(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 039 867 A2**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
25.03.2009 Bulletin 2009/13

(51) Int Cl.:
E06B 3/673 *(2006.01)*

(21) Application number: **08466026.5**

(22) Date of filing: **19.09.2008**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MT NL NO PL PT RO SE SI SK TR
Designated Extension States:
AL BA MK RS

(30) Priority: **21.09.2007 CZ 20070667**

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(54) **Universal frame of door or window leaf and method of production**

(57) A door/window leaf frame (1) comprises at least one surface (6) around entire perimeter allowing for setup and fixing, e.g. by pasting, a single glass pane (2), whereas every subsequent surface (6) is formed to allow for insertion of outer pane (2') of larger dimensions in comparison with the previous, inner pane (2); between each single pane (2,2',2''), in the inter-panel surface (9) of a door/window leaf frame (1), openings (4) are created to provide the desiccant located within space (3) inside the door/window leaf frame section (1) beneath the inter-panel surface (9), with contact with the inter-panel chambers (7) located between individual glass panes (2,2',2''), whereas at the point of the last glass pane (2') the door/window leaf frame (1) forms an overlapping (5) covering the peripheral edge of pane (2'), upon insertion and pasting, e.g. with glue, thus eliminating a need for additional work on the pane's edge.

The openings (4) between individual glass panes (2,2',2'') in the inter-panel surface (9) of the leaf frame (1), are made in the extrusion process of manufacturing the sections used in the leaf frame production, through a modification performed after the extruder, by adding a technology process of creating these openings (4). The openings are made in the inter-panel surface (9), and thus connecting the desiccant space (3) with the inter-panel chambers (7) located between the panes (2,2',2''), whereas the perforated openings (4) have a section preventing the desiccant to fall through. After a door/window leaf frame section (1) is cut and the desiccant space (3) is filled up, the leaf frame section (1) is put together, thus within the closed connected section (1), forming a set of closed cavities including the desiccant closed space (3), accessible only through the perforated openings (4) located in the inter-panel surface (9) to the chambers (7) located between glass panes (2,2',2''), thus the desiccant functionality is secured within space (7) located between the panes (2,2',2'').

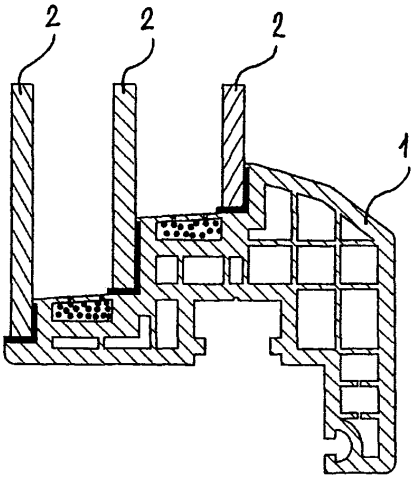

Fig. 3

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Description

Area of technology

[0001] The invention relates to door and window leaf frame used in buildings. In particular, it is about doors and windows made of sections through extruding, pressing and milling.

State of the art

[0002] Currently, there are many design solutions for windows, made of sections mainly through plastic extruding, a technology producing basic material for window manufacturing. Upon a section bar is produced, it is cut, strengthened, milled and consequently put together to make a wing frame. After fittings are installed, typically a double-glazed unit or triple-glazed unit, sealed or filled with insulating gas, is put into the frame and secured with a batten bar. A number of ways of setting double-glazed unit or triple-glazed unit, sealed or filled with insulating gas has been known.

[0003] A window leaf produced this way, put into the window frame is ready for installing in buildings.

[0004] Use of a double-glazed unit or a triple-glazed unit, sealed or filled with insulating gas, a ready-made piece inserted into window leaf frame, brings some disadvantages, particularly the heavy weight of such a wing and a potential loss of the insulating gas over a period of time, resulting in reducing its thermal insulation and possibly subsequent water condensing on the inner surface of glass plate - glass damping.

[0005] At plastic windows manufactured these days, metal braces are used in order to provide stability however, having a negative impact on window heat resistance.

[0006] A negative influence of setting block's thermal bridge is also significant, participating in reducing in insulating capabilities of the entire window.

[0007] Another disadvantage of windows manufactured these days is a huge material consumption/waste resulting in high costs of manufacturing own section systems of doors and windows.

[0008] Overall, window and door wings manufactured these days are labor-intensive.

[0009] Plastic windows produced these days are significantly affected by thermal expansion caused by solar radiation, having impact on stability of the entire window. It's well known that temperature of the sections reaches up to sixty degree Celsius during higher intensity of solar radiation. That causes expansion of plastic sections up to two millimeters per one meter of section's length, indicated by subsequent sections deformation and changes in wings dimensions which is not desirable.

[0010] Currently, consumers make still higher demands on window quality, particularly it's thermal and noise insulation. On the manufacturer's part, window manufacturing costs as lowest as possible are desired.

Gist of the invention

[0011] The invention's function has been designing a solution eliminating to a great extent the aforementioned drawbacks. A solution based on door/window-leaf universal frame made through extrusion has been designed. It is based on a technique when individual panes are inserted into door/window-leaf universal frame through e.g. gluing each paneling. The door/window-leaf frame comprises at least one integral surface across entire perimeter for setting up and fixing the paneling to the door/window-leaf frame while other surfaces are designed for insertion of paneling of larger dimensions. In the area between each panels inside the door/window-leaf frame openings are made to provide a contact with a desiccant laid within space inside the leaf frame section beneath the inter-panel area with inter-panel chambers between window panels. For the last window panel, the leaf frame has an overlapping so that upon insertion and fixing the last panel, it covers the panel's peripheral edge. The material overlapping protects the sharp edge of the panel against damage and potential harm to operator so there is no need to treat that edge.

[0012] Fixing the door/window paneling to the leaf frame is achieved through e.g. gluing, puttying, etc.

[0013] The openings between each window panels, within the inter-panel area of leaf frame, providing contact of the desiccant, laid within space inside the leaf frame section beneath the inter-panel area with inter-panel chambers between window panels, are made at stage of leaf frame sections production - just after extruder by adding a technology process making the holes. These holes are made in the inter-panel area through which a space inside the door/window leaf frame section is accessible to the desiccant with chambers between panels. Diameter of these perforated holes prevents fall of the desiccant through from the space inside door/window leaf frame section, beneath the inter-panel areas, to the chambers between panels, typically glass panes. Upon cutting the section bars and filling up the space with the desiccant, the section is put together through a common technique. This way, closed cavities are formed, including desiccant-filled space inside closed joined section. This space is accessible only through perforated holes in the inter-panel area from chambers located between panels, typically glass panes, thus the drying-agent function is secured.

[0014] Various types of glass are used as door/window paneling. Various types of polycarbonates or plastic panels may be used.

[0015] As a convenient modification, the leaf frame is made having a sloping inter-panel surface or inter-panel surfaces between individual window panels, in order to allow for easier insertion of window panels - glass in particular.

[0016] A glue material is applied on the surface around entire leaf-frame perimeter, used for setting up and fixing a window panel. A window panel is put on this material,

while the panel weight squeezes out an excessive glue material onto the peripheral edge of the window panel.

[0017] It has been experimentally proved, that an adequate amount of glue material for gluing window panels, typically glass panes, in lay-out according to the invention provides excellent rigidity of window leaf both, static and in dilatation.

[0018] The wing is stiff enough, need for use of a metal reinforcement is eliminated.

[0019] For better noise insulation, it is suitable to design the leaf frame with various widths of the inter-panel spaces between glass panes.

[0020] Everything concerning a window leaf frame may be applied even to a door leaf frame in the same way.

[0021] The openings between individual window panels within the inter-panel area of leaf frame are made at stage of leaf frame sections production - just after extruder by adding a technology process making the holes. These holes are made in the inter-panel area through which the drying-agent space is accessible to the inter-panel chambers between panels. Diameter of these perforated holes prevents fall of the desiccant through. Upon cutting the section bars and filling up the space with the desiccant, the section is put together through a common technique. This way, closed cavities are formed, including desiccant-filled space inside closed joined section. This space is accessible only through perforated holes in the inter-panel area from chambers located between panels, typically glass panes, thus the drying-agent function is secured inside the area /7/ between panels.

[0022] Filling up with the insulating gas or vacuuming is done after window panels are fixed to the leaf frame and holes are perforated, for example by boring, in opposite side of the inter-panel area - off the chambers between panels in the door/window leaf frame ending up in the drying-agent space. Insulating gas filling or vacuuming is subsequently done through this hole into the drying-agent space, interconnected with the inter-panel chamber through the perforated openings. Those openings are closed upon filling up with insulating gas or vacuuming, for example with a system plug or through gluing process.

Invented solution's benefits:

[0023]

- A number of window panels of various types can be used through pasting each panel into the leaf frame. Thus, insulating chambers are formed between each glass pane so there is no need for using commonly manufactured and used insulated panels - double/triple-glazed units, manufactured as prefabricated, vacuumed or with space between the glass panes filled with e.g. inert gas and inserted into a leaf frame as a whole.
- The leaf frame, based on the engineering solution can be designed with various widths of spaces between panels - glass panes, thus controlling its noise and thermal insulation characteristic.
- With respect to design complexity, the leaf frame designed by this technique is simpler, resulting in lower labor consumption of production in compare with commonly manufactured leafs these days.
- For leaf frame designed according to this invention, a larger area of glassed surface is achieved, resulting in higher light yield of the window.
- Lower amount of material - plastic in particular - is used in production of window leaf. There is no need for use of reinforcement, glassing washers or spacers, resulting in lower weight of the leaf and allowing for use of multiple panels, if allowed by window fittings bearing capacity.
- There is no need for use of a spacer as is common in currently common prefabricated double/triple glazed sealed units - since the desiccant space is located directly inside the leaf frame.
- Leaf frame designed in accordance the invention allows for utilizing double/triple glazed sealed units if necessary. In such a case a spacer is used.
- Upon sticking the last pane of glass to the leaf frame, a material overlapping is left on the leaf frame, eliminating the need to treat the pane's sharp edge which is covered by leaf frame.
- Inter-pane space of leaf frame designed in accordance with the invention allows for filling up or refilling with insulating gas or vacuuming with no need for dismantling anytime, even after final installation of window, particularly at a construction, resulting in prolonged window lifespan.
- A wing designed in accordance the invention, is universal and can be installed into common window frames.
- There is no need for glass stop in window frame manufacturing, as in common windows.
- After sticking in the panels, for example individual glass panes - usually two or three panes of glass are used - to the window leaf, it has higher stability, particularly at higher ambient temperature levels, no droop occurs
- A window manufactured with use of leaf frame designed in accordance with the invention, has significantly higher insulating quality than commonly produced windows.
- Windows utilizing leaf frame according to the engineering solution - single-winged, multi-winged, with stationary or movable column, openable, tiltable or sash windows, are visually optically identical, having frame of the same width, in a set with fixed glazing, when standard window frames are used.
- In case of colorful window frame, there is no need for painting or other color modification on the external side since the leaf frame is not visible as it is hidden behind the window frame even when a standard profile is used.
- When putting a panel on top of sticking surface of

leaf frame, with glue applied, an excessive glue substance is squeezed out onto the peripheral edge of window panel and thus resulting in increase of sticking area by the panel thickness, i.e. increase in toughness and eliminating direct contact of the panel with leaf frame, resulting in reduction of window panel damaging risk when roughly manipulated.

List of drawings

[0024] The invention is clarified in more details in enclosed drawings; fig. 1 shows section of a door/window leaf frame with two panels; fig. 2 shows a three-dimensional section of door/window frame with highlighted layer of glue substance; fig. 3 shows a three-panel variant.

Example of invention realisation

[0025] An exemplary invention implementation has a window leaf frame 1, into which two single glass panes 2 are stuck in, in a parallel way, comprising two surfaces 6 for setting up and pasting the glass panes 2 around whole perimeter of leaf frame 1, while the other surface 6 is formed upon insertion of the outer glass pane 2 of larger dimensions as compared with the inner glass pane 2; between each glass panes 2 in the inter-pane area 9, openings are created in order to provide contact for a desiccant located in space 3 inside the window leaf frame 1 section beneath the inter-panel area 9, with the inter-panel chambers 7 between glass panes 2, while at the point of inserting the second - outer pane of glass 2 the leaf frame 1 forms an overlapping 5, which covers the peripheral edge of pane 2 upon its insertion and sticking-in, thus the edge of that pane of glass 2 needs no special treatment.

[0026] Fixing the glass pane to the leaf frame 1 is done through a gluing process in which a glue substance is applied on the surface 6, formed around whole perimeter of the leaf frame, after setting-up and fixing the glass pane 2. Then the glass pane 2 is settled onto the glued surface 6, whereas weight of the glass pane 2 and/or by applying an additional press to the glass pane 2, excessive glue 8 is squeezed out onto the peripheral edge of the pane of glass 2.

[0027] This example of implementation is applicable to a leaf frame with two glass panes 2. However, more single panes of glass may be used.

[0028] Openings between each glass pane 2 in the inter-panel surface 9 of the door/window leaf frame 1 providing contact for the desiccant, located within space inside the door/window leaf frame 1 section beneath the inter-panel area 9, with the inter-panel chambers 7 located between glass panes 2, are created in extrusion process of sections used in production of a door/window leaf frame 1, through a modification done after the extruder, by adding a technology providing perforating these openings. The openings are created in the inter-panel surface 9 and thus the desiccant space 3 in interconnected with the inter-panel chambers 7 between panes 2. Diameter of the perforated openings prevents falling of the desiccant from the space 3 down to the inter-panel chamber 7 between panes of glass. After the door/window leaf frame 1 section is cut and filling the space 3 with a desiccant, the leaf frame 1 section is welded by a widely common technique. This way, a set of closed cavities, including a closed space 3 for the desiccant are formed inside the closed welded door/window leaf frame 1 section. The desiccant is accessible only through the perforated openings 4 in the inter-panel surface 9 for chambers 7 located between the panes of glass 2 and thus the functionality of the desiccant is secured within space 7.

[0029] Those openings are created for example through a gradual extrusion by rolling tool of circular section with sharp spikes, onto the surface 9.

Industrial applicability

[0030] A door/window leaf frame designed in accordance with the invention can be utilized in buildings and thanks to its universality it can be installed even at existing door/window frames.

Claims

1. An universal door/window wing frame made of sections manufactured in extrusion process and a technique, **characterized by the fact that** a door/window leaf frame /1/ is made out of at least one surface /6/ around entire perimeter for setup and fixing, for example by sticking-in a single door/window glass pane /2/, whereas any other surface 6 is formed to allow for insertion of the outer pane 2 of a larger dimensions in comparison to the previous, inner pane 2, and between each single glass panes /2/ in the inter-panel area /9/ of the door/window leaf frame /1/, openings /4/ are created in order to provide the desiccant, located within space /3/ inside the door/window leaf frame section /1/ beneath the inter-panel surface /9/, with the inter-panel chambers /7/ located between each glass panes /2/, whereas at the point of the last pane of glass /2/ the door/window leaf frame /1/ forms an overlapping /5/, which, after insertion and fixing, for example by pasting, the glass pane /2/, coves peripheral edge of the pane /2/, so there is no need for additional work on it.

2. An universal door/window wing frame, based on claim no. 1, **characterized by the bact that** the fixing of glass pane to the leaf frame /1/ is done so that on the pane /2/ setup and fixing surface /6/, formed around entire perimeter of leaf frame /1/, a glue material /8/ is applied, onto which a pane /2/ is settled, whereas with help of weight of the pane 2 and/or by applying additional press on the pane /2/, excessive glue material /8/ is squeezed out onto the peripheral

edge of the glass pane.

3. A universal door/window leaf frame, according the claim no. 1, **characterized by the fact that** each surface /6/ for door/window glass pane /2/ setup and fixing is formed for sticking-in panes /2/ having various dimensions.

4. An universal door/window leaf frame, based on claim no. 1, **characterized by the fact that** the door/window leaf frame /1/ features a sloping inter-panel surface /9/ or inter-panel surfaces /9/ between individual glass panes /2/, in order to allow easier insertion of pane of glass.

5. An universal door/window leaf frame, made out of sections manufactured in extrusion process, and the manufacturing process technology **characterized by the fact that** the openings /4/ between each glass pane /2/ in the inter-panel surface /9/ or lef frame /1/, are made within the extrusion process of manufacturing the sections used in leaf frame /1/ production, through a modification after the extruder, by adding a technology of making the openings /4/, being created in the inter-panel surface /9/, and thus interconnecting the desiccant space /3/ with the inter-panel chambers /7/ located between the panes /2/, whereas these perforated openings /4/ have a diameter preventing falling-through the desiccant and upon the door/window leaf frame section /1/ is cut and the space /3/ is filled with the desiccant, the leaf frame section /1/ is connected, thus forming within the closed connected door/window leaf frame section /1/, a set of closed cavities, including the desiccant closed space /3/, accessible only through these perforated openings /4/ located in the inter-panel area /9/, to chambers /7/ located between the panes of glass /2/, and thus securing the desiccant functionality within the space /7/ between the panes /2/.

6. An universal door/window leaf frame, made out of sections manufactured in extrusion process, and the manufacturing process technology **characterized by the fact that** the filling of an insulating gas or vacuuming is done after the glass panes are fixed to the leaf frame /1/, creating the openings, e.g. by boring at the opposite side of the inter-panel surface /9/ - off a chamber /7/ between panes /2/ into the leaf frame /1/, ending up to the space /3/. Subsequent filling with insulating gas or vacuuming through this opening to the desiccant space /3/, interconnected with the inter-panel chamber /7/ through the perforated openings /4/. The openings are closed with e.g. a system plug or glue, upon the filling or vacuuming process is completed.

7. An universal door/window leaf frame, based on claims no. 1, 2, 3 and 4, **characterized by the fact that** in case of colorful windows, there is no need to modify the color of the door/window leaf frame /1/ at the exterior side by painting or other techniques, since the door/window leaf frame /1/ is not visible from the exterior side as it is hidden beneath window frame even when a standard section is used.

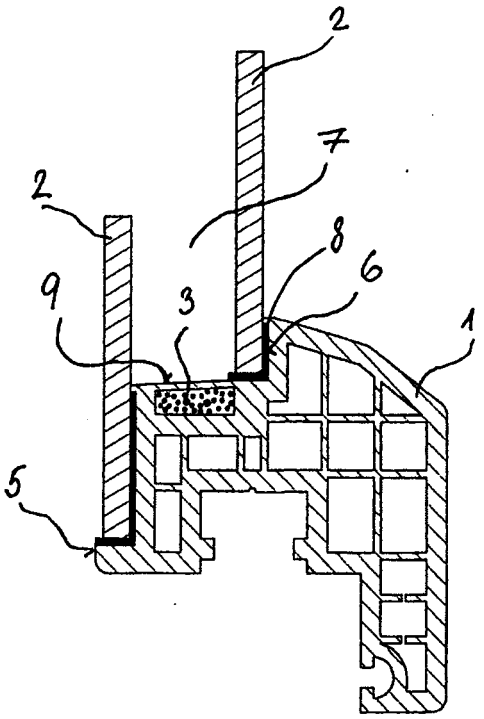

Fig. 1

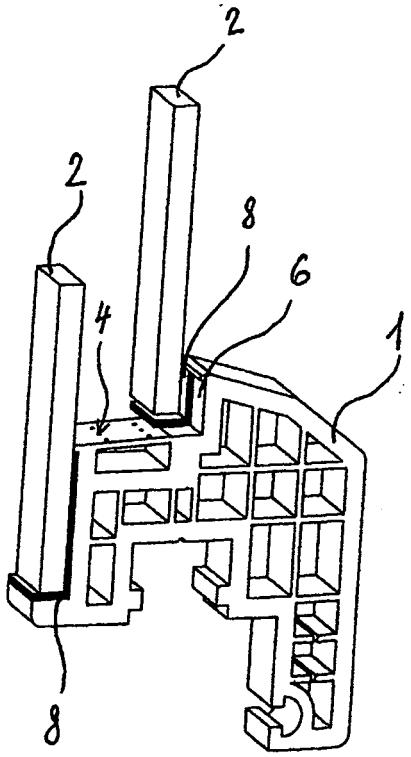

Fig. 2

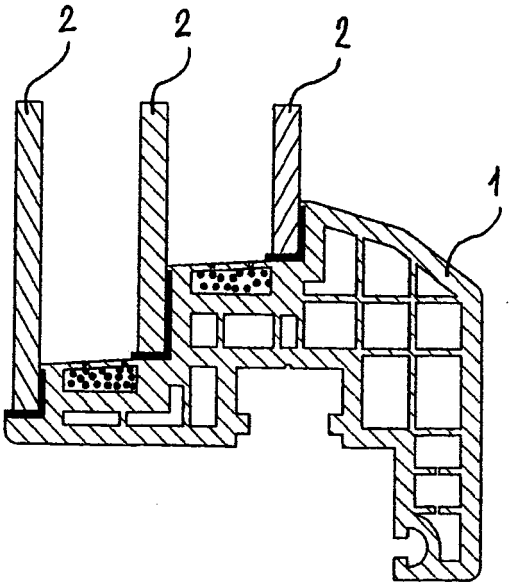

Fig. 3