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(54) **METHOD FOR ATTACHING A GLASS ELEMENT TO A FRAME, AND GLAZING**

(57) Method for attaching a glass element (4) to a frame (2) provided with a glass opening (3), in which method the glass element (4) is fitted against the glazing rabbet (5) on an edge of the glass opening (3), and the glass element (4) is attached to the frame (2), **characterized** in that the glass element (4) is preattached to the frame (2) so that hot-setting adhesive is arranged on the surface of the glazing rabbet (5), and the glass element (4) is adjusted against the glazing rabbet (5) so that hot-setting adhesive is between the glass element (4) and the frame (2).

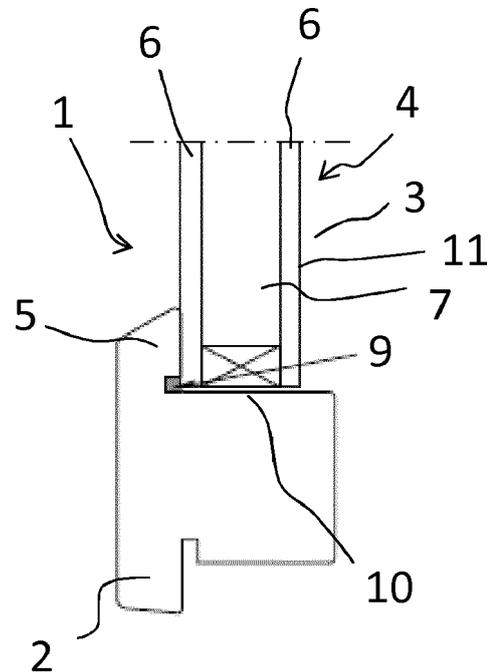


Fig. 1

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Description

[0001] The object of the invention is a method for attaching a glass element to a frame. The object of the invention is also glazing.

[0002] Doors and windows typically comprise glazing, which comprises a frame, to which a plate glass, or other glass element, is attached. Typically, a glass element is attached to a frame with a glazing bead, which is attached to the frame, for example by nailing, so that the glass element is between the glazing bead and the glazing rabbet of the frame. A problem with this solution is that attachment of glazing beads requires numerous working phases, which are difficult to automate. It is possible to attach a glass element to a frame also with silicon, wherein the problem is a long curing time of silicon, during which time the frame and the glass element cannot be transferred, for example by lifting from the glass element.

[0003] The object of the present invention is to provide an improved method and glazing with which the above described problems can be reduced.

[0004] The objects of the invention are achieved by a method according to claim 1 for attaching a glass element to a frame provided with a glass opening. In the method according to the invention the glass element is fitted against a glazing rabbet on the edge of the glass opening, and the glass element is attached to the frame. Before actual attachment the glass element is preattached to the frame so that hot-setting adhesive is arranged on the surface of the glazing rabbet, and the glass element is fitted against the glazing rabbet so that the hot-setting adhesive is between the glass element and the frame.

[0005] The glazing according to the invention comprises a frame with a glass opening, on the edge of which there is a glazing rabbet against of which a glass element is fitted. Hot-setting adhesive is arranged between the glazing rabbet and the glass element, with which hot-setting adhesive the glass element is preattached to the frame.

[0006] Significant advantages are achieved with the solution according to the invention. In the solution according to the invention a glass element is first preattached to a frame with hot-setting adhesive, which cools and cures fast, in about 10-30 seconds. Hot-setting adhesive practically cools and cures as soon as the glass element is fitted against a glazing rabbet, wherein glass reaches the hot-setting adhesive and cools it. After curing of the hot-setting adhesive the glazing, i.e. the frame and the glass element preattached to it, can be transferred from the glass element by lifting to the next working phase, for example to gluing phase, where the glass element is actually attached to the frame, for example with silicon. Alternatively, the actual gluing of the glass element can take place at the same working place as the hot-setting adhesive gluing takes place, wherein there is more time for hot-setting adhesive to cool and cure, as the applying of the actual glue takes time. The frame and the glass element can be transferred from the glass el-

ement by lifting to the next working stage and/or packed before curing of the actual adhesive, since preattachment with hot-setting adhesive keeps the glass element attached to the frame. This saves time needed for preparation of a frame, because there is no need to wait for curing of the actual adhesive before the frame is transferred by lifting. The method according to the invention is also easy to automate. The solution according to the invention can be used in connection with several types of glazings provided with a frame.

[0007] According to one embodiment of the invention a recess or recesses, such as a groove, is provided with a glazing rabbet of the frame, into which recess hot-setting adhesive is applied so that hot-setting adhesive areas are at a distance from each other. A glass element is fitted on the recess/recesses, wherein the additional hot-setting adhesive flows into the recess. In this way overflowing of hot-setting adhesive between the glass element and the frame is avoided. The depth and/or width of the recess can be formed so that hot-setting adhesive cures in the recess as fast as desired. Also the thermal conductivity of the material of the frame has effect on the curing rate of the hot-setting adhesive. If the thermal conductivity of the frame is high, the recess can be made to be deeper than normally, wherein the hot-setting adhesive in the recess cures slower.

[0008] In the following, the invention will be described in more detail by the aid of examples with reference to the attached drawings, in which

fig. 1 presents a cross section of the lower frame of the glazing according to one embodiment of the invention, and a glass attached to the lower frame,

fig. 2 presents a cross section of the lower frame of the glazing according to a second embodiment of the invention, and a glass attached to the lower frame, and

fig. 3 presents a front view of the glazings of figs. 1 and 2.

[0009] Figs. 1-3 present glazings 1 comprising a frame 2 with a glass opening 3, into which a glass element 4 is fitted. The glass element 4 is attached to the frame 2. There is a glazing rabbet 5 on the edge of the glass opening 3, against which glazing rabbet 5 the glass element 4 is fitted. The glazing rabbet 5 extends towards the inner part of the opening 3 edged by the frame 2.

[0010] In the embodiment according to fig. 1, the glass element 4 is so called 2K-glass element comprising two plate glasses 6 having a gas tight space 7 between them. There is gas, such as argon, in the space 7 improving thermal resistance of the glass element 4. The glasses 6 are separated from each other with a parting strip 8. Alternatively, the glass element 4 can comprise three or more glasses 6, which are arranged one after the other, between which there are gas tight spaces 7 and which

are separated from each other with parting strips 8.

[0011] In the embodiment of fig. 2, the glass element 4 is a single plate glass 6. The glazings 1 of figs. 1 and 2 can be a part of the window. The glazing of fig. 1 can be an inner frame of the window, and the glazing of fig. 2 an outer frame of the same window. Although only a lower part of the frame 2 is presented in figures 1 and 2, the frame 2 comprises also an upper part and two side parts into which the glass element 4 is attached. Alternatively, the glazing 1 can be a door, into frame of which the glass element is attached. The frame comprises a glass opening having a glazing rabbet 5 on the edge of it, against of which glazing rabbet 5 the glass element is fitted.

[0012] The frame 2 comprises one or more recesses 9 in a place where the glass element 4 is fitted against the frame 2, such as in the glazing rabbet 5. Typically, the recess 9 is a longitudinal groove extending longitudinally to the part forming the frame. The groove can be in all the parts of the frame (in lower part, in upper part and in side parts) or only in some of the parts of the frame (e.g. in lower and upper parts). Dimensions of the groove, such as depth and/or width, are selected to be suitable for the embodiment, inter alia, according to the thermal conductivity of the material of the frame.

[0013] There is hot-setting adhesive in the recess or recesses 9 with which hot-setting adhesive the glass element 4 is preattached to the frame 2. Hot-setting adhesive is molten above a certain temperature and it cures when the temperature falls. Hot-setting adhesive is arranged dropwise in the recess 9 so that the areas comprising hot-setting adhesive are at a distance from each other. The distance between the adjacent hot-setting adhesive areas or hot-setting adhesive drops in the recess 9 is at least 20 cm, typically 30-40 cm. The distance between the adjacent hot-setting adhesive areas depends, inter alia, on the mass of the frame 2 and on the characteristics of the hot-setting adhesive. It is important that there is an area between the adjacent hot-setting adhesive areas in the recess 9 without hot-setting adhesive. Then the additional hot-setting adhesive flows into the recess 9 and does not get squeezed between the glass element 4 and the surface of the frame 2.

[0014] The glass element 4 is attached to the frame 2 with adhesive suitable for the purpose, such as silicone, advantageously sg silicone (structural glazing silicone). Adhesive is arranged between the glass element 4 and the frame 2, e.g. in the area of the inner surface 10 of the frame. Additionally, silicone is arranged on the corner between the front surface 11 of the glass element 4 and the inner surface 10 of the frame. The inner surface 10 of the frame borders the glass opening 3. The inner surface 10 is perpendicular to the front surface 11 of the glass element.

[0015] Glazing 1 according to figures 1 and 2 is produced as follows. The glazing rabbet 5 of the frame is provided with a recess 9 or recesses, such as a groove, which extends in the longitudinal direction to the part

forming the frame 2. Dimensions of the recesses 9, such as width and/or depth, are selected so that hot-setting adhesive in the recess 9 cools and cures as fast as desired. The greater the depth of the recess 9, the slower the hot-setting adhesive cools and cures in the recess 9. The width and/or the depth of the recess 9 is selected also on the basis of the thermal conductivity of the material. The thermal conductivity of the frame 2, which is fabricated, e.g. from wood, is lower than thermal conductivity of the frame 2 fabricated from aluminium, wherein hot-setting adhesive in the recess 9 of the wooden frame 2 cools slower. Then the desired cooling rate of hot-setting adhesive is reached with smaller dimensions of the recess 9 compared to the frame of aluminium.

[0016] The frame 2 is set on a base, e.g. on a horizontal base. Silicone mass is applied on the surface of the glazing rabbet 5 of the frame 2, with which silicone mass the space between the glass element 4 and the frame 2 is sealed. Hot-setting adhesive is applied on the surface of the glazing rabbet 5, with which hot-setting adhesive the glass element 4 is preattached to the frame 2. In the embodiment according to the drawings this takes place so that hot-setting adhesive is arranged on the recess 9 or recesses 9 of the glazing rabbet 5 before the glass element 4 is set in its place against the glazing rabbet 5. Hot-setting adhesive is applied over the whole height of the recess 9 so that the hot-setting adhesive layer extends at least on the level of the edges of the recess. Hot-setting adhesive is applied dropwise on the recess 9 so that hot-setting adhesive drops are at a distance from each other. The distance between adjacent hot-setting adhesive drops depends on the mass of the frame 2. The greater the mass of the frame 2, the smaller is the distance between the hot-setting adhesive drops. The distance between adjacent hot-setting adhesive areas or hot-setting adhesive drops is at least 20 cm, typically 30-40 cm.

[0017] Hot-setting adhesive is brought into recess 9, e.g. by a glue gun. Adhesive is heated in the glue gun, where it melts. The molten adhesive is led from the nozzle of the glue gun into a desired place in the recess 9.

[0018] After the appliance of hot-setting adhesive the glass element 4 is set against the glazing rabbet 5. The glass element 4 is set against hot-setting adhesive in the recess 9, wherein the additional hot-setting adhesive flows into the recess 9 and does not get squeezed between the glass element 4 and the surface of the frame 2 next to the recess 9.

[0019] Hot-setting adhesive cools and cures in the recess 9 and preattaches the glass element 4 to the frame 2. The depth of the recess determines the cooling and curing rate of hot-setting adhesive. The deeper the recess 9, the slower hot-setting adhesive cools and cures.

[0020] After the hot-setting adhesive is cured, the glass element 4 is preattached to the frame 2. The glazing 1, i.e. the frame 2 and the glass element 4 attached to it, are transferred to the next handling place or handling phase, e.g. by lifting. This takes place so that suction

pads or other lifting elements are attached to the glass element 4, with which suction pads or other lifting elements the glass element 4 and the frame 2 are lifted and transferred to the desired place.

[0021] Thereafter, adhesive, e.g. silicone, is applied between the glass element 4 and the frame 2, with which adhesive the glass element 4 is actually attached to the frame 2. This can be carried out in the same or in the different handling place than the gluing with hot-setting adhesive. Silicone is so-called sg silicone (structural glazing silicone) from its type. Silicone is applied also on the corner between the glass element 4 and the inner surface 10 of the frame 2. Silicone gluing cures and reaches its gluing strength typically within a few hours. Before the adhesive, i.e. silicone, is cured and/or before the gluing strength is reached, the glazing 1 is transferred to the next handling place or handling phase, in which the glazing is e.g. manufactured to the desired finished product (e.g. a window) and/or packed. The glazing 1 is transferred from the glass element 4 by lifting to the next handling place or handling phase. This takes place so that suction cups or other lifting elements are attached to the glass element 4, with which suction cups or other lifting elements the glass element 4 and the frame 2 are lifted and transferred to the desired place.

Claims

1. Method for attaching a glass element (4) to a frame (2) provided with a glass opening (3), in which method the glass element (4) is fitted against a glazing rabbet (5) on an edge of the glass opening (3), and the glass element (4) is attached to the frame (2), **characterized in that** the glass element (4) is preattached to the frame (2) so that hot-setting adhesive is applied on the surface of the glazing rabbet (5), and the glass element (4) is fitted against the glazing rabbet (5) so that hot-setting adhesive is between the glass element (4) and the frame (2).
2. Method according to claim 1, **characterized in that** the glazing rabbet (5) is provided with a recess (9), such as a groove, into which hot-setting adhesive is arranged.
3. Method according to claim 2, **characterized in that** hot-setting adhesive drops are applied in the recess (9) at a distance from each other.
4. Method according to claim 1, **characterized in that** after the gluing with hot-setting adhesive, the adhesive, such as silicone, is applied between the glass element (4) and the frame (2), with which adhesive the glass element (4) is actually attached to the frame (2).
5. Method according to any of the preceding claims, **characterized in that** adhesive, such as silicone, is arranged on a corner between the front surface (11) of the glass element (4) and the inner surface (10) of the frame (2), with which adhesive the glass element (4) is attached to the frame (2).
6. Method according to any of the preceding claims, **characterized in that** the recess (9) is formed in the glazing rabbet (5), the depth of which recess (9) is selected so that hot-setting adhesive in the recess (9) cools as fast as desired.
7. Method according to any of claims 4 or 5, **characterized in that** the glass element (4) and the frame (2) are transferred to the next handling place or handling phase before the adhesive is cured.
8. Glazing (1), comprising a frame (2), which is provided with a glass opening (3) on an edge of which there is a glazing rabbet (5), against of which the glass element (4) is fitted, **characterized in that** hot-setting adhesive is arranged between the glazing rabbet (5) and the glass element (4) with which hot-setting adhesive the glass element (4) is preattached to the frame (2).
9. Glazing (1) according to claim 8, **characterized in that** glazing rabbet (5) is provided with a recess (9), such as a groove, containing hot-setting adhesive and against of which the glass element (4) is fitted.
10. Glazing (1) according to claim 8 or 9, **characterized in that** silicone is arranged between the glass element (4) and the frame (2) and/or on a corner between the front surface (11) of the glass element (4) and inner surface (10) of the frame (2), with which silicone the glass element (4) is attached to the frame (2).

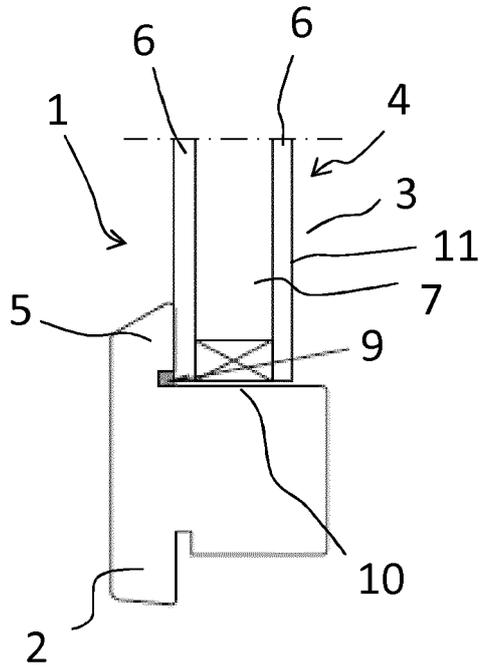


Fig. 1

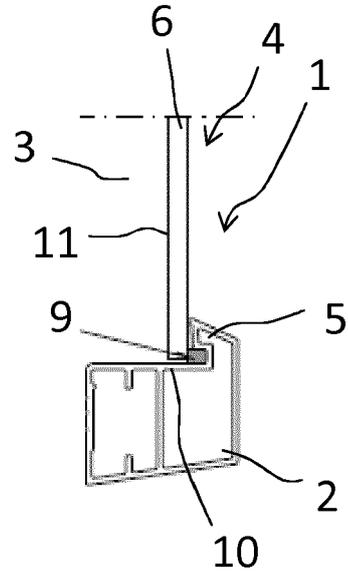


Fig. 2

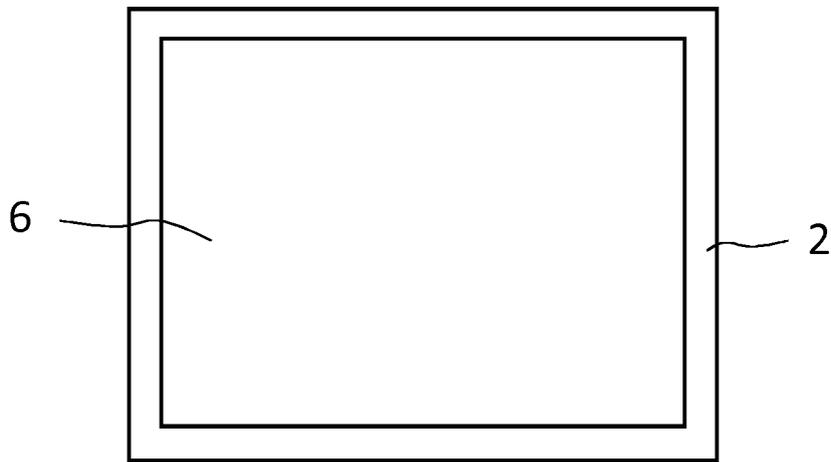


Fig. 3



EUROPEAN SEARCH REPORT

Application Number
EP 18 15 7983

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Place of search		Date of completion of the search	Examiner
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