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(71) Applicant: **Kuban, Pavel**
**377 08 Ceske Budejovice 6 (CZ)**

(72) Inventor: **Kuban, Pavel**
**377 08 Ceske Budejovice 6 (CZ)**

(74) Representative: **Pavlica, Tomas**
**Traplová, Hakr, Kubát**
**Law and Patent Offices**
**Pristavni 24**
**170 00 Praha 7 (CZ)**

## (54) Glass panel for construction opening

(57) A glass panel for a construction opening, in particular for a window, a French window, a glass door, is made up of at least one glass leaf (10) mounted for opening or tilting or for combined opening and tilting, in a fixed frame (7), which frame (7) is designed for mounting in the construction opening. The glazed leaf (10) is formed by an insulating glass unit comprising at least a first bearing glass pane (1a) and a second bearing glass pane (1b), between which is disposed a with them bearingly connected spacer frame (2), and the first bearing glass pane (1a) and the second bearing glass pane (1b) are formed with an overlap (L1) with regard to the outer circumference of the spacer frame (2) to form a space. The glazed leaf (10) further comprises at least over a part of its circumference a retaining insert 3 provided with a protrusion (4) formed for insertion into a space between the first and the second bearing glass pane (1a, 1b). Along at least part of the glazed leaf (10) circumference is arranged a window fitting (6) for connecting of the leaf (10) with the fixed frame (7).

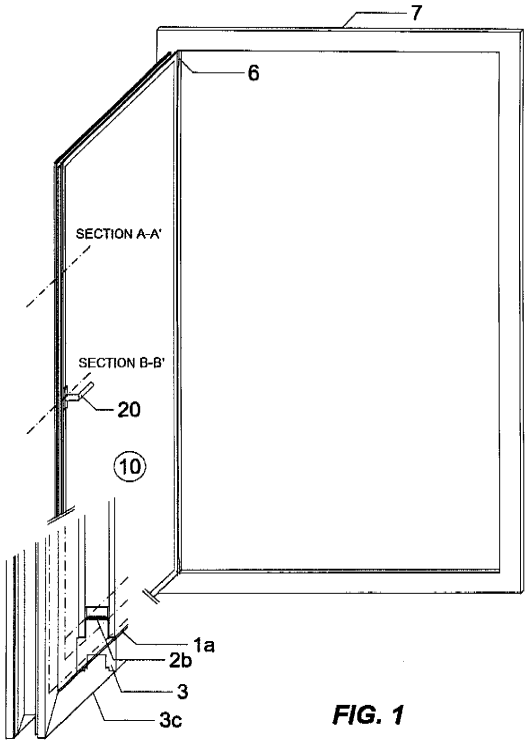


*FIG. 1*

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## Description

Field of the invention

**[0001]** The substance of this technical solution is an insulating glass panel, which is particularly useful as a window, a French window, or a glazed door into the relevant construction openings.

Background of the invention

**[0002]** Most frequently, the insulating glass panels are being used as panels for construction openings. They consist of an insulating glass unit, more preferably of an insulating double glass unit or a triple glass unit, which unit is inserted into a plastic, wooden or aluminium window leaf frame, which frame is pivotally, tiltably, or in a combined way mounted in a fixed frame, wherein the of the window leaf frame and the fixed frame are overwhelmingly made of the same material. The insulating glass units mainly provide the thermal insulation, but conveniently also the sound insulation. Currently, the most often used insulating glass panels are those with a plastic window leaf frame, in which frame an insulating glass unit is embedded. Then the window leaf frame is pivotably or tiltably or in a combined way fixed in a plastic fixed frame. Currently, there are many manufacturers of plastic profiles, from which profiles the plastic windows are manufactured. There are many types of plastic profiles, which exhibit different thermal resistance of the frames, wherein there is an effort to design a frame with the best thermal insulation and static properties. Currently, the most commonly used profiles are the six-chamber frame profiles and progressively gain ground profiles and types with even a higher number of chambers. The increasing number of chambers not only increases the thermal resistance of windows, but also increases production costs and thus the price of windows.

**[0003]** The wooden windows are represented mostly by the so called Euro-windows, in which the window frame and the fixed frame are of profiles made of glued wooden blocks. Wood has excellent qualities, has a very pleasant impression and is the longest tradition in the manufacture of windows. When appropriately maintained, it has also sufficient durability. However, it has also disadvantages arising primarily from its having a quite demanding maintenance. The service life, and also the original properties of the wooden windows without adequate maintenance therefore deteriorate quickly especially in the difficult climatic conditions. The principal disadvantage of wooden windows thus represents primarily the need to renew the protective coating of wood. If the protective coating has not been renewed on time, degradation of wood follows. The window begins to lose its basic properties and due to direct weathering on exposed wood the frames will be irreversibly damaged what results in the end in a total replacement of such window.

**[0004]** Another type of the currently used insulating windows are the windows with aluminium frames. Windows with aluminium frames, while not suffering from drawbacks of the wooden windows, are very expensive to manufacture and consequently they are also expensive.

**[0005]** The common objective in case of all types of window frames is, inter alia, the need to increase the thermal resistance of the frame, which is usually smaller than the thermal resistance of the available insulating glass unit. The insulating glass units have undergone a rapid development, where the initial vacuum space between the outer and the inner glass panes has begun to be replaced by an inert gas filling with better functional properties than what were those of the vacuum. Further, the thermal insulation performance has been improved by using different coating materials applied to the glass pane. At present, the use of insulating triple glazed windows, of the laminated glass pane, and the like also begins to expand. Windows development is continuing forward. The limiting factor in this endeavour but remain primarily the window frames, and this both those of the leaf (or sash) and of the window fixed frames.

**[0006]** Attempts have been made to create frameless windows, where the glass panel is used without a proper leaf frame and is directly connected with the hinges and/or window fittings. Such type of the glass panel is described for example in the patent application WO98/02632. According to this document, the spacer frame is recessed around the circumference so that a profiled insert is inserted into the space, wherein the first and second bearing glass panes exceed this insert. A groove for circumference window fitting is formed in the profiled insert, wherein the glass pane on the inner side is longer than the glass pane on the outer side to ensure sealing of the glass panel in the fixed frame. A disadvantage of this solution is the complexity of installing of the operating mechanism of the window fitting, when it is necessary to create an opening for the square shaft of the control mechanism. A similar solution is described also in the document DE 19733415A1, which solution also has the same drawbacks.

**[0007]** Another solution is described in the document EP 1020605A2, which document discloses a glass insulating panel with both glass panes of equal length, between which glass panes is inserted a profile insert with a notch for for window fitting. However, even this solution has the drawbacks described above when installing the operating mechanism.

Summary of the Invention

**[0008]** According to the presented technical solution an insulating glass panel for a construction opening, in particular for a window, a French window, and a glazed door is presented, which glass panel comprises at least one glass leaf of insulating glass, especially preferably an insulating double or triple glass unit. The insulating glass unit is formed by at least two bearing glass panes

with a spacer frame disposed between them, wherein the outer circumference sides of the spacer frame are arranged against the outer circumference of the insulating glass panes at a distance, which is, if compared to a standard insulating glass pane, set back at least on two opposite sides, preferably around the whole circumference of the insulating glass, towards the centre of the glass pane. Particularly preferably, the length of the set back is at least 10 mm, preferably about 15 mm. Subsequently, special retaining inserts provided with a protrusion are glued into the so created space, where the protrusion has a shape corresponding to the space created by the set back of the spacer frame. The protrusion of the retaining insert preferably rests with its walls on the inner surfaces of both bearing glass panes, existing in the space between the spacer frame and the circumference of the insulating glass unit, and the remaining part of the retaining insert then exceeds insulating glass unit of the glass panel and extends it, and this preferably around the whole circumference of the so formed glass panel. In one particularly preferred embodiment, the retaining insert exceeds the circumference of the insulating glass unit by about 22 mm. The total height of the retaining insert according to this preferred embodiment then is about 37 mm

**[0009]** At least the retaining insert, through which the window leaf is connected by hinges of the window fitting with the window frame is bearing, i. e. it is able to transfer force strain from the window leaf on the fixed frame. Preferably, all retaining inserts are then bearing, i. e. they are substantially the same and differ only in their length in dependence of the length of the insulating glass unit side, where they are to be glued. After having glued the retaining insert into the glass unit, the retaining insert forms the outer frame, into which it is then possible to install a standard window fitting. It is important that at least the retaining insert, by which the window leaf is connected to a fixed frame, is connected with the insulating glass leaf by a bearing joint, i. e. that its joint ensures reliable transfer of forces acting on the leaf from the insulating glass unit to the retaining insert and through it and over the hinges of the construction window the fitting then ensures transfer of the strain causing forces from the window leaf to act on the fixed frame. Preferably, the retaining inserts are terminated at the end by a trim in angle of 45° and allow forming of an all-circumferential outer frame, which is not interrupted by any gap in the corners. It is not required that the so formed all-circumferential frame is bearing as a whole, i. e. it is not necessary to provide bearing connecting of individual retaining inserts to each other, but the already mentioned bearing connecting of the retaining insert with the glass unit is sufficient. According to a preferred embodiment, connection of all retaining inserts with the insulating glass unit is realized as a bearing one.

**[0010]** The window fitting, which for the purposes of this application includes also a locking mechanism of the window wing, the transmission mechanism, the control element and the hinges, if they are used in the given example of the insulating glass unit, are arranged completely in that part of the retaining insert, which never comes into contact with the glass unit so that the unwanted force transfers from the window fitting to the glass unit are prevented not only during its assembly, but also during its use, and thus the following damaging of the glass, especially causing of cracks.

**[0011]** The retaining insert conveniently allows in itself also a recess, the so called mortising, of all commonly used elements of the window fitting, including installation of a transmission mechanism controlling the locking part of the window fitting and of a controlling element for locking of the window leaf in the fixed frame by the window fitting. Most frequently then the control element is the handle mounted on the inner side of the window leaf, allowing the locking and opening of the window leaf in the fixed frame, but it may be also any other element allowing control of the locking mechanism. Therefore, particularly preferably, the dimensions of the retaining insert are such as to enable recess for the transmission mechanism with a depth of approx. 30mm. Dimensions of the retaining insert with the respective recess for the window fitting including the transmission mechanism of the window leaf locking thus allow that during normal handling of the window leaf during its opening and closing by the control element (usually a handle) there is no strain of the glass with the possible formation of cracks or similar defects in the glass because the control element and the window fitting are arranged in the retaining insert outside of the glass area.

**[0012]** The retaining insert of the glass panel of the present invention provides transfer of forces, especially of the load, from the window leaf proper to the fixed frame inserted into the respective construction opening and serves to placing of the window fitting, ensuring opening of the window leaf and its closing and locking without any use of the commonly used bearing window leaf frame, in which the glass panel is inserted. According to a particularly preferred embodiment of this invention then the retaining insert is used for setting of the standard all-circumferential window fitting for the glass panels.

**[0013]** As already mentioned above, the control element of the window fitting, thus most frequently the handle, is then subsequently fitted into that part of the retaining insert, which is already safely outside the glass panes, between which the retaining insert is adjusted. The retaining insert of the insulating panel according to the present invention preferably has such dimensions, so as substantially not widen the used insulating glass unit and with regard to its length so as only minimally lengthen it so as it is needed for installing of the mechanisms used for locking of the window leaf, in particular for the transmission mechanism, if it is used in this case of the glass panel. In particular, the transmission mechanism constitutes essentially the most voluminous component, which is required to be fixed in the retaining insert in accordance with the principles of the present invention. However, it

depends on the specific application example, in principle, the dimensions of the retaining insert should enable reliable incorporation of the most voluminous from the elements of the window fitting.

**[0014]** The retaining insert according to another aspect of the present invention serves particularly preferably as a fastening element for fitting of the casings, eventual seals, and similar elements, which will be described below. For the purposes of this invention, meaning of the casings is that they are flashing of the window leaf, which covers in particular the retaining insert and creates the impression of a window frame. The casings, it is the flashing of the window leaf, are often made of suitable laths fixed to the retaining insert. Forming and using of the casings will be described in greater detail below.

**[0015]** According to a preferred embodiment, the retaining insert can be arranged on two opposite sides of the window leaf being opened, wherein on one side of the window leaf it serves to attach the hinges for opening/tilting, and on the second, opposing side of the window leaf it serves to lock the window leaf in the fixed frame by means of the window fitting. As already mentioned, according to a particularly preferred embodiment of this invention the retaining insert is arranged around all four sides of the window leaf, in particular for use of all-circumferential window fitting.

**[0016]** According to another aspect of the present invention the retaining insert advantageously terminates the glass panel so that it ensures safe ending of the internal and external glass pane used in the double glass unit without necessity to modify edges by grinding before further damage or vice versa before any injury, thus saving a manufacturing operation and lowering the production costs.

**[0017]** Construction of the retaining insert, in particular its dimensions and shape very preferably provide the following features:

Depth L1 of the glued part starts from is recess of the spacer frame 2 from the edge of the glass and has to ensure the optimal area size of the glued materials 11a, 11b to transfer load from the glass window panes 1a, 1b to the glued in retaining insert via window fitting into the fixed window frame around the whole window.

**[0018]** The entire depth L of the retaining insert serves to form a morticing 11 for the largest part of the window fitting, which most often is the transmission mechanism. Width of the projection of the retaining insert glued between the glass panes is based on distances between the glass panes from each other and is reduced to allow for the thickness of the glue applied to the gap between the protrusion of the retaining insert and the glass pane to achieve optimal effects for connecting of both materials, wherein when designing the width of the protrusion, it is suitable to take into account the possible production tolerances of the distances of the glass panes of the insulating glass unit to avoid problems when gluing in the retaining inserts. The width D of the part of the retaining insert with the protrusion, i. e. behind the circumference of the insulating glass unit, is substantially identical equal to the thickness of the insulation glass unit, preferably it is increased by some minimal safety tolerance, i. e. it is exceeding the insulation glass unit to each side to certain distance, according to one preferable embodiment in the order of several tenths of millimetre. This ensures that the projecting portion of the retaining insert is always wider than the insulating glass, and this even when a certain tolerance of the width of the insulating glass production is kept.

**[0019]** According to another aspect of the present invention, it ensures thereby that particularly during mounting of the casings and subsequently also during assembling of the control element of the window fitting, that is most frequently of the handle, it is excluded that the control element presses the casings to the glass pane and causes possible damage to the insulating glass unit when the control element is tightened to the retaining insert. The height of the retaining insert exceeding the circumference of the insulating glass unit is such that it is possible to mill safely in this part the so called forging groove for recess of the window fitting, preferably all-circumferential one. According to a preferred embodiment of the glass panel, the height of the retaining insert is such that it allows also the establishment of the used locking transmission mechanism of the window leaf, which in this case reaches up to the projection glued into the insulating glass unit.

**[0020]** According to another aspect of this invention, the part of the insert extending beyond the two glass panes, is so high to allow fitting and abutment of the control element, most often of the window handle, with the exclusion of its abutment on the glass portion of the window leaf. Height L2 of the insert behind both glasses simultaneously serves for the possibility of mounting or abutment of the so called casings, which casings further take over a number of functions of the whole window element.

**[0021]** According to a particularly preferred embodiment of the glass panel according to the invention, by gluing of the retaining insert into the insulating glass unit of the glass panel the dimensions of the insulating glass unit are lengthened by about 22mm on each side of the window leaf, with that it integrates in itself the above-described advantages.

**[0022]** According to a particularly preferred embodiment of the glass panel of the present invention the retaining insert is made of wood. This ensures both good insulation properties and it is easy to manufacture and it also contributes to the low manufacturing costs, it is environmentally friendly, and exhibits many other benefits.

**[0023]** According to another preferred embodiment, the retaining insert is of a wooden part glued of several layers. The retaining insert of wood can be accurately machined, preferably by milling. The retaining insert is

preferably provided with a protective coating resistant to the effects of the known strains and subsequently the retaining insert is conveniently aesthetically surface finishes. As an alternative material for manufacture of the retaining insert, e.g. a plastic, recycled plastic, silon (nylon), and other suitable materials can be used.

**[0024]** It is important to realize that for understanding of the substance of the invention, the term glass panel is intended to mean first of all windows, French windows, glazed balcony door or similar glazed door, but it may also mean any other possible glass panels for construction openings, in which there is the requirement for their opening.

**[0025]** The glass panel according to the technical solution of the present invention is of course possible to be designed not only as a one leaf window, but also with two or more leafs. It is also possible to design the glass panel as pivotally opened, as a tilted window, as a combination a tilted and swivelled window, so as it is currently also common, e. g. for the plastic windows, or for the Euro-windows, and how it allows the window fitting used.

**[0026]** The glass panel for a construction opening, in particular for a window, a French window, a glassed door, is made up of at least one glazed leaf, mounted so that it can be opened (hinges are mounted on one end of the leaf), pivotally or swingingly mounted (hinges are placed in the middle of the leaf), foldably or preferably openably and foldably, as it is allowed for example by most of the all-circumferencial window fittings for attaching of the window leafs in the fixed frames.

**[0027]** According to a particularly preferred embodiment, the glass panel according to the invention is provided with the so-called all-circumferential window fitting, which is placed in the retaining insert glued in the insulating glass, as it has been described above. The retaining insert when an all-circumferential window fitting is used is also placed around the whole circumference of the insulating glass unit or window leaf. Peripheral fittings also including hinges of the wing is subsequently secured transmission of forces from the glazed leaf into a fixed frame, the connection thus created wings of the frame and also lock the wings in the frame respectively. its opening. According to a particularly preferred embodiment of the glass panel according to the invention the retaining insert is provided with a groove for installing of an all-circumferential window fitting which can be installed on all four sides of each wing of the future glass leaf of the glass panel because it can fully exploit possibilities of the all-circumferential window fitting, and also because via this window fitting there will still a better connection of all four retainingych inserts, arranged substantially around the whole circumference of the window wing, thereby safety of the so formed glass panel, especially of the retaining of the window leaf in the fixed frame is increased. It is preferred that individual retaining inserts need not to be firmly joined in the corners.

**[0028]** According to the invention, the retaining insert is formed for being glued into the insulating glass unit of the glazed leaf, wherein the insulating glass unit contains, as already mentioned, at least a first and a second bearing glass pane, the vacuum created between them or an inert gas between them. The terms a first bearing glass pane or a second bearing glass pane for the purposes of this application are not to be used in any restrictive meaning, but most often the term a first bearing glass pane means the inner glass pane and the term second bearing glass pane means the outer glass pane. According to another particularly preferred embodiment of the present invention the glass panel has at least one, preferably a second bearing glass pane, which is produced from a safety glass, most preferably of a hardened glass pane. The glass panel according to the invention is thus protected against any mechanical damage, breakage of whatever kind.

**[0029]** Even more advantageous is then the use of tempered glass panes for the first and second bearing glass panes, which provides a high mechanical resistance also from the interior side, which is advantageous e. g. in gyms, kindergartens, areas with higher security requirements for safety, and in similar areas of operation.

**[0030]** As already mentioned, for the manufacture of the retaining insert the most commonly used is a glued wooden prism beam, but it is also possible to use an alternative material, other than wood, if the material has sufficient strength, flexibility and ability to be bearingly connected with the bearing glass panes a it possible to create a profile in it for inserting of window fitting conveniently into the retaining insert. Particularly preferably, the retaining insert is connected not only with the first and the second bearing glass pane, but also with the spacer frame. Particularly preferably, the connection is made with a glue or a sealant.

**[0031]** To understand the nature of this invention, it is important to realize that transmission of the overall load from the glazed leaf into the fixed frame is carried out by the bearing glass panes, the retaining insert connected with the bearing glass panes and by the window fitting, connected both with the retaining insert and with the fixed frame.

**[0032]** The height of the retaining insert is, as already mentioned, preferably designed to fully visually and mechanically cover all mechanical parts of the window fitting including the handle transmission and still also cover the end edges of the glass panes around the whole circumference of the window wing.

**[0033]** According to a further preferred embodiment, the glass leaf is provided by a casing on the inner side along its circumference, which casing covers the otherwise visible joint of the retaining insert and the bearing glass pane. Covering the wing casing from the outside will be described below. Casing frame from the inner side also covers the gap between the window leaf wing and the fixed frame, where otherwise the protruding movable elements of the window fitting can be seen which elements are inserted into the so called stone anchored in the fixed frame in the closed position of the window.

**[0034]** A casing, both the internal and the external one, is preferably formed as an aesthetic complement of the window leaf. It can be made of any suitable material, e. g. of the massive wood, the laminated wood, a plastic, aluminium, or of various material combinations, which best ensure the aesthetic and other requirements for the casing. The casings are preferably designed with the possibility of their removing in case of service actions or if they are to be replaced due to their damage or due a new requirement on the appearance of the glass panel.

**[0035]** The casing is secured at least to the retaining insert, in which window fitting is also placed. However, the casings are preferably fastened to the retaining inserts around the circumference of the glass panel.

**[0036]** In view on the glass panel, the casing preferably covers always the entire retaining insert, to which it is attached, and more preferably including the spacer frame glued between the bearing glass panes.

**[0037]** According to one preferred embodiment of the glass panel of the present invention, the casing relatively to the fixed frame exceeds this fixed frame, preferably by from few millimetres to tens of millimetres, so that simultaneously it provides also the sealing function. To increase effectiveness of the sealing, in this part the casing is more preferably supplemented with a silicone seal on the respective contact surfaces.

**[0038]** A similar principle of the casing is also used on the outer side of the window with the fact that there the casing is firmly connected to the fixed frame by screwing or gluing it and mainly in the visible part of the glued insert the window leaf is pressed during closing of the window leaf exactly on this casing.

**[0039]** Preferably, it is possible to provide the window leaf, the casings, and the solid frame with some commonly used supplements used in window technique, such as for example by seals, various aluminium clips, etc., that will in particular maximize safety, thermal technical, hygienic, aesthetic options of the window, especially in accordance with the current requirements on these products.

Brief Description of the Figures in the Drawings

**[0040]** The substance of the technical solution will be more readily understood from the following examples of embodiments and from the attached figures, in which:

Fig. 1 shows a view of an embodiment of a glass panel with one window leaf in axonometric view, with an enlarged detail in the bottom part and with marked section planes AA' and BB';

Fig. 2 shows a detail of the design of a glass panel with a glued retaining insert and with a fixed frame, in partial cutaway;

Fig. 3a shows a detail of an embodiment of the glass panel in partial cutaway along the plane AA' of Fig. 1, but additionally provided with casings;

Fig. 3b is a detail of embodiment of the glass panel in partial cutaway along the plane BB' of Fig. 1, but additionally provided with casings and a handle;

Fig. 4 shows a detail of the retaining insert with a recess for mounting of the transmission mechanism into this retaining insert.

Examples of Embodiments

**[0041]** Figure 1 shows the first embodiment of a glass panel according to this invention in the form of a window and this in a view from the outside of the glass panel. The line 1a indicates the outer circumference of the insulating double glass unit of the glazed leaf. The line 2b indicates the outer circumference of the distance frame embedded in the insulating glass to create space into which the protrusion 4 of the retaining insert 3 is inserted, what will be described hereinafter. Then, the line 3c indicates the outer circumference of the glued retaining insert 3, which retaining insert 3 is arranged around the whole outer circumference of the leaf 10 in this embodiment.

**[0042]** Figure 2 shows in detail a partial cross-section of an embodiment of the glass panel according to the technical solution shown in Figure 1. In this case, the glazed leaf 10 is formed by an insulating double glass unit with two bearing glass panes 1a, 1b, the first bearing glass pane 1a and the second bearing glass pane 1b, separated from each other by a spacer frame 2, which is inserted between them. Spacer frame 2 is embedded between both bearing glass panes 1a, 1b by a distance L1, whereby overlaps of both glass panes 11a and 11b are formed. It is appropriate to note that the overlaps 11a and 11b need not be equally long. According to another preferred embodiment (not shown), the exceeding 11a is greater than the exceeding 11b. The spacer frame 2 is connected to both bearing glass panes 1a, 1b to form an insulating space between both bearing glass panes similarly as it is the case with conventional insulating glass panes. Therefore, the connection will not be described in detail here. In the space of the overlaps 11a and 11b between both bearing glass panes 1a, 1b and the spacer frame 2, a retaining insert 3 of a corresponding shape is inserted, wherein thickness D of the retaining insert 3 is substantially equal to that of the insulating double glass unit, and it is made thinner in this area to form a so called key protrusion 4 of the retaining insert 3 which is glued in the space between the glass panes 1a, 1b. Here it should be noted that this feature is not essential for functioning of the invention. Any person skilled in the art engaged in design of the insulating glass units is certainly able to suggest a number of functional solutions in which the thickness of the double glass unit will be different from the thickness of the insert. Further, additional glass panes with auxiliary spacer frames can be added to the insulating double glass unit (not shown), thus making possible to provide an insulating triple or more glass unit. Then, the shape and dimensions of the retaining

insert 3 and/or the protrusion 4 are preferably adapted to the so formed insulating glass unit. However, there are other possible modifications of the glass panel of the present invention and they will not be described in detail, as they can be suggested by any designer who receives the task of designing a glass panel provided with a insulating glass unit with three or more glass panes in accordance with features of the present invention. In terms of the substance of this exemplary embodiment of this invention, it is only important that in case a triple or more glass pane unit is used at least one spacer frame is embedded between the bearing glass panes so as to make a for the retaining inserts for the respective window fitting, which window fitting connects the glazed wing with a fixed frame and that the retaining insert has a width corresponding to the width of the insulating glass unit, and is in accordance with the requirements described.

**[0043]** In the embodiment of Figure 2, the retaining insert 3 is connected with the first and second bearing glass panes 1a, 1b, and here preferably also with the spacer frame 2, by an adhesive or a putty 8, for example by a butyl based one. Of course, it is possible to use any other suitable adhesive or putty used for such purposes. A forging groove is formed in the retaining insert 3. A window fitting 6 is then arranged in the forging groove 5. A window fitting 6 also connects the glazed leaf with a fixed frame 7. A whole circumferential window fitting is advantageously used as the window fitting 6 in this example of an embodiment, in accordance with the current design of the plastic or wooden windows and doors. As already mentioned, it is also possible to use partial window fittings, ensuring the opening or tilting of the glazed leaf in a fixed frame and its locking in the frame.

**[0044]** Here, it should be noted that in this embodiment a standard window handle is used as the control element for the purpose of handling the window fitting, which handle transmits via a transmission mechanism the change in the positions of individual fitting rolls, and the fitting rolls then set by their position the corresponding option for the position of the of the window leaf with regard to the window frame. In this example of embodiment the position may be closed, micro-ventilation, tilting of the leaf, or its opening.

**[0045]** Exactly placing of the whole gear mechanism into the recess 11 in the retaining insert 3, which is preferably only a few millimetres larger than the gear mechanism, so that the gear mechanism reliably fits in the recess, is one of the important features of the invention. So, the whole gear mechanism according to the invention is mounted in the retaining insert and the control element of this mechanism (the window handle) is fully beard only by the retaining insert and/or it is beard by it via an inner casing so that stressing of the glass panes is completely eliminated.

**[0046]** A recess 11 for mounting of a gearbox and three onesided circular holes, two outside ones for mounting of a control element (the handle) in the insert by a pair of metric screws and one in the middle for putting in of the square shaft proper of the handle, which shaft transfers the the rotational movement of the handle to the gear mechanism, are milled into the retaining insert at the proper place.

**[0047]** Figure 3a shows in detail an embodiment of the glass panel according to this technical solution, similarly as in Figure 2 except that in this case the glass panel is also completed with the so called casings which casings have already been mentioned in the previous text. On the interior side of the glass panel the inner casing 12 is present and on the exterior side the outer casing 13 is present. In this case, the casings are drawn only generally, however for the full functioning of this embodiment of the glass panel of the present invention they are of important significance. The outer casing 13, to which the glazed wing is sealed, is mounted to the fixed frame and this by screwing, gluing or casing into pre-prepared profiles. Preferably, the outer casing 13 is terminated 13 at the height of the inner side of the spacer frame 2. Sealing to the outer glass pane of the insulating glass unit is provided with a sealing 15, which sealing 15 can be attached both to the respective glass pane and the outer casing 13. The outer casing 13 is then preferably also covered by a protective ledge 14 from above, which ledge 14 is resistant to weathering.

**[0048]** Typically, the inner casing 12 is mounted on the retaining insert 3, and this on its inner, interior side, and this again by screwing, gluing or mounting in pre-prepared profiles. Likewise, in the inner casing 12 inserted sealings 15 are used preferably to achieve a better insulating effect regarding the whole element. Preferably, the inner casing 12 is again terminated at the height of the inner side of the spacer frame.

**[0049]** The casings can be e.g. of rectangular shape of the profile with different types of chamfered edges, grooves and half-grooves for various additional, sealing and protective devices. Profile of the casings may not be firmly fixed, and can be designed according to the needs and requirements imposed upon them.

**[0050]** According to the material used, the casings may be wooden, from different species of wood and cork, and further also from metal, plastics, pertinax, glass and obviously combined, e. g. sandwiched, from the above listed materials. Preferably, various insulating materials used will certainly be applied here, e. g. various sealing rubber and silicone sealing, materials for active work with moisture such as nano-fibres, etc.

**[0051]** According to their functions, the casings may provide thermal insulation, humidity, static and aesthetic requirements, and obviously and firstly the functional ones, and so ensure the function of the glass panel according to the invention in accordance with the requirements imposed on them.

**[0052]** An advantage of the casings of the glass panel of the present invention is then their variability and the possibility of modifications or substitutions.

**[0053]** Preferably, the fixed frame 7 is made of the same material as the retaining insert 3, for example it is

of a glued engineering plywood. Preferred is when the frame is lamellary connected by gluing in the corners. Preferably, the width of the fixed frame 7 corresponds to the width of the retaining insert 3 in its free part.

**[0054]** The counterparts (blocks) 9 for anchoring and fixing of the movable parts of the window fittings (the so called rollers) are then fixed into this side of the fixed frame 7,. Usually, the fixed frame 7 is anchored to the walls of the construction hole, eventually also to the sill or to the cap by the so called clamps 18, but the anchoring but can also be made in another suitable manner.

**[0055]** It is particularly preferred if the various components of the glass panel according to the invention are surface treated adequately before assembly to the building opening, especially when they are of wood.

**[0056]** It is not excluded that subsequently further advantages and possibilities of use of the present invention will be identified. However, this does not preclude that such will be within the scope of protection of this invention, since the benefits mentioned herein are listed as possible and not as delimited in their number. Likewise, the examples of embodiments are merely illustrative and in their scope not delimiting the protection scope of the technical solution, which scope is determined exclusively by the scope of claims for protection.

Industrial Use

**[0057]** A window for construction openings of this technical solution can be used mainly in the construction industry both in the construction of new houses, including the family houses, apartment buildings and offices, as well as in their reconstruction.

**[0058]** Advantages of a window for construction openings according to this technical solution are especially as follows:

- A window, or a window leaf, is produced in a more subtle design than as it is in case of the conventional windows, and this is reached using the basic elements, the glass panel, the wooden laminated insert, and the window fittings;
- Subtlety and elegance are achieved by a thinner window;
- The disclosed window uses less material than the conventional windows;
- All the mentioned elements take over the load-bearing function, i. e. the glass panel, the wooden insert, and the fittings, unlike the ordinary window, where it is taken over mainly by the frame;
- The window can be and is suitable for being completed by some sealing, insulating and design elements, the casings, which casings, according to claims, then meet the requirements expected of them;
- The casings as additional elements are replaceable at any time, because this does not interfere with the carrying parts of the window;
- In case of these elements, the casings, emphasis can be placed on different desired functions, such as the insulation functions, the weather resistance, the design, etc. and moreover differently for the inner casings and the outside casings;
- The casings may be changed or replaced within time, or according other requirements and needs;
- For these above described reasons, the windows are fully repairable in case of failure of any element;
- It is possible to prioritize requirement on any element or function, and hence vary the individual elements;
- Therefore, for example it is possible to design a window that has such safety requirements that although it is breakable it is virtually insurmountable;
- One of the advantages is the fact that the window is finalized in the structure, that is not sooner than in the so called finalized construction, just the frame, the leaf and the casings are mounted after paintings.

**Claims**

**1.** A glass panel for a construction opening, in particular for a window, a French window, a glass door, is made up of at least one glass leaf (10) mounted for opening or tilting or for combined opening and tilting, in a fixed frame (7), which frame (7) is designed for mounting in said construction opening, wherein said glazed leaf (10) comprises an insulating glass unit consisting of at least two glass panes arranged spaced apart in parallel planes, between which at least one spacer frame 2 is arranged to form an insulating space between both glass panes constituted for example by vacuum or by an inert gas, and along at least part of the glazed leaf (10) circumference is arranged a window fitting (6) for connecting of said leaf (10) with said fixed frame (7), **characterized in**
**that** said glazed leaf (10) is formed by an insulating glass unit comprising at least a first bearing glass pane (1a) and a second bearing glass pane (1b), between which is disposed a with them bearingly connected spacer frame (2), wherein both said first bearing glass pane (1a) and said second bearing glass pane (1b) are formed for transferring of the force strain from said glazed leaf (10) on said fixed frame (7) and said first bearing glass pane (1a) and said second bearing glass pane (1b) are formed with an exceed (L1) with regard to the outer circumference of said spacer frame (2) to form a space and
**that** said glazed leaf (10) further comprises at least over a part of its circumference a retaining insert 3 provided with a protrusion (4) formed for insertion into a space between said first and said second bearing glass pane (1a, 1b), wherein a protrusion said the retaining insert (3) is fixedly connected with the inner sides of said first and said second bearing glass panes (1a, 1b) which exceed beyond the outer edge of said spacer frame (2), wherein said retaining insert

(3) is formed for arrangement of said window fitting (6), wherein said window fitting (6), including a control element, is arranged in said retaining insert (3) and the width of said retaining insert (3) corresponds to the width of said insulating glass unit.

2. A glass panel according to Claim 1, **characterized in that** said retaining insert (3) is arranged around the whole circumference of said leaf (10), wherein it is provided along its entire length with a forging groove (5) for the locking mechanism of the window fitting and with a recess (11) for mounting of a transmission mechanism, which is part of said window fitting (6), and that a control element of a transmission mechanism of said window fitting (6) is connected with said retaining insert (3) to provide for handling of said window fitting during locking or opening of a window leaf 10 in said window frame (7).

3. A glass panel according to Claims 1 or 2, **characterized in that** said retaining insert (3) width is at least the same or wider than the width of the insulation glass unit.

4. A glass panel according to anyone of claims 1 to 3, **characterized in that** the height (L) of the retaining insert is higher than the depth of the recess (11) for mounting the transmission mechanism.

5. A glass panel according to anyone of Claims 1 to 5, **characterized in that** said first bearing glass (1a) and/or said second bearing glass (1b) is hardened and/or provided with a safety foil.

6. A glass panel according to anyone of Claims 1 to 5, **characterized in that** said retaining insert (3) is formed from at least one material selected from the group comprising a laminated wood, a plywood, a hard or a tropical wood, a plastic, a recycled plastic, a metal.

7. A glass panel according to anyone of Claims 1 to 6, **characterized in that** in the place of a recess (11) along one side said retaining insert (3) is provided with two holes for mounting of a control element outside the glass portion and a hole for the passage of a controlling square shaft into said transmission mechanism (6).

8. A glass panel according to anyone of Claims 1 to 7, **characterized in that** said fixed frame (7) is made of engineering laminated wood, engineering plywood or hard wood, eventually also the tropical one, which frame (7) is further completed as a sandwich by an insulator (16) and by another additional element, mainly from outer and the inner sides because of the protective and the aesthetic reasons.

9. A glass panel according to anyone of Claims 1 to 8, **characterized in that** said retaining insert (3) is on its inner sid eprovided with an inner casing (12), which is fixed to it.

10. A glass panel according to Claim 9, **characterized in that** said inner casing (12) is shouldered so that its upper edge is leveled with the inner edge of said spacer frame (2) of said insulation glass unit and the other edge then exceeds beyond the inner edge of said fixed frame (7), wherein said exceed is provided with a sealing (15) to prevent the heat escape.

11. A glass panel according to anyone of Claims 1 to 10, **characterized in that** from its outer side it is provided with the outer casing 13, which is from its outer side fixed to said fixed frame (7), wherein the inner edge of said outer casing (13) exceeds beyond the inner edge of the protrusion (4) of the retaining insert (3) and in the place of contact of the outer casing (13) with the glass leaf a sealing (15) is arranged to prevent heat escape.

12. A glass panel according to Claim 9 or 11, **characterized in that** said casing is formed of at least one of materials comprising wood, metal, aluminium, plastic, pertinax or glass.

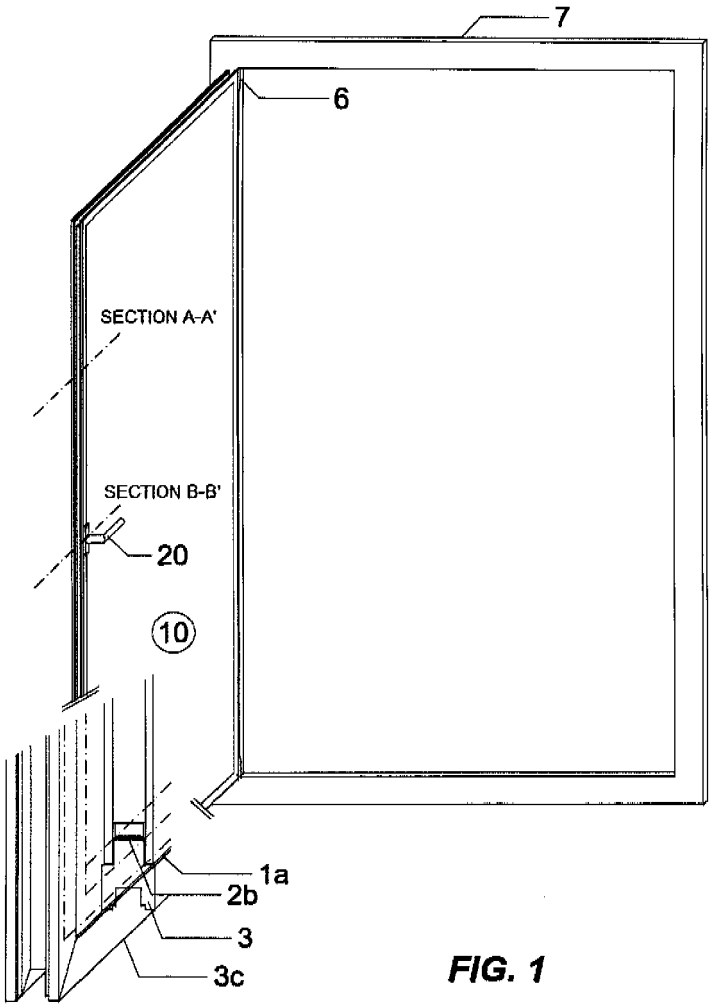


FIG. 1

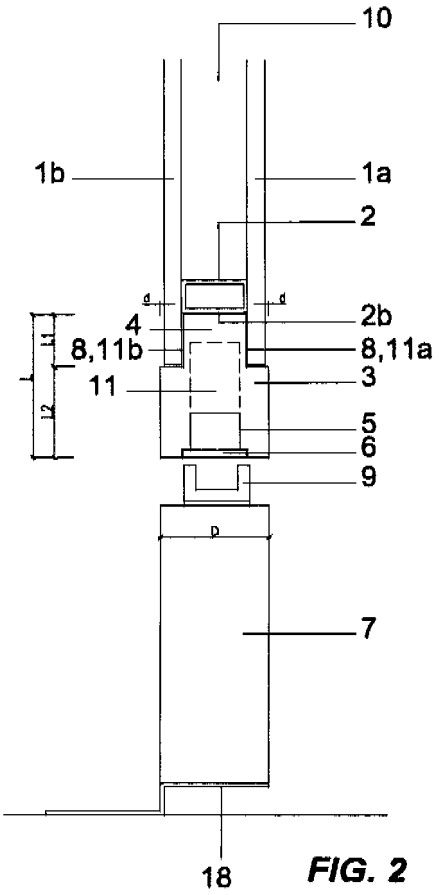


FIG. 2

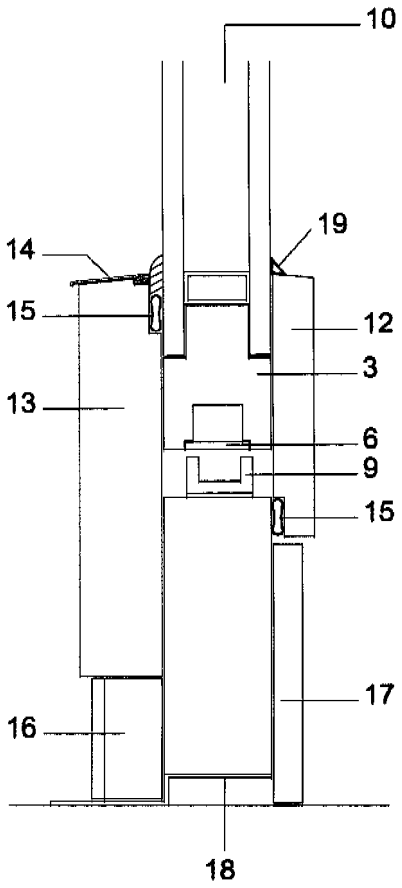


*FIG. 3a*

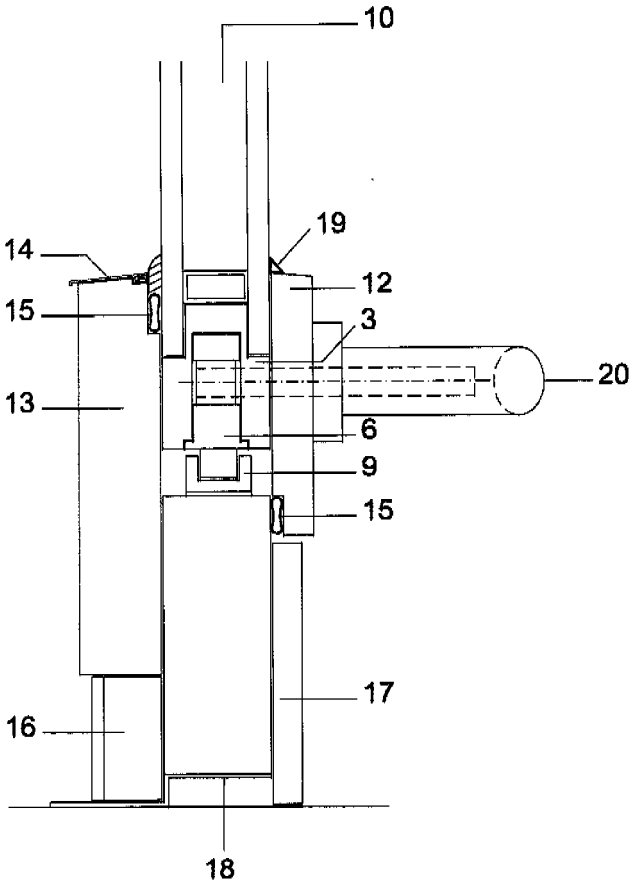


*FIG. 3b*

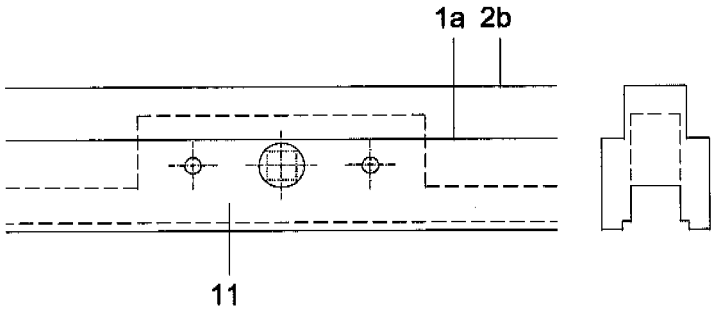


*FIG. 4*

## REFERENCES CITED IN THE DESCRIPTION

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