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(54) Frame for a roof window and roof window

(57) A roof window frame comprising a top frame member, two lateral frame members and a bottom frame member, wherein said frame members form a rectangular-shaped structure, where the profile of the rectangular structure is of standard dimensions, and that at least one of the top and bottom members has an inclined inner surface extending inwards from the bottom surface edge of said at least one member towards the inside of the window frame and faced inwardly on the room when the frame is installed.

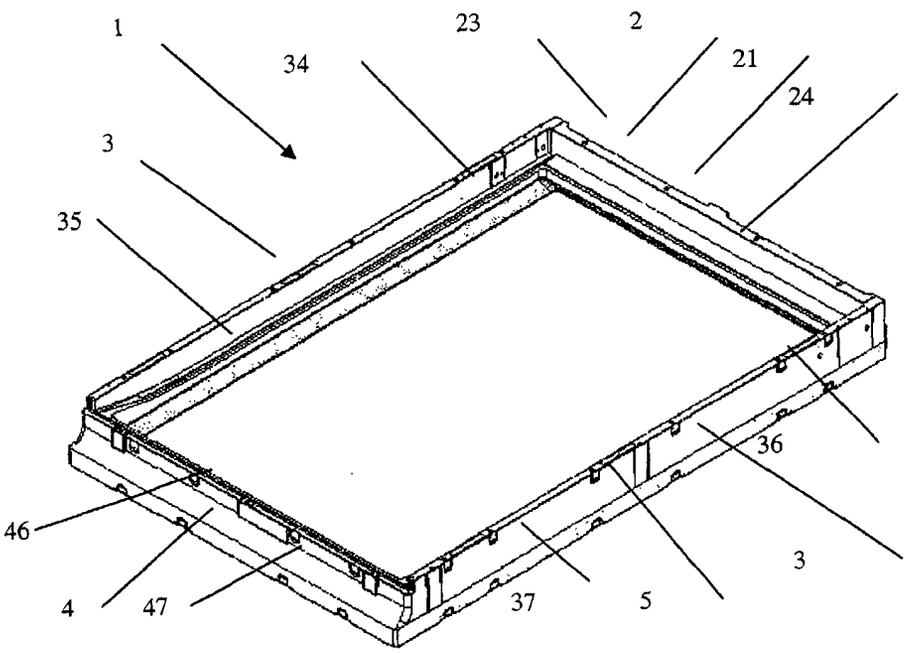

Fig. 1

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Description

FIELD OF INVENTION

[0001] The present invention relates to a window frame, in particular a frame for a roof window. The frame comprises a top member, two lateral members and a bottom member. The frame may be hinged to a sash so that the window is openable, or it may be unopenable. The invention also relates to a roof window.

BACKGROUND OF THE INVENTION

[0002] A known roof window, in particular an openable roof window, comprises a plurality of members. For example, International Publication WO99/51831 discloses an openable roof window comprises a frame, a sash, a glazing and a plurality of coverings. It is certainly favorable to manufacture windows and members in standard dimensions and sizes for interchangeability of members. Thus, it is beneficial to prepare packages for the members and replace one with another, which results in a reduced cost for storing and transporting the members.

[0003] However, it is problematic to manufacture windows and members under standard specifications. There are various applications. For example, some users may want an electric device for opening the window or a ventilation device. When using standard hollow panes and standard sized frames, one has to change the thickness of the frame or the sash. For an openable roof window, An increased thickness will lead to a heavier sash, especially when the sash is made from a high-density material. It could be dangerous to slam a heavy sash. Therefore, the window frame is thicker and heavier. Furthermore, the increased thickness will lead to a reduced available sunshine opening for the window.

[0004] Meanwhile, some high strength, water-resistant and erosion-resistant materials have been widely used for manufacturing window frames. Heavier frames cost more substantially.

[0005] When prior roof windows are installed in roofs, some cracks will appear at the connection of the frames or their casings.

[0006] Furthermore, the window may need a window screen to prevent the insects from entering the house. Usually the window screen needs to be installed on the frame by means of guide tracks. The guide tracks are fastened to the bottom member, top member and lateral members of the frame. Thus, the appearance of the window is not attractive. Certainly, it is hard to position and fasten the tracks precisely.

SUMMARY OF THE INVENTION

[0007] One purpose of the invention is to provide a window frame under standard specifications.

[0008] Another purpose of the invention is to provide a frame with a better appearance.

[0009] Still another purpose of the invention is to provide a frame, on which the window screen is easy to be installed.

Therefore, the present invention provides A roof window frame comprising a top frame member, two lateral frame members and a bottom frame member, wherein said frame members form a rectangular-shaped structure, characterized in that the profile of the rectangular structure is of standard dimensions, and that at least one of the top and bottom members has an inclined inner surface extending inwards from the bottom surface edge of said at least one member towards the inside of the window frame and faced inwardly on the room when the frame is installed.

Preferably, said inclined surface is a flat or/and curved surface.

More preferably, the top and bottom members and/or the lateral members have an inclined outer surface.

More preferably, the top and bottom members and/or the lateral members have at least two crossing outer surfaces.

More preferably, the top and bottom members and/or the lateral members have a base edge around the window frame and the inclined surfaces are extending into the inner of the frame from the base edge.

More preferably, the inclined surface on the outer surface of the frame is above the base edge.

More preferably, the inclined surface on the outer surface of the frame is below the base edge.

More preferably, the inclined surface on the outer surface of the frame is above and below the base edge.

More preferably, an outer recess is formed around the bottom surface edge of the frame.

More preferably, the outer recess is curved, L-shaped or V-shaped.

More preferably, an inner recess is formed around the bottom surface edge of the frame to mount a curtain.

More preferably, the inner recess is curved, L-shaped or V-shaped.

More preferably, the frame is made from wood, stainless steel, or aluminum alloy, metal-plastic complex or other complex materials.

More preferably, the frame consists of a wooden core and a PUR layer applied the core.

More preferably, the wooden core is made of plywood.

More preferably, a coating is applied to the PUR layer.

More preferably, the frame that constitutes of lateral members and horizontal members is integral.

More preferably, the frame is a one-piece structure.

The present invention also provides a roof window consisting of a window frame and a sash frame hinged on the frame and provided with a glazing and a covering, where the frame comprising two lateral members and two horizontal members which constitute one top member and one bottom member of the frame, wherein the window frame comprising a top frame member, two lateral frame members and a bottom frame member,

wherein said frame members form a rectangular-shaped structure, characterized in that the profile of the rectangular structure is of standard dimensions, and that at least one of the top and bottom members has an inclined inner surface extending inwards from the bottom surface edge of said at least one member towards the inside of the window frame and faced inwardly on the room when the frame is installed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010]

Fig. 1 is a perspective view showing a preferred embodiment of the frame according to the invention;
Fig. 2 is a A-A cross section of the top member of the frame in Fig. 1;
Fig. 3 is a B-B cross section of the lateral member of the frame in Fig. 1;
Fig. 4 is a C-C cross section of the bottom member of the frame in Fig. 1;
Fig. 5 is a structure view of the composition material of the frame; and
Fig. 6 is a sectional view of a member of another roof window according to the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0011] Hereinafter, a sloped roof window frame and a sloped roof window equipped therewith of preferred embodiments of the invention will be described in detail with reference to the drawings, so as to appreciate the invention.

The first embodiment

[0012] Figs. 1 to 4 show schematically a preferred embodiment of a window frame according to the present invention. The frame 1 comprises horizontal members consisting of a top frame member 2 and a bottom member 4, and two lateral frame members 3 extending parallel to a roof. The ends of the lateral members 3 are connected to the top member 2 and the bottom member 4, as shown in Fig. 1, the top member 2, lateral members 3 and bottom member 4 of the frame 1 comprises a one-piece structure produced by means of demolding processes. Of course, the frame can consists of separate members then assembled together according to the present invention. For example, the members may be made from wood, plastic-steel complex, stainless steel and aluminum alloy or other materials. Usually, the first step is to produce the frame members, i.e. top member 2, bottom member 4 and two lateral members 3, and then engage and fix them together at the second step. It is necessary to machine different materials or members. The frame can also be assembled by two L-shaped frame members, or a U-shaped member and a linear frame member.

[0013] Referring to Figs. 1 to 4, there is a base edge 5 around the entire frame including the top member 2, bottom member 4 and lateral members 3. The length and the width of the rectangle formed by the overall base edge 5 match a standard sized window. The base edge makes the frame structure easily engage and ideally cooperate with a standard drainage member (not shown) produced by the same production company or a different production company, and also makes the frame match the standard window recess constructed in the roof. This feature is very advantageous and important to the design, production, assembling and installation of the product.

[0014] Referring to Fig. 2, the top surface 21 and the bottom surface 22 of the top member 2 are flat surfaces substantially parallel to each other. And the inner surface 23 of the top member 2 has a flange 24 extending towards the inside space surrounded by the frame members. The flange is used to support a sash and creates a seal structure with the sash. There is an inclined slope 25 below the flange 24, and the inclination angle of the inner slope 25 can be determined according to the frame material and the sizes of other members, to guarantee the overall strength of the frame, and minimize the cross section of the members, so as to minimize the frame material and thus achieve the purpose of saving material cost and decreasing its weight.

[0015] Above and below the base edge 5 at the top member 2 is inclined surfaces 26 and 27, which goes nearer to the center of the member as they approaches their ends respectively, to reduces the amount material used for making the frame. This also applies to the inner inclined surface 25 of the top frame member.

[0016] As shown in Figs. 1, 3, and 4, there are also a flange 44 protruding inward from and an inner inclined surface 45 at the inner surface of the bottom member 4, above and below the base edge 5 of the bottom member 4 being a top inclined surface 46 and a bottom inclined surface 47. There are flanges 34 protruding inward from and inner inclined surfaces 35 at the inner surfaces of the two lateral members, above and below the base edge 5 being inclined surfaces 36, 37 inclined to the center of the frame member at the outer surface of the lateral members.

[0017] In the preferred embodiment, as shown in Fig. 5, the frame is made from a complex material comprising a wooden core 302 made from cheap plywood. A PUR layer 301 covers the wooden core. The PUR layer 301 is extruded onto the wooded core 302 by means of plastic foaming processes. The wooden core 302 may be replaced by a hollow aluminum alloy member. Compared with the wooden frame, at the same structural strength, the complex frame has the same cost and weight level as a wooden one, while being wind-resistant and rain proofing far better than the wooden one. Of course, the frame may entirely be made of wood, but the wood tends to erode when exposed to rain and sun-

shine. A paint coating can protect the wood to a certain degree, but the paint can be peeled off gradually. The wooden frame will inevitably crack some time, which will also affect the normal use and the appearance of the window. It also another choice to use aluminum alloy, stainless steel, plastic-steel complex or other complex materials, which would cost much more than using wood-PUR complex material according to the preferred embodiment. For the complex frame, the frame can be painted depending on actual applications.

[0018] The PUR-wooden frame of the embodiment is produced by plastic molding processes. As shown in Figs. 2 and 4, since there are inner inclined surfaces 25, 45, 35 and outer inclined surfaces 26, 27, 46, 47, 36, 37 at the top member 2, bottom member 4 and two lateral members 3 of the frame, the inclinations reduce substantially the cross section of the frame members, so that compared with the prior parallelogram frame structure, the inclinations can considerably save materials for making a frame while ensuring the structural strength of the frame, and the extruded base edge 5 at the outer surface of the frame meets the dimensional specifications of a standard window frame. The reduced material will lower the production cost and the product weight, which leads to a reduced transportation cost and facilitates the assembling and installation of the frame with a sash or other members into a roof. Furthermore, since the complex frame is a one-piece structure made by plastic molding processes, the inner inclined surfaces 25, 35, 45 and the outer inclined surfaces 27, 37, 47 will facilitate the demolding process.

[0019] As shown in Figs. 1 to 4, at the bottom surface of the top member 2, lateral members 3 and the bottom member 4 of the frame, i.e. the surface faced indoor when then frame being installed into the sloped roof, there is a recess 29, 39, 49 around the inner surface of the entire frame. The recess 29, 39, 49 is L-shaped for installing guide tracks (not shown) or other window screen members. The screen can be mounted into the inner recess 29, 39, 49 via the guide tracks. Compared with the configuration which connects the guide tracks directly with the bottom surface 22, 32 of the frame, since the guide tracks is substantially in the same plane with the bottom surface of the frame, the screen can be installed smoothly and decently. Since the inner recess 29, 39 49 is formed during the frame-molding processes, its finished precision is high. Therefore, the guide tracks or the frame members can be easily and precisely fixed on the window frame for installing the window screen. The depth and the width of the inner recess 29, 39, 49 can be designed depending on the width of the guide tracks and the entire bottom surface of the frame, which makes it possible to standardize the design of the window screen, to increase the compatibility of the screen and to ensure the installation precision of the screen. Of course, this inner recess can be also used to install a standard curtain. It will be appreciated that such a recess is only formed in the lateral members or in the top member or bottom member, depending on the screen structure and the fixing device for the screen.

[0020] Around the entire frame at the bottom surface thereof is another recess 28, 38, 48. The recess 28, 38, 48 is L-shaped, so that when the window frame is installed into a sloped roof, a decorating casing for the window is mounted between the sloped roof window and the house wall and enter into the recess 28, 38, 48 vertically. The window casing and the frame recess are engaged tightly with each other, and sealed together by applying adhesive to the recess. The engagement is tight and fast, and even if it begins cracking, the cracking will develop straightly, which will not affect the decency of the window. What's more, the outer recess also saves materials for making a frame and facilitates the demolding process during the plastic injection and molding processes.

[0021] Since there are inclined surfaces of the frame, in particular the inclined surfaces 25, 45 at the top and bottom members, the transparent opening of the frame is increased. As the window is installed in a sloped roof, the enhancement is substantial. Since the sunshine always projects onto the window non-vertically, due to the existence of the inclined surface, the lighting opening of the frame with the inner inclined surfaces 25, 45 is larger than that of a conventional frame without such inclined surfaces, and has an improved lighting efficiency. The angle between the inner inclined surfaces 25, 45 of the frame and the inner surface of the roof becomes smaller, which facilitates the ventilation of the house. The inner surface 45 of the bottom member 4 does not tend to adhere condensate water even when the temperature difference is considerable.

The second embodiment

[0022] Fig. 6 is a perspective view of another sloped-roof window according to the invention. The roof window consists of a frame 1 and a sash. Hollow panes 400 are mounted in the sash through a sash covering 200. A frame covering 100 is installed on the frame 1 and then engaged with a flashing member (not shown). The frame 1 is characterized similarly to the first embodiment, comprising similar inner/outer

Claims

1. A roof window frame comprising a top frame member, two lateral frame members and a bottom frame member, wherein said frame members form a rectangular-shaped structure, **characterized in that** the profile of the rectangular structure is of standard dimensions, and that at least one of the top and bottom members has an inclined inner surface extending inwards from the bottom surface edge of said at least one member towards the inside of the window frame and faced inwardly in the room when the

frame is installed.

2. A roof window frame according to claim 1, wherein said inclined surface is a flat or/and curved surface.

3. A roof window frame according to any oneof the preceding claims, wherein the top and bottom members and/or the lateral members have an inclined outer surface, wherein the top and bottom members and/or the lateral members can have at least two crossing outer surfaces, wherein the top and bottom members and/or the lateral members can have a base edge around the window frame and the inclined surfaces are extending into the inner of the frame from the base edge, wherein the inclined surface on the outer surface of the frame can be above the base edge, or wherein the inclined surface on the outer surface of the frame can be below the base edge, or wherein the inclined surface on the outer surface of the frame can be above and below the base edge.

4. A roof window frame according to any one of the preceding claims, wherein an outer recess is formed around the bottom surface edge of the frame, wherein the outer recess can be curved, L-shaped or V-shaped.

5. A roof window frame according to any one of the preceding claims, wherein an inner recess is formed around the bottom surface edge of the frame to mount a curtain, wherein the inner recess can be curved, L-shaped or V-shaped.

6. A roof window frame according to any one of the preceding claims, wherein the frame is made from wood, stainless steel, or aluminum alloy, metal-plastic complex or other complex materials.

7. A roof window frame according to any one of the preceding claims, wherein the frame consists of a wooden core and a PUR layer applied the core, wherein the wooden core can be made of plywood, wherein a coating can be applied to the PUR layer.

8. A roof window frame according to any one of the preceding claims, wherein the frame that constitutes of lateral members and horizontal members can be integrated, and wherein the frame can be a one-piece structure.

9. A roof window consisting of a window frame and a sash frame hinged on the frame and provided with a glazing and a covering, where the frame comprising two lateral members and two horizontal members which constitute one top member and one bottom member of the frame, wherein the window frame comprising a top frame member, two lateral frame members and a bottom frame member, wherein said frame members form a rectangular-shaped structure, **characterized in that** the profile of the rectangular structure is of standard dimensions, and that at least one of the top and bottom members has an inclined inner surface extending inwards from the bottom surface edge of said at least one member towards the inside of the window frame and faced inwardly on the room when the frame is installed.

10. A roof window according to claim 9, wherein said inclined surface is a flat or/and curved surface.

11. A roof window according to any one of the preceding claims 9-10, wherein the top and bottom members and/or the lateral members have a base edge around the window frame and the inclined surfaces are extending into the inner of the frame from the base edge, wherein the inclined surface on the outer surface of the frame can be above and/or below the base edge.

12. A roof window according to any one of the preceding calims 9-11, wherein an inner recess is formed around the bottom surface edge of the frame to mount a curtain, wherein the outer recess can be formed as a curve, L-shape or V-shape.

13. A roof window according to any one of the preceding claims 9-11, wherein an inner recess is formed around the bottom surface edge of the frame to mount a curtain, wherein the inner recess can be curved, L-shaped or V-shaped.

14. A roof window according to any one of the preceding claims, wherein the material used in lateral members and horizontal members of the frame and/or sash is wood or steel or aluminum or PUR or combinations.

15. A roof window according to any one of the preceding claims, wherein the frame and/or sash is made from wood, stainless steel, or aluminum alloy, metal-plastic complex or other complex materials, wherein a wooden core can be made of plywood, wherein a coating can be applied to the PUR, wherein the frame and/or sash can be a one-piece structure.

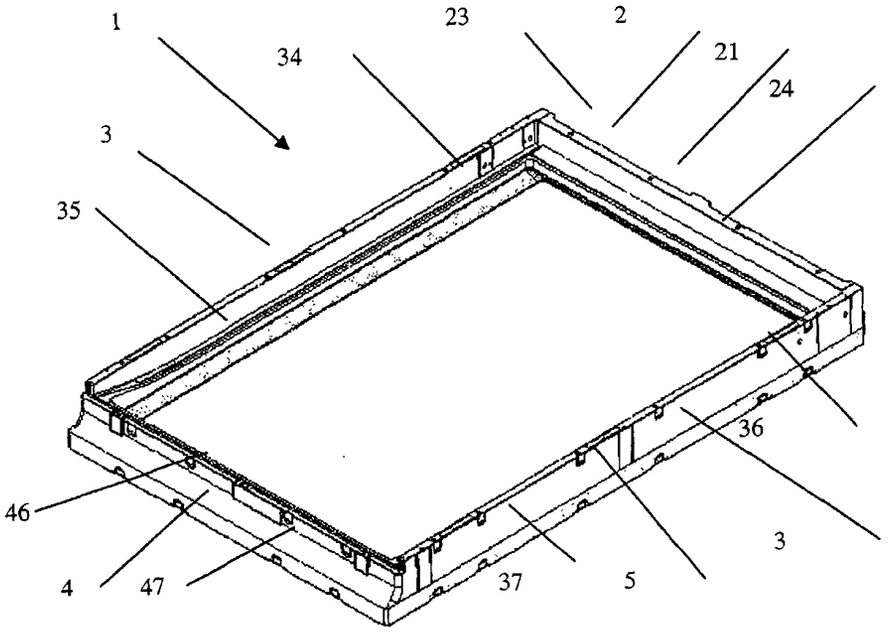

Fig. 1

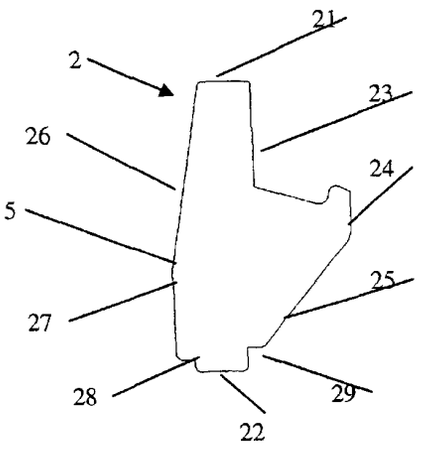

Fig. 2

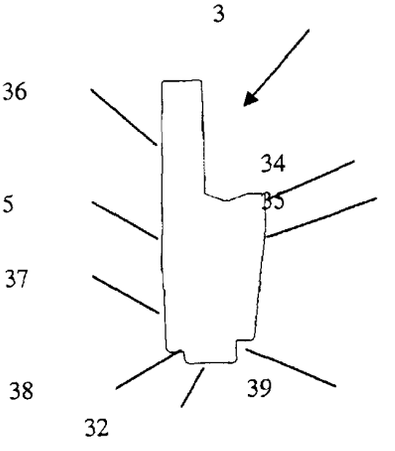

Fig. 3

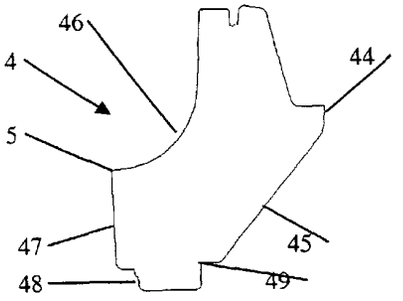

Fig. 4

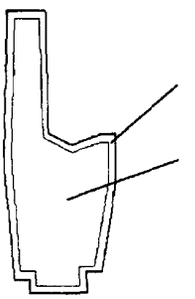

Fig. 5

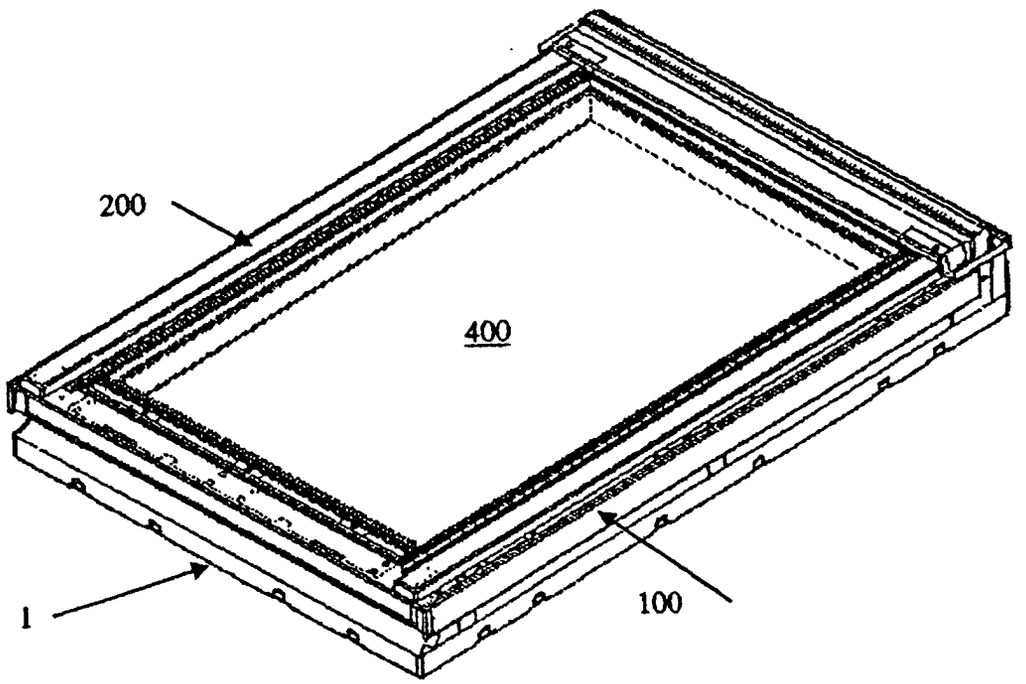

Fig. 6