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(54) **A roof window**

(57) The invention relates to a roof window having a frame and a sash, said sash carrying a pane and being connected with the frame by means of a pair of pivot hinges, in which covering members are provided on the outside for shielding the sash and frame members against the weather and where a sealing strip is arranged between the pane and the sash. The frame and sash members are made from extruded plastic profiles. One or more of the frame and sash members may be provided with a flange having the shape of an inverted L and projecting towards the exterior of the window, a first leg of the L being connected to the main body of the profile and a second leg being substantially parallel with the plane of the pane, and that said second leg of the flange supports a covering member. A space is defined between the side members of the frame and sash on both sides of the window, said space extending over the entire length of the side members and, in the mounted state, being upwards open. A bottom portion of the sealing strip is preferably interrupted or has grooves forming drainage channels across the sealing. A method of such a roof window includes the cutting of the extruded plastic profiles into appropriate pieces corresponding to length of the frame and sash members, the interconnection of these pieces by gluing, welding or the like or by means of appropriate fittings to form rectangular framings, and the customization of at least one profile piece by trimming or by addition of an adaptation element.

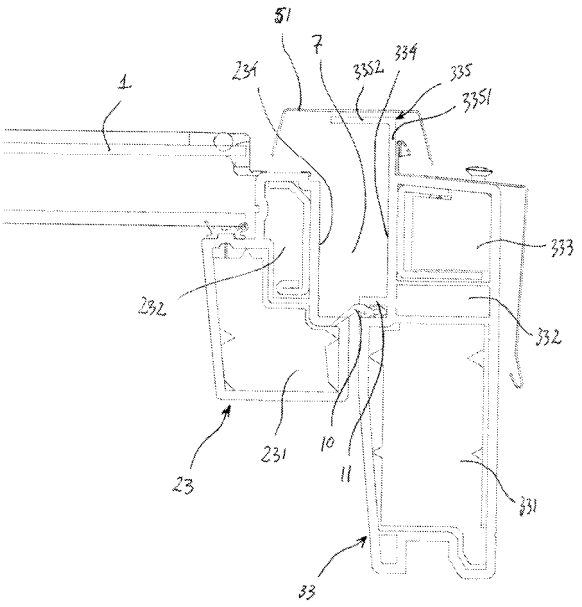


Fig. 2

EP 1 988 230 A1

Description

[0001] The present invention relates to a roof window comprising a frame and a sash each including a top member, a bottom member and a pair of mutually opposite side members, said sash carrying a pane and being connected with the frame by means of a pair of pivot hinges defining a hinge axis, which is substantially parallel with the top and bottom members, in which covering members are provided on the outside for shielding the sash and frame members against the weather and where a sealing strip is arranged between the pane and the sash, said sealing strip comprising a top portion, a bottom portion and two side portions corresponding to the top, bottom and side members of the sash. The invention further relates to a method of making such a window.

[0002] Roof windows of this kind are known in a number of different configurations and have proven to function very well in a number of different uses. However, when the room beneath the window is used for purposes, where the humidity is extremely high over extended periods of time, such as bathrooms, laundry rooms etc., condensation is known to be a problem as it causes the growth of mould or alga, particularly on the bottom sash member and on the bottom portion of the sealing strip. Over time this causes tarnishing and possible deterioration of the material of the sash and frame members. To avoid these drawbacks windows for bathrooms and like have been made from plastic or from plastic covered wood. Plastic has excellent resistance to humidity, as it is by nature non-hygroscopic and as it may contain fungicides.

[0003] Prior art plastic windows are known from a plurality of patent applications such as for example EP 0742335 A2. These windows, however, all seem to have been designed with the primary purpose of exploiting the possibilities and comply with the limitations of plastic materials, whereas the possibility of reutilising other parts known from roof windows having wooden sash and frame has not been taken into consideration. This has caused a massive increase in the number of items to be kept in stock for the production of the different types and sizes of roof windows. In addition, the lack of reutilisation often causes a lack of consistency as regards the physical appearance or design of the windows, which may especially be experienced as a problem, when both plastic and wooden windows are used in the same building.

[0004] A second problem with the known plastic windows is that plastic is more sensitive to overheating than wood and that the sash and frame profiles may thus be weakened when provided with dark coloured coverings as is the case with practically all of the roof windows that are commercially available today.

[0005] A third problem with the known plastic windows is, as mentioned above, the formation of condensation on the inside of the pane.

[0006] It is therefore an object of the present invention to provide a roof window made from plastic profiles, which solves at least one of the above problems.

[0007] This is achieved with a roof window of the above kind, where the frame and sash members are made from extruded plastic profiles, where one or more of the frame and sash members are provided with a flange having the shape of an inverted L and projecting towards the exterior of the window, a first leg of the L being connected to the main body of the profile and a second leg being substantially parallel with the plane of the pane, and where said second leg of the flange supports a covering member.

[0008] In common type roof windows, which are made wholly or partly from wooden profiles, a separate fitting is attached to the each side frame member for supporting the side covering member covering the line, where the frame and sash meets. By providing the profile with a flange as mentioned above, such fittings are no longer necessary and the number of window components and the risk of errors during assembly is reduced.

[0009] When mounting windows of the above type in an inclined roof three different types of sheath-like elements are used for providing a waterproofing of the construction; a first type of elements known as flashings proof the meeting between the roofing and the window, a second type of elements known as claddings proof the frame and sash profiles themselves and a third type of elements known as coverings proof space between the sash claddings and the pane or glassing beads.

[0010] An additional advantage of the flange is that it increases the moment of inertia of the profile, which in turn increases the resistance to i.a. bending and torsion, and other parts of the profile may therefore be slimmed.

[0011] Thirdly, the flange keeps the covering at a distance from the main body of the profile thereby minimizing the heat transfer thereto. The flange should therefore preferably be made from a material having relatively poor thermal conductivity. Extruding the flange as a part of the profile is an option as the kinds of plastic normally used fulfils this criteria, but the flange could also be made from a different material either by co-extrusion or by post-fitting.

[0012] The flange may be provided only at selected points or sections of the profile, but in a preferred embodiment the top frame member is provided with a flange extending substantially over the entire length thereof and each side frame member is provided with a flange only on the part located between the hinges and the top frame member. This embodiment means that the flanges provide support over the entire length of the covering members attached to the side and top frame members. Thereby the risk of distortion of the covering if stepped on, hit by a ball or the like is reduced considerably.

[0013] Similar advantages may be achieved by the side sash members being provided with a flange on the part located between the hinges and the bottom sash member.

[0014] The actual attachment of the covering may be achieved by gluing, but it is preferred to use screws to thereby allow later disassembly. The covering may be

attached to the flange itself or, if heat transfer is not of primary concern, to the main body of the frame member, the flange then purely serving support purposes.

[0015] To keep the amount of material used and thereby the weight of the profile at a minimum the flange should be as slender as possible. This, however, may cause problems if the covering is attached to the flange, as the slender flange may not have sufficient strength for preventing screws from being torn out when the covering is subjected to wind suction. It is therefore preferred that receiving means are provided for receiving fastening means, such as screws, used for fastening a covering to the flange, said receiving means being a reinforcement or thickening of the flange itself or separate means arranged in connection with the flange. Elements inserted in hollows in the profiles for the purpose of serving as heat bridges or strengthening or stiffening elements may also serve as receiving means.

[0016] The object of the invention is also achieved with a roof window of the above kind, where the frame and sash members are made from extruded plastic profiles and a space is defined between the side members of the frame and sash on both sides of the window, said space extending over the entire length of the side members and, in the mounted state, being upwards open.

[0017] The space functions to isolate the covering from the main body of the profile, thereby minimizing the transfer of heat and entailing the above described advantages. Depending on the construction of the sash, frame and other window parts, natural ventilation caused by thermal effects may also be achieved within the space, leading to a cooling thereof. The need for air-conditioning of the room beneath the window may thus be reduced.

[0018] With a view to achieving the optimum thermal isolation and ventilation it a preferred that the space constitutes at least 1/10 of the total cross sectional width of the sash and frame in a direction parallel to the longitudinal direction of the top and bottom members, preferably at least 1/5 of the total width. The space should, however, not be so big that the strength and stability of the sash or frame is jeopardized or that the window is unsuitable for use during the winter season.

[0019] In the ordinary design of the window, the hinges are arranged in the space approximately half way between the top and bottom members of the sash. It is therefore preferred that the width of the space is at least a big as the width of standard type pivot hinges.

[0020] Attempting to maximise the volume of the space between the sash and frame, the relatively bulky striking bead used on common type windows with wholly or partly wooden profiles is replaced by a slim tongue. This is possible with the plastic profiles, whereas the tongue would not have the necessary strength if made in wood. With this design it is, however, necessary that the space is closed at its lowermost end to prevent birds, dirt etc. from entering the space. This is achieved by the provision of a plug having approximately the same cross sectional shape and size as the space itself. The plug may simultaneously serve as a striking bead, the tongue being left out at the lowermost part of the side sash member, as a fastening point for the covering and as an end covering for the bottom sash member.

[0021] Yet another roof window achieving the object of the invention is one, where the frame and sash members are made from extruded plastic profiles and where the bottom portion of the sealing strip is interrupted or has grooves forming drainage channels across the sealing. With this approach it has been recognized that despite numerous attempts it has not been possible to produce a window, where the formation of condensation is avoided altogether. The window according to the invention has instead been designed to remedy the consequences of the formation of condensation.

[0022] For normal size windows it will be sufficient, if the bottom portion of the sealing strip has drainage channels at one or both of its ends facing the side portions. It is, however, to be understood that more channels may be used and that they may be provided at different locations.

[0023] To avoid the ingress of water from the outside by capillary suction it is preferred that each of the drainage channels has a width of at least 1 mm.

[0024] The total number and size of the drainage channels should always be kept a minimum in order to minimize the risk of draught.

[0025] The three different ways mentioned above of achieving the object of the invention may of cause be combined in one window having all of the features of claims 1, 5 and 11.

[0026] Common to all embodiments is that the frame and sash members are preferably made from polyvinylchloride, which has proven particularly well suited for the purpose, and that hollows in one or more the frame and/or sash members may be wholly or partly filled with an insulating material to improve the insulating properties of the window. The provision of insulation may contribute to minimizing condensation, not only at the pane but also at the gasket tightening the meeting between the sash and frame. The latter may further be facilitated if a thermal conductor is provided in one or more the frame and/or sash members at a surface thereof facing the room beneath the window and adjacent to the gasket. Such a thermal conductor is preferably provided in a hollow of the frame or sash member.

[0027] A window having the properties described above may be made by cutting extruded plastic profiles into appropriate pieces corresponding to the length of the frame and sash members, interconnecting these pieces by gluing, welding or the like or by means of appropriate fittings to form rectangular framings and customizing at least one profile piece by trimming or by addition of an adaptation element. To optimise the performance of each sash and frame member different profiles may be used for each type.

[0028] Preferred examples of the customization is that the side frame members are made from a profile having

a projecting flange and the flange is removed from a part of each side frame member by cutting or milling and/or that a striking plug is attached to the side of each side sash member intended to face the corresponding side frame member.

[0029] In the following the invention will, by means of examples, be described in closer detail with reference to the accompanying drawing, in which:

Fig. 1 shows a roof window in a perspective view,
Fig. 2 is a cross sectional view of the upper right side of the window as indicated with II in Fig. 1,
Fig 3 is a cross sectional view of the top of the window as indicated with III in Fig. 1,
Fig. 4 is a cross sectional view of the lower right side of the window as indicated with IV in Fig. 1,
Fig. 5 is a detailed perspective illustration of the lower right corner of the window as indicated with V in Fig. 1, where the covering is transparent and the side frame member has been removed to expose the plug,
Fig. 6 is a detailed perspective illustration showing the lower left corner of the window as indicated with VI in Fig. 1,
Fig 7 is a cross sectional view of the bottom of the window as indicated with VII in Fig. 1, and
Fig. 8 shows cross sectional sketches illustrating examples of the location of thermal conductors in sash and frame profiles.

[0030] A centre-hung roof window according to the invention is shown in Fig. 1. The window comprises a pane 1, mounted on a sash 2, which is interconnected with a stationary frame 3 by means of pivot hinges 4. The sash and frame each comprises a top member 21,31, a bottom member 22,32 and two side members 23,33,24,34 and the hinges are located approximately half way between the top and bottom members. A covering member 5 is provided above the line 6, where the sash and frame members meet, to thereby prevent rainwater and the like from entering the structure. On the right side of the window the corresponding covering has been removed to expose the sash and frame members, but it is to be understood that this is only for illustration purposes. Also missing in Fig. 1 are the covering members covering the lower half of the sides and other elements, which are not attached until the window have been mounted in the roof.

[0031] Fig. 2 shows a cross section of the sash and frame at a point above the hinge. As may be seen, both the sash and the frame are made of profiles consisting of a number of closed hollows 231,232,331,332,333. The exterior shape of the sash and frame members are such that when arranged closely adjacent to each other as shown in Fig. 2 a space 7 is defined between recessed surfaces 234,334 at the upper parts of the profiles. The dimensions of the space correspond to the dimensions of common type pivot hinges (not shown in Fig. 2), which are arranged in the space as suggested in Fig. 1.

[0032] To improve the insulating properties of the window, the hollows 231,331 facing inwards in the mounted state of the window are almost entirely filled with an insulating material such as expanded polystyrene (EPS). Other hollows may also be filled depending among other things on the climate in which the window is to be used and on the number and distribution of the hollows. The method of introduction of the insulating material depends on the material used and will be straight forward to the person skilled in the art.

[0033] On the upper side of the frame member 33 an angular or L-shaped flange 335 is provided. A first leg 3351 thereof being substantially perpendicular to the plane of the pane 1 and the second leg 3352 being substantially parallel with the pane 1 and extending from the first leg 3351 in the direction towards the pane 1. As may be seen from Fig. 2 the second leg projects over the space 7 between the sash and frame and supports a covering member 51 intended to protect the meeting between the sash and the frame from the ingress of rainwater and the like. A similar flange is provided on the opposite side frame member 34.

[0034] In the present embodiment, the flanges 335 on the side frame members are only provided on the uppermost half of the frame between the hinges and the top frame member. This is due to the fact that the window is centre-hung and that the covering of the meeting between the sash and the frame is therefore split in two; the upper half being mounted on the frame and the lower half being mounted on the sash. If applying the present method of mounting the covering to a window having a different location of the hinge axis the location of the flanges on the side members should merely be adjusted accordingly. Flanges could also be provided on parts of the sash side members located below the hinge axis.

[0035] As may be seen from Fig. 3 the top frame member 31 is provided with a similar flange 311 corresponding to the one on the side member 33 but extending over the entire length of the top member. In this case, however, the covering or cassette is attached to the upper surface 336 of the main body of the top frame member, the flange serving only as a support preventing excessive deflection of the covering under the influence of wind pressure or if stepped on by persons working on the roof.

[0036] The height of the flange 334 not only allows the mounting of the covering 51 in the right level in relation to other parts of the window, it also provides a thermal separation between the covering and the bearing part of the frame. When exposed to sunlight the covering members, who are normally made from aluminium painted in a dark colour, can become extremely hot leading to a warming of the supporting structure. When using wooden profiles for the frame members, this is no problem, but most plastics are sensitive to warming; some become softer and most deteriorate under the long-term influence of heat. With the flange configuration according to the invention the covering is kept at a distance from the bearing part of the frame profile, which is thereby kept rela-

tively cool.

[0037] Polyvinylchloride, commonly known as PVC, which is normally used for the sash and frame members could in principle be used without the covering. The flange 335 could then be extended or redesigned to allow it to completely cover and proof the space 7 and the meeting between the sash and frame in the closed state of the window. This, however, would require some kind of protection of the parts of the profile exposed to sunlight, as PVC deteriorates under the influence of UV radiation. UV protection could for example be achieved by painting the profile in a dark colour, by applying an appropriate foil or the like. The above considerations apply to most plastic materials, which could conceivably be used for the manufacture of windows.

[0038] In the embodiments shown in Figs. 2 and 3 a flange is only provided on the upper half of the side frame members and on the top frame member. It is, however, to be understood that the general idea of using flanges for supporting the covering members at a distance above the main body of the profile may also be employed in the design of sash profiles.

[0039] The profiles having a flange are preferably extruded with a flange over their entire length, the profile subsequently being trimmed for the specific window to be made by removal of some of the flange. This may for instance be achieved by milling. Alternatively the flange may be provided in the form of an adaptation element added to relevant portions of the profile after extrusion. Under normal circumstances the removal of portions of the flange will be cheaper than adding them later.

[0040] Fig. 4 shows a cross-sectional view of the right side of the sash and frame between the hinge and the bottom members. As may be seen, the side frame member 33 has no flange at this point, the covering 53 instead being attached to a plug 9, which is located in the space 7 between the sash and frame and which is fastened to the side sash member by means of a screw 91. The plug further serves to holding the gasket 10, which tightens the meeting between the sash and frame. Over the remaining part of the side sash member the space is maintained and the gasket is held in a groove formed by a projecting tongue 11 on the side sash member as may be seen from Fig. 5, which shows the lower right corner of the window with the side frame member removed.

[0041] As for the flange, the tongue may be extruded over the entire length of the profile and then trimmed or added to the profile as an adaptation element. The former option is usually preferred. The plug is preferably added when the tongue has been completed and the gasket attached.

[0042] Due to the fact that the window is centre-hung, the gasket 10 is attached to the side frame member at the uppermost part of the window as shown in Fig. 2 and to the side sash member at the lowermost part of the window as shown in Fig. 4 and 5.

[0043] The gasket shown in Figs. 2 and 4 deviates from the ones formerly used by having a pair of longitudinal cavities 101,102. These cavities increased the resilience of the gasket giving it an increased draw-out resistance.

[0044] The plug 9 only fills the lowermost part of the space 7, the rest of it remaining open and working as thermal insulation as explained above. With common type roof windows having a wholly or partly wooden sash it is not possible to use a tongue 11 and the space 7 is therefore occupied by a relatively bulky striking bead.

[0045] In addition to closing the space 7 at its lower end the plug also terminates the bottom sash profile 22, the nose 92 of the plug (see Fig. 5) corresponding in size and shape to the flat projecting part 221 of the bottom sash profile (see Fig. 7).

[0046] Fig. 6 shows the lowermost right corner of the window in detail, where the pane and the bottom covering member have been removed. A cross sectional view of the bottom part of the window is shown in Fig. 7. As may be seen the sealing strip 82 used between the pane 1 and the bottom sash member 22 comprises a relatively flat base part 821 and an upwards projecting bead 822. The bead is hollow, allowing it to be compressed upon mounting of the pane. In Fig. 7 the bead is shown in the uncompressed state for illustration purposes. Under normal conditions the pane is not in contact with base part of the sealing strip.

[0047] As may be seen in Fig. 6 the bead 822 has been interrupted at a distance from the side portion of the sealing strip 84, whereas the base part 821 continues. This forms a channel 85 where condensation formed on the inside of the pane may drain of to the outer side of the frame 3 as indicated by the arrows in Fig. 7 without coming into contact with the bottom sash member itself. The width of the channel should be so big that there is no risk of capillary ascension, but should on the other hand be so small that it does not cause a draught. A width of a few millimetres is preferred.

[0048] In an alternative embodiment (not shown) the bottom sealing strip 82 is interrupted completely, thereby forming a deeper channel or allowing the use of a simpler sealing strip with no bead.

[0049] The interruptions of the sealing strip are preferably located at the corners of the pane as condensation often collects here, but other locations are also possible. Likewise, depressions of the strip, a groove formed therein or any other means entailing the formation of a drainage channel would also be serve the purpose.

[0050] As explained above it has been assumed that the formation of condensation on the pane is unavoidable considering the intended use of the window and relevant measures have therefore been taken to ensure that this does not cause problems. Condensation may, however, also occur at the gasket 10 tightening the line 6, where the frame 3 and sash 2 meets. This is particularly the case with the relatively cool space 7 located directly above the gasket. In a preferred embodiment the sash and/or frame profiles are therefore provided with insertions 12 serving as heat bridges conducting heat from the room beneath the window towards the gasket level.

Examples of the location of the insertions are shown in Fig. 7 and 8. The insertions preferably consist of a metal such as aluminium or steel and may also serve to strengthen or stiffen the plastic profile.

[0051] Insertions serving only as strengthen or stiffen members may also be provided in combination with or as an alternative to those serving as heat bridges.

[0052] Insertions may be provided only in one of the adjacent profiles as shown in Fig. 7 or in both as shown in Fig. 8.

[0053] When attaching a covering 52 by means of screws 54 as shown in Fig. 3 insertions provided for the purpose of thermal conduction, strengthening or stiffening may serve as receiving means giving the screws a better attachment and preventing them from being torn out.

[0054] The different aspect of the embodiments described above may be freely combined into a number of different window configurations all falling within the scope of the appended claims.

Claims

1. A roof window comprising a frame and a sash each including a top member, a bottom member and a pair of mutually opposite side members, said sash carrying a pane and being connected with the frame by means of a pair of pivot hinges defining a hinge axis, which is substantially parallel with the top and bottom members, in which covering members are provided on the outside for shielding the sash and frame members against the weather and where a sealing strip is arranged between the pane and the sash, said sealing strip comprising a top portion, a bottom portion and two side portions corresponding to the top, bottom and side members of the sash, **characterized in that** the frame and sash members are made from extruded plastic profiles, that one or more of the frame and sash members are provided with a flange having the shape of an inverted L and projecting towards the exterior of the window, a first leg of the L being connected to the main body of the profile and a second leg being substantially parallel with the plane of the pane, and that said second leg of the flange supports a covering member.

2. A roof window according to claim 1, **characterized in that** the top frame member is provided with a flange extending substantially over the entire length thereof and that each side frame member is provided with a flange only on the part located between the hinges and the top frame member.

3. A roof window according to any of the preceding claims, **characterized in that** the side sash members are provided with a flange on the part located between the hinges and the bottom sash member.

4. A roof window according to any of the preceding claims, **characterized in that** receiving means are provided for receiving fastening means, such as screws, used for fastening a covering to the flange, said receiving means being a reinforcement or thickening of the flange itself or separate means arranged in connection with the flange.

5. A roof window comprising a frame and a sash each including a top member, a bottom member and a pair of mutually opposite side members, said sash carrying a pane and being connected with the frame by means of a pair of pivot hinges connecting the frame side members to the sash side members and defining a hinge axis, which is substantially parallel with the top and bottom members, in which covering members are provided on the outside for shielding the sash and frame members against the weather and where a sealing strip is arranged between the pane and the sash, said sealing strip comprising a top portion, a bottom portion and two side portions corresponding to the top, bottom and side members of the sash, **characterized in that** the frame and sash members are made from extruded plastic profiles and that a space is defined between the side members of the frame and sash on both sides of the window, said space extending over the entire length of the side members and, in the mounted state, being upwards open.

6. A roof window according to claim 5, **characterized in that** the space constitutes at least 1/10 of the total cross sectional width of the sash and frame in a direction parallel to the longitudinal direction of the top and bottom members, preferably at least 1/5 of the total width.

7. A roof window according to claim 5 or 6, **characterized in that** the hinges are arranged in the space approximately half way between the top and bottom members of the sash.

8. A roof window according to any of claims 5 to 7, **characterized in that**, in the mounted state, the space is closed at its lowermost end by a plug having approximately the same cross sectional shape and size as the space itself.

9. A roof window according to claim 8, **characterized in that** the plug serves as a striking bead.

10. A roof window according to claim 8 or 9, **characterized in that** the plug serves as a fastening point for the covering.

11. A roof window comprising a frame and a sash each including a top member, a bottom member and a pair of mutually opposite side members, said sash car-

rying a pane and being connected with the frame by means of a pair of pivot hinges connecting the frame side members to the sash side members and defining a hinge axis, which is substantially parallel with the top and bottom members, in which covering members are provided on the outside for shielding the sash and frame members against the weather and where a sealing strip is arranged between the pane and the sash, said sealing strip comprising a top portion, a bottom portion and two side portions corresponding to the top, bottom and side members of the sash, **characterized in that** the frame and sash members are made from extruded plastic profiles and that the bottom portion of the sealing strip is interrupted or has grooves forming drainage channels across the sealing.

12. A roof window according to claim 11, **characterized in that** the bottom portion of the sealing strip has drainage channels at one or both of its ends facing the side portions.

13. A roof window according to claim 11 or 12, **characterized in that** each of the drainage channels has a width of at least 1 mm.

14. A roof window according to any of the preceding claims, **characterized in that** the frame and sash members are made from polyvinylchloride.

15. A roof window according to any of the preceding claims, **characterized in that** at least one hollow in one or more the frame and/or sash members are wholly or partly filled with an insulating material.

16. A roof window according to any of the preceding claims, **characterized in that** a thermal conductor is provided in one or more the frame and/or sash members at a surface thereof facing the room beneath the window and adjacent to a gasket tightening the line where the frame and sash meets.

17. A roof window according to claim 16, **characterized in that** the thermal conductor is provided in a hollow of the frame or sash member.

18. A method of making a roof window comprising a frame and a sash each including a top member, a bottom member and a pair of mutually opposite side members, **characterized in that** extruded plastic profiles are cut into appropriate pieces corresponding to the length of the frame and sash members, that these pieces are interconnected by gluing, welding or the like or by means of appropriate fittings to form rectangular framings, and that at least one profile piece is customized by trimming or by addition of an adaptation element.

19. A method according to claim 18, **characterized in that** different profiles are used for different frame and sash members.

20. A method according to claim 18 or 19, **characterized in that** the side frame members are made from a profile having a projecting flange and that the flange is removed from a part of each side frame member by cutting or milling.

21. A method according to claim 18 or 19, **characterized in that** a striking plug is attached to the side of each side sash member intended to face the corresponding side frame member.

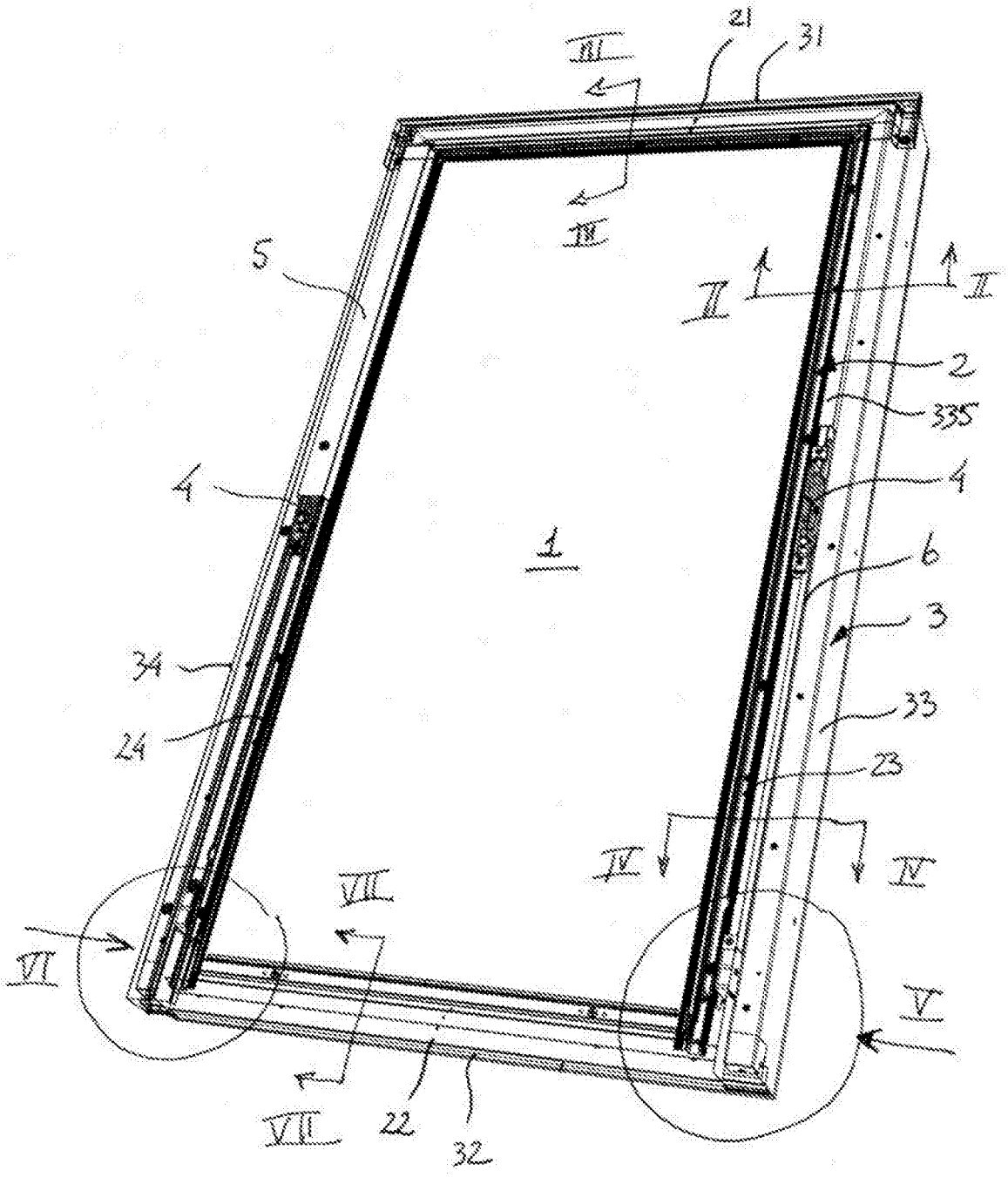


Fig. 1

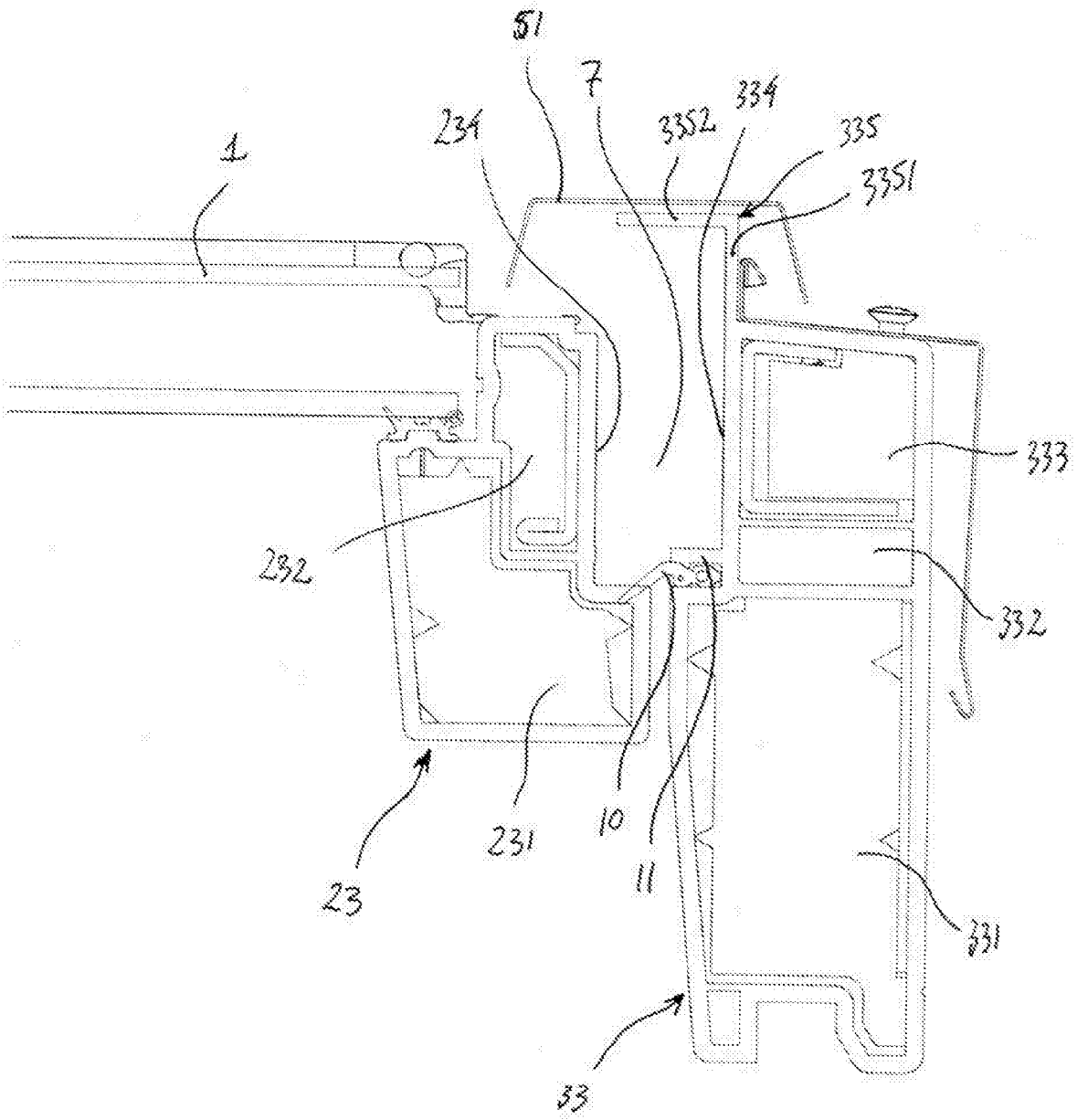


Fig. 2

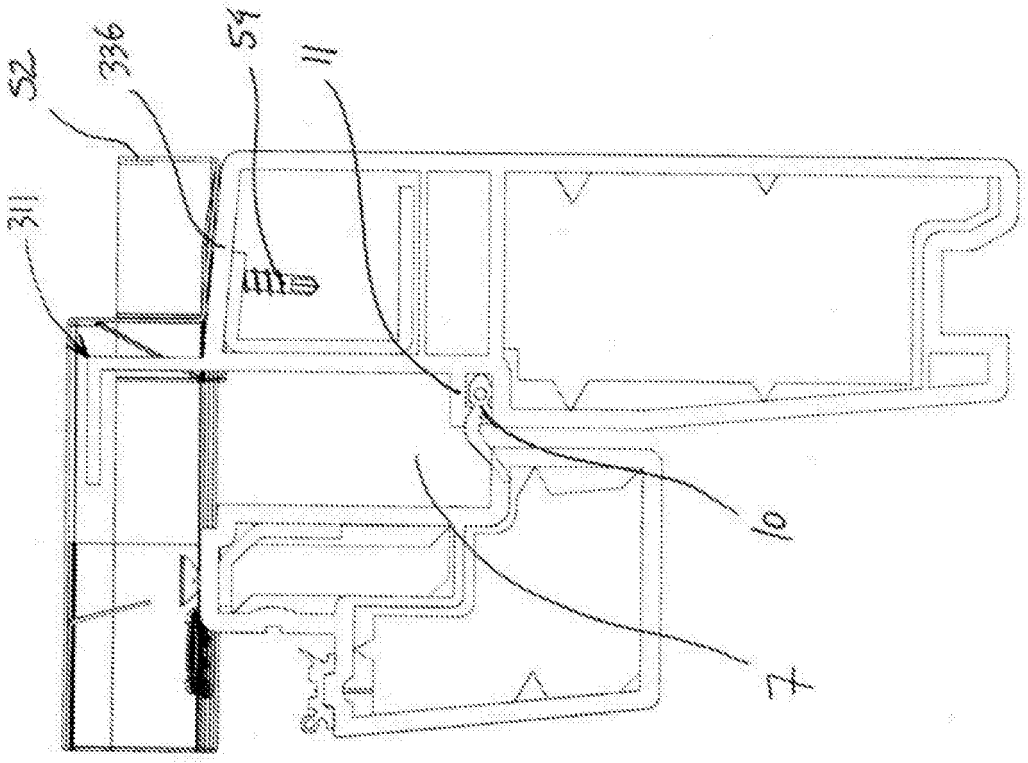


Fig. 3

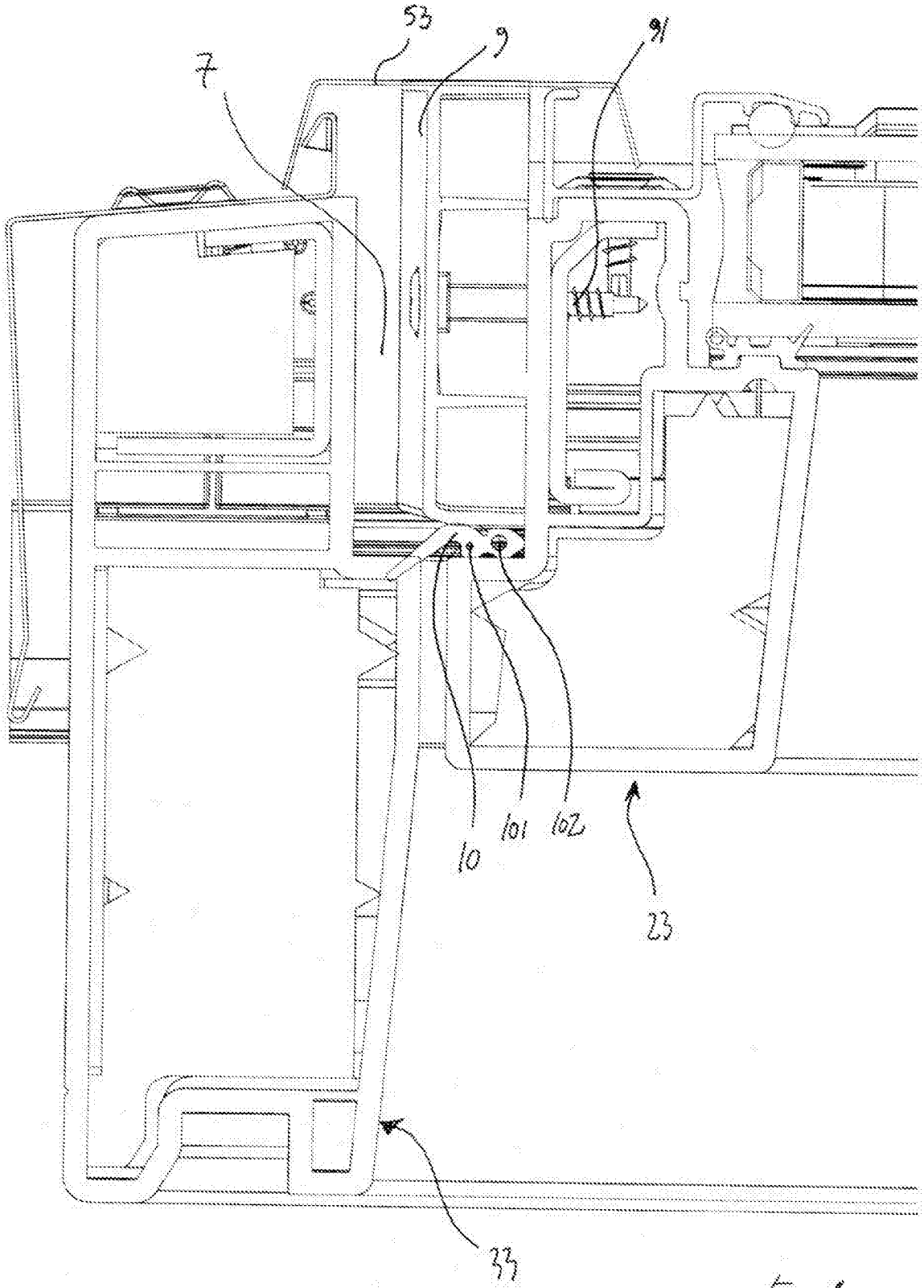


Fig. 4.

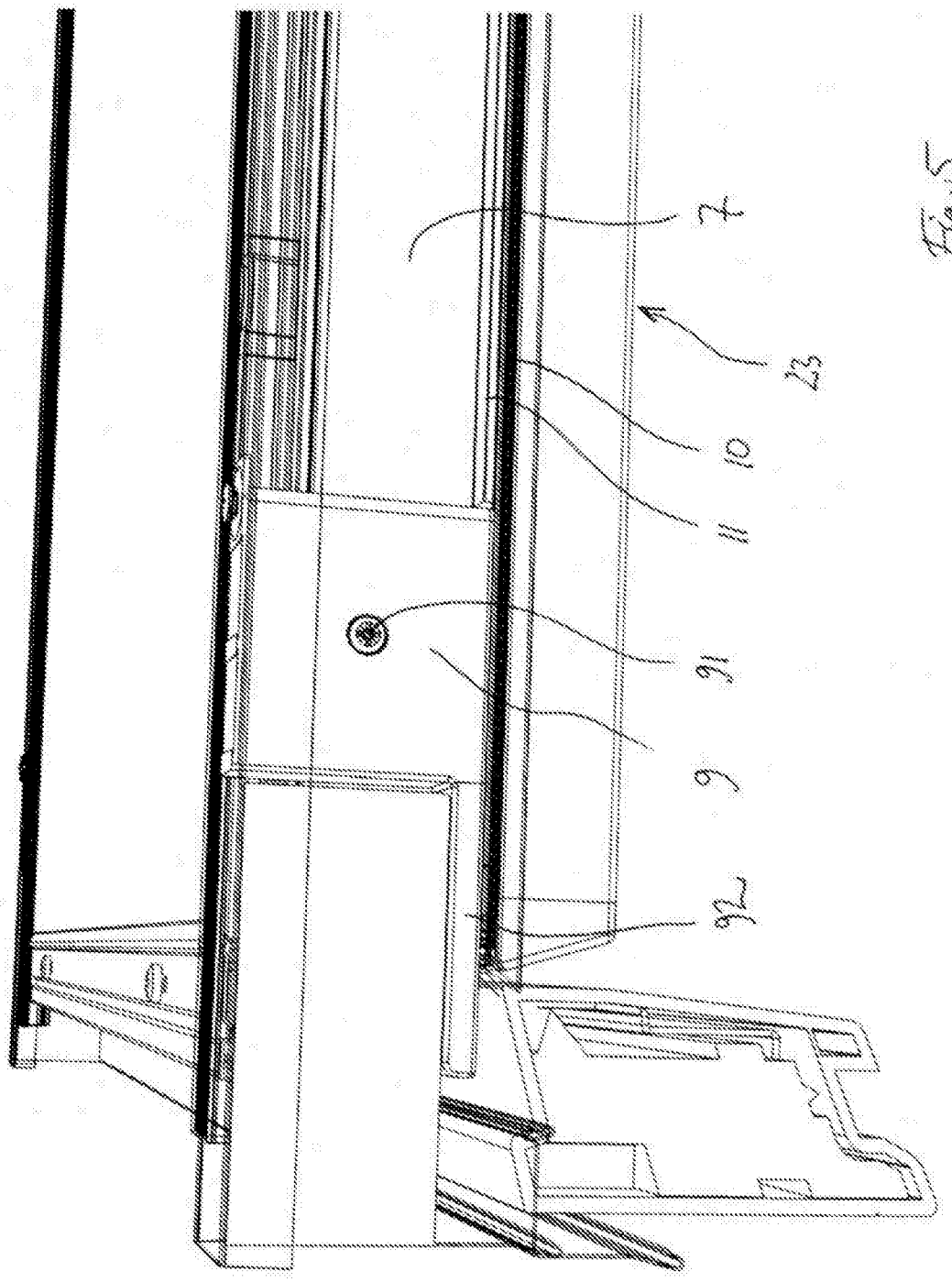


Fig. 5

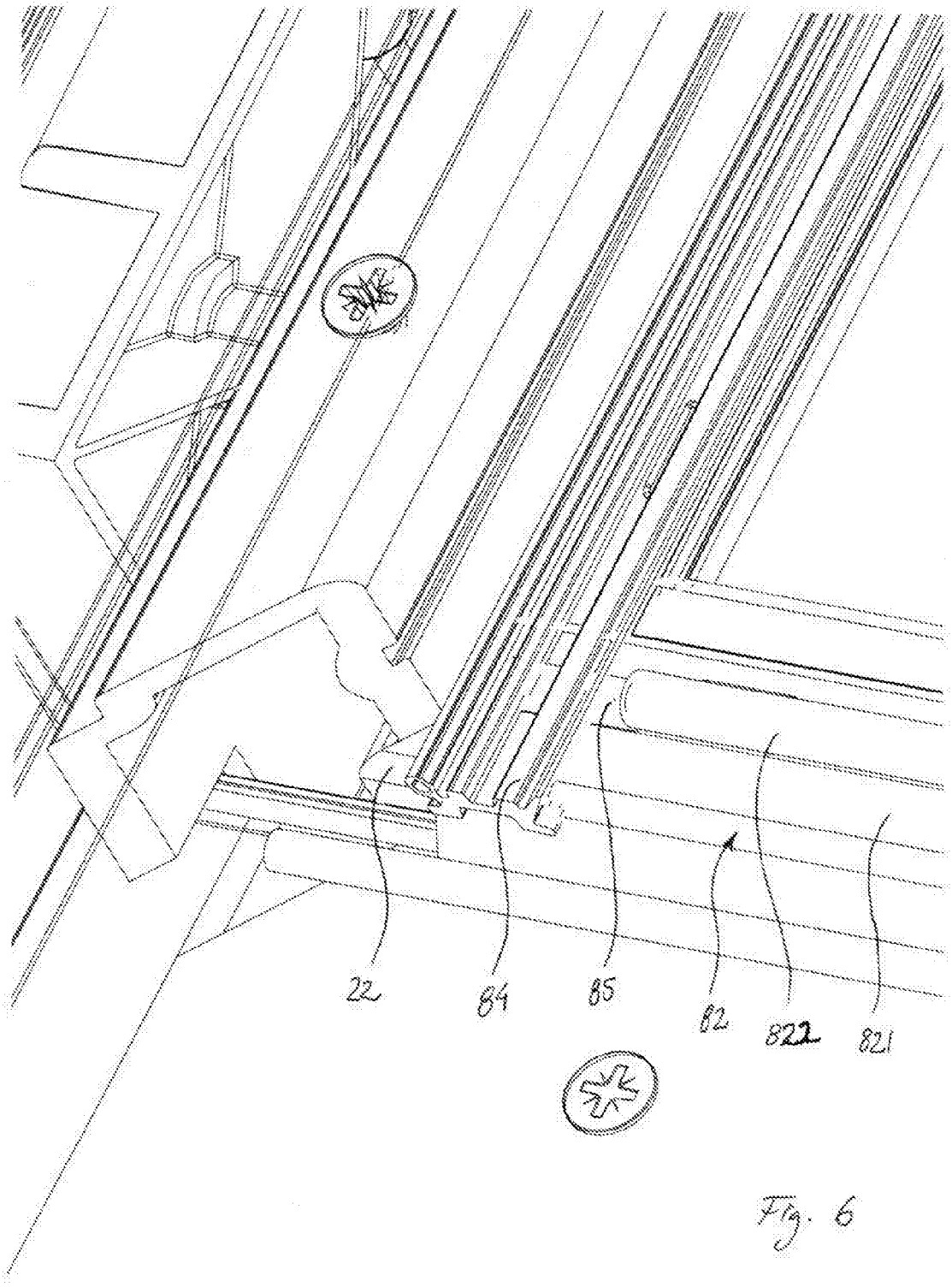


Fig. 6

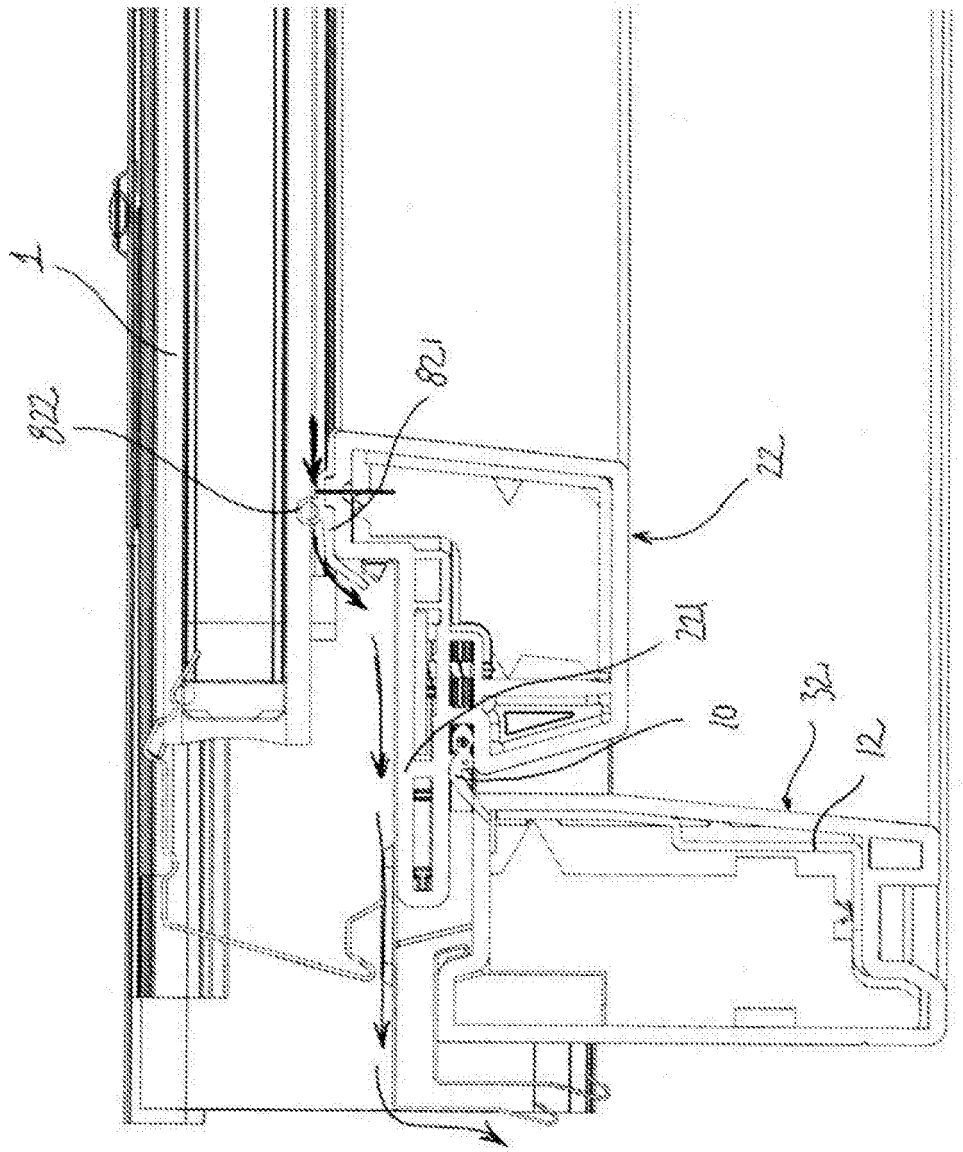
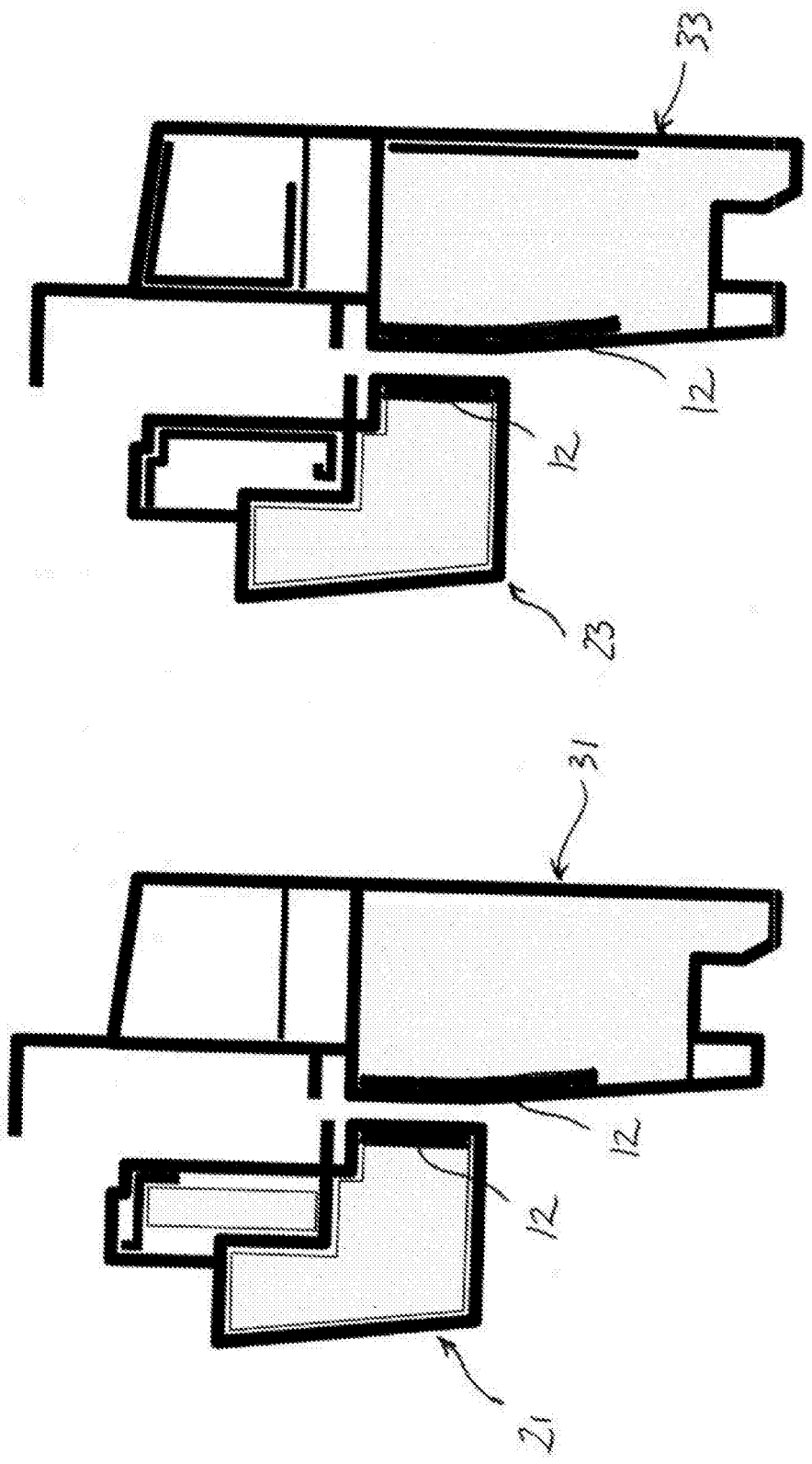


Fig. 7

Fig. 8.



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EUROPEAN SEARCH REPORT

Application Number
EP 07 10 7459

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 1 510 631 A (ROTO FRANK AG [DE]) 2 March 2005 (2005-03-02) * figure 1 *	1-10,14, 15,18-21	INV. E04D13/03
Y	* claim 1 *	11-13	ADD. E06B3/40
D,X	EP 0 742 335 A2 (ROTO FRANK AG [DE]; DEUTSCHMEISTER BAUELEMENTE [DE]) 13 November 1996 (1996-11-13) * figure 1 *	5-7, 14-17	E06B7/14
Y	* claims 1,6 *	11-13	
Y	DE 43 20 321 A1 (STELL D O O [SI]) 23 December 1993 (1993-12-23) * figure 1 * * claim 1 *	11-13	
A	EP 1 674 634 A (VKR HOLDING AS [DK]) 28 June 2006 (2006-06-28) * figures 2,6,7 *	7	

TECHNICAL FIELDS SEARCHED (IPC)

E04D
E06B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	18 October 2007	Tänzler, Ansgar

CATEGORY OF CITED DOCUMENTS

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18-10-2007

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1510631 A	02-03-2005	NONE	
EP 0742335 A2	13-11-1996	AT 234992 T	15-04-2003
		CZ 9601382 A3	13-11-1996
		DE 19517212 A1	14-11-1996
		DK 742335 T3	14-07-2003
		HU 9601263 A1	28-02-1997
		NO 961554 A	12-11-1996
		PL 314146 A1	12-11-1996
DE 4320321 A1	23-12-1993	NONE	
EP 1674634 A	28-06-2006	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 0742335 A2 **[0003]**