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(54) **METHOD FOR GLAZING A DOOR BLADE AND DOOR**

VERFAHREN ZUM VERGLASEN EINES TÜRBLATTS UND TÜR

PROCÉDÉ POUR LE VITRAGE D'UN BATTANT DE PORTE ET PORTE

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Description

TECHNICAL FIELD

[0001] This invention relates to a method for glazing a door blade. The invention also relates to a door comprising a door blade and glazed unit fitted into an opening cut out in the door blade. The invention is particularly relevant in the field of security doors.

BACKGROUND ART

[0002] Doors are commonly composed of a number of layers, which from the outside of a building in general structure terms comprise: a surface layer which constitutes an outside intended to face away from the building, a reinforcing layer against the surface layer; an insulating layer against the reinforcing layer; a reinforcing layer against the insulating layer; and a surface layer which constitutes an inside of the door intended to face into the building.

[0003] The glazing of doors means that a glazed unit is fitted into a through-opening made in the door. A piece of the insulation surrounding the opening is replaced by a peripheral wooden strip. The glazed unit is fitted into the opening defined by the wooden strip and is thereafter held in place between an outer strip and an inner strip. The outer strip is fixed to the wooden strip from the outside and the inner strip is fixed to the wooden strip from the inside. Document WO 2013/077754 A1 discloses a method for embedding glass lites into door slabs.

[0004] One problem with the method of manufacture and the device described is that the insulation must be adjusted and the peripheral wooden strip has to be fitted into the freed space. This results in complex and time-consuming production.

[0005] There is thus a need for an improved, simplified manufacture of glazed doors removing the above mentioned disadvantages, while retaining resistance to breaking.

SUMMARY OF THE INVENTION

[0006] An object of the present invention is to provide an inventive method for glazing a door where the previously mentioned problem is at least partly avoided. This object is achieved by the features of claim 1.

[0007] The invention concerns a method for glazing a door blade, the method comprising:

- creating an opening in the door blade, the opening being delimited by an internal edge of the door blade,
- placing a glazed unit in the opening such that a slot is formed between a periphery of the glazed unit and the internal edge of the door blade,
- filling the slot at least partly with an adhesive, thus forming a joint between the periphery of the glazed unit and at least a portion of the internal edge of the

door blade, and

- allowing the adhesive to cure.

[0008] The internal edge delimiting the door blade is simply constituted by the interior of the door blade which is revealed when creating the opening. This method does not require that the opening in the door blade is lined with a wooden strip or anything else. Neither does any insulation have to be removed in order to create room for a wooden strip or any other liner. Consequently, the method is simple and fast. It also allows for flexibility as the opening created in the door blade can be adapted to a desired shape of the glazed unit.

[0009] The adhesive joint results in a strong and reliable fitting of the glazed unit to the door blade. The adhesive joint does not allow the glazed unit to be lifted away or pressed through the door blade. Therefore, a further advantage of the method is that the resulting glazed door has a good resistance to breaking. Consequently, the method is applicable also for glazing of security doors.

[0010] As used herein, the term "filling the slot at least partly with an adhesive" means that the slot is at least partly filled with adhesive in a direction along the periphery of the glazed unit and/or in a direction transversal to the periphery of the glazed unit, referred to as the z direction in the figures. In these directions, the joint may be narrower than the slot or intermittent. However, in a direction perpendicular to the periphery of the glazed unit, the slot has to be wholly filled with adhesive in order to create a joint that actually joins the glazed unit with the door blade.

[0011] Further advantages are achieved by implementing one or several of the features of the dependent claims.

[0012] In one example of the invention, the slot is wholly filled with an adhesive. Filling the slot whole with an adhesive produces a large contact surface between the adhesive joint and the glazed unit and the door blade respectively. A larger contact surface increases the strength of the joint. It is also possible to have a joint that is narrower than the slot in the z direction, but which wholly fills the joint in the x and y directions (as defined in the figures).

[0013] In one example of the invention, the door blade comprises an insulation between a first surface layer and a second surface layer, and the internal edge comprises at least a portion of the insulation. Insulation makes the door less permeable to e.g. cold, heat, and sound. The insulation can be made of e.g. cellular plastic, wood fibre, or any other material with good insulating properties.

[0014] The internal edge of the door blade comprising at least a portion of the insulation means that the adhesive filled into the slot adheres directly to the insulation. This is advantageous, since no time-consuming lining of the opening in the door blade is required.

[0015] In one example of the invention, the door blade comprises a reinforcing layer. A reinforcing layer makes

the door blade more burglar proof as it improves resistance to breaking through the door by means of e.g. kicking or tampering using a crowbar, axe, or hammer.

[0016] In one example of the invention, the reinforcing layer is positioned within the insulation. This positioning of the reinforcing layer prolongs the time required to break through the door as the reinforcing layer becomes less accessible to a burglar trying to chop his/her way through the door. The burglar first has to get through the insulation to get to the reinforcing layer before he can start working on destroying it.

[0017] In one example of the invention, the reinforcing layer is a net. A net made of a strong material is lightweight while still providing good resistance to breaking. Hence, an advantage of using a net as reinforcing layer is that the door blade gets more lightweight and thus easier to handle than if a solid reinforcing layer such as a sheet metal is used as reinforcing layer. A net is thin and may be positioned within the insulation hardly without stealing any space. Hence, the amount of insulating material does not have to be significantly decreased, which allows for a good insulation value of the door blade. Moreover, a reinforcing layer in the shape of a net instead of a sheet metal makes it easier to create an opening in the door blade during the act of glazing the door. This is because it is easier to e.g. mill or cut through a net than through a solid sheet metal.

[0018] A reinforcing layer in the form of a net positioned within the insulation provides a barrier which is tough and tenacious barrier to break through.

[0019] In one example of the invention, the reinforcing layer is a fibre-glass net. Fibre-glass is a lightweight, extremely strong, robust and cheap material. Its bulk strength and weight properties are also very favourable when compared to metals, and it can be easily formed using moulding processes.

[0020] Alternatively, the net could be made of a metal.

[0021] In one example of the invention, the reinforcing layer is a sheet metal. The sheet metal may be for example aluminium or steel.

[0022] In one example of the invention, the slot is 1-100 millimetres wide, more specifically 5-15 millimetres wide. The width of the slot may vary within the stated ranges along the entire extension of the slot. The slot is the space between the periphery of the glazed unit and the internal edge of the door blade which is at least partly filled with an adhesive during the glazing process.

[0023] In one example of the invention, the joint is resilient. This is achieved by using an adhesive which is resilient when cured. A resilient joint provides a somewhat resilient mounting of the glazed unit, making it even more resistant to shock. The ductility of a resilient joint also makes it even harder for a burglar to remove the glazed unit from the door blade.

[0024] Alternatively, the joint could be hard. This is achieved by using an adhesive which is hard after curing. A hard joint provides a mechanical anchorage of the glazed unit.

[0025] The adhesive has the properties to adhere both to the material of the periphery of the glazed unit and the material of the internal edge of the door blade. The material of the periphery of the glazed unit is for example wood, plywood, wooden composite, other composite materials, metal, plastic, fibre board, or a combination of materials. The internal edge is constituted by one or many of the materials provided in the door blade. A person skilled in the art attempting to use the disclosed method should take into consideration the materials of the periphery of the glazed unit and the internal edge when selecting adhesive.

[0026] In one example of the invention, the adhesive is a modified silicone polymer. Modified silicone polymer is elastic and tenacious when cured, like an elastic rubber band, which makes it very hard for a burglar to remove the glazed unit from the door blade since the resilient properties of the joint hinders cracking of the joint and thereto attached materials. Alternatively, silicone glue, which is also an elastic and tenacious adhesive, could be used.

[0027] In one example of the invention, the opening in the door blade is created through milling. Milling allows for the creation of an opening of precise size and shape. However, there are other alternatives than milling out the opening as described in conjunction with Figure 6 in the detailed description.

[0028] In one example of the invention, the opening is created such that the resulting internal edge is flat. Being flat means that the internal edge is flat in z direction, but may take any shape in the xy plane. The x, y, and z directions are defined in the figures. A flat edge is easy and quick to create.

[0029] In one example of the invention, the opening is created such that the resulting internal edge is provided with at least one elevation. The at least one elevation protrudes from the internal edge in the z direction, and extends longitudinally in a direction along the internal edge in the xy-plane. The elevation provides additional support in a lateral direction (referred to as the z direction in the figures) for the glazed unit, making it even harder to press the glazed unit out from the door blade. Preferably, the glazed unit is positioned relative the elevation such that a vertical slot is provided between the side of the glazed unit and the elevation. This vertical slot is preferably also filled with adhesive.

[0030] In one example of the invention, the opening is created such that the resulting internal edge is provided with two elevations which define a groove in the z-direction. The groove is positioned between the elevations. Being a part of the slot, the groove is also filled with adhesive. The presence of a groove improves the strength of the attachment of the glazed unit to the door blade.

[0031] Other shapes of the internal edge in the z-direction are also possible, for example curved, waved, inclined, chamfered, or zigzag-shaped. The internal edge may also take various shapes in a direction along the internal edge, i.e. the xy-plane, for example zigzag-

shaped, curved, waved, chamfered, or smooth with or without projections of various geometries.

[0032] In one example of the invention, the method further comprises the step of fixing at least one frame strip to the glazed unit and the door blade such that the frame strip overlaps the slot and partially overlaps the glazed unit and the door blade and such that at least one cavity is formed between the frame strip and the glazed unit and/or the door blade. The at least one cavity is in communication with the slot between the periphery of the glazed unit and the internal edge of the door blade.

[0033] The at least one frame strip can be applied either before or after filling adhesive into the slot. If the frame strip is applied before, adhesive is then filled into the slot to such an extent that the adhesive also flows into the at least one cavity. If the at least one frame strip is applied after filling adhesive into the slot, excessive adhesive in the slot will flow into the at least one cavity. In both cases, the resulting adhesive joint will extend at least partly into the at least one cavity.

[0034] One advantage of using a frame strip is that it hides the adhesive joint, which joint may be considered aesthetically unpleasing. A further advantage is that the at least one at least partly adhesive-filled cavity provides a wedging effect which results in that the glazed unit is held even more firmly in the door blade.

[0035] In one example of the invention, a first frame strip is fixed to a first side of the glazed unit and the door blade and a second frame strip is fixed to a second side of the glazed unit and door blade. As used in this context, the terms "first side" and "second side" refer to the two largest delimiting surfaces of the door, for example the first side may be the outside facing away from a building and the second side may be the inside facing into the building if the door is an exterior door. This embodiment has the advantage of concealing the joint from most viewing angles, hence making the glazed door blade more aesthetically pleasing. A further advantage is that adhesive-filled cavities are provided on both sides of the glazed unit, which increases the wedging effect. Consequently, the robustness of the attachment of the glazed unit to the door blade is further increased.

[0036] In one example of the invention, the method further comprises the step of sealing the at least one cavity with a sealing strip. A sealing strip prevents fluids and moisture from entering into the cavity from where it possibly may migrate further into the door blade. As an alternative to providing a sealing strip, one may over-fill the cavity with adhesive, such that the adhesive wells out from the cavity, and then cut clean along the frame strip when the adhesive has semi-cured.

[0037] In one example of the invention, the slot is constituted by a plurality of sub slots. Under some circumstances, the provision of sub slots may facilitate the glazing process. For example, material separating the sub slots may contribute to temporarily hold the glazed unit in place before the adhesive has cured.

[0038] A further object of the present invention is to

provide a glazed door with simplified manufacture. This object is achieved by the features of claim 21.

[0039] The invention concerns a door comprising a door blade and a glazed unit fitted to the door blade according to the method described above. An advantage of such a door is that it is easy, quick and cheap to manufacture. A further advantage is that it provides good resistance to breaking and enables fulfilment of the requirements for security resistance classing.

[0040] In one example of the invention, the door is an exterior door.

BRIEF DESCRIPTION OF THE DRAWINGS

[0041] In the detailed description of the invention given below reference is made to the following figures, in which:

Figure 1 shows a schematic perspective view of a first embodiment of a door having a glazed unit fixed in the door blade,

Figure 2 shows a cross-sectional detail of a first embodiment of a door blade fitted with a glazed unit,

Figure 3 shows a cross-sectional detail of a second embodiment of a door blade fitted with a glazed unit,

Figure 4 shows a cross-sectional detail of a third embodiment of a door blade fitted with a glazed unit,

Figure 5 shows a cross-sectional detail of a fourth embodiment of a door blade fitted with a glazed unit,

Figure 6 shows a cross-sectional detail of a fifth embodiment of a door blade fitted with a glazed unit,

Figure 7 shows a process map of an example of the inventive method of glazing a door blade.

Figure 8 shows a schematic perspective view of a sixth embodiment of a door having a glazed unit fixed in the door blade, and

Figure 9 shows a schematic perspective view of a seventh embodiment of a door having a glazed unit fixed in the door blade,

DETAILED DESCRIPTION

[0042] Various aspects of the invention will hereinafter be described in conjunction with the appended drawings to illustrate and not to limit the invention. Variations of the inventive aspects are not restricted to the specifically

shown embodiment, but are applicable on other variations of the invention. Like designations denote like elements.

[0043] Figure 1 shows a schematic perspective view of a first embodiment of a door 1 having a glazed unit 10 fixed in the door blade 2. The door 1 has a first side 4a, a second side 4b opposite the first side, and an external edge 8. The first side 4a of the door may be intended to face outdoors and the second side 4b to face into the building or vice versa. Alternatively, both the first side 4a and the second side 4b may be intended to face outdoors. If the door is an interior door, both the first and second sides 4a, 4b may be intended to face the interior of a building. In this example, the glazed unit 10 is rectangular, but it could equally well be rhombic, trapezoid, circular, semi-circular, elliptical, square, triangular, hexagonal, octagonal, or any other shape. In this example, the glazed unit 10 is positioned in the upper part of the door blade, but it could be positioned anywhere in the door blade.

[0044] The glazed unit 10 is positioned in an opening 50 created in the door blade 2. The opening is somewhat larger than the glazed unit such that a slot 51 is formed between the periphery 11 of the glazed unit and the internal edge 3 delimiting the opening 50 in the door blade. The slot is filled with an adhesive which has cured to form a joint 20 between the door blade and the glazed unit.

[0045] Depending on intended use of the door 1, the glazed unit can be selected to be burglary rated, sound-proof, and/or fire-retardant. If the door 1 is supposed to function as a fire door, the adhesive should be selected from a group of fire-sealing adhesives.

[0046] Figure 2 shows a cross-sectional detail of a first embodiment of a door blade 2 fitted with a glazed unit 10. In this embodiment, the glazed unit 10 comprises a first glass pane 13 and a second glass pane 14 separated by a frame 15. The frame 15 extends around the periphery of the glass panes and is sealed against the glass panes 13, 14 by suitable sealing means (not shown). The periphery 11 of the glazed unit may be lined with e.g. wood, plywood, wooden composite, other composite materials, metal, plastic, or fibre board. Alternatively, the periphery 11 is not lined and hence comprises the materials of the glass panes 13, 14 and the frame 15, i.e. glass and e.g. wood. The glazed unit 10 could however be constructed in other ways than from two glass panes 13, 14 and a separating frame 15. For example, it may be constituted by a single glass pane, or by three or more glass panes and a corresponding number of separating frames.

[0047] In this embodiment, the door blade 2 comprises insulation 9 comprising two reinforcing layers 7 between a first surface layer 5 facing the first side 4a of the door and a second surface layer 6 facing the second side 4b of the door. The surface layers 5, 6 may be of wood or other suitable material. The material is preferably water-repellent or impregnated with water-repellent material, especially if it is intended to be used in an exterior door

assembly facing the outside of a building. The insulation 9 is preferably composed of a fibre material which contains a sufficiently large proportion of air to provide suitable insulating characteristics. Examples of such fibres are cellulose fibres, such as wood fibres, or oil-based fibres such as plastic fibres. A further alternative is cellular plastics.

[0048] In this embodiment, the reinforcing layers 7 are fibre-glass nets provided within the insulation 9. The purpose of the reinforcing layers 7 is to prevent tools, such as crowbars, to break through the door blade. The size of the meshes in the net is preferably 5-50 mm, and even more preferably 15-20 mm.

[0049] The glazed unit 10 is secured to the door blade 2 by means of an adhesive joint 20 provided in the slot 51 between the periphery 11 of the glazed unit and an internal edge 3 in the door blade. The internal edge 3 delimits the opening created in the door blade 2 during the glazing of the door. In this example, the internal edge 3 is flat, without any elevations or grooves. As can be seen in Figure 2, the internal edge 3 reveals the interior of the door blade 2. The insulation 9 as well as the reinforcing layers 7 and the surface layers 5, 6 are in direct contact with the adhesive joint 20.

[0050] In this embodiment, the glazed unit 10 and the door blade 2 are of substantial equal width, and the joint 20 extends over substantially the entire width of the door blade 2. Hence, the joint 20 adheres to the insulation 9, the reinforcing layers 7 as well as the first and second surface layers 5, 6 of the door blade 2 and to the periphery 11 of the glazed unit 10.

[0051] Figure 3 shows a cross-sectional detail of a second embodiment of a door blade 2 fitted with a glazed unit 10. This embodiment is quite similar to the first embodiment. However, in this second embodiment, the glazed unit 10 is narrower than the door blade 2, and the joint 20 extends only over a portion of the width of the door blade. Here, the joint 20 adheres to the insulation 9 and the reinforcing layer 7 of the door blade 2, and to the periphery 11 of the glazed unit. Moreover, the door blade comprises only one reinforcing layer 7. Here, the reinforcing layer 7 is positioned in the middle of the insulation 9 but it could also be positioned further towards one of the surface layers 5, 6 or even at the boundary of the insulation 9 and one of the surface layers 5, 6.

[0052] Figure 4 shows a cross-sectional detail of a third embodiment of a door blade 2 fitted with a glazed unit 10. The glazed unit 10 is narrower than the door blade 2. A first frame strip 21 is attached to overlap the slot 51 on one side of the glazed unit 10 and door blade 2 and a second frame strip 22 is attached to overlap the slot 51 on the other side of the glazed unit 10 and door blade 2. Each of the frame strips 21, 22 is positioned such that a cavity 53 is formed between the frame strip 21, 22 and the glazed unit 10 and the door blade 2 respectively. The frame strips 21, 22 have been applied before the adhesive filled into the slot 51 between glazed unit and the door blade still has not cured, such that excessive adhe-

sive is pressed into the cavities 53. Alternatively, the frame strips 21, 22 can be applied before filling adhesive into the slot. In such case, adhesive should be filled into the slot to such an extent that adhesive also flows into the cavities. In either case, the result is an adhesive joint 20 with a two dimensional cross-section, as seen in Figure 4. The joint 20 adheres to the insulation 9, the reinforcing layers 7, the cut surface as well as the side surface of the first and second surface layers 5, 6 of the door blade 2 and to the periphery 11 as well as the sides of the glazed unit 10, and to the frame strips 21, 22. The vertical portions, provided in the cavities 53, of the joint 20 contributes to creating a wedging effect which holds the glazed unit 10 firmly in place. In this example, each cavity is sealed with a sealing strip 25. The sealing strips 25 seals the frame strips 21, 22 to the glazed unit 10 and door blade 2 respectively. The sealing strips 25 prevent fluids from leaking into the cavities 53 from where it might migrate further into the door construction where it might cause damage. The provision of at least one frame strip 21, 22 and/or sealing strips 25 may be applied to any of the described embodiments of a door blade fitted with a glazed unit.

[0053] In the third embodiment, the door blade 2 is provided with three reinforcing layers 7 within the insulation 9. As can be seen in Figure 4, the reinforcing layers 7 are evenly distributed within the insulation. However, the reinforcing layers 7 could also be unevenly distributed within the insulation. It would also be possible to have more or less than three reinforcing layers. In fact, any number of reinforcing layers would be possible in all of the described embodiments of Figures 1-9.

[0054] Figure 5 shows a cross-sectional detail of a fourth embodiment of a door blade 2 fitted with a glazed unit 10. In this embodiment, the opening in the door blade 2 has been created such that the internal edge 3 is provided with an elevation 55. As seen in Figure 5, the glazed unit 10 is positioned relative the elevation 55 such that a vertical slot 52 is provided between the side of the glazed unit 10 and the elevation 55. The adhesive joint 20 extends into the vertical slot 52. The elevation 55 provides additional support to the glazed unit 10 in the lateral direction, thereby making it even more difficult for a burglar to press the glazed unit out from the door blade 2. A frame strip 21 is fixed to the opposite side of the door blade 2 relative to the elevation 55. The frame strip 21 is positioned such that a cavity 53 is formed between the frame strip 21 and each of the glazed unit 10 and the door blade 2 respectively. The adhesive joint 20 extends into the cavities 53 as well as the vertical slot 52. The vertical portions of the joint 20, provided in the cavities 53 and in the vertical slot 52, contribute to creating a wedging effect which holds the glazed unit 10 firmly in place. In the embodiment of Figure 5, no sealing strips are provided. Instead the cavities 53 and the vertical slot 52 were over-filled with adhesive when the joint 20 was created. When the adhesive had semi-cured, it was cut clean along the frame strip 21 and the elevation 55 in order to form a joint

20 flush with the vertical boundaries of the frame strip 21 and elevation 55. As the adhesive joint 20, which is impermeable to moisture, entirely fills the cavities 53 and the vertical slot 52, a good sealing effect is achieved also without a sealing strip. The provision of an elevation 55 in the internal edge 3 may be applied to any of the described embodiments of a door blade fitted with a glazed unit.

[0055] Figure 6 shows a cross-sectional detail of a fifth embodiment of a door blade 2 fitted with a glazed unit 10. This embodiment is similar to the third embodiment shown in Figure 4. The major difference is that in this fifth embodiment, the opening in the door blade 2 has been created such that the internal edge 3 is provided with two elevations 55 defining a groove 57 in between the two elevations. Being a part of the slot, the groove 57 is also filled with adhesive during the forming of the joint 20. The presence of a groove 57 further increases the wedging effect provided by the adhesive-filled cavities 53 between the frame strips 21, 22 and the glazed unit 10 and door blade 2 respectively. Hence, the provision of a groove 57 further increases the strength of the attachment of the glazed unit to the door blade. The provision of two elevations 55 defining a groove 57 in the internal edge 3 may be applied to any of the described embodiments of a door blade fitted with a glazed unit.

[0056] Figure 7 shows a process map of an example of the inventive method of glazing a door blade, i.e. a method of providing a door blade with a glazed unit. The first step 71 is to create an opening in the door blade. The size and shape of the created opening is adapted to the shape and size of the glazed unit to be fitted to the door blade, however with an additional margin, preferably of 1-100 mm width, around the opening. The opening is delimited by an internal edge of the door blade. The opening is created such that the resulting internal edge of the door blade either is flat, or provided with one or more elevations, grooves, or any other pattern. The internal edge is not lined, but reveals the interior, such as insulation, of the door blade. The opening may be created by means of milling, drilling, sawing, laser cutting, water jet cutting, or any other available method for making of holes. A further alternative is to assemble the door from components, for example from two side pieces, one top piece and a filling under the opening - like an old fashioned, traditional framed door. Milling is considered a preferred alternative for creating the opening.

[0057] The second step 72 is to place the glazed unit in the created opening. The additional margin of the opening compared to the size of the glazed unit, implies that a slot is formed between the periphery of the glazed unit and the internal edge of the door blade. The width of the slot is preferably 1-100 mm, and more preferably 5-15 mm. If the door blade is lying horizontally on a surface, the glazed unit may be supported by the surface and no temporary fixation of the glazed unit in the opening is needed. If the door blade is held vertically, spacers may be used to hold the glazed unit temporarily in the opening.

Alternatively, plugs extending between a strips fixed to each side of the door blade may be used for temporary fixation. Alternatively, a gluing fixture that holds the glazed unit by means of suction cups may be used for temporary fixation. Alternatively, any other available temporary fixation means may be used.

[0058] The third step 73 is to fill an adhesive into the slot between the periphery of the glazed unit and the internal edge of the door blade. Preferably the adhesive is injected into the slot. The injection can be aided by vacuum.

[0059] The fourth step 74 is optional. In this step, at least one frame strip is fixed to overlap the slot and to partly overlap the glazed unit and the door blade. The frame strip is positioned such that at least one cavity is formed between the frame strip and/or the door blade. The at least one cavity is in communication with the slot, and excessive adhesive filled in the slot is allowed to flow into the at least one cavity in order to at least partly fill the cavity.

[0060] Alternatively, this fourth step 74 could be performed before the third step 73 of filling adhesive into the slot. Adhesive is then filled into the slot to such an extent that the adhesive also flows into the at least one cavity.

[0061] The fifth step 75 is to allow the adhesive to cure.

[0062] Optionally, the method can be extended to include a step of sealing the at least one cavity with a sealing strip, or to include a step of cutting clean excess adhesive that has seeped out from the cavities and/or the slot.

[0063] Figure 8 shows a schematic perspective view of a sixth embodiment of a door 1 having a glazed unit 10 fixed in the door blade 2. This embodiment is similar to the first embodiment shown in Figure 1, except in that the joint 20 is intermittent, i.e. it is constituted by a number of sub joints 20' provided in the slot 51. The sub joints 20' are separated from each other, either by empty space or by physical separators, such as spacers of any kind or a filling material. If physical separators are used, these are preferably provided before the adhesive is filled into the slot. This example shows nine sub joints 20', but the number of sub joints may be any from two to hundreds or even more sub joints. The sizes and shapes of the sub joints 20' may also be varied, also between the subjoin.

[0064] Figure 9 shows a schematic perspective view of a seventh embodiment of a door 1 having a glazed unit 10 fixed in the door blade 2. In this embodiment, the internal edge 3 is zigzag-shaped in the xy plane. The internal edge 3 comprises a plurality of triangular projections 3a which with their apexes abut against the periphery 11 of the glazed unit 10. This results in a slot 51 which is constituted by a plurality of sub slots 51'. Each sub slot 51' is separated from an adjacent sub slot by a projection 3a of the internal edge 3 which abuts against the glazed unit. Consequently, the joint 20 is constituted by a plurality of sub joints 20'. During manufacture, adhesive may be filled into each sub slot 51' individually. Each projection 3a may either abut tightly against the periphery 11

of the glazed unit 10 such that no adhesive is allowed to flow between the sub slots 51' separated by the projection 3a, or may abut less tightly against the periphery 11 such that adhesive can leak between the adjacent sub slots 51'. Alternatively, adhesive is filled into only one or some of the sub slots 51' and allowed to flow between the sub slots 51'. The flow between the sub slots 51' may take place between the projection 3a and the periphery 11 of the glazed unit or over and/or under the projections 3a' in z direction. Small channels may be provided in the surface of the door blade between the sub slots 51' to guide the flow of adhesive. Alternatively, a channel may be provided through the projection 3a or between the projection 3a and the periphery 11 of the glazed unit 10 to allow and/or to increase the flow of adhesive between adjacent sub slots 51'. An advantage of this embodiment is that the projections 3a contributes to holding the glazed unit 10 in place, especially before the adhesive has cured, while providing a large contact surface between the adhesive and glazed unit.

[0065] In this example, each sub slot 51' contains one sub joint 20' which wholly fills the sub slot 51'. It would also be possible to have sub joints 20' which only partly fill the sub slot 51', as well as more than one sub joint 20' in one sub slot 51'. Some sub slots 51' may also be left empty. The number of sub slots 51' constituting the slot may be any from two to hundreds or even more sub slots.

[0066] The concept of having a slot 51 constituted by a plurality sub slots 51' may be varied in a large variety of ways. The internal edge 3 may be zigzag-shaped in the xy plane as shown in Figure 9, but many other shapes are also possible. The internal edge 3 may in the xy plane have the shape of for example a sinus wave, a rectangle with at least two projections adapted to abut the periphery 11 of the glazed unit, or any other shape with at least two projections 3a adapted to abut the periphery 11 of the glazed unit such that at least two sub slots 51' are created between the periphery 11 of the glazed unit 10 and the internal edge 3. The possible shapes all have in common that at least two projections 3a are provided to hold the glazed unit 10 in a correct position in the opening in the door blade. This is particularly advantageous before the adhesive has cured. The projections 3a may press against the periphery of the glazed unit as to force fit the glazed unit.

[0067] The projections 3a may take a variety of geometries - for example pointed, rectangular or curved against the periphery of the glazed unit. The different projections 3a provided in one internal edge 3 may or may not have the same shape. The number of projections 3a may vary from two to a hundred or even more projections.

[0068] Additionally, the internal edge 3 may further be provided with elevations, grooves, or other patterns in the z direction. Combinations of different shapes/patterns of the internal edge 3 are also possible, both in the xy plane and in the z direction.

[0069] An alternative to having projections adapted to

fix the glazed unit in a desired position, is to create the internal edge inclined in the z-direction such that the opening in the door blade is greater than the periphery of the glazed unit at a one side of the door blade and smaller than the periphery of the glazed unit at the other side of door blade. The glazed unit may then be entered into the opening from the opening's greater side and will get wedged at a position in the z direction where the opening gets smaller than the glazed unit. This wedging by the inclined internal edge may contribute to properly position the glazed unit in the z direction as well as fixing the glazed unit before the adhesive has been applied and cured.

[0070] When selecting which adhesive to use, the person skilled in the art should take into account the materials of the periphery of the glazed unit and of the internal edge to which the adhesive is to adhere, as well as the size of the contact area and the intended shape of the resulting joint, such that a reliable and preferably burglar-resistant joint is achieved.

[0071] Reference signs mentioned in the claims should not be seen as limiting the extent of the matter protected by the claims - their only function is to make the claims easier to understand.

[0072] As will be realised, the invention is capable of modification in various obvious respects, all without departing from the scope of the appended claims. Accordingly, the drawings and the description thereto are to be regarded as illustrative in nature, and not restrictive.

Claims

1. A method for glazing a door blade (2) comprising:

- creating an opening (50) in the door blade (2), the opening (50) being delimited by an internal edge (3) of the door blade (2), wherein the door blade (2) comprises an insulation (9) between a first surface layer (5) and a second surface layer (6), and wherein the internal edge (3) comprises at least a portion of the insulation (9), and wherein the door blade (2) comprises a reinforcing layer (7) positioned within the insulation (9),
- placing a glazed unit (10) in the opening such that a slot (51) is formed between a periphery (11) of the glazed unit (10) and the internal edge (3) of the door blade (2),
- filling the slot (51) at least partly with an adhesive, thus forming a joint (20) between the periphery (11) of the glazed unit (10) and at least a portion of the internal edge (3) of the door blade (2),
- and
- allowing the adhesive to cure, **characterized in that**, when filling the slot (51) the insulation (9) as well as the reinforcing layers (7) come in to direct contact with the adhesive joint (20) and

wherein the joint adheres to the insulation (9) and the reinforcing layer (7) of the door blade.

2. The method according to claim 1, wherein the slot (51) is wholly filled with the adhesive.
3. The method according to claim 1, wherein the reinforcing layer (7) is a net.
4. The method according to claim 1, wherein the reinforcing layer (7) is a fibre-glass net.
5. The method according to claim 1, wherein the reinforcing layer (7) is a sheet metal.
6. The method according to any one of the preceding claims, wherein the slot (51) is 1-100 millimetres wide, more specifically 5-15 millimetres wide.
7. The method according to any one of the preceding claims, wherein the joint (20) is resilient.
8. The method according to any one of the preceding claims, wherein the adhesive has the properties to adhere both to the material of the periphery (11) of the glazed unit (10) and the material of the internal edge (3) of the door blade (2).
9. The method according to any one of the preceding claims, wherein the adhesive is a modified silicone polymer.
10. The method according to any one of the preceding claims, wherein the opening (50) is created through milling.
11. The method according to any one of the preceding claims, wherein the opening (50) is created such that the resulting internal edge (3) is flat.
12. The method according to any one of claims 1-10, wherein the opening (50) is created such that the resulting internal edge (3) is provided with at least one elevation (55, 56).
13. The method according to claim 12, wherein the opening (50) is created such that the resulting internal edge (3) is provided with two elevations (55, 56) which define a groove (57).
14. The method according to any one of the preceding claims, wherein the method further comprises the step of fixing at least one frame strip (21, 22) to the glazed unit (10) and the door blade (2) such that the frame strip (21, 22) overlaps the slot (51) and partially overlaps the glazed unit (10) and the door blade (2) and such that at least one cavity (53) is formed between the frame strip (21, 22) and the glazed unit

(10) and/or the door blade (2).

15. The method according to claim 14, wherein a first frame strip (21) is fixed to a first side of the glazed unit (10) and the door blade (2) and a second frame strip (22) is fixed to a second side of the glazed unit (10) and door blade (2). 5
16. The method according to claim 14 or 15 further comprising the step of sealing the at least one cavity (53) with a sealing strip (25). 10
17. The method according to any one of the preceding claims, wherein the slot (51) is constituted by a plurality of sub slots (51'). 15
18. A door (1) comprising a door blade (2) and a glazed unit (10) fitted to the door blade (2) according to the method of any one of the preceding claims. 20

Patentansprüche

1. Verfahren zum Verglasen eines Türblatts (2) umfassend: 25
 - Bilden einer Öffnung (50) in dem Türblatt (2), wobei die Öffnung (50) durch einen inneren Rand (3) des Türblatts (2) begrenzt ist, wobei das Türblatt (2) eine Dämmung (9) zwischen einer ersten Oberflächenschicht (5) und einer zweiten Oberflächenschicht (6), und wobei der innere Rand (3) mindestens einen Teil der Dämmung (9) umfasst, und wobei das Türblatt (2) eine innerhalb der Dämmung (9) angeordnete Verstärkungsschicht (7) umfasst, 30
 - Anordnen einer verglasten Einheit (10) in der Öffnung derart, dass ein Schlitz (51) zwischen einem Umfang (11) der verglasten Einheit (10) und dem inneren Rand (3) des Türblatts (2) gebildet wird, 35
 - Füllen des Schlitzes (51) zumindest teilweise mit einem Klebemittel, wodurch eine Verbindung (20) zwischen dem Umfang (11) der verglasten Einheit (10) und zumindest einem Teil des inneren Randes (3) des Türblatts (2), und 40
 - das Klebemittel härten lassen, **dadurch gekennzeichnet, dass**, beim Füllen des Schlitzes (51), die Dämmung (9) sowie die Verstärkungsschichten (7) in direkten Kontakt mit der Klebemittelverbindung (20) gebracht wird, und wobei die Verbindung an der Dämmung (9) und der Verstärkungsschicht (7) des Türblatts haftet. 45
2. Verfahren nach Anspruch 1, wobei der Schlitz (51) mit dem Klebemittel völlig gefüllt wird. 50
3. Verfahren nach Anspruch 1, wobei die Verstär-

kungsschicht (7) ein Netz ist.

4. Verfahren nach Anspruch 1, wobei die Verstärkungsschicht (7) ein Glasnetz ist. 5
5. Verfahren nach Anspruch 1, wobei die Verstärkungsschicht (7) ein Metallblech ist. 10
6. Verfahren nach einem der vorgehenden Ansprüche, wobei die Breite des Schlitzes (51) 1-100 Millimeter, insbesondere 5-15 Millimeter beträgt. 15
7. Verfahren nach einem der vorgehenden Ansprüche, wobei die Verbindung (20) elastisch ist. 20
8. Verfahren nach einem der vorgehenden Ansprüche, wobei das Klebemittel Hafeigenschaften sowohl zum Material des Umfangs (11) der verglasten Einheit (10) als auch zum Material des inneren Randes (3) des Türblatts (2) besitzt. 25
9. Verfahren nach einem der vorgehenden Ansprüche, wobei das Klebemittel ein modifiziertes Siliconpolymer ist. 30
10. Verfahren nach einem der vorgehenden Ansprüche, wobei die Öffnung (50) durch Fräsen gebildet wird. 35
11. Verfahren nach einem der vorgehenden Ansprüche, wobei die Öffnung (50) derart gebildet wird, dass der sich ergebende innere Rand (3) flach ist. 40
12. Verfahren nach einem der Ansprüche 1-10, wobei die Öffnung (50) derart gebildet wird, dass der sich ergebende innere Rand (3) mit mindestens einer Erhöhung (55, 56) versehen wird. 45
13. Verfahren nach Anspruch 12, wobei die Öffnung (50) derart gebildet wird, dass der sich ergebende innere Rand (3) mit mindestens zwei Erhöhungen (55, 56) versehen wird, die eine Nut (57) definieren. 50
14. Verfahren nach einem der vorgehenden Ansprüche, wobei das Verfahren ferner den Schritt des Befestigens mindestens eines Rahmenstreifens (21, 22) an der verglasten Einheit (10) und dem Türblatt (2) umfasst, so dass der Rahmenstreifen (21, 22) den Schlitz (51) überlappt und die verglaste Einheit (10) und den Türblatt (2) teilweise überlappt, und so dass mindestens eine Aussparung (53) zwischen dem Rahmenstreifen (21, 22) und der verglasten Einheit (10) und/oder dem Türblatt (2) gebildet wird. 55
15. Verfahren nach Anspruch 14, wobei ein erster Rahmenstreifen (21) an einer ersten Seite der verglasten Einheit (10) und dem Türblatt (2) befestigt ist, und ein zweiter Rahmenstreifen (22) an einer zweiten Seite der verglasten Einheit (10) und dem Türblatt

(2) befestigt ist.

16. Verfahren nach Anspruch 14 oder 15, ferner umfassend den Schritt des Abdichtens der mindestens einen Aussparung (53) mit einer Dichtleiste (25).
17. Verfahren nach einem der vorgehenden Ansprüche, wobei der Schlitz (51) aus einer Mehrzahl von Teilschlitz (51') gebildet ist.
18. Tür (1) umfassend ein Türblatt (2) und eine verglaste Einheit (10), die nach dem Verfahren nach einem der vorgehenden Ansprüche an dem Türblatt (2) montiert ist.

Revendications

1. Procédé pour le vitrage d'un battant de porte (2) comprenant :

- la création d'une ouverture (50) dans le battant de porte (2), l'ouverture (50) étant délimitée par un bord intérieur (3) du battant de porte (2), le battant de porte (2) comprenant un isolant (9) entre une première couche de surface (5) et une deuxième couche de surface (6), et le bord intérieur (3) comprenant au moins une portion de l'isolant (9), et le battant de porte (2) comprenant une couche de renforcement (7) positionnée dans l'isolant (9),

- placer une unité vitrée (10) dans l'ouverture si bien qu'une fente (51) est formée entre une périphérie (11) de l'unité vitrée (10) et le bord intérieur (3) du battant de porte (2),

- remplir la fente (51) au moins partiellement avec un adhésif, formant ainsi un joint (20) entre la périphérie (11) de l'unité vitrée (10) et au moins une partie du bord intérieur (3) du battant de porte (2), et

- laisser l'adhésif durcir, **caractérisé en ce que**, lors du remplissage de la fente (51), l'isolant (9) ainsi que les couches de renforcement (7) entrent en contact direct avec le joint adhésif (20) et dans lequel le joint adhère à l'isolant (9) et la couche de renforcement (7) du battant de porte.

2. Procédé selon la revendication 1, dans lequel la fente (51) est entièrement remplie d'un adhésif.
3. Procédé selon la revendication 1, dans lequel la couche de renforcement (7) est un filet.
4. Procédé selon la revendication 1, dans lequel la couche de renforcement (7) est un filet en fibre de verre.
5. Procédé selon la revendication 1, dans lequel la couche de renforcement (7) est une tôle.

6. Procédé selon l'une quelconque des revendications précédentes, dans lequel la fente (51) a une largeur de 1 à 100 millimètres, plus spécifiquement une largeur de 5 à 15 millimètres.

7. Procédé selon l'une quelconque des revendications précédentes, dans lequel le joint (20) est élastique.

8. Procédé selon l'une quelconque des revendications précédentes, dans lequel l'adhésif a les propriétés d'adhérer à la fois au matériau de la périphérie (11) de l'unité vitrée (10) et au matériau du bord intérieur (3) du battant de porte (2).

9. Procédé selon l'une quelconque des revendications précédentes, dans lequel le tissu est un polymère de silicone modifié.

10. Procédé selon l'une quelconque des revendications précédentes, dans lequel l'ouverture (50) est créée par fraisage.

11. Procédé selon l'une quelconque des revendications précédentes, dans lequel l'ouverture (50) est créée si bien que le bord intérieur résultant (3) est plat.

12. Procédé selon l'une quelconque des revendications 1 à 10, dans lequel l'ouverture (50) est créée si bien que le bord intérieur résultant (3) est pourvu d'au moins une élévation (55, 56).

13. Procédé selon la revendication 12, dans lequel l'ouverture (50) est créée si bien que le bord intérieur résultant (3) est pourvu de deux élévations (55, 56) qui définissent une rainure (57).

14. Procédé selon l'une quelconque des revendications précédentes, dans lequel le procédé comprend en outre l'étape consistant à fixer au moins une bande de cadre (21, 22) à l'unité vitrée (10) et au battant de porte (2) si bien que la bande de cadre (21, 22) recouvre la fente (51) et recouvre partiellement l'unité vitrée (10) et le battant de porte (2) et si bien qu'au moins une cavité (53) est formée entre la bande de cadre (21, 22) et l'unité vitrée (10) et / ou le battant de porte (2).

15. Procédé selon la revendication 14, dans lequel une première bande de cadre (21) est fixée sur un premier côté de l'unité vitrée (10) et du battant de porte (2), et une deuxième bande de cadre (22) est fixée sur un deuxième côté de l'unité vitrée (10) et du battant de porte (2).

16. Procédé selon la revendication 14 ou 15, comprenant en outre l'étape consistant à sceller l'au moins une cavité (53) avec une bande d'étanchéité (25).

17. Procédé selon l'une quelconque des revendications précédentes, dans lequel la fente (51) est constituée d'une pluralité de sous fentes (51').

18. Porte (1) comprenant un battant de porte (2) et une unité vitrée (10) montée sur le battant de porte (2) selon le procédé de l'une quelconque des revendications précédentes.

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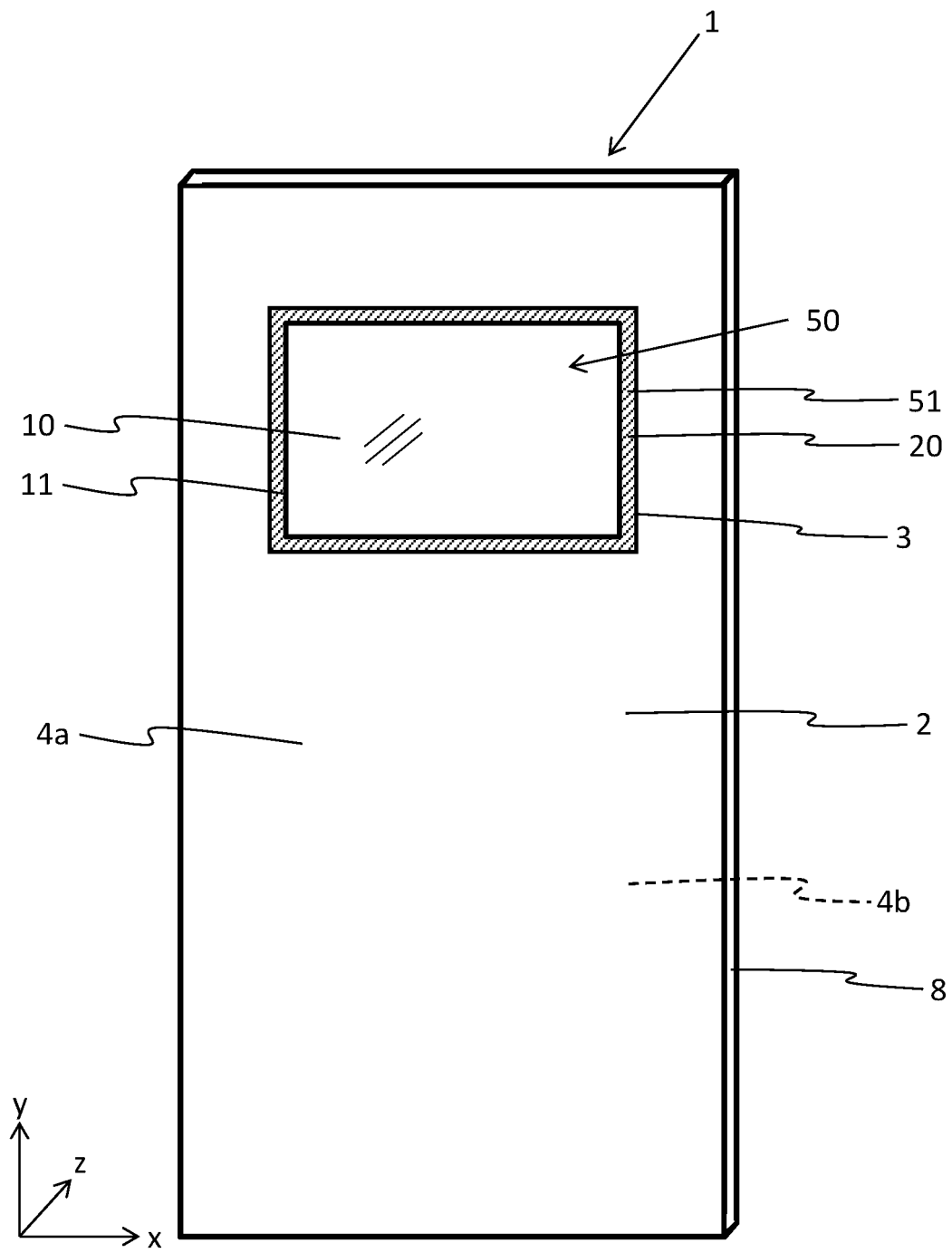


FIG 1

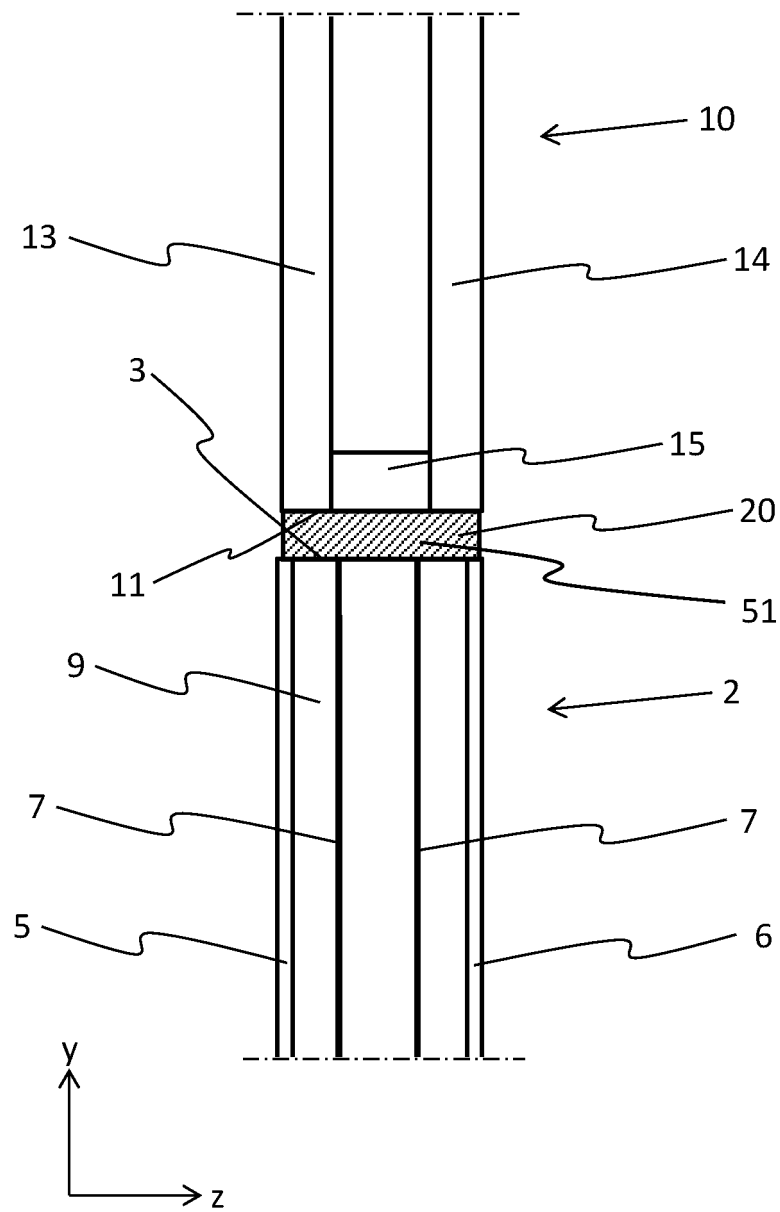


FIG 2

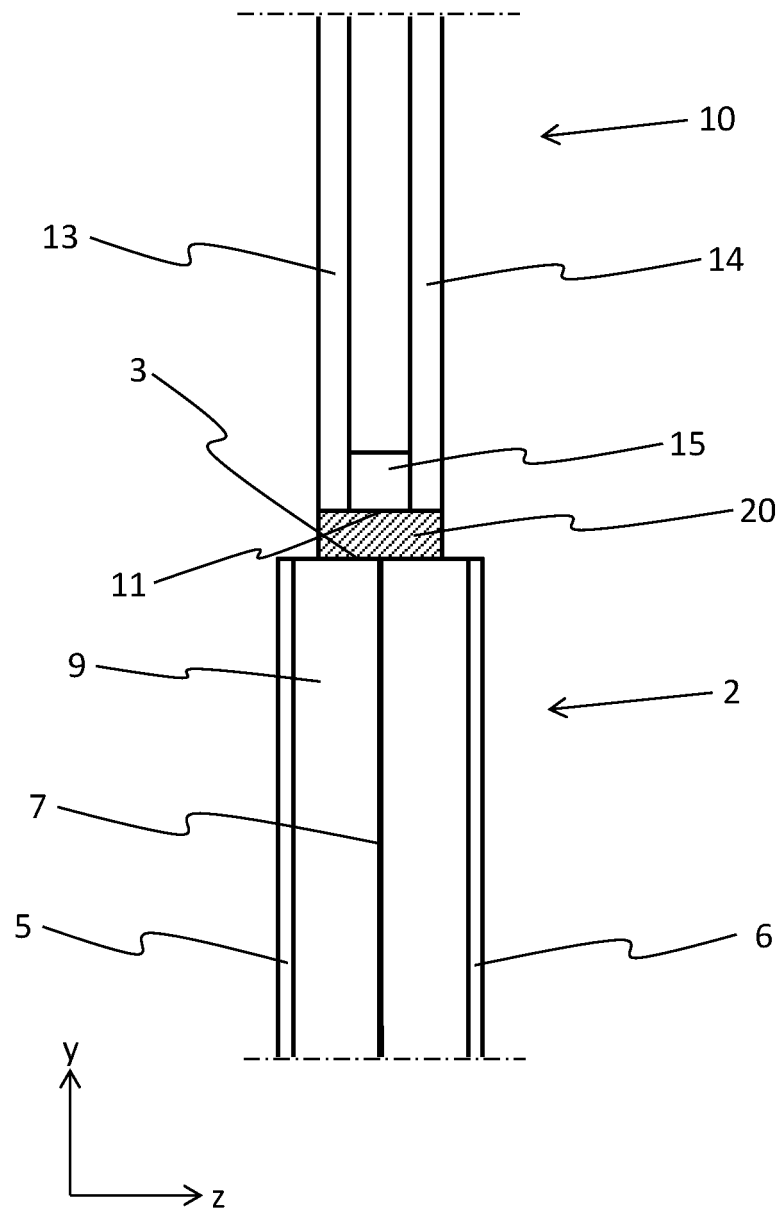


FIG 3

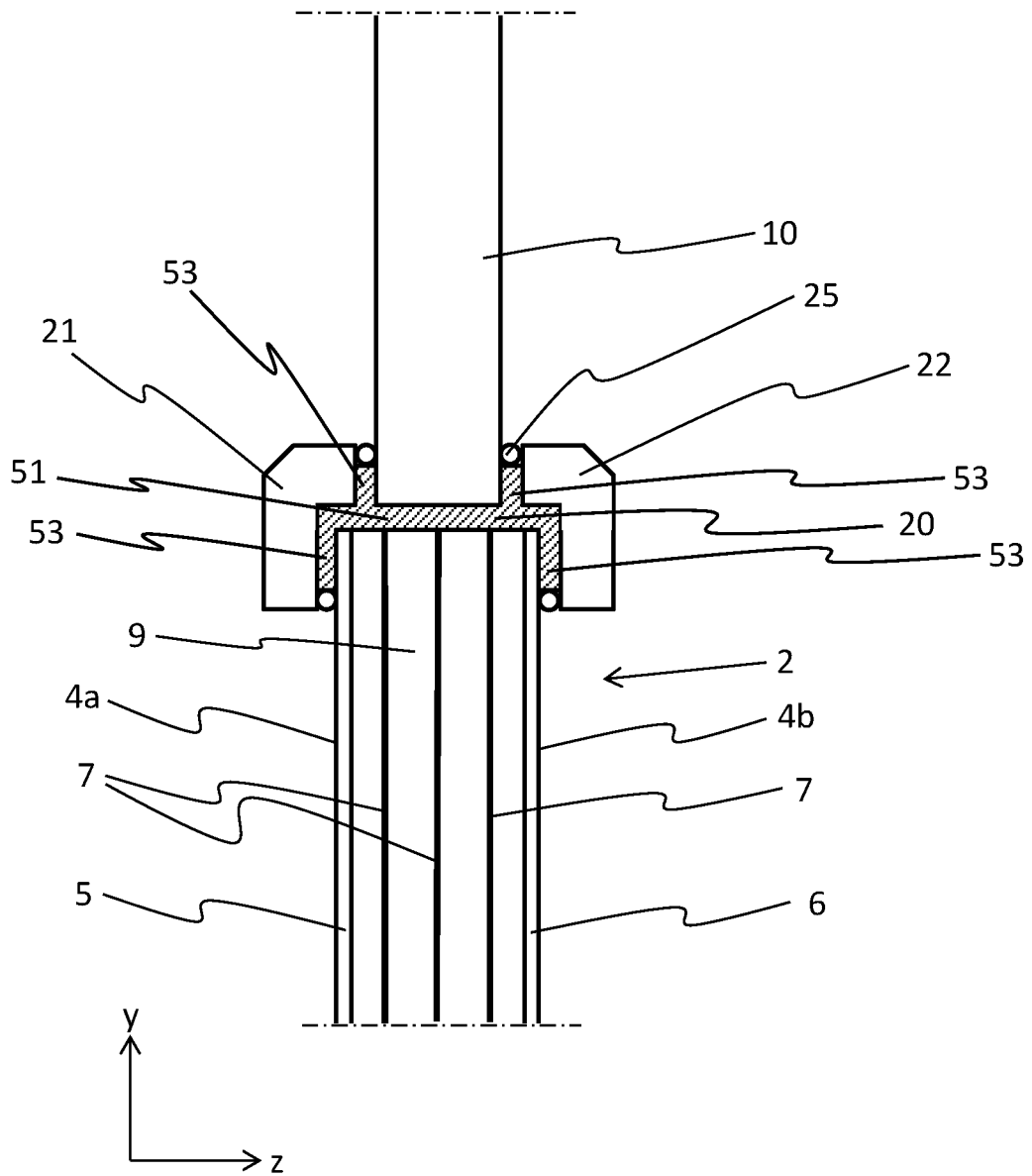


FIG 4

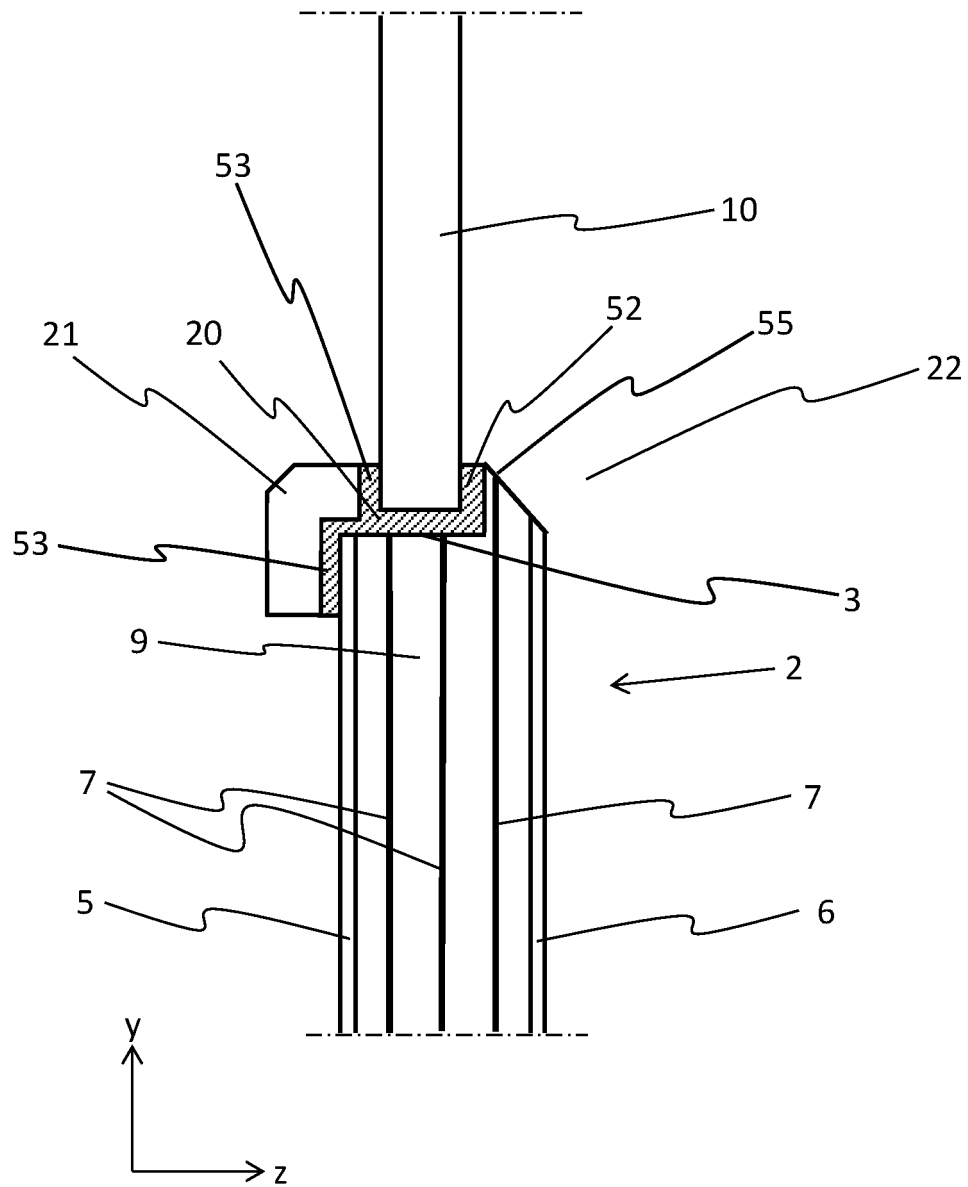


FIG 5

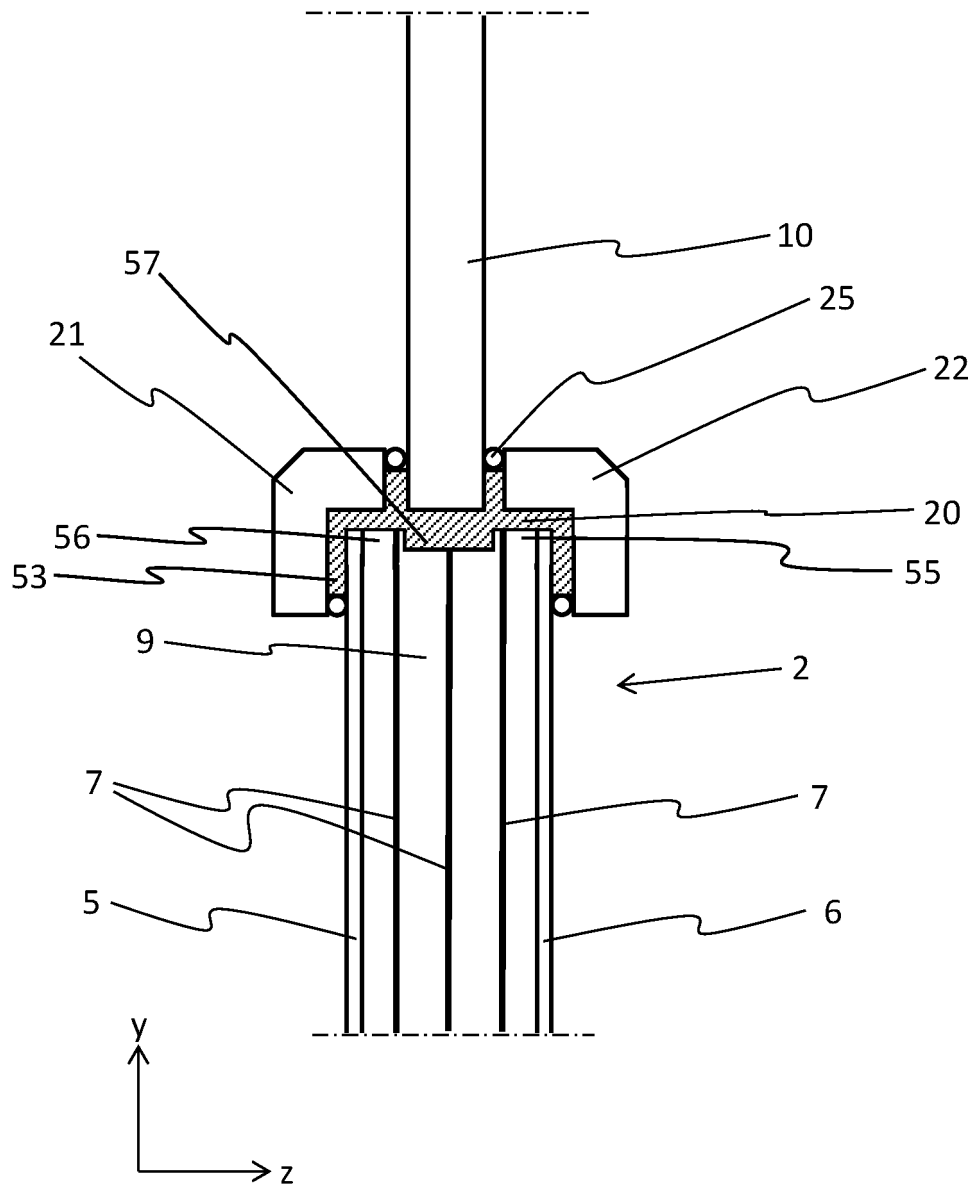


FIG 6

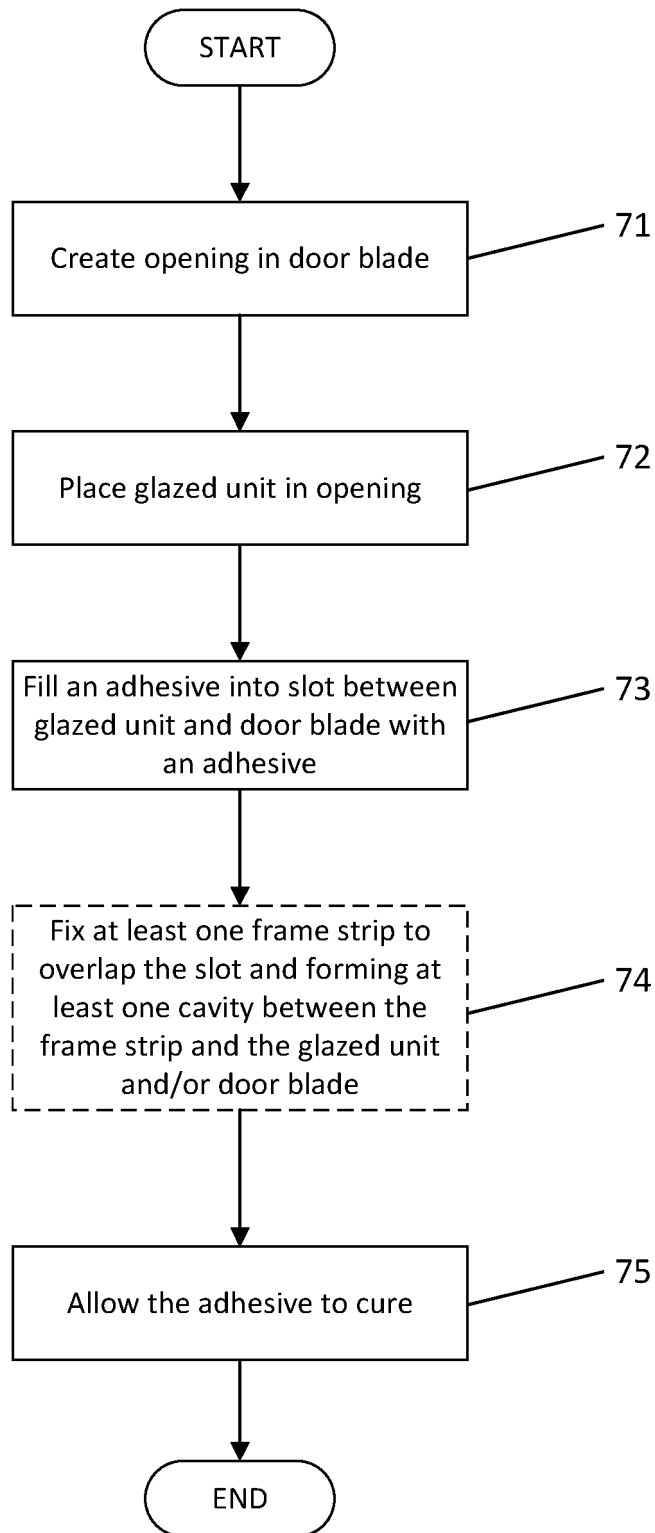


FIG 7

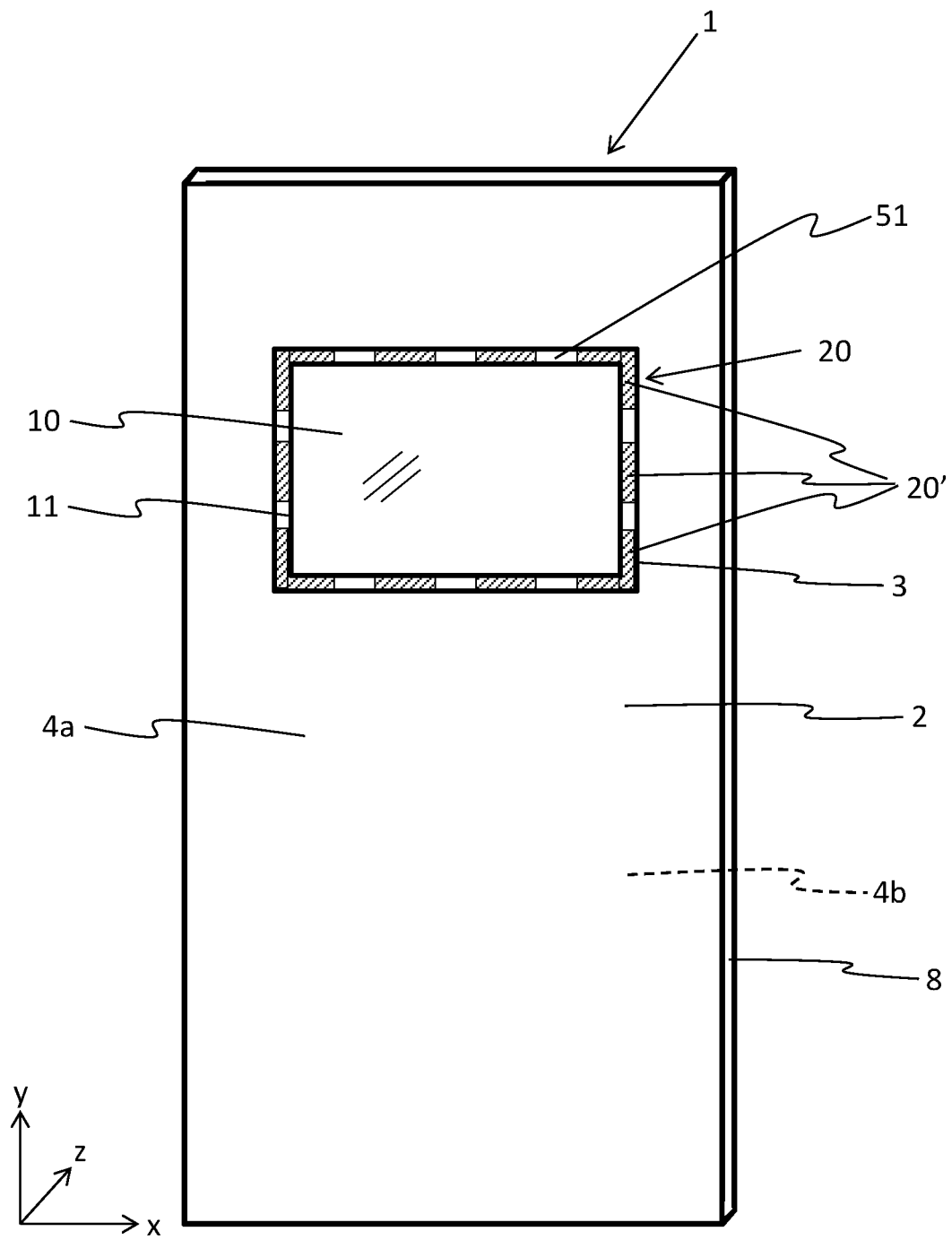


FIG 8

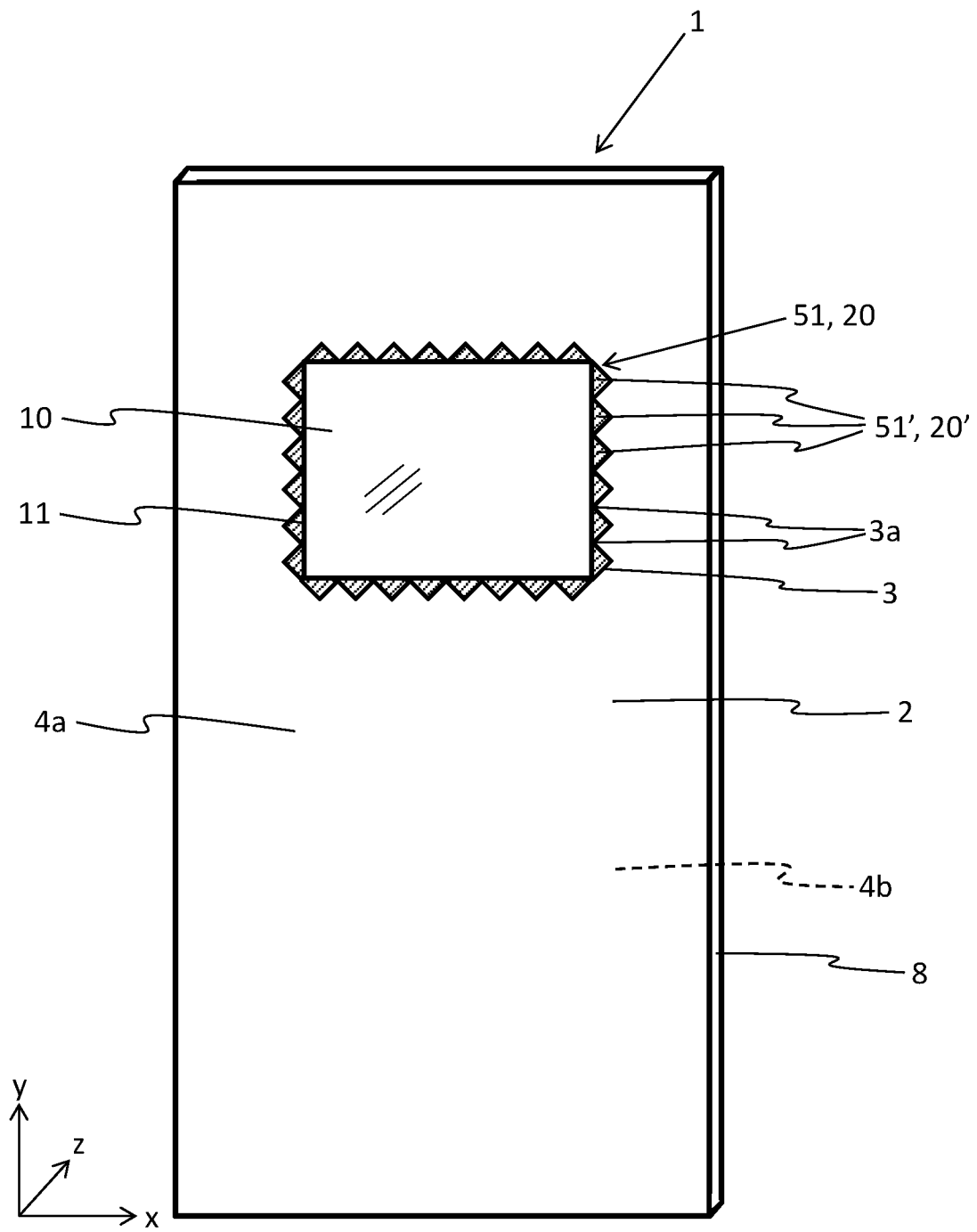


FIG 9

REFERENCES CITED IN THE DESCRIPTION

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