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(54) Title: A SECURITY SCREEN ASSEMBLY

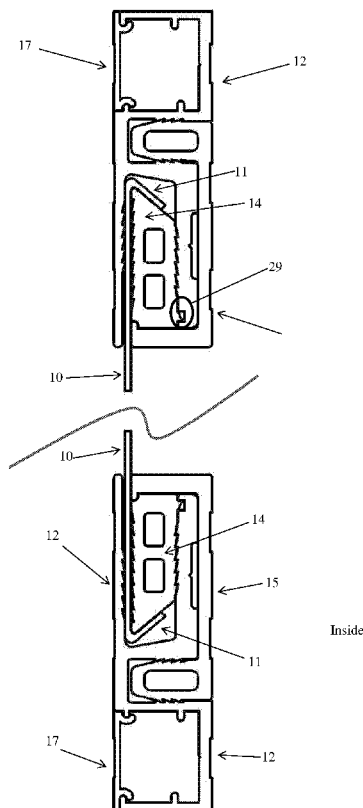


Figure 1

(57) Abstract: A screen assembly and including a sheet of meshlike screen material having an edge portion, a frame assembly including a plurality of elongate frame members assembled to define an opening which is at least partially closed by said sheet of screen material and wherein at least one of said elongate frame members includes at least one elongate slot to receive an edge portion of the screen material therein, the at least one elongate slot provided with a portion of an engagement mechanism, a primary fastener retained in each at least one elongate slot, said fastener having an abutment portion to abut the edge portion of the screen material within the opening, the fastener provided with a second portion of an engagement mechanism to engage with the portion of the engagement mechanism provided with the at least one elongate slot, and a secondary fastener engageable with the at least one elongate frame member to lock the primary fastener in the at least one elongate slot.

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A SECURITY SCREEN ASSEMBLY

TECHNICAL FIELD

[0001] The present invention relates to a screen assembly and particularly to a security screen assembly for a window or doorway.

BACKGROUND ART

[0002] Many different types of security screens are presently available for protecting residential and commercial properties from third party intrusion. One type of known security screen comprises a simple steel bar grille which is either bolted or otherwise attached across a window or is configured in a door like manner for locking across a doorway. Other security screens are known that comprise a wide grate mesh made from expanded aluminium bolted across or otherwise fixed to a peripheral frame.

[0003] While these known screens are effective in preventing or at least deterring intrusion they are aesthetically detract from the property. An attempt to improve the aesthetics has been made and disclosed in Australian Patent No 694515 which describes an intruder resistance screen having a frame and a wire woven mesh attached to the frame. This patent discloses the use of a clamp to clamp the peripheral edge of the mesh into the frame. Clamping members are shown which physically compress or squash the periphery of the mesh against the frame of the screen. Additionally, fastening of the mesh can be achieved by use of mechanical fasteners such as screws or rivets which pass through the periphery of the mesh.

[0004] The screen in accordance with AU694515 performs its intended function adequately and overcomes some of the problems with the aesthetics of the grill or grate type security screens. Nevertheless, improvements can be made to the method of fastening the mesh to the frame.

[0005] It will be clearly understood that, if a prior art publication is referred to herein, this reference does not constitute an admission that the publication forms part of the common general knowledge in the art in Australia or in any other country.

SUMMARY OF INVENTION

[0006] The present invention is directed to a screen assembly, which may at least partially overcome at least one of the abovementioned disadvantages or provide the consumer with a useful or commercial choice.

[0007] With the foregoing in view, the present invention in one form, resides broadly in a screen assembly including a sheet of meshlike screen material having an edge portion, a frame assembly including a plurality of elongate frame members assembled to define an opening which is at least partially closed by said sheet of screen material and wherein at least one of said elongate frame members includes at least one elongate slot to receive an edge portion of the screen material therein, the at least one elongate slot provided with a portion of an engagement mechanism, a primary fastener retained in each at least one elongate slot, said fastener having an abutment portion to abut the edge portion of the screen material within the opening, the fastener provided with a second portion of an engagement mechanism to engage with the portion of the engagement mechanism provided with the at least one elongate slot, and a secondary fastener engageable with the at least one elongate frame member to lock the primary fastener in the at least one elongate slot.

[0008] The sheet of meshlike screen material may be of any type. In particular, the screen material may be flexible but it is preferably at least semi-rigid and most preferably, a rigid security screen material. The openings formed in the screen material may be formed in any way. Without any limitation intended, the screen material may be any type including a welded screen material, a woven screen material, a perforated screen material or an expanded mesh screen material. According to a particularly preferred embodiment, the screen material will be a stainless steel woven wire mesh panel.

[0009] The sheet of screen material may be of any size. Typically, the frame assembly defines an opening and the sheet of screen material will typically be larger than the opening, being at least partially received into the elongate slots in the respective frame members.

[0010] The sheet of screen material will typically have an edge portion and the edge portion will preferably be shaped in order to more positively engage the primary fastener. Typically, a shaped edge portion will be provided on one or more edges of the sheet of screen material and preferably, all of the edges will be provided with a shaped edge portion. In particular, the shaped edge portion will preferably be a return portion, angled relative to the plane of the sheet to return over an adjacent part of the sheet. The edge portion will typically be oriented inwardly, towards the centre of the sheet from each edge.

[0011] Typically, the edge portion will be angled relative to the main portion of the sheet of screen material. An acute angle is preferred but an angle up to perpendicular may be used. Normally, an edge portion of the sheet is bent back over the main portion of the sheet in order to form the shaped edge portion. This may require a portion or portions to be removed at the

corners of the sheet to allow the edge portions on different side edges of the sheet to be bent back in this way. The shaped edge portions of the sheet will typically extend continuously over each edge but one or more spaced apart shaped edge portions may be provided. This is less preferred however as it will require material to be removed which increases the complexity of manufacture.

[0012] The screen assembly of the present invention includes a frame assembly including a plurality of elongate frame members assembled to define an opening which is at least partially closed by said sheet of screen material and wherein at least one of said elongate frame members includes at least one elongate slot to receive an edge portion of the screen material therein, the at least one elongate slot provided with a portion of an engagement mechanism.

[0013] Normally, a number of frame members will be used to form the frame assembly and any number of frame members may be used. The frame members can be manufactured from any material but normally, the frame members will be manufactured from a metal material. The material used may be the same as, similar to or different to that used to form the sheet of screen material. Each frame member may be formed from more than one member attached to or relative to one another.

[0014] The frame assembly can have any shape. Typically, the frame assembly will be generally rectangular in shape as the screen assembly of the present invention will normally be used in relation to windows or doors for a structure. As such, the security screen assembly will normally have one side located towards the outer or weather side of the structure and another side oriented towards an interior of the structure.

[0015] The frame members are normally joined to or relative to each other in order to define the opening. The frame members may be square cut at the corner or have mitre cut corners. The sheet of meshlike screen material is provided between the frame members in order to close the opening and is securely attached to the frame assembly.

[0016] Each of the frame members will typically be extruded and therefore is constant in cross-section over the length. Features that are therefore provided at one portion of the frame member are normally consistent over the length of the frame member.

[0017] At least one frame member and preferably each frame member will include at least one elongate slot to receive an edge portion of the screen material therein with the at least one elongate slot provided with a portion of an engagement mechanism. Typically, a single elongate slot is provided over the length of the at least one and preferably each frame member. Typically,

the at least one elongate slot will face laterally into the opening defined by the frame assembly. Normally, the at least one elongate slot is oriented to be parallel to the plane of the meshlike screen material.

[0018] Normally, the at least one elongate slot is formed from a pair of spaced apart portions or wall members. Preferably, the pair of spaced apart wall members are substantially parallel to one another, at least in part. The pair of spaced apart wall members are normally linked by an end wall and according to a particularly preferred embodiment, the end wall is preferably angled.

[0019] Normally, at least one of the spaced apart wall members will have a portion of an engagement mechanism associated with an inner surface thereof. Generally, the portion of the engagement mechanism is provided on an inner surface of at least one, and preferably both of the spaced apart wall members. It is preferred that the respective portions of the engagement mechanism provided on each of the spaced apart wall members are substantially opposite one another.

[0020] In some embodiments, the engagement mechanism provided will include a number of teeth and therefore, in these embodiments, the inner surface of each of the spaced apart wall members defining the elongate slot will preferably be provided with one or more teeth members, normally a plurality of teeth members spaced over at least a portion of the inner surface of the wall.

[0021] Each of the teeth will typically include an abutment surface to abut correspondingly shaped teeth provided on the primary fastener. The abutment surface will normally be substantially perpendicular to the longitudinal dimension of the elongate slot, in other words, preferably substantially perpendicular to the wall member relative to which the teeth extend. The abutment surface will normally have an associated, angled, entry wall, normally converging toward the centre of the slot in order to ease entry of the primary fastener into the slot during engagement. The particular engagement mechanism preferred allows insertion of the primary fastener into the slot opening but will substantially increase the difficulty in removing the primary fastener from the slot. In particular, it has been found that the provision of a toothed engagement mechanism results in high strength due to the fact that the more force applied to the mesh in an attempt to remove the mesh results in a tighter engagement between the corresponding portions of the engagement mechanism.

[0022] The teeth provided on one of the sidewalls may have a different configuration to the teeth provided on the other of the sidewalls. In normal use, the mesh will typically abut one of

the sidewalls of the elongate slot and therefore, the preferred teeth provided on that side wall may be particularly adapted to engage with the mesh, and more particularly, with the openings in the mesh in order to retain the mesh more securely in the elongate slot.

[0023] The elongate slot may also be provided with a secondary catch assembly. Preferably, the secondary catch assembly includes a first portion provided on one of the spaced apart side walls defining the elongate slot and a second portion provided on the primary fastener. Normally, an abutment land is provided on at least one of the spaced apart walls spaced from the preferred teeth assembly toward a free end of the wall. Preferably, the abutment land will be closely spaced from the free end. Typically, the abutment land is provided on the side wall which is located relative to the interior of the structure rather than the opposite side wall. The abutment land may be formed through the provision of a groove or notch and the abutment land is typically substantially perpendicular to the plane of the inner surface of the sidewall into which it is formed.

[0024] The preferred abutment land will typically engage with an abutment tooth formed on the primary fastener. The provision of the abutment land and abutment tooth of this configuration preferably minimises rotation of the primary fastener which may occur if excessive force is applied to the mesh from outside the structure. The application of force in the direction drives the abutment tooth into closer engagement with the abutment land. As mentioned above, the abutment land is longitudinally spaced from the teeth of the engagement mechanism provided on an inner surface of the sidewall. Normally, a solid portion of wall is provided at the free end to space the abutment land from the free end of the sidewall.

[0025] One of the walls may be longer than the other and normally, the sidewall provided on the exterior of the structure is normally longer than the sidewall provided on the interior of the structure. It is preferred that the longer sidewall lack any secondary catch with the secondary catch provided on the shorter, interior sidewall. The provision of the longer sidewall on the exterior of the structure may improve the aesthetics of the screen assembly.

[0026] The screen assembly of the present invention also includes a primary fastener retained in each at least one elongate slot, said fastener having an abutment portion to abut the edge portion of the security screen material within the opening, the fastener provided with a second portion of an engagement mechanism to engage with the portion of the engagement mechanism provided with the at least one elongate slot.

[0027] In a particularly preferred embodiment, the primary fastener will be a fastener block

or strip. The preferred primary fastener will typically be elongate, and extend substantially over the length of each frame member. In other words, a single primary fastener block or strip will normally be provided for each frame member. The primary fastener block or strip will preferably be sized to be closely received within the elongate slot with some minor deformation of the primary fastener block or strip required or possible during the insertion process. If the primary fastener block or strip is dimensioned to be closely received within the elongate slot, then the provision of the mesh thickness can be sufficient to cause the fastener block or strip to be tightly received within the slot once assembled.

[0028] The primary fastener block or strip may be solid or not. In some preferred forms, one or more elongate voids may be provided longitudinally through the primary fastener block or strip to form a lighter primary fastener but still provide the required strength. These voids may also assist with providing a small amount of deformation. In a most preferred form, a pair of elongate voids are provided with a cross member between the elongate voids to resist transverse deformation of the primary fastener block or strip.

[0029] The primary fastener block or strip will normally be substantially rectangular in cross-section having a tip end and a tail end and a pair of side surfaces. Normally, the tip end of the primary fastener block or strip will engage the edge portion of the mesh during assembly. The tip end of the primary fastener block or strip is preferably wedge shaped. Normally, the wedge shape tapers to a point and in a particularly preferred embodiment, the forward edge of the tip end of the primary fastener block or strip is angled from one side to another in order to form the wedge shaped tip. This configuration will typically correspond to the preferred shape of the edge portion in the mesh or screen material. The wedge shaped tip will therefore normally be seated between the main portion of the screen material and the return formed at the edge portion.

[0030] The tail end of the primary fastener block or strip is preferably substantially planar and perpendicular to the pair of side surfaces.

[0031] The engagement portion provided on the primary fastener block or strip will normally be provided on at least one, and normally each of the pair of side surfaces. The engagement portion will normally correspond with the engagement portion provided on the sidewalls of the elongate slot of the frame member. Each engagement portion provided on the primary fastener block or strip will therefore normally include at least one abutment surface in order to abut at least one of the preferred abutment surfaces provided on at least one of the teeth provided on the frame member.

[0032] In a most preferred embodiment, the engagement portion provided on the primary fastener block or strip will include a plurality of teeth, each having an abutment surface, provided on each of the pair of side surfaces of the primary fastener. This will typically provide a number of engagements between a number of teeth on the primary fastener block or strip with a number of teeth provided on the frame member rather than just a single point of engagement.

[0033] The preferred teeth provided on the primary fastener block or strip will normally be provided in a portion located over each side wall of the primary fastener block or strip between the tip end and the tail end. As will be apparent from the explanation above, the preferred primary fastener block or strip will normally have a longer side surface and a shorter side surface caused by the formation of the wedge shaped tip. Normally, teeth will be provided substantially over the length of the longer side which will normally be oriented on the mesh side of the assembly. Again, the teeth provided on the mesh side of the assembly may have a different configuration in order to better engage with the mesh, and in particular the openings on the mesh.

[0034] The tail end of the primary fastener block or strip is preferably planar not only to provide an abutment surface for the secondary fastener but, also to allow the primary fastener to be pressed or hammered into engagement with the frame member if necessary. As mentioned above, an abutment tooth will normally be provided on the shorter of the two side surfaces of the primary fastener block or strip, spaced from the tail end. Normally, this will be oriented to the inner side of the assembly rather than the outer side. The abutment tooth will typically have an abutment surface or shoulder extending substantially perpendicular to the side surface from which the abutment tooth extends. Further, an angled surface may preferably be provided forwardly (in the direction of insertion) of the abutment surface or shoulder, angled inwardly towards the tip of the primary fastener block or strip.

[0035] In some preferred embodiments, a rebate is preferably provided at the tail end of the primary fastener block or strip, preferably at the corner between the tail end and the longer side surface. Preferably, the rebate will extend over the length of the primary fastener block or strip. The rebate will preferably receive a portion of the preferred secondary fastener.

[0036] In use, the primary fastener block or strip will typically be an extruded member of consistent cross-section over its length which can be cut to length once the frame has been assembled, and then simply inserted into the elongate slot and hammered or pressed into engagement with both the edge portion of the screen material and the frame member.

[0037] The screen assembly of the present invention also includes at least one secondary fastener engageable with the at least one elongate frame member to lock the primary fastener in the at least one elongate slot.

[0038] Normally, the at least one secondary fastener will also be an extruded member with a consistent shape or cross-section over its length. Normally, the secondary fastener will be elongate and preferably, the at least one secondary fastener will function to close the elongate slot in the frame assembly to provide not only more secure construction, but also an aesthetically pleasing finish by covering the primary fastener.

[0039] The at least one secondary fastener will function to lock the primary fastener in place. The at least one secondary fastener will typically engage with the frame member and with the primary fastener.

[0040] In a particularly preferred embodiment, the at least one secondary fastener will be substantially U-shaped in cross-section including a cover portion in order to cover and preferably engage the primary fastener, a spaced apart engagement portion in order to engage with the frame member relative to which the secondary fastener is attached and an elongate wall separating the cover portion from the engagement portion.

[0041] The engagement portion of the secondary fastener will normally be an engagement block or strip similar in some respects to the primary fastener block or strip in that it engages with the frame member, normally in a similar way to the engagement between the primary fastener block or strip and the frame member. Typically, the engagement portion of the secondary fastener will also engage in an opening in the frame member. Normally, the opening provided in the frame member to engage with the secondary fastener engagement block or strip is angled, preferably perpendicularly to the engagement slot provided for the primary fastener.

[0042] In a particularly preferred embodiment, the opening in the frame member provided to engage the secondary fastener is located immediately adjacent the end wall of the engagement slot. The opening is typically also a slot opening defined by a pair of sidewalls and the end wall of the slot opening for the secondary fastener is typically a continuation of one of the sidewalls forming the engagement slot for the primary fastener.

[0043] Preferably, a portion of an engagement mechanism is provided on both of the engagement portion of the secondary fastener and at least one, and preferably both side walls of the slot opening provided in the frame member to engage with the secondary fastener. Preferably, the engagement mechanism provided is similar in configuration to the engagement of

the primary fastener that is, a number of teeth provided on each side of the engagement portion each tooth having an abutment shoulder and a number of teeth are provided on an inner surface of each of the sidewalls of the slot opening provided to receive the secondary fastener, each of the teeth having a corresponding abutment shoulder.

[0044] Preferably, the entry end of the engagement portion of the secondary fastener will be tapered in order to ease entry of the engagement portion into the slot opening. Again, the secondary fastener engagement portion may be solid or may have one or more voids formed therein.

[0045] The elongate wall of the secondary fastener will normally extend from an outer end, opposite the entry end of the engagement portion of the secondary fastener. Normally, the tail end of the engagement portion will be formed integrally, normally in the same plane as the elongate wall. The elongate wall will normally overlie a side wall of the frame member defining the elongate slot for receiving the primary fastener and normally, an inner surface of the elongate wall will abut an outer surface of the sidewall

[0046] Typically, the elongate wall is planar and as mentioned above, the outer surface of the elongate wall will normally provide an aesthetically pleasing finish as it will be this surface which is normally presented to the interior of the structure or screen assembly.

[0047] The cover portion of the secondary fastener will cover and preferably engage the primary fastener. Normally, the cover portion extends substantially perpendicularly to the elongate wall of the secondary fastener at the end of the secondary fastener opposite the engagement portion. The cover portion will normally extend over the primary fastener in order to prevent access to the primary fastener and typically, the cover portion will prevent the primary fastener from being seen once the secondary fastener is properly installed.

[0048] An engagement lug or flange will preferably be provided on a free end of the cover portion in order to engage with the rebate provided on the primary fastener. The lug or flange will normally extend substantially parallel to the elongate wall. The lug or flange will typically be received within the rebate provided on the primary fastener and an inner surface of the cover portion will normally abut the tail end of the primary fastener. The engagement lug or flange is preferably provided to engage with the primary fastener in order to convert any force or load applied from the outside of the mesh into a rotational force to drive the primary fastener into engagement between the abutment tooth and the abutment land provided in the primary fastener arrangement.

[0049] Therefore, in some particularly preferred embodiments, the frame member will have a primary slot opening for a primary fastener in line with the panel of screen material and a secondary slot opening for the secondary fastener extending substantially transversely or perpendicularly to the direction of the primary slot opening.

[0050] The panel of screen material will normally be mounted relative to one side, normally the outside of the frame member and the secondary fastener will normally be provided relative to the inside of the frame member. As mentioned above, in use, the edge of the mesh panel will normally be inserted into the primary slot opening in the primary fastener then driven into engagement with the edge portion of the mesh panel and the primary slot opening. The secondary fastener can then be installed over the top of the primary fastener, locking the primary fastener into place and also hiding the primary fastener.

[0051] In preferred embodiment of the present invention, the materials used for construction of the various components of the invention can be the same or different. In particular, the frame members will normally be manufactured of a metal material such as aluminium for example and the secondary fastener is preferably also manufactured of this material but a plastic material could be used. The primary fastener can be metallic or a rigid plastic for example.

[0052] Any of the features described herein can be combined in any combination with any one or more of the other features described herein within the scope of the invention.

[0053] The reference to any prior art in this specification is not, and should not be taken as an acknowledgement or any form of suggestion that the prior art forms part of the common general knowledge.

BRIEF DESCRIPTION OF DRAWINGS

[0054] Preferred features, embodiments and variations of the invention may be discerned from the following Detailed Description which provides sufficient information for those skilled in the art to perform the invention. The Detailed Description is not to be regarded as limiting the scope of the preceding Summary of the Invention in any way. The Detailed Description will make reference to a number of drawings as follows:

[0055] Figure 1 is a sectional side elevation view of a fixed screen assembly according to a preferred embodiment of the present invention.

[0056] Figure 2 is a sectional side elevation view of an emergency release screen assembly

according to a particularly preferred embodiment of the present invention in the closed configuration.

[0057] Figure 3 shows the configuration illustrated in Figure 2 but in the open configuration.

[0058] Figure 4 is a sectional view of a frame member according to a preferred embodiment of the present invention.

[0059] Figure 5 is a sectional view of a primary fastener member according to a preferred embodiment of the present invention.

[0060] Figure 6 is a sectional view of a cover member according to a preferred embodiment of the present invention.

[0061] Figure 7 is a sectional view of a secondary fastener member according to a preferred embodiment of the present invention.

[0062] Figure 8 is an exploded view of the portion designated "A" in Figure 1 showing the engagement of the components with one another.

[0063] Figure 9 is a sectional view of an alternative configuration of frame member as used in the emergency release screen illustrated in Figure 2.

DESCRIPTION OF EMBODIMENTS

[0064] According to a particularly preferred embodiment of the present invention, a security screen assembly is provided.

[0065] Although provided in different configurations, the embodiment illustrated in Figure 1 and that illustrated in Figures 2 and 3 each include a sheet of mesh 10 having a shaped edge portion 11, a frame assembly including a plurality of elongate frame members 12 assembled to define an opening which is closed by the sheet of mesh 10. The elongate frame members 12 include an elongate primary slot 13 to receive the edge portion 11 of the mesh 10 therein and the primary slot 13 is provided with a portion of an engagement mechanism to engage with a primary fastener 14 inserted into each elongate primary slot 13. The primary fastener 14 has an abutment portion to abut the edge portion 11 of the mesh 10 within the primary slot 13 and is provided with a second portion of an engagement mechanism to engage with the portion of the engagement mechanism provided in the elongate primary slot 13. A secondary fastener 15 engageable with a secondary slot opening 16 in the frame member 12 to lock the primary

fastener 14 into the primary slot 13 is also provided.

[0066] As mentioned above, a fixed screen assembly according to a preferred embodiment of the invention is illustrated in Figure 1 with the components used, illustrated in Figures 4 to 8. This embodiment includes an extruded perimeter frame made up of a number of frame members 12, an extruded snap in conceal fix cover 17 is provided as is a primary fastener 14 or grip block, the secondary fastener 15 or grip lock and a stainless steel woven wire mesh infill panel 10.

[0067] An emergency release screen assembly according to a preferred embodiment of the invention is illustrated in Figures 2 and 3 and the frame member used is illustrated in Figure 9. The remaining components are illustrated in Figures 5 to 7. This embodiment includes an extruded perimeter frame made up of a number of frame members 12 albeit of the configuration illustrated in Figure 9, an extruded snap in conceal fix cover 17 is provided as is a primary fastener 14 or grip block, the secondary fastener 15 or grip lock and a stainless steel woven wire mesh infill panel 10. Also illustrated in this embodiment is an extruded perimeter base frame 18 a latch guide 19 a latch release 20 and extruded hinge base frame 21 a latch guard 22 a bow spring 23 to aid with lifting the hinged screen, and a receiving slot 24 for a full perimeter insect screen (not shown).

[0068] As can be seen from Figures 2 and 3, the hinged screen assembly (left) can be released in an emergency from the mounting frame (right) through operation of the latch guard 22 in order to release the latch guard 22 from the latch release member 20. This will allow a person inside the structure to escape outwardly if the need arises by disengaging the screen assembly, such as may occur in instances of fire for example.

[0069] The mesh 10 may be of any type, in the illustrated preferred embodiment, a stainless steel woven wire mesh panel is used. The shaped edge portion 11 is usually provided on all of the edges of the mesh panel. As illustrated, the shaped edge portion 11 includes a return portion, angled relative to the plane of the sheet to return over an adjacent part of the sheet. The edge portion 11 will typically be oriented inwardly, towards the centre of the sheet from each edge.

[0070] The edge portion 11 is angled relative to the main portion of the sheet of mesh with an edge portion 11 of the sheet bent back over the main portion of the sheet in order to form the shaped edge portion. This may require portions to be removed at the corners of the sheet to allow the edge portions on different side edges of the sheet to be bent back in this way. The shaped edge portions 11 of the sheet will typically extend continuously over each edge.

[0071] The frame members 12 used to form the frame assembly can be manufactured from

any material but normally, the frame members will be manufactured from a metal material. The material used may be the same as, similar to or different to that used to form the mesh 10.

[0072] The frame assembly can have any shape but will normally be generally rectangular in shape as the security screen assembly of the present invention will normally be used in relation to windows or doors for a structure. As such, the security screen assembly will normally have one side located towards the outer or weather side of the structure and another side oriented towards an interior of the structure as indicated on Figures 1 to 3.

[0073] The frame members 12 are normally joined to or relative to each other in order to define the opening closed by the mesh 10. The frame members may be square cut at the corner or have mitre cut corners. The mesh panel is provided between the frame members 12 in order to close the opening and is securely attached to the frame assembly.

[0074] Each of the frame members 12 will typically be extruded and therefore be constant in cross-section over their length.

[0075] According to the embodiment illustrated in Figure 1, each frame member used is that illustrated in Figure 4 and includes an elongate primary slot 13 to receive an edge portion 11 of the mesh 10 therein (as illustrated in Figure 1) and the elongate primary slot 13 has a portion of an engagement mechanism to engage with the primary fastener 15. A single elongate primary slot 13 is provided over the length of the each frame member 12 and faces into the opening defined by the frame assembly, that is, all of the elongate primary slots 13 of the respective frame members 12 face one another.

[0076] As illustrated in Figure 4, the elongate primary slot 13 is formed from a pair of spaced apart wall members, a shorter inner wall 25 and a longer, outer wall 26 which are substantially parallel to one another, linked by an end wall 27 which is angled and preferably formed integrally with a wall of the secondary slot opening 16.

[0077] In the illustrated embodiment, each of the spaced apart walls 25, 26 have a portion of an engagement mechanism associated with an inner surface thereof. The engagement mechanism illustrated includes a number of teeth 28 spaced over a portion of the inner surface of each wall 25, 26.

[0078] Each of the teeth 28 include an abutment surface to abut correspondingly shaped teeth provided on the primary fastener 14. The abutment surface is normally substantially perpendicular to the longitudinal dimension of the elongate slot 13, in other words, preferably

substantially perpendicular to the wall member relative to which the teeth 28 extend. The abutment surface will normally have an associated, angled, entry wall, normally converging toward the centre of the slot 13 in order to ease entry of the primary fastener 14 into the slot 13 during engagement. The particular engagement mechanism preferred allows insertion of the primary fastener 14 into the slot 13 but will substantially increase the difficulty in removing the primary fastener 14 from the slot 13. In particular, it has been found that the provision of a tooth engagement mechanism results in high security due to the fact that the more force applied to the mesh in an attempt to remove the mesh 10 results in a tighter engagement between the corresponding portions of the engagement mechanism.

[0079] The teeth 28 provided on one of the longer, outer sidewall 26 may have a different configuration to the teeth 28 provided on the shorter, inner 25 sidewall because, in normal use, the mesh 10 abuts longer, outer sidewall 26 of the elongate slot 13 and therefore, the preferred teeth provided on that side wall 26 may be particularly adapted to engage with the mesh 10, and more particularly, with the openings in the mesh in order to retain the mesh more securely in the elongate slot 13.

[0080] Each elongate slot 13 is provided with a secondary catch assembly 29 as shown in Figure 1. The secondary catch assembly 29 includes a groove or notch 30 with an abutment land provided on the shorter, inner sidewall 25 of the elongate slot 13 and an abutment tooth 31 provided on the primary fastener 14. The groove or notch 30 is provided on the shorter, inner sidewall 25 spaced from the teeth 28, toward a free end of the wall 25.

[0081] The abutment land engages with the abutment tooth 31 formed on the primary fastener 14. The provision of this secondary catch assembly 29 minimises rotation of the primary fastener 14 which may occur if excessive force is applied to the mesh 10 from outside the structure. The application of force in the direction drives the abutment tooth 31 into engagement with the abutment land.

[0082] In the particularly preferred embodiment illustrated, the primary fastener 14 is an elongate fastener block or strip as illustrated in Figure 5. The primary fastener 14 typically extends substantially over the length of each frame member 12. In other words, a single primary fastener block or strip will normally be provided for each frame member. The primary fastener 14 is sized to be closely received within the elongate slot 13 with some minor deformation of the primary fastener block or strip possibly required during the insertion or engagement process. If the primary fastener 14 is dimensioned to be closely received within the elongate slot 13 then the provision of the mesh 10 between the primary fastener 14 and the sidewall 26 is sufficient to

cause the fastener block or strip to be tightly received within the slot once assembled and the engagement of the respective teeth ensured.

[0083] The primary fastener 14 of the illustrated embodiment is provided with a pair of elongate voids 32 provided longitudinally through the primary fastener 14 to form a lighter primary fastener but still provide the required strength. In a most preferred form, a pair of elongate voids 32 are provided with a crossmember 33 between the elongate voids 32 to resist transverse deformation of the primary fastener 14.

[0084] The primary fastener 14 is substantially rectangular in cross-section having a wedge shaped tip end and a tail end and a pair of side surfaces. Normally, the tip end of the primary fastener 14 engages the edge portion 11 of the mesh 10 during assembly. The tail end of the primary fastener 14 is substantially planar and perpendicular to the pair of side surfaces.

[0085] In a most preferred embodiment, the engagement portion provided on the primary fastener 14 includes a plurality of teeth 34, each having an abutment surface provided on each of the pair of side surfaces of the primary fastener 14 as illustrated in Figure 5. This will typically provide a number of engagements between a number of teeth 34 on the primary fastener 14 with a number of teeth 28 provided on the frame member 12 rather than just a single engagement.

[0086] The tail end of the primary fastener 14 is preferably planar not only to provide an abutment surface for the secondary fastener 15 as shown in Figure 1, but, also to allow the primary fastener 13 to be hammered into engagement with the frame member 12 if necessary. As mentioned above, the abutment tooth 31 is provided on the shorter, inner side wall 25 of the primary fastener 14, spaced from the tail end. Normally, this will be oriented to the inner side of the assembly rather than the outer side. The abutment tooth 31 has an abutment surface or shoulder extending substantially perpendicular to the side surface from which the abutment tooth 31 extends. Further, an angled surface may preferably be provided forwardly of the abutment surface or shoulder angled inwardly towards the tip of the primary fastener 14.

[0087] A rebate 35 is provided at the tail end of the primary fastener 14, at the corner between the tail end and the longer side wall 26. The rebate extends over the length of the primary fastener 14 and receives a portion of the secondary fastener 16 as explained below.

[0088] In use, the primary fastener 14 is an extruded member of consistent cross-section over its length which can be cut to length once the frame has been assembled, and then simply inserted into the elongate slot 13 and hammered or pressed into engagement with both the edge portion 11 of the mesh 10 and the frame member 12.

[0089] Normally, the secondary fastener 15 is also an extruded member with a consistent shape or cross-section over its length. Normally, the secondary fastener 15 is elongate and functions to close the elongate slot 13 in the frame assembly to provide not only more secure construction, but also an aesthetically pleasing finish.

[0090] The secondary fastener 15 functions to lock the primary fastener 14 in place through engagement with the frame member 12 and with the primary fastener 14.

[0091] In a particularly preferred embodiment illustrated in Figure 7 in particular, the secondary fastener 15 is substantially U-shaped in cross-section including a cover portion 36 in order to cover and engage the primary fastener 14, a spaced apart engagement portion 37 in order to engage with the frame member 12 relative to which the secondary fastener 15 is attached and an elongate wall 38 separating the cover portion from the engagement portion.

[0092] The engagement portion 37 of the secondary fastener 15 is normally be an engagement block or strip similar in some respects to the primary fastener 14 in that it engages with the frame member 14, normally in a similar way to the engagement between the primary fastener 14 and the frame member 12. The engagement portion 37 of the secondary fastener 15 engages into the secondary slot opening 16 in the frame member 12. Normally, the secondary slot opening 16 provided in the frame member 12 to engage with the secondary fastener engagement portion 37 is provided perpendicularly to the engagement slot 13 provided for the primary fastener 14 as shown in Figure 4.

[0100] In a particularly preferred embodiment, the secondary slot opening 16 in the frame member 12 is located immediately adjacent the end wall of the engagement slot 13 normally formed integrally therewith. The secondary slot opening 16 is defined by a pair of sidewalls and the end wall 39 of the secondary slot opening 16 is a continuation of the longer, outer sidewall 26 forming the engagement slot 13 for the primary fastener 14.

[0101] Preferably, the engagement mechanism provided is similar in configuration to the engagement of the primary fastener 14 that is, a number of teeth 40 are provided on each side wall of the secondary slot opening 16, each tooth having an abutment shoulder and a number of teeth 41 are provided on an outer surface of the secondary fastener engagement portion 37.

[0102] Preferably, the entry end of the engagement portion 37 of the secondary fastener 15 will be tapered in order to ease entry of the engagement portion into the slot opening. Again, the secondary fastener engagement portion 37 has a void 42 formed therein.

[0103] The elongate wall 38 of the secondary fastener will normally extend from an outer end of the engagement portion 37 of the secondary fastener. Normally, the tail end of the engagement portion 37 is formed integrally, normally in the same plane as the elongate wall 38. As illustrated in Figure 1, the elongate wall 38 will normally overlie the shorter, inner sidewall 25 of the frame member 12 and normally, an inner surface of the elongate wall 38 will abut an outer surface of the shorter, inner sidewall 25.

[0104] Typically, the elongate wall 38 is planar and as mentioned above, the outer surface of the elongate wall 38 will normally provide an aesthetically pleasing finish as it will be this surface which is normally presented to the interior of the structure or screen assembly.

[0105] The cover portion 36 of the secondary fastener 15 will cover and engage the primary fastener 14. Normally, the cover portion 36 extends substantially perpendicularly to the elongate wall 38 of the secondary fastener 15 at the end of the secondary fastener opposite the engagement portion 37. The cover portion 36 extends over the primary fastener 14 in order to prevent access to the primary fastener 14 and typically, the cover portion 36 will prevent the primary fastener 14 from being seen once secondary fastener 15 is properly installed.

[0106] An engagement flange 43 is provided on a free end of the cover portion 36 in order to engage with the rebate 35 provided on the primary fastener 14. The flange 43 extends substantially parallel to the elongate wall 38. The flange 43 is received within the rebate 35 provided on the primary fastener 14 and an inner surface of the cover portion 37 abuts the tail end of the primary fastener 14. The flange 43 engages with the primary fastener 14 in order to convert any force or load applied from the outside of the mesh 10 into a rotational force to drive the primary fastener 14 into tighter engagement particularly between the abutment tooth 31 and the abutment groove 30 provided in the primary fastener arrangement.

[0107] The frame member 12 illustrated in Figure 9 has the same essential features as that illustrated in Figure 4 but is adapted for use in a hinged assembly as illustrated in Figures 2 and 3.

[0108] The panel of mesh 10 is normally be mounted relative to one side, normally the outside of the frame member 12 and the secondary fastener 15 will normally be provided relative to the inside of the frame member 12. As mentioned above, in use, the edge of the mesh panel will normally be inserted into the primary slot opening 13 and the primary fastener 14 then driven into engagement with the edge portion 11 of the mesh panel 10 and the primary slot opening 13. The secondary fastener 15 can then be installed over the top of the primary fastener

14, locking the primary fastener 14 into place and also hiding the primary fastener 14. As can be seen, no screws or similar need to be used to form a robust and secure screen assembly.

[0109] In the present specification and claims (if any), the word ‘comprising’ and its derivatives including ‘comprises’ and ‘comprise’ include each of the stated integers but does not exclude the inclusion of one or more further integers.

[0110] Reference throughout this specification to ‘one embodiment’ or ‘an embodiment’ means that a particular feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment of the present invention. Thus, the appearance of the phrases ‘in one embodiment’ or ‘in an embodiment’ in various places throughout this specification are not necessarily all referring to the same embodiment. Furthermore, the particular features, structures, or characteristics may be combined in any suitable manner in one or more combinations.

CLAIMS

1. A screen assembly including a sheet of meshlike screen material having an edge portion, a frame assembly including a plurality of elongate frame members assembled to define an opening which is at least partially closed by said sheet of screen material and wherein at least one of said elongate frame members includes at least one elongate slot to receive an edge portion of the screen material therein, the at least one elongate slot provided with a portion of an engagement mechanism, a primary fastener retained in each at least one elongate slot, said fastener having an abutment portion to abut the edge portion of the screen material within the opening, the fastener provided with a second portion of an engagement mechanism to engage with the portion of the engagement mechanism provided with the at least one elongate slot, and a secondary fastener engageable with the at least one elongate frame member to lock the primary fastener in the at least one elongate slot.
2. A screen assembly as claimed in claim 1 wherein the screen material is at least semi-rigid.
3. A screen assembly as claimed in claim 1 or claim 2 wherein the sheet of screen material has a shaped edge return portion, angled relative to the sheet to return over an adjacent part of the sheet to positively engage the primary fastener.
4. A screen assembly as claimed in claim 3 wherein the edge portion is angled relative to a main portion of the sheet at an acute angle.
5. A screen assembly as claimed in any one of the preceding claims wherein a single elongate slot is provided along each frame member.
6. A screen assembly as claimed in claim 5 wherein each or each elongate slot is formed from a pair of spaced apart side walls and at least one of the spaced apart side walls has a portion of an engagement mechanism associated with an inner surface thereof.
7. A screen assembly as claimed in any one of the preceding claims wherein the engagement mechanism provided includes a plurality of teeth members spaced over at least a portion of a surface.
8. A screen assembly as claimed in claim 6 further including a secondary catch assembly including an abutment land provided on one of the spaced apart side walls defining the or each elongate slot and a second portion provided on the primary fastener, the abutment land provided on the side wall which is located relative to an interior of the screen assembly.

9. A screen assembly as claimed in claim 8 wherein the preferred abutment land engages with an abutment tooth formed on the primary fastener when the primary fastener is properly located in the elongate slot.
10. A screen assembly as claimed in any one of the preceding claims wherein the primary fastener is an elongate fastener block or strip extending substantially over each frame member.
11. A screen assembly as claimed in any one of the preceding claims wherein the primary fastener includes an engagement portion provided on each of the pair of side surfaces and corresponding with the engagement portion provided on the side walls of the elongate slot of the frame member.
12. A screen assembly as claimed in any one of the preceding claims wherein a rebate is provided at a tail end of the primary fastener, extending over the primary fastener to receive a portion of the secondary fastener.
13. A screen assembly as claimed in any one of the preceding claims wherein the at least one secondary fastener is substantially U-shaped in cross-section including a cover portion in order to at least cover the primary fastener, a spaced apart engagement portion in order to engage with the frame member relative to which the secondary fastener is attached and an elongate wall separating the cover portion from the engagement portion.
14. A screen assembly as claimed in claim 13 wherein the engagement portion of the secondary fastener is an engagement block or strip to engage in a secondary opening in the frame member.
15. A screen assembly as claimed in claim 14 wherein the secondary opening in the frame member provided to engage the secondary fastener is located immediately adjacent to the engagement slot and angled relative thereto.
16. A screen assembly as claimed in any one of claims 13 to 15 wherein an entry end of the engagement portion of the secondary fastener is tapered in order to ease entry of the engagement portion.
17. A screen assembly as claimed in any one of claims 13 to 16 wherein the elongate wall of the secondary fastener extends from an outer end of the engagement portion of the secondary fastener.

18. A screen assembly as claimed in any one of claims 13 to 17 wherein the cover portion of the secondary fastener covers and engages the primary fastener.
19. A screen assembly as claimed in any one of claims 13 to 18 wherein an engagement lug or flange is provided on a free end of the cover portion in order to engage with the primary fastener.
20. A screen assembly as claimed in any one of the preceding claims wherein each frame member has a primary slot opening for a primary fastener in line with the screen material and a secondary slot opening for the secondary fastener extending substantially transversely or perpendicularly to the primary slot opening.

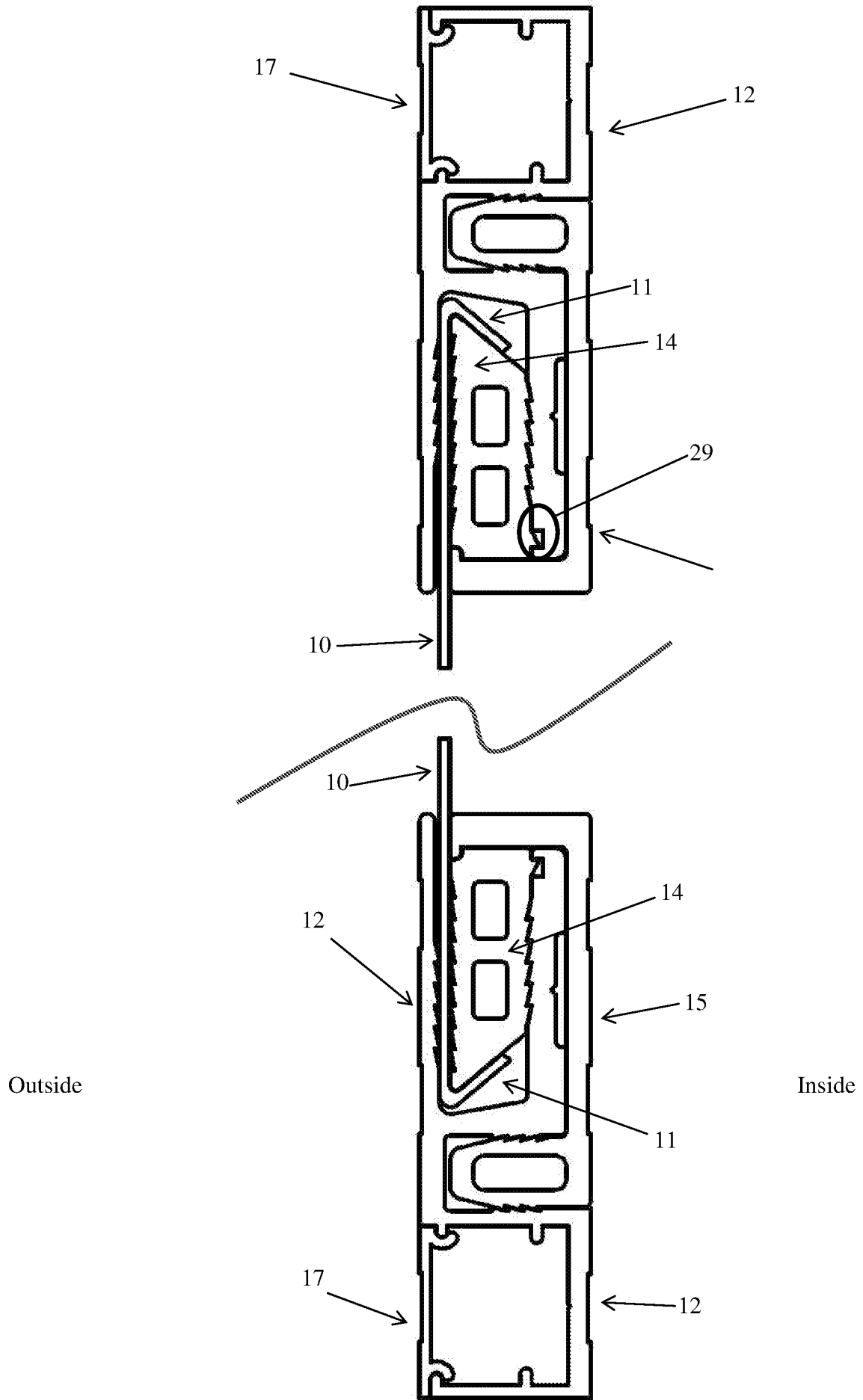


Figure 1

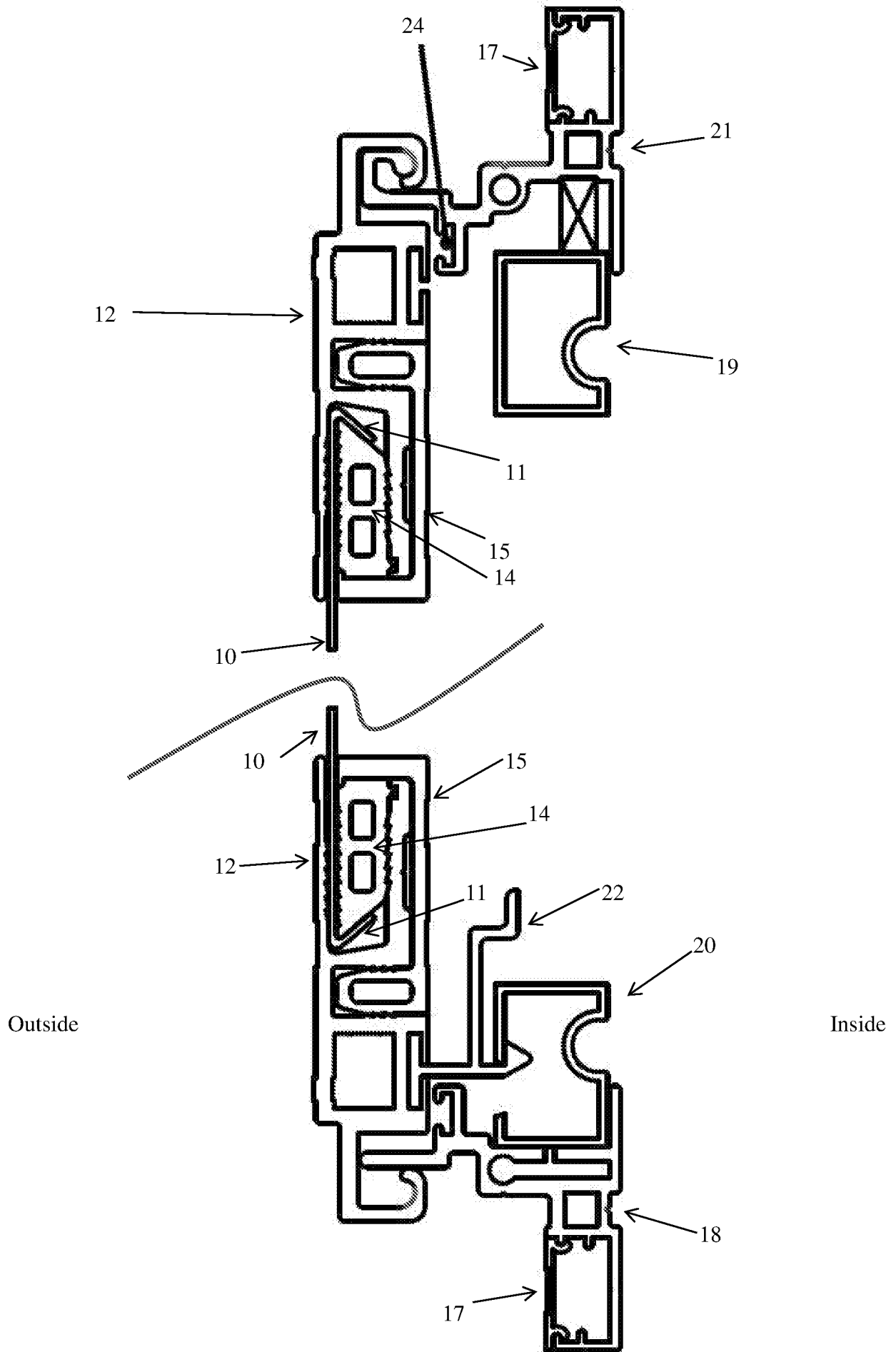


Figure 2

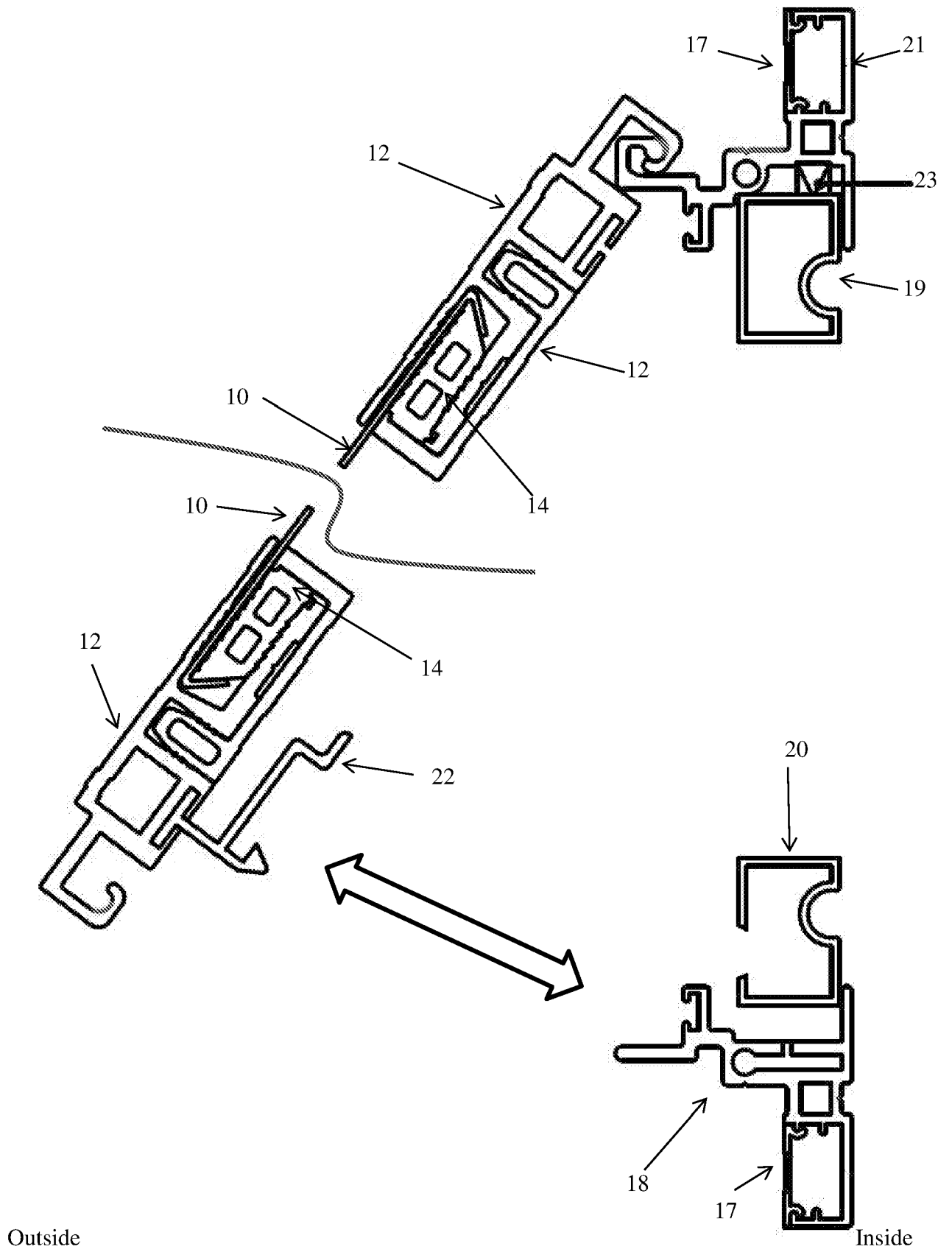


Figure 3

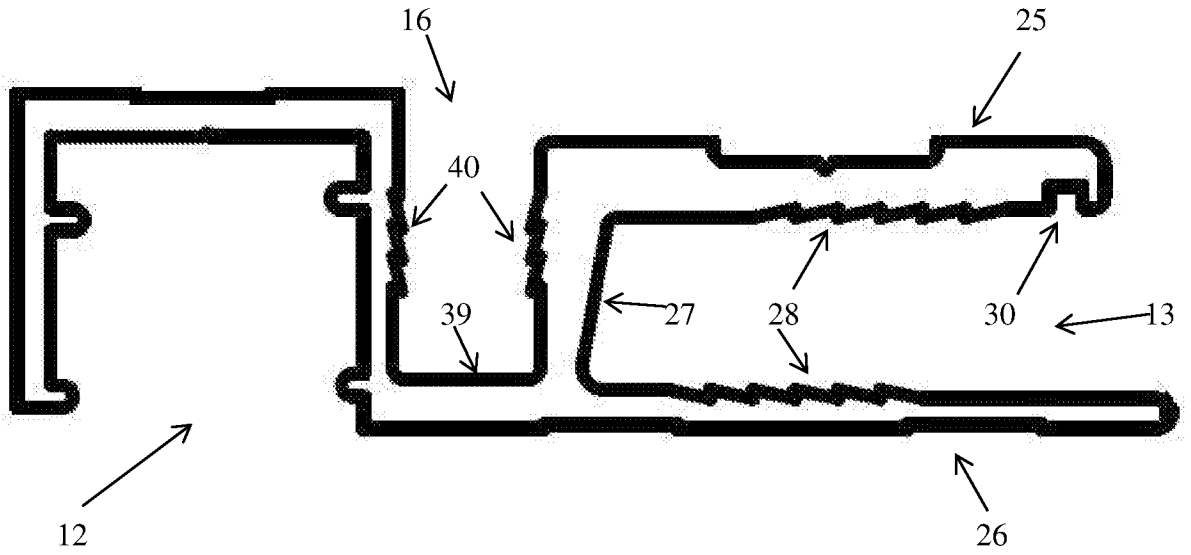


Figure 4

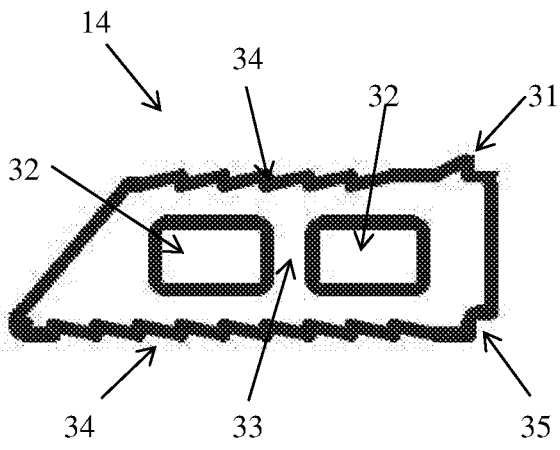


Figure 5

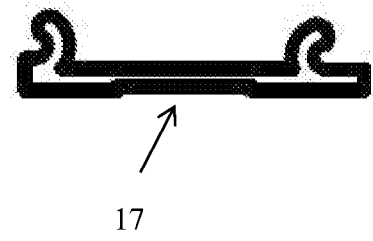


Figure 6

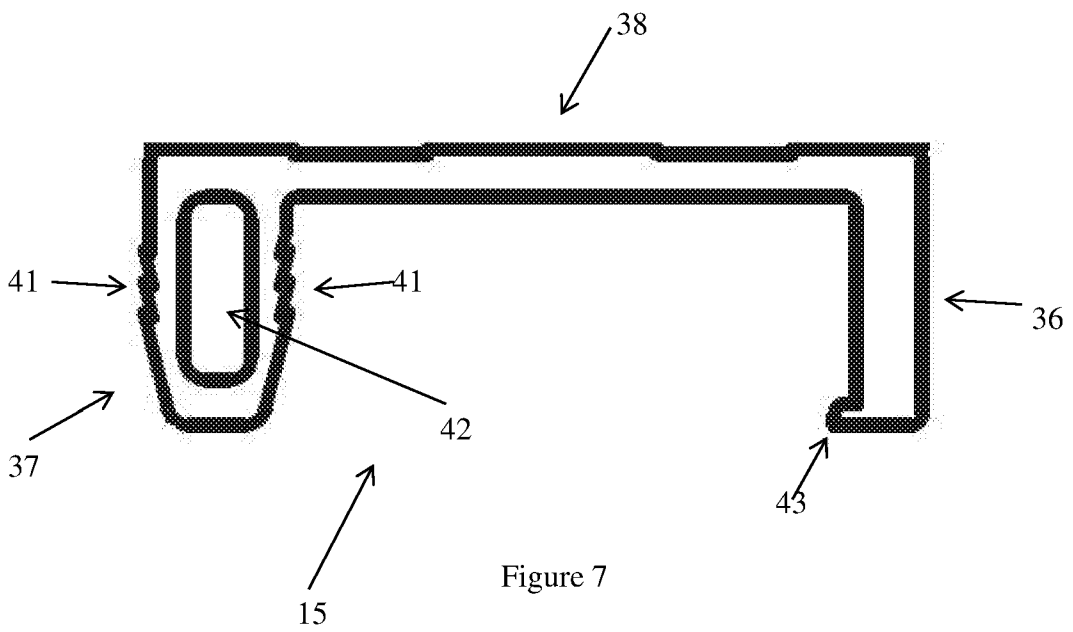


Figure 7

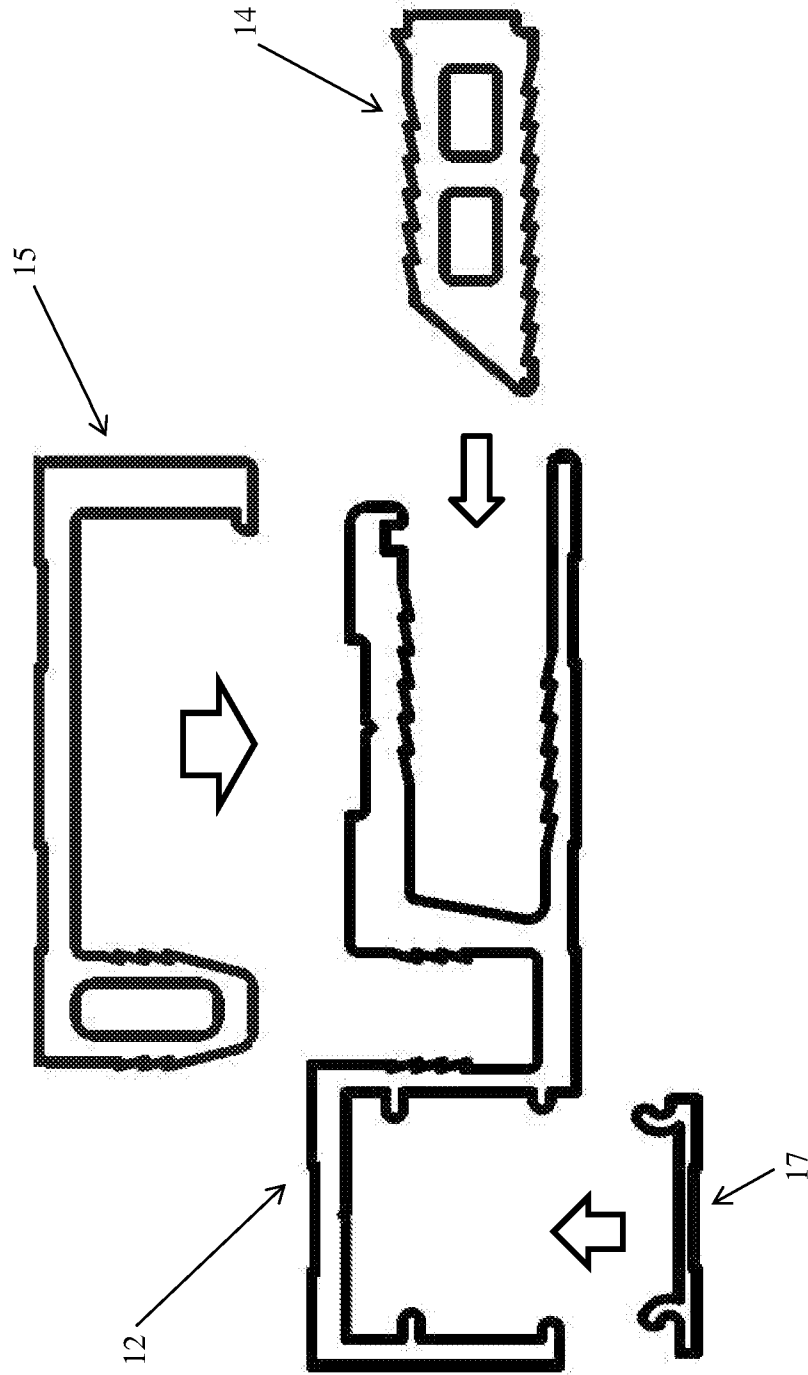


Figure 8

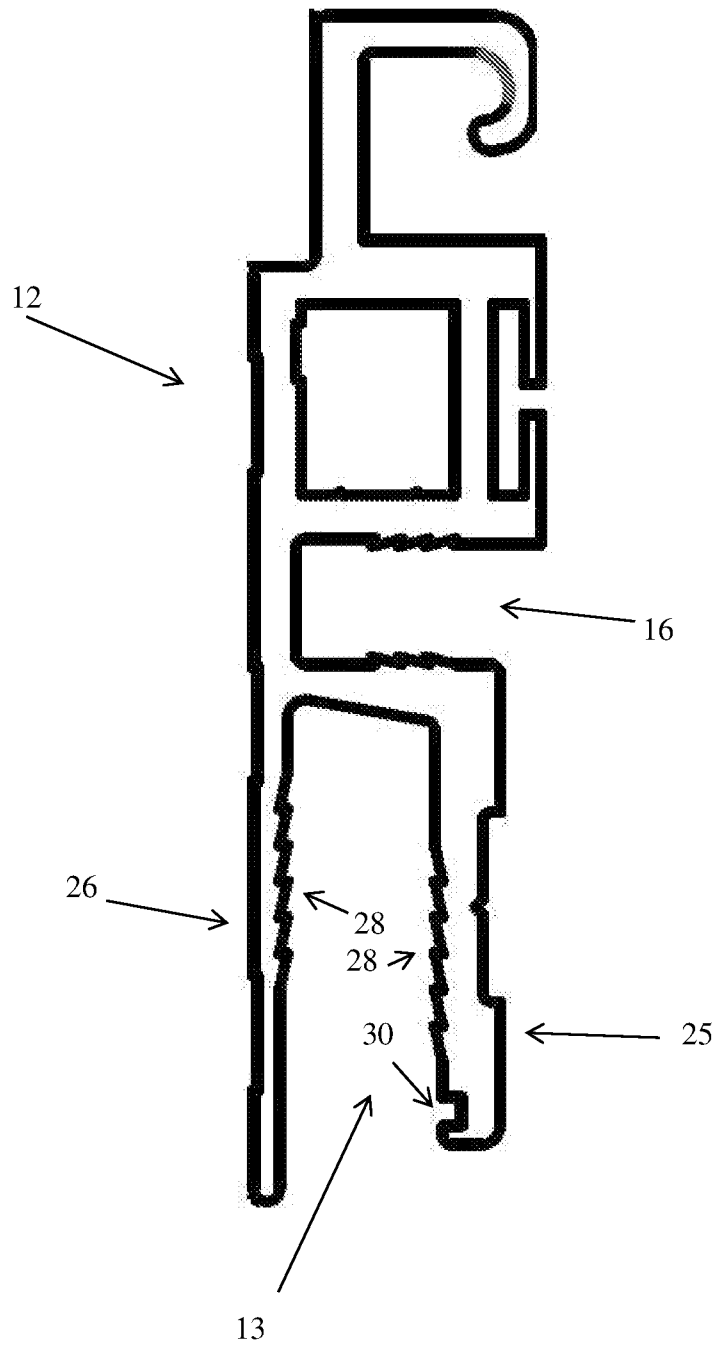


Figure 9