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(54) Benævnelse: **RAMMEUDFORMNING SOM DEL AF ET PANELELEMENT TIL ET SEKTIONSPORTBLAD**

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Description

The invention relates to a frame construction as part of a panel element for a sectional door leaf which consists of a number of panel elements which are connected to one another in a hinged manner. The sectional door leaf is movably guided in lateral guides. The frame construction consists of horizontal and vertical aluminium profile elements, which are interconnected, wherein the aluminium profile elements are equipped with insulating bars which bring about a thermal separation between outside and inside a building.

DE 10 2012 010 028 A1 relates to a frame arrangement for producing a frame, which surrounds a filling, for a structural element, such as a sectional door panel, a door or the like with an outer profile forming an outside of the frame and an inner profile forming an inside of the frame, the profiles preferably being spaced apart in a direction extending perpendicular to the outside or inside respectively and being connected to one another via a connection device which consists at least partially of a thermally insulating material and which has at least one delimiting surface facing the filling, wherein a coupling device serving to establish a positive connection to a retaining device designed to retain the filling is arranged on the delimiting surface of the connection device, facing the filling.

In DE 20 2019 105 111 U1, a sectional door with a lifting wing is formed with plate segments which are arranged one above the other and which are connected to one another in a hinged manner, with the hinge axes being situated perpendicular to the direction of movement of the wing. At least one of the wing segments is a rectangular frame with plate filling consisting of hollow beams made of profiles, with the upper beam of the frame having a convex edge at the top, the two supports being compatible with each other, and each of these supports consisting of two parallel and spaced-apart closed profiles which are connected to each other by thermally insulating transverse bridges.

A sectional door with a raisable door leaf is known from DE 20 2018 103 416 U1. Here, the door leaf consists of plate sections which are arranged over one another and hinged together, with the hinge axles being situated perpendicular to the direction of movement of the door leaf which is determined by the lateral rail guides, and with at least one of the door leaf sections having the form of a quadrangular frame with plate filling, which quadrangular frame consists of hollow beams formed by profiles, with the upper beam of the frame having a convex edge to the top and the lower beam of the frame having a concave edge to the bottom and the convex and concave contours of the edges of the two beams fitting together and each of these beams consisting of two closed, parallel and spaced apart profiles which are connected together by transverse heat-insulation bridges, wherein the cavity delimited by the side walls

of the profiles and the bridges connecting them forms an intermediate chamber in each of these beams and wherein the lower beam of the frame consists of profiles which have at least one chamber, and the upper beam consists of single-chamber profiles, with each of the profiles of the lower beam being divided by a transverse partition wall into two chambers situated one above the other.

WO 2021/209536 A1 illustrates a sectional door system having a sectional door leaf having a number of horizontal sections which are movable between a vertical, closed position and a horizontal, open or overhead position inside a guide rail system. Here, the sectional door leaf has an inner and an outer door surface.

The aim of the invention is to create a frame construction as part of a panel element for sectional doors, which ensures that the legal requirements on heat insulation are met. Such a frame construction should be easy to manufacture, while at the same time providing sufficient longitudinal shear strength. Care must be taken to ensure that the frame construction is easy to assemble.

The problem of the invention is solved through the features of Claim 1. The subordinate claims which follow depict a further configuration of the concept according to the invention.

Aluminium profile elements are used that have an outer hollow section and an inner hollow section in cross-section, which are separated from each other. The outer hollow section serves to ensure thermal insulation. This hollow section is formed by an outer limb of the aluminium profile element by insulating bars present on the top and bottom sides, which are connected to an inner intermediate bar running in the direction of the aluminium profile element. This creates an outer hollow section which ensures that the necessary thermal bridge, i.e. separation between the inside and outside of a building, is guaranteed. The second, inner hollow section is directed towards the interior of the building and is formed by the intermediate bar and the aluminium profile element sections connected to it into the inside of the building. The inner limb of the aluminium profile element can be connected directly or indirectly to the insulating intermediate bars. This configuration of the aluminium profile elements applies both to profile designs used horizontally and profile designs used vertically.

As a result of the frame construction being intended as part of a panel element for sectional door leaves, it must be ensured here that the frame construction is so stable at the top and bottom to ensure the same sealing and interacting function with a conventional panel element of the same configuration arranged above or below it. For this purpose, such frame constructions have a convex shape on their upper side and a concave shape on their

underside. Such a design ensures that an interaction of a frame construction with panel elements arranged above or below it functions without any problems. Through such an embodiment, the same fittings can also be used between a frame construction and a closed panel element in order to thus be able to carry out a hinged movement relative to one another.

Through the structural formation of the aluminium profile elements into an inner and an outer hollow section in cross-section, a very effective division into an outer hollow section used exclusively for thermal insulation and an inner hollow section, which also contributes to thermal insulation, but is also used to connect corner designs of the aluminium profile elements into an abutting design, i.e. there are no mitre cuts.

The outer hollow section has an outer limb that has no further reinforcing elements or chambers or projections moulded on the inside. The intermediate bar does not necessarily have a straight course between the inner and outer hollow sections, but can also take other shapes. At the top and bottom, the outer hollow section is closed by the insulating bars. For connection between the outer limb and the intermediate bar with the insulating bars, these have, at the ends, affixing sections which make it possible to permanently affix the insulating bars in a different shape for aluminium profile elements in a manufacturing process. For this purpose, the insulating bars preferably have approximately trapezoidal mounting sections at the ends, which are permanently pressed with the sections of the aluminium profile elements in the manufacturing process. In order to achieve high strength and also rigidity in the insulating bars employed, polymers are used as the material. Polymers are ideally suited to forming such insulating bars. This is because the polymers are characterised as a tough material with high strength and rigidity, which can also be used in a large temperature range from approximately -30°C to over +100°C. This is particularly important in the case of sectional doors with a frame design, as very high temperatures when the outer limbs are exposed to sunlight, but also very low temperatures in winter, are possible. The family of linear polymers with amide compounds is particularly suitable for this purpose.

In order to achieve an even higher dimensional stability and load-bearing capacity of the insulating bars, the linear polymers can be provided with additives. Preferably elongated glass fibres in the form of glass fibre-reinforced polyamides have proven their worth in the configuration and design of insulating bars.. The possibility of efficient production of bar materials for the insulating bars from the material polyamide is cost-effective. The complexity of the geometry of the insulating bars with and without fibre-reinforced polyamides has an enormous rigidity combined with high elasticity. The water absorption of the insulating bars is basically unavoidable, but can be described as minimal and does not impair the dimensional

stability of the frame construction of the aluminium profile elements in any way.

The inner hollow section of the aluminium profile elements can in principle also contribute to the thermal insulation of the profile construction as a whole. However, this inner hollow section has the particular task of facilitating the connection between vertical and horizontal profile sections to form the frame. The inner hollow section has a substantially straight inner limb on the inside and the connection sections connected to it, which are connected, for example, directly or indirectly to the intermediate bar or can enable the accommodation of retaining strips for holding plate-shaped elements. Furthermore, connecting screws can be introduced into a profile, to be connected, as a butt joint. Bores are provided for this purpose, via which the connection between two aluminium profile elements positioned at an angle of 90° to each other can be made using reinforced connecting bearings. This enables a simple and durable, cost-effective connection of two profile sections.

The connection section between the inner limb and the intermediate bar forms a receiving space for the retaining strips. For example, such a retaining strip can be made of plastic or light metal for weight reasons. Such a retaining strip has a cavity enclosed by walls on all sides, this cavity making the retaining strip torsion-resistant overall. It is necessary that the plate-shaped elements can be replaced quickly and easily for assembly and also disassembly in the event of damage to the fillings of the fields of vision. When designing the retaining strip in plastic, an impact-resistant plastic with a very high Shore hardness is preferably used. The enclosed cavity has a base on the underside, from which a protruding, splayed hook extends. The retaining strip engages with this hook into a recess of the aluminium profile element, which is part of the inner hollow section. With a lower support side, which is part of the base and lies in the region in front of the hook, the retaining strip rests on a part of the aluminium profile element. The formation of the hook is characterised by two different sections. The aim is to generate a high prestress on an outside of the retaining strip compared to the plate-shaped element. It is essential that only materials that are not subject to embrittlement are used for the retaining strip.

It is also possible that the side with which the retaining strip is positioned against the plate-shaped element is equipped with sealing lips. Such a construction can be realised in production using a two-component technique. In this case, different hardnesses of a retaining strip are produced in an injection moulding process in a single operation, but with strictly separate component areas. By using such additional sealing lips, a further very good seal can be achieved between the retaining strip and the plate-shaped element. The combination of thermoplastic plus elastomer, i.e. plastic and rubber, makes it possible to avoid complex assembly work on the frame construction after the insertion of the plate-shaped element to

ensure adequate tightness.

By separating the aluminium profile element in its cross-section into an outer and an inner hollow section, the greatest possible thermal insulation is achieved, because the outer hollow section is only used for thermal insulation. In EP 2 666 948 A1, the opening of the insulating bars is carried out via connections of vertical and horizontal hollow sections, which can no longer guarantee effective thermal insulation.

The invention is described in greater detail hereafter using various exemplary embodiments.

Figure 1 shows a perspective detail depiction of two non-interconnected frame construction sections of a sectional door leaf arranged one above the other;

Figure 2 is like Figure 1, but with a depiction of the aluminium profile elements and retaining strips.

Figure 3 shows a separate depiction of a horizontal profile construction;

Figure 4 shows the use of a retaining strip in a detail depiction inside an aluminium profile detail;

Figure 5 shows a further embodiment of a retaining strip;

Figure 6 shows an upper closure of a sectional door leaf with a sectional element;

Figure 7 shows a preferred embodiment of a vertical aluminium profile element;

Figure 8 shows a further preferred design of a vertical aluminium profile element in a vertical design;

Figure 9 shows a detail depiction of a butt joint of a vertical aluminium profile element to a horizontal aluminium profile element;

Figure 10 shows the lower closure of a sectional door leaf.

A sectional door leaf in a partial sectional view is shown in Figure 1 in a perspective view with a horizontal profile 24 and a horizontal profile 23 arranged below it. This schematic depiction

depicts the interaction of two panel elements in frame constructions for a sectional door leaf. These frame constructions can consist of one or more subdivided fields, which are filled with exchangeable panes 45. Such panes 45 can be used as plate-shaped elements in a transparent or opaque design. Such panes 45 maintain their position inside the frame construction by means of exchangeable retaining strips 1 to be attached to the inside of the building. Since these frame constructions are functionally equivalent to the known panel elements when the sectional door leaves are in the closed state, it is necessary for such frame constructions to be configured in an overlapping manner in the same design on both the upper and lower horizontal sections when the sectional door leaf is in the closed position. For example, the horizontal profile 23 has a convex formation at the top and the corresponding horizontal profile 24 shown above it has a concave region, with the two aluminium profile elements 23 and 24 virtually engaging one another in this position. A seal element 33 is present in the profile 24, for example, in order to seal the two horizontal profiles 23 and 24 to one another; other sealing options can also be implemented. When the sectional door leaf is in the closed position, i.e. when the two panel elements 23, 24 are positioned one above the other, this seal element 33 performs a sealing function against moisture and wind loads etc. towards the interior of the building.

The panel elements usually consist of outer and inner sheet metal elements spaced apart by an insulating foam.

The horizontal profile 23 is divided into two separate cavities in its cross-section. As a result, there is an outer cavity and an inner cavity. The outer cavity is delimited on the outside of the building 26 by an outer limb 28 as part of the frame construction. Between the outer limb 28 and an intermediate bar 25, insulating bars 22 are arranged on the upper and lower sides respectively, so that a closed outer cavity exists. There are no chambers or additional self-contained additional cavities inside this enclosed outer cavity. The insulating bars 22 are made of a polyamide and each have mounting sections 53 at their lateral ends, which have been non-positively and positively connected to the aluminium outer limb 28 and the aluminium intermediate bar 25 in a manufacturing process. The inner cavity, which points toward the interior of the building, has an inner limb 29 as part of the frame construction, which has a profile offset 2 at the top, which merges into the intermediate bar 25 in an upper end region. A connection section 61 with a receiving section 16 for a retaining strip 1 forms the lower closure of the inner cavity between the intermediate bar 25 and the inner profile. This lower connection section 61 has a thickened cross-section compared to the other aluminium profile constructions with an additional recess in the form of a connecting bearing for connecting the horizontal profiles 23 to a vertical profile 27 in a butt joint design. In the region in which there are holes 31 on the underside for the butt joint to the vertical profile 27,

the inner cavity has moulded-on material thickenings which are used to connect the vertical profiles 27 via connecting elements 48. This makes the inner cavity virtually an assembly section with insulating properties and the outer cavity an exclusive insulating section in the frame construction.

To form the upper convex end shape of the horizontal profile 23, a profile offset can be present on the upper side of the outer limb 28 before the insulating bar 22 begins. The upper closure of the horizontal profile 23 is thus provided with a protruding, convex closure.

When the sectional door leaf is in the closed position, an upper panel element which is present in a frame construction and which contains the seal element 33 that is embedded in a seal receptacle 36 of the horizontal profile 24, for the sealing function with respect to the insulating bar 22 interacts with the horizontal profile 23. In order to ensure the sealing function of the two panel elements in the frame construction relative to one another, there are, on the horizontal profile 24, in each case laterally in continuation of an inner limb 57 and of the outer limb 30, lugs which bear in a jutting manner against the profile attachments with a clearance.

Like the horizontal profile 23, the horizontal profile 24 is also equipped with an outer and inner cavity in cross-section. The outer cavity is formed by the outer limb 30 as part of a frame construction in conjunction with the intermediate bar 56 spaced apart by the insulating bars 22. The inner cavity has the bore 31, via which the connection bearing 32, also formed here, is accessible in order to connect, here too, the horizontal profile 24 to a vertical profile 27 via a butt joint configured at an angle of 90°. The horizontal profile 24 also has a receiving section 16 for the retaining strip 10. In order to implement the butt joint between the horizontal profile 24 and the vertical profile 27, the profile thickening in the connection section 61 is also present here in alignment with the bore 31 as reinforcement, which is used for the connection bearing 32, so that the horizontal profile 24 is not warped when the connection between a vertical profile 27 and horizontal profile 24 is realised. At the same time, the connection section 61 reinforces the horizontal profiles 23, 24 without increasing the weight of the aluminium profile elements.

The inner cavity is formed differently in the case of the horizontal profile 24 than in the case of the horizontal profile 23. This is because the panel elements of the sectional door leaf will achieve a sealing function relative to one another between two adjacent panel elements when the door is in the closed position. For this purpose, there is an additional chamber downwards at the inner cavity, this additional chamber ending in a rounded portion 39. By means of the rounded portion 39, the existing sealing element 33, which is attached to the horizontal profile 24, is pressed against the convex profile attachment 2 of the underlying panel element with

the horizontal profile 23. To the outside is carried out by the projecting end limb 58 of the outer limb of the horizontal profile 24, opposite the profile offset 2. As a result, this is configured on the underside of the horizontal profile 24 a substantially concave shape, into which the convex end region of the horizontal profile 23 dips.

The butt joint is not depicted in Figure 1. For the design between the vertical profile 27 and the horizontal profile 24, a substantially flat surface, for example, is created on the outside 26 of the sectional door leaf. For this purpose, the horizontal profile 24, for example, has the outer limb 30 in a projecting manner, which dips at the end into a shoulder 34 moulded into the vertical profile 27.

Figure 2 only depicts the horizontal profiles 23 and 24 with retaining strips 1 inserted. In this case, the retaining strip 1 in each case is inserted into the two profiles 23 and 24 via a bend 12. From this depiction, it clearly emerges in the case of the horizontal profile 24 that, above the bore 31, there is a smaller bore 38 in the reinforced connection section 61. The connection bearing 32 can be inserted with a continuous guide 59, according to the connection element 48 depicted in Figures 9 and 10. The lateral guide 59 not only significantly facilitates the insertion of the connection element 48, but rather at the same time it also guarantees that the profiles 23 and 24 are not warped.

For the purpose of applying the panes 45 or the like to the outside 26 of the building, seal receptacles 35 are respectively present in the projecting limb designs of the horizontal profiles 23 and 24 and for closure at the vertical profiles.

The horizontal profile 24 according to Figure 3 shows, in a cross-sectional depiction, the connection bearing 32 with the reinforced material design in the connection section 61 with the frame support 15. The construction makes it possible for the butt joint between the vertical profile 27 and the horizontal profile 23 and 24 to provide a durable, secure, non-positive and positive connection without the need to additionally employ further structural elements. The cross-sectional reinforcement depicts a simple connection in the connection section 61 with the guide 59 and no further structural elements need to be provided for stabilisation in the design of a frame corner joint, which would also lead to an increase in weight.

The cut-out depiction of the detail from Figure 3 illustrates in Figure 4 how the retaining strip 1 can be inserted inside the open receiving space 16 with the protruding hook 12 and can be applied against the plate-shaped element 45. Here, Figure 4 illustrates a first preferred design of a retaining strip 1. The retaining strip 1 has a cavity 6 closed on all sides, which is

enclosed on the outside of the door leaf by an outer wall 4 and on the inside by a bearing side 3, as well as an upper-side intermediate leg 5 and a lower-side base 7. In the installed state, the contact side 3 leads to contact with the pane 45. The contact side 3 must apply the necessary pressure against the pane 45 or another plate-shaped element so that no water can penetrate between the contact side 3 and the pane 45 from outside. This can be achieved in particular by manufacturing the retaining strip 1 from an impact-resistant plastic with a high Shore hardness, which nevertheless ensures a high contact pressure and thus high adhesive forces on the pane 45. However, it is also possible to manufacture the retaining strip 1 from a different material, such as aluminium.

The base 7 of the retaining strip 1 consists of a substantially straight support side 9, the adjoining hook 12 and an adjoining side with a bevel 8 which ends in an outer support point 11. The support side 9 and the support point 11 are at the same height level. The bevel 8, starting from the support point 11, lies substantially in a region of 1° to 10°. The hook 12 is divided into a first section 10 and a second section 60. The first section 10 is set at an angle of between 91° and 110° relative to the substantially straight support side 9. Adjoining this first section 10, however, the second section 12 is bevelled again in the direction of the support side 6, with this angle, starting from the first section 10, being configured approximately between 40° and 50°. At the end of the second section 12 there is a protruding contact point 13. The section 10 and the bend 60 of the hook 12 dip into the receiving section 16. The support side 9 rests on the frame support 15 of the profiles 23, 24, 27 of the frame construction. At the same time, the support point 11 has a further contact with the frame support 15. While the support point 11 is in contact with the limb 20, the section 10 of the hook 12 is laterally in contact with a counter bearing 19 of the frame construction in the receiving section 16. Due to the inclined position of the bend 60 of the hook 12, its end comes into contact, inside the receiving section 16, with an inner wall 17 on a contact wall 18 via the contact point 13. This type of construction ensures that the mounting strip 1 can be guaranteed a secure and permanent retention with the contact areas. The frame construction has a frame profile outside 14 on the outside, which is oriented substantially aligned with the outer wall 4 of the retaining strip 1 after the mounting strip 1 has been inserted.

Figure 5 illustrates a further preferred embodiment of the mounting strip 1. In this embodiment, sealing lips 21 are additionally configured on the contact side 3. These sealing lips 21 have a lower Shore hardness than the retaining strip itself. This means that the two components of the retaining strip 1 can be produced in a single operation by a 2K injection moulding method, so that the contact side 3 can consist of a thermoplastic and the sealing lips can consist of an elastomer.

In a further cut-out depiction according to Figure 9, the formation of the butt joint between the vertical profile 27 and one of the horizontal profiles 23 or 24 is discussed once again. This depiction makes clear that, in the region in which the connection element 48 dips into the connection section 61, there is a substantially greatly enlarged profile construction compared to the other walls of the aluminium profile elements. This thickening of the profile element puts the connection bearing 32 into a position such that the tightening of the connection element 48 does not result in distortion of one of the aluminium profile elements used.

Figure 7 illustrates an exemplary preferred design of a vertical profile 27. In this embodiment, an outer limb 40 is shown, which has, at one end, a projecting region for a seal receptacle 35. Here too, an inner and an outer cavity are present. The outer cavity is separated from the inner cavity by an intermediate bar 41. The screw channels only have to enter into the functional task with the butt joint. The outer limb 40 is again separated from the intermediate bar 41 by insulating bars 22. Reference is once again made to the non-positive and positive connection of the mounting sections 53 of the insulating bars 22 to the aluminium profile elements. The insulating bars 22 have a substantially straight distance 52 here, which is adjoined at each end by offsets 54. The offsets 54 then merge into the mounting sections 53. An inner cavity is also present on the inside of the building in the profile construction according to Figure 7, this cavity being formed with the receiving section 16 for the retaining strip 1 on one side.

Figure 8 illustrates a further, modified, preferred embodiment of a vertical profile 37. The vertical profile 37 is substantially formed by an outer limb 46 and insulating bars 22 which are connected to it and which are then connected at the end to an intermediate bar 56. Such a vertical profile 37 is used when the frame construction consists of a number of, i.e. self-contained, fields for panes 45. This is also shown by the fact that the inner cavity is closed on the outside by an inner limb 47. The inner limb 47 has, on each of its two vertical sections, the receiving sections 16 for the retaining strips 1 and thus for the insertion of panes 45. The outer limb 46 has projecting ends on both sides, each with a seal receptacle 35.

Figure 6 shows an upper closure of a sectional door leaf. The design according to Figure 6 is used in such a way that a seal receptacle 36 can be realised on the upper side with a seal foot 44 on a projecting upper closing seal 43. An intermediate wall 55 also separates the outer and inner cavity from each other here.

The lower section of a sectional door leaf, which has been provided with a frame construction, for example, is shown in Figure 10, with a floor closure profile 49 being used here. Compared to the other horizontally used profiles 23 and 24, this floor closure profile 49 has a significantly higher configuration. As a result, the outer cavity is subdivided by a number of insulating bars

22 in order to simultaneously achieve good thermal insulation in addition to greater strength for the floor closure profile 49. The floor seal 51 is inserted by its seal foot 42 inside a seal receptacle 50, which forms the lower closure relative to a contact surface on the building.

Reference Numbers

1	retaining strip
2	profile offset
3	contact side
4	outer wall
5	intermediate limb
6	cavity
7	base
8	bevel
9	support side
10	section
11	support point
12	hook
13	contact point
14	frame profile outside
15	frame support
16	receiving section
17	inner wall
18	contact wall
19	counter bearing
20	limb
21	sealing lips
22	insulating bar
23	horizontal profile
24	horizontal profile
25	intermediate bar
26	outside of the building
27	vertical profile
28	outer limb
29	inner limb
30	outer limb
31	bore
32	connection bearing
33	seal element
34	shoulder
35	seal receptacle
36	seal receptacle

37 vertical profile
38 bore
39 rounded portion
40 outer limb
41 intermediate bar
42 seal foot
43 closing seal
44 seal foot
45 panes
46 outer limb
47 inner limb
48 connection element
49 floor closure profile
50 seal receptacle
51 floor seal
52 distance
53 mounting section
54 offset
55 intermediate wall
56 intermediate bar
57 inner limb
58 end limb
59 guide
60 bend
61 connection section

P A T E N T K R A V

1. Panelelement med en rammeudformning til et sektionsportblad, der består af flere panelelementer, der er forbundet hængslet med hinanden, hvor sektionsportbladet føres stedforanderligt i sideværts føringer, hvor rammeudformningen består af et øvre horisontalt aluminiumprofilelement (23) og et nedre horisontalt aluminiumprofilelement (24) og vertikale aluminiumprofilelementer (27, 37),

hvor aluminiumprofilelementerne (23, 24, 27, 37) på indersiden har isoleringsribber (22), og hvor isoleringsribberne (22) er kraft- og formsluttende forbundet med aluminiumprofilelementerne (23, 24, 27, 37) på yder- og indersiden, således at der i tværsnit opstår et ydre, i sig selv lukket, hulrum og et indre hulrum, som er adskilt med en mellemribbe (25, 56, 41), hvor rammeudformningen er udfyldt med et udskifteligt, pladeformet element som skive (45), hvor skiven (45) holdes af holdelister (1), hvor isoleringsribberne (22) er fastgjort kraft- og formsluttende mellem ydre ben (28, 30, 42, 46) af aluminiumprofilelementerne (23, 24, 27, 37) og mellemribben (25, 56) på indersiden og afslutter det ydre hulrum, hvor

det indre hulrum fra mellemribben (25, 56, 41) til et indre ben (29, 57, 40) af aluminiumprofilelementet (23, 24, 27, 37) på oversiden af rammeudformningen er forbundet direkte eller indirekte med mellemribben (25, 56, 41), hvor der på undersiden

af de horisontale aluminiumprofilelementer (23, 34) er et forbindelsesafsnit (61), der er udformet mellem det indre ben (29, 57) og mellemribben (25, 56), og hvor der hen over de horisontale aluminiumprofilelementers (23, 24) indre hulrum findes skrueforbindelser til de vertikale aluminiumprofilelementer (27, 37),

kendetegnet ved, at det øvre horisontale aluminiumprofilelements (23) indre ben (29) og ydre ben (28) med deres ender på oversiden har en mod hinanden rettet profilforskydning (2) og ved hjælp af isoleringsribben (22) er indbyrdes kraft- og formsluttende forbundet med hinanden, hvor mellemribben (25) med en

forkrøpning møder enden af det indre bens (29) profilforskydning (2).

2. Panelelement ifølge krav 1, **kendetegnet ved, at** det nedre horisontale aluminiumprofilelements (24) underside med henblik på en korresponderende anvendelse med det øvre horisontale aluminiumprofilelement (23) har en tætningsoptagelse (36), i hvilken et tætningselement (33) er anbragt, hvor det nedre horisontale aluminiumprofilelement (24) har et indre og ydre hulrum, hvor hulrummene er adskilt af en indvendigt forløbende mellemribbe (56).

3. Panelelement ifølge krav 1, **kendetegnet ved, at** det nedre horisontale aluminiumprofilelements (24) ydre hulrum på over- og undersiden er afsluttet af isoleringsribber (22), som på den ene side er kraft- og formsluttende forbundet med mellemribben (56) og på den anden side med et ydre ben (30) af det nedre horisontale aluminiumprofilelement (24), og at her et ydre ben (30) i tilslutning til isoleringsribbernes (22) indspænding har et udkragende ben med en tætningsoptagelse (35) og i tilslutning til den nedre indspænding af den yderligere isoleringsribbe (22) et udkragende endeben (58).

4. Panelelement ifølge krav 1, **kendetegnet ved, at** holdelisten (1) består af et slagfast kunststof med en høj Shore-hårdhed eller letmetal, med et til alle sider omsluttet hulrum (6), som på undersiden har en basis (7), som i tilslutning til en omtrent lige understøtningsside (9) har en udragende krog (12), og at der i tilslutning til krogen (12) er udformet en stigende afskråning (8), der er rettet fra et understøtningspunkt (11) på endesiden mod krogen (12).

5. Panelelement ifølge krav 4, **kendetegnet ved, at** understøtningspunktet (11) og understøtningssiden (9) dimensionelt ligger på ét plan, hvor den fra understøtningspunktet (11) til krogen (12) stigende afskråning (8) er udformet i en vinkel på cirka 1° til 10°.

6. Panelelement ifølge krav 4, **kendetegnet ved, at** krogen (12) bestemmes af et

første afsnit (10) med dertil tilsluttende andet afsnit (60), hvor krogens (12) første afsnit (10) i forhold til den omtrent lige understøtningsside (9) er stillet i en vinkel mellem 91° og 110°, og at det til krogens (12) første afsnit (10) tilsluttende andet afsnit (60) er udformet med en vinkelstilling på over 90° i retning mod anlægssiden (9), hvor det andet afsnit (12) på endesiden afsluttes af et fremstående anlægspunkt (13).

7. Panelelement ifølge et eller flere af de foregående krav, **kendetegnet ved, at** isoleringsribberne (22) har en stor tværsnitsformstabilitet og dårlig varmeledningsevne og består af en polyamid med i det mindste et tilsætningsstof, hvor isoleringsribbernes (22) ender er forsynet med indspændingsafsnit, der er kraft- og formsluttende forbundet med aluminiumprofilelementerne (23, 24, 27, 37).

8. Panelelement ifølge krav 7, **kendetegnet ved, at** tilsætningsstoffet består af langstrakte glasfibre.

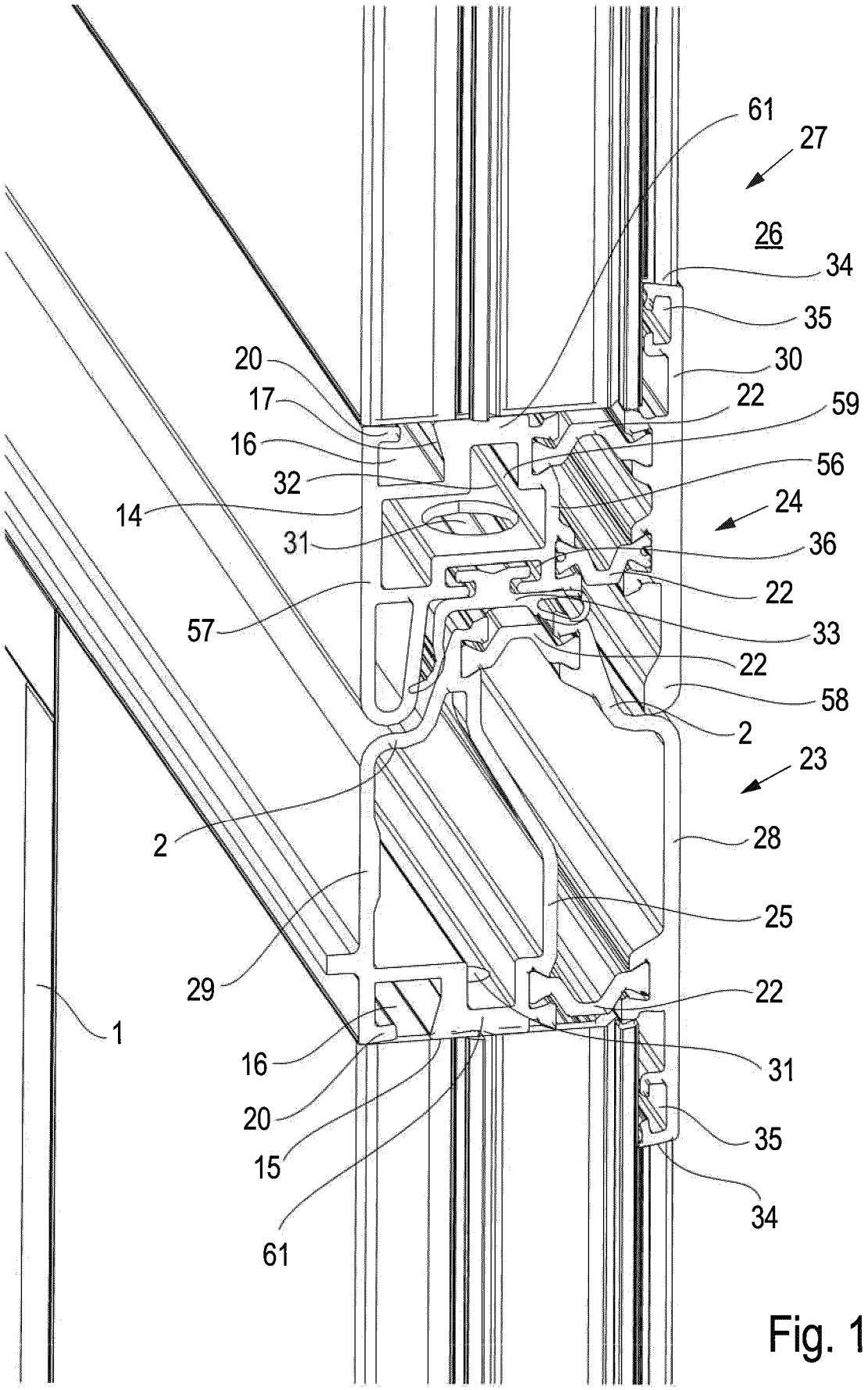
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Fig. 1

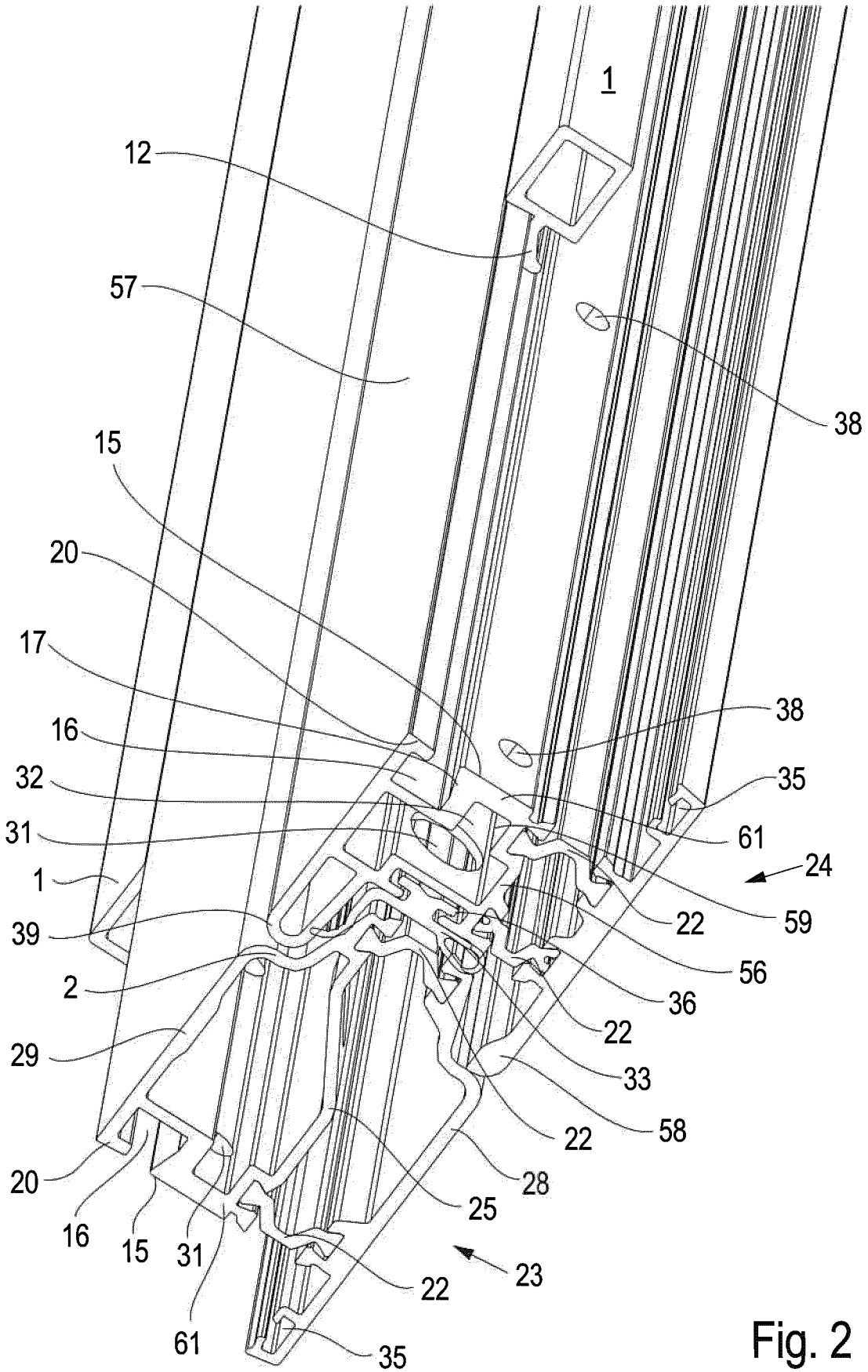
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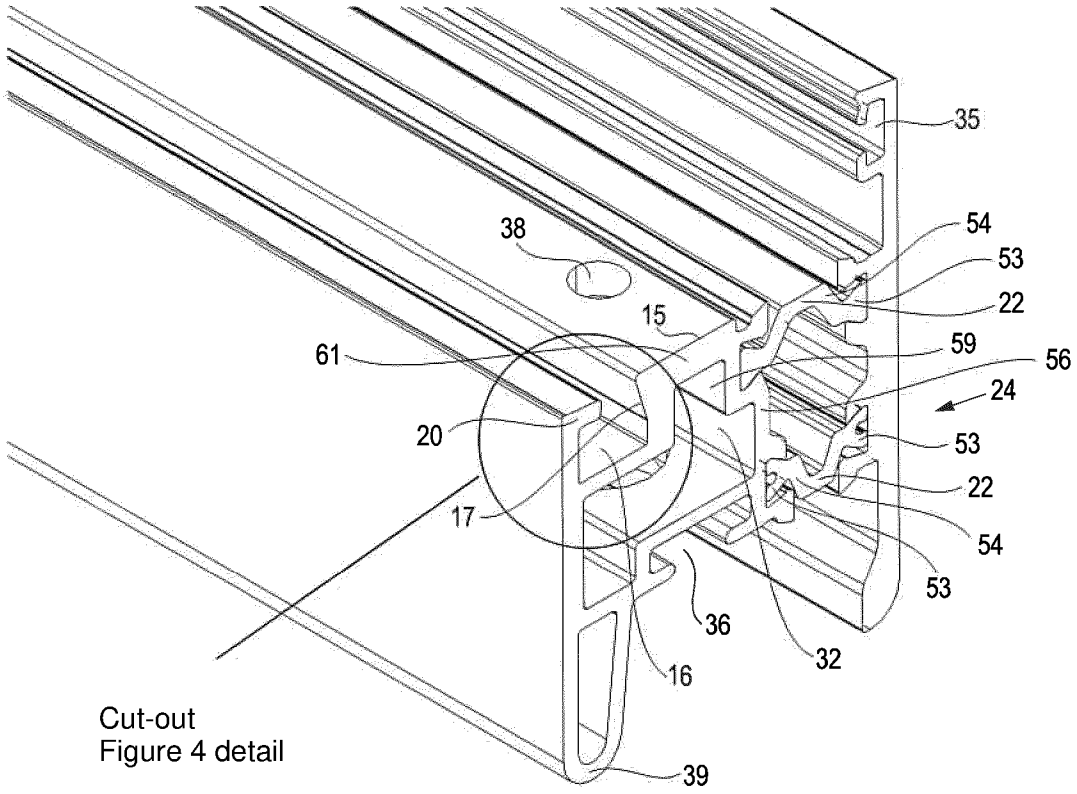
Fig. 2



Cut-out
Figure 4 detail

Fig. 3

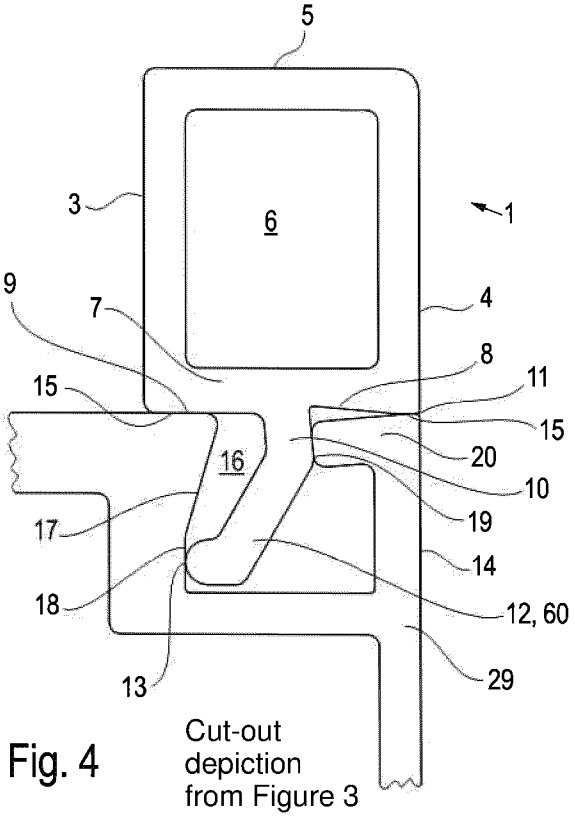


Fig. 4 Cut-out depiction from Figure 3

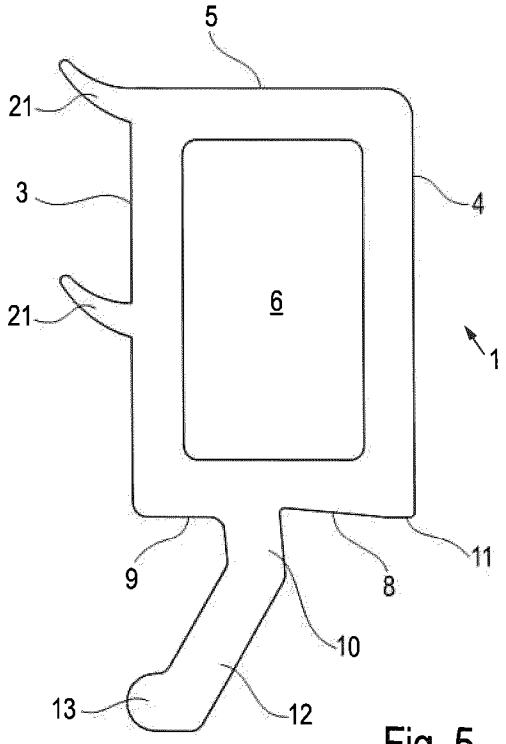


Fig. 5

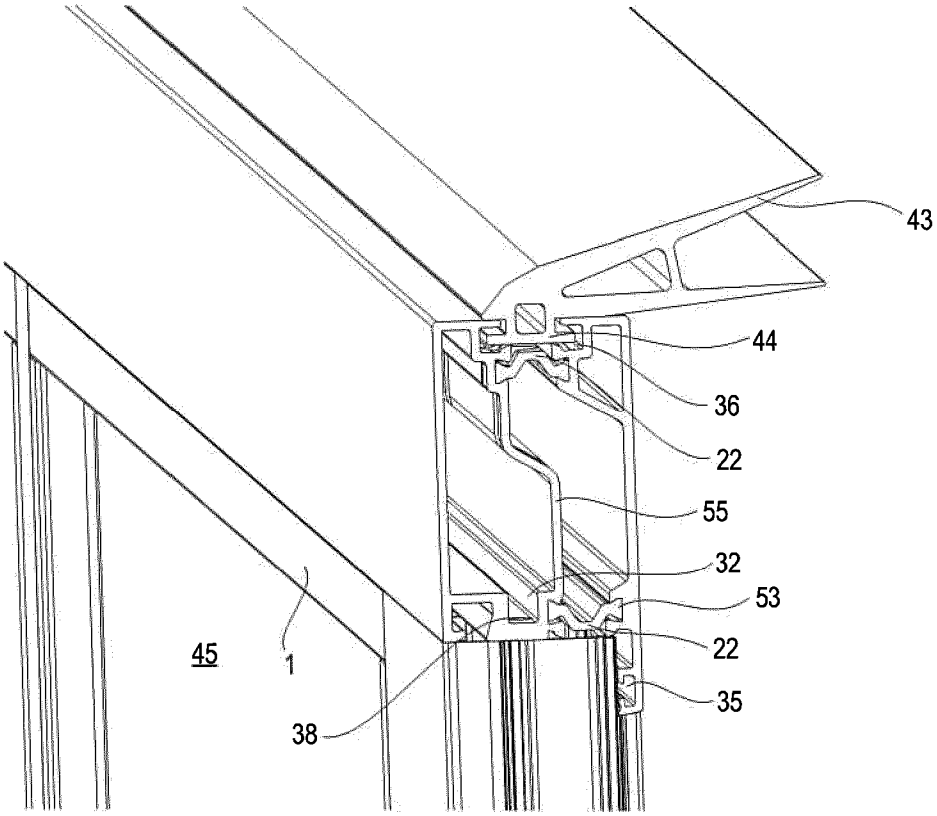


Fig. 6

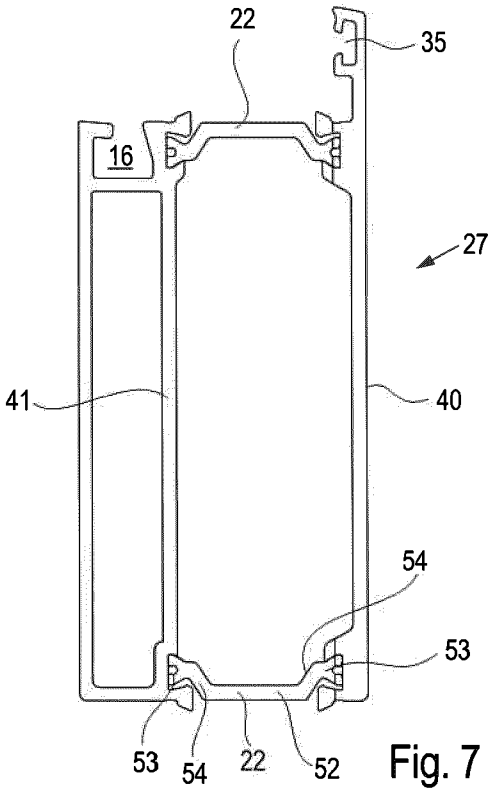

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Fig. 7

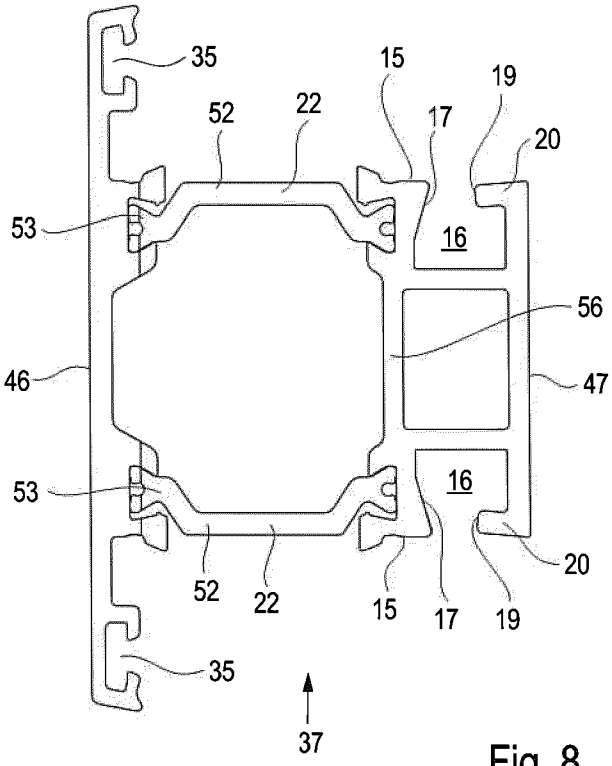
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Fig. 8

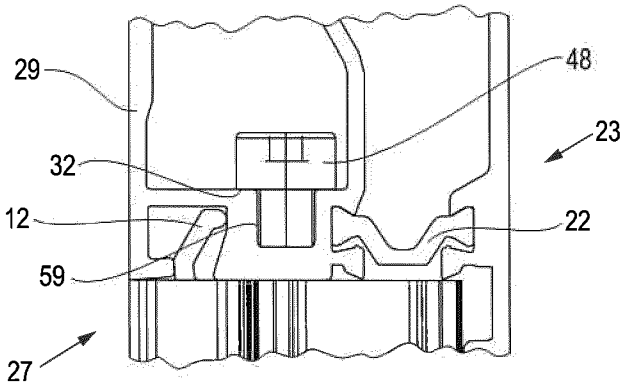

Fig. 9

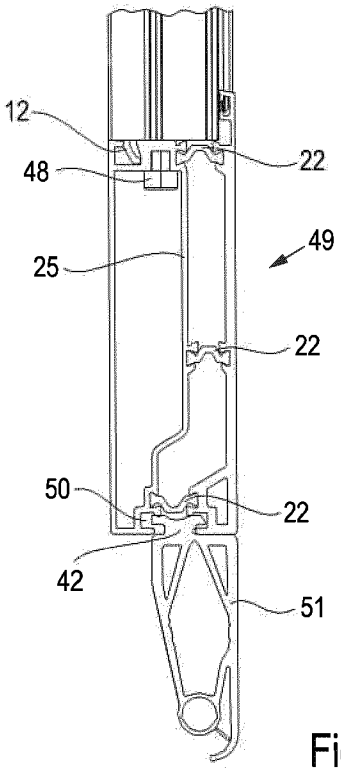

Fig. 10