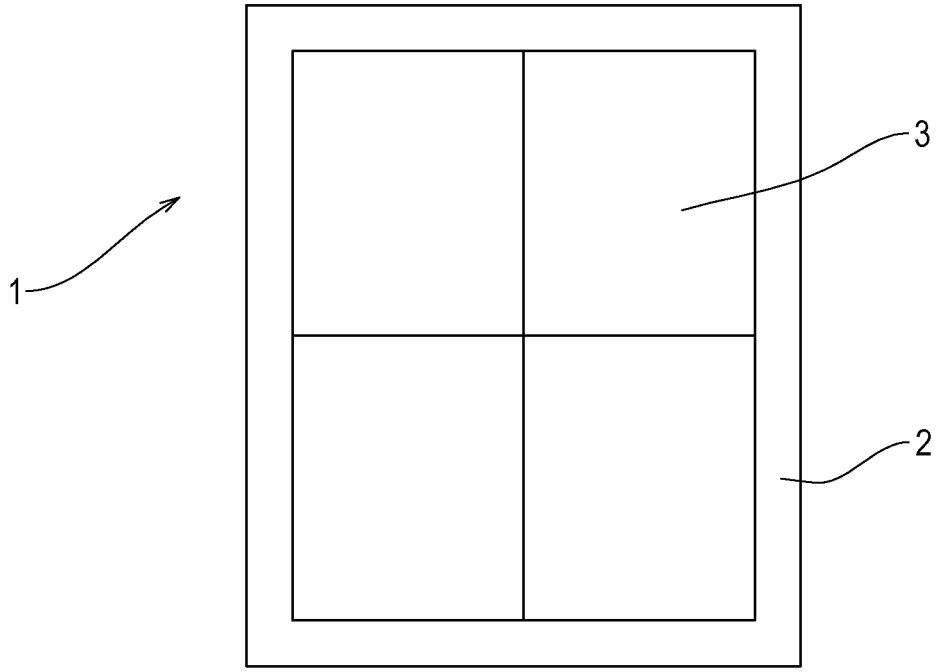

Figure 1

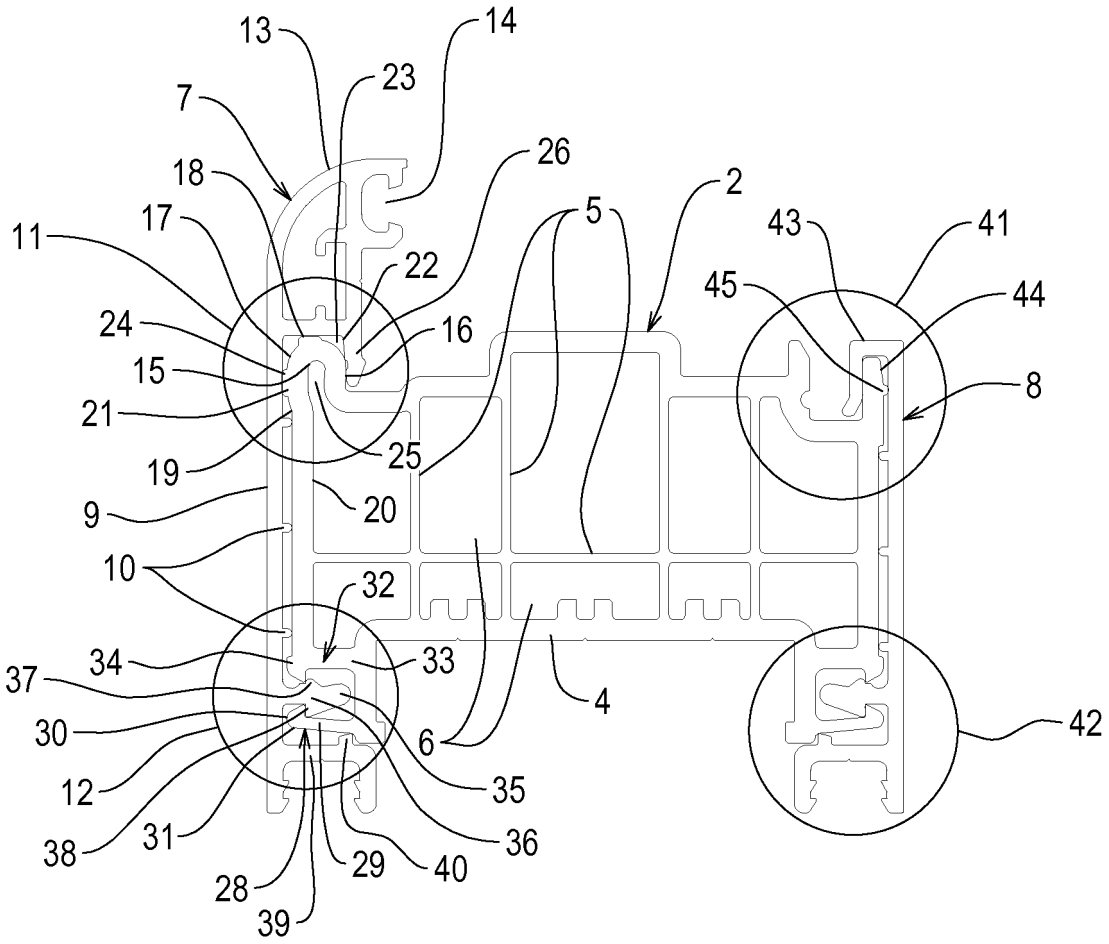
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Figure 2

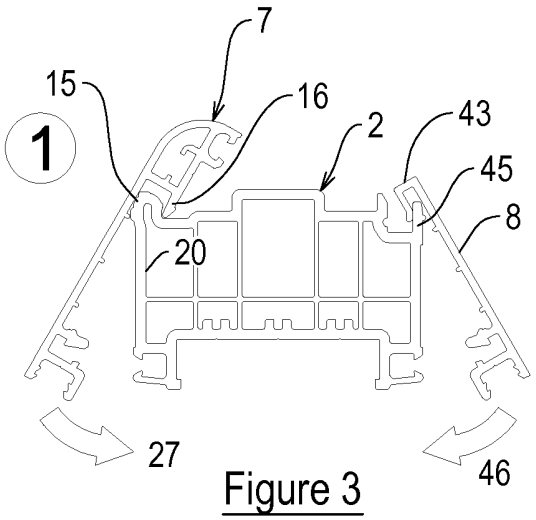

Figure 3

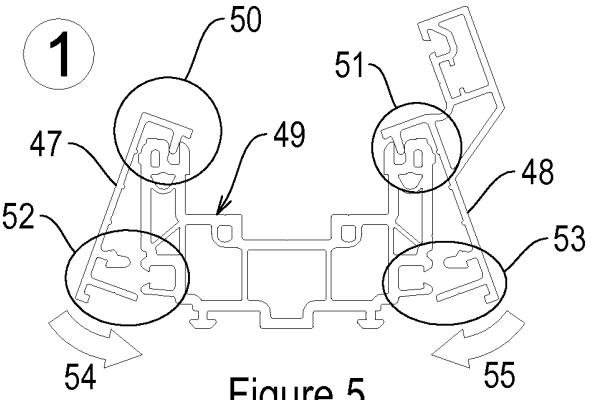

Figure 5

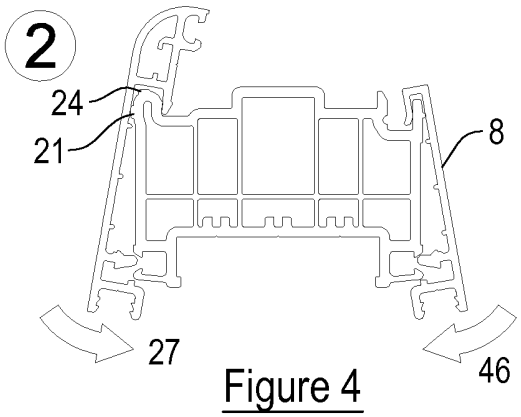

Figure 4

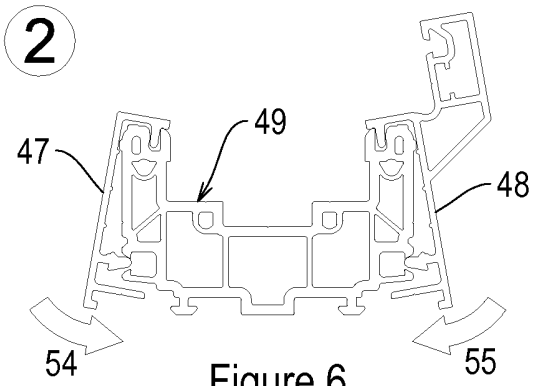

Figure 6

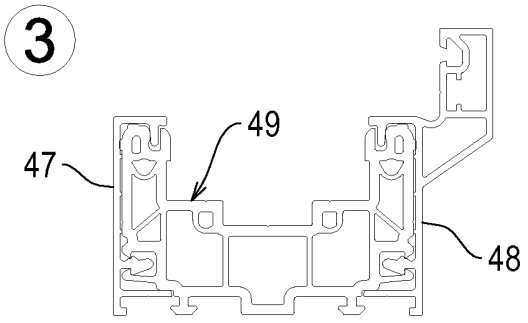

Figure 7

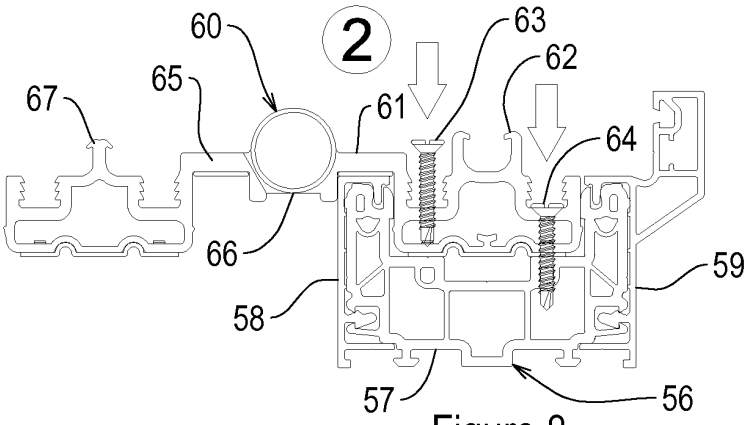

Figure 8

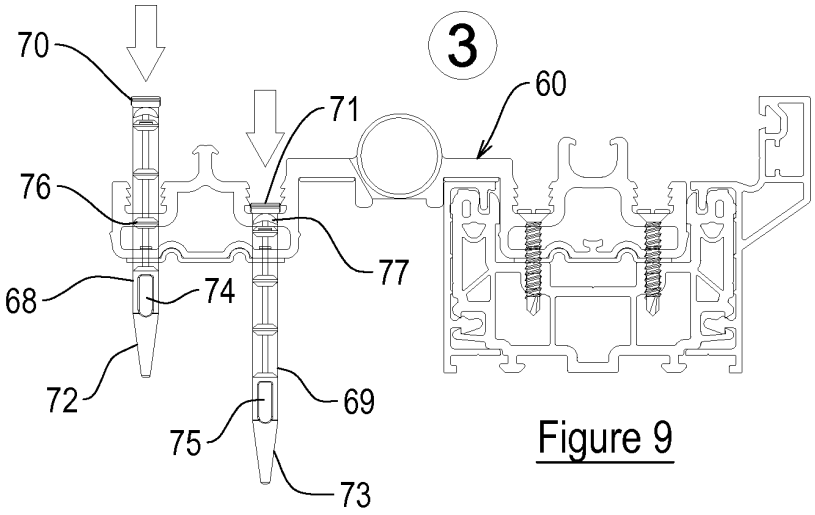

Figure 9

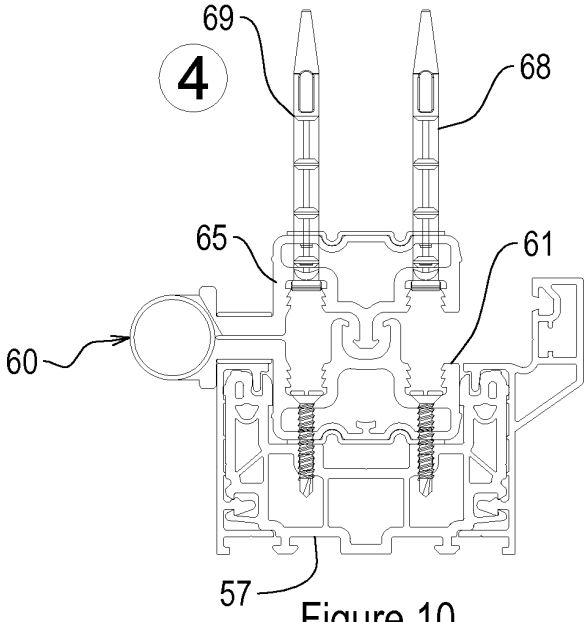

Figure 10

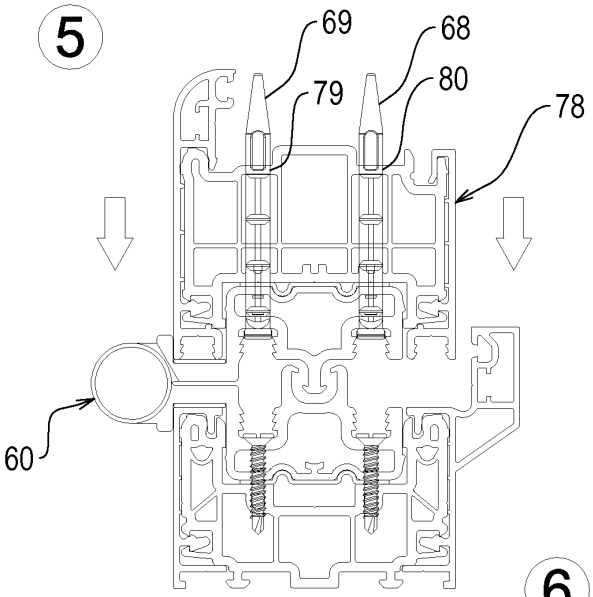

Figure 11

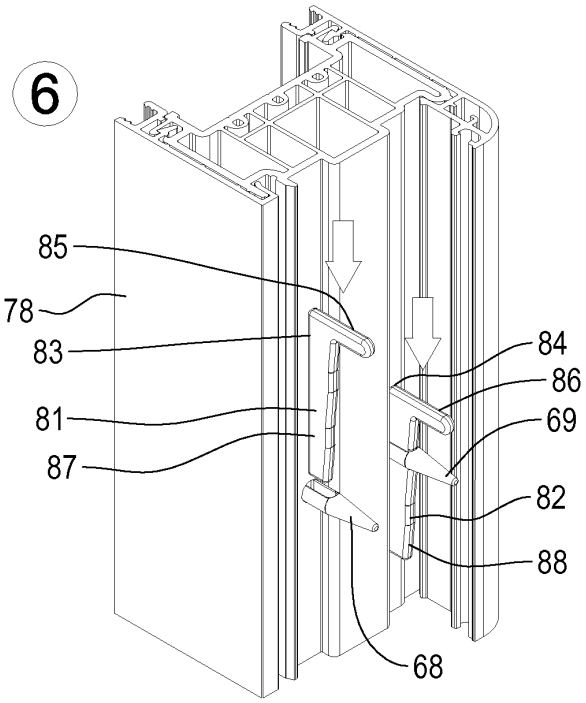

Figure 12

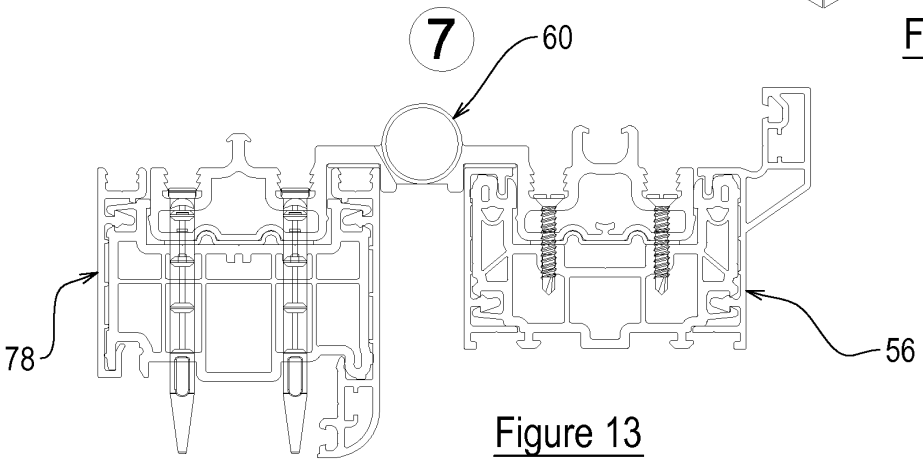

Figure 13

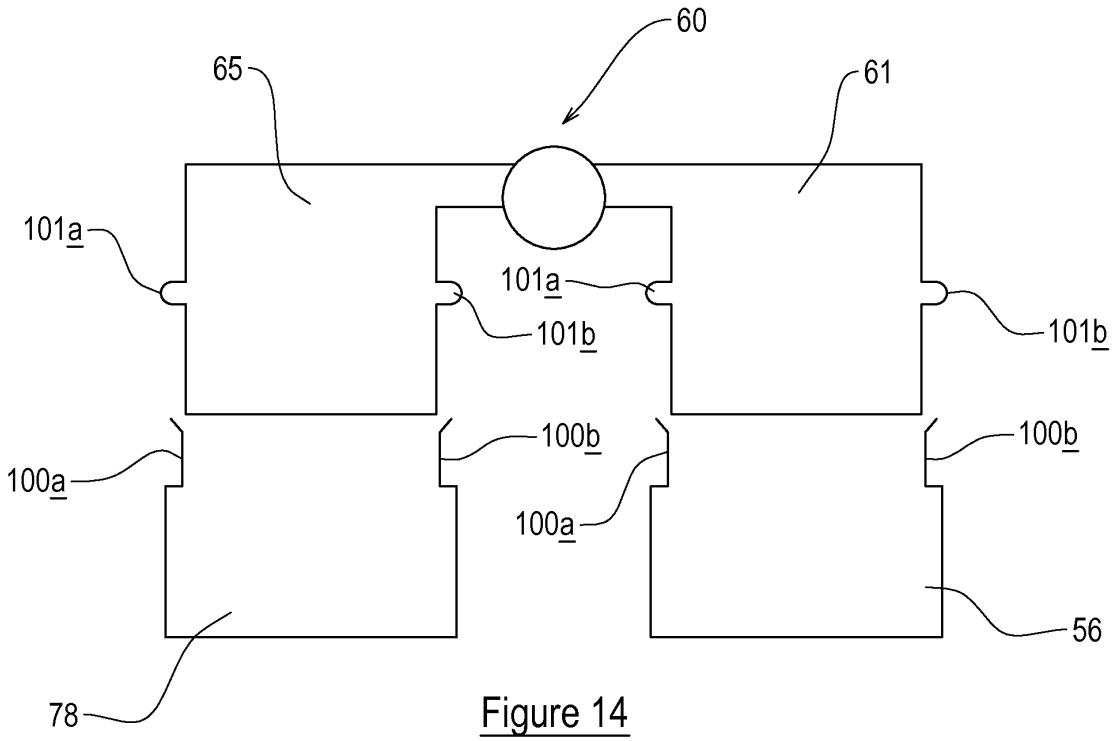

Figure 14

Europäisches Patentamt
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EUROPEAN SEARCH REPORT

Application Number
EP 14 16 4606

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 2012/104440 A2 (BOWATER BUILDING PRODUCTS LTD [GB]; HOELLRIGL ROBERT FRIEDRICH [GB]) 9 August 2012 (2012-08-09) * figures 1 a-c *	1-13	INV. E06B3/30 E06B1/30
X	GB 2 487 903 A (BOWATER BUILDING PRODUCTS LTD [GB]) 15 August 2012 (2012-08-15) * figure 1 *	1-15	

TECHNICAL FIELDS SEARCHED (IPC)
E06B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	16 June 2014	Cobusneanu, D

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 14 16 4606

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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16-06-2014

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2012104440 A2	09-08-2012	NONE	
GB 2487903 A	15-08-2012	NONE	

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82