

# PATENT SPECIFICATION

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## (54) A GLASS PANEL READY FOR MOUNTING

(71) I, JORGEN SKOUBO JOHANSEN, a Danish Subject of Hjortespringparken 26, DK-2730 Herlev, Denmark, do hereby declare the invention, for which I pray that a Patent may be granted to me, and the method by which it is to be performed to be particularly described in and by the following statement:—

The present invention relates to a glass panel ready for mounting, comprising at least two parallel, substantially equal area glass layers with spaces in between, said glass layers optionally forming an independent, hermetically sealed insulating window unit.

An insulating window unit is known, which may be provided with a frame along its periphery. Such a frame comprises mounting strips in the corners and to which fittings such as hinges and hasps are secured. When the mounting strips are made of metal, problems may arise with the metal-glass connection since the metal easily breaks the glass owing to outdoor thermal fluctuation, or to differences in temperature on various parts of the metal, said differences often arising in the winter, since the expansion coefficients of the materials differ.

Furthermore, a car window is known comprising only one glass layer. This glass layer is provided with metal strips glued on its periphery and having a U-shaped cross section. Problems, however, arise with the production of these windows since the strips must be very accurately guided relative to the glass as soon as they have been applied with glue in order to ensure that the U actually surrounds the glass.

An improved sound reduction of the insulating windows is often desired.

According to the present invention I provide a glass panel ready for mounting, comprising at least two parallel glass panes of substantially equal size spaced apart to

provide cavities therebetween, the panes forming an insulating window unit, sealed in air-tight manner if required, the panel also comprising a number of mounting strips extending completely or partly along the periphery of the said parallel glass panes, each individual mounting strip having a substantially L-shaped section comprising a first portion that extends along its entire length and abuts a first adhesive seal that seals an outer pane and a second portion that is integral with the first portion and abuts a second adhesive seal at the periphery of at least one of the glass panes, characterised in that the layer of sealing material in the said second seal is four to six times as thick as the layer of sealing material in the said first seal, the first seal and the second seal both being made of resilient material so that the glass panes at the seals are only gently clamped.

The invention will be more fully understood from the following description given by way of example only with reference to the figures of the accompanying drawings which are diagrammatic and in which the ratio of the sealing compound layers is not to be calculated from them.

In the drawings

Figure 1 is a fragmentary, sectional view of a first embodiment of a panel of the invention having three glass layers;

Figure 2 is a fragmentary sectional view similar to Figure 1 of a second embodiment of the panel;

Figure 3 is a fragmentary sectional view similar to both Figures 1 and 2 of a third embodiment of the panel;

Figure 4 is similar to Figures 1, 2 and 3 but shows a further embodiment of the panel;

Figures 5, 6 and 7 are yet further embodiments of the panel of previous figures.

Figure 8 is a fragmentary sectional view

of the panel having two glass layers;

Figure 9 is a view in oblique perspective, showing a portion only of a mounting strip relative to an insulating window unit, and

5 Figure 10 is a view in oblique perspective of a glass panel having two parallel mounting strips.

Referring now to Figure 1 there is illustrated a glass panel comprising an insulating window unit with three glass layers 1, 2, 3 and a mounting strip shown generally at 4 arranged at the periphery of the window unit. The panes or glass layers 1, 2, 3 have spaces 6, 7 provided by spacer ribs 40 and 50, made of metal or of a plastics. However, the glass layers 1, 2 and 3 need not form a window unit containing spacer ribs 40, 50 since the glass layers 1, 2, 3 need no other mutual connection than the mounting strip 4.

Each mounting strip 4 comprises a first strip portion 4a and a second strip portion 4b having an L form in section. The strip portion 4a forms part of a first adhesive seal 10 of an edge zone 1' on the side of the outer glass layer 1, whereas the second strip portion 4b forms part of a second adhesive seal 15 at the edge of the glass layers 1, 2, 3. This edge corresponds in Figure 1 to the glass edge surfaces 11, 12 and 13, and to more or less of the glass edge zones 1'', 2'', 3'', and optionally to the radially outer surface of the spacer ribs 40 and 50. The strip portions 4a and 4b are arranged adjacent and perpendicular to each other. The first seal 10 using sealing compound extends to the entire extent of the strip portion 4a, (optionally except a short distance at the transition between the strip portions 4a and 4b). The second seal 15 using sealing compound extends to the entire extent of the second strip portion 4b, but may also, see Figures 4, 5, 6 and 8, only extend along a part of the strip portion 4b. Normally, the second seal 15 extends over the entire length of the second strip portion 4b—seen in the longitudinal direction of the strip 4, i.e. perpendicular to the paper—but this is not absolutely necessary. The strip portion 4b may, see Figure 9, be cut, since it has one or more incisions opposing the incision 17. Normally, the glass layer 3 faces the outside whereas the glass layer 1 faces the interior of the buildnig.

The structure of the panel provides a considerable reduction of the risk that the strip breaks the glass owing to high thermal fluctuation or to differences in temperature, since the sealing compound is capable of compensating for thermal stresses. Furthermore, a very easy mounting of the strip 4 is obtained, since the serviceman can work with relatively coarse tolerances when he is to position the strip

4. After having applied glue to the correct areas of the strip portions 4a and 4b, he can position the strip 4 against the insulating window during the first step of operation, whereby the strip portion 4a is almost completely positioned. Subsequently, during the second step of the operation the strip is turned whereby the portion 4b is positioned and the seal 15 is formed. Superfluous sealing compound, if any, may be easily brushed off at the glass layer 3. The panel furthermore possesses a high sound insulating capacity, i.e. a high sound reduction number, probably because the fitting of the glass layer 1 is considerably stronger than the fitting of the glass layers 2 and 3.

Figure 1 illustrates an embodiment of the panel wherein the spaces between the glass layers 1, 2 and 3 and the spacer ribs 40 and 50 are not completely filled up with sealing compound. Figure 2 illustrates said spaces completely filled up. The panel of Figure 3 almost corresponds to the panel of Figure 1, since the glass layers form an insulating window unit shown generally at 100 having two glass layers 1<sub>3</sub>, 2<sub>3</sub> with a spacer rib 40<sub>3</sub> plus a glass layer 3<sub>3</sub> loosely arranged.

In Figure 4 a second seal is provided only at 15a for the glass layer 3<sub>3</sub>. In Figure 5 it is arranged at the glass layer 2<sub>3</sub>. In both cases the seals 10 15a, 15b have a space 17 in between, wherein moisture, if any, may be accumulated.

The second seal may comprise sealing compound opposing both the glass layer 2 and the glass layer 3, cf. the seal portions 15b and 15e, the latter only indicated by a dotted line. Nothing prevents the sealing portion from opposing the glass layer 1 either, cf. the seal portion 15f also indicated by a dotted line. This is also the case in the arrangements shown in Figures 6 and 8.

The thickness of the second seal 15a, of Figure 4 is indicated by  $d_2$ , and the thickness of the first seal 10 is indicated by  $d_1$ . It is essential that  $d_2$  is four to six times greater than  $d_1$ .

In the arrangement of Figure 6 the second seal 15c comprises an extension 15c' extending somewhat into the edge zone 3'' on the outside of glass layer 3<sub>3</sub>. The seal 15c extends beyond the interface 19 of edge surface 13 and the said edge zone 3''. This extension is partly sideways supported by means of an inwards projection 22 of the strip portion 14b, that corresponds to the strip portion 4b of the arrangement shown in Figure 1. The strip portion 14b also comprises two other inwardly directed projections 23 and 24, whereby the projection 23 optionally may sideways support the sealing 15c. The pro-

jections 23 and 24 furthermore are adapted so as to "catch" the glass layers 2<sub>6</sub> and 3<sub>6</sub>, when the mounting strip during the mounting operation is fixed along the periphery 5 of the insulating window.

In Figure 7 the second strip 4b is shortened by having its end 4b' bent into the space between two glass layers 2<sub>7</sub> and 3<sub>7</sub>.

If desired, it is possible to use but two 10 mounting strips 4<sub>1</sub>, 4<sub>11</sub> arranged in parallel on the window as shown in Figure 10, whereby the manufacture of the panel is particularly inexpensive.

In Figure 8 an insulating window is 15 shown with but two glass layers 1<sub>8</sub>, 2<sub>8</sub> provided respectively with seals 10 and 15d also a spacer rib 40<sub>8</sub>.

The mounting strips 4 are preferably made of metal. The seal 10 normally comprises a cured adhesive or soldering material, whereas the seals 15, 15a, 15b, 15c, 15d and 15e are normally made of a yielding material such as thermoplastics or putty.

25 "Ready for mounting" here means "ready for mounting in the embrasure of a building; however, suitable fittings have to be mounted on the mounting strips".

The invention may be varied in many 30 ways without deviating from its scope. The first strip portion may for instance extend along an edge zone on the inside of an outer glass layer. Furthermore, only part of the space between on one side the glass 35 and the spacer ribs and on the other side the second strip portion may be filled up with sealing compound, e.g. the part opposing and extending between the glass layers 1 and 2 of Figure 2.

#### 40 WHAT I CLAIM IS:—

1. A glass panel ready for mounting, comprising at least two parallel glass panes of substantially equal size spaced apart to provide cavities therebetween, the panes 45 forming an insulating window unit, sealed in air-tight manner if required, the panel also comprising a number of mounting strips extending completely or partly along the periphery of the said parallel glass 50 panes, each individual mounting strip having a substantially L-shaped section comprising a first portion that extends along its entire length and abuts a first adhesive seal that seals an outer pane and 55 and a second portion that is integral with the first portion and abuts a second adhesive seal at the periphery of at least one of the glass panes, characterised in

that layer of sealing material in the said second seal is four to six times as thick 60 as the layer of sealing material in the said first seal, the first seal and the second seal both being made of resilient material so that the glass panes at the seals are only gently clamped. 65

2. The glass panel according to claim 1 in which the insulating window unit has spacer ribs between three or more glass panes, characterised in that the second seal partly fills the cavity between the panes 70 and the spacer ribs on one side and partly fills the strip portion on the other side.

3. The glass panel according to claim 1, characterised in that the second seal is disposed on the edge of a pane other than 75 the pane on which the first seal is provided, so that the cavity is formed between the two seals.

4. The glass panel according to one or more of claims 1-3, characterised in that 80 the first strip portion extends in the edge region on the outside of one of the outer panes of the panel.

5. The glass panel according to one or more of claims 1 to 4 for suspending in 85 an aperture in masonry, characterised in that mounting strips are provided in the two opposite peripheral parts of the insulating window unit.

6. The glass panel according to one or 90 more of claims 1 to 5, characterised in that the second strip portion has small projections extending between the glass panes without serving as spacer members between the panes of the insulating window. 95

7. The glass panel according to one or more of claims 1 to 6, characterised in that the second strip portion is shortened in that its end part is bent and projects into the cavity between the two panes. 100

8. The glass panel according to one or more of claims 1 to 7, characterised in that two of the glass panes used form a double insulating window and an additional pane is mounted at a distance from the window, 105 by means of the aforementioned mounting portions and seals.

9. A glass panel constructed and arranged substantially as herein described and as shown in the figures of the accom- 110 panying drawings.

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COMPLETE SPECIFICATION

3 SHEETS

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Sheet 1

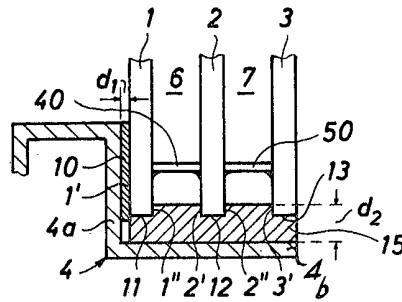


Fig. 1

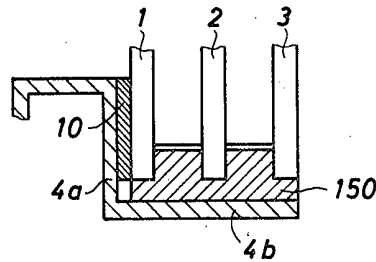


Fig. 2

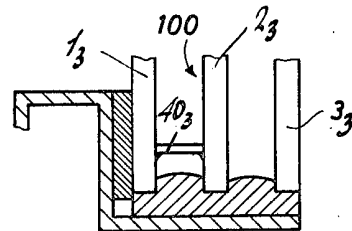


Fig. 3

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Sheet 2

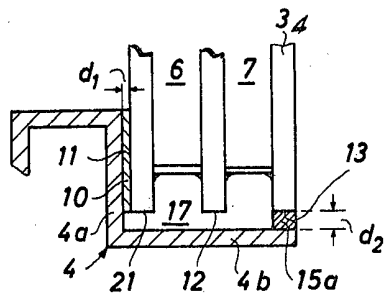


Fig. 4

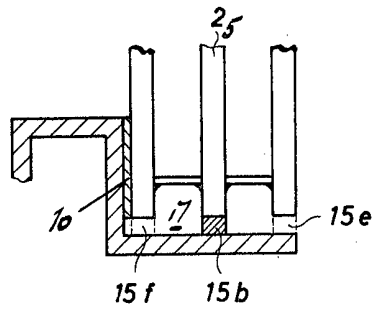


Fig. 5

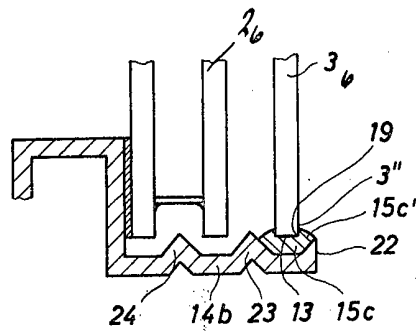


Fig. 6

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Sheet 3

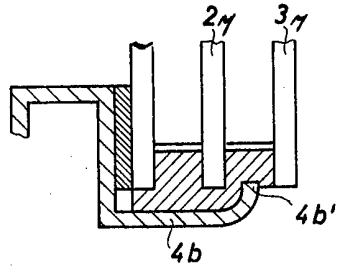


Fig. 7

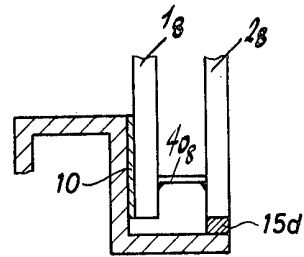


Fig. 8

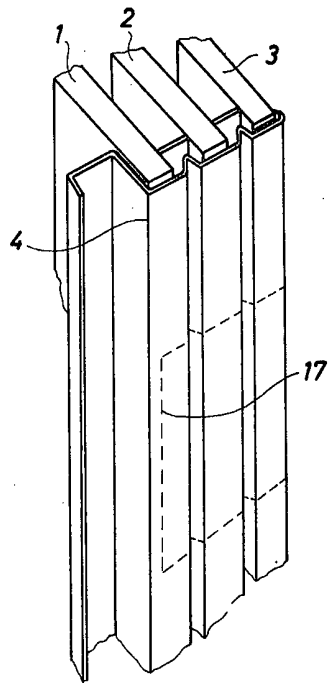


Fig. 9

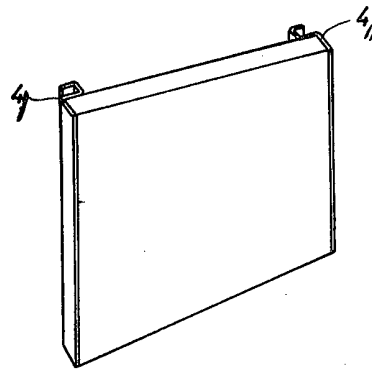


Fig. 10