



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
28.07.2021 Bulletin 2021/30

(51) Int Cl.:
E06B 3/58 (2006.01)

(21) Application number: **21153852.5**

(22) Date of filing: **27.01.2021**

(84) Designated Contracting States:
**AL 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 RS SE SI SK SM TR**
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(30) Priority: **27.01.2020 GB 202001132**

(71) Applicant: **Garner Aluminium Extrusions Limited**
Ormonde Drive, Denby Hall Business Park
Derby
Derbyshire DE5 8LE (GB)

(72) Inventor: **PARRY, Philip Dayton**
Derby, Derbyshire DE5 8LE (GB)

(74) Representative: **Foot, Paul Matthew James**
Withers & Rogers LLP
4 More London Riverside
London
Greater London SE1 2AU (GB)

(54) **A GLAZING BEAD**

(57) A glazing bead (14) for retaining a glazing unit (18) within a frame member (12d), the glazing bead (14) comprising;
a structural support member (22) having a cross section extending along a longitudinal axis, wherein the cross

section comprises an engagement formation (34)
an exterior trim (20) fastened to an exterior surface of the structural support member (22) and having a cross section which extends along a longitudinal axis.

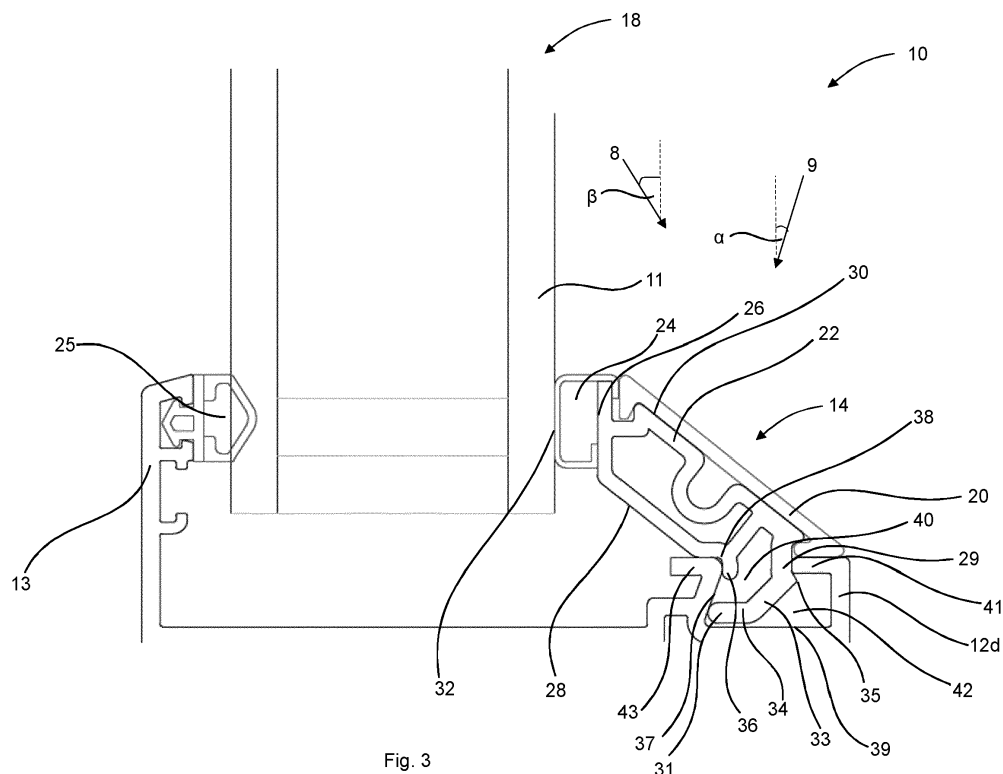


Fig. 3

Description

FIELD

[0001] The present teachings relate to a composite glazing bead assembly for a fenestration unit, and a frame assembly comprising said composite glazing bead and a frame member.

BACKGROUND

[0002] Modern fenestration units typically comprise a frame assembly, into which a panel, such as a glass pane, or a sealed double glazing unit, is inserted in a direction generally normal to the plane of the panel. Typically, such frame assemblies are pre-assembled prior to the panel being inserted. A glazing bead is then secured to the frame assembly after the panel has been inserted into the frame assembly, along with a gasket, for securing and sealing said panel within the frame assembly.

[0003] Frames for a fenestration unit can be manufactured from a variety of materials, for example aluminium and uPVC. Commonly, the glazing bead and the frame are manufactured using the same material. For uPVC windows glazing beads are commonly secured to the frame using a snap-fit connection. As uPVC beads are more flexible when substantially flat with largely parallel faces (as opposed to box sections which will buckle), they are able to be bent into position thus enabling each end to feature a 45° mitre which aligns with the 45° mitre of the frame. Mitred beads can also feature a form other than flat, an oval or scotia form for example and maintain an alignment of those forms at the corners. uPVC beads are also known to feature a co-extruded soft gasket, often black, which saves time on window/door manufacture and installation.

[0004] The use of uPVC beads with aluminium systems is generally not considered acceptable in the fenestration industry and is generally not cost effective after essential spray painting to match the colour and gloss levels of the aluminium frames is carried out. This means aluminium windows commonly use an aluminium glazing bead to retain the glazing unit. However, aluminium is relatively lacking in resilience. Therefore, mitred beads with snap-fit connections or a shuffle type assembly, as is known for uPVC glazing beads, are not possible.

[0005] Other options for glazing with aluminium beads result in potential damage to the pair of opposing beads installed first, since the second pair of opposing beads have uncoated and often burred cut ends which pass over the visible faces of the first until seated correctly in their final assembled position.

[0006] Consequently, it is typical for aluminium beads to be a loose fit within a channel of a frame, and to be secured in place by fitting a gasket between the bead and the fenestration unit to bias the bead into engagement within the frame. If the gasket is not installed cor-

rectly, a tight, uniform and durable seal cannot be achieved. This can lead to poor thermal insulation and weather sealing. In addition, this requires additional labour at the installation stage, adding to the total cost of installation.

[0007] The present teachings seek to overcome or at least mitigate one or more of the problems associated with the prior art.

10 SUMMARY

[0008] A first aspect of the teachings provides a glazing bead assembly for retaining a glazing unit within a frame member, the glazing bead assembly comprising a structural support member having a cross section extending along a longitudinal axis, wherein the cross section comprises an engagement formation an exterior trim fastened to an exterior surface of the structural support member and having a cross section which extends along a longitudinal axis.

[0009] This arrangement enables the bead to be installed and removed without damage to enable easy removal of the window pane, for example for maintenance. The separate exterior trim enables the glazing bead to be customisable based on design preferences, for example the material of the window frame and the desired shape of the exterior trim.

[0010] Optionally, the glazing bead assembly further comprises mitred ends.

[0011] Optionally, at least one gasket is mounted to the structural support member.

[0012] Optionally, at least one gasket is coextruded with the structural support member.

[0013] This removes the need for a separate gasket, thereby reducing the number of steps in the manufacturing process and possibly speeding it up. Advantageously, this means fewer parts have to be assembled when the glazing unit is installed and removed.

[0014] Optionally, the structural support member and the exterior trim are mechanically fastened together.

[0015] This may enable the trim to be replaced relatively easily and with minimal damage to either the trim or the structural support member.

[0016] Optionally, the structural support member has at least one formation on the exterior surface, and the exterior trim has at least one corresponding formation on the interior surface to mechanically fasten the structural support member and the exterior trim using a snap fit.

[0017] Optionally, the structural support member has at least one notch on the exterior surface, and the exterior trim has at least one corresponding protrusion on the interior surface to mechanically fasten the structural support member and the exterior trim using a snap fit.

[0018] The snap-fit arrangement enables easy fastening and separating of parts upon installation and removal. Advantageously, this requires a fewer number of parts than alternative fastening mechanisms, making it simpler and more convenient for fitter.

[0019] Optionally, the cross section of the structural support member extends along the longitudinal axis of the structural support member to form a prism.

[0020] Optionally, the cross section of the exterior trim extend along the longitudinal axis of the exterior trim to form a prism.

[0021] The prism shape enables an extrusion process to be used, which reduces the level of post-processing necessary to manufacture the part.

[0022] Optionally, the structural support member and the exterior trim are manufactured from different materials.

[0023] Optionally, the exterior trim is manufactured from aluminium or an aluminium alloy.

[0024] Optionally, the structural support member is manufactured from uPVC.

[0025] This has aesthetic benefits because the non-aluminium interior is hidden, which gives the appearance the whole bead is also aluminium when assembled to a window frame. Manufacturing the structural support member using uPVC is advantageous to the function as it is more compliant than aluminium, meaning it will flex more easily, or in a worst case fail first and will be unlikely to damage the aluminium frame. The amount of aluminium needed is reduced, which lowers manufacturing cost. Aluminium beads are difficult to remove without inflicting damage on either the aluminium frame to the glazing bead itself. Using uPVC as the structural support member is advantageous because it has the ability to absorb energy when deformed elastically without creating permanent deformation. The uPVC support structure avoids the need for the gasket to be separate and therefore to be fitted after the bead to hold it in place. Further the greater flexibility offered by uPVC may permit mitred bead to be fitted with greater ease and a reduced danger of damage to surface coatings during fitting.

[0026] Optionally, the coextruded gasket is manufactured using a thermoplastic elastomer (TPE).

[0027] Using a thermoplastic elastomer (TPE) gasket enables the gasket to be coextruded with the structural support member due to its ability to chemically bond to plastics, which simplifies the manufacturing process. TPE also has the advantage of being lower cost than silicone, which is commonly used to manufacture gaskets.

[0028] Optionally, at least one surface of the exterior trim is in direct contact with at least one wall of the coextruded gasket.

[0029] Both uPVC and aluminium have a low coefficient of friction, meaning they could easily slide against each other, particularly during installation and removal. TPE has a high coefficient of friction, meaning the contact between the TPE gasket and the aluminium surface inhibits sliding.

[0030] Optionally, the cross sectional shape of the exterior trim is any suitable shape.

[0031] This makes the exterior trim customisable and more versatile by having a choice of both material and

shape, e.g. for aesthetic or performance benefits.

[0032] Optionally, the structural support member has a deviation in profile at a substantially central location of the exterior surface, which extends along the longitudinal axis of the structural support member.

[0033] Advantageously, this allows the UPVC structural support member to flex as the aluminium element is clipped on, distributing the bending stress at the centre and reducing the likelihood of the component failing at the centre.

[0034] Optionally, the cross section of the structural support member comprises at least one hollow void, extending along the longitudinal axis of the glazing bead.

[0035] This allows for greater flexibility of the structural support member, less material used in manufacture and improved insulation properties relative to a solid structural support member.

[0036] A second aspect of the teachings provides a frame assembly comprising a frame member for engagement with the glazing bead assembly of any preceding claim, wherein the frame member and the exterior trim are manufactured from at least partially the same material.

[0037] There are still the same aesthetic benefits from visible surfaces having the same finish.

[0038] Optionally, the exterior trim is in direct contact with the frame member on at least the margin thereof remote from the gasket to form a cover between the structural support member and the exterior of the window frame.

[0039] The aluminium trim hides the uPVC structural support member from view, improving the aesthetics of the window frame.

[0040] Optionally, at least one complementary formation configured to mount the engagement formation of the structural support member.

[0041] Optionally, a complementary female formation configured to receive a male engagement formation of the structural support member.

[0042] This is a simple means of securing the glazing bead within the frame member to aid the glazing bead installation and removal processes and retain the glazing unit within the frame. Having the female formation on the frame member doesn't act as a barrier to fitting of glazing unit, as it may if the male formation was on the frame member.

[0043] Optionally, a surface of the exterior trim extending along the longitudinal axis of the exterior trim is configured to contact a surface of the frame member.

[0044] Optionally, the engagement protrusion of the structural support member comprises a generally angled leading profile.

[0045] This enables a more convenient installation process because the need to pivot the bead as with aluminium glazing beads is removed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0046]

Figure 1 is a front view of a fenestration unit having a glazing bead assembly according to an embodiment of the present teachings;

Figure 2 is a front view of a fenestration unit having a mitred glazing bead assembly according to an alternative embodiment of the present teachings;

Figure 3 is a cross sectional view of a fenestration unit on the plane z-z of Figure 1;

Figure 4 is an enlarged cross sectional view of the glazing bead assembly of Figure 3; and

Figure 5 is a cross sectional view of a glazing bead assembly of another embodiment of the present teachings.

DETAILED DESCRIPTION OF EMBODIMENTS

[0047] Figure 1 shows a fenestration unit of an embodiment of the present teachings generally indicated at 10, having a frame 12 with a glazing bead assembly 14 mounted thereto. The fenestration unit 10 of this embodiment is suitable for a window, door or other type of fenestration, such as a vent or cladding panel.

[0048] The frame 12 is configured to receive and support a pane or panel, such as a pane of glass, a double glazing unit or a triple glazed sealed unit, or a panel of wood, aluminium or other suitable material. It shall be appreciated that although the glazing unit 18 in this embodiment is a double glazing unit, alternative glazing units, for example triple glazing or opaque panels, for example for doors, may be used.

[0049] Fenestration units 10 of this type are typically used in external walls of domestic and commercial buildings. It is therefore necessary that the fenestration unit meets requirements for thermal insulation, sealing against water ingress, draughts etc.

[0050] Typically, the frame 12 is a metallic frame constructed from four frame members 12a-d arranged at right angles to each other. A metallic frame as described here may include features or components of some non-metallic or composite material, such as plastics material or wood. In particular, the frame members 12a-d may comprise external and internal aluminium profiles, which provide structural strength to the frame, with a thermal break of plastics or foam material sandwiched therebetween. Beads 14 are fitted to the frame 12 with ends finished at right angles. The beads 14 are described in more detail below.

[0051] Typically, the frame 12 is an aluminium frame. The frame 12 of this embodiment comprises a 6063T6 aluminium alloy. However, it shall be appreciated that

any other suitable material may be used. In one alternative, the frame is of some other suitable material, such as some other 6063 series aluminium alloy, or a 6060 series aluminium alloy.

[0052] Figure 2 shows a fenestration unit 10' comprising a frame 12' according to the teachings, wherein the frame members 12a'-d' are connected by 45° mitre joints. In addition beads 14' are fitted with mitred abutting ends at 45° to match the mitres of the frame 12'. Advantageously, having mitred ends corresponding to the mitred ends of the frame members 12a'-d' has improves the aesthetics of the fenestration unit 10'.

[0053] It shall be appreciated that the term 'exterior' refers to the area outside of the fenestration unit 10, and the term 'interior' refers to the area enclosed between the frame member 12d and the glazing unit 18. Therefore, for example, 'exterior side' refers to the side closest to the outside of the fenestration unit 10, and 'interior side' refers to the side closest to the area enclosed between the frame member 12d and the glazing unit 18.

[0054] The fenestration unit 10 may comprise a fixed or moveable sash. In this embodiment, the sash is omitted and the glazing unit 18 is installed directly into the outer frame 12. The teachings are however applicable to embodiments in which there are sliding or pivoting sashes.

[0055] Figure 3 shows a cross sectional view of a portion of the fenestration unit 10 on the plane z-z in which the glazing bead assembly 14 is configured to retain the glazing unit 18 via a gasket 24. In this embodiment, the frame member 12d comprises an opposing gasket 25 mounted to an upstand or abutment 13 on the opposite side of the glazing unit 18 to the glazing bead assembly 14, and a female formation 40 in an upper surface of the frame member 12d to receive the glazing bead assembly 14. The opposing gasket 25 is fitted into the abutment 13 of the frame member 12d prior to installation of the glazing unit 18. The opposing gasket 25 manufactured from a rubber-like material, in particular Thermoplastic Elastomer (TPE) or EDPM, meaning upon installation of the glazing unit 18, the opposing gasket 25 compresses due to the force exerted by the glazing unit 18. The use of the opposing gasket 25 fitted into abutment 13 on a first side of the glazing unit 18, and the gasket 24 on a second side of the glazing unit 18, centralises the glazing unit 18 within the fenestration unit 10 because both gaskets 24, 25 are configured to compress by a similar amount relative to each other. This creates an effective seal and correctly aligns the glazing unit 18 through the compression of the gaskets 24, 25, whilst enabling the retention of the glazing unit 18 within the frame 12.

[0056] The female formation 40 in the upper surface of the frame member 12d extends along the longitudinal axis of the frame member 12d, and is in the form of a channel 42 defined by an angled exterior side wall 37 terminating in a nose 43, a base 39, an interior side wall and a transverse protrusion 41.

[0057] The protrusion 41 extends from an opening of

the female formation 40 in a direction perpendicular to the panel 11 of the glazing unit 18, and the nose 43 extends from an outer end of the angled wall 37 in a direction perpendicular to the panel 11 of the glazing unit 18. The first protrusion 41 and the nose 43 are separated by the opening of the female formation 40, at a distance slightly less than the width of a male engagement formation 34 of the glazing bead assembly 14, described in more detail below.

[0058] The channel 42 and the angled wall 37 are configured to complement the shape of the male engagement formation 34. The angled wall 37 connects to the nose 43 to form a continuous wall. The angle enclosed between the nose 43 and the angled wall 37 is an acute angle. This means the base 39 of the female formation 40 is wider than the opening of the female formation 40, to accommodate the male engagement formation 34.

[0059] The features of the female formation 40 mean it is configured to receive the male engagement formation, and therefore retain the structural support member 22 within the frame member 12d, as described in more detail below.

[0060] Whilst only one glazing bead assembly 14 is illustrated in Figure 3, it shall be appreciated that at each of the four sides of the frame 12 there may be a glazing bead assembly 14 of substantially the same configuration. Therefore, for reasons of conciseness and brevity, only glazing bead assembly 14 shall be described herein. Additionally, the glazing bead 14' of Figure 2 may be formed from the same profile as glazing bead 14 and the description below also applies to bead 14'.

[0061] Figure 4 shows a detailed cross sectional view of the glazing bead assembly 14 illustrated in Figure 3. The glazing bead assembly 14 comprises an exterior trim 20, a structural support member 22 and the gasket 24 to secure the glazing unit 18 within the fenestration unit 10. The respective cross sections of the exterior trim 20, the structural support member 22 and the gasket 24 extend along their respective longitudinal axes. The glazing bead assembly 14 may be beaded to the internal or external side of a building based on the application.

[0062] In this embodiment, the exterior trim 20, the structural support member 22 and the gasket 24 are of constant cross-section i.e. a prism formed in a suitable extrusion process. However, in alternative embodiments the exterior trim, structural support member and gasket may have an alternative geometry, e.g. a non-constant cross-section, for example from post processing.

[0063] The structural support member 22 is manufactured from uPVC. As uPVC is resilient, this eases the installation and removal of the glazing bead assembly 14 whilst minimising the risk of damage to the glazing bead assembly 14 or the frame member 12d.

[0064] The structural support member 22 comprises the male engagement formation 34 extending generally downwards from the structural support member 22, and positioned at an end of the cross section of the structural support member 22 remote from the gasket 24 for inser-

tion into the female formation 40 of the frame member 12d.

[0065] The structural support member 22 comprises a hollow void 57 extending along the longitudinal axis of the structural support member 22 and surrounded by a wall. This configuration is simple to manufacture using an extrusion process as is well known per se. The hollow void 57 minimises the total mass and material required to manufacture the structural support member 22, whilst meeting the necessary strength requirements for the application.

[0066] The male engagement formation 34 has a first engagement protrusion 35, to aid the retention of the structural support member 22 within the frame member 12d. A second engagement protrusion 36 extends from an interior surface 28 of the structural support member. In this embodiment, the male engagement formation 34 comprises a leg having first section 29, a central section 33 and an end section 31, connected by a first and second bend, wherein each section extends at a different angle.

[0067] The central section 33 is angled to act as a guide and direct the male engagement formation 34 into the female formation 40 through the contact between the first protrusion 41 of the female formation 40 and the central section 33 of the male engagement formation 34, thus aiding the installation process. This is described in more detail below. The end section 31 is angled parallel to the base 31, to further stabilise the bead assembly 14 when installed. The first section 29 abuts an end of the first protrusion 41. A notch 38 of the male engagement formation seats against the nose 43.

[0068] In this embodiment, the structural support member 22 comprises a first engagement notch 50 and a second engagement notch 52 located on an exterior surface 30 thereof and positioned at a first end and an opposing second end of the cross section of the structural support member 22.

[0069] The structural support member 22 has a cross section comprising a deviation in profile 55 at a central location of the structural support member 22. Upon assembly with the exterior trim, an axial force is exerted at both ends of the structural support member at the notches 50, 52 towards the centre of the structural support member 22. The deviation enables the structural support member 22 to deflect and flex when the exterior trim is installed to ease its fitting.

[0070] The structural support member 22 and the gasket 24 are coextruded to form one part during the manufacturing process, and therefore extend along parallel longitudinal axes. However, it shall be appreciated that in alternative embodiments the gasket and the structural support member may be manufactured separately, or the gasket may be mounted on the structural support member using any suitable method, such as adhesive or heat bonding. The gasket 24 is positioned adjacent to a planar surface 26 of the structural support member 22 that connects the interior surface 28 and the exterior surface 30 of the structural support member 22.

[0071] The gasket 24 in this embodiment is a bubble gasket comprising a rounded rectangular cross section, however in alternative embodiments the gasket may have a different cross section, for example a leading wedge profile or a lip. In this embodiment there is one gasket 24 associated with the glazing bead assembly 14, however it shall be appreciated that in exemplary embodiments there may be more than one gasket.

[0072] The gasket 24 is typically manufactured from a resilient material configured to provide a sealing effect about the glazing unit 18. The gasket may comprise a rubber-like material, in particular Thermoplastic Elastomer (TPE) or EDPM, although it shall be appreciated that any other suitable material may be used.

[0073] In this embodiment, the exterior trim 20 comprises a first engagement protrusion 44 and a second engagement protrusion 46 extending from an interior surface 48 of the exterior trim 20 and positioned at a first end and an opposing second end of the cross section of the exterior trim 20. The exterior trim 20 is manufactured from metal, in this embodiment an aluminium alloy. This is to match the material of the exterior trim 20 and the material of the frame member 12d in order to provide a uniform appearance.

[0074] The exterior trim 20 comprises a substantially planar surface that rests adjacent to the exterior surface 30 of the structural support member 22. The first engagement protrusion 44 and the second engagement protrusion 46 extend at an angle to enable an edge surface of the first engagement protrusion 44 to sit adjacent to the frame member 12d, and an edge surface of the second engagement protrusion 46 to sit adjacent to the gasket 24. When assembled, the contact between the gasket 24 and the first edge surface inhibits sliding of the structural support member 22 and the exterior trim 20 relative each other longitudinally.

[0075] The first protrusion 44 of the exterior trim 20 at the first end engages with the first notch 50 of the structural support member 22, and the second protrusion 46 of the exterior trim 20 at the second end engages with the second engagement notch 52 of the structural support member 22, to mechanically fasten the interior surface 48 of the exterior trim 20 and the exterior surface 30 of the structural support member 22 using a snap-fit mechanism. The width of the exterior surface 48 of the exterior trim 20 is configured to be wider than the width between the first and second protrusions 44, 46 of the exterior trim 20 so the exterior trim 20 and the structural support member 22 remain connected.

[0076] The snap-fit assembly of the exterior trim 20 and the structural support member 22 may occur prior to installation in the fenestration unit 10. However, in particular where the bead assembly 14' features mitred ends, it may be advantageous to fit at least the final (fourth) structural support member 22 without the exterior trim 20. This may allow it to flex more easily about its longitudinal axis and therefore fit into place without binding on adjacent beads. The exterior trim 20 may then be

push fitted to the structural support member 22 once it is in place. Advantageously, the substantially planar surface of the exterior trim 20 may enable the exterior trim to flex more easily about its longitudinal axis, as with the structural support member 22. This may be beneficial when installing the final glazing bead in the assembled state, even when the bead assembly 14' features mitred ends.

[0077] The first end of the exterior trim 20 and the gasket 24 and the second end of the exterior trim 20 and the frame member 12d are configured to sit adjacent to one another in order to form a cover between the exterior and the structural support member 22. When assembled, this arrangement masks the structural support member 22 from view giving the appearance of a uniform material throughout. The interior and exterior surfaces 28, 30 of the structural support member 22 are substantially parallel to each other and to the exterior trim 20, excluding the deviation in profile 55. However, it shall be appreciated that in alternative embodiments the interior and exterior surfaces of the structural support member and the exterior trim may be arranged in any suitable shape.

[0078] In this embodiment, due to the gasket 24 being coextruded, the glazing bead assembly 14 and the gasket 24 are installed and removed together. However, in alternative embodiments the gasket 24 may be inserted into the gap between the glazing unit 18 and the structural support member 22 after the frame member 12d has been assembled and secured around the panel 11.

[0079] When the glazing bead assembly 14 is in the assembled state within the fenestration unit 10, as shown in Figure 3, the glazing bead assembly 14 is configured to engage with the frame member 12d. The gasket 24 is configured to engage with an exterior surface of the panel 11 and the arrangement exerts a force on the exterior surface of the panel 11 that secures the glazing unit 18 within the fenestration unit 10. The gasket 24 is typically sized to be larger than the space provided between the structural support member 22 and the glazing unit 18. The gasket 24 therefore becomes compressed when assembled, thereby achieving an effective seal between the structural support member 22 and the glazing unit 18.

[0080] To fit the glazing bead assembly 14 within the fenestration unit 10, the glazing unit 18 is first offered up to the frame 12 to seat against the opposing gasket 25 retained within the frame member 12d on one side. The glazing bead assembly 14 is then fitted by insertion of the male engagement formation 34 into the female formation 40 in direction 9 at an angle of insertion α , illustrated in Figure 3, generally away from the position of the fitter. The angle of insertion α is an acute angle that is formed between an axis parallel to the panel 11 of the glazing unit 18 and the direction of insertion 9. The second protrusion 36 of the structural support member 22 engages with a surface of the nose 43 of the female formation 40, and the first protrusion 35 of the structural support member 22 engages with the end of the protrusion 41 of the female formation 40, and the arrangement

retains the structural support member 22 within the frame member 12d.

[0081] The male engagement formation 34 flexes upon installation into the opening of the female formation 40. This enables the male engagement formation 34 to fit through the opening of the female formation 40 when inserted in direction 9, despite its width from the first protrusion 35 to the end section 31 being greater than the width of the opening of the female formation 40.

[0082] Once the contact between the central section 33 of the male engagement formation 34 and the protrusion 41 of the female formation 40 reaches the first protrusion 35 of the male engagement formation 34, the first protrusion engages behind the protrusion 41 of the female formation 40 to retain the structural support member 22 within the frame member 12d. The male engagement formation 34 relaxes when in its fitted position as depicted in Figure 3.

[0083] This is an easier installation process than with a prior art aluminium glazing bead, where the glazing bead is inserted into the opening of the female formation 40 in the direction 8 towards the fitter at an angle of insertion β and subsequently pivoted into its assembled position. The angle of insertion β is an acute angle that is formed between an axis parallel to the panel 11 of the glazing unit 18 and the direction of insertion 8. The angles of insertion α , β extends in opposite directions from the axis parallel to the glazing unit 18. The installation is further simplified by avoiding the additional step of fitting the gasket between the glazing unit 18 and the bead assembly 14.

[0084] The removal of the glazing bead assembly 14 involves inserting a flat bladed tool into the gap between the frame member 12d and the bead assembly 14 and applying a force to remove the male engagement formation 34 from the female formation 40. This requires the male engagement formation 34 to deflect so the first protrusion 35 slides over the protrusion 41. This method of removal is simpler than removal methods for traditional aluminium glazing beads, which require the gasket to be extracted before the bead can be removed in a separate operation. The glazing unit 18 can subsequently be removed from the frame member 12d, e.g. for replacement or maintenance.

[0085] A cross section of an alternative embodiment of the glazing bead assembly 114 is illustrated in Figure 5. Like parts to the Figure 4 embodiment are labelled by like reference numerals with prefix "1". Any differences with the Figure 4 embodiment are discussed in detail below.

[0086] It shall be appreciated that the glazing bead assembly 114 of Figure 5 is suitable for assembly within the frame member 12d of Figure 3 in the position of the glazing bead assembly 14 of Figure 3.

[0087] The structural support member 122 has a male engagement formation 134 comprising a generally hollow angled leading profile for insertion into the female formation 40 of the exterior surface of the frame member

12d, positioned at an end of the cross section of structural support member 122 remote from the gasket 124. The first protrusion 136 extends to form a continuous wall with the remainder of the male engagement formation 134. When assembled, this configuration may better distribute the force exerted by the gasket 124 on the male engagement formation 134 by increasing the contact area between the male engagement formation 134 and the female formation 140. The second protrusion 135 and the central section 133 perform the same function as the embodiment of Figure 4, as described above.

[0088] For the glazing bead assembly 114, illustrated in Figure 5, the exterior trim 120 and the structural support member 122 are mechanically fastened using an alternative snap-fit arrangement. The exterior trim 120 comprises an engagement protrusion 144 extending at an angle from the interior surface 148 of the exterior trim 120 and positioned at a central location of the interior surface 148 of the exterior trim 120. The structural support member 122 comprises a corresponding engagement notch 150 located at an exterior surface 130 of the structural support member 122 and positioned at a substantially central location of the structural support member 122.

[0089] The engagement protrusion 144 of the exterior trim 120 comprises a widening in profile 156 that subsequently tapers to form a rounded arrowhead cross section, and the engagement notch 155 comprises a corresponding cross section. The widening in profile 156 engages behind the corresponding formation of the engagement notch 155, and inhibits the release of the exterior trim 120 once assembled within the structural. This mechanically fastens the interior surface 148 of the exterior trim 120 and the exterior surface 130 of the structural support member 122 using a snap-fit mechanism. The use of a single engagement formation 144 and a single engagement notch 155 means the fitter has to snap-fit at one location as opposed to multiple locations, and may therefore ease the assembly process.

[0090] A supporting wall 165 of the structural support member 122 extends along the longitudinal axis of the structural support member 122 and may stabilise the engagement notch 155 to retain the structural support member 122 in position when assembled. A first hollow void 163 and a second hollow void 164 extend along the longitudinal axis of the structural support member 122 and are separated by the supporting wall 165. This configuration provides the required strength to the structural support member 122, whilst providing suitable flexibility and decreasing the material required by incorporating the first and second hollow void 163, 164. An exterior surface 169 of the gasket 124 and an exterior surface 149 of the exterior trim 120 are angled at the same gradient. This may improve the overall aesthetics of the glazing bead assembly 114.

[0091] Further, the ability to fit mitred beads more easily and with less risk of damaging surface coatings is advantageous and also enables aluminium windows to

have a neat appearance with beads that have a variety of profiles - e.g., angled as in the present teachings, rounded or chamfered - in addition to squared-off beads that are currently commonplace. This is because it enables the shapes of the beads 14' to match each other where they meet at the corner mitre.

[0092] It shall be appreciated that in further alternative embodiments, the structural support member and the exterior trim may comprise any number of engagement formations. The engagement formations may be protrusions and notches fastened to form a snap-fit arrangement, and the structural support member and exterior trim may both comprise protrusions and/or notches. In alternative embodiments, the engagement formations may be any suitable shape.

[0093] The means of fastening the exterior trim and the structural support member may be any suitable means of mechanical fastening, for example threaded fasteners.

[0094] The means of fastening the exterior trim and the structural support member may alternatively be any suitable means of non-mechanical fastening, for example an adhesive.

[0095] In further alternative embodiments, it shall be appreciated that any number of male engagement formations and female formations may be used to secure the glazing bead assembly within the frame. The male engagement formation may extend from either the structural support member or the frame, and the structural support member and/or the frame member may comprise the female formation of the frame and the hollow channel. The female formation of the frame and the hollow channel may be any suitable shape. Additionally, the male engagement formation may be any suitable shape, for example a hook configuration. In alternative embodiments, any suitable method of engaging the structural support member within the frame may be used, for example a pin mechanism.

[0096] The exterior trim may be coated, for example powder coated in a colour to match the colour of the frame. The exterior trim may be manufactured using any one or a combination of suitable metallic or non-metallic materials, for example copper or uPVC. The exterior trim may be any suitable shape, for example, right-angled or a substantially curved cross section. This makes the exterior trim customisable based on the application, whilst the structural member is standardised.

[0097] The deviation in profile of the structural support member may be of any suitable shape, for example, triangular in cross section.

[0098] The structural support member may comprise any number of hollow voids, and in alternative embodiments the hollow void may be omitted. The hollow void may form any suitable shape and comprise any number of suitable chambers based on the application.

Claims

1. A glazing bead assembly for retaining a glazing unit within a frame member, the glazing bead assembly comprising;
 - a structural support member having a cross section extending along
 - a longitudinal axis, wherein the cross section comprises an
 - engagement formation
 - an exterior trim fastened to an exterior surface of the structural support member and having a cross section which extends along a longitudinal axis.
2. The glazing bead assembly of claim 1 further comprising mitred ends.
3. The glazing bead assembly of any preceding claim wherein at least one gasket is mounted to the structural support member, optionally wherein at least one gasket is coextruded with the structural support member.
4. The glazing bead assembly of any preceding claim wherein the structural support member and the exterior trim are mechanically fastened together.
5. The glazing bead assembly of claim 4 wherein the structural support member has at least one formation on the exterior surface, and the exterior trim has at least one corresponding formation on the interior surface to mechanically fasten the structural support member and the exterior trim using a snap fit.
6. The glazing bead assembly of claim 5 wherein the structural support member has at least one notch on the exterior surface, and the exterior trim has at least one corresponding protrusion on the interior surface to mechanically fasten the structural support member and the exterior trim using a snap fit.
7. The glazing bead assembly of any preceding claim wherein the cross section of the structural support member extends along the longitudinal axis of the structural support member to form a prism, optionally wherein the cross section of the exterior trim extends along the longitudinal axis of the exterior trim to form a prism.
8. The glazing bead assembly of any preceding claim wherein the structural support member and the exterior trim are manufactured from different materials, optionally wherein the exterior trim is manufactured from aluminium or an aluminium alloy, and optionally wherein the structural support member is manufactured from uPVC.

9. The glazing bead assembly according to claim 3 wherein the coextruded gasket is manufactured using a thermoplastic elastomer (TPE), optionally wherein at least one surface of the exterior trim is in direct contact with at least one wall of the coextruded gasket. 5

10. The glazing bead assembly of any preceding claim wherein the structural support member has a deviation in profile at a substantially central location of the exterior surface, which extends along the longitudinal axis of the structural support member, optionally wherein the cross section of the structural support member comprises at least one hollow void extending along the longitudinal axis of the glazing bead. 10
15

11. A frame assembly comprising a frame member for engagement with the glazing bead assembly of any preceding claim, wherein the frame member and the exterior trim are manufactured from at least partially the same material. 20

12. The frame assembly of claim 11 dependent on any one of claim 2 to 10 wherein the exterior trim is in direct contact with the frame member on at least the margin thereof remote from the gasket to form a cover between the structural support member and the exterior of the window frame. 25
30

13. The frame assembly of claim 11 to 12 wherein the frame member comprises at least one complementary formation configured to mount the engagement formation of the structural support member, optionally wherein the complementary female formation is configured to receive a male engagement formation of the structural support member. 35

14. The frame assembly of claim 11 to 13 wherein a surface of the exterior trim extending along the longitudinal axis of the exterior trim is configured to contact a surface of the frame member. 40

15. The frame assembly of claim 14 wherein the engagement protrusion of the structural support member comprises a generally angled leading profile. 45

50

55

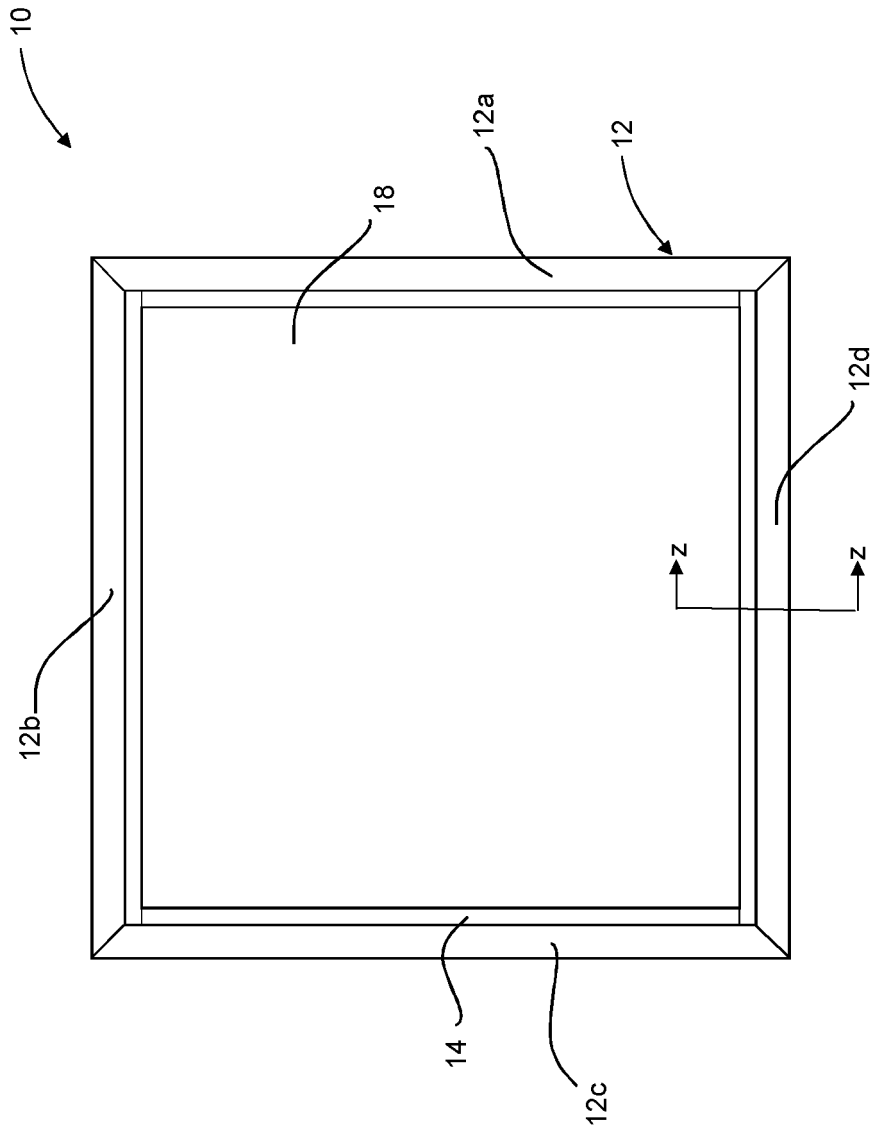


Fig. 1

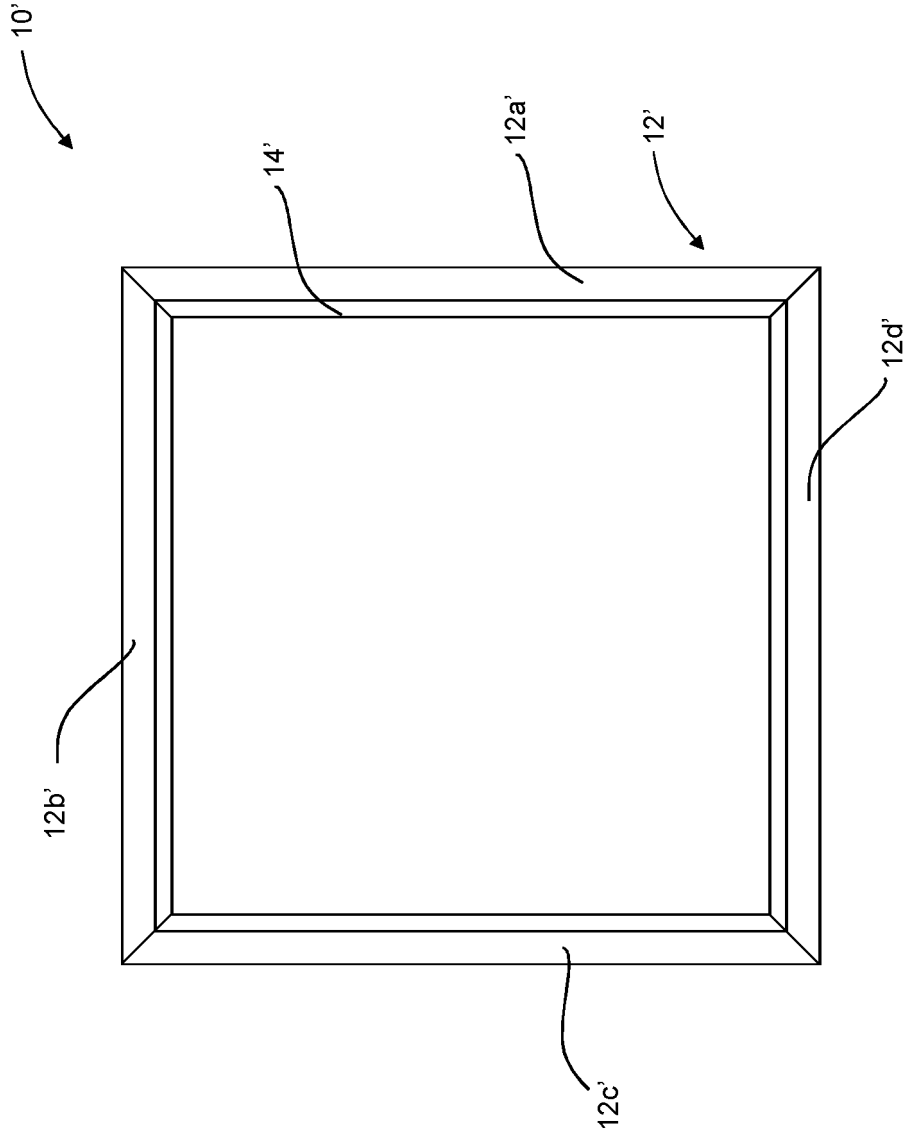
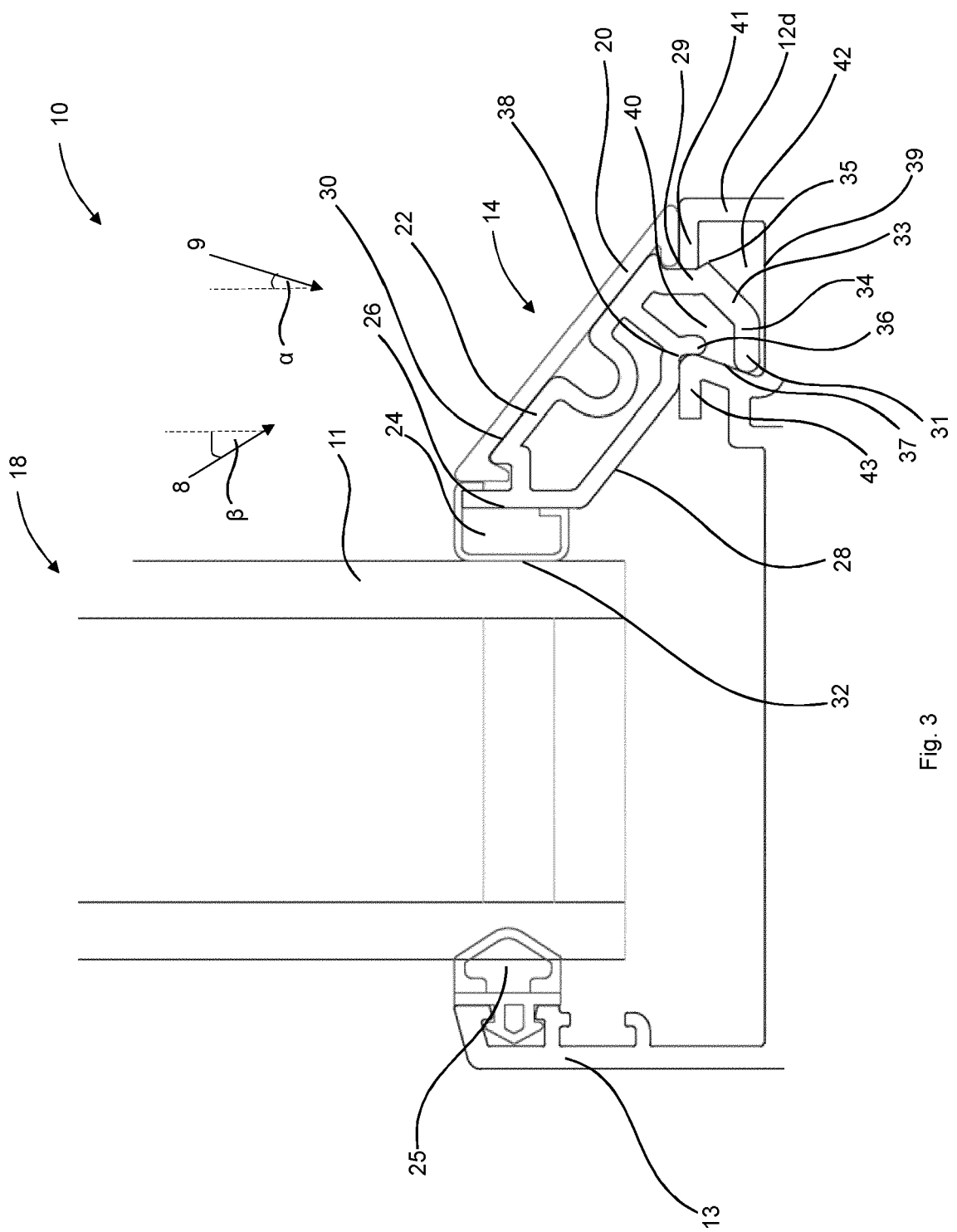


Fig. 2



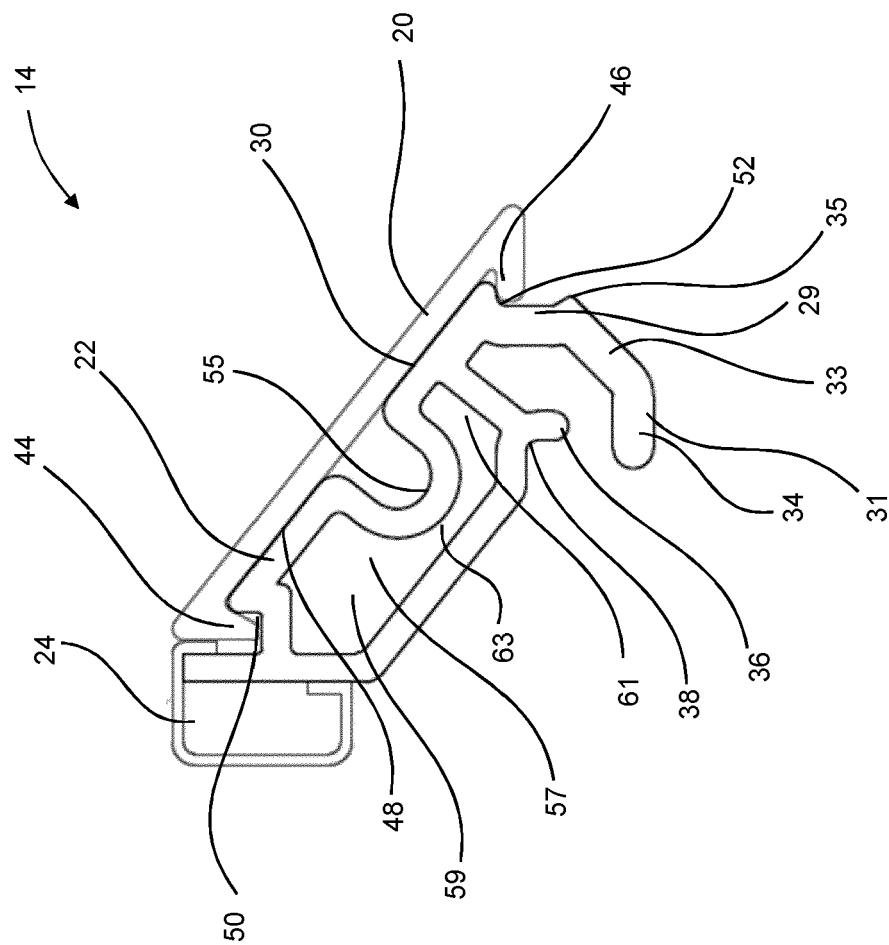


Fig. 4

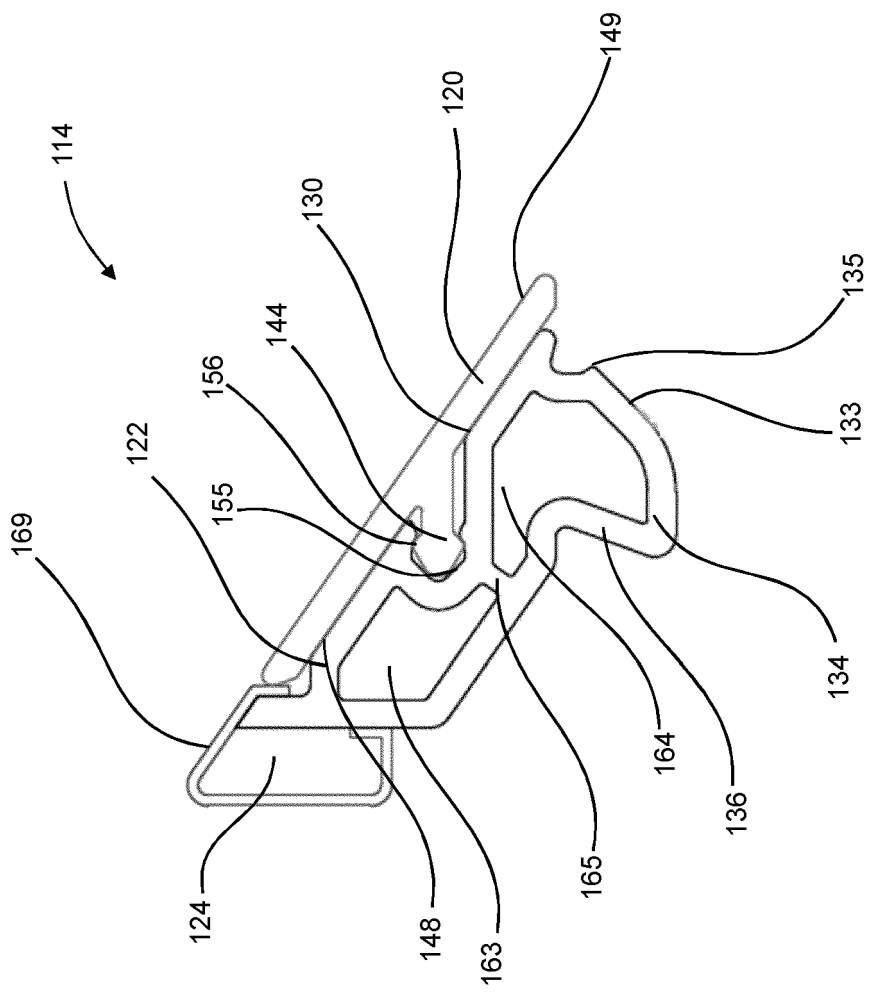


Fig. 5



EUROPEAN SEARCH REPORT

Application Number
EP 21 15 3852

5

10

15

20

25

30

35

40

45

50

55

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	US 2018/355656 A1 (KNAPP FRIEDRICH [AT]) 13 December 2018 (2018-12-13) * paragraphs [0024], [0025], [0032]; figures *	1,3-6,8, 9,11-15	INV. E06B3/58
X	DE 39 00 129 A1 (WICONA BAUSYSTEME [DE]) 5 July 1990 (1990-07-05) * figures *	1-7,10	
			TECHNICAL FIELDS SEARCHED (IPC)
			E06B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 11 February 2021	Examiner Kis, Pál
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			

 3
EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 21 15 3852

5 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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

11-02-2021

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2018355656 A1	13-12-2018	CA 3004618 A1	26-05-2017
		CN 108350720 A	31-07-2018
		EP 3170961 A1	24-05-2017
		JP 2018538464 A	27-12-2018
		PL 3170961 T3	30-11-2018
		US 2018355656 A1	13-12-2018
		WO 2017084919 A1	26-05-2017

DE 3900129 A1	05-07-1990	NONE	
