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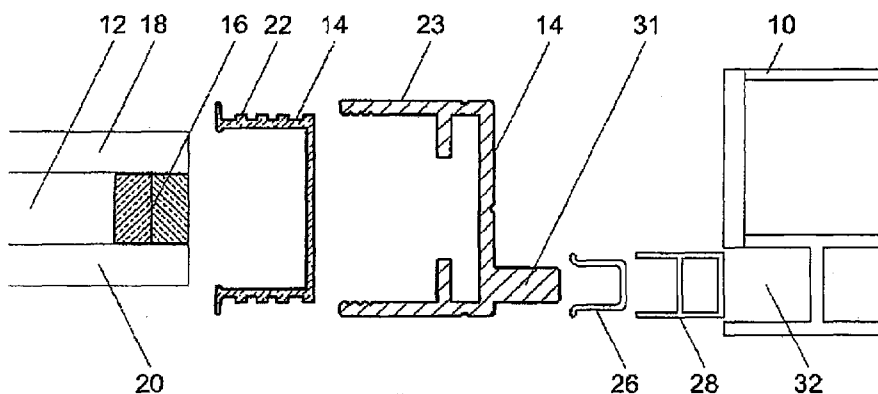


FIGURE 2

(57) **Abstract:** The invention relates to a window adaptor for use with a window frame. The window frame being configured for installation of a first type of glass unit or pane, and the window adaptor including a first part and a second part. The first part is configured for installation in the window frame in place of the first type of glass unit or pane. The second part of the window adaptor is configured for installation of a second type of glass unit or pane therein. In use, the window adaptor enables the second type of glass unit or pane to be installed in the window frame, the window frame not being designed to have the second type of glass unit or pane installed therein. The invention also relates to variants in design and a method of use of the adaptor.



WINDOW ADAPTOR

FIELD OF THE INVENTION

The present invention relates to a window adaptor and in particular to a
5 window adaptor that enables a different kind of window to be installed in a window frame.

BACKGROUND OF THE INVENTION

As is well understood in the industry, the term "window" is used to refer to the entire window, not simply to the glass pane.

10 Throughout parts of the specification, the invention is described with reference to use when installing insulated glass units. The invention is particularly applicable to installation of insulated glass units but can also be used to install other glass units or panes with a different thickness to a standard pane of glass or that for which the window frame is configured.

15 The invention is also particularly applicable to installing treated specialist glass panes such as laminated glass, reinforced, tinted or heat resistant glass panels which are of a greater thickness to a standard pane of glass. The thickness of these specialist glass panes may be approximately 6-13 millimetres in thickness, for example. It is also envisaged that the invention

20 could be used for the reverse situation where insulated glass units or thicker glass panes could be removed and replaced using the window adaptor to enable a thinner pane or unit of glass to be installed without the need to remove the window frames in order to do so.

Windows, in one form or another, have been around for thousands of years.

25 Over time the form of windows has changed dramatically, as technology advances. Small glass windows or leaded lights in stone or wooden frames have been replaced with large clear glass paned windows for maximum light. Floor to ceiling glass windows can now be installed to maximise sea

views, for example. One very successful advance in window technology has been use of double or triple glazing, using insulated glass units. Insulated glass units have two or three layers of glass held by a spacer frame at a predetermined distance apart. Desiccant is used between the glass to
5 absorb moisture and a gas sealed in the unit, or a vacuum generated, to create an effective thermal barrier. Insulated glass units have a long and successful history of use, in particular in Europe and North America.

Use of insulated glass units is desirable in cool climates to insulate homes and keep them warm, and in hot climates to preserve the cool air generated
10 by air-conditioning to keep the home cool. Insulation is an environmentally friendly means of reducing energy use, increasing efficiency of heating or cooling systems and reducing power bills for the home owner. Another very significant reason for installing insulated glass units is noise reduction. Use of insulated glass units can dramatically reduce the amount of noise from
15 outside that enters the home. The home owner can then enjoy peace and quiet when sleeping or easily listen to music or the television without disturbance from outside.

Many home owners would like to benefit from the insulation and sound reduction advantages of using insulated glass units. However, the cost of
20 installing double glazing is expensive since totally new window frames are required in order that the insulated glass units can be installed. Also removal of the old windows often can lead to unsightly damage around the perimeter of the window opening. It would be extremely beneficial to be able to install insulated glass units into existing window frames, significantly
25 reducing the costs and inconvenience of installing double glazing.

Other types of glass units or panes can be different thicknesses to standard window panes, for example, laminated or other treated glass is thicker than typical glass. There are significant advantages to use of treated glass, to protect against noise, breakage, glare, heat or as an anti-theft measure, for
30 example. Again, in order to be able to use these other types of glass in a

home completely new window frames are usually required, which makes the process expensive and troublesome. It would be most desirable to be able to fit these alternative types of glass units or panes into an existing, standard window frame.

- 5 For clarity, any prior art referred to herein, does not constitute an admission that the prior art forms part of the common general knowledge, in Australia or elsewhere.

It is an object of the present invention to provide a window adaptor that at least ameliorates one or more of the aforementioned problems of the prior art.

DISCLOSURE OF THE INVENTION

Accordingly, the present invention provides, in a first aspect, a window adaptor for use with a window frame, the window frame being configured for installation of a first type of glass unit or pane, the window adaptor including:

a first part of the window adaptor, configured for installation in the window frame in place of the first type of glass unit or pane; and

a second part of the window adaptor, configured for installation of a second type of glass unit or pane therein,

- 20 wherein, in use, the window adaptor enables the second type of glass unit or pane to be installed in the window frame, the window frame not being designed to have the second type of glass unit or pane installed therein.

Most preferably, the first part of the window adaptor substantially mimics the edge of the first type of glass unit or pane.

- 25 The first part of the window adaptor, preferably does not contact the window frame directly but is fitted into the existing means of installing the first type of glass unit or pane into the window frame. The existing means of installing

the first type of glass unit or pane into the window frame may include surrounding the first part of the adaptor with a gasket. Alternatively, a wedge may be used between the first part of the window adaptor and the window frame.

- 5 The second part preferably does not receive the second type of glass unit or pane directly. Preferably, the windows adaptor includes or is used with a gasket means. Preferably, the gasket means substantially surrounds the edge of the second type of glass unit or pane before being installed in the second part of the window adaptor.
- 10 The window frame may be any suitable window frame. The window frame may be a fixed window frame, sliding window, sash, casement or other type of window frame. Typically the window frame will be part of several window frames that, with other parts and fittings, make a whole window. The window frame may be made of any suitable material including metal
- 15 including steel or aluminium, wood, plastic or a combination thereof. Preferably, no remodelling of the window frame or surrounding area is required when using the window adaptor in order that the second type of glass unit or pane can be installed. The window frame may be any size or shape. The window may include a fixed window frame and a sliding window
- 20 frame which together make a sliding window. Preferably, the window frame is a rectangular window frame. The window frame may be of any suitable configuration.

- Preferably, the window frame is of a kind including a channel or rebate for installation of a glass unit or pane therein. Preferably, the channel or rebate
- 25 runs substantially around the inner perimeter of the window frame. The installation of the glass unit or pane may be made directly into the channel or rebate. More usually the installation of the glass unit or pane may be by use of a rubber gasket or vinyl channel used to surround the edge of the glass unit or pane before being fitted into the channel or rebate. In an
- 30 alternative form of the invention, the window adaptor may be used with a

wedge means to install the glass unit or pane into the channel or rebate of the window frame. Other means of installing a glass unit or pane into the channel or rebate of the window frame may be used, for example, use of glazing pins and putty.

- 5 The first type of glass unit or pane may be any suitable glass unit or panel. It is envisaged that the first type of glass unit or pane may be a single pane of glass, of standard thickness. Alternatively, the first type of glass unit or pane may have any one or more of the following characteristics: insulating; heat resistant; shatter resistant; tinted glass or sun protection; laminated; or
10 be safety glass.

The window adaptor may be formed of two or more parts. Three or more parts may be included. Preferably, the first part and the second part are connected or connectable together. The first part and the second part may be formed integrally with one another, in a preferred form of the invention.

- 15 Alternatively, the first part and the second part of the window adaptor may be assembled during use.

Preferably, the window adaptor is formed of several lengths of window adaptor, used together to surround the edge of the second type of glass unit or pane. The window adaptor may be made of any suitable material.

- 20 Preferably, the window adaptor is made of aluminium. Preferably, the window adaptor is lengths of aluminium extrusion. Preferably, lengths of window adaptor are used of a suitable length to fit the window frame, when installed. The lengths of window adaptor may be manufactured in suitable lengths. Preferably, the window adaptor is a metal extrusion and suitable
25 lengths of the metal extrusion are cut for installing in the window frame. For example, four lengths of window adaptor may be cut with mitred ends to form a rectangle of a suitable size to surround the glass unit or pane of the second type.

Preferably, the first part includes one or more projection. Most preferably, the or each projection mimics an edge of a pane of glass. Alternatively, the or each projection may mimic an edge of a glass unit. Preferably, the or each projection is configured to have the same shape and dimensions as an edge of the first type of glass unit or pane. Preferably, the first type of glass unit or pane is a pane of standard glass and the or each projection mimics the edge of the pane of standard glass. In this way the window adaptor can be installed in the window frame in the place of the first type of glass unit or pane.

Preferably, the or each projection has a thickness substantially similar to a standard pane of glass. Most preferably, there is a single projection of a thickness substantially similar to a standard pane of glass. The or each projection may be 4 millimetres thick. The or each projection may be 7 millimetres in length. The or each projection may be 10 millimetres in length. Alternatively, the or each projection may be 14 millimetres in length. Preferably, the projection is rectangular in profile. The projection may be any suitable shape in profile. The position of the or each projection may be varied depending on the desired positioning of the second type of glass unit or pane in the window frame. For example, the channel or rebate of the window frame is generally central but by moving the position of the or each projection of the window adaptor relative to the central channel or rebate the position of the second type of glass unit or pane can be varied, forward or back within the window frame. Varying the position of the or each projection relative to the channel or rebate may be useful where additional room needs to be made for a thicker glass unit or pane. For example, the position of the or each projection may need to be off-centre to enable sliding windows to slide without contact due to the thicker glass or glass unit than the window frame was initially designed to hold. In one form of the invention the projection runs substantially the length of the first part, mimicking an edge of a pane of glass. In other forms of the invention there

may be multiple projections that mimic the edge of a pane of glass. In yet another form of the invention, the projections may take another form, suitable to attach to the window frame, such as use of clips or other securing means. In different forms of the invention the dimensions of the projection may be varied to suit a particular window frame.

Preferably, the or each projection fits into the channel or rebate of the window frame into which usually the first type of glass unit or pane of glass fits. The or each projection may fit directly into the channel or rebate of the window frame. Preferably, the or each projection will use the existing means of attaching the pane of glass to the window frame. For example, the or each projection may fit into an existing gasket or vinyl which fits into an existing extrusion which in turn fits into the channel or rebate of the window frame so as to securely connect the first part of the adaptor to the window frame. Alternative forms of connecting a window pane to a window frame are known and these may be connected to the first part of the window adapter as the first part of the window adaptor is configured to replace the edge of the first type of glass unit or pane and so can be connected by any means of installing the first type of glass unit or pane. For example, a wedge means may be used to replace use of the existing gasket.

Preferably, the second part of the window adaptor is configured to have an edge of the second type of glass unit or pane installed therein. Any suitable means of installing the second type of glass unit or pane may be used. Preferably, the second part of the adaptor includes a channel. Preferably, the channel is configured to receive the edge of the second type of glass unit or pane therein. Preferably, the channel is configured to receive an edge of a glass unit or pane therein that is of a greater thickness than the window frame is designed to receive. Preferably, the channel is configured to receive an edge of an insulated glass unit therein. Preferably, the channel is substantially U-shaped. The channel may be any suitable shape.

In one specific preferred form of the invention, the base of the channel is substantially 21.4 millimetres with a side attached at each end of substantially 16.35 in length. The particular dimensions of the channel may be varied to suit the dimensions of an edge of the second type of glass unit or pane that it is desired to install therein.

Other forms of the second part of the window adaptor, configured for installation of the second type of glass unit or pane therein are envisaged. The second part of the window adaptor may include clips or other connection means.

Preferably, the inner surface of the second part of the window adaptor includes grip means to assist in installation of an edge of the second type of glass unit or pane. Preferably, the inner surface of the channel of the second part includes grip means to assist in installation of an edge of the second type of glass unit or pane. Preferably, the grip means are used for engaging the gasket means. Preferably, the grip means include a plurality of grooves. Preferably, the gasket means includes a plurality of corresponding grooves that work together with the grooves of the second part of the windows adaptor to maintain the edge of the second type of glass unit or pane in the window adaptor.

Preferably, a spacer means is included to maintain a space in the second part next to an edge of a second type of glass unit or pane, once installed. The space allows air to circulate, any moisture to evaporate or evacuate under gravity and allows room for expansion of the various components due to changes in climatic conditions. One or more holes may be formed or drilled in the window adaptor at a suitable position to enable any water to escape the window adaptor. Preferably, the spacer means include one or more projections from one or more sides of the second part. The projections may take any suitable shape or form. Preferably, there are two projections which prevent an edge of the second type of glass unit or pane from contacting the back of the channel of the second part. Preferably, the

projections are substantially rectangular. Preferably, the projections run substantially the length of the window adaptor.

Preferably, the first part and second part of the window adaptor are formed in lengths. Preferably, the first part and the second part of the window
5 adaptor are formed of a metal extrusion.

The first part and or the second part of the window adaptor may be made of any suitable material including metal, plastic, wood, or any combination thereof.

Preferably, a plurality of window adaptors is used. Alternatively, a single
10 window adaptor may be used. Preferably, there are four lengths of window adaptor used, one each corresponding to each side of the window frame in which the second type of glass unit or pane is to be installed. Preferably, lengths of window adaptor are cut during installation to a suitable length with mitred ends which fit together to form a frame. Preferably, a spacer is
15 included to assist to hold the window adaptors together. Preferably, the spacer is substantially L-shape. Preferably, the spacer is configured to connect two window adaptors together at right-angles. Preferably, the spacer fits behind the spacer means of the adaptor. Preferably, once installed the two mitred ends of the two window adaptors meet together and
20 are held together by the spacer. The spacer is preferably substantially completely contained by the adaptors. Preferably, the spacer is a corner stake.

Most preferably, the second type of glass unit or panel is an insulated glass unit. Preferably, the insulated glass unit includes two or more panes of
25 glass, spaced apart a predetermined distance by a spacer frame. In one preferred form of the invention, there are two panes of glass and the first pane of glass is substantially 4 millimetres thick and the second pane of glass is substantially 5 millimetres thick and the distance that the spacer frame maintains between the panes of glass is substantially 10 millimetres.

Any suitable thicknesses of glass or combinations of thicknesses of glass may be used. The distances between the panes maintained by the spacer frame may be any suitable distance for the desired characteristics of a particular insulated glass unit. The spacer frame may be made of any
5 suitable material including metal or plastic or a combination thereof. The glass may be reinforced glass, laminated glass or any specially treated glass to give the glass specific characteristics.

Alternatively, the second type of glass unit or panel is a single pane of glass. Preferably, in this form of the invention the pane of glass is treated to
10 provide improved properties or characteristics. The pane of glass may be treated or otherwise adapted to have any of the following characteristics: heat resistance; improved sound proofing; anti-theft; safety, shatter resistant; tinted; sun protection; laminated; and similar. The second type of glass unit or pane may be any suitable type of glass unit or pane.

15 Preferably, the gasket means is included to improve the fit of the insulated glass unit into the second part. The gasket may also be known as a vinyl. Preferably, the gasket means includes a channel. The channel may be made of vinyl. Preferably, the window adaptor includes an extrusion and is used with a gasket means which work together for installation of the second
20 type of glass unit or pane. The gasket means may be a single length of material or may be a plurality of gasket means, used together. Preferably, where the first part and second part are an extrusion the gasket means is of a corresponding length to the length of the extrusion, or is cut to a corresponding length. Preferably, the gasket means is configured to fit
25 within the second part. Preferably, the gasket means can be applied along an edge of the second type of glass unit or pane before being put into the second part of the windows adaptor. Preferably, the gasket means has similar dimensions to the second part. Preferably, the gasket means is substantially U-shaped in profile. The gasket means may include grooves to
30 assist grip to the second part. Where the second part includes grooves the

- gasket means may include corresponding grooves to assist to maintain the gasket means within the second part. Preferably, the edges of the gasket means include projections configured to assist maintenance of the gasket means within the second part. Preferably, the edges of the gasket means
- 5 include projections configured to assist maintenance of the second type of glass unit or pane within the gasket means, within the second part. Preferably, the gasket means includes one or more slits. Preferably, the slits are configured to enable air and any moisture to escape. Where the second part has projections to maintain a space the gasket means is
- 10 positioned within the second part against the projections and air or any moisture can pass into the space through the slits. Preferably, the gasket means surrounds an edge of a glass unit before being put into the second part of the window adaptor and the gasket means deforms and acts to help hold the glass unit in the second part.
- 15 Preferably, the gasket means is made of vinyl, rubber, plastic or similar deformable material or combination thereof. The gasket means may be made of any suitable material.

In one form of the invention the window adaptor may be made integrally with an insulated glass unit.

- 20 In another form of the invention the window adaptor may be made integrally with the window frame.

- A narrow form of the invention may be used where the components of the window adaptor are very narrow so that when installed it is difficult to see the components. In this form of the invention, the spacer means and
- 25 associated space may be omitted. The narrow version of the window adaptor may be particularly suitable for use in listed buildings and the like where it is required that the historic appearance of the building remains unchanged.

Ridges may be included in the extrusion to assist to grip to the gasket means. The gasket means may include reciprocating ridges.

Weepholes may be drilled in the extrusion. The weepholes may be aligned through use of a groove on the extrusion.

- 5 The spacer may be an L-shaped spacer for holding two pieces of extrusion together. The L-shaped spacer may be configured to fit behind internal projections of the extrusion. The L-shaped spacer may take any suitable form. Preferably, the L-shaped spacer is a corner stake.

10 A material other than glass may be used for the glass unit or pane such as clear plastic or similar.

Accordingly, the present invention provides, in a second aspect, a window adaptor for installing an insulated glass unit in an existing window frame, not configured for receiving an insulated glass unit, the window adaptor including:

- 15 a first part connectable to the existing window frame; and
a second part being configured to hold or connect to at least part of the insulated glass unit,

wherein, in use, the first part of the window adaptor is connected to the window frame in the place of a pane of glass and the insulated glass unit is
20 held by or connected to the second part of the window adaptor to enable installation of the insulated glass unit into the existing window frame.

Preferably, the first part mimics an edge of a pane of glass and connects to the window frame in place of the edge of the pane of glass.

25 The first part of the window adaptor, preferably, does not contact the window frame directly but is fitted into the existing means of installing the first type of glass unit or pane into the window frame. The existing means of installing the first type of glass unit or pane into the window frame may

include surrounding the first part of the window adaptor with a gasket. Alternatively a wedge may be used between the first part of the window adaptor and the window frame.

The second part preferably does not receive the second type of glass unit or pane directly but has a gasket means is included. Preferably, the gasket means substantially surrounds the edge of the second type of glass unit or pane before being installed in the second part of the window adaptor.

Accordingly, the present invention provides, in a third aspect, a window adaptor provided in lengths, for use with a window frame, the window frame configured for installation of a first type of glass unit or pane, the window adaptor including:

a first part of the window adaptor including a projection that mimics the edge of the first type of glass unit or pane; and

a second part of the window adaptor including a channel adapted for installation of a second type of glass unit or pane therein,

wherein, in use, lengths of window adaptor are used, suitable for the size of the window frame, and the window adaptor enables the second type of glass unit or pane to be installed in the window frame, the window frame not being designed to have the second type of glass unit or pane installed therein.

Preferably, lengths of gasket means are used with the lengths of window adaptor for installing the second type of glass unit or pane in the window frame.

Accordingly, the invention also provides a method of reglazing a window, including use of a window frame configured for receipt of a first type of glass unit or pane, and lengths of window adaptor including a first part and a second part, the method including the following steps:

- a) cutting lengths of window adaptor suitable for installation of the second type of glass unit or pane into the window frame;
- b) attaching lengths of window adaptor to the second type of glass unit or pane;
- 5 c) fitting window adaptor into window frame using the first part of the window adaptor in place of an edge of the first type of glass unit of pane so as to fit the second type of glass unit or pane with the window adaptor into the window frame.

Accordingly, the invention also provides a second method of reglazing a window, including use of a window frame configured for installation of a first
10 type of glass unit or pane, and lengths of window adaptor including a first part and a second part, the method including the following steps:

- a) attaching a gasket means to a second type of glass unit or pane;
- b) cutting lengths of window adaptor suitable for installation of the
15 second type of glass unit or pane into the window frame;
- c) attaching lengths of window adaptor to the gasket means on the second type of glass unit or pane;
- d) removing any existing window pane from the window frame;
- e) removing any existing gasket from window pane and attaching to the
20 first part of the window adaptor; and
- f) fitting the second type of glass unit or pane with attached window adaptor and gaskets into the window frame.

Preferably, the first part of the window adaptor mimics an edge of the first type of glass unit or pane. Preferably, the first part and gasket means fit
25 within a channel or rebate on the inner perimeter of the window frame. Preferably, the second part of the window adaptor includes a channel

adapted for receipt of an edge of the second type of glass unit or pane with associated gasket means.

Preferably, the method uses the window adaptor according to the invention in any of its many forms or aspects.

5 **INDUSTRIAL APPLICABILITY**

It is intended that the adaptor will be manufactured and used by window installers when providing replacement window installations for customers, both domestic and commercial.

BRIEF DESCRIPTION OF THE DRAWINGS

10 The invention will now be described in connection with non-limiting preferred embodiments with reference to the accompanying drawings, in which:

Figure 1 is a front perspective view of a completed window reglazed using a window adaptor according to a first preferred embodiment of the invention;

15 Figure 2 is an exploded detailed view from above of the window adaptor of Figure 1 illustrating the connection to the insulated glass unit through use of the window adaptor to a standard window frame;

Figure 3 is a perspective view of a section of extrusion of the window adaptor of Figures 1 and 2 with the projection omitted for ease of illustration
20 and with a corner stake included showing how the sections of extrusion are fitted together;

Figure 4 is a plan view from above of the extrusion of the window adaptor of Figures 1 to 3;

Figure 5 is a perspective view of the vinyl gasket of the adaptor of Figures 1
25 to 4 with the insulated glass unit for installation therein;

Figure 6 is a plan view from above of an extrusion of a window adaptor according to a second preferred embodiment of the invention;

Figure 7 is a plan view from above of an extrusion of a window adaptor according to a third preferred embodiment of the invention;

- 5 Figure 8 is a plan view from above of an extrusion of a window adaptor according to a fourth preferred embodiment of the invention;

Figure 9 is a plan view from above of an extrusion of a window adaptor according to a fifth preferred embodiment of the invention; and

- 10 Figure 10 is a sectional view of the extrusion of Figure 9 being used with a specialist vinyl as may be required where the original method of installation is by use of a wedge rather than a vinyl gasket;

Figure 11 is a detailed front perspective view of a corner of the completed window of Figures 9 and 10 with a section removed to illustrate the internal structure; and

- 15 Figure 12 is a front perspective view of a side section of the reglazed window of Figures 9 to 11 with a section removed to illustrate the internal structure.

DETAILED DESCRIPTION OF THE INVENTION INCLUDING A BEST MODE

- 20 Referring to Figures 1 to 5, a first preferred embodiment of the invention will be described. Referring in particular to Figure 1, completed window 1 can be seen to include fixed sash 2, sliding sash 4, mullion 6 and handle 8. Window frames 10, of fixed sash 2 and sliding sash 4, have insulated glass units 12 installed through use of lengths of window adaptor 14. Window
25 adaptor 14 is adapted to fit between insulated glass unit 12 and window frame 10.

Window frames 10 are of a known kind of a conventional rectangular configuration, illustrated made of aluminium. Window frames 10 could be made of any suitable material including wood, plastic, other metals or combinations of materials. Window frames 10 were used previously for
5 installation of a conventional pane of glass, which has been removed. Window frames 10 come in many different forms or shapes and the invention is applicable to all types of windows. For example, the invention can be used with sash, sliding, awning, hoppers, casement or fixed standard windows. Window 1 does not look noticeably different to a
10 standard conventional window, however, window 1 has the significant beneficial properties of including the insulated glass units. Inclusion of the properly installed insulated glass units 12 significantly reduces the noise pollution from outside and acts as a thermal barrier with the outside.

Referring to Figures 2 and 3 in particular, insulated glass unit 12, as
15 illustrated, is formed of two sheets of glass held at a predetermined distance apart by spacer frame 16. Spacer frame 16 mirrors the shape of the glass panes 18 and 20 and holds and maintains the suitable distance between them. The distance between the two sheets of glass as well as the thickness of the glass alters the sound proofing and thermal barrier
20 properties. The distance between the two sheets of glass and the thickness of each pane of glass can be varied according to the particular needs of a customer. For example, optimal sound proofing can be achieved by having a greater distance between panes 18 and 20, however, optimal thermal barrier qualities may be achieved through use of a slightly narrower
25 distance.

As illustrated first pane 18 is 4 millimetres thick and second pane 20 as illustrated is 5 millimetres thick, spaced 10 millimetres apart. Clearly, alternate thicknesses and spacing may be used for insulated glass unit 12, as appropriate. During construction of insulated glass unit 12 desiccant and
30 a suitable gas such as argon are sealed within the unit (neither shown) in a

known manner to create an effective thermal and sound barrier. It is important to the function of insulated glass unit 12 that the unit is completely sealed, and several layers of adhesive may be used during the construction process.

5 Window adaptor 14 includes gasket 22 and extrusion 23. In use, corresponding lengths of gasket 22 and extrusion 23 are cut to a suitable length to fit together between window frame 10 and insulated glass unit 12 (this would occur in the factory prior to installation). Alternatively, the lengths of gasket 22 and extrusion 23 may be formed in suitable lengths for
10 common configurations of windows, and fitted together during installation. The extrusion 23 and gasket 22 have mitred ends at approximately a 45 degree angle to make conventional corner pieces which fit together. Corner stake 24 sits in space 25 of extrusion 23 and is used during installation to hold two pieces of extrusion 23 together to facilitate the handling, in
15 particular of larger installations. Corner stake 24 are used at each of the four corners when installing a rectangular window. Alternatively, two corner stakes 24 may be used or corner stakes 24 may be omitted.

Use of gasket 22 significantly improves the fit and function of insulated glass units 12 into window adaptor 14 by creating a tight fit between
20 adaptor 14 and insulating glass unit 12 and a suitable barrier or interface between metal and glass. Gasket 22 may be omitted, in an alternative form of the invention or alternative forms of gasket 22 may be included. Gasket 22 is shown made of vinyl, but rubber or other suitable materials may be used instead. Gasket 22 is adapted to fit in extrusion 23 so that when an
25 edge of insulated glass unit 12 is pushed into gasket 22, sitting within extrusion 23, gasket 22 deforms. The combination of deformed gasket 22 and extrusion 23 holds insulated glass unit 12 firmly in place and resists removal of insulated glass unit 12 from extrusion 23. For effective sound resistance and thermal barrier properties it is important that insulated glass
30 unit 12 is installed in a sealed manner into existing window frame 10.

Existing gasket 26 (if present) is held in existing extrusion 28 of window frame 10. Existing gasket 26 can be used to surround projection 31 of extrusion 23 before being held in existing extrusion 28. Projection 31 mimics the dimensions of the edge of a single pane of glass suitable to fit in window frame 10. Existing gasket 26 in turn is held in existing extrusion 28 which fits into channel 32 of window frame 10.

Therefore, like installing a standard pane of glass, projection 31 of extrusion 23 takes the place of the edge of the standard pane of glass, and is fitted the same way using the existing gasket 26, extrusion 28 which all fits into channel 32. Clearly, alternative arrangements of extrusions, channels and gaskets may be used to install a glass unit or pane since projection 31 mimics an edge of a glass unit or pane the invention will also work with these other arrangements. In this way window adaptor 14 enables insulated glass unit 12 to be installed in existing window frame 10 without the need to remove or replace window frame 10. The result will not look much different to the window installed previously but has all the beneficial properties of double-glazing, without the disadvantages and additional costs of needing to remove the existing window frames.

Referring to Figure 4 in particular, the configuration of extrusion 23 can be seen, including projection 31. Projection 31 has a thickness suitable to fit within channel 32 with existing gasket 26 and existing extrusion 28 (refer to Figure 2) of window frame 10 (refer Figure 1). As illustrated projection 31 is 7 millimetres long and 4 millimetres wide. Extrusion 23 is illustrated as 24.6 millimetres wide by 16.35 long. Space 25 of extrusion 23 is defined by projections 35 which prevent gasket 22 from passing into space 25 so that space 25 is continually maintained. Space 25 enables any moisture that builds up to run away and allows space for expansion of the components due to changes in temperature. Projections 35 as illustrated are 5 millimetres long. Air space 25 also provides the area for use with corner

stake 24, described above, to fit the mitred ends of lengths of extrusion 23 together.

Grooves 37 provide a guide for drilling neatly aligned weepholes (not shown), the weepholes enable moisture to escape. Ridges 39 correspond
5 to ridges 42 on gasket 22 (refer Figure 2).

Referring to Figure 5, in particular, ridges 42 of gasket 22 can be seen to be found on the two sides 44 of gasket 22. Ridges 39 (refer Figure 4) and 42 catch into one another, in use, to assist to hold gasket 22 and extrusion 23 together. Ends 46 on sides 44 are substantially an asymmetric T-shaped in
10 cross section so as to correctly locate insulated glass unit 12 within extrusion 23 (refer Figure 4). Back 48 of gasket 22 includes slits 50 to allow moisture that may gather in space 25 to escape.

To install a new insulated glass unit 12 into existing window frame 10 suitable lengths of gasket 22 are applied along an edge of insulated glass
15 unit 12 and lengths of extrusion 23 are measured and cut, at an angle. The conventional pane of glass is removed from the existing window frame 10, and in turn the existing gaskets 26 removed from the pane of glass. The existing vinyl gasket 26 is then applied to projection 31 of extrusion 23, and existing extrusion 28 applied around gasket 26, ready to fit back into
20 channel 32 of window frame 10.

Referring to Figure 6, a second preferred embodiment of the invention will be described, including extrusion 52. Extrusion 52 is used the same way as for the previously described first preferred embodiment and differs only with respect to the configuration of the projection. Extrusion 52 has ridges 54
25 which correspond to ridges 42 on gasket 22 (refer Figure 5). Ridges 54 and 42 catch into one another, in use, to assist to hold gasket 22 and extrusion 52 together. Extrusion 52 includes projection 56 having a thickness suitable to fit in channel 32 with existing gasket 26 and existing extrusion 28 of window frame 10. As illustrated, projection 56 is longer than that of the first

preferred embodiment being 10 millimetres long and 4 millimetres wide. All the other dimensions of extrusion 52 are the same as extrusion 23 of the first embodiment. Projection 56 is positioned more centrally than projection 30 of the first embodiment, so as to be suitable for sliding door sash frames.

- 5 The position of projection 56 varies the position of insulated glass unit 12 relative to window frame 10. Extrusion 52 has space 58 defined by projections 60 which prevent gasket 22 from passing into space 58 so that space 58 is maintained. Grooves 62 again enable careful and neat drilling of weepholes (not illustrated) to enable moisture to escape.
- 10 Extrusion 52 is used in exactly the same way as extrusion 23 to install insulated glass unit 12 into an existing window frame. Extrusion 52 may, be particularly useful when reglazing a sliding glass door.

- Referring to Figure 7, a third preferred embodiment of the invention will be described, including extrusion 66. Extrusion 66 is used the same way as for
- 15 the previously described first and second preferred embodiments and differs only with respect to the configuration of the projection. Extrusion 66 has ridges 68 which correspond to ridges 42 on gasket 22. Ridges 68 and 42 catch into one another, in use, to assist to hold gasket 22 and extrusion 66 together. Extrusion 66 includes projection 70 having a thickness suitable
- 20 to fit in channel 32 of window frame 10, with use of existing gasket 26 and existing extrusion 28. As illustrated, projection 70 has the same dimensions to the first preferred embodiment being 7 millimetres long and 4 millimetres wide, but is positioned closer to one side.

- The position of projection 70 is suitable to allow a different offset position
- 25 within the window frame and channel to the other embodiments. All the other dimensions of extrusion 70 are the same as extrusion 23 of the first embodiment. Extrusion 66 has space 72 defined by projections 74 which prevents gasket 22 from passing into space 72 so that space 72 is maintained. Grooves 76, assist with the drilling of weepholes (not shown).

Extrusion 66 is installed in the same way as for the first two embodiments so as to install insulated glass unit 12 into an existing window.

Referring to Figure 8, a fourth preferred embodiment of the invention will be described, including extrusion 100. Extrusion 100 is similar to the previously
5 described preferred embodiments but is much narrower in form. Extrusion 100 includes projection 104 having a thickness suitable to fit into rebates where an existing glass pane may have been secured by pins and covered by putty. As illustrated, projection 104 is narrow, 3 millimetres wide, and 7 millimetres long, positioned at one side.

10 Extrusion 100 is installed in the same way as for the earlier described embodiment so as to install insulated glass unit 12 into an existing window. Use of extrusion 100 is intended in particular for use where it is desired that only a very narrow extrusion is to be used. The reason for doing so is to minimise the visual impact of using the extrusion, for example for installing
15 insulated glass units 12 in a listed building.

Referring to Figures 9 to 12, a fifth preferred embodiment of the invention will be described, including extrusion 105. Extrusion 105 is used in a similar way as for the previously described preferred embodiments and differing with respect to the configuration of the projection and use of a
20 wedge. Referring to Figure 9 in particular extrusion 105 has ridges 106 which correspond to ridges 42 on gasket 22. Ridges 106 and 42 catch into one another in use to assist to hold gasket 22 and extrusion 105 together. Extrusion 105 includes projection 107 having a thickness suitable to fit in channel 32 of window frame 10, with existing gasket 26 and existing
25 extrusion 28. As illustrated, projection 107 is 10 millimetres long, 4 millimetres wide, and positioned very close to one side. The dimensions of projection 107 are suitable for use with a wedge as described below. Again, the position of projection 107 is suitable to locate insulated glass unit 12 into a different position within window frame 10. All the other dimensions of
30 extrusion 105 are the same as extrusion 23 of the first embodiment.

Extrusion 105 has space 108 defined by projections 109 which prevent gasket 22 from passing into space 108 so that space 108 is maintained. Grooves 110 enable positioning of weepholes (not shown)

Extrusion 105 is used to install insulated glass unit 12 into an existing
5 window frame in a similar way to the earlier described embodiments. However, no existing gasket is used, instead a wedge is used as would be used on the original window between the existing extrusion and the glass.

Referring to Figure 10 the extrusion 105 can be seen used with wedge 112 including lip 114. Wedge 112 may be used where a wedge is used to install
10 the original window instead of a vinyl channel or gasket. Lip 114 can be seen to rest on existing extrusion 26 in this case while projection 105 itself rests on wedge 112.

Referring to Figures 11 and 12 in particular the cut-away portions enable the position of the lengths of extrusion 105 to be seen. Also wedge 112 can
15 be seen fitted between extrusion 105 and window frame 10.

The inventor has therefore developed an ingenious means of adapting any conventional window to enable an insulated glass unit or other glass unit or pane to be installed. There is no need, when using the invention to install insulated glass units to replace the window frames, avoiding the cost and
20 inconvenience associated with doing so. The benefits of the sound resistant insulated glass units, is clear and well documented globally, particular with more and more people living in high density living, close to many neighbours and busy roads. Energy costs are increasing dramatically at present as attempts are made to reduce our carbon emissions that could
25 lead to global warming. To this end it is extremely desirable to be able to insulate homes so that energy used to heat a home is not lost through the windows. More energy is used to cool homes in hot climates through use of air-conditioning and so it is even more beneficial in hot climates to use double glazed windows to prevent the cooled air being lost through the

windows. Use of double glazing is well known for reducing heating and cooling bills as well as the overall comfort of a home or office. The subject invention clearly is a significant advance, enabling insulated glass units to be readily installed in existing window frames.

- 5 Further, there is increasing demand for specialist types of glass, such as heat resistant glass, tinted glass, toughened glass or laminated glass to be installed in homes and offices. Any of these aforementioned types of glass may be thicker than convention panes of glass and so will not fit in a standard window frame. Use of the invention allows these types of glass to
- 10 be installed in an existing window with minimal difficulty and at a dramatically reduced cost.

It will be apparent to a person skilled in the art that changes may be made to the embodiments disclosed herein without departing from the spirit and scope of the invention in its various aspects.

THE CLAIMS:

1. A window adaptor for use with a window frame, the window frame being configured for installation of a first type of glass unit or pane, the window adaptor including:
 - 5 a first part of the window adaptor, configured for installation in the window frame in place of the first type of glass unit or pane; and
a second part of the window adaptor, configured for installation of a second type of glass unit or pane therein,wherein, in use, the window adaptor enables the second type of glass unit
10 or pane to be installed in the window frame, the window frame not being designed to have the second type of glass unit or pane installed therein.
2. The window adaptor of claim 1, wherein the first part of the window adaptor substantially mimics the edge of the first type of glass unit or pane.
3. The window adaptor of claim 1 or 2, wherein the first part of the
15 window adaptor, does not contact the window frame directly but is fitted into the existing means of installing the first type of glass unit or pane into the window frame.
4. The window adaptor of claim 3, wherein the existing means of installing the first type of glass unit or pane into the window frame includes
20 surrounding the first part of the adaptor with a gasket.
5. The window adaptor of claim 3, wherein a wedge is be used between the first part of the window adaptor and the window frame.
6. The window adaptor of any one of claims 1 to 5, wherein the second part does not receive the second type of glass unit or pane directly.
- 25 7. The window adaptor of any one of claims 1 to 6, wherein the windows adaptor includes or is used with a gasket means.

8. The window adaptor of claim 7 wherein the gasket means substantially surrounds the edge of the second type of glass unit or pane before being installed in the second part of the window adaptor.

9. The window adaptor of any one of claims 1 to 8, wherein the window
5 frame may be any suitable window frame a fixed window frame, sliding window, sash, casement or other type of window frame.

10. The window adaptor of any one of claims 1 to 9, wherein no remodelling of the window frame or surrounding area is required when using the window adaptor in order that the second type of glass unit or pane
10 can be installed.

11. The window adaptor of any one of claims 1 to 10, wherein, the window frame is of a kind including a channel or rebate for installation of a glass unit or pane therein running substantially around the inner perimeter of the window frame.

12. The window adaptor of claim 11, wherein the installation of the glass
15 unit or pane is made directly into the channel or rebate.

13. The window adaptor of claim 11 or 12, wherein the installation of the glass unit or pane is by use of a rubber gasket or vinyl channel used to surround the edge of the glass unit or pane before being fitted into the
20 channel or rebate.

14. The window adaptor of claim 11 or 12, wherein the window adaptor is used with a wedge means to install the glass unit or pane into the channel or rebate of the window frame.

15. The window adaptor of any one of claims 1 to 14, wherein the first
25 type of glass unit or pane is a single pane of glass, of standard thickness.

16. The window adaptor of any one of claims 1 to 15, wherein the window adaptor is formed of three or more parts.

17. The window adaptor of any one of claims 1 to 16, wherein the first part and the second part are connected or connectable together.
18. The window adaptor of any one of claims 1 to 17, wherein the window adaptor is formed of several lengths of window adaptor, used
5 together to surround the edge of the second type of glass unit or pane.
19. The window adaptor of any one of claims 1 to 18, wherein the window adaptor is lengths of aluminium extrusion of a suitable length to fit the window frame, when installed.
20. The window adaptor of any one of claims 1 to 19, wherein the first
10 part includes one or more projection.
21. The window adaptor of claim 20, wherein the or each projection mimics an edge of a pane of glass.
22. The window adaptor of claim 20, wherein the or each projection mimics an edge of a glass unit.
- 15 23. The window adaptor of claims 20 or 21, wherein the or each projection is configured to have the same shape and dimensions as an edge of the first type of glass unit or pane.
24. The window adaptor of claim 23, wherein the first type of glass unit or pane is a pane of standard glass and the or each projection mimics the
20 edge of the pane of standard glass.
25. The window adaptor of any one of claims 20 to 24, wherein the or each projection has a thickness substantially similar to a standard pane of glass.
26. The window adaptor of claim 25, wherein there is a single projection
25 of a thickness substantially similar to a standard pane of glass.

27. The window adaptor of any one of claims 20 to 26, wherein the position of the or each projection can be varied depending on the desired positioning of the second type of glass unit or pane in the window frame.

28. The window adaptor of any one of claims 20 to 27, wherein the
5 projection runs substantially the length of the first part, mimicking an edge of a pane of glass.

29. The window adaptor of any one of claims 20 to 27, wherein there multiple projections are included that mimic the edge of a pane of glass.

30. The window adaptor of any one of claims 20 to 27, wherein the or
10 each projection fits into the channel or rebate of the window frame into which usually the first type of glass unit or pane of glass fits.

31. The window adaptor of any one of claims 20 to 30, wherein the or each projection will use the existing means of attaching the pane of glass to the window frame.

15 32. The window adaptor of any one of claims 1 to 31, wherein the second part of the window adaptor is configured to have an edge of the second type of glass unit or pane installed therein.

33. The window adaptor of any one of claims 1 to 32, wherein the second part of the adaptor includes a channel.

20 34. The window adaptor of claim 33, wherein the channel is configured to receive the edge of the second type of glass unit or pane therein.

35. The window adaptor of claim 33 or 34, wherein the channel is configured to receive an edge of a glass unit or pane therein that is of a greater thickness than the window frame is designed to receive.

25 36. The window adaptor of any one of claims 33 to 35, wherein the channel is configured to receive an edge of an insulated glass unit therein.

37. The window adaptor of any one of claims 33 to 36, wherein the channel is substantially U-shaped.
38. The window adaptor of any one of claims 1 to 37, wherein the second part of the window adaptor includes clips or other connection means.
- 5 39. The window adaptor of any one of claims 1 to 38, wherein the inner surface of the second part of the window adaptor includes grip means to assist in installation of an edge of the second type of glass unit or pane.
40. The window adaptor of any one of claims 1 to 39, wherein the inner surface of a channel of the second part includes grip means to assist in
10 installation of an edge of the second type of glass unit or pane.
41. The window adaptor of claims 39 or 40, wherein the grip means are used for engaging the gasket means.
42. The window adaptor of any one of claims 39 to 41, wherein the grip means include a plurality of grooves.
- 15 43. The window adaptor of any one of claims 39 to 42, wherein a gasket means is included and includes a plurality of corresponding grooves that work together with the grooves of the second part of the windows adaptor to maintain the edge of the second type of glass unit or pane in the window adaptor.
- 20 44. The window adaptor of any one of claims 1 to 43, wherein a spacer means is included to maintain a space in the second part next to an edge of a second type of glass unit or pane, once installed.
45. The window adaptor of claim 44, wherein the spacer means includes one or more projections from one or more sides of the second part.
- 25 46. The window adaptor of claim 45, wherein there are two projections which prevent an edge of the second type of glass unit or pane from contacting the back of the channel of the second part.

47. The window adaptor of any one of claims 1 to 46, wherein a plurality of window adaptors is used.

48. The window adaptor of claim 47, wherein four lengths of window adaptor used, one each corresponding to each side of the window frame in
5 which the second type of glass unit or pane is to be installed.

49. The windows adaptor of any one of claims 1 to 48, wherein more than one window adaptor is used and a spacer is included to assist to hold the window adaptors together.

50. The window adaptor of claim 49, wherein the spacer is substantially
10 L-shape and the spacer is configured to connect two window adaptors together at right-angles.

51. The windows adaptor of any one of claims 1 to 50, wherein the second type of glass unit or panel is an insulated glass unit.

52. The window adaptor of claim 51, wherein the insulated glass unit
15 includes two or more panes of glass, spaced apart a predetermined distance by a spacer frame.

53. The window adaptor of claim 52, wherein the insulated glass unit includes two panes of glass and the first pane of glass is substantially 4 millimetres thick and the second pane of glass is substantially 5 millimetres
20 thick and the distance that the spacer frame maintains between the panes of glass is substantially 10 millimetres.

54. The window adaptor of any one of claims 1 to 53, wherein the glass is reinforced glass, laminated glass or any specially treated glass to give the glass specific characteristics including heat resistance; improved sound
25 proofing; anti-theft; safety, shatter resistant; tinted; sun protection; laminated; and similar.

55. The window adaptor of any one of claims 1 to 54, wherein a gasket means is included to improve the fit of the insulated glass unit into the second part.

56. The window adaptor of claim 55, wherein the gasket includes a
5 channel.

57. The window adaptor of claim 55 or 56, wherein the window adaptor includes an extrusion and is used with a gasket means which work together for installation of the second type of glass unit or pane.

58. The window adaptor of any one of claims 55 to 57, wherein where the
10 first part and second part are an extrusion the gasket means is of a corresponding length to the length of the extrusion, or is cut to a corresponding length.

59. The window adaptor of any one of claims 55 to 58, wherein the gasket means is configured to fit within the second part and the gasket means can
15 be applied along an edge of the second type of glass unit or pane before being put into the second part of the windows adaptor.

60. The window adaptor of any one of claims 55 to 59, wherein the gasket means is substantially U-shaped in profile.

61. The window adaptor of any one of claims 55 to 60, wherein the
20 gasket means includes grooves to assist grip to the second part.

62. The window adaptor of claim 61, wherein the second part includes grooves and the gasket means includes corresponding grooves to assist to maintain the gasket means within the second part.

63. The window adaptor of any one of claims 55 to 62, wherein the edges
25 of the gasket means include projections configured to assist maintenance of the gasket means within the second part.

64. The window adaptor of any one of claims 55 to 63, wherein the edges of the gasket means include projections configured to assist maintenance of the second type of glass unit or pane within the gasket means, within the second part.

5 65. The window adaptor of any one of claims 55 to 64, wherein the gasket means includes one or more slits configured to enable air and any moisture to escape.

66. The window adaptor of any one of claim 1 to 65, wherein a narrow form of the invention is used where the components of the window adaptor
10 are very narrow so that when installed it is difficult to see the components.

67. A window adaptor for installing an insulated glass unit in an existing window frame, not configured for receiving an insulated glass unit, the window adaptor including:

a first part connectable to the existing window frame; and

15 a second part being configured to hold or connect to at least part of the insulated glass unit,

wherein, in use, the first part of the window adaptor is connected to the window frame in the place of a pane of glass and the insulated glass unit is held by or connected to the second part of the window adaptor to enable
20 installation of the insulated glass unit into the existing window frame.

68. The window adaptor of claim 67, wherein the first part mimics an edge of a pane of glass and connects to the window frame in place of the edge of the pane of glass.

69. A window adaptor provided in lengths, for use with a window frame,
25 the window frame configured for installation of a first type of glass unit or pane, the window adaptor including:

a first part of the window adaptor including a projection that mimics the edge of the first type of glass unit or pane; and

a second part of the window adaptor including a channel adapted for installation of a second type of glass unit or pane therein,

5 wherein, in use, lengths of window adaptor are used, suitable for the size of the window frame, and the window adaptor enables the second type of glass unit or pane to be installed in the window frame, the window frame not being designed to have the second type of glass unit or pane installed therein.

10 70. A method of reglazing a window, including use of a window frame configured for receipt of a first type of glass unit or pane, and lengths of window adaptor including a first part and a second part, the method including the following steps:

- 15 a) cutting lengths of window adaptor suitable for installation of the second type of glass unit or pane into the window frame;
- b) attaching lengths of window adaptor to the second type of glass unit or pane;
- 20 c) fitting window adaptor into window frame using the first part of the window adaptor in place of an edge of the first type of glass unit or pane so as to fit the second type of glass unit or pane with the window adaptor into the window frame.

71. A method of reglazing a window, including use of a window frame configured for installation of a first type of glass unit or pane, and lengths of window adaptor including a first part and a second part, the method
25 including the following steps:

- a) attaching a gasket means to a second type of glass unit or pane;

- b) cutting lengths of window adaptor suitable for installation of the second type of glass unit or pane into the window frame;
 - c) attaching lengths of window adaptor to the gasket means on the second type of glass unit or pane;
 - 5 d) removing any existing window pane from the window frame;
 - e) removing any existing gasket from window pane and attaching to the first part of the window adaptor; and
 - f) fitting the second type of glass unit or pane with attached window adaptor and gaskets into the window frame.
- 10 72. The method of claim 70 or 71, wherein the window adaptor is the window adaptor of any one of claims 1 to 69.
73. A window adaptor substantially as hereinbefore described with reference to any one of Figures 1 to 5, 6, 7, or 8, or 9 to 12.
- 15 74. A method using a window adaptor substantially as hereinbefore described with reference to any one of Figures 1 to 5, 6, 7, or 8, or 9 to 12.

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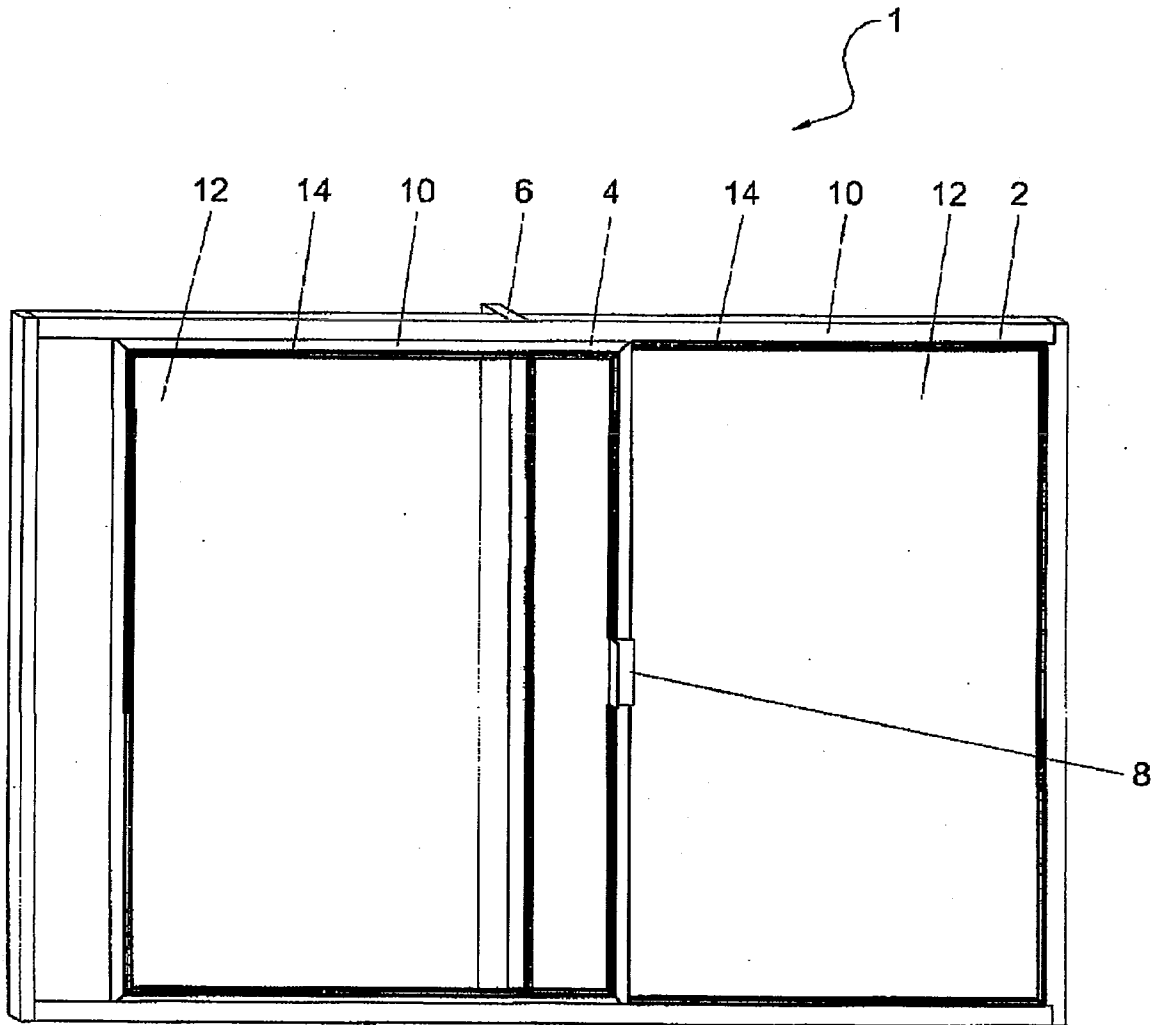


FIGURE 1

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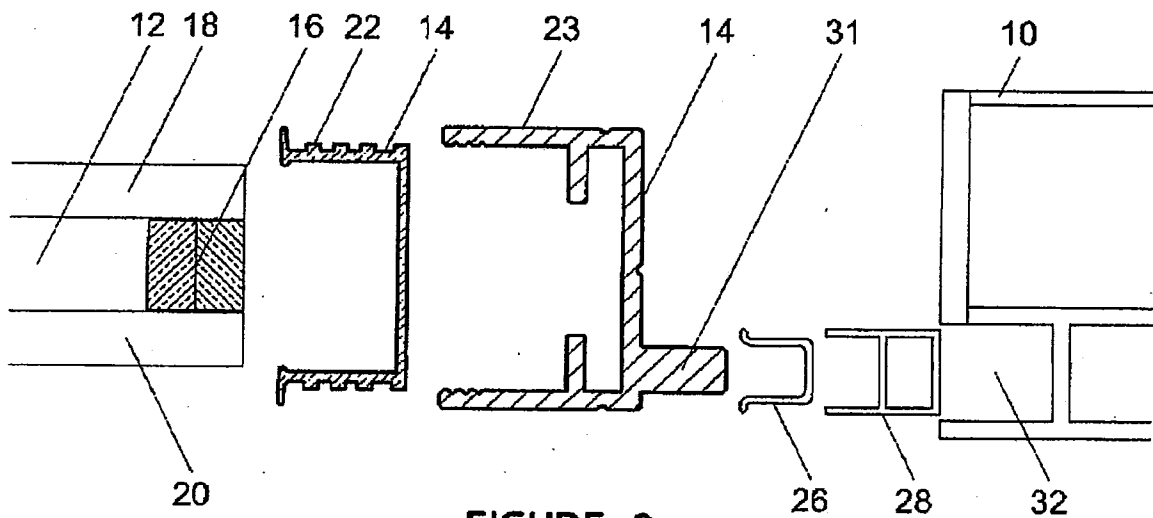


FIGURE 2

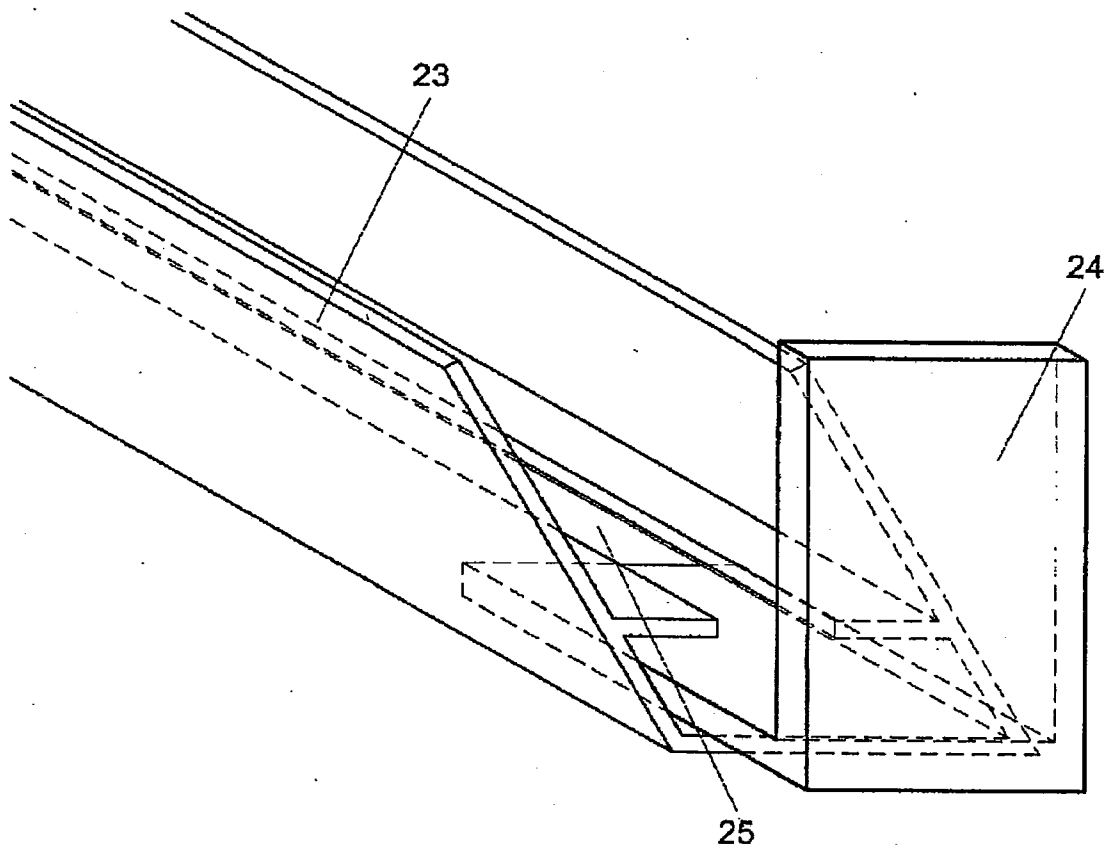


FIGURE 3

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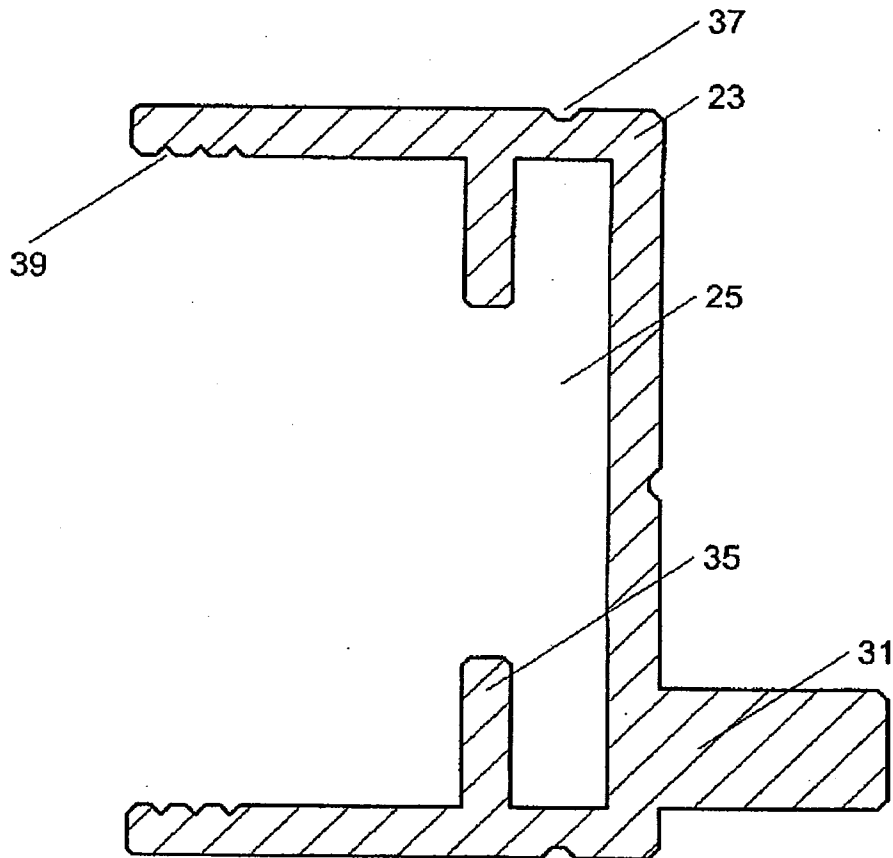


FIGURE 4

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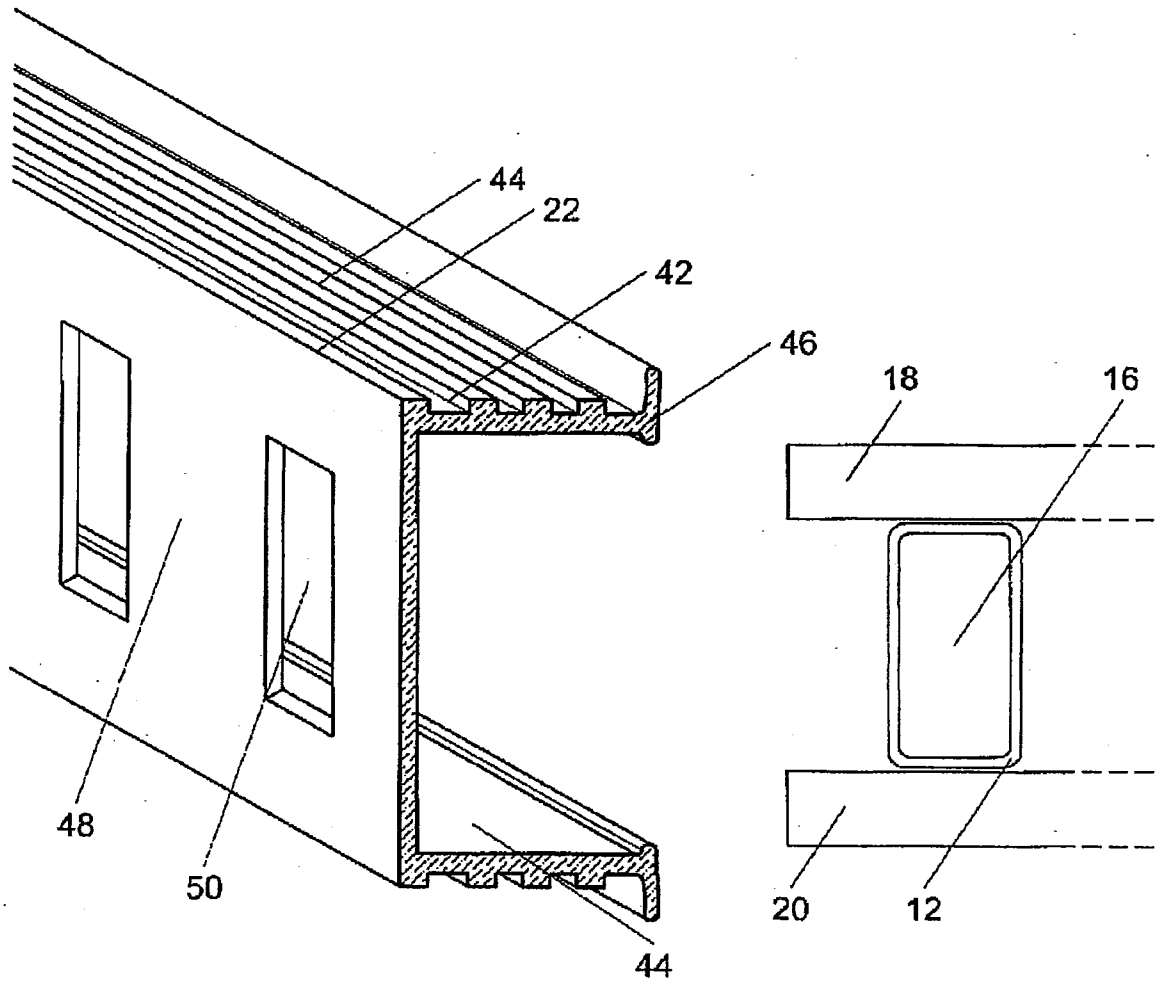


FIGURE 5

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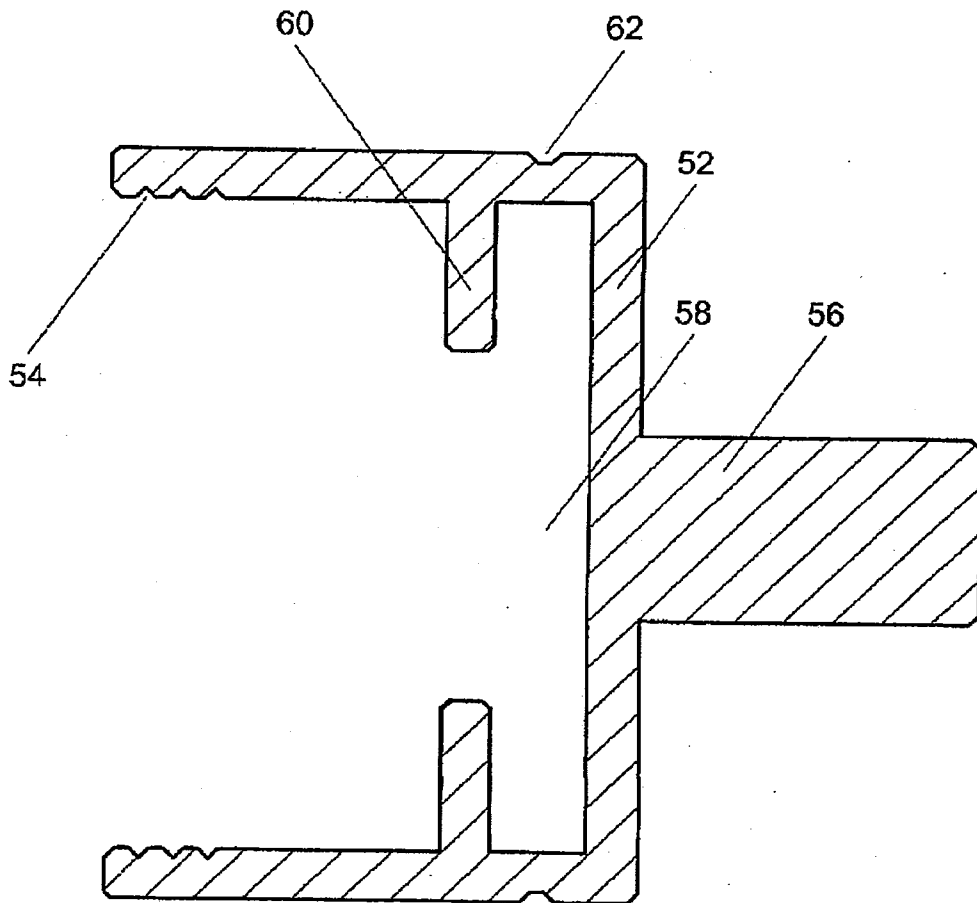


FIGURE 6

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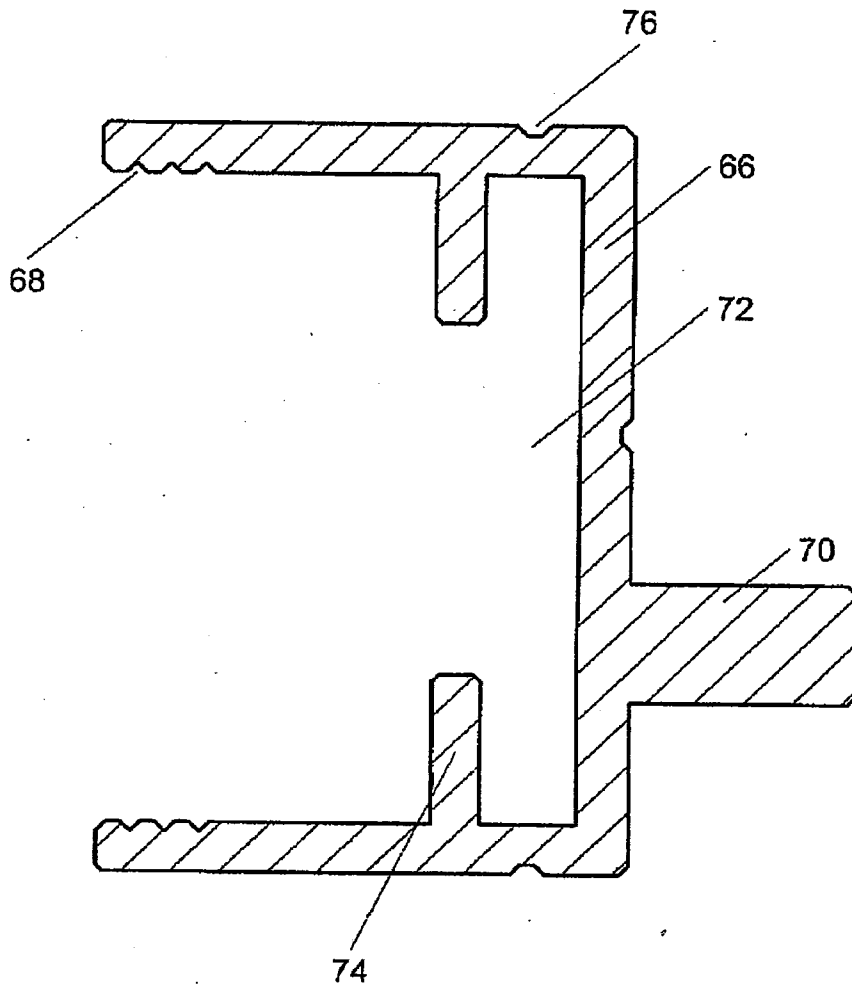


FIGURE 7

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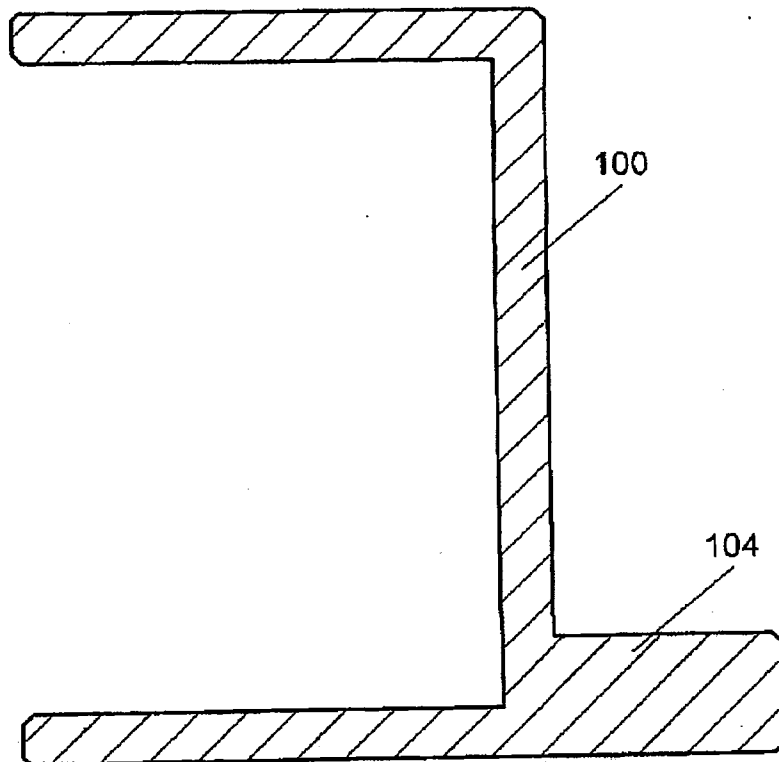


FIGURE 8

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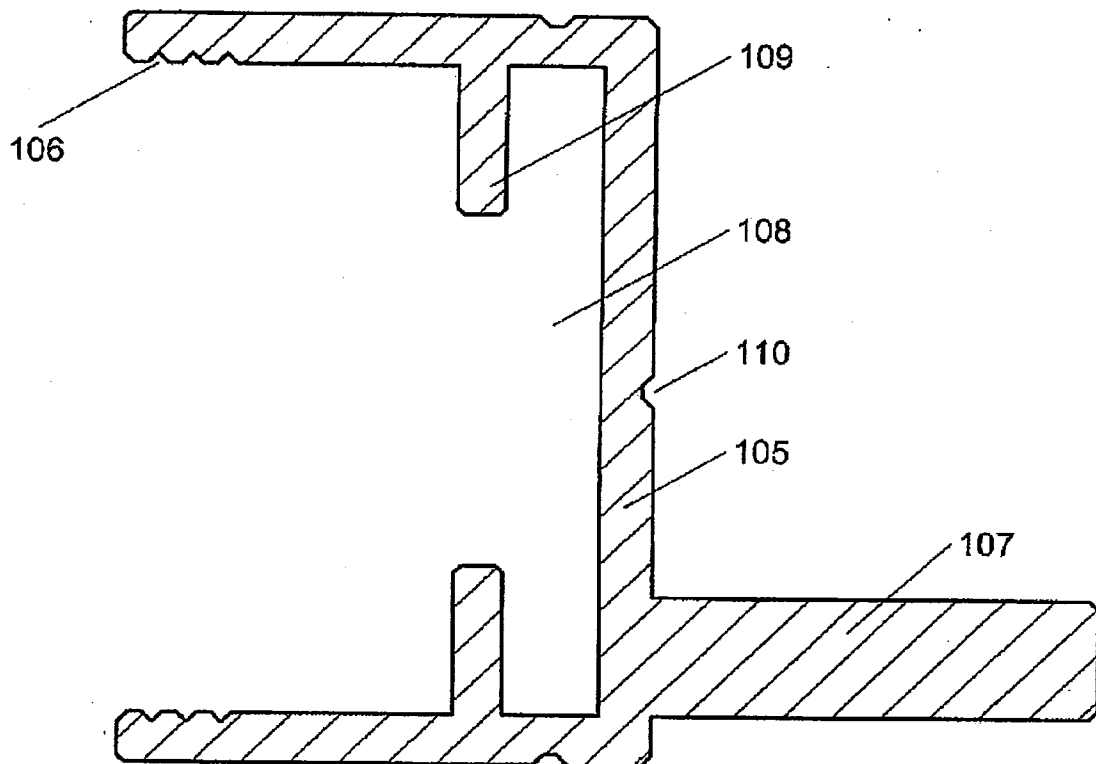


FIGURE 9

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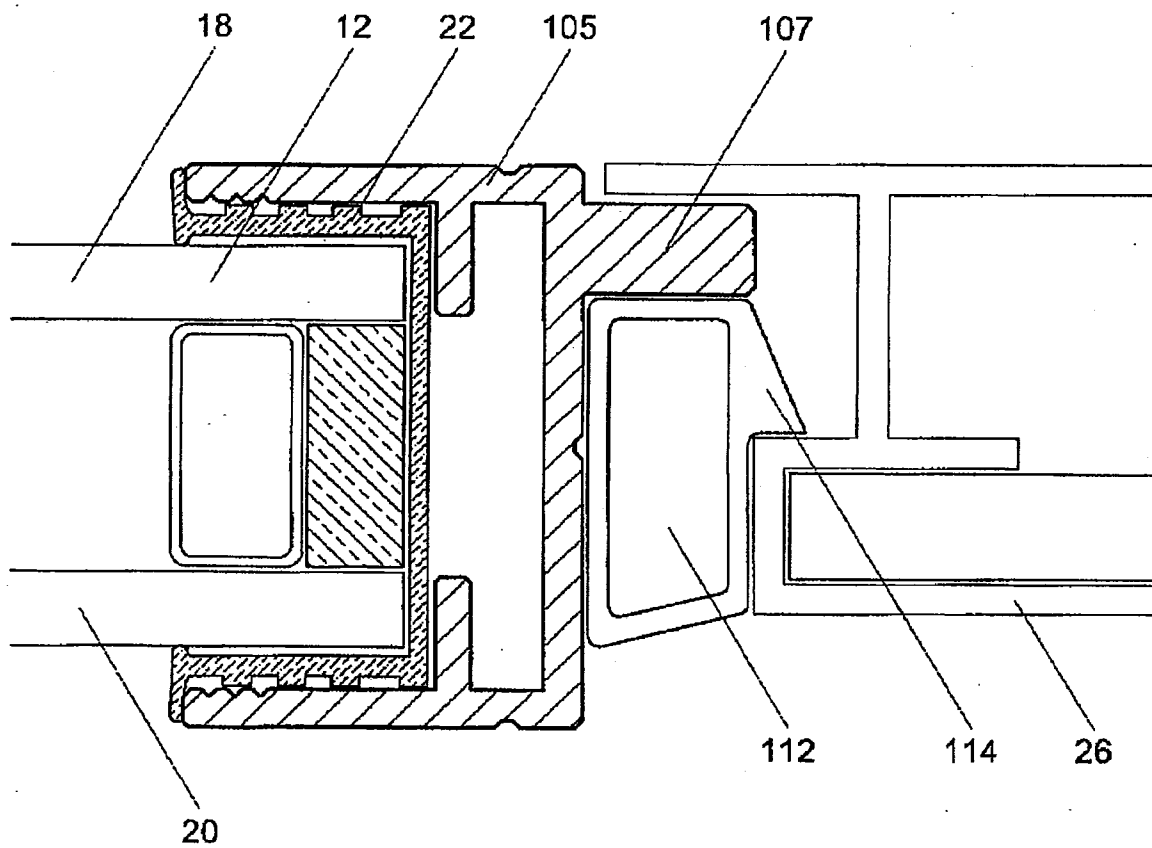


FIGURE 10

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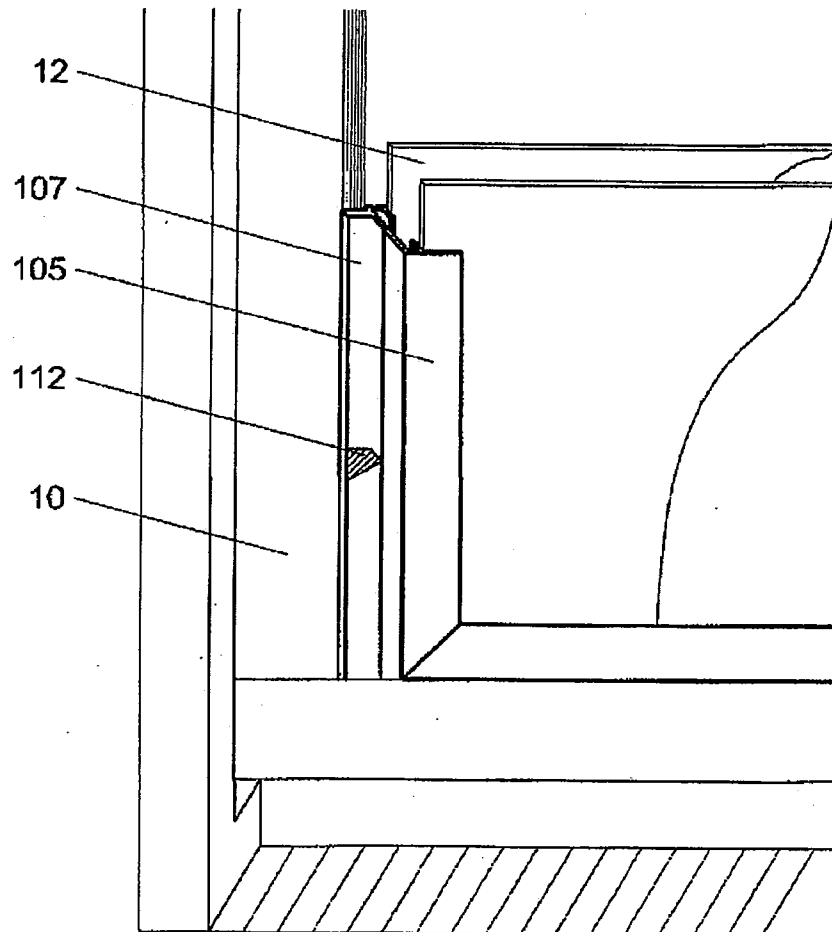


FIGURE 11

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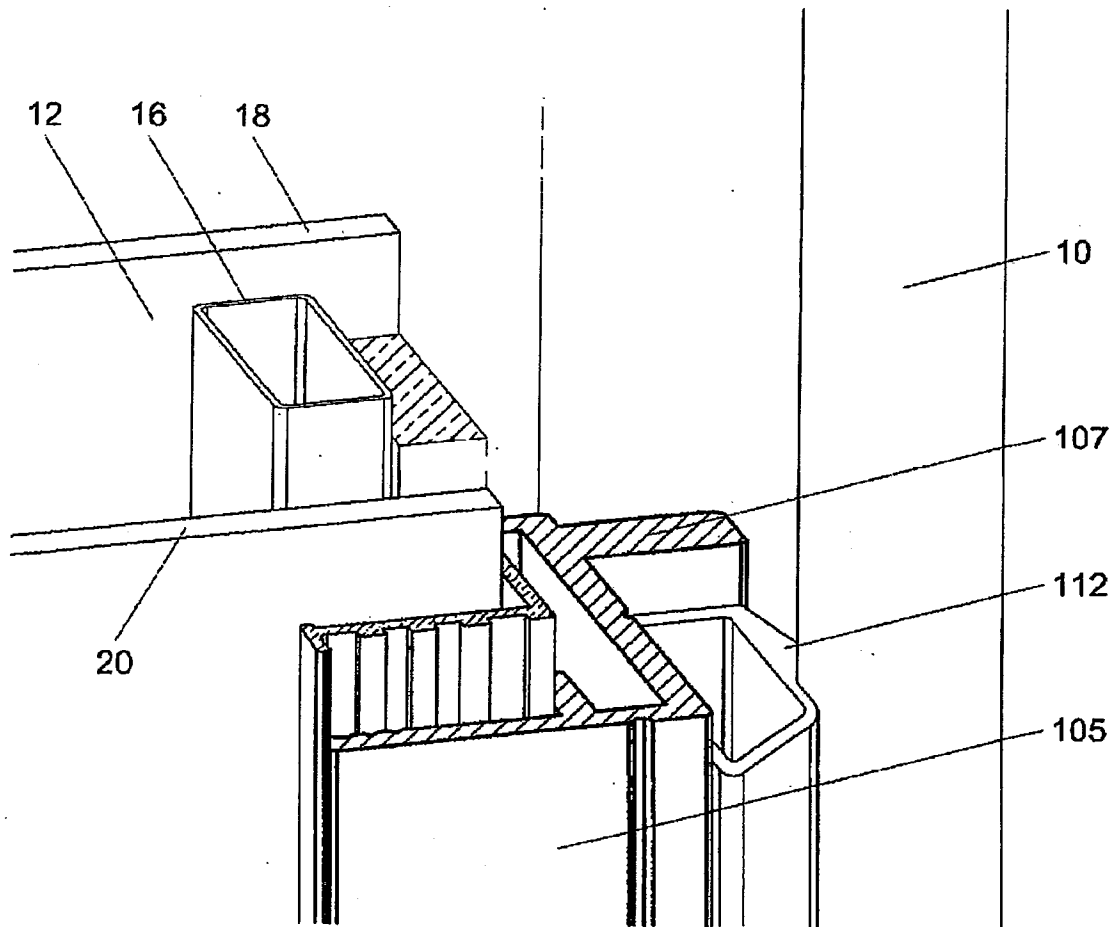


FIGURE 12

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU2012/000445

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl.

E06B 3/64 (2006.01)*E06B 3/58* (2006.01)

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)

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)

WPI - ECLA: E06B3/64B & Keywords (adaptor, wedge, water, convert, gasket) & like terms

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4295305 A (SHELVER) 20 October 1981 Abstract; figures 1-13; col. 2, line 41-50; col. 3, line 1-22, col. 4, line 38-41; col. 5, line 14-15; col. 7, line 12 to col. 8, line 14	1-72
X	AU 58761/90 (619121) B (WIDELINE PTY LTD) 16 January 1992 Figures 1-8; page 3, line 1-6	1-72
X	Patent Abstracts of Japan, JP 09-049373 A (NIPPON SHEET GLASS CO LTD et al.) 18 February 1997 Whole abstract and figures	1-72



Further documents are listed in the continuation of Box C



See patent family annex

* Special categories of cited documents:	
"A" document defining the general state of the art which is not considered to be of particular relevance	"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
"E" earlier application or patent but published on or after the international filing date	"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
"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)	"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
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"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
31 May 2012Date of mailing of the international search report
1 June 2012

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU2012/000445

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.: **73-74**
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:

These claims do not comply with Rule 6.2(a) because they rely on references to the description and drawings.

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:

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 additional fees, this Authority did not invite payment of additional fees.
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 and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/AU2012/000445

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	
US	4295305	CA 1048252	US 3889434 US 4033087
AU	619121	AU 58761/90	
JP	9049373	NONE	
Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.			
END OF ANNEX			