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(54) **Improved window/door.**

(57) The invention is an improved window/door set (1) comprising a casing (2) to which a leaf (3) is rotatingly joined via connection means (4), said leaf (3) being defined by a main frame (5) provided with a seat (6) suited to house a glass pane (7). The main frame (5) of the window/door set is provided with first joining means (8), at the level of two perimetral edges of the inner surface (9) in which the point of access (11) to the seat (6) is created, said first joining means (8) being suited to be removably coupled with second joining means (10) present on a counter frame (12), so that the counter frame (12) closes the point of access (11) to the seat (6) and constrains the glass pane (7) in the seat (6).

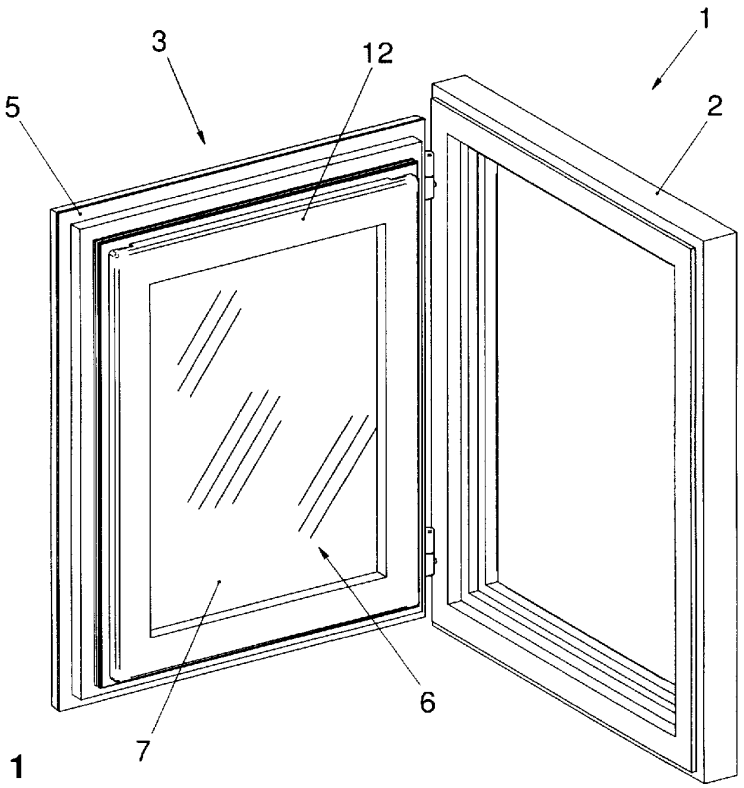

FIG. 1

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Description

[0001] The present invention concerns an improved window/door set, particularly but not exclusively suitable for making windows with inner double glazing.

[0002] It is known that in order to separate the rooms of buildings from the outside, door/window sets are installed on access openings like for example doors and windows, and said door/window sets may have various structural characteristics and be made with different types of material.

[0003] It is also known that in order to assess the higher or lower quality of a given type of window/door set or of the material used compared to other solutions various assessment factors are taken in consideration, like for example the degree of heat and sound insulation guaranteed, the tightness to air and wind, the resistance to sudden changes in temperature and hygrometric conditions, to sun rays and UV rays, to the biodegradation due to mildew and insects.

[0004] Furthermore, another factor considered in order to determine the higher or lower quality of a window/door set compared to others is its capacity to hinder any housebreaking attempts by burglars, in such a way as to guarantee a higher degree of safety.

[0005] Among the various possible choices concerning the materials for making window sets, aluminium or wood or a combination of the two materials are mainly used.

[0006] Always in the specific case of window sets, their structure comprises, as first thing, a casing defined by a frame usually embedded in the four sides of the window.

[0007] Said casing is rotatingly joined, via connection means like hinges, to one or more opening elements consisting of a main moving frame and at least one glass pane which, when assembled together, in technical jargon are called "leaves".

[0008] In particular, the above mentioned glass panes are located in suitable seats obtained in the inner part of the leaf structure and accessible from a single surface that hereinafter will be referred to as "inner surface".

[0009] Finally, it is well known that one of the most common methods for fixing the glass pane inside the seat consists in the use of special devices, called "clips" in technical jargon, which are placed on various points of said inner surface, spaced from one another, along the perimetral edge of the leaf itself.

[0010] Once positioned, said clips must be screwed one by one with special tools, like for example socket wrenches.

[0011] However, the closing and fixing techniques described above pose some important drawbacks that are listed here below.

[0012] A first important drawback of this special type of fixing system is represented by the fact that along the perimetral edge of the inner surface of the leaf suitable heat and sound insulation between the outside and the inside is guaranteed only at the height of the points where the clips are positioned, while in the remaining part of the profile the coupling between the glass pane and the leaf frame is not perfectly insulated.

[0013] For this reason, the heat and sound insulation and the air tightness of the entire window/door set are inadequate to meet the customer's requirements.

[0014] Moreover, a further drawback lies in the great difficulty encountered for the installation of this type of windows/door sets.

[0015] In fact, the clips must be positioned one by one in the fixing points and then must be screwed with special tools, as already mentioned above.

[0016] This involves a considerable waste of time for the installation, which disadvantageously leads to a rather low ratio between the number of windows/door sets installed and the time needed, meaning a considerable reduction in daily earnings for the company that installs the windows/door sets. Furthermore, if it is necessary to intervene on the window/door set for maintenance or replacement of any element, said clips must once again be unscrewed and removed one by one, which makes the operation difficult and complex, meaning waste of time and consequently reduced earnings for the installer.

[0017] A further technique used to fix the glass panes on the window/door set includes the use of the so-called "glazing beads".

[0018] The above mentioned elements are simply portions of frame that are fixed with nails or screws along the four inner edges of the leaf, in such a way as to lock the glass pane in its seat.

[0019] Even this technique, however, poses important drawbacks that are listed here below.

[0020] A first important drawback lies in that the glass pane must absolutely be thinner than the seat in which it is inserted, as part of the edge of said seat is used to fix said glazing beads.

[0021] A second important drawback is represented by the fact that said glazing beads must be fixed to the inner part of the leaf, since otherwise it would be simpler for burglars to remove them and withdraw the glass pane in order to access the building.

[0022] This means, however, that said fixing elements are visible in the inner part of the window/door set, thus negatively affecting its appearance.

[0023] For this reason, most of the times it is necessary to putty and colour said fixing elements in order to make them more pleasant to look at.

[0024] This operation obviously increases the time necessary for installing the entire window/door set.

[0025] Furthermore, the structure of the window/door set with said glazing beads does not make it possible to obtain a thickness of the window/door set suited to guarantee good heat and sound insulation.

[0026] The object of the present invention is to eliminate the above mentioned drawbacks.

[0027] In particular, the main object of the present invention is to provide an improved window/door set that guarantees an improvement in the heat and sound trans-

mittance factor compared to the windows/door sets of the known art, with construction costs only slightly different from those of existing windows/door sets.

[0028] A second object of the present invention is to provide a perfected window/door set capable of guaranteeing a higher degree of insulation along the entire edge of the seat in which the glass panes are inserted, compared to the windows/door sets of the known art.

[0029] A further object of the invention is to provide an improved window/door set that allows easy and smooth replacement of the various elements that make up the window/door set itself, and in particular the glass panes, compared to the windows/door sets of the known art.

[0030] It is a further, yet not the least object of the present invention to provide a window/door set that, though eliminating the above mentioned drawbacks, complies with the thickness values set by the current standards for windows/doors.

[0031] The objects illustrated above are achieved by an improved window/door set whose main characteristics are in accordance with the contents of the main claim.

[0032] Advantageously, the improved window/door set carried out according to the present invention allows greater diversification and customization of the materials and colours used for making the window/door, thus ensuring a pleasant appearance that can also be adapted to the customer's needs.

[0033] Still advantageously, the window/door set allows quick and easy maintenance of its outward facing side.

[0034] Another important advantage is the improved appearance also of the inner side of the window/door compared to the windows/doors of the known art.

[0035] The objects and advantages described above will be highlighted in greater detail in the description of a preferred embodiment of the invention that is supplied as an indicative, non-limiting example with reference to the enclosed drawings, wherein:

- Figure 1 shows an axonometric view of the inner side of the window/door set of the invention, in open position in relation to the casing;
- Figure 2 shows an axonometric view of the outer side of the window/door set of the invention, in closed position in relation to the casing;
- Figure 3 shows a front view of the outer side and a side view of the window/door set of the invention;
- Figure 4 shows a cross section of Figure 3 along plane IV-IV;
- Figure 5 shows a front view of the inner side of the main frame of the leaf belonging to the window/door set that is the subject of the invention;
- Figure 6 shows a front view of the inner side of the counter frame of the leaf belonging to the window/door set that is the subject of the invention;
- Figure 7 shows an axonometric view of the window/door set of the invention installed on a wall.

[0036] The improved window/door set that is the subject of the invention is shown in its whole in Figures 1, 2, 3 and 4, where it is indicated by **1.**

[0037] The above mentioned window/door set **1** comprises a casing **2** that serves as external frame to be embedded in the four sides of the window **A** and insulated together with it by means of mortar, special foams or tapes, as shown in Figure 7.

[0038] In the particular embodiment described herein, the casing **2** is rotatingly joined to a leaf **3** via connection means **4,** so that it can assume an open position and a closed position in relation to the casing itself.

[0039] In different embodiments of the invention, not described herein, if the casing **2** is larger compared to the embodiment illustrated herein, it can be joined to more than one leaf **3,** usually two.

[0040] In the particular solution described herein the connection means **4** are hinges **41.**

[0041] In different embodiments of the invention, the connection means **4** can be of a type different from the above mentioned hinges **41,** provided that they serve to rotatingly join the casing **2** to one or more leaves **3** and provided that they are elements belonging to the known art.

[0042] As shown in Figure 4 the leaf **3** as a whole is defined by a main frame **5,** provided with one ore more seats **6** suited to house at least one glass pane **7.**

[0043] In a preferred embodiment of the invention, described herein and illustrated in the drawings, the main frame **5** is provided with a single seat **6** on which a single glass pane **7** is arranged.

[0044] The above mentioned glass pane **7** is preferably but not necessarily a double glazing.

[0045] It is not excluded that in different embodiments of the invention the glass panes **7** can be of a different type, provided that they belong to the known art.

[0046] In particular, in a second embodiment of the invention not described herein, the glass pane **7** can be made of a special type of glass provided with photovoltaic devices for the production of electric energy.

[0047] In this case, the window/door set **1** must be provided with special wirings, in such a way as to transfer the electric energy produced to third internal or external devices.

[0048] According to the invention, the main frame **5** defining said leaf **3** comprises first joining means **8** arranged on two perimetral edges of the so-called inner surface **9,** in which the point of access **11** of said seat **6** is located, as shown in Figure 5.

[0049] Said first joining means **8** are suited to be removably coupled with second joining means **10** that, in turn, are arranged on a counter frame **12,** as shown in Figure 6, in such a way as to close the point of access **11** and consequently lock the glass pane **7** inserted in the seat **6.**

[0050] In the particular embodiment of the invention described herein, the first joining means **8** are positioned on two perimetral edges **91** and **92,** opposite to each

other and arranged vertically when the installation of the window/door set **1** has been completed.

[0051] In other embodiments of the invention, the first joining means **8** may be positioned on the perimetral edges **93** and **94** in horizontal position or on perimetral edges that are orthogonal to each other.

[0052] Obviously, in the preferred embodiment of the invention described herein, the second joining means **10** present on the counter frame **12** must be positioned on a first and on a second opposing perimetral edges **121** and **122** so that they are removably coupled with the first joining means **8** positioned on said first and second perimetral edges **91** and **92** of the main frame **5.**

[0053] In the particular embodiment of the invention described herein, said first and second joining means **8** and **10** comprise first and second projecting elements **13** and **14,** as shown in detail in Figure 4, each one of which is carried out in such a way as to define a sliding guide.

[0054] In particular, the first projecting elements **13,** present on the main frame **5,** are shaped so that they can be slidingly coupled with said second projecting elements **14** present on the counter frame **12.**

[0055] Both these projecting elements **13** and **14** preferably but not necessarily have an L-shaped profile.

[0056] In other embodiments of the invention, the second projecting elements **14** may have a T-shaped profile and consequently the first projecting elements **13** must be shaped so that they can be slidingly coupled with said second elements **14.**

[0057] Furthermore, in different embodiments that are neither described nor represented herein, the first and second joining means **8** and **10** can be of a type different from those described above, like for example a pressure-fit system or any other system belonging to the known art.

[0058] In the particular embodiment of the invention described herein, the second joining means **10** are housed in two recesses **15** and **16** obtained on said perimetral edges **91** and **92,** so that the most external surface **101** and **102** of each one of said second joining means is coplanar with the surface of the counter frame **12,** as shown in Figure 6.

[0059] According to the embodiment described herein and illustrated in Figure 5, furthermore, the main frame **5** comprises a stop element **17,** positioned on the third perimetral edge **93** of the inner surface **9,** orthogonal to said first and second perimetral edges **91** and **92** of the frame itself.

[0060] Said stop element **17** has the function to prevent the counter frame **12** from sliding on the main frame **5** in one of the two sliding directions.

[0061] As regards the counter frame **12** that locks the glass pane **7,** in the embodiment described herein it is provided with a weather strip **18** arranged between its inner surface and the inner surface **9** of the main frame **5,** in such a way as to increase air tightness and insulation between them, as shown in Figure 6.

[0062] Said weather strip **18** is preferably but not necessarily made in polyurethane foam, but it is not forbidden to use other types of seals or other materials, provided that they belong to the known art.

[0063] Another important aspect of the window/door set **1** of the invention lies in that its particular structure, with the insertion of the counter frame **12** that can be coupled with the main frame **5,** makes it possible to obtain a leaf **3** whose surface is substantially coplanar with the outer surface of the casing **2** when the leaf **3** is in closed position, as shown in Figure 2.

[0064] This makes it possible to obtain an important advantage, due to the fact that the window/door set **1** of the invention, though maintaining a thickness substantially in compliance with the standard values for windows/doors, comprises a leaf **3** that is thicker than the leaves of the known art, thus ensuring better heat and sound insulation compared to the known solutions.

[0065] In practice, to install the window/door set **1** of the invention it is necessary first of all to embed the casing **2** at the level of the sides of the window **A,** properly obtaining an insulating effect between the casing **2** and the wall **M,** as shown in Figure 7.

[0066] The second operation consists in positioning the glass pane **7** in the seat **6** present in the main frame **5,** if necessary insulating the two elements with special seals.

[0067] At this point the counter frame **12** is slidingly inserted from the side **94** on the main frame **5,** in such a way as to close the point of access **11** of the seat **6** and lock the glass pane **7.**

[0068] Finally, the leaf **3** is connected to and installed on the casing **2** via the connection means **4.**

[0069] A further important detail determined by the special structure of the window/door set **1** of the invention lies in that it is possible to withdraw and remove the counter frame **12** only in the case where the leaf **3** is in open position with respect to the casing **2.**

[0070] This situation, furthermore, ensures reduced risk of tampering and therefore a higher degree of safety compared to the windows/door of the known art.

[0071] The window/door set of the invention is preferably but not necessarily provided with a further element that guarantees even more safety.

[0072] In fact, inside said counter frame **12** there is/are one or more sensor means, not illustrated in the figures, suited to detect any movement of and/or tampering with the frame **12** in relation to the main frame **5.**

[0073] The introduction of said sensors in the counter frame **12** already during construction of the window/door set **1,** makes it possible to avoid drilling the window/door set **1** later on, which would affect the heat and sound insulation properties guaranteed at the beginning.

[0074] On the basis of the above, it is clear that the window/door set **1** that is the subject of the invention achieves all the set objects.

[0075] In particular, the invention achieves the object to provide an improved window/door set that guarantees better heat and sound transmittance than the windows/door sets of the known art, with construction costs only

slightly higher than those of the existing windows/door sets

[0076] The invention also achieves the second object to provide an improved window/door set that, compared to the windows/door sets of the known art, guarantees a higher degree of insulation along the entire perimetral edge of the seat in which the glass panes are installed.

[0077] The invention achieves the further object to provide an improved window/door set that allows quick and smooth replacement of the various elements that make it up, and in particular of the glass panes, always compared to the windows/door sets of the known art.

[0078] The invention finally achieves the object to provide a window/door set that, though eliminating the above mentioned drawbacks, complies with the thickness values set by the current standards for windows/doors.

[0079] During the construction phase, the window/door set that is the subject of the invention may undergo further changes that, though not illustrated or described herein, shall nonetheless be covered by the present patent, provided that they come within the scope of the claims that follow.

[0080] In the cases where the technical characteristics illustrated in the claims are followed by references, these have been added only with the aim to facilitate the comprehension of the claims themselves and therefore said references do not have any limiting effect on the degree of protection to be granted to each element they identify only by way of example.

Claims

1. Improved window/door set (1) comprising a casing (2) to which at least one leaf (3) is rotatingly joined via connection means (4), said at least one leaf (3) being defined by a main frame (5) provided with one or more seats (6) each one of which is suited to house at least one glass pane (7), **characterized in that** said main frame (5) is provided with first joining means (8), at the level of at least two perimetral edges of the inner surface (9) in which the point of access (11) to said one or more seats (6) is created, said first joining means (8) being suited to be removably coupled with second joining means (10) present on a counter frame (12), so that said at least one counter frame (12) closes said point of access (11) of said at least one seat (6) and constrains said at least one glass pane (7) in said at least one seat (6).

2. Window/door set according to claim 1), **characterized in that** said first joining means (8) are positioned on a first and a second opposite perimetral edges (91 and 92) of said inner surface (9) and said second joining means (10) are positioned at the level of a first and a second opposite perimetral edges (121 and 122) belonging to said counter frame (12), and wherein said first and second perimetral edges (91 and 92) of said inner surface (9) can be respectively coupled with said first and second perimetral edges (121 and 122) of said counter frame (12).

3. Window/door set according to any of the preceding claims, **characterized in that** said first joining means (8) and said second joining means (10) comprise first and second shaped projecting elements (13 and 14), each one of which defines a slide guide, so that said second shaped projecting elements (14) can be slidingly connected with said first shaped projecting elements (13).

4. Window/door set according to claim 3), **characterized in that** said first and second shaped projecting elements (13 and 14) have an L-shaped profile.

5. Window/door set according to any of the preceding claims, **characterized in that** said second joining means (10) of said counter frame (12) are housed in corresponding recesses (15 and 16) respectively obtained in said first and said second perimetral edges (121 and 122) of said counter frame (12).

6. Window/door set according to any of the preceding claims, **characterized in that** said main frame (5) comprises at least one stop element (17) arranged on a third perimetral edge (93) of said inner surface (9) and suited to stop the sliding movement of said at least one counter frame (12) in a given direction on said main frame (5).

7. Window/door set according to any of the preceding claims, **characterized in that** the outer surface of said second shaped projecting elements (14) is coplanar with the surface of said counter frame (12).

8. Window/door set according to any of the preceding claims, **characterized in that** it comprises one or more gaskets (18) arranged on the surface of said counter frame (12).

9. Window/door set according to claim 8), **characterized in that** said gaskets (18) are made of polyurethane foam.

10. Window/door set according to any of the preceding claims, **characterized in that** when said leaf (3) is closed said counter frame (12) of said leaf (3) is substantially coplanar with the outer surface of said casing (2).

11. Window/door set according to any of the preceding claims, **characterized in that** said counter frame (12) of said leaf (3) comprises sensor means suited to detect any tampering with said counter frame (12) in relation to said main frame (5).

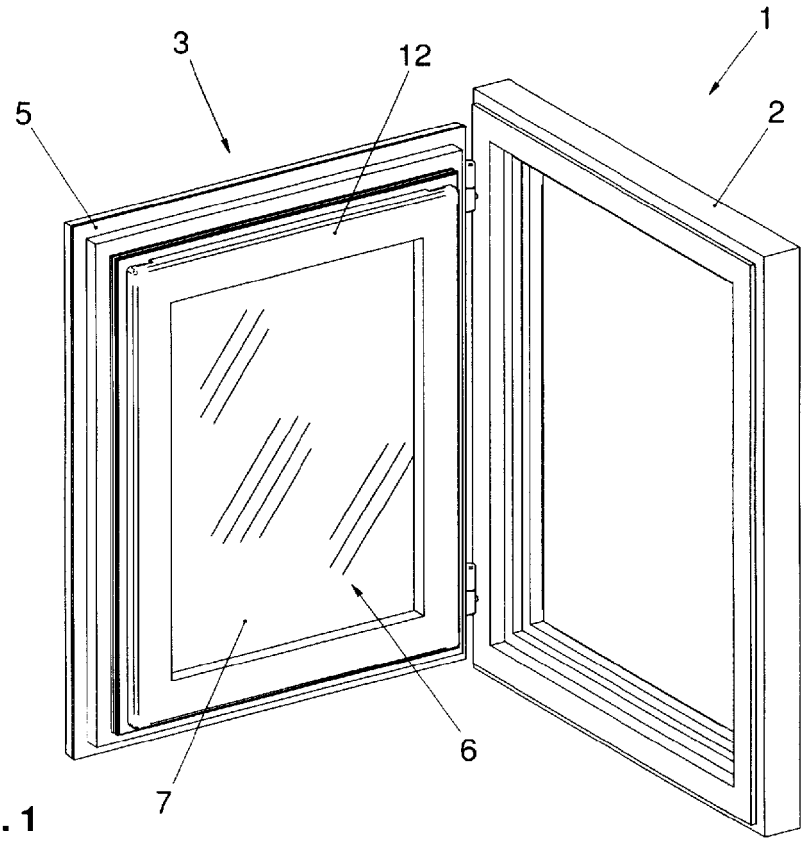

FIG. 1

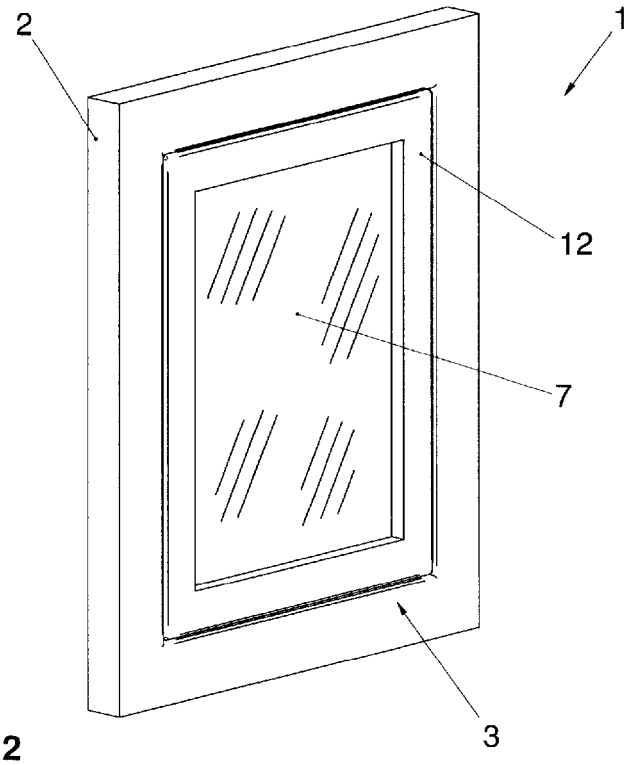

FIG. 2

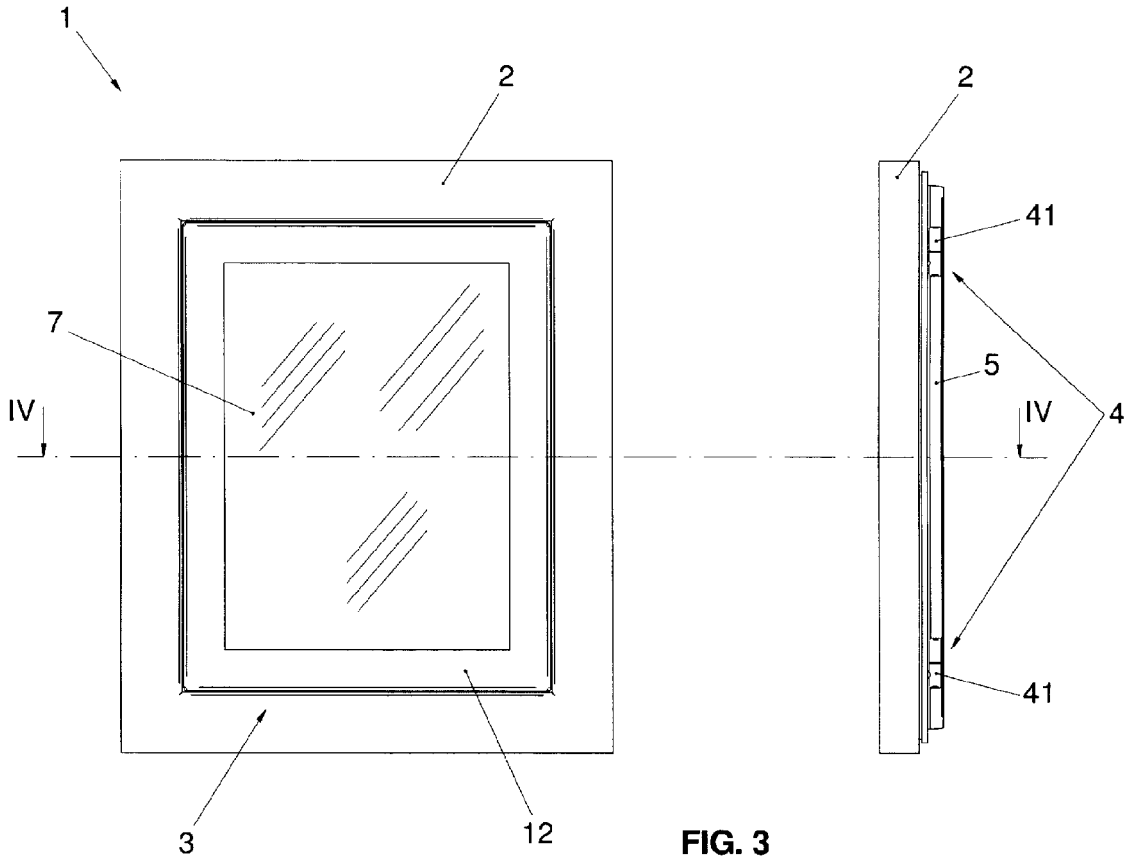

FIG. 3

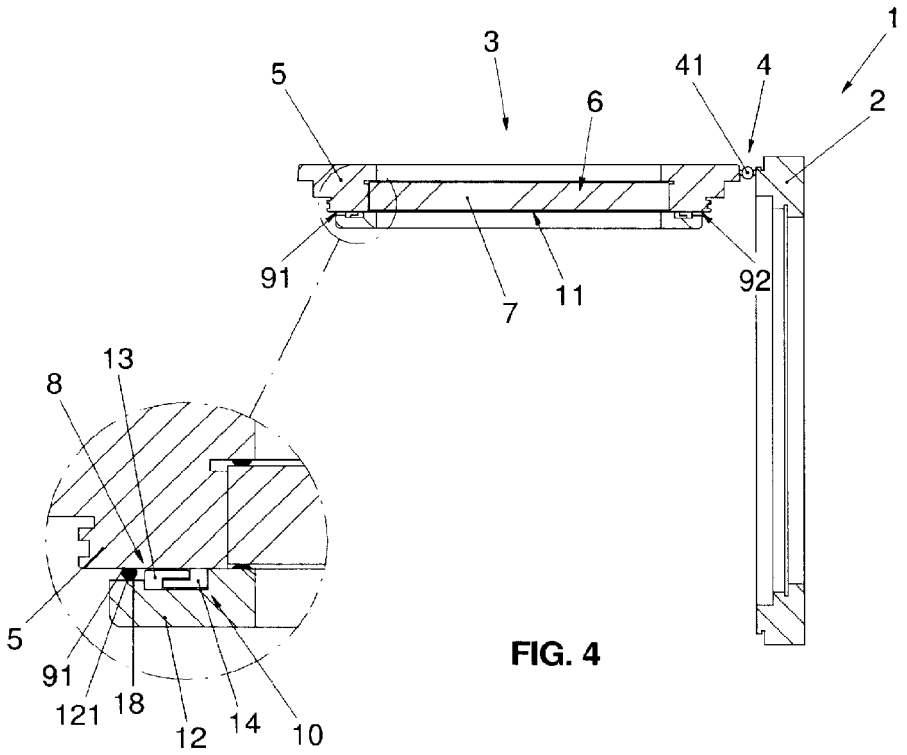

FIG. 4

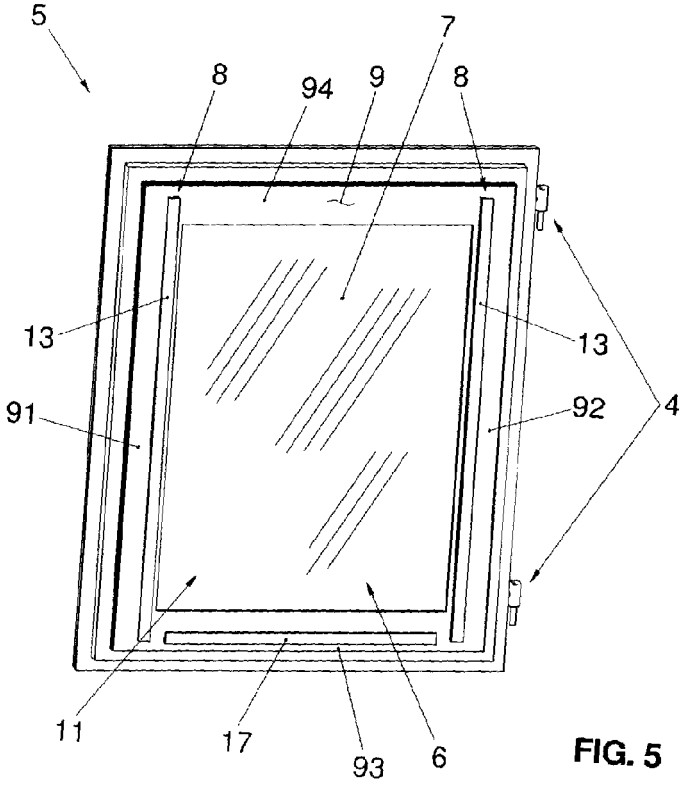

FIG. 5

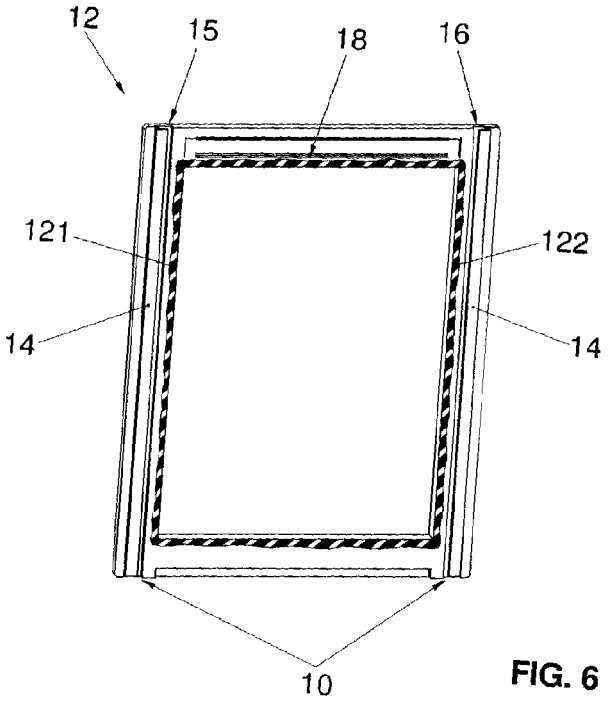

FIG. 6

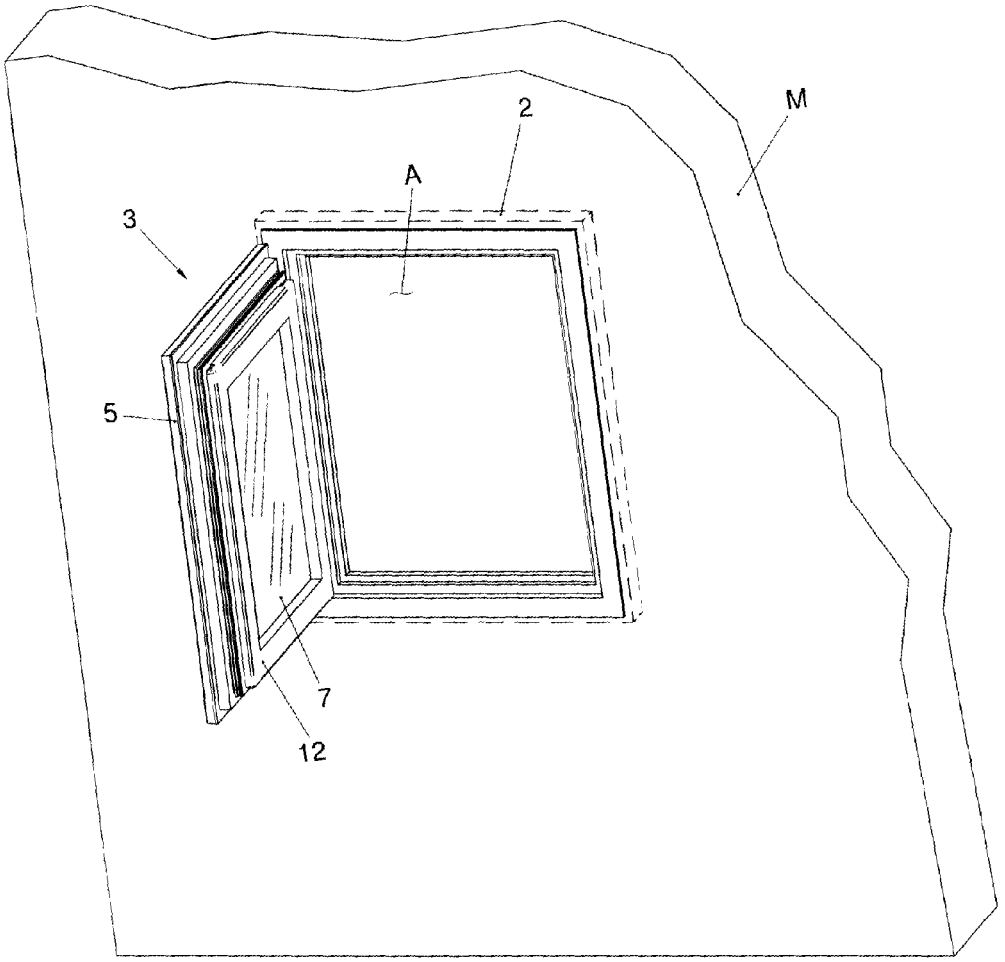

FIG. 7