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- (54) Benævnelse: **Tætningsprofil til et rammeprofil samt rammeprofil**
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DE-C2- 2 460 417
DE-U- 1 772 234
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The present invention relates to a sealing profile for a frame profile, especially a middle seal, comprising a first wall on which a foot portion is formed for fixing to a frame profile, and a second wall which is arranged spaced from the first wall and is connected via several intermediate walls to the first wall.

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DE 20 2010 008 921 discloses a middle seal for a window or a door, in which two anchoring feet are provided to fix the middle seal to a blind frame. A sealing lip protrudes on the side facing the sash, which lip ensures the sealing.

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DE 43 21 702 discloses a frame for a window on which a middle seal is provided. The middle seal comprises a protruding sealing lip which interacts with a stop.

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A seal for a window is known from DE 10 2000 044 421, in which a profile base is fixed to a groove. The seal comprises a hollow chamber and thus ensures a specific amount of elasticity of a protruding rib.

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A method for forming a sharp corner of a sealing strip is known from DE 24 60 417, in which a recess is provided in the sealing strip in order to fix a corner piece there.

DE 17 72 234 shows a corner connection for a frame in which a plug-in angle bracket is shown.

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EP 1 972 249 discloses a window with a frame in which a corner piece is provided in the corner region.

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EP 1 811 117 discloses a sealing profile for a frame profile, which can be fixed via a base part to a web of the frame profile. A head piece is provided on the side facing away from the base part, on which laterally protruding sealing lips are formed. In a closing position of a wing profile, the sealing lips rest on a contact edge and are pivoted against the head piece. It is disadvantageous in such thin-walled sealing lips that the restoring forces are comparatively low and decrease over time. This can lead to an impairment in the sealing.

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EP 2 196 614 discloses a sealing profile for a frame profile of a window or door construction, in which a base part can be fixed to the frame profile. The sealing profile consists of a foamed material and is substantially formed as a solid profile, wherein a bead-shaped sealing protrusion is formed above the base part. The

bead-shaped sealing protrusion is supported directly on the base part and has only low elasticity. It may occur during a closing movement of the sash that the bead-shaped sealing protrusion is pivoted, which leads to higher closing forces as a result of the shearing forces.

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It is therefore the object of the present invention to provide a sealing profile for a frame profile as well as a respective frame profile in which reliable sealing and sufficiently high restoring forces which are not too high can be ensured over a long period of time.

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This object is achieved by a sealing profile with the features of claim 1.

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In the sealing profile in accordance with the invention, a bead-shaped sealing projection is formed on the second wall, and the second wall with the bead-shaped sealing projection is pivotably mounted via the intermediate walls relative to the first wall. This leads to sufficient mobility of the bead-shaped sealing projection via the parallelogram-like articulation of the intermediate walls on the first wall, without the restoring forces becoming too high. Even greater closing paths, which can occur as a result of tolerances during closure of a wing profile, are bridged easily by the sealing projection because the bead-shaped sealing projection is much more flexible via the articulation of the intermediate walls than a sealing projection made of a formed material which is supported on the foot portion. Furthermore, the restoring forces on the sealing projection are higher than in the case of a thin-walled sealing lip whose elasticity decreases over time, which reduces the restoring forces since the multiple intermediate walls jointly ensure sufficient restoring forces even after a prolonged period of time.

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The sealing profile is formed as a hollow chamber profile by the intermediate walls, wherein a material which is easily compressible or a fluid, especially air, is provided in the hollow chambers. The elasticity of the sealing profile in the closing direction is increased by the hollow chambers, wherein the number of the hollow chambers can be adjusted to the respective purpose. It is not necessary that all intermediate walls need to be connected on both sides to the first and the second wall. The restoring force can be set by selecting the number of the walls connected on both sides or only on one side.

At least one separating wall is provided, which protrudes into an interior space of the sealing profile and is only connected to the first or second wall. Although heat

insulation is increased by such a separating wall which is only connected on one side, but not the restoring forces during displacement of the sealing projection.

5 An enlargement in the material can be regarded as a bead-shaped sealing projection within the terms of the invention, which enlargement is integrally formed on the second wall and interacts with a contact surface of a component which can be moved relative to the sealing profile. The sealing projection can be compressible to a certain extent as a result of the elasticity of the material, but it is not only

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The bead-shaped sealing projection preferably comprises a rounded contact edge. The contact edge can be formed laterally on the sealing projection and interact with a contact surface on a sash.

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According to a preferred embodiment of the invention, the bead-shaped sealing projection and the foot portion, as seen in the longitudinal direction of the sealing profile, are arranged on the same side of the sealing profile. When seen in a cross-sectional view, the sealing projection and the foot portion can be jointly arranged on the left or the right side or centrally. As a result, tensile loads on the

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foot portion are kept to a low level. An intermediate wall can preferably also be oriented substantially perpendicularly to the first wall and the second wall, and said intermediate wall connects the mutually facing inner sides of the bead-shaped sealing projection to the foot portion. It is thus ensured that the sealing projection is pivoted from an initial position substantially parallel to the first wall.

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In order to increase the restoring forces, a support web can be integrally formed on the first wall adjacent to the foot portion. The support web can be arranged on the foot portion on the side opposite the contact edge, wherein the support web is preferably oriented in an inclined manner in relation to the first wall.

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The sealing profile can substantially be formed in a trapezoidal manner in the cross-section, wherein the first wall is longer than the second wall. The first wall can also be formed in a stepped manner in the region of the foot portion and comprise respective latching means for fixing to the frame profile. The first wall

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and the second wall, as well as the intermediate walls, can substantially have the same thickness. Preferably, the first wall, the second wall and the intermediate walls are formed with a wall thickness of between 0.5 mm and 6 mm, especially 1 mm to 4 mm. The first wall and the second wall as well as the intermediate walls

can each be skin-lined on their surfaces in order to produce the sealing profile with high precision. The sealing profile preferably consists of an elastic material, especially cellular or sponge rubber.

5 Furthermore, a frame profile of a frame or a T-connection is provided in accordance with the invention in which a sealing profile is provided. The sealing profile can be incised on the outside and oriented angularly in a corner region of the frame or the T-connection. The sealing profile can thus be bent strongly in the corner region with low radius of curvature, so that the sealing profile protrudes
10 only slightly into an inner region of the frame in the corner region. The incision on the sealing profile can extend through the outer first wall and at least partly through the intermediate walls in order to enable the bending of the sealing profile in a narrow radius of curvature. A corner element is preferably arranged in the incision of the sealing profile, which corner element is used for the orientation of
15 the sealing profile. The corner element can comprise projections which engage in cavities of the sealing profile. Furthermore, at least one channel for the distribution of the sealing compound can be provided on the corner profile, which compound can be injected via the corner element into the corner region.

20 The invention will be explained below in closer detail by reference to several embodiments shown in the enclosed drawings, wherein:

Figs. 1A and 1B show two perspective views of a corner region of a frame in accordance with the invention;
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Figs. 2A to 2C show several views of a corner region of a T-connection in accordance with the invention;

30 Figs. 3A to 3C show several sectional views through a frame profile with inserted sealing profile;

Fig. 4 shows a sectional view through the sealing profile on the frame profile;

35 Figs. 5A and 5B show two views during mounting of a corner element on the sealing profile;

Figs. 6A to 6C show several sectional views through a frame profile in the region of a corner element;

Figs. 7A to 7I show several views of a corner element for a frame or a T-connection, and

5 Figs. 8A to 8C show several views of the corner element of Fig. 7 in exploded views.

10 A frame 1 comprises a first frame profile 2 and a second frame profile 3, which are oriented at an angle to each other, preferably at a right angle. For this purpose, the frame profiles 2 and 3 rest on each other along a mitred surface 4.

15 A corner element 5 is shown in Fig. 1B on the frame profile 2 and the frame profile 3, which corner element is arranged in extension to a sealing profile 6, which is fixed both to the frame profile 2 and also to the frame profile 3. The sealing profile 6 is bent with small radius in the corner region.

20 Fig. 2A shows a T-connection 1', in which a first frame profile 2' is connected to a second frame profile 3', wherein the frame profiles 2' and 3' are oriented at a right angle in relation to each other. The frame profile 3' is fixed at the front side to an abutment surface 4' on the frame profile 2'. As is shown in Fig. 2B, a corner element 5 can also be mounted in the corner region of such a T-connection 1', by means of which a sealing profile 6 can be aligned. The sealing profile 6 is shown in Fig. 2C to be fixed to the frame profiles 2' and 3' and is bent at a right angle in the corner region.

25 Fig. 3A shows the sealing profile 6 in a position mounted on the frame profile 2. The frame profile 2 is formed identically to the frame profile 3, and the frame profiles 2' and 3' can also be formed in a respective manner. The frame profile 2 comprises an inner shell 20 made of aluminium and an outer shell 22 made of aluminium, which are connected to each other via insulating webs 21 made of plastic. A groove 23 for an outer seal is provided on the outer shell 22. The terms "inner" and "outer" relate to the preferred installation situation of a window or door with a frame profile 2, 3, 2' or 3', and are also exchangeable in the case of reversed installation.

35 A groove 24 is formed on the insulating web 21, into which a foot portion 60 of the sealing profile 6 is inserted and via which the groove 24 is fixed via the inwardly facing webs.

The sealing profile 6 is formed as a hollow-chamber profile and comprises a first outer wall 61 and a second inner wall 62, wherein a sealing projection 69 is integrally formed on the inner wall 62. The inner wall 62 is connected to the outer wall 61 via several intermediate walls. The terms "inner" and "outer" relate to the corner region in this case in which the sealing profile 6 is bent and therefore radially inner and outer regions are present.

Fig. 3B shows the frame profile 2 of Fig. 3A together with a wing profile 7, which can be moved relative to the frame profile 2. The wing profile is formed as a heat-insulated composite profile and comprises a contact surface 71 on its exterior side, which contact surface interacts with a sealing profile which is fixed in the groove 23. The wing profile 7 comprises a groove 72 on the inner side on which an inner seal is inserted which interacts with the inner shell 20 of the frame profile 2 so that the sealing profile 6 is formed as a middle seal which is arranged between an outer and an inner seal. The sealing profile 6 substantially extends over the width of the insulating webs 21.

The sealing profile 6 rests with the sealing projection 69 on a block 70 which is part of an insulating web of the wing profile 7. In the closed position, the block 70 deforms the sealing profile 6, as shown in Fig. 3C. The sealing projection 69 rests with a sealing surface on the block 70, with the sealing profile 6 being displaced to the left in Fig. 3C in the region of the inner wall 62. For this purpose, the inner wall 62 is displaceable in the manner of a parallelogram link relative to the outer wall 61 via the intermediate walls 63, 64, 65 and 66, wherein the original position of the intermediate walls 63 is shown with the dashed line in Fig. 3C and the pivoted position with 63'. The sealing projection 69 can be displaced with low spring forces in a direction perpendicularly to the plane of a filling element within the wing profile 7 as a result of the connection of the inner wall 62 with the outer wall 61 via several intermediate walls 63, 64, 65 and 66.

Fig. 4 shows the sealing profile 6 in detail. The sealing profile 6 consists of an elastic material, especially a foamed cellular or sponge rubber which skin-lines the inner sides. The sealing profile 6 comprises a first outer wall 61 and a second inner wall 62, wherein the terms "outer" and "inner" relate to a corner region of a frame or a T-connection on which the outer wall 61 is provided to be disposed on the outside and the inner wall 62 is provided to be disposed on the inside.

The first wall 61 and the second wall 62 are connected to each other via four intermediate walls 63, 64, 65 and 66, wherein the number of the intermediate walls 63, 64, 65, 66 can be varied in order to vary the number of the cavities in the sealing profile 6. A separating wall 68 is further formed on the second wall 62, which separating wall is formed in a freely suspended manner and does not extend up to the outer wall 61. A foot portion 60 of a mushroom-head-shaped cross-section is further shown on the first wall 61, wherein the first wall 61 is formed in a stepped manner in the region of the foot portion 60. The first wall 61 can further be fixed to a groove of the frame profile 2 spaced from the foot portion 60, so that a displacement of the first wall 61 perpendicularly to the longitudinal direction of the sealing profile 6 is securely prevented.

A support web 67 which extends obliquely to the outside is provided on the first wall 61 and adjacent to the foot portion 60, which support web supports the sealing profile 6 when the sealing projection 69 is pushed by the block 70 on the wing profile 7 to a closed position, as shown in Fig. 3C.

Fig. 5A shows the sealing profile 6 in a state during mounting. The sealing profile 6 is incised in a corner region, wherein at least the outer wall 61 is severed, but preferably also a portion of the intermediate walls 63, 64, 65 and 66, which can also be completely severed for example. Only the inner wall 62 needs to remain at least partly contiguous, so that the sealing profile 6 can be oriented in an angular manner after the insertion, as shown in Fig. 5A. The hollow chambers are opened by the incision and the bending of the sealing profile 6, and a corner element 5 is arranged in the corner region of the sealing profile 6. The corner element 5 is substantially formed by a cuboid web, which comprises angularly protruding projections 53, 54 and 55 which can be inserted into individual cavities of the sealing profile 6. Furthermore, the corner element 5 comprises two rectangularly protruding plates 52 which can be fixed to a frame profile 2, 3, 2', 3' and further ensure the distribution of a sealing compound. A sealing compound is injected into the corner element 5 via a channel 10 after mounting.

As is shown in Fig. 5B, the corner element 5 adapts in a substantially interlocking manner to the incised front corners of the sealing profile 6 and seals said edges. An upper side 51 of the corner element 5 is substantially oriented in a flush manner with an exterior side of the sealing profile 6 and the projections 53, 54 and 55 are inserted into the cavities of the sealing profile 6, so that the sealing profile 6 is retained in a pre-fixed manner by the corner element 5 in the angular position.

Fig. 6A shows the sealing profile 6 in a position mounted on the corner element 5, wherein the corner element 5 is fixed to the frame profile 2. The plates 52 on the corner element 5 comprise groove-shaped channels 13 and 14, into which the webs of the groove 23 engage in the outer shell 22 of the frame profile 2. As is shown in Fig. 6B, the corner element 5 can be fixed between the outer shell 22 and the inner shell 20, wherein a latching element 46 engages for this purpose on the corner element 5 adjacent to the upper side of 51 in the groove 26 on the inner shell 20. A latching element 56 is also provided on the opposite side on the corner element 5, which latching element engages in a groove 25 on the outer shell 22. The latching means 46 and 56 in the corner element 5 are formed in an at least partly elastic manner and allow latching of the corner element 5 during mounting. It is also possible to form the corner element 5 in its entirety from a material with a specific amount of elasticity or to at least provide individual sections made from an elastic material.

Webs 49 laterally protrude from the upper side 51, which webs engage beyond the sealing profile 6 in the position mounted on the corner element 5. The sealing profile 6 is then fixed in a clamping manner between the webs 49 on the upper side 51 and a plate 57 arranged on the corner element 5.

Fig. 6C shows a sectional view through the corner element 5, wherein the channel 10 can be recognised for distributing a sealing compound. The channel 10 is connected via one or several distribution sections to the channels 13 and 14, so that the sealing compound injected on the upper side 51 is distributed by the channel 10 in the corner region. In the embodiment shown in Fig. 6C, the channel 10 opens into the region of the mitred surface 4 of two frame profiles 2 and 3, wherein a sealing can also be produced in the region of an abutment surface 4' by the channels 13 and 14 by the sealing compound. Furthermore, openings 16 are provided on the channel 10 on the side facing the sealing profile 6 in order to inject sealing compound also into the cavities of the sealing profile 6 and to securely seal this region. On the side facing away from the sealing profile 6, a further opening 18 is provided on the channel 10 in order to enable injection of sealing compound in this region too.

The corner element 5 preferably consists of plastic and can be fixed in a dimensionally stable manner in the corner region of two frame profiles 2 and 3 as well as 2' and 3', wherein the corner element 5 can be latched via one or several latching means 46 and 56 for the purpose of simple mounting.

The corner element 5 is shown in detail in Figs. 7A to 7I. The corner element 5 comprises several web-shaped projections 53, 54 and 55 on the cuboid web, which projections can be inserted into the cavities of the sealing profile 6. The projections 53, 54, 55 are formed in an angular manner, preferably substantially at a right angle, in order to enable prefixing of the sealing profile 6 in an angular position. An opening of a channel 10 is formed on an upper side 51 of the corner element 5, into which a nozzle can be inserted for injecting sealing compound. The sealing compound is then distributed via the channel 10, wherein the channel 10 is arranged on the opposite side in the region of the plates 52 and distributes sealing compound along the mitred surface 4 of a frame 1 via a first distribution section 12. The first distribution sections 12 is connected via two groove-shaped distribution sections 11 which transport the sealing compound to the groove-shaped channels 13 and 14. An opening 15 is formed on the channel 14 which is provided on the upper side of the plate 52 and allows a visual check whether a sufficient amount of sealing compound was injected into the corner element 5, since sealing compound will escape from the opening 15 in the case of sufficient filling of the corner element 5.

Latching elements 55 and 56 are further formed on opposite sides on the corner element 5, which latching elements can be latched onto a frame profile 2 on the respective webs of grooves 26 and 25. A plate 57 is further provided in a middle region of the corner element 5 which tapers to the front and engages beneath an outer wall of the sealing profile. As a result, the plates 52 are arranged to be spaced from the sealing profile 6. A recess 17 is provided between the plates 52 on the plate 57, which recess is used for the injection of the sealing compound when necessary in that the base wall of the recess is penetrated so that a nozzle can be inserted into the channel 10.

As is shown in Figs. 8A to 8C, the corner element 5 is formed in two parts and comprises a first part 58 made from a softer, elastic material and a second part 59 made from a rather dimensionally stable material. The first part 58 made of the softer material allows the latching of the corner element 5 on a frame profile 2, 3, 2', 3'. The first part 58 comprises a sleeve 40 for this purpose which can be inserted into the channel 10 on the second part 59, so that the first part 58 and the second part 59 are tightly connected to each other after mounting.

For the purpose of mounting a frame or a T-connection, a sealing profile 6 is incised and bent or folded in the region of an outer wall 61 and preferably also in

the region of the intermediate walls 63, 64, 65 and 66. A corner element 5 is then inserted into the incised section, as is shown in Figs. 5A and 5B. The corner element 5 can already be premounted selectively on a frame 1 or a T-connection 1' or mounted loosely on the sealing profile 6, so that then the unit consisting of the
5 sealing profile 6 and the corner element 5 can then be mounted on a frame 1 or a T-connection 1'. After the mounting of the sealing profile 6 on the frame 1 or the T-connection 1', the sealing compound is injected into the channel 10 and distributed in the corner element 5 in order to seal the frame profiles 2, 3, 2', 3' accordingly.

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The sealing profile 6 is held via four corner element 5 during mounting of a frame, wherein the sealing profile 6 is preferably provided in an integral manner. The sealing profile 6 rests on each other with the face ends in the region of the end sections in order to achieve adequate sealing. It is optionally also possible to provide
15 a connection element on the end sections of the sealing profile 6.

List of reference numerals

	1	Frame
5	1'	T-connection
	2, 2', 3, 3'	Frame profile
	4	Mitred surface
	4'	Abutment surface
	5	Corner element
10	6	Sealing profile
	7	Wing profile
	10	Channel
	11	Distribution section
	12	Distribution section
15	13	Channel
	14	Channel
	15	Opening
	16	Opening
	17	Recess
20	18	Opening
	20	Inner shell
	21	Insulating web
	22	Outer shell
	23	Groove
25	24	Groove
	25	Groove
	26	Groove
	40	Sleeve
	46	Latching means
30	49	Webs
	51	Upper side
	52	Plates
	53	Projection
	54	Projection
35	55	Projection
	56	Latching means
	57	Plate
	58	First part

	59	Second part
	60	Foot portion
	61	Outer wall
	62	Inner wall
5	63, 63'	Intermediate wall
	64	Intermediate wall
	65	Intermediate wall
	66	Intermediate wall
	67	Support web
10	68	Separating wall
	69	Sealing projection
	70	Block
	71	Contact surface
	72	Groove
15		

Patentkrav

1. Tætningsprofil (6) til et rammeprofil (2, 2', 3, 3'), især en mellemtætning, omfattende en første væg (61) på hvilken et fodparti (60) er dannet til fastgørelse til et rammeprofil (2, 2', 3, 3'), og en anden væg (62), som er arrangeret i afstand fra den første væg (61) og er forbundet via flere mellemvægge (63, 64, 65, 66) med den første væg (61), **kendetegnet ved, at** der på den anden væg (62) er udformet et vulstformet tætningsfremspring (69), og at den indre anden væg (62) med det vulstformede tætningsfremspring (69) er forskydeligt lejret via mellemvæggene (63, 64, 65, 66) i forhold til den første væg (61) som en parallelogramledforbindelse.
2. Tætningsprofil ifølge krav 1, **kendetegnet ved, at** det vulstformede tætningsfremspring (69) omfatter en afrundet anlægskant.
3. Tætningsprofil ifølge krav 1 eller 2, **kendetegnet ved, at** det vulstformede tætningsfremspring (69) og fodpartiet (60) set i tætningsprofillets længderetning er arrangeret på samme side af tætningsprofilet (6).
4. Tætningsprofil ifølge et af de foregående krav, **kendetegnet ved, at** der er tilvejebragt mindst en skillevæg (68), som rager ind i et indre rum af tætningsprofilet (6) og kun er forbundet med den første eller anden væg (61, 62).
5. Tætningsprofil ifølge et af de foregående krav, **kendetegnet ved, at** en mellemvæg (65) er orienteret i det væsentlige vinkelret på den første væg (61) og den anden væg (62), og at mellemvæggen (65) forbinder de mod hinanden vendende sider af det vulstformede tætningsfremspring (69) med fodpartiet (60).
6. Tætningsprofil ifølge et af de foregående krav, **kendetegnet ved, at** et støttestykke (67) er udformet på den første væg (61) tilstødende fodpartiet (60).
7. Tætningsprofil ifølge et af de foregående krav, **kendetegnet ved, at** tætningsprofilet (6) er i det væsentlige trapezformet i tværsnit, hvori den første væg (61) er længere end den anden væg (62).
8. Tætningsprofil ifølge et af de foregående krav, **kendetegnet ved, at** tætningsprofilet (6) er lavet af celle- eller svampegummi.

9. Rammeprofil af en ramme (1) eller en T-forbindelse (1'), **kendetegnet ved, at** et tætningsprofil (6) ifølge et af krav 1 til 8 er tilvejebragt på rammen (2, 2', 3, 3').
- 5 10. Rammeprofil ifølge krav 9, **kendetegnet ved, at** tætningsprofilet (6) er indskåret på ydersiden og orienteret med en vinkel i et hjørneområde af rammen (1) eller T-forbindelsen (1').
- 10 11. Rammeprofil ifølge krav 10, **kendetegnet ved, at** et hjørneelement (5) er arrangeret på tætningsprofilets (6) indskæring.
- 15 12. Rammeprofil ifølge krav 11, **kendetegnet ved, at** der er tilvejebragt en indskæring, som strækker sig gennem den udvendige første væg (61) og i det mindste delvist gennem et område af tætningsprofilets (6) mellemvægge (63, 64, 65, 66).
13. Rammeprofil ifølge krav 11, **kendetegnet ved, at** hjørneelementet (5) omfatter fremspring (53, 54, 55), som er indført i tætningsprofilets (6) hulrum.
- 20 14. Rammeprofil ifølge krav 11 eller 13, **kendetegnet ved, at** i det mindste én kanal (10) til fordeling af tætningsmasse er dannet på hjørneelementet (5).

Fig. 1A

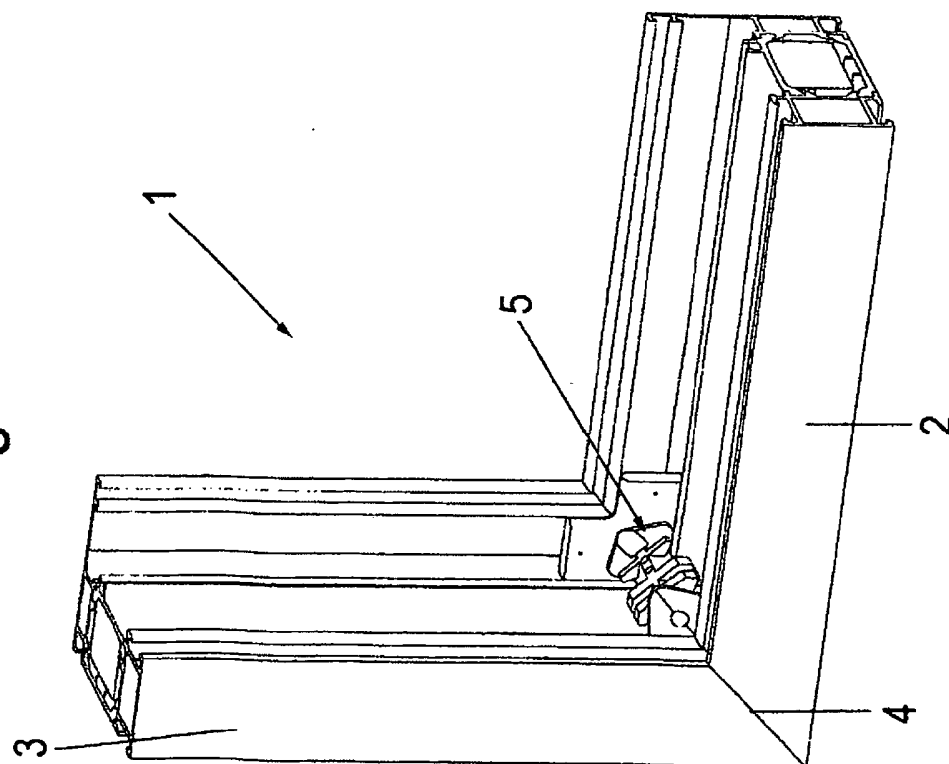
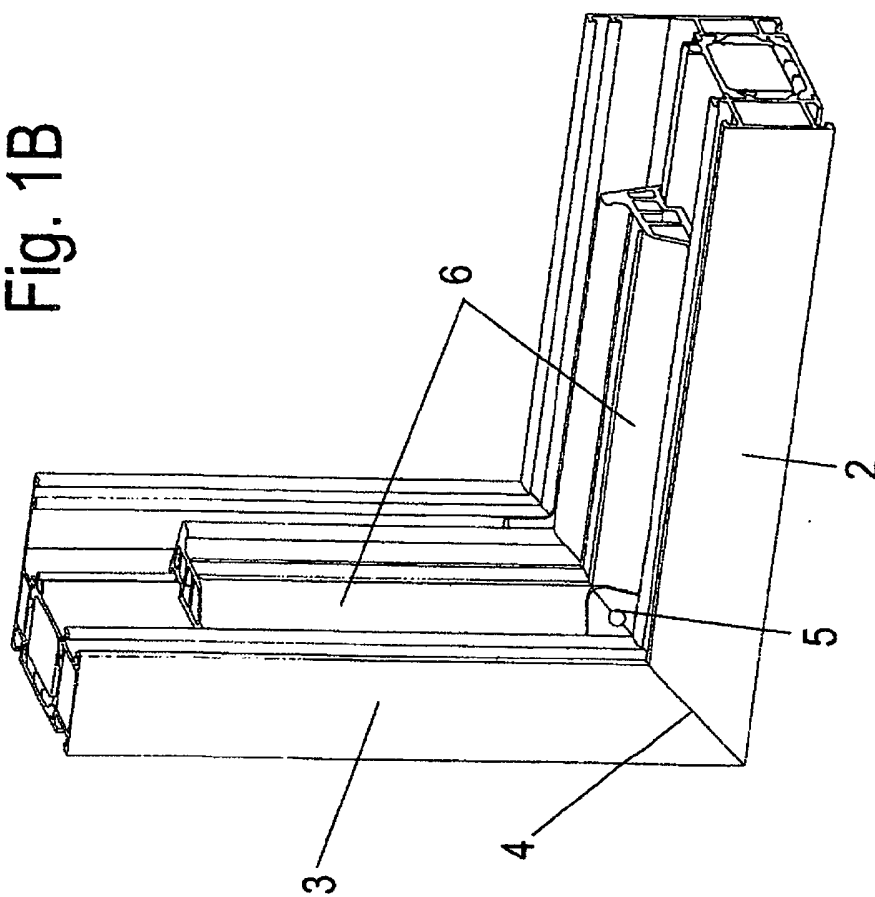
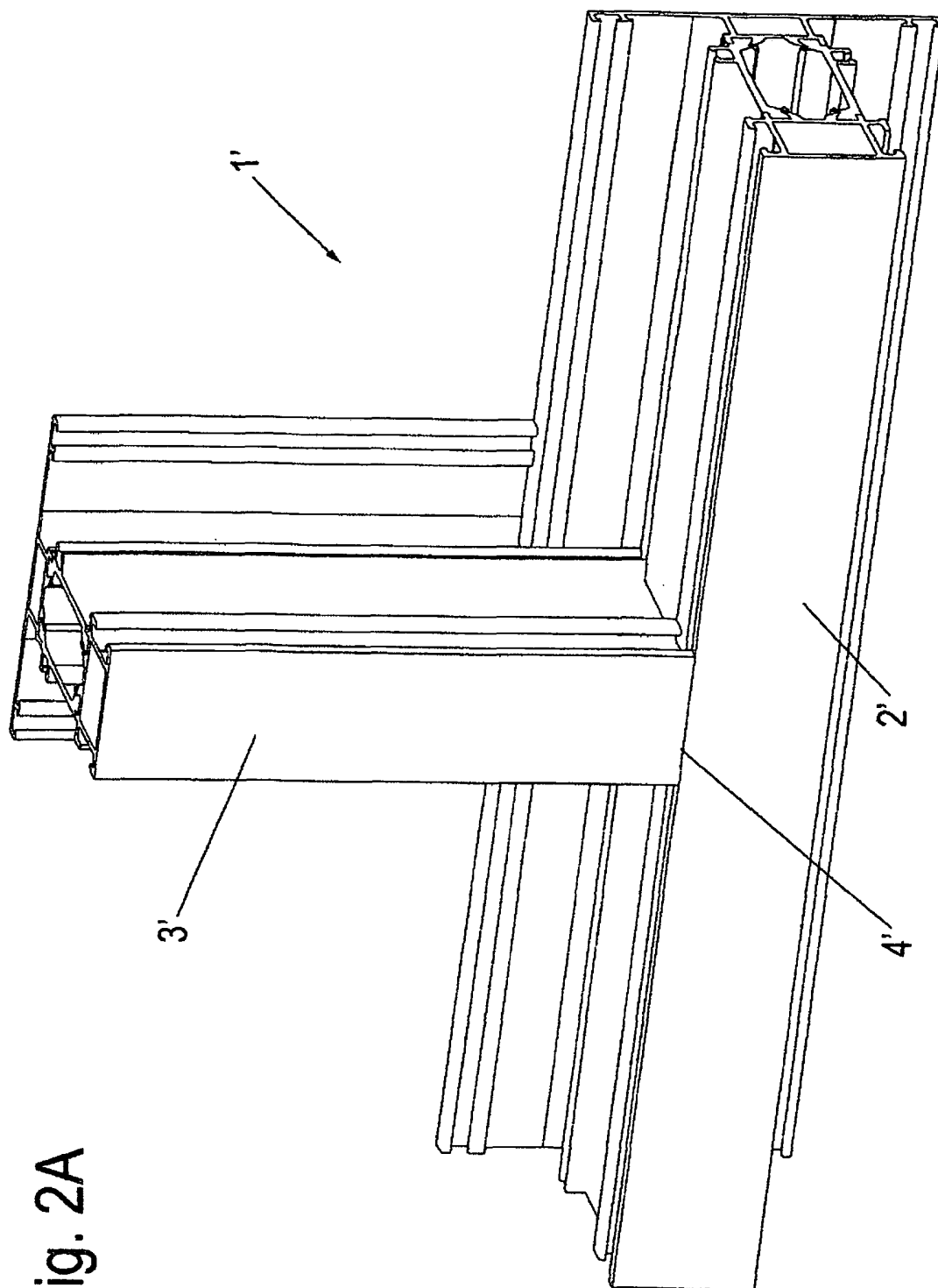


Fig. 1B





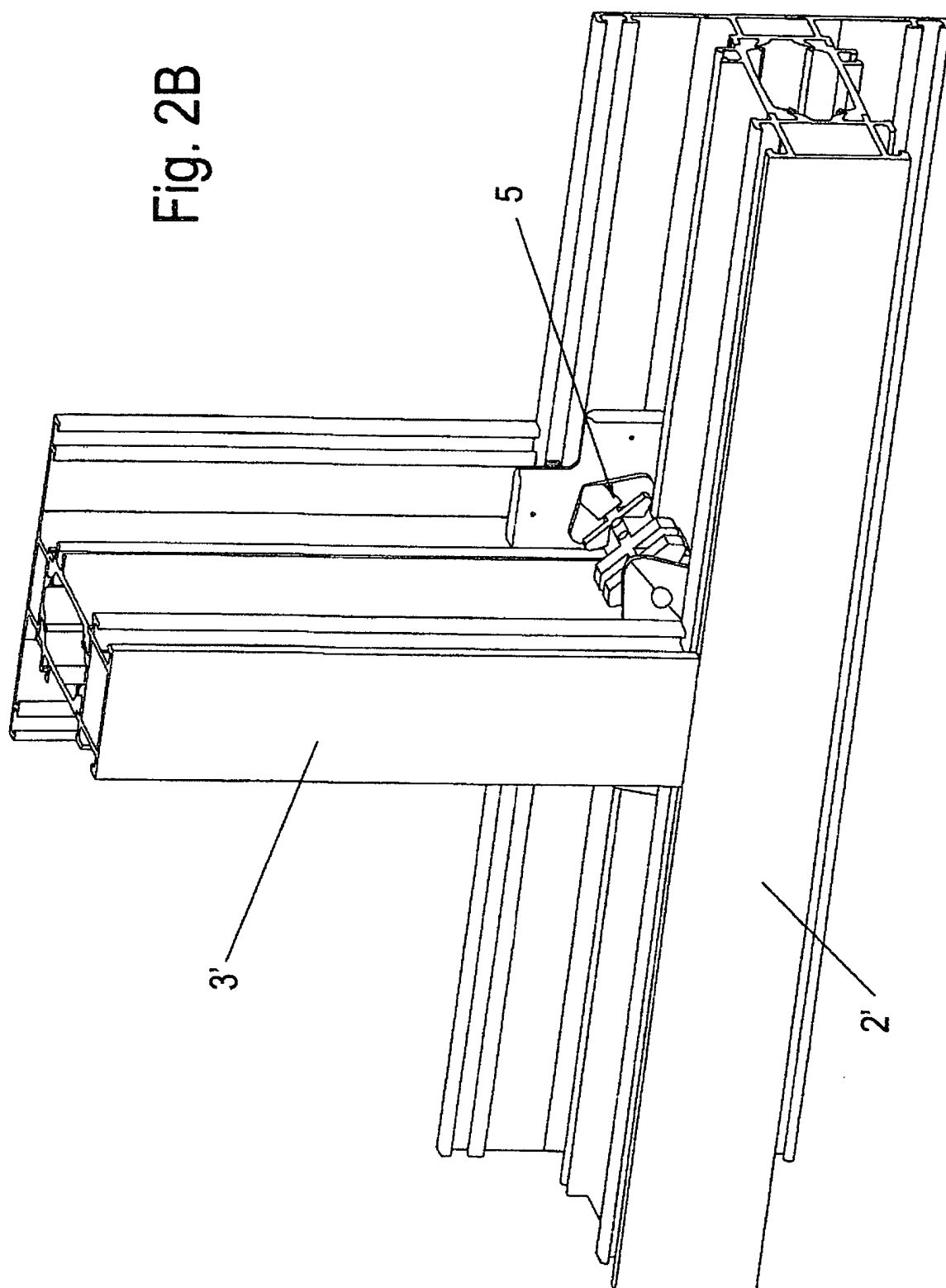
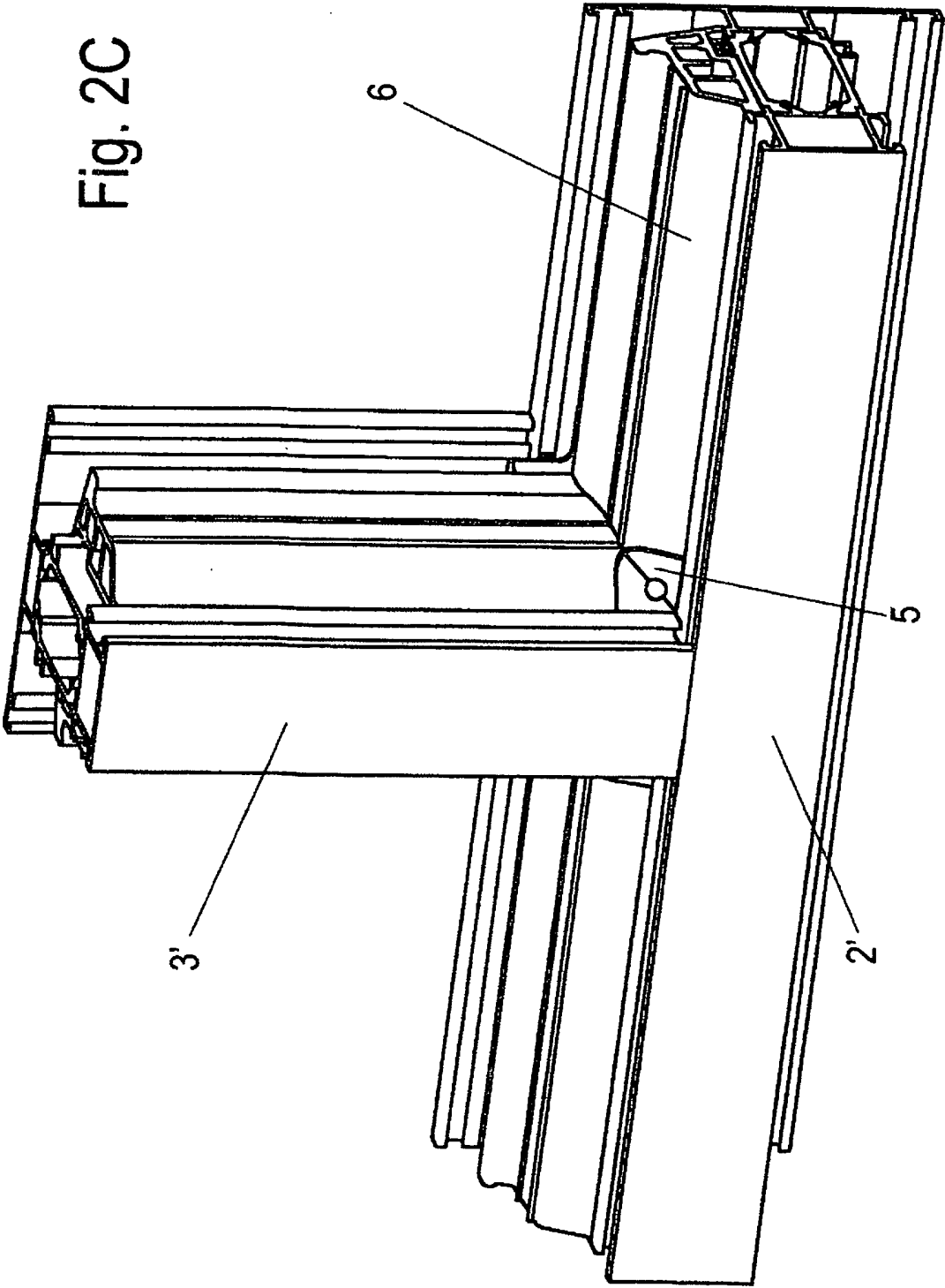


Fig. 2C



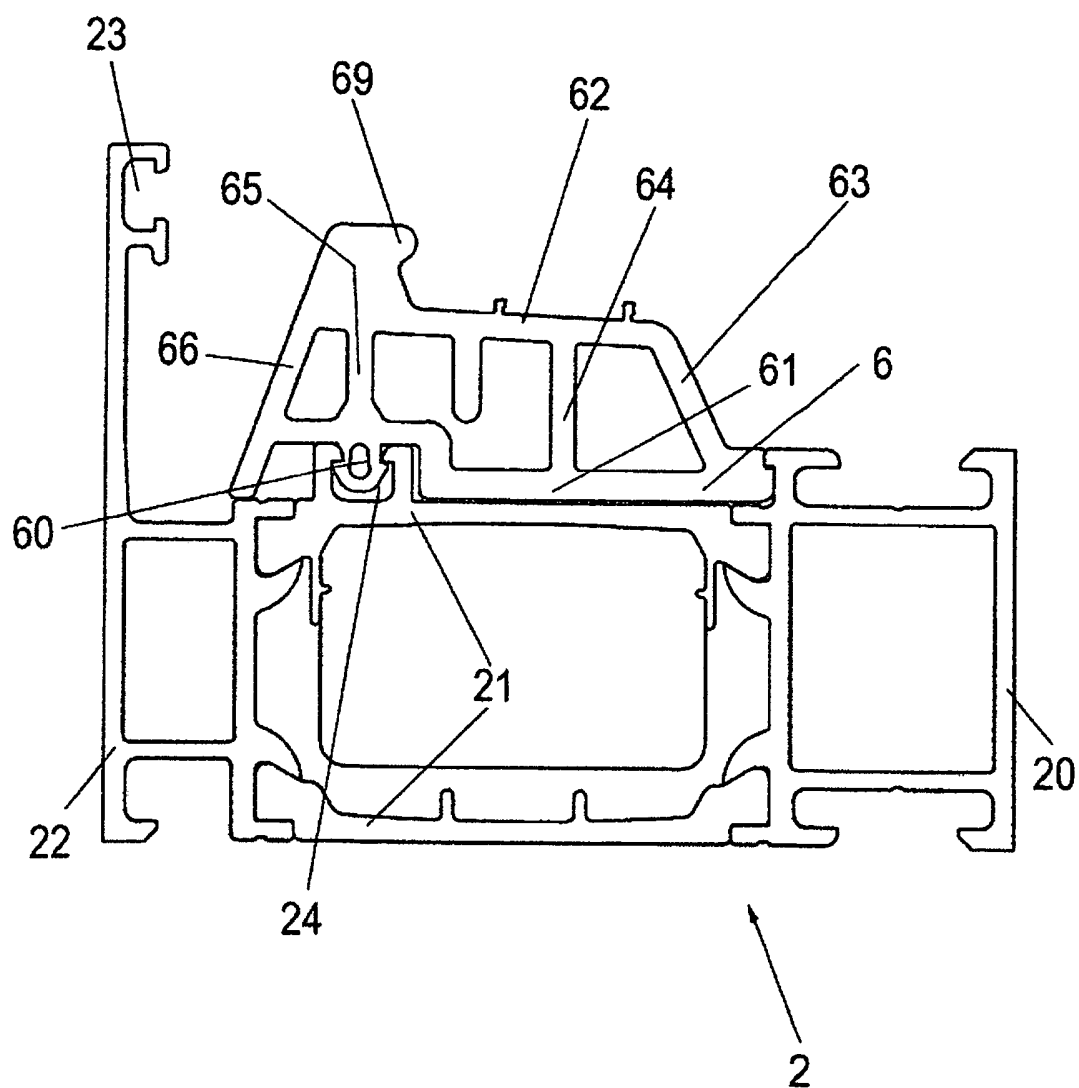


Fig. 3A

Fig. 3B

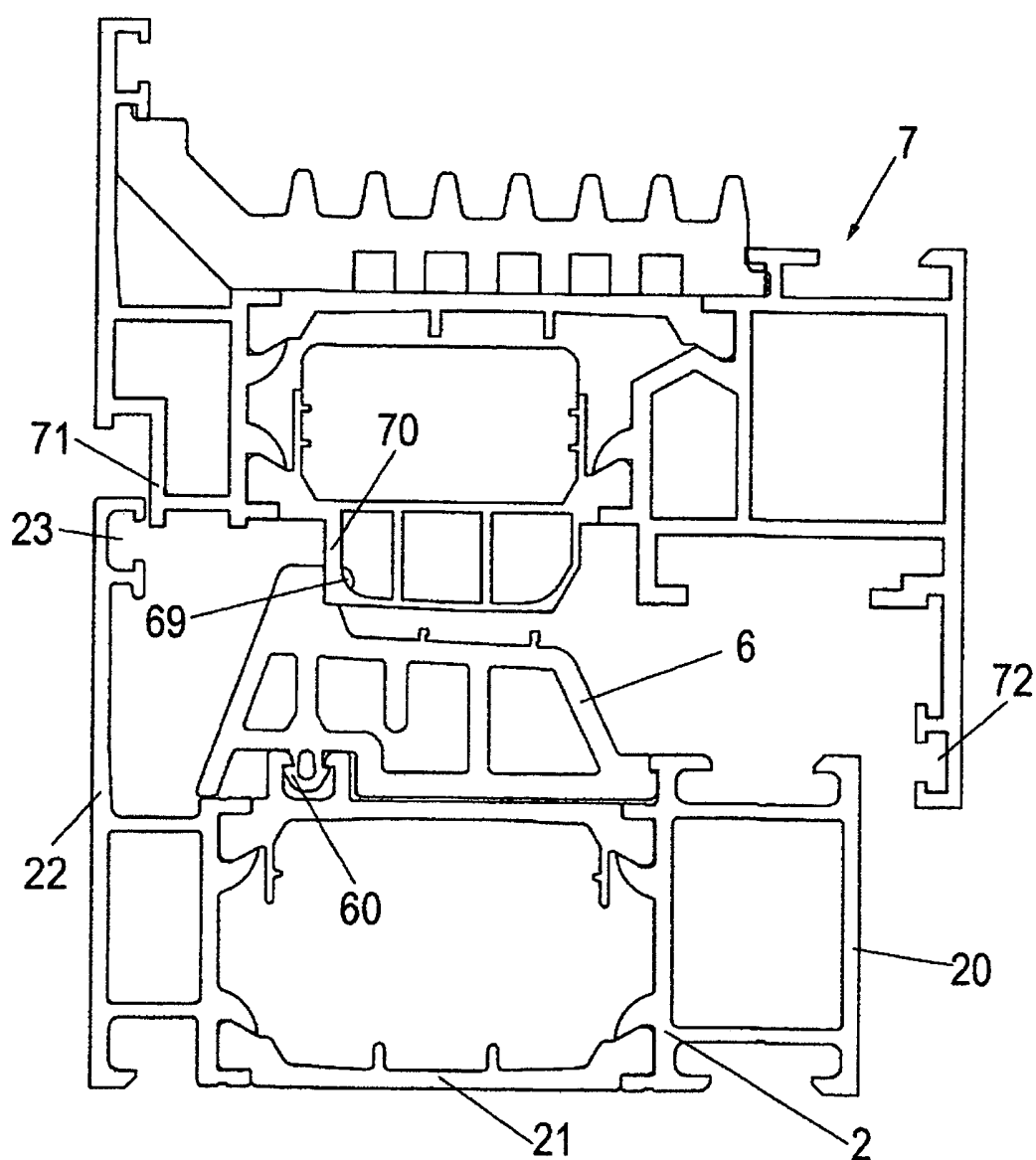


Fig. 3C

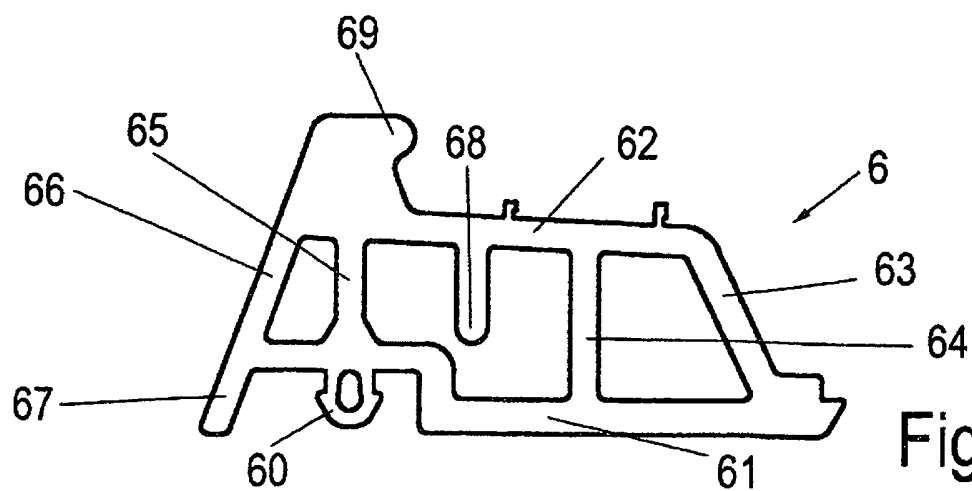
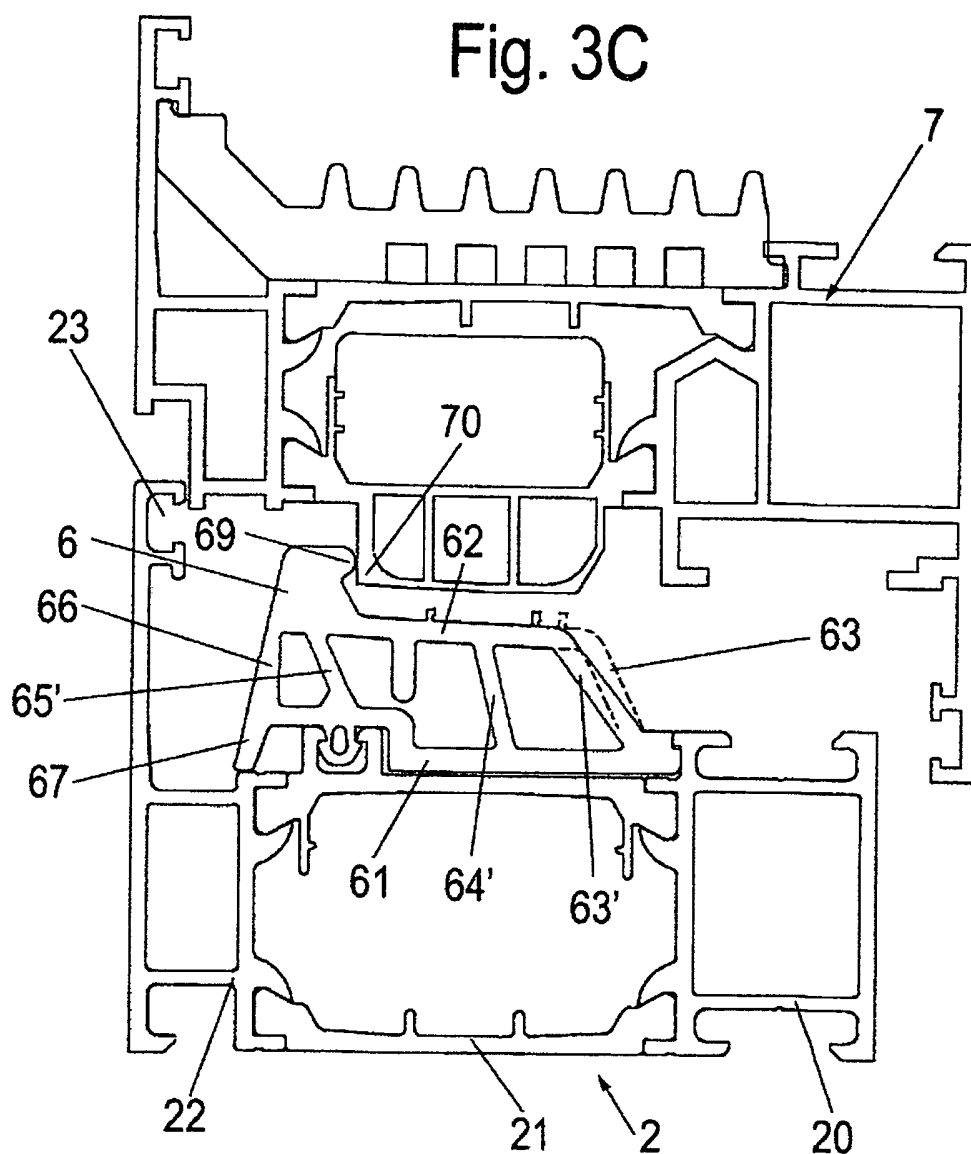


Fig. 4

Fig. 5A

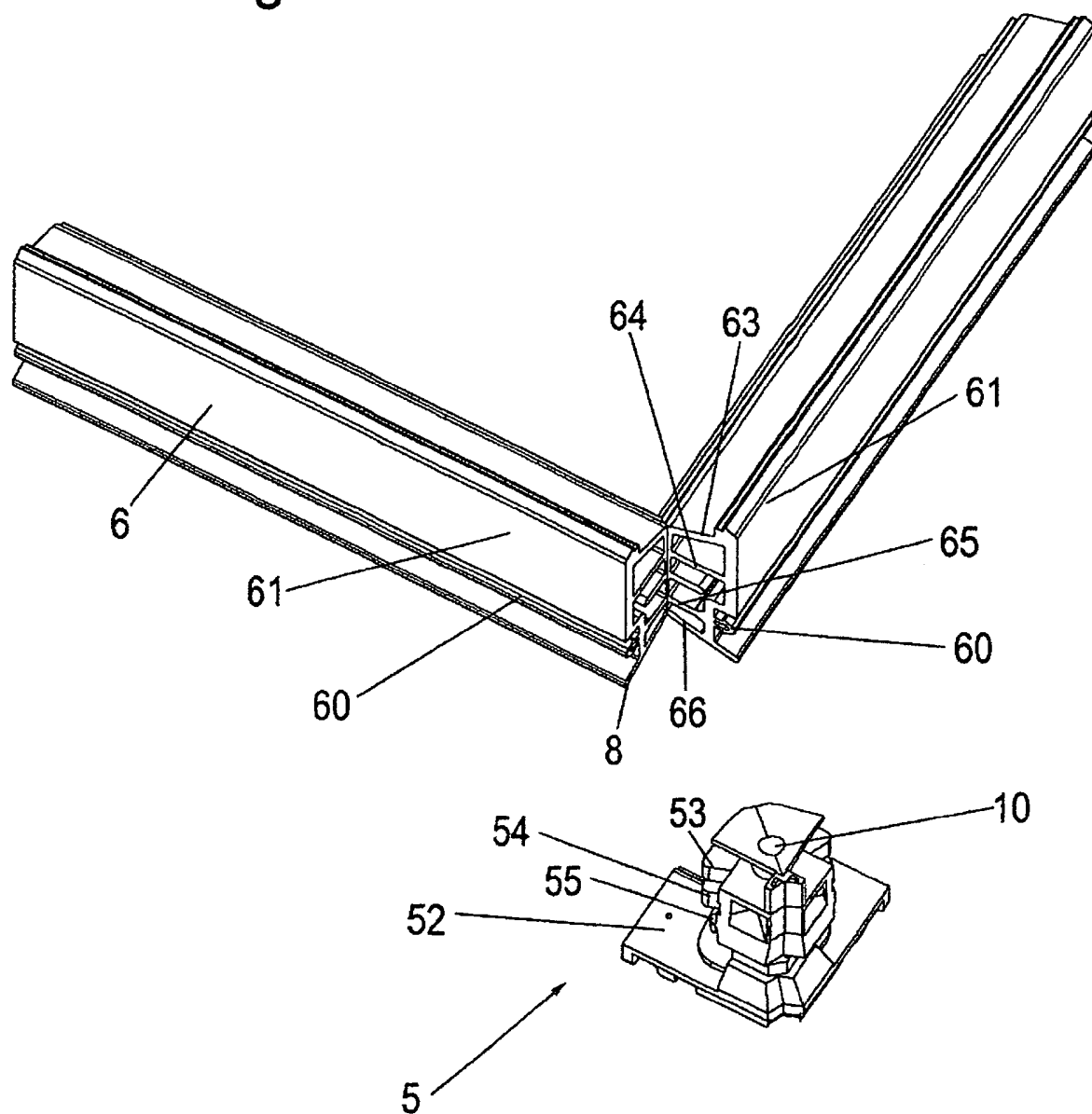
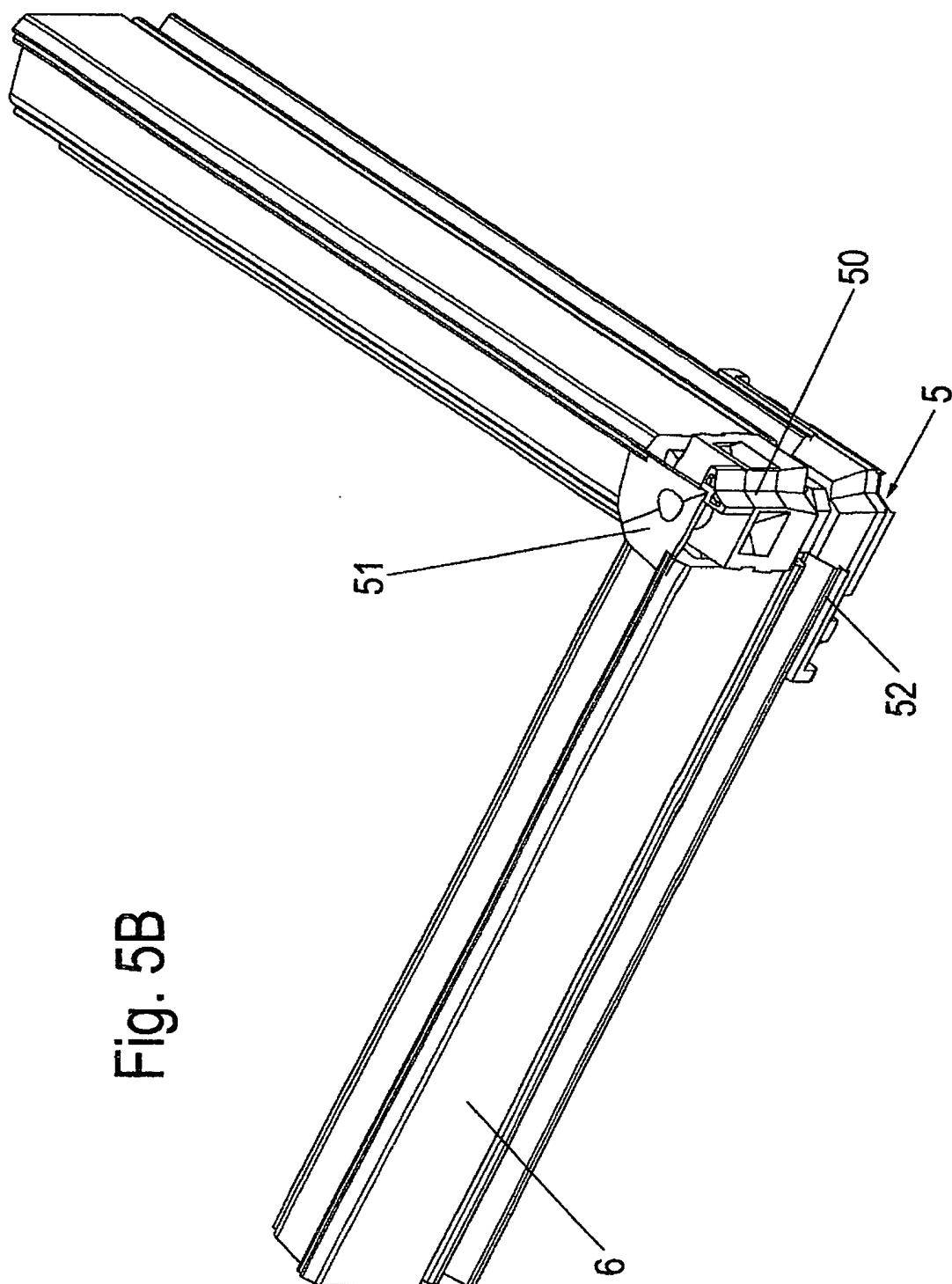


Fig. 5B



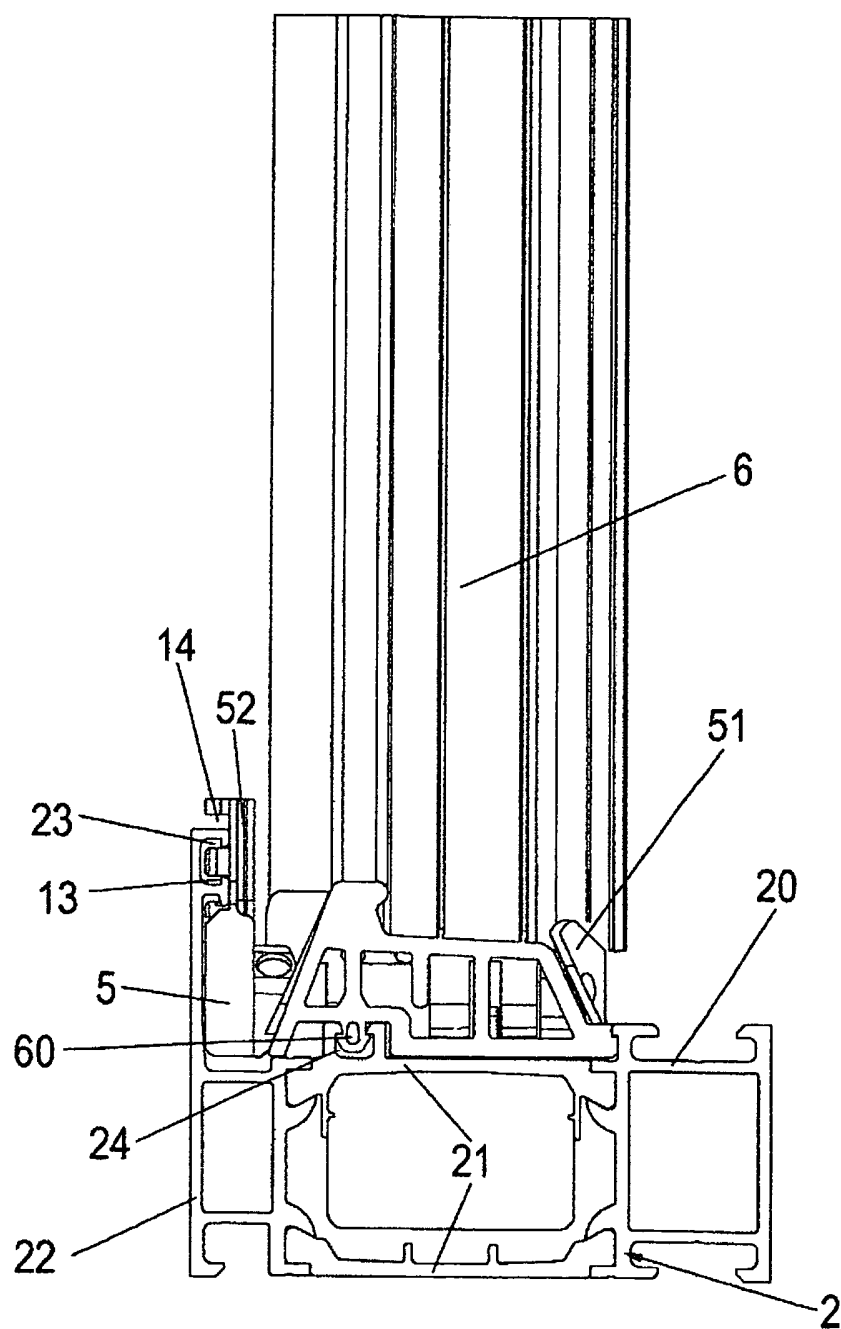


Fig. 6A

Fig. 6B

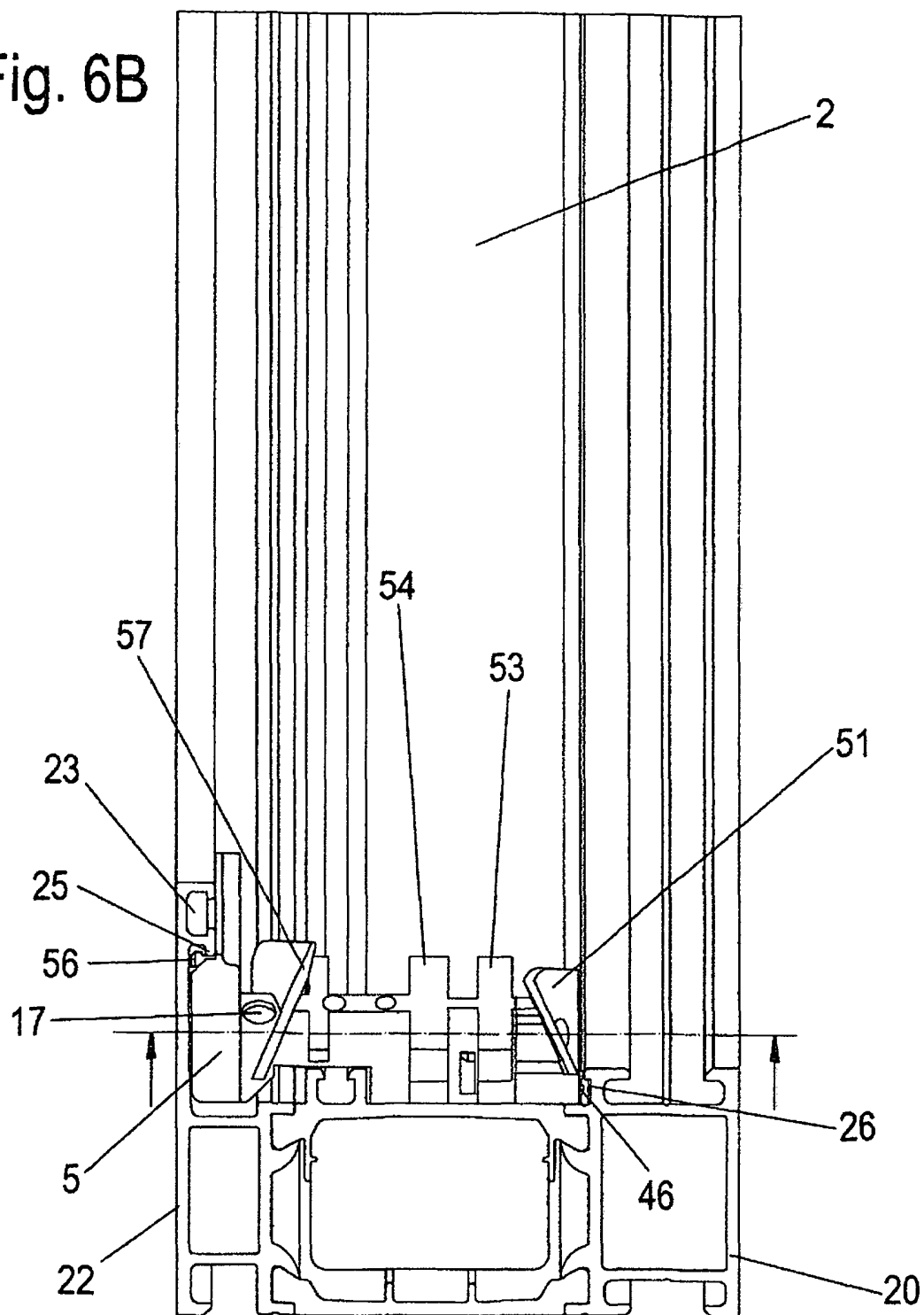
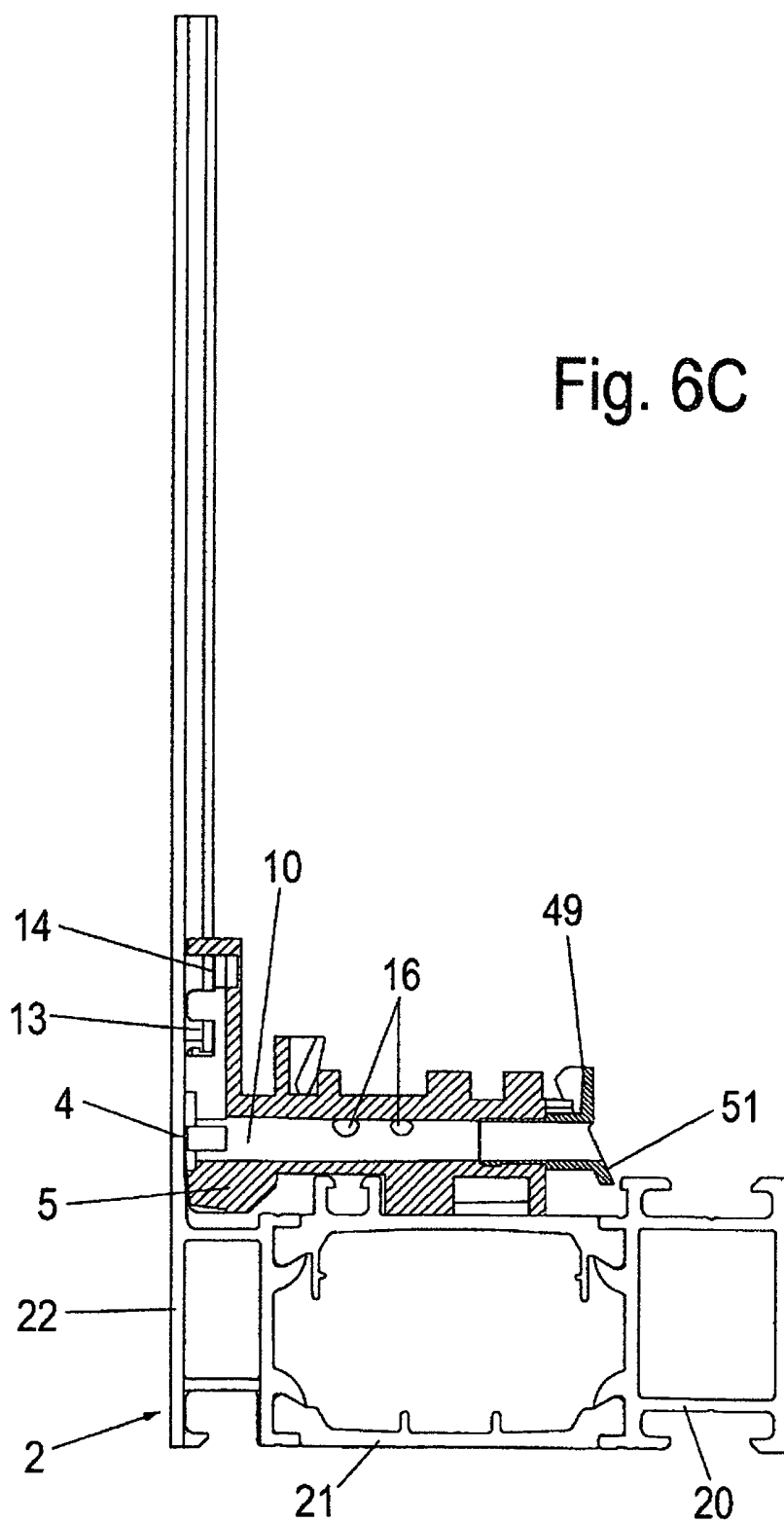


Fig. 6C



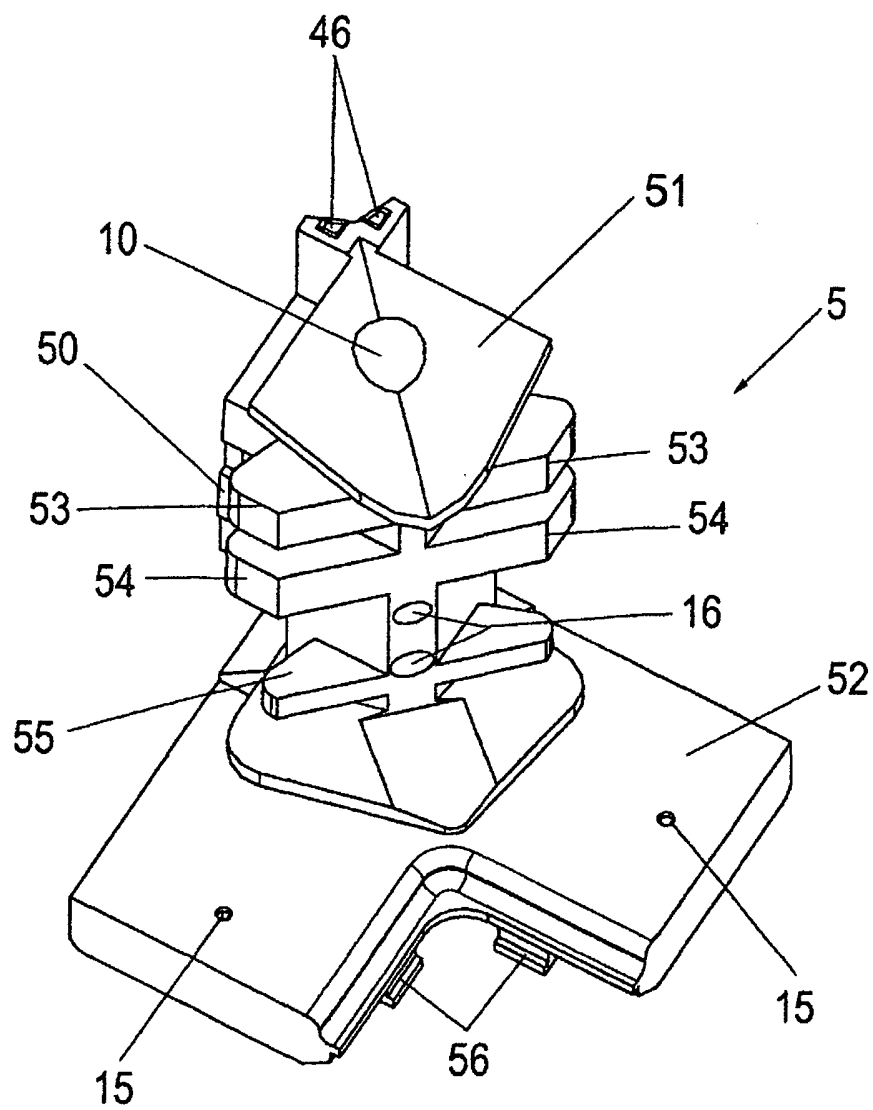
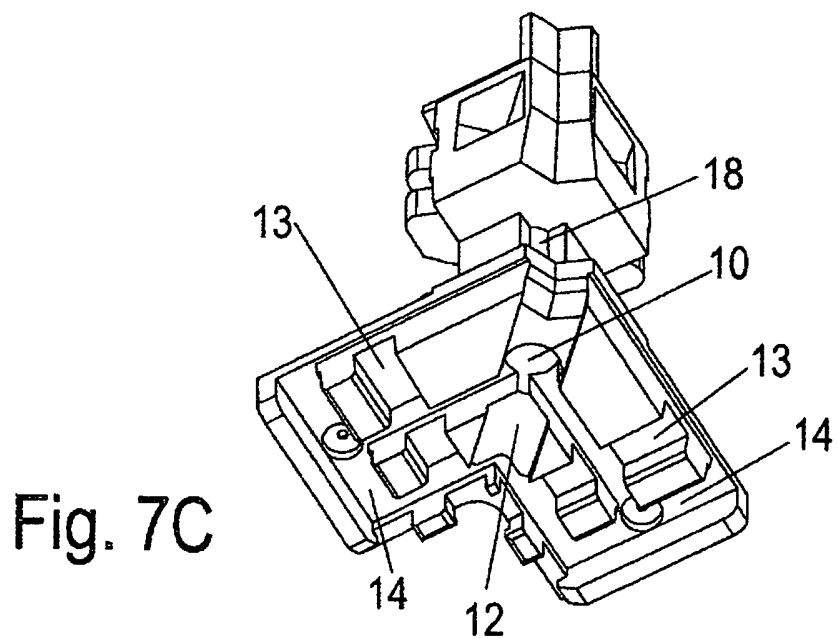
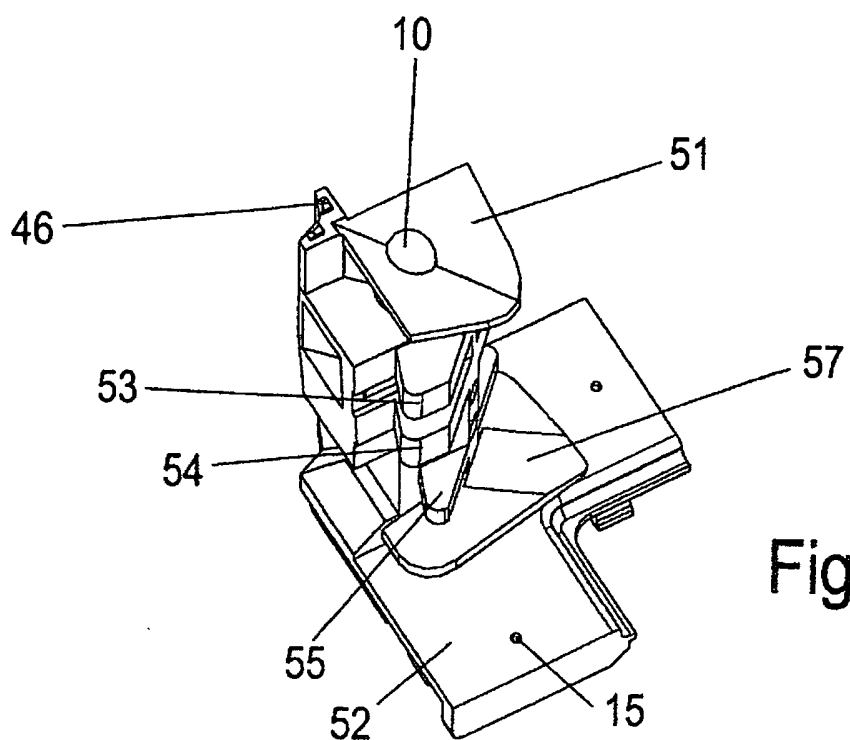
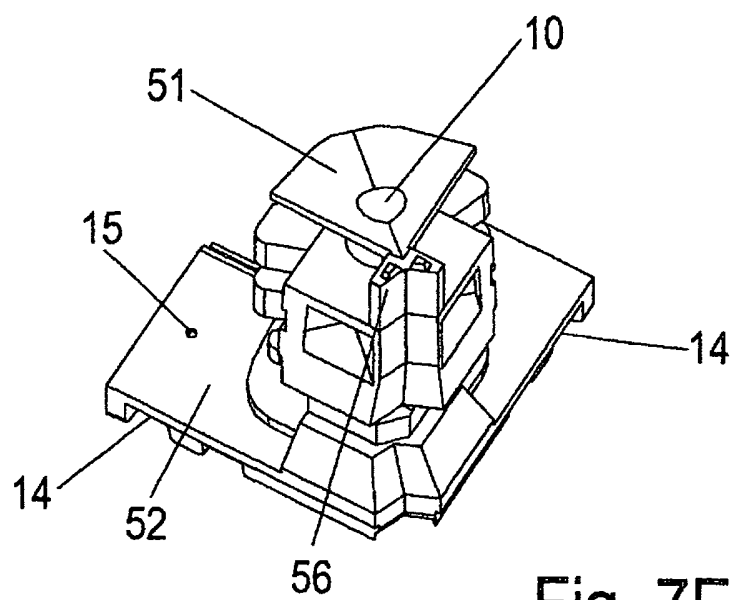
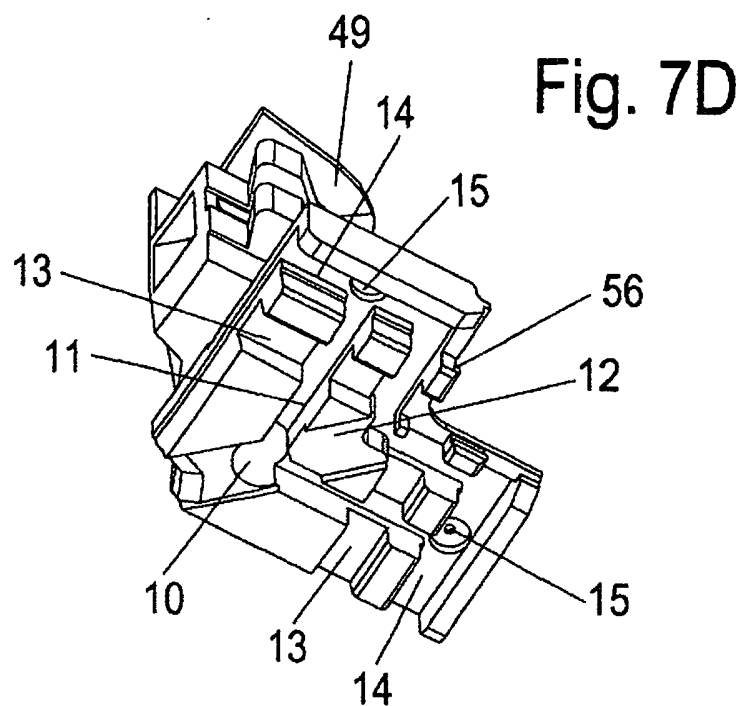


Fig. 7A





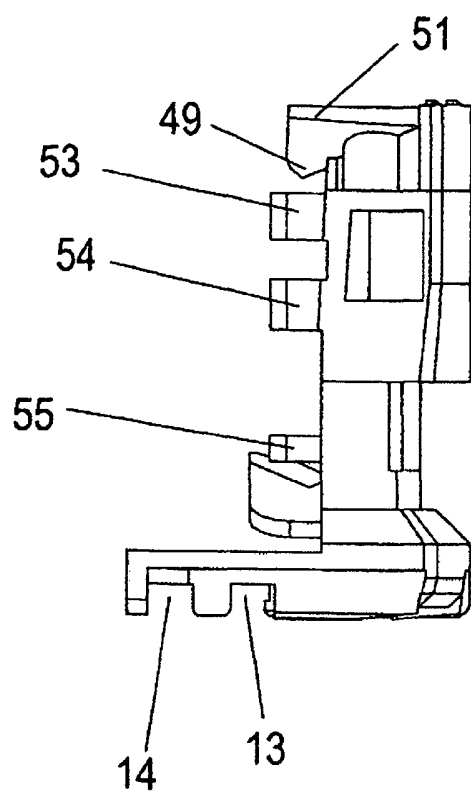


Fig. 7F

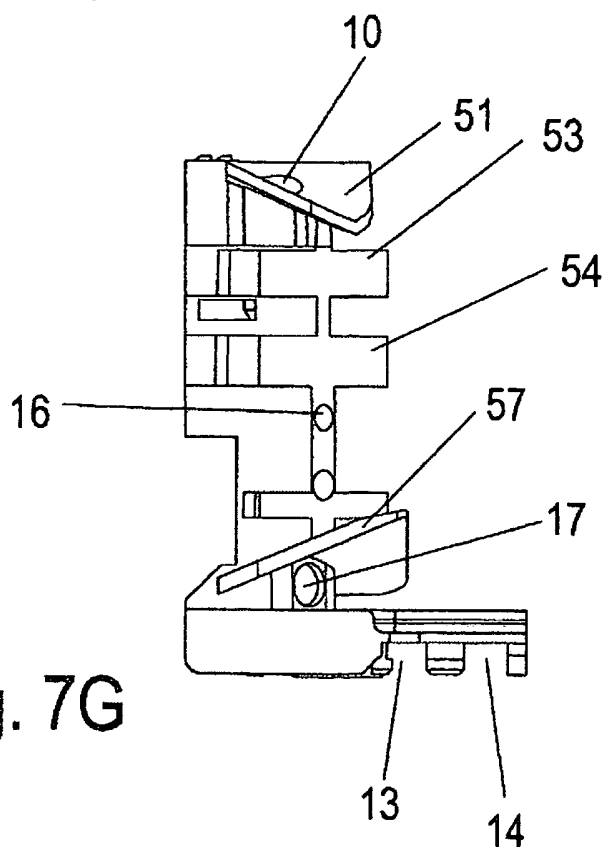
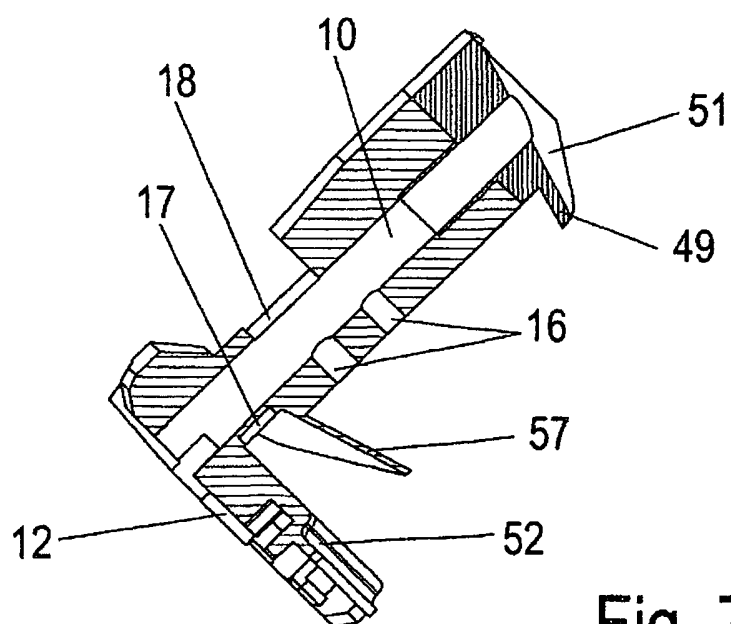
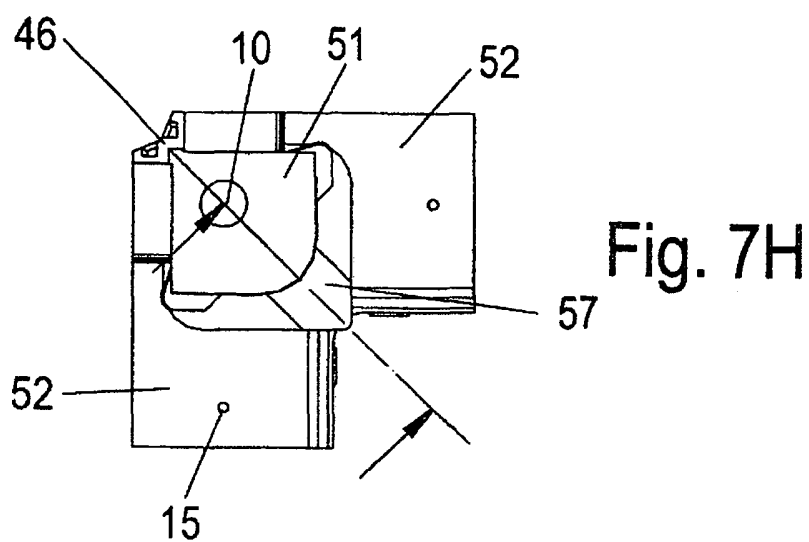


Fig. 7G



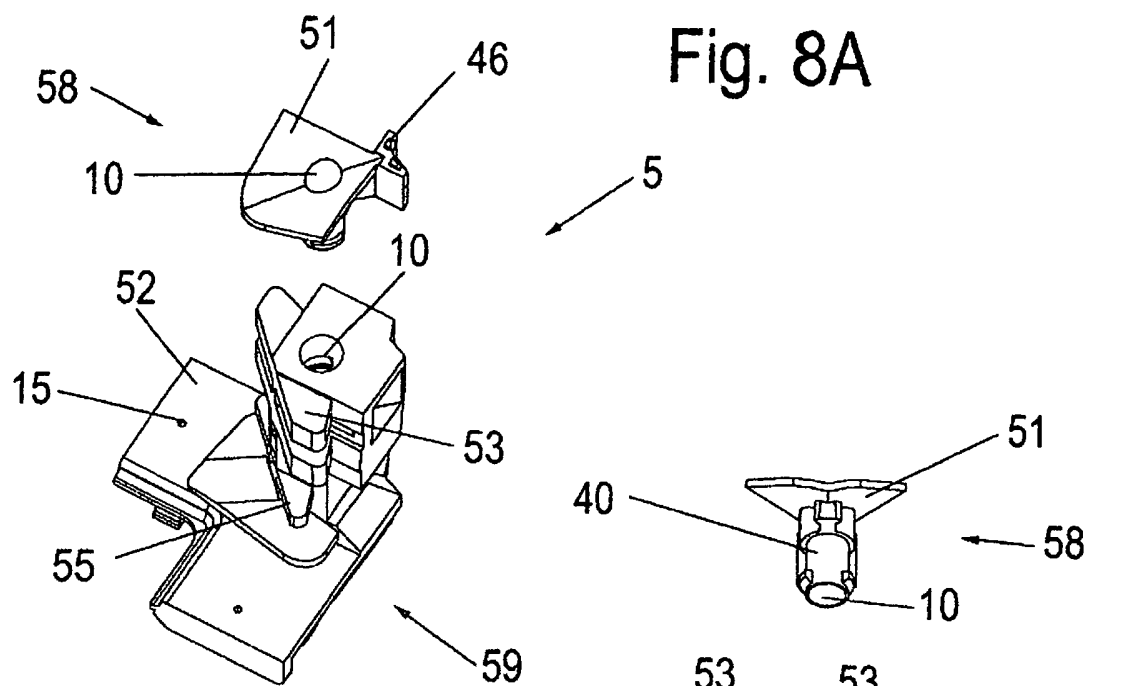


Fig. 8B

