

DECLARATION

I, Hilary Anne Kemmett, Technical Translator to S. Jones-Robinson & Co, Chartered Patent Agents, of 27 Imperial Square, Cheltenham, Gloucestershire GL50 1RQ, do hereby declare that I am well acquainted with the English and German languages, and I hereby certify that the following translation made by me is, to the best of my knowledge and belief, a true and correct translation into the English language of the published specification of European Patent No. 0333074.

Signed this 10th day of February 1993.

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The invention relates to structural glazing as described in the preamble of claim 1.

In the constructional method known by the technical term "structural glazing", glazing is fixed without framing at two or four sides to facade profiles such as facade uprights and facade horizontal members. The glazing comprises one pane or two or more panes of insulating glazing and is directly sealed on to the facade elements, where the sealing does not only have a sealing function but also provides static functions such as, for example, the transmission of wind loading (wind pressure and wind suction) and partially also bears the dead weight of the glazing units. Sealing is effected in particular using a one- or two-component silicon rubber.

In the event of fire it is required that the glass panes held by silicon in structural glazing must not fall out as intact pieces, which means that the glass pane or glass panes must be held and at least broken before the cement fails. Fire tests have shown that, in structural glazing, this cannot be achieved by the supporting sealing of silicon rubber alone.

Structural glazing is known from EP-A-O 251 834, where the glazing consists of a double glass pane. The glazing is fixed to parts of the facade by means of supporting seals. Together with the supporting seal, holding means are arranged in the edge area of the double glazing, which are formed to slope in the edge area of the outer pane. Correspondingly the edge area of the outer pane is also chamfered so that sealing material may be present between the outer pane and the holding means. The external seal of the holding means ends in front of the external plane of the outer pane. The intermediate space thus resulting is also filled with sealing material in order to obtain a continuous plane between the sealing material and the glass pane. The holding means ensure that the glass panes of the double glazing do not fall off as intact elements

in the event of fire, because the holding means either hold or at least break the double glazing.

With this known glazing there is a disadvantage in that by using the sealing material in the area of the holding means the visual impression of the structural glazing is adversely affected because the glass regions are interrupted by the joins filled with the sealing material.

It is an object of the present invention to provide structural glazing in which the holding means also arranged with the supporting sealing are no longer noticeable from a closer distance and thus do not adversely affect the visual appearance of the structural glazing.

The object is achieved with glazing of this type using the features given in the characterising part of claim 1.

The thin covering glass arranged on the outer side of the holders, which has the same coating as the actual facade pane or is coloured like the glass pane, cover the holders also arranged to hold the glazing. Thus only a thin, hardly noticeable dividing line remains visible between the covering glass arranged on the holders and the glass pane or glazing to be held.

According to preferred embodiments the pane or the outer pane in the case of multiple glazing is provided with bevels, with recesses or with through-holes increasing in size towards the outside, whereby the holders engage with the recesses, the bevels or the through-holes.

Preferably the bevel is formed over the whole thickness of the pane, or passes into an edge surface approximately vertical with respect to the edge surface. In the first case the covering glass or the covering pane on the holder must also be

provided with an inclined edge surface, whilst in the latter case the thin covering glass on the holder can be formed with vertical edge surfaces.

In the case of bevelled panes or glazing the holders are preferably of dovetail shaped cross-section on one or two sides.

According to a further preferred embodiment the recess is arranged on the front surface of the pane and the holders are of a L- or T-shaped cross-section. L-shaped holders serve to hold one pane or glazing, while T-shaped holders are fitted to hold adjacent panes or glazing.

When the panes are provided with conical through-holes, whose wider opening is arranged on the outer side of the pane or glazing, the holders are preferably shaped as a truncated cone or stepped.

In a further embodiment of the invention, the holders are formed as hollow bodies and are preferably extruded. Thus material and weight savings are possible by use of the holders.

The holders are preferably formed of metal such as aluminium and preferably high-grade steel, of plastics or ceramics.

The thin glass panes disposed on the outer side of the holders, which are preferably cemented with silicon, are coated or coloured.

Exemplary embodiments of the invention are described in more detail with the aid of the drawing as follows:

Figure 1 shows a front view of a row of glazing units arranged without framing on facade elements,

Figure 2 shows a section through line II-II of Figure 1,

Figure 3 shows a section through line III-III of Figure 1,
Figure 4 shows a section through line IV-IV of Figure 1,
Figure 5 shows a section through line V-V of Figure 1,
Figure 6 shows a section through line VI-VI of Figure 1,
Figure 7 shows an embodiment analogous to Figure 6, and
Figure 8 shows a section through the edge area of a structural glazing which is formed as insulating glazing.

Figure 1 shows a portion of a facade having facade uprights 10 and facade horizontal members 12, on which are fixed structural glazing units using supporting seals made of silicon rubber. The glazing units each comprise a pane 14, 16, 18 and 20 but insulating glazing made of two or more panes can also be used.

Figure 2 shows an edge area of the pane 14 and its fixing to the facade upright 10. A spacer 22 made of an elastomer is positioned between the facade upright 10 and the pane 14. The attachment of the pane 14 to the facade upright 10, which is formed of aluminium for example, is effected using a supporting seal 24 made of a two-component silicon rubber.

In order to ensure that, in the event of fire, the pane 14 is held to the facade elements until it breaks and falls in pieces from the facade, which means continuing to hold the pane 14 after the supporting seal 24 fails due to the effect of the fire, holders 26 are provided which engage with the corners of the pane 14. The pane 14 is therefore cut straight or curved at the corners and the edge surfaces 28 are chamfered or bevelled. The holder 26 has a correspondingly chamfered surface 30 which is fitted against the surface 28 of the pane 14. The holder 26, which is preferably formed of high-grade steel, is fixed by a screw 32 to the facade upright 10. The length of the holder 26 is less than the thickness of pane 14 and supporting seal 24 and spacer 22. The outer side of the holder 26 is provided with a covering glass 34, which is cemented to the holder 26 using, for example, silicon. The

covering glass 34 is provided with the same coating as the pane 14, or has the same colouring as the pane 14, so that from outside only a thin separating line 36 is visible between the covering glass 34 and the pane 14. The thickness of the covering glass 34 corresponds to the difference between the thickness of pane 14 and supporting seal 24 and the length of the holder 26. In the embodiment shown in Figure 2 the pane 14 is provided at the edge with a continuous inclined surface 28 and the covering glass 34 has a corresponding bevelled edge 38.

Figure 3 corresponds in substance to the arrangement shown in Figure 2. The pane 14 is fixed by using the supporting seal 24 to the facade upright 10. A spacer 22 made of an elastomer is provided between the pane 14 and the facade upright 10. The edge surface 40 of the cut off corner of the pane 14 has an edge surface 42 running perpendicularly to the plane of the pane 14, which passes into a bevelled or inclined surface 44. A holder 46 is fixed by a screw 48 to the facade upright 10. The holder 46 has an inclined surface 50 which is fitted against the chamfered or bevelled surface 44 of the pane 14. The outer side of the holder 46 is provided having a covering glass 52, which has a surface 54 running perpendicularly which is in contact with the surface 42 running perpendicularly to the pane 14. The covering glass 52 has the same colouring or coating as the pane 14 so that between the covering glass 52 and pane 14 only a thin dividing line 56 is visible.

Figure 4 shows the pane 18 which is fixed to a facade upright 10 using a supporting seal 62 with the interposition of a spacer 60 made of an elastomer. In order to hold the glazing in the event of fire, even after failure of the supporting seal, until a breakage of the pane 18 occurs, the pane 18 has a rectangular recess 64 in the edge area in which a flange 66 of the holder 68, preferably formed of high-grade steel, engages. The holder 68 is fixed to the facade upright 10 by means of

screws 70. The thickness of the flange 66 of the holder 68 is less than the height of the side surface 72 of the recess 64, so that a covering glass 74, which is cemented to the holder 68 using silicon for example, is flush with the glazing. The covering glass 74 has the same colouring or coating as the pane 18 so that only the thin dividing line 76 between the covering glass 74 and the pane 18 is visible. The recess 64 is formed rectangularly but recesses in the shape of the segments of a circle and correspondingly formed holders can also be used.

Figure 5 shows the formation of the edges of the panes 18 and 20 which are both formed over the whole height and on opposite side edges, with bevels 80 and 82. The glazing or pane 18 is fixed to the facade upright 10 using a supporting seal 84 with the interposition of a spacer 86 made of an elastomer on a facade upright 10, while the pane 20 is fixed with a supporting seal 88 and the interposition of a spacer 90 to the facade upright 10. Between the panes 18 and 20 a holder 92 is provided which extends up the whole height of the glazing 28. The holder is formed as a dovetail in cross-section and is fixed by means of screws 94 to the facade upright 10. The inclined longitudinal edges 96 and 98 of the holder 92 lie against the inclined surfaces 80 of the pane 18 or 82 of the pane 20. The thickness of the holder 92 is selected such that, after applying a covering glass 100 to the outer side of the holder 92, a transition line between the panes 18 and 20 and the covering glass 100 is achieved, so that only thin dividing lines 102 and 104 are visible between the pane 18 and the covering glass 100 or the pane 20 and the covering glass 100. The covering glass 100 has the same colouring or coating as the panes 18 and 20.

Figure 6 shows the pane 16 which is fixed to a facade upright 10 with a supporting seal 110. Moreover between the pane 16 and the facade upright 10 a spacer 112 made of an elastomer is

positioned. The pane 16 is formed with a conical through-hole 114 whose larger opening lies on the outer side of the pane 16. In the through-hole 114 a conical holder 116 is positioned which is fixed by means of a screw bolt 118 and a nut 120 to the facade upright 10. The screw bolt thus goes through the supporting seal 110. On the outer side of the conical holder 116 a covering glass 122 is cemented which is flush with the outer surface of the pane 16 and has the same colouring or coating as the pane 16 so that only a thin circular dividing line 124 is visible.

Figure 7 shows an embodiment in which a pane 130 is also held to a facade upright 10. The pane 130 is fixed to the facade upright 10 using a supporting seal 132 with the interposition of a spacer 134 made of an elastomer. In the pane 130 a through-hole 136 is formed with an inner portion 138 of smaller diameter and an outer section 140 of greater diameter. Into this stepped through-hole 136 a holder of T-shaped cross-section is inserted which is held by a screw bolt 144 and a nut 146 to the facade upright 10. On the outer side of the head 148, that is the greater diameter part of the holder 142, a covering glass 150 is cemented which is flush with the outer surface of the pane 130 and has the same colouring or coating as the pane 130. This holder 142 also ensures that after failure of the supporting seal 132 in the event of fire the pane 130 is held to the facade upright 10 until it breaks and falls in pieces from the facade.

Whilst the holding of individual glazing units to facade elements has been described with the aid of Figures 2 to 7, glazing 160 is shown in Figure 8 which consists of an inner pane 162 and an outer pane 164 and which is formed as insulating glazing. Between the panes 162 and 164 a spacer 166 made of an elastomer is positioned. The connection of the panes 162, 164 is effected using a supporting seal 168. Between the facade upright or facade horizontal member 170 and

the inner side of the pane 162 of the glazing 160 a spacer 172 made of an elastomer is positioned. The glazing 160 is fixed to the facade upright 170 using a supporting seal 174 made of a silicon rubber. The outer pane 164 of the glazing 160 is formed with an inclined bevel 176. To secure the glazing 160 in event of fire, a holder 178 is provided which is formed as a hollow box profile made of extruded aluminium for example. The holder 178 is fixed with screws 180 to the facade element 170 and has on one longitudinal side an inclined nose 182 which lies against the oblique surface 176 of the pane 164. On the outer side the holder 178 is provided with a covering glass 184 which is flush with the outer surface of the pane 164 of the glazing 160. The covering glass 184 has the same colouring or coating as the pane 164, so that only a thin dividing line 186 is visible between the holder 178 and the glazing 160.

Claims

1. Structural glazing having edge areas of one- or multiple-pane glazing which is fixed using supporting seals, in particular made of silicon rubber, to facade uprights, horizontal members or sectional facades, the glazing being held against the supporting seals by means of holders, characterised in that the holders (26; 46; 68; 92; 116; 142; 178) are arranged across the glazing in the area of the corners having the shape of the edges, or on two or four sides, and that on the outer side of the holders (26; 46; 68; 92; 116; 142; 178) thin covering glass (34; 52; 74; 100; 122; 150; 184) is located having the same colour as the pane (12; 14; 16; 18; 20; 130) or, in case of multiple glazing, as the outer pane (164) and the outer face of the thin covering glass (34; 52; 74; 100; 122; 150; 184) is flush with the outer surface of the pane (12; 14; 16; 18; 20; 130) or, in the case of multiple glazing, the outer pane (164).
2. Glazing according to Claim 1, characterised in that the pane (12; 14; 16; 18; 20; 130) or, in the case of multiple glazing, the outer pane (164) is bevelled (28; 40; 82; 176), recessed (64) or has through-holes (114; 136) widening towards the outside, whereby the holders (26; 46; 68; 92; 116; 142; 178) engage with the bevels (28, 40; 82; 176), the recesses (64) or the through-holes (114; 136).
3. Glazing according to Claim 2, characterised in that the bevel (28; 82) is formed over the whole thickness of the pane (14; 20).
4. Glazing according to Claim 2, characterised in that the bevel (40) passes into an edge surface (42) approximately perpendicular to the plane of the pane (14).



5. Glazing according to Claim 3 or 4, characterised in that the holders (26; 46; 92; 116; 178) are designed with an approximately dovetail or half-dovetail shaped cross-section.
6. Glazing according to Claim 2, characterised in that the recess (64) is located on the front surface of the pane and the holders (68) are formed with an L- or T-shaped cross-section.
7. Glazing according to Claim 1 or 2, characterised in that the holders (116; 142) are formed in the shape of a truncated cone or with a T-shaped cross-section and the through-holes (114; 136) are formed as cones, or are stepped.
8. Glazing according to any one of Claims 1 to 7, characterised in that the holders (178) are formed as hollow bodies.
9. Glazing according to Claim 8, characterised in that the holders (178) are extruded.
10. Glazing according to any one of Claims 1 to 9, characterised in that the holders (26; 46; 68; 92; 116; 142; 178) are formed of metal, such as aluminium and in particular high-grade steel, of plastics or of ceramics.
11. Glazing according to Claim 1, characterised in that the covering glass (34; 52; 74; 100; 122; 150; 184) is coated or coloured.

