

(19)



(11)

EP 2 843 150 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
23.12.2015 Bulletin 2015/52

(51) Int Cl.:
E04D 13/035 (2006.01) E04D 13/03 (2006.01)

(21) Application number: **14182374.0**

(22) Date of filing: **27.08.2014**

(54) **Window frame with fitting for roof window**

Blendrahmen mit Beschlag für Dachfenster

Châssis de fenêtre avec ferrure pour fenêtre de toit

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

(30) Priority: **28.08.2013 PL 40515513**

(43) Date of publication of application:
04.03.2015 Bulletin 2015/10

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Description

[0001] The invention relates to a roof window comprising the features of the preamble of claim 1, said window is opened by rotation of the sash around a horizontal axis, as a pivoting window, or tilting window, or dual-action window: pivoting-tilting window. The roof window according to the invention is intended mainly for installation in a roof, with large immersion of the window sash in the layered structure of the roof.

[0002] State of the art. Patent description No. PL 200789 discloses a solution for a window frame of a roof window, having a rectangular recess on its bottom surface, the recess having a support surface being seated on elements of the roof structure. A significant part of this window frame, and consequently of the roof window, protrudes above the roof's surface. Patent description No. PL 214536 discloses a roof window, having a window frame fixed by runners penetrating the roof structure basically perpendicularly to its surface, the runners being covered on the side with a thin layer of thermal insulation. Also in this solution, a significant part of the window frame protrudes above the roof's surface, moreover the fixing runners form thermal bridges, facilitating escape of heat from the attic outwards. In known roof windows being opened at least as pivoting, called also pivot windows or reversible windows, the hinges, using which the sash is mounted, are immersed into the window between the side members of the window frame and the sash, forming thermal bridges with a high share of metal parts.

[0003] EP 2 500 487 B1 discloses a roof window according to the preamble of claim 1, the structural element being mounted on the lateral surface of the window frame members.

[0004] Essence of the solution.

[0005] A roof window comprises the features of claim 1.

[0006] In the first aspect of the invention, the structural element of the window frame connecting it with the roof, is a support flashing, adjacent to at least three of the window frame members, including both side members, protruding at least sideways beyond the outline of the members. In its members, the window frame has walls made of a material with a low thermal conductivity, preferably a plastic, situated along the support flashing, transversely to its surface resting on the roof. These walls are situated at least at the side of the window sash, forming - on at least three members, the top one and both side ones - a circumferential wall surrounding the opening in the window frame. In the walls situated in the window frame members from the side of the window sash, there are longitudinal grooves, particularly with a T-shaped cross-section. These grooves serve the purpose of mounting the seals situated between the window frame and the window sash.

[0007] Outside the walls, the window frame members seated in the roof structure, have a filling made of an insulating material, preferably a porous one, with a lower resistance than the material of the walls in the window

frame, but with a higher thermal performance than the material of walls. Basically, the external surface of the filling does not require an exposure, but it may be equipped with a second wall the same type of plastic, as the wall from the side of the window sash. A variation of the frame members is also possible, where they do not have a separation of materials to a more mechanically resistant wall and a filling with improved thermal performance, but they are made of a material uniting both these properties. Grooves for the seals are then situated directly in this material of the frame members.

[0008] In a second aspect of the invention, the structural element of the window frame connecting it with the roof is constituted by bearing strips, adjacent to the side members of the window frame, on the external side of the window. The bearing strips protrude beyond the outline of the window frame members on its opposite sides, and it may be a protrusion of the strips sideways of the window, or a protrusion along the side frame members, upwards and downwards, beyond the top member and the bottom member of the window frame. The window frame according to the second aspect of the invention has in its members, similarly as according to the first aspect, walls made of a material with a low thermal conductivity, preferably a plastic, which are situated at least on the side of the window sash, forming on at least three frame members, the top one and both side ones, a circumferential wall surrounding the opening in the window frame. In the walls situated in the window frame members on the side of the window sash, there are longitudinal grooves, particularly with a T-shaped cross-section. These grooves serve the purpose of mounting the seals situated between the window frame and the window sash. Outside the walls, the window frame members seated in the roof structure, have a filling made of an insulating material, preferably a porous one, with a lower resistance than the material of the walls in the window frame, but with a higher thermal performance than the material of the walls. Basically, the external surface of the filling does not require an exposure, but it may be equipped with a second wall of a plastic; a variation of the frame members is also possible, made of a uniform material, with grooves for the seals situated directly in this material - as in the first aspect of the invention.

[0009] The fixing set of the window sash, belonging to the fitting system of the window frame, and containing hinges fixed on the structural element of the window frame, connecting it with the roof, that is on the support flashing, or on bearing strips; occurs in three aspects.

[0010] The first aspect of the fitting belonging to the window frame, is constituted by hinges situated on both side frame members of the window frame, in the middle section of the length of these members, above the middle of the window height, on its external side. The hinges are intended for opening of the window in the pivoting mode, i.e. by rotation of the sash around a geometrical axis, located usually slightly below the middle of the window height, so that the lower part of the window sash during

opening of the window moves towards the exterior of the roof, and the upper part of the sash moves towards the interior of the attic. The hinges, are defined in this description as "pivoting hinges", on the account of opening of the window in the pivoting mode. The hinges are mounted on the external surface of the structural element of the window frame connecting the frame with the roof, that is on the external surface of the support flashing, or on the external surfaces of both bearing strips.

[0011] The second aspect of the fitting belonging to the window frame is constituted by window sash hinges situated near the top edge of the window, serving the purpose of opening of the window in the tilting mode, hereinafter defined as "tilting hinges". The hinges are mounted on the external surface of the structural element of the window frame connecting the frame with the roof, that is on the external surface of the support flashing, or on the external surfaces of both bearing strips. In the tilting hinges, arms are seated, terminated with pivoting hinges, while both the tilting and pivoting hinges, as well as the arms connecting them, are situated on the external side of the window. The hinges according to this aspect enable using the window as a dual-action window, by opening it as a pivot window or a tilt window. During opening of the window in the pivoting mode, the window sash rotates in the pivoting hinges, as in the first aspect of the fitting, while the tilting hinges are blocked, and the arms connecting both types of hinges rest on the window frame. During opening of the window in the tilting mode, the window sash together with the arms connecting both types of hinges, rotate in the tilting hinges.

[0012] The third aspect of the fitting belonging to the window frame is constituted by hinges for a window sash, situated near the top edge of the window, i.e. tilting hinges, in which the window sash is mounted directly. The hinges are placed on the external side of the window. The window according to the third aspect of the invention is being opened only in the tilting mode.

[0013] In all aforementioned aspects, the window frame with a fitting may have an additional frame, preferably made of wood, situated at the internal side of the window, that is on the side of the attic. On the additional frame, elements locking the window are installed, mating with corresponding locking elements seated on the frame of the sash. These are for instance bolt sockets, mating with the bolt of the handle. On the other hand, the window frame has on its external surface, on the external side of the window, installation elements for connecting the window frame with the flashings of the window, which seals the connection of the window frame with the roof. Preferably it is an installation frame, upon which properly bent edges of the flashing of the window are laid, resting on the roof and adjacent to the window.

[0014] Advantages of the invention. Thanks to its design enabling its immersion in the roof structure, the roof window frame with a fitting for a roof window for immersing also the sash of the roof window in this structure, increases the thermal performance of the whole win-

dow. Metal elements of the window frame, having large volume and mass, such as: hinges, support flashing, or bearing strips, are situated on the external side of the window frame, and do not have components penetrating the interior of the roof structure, or the interior of the opening in the window frame for a sash; optionally these parts constitute a small share in metal fitting subsets, so there are no thermal bridges in the window frame, which could lead to thermal losses from the attic by outflow of heat to the outside of the building.

[0015] Embodiments. A roof window comprising a window frame with a fitting for a roof window sash being the subject of the invention is presented by its embodiments in the drawing, with the individual Figures showing:

Fig. 1 - A window frame with the support flashing, for a pivoting window, seated on battens in the roof structure, according to the first embodiment - in an axonometric view.

Fig. 2 - The window side frame member of Fig. 1 and a pivoting hinge with a fragment of the sash - in a cross-section transverse in relation to the side frame member.

Fig. 3 - A detail of the mounting of the additional frame in the window frame of Fig. 1 - in a cross-section transverse in relation to the window side frame member.

Fig. 4 - A window frame with bearing strips for a dual-action window, pivoting & tilting, seated on battens of the roof structure, according to the second embodiment - in an axonometric view.

Fig. 5 - The window side frame member of Fig. 4 with a tilting hinge and a fragment of the window sash - in a cross-section transverse in relation to the side window frame member.

Fig. 6 - A side window frame member and pivoting hinge with a fragment of the window sash, according to the third embodiment - in a cross-section transverse in relation to the side window frame member.

[0016] The roof window according to the invention, is also presented in embodiments not supplemented with a drawing, but described through indication of their mutual features with the drawn embodiments and features differing them from the drawn embodiments.

[0017] Example 1. The roof window with window frame which has a form of a rectangular frame **1**, with the following main elements: two side frame members **11**, a top frame member **12** and a bottom frame member **13**. On the external side of the window, the window frame has a support flashing **2** in the form of an open frame, placed at the external side of the window on the window side frame members **11** and the window top frame member **12**. The support flashing **2** is adjacent to the window frame members: side **11** and top **12** with its flat internal area **21**, while it protrudes beyond the outline of the window frame members: side **11** and top **12** with its flat external area **22**, sideways and towards the upper section

of the roof plane, while being adjacent only partially to terminal fragments of surfaces of these members on the external side of the window. The flat internal area **22** of the support flashing **2** rests on the supporting structure **3** of the roof, on horizontal tile battens **31**, being a support for roofing-tiles **32**, while the tile battens rest on counter battens **33** laid on rafters **34**, being basic supporting elements of the roof structure.

[0018] Both window side frame members **11** have thin walls **14** with a low thermal conductivity, made of a plastic, situated in the window frame on the side of the sash **4** of the window, while the main bulk of the window side frame member is formed by the filling **15** made of an insulating material, particularly a porous one. In the walls **14**, T-shaped grooves **16** are situated along the window frame members, and in these grooves seals **17** are mounted, with freely moving flaps adjacent, in a closed window, to the side surfaces of the sash **4**. On the external side of the window, the walls **14** have a connecting lip **18**, by which these walls are connected with an internal bend **23** of the support flashing. The filling **15** of the side frame members is glued both to the plastic walls **14**, and to the support flashing **2** of the window frame. The top member of the window frame (not shown in the cross-section) is built in the same way, and the wall of the frame member situated from the side of the window sash, is connected with the walls **14** of the side members at its ends, forming, together with them, a frame surrounding the opening in the window frame for a sash **1** from at least three sides.

[0019] On the support flashing **2**, on its side sections, which rest on the side frame members **11** of the window frame, on the external side of the window, pivoting hinges **5** are installed, situated slightly above the middle of length of the window side frame members **11**. In the pivoting hinges **5**, both their stationary parts **51** fixed to the support flashing **2**, and moving parts **52**, mating with the sash **4** of the window, as well as axes **53** of the hinge, are situated above the support flashing **2**, as well as above the glazing unit **41** in the sash **4** of the window, the unit consisting of four panes separated with internal frames. Only a small strip **54** belonging to the moving part **52** of the pivoting hinge, enters partially the space between the side member **11** of the window frame and the side wall **42** of the sash **4**, in order to stabilise this part of the hinge on the sash **4**. Movable parts **52** of the pivoting hinges **5** are connected with the side walls **42** of the sash **4** using a reinforcing insert **43**, placed in the duct of the side wall **42** of the sash **4** on the external side of the window. The movable part **52** of the pivoting hinge **5** is connected with the reinforcing insert **43** using threaded fasteners **55**. In the pivoting hinges **5**, during opening of the window, the window sash **4** rotates so as to the lower part of the sash, situated below these hinges, moves towards the exterior of the roof, and the upper part of the sash situated above of these hinges moves towards the interior of the attic.

[0020] In the sections rested on the side frame members **11** and on the top frame member **12**, between its flat internal area **21** and flat external area **22**, the support

flashing **2** has a lip, forming an open installation frame **24** in these three sections of the flashing, for connection of the flashing **35** of the window, installed in the roof structure, to the support flashing **2**. The purpose of the flashing **35** is to seal the mounting of the window in the roof structure. At external edges of its side sections, the support flashing **2** has a series of holes **25** for threaded fasteners, particularly screws, fixing this support flashing to battens **31** of the roof structure. The holes **25** in the support flashing **2** and the threaded fasteners seated in them are covered with the flashing **35**.

[0021] Above the support flashing **2**, as well as above the pivoting hinges **5**, shields **6** of the side gaps are situated, the gaps being located between the side members **11** of the window frame and the sash **4** of the window. The shields **6** (shown in Fig. 2, omitted in Fig. 3) are divided, as a common practice in pivoting windows, and sections of the shields situated in the upper part of the window, are installed immovably on the window frame, while sections of the shields situated in the lower part of the window are installed on the sash and move during opening of the window together with the lower part of the sash, outwards.

[0022] The window frame has also a wooden additional frame **7**, located on the side of the attic. In the wooden additional frame **7**, locking elements of the window are seated, for instance sockets for a handle bolt, mating with their respective locking elements mounted on the sash **4**, in its additional frame **44**. Moreover, on the side of the attic, the additional frame **7** has a groove **71**, in which an edge of lining **36** of the window opening in the roof is seated; the frame has also an additional groove for mounting of the seal **72**, having a free flap adjacent, in a closed window, to the surface of the sash **4**. The wooden additional frame **7** of the window frame is fixed to the support flashing **2** using screws **73**, placed in bushings **72** running through the side window frame member. Identically, in the section mating with the window top frame member **13**, the additional frame is fixed to the upper section of the flashing using screws, and has a groove for the lining.

[0023] Example 2. The roof window with window frame, which has a form of a rectangular frame **1**, with the following main elements: two side members **11**, a top member **12** and a bottom member **13**. On the external side of the window, the window frame has two bearing strips **8** laid on its side members **11**. The bearing strips **8** are adjacent to the window side frame members **11** with their flat internal areas **81**, while they protrude beyond the outline of the window side frame members **11** with their flat external areas **82**, sideways and along these members towards the upper (above the window) and the lower (below the window) sections of the roof plane, while being only partially adjacent to the terminal fragments of surfaces of the side members. In both bearing strips **8**, their flat external areas **82**, as well as sections of the strips protruding outwards along the side frame members **11**, rest on the supporting structure **3** of the roof, on hor-

horizontal tile battens **31**, being a support for roofing-tiles **32**, while the tile battens rest on counter battens **33** laid on rafters **34**, being basic supporting elements of the roof.

[0024] Both window side frame members **11** have thin walls **14** with a low thermal conductivity, made of a plastic, situated on the window frame on the side of the sash **4** of the window, while the main bulk of the side member is formed by the filling **15** made of an insulating material, particularly a porous one. In the walls **14**, T-shaped grooves **16** are situated along the window frame members, and in these grooves, weather strips **17** are mounted, with freely moving flaps adjacent, in a closed window, to the side surfaces of the sash **4**. On the external side of the window, the walls **14** have a connecting lip **18**, by which these walls are connected with internal lips **83** of the support flashings. The filling **15** of the side frame members is glued both to the plastic walls **14**, and to the support flashing **2** of the window frame. The top member of the window frame (not shown in the cross-section) is built in the same way, and the wall of the frame member situated from the side of the window sash, is connected with the walls **14** of the side frame members at its ends, forming, together with them, a frame surrounding the opening in the window frame for a sash **1** from at least three sides.

[0025] On the bearing strips **8** which rest on the side frame members **11** of the window frame, in upper sections of the strips, near the top member **12** of the window frame, tilting hinges **9** are installed, connected with the pivoting hinges **5** by their intermediate arms **91**, and the tilting hinges are situated slightly above the middle of length of the window. In the tilting hinges **9**, both their stationary parts **92** fixed to the bearing strips **8**, and moving parts **93** mating with their intermediate arms **91**, as well as the axes **94** of these hinges, are situated above the bearing strips **8**, and also above the glazing unit **41** in the window sash **4**, the unit consisting of two panes separated with internal frames. Also the pivoting hinges **5** are situated above the bearing strips **8**, and above the glazing unit in the window sash. Movable parts of the pivoting hinges are connected with the sash through reinforcing inserts placed in ducts of the side walls of the sash on the external side of the window - identically as in the first embodiment of the invention.

[0026] The window frame according to the second embodiment, particularly its fitting, is intended for a dual-action window, opened as a pivot window or a tilt window. During pivoting opening, the intermediate arms **91** rest on the window frame along its side members **11** (Fig. 4, the right-hand arm), and the window sash rotates in the pivoting hinges **5** - as in the first embodiment. During tilting opening, the window sash rotates in the tilting hinges **9**, and the intermediate arms **91** are raised together with the sash (Fig. 4, the left-hand arm).

[0027] Between their flat internal areas **81** and flat external areas **82**, the bearing strips **8** have a bend forming a mounting lip **84** in every strip, for connection of the window flashing **35**, installed in the roof structure, to the

bearing strips **8**. The purpose of the flashing **35** is to seal the mounting of the window in the roof structure. Near their external edges, the bearing strips **8** have a series of holes **85** for threaded fasteners, particularly screws, fixing these bearing strips to battens **31** of the roof structure. The holes **85** in the bearing strips and the fasteners seated in them are covered with flashing **35**.

[0028] Above the bearing strips **8**, as well as above the pivoting hinges **5**, the tilting hinges **9**, and the intermediate arms **91**, shields **6** of the side gaps are situated, the gaps being located between the side frame members **11** of the window frame and the window sash **4**. The shields **6** are divided; their sections situated in the upper part of the window are installed on the intermediate arms, while the sections situated in the lower part of the window are installed on the sash. During pivoting opening, the upper sections of the shields rest together with the intermediate arms on the side members of the window frame, and the lower sections move together with the lower part of the sash. During tilting opening, the window sash moves as a whole towards the exterior of the roof, and both lower and upper sections of the shields, move together with the sash.

[0029] The window frame has also a wooden additional frame **7**, situated on the side of the attic, as in the first embodiment. In the wooden additional frame **7**, locking elements of the window are seated, for instance sockets for a handle bolt, mating with their respective locking elements mounted on the sash **4**, in the additional frame **44** of the sash. On the side of the attic, the additional frame **7** has a groove **71**, in which an edge of lining **36** of the window opening in the roof is seated; in this frame, also a seal **72** is mounted, having a free flap adjacent, in a closed window, to the surface of the sash **4**. The wooden additional frame **7** of the window frame is fixed to the bearing strips **8** using screws **73** placed in bushings **72**, running through the window side frame member **11**.

[0030] Example 3. The roof window with window frame, which has a form of a rectangular frame, with the following main elements: two side members **19**, a top member and a bottom member - as in both previous embodiments. On the external side of the window, the window frame has a support flashing **2** in the form of an open frame, placed at the external side of the window on the side window frame members **19** and the window top frame member **12**. The support flashing **2** is adjacent to the window frame members: side **19** and top (not shown in Fig. 6) with its flat internal area **21**, while it protrudes beyond the outline of the window frame members: side **19** and top with its flat external area **22**, sideways and towards the upper section of the roof plane, while being adjacent only partially to terminal fragments of surfaces of these members on the external side of the window. The flat internal area **22** of the support flashing **2** rests on the supporting structure **3** of the roof, on horizontal tile battens **31**, being a support for roofing-tiles **32**, while the tile battens rest on counter battens **33** laid on rafters **34**, being basic supporting elements of the roof structure.

[0031] In this embodiment, unlike in the previous embodiments, the window side frame members do not have thin plastic walls, situated on the window frame on the side of the window sash 4. In this embodiment, the window side frame members 19 are made of a uniform material, constituting both a support structure of the window frame, and thermal insulation. The T-shaped grooves 16, situated along the window frame members, and intended for mounting of the seals 17, are located directly in the uniform side frame member 19.

[0032] On the support flashing 2, on its side sections, which rest on the side members 19 of the window frame, on the external side of the window, pivoting hinges 5 are installed, situated slightly above the middle of length of the window side frame members 11. In these hinges, both their stationary parts 51 fixed to the support flashing 2, and moving parts 52 mating with the window sash 4, as well as the axes 53 of the hinge, are situated above support flashing 2, as well as above the glazing unit 41 in the window sash 4, the unit consisting of two panes separated with internal frames. Movable parts 52 of the pivoting hinges 5 are connected with the side walls 42 of the sash 4 using a reinforcing insert 43, placed in the duct of the side wall 42 of the sash 4 on the external side of the window, and the threaded fasteners 55.

[0033] The support flashing 2 has a lip forming an open installation frame 24 for connection of the flashing 35 of the window, installed in the roof structure, to the support flashing 2. The purpose of the flashing 35 is to seal the mounting of the window in the roof structure. At external edges of its side sections, the support flashing has a series of holes for threaded fasteners, particularly screws, fixing the support flashing to battens 31 of the roof structure. The holes in the support flashing 2 and the threaded fasteners seated in them are covered with the flashing 35. Above the support flashing 2, as well as above the pivoting hinges 5, shields 6 are situated - as in previous embodiments.

[0034] The window frame has also a wooden additional frame 7, located on the side of the attic. In the wooden additional frame 7, locking elements of the window are seated, for instance sockets for a handle bolt, mating with their respective locking elements mounted on the sash 4, on the additional frame 44 of the sash. Moreover, on the side of the attic, the additional frame 7 has a groove 71, in which an edge of lining 36 of the window opening in the roof is seated; the frame has also an additional groove for mounting of the seal 72, having a free flap adjacent, in a closed window, to the surface of the sash 4. The wooden additional frame 7 of the window frame is fixed to the support flashing 2 using screws 73, placed in bushings 72 running through the side window frame member. Identically, in the section mating with the window tope frame member 12, the additional frame is fixed using screws to the upper section of the flashing and has a groove for the lining.

[0035] **Example 4.** The roof window with window frame which has a form of a rectangular frame, with a support

flashing 2 as in the first embodiment. On the side frame members, near the top frame member, tilting hinges 9 are fixed, situated above the support flashing, and under the shields 6 of the side gaps. Movable parts of the tilting hinges connected directly with the window sash, are fixed to reinforcing inserts placed in ducts in the side walls of the sash, in the sections of these walls situated at upper ends of the side walls. According to this embodiment of the invention, the window frame with a fitting allows for opening of the window only in the tilting mode, that is by rotation of the sash around a horizontal axis located at the top edge of the window.

[0036] The embodiments presented do not exclude other possibilities for the realisation of the invention, as defined in the appended claims.

[0037] The window frame may have a support frame, as in the first embodiment, and a set of tilting and pivoting hinges, for dual-action of the window, as in the second embodiment. Also a reversed combination is possible, i. e. bearing strips and pivoting hinges only. The window frame may be installed in roofs with other structures, for instance in a roof with profiled sheets seated on battens, or in a flat rooftop, with roofing sheets or roof paper.

Claims

1. A roof window comprising a window sash (4) and a window frame (1) with a fitting for a window sash,
 - the window frame (1) having a design enabling the window frame to be immersed in the roof structure, the window frame having the form of a rectangular frame and comprising: a top member (12), a bottom member (13) and two side members (11; 19),
 - the window frame (1) being equipped with said fitting constituting at least an installation set of the window sash,
 - the window frame (1) further comprising at least one structural element (2, 8) for connecting the window frame with the roof, said at least one structural element (2, 8) of the window frame protruding beyond the outline of the window frame members (11 or 19, 12, 13),
 - the window sash (4) comprising a glazing unit (41), the window sash being situated in the opening of the window frame at least when the window is closed, the window sash being opened by rotation around at least one horizontal geometrical axis,
 - the window sash (4) as well having elements of a locking set for when the window sash is in a closed position,
 - the window frame (1) mating with shields (6) of gaps between the window frame and the window sash, and the window frame comprising a set of seals (17) in these gaps, characterised

in that:

- the at least one structural element (2, 8) of the window frame is located in use on the top surface of the window frame members (11 or 19, 12, 13), while said at least one structural element (2, 8) of the window frame protrudes beyond the outline of the window frame members (11 or 19, 12, 13),
- hinges (5, 9) are installed on the at least one structural element (2, 8),
- and said at least one horizontal geometrical axis is located, in use, slightly above the surface of the window frame.

2. A roof window according to claim 1, **characterised in that** the at least one structural element (2, 8) of the window frame connecting it with the roof is constituted by a support flashing (2) adjacent to at least three of the window frame members, including both side members (11, 19) the support flashing protruding at least sideways beyond the outline of the window frame members.
3. A roof window according to claim 2, **characterised in that** said window frame has walls (14) made of a material with a low thermal conductivity, preferably a plastic, situated on the window frame members at least on the side of the window sash (4), along the support flashing (2), transversely to its surface resting on the roof.
4. A roof window according to claim 3, **characterised in that** the walls (14) situated on the side of the window sash (4) have longitudinal grooves (16), with a T-shaped cross-section, for the mounting of the seals (17).
5. A roof window according to claim 1, **characterised in that** the structural element (2, 8) of the window frame connecting it with the roof is constituted by bearing strips (8), adjacent to the side window frame members (11), protruding beyond the outline of the window frame members on its opposite sides.
6. A roof window according to any one of the claims 1 to 5, **characterised in that** said hinges are pivoting hinges (5) for opening the window sash in the pivoting mode, said pivoting hinges (5) being installed in the middle section of the length of the window side frame members (11, 19), above the middle of the window height.
7. A roof window according to any one of the claims 1 to 5, **characterised in that** said hinges are tilting hinges (9) for opening the window sash in the tilting mode, said tilting hinges (9) being situated in use near the top edge of the window, and **in that** arms (91) terminated with pivoting hinges (5) are seated

in said tilting hinges (9), while both the tilting hinges (9) and the arms (91) are situated in use on the top surface of the window frame.

8. A roof window according to any one of the claims 1 to 5, **characterised in that** said hinges are tilting hinges (9) for opening the window sash in the tilting mode, said tilting hinges (9) being situated in use near the top edge of the window, and **in that** the window sash is seated directly in said tilting hinges (9).
9. A roof window comprising a window frame with fitting for a roof window, according to claim 1, or 2, or 3, or 4, or 5, or 6, or 7, or 8, **characterised in that** the window frame members seated in the roof structure are made of an insulating material, preferably a porous one.
10. A roof window according to any one of the claims 1 to 9, **characterised in that** the window frame comprises an additional frame (7), preferably made of wood, situated in use on the internal side of the window frame, the locking elements of the window frame being installed on said additional frame (7) and mating with their respective locking elements mounted on the window sash.
11. A roof window according to any one of the claims 1 to 10, **characterised in that** the structural elements (2, 8) comprise installation elements (24, 84) for connection of the window frame with the flashing (35) of the window, the installation elements being located in use on the top surface of the window frame on the external side of the window.

Patentansprüche

1. Dachfenster, das einen Flügel (4) und einen Fensterrahmen (1) mit einem Beschlag für den Flügel hat,
 - der Fensterrahmen (1) hat die Form eines Rahmens, besonders rechteckig, eingesetzt in die Struktur des Daches und enthält: oberes Rahmenholz (12), unteres Rahmenholz (13) und zwei seitliche Rahmenhölzer (11, 19),
 - der Fensterrahmen (1) ist mit Beschlägen ausgerüstet, die mindestens die Befestigungsbaugruppe des Fensterflügels darstellen,
 - der Fensterrahmen (1) enthält auch mindestens ein Konstruktionselement (2, 8) des Fensterrahmens, das den Fensterrahmen mit dem Dach verbindet, wobei das Konstruktionselement des Fensterrahmens aus der Kontur der Rahmenhölzer des Fensterrahmens (11 oder 19, 12, 13) hervorsticht,
 - der Flügel (4) besitzt ein Scheibenpaket (41),

wobei dieser Flügel mindestens im geschlossenen Zustand des Fensters in einer Öffnung des Fensterrahmens angeordnet ist, besonders des zum Öffnen des Fensters drehbaren Flügels, und zwar rundum mindestens einer horizontalen geometrischen Achse,

- der Flügel (4) besitzt auch Elemente einer Verriegelungsbaugruppe des Flügels in geschlossener Stellung,

- der Fensterrahmen arbeitet mit den Abdeckungen (6) der Spalten zwischen dem Fensterrahmen und dem Flügel zusammen und der Fensterrahmen hat auch Dichtungen (17) in diesen Spalten,

dadurch gekennzeichnet, dass

- zumindest ein Konstruktionselement (2, 8) des Fensterrahmens, das ihn mit dem Dach verbindet, auf der Fläche der Rahmenhölzer (11 oder 19, 12, 13) des Fensterrahmens angeordnet ist, wobei das Konstruktionselement des Fensterrahmens, das ihn mit dem Dach verbindet, aus der Kontur der Rahmenhölzer des Fensterrahmens (11 oder 19, 12, 13) hervorsticht,

- die Scharniere (5, 9) mindestens an einem Konstruktionselement (2, 8) befestigt werden,

- und mindestens eine horizontale, geometrische Achse etwas über der Fläche des Fensterrahmens angeordnet ist.

2. Das Dachfenster gemäß Anspruch 1, **dadurch gekennzeichnet, dass** mindestens ein Konstruktionselement (2, 8) des Fensterrahmens, was ihn mit dem Dach verbindet, ein Bundflansch (2) ist, der mindestens an drei Rahmenhölzer des Fensterrahmens anliegt, darunter an die beiden seitlichen (11, 19) und zumindest an den Seiten aus der Kontur der Rahmenhölzer hervorsticht.

3. Das Dachfenster gemäß Anspruch 2, **dadurch gekennzeichnet, dass** der Fensterrahmen Wände (14) aus Materialien mit niedrigem Wärmeleitwert hat, vorzugsweise aus Kunststoff, angeordnet in den Rahmenhölzern des Fensterrahmens, und zwar mindestens von der Seite des Fensterflügels (4), längs des Bundflansches (2), quer zu seiner auf dem Dach ruhenden Fläche.

4. Das Dachfenster gemäß Anspruch 3, **dadurch gekennzeichnet, dass** die an der Seite des Fensterflügels (4) angeordneten Wände (14) Längsnute (16) haben, und zwar besonders mit einem T-förmigen Querschnitt zur Befestigung der Dichtungen (17).

5. Das Dachfenster gemäß Anspruch 1, **dadurch gekennzeichnet, dass** das Konstruktionselement (2, 8) des Fensterrahmens, das ihn mit dem Dach ver-

bindet, Bundleisten (8) sind, die an die seitlichen Rahmenhölzer (11) des Fensterrahmens anliegen und an ihren gegenüberliegenden Seiten aus der Kontur der Rahmenhölzer hervorstehen.

6. Das Dachfenster gemäß Anspruch 1 bis 5, **dadurch gekennzeichnet, dass** es Scharniere (5) für den Fensterflügel zum Öffnen des Fensters in der Kippfunktion hat, wo gerade diese Scharniere (5) auf ihren seitlichen Rahmenhölzern (11, 19) in der Mittelzone der Länge dieser Rahmenhölzer, oberhalb der Hälfte der Fensterhöhe, befestigt werden.

7. Das Dachfenster gemäß Anspruch 1 bis 5, **dadurch gekennzeichnet, dass** es Scharniere (9) für den Fensterflügel (4) zum Öffnen des Fensters in der Schwenkfunktion hat, wo gerade diese Scharniere (9) in der Nähe des oberen Fensterrandes angeordnet und die Arme (91) mit Kippscharnieren (5) in Schwenkscharnieren (9) eingesetzt sind, wobei sowohl die Schwenkscharniere als auch die Arme (91) an der Außenseite des Fensters angebracht sind.

8. Das Dachfenster gemäß Anspruch 1 bis 5, **dadurch gekennzeichnet, dass** es die Schwenkscharniere (9) zum Öffnen des Fensters in der Schwenkfunktion hat, wobei die Schwenkscharniere (9) in der Nähe des oberen Fensterrandes angeordnet sind und in diesen Scharnieren der Fensterflügel direkt eingesetzt wird.

9. Das Dachfenster, das einen Fensterrahmen (1) mit Beschlag gemäß den Ansprüchen 1, oder 2, oder 3, oder 4, oder 5, oder 6, oder 7, oder 8 hat, **dadurch gekennzeichnet, dass** die Elemente der Rahmenhölzer des Fensterrahmens, eingesetzt in die Struktur des Daches, aus thermoisolierendem, vorzugsweise porösem Material, gefertigt sind.

10. Das Dachfenster, gemäß Anspruch 1 bis 9, **dadurch gekennzeichnet, dass** der Fensterrahmen einen zusätzlichen Rahmen (7), vorzugsweise aus Holz, besitzt und dieser an der Innenseite des Fensterrahmens angeordnet ist, wobei an dem zusätzlichen Rahmen (7) die Verriegelungselemente des Fensters befestigt sind, die mit den ihnen entsprechenden und am Flügel eingesetzten Verriegelungselementen, zusammenarbeiten.

11. Das Dachfenster gemäß Anspruch 1 bis 10, **dadurch gekennzeichnet, dass** die Konstruktionselemente (2, 8) auf ihrer Außenfläche an der Außenseite des Fensters Montageelemente (24, 84) zum Verbinden des Fensterrahmens mit dem Abdeckblech (35) des Fensters haben.

Revendications

1. Fenêtre de toit possédant l'ouvrant (4) et le dormant (1) avec la quincaillerie pour l'ouvrant,

- le dormant (1) a une forme d'un cadre, essentiellement perpendiculaire, monté dans la structure du toit, possédant une traverse haute (12), une traverse basse (13) et deux montants latéraux (11, 19),
- le dormant (1) est équipé d'une quincaillerie constituant au moins l'ensemble de la fixation de l'ouvrant,
- le dormant (1) possède également au moins un élément de structure (2, 8) du dormant, qui relie le dormant au toit, et ledit élément fait saillie en dehors du contour du cadre du dormant (11 ou 19, 12, 13),
- l'ouvrant (4) possède le vitrage (41), et, au moins dans la position fermée de la fenêtre, ledit ouvrant est situé dans l'ouverture du dormant, en particulier dans le cas de l'ouvrant pivotant autour d'au moins un axe géométrique horizontal pour ouvrir la fenêtre,
- l'ouvrant (4) possède également les éléments de l'ensemble du verrouillage de l'ouvrant dans la position fermée,
- l'ouvrant (4) coopère avec les couvertures (6) des rainures entre le dormant et l'ouvrant et le dormant possède l'ensemble des joints (17) dans ces rainures,

caractérisée en ce que:

- au moins un élément de structure (2, 8) du dormant qui le relie au toit est situé sur la surface du cadre (11 ou 19, 12, 13) du dormant, et l'élément de structure du dormant qui le relie au toit fait saillie en dehors du contour du cadre du dormant (11 ou 19, 12, 13),
- et les charnières (5, 9) sont montées sur au moins un élément de structure (2, 8),
- et au moins un axe géométrique horizontal est situé légèrement au-dessus de la surface du dormant.

2. Fenêtre de toit selon la revendication 1, **caractérisée en ce que** au moins un élément de structure (2, 8) du dormant qui le relie au toit est le raccord d'étanchéité (2) contigu à au moins trois montants et traverses du dormant, dont à deux montants latéraux (11, 19), faisant saillie au moins latéralement en dehors du contour du cadre.
3. Fenêtre de toit selon la revendication 2, **caractérisée en ce que** le dormant possède les parois (14), d'un matériau à faible conductivité thermique, favorablement en matière plastique, disposées dans le

cadre du dormant au moins du côté de l'ouvrant (4), le long du raccord d'étanchéité (2), transversalement à sa surface reposant sur le toit.

4. Fenêtre de toit selon la revendication 3, **caractérisée en ce que** les parois (14) situées du côté de l'ouvrant (4) sont dotées de rainures longitudinales (16), notamment de la section transversale de forme en T, pour le montage des joints (17).
5. Fenêtre de toit selon la revendication 1, **caractérisée en ce que** les éléments de structure (2, 8) du dormant qui le relie au toit sont les lattes résistantes (8) contiguës aux montants latéraux (11) du cadre du dormant, qui se prolongent au-delà du contour du cadre sur les côtés opposés du dormant.
6. Fenêtre de toit selon la revendication 1 à 5, **caractérisée en ce qu'elle** possède les charnières (5) de l'ouvrant permettant d'ouvrir la fenêtre par basculement, et que lesdites charnières (5) sont montées sur les deux montants latéraux (11, 19) dans la zone centrale de la longueur des ces montants, au-dessus de la moitié de la hauteur de la fenêtre.
7. Fenêtre de toit selon la revendication 1 à 5, **caractérisée en ce qu'elle** possède les charnières (9) de l'ouvrant (4) permettant d'ouvrir la fenêtre par projection, et que lesdites charnières (9) sont situées à proximité du bord supérieur de la fenêtre, et les bras (91) qui sont terminés par les charnières basculantes (5) et montés dans les charnières de projection (9), et que lesdites charnières (9) de même que les bras (91) sont situés sur le côté extérieur de la fenêtre.
8. Fenêtre de toit selon la revendication 1 à 5, **caractérisée en ce qu'elle** possède les charnières de projection (9) permettant d'ouvrir la fenêtre par projection qui sont situées à proximité du bord supérieur de la fenêtre et que l'ouvrant est monté directement dans lesdites charnières.
9. Fenêtre de toit possédant le dormant avec la quincaillerie selon la revendication 1, ou 2, ou 3, ou 4, ou 5, ou 6, ou 7, ou 8, **caractérisée en ce que** les éléments du cadre du dormant montés dans la structure du toit sont fabriqués d'un matériau thermoisolant, favorablement poreux.
10. Fenêtre de toit selon la revendication 1 à 9, **caractérisée en ce que** le dormant possède le châssis supplémentaire (7) favorablement en bois, situé sur le côté intérieur du dormant, et que sur ce châssis supplémentaire (7) sont montés des éléments de verrouillage de la fenêtre qui coopèrent avec les éléments de verrouillage correspondants montés sur l'ouvrant.

11. Fenêtre de toit selon la revendication 1 à 10, **caractérisée en ce que** les éléments de structure (2, 8) du dormant possèdent sur leur surface extérieure sur le côté extérieur de la fenêtre les éléments de montage (24, 84) pour connecter le dormant avec 5
tôle de protection (35) de la fenêtre.

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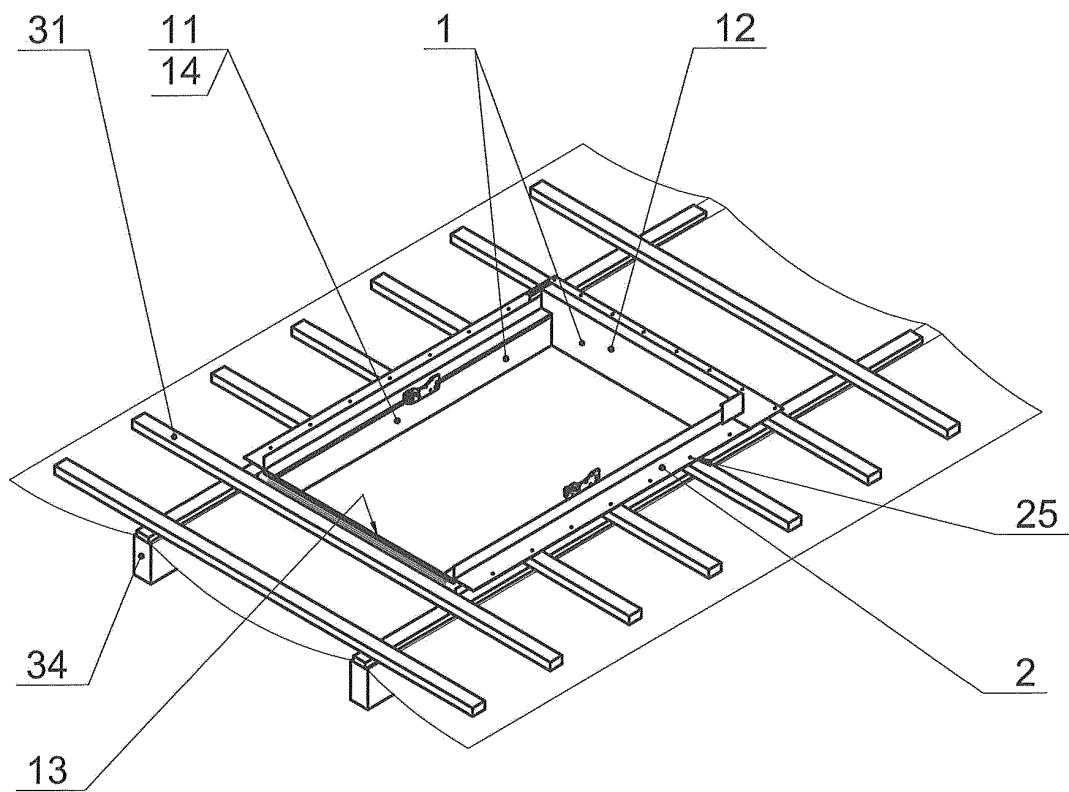


Fig 1

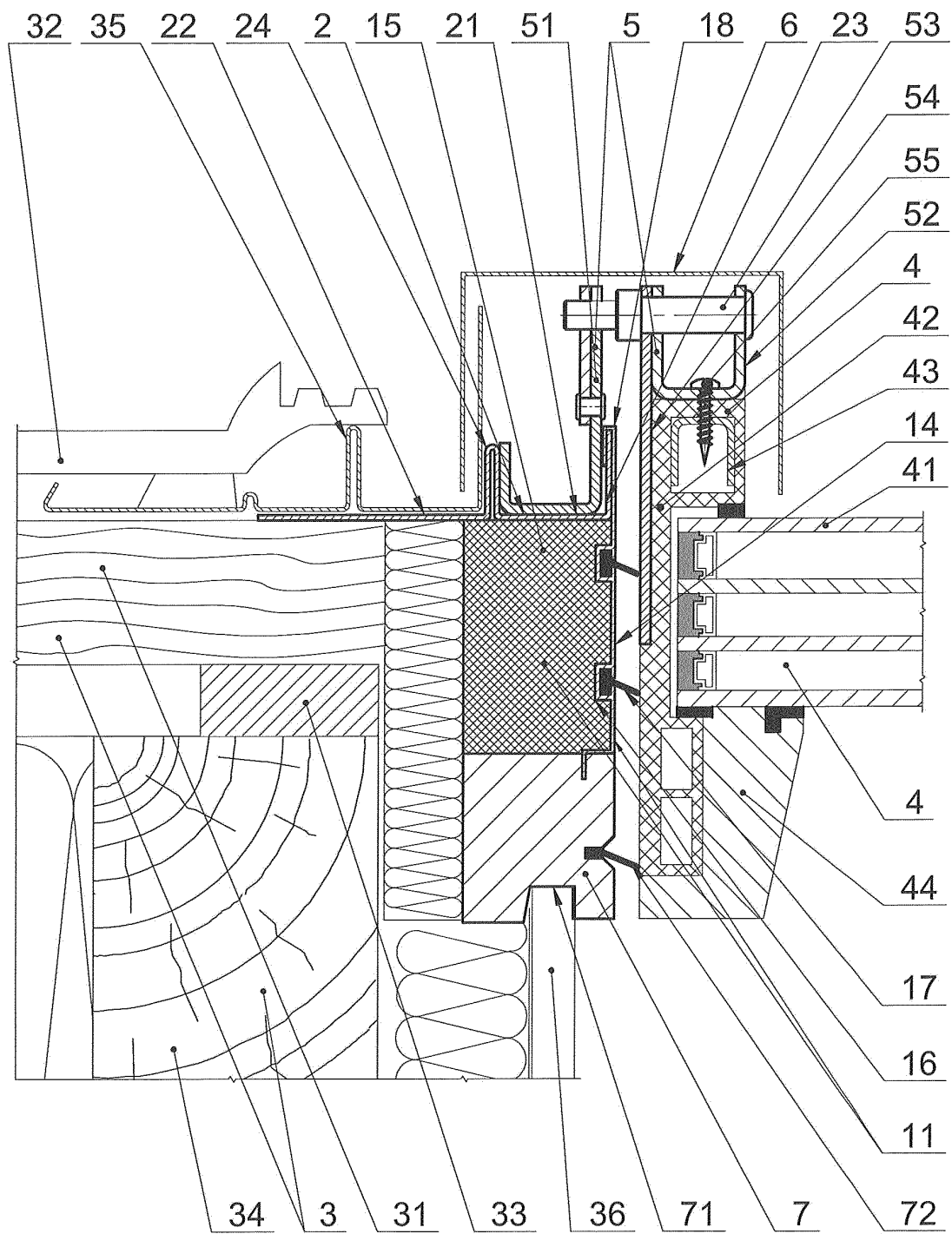


Fig 2

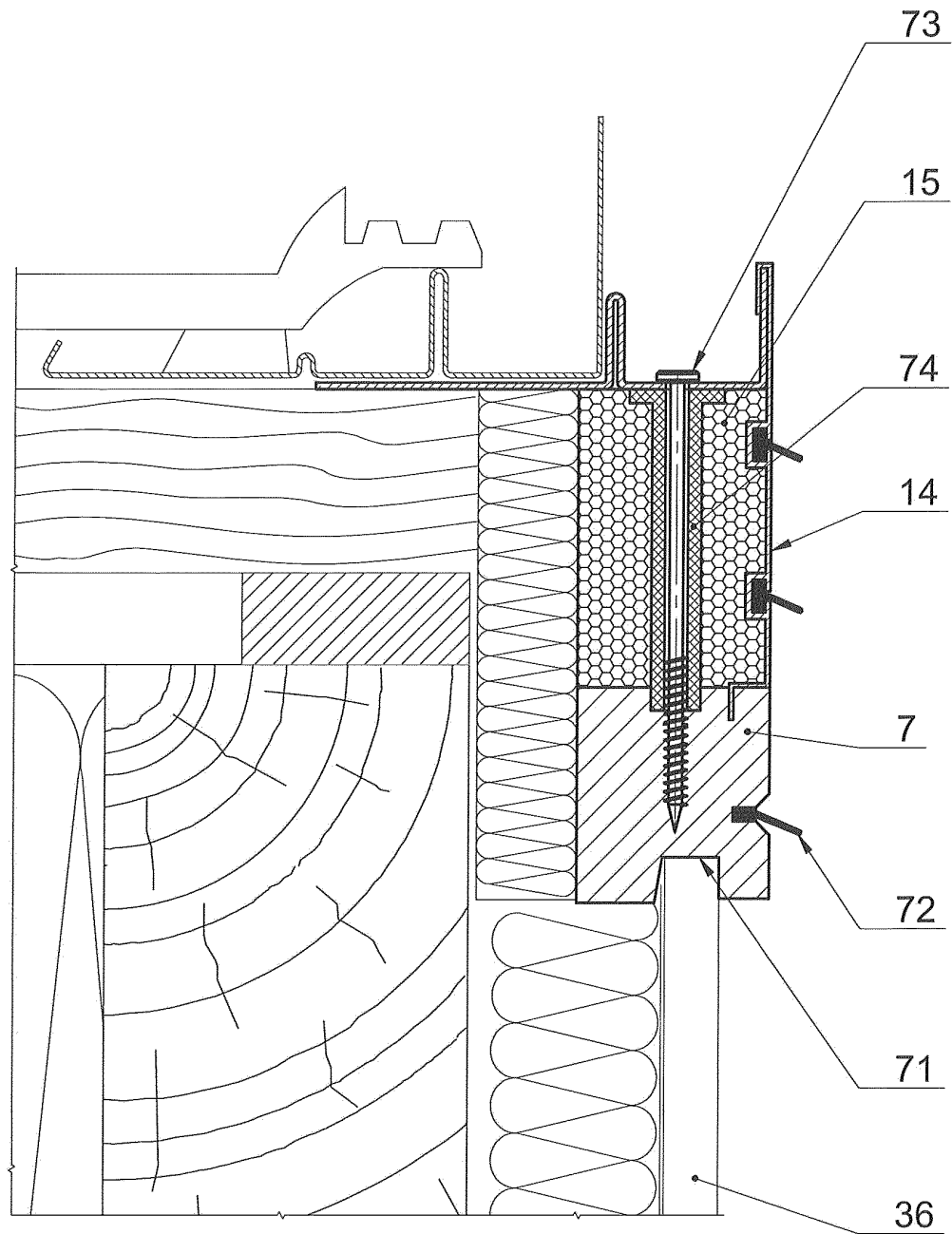


Fig 3

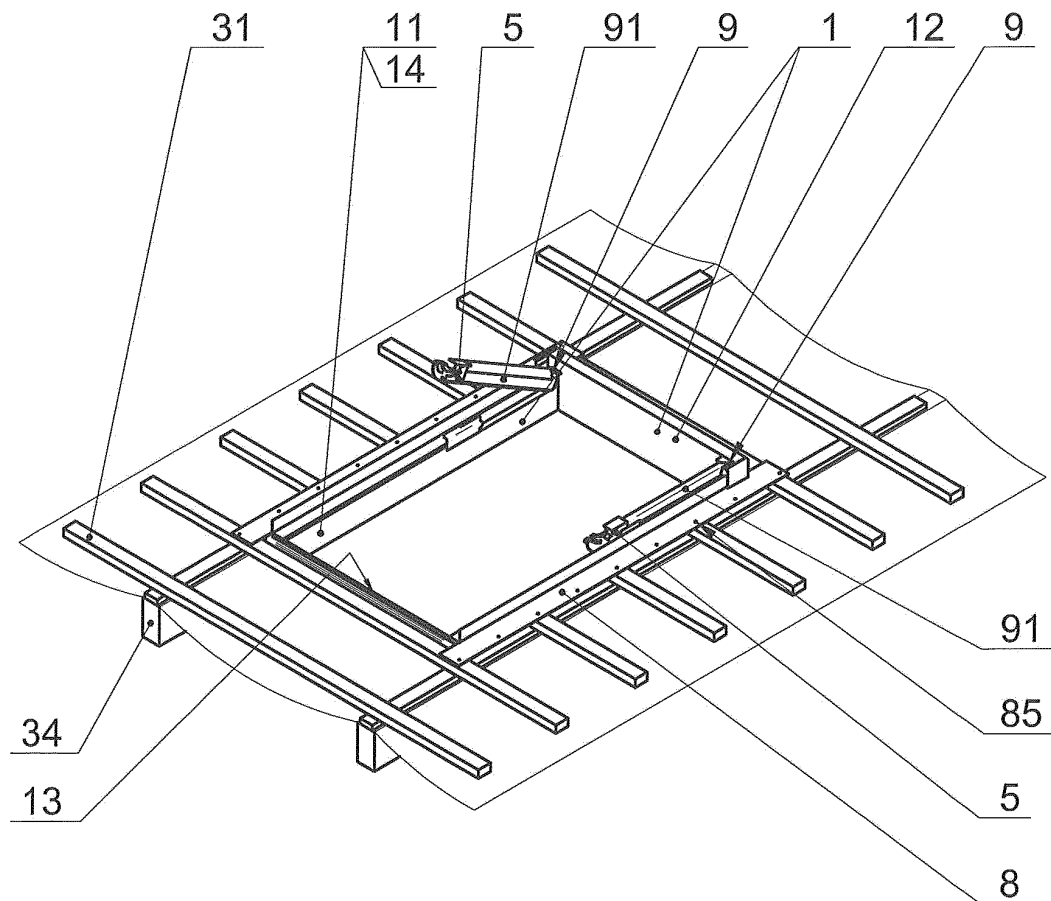


Fig 4

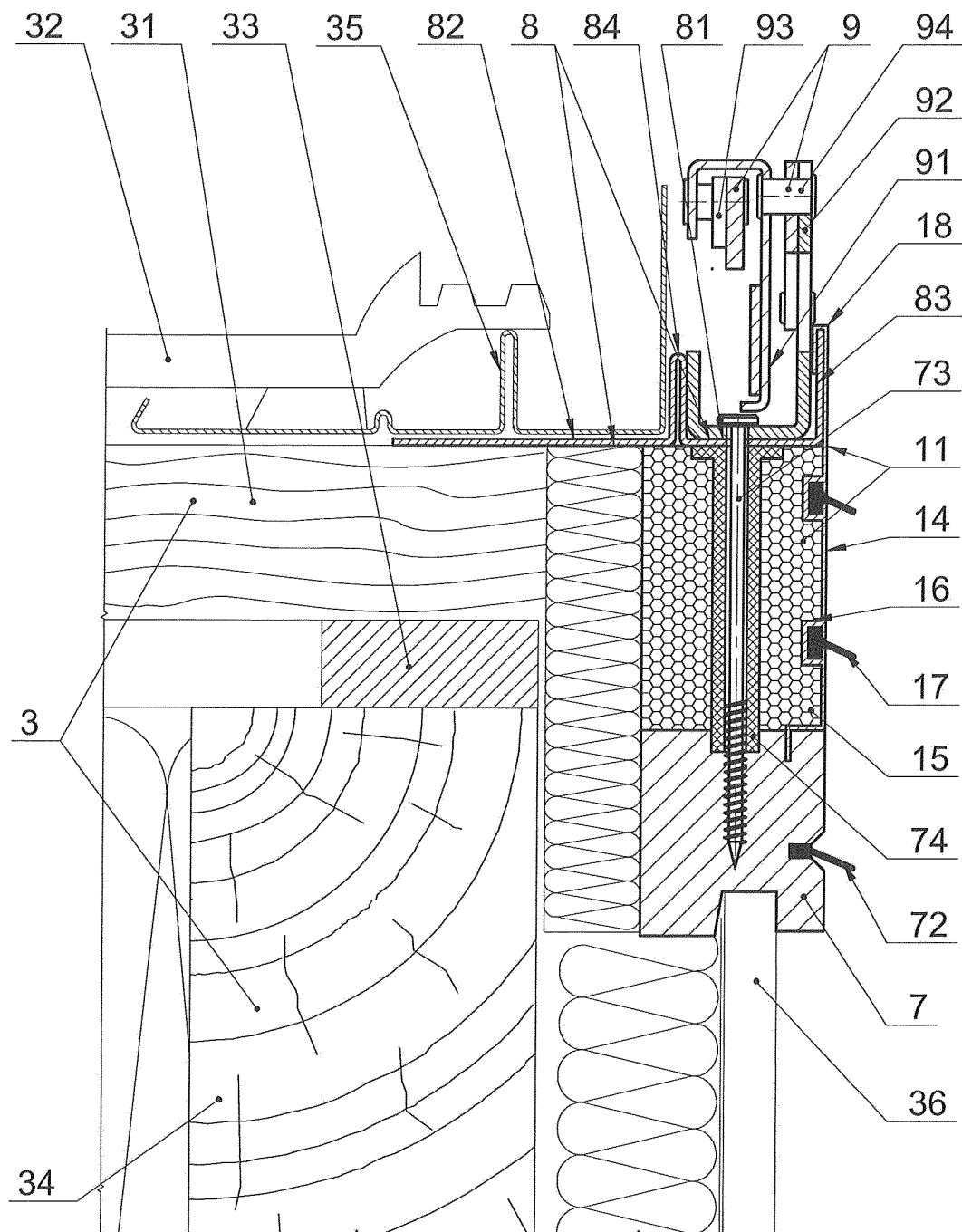


Fig 5

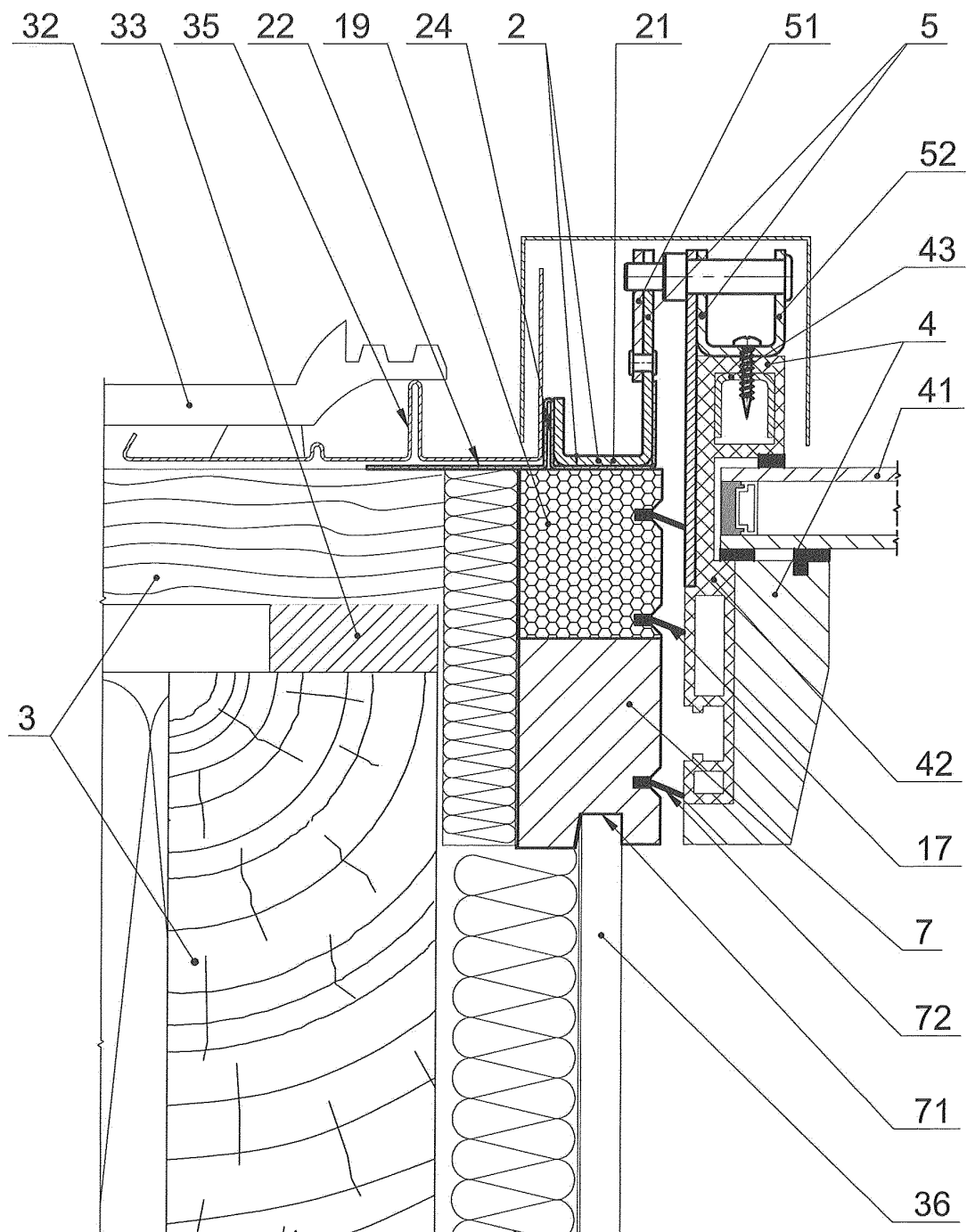


Fig 6

REFERENCES CITED IN THE DESCRIPTION

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