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(56) Documents Cited:
BE 000898862 A **DE 020004859 U**
DE 202006003289 U1 **FR 002769663 A1**
US 5918430 A **US 20060037261 A1**

(58) Field of Search:
INT CL **E06B**
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(54) Title of the Invention: **A window glazing panel**
Abstract Title: **A secondary window glazing panel having a connectable element and aperture**

(57) A window glazing panel 100 includes a transparent sheet 130 and a first element 140 (fig 2), which is one of a pair of connectable elements, arranged adjacent to at least part of the perimeter of the transparent sheet. The glazing panel further includes at least one aperture 150 located adjacent to the perimeter of said transparent sheet. In a second aspect, a glazing system 120 incorporates the glazing panel with a mounting 110 that includes the other element 160 of the connectable pair of elements. The mounting includes a protrusion 170 that is receivable through the aperture of the panel to restrict planar movement between the connectable elements. The protrusion may have an enlarged head, and the aperture may be keyhole shaped. Other aspects provide a construction and methods of connecting or disconnecting the glazing panel to the mounting.

Figure 1

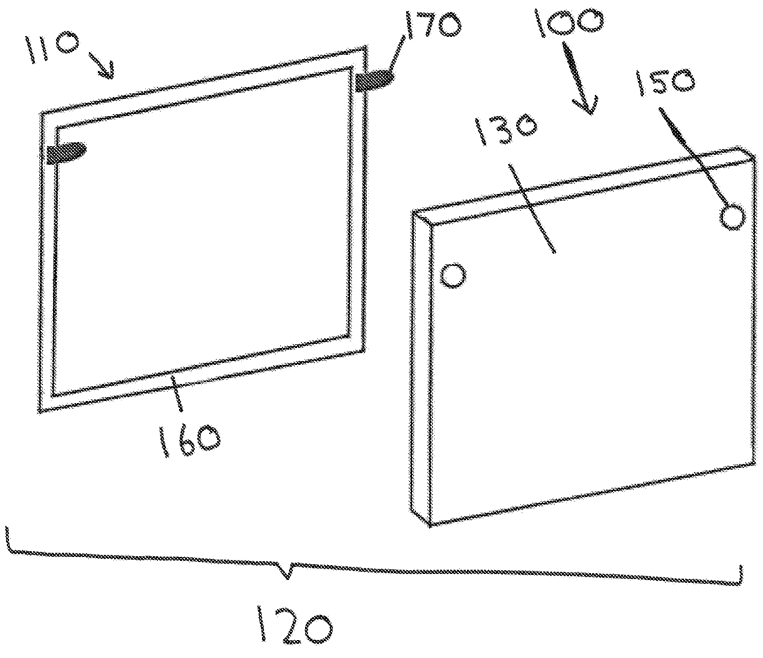

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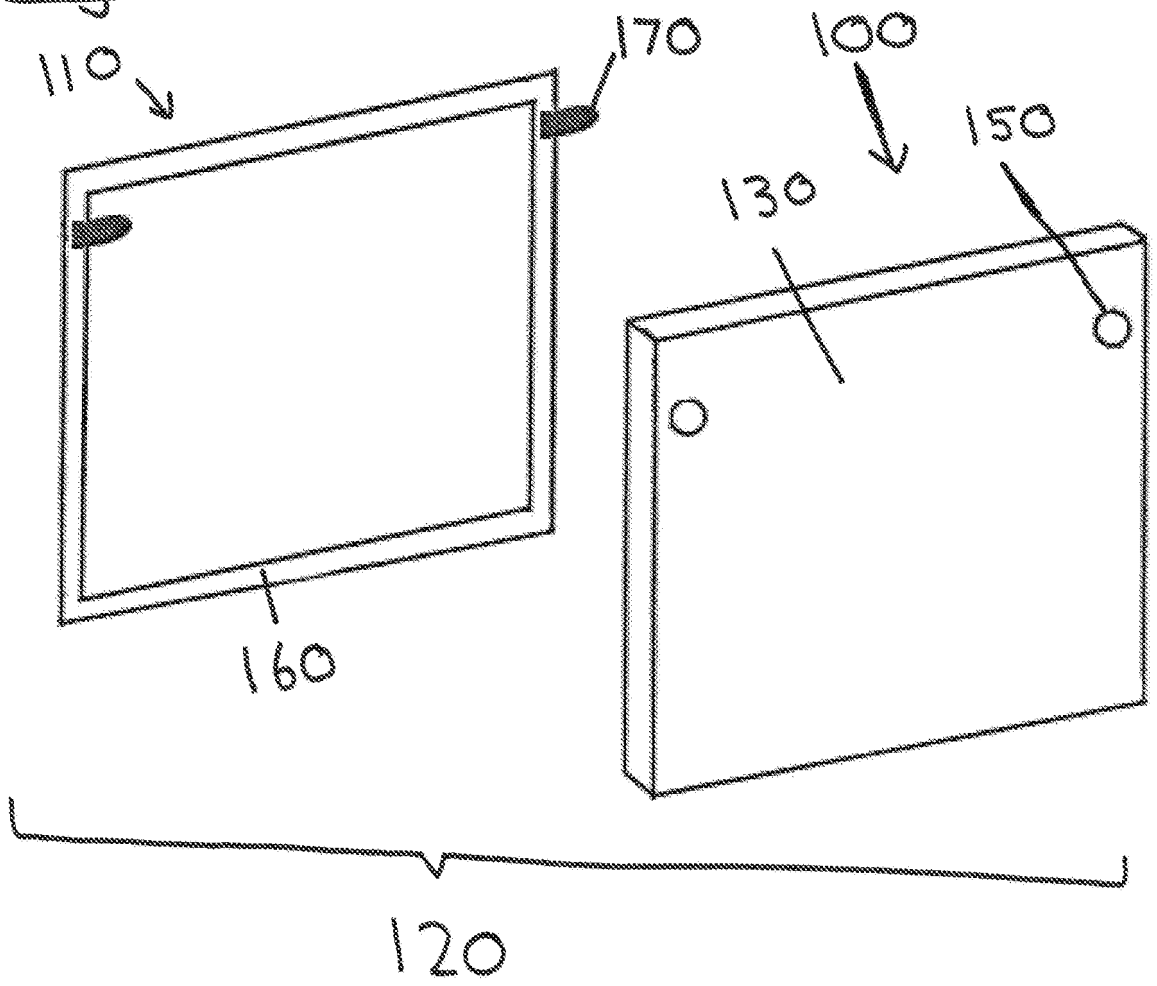
Figure 1



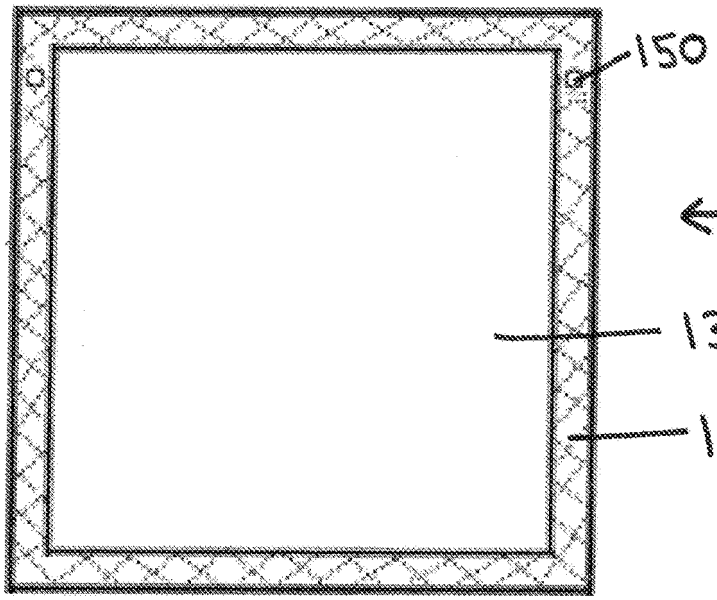


Figure 2

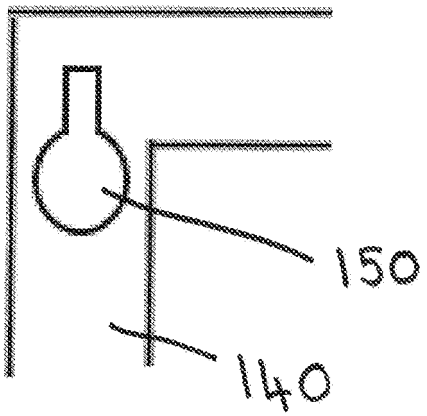


Figure 3

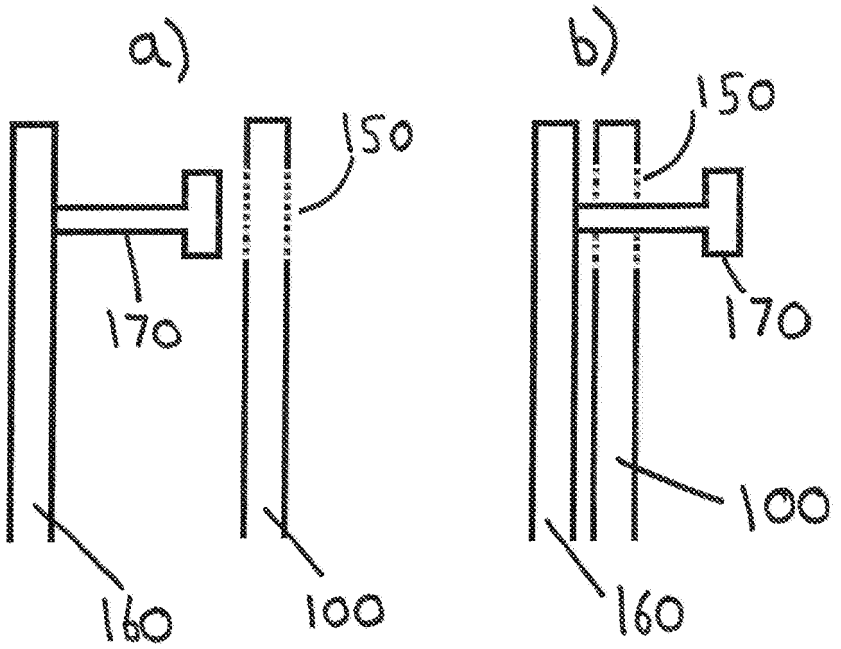


Figure 4

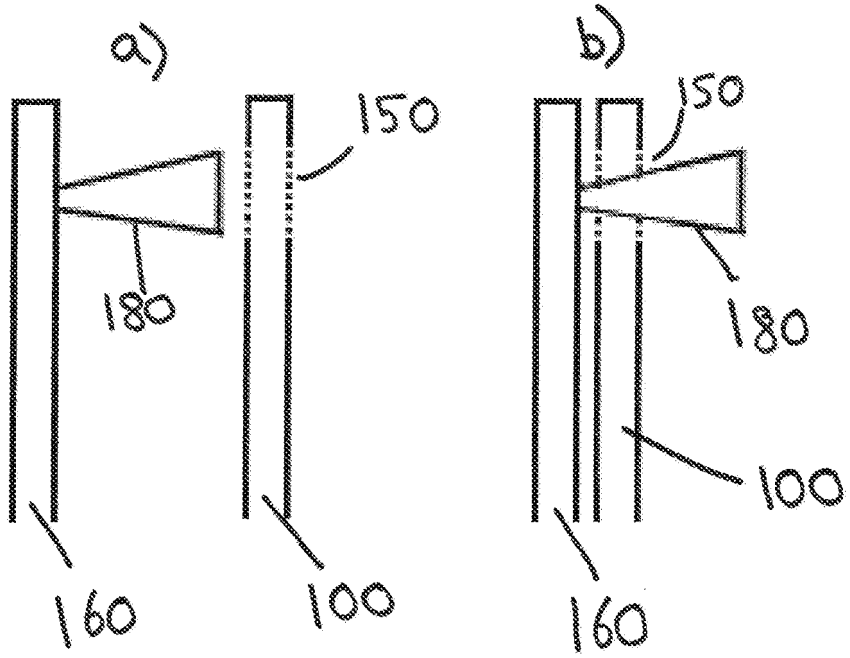


Figure 5

Figure 6

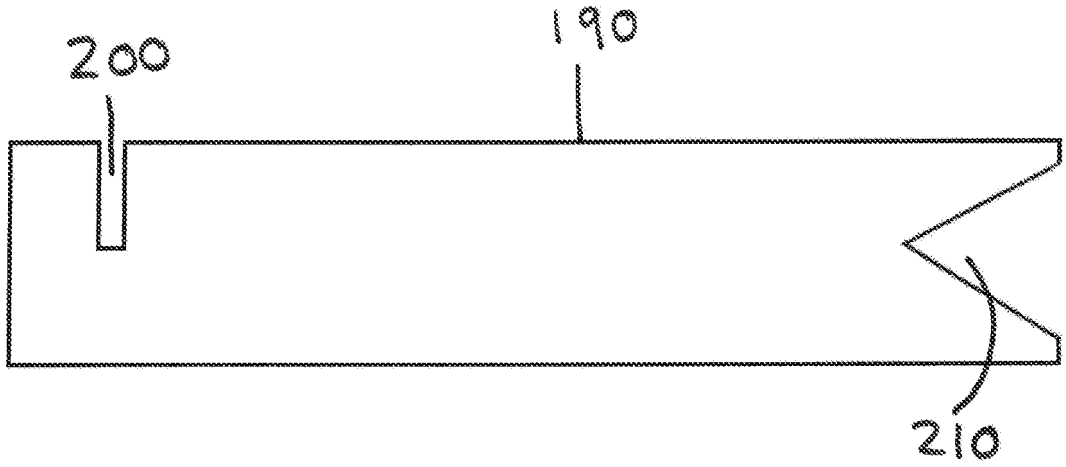


Figure 7

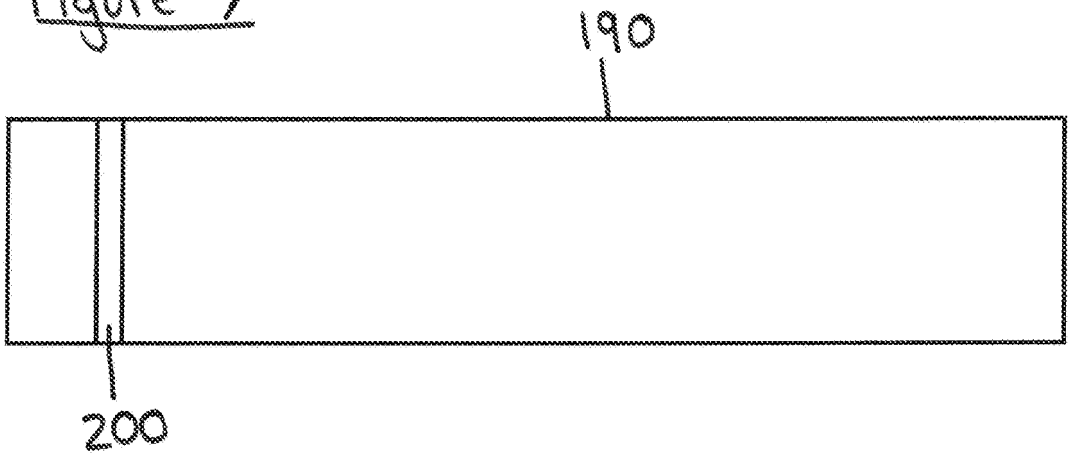
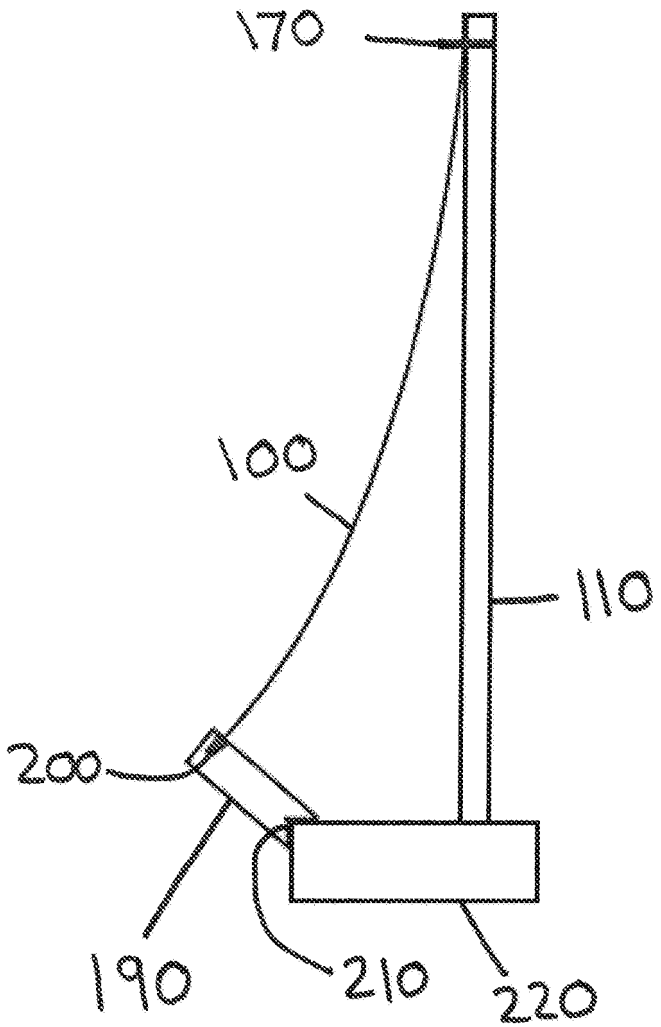


Figure 8



Title: A window glazing panel

Field of Invention

The present invention relates to a window glazing panel.

Background of invention

This invention generally relates to a window glazing panel, and a method of attaching the window glazing panel to a mounting in order to form a window glazing system. More specifically, although not exclusively, the invention relates to a secondary glazing panel to be used in conjunction with an existing (primary) window in an existing opening. The panel may find particular use in the winter, in order to increase the overall thermal efficiency of the window with which it is used.

Some windows, particularly single pane windows, can suffer from poor thermal efficiency and/or are draughty. Condensation can form during cold weather, which is unattractive and/or can cause damage to the window. Replacing such a window with a new, more efficient and/or less draughty window is one solution. However, this solution can present significant costs to the consumer. Moreover, there can be planning restrictions governing the replacement of windows in some dwellings.

An alternative, known, solution is to fix a permanent secondary glazing panel to the existing window opening. This improves the thermal efficiency. However, during the summer months, the secondary glazing panel may be unnecessary. Having the secondary glazing panel fixed in place then prevents

the primary window glazing panel being opened for ventilation. Moreover, existing secondary glazing systems can be unattractive.

It is known to provide temporary secondary glazing panels, which are intended to be removed during the summer months and stored away. This allows the user to more easily open the primary window during the summer months. A known secondary glazing panel system, for example MagneGlaze®, comprises a first magnetic strip attached to a window frame and an acrylic sheet with a second magnetic strip around its perimeter, wherein the sheet can be removably attached to the first magnetic strip of the window frame. The magnetic strips are magnetically attracted to each other, and configured such that the magnetic force ensures that the sheet (secondary pane) remains secured to the frame when needed. The sheet can be removed by pulling it away from the frame, thus overcoming the magnetic force of the two magnetic strips.

A problem with this known temporary arrangement is that sometimes the magnetic force is not sufficient to ensure that the glazing panel remains in place. The panel may slip down under its own weight; and/or could be dislodged through a gust of wind acting on the back of the panel. The glazing panel may also be dislodged by children, which presents a potential safety hazard.

Moreover, if the user wishes to open the primary window to allow ventilation, the secondary glazing panel must be removed entirely, and temporarily stored.

Hence the present invention seeks to improve upon the concept of secondary glazing panels.

Summary of invention

Accordingly, the present invention provides a window glazing panel, comprising: a transparent sheet; a first element comprised of one of a pair of connectable elements, arranged adjacent to at least part of the perimeter of said transparent sheet; and at least one aperture located adjacent to the perimeter of said transparent sheet.

In a further aspect, the present invention provides a window glazing system, comprising the window glazing panel, and a mounting, the mounting comprising: a second element comprised of the other of said pair of connectable elements, wherein said first element is connectable to said second element; at least one protrusion extending from the surface of the mounting, wherein said protrusion is receivable through said aperture to substantially restrict relative planar movement of the first and second elements, in use.

In a further aspect, the window glazing panel has substantially the same dimensions as the mounting.

In a further aspect, said at least one aperture is provided through said first element.

In a further aspect, said first and/or second element comprise(s) a strip.

In a further aspect, said strip substantially extends around the perimeter of said sheet and/or mounting.

In a further aspect, the transparent sheet comprises a frame around the perimeter thereof.

In a further aspect, said first and/or second element comprises said frame.

In a further aspect, the first element is less flexible than the transparent sheet.

In a further aspect, said protrusion has an enlarged head at its distal end.

In a further aspect, said aperture is keyhole-shaped, comprising a first section that is generally circular and a second section, extending from the first section, that is generally square.

In a further aspect, the distal end of the keyhole-shaped aperture is rounded.

In a further aspect, in use the second section is located substantially above the first section.

In a further aspect, the first section of the keyhole has a greater cross sectional area than that of the enlarged head of the protrusion.

In a further aspect, the second section of the keyhole has a smaller cross sectional area than that of the enlarged head of the protrusion.

In a further aspect, the length of the protrusion is greater than the depth of the aperture.

In a further aspect, said first element is magnetic and said second element is magnetically attractive.

In a further aspect, there are at least two said apertures located adjacent one edge of the sheet.

The present invention further provides a construction comprising a surface having an opening therethrough, further comprising the glazing system, wherein: said mounting is secured to the surface of the construction adjacent the perimeter of the opening.

In a further aspect, the glazing panel is arranged substantially vertically.

In a further aspect, said aperture is located in the upper half of said window glazing panel.

In a further aspect, the glazing panel comprises two apertures, located adjacent the upper right corner and upper left corner of said window glazing panel respectively.

In a further aspect, said opening comprises a window.

In a further aspect, the glazing panel comprises two apertures and the mounting comprises two protrusions, such that, in use, when the protrusions are received in the apertures said window glazing panel is rotatable about an axis which is coaxial with, or parallel to an axis passing through said protrusions.

In a further aspect the present invention provides a method of connecting the window glazing panel to the mounting, comprising: offering up said window glazing panel to said mounting; passing said protrusion through said aperture; and connecting said first element to said second element to removably secure said glazing panel to said mounting.

In a further aspect the present invention provides a method of disconnecting said window glazing panel from said mounting, comprising: disconnecting said

first element from said second element; decoupling said protrusion from said aperture; and retracting said window glazing panel from said mounting.

Brief description of drawings

Embodiments of the present invention will now be described, by way of example only, with reference to the following figures in which:

Figure 1 shows an exploded view of a window glazing system comprising a window glazing panel and a mounting.

Figure 2 shows a rear view of the window glazing panel of figure 1 with two apertures therethrough and a first element comprising a pair of connectable elements.

Figure 3 shows an enlarged view of an aperture located adjacent to the perimeter of the window glazing panel of figure 1, wherein the aperture is keyhole shaped.

Figures 4a and 4b show an enlarged view of an aperture located on a protrusion, wherein the protrusion has an enlarged head at its distal end, in both coupled and uncoupled forms.

Figures 5a and 5b shows an enlarged view of an aperture located on a protrusion, wherein the protrusion is conically shaped, in both coupled and uncoupled forms.

Figure 6 shows a side view of a spacer for creating a gap between the window glazing panel and mounting when they are connected.

Figure 7 shows a plan view of the spacer of figure 6.

Figure 8 shows the spacer of figures 6 and 7 engaged between the window glazing panel and a recess of the construction.

Detailed description of specific embodiments

As illustrated in figures 1 and 2, the present invention provides a window glazing system 120 comprising a window glazing panel 100 and a mounting 110. The window glazing panel 100 comprises a transparent sheet 130. A first element 140 is arranged adjacent to the perimeter of the sheet 130, and is preferably permanently connected thereto. This first element 140 comprises one of a pair of connectable elements 140, 160. A pair of apertures 150 are located adjacent the perimeter of the sheet 130.

The mounting 110 comprises a second element 160 comprising the other of the pair of connectable elements 160, 140 and a pair of protrusions 170 extending from the surface of the mounting 110.

When the system 120 is in use, the window glazing panel 100 is removably connected to the mounting 110. This provides a secondary glazing panel which increases the thermal efficiency of the opening, normally containing a first window. When the system 120 is not in use, normally during the summer months however not exclusively, the window glazing panel 100 is removable from the mounting 110 and can be stored.

In one embodiment of the present invention, the first and second elements 140, 160 attached to the transparent sheet 130 and/or mounting 110 comprise a strip. Preferably the first element 140 provided substantially around the entire perimeter of the transparent sheet 130. This ensures that when the window glazing panel 100 is attached to the mounting 110, a substantially

airtight seal is created between substantially the whole of the perimeter of the window glazing panel 100 and the mounting 110.

Preferably when the first element 140 is connected to the transparent sheet 130, the rigidity of the window glazing panel 100 is increased. Within the window glazing panel 100 there is at least one aperture 150 located adjacent to the perimeter of the transparent sheet 130. Preferably the aperture 150 passes through the first element 140.

In some embodiments the first element 140 is less flexible than the transparent sheet 130. In another embodiment the first element 140 is more flexible than the transparent sheet 130.

As illustrated in figure 2, the transparent sheet 130 is provided with a frame around its perimeter, which can improve the aesthetic appeal of the window glazing panel 100. The frame may also provide added structural rigidity to the transparent sheet 130 to reduce the potential flexing of the window glazing panel 100. In one embodiment the first element 140 acts as the frame (i.e. there is no additional frame). In another embodiment, the first element 140 is secured to the frame.

Preferably the transparent sheet 130 of the window glazing panel 100 is made of Polyethylene terephthalate (PET), Polyethylene terephthalate glycol-modified (PETG) or Polycarbonate, however, it is possible to use other types of plastic and other transparent flexible materials. In one embodiment the sheet 130 is around 1-3 mm thick, preferably 2mm, which provides a suitable balance between being sufficiently rigid to maintain its structure when in use, and light enough to enable the user to easily attach and detach the panel 100.

In one embodiment the first element 140 is magnetic and the second element 160 is a steel strip. In another embodiment, the first and second elements 140,

160 are both magnetically attracted to one another, providing a strong magnetic connection between the window glazing panel 100 and the mounting 110, to substantially reduce any undesired movement of the window glazing panel 100 when connected to the mounting 110. Preferably, the first and second elements 160 are arranged around the perimeter of each of the respective panel and mounting, which aids in creating an airtight seal. In another embodiment, the connectible elements 140, 160 could be made of Velcro®, optionally with a rubber gasket, to create an airtight seal. In a further embodiment, one element is magnetic and the other element is magnetically attractive. In one embodiment, the first element 140 provided on the glazing panel may only be magnetically attractive, rather than magnetic, such that a plurality of stacked window glazing panels do not inadvertently secure themselves to one another.

With respect to figure 1 the at least one aperture 150 is located adjacent to the perimeter of the transparent sheet 130 in a position that corresponds to the position of the corresponding protrusion 170 when the window glazing panel 100 is connected to the mounting 110. In an embodiment comprising two apertures and two protrusions, the two apertures and the two protrusions are preferably spaced an equal distance apart.

In one embodiment the length of the protrusion 170 is longer than the thickness of the panel 100. When the panel 100 is connected to the mounting 110 and the protrusion 170 is received in the aperture 150, the protrusion 170 provides vertical support to the window glazing panel 100 to prevent the window glazing panel 100 translating downwards due to gravity or for example a child pulling on the window glazing panel 100.

As illustrated in figure 3, in one embodiment the aperture 150 is keyhole shaped, defined as having a first section with a cross sectional area and a

second adjacent section that has a smaller cross sectional area than that of the first section.

As illustrated in figures 4, in one embodiment the protrusion 170 has an enlarged head at its distal end. The protrusion 170 is receivable in the aperture 150 of the window glazing panel 100 and substantially restricts relative planar movement of the window glazing panel 100 and mounting 110.

Figure 5 shows an embodiment where the protrusion 180 is conically shaped, which encourages the window glazing panel 100 to slide towards the mounting 160 under gravity when the window glazing panel 100 and mounting 110 are coupled. This prevents the window glazing panel 100 from being located away from the mounting 110 when in use, ensuring an air tight seal is created.

In both embodiments of the protrusion 170/180, the proximal end is smaller in diameter than the distal end.

Preferably the protrusions 170/180, of figures 4 and 5 respectively, extend perpendicular to the surface of the mounting 110. In another embodiment the protrusions are angled upwards relative to the mounting 110, to encourage the window glazing panel 100 towards the mounting 110 when in use.

The protrusion of a keyhole aperture enables the enlarged head of the protrusion 170/180 to initially be received in the first section of the aperture 150, the window glazing panel 100 can then be translated to the proximal end of the protrusion 170/180, so that the proximal end of the protrusion 170/180 can be received by the second section of the keyhole aperture 150. This prevents the window glazing panel 100 being removed from the mounting 110 unintentionally.

In a preferred embodiment, the orientation of the keyhole is such that the second section with the smaller cross-sectional area is located above the first section of a larger cross-sectional area when the window glazing panel 100 is connected to the mounting 110 of the window glazing system 120.

Preferably there are two apertures 150 and two protrusions 170/180 located in the upper left and upper right corners of the window glazing system 120. Each aperture 150 passes through both the first element 140 and the transparent sheet 130. It is preferable to provide the window glazing panel 100 with substantially the same dimensions as the mounting 110, to improve the fitment of the window glazing panel 100 in the system 120 and aid in creating the airtight seal. Preferably, the first and second elements 140, 160 are of substantially the same, preferably identical, dimensions.

Figures 6, 7 and 8 show a spacer 190 that can be used to maintain a gap between the bottom edge of the window glazing panel 100 and the mounting 110 when they are connected. In one embodiment the spacer 190 is connected to either of the panel 100 and mounting 110 or the recess 220, and is moveable between a stowed and deployed position. Preferably the spacer 190 is made of a soft, lightweight material, such as foam. Preferably the length of the spacer is between 20cm and 30 cm, and its width between 3cm and 5cm.

Preferably the spacer 190 is substantially elongate and square in cross section. Preferably a groove 200 is provided on one side face, adjacent a first end of the spacer 190. The bottom edge of the panel 100 is receivable in the groove 200 in use, preferably with an interference fit.

Preferably at the second end of the spacer 190, the end face is provided with a cut-out 210, preferably with a V-shaped cross section. In use, the cut-out

engages with a corner edge of the mounting 110 and/or the recess 220 on which the mounting 110 is provided.

In use, as shown in figure 8, when the spacer 190 is installed between the panel 100 and the mounting 110 and/or the recess 220, the top part of the panel 100 may still be held substantially parallel to the mounting 110. As a result, the panel 100 is caused to bend. A benefit of this arrangement is that the bent panel 100 exerts a force on the spacer 190 in a direction substantially perpendicular to the plane of the bottom of the panel 100, which urges and maintains the cut-out 210 in engagement with the corner edge of the mounting 110 and/or the recess 220. This preferably ensures that the spacer 190 is held in place and cannot fall out without deliberate manual intervention. The composition of the spacer 190 further ensures that it the spacer 190 were to fall out, then it could not cause any harm to persons or damage to other objects.

The presence of the first and second connectable elements 140, 160 allows the window glazing panel 100 to be connected to the mounting 110 and provide an airtight seal to prevent draughts and increase the thermal efficiency of the opening. The addition of the aperture 150 and protrusion 170 add increased security to this fixing by preventing the accidental removal of the window glazing panel 100 from the mounting 110, as well as preventing the window glazing panel 100 from sliding down the mounting 110 and breaking the airtight seal. The benefits are:

- The system 120 increases the security and safety of the occupants of the construction in which the window glazing system 120 is located, by preventing the window glazing panel 100 from being unintentionally or accidentally disconnected from the mounting 110. This helps reduce possible injury to any occupants, or any damage occurring to the window glazing panel 100.

- The protrusion 170 prevents the window glazing panel 100 from sliding down on the mounting 110 ensuring the airtight seal is maintained throughout the time in which the window glazing panel 100 is in use which prevents any unintentional reduction in the thermal efficiency of the opening and reduces draughts.

- This system 120 enables the user to partially disconnect the glazing panel 100 from the mounting 110 to create an opening. This allows a through-draught when the primary window is opened as per the user's desire, while the secondary panel 100 is supported partially by the connected elements 140, 160 and by the protrusion 170s of the mounting 110. When partially disconnecting the secondary glazing panel 100, the lower or upper section of the secondary glazing panel 100 below or above the coupled protrusion 170 and aperture 150 respectively, may be rotated about an axis which is coaxial with or parallel to an axis passing through the coupled protrusion 170 and aperture 150. The lower edge of the window glazing panel 100 may then be held away from the lower part of the mounting 110 using the spacer 190, in order to maintain the opening between the window glazing panel 100 and mounting 110.

- The use of a protrusion 170 to support the window glazing panel 100 creates additional vertical support that enables the thickness of the first and second elements 140, 160 to be reduced. This creates a more aesthetically appeal product.

- A further benefit of the protrusion 170 is to allow larger window glazing panels 100, than currently feasible, to be mounted, allowing secondary glazing panels to be used on large windows.

In order to connect the window glazing panel 100 to the mounting 110, the window glazing panel 100 is offered up to the mounting 110 and the aperture 150 receives the protrusions 170. In embodiments where the aperture 150 is keyhole shaped, the window glazing panel 100 would then be lowered so that the smaller section of the keyhole aperture 150 contains the proximal end of the protrusion 170. At this point, the first and second elements 140, 160 are connected together to create the airtight seal.

When the user does not want the window glazing panel 100 installed, normally during the summer months, the first and second elements 140, 160 are manually disconnected, and the aperture 150 is decoupled from the protrusion 170 and the window glazing panel 100 is removed from the mounting 110. Once the window glazing panel 100 has been removed, it may be stored by the user or returned to the provider for external storage.

One possible application of the secondary glazing panel 100 provided herein, is for use within a construction, the construction comprising a surface having an opening therethrough, wherein the mounting 110 of the window glazing system 120 is secured to the surface of the construction adjacent the perimeter of the opening, in such a way as to enable the window glazing panel 100 to be connected to the mounting 110 of the window glazing system 120.

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

The features disclosed in the foregoing description, or the following claims, or the accompanying drawings, expressed in their specific forms or in terms of a means for performing the disclosed function, or a method or process for attaining the disclosed result, as appropriate, may, separately, or in any

combination of such features, be utilised for realising the invention in diverse forms thereof.

Claims

1. A window glazing panel, comprising:

a transparent sheet;

a first element comprised of one of a pair of connectable elements, arranged adjacent to at least part of the perimeter of said transparent sheet; and

at least one aperture located adjacent to the perimeter of said transparent sheet.

2. A window glazing system, comprising the window glazing panel of claim 1, and a mounting, the mounting comprising:

a second element comprised of the other of said pair of connectable elements, wherein said first element is connectable to said second element;

at least one protrusion extending from the surface of the mounting, wherein said protrusion is receivable through said aperture to substantially restrict relative planar movement of the first and second elements, in use.

3. A window glazing system according to claim 2, wherein; said window glazing panel has substantially the same dimensions as the mounting.

4. A window glazing panel or system according to any preceding claim, wherein said at least one aperture is provided through said first element.

5. A window glazing panel or system according to any preceding claim, wherein said first and/or second element comprise(s) a strip.

6. A window glazing panel or system according to claim 5, wherein said strip substantially extends around the perimeter of said sheet and/or mounting.

7. A window glazing panel or system according to any preceding claim, wherein the transparent sheet comprises a frame around the perimeter thereof.

8. A window glazing panel or system according to claim 7, wherein said first and/or second element comprises said frame.

9. A window glazing panel or system according to any preceding claim, wherein the first element is less flexible than the transparent sheet.

10. A window glazing panel or system according to claim any of claims 2 to 9, wherein said protrusion has an enlarged head at its distal end.

11 A window glazing panel or system according to claim 10, wherein said aperture is keyhole-shaped, comprising a first section that is generally circular and a second section, extending from the first section, that is generally square.

12. A window glazing panel or system according to claim 11, wherein the distal end of the keyhole-shaped aperture is rounded.

13. A window glazing panel according to claim 11, wherein in use the second section is located substantially above the first section.

14. A window glazing system according to claim 11, wherein the first section of the keyhole has a greater cross sectional area than that of the enlarged head of the protrusion.

15. A window glazing system according to claim 11, wherein the second section of the keyhole has a smaller cross sectional area than that of the enlarged head of the protrusion.

16. A window glazing system or panel according to any preceding claim, wherein the length of the protrusion is greater than the depth of the aperture.

17. A window glazing panel or system according to any preceding claim, wherein said first element is magnetic and said second element is magnetically attractive.

18. A window glazing panel or system according to any preceding claim, wherein there are at least two said apertures located adjacent one edge of the sheet.

19. A construction comprising a surface having an opening therethrough, further comprising the glazing system of any of claims 2 to 18, wherein:
said mounting is secured to the surface of the construction adjacent the perimeter of the opening.

20. A construction according to claim 19, wherein the glazing panel is arranged substantially vertically.

21. A construction according to claim 20, wherein said aperture is located in the upper half of said window glazing panel.

22. A construction according to claim 20, wherein the glazing panel comprises two apertures, located adjacent the upper right corner and upper left corner of said window glazing panel respectively.

23. A construction according to claim 19, wherein said opening comprises a window.

24. A window glazing system or construction according to any of claims 2 to 23, wherein the glazing panel comprises two apertures and the mounting comprises two protrusions, such that, in use, when the protrusions are received in the apertures said window glazing panel is rotatable about an axis which is coaxial with, or parallel to an axis passing through said protrusions.

25. A method of connecting the window glazing panel to the mounting of claim 2, comprising:

offering up said window glazing panel to said mounting;

passing said protrusion through said aperture; and

connecting said first element to said second element to removably secure said glazing panel to said mounting.

26. A method of disconnecting said window glazing panel from said mounting, comprising:

disconnecting said first element from said second element;

decoupling said protrusion from said aperture; and

retracting said window glazing panel from said mounting.

Application No:	GB1420413.5	**Examiner:**	Alan Jones
Claims searched:	1-26	**Date of search:**	4 June 2015

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1, 2, 4, 5, 9 & 16-26 at least	US5918430 A (ROWLAND) See e.g. figs, apertures 56-62, first element 84, mounting 50 comprising second element 80 including protrusion 82
X	1-9, 16-26 at least	BE898862 A (ARCHIBO BIOLOGICA) See e.g. figs, first element 2, mounting comprising second element 3, protrusion 9
X	1, 4, 5, 7-9, 16, 18-26 at least	FR2769663 A1 (PARCOMM IND.) See e.g. figs, first element 6, second element comprising strip 9, connectable via bolt/insert 33, 35, apertures 34
X	1, 9 & 16-23 at least	DE202006003289 U1 (WEINER) See e.g. figs, transparent sheet 1, first element 10 connectable to paired element 11, apertures 9
X	1, 4-9 & 18-24 at least	US2006/037261 A1 (CALLAHAN ET AL) See e.g. figs, transparent sheet 2, apertures 4 for receiving connecting screws
X	1, 4, 9 & 17-24 at least	DE20004859 U (GEBR. LEUTHOLD METALLBAU) See e.g. figs, transparent sheet 1, connectable elements 7, 8

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^{X} :

Worldwide search of patent documents classified in the following areas of the IPC

E06B

The following online and other databases have been used in the preparation of this search report

Online: WPI, EPODOC

International Classification:

Subclass	Subgroup	Valid From
E06B	0003/28	01/01/2006
E06B	0003/54	01/01/2006