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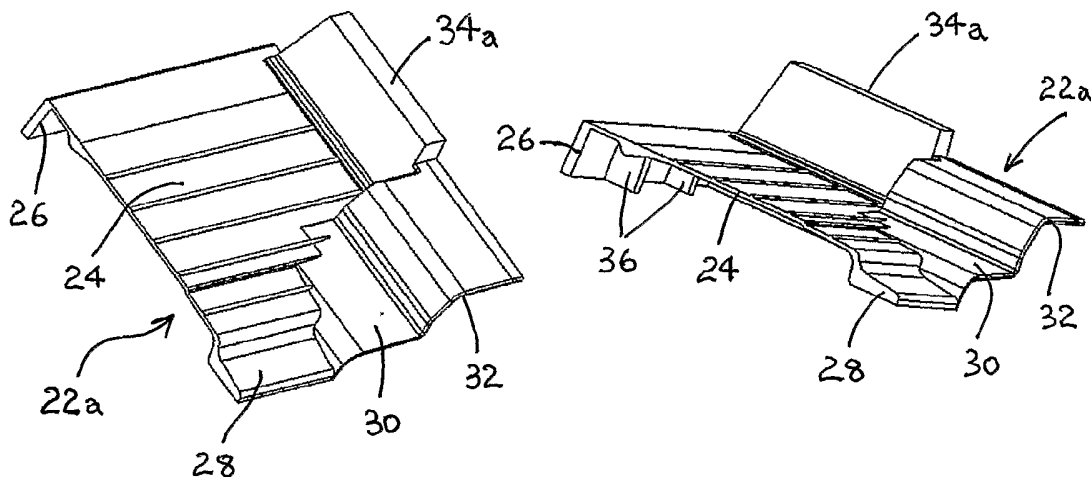
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(54) Title: A CORNER SEAL COVER AND AN EDGE SEAL FOR SOLAR PANELS



(57) Abstract: A corner seal cover (22) adapted to be installed between adjacent overlapping corners of upper (18a) and lower (18b), inclined solar panels (18). The upper panel (18a) overlapping the lower panel (18b), the panels (18) each having an upper surface bounded along their side and top edges by sealing strips (40 & 38) raised with respect to the upper surface. The top edge sealing strip (38) meets each of the side edge sealing strips (40) at a junction. The corner seal cover (22) includes a first portion (24, 26 & 28) and a second portion (30 & 32). The first portion extends over the lower panel's top edge raised sealing strip (38). The second portion extends over the panel's adjacent side edge raised sealing strip (40). The first and second portions are integrally formed from a water impervious material and cover the junction between the lower panel's adjacent top and side edges sealing strips (38 & 40). An edge seal (50) for a solar panel (18) is also disclosed.



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A Corner Seal Cover and an Edge seal for Solar Panels

Field of the invention

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The present invention relates generally to the weather sealing of solar panel framing systems used in building claddings against water ingress and more particularly to a corner seal cover and an edge seal for solar panels as a cladding.

10

The invention has been developed for use in mounting solar panel members or laminates in an array on a supporting structure and will be described with reference to mounting solar electric panels, also known as photovoltaic (PV) panels, to a suitable angle to the horizontal and with respect to the sun, typically for the dual use as solar energy generator and roofing material.

15

However, the invention is not restricted to this particular use and is also suitable for analogous applications, for example the vertical mounting of an external PV wall cladding system.

20

Background of the invention

25

Laminate solar PV panels having the general characteristics of a roofing tile are known. Such panels are able to be integrated into a roof, commonly but not exclusively a tile roof, and serve as the roofing material as well as a solar power generator. Solar PV panels mounted over a roof are also known.

30

An important consideration of the design and development of PV panels is the ability of the panels to be effectively integrated architecturally into a roof design. Further, where the panels take the place of conventional roofing elements such as tiles or metal sheets, reliable and convenient mounting within the roof and effective weather sealing is very important.

35

One known installation system relies on each solar panel having a framework for mounting the PV laminate with a seal around the periphery of the laminate and the framework having structural features to facilitate its mounting on, for example, conventional roof battens. However, such framework are of fixed proportions and therefore are not necessarily desirable for some installations and will not conform with, for example, standard batten spacings. Further, the fixed proportions also severely limit the number of commercially and commonly available PV panels that can be incorporated into the framework. Custom size PV panels are more expensive, which makes any system using them less competitive in the market.

40

45

Another known installation system requires additional structures below the PV panel to ensure weather sealing, or use extruded or longitudinal frame sections that need additional components to attach to the roof structure, which in some cases lack a smooth

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external finish appearance important for both aesthetic and external environmental conditions.

5 Another known installation system uses PV panels that are assembled, prior to transportation to site or installation, with external sealing strips that are suited to easy mounting on conventional roof battens. This system advantageously avoids any on-site component assembly, which can be complex and time consuming, and also lowers the risk of transportation/installation damage by providing edge protection to the glass PV laminate panels.

10 This system also improves the weather sealing of PV panels by using longitudinal edge sealing elements joined at the corners of each panel, either by direct mitre joints or in combination with corner sealing elements, to make a frame that surrounds and is weather sealed to the PV panel. The advantage of longitudinal edge sealing elements in
15 such a panel framing system is that they may be cut to length to suit the glass panel dimensions. This makes such a system adaptable to variations in panel dimensions, such as occurs in panels from different manufacturers. The framed panel is then used as a roofing element that can be laid on conventional roofing structures such as roof battens and, when laid and joined together, forms a weather proof roofing system. Such a framing
20 system is often referred to by the generic name of solar roof tiles.

However, a problem with using such longitudinal edge sealing elements to frame glass PV panels is that poor sealing often occurs between the longitudinal elements and the glass panel, in particular the sealing of the longitudinal elements at corner joints. This
25 can lead to leaks into the supporting building.

It is an object of the present invention to substantially overcome or at least ameliorate one or more of the above disadvantages.

30 Summary of the invention

Accordingly, in a first aspect, the present invention provides a corner seal cover adapted to be installed between adjacent overlapping corners of upper and lower, inclined
35 solar panels,

the upper panel overlapping the lower panel, the panels each having an upper surface bounded along their side and top edges by sealing strips raised with respect to the upper surface, the top edge sealing strip meeting each of the side edge sealing strips at a
40 junction,

the corner seal cover including:

a first portion extending over the lower panel's top edge raised sealing strip; and

a second portion extending over the panel's adjacent side edge raised sealing strip,

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wherein the first and second portions are integrally formed from a water impervious material and cover the junction between the lower panel's adjacent top edge and side edge sealing strips.

5 The term "sealing strip" as used herein is intended to include resilient sealing strips applied to the panel edges and also to a combination of resilient sealing strips and adjacent rigid supporting or mounting structures, the latter commonly being in the form of Aluminium extrusions.

10 The first portion preferably has a substantially central planar portion, a rear lip extending and depending from the central portion and a front stepped flange depending from the central portion.

15 The second portion preferably has a substantially planar portion adjacent the front stepped flange and a relatively raised curved side portion. The relatively raised curved side portion preferably has a distal part adapted to overlap a relatively raised curved side portion distal part of a like mirrored corner seal.

20 The corner seal cover preferably further includes a third portion adapted to engage a corresponding portion of a like mirrored corner seal.

25 The corner seal cover is preferably produced from a plastic material. The corner seal corner seal is preferably produced from a polymer. The polymer is preferably SEBLEX (Trade Mark) or a type of polyolefin elastomer which has similar physical properties to neoprenes.

30 In a second aspect, the present invention provides an edge seal for solar panels, the solar panels having an upper surface, a lower surface and an edge surface therebetween,
the edge seal including:
a longitudinally extending, generally U-shaped, channel having two distal edges, the channel being adapted to snugly receive the edge surface of the panel therein; and
35 a longitudinally extending, flexible lip extending at an angle outwardly from one of the channel's distal edges and in a direction towards the other of the channel's distal edges, the lip being resiliently biased towards the channel's other distal edges,
wherein the lip, in use, abuts the panel's lower surface and forms a
40 longitudinal drainage void between the lip, the channel and the panel's lower surface.

The lip preferably has a proximal part and a distal part, the distal part being angled with respect to the proximal part.

45 The exterior of the channel preferably includes a plurality of longitudinal grooves.

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The edge seal is a preferably produced from a plastic material. The edge seal is preferably produced from a polymer. The polymer preferably has the physical properties and long service life of neoprene.

5 In further aspects, the present inventions provide three elements or components to improve the weather sealing of longitudinal element framed glass panels with corner joins and these elements or components may be applied separately or work in unison to form an improved sealing system for weather sealing and for providing safe water drainage of the framed panel. The inventions apply in particular for systems for PV
10 panels in roofs or facades that use an overlapping roof-tile like PV panel elements made up of elongate frame elements surrounding PV glass panels.

In commonly found glazing systems, a weather/water seal between an elongate element retaining channel and the edge of a glass panels can be achieved using an
15 elongate polymeric glazing element or gasket, typically of a U shape profile. However corner joints at the end of elongate frame elements are commonly found as areas difficult to effect a durable weather seal due to the joints and satisfactory methods for sealing of these.

20 The first component is preferably a weather sealing component of thin, non-porous material with a shape to form a water sealing interfacial gasket fitted closely between overlapping corner joints of a tile-like or tessellated glazing system wherein a superior tile lower frame elongate element overlaps an inferior tile upper frame elongate element and each of the overlapping elongate elements has joints at either end to
25 respective side frame elongate elements at corner joints made by mitre- or partial mitre-cuts of the elongate elements or by using corner insert joining elements.

The frame corner weather sealing components are preferably a system of a left-hand and right-hand pair of thin, generally flat shaped polymeric elements forming
30 interface gaskets or 'flashings' used in between the overlap of the corner joints of the framing system forming a weather/water seal on the upper surface of the upper left-hand and right-hand upper corners of each inferior frame, that in turn are overlapped by the lower corners of the superior frame.

35 The second component preferably includes a V groove water catching and drainage channel feature added to outer lip of the bottom wall of a generally U shaped elongate polymeric gasket used to seal elongate elements of framed panels to the glass panel of a framing system.

40 The third component is preferably an improvement of the weather seal of an overlap join between the superior lower frame elongate element and inferior upper frame elongate element at the outer most, weather exposed overlap join between these elements using a polymeric 'bulb' shaped seal to make a compression seal between the lower edge of the superior frame onto the surface of an inferior glass panel of the inferior frame.
45

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The first part of the invention, being the polymeric corner flashings will now be described. Preferably the corner flashing is a thin interposed polymeric gasket-type element forming a water flashing located between the upper and lower surfaces of upper and lower corner elements and or adjoining elongate frame elements that make the corner joint of a frame.

Preferably, the shape of the polymeric corner flashing is generally that of a thin overlaying element that conforms closely to the surface shape of the framing system left- or right-hand upper corner joints, if corner insert elements are used, and/or to the adjoining surfaces of upper frame and side frame elongate elements.

Preferably, the shape of the corner flashings also closely conforms to the outer surface of the elongate capping element described as "the cover strip" that joins two side by side adjacent tiles, the cover strip being inserted into voids provided in the lower frame corner elements when the lower corner elements lie on top of the upper frame corner elements when installed.

Preferably, the corner flashing is made of left- and right-hand parts that mate together when assembled in the installation of the panel framing system by inserting together, and overlapping intimately such that their interlocking also defines the spacing distance side-to-side between the adjacent framed panels, the shape of this interlocked area between flashings has features of; a vertical wall portion that rises to a height so as to fit closely beneath a superior elongate capping element or 'cover strip' fitted to seal and secure between adjacent superior framed panels, the vertical wall portion ends with a flat horizontal wall on one -hand of the flashing, this flat area is of a rectangular size and shape and stiffness so as to fit underneath, into a pocket formed by the equivalent vertical and horizontal wall portions of the other -hand flashing, this flashing having a similar rectangular horizontal wall which is slightly higher than the other, and in addition has a groove feature that is for taking the tip of a penetrating self-drilling roofing screw that is driven through the superior capping element or 'cover strip' and penetrates through both the flashing rectangular horizontal wall portions for the purpose of securing the framing system to the supporting structure of the building.

Preferably, the corner flashing/s have an upper extension lip area that extends beyond the upper frame elongate upper edge and upper edge of the corner insert if present, to form a surface for capture of drainage water from the overlapping end of the glazing polymeric elongate gasket V shaped drainage channel, the upper lip extension of the corner flashing also ending with a depending vertical wall portion which stiffens the overhanging portion of the lip area, the depending vertical wall also having perpendicular abutment walls that bear onto the vertical walls of the upper frame elongate and corner insert if present, to add further support and stiffening to the overhanging lip area.

Preferably, each left- and right-hand corner flashing has a portion to closely overlap the capping elongate element or 'cover strip' that inserts into the overlap corner joints of two adjacent side-by-side framed panels; this overlap portion of one -hand corner flashing is extended further than the other -hand to form a further overlap join

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between the flashing overlap portions, preferably the thickness of the overlapped portions of each flashing is reduced to maintain consistent overall thickness of the two overlapped parts to the thickness of the flashing generally.

5 Preferably, each flashing has a portion that closely follows the contour of the overlapped inferior frame elongate side frame section and a further portion that drops down onto the glass area of the inferior panel in the upper corner area of the panel to form a further barrier to water impinging from the glass surface onto the upper corner joint of the inferior framed panel.

10

 The second components of the present invention, being the elongate polymeric gasket component will now be described. Preferably the elongate glazing gasket is made of a polymeric material usually with an asymmetric U shape profile, with the addition of an extended lip portion that forms the outer side wall of a 'V' shaped channel extending
15 from the lower edge, outermost face of a lower wall portion of the U shaped gasket.

15

 The V channel shape formed by the lip extension creates a drainage channel to collect, retain and channel water that may penetrate between the glazing polymeric seal and the glass panel to an external surface where it is expelled to the outside of the panel
20 system.

20

 Preferably, the outermost edge of the V channel lip feature forms a mild compression seal to the underside of the panel or laminate by virtue of its pre-formed, pre-tensile shape such that it deflects on installation and the elastic resilience of the
25 polymeric material holds the inclined plane shape of the tip of the V outer wall to seal flat onto the glass panel rear surface at installation, the V wall extends to leave a void within the V groove in which water can be retained and drained.

25

 Gravity and surface tension drains the water to a lower position in the framing
30 system where it can be put to the external weather surface of the panel framing system.

30

 Preferably, the lowermost end of the V shaped drainage channel of the elongate polymeric gasket used in the side frame elongate elements of the panel framing system overlaps onto an upper surface feature of the polymeric corner flashing located at the
35 panel frame lower corner overlap joint.

35

 The third component of the present invention being the overlapping bulb seal will now be described. Preferably, the lower frame elongate element has a lower horizontal lip extension of frame material that includes a mushroom shaped undercut groove on the
40 lower under side surface of the extension for taking the flange of an elongate polymeric seal that has a bulb shaped profile.

40

 Preferably, the polymeric bulb seal has a hollow or easily deformable circular form with a mushroom shaped flange to insert into a retaining groove, the bulb being a
45 deformable shape that affects a seal when compressed between the two surfaces of the lower frame lip extension and the glass of the inferior panel.

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Brief description of the drawings

5 Preferred embodiments of the invention will now be described, by way of examples only, with reference to the accompanying drawings, in which:

10 Figure 1 is a perspective view of a roof with solar tiles attached thereto using the covers and seals according to embodiments of the invention;

Figure 2A is a perspective view of two solar tiles using the covers and seals according to embodiments of the invention;

15 Figure 2B is an enlarged partial detailed view of the tiles/ covers and seals shown in Figure 2 and a third tile;

Figure 3 is perspective views of a left hand corner seal cover according to an embodiment of the invention;

20 Figure 4 is perspective views of a right hand corner seal cover according to an embodiment of the invention;

25 Figure 5 is a partial perspective view of three tiles installed using covers and seals according to embodiments of the invention;

Figure 6 is a partial perspective view of two tiles installed using covers and seals according to embodiments of the invention;

30 Figure 7 is a cross sectional view of two tiles installed using covers and seals according to embodiments of the invention; and

35 Figure 8 is a cross sectional view of three tiles installed with some elements removed to better show the use of covers and seals according to embodiments of the invention.

Detailed description of the preferred embodiments

40 Referring to Figure 1, there is shown a segment of an inclined roofing structure 10 comprising rafters 12, battens 14, roof tiles 16 and solar PV panels 18. The airflow path behind the panels 18 is indicated by arrows 20 (inclined solar panels).

45 Figure 2A shows two of the panels 18 in isolation, namely an upper panel 18a and a lower panel 18b. The bottom edge of the upper panel 18a overlaps the top edge of the lower panel 18b. An embodiment of a corner seal cover 22 is shown on the top corners

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of the upper panel 18a and between the top corners of the lower panel 18b and the bottom corners of the upper panel 18a.

5 The corner seal covers 22 are best shown in the Figures 3 and 4 and are produced as a left hand corner seal cover 22a (Figure 3) and a right-hand corner seal cover 22b (Figure 4). The left and right hand corner seal covers 22a and 22b are effectively a mirror of one another except for some male/female interlocking components which will be described in more detail below.

10 The corner seal covers 22 are comprised of a first portion that includes a central planar portion 24, a rear lip 26 depending from the extended central portion 24 and a front stepped flange 28, also depending from the central portion 24. The seal covers 22 also have a second portion with a substantially planar portion 30 adjacent the flange 28 and a relatively raised curved side portion 32. The left hand corner seal cover 22a also
15 includes a male boss 34a which can be received in an interlocking fashion within a corresponding female recessed part 34b provided in the right-hand side corner seal cover 34b. The corner seal covers 22 also include walls 36 between the central planar portion 24 and rear lip 26.

20 The various parts of the corner seal covers 22 described above are integrally formed from a water impervious material, preferably the polymer marketed under the trade mark SEBLEX.

25 The installation and purpose of the corner seal covers 22 will now be described with reference to Figures 5 to 8.

30 Turning firstly to Figure 6, there is shown two side-by-side lower panels 18b and 18b'. The panels 18b and 18b' have a top sealing strip 38 along their top edges and an edge sealing strip 40 along their adjacent side edges. The sealing strips 38 and 40 are comprised of a rigid aluminium extrusion and a flexible polymeric seal, as will be described in more detail below.

35 The sealing strips 38 and 40 meet adjacent the corner of the panels 18b and 18b' and it is this join or junction that presents a potential leaking point for the panels 18 and the sealing strips 38 and 40.

40 Figure 6 shows a left hand corner seal cover 22a being positioned at the junction of the top and side sealing strips 38 and 40 with its first portion (comprising the central portion 24, the lip 26 and the flange 28) extending over the panel's top edge sealing strip 38. The second portion of the corner seal cover 22a (comprising the planar portion 30 and the raised curved side portion 32) extends over the panel's side edge sealing strip 40. The seal 22a is positioned with the walls 36 abutting the outer edge of the top edge sealing strip 38.

45 As the corner seal covers 22 are water impervious then, by covering the junction or join of the top and side sealing strips 38 and 40, any water that is incident on the

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junction or join region is directed over and away from the join therefore avoiding any leakage at the join.

5 A similar process occurs in relation to the right hand corner seal cover 22b which is positioned over the junction of the top and side edge sealing strips for the panel 18b'. The corner seal cover 22b is installed with the recessed part 34b being placed over and into engagement with the boss 34a of the corner seal cover 22a.

10 Further, and referring now to Figure 5, there is shown an upper panel 18a overlapping the lower panel 18b. The bottom edge of the upper panel 18a has a substantially flush sealing strip 42 (as best seen in Figure 7). Accordingly, any water incident on the upper panel 18a, particularly that is travelling adjacent the side sealing strip 40 of the upper panel 18a, is directed onto the corner seal cover 22a and over the potential leak point discussed above.

15 An edge seal 50 for solar PV panels will also now be described with reference to Figures 7 and 8. The seal 50 is produced from a polymer with characteristics of neoprene and can be used for sealing the top, bottom and side edges of the panels 18.

20 Figures 7, 7A and 8 show the edge seals 50 which have a longitudinally extending generally U-shaped channel 52 which is adapted to snugly receive the panel 18a therein in a substantially water-tight sealing connection. The channel 52 includes two distal edges 54 and 56. A longitudinally extending, flexible lip 58 extends at an angle outwardly from the distal edge 54 and in a direction towards the distal edge 56, towards
25 which it is also resiliently biased. After installation, this also biases the lip 58 towards the adjacent lower surface of the panel 18b. More particularly, the lip 58 has a proximal part 58' and a distal part 58'', with the latter being resiliently biased, after installation, into contact with the adjacent lower surface of the panel 18.

30 The upper inner surface of the channel 52 includes a number of fine longitudinal grooves 55 to assist in sealing the edge seal to the upper surface of the panel glass.

The upper and lower exterior surfaces of the channel 52 include a number of longitudinal grooves 60 to assist in interlocking the seal 50 within a correspondingly
35 grooved recess provided in a recess 64 in the aluminium mounting extrusion.

In use, the distal part 62 of the lip 58 abuts the panel's lower surface and forms longitudinal drainage void 57 between the lip 58, the channel 50 and the panel's lower surface. As a result, any water that leaks past the interface between the exterior surfaces
40 of the panel and the interior surfaces of the U-shaped channel 50 is caught in the void 56 and can thereafter be safely drained away by the downward sloping inclination of the panels side edges and the mitre joining of the upper frame edge horizontal drainage channel portion at the panel's upper corners where it is possible to have the mitre join of the U shaped channel and drainage portion fusion welded so that the drainage channel is
45 fully sealed at the mitre joins.

Although the invention has been described with reference to preferred embodiments, it will be appreciated by those skilled in the art that the invention may be embodied in many other forms.

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CLAIMS:

1. A corner seal cover adapted to be installed between adjacent overlapping corners of upper and lower, inclined solar panels,
5 the upper panel overlapping the lower panel, the panels each having an upper surface bounded along their side and top edges by sealing strips raised with respect to the upper surface, the top edge sealing strip meeting each of the side edge sealing strips at a junction,
the corner seal cover including:
10 a first portion extending over the lower panel's top edge raised sealing strip; and
a second portion extending over the panel's adjacent side edge raised sealing strip,
wherein the first and second portions are integrally formed from a water
15 impervious material and cover the junction between the lower panel's adjacent top edge and side edge sealing strips.
2. The corner seal cover as claimed in claim 1, wherein the first portion has a substantially central planar portion, a rear lip depending from the central portion and a
20 front stepped flange depending from the central portion.
3. The corner seal cover as claimed in claim 2, wherein the second portion has a substantially planar portion adjacent the front stepped flange and a relatively raised curved side portion.
25
4. The corner seal cover as claimed in claim 3, wherein the relatively raised curved side portion has a distal part adapted to overlap a relatively raised curved side portion distal part of a like mirrored corner seal.
- 30 5. The corner seal cover as claimed in any one of claims 1 to 4, further including a third portion adapted to engage a corresponding portion of a like mirrored corner seal.
6. The corner seal cover as claimed in any one of the preceding claims, wherein the corner seal is a produced from a plastic material.
35
7. The corner seal cover as claimed in claim 5, wherein the corner seal is a produced from a polymer.
8. The corner seal cover as claimed in claim 6, wherein the polymer is SEBLEX (Trade
40 Mark) or a polymer with polyolefin elastomer modified polypropylene or neoprene like characteristics.
9. An edge seal for solar panels,
the solar panels having an upper surface, a lower surface and an edge surface
45 therebetween,
the edge seal including:

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a longitudinally extending, generally U-shaped, channel having two distal edges, the channel being adapted to snugly receive the edge surface of the panel therein; and

5 a longitudinally extending, flexible lip extending at an angle outwardly from one of the channel's distal edges and in a direction towards the other of the channel's distal edges, the lip being resiliently biased towards the channel's other distal edges,

10 wherein the lip, in use, abuts the panel's lower surface and forms a longitudinal drainage void between the lip, the channel and the panel's lower surface.

10. An edge seal as claimed in claim 9, wherein the lip has a proximal part and a distal part, the distal part being angled with respect to the proximal part.

15 11. An edge seal as claimed in claim 9 or 10, wherein the interior of the channel includes a plurality of fine longitudinal grooves.

20 12. An edge seal as claimed in any one of claims 9 to 11, wherein the exterior of the channel includes a plurality of longitudinal grooves.

13. The edge seal as claimed in any one of claims 9 to 12, wherein the edge seal is a produced from a plastic material.

25 14. The edge seal as claimed in claim 13, wherein the edge seal is a produced from a polymer.

15. The edge seal as claimed in claim 13, wherein the polymer is a neoprene like material.

AMENDED CLAIMS

[received by the International Bureau on 16 September 2004 (16.09.04),
original claims 1 to 15 replaced by new claims 1 to 14 (2 pages)]

1. An corner seal cover adapted to be installed interfacial between the overlapping, unsealed corners of upper and lower, inclined framed panels,
the frame surround for each panel characterized by longitudinal side, top and bottom frame elements each being in a weather sealed relationship to their respective panel edges, and being joined at corners characterized in that the junctions between adjacent frame parts are not sealed or water tight,
the overlapping relationship of the upper framed panel to the lower framed panel characterized in that the upper panel's bottom frame corner junctions directly overlap the lower panel's top frame corner junctions,
the improvement is that the corner seal cover is in the majority interfacial only to the overlap region of the panel corner junctions and of a shape that seals over the lower panel's unsealed corner junctions,
the corner seal including:
a first portion extending over the lower panel's top frame; and
a second portion extending over the lower panel's adjacent side frame, wherein the first and second portions are integrally formed from a water impervious material and cover the junction between the lower panel's adjacent top frame and side frame;
2. A corner seal cover as claimed in claim 1 wherein;
the first portion has a substantially central planar portion, a rear lip depending from the upper edge of the central portion and a front stepped flange depending from the central portion.
3. A corner seal cover as claimed in claim 2 wherein an upper edge portion of the central planar portion extends beyond the lower panel top frame upper edge to create an extended surface to capture drainage from an edge seal drainage capture feature associated with the overlapping upper panel's side frame element.
4. A corner seal cover as claimed in claim 2 wherein the extended upper edge portion and the depending rear lip are supported by buttress walls that bear onto the upper depending wall of the top frame.
5. The corner seal cover as claimed in claim 1, wherein the second portion has a substantially planar portion adjacent the front stepped flange and a relatively raised curved side portion.
6. The corner seal cover as claimed in claim 5, wherein the relatively raised curved side portion has a distal part adapted to overlap a relatively raised curved side portion distal part of a like mirrored corner seal.
7. The corner seal cover as claimed in any one of claims 1 to 5, further including a third portion adapted to engage a corresponding portion of a like mirrored corner seal.
8. The corner seal cover as claimed in any one of the preceding claims, wherein the corner seal is a produced from a plastic material.
9. The corner seal cover as claimed in claim 8, wherein the corner seal is a produced from a polymer.

10. The corner seal cover as claimed in claim 8, wherein the polymer is SEBLEX (Trade Mark) or a polymer with polyolefin elastomer modified polypropylene or neoprene like characteristics.
11. An edge seal for solar panels as claimed in claim 3, wherein, the solar panels having an upper surface, a lower surface and an edge surface there between, the edge seal including:
 - a longitudinally extending, generally U-shaped, channel having two distal edges, the channel being adapted to snugly receive the edge surface of the panel therein; and
 - a longitudinally extending, flexible lip extending at an angle outwardly from one of the channel's distal edges and in a direction towards the other of the channel's distal edges, the lip being resiliently biased towards the channel's other distal edges,
 - wherein the lip, in use, abuts the panel's lower surface and forms a longitudinal drainage void between the lip, the channel and the panel's lower surface,
 - the drainage void lower open end being in an overlying relationship to an extended upper edge portion of the adjacent underlying corner seal cover.
12. The edge seal as claimed in claim 11, wherein the edge seal is a produced from a plastic material.
13. The edge seal as claimed in claim 12, wherein the edge seal is a produced from a polymer.
14. The edge seal as claimed in claim 12, wherein the polymer is a neoprene like material.

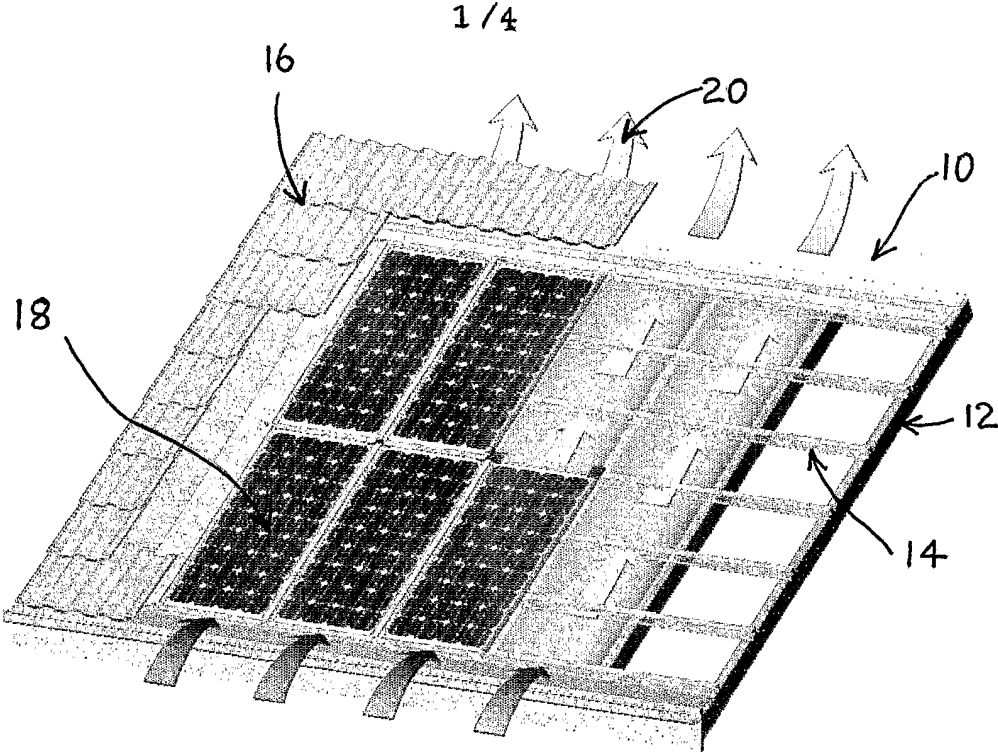


Figure 1

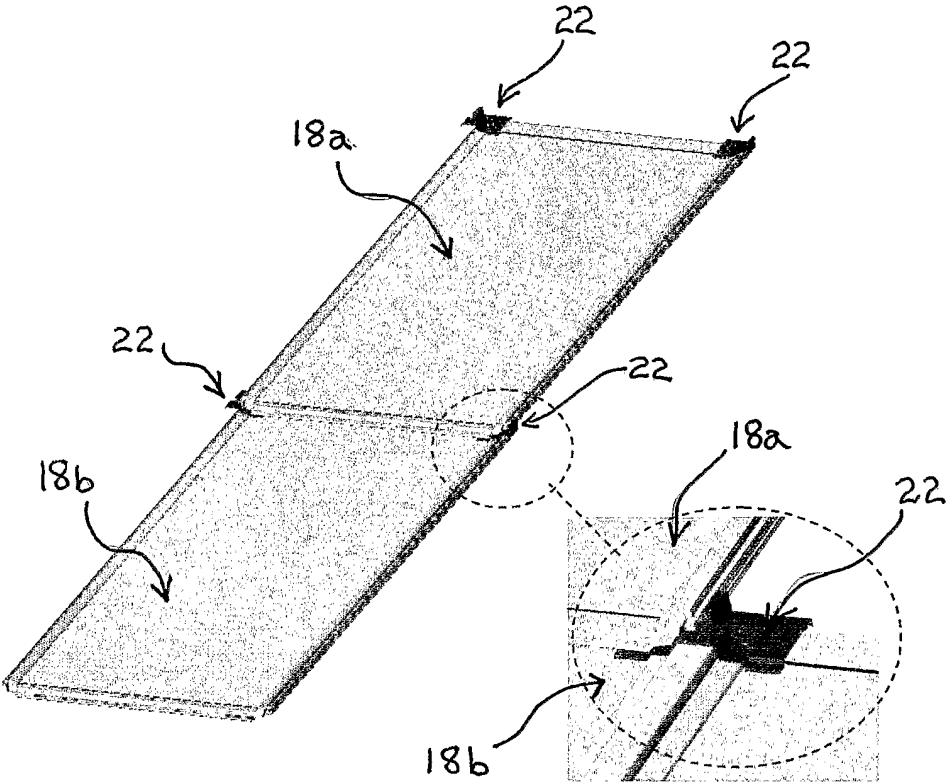


Figure 2A

Figure 2B

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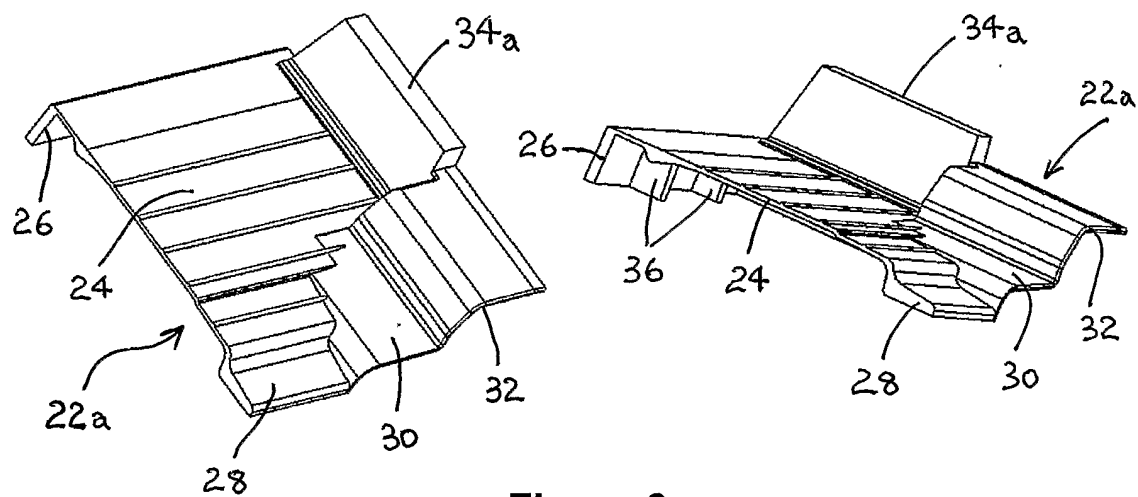


Figure 3

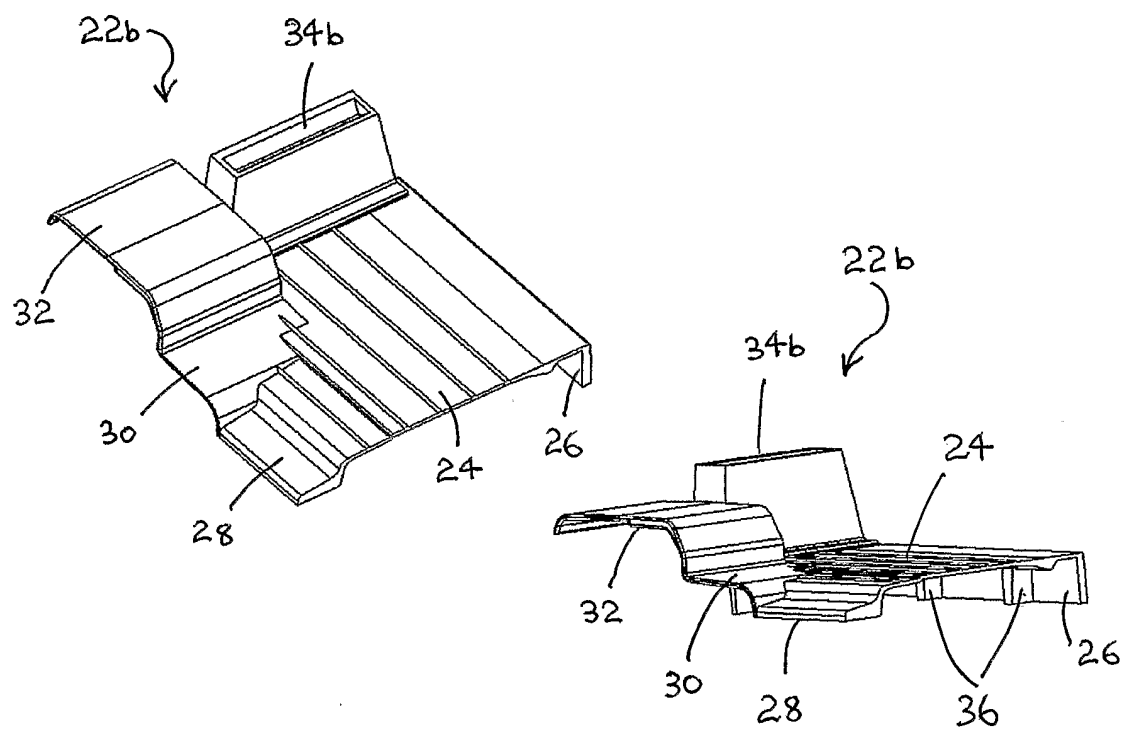
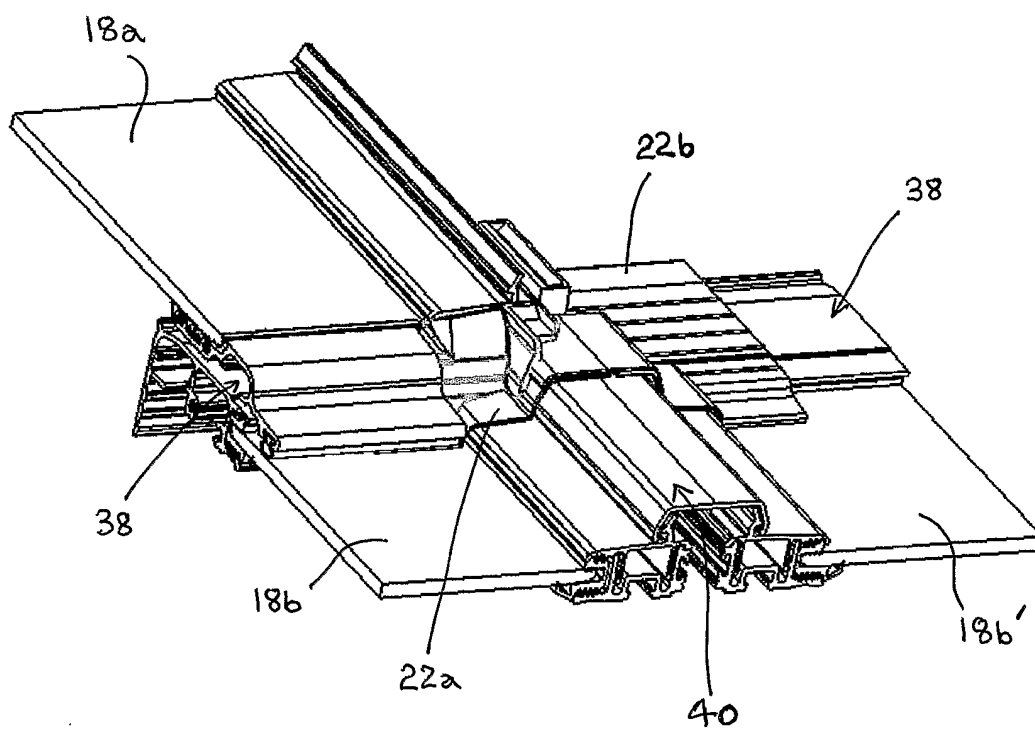
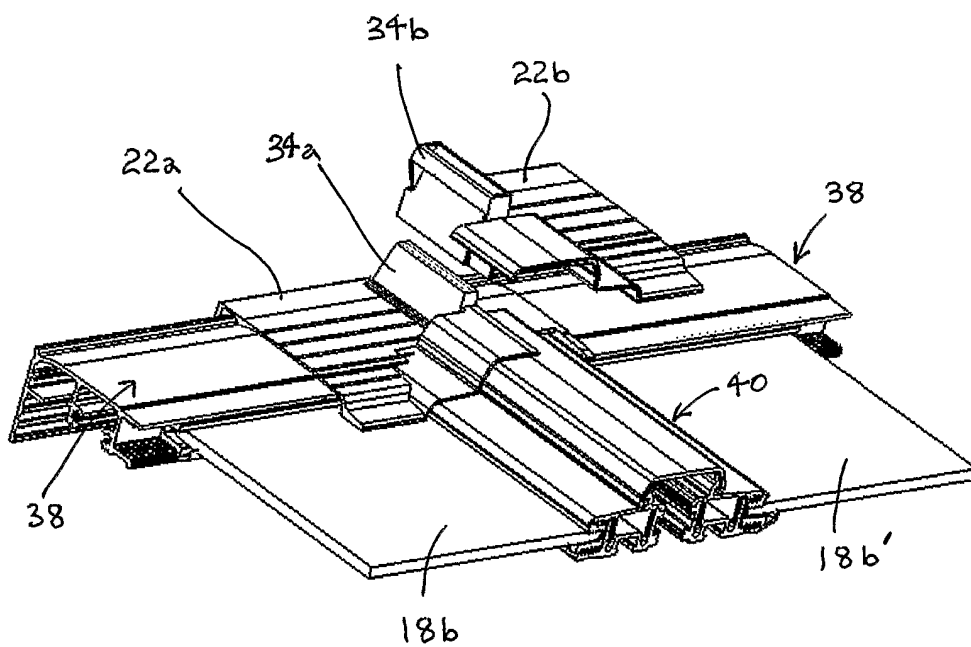


Figure 4

**Figure 5****Figure 6**

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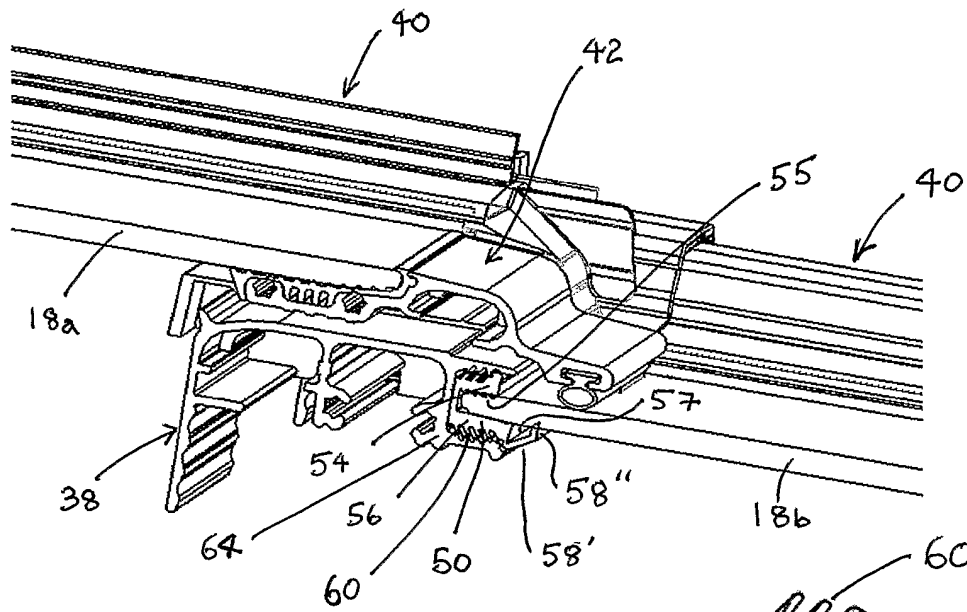


Figure 7A

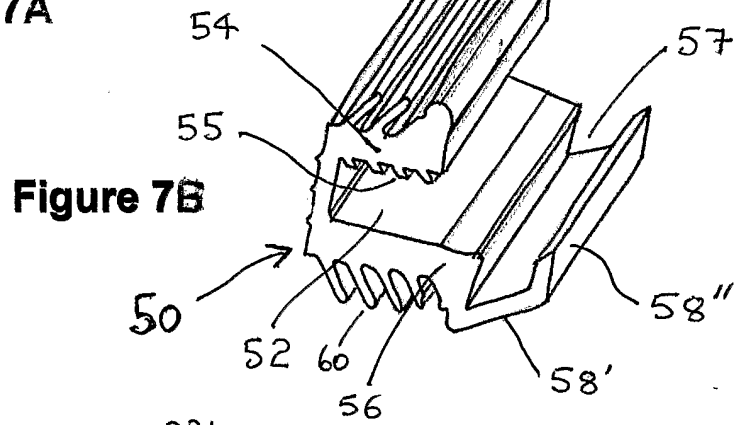


Figure 7B

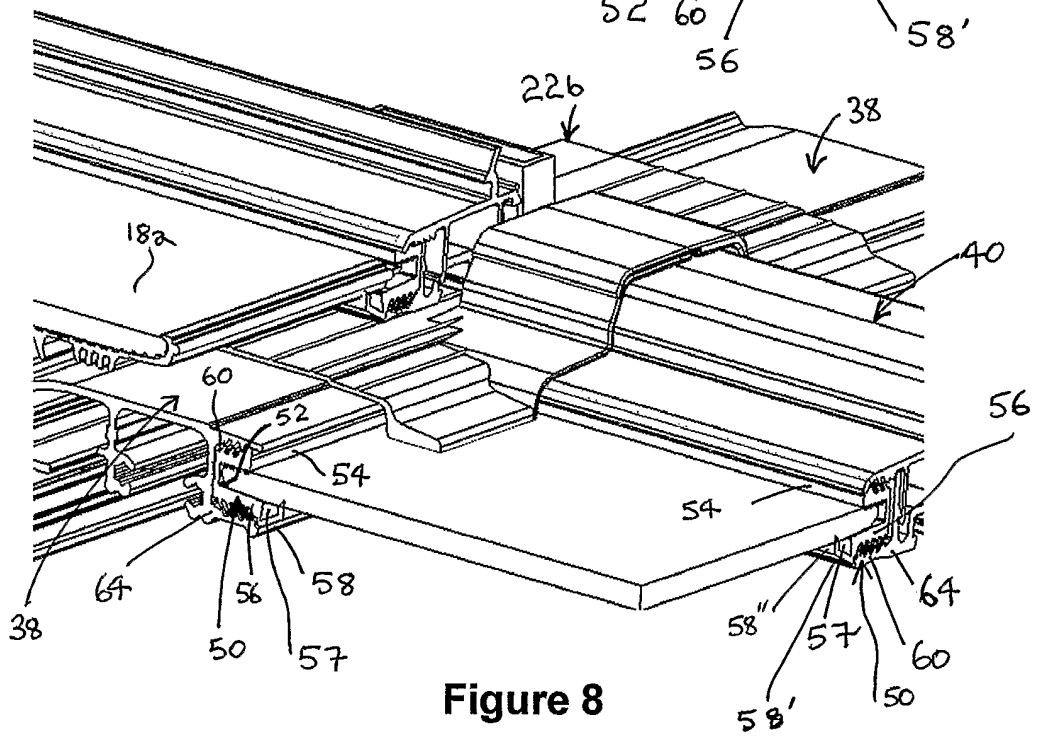


Figure 8

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2004/000649

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl. ⁷: E04D 13/18, F24J 2/52, H01L 31/05

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

REFER TO ELECTRONIC DATABASE BELOW

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

DWPI: & keywords: solar, panel, cap, seal, lip and similar terms.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 1996/018857 A1 (GEBHARDT) 20 June 1996 See figures 14 and 15.	1-3, 6-8
X	US 5164020 A (WAGNER et al.) 17 November 1992 See figures 8A-10.	1-3, 6-8
X	JP 2001-311267 A (SEKISUI HOUSE KK) 9 November 2001 See figures 9 and 13.	1-2
X	AU 52692/99 A1 (KANEKA CORP.) 28 September 2000 See figure 2.	9-15

☒ Further documents are listed in the continuation of Box C

☒ See patent family annex

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier application or patent but published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 30 July 2004	Date of mailing of the international search report 12 AUG 2004
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustalia.gov.au Facsimile No. (02) 6285 3929	Authorized officer JOHN HO Telephone No : (02) 6283 2329

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU2004/000649

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 979676 A (HALLAM, SLEIGH & CHESTON LTD.) 6 January 1965 See figure 2 and page 1 line 68 -- page 2 line 36.	9-15
X	EP 14870 B1 (VEITH PIRELLI A.G) 26 January 1983 See figure 1 and claims 1-5.	9-15
X	BE 571759 A (HEYLEN-GEERTS) 31 October 1958 See figure 4.	9-15
X	SU 1219756 A (MOSSPETS PROMPROEKT) 23 March 1986 See figures 4 and 7.	9-15
X	US 5079882 A (BAHOUT) 14 January 1992 See figures 1-6.	9-15
X	EP 644305 B1 (ULTRAFRAME (UK) LTD.) 2 June 1999 See figure 1.	9-15

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU2004/000649

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
See explanation in Supplemental Sheet.

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☒ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

Supplemental Box

(To be used when the space in any of Boxes I to VIII is not sufficient)

Continuation of Box No: III

The international application does not comply with the requirements of unity of invention because it does not relate to one invention or to a group of inventions so linked as to form a single general inventive concept. In coming to this conclusion the International Searching Authority has found that there are different inventions as follows:

1. Claims 1-8 are directed to a corner seal cover adapted to be installed between adjacent overlapping corners of upper and lower inclined solar panels. It is considered that the use of a corner seal having a first portion extending over the lower panel's top edge raised sealing strip, a second portion extending over the panel's adjacent side edge raised sealing strip and wherein the first and second portions are integrally formed from water impervious material and cover the junction between the lower panel's adjacent top edge and side edge sealing strips comprises a first "special technical feature".
2. Claims 9-15 are directed an edge seal for solar panels. It is considered that the use of a seal having a longitudinally extending U-shaped channel with two distal edges, a longitudinally extending flexible lip extending and resiliently biased at an angle outwardly from one of the channel's distal edges and in a direction towards the other of the channel's distal edges wherein in use the lip abuts the panel's lower surface and forms a longitudinal drainage void between the lip, the channel and the panel's lower surface comprises a second special technical feature.

Since the abovementioned groups of claims do not share any of the technical features identified, a "technical relationship" between the inventions, as defined in PCT rule 13.2 does not exist. Accordingly the international application does not relate to one invention or to a single inventive concept, a priori.

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/AU2004/000649

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report				Patent Family Member			
WO	9618857	AU	43436/96	DE	4444439	DE	19601069
US	5164020	CA	2091059	EP	0540724	WO	9221152
JP	2001311267	NIL					
AU	52692/95	NIL					
GB	979676	NIL					
EP	0014870	DE	2906453				
BE	571759	NIL					
SU	1219756	NIL					
US	5079882	EP	0404614	FR	2648530	JP	3056770
EP	0644305	EP	0790368	GB	2283997	GB	2299596
Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.							
END OF ANNEX							