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(71) Applicant: **MARBET Spólka z o.o.**
43-346 Bielsko-Biala (PL)

(72) Inventors:
- **GIELMUDA, Piotr**
  43-344 Bielsko-Biala (PL)
- **WYPCHALOWSKI, Krzysztof**
  43-360 Bystra (PL)

(74) Representative: **Rygiel, Andrzej**
Kancelaria Rzecznika Patentowego
ul. Bohaterow Warszawy 26, Lok. F
43-300 Bielsko-Biala (PL)

(54) **METHOD OF JOINERY FITTING AND THE SET OF JOINERY FITTING ELEMENTS**

(57) The object of the invention is the method of joinery fitting and the set of joinery fitting elements based on segment elements, applied in energy-efficient and passive construction industry.

The method of joinery fitting based on segment elements made from rigid EPS in the form of the mounting beam **(1),** the ground beam (2), the internal basis (4) for window sills and the external basis (3) for window sills, joined tightly with the wall and joined with each other with special locks and other known elements in the form of glues, assembly foams, assembly connectors and sealing tapes:

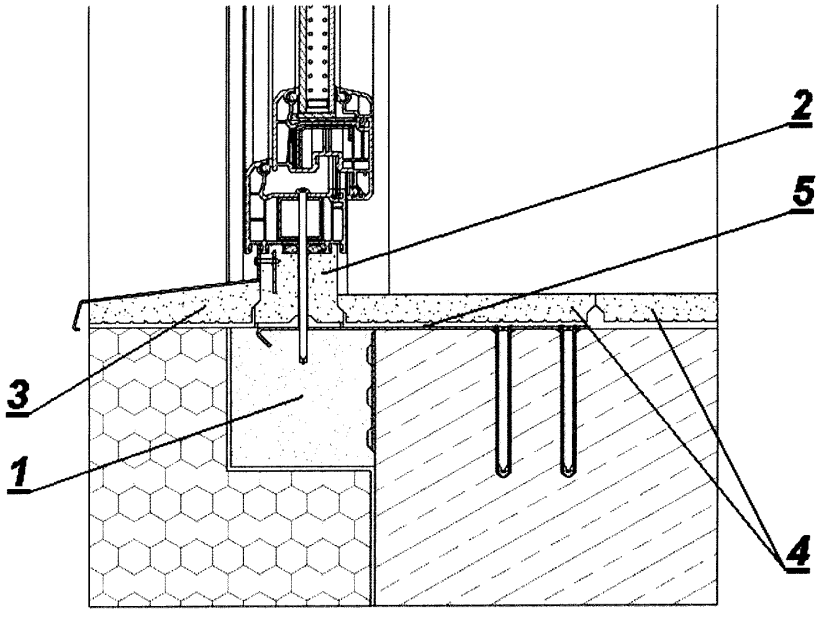

Fig. 5

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Description

[0001] The object of the invention is the method of joinery fitting and the set of joinery fitting elements based on segment elements, applied in energy-efficient and passive construction industry.

[0002] Recently, a significant increase in prices of thermal energy used to heat homes has resulted in the increased interest in limiting heat losses resulting from thermal bridges and tightness of joinery joints; thus, the advancement of windows and balcony doors beyond the face of the wall shifted into the zone of the external building insulation and possibly tight connections of window and door frames with the wall are aimed for.

[0003] There is a commonly known method of joinery insulation consisting in that into an opening in the wall cleaned from dust, grease and other dirt window and/or door frames, which are previously equipped on the perimeter with fixing anchors, are inserted. Then windows and/or doors are levelled, their correct fitting position in the wall openings is determined with wedges placed between the wall and the windows and/or doors frame, then the anchors are bent in such a way that they adhere to the wall and screwed, most commonly with wall plugs and fixing screws, and then the gaps created between the frame and the opening in the wall are filled in 50 to 75% of the volume of the present gap between the frame and the wall with assembly foam, most commonly polyurethane foam, which increases its volume and tightly fills the gap between the frames and the wall. After the foam hardens due to air humidity, the fitting wedges are removed and the assembly foam is reinjected into the created gaps, and after it hardens its excess is shaved off, flushing the foam properly with the surfaces between the frame and the wall.

[0004] The purpose of the invention is to develop a method of joinery fitting and a set of joinery fitting elements based on segment elements made of rigid EPS in the form of a mounting beam, a ground beam, an internal window sill base and an external window sill base joined tightly with the wall, and joined with each other with special locks and other known elements in form of glues, assembly foams, assembly connectors and sealing tapes.

[0005] The object of the invention is presented in the embodiment in the drawing, where Fig. 1 presents in the outside view a window installed in a wall opening, with mounting beams fixed with external anchors running along its whole perimeter, Fig. 2 presents in the outside view a window installed in a wall opening, with mounting beams fixed with internal anchors running along its whole perimeter, Fig. 3 presents in cross-section through the wall opening the top and/or the side part of the window, in which the mounting beam surrounding it is equipped with a mounting anchor fixed to the face of the external wall, Fig. 4 presents in cross-section through the wall opening the top and/or the side part of the window, in which the mounting beam surrounding it is equipped with a mounting anchor fixed to the external wall at the reveal side, Fig. 5 presents in cross-section through the wall opening the bottom part of the window, in which the mounting beam surrounding it is equipped with a mounting anchor fixed to the wall at the window sill reveal side, Fig. 6 presents in cross-section through the wall opening the bottom part of the window, in which the mounting beam surrounding it is equipped with a mounting anchor fixed to the face of the external wall, Fig. 7 presents in the axonometric view from the back a narrow mounting beam equipped with an angle mounting anchor fixed inside the wall opening in the reveal plane, Fig. 8 presents in the axonometric view from the front a narrow mounting beam equipped with an angle mounting anchor installed inside the wall opening in the reveal plane, Fig. 9 presents in the side view a narrow mounting beam equipped with an angle mounting anchor installed inside the wall opening in the reveal plane, Fig. 10 presents in the axonometric view from the front a narrow mounting beam equipped with an angle mounting anchor with an angle reinforcement fixed to the external face of the wall in the façade plane, Fig. 11 presents in the axonometric view from the back a narrow mounting beam equipped with an angle mounting anchor with an angle reinforcement, fixed to the external face of the wall in the façade plane, Fig. 12 presents in the side view a narrow mounting beam equipped with an angle mounting anchor with an angle reinforcement fixed to the external face of the wall in the façade plane, Fig. 13 presents in the axonometric view from the front a narrow mounting beam installed in the façade plane, Fig. 14 presents in the axonometric view from the back a narrow mounting beam installed in the façade plane, Fig. 15 presents in the side view a narrow mounting beam installed in the façade plane, Fig. 16 presents in the axonometric view from the front a wide mounting beam equipped with an angle mounting anchor, Fig. 17 presents in the axonometric view from the back a wide mounting beam equipped with an angle mounting anchor, Fig. 18 presents in the side view a wide mounting beam equipped with an angle mounting anchor, Fig. 19 presents in the axonometric view from the front a wide mounting beam equipped with an angle mounting anchor with an angle reinforcement, Fig. 20 presents in the axonometric view from the back a wide mounting beam equipped with an angle mounting anchor with an angle reinforcement, Fig. 21 presents in the side view a wide mounting beam equipped with an angle mounting anchor with an angle reinforcement, Fig. 22 presents in the axonometric view from the front a wide mounting beam, Fig. 23 presents in the axonometric view from the back a wide mounting beam, Fig. 24 presents in the side view a wide mounting beam, Fig. 25 presents in the front view a ground beam with a fixing ridge located at the edge of the top surface, Fig. 26 presents in the axonometric view from the front a ground beam with a fixing ridge located at the edge of the top surface, Fig. 27 presents in the front view a ground beam with a fixing ridge located in the centre of the top surface, Fig. 28

presents in the axonometric view from the front a ground beam with a fixing ridge located in the centre of the top surface, Fig. 29 presents in the front view a ground beam with a flat top surface, Fig. 30 presents in the axonometric view from the front a ground beam with a flat top surface, Fig. 31 presents in the front view the internal window sill, Fig. 32 presents in the axonometric view from the front the internal window sill, Fig. 33 presents in the front view the external window sill, Fig. 32 presents in the axonometric view from the front the external window sill.

[0006] The method of fitting of joinery in the form of doors and/or windows in openings in the wall made in known construction technologies, whose surfaces are evened and levelled/plumbed to obtain straight angles in the corners, then these surfaces are cleaned from dust, grease and other dirt, and then the frame of windows and/or doors is placed in the wall opening, according to the invention is characterised by that after surveying of the wall opening consisting in planning the arrangement of the warm mounting beam segments and location of possible re-cut warm mounting beams joints, the correctness of dimensions in the façade plane is checked and inspection of corners angles, verticality of reveals and required mounting clearance is conducted, and then the bottom line of warm mounting beams is laid in such a way that the first extreme warm mounting beams are shortened by several/a dozen or so centimetres that ensures their mounting close to the hinge line, window casements support and easy installation, and then those beams are the first to be slid out by about 10 cm beyond the outline of the wall opening and levelled by drilling holes in the wall through mounting anchors equipped with process openings, and then the test arrangement of extreme beams is stabilised by drilling and inserting a mounting pin/screw initially into every second opening in the anchor, filling the space between the extreme beams with other beams, which, if necessary, are re-cut to the required width, or a missing element without an anchor is added, and after test fitting of the arrangement of all warm mounting beams in the bottom threshold line of the reveal the warm mounting beams are disassembled and low expansion PU adhesive for polystyrene is applied onto the back and side surfaces of the beam, and then they are fixed to the wall with the mounting elements in the form of screws, bolts and metal expansion anchors screwed in all the way, then the side warm mounting beams are measured and mounted in a similar way, starting with bottom corners and protruding them about 10 cm beyond the planned height of the opening in the wall, and next the line of the top warm mounting beams is completed, whereby on the bottom line of warm beams a ground beam matched to the frame profile, re-cut to the full width of the created warm beams reveal opening, is mounted with PU adhesive for polystyrene, with the depth of the protrusion of the window into the external insulation zone determined at this stage, whereby thin steel screws are used to ultimately stabilise the glued ground beam on the warm mounting beams for the time of the PU adhesive for polystyrene bonding, integrating these elements in an assembly way, then vapour barrier tape is applied on the window and/or door frame from the inside, and vapour permeable tape is applied on the outside, and between the window and/or door frame and the ground beam sealing expanding tape and/or acrylic-based sealant are inserted, and in the reveal opening made with warm mounting beams the window and/or door frame is installed, which is stabilised at the sides and at the top with mounting wedges, and then the window and/or door frame is screwed with self-tapping screws with the anchors sunk in the warm mounting beams in screws installation areas, whereby the space at the sides and in the top part between the window and/or door frame is filled with PU foam, and after the foam hardens and dries its excess is shaved off and removed, and then from the inside to the warm mounting beam and further to the inside of the opening in the wall the vapour barrier tape released from under the frame is applied, and on the outside to the warm mounting beam the vapour permeable tape released from under the window frame is applied, and then the base of the internal window sill is mounted on the wall on the PU foam and wedges, fitting the profiled laps to the ground beam, preferably in such a way as to ensure covering of the full width of the wall with the polystyrene foam undercoat, which is cut to the required width from another element of the internal window sill base, and then during or after installation of the external insulation of the building the external window sill base is mounted in the same way as the internal window sill base is mounted, and then the external window sill, which can be screwed to the ground beam with screws through spiral connectors, is fixed, and then the window casements and/or door leaves are installed and the correctness of mounting is checked.

[0007] The set of joinery fitting elements according to the invention is characterised by that it is constituted by the warm mounting beam, the ground beam, the external window sill and the internal window sill, where the warm mounting beam is in the form of an elongated cuboid, in the central part of which there is at least one mounting anchor permanently connected with it, whereby locks equipped with slits constitute the ends of the warm mounting beam, and the surface is covered with recesses, the ground beam is in the form of an elongated cuboid whose top surface is flat or has a ridge, whereas in the bottom part of the base there is a stabilising groove, whereby the base has ridges, the external window sill is in the form of a prism whose top surface is inclined towards the base at the angle of 5 to 15°, which is equipped with a row of recesses that are essentially parallel to each other, the side surface has a hollow in its bottom part, the internal window sill is in the form of a cuboid whose side walls have ridges, and the bottom surface is equipped with a row of recesses that are essentially parallel to each other.

[0008] **Embodiment I.** The method of fitting of joinery in the form of doors in the openings in the wall made in

known construction technologies, whose surfaces are evened and levelled/plumbed to obtain straight angles in the corners, then these surfaces are cleaned from dust, grease and other dirt, and then the frame of the door is placed in the wall opening, and after surveying of the wall opening consisting in planning the arrangement of warm mounting beam segments and location of possible cut warm mounting beams joints correctness of dimensions in the façade plane is checked and inspection of corners angles, verticality of reveals and required mounting clearance is conducted, and then the bottom line of warm mounting beams is laid in such a way that the first extreme warm mounting beams are shortened by several/a dozen or so centimetres that ensures their mounting close to the hinge line, door leaves support and easy installation, and then those beams are the first to be slid out by about 10 cm beyond the outline of the wall opening and levelled by drilling holes in the wall through mounting anchors equipped with process openings, and then the test arrangement of extreme beams is stabilised by drilling and inserting a mounting pin initially into every second opening in the anchor, filling the space between the extreme beams which, if necessary, are re-cut to the required width, and after test fitting of the arrangement of all warm mounting beams in the bottom threshold line of the reveal the warm mounting beams are disassembled and low expansion PU adhesive for polystyrene is applied onto the back and side surfaces of the beams, and then they are fixed to the wall with the mounting elements in the form of screws screwed in all the way, then the side warm mounting beams are measured and mounted in a similar way, starting with bottom corners and protruding them about 10 cm beyond the planned height of the opening in the wall, and next the line of the top warm mounting beams is completed, whereby on the bottom line of warm beams a ground beam matched to the frame profile, cut to the full width of the created warm beams reveal opening, is mounted with PU adhesive for polystyrene, with the depth of the protrusion of the door into the external insulation zone determined at this stage, whereby thin steel screws are used to ultimately stabilise the glued ground beam on the warm mounting beams for the time of the PU adhesive for polystyrene bonding, integrating these elements in an assembly way, then vapour barrier tape is applied on the door frame from the inside, and vapour permeable tape is applied on the outside, and between the door frame and the ground beam sealing expanding tape and acrylic-based sealant are inserted, and in the reveal opening made with warm mounting beams the door frame, which is stabilised at the sides and at the top with mounting wedges, is installed, and then the door frame is screwed by self-tapping screws with the anchors sunk in the warm mounting beams in screws installation areas, whereby the space at the sides and in the top part between the door frame is filled with PU foam, and after the foam hardens and dries its excess is shaved off and removed, and then at the inside onto the warm mounting beam and further onto the inside of the opening in the wall the vapour barrier tape released from under the frame is applied, and on the outside onto the warm mounting beam the vapour permeable tape released from under the frame is applied, and the base of the internal window sill is mounted on the wall using the PU foam and wedges, fitting the profiled laps to the ground beam, preferably in such a way as to ensure covering the full width of the wall with the polystyrene undercoat which is cut to the required width from another element of the internal window sill base, and then during or after installation of the external insulation of the building the external window sill base is mounted in the same way as the internal window sill base is mounted, and the external window sill, which is screwed to the ground beam with screws through spiral connectors, is fixed, and then the door leaf is installed and the correctness of mounting is checked.

[0009] Embodiment II. The method of fitting of joinery in the form of windows in the openings in the wall made in known construction technologies, whose surfaces are evened and levelled/plumbed to obtain straight angles in the corners, then these surfaces are cleaned from dust, grease and other dirt, and then the frame of the windows is placed in the wall opening, and after surveying of the wall opening consisting in planning the arrangement of warm mounting beam segments and location of possible cut warm mounting beams joints correctness of dimensions in the façade plane is checked and inspection of corners angles, verticality of reveals and required mounting clearance is conducted, and then the bottom line of warm mounting beams is laid in such a way that the first extreme warm mounting beams are shortened by several/a dozen or so centimetres that ensures their mounting close to the hinge line, window casements support and easy installation, and then those beams are the first to be slid out by about 10 cm beyond the outline of the wall opening and levelled by drilling holes in the wall through mounting anchors equipped with process openings, and then the test arrangement of extreme beams is stabilised by drilling and inserting a mounting pin initially into every second opening in the anchor, filling the space between the extreme beams which, if necessary, are re-cut to the required width or a missing element without an anchor is inserted, and after test fitting of the arrangement of all warm mounting beams in the bottom threshold line of the reveal the warm mounting beams are disassembled and low expansion PU adhesive for polystyrene is applied onto the back and side surfaces of the beams, and then they are fixed to the wall with the mounting elements in form of metal expansion anchors screwed in all the way, then the side warm mounting beams are measured and mounted in a similar way, starting with bottom corners and protruding them about 10 cm beyond the planned height of the opening in the wall, and next the line of the top warm mounting beams is completed, whereby on the bottom line of warm beams a ground beam matched to the frame profile, cut to the full width of the created warm beams reveal opening, is mounted with PU adhesive for

polystyrene, with the depth of the protrusion of the window into the external insulation zone determined at this stage, whereby thin steel screws are used to ultimately stabilise the glued ground beam on the warm mounting beams for the time of the PU adhesive for polystyrene bonding, integrating these elements in an assembly way, then vapour barrier tape is applied on the window frame from the inside, and vapour permeable tape is applied from the outside, and between the window frame and the ground beam acrylic-based sealant is inserted, and in the reveal opening made with warm mounting beams the window frame, which is stabilised at the sides and at the top with mounting wedges, is installed, and then the window frame is screwed by self-tapping screws with the anchors sunk in the warm mounting beams in screws installation areas, whereby the space at the sides and in the top part between the window frame is filled with PU foam, and after the foam hardens and dries its excess is shaved off and removed, and then from the inside onto the warm mounting beam and further onto the inside of the opening in the wall the vapour barrier tape released from under the frame is applied, and from the outside onto the warm mounting beam the vapour permeable tape released from under the frame is applied, and the base of the internal window sill is mounted on the wall using the PU foam and wedges, fitting the profiled laps to the ground beam preferably in such a way as to ensure covering the full width of the wall with the polystyrene foam undercoat which is cut to the required width from another element of the internal window sill base, and then during or after installation of the external insulation of the building the external window sill base is mounted in the same way as the internal window sill base is mounted, and the external window sill, which is screwed to the ground beam with screws through spiral connectors, is fixed, and then the window casements are installed and the correctness of mounting is checked.

[0010] The set of joinery fitting elements consists of the warm mounting beam **1,** the ground beam **2,** the external window sill **3** and the internal window sill **4.** The warm mounting beam **1** is in the form of an elongated cuboid, in the central part of which at least one mounting anchor **5** is permanently connected with it, whereby the ends of the warm mounting beam **1** are constituted by locks 6 equipped with recesses **7** and ridges **8,** and the surface **9** is covered with flutes **10** enhancing adherence and ensuring tightness of glued joints. The ground beam **2** is in the form of an elongated cuboid whose top surface **12** is flat or possesses a ridge **13** that can change its position across the surface width **12**, whereas in the bottom part of the base **14** there is a stabilising groove **15** for the pressed seat and adhesive weld, whereby the base **14** possesses side ridges **16, 16'.** The external window sill **3** is in the form of a prism whose top surface **18** is inclined in relation to the base **19** at the angle of 5 to 15°, which is equipped with a row of recesses that are essentially parallel to each other **20**, and the side surface **21** has in the bottom part a hollow **22** for fitting the joint with side ridges **16, 16'** of the ground beam **11.** The internal window sill **4** is in the form of a cuboid whose side walls **23**, **23**' have ridges **24, 24**', and the bottom surface **25** is equipped with a row of chamfered recesses **26** that are essentially parallel to each other, facilitating cutting off of the redundant width of the internal window sill **4.**

Claims

1. The method of fitting of joinery in the form of doors and/or windows in the openings in the wall made in known construction technologies, whose surfaces are evened and levelled/plumbed to obtain straight angles in the corners, then these surfaces are cleaned from dust, grease and other dirt, and then the frame of windows and/or doors is placed in the wall opening, **characterised by that** after surveying of the wall opening consisting in planning the arrangement of warm mounting beam segments and location of possible cut warm mounting beams joints, the correctness of dimensions in the façade plane is checked and inspection of corners angles, verticality of reveals and required mounting clearance is conducted, and then the bottom line of warm mounting beams is laid in such a way that the first extreme warm mounting beams are shortened by several/a dozen or so centimetres that ensures their mounting close to the hinge line, window casements support and easy installation, and then those beams are the first to be slid out by about 10 cm beyond the outline of the wall opening and levelled by drilling holes in the wall through mounting anchors equipped with process openings, and then the test arrangement of extreme beams is stabilised by drilling and inserting a mounting pin/screw initially into every second opening in the anchor, filling the space between the extreme beams, which, if necessary, are re-cut to the required width or a missing element without an anchor is inserted, and after test fitting of the arrangement of all warm mounting beams in the bottom threshold line of the reveal the warm mounting beams are disassembled and low expansion PU adhesive for polystyrene is applied onto the back and side surfaces of the beams, and then they are fixed to the wall with mounting elements in the form of screws, bolts and metal expansion anchors screwed in all the way, then the side warm mounting beams are measured and mounted in a similar way, starting with bottom corners and protruding them about 10 cm beyond the planned height of the opening in the wall, and next the line of the top warm mounting beams is completed, and on the bottom line of warm beams a ground beam matched to the frame profile, cut to the full width of the created warm beams reveal opening, is mounted with PU adhesive for polystyrene, with the depth of the protrusion of the window/door into the external insulation zone deter-

mined at this stage, whereby thin steel screws are used to ultimately stabilise the glued ground beam on the warm mounting beams for the time of the PU adhesive for polystyrene bonding, integrating these elements in an assembly way, then vapour barrier tape is applied onto the window and/or door frame from the inside, and vapour permeable tape is applied from the outside, and between the window and/or door frame and the ground beam sealing expanding tape and/or acrylic-based sealant are inserted, and in the reveal opening made with warm mounting beams the window and/or door frame is installed, which is stabilised at the sides and at the top with mounting wedges, and then the window and/or door frame is screwed with self-tapping screws with the anchors sunk into the warm mounting beams in screws installation areas, whereby the space at the sides and in the top part between the window and/or door frame is filled with PU foam, and after the foam hardens and dries its excess is shaved off and removed, and then from the inside to the warm mounting beam and further to the inside of the opening in the wall the vapour barrier tape released from under the frame is applied, and from the outside to the warm mounting beam the vapour permeable tape released from under the frame is applied, and then the base of the internal window sill is mounted on the wall on the PU foam and wedges, fitting the profiled laps to the ground beam, preferably in such a way as to ensure covering the full width of the wall with the polystyrene foam undercoat, which is cut to the required width from another element of the internal window sill base, and then during or after installation of the external insulation of the building the external window sill base is mounted in the same way as the internal window sill base is mounted, and then the external window sill, which can be screwed to the ground beam with screws through spiral connectors, is fixed, and then the window casements and/or door leaves are installed and the correctness of mounting is checked.

2. The set of joinery fitting elements, **characterised by that** it is constituted by the warm mounting beam **(1),** the ground beam **(2),** the external window sill **(3)** and the internal window sill **(4).**

3. The set according to claim 2, **characterised by that** the warm mounting beam (**1**) is in the form of an elongated cuboid in the central part of which at least one mounting anchor **(5)** is permanently joined with it, whereby the ends of the warm mounting beam **(1)** are constituted by locks **(6), (6')** with recesses **(7)** and ridges **(8),** and the surface **(9)** is covered with flutes **(10).**

4. The set according to claim 2, **characterised by that** the ground beam **(2)** is in the form of an elongated cuboid whose top surface **(12)** is flat or possesses a ridge **(13),** whereas in the bottom part of the base **(17)** there is a stabilising groove **(15),** whereby the base **(17)** possesses side ridges **(16), (16').**

5. The set according to claim 2, **characterised by that** the external window sill **(3)** is in the form of a prism whose top surface (**18**) is inclined in relation to the base **(19)** at the angle of 5 to 15°, whereby the base **(19)** is equipped with a row of recesses **(20)** that are essentially parallel to each other, and the side surface **(21**) possesses a hollow **(22)** in the bottom part.

6. The set according to claim 2, **characterised by that** the internal window sill **(4)** is in the form of a cuboid whose side walls **(23), (23')** possess chamfered ridges **(24) (24'),** and the bottom surface **(25)** is equipped with a row of recesses **(26)** that are essentially parallel to each other.

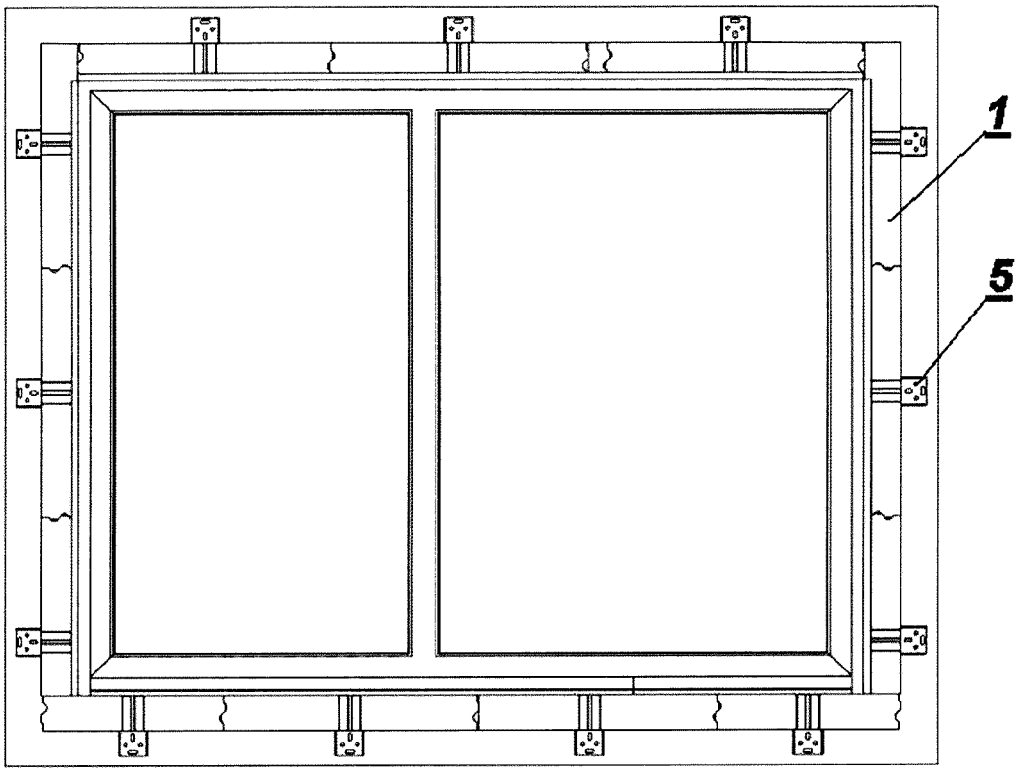


Fig. 1

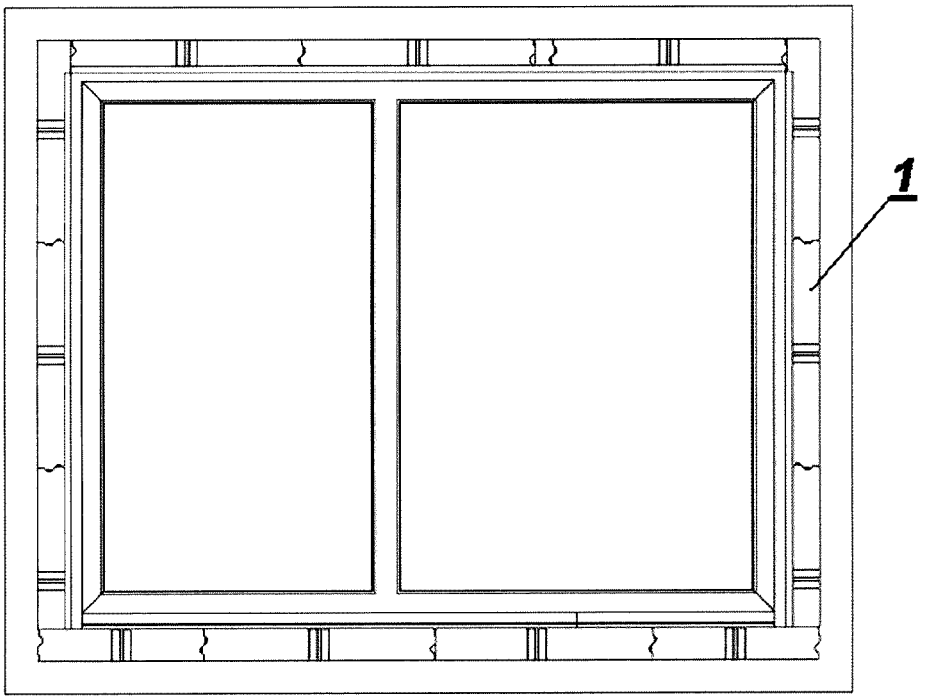


Fig. 2

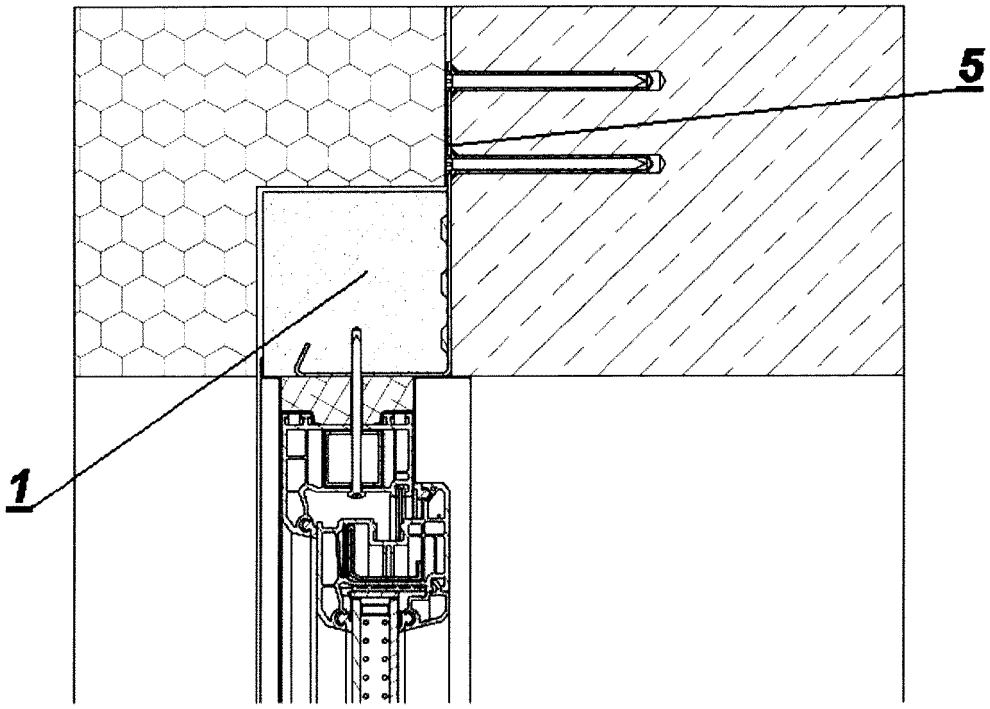


Fig. 3

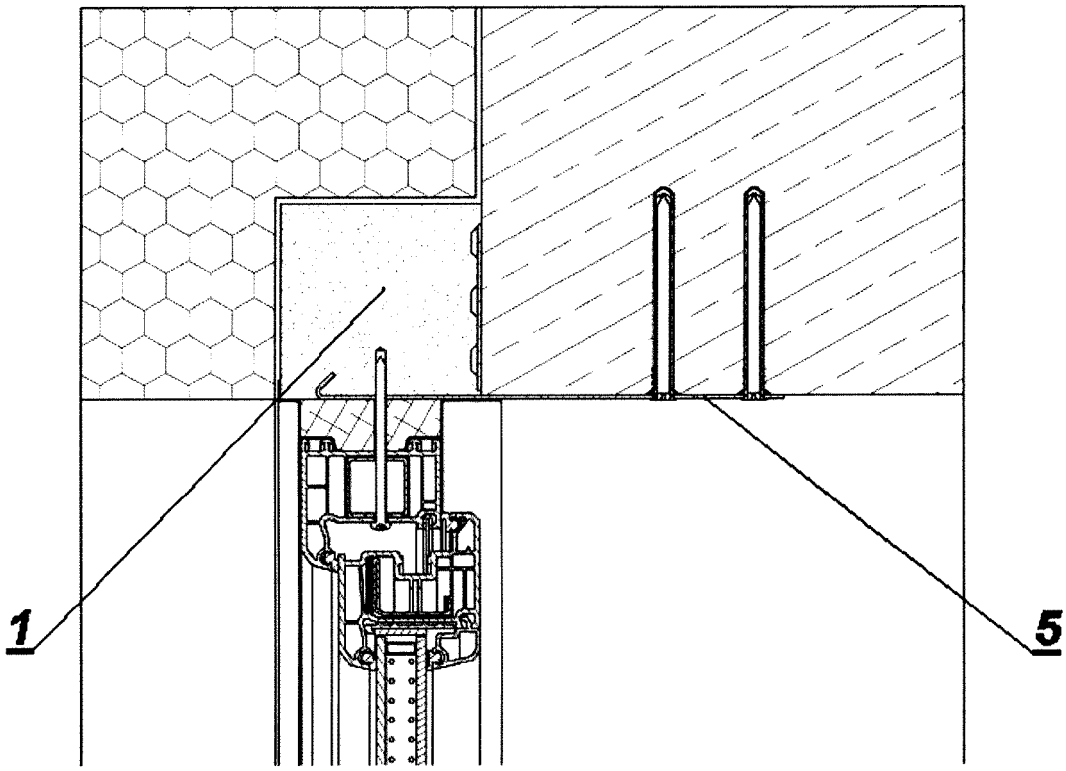


Fig. 4

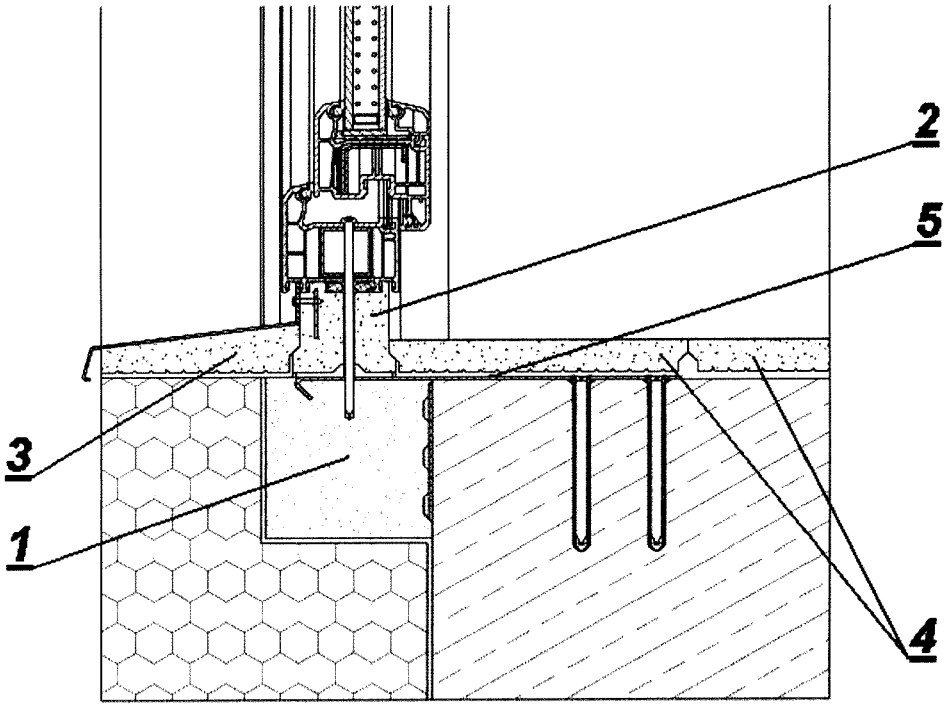


Fig. 5

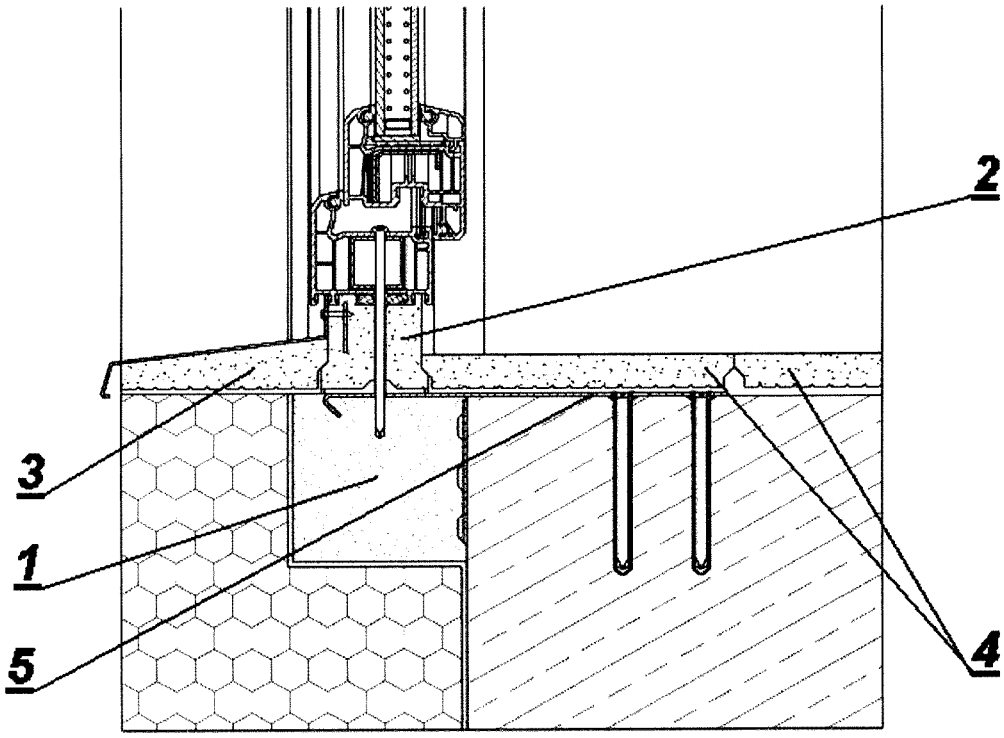


Fig. 6

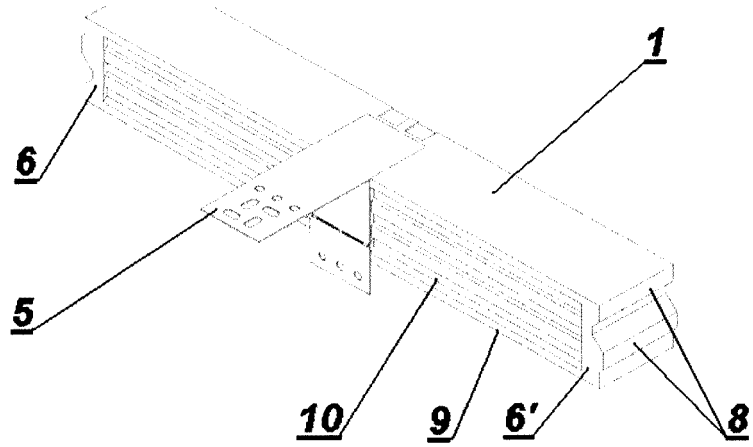


Fig. 7

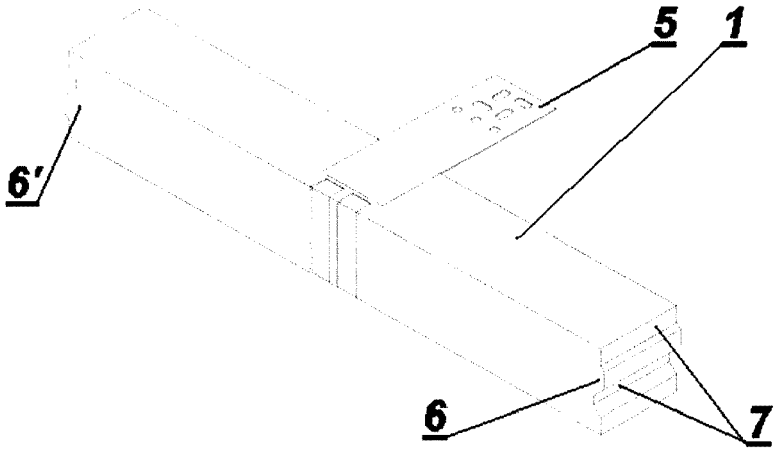


Fig. 8

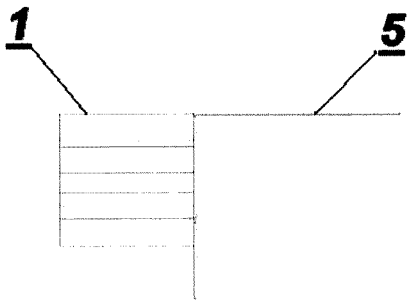


Fig. 9

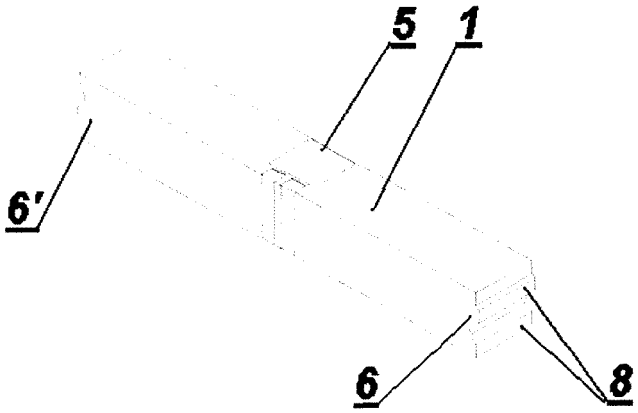


Fig. 10

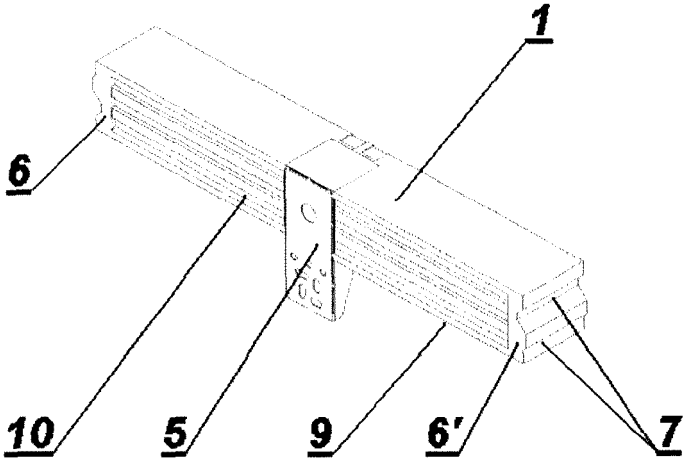
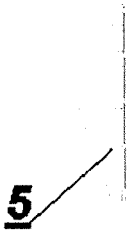


Fig. 11



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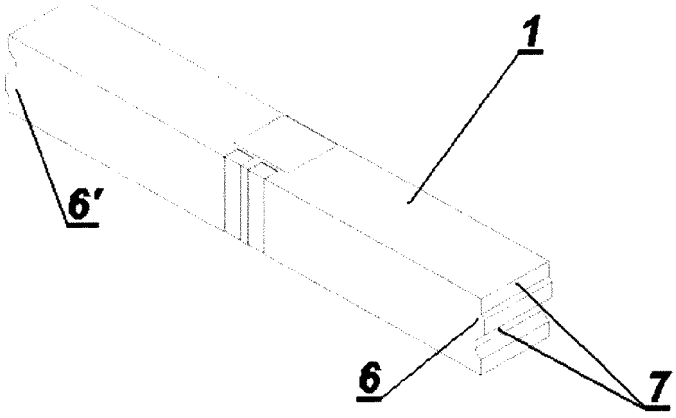
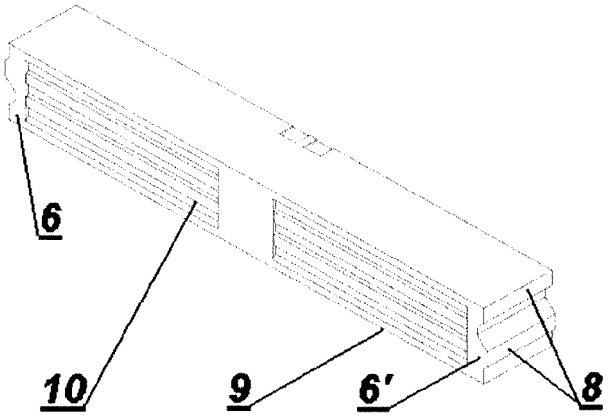


Fig. 13



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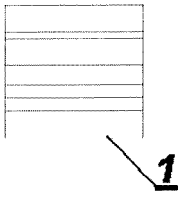

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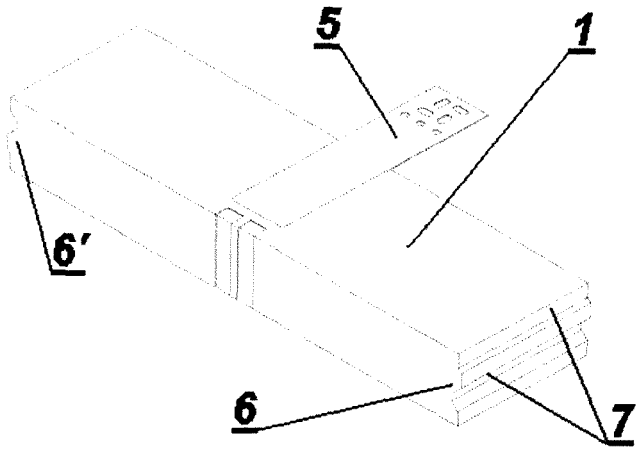

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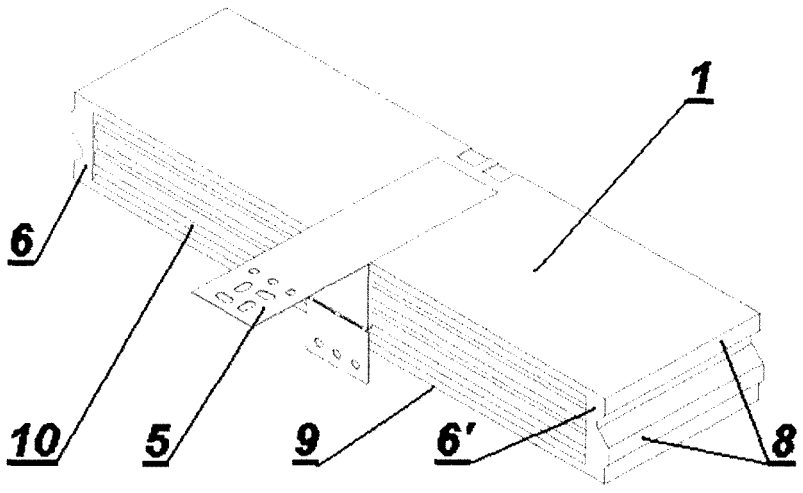

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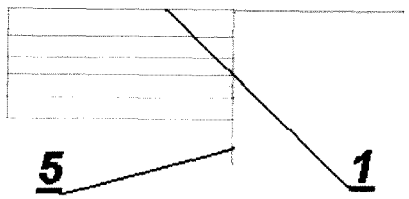

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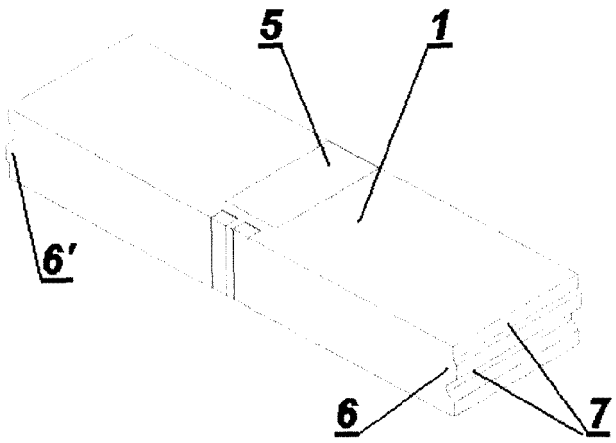
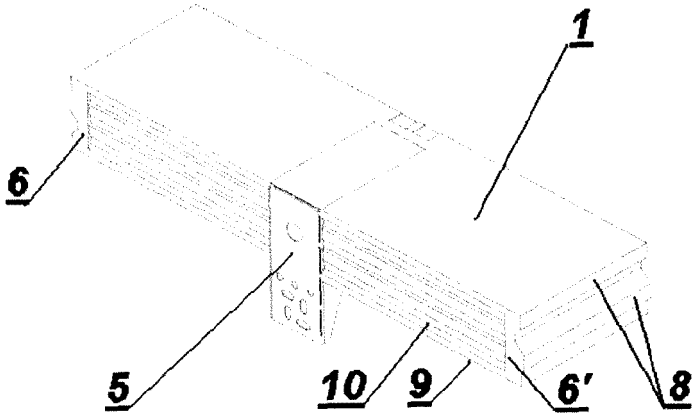


Fig. 19



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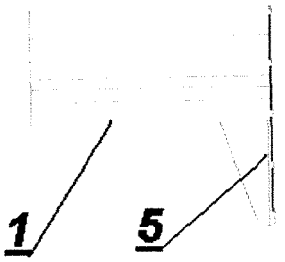

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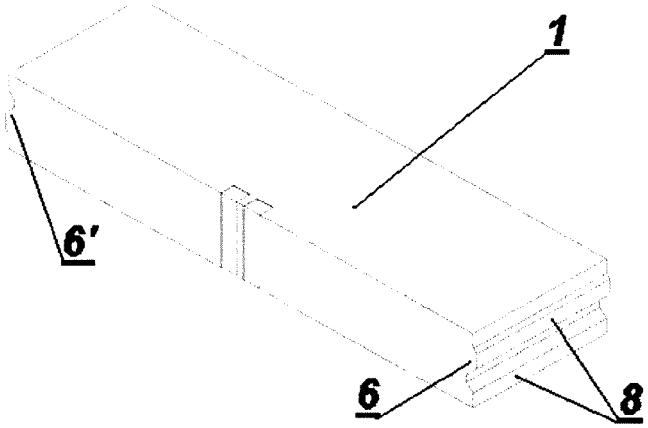

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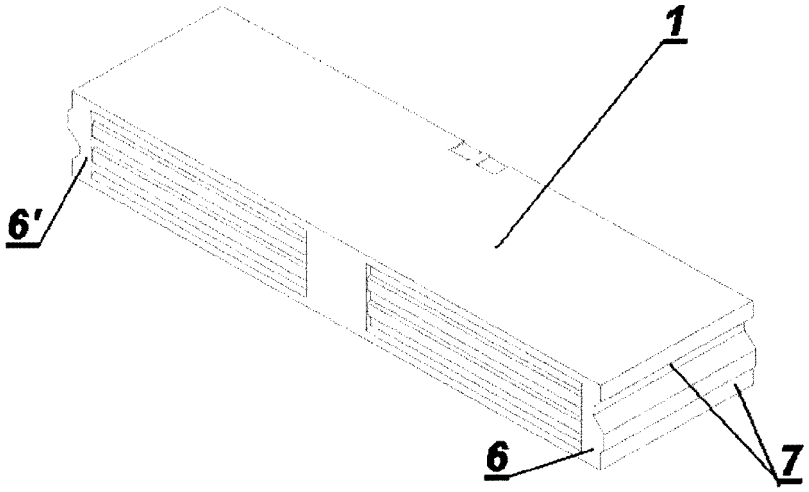

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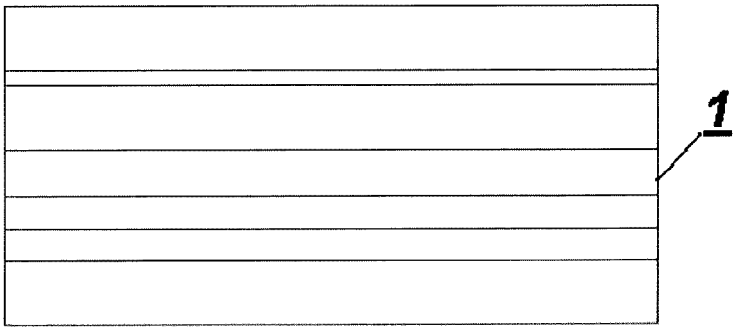
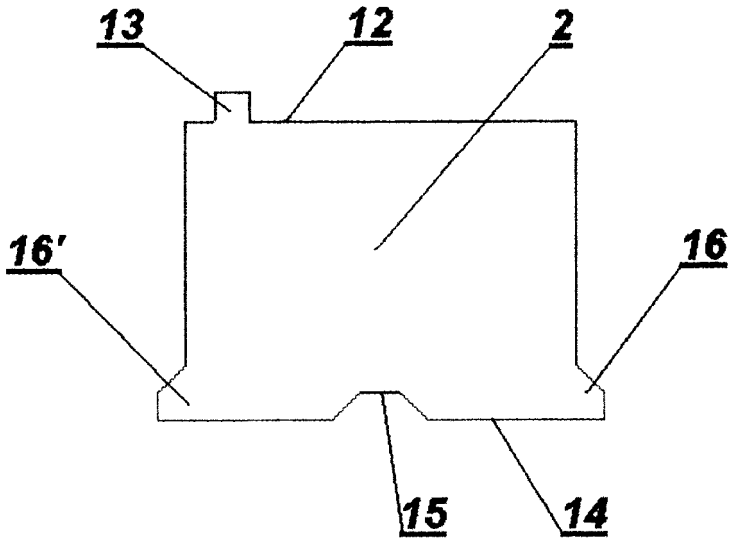


Fig. 24



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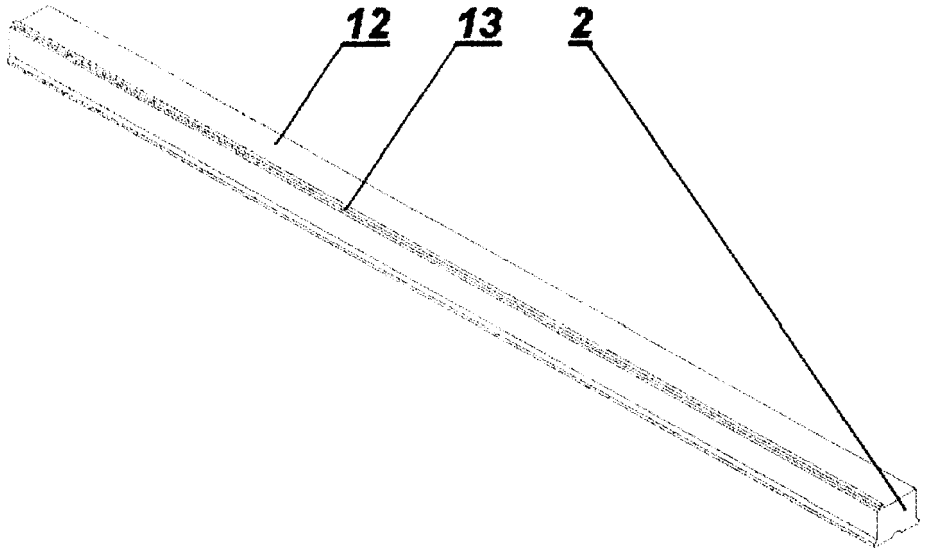

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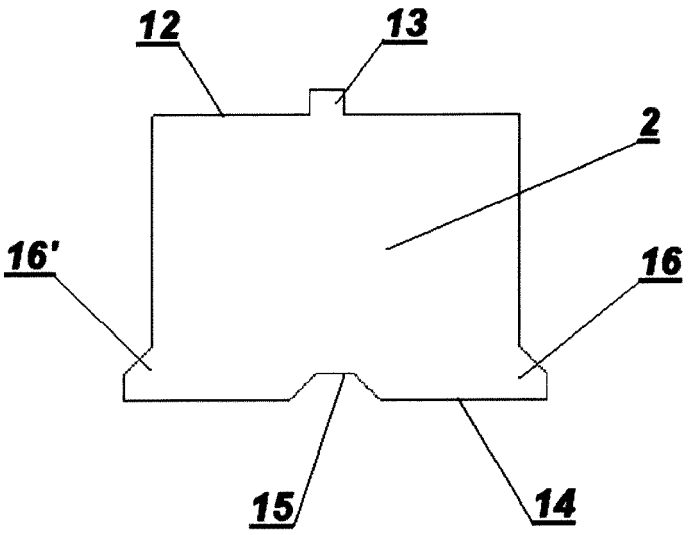

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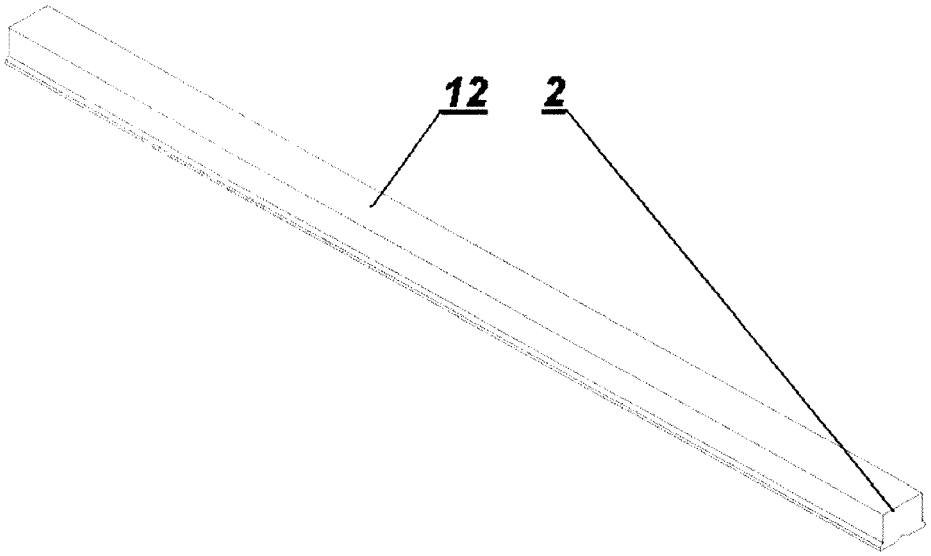

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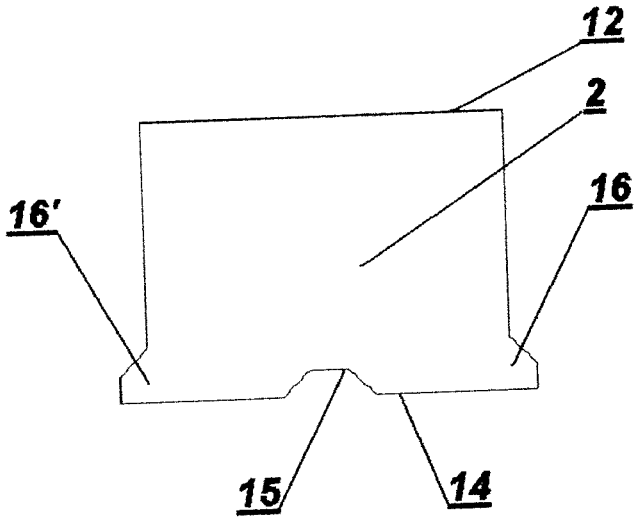
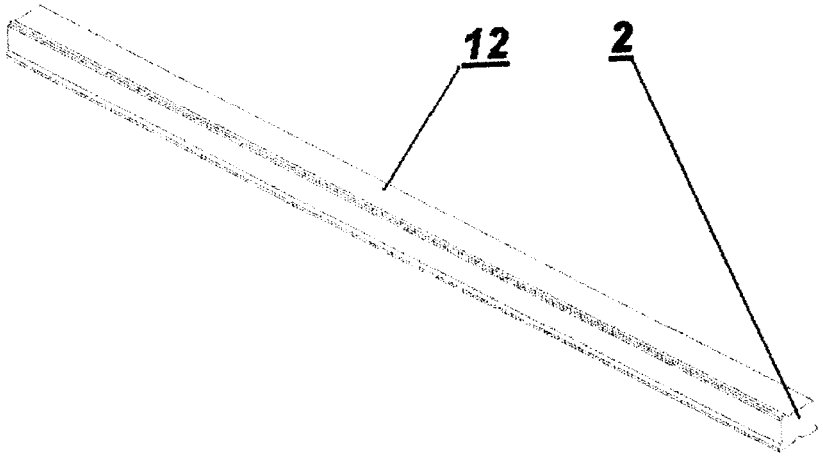


Fig. 29



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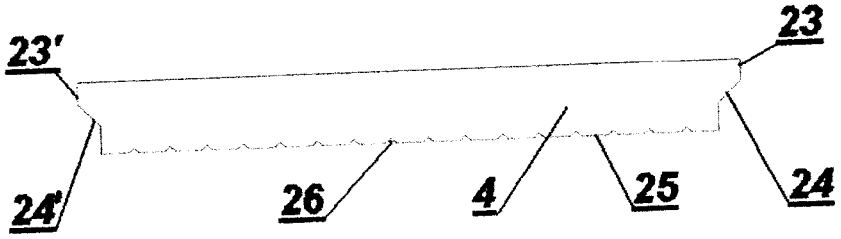

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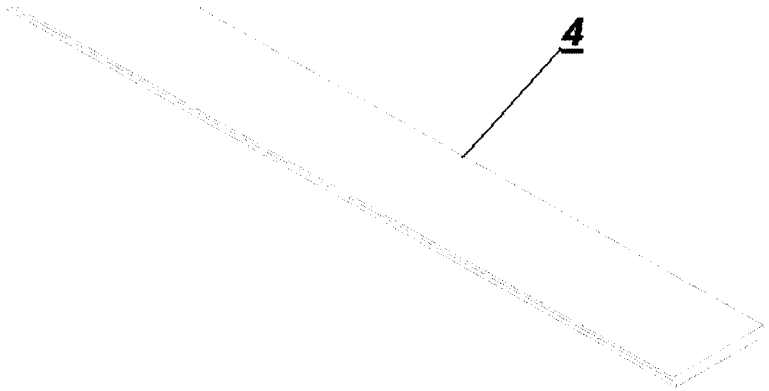

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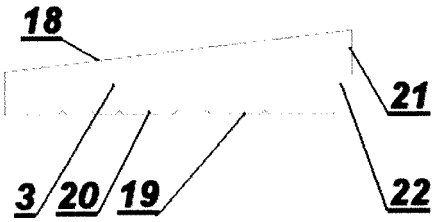

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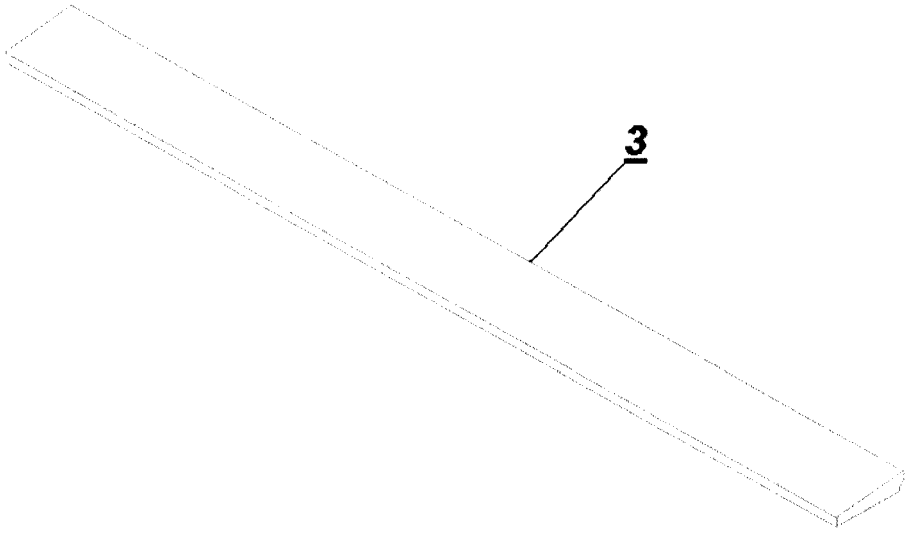

Fig. 34

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EUROPEAN SEARCH REPORT

Application Number
EP 16 46 0074

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	DE 20 2015 103988 U1 (KUNSTSTOFFWERK KATZBACH GMBH & CO KG [DE]) 22 September 2015 (2015-09-22) * figures 4,6 *	1-6	INV. E06B1/02
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E06B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	30 January 2017	Jülich, Saskia

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30-01-2017

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