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(54) **PROFILE WIDENING A WINDOW OR DOOR**

(57) A profile widening (2.1,2.2,2.3,2.4) a window or door is made up of individual sections of a foamed plastic profile into a profile with a length corresponding to the length of the edge of a reveal (7). The sections of the profile cooperating with the same edge of a window frame (1) are aligned and connected to one another. The adjacent subsequent sections of the widening (2.1,2.2,2.3,2.4) are provided at their ends with longitudinal dovetail joints (6), with mutually parallel trapezoidal longitudinal projections (11) separated by trapezoidal

longitudinal recesses (12). The mutually parallel edges of the longitudinal projections (11) and the longitudinal recesses (12) of the dovetail joint (6) are arranged in planes parallel to one another and perpendicular to the surface of a reveal (7). On the longitudinal edges of the profiles (2.1,2.2,2.3,2.4) cooperating with at least one edge of the window or door frame (1) tongues (3) are profiled. The tongues (3) of the horizontal widening profiles (2.1,2.2) cooperate with grooves (10) which are profiled at the ends of the vertical widening profiles (2.3,2.4).

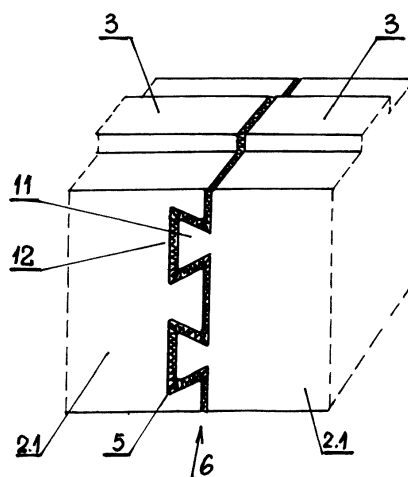


Fig. 13

Description

[0001] The invention relates to a profile widening a window or door made of foamed plastic with a low coefficient of thermal conductivity. The widening profile, according to the invention, is used in the construction industry in the operation of fixing window or door frames in reveals.

[0002] The term profile widening a window or door, or a window or door extension profile should be understood here as a set of profile sections which are fixed on the edge of a reveal, and then to the profile fixed on the reveal, a window or door frame is fixed. The purpose of said widening profiles is to eliminate major dimension differences between the inner edges of reveals and the outer edges of a window or door frame. The principle in the construction industry is to perform, at the facility's construction stage, reveals, i.e. window or door openings with internal dimensions bigger than the outer dimensions of window or door frames that will be fixed in reveals. If gaps between a window or door frame are small, for example up to 1 cm, such gaps are filled with sealing polyurethane foam intended for this purpose. However, in the case of bigger gaps, a layer of foam applied manually and thus forming a nonhomogeneous layer, does not provide uniform support for a window or door frame. This makes that such structures can warp over time, possibly resulting in a failure of window opening and closing mechanisms.

[0003] In the case of bigger gaps, profiles in the form of window extensions filling the bigger gaps, fixed to the edges of reveals are used, and to the extensions a window or door frame is fixed. The other small gaps are filled with sealing foam.

[0004] A solution disclosed in European patent application EP 2180125 is known. The invention relates to a window or door case, comprising a base unit and two associated side units. The side units have disc profiles enclosing a cavity in each case. The side units are made of foamed plastic consisting, particularly of expanded polypropylene or expanded polystyrene or expanded polyethylene.

[0005] Another known solution is disclosed in European patent application EP 3000949. The invention relates to a frame for a window intended to serve as a stationary frame or as a sash frame. According to the invention, it comprises an insulating abutment list on a side surface of at least one of the top, bottom or side members intended to face a side surface of another frame of the window. The insulating abutment list is made from a material having a thermal conductivity of less than $0,08 \text{ W/(m}^2 \text{ K)}$, preferably less than $0,04 \text{ W/(m}^2 \text{ K)}$, said insulating abutment list projecting over the exterior side of the frame. Preferred materials for the insulating abutment list are expanded polystyrene EPS or extruded polystyrene XPS. In a window with such a frame, an insulating abutment list on the sash frame extends from a hinge part to the bottom member of the sash frame and an insulating abutment list on the stationary frame extends from a

hinge part to the top member of the stationary frame.

[0006] Another solution known from the specification of international application WO 2013/167144 discloses the invention relating to a frame structure, such as a window sash or a frame for a window or door, comprising a core made from at least one core member made from expanded polystyrene EPS with a density of $80\text{--}200 \text{ kg/m}^3$ and a shell of polyurethane PUR encasing the core. The core may include a plurality of members.

[0007] Another known solution in the field of window frame extensions is disclosed in German patent specification DE102010026477. The invention relates to a connection profile element for use in the installation of a window or door in a building, especially a low-energy house, where the connection profile element comprising an extension is at least substantially made of a thermoplastic plastic foam based on polystyrene with a density in a range from 60 kg/m^3 to 900 kg/m^3 and a coefficient of thermal conductivity in a range of $0.02 \text{ W/m}^2 \text{ K}$ to $0.13 \text{ W/m}^2 \text{ K}$. According to the invention, the thermoplastic plastic foam is provided as expanded polystyrene particle rigid foam.

[0008] A further solution is disclosed in another German patent specification DE 102010022124. The component i.e. shutter box has an insulating profile made of a heat insulating material i.e. foamed plastic, arranged on a window or door frame. The heat insulating material is selected from a group of expanded polyethylene, expanded polypropylene, expanded polystyrene, foamed thermoplastics, foamed elastomers and foamed thermosetting polymers. A holding portion engages a part of an outer contour of the insulating profile. The heat insulating material is selected from a group of glass wool, rock wool, perlite, cellulose, cotton, wood fibre, timber, glass or plastic fibre. The foamed plastic is selected from a group of graphite, melamine resin froth, polyurethane foam, phenol resin froth, porous inorganic glass froth glass wool, rock wool, perlite, cellulose, cotton, wood fibre, timber, glass or plastic fibre.

[0009] Another known solution is disclosed in the specification of the Chinese utility model known from application CN 202176213. It discloses the use of energy-saving plastic and aluminium window and door profiles reinforced with a rib which do not need to have their corners sealed or cleaned. The energy-saving plastic and aluminium window and door profiles are firmly fixed and made of a high-strength material. This type of an energy-saving window and door profile is characterised in that an aluminium angle section with an angle of 90° was used for the installation and connection of two aluminium grooves. The aluminium reinforcing rib has a square section. Plastic such as polyvinyl chloride is arranged outside the aluminium reinforcing rib. Raised rebates are arranged in the four corners of an aluminium member. Expanded polystyrene is arranged between aluminium and plastic. The reinforcing rib and plastic are connected by means of an adhesive.

[0010] As is clear from the above description of the

prior art, a widening profile comprises a section which is fixed to the edge of a reveal and which is a base to which the edge of a window or door frame is fixed. Depending on the needs, widening profiles are fixed to one, two or three or all four edges of reveals. In an extreme case, one widening profile can be used, on the bottom edge of a reveal, under the bottom edge of a window frame, depending on the size of gaps between a window or door frame and the edge of a reveal. The material from which widening profiles are made at the same time maintains high thermal performance and relatively high mechanical strength.

[0011] The problem in the use of the widening profiles described above in the construction industry, where now there is a tendency towards the architectural diversity of structures, and thus variable sizes of reveals, is the fact that the edges of window and door have different lengths and there is a need to adjust the length of the profiles to the length of the edges of reveals. When a longer widening profile from several shorter sections is made, the problem of connecting these sections arises, which is performed in prior art solutions by butting and bonding. The butting of the subsequent sections of widenings may lead to the formation of thermal bridges and a reduction in the insulating degree of the entire widening profile, and on the other hand, results in inconveniences in the positioning of said profiles within the side vertical edges and within the upper horizontal edge of reveals. The purpose of the invention is to eliminate these inconveniences, and in particular to develop a system for joining individual sections of a profile into longer sections in a manner preventing clearance on the joints and detachment on the joints.

[0012] According to the invention, the profiles widening a door or window are made up of individual sections of a foamed plastic profile into a single profile with a length corresponding to the length of the edge of a reveal. The sections of the profile cooperating with the same, at least one edge of a reveal have the same cross sectional shape and are aligned and connected to one another.

[0013] According to the invention, the widening profile is characterised in that the adjacent subsequent sections of the widening profile are provided at their ends with dovetail joints, with mutually parallel trapezoidal longitudinal projections separated by trapezoidal longitudinal recesses. The mutually parallel edges of the longitudinal projections and the longitudinal recesses of the dovetail joint are arranged in planes parallel to one another and perpendicular to the surface of a reveal, wherein on the longitudinal edges of the profiles cooperating with at least one edge of a window or door frame tongues are profiled.

[0014] According to the invention, the tongues of the horizontal widening profiles can cooperate with grooves which are profiled on the end surfaces of the vertical widening profiles.

[0015] The adjacent sections of the vertical widening profiles can be provided at their ends with the dovetail joints, like the adjacent sections of the horizontal profiles.

[0016] The mutually parallel trapezoidal longitudinal projections separated by the trapezoidal longitudinal recesses of the joints of the vertical widening profiles preferably extend in a direction perpendicular to the direction of the grooves formed at the ends of the vertical widening profiles. Said grooves at the ends of the vertical widening profiles cooperate with the tongues of the horizontal widening profiles.

[0017] According to the invention, a new system for joining individual sections of profiles widening a window or door is proposed. The proposed solution for joining the sections of the profiles has made it possible to obtain a tight joint due to the elimination of thermal bridges, on the one hand, and the proposed dovetail joint prevents any potential detachment of the sections and facilitates the arrangement of the vertical widenings joined in this manner and the upper horizontal widening, on the other. At the same time, the tongue profiled in a plane perpendicular to the plane of the dovetail joint on the upper surface of each section facilitates the arrangement of the vertical widenings at the ends of the horizontal widenings during installation. Said tongue on the edge of the widening profile contacting the edge of the window frame also enables the linear centring of the window frame over its entire length and the cooperating widening, where the longitudinal tongue of the widening profile is inserted between two strips on the outer edge of the window or door frame.

[0018] The subject of the invention is shown in the embodiments in the accompanying drawings in which the individual figures show:

- Fig. 1 - the widening profiles of the four edges of the window frame.
- Fig. 2 - the widening profiles of the two horizontal edges of the window.
- Fig. 3 - a view of a lower part of the widening profiles.
- Fig. 4 - an exploded view of the widening, according to Fig. 3.
- Fig. 5 - a section of the widening using individual profiles.
- Fig. 6 - a section, according to Fig. 5, with the widenings using doubled profiles.
- Fig. 7 - a section of the doubled widening profile.
- Fig. 8 - a side view of the widening profile, according to Fig. 7.
- Fig. 9 - a section of the profile in an embodiment.
- Fig. 10 - a section of the profile in another embodiment.
- Fig. 11 - a section of the profile in yet another embodiment.
- Fig. 12 - a partial section of the window frame based on the widening profile.
- Fig. 13 - a view of the profile in the joint area.

[0019] Fig. 1 shows the profiles widening a window where the widening profiles are used on all four edges of a window frame 1. Horizontal profiles 2.1 and 2.2 as

well as vertical profiles 2.3 and 2.4 are fixed to the inner edges of reveals not shown in Fig. 1 and Fig. 2. The term reveal should be understood here as an opening in the wall of a building intended for fixing a window or door frame. Fig. 1 and Fig. 2 schematically show the window frame 1. Fig. 1 shows a single-sash window, while Fig. 2 shows a double-sash window. As shown in Fig. 1, between the window frame 1 and a reveal 7 more closely shown in Fig. 5 and Fig. 6, the widening profiles 2.1, 2.2, 2.3, 2.4. are provided. In this embodiment, at the stage of the construction of the building, the reveal 7 was so wide that it was necessary to use the widening profiles 2.1, 2.2, 2.3, 2.4 around all four edges of the window frame 1.

[0020] However, in the embodiment shown in Fig. 2, the horizontal profiles 2.1, 2.2 had to be used only in the case of horizontal gaps between the reveal and the horizontal edges of the window frame 1. In this embodiment, vertical gaps between the reveal 7 opening and the window frame 1 were so small that it was sufficient to use sealing foam. In other embodiments, it may be necessary to use only one lower horizontal or side vertical widening profile or only three selected profiles, depending on dimension differences between the dimension of the window frame 1 and the dimension of reveals in the building wall. Fig. 1 and Fig. 2 show the connections 3 of short sections of connecting profiles which, when arranged along a straight line, make it possible to obtain one longitudinal widening profile 2.1, 2.2, 2.3, 2.4.

[0021] Fig. 9, Fig. 10 and Fig. 11 show that the widening profiles may be of different thickness, which enables the selection of the profile 2.1, 2.2, 2.3, 2.4 height required for the gap size. This figure shows examples of the profile 2.1 heights in various embodiments, but all the profiles 2.1, 2.2, 2.3, 2.4 can be used in these embodiments. Profiled tongues 3 and grooves 4 are also shown here. These profiles contain a described arrangement of the tongues and the corresponding grooves, enabling the combination of two or more connected profiles for the optimum profile height required on a given edge of the reveal. This is shown in Fig. 7 and Fig. 8, where two widening profiles 2.1 are combined using the tongue-and-groove method and bonded together by an adhesive layer. In this embodiment, the widening profile height is the sum of the height of both profiles 2.1 arranged on top of the other and bonded together on a tongue-and-groove joint.

[0022] The examples of connections described herein are bonded together using single-component adhesive in the form of an acrylate-based adhesive and sealing compound.

[0023] Fig. 8 shows a side view of the widening, according to Fig. 7. As in Fig. 7, an adhesive layer 5 is shown here.

[0024] Fig. 3 shows an example of a lower part of the widening profile with three connected horizontal profiles 2.1 and two vertical profiles 2.3 and 2.4 attached thereto. A similar upper part of this unit, not shown in this figure,

comprising further vertical profiles 2.3, 2.4 and the upper horizontal profiles 2.2 can be fixed to the lower part of the widening unit. In other embodiments, different numbers of sections of the profiles 2.1, 2.3, 2.4 can be aligned, depending on the length of the edges of reveals. This figure shows a side view of a dovetail joint 6.

[0025] Fig. 4 shows the same part of the widening unit, as in Fig. 3, but in an exploded view. It clearly shows the arrangement of individual dovetail joints 6 and the tongues of tongue-and-groove joints. It is clearly shown here that on each of the widening profiles 2.1, 2.3, 2.4, the plane on which the tongue 3 is formed is perpendicular to the plane on which the dovetail joint 6 is formed. This is shown more precisely in Fig. 13.

[0026] Fig. 13 shows an example of this type of a joint on the horizontal widening profile 2.1. Trapezoidal projections 11 here are, at the stage of fitting a joint, inserted into trapezoidal recesses 12. Between the surfaces of the projections 11 and the recesses 12 there is the adhesive layer 5. Similar connections of sections of the widening are on the other widening profiles 2.2, 2.3, 2.4.

[0027] The mutually parallel trapezoidal longitudinal projections separated by the trapezoidal longitudinal recesses of the dovetail joints 6 of the vertical widening profiles 2.3, 2.4 extend in a direction perpendicular to the direction of the grooves 10 formed at the ends of the vertical widening profiles 2.3, 2.4. Said grooves 10 at the ends of the vertical widening profiles cooperate with the tongues 3 of the horizontal widening profiles 2.1, 2.2.

[0028] Fig. 13 shows that the lines of the projections 11 and the recesses 12 comprising members of the dovetail joint 6 extend perpendicularly to the direction of the tongue 3 along the widening profile 2.1.

[0029] Examples of the use of the widening profiles are shown in Fig. 5 and Fig. 6. Fig. 5 shows an embodiment where above and below the window frame 1 one lower widening profile 2.1 and one upper widening profile 2.2 are used. Due to the dimensional allowance of the reveal 7 in the building wall 8, in this embodiment, one widening profile 2.1, 2.2 had to be performed. However, Fig. 6 shows another embodiment, where above and below the window frame 1 two lower profiles 2.1 and two upper profiles 2.2 are used, because in this embodiment due to the dimensional allowance of the reveal 7 in the building wall 8, two widening profiles 2.1, 2.2 had to be inserted on each side. The required thickness of the vertical widening profiles 2.3 and 2.4 is selected in a similar way, using various thicknesses of the profiles shown as examples in Fig. 7 up to Fig. 11.

[0030] Fig. 12 shows a section of the contact of the lower widening profile 2.1 with the window frame 1. It can be seen here that the window frame 1 comprises a central lower channel in which the tongue 3 of the widening profile 2.1 is mounted. With such a configuration, the widening profile 2.1 and the window frame 1 additionally mutually centre their position.

[0031] Examples of dimensions of sections of the widening profiles: length 400 mm, height 95, including the

tongue height 18 mm, width 65 mm.

List of designations in the figures

[0032]

- | | |
|-----------------------------------|----|
| 1. Window frame. | |
| 2.1. Horizontal widening profile. | |
| 2.2. Horizontal widening profile. | |
| 2.3. Vertical widening profile. | 10 |
| 2.4. Vertical widening profile. | |
| 3. Tongue. | |
| 4. Groove. | |
| 5. Adhesive layer. | |
| 6. Dovetail joint. | 15 |
| 7. Reveal. | |
| 8. Building wall. | |
| 9. Sash. | |
| 10. Groove. | |
| 11. Longitudinal projection. | 20 |
| 12. Longitudinal recess. | |

Claims

- | | |
|---|----------------------------|
| 1. A profile widening a window or door in the form of individual sections of a foamed plastic profile combined into a profile with a length corresponding to the length of the edge of a reveal, wherein the sections of the profile cooperating with the same, at least one edge of a reveal have the same cross sectional shape and are aligned and connected to one another, characterised in that the adjacent subsequent sections of the widening (2.1,2.2,2.3,2.4) are provided at their ends with longitudinal dovetail joints (6), with mutually parallel trapezoidal longitudinal projections (11) separated by trapezoidal longitudinal recesses (12) corresponding to said projections (11), wherein the mutually parallel edges of the longitudinal projections and the longitudinal recesses (11,12) of the dovetail joint (6) are arranged in planes parallel to one another and perpendicular to the surface of a reveal (7), and on the longitudinal edges of the profiles (2.1,2.2,2.3,2.4) cooperating with at least one edge of a window or door frame (1), tongues (3) are profiled. | 25
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| 2. The profile, according to claim 1, characterised in that the tongue (3) of the horizontal widening profile (2.1,2.2) cooperate with grooves (10) which are profiled at the ends of the vertical widening profiles (2.3,2.4). | 50 |
| 3. The profile, according to claim 1 or 2, characterised in that the adjacent sections of the vertical widening profiles (2.3,2.4) are provided at their ends with the dovetail joints (6). | 55 |

4. The profile, according to claim 3, **characterised in that** the mutually parallel trapezoidal longitudinal projections (11) separated by the trapezoidal longitudinal recesses (12) of the dovetail joints of the vertical widening profiles (2.3,2.4) extend in a direction perpendicular to the direction of the grooves (10) formed at the ends of the vertical widening profiles (2.3,2.4) which cooperate with the tongues (3) of the horizontal widening profiles (2.1,2.2).

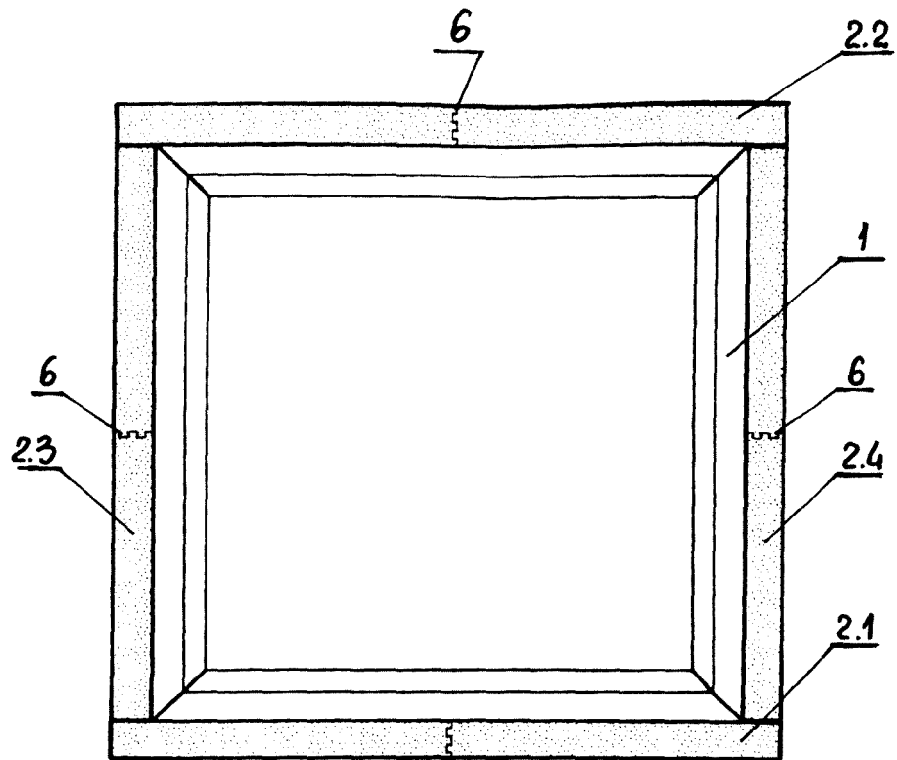


Fig. 1

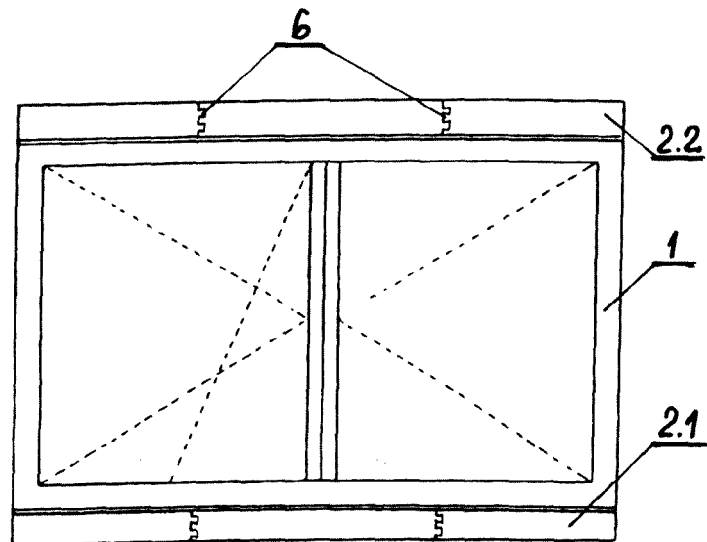


Fig. 2

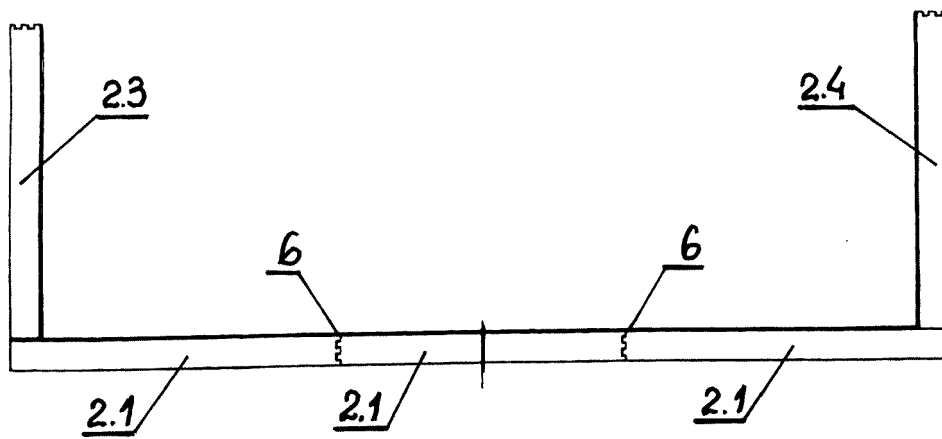


Fig. 3

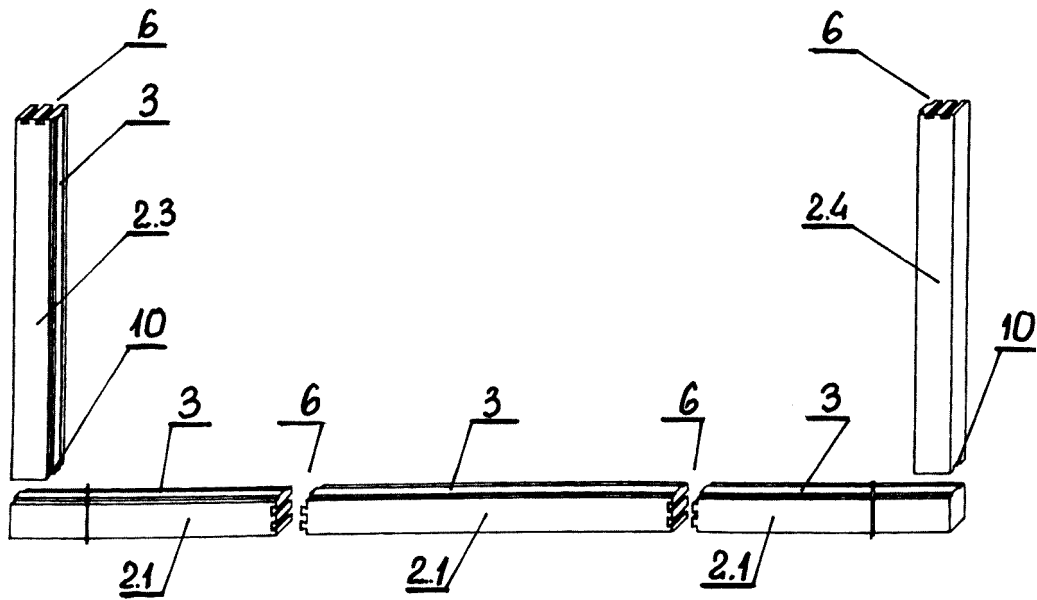


Fig. 4

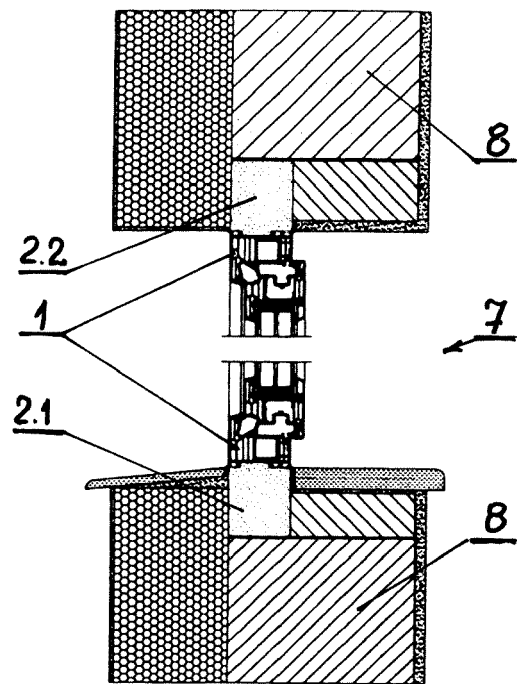


Fig. 5

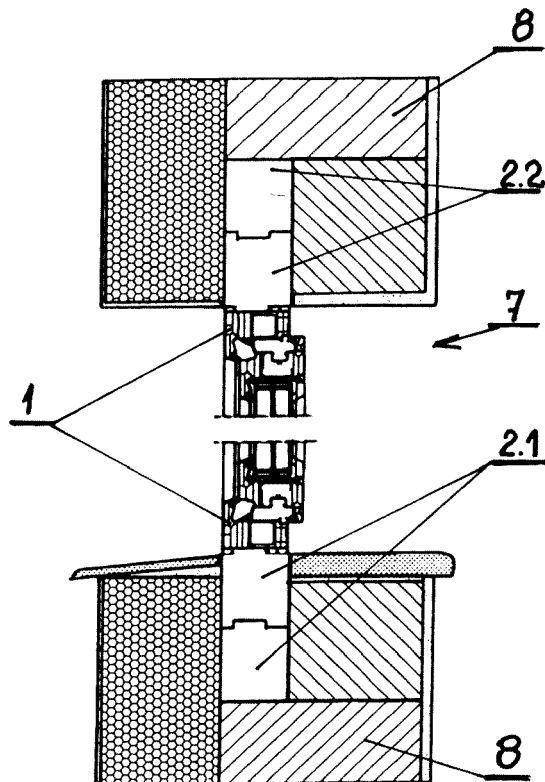


Fig. 6

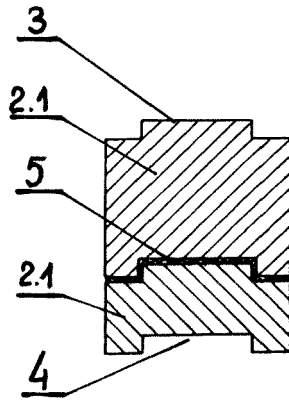


Fig. 7

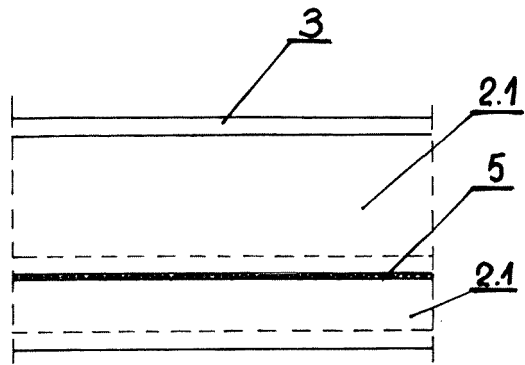


Fig. 8

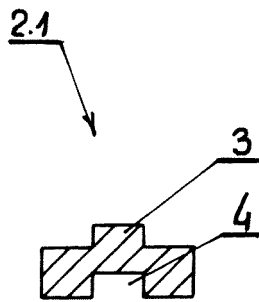


Fig. 9

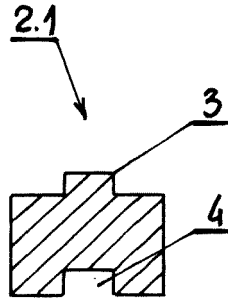


Fig. 10

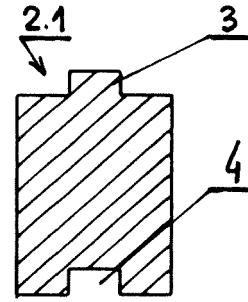


Fig. 11

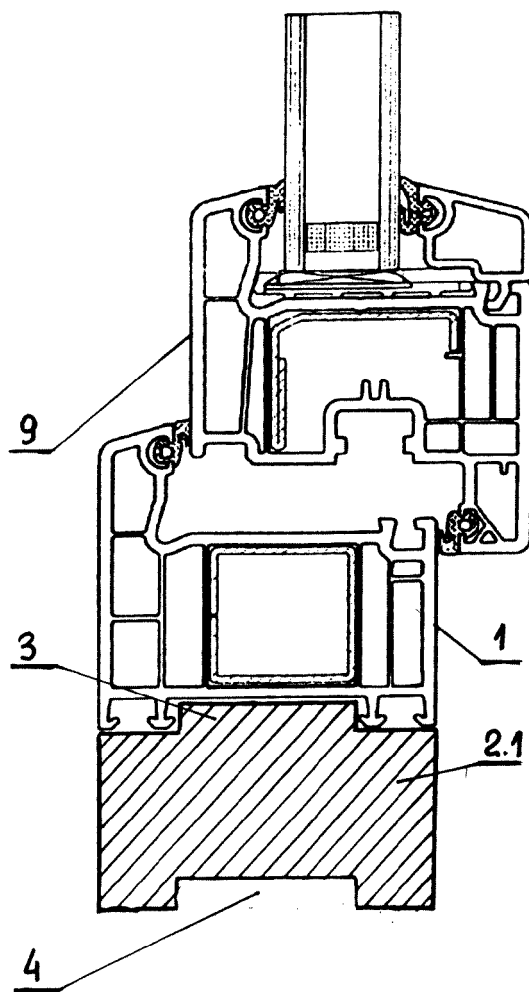


Fig. 12

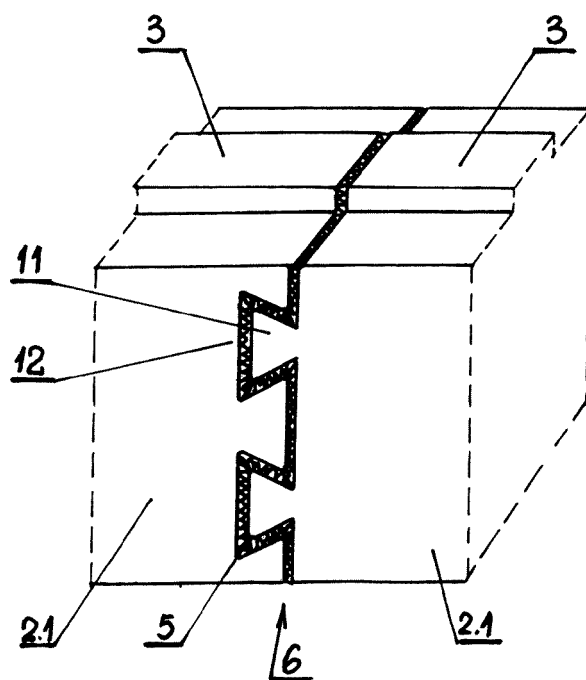


Fig. 13



EUROPEAN SEARCH REPORT

Application Number
EP 16 46 0094

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DOCUMENTS CONSIDERED TO BE RELEVANT			
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			TECHNICAL FIELDS SEARCHED (IPC)
			E06B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 14 March 2017	Examiner Crespo Vallejo, D
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ON EUROPEAN PATENT APPLICATION NO.**

EP 16 46 0094

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14-03-2017

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