(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 644 812 A2**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
02.10.2013 Bulletin 2013/40

(51) Int Cl.:
E05D 15/06 *(2006.01)* ***E05D 15/58*** *(2006.01)*

(21) Application number: **13161556.9**

(22) Date of filing: **28.03.2013**

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

(30) Priority: **29.03.2012 FI 20120102**

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(54) **Glazing system or such like**

(57) A glazing system or equivalent which has at least one guide rail (1) for a panel element/panel elements (9) and at least one panel element (9), adjustable to a guide rail, comprising a plane element (91) attached to a profile (92), and attachable via the profile to at least one, preferably two rollers (3) adjustable to a guide rail (1) comprising two sides (1 a, 1 b), connected by the base (1 c) of the rail, whereupon the inner surface of one side of the guide rail has a guide groove (6) attached to it or has been formed into a guide groove (6) longitudinal to the rail (1), whereupon the horizontal roller (3) of the guide rail may be adjusted to the guide groove (6) so that the roller (3) may be slid or rolled along said groove (6). The guide groove (6) on the first side (1 a, 1b) of the guide rail is considerably wider than the wheel (3a) of the roller (3) moving in said groove in the vertical direction of the side and the other side (1a, 1b) of the guide rail (1) has at least one seal groove (4) so that the seal/seals (40) installed into the seal groove/seal grooves (4) support the roller (3) when it is in contact with the guide groove (6).

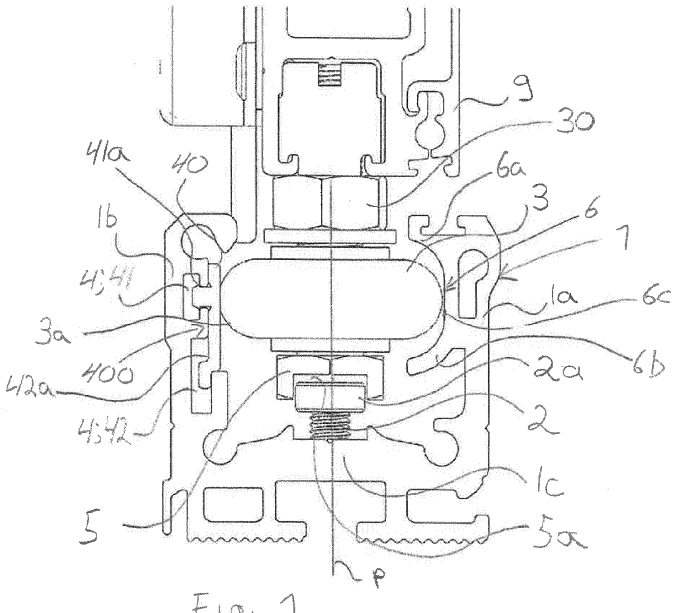

Fig. 1

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Description

Branch of technology

[0001] The invention applies, in accordance with the preamble of the patent claim 1, to a glazing system or equivalent with at least one guide rail for a panel element / panel elements and at least one panel element adjustable to a guide rail.

Level of technology

[0002] The current glazing systems, used in established frameless balcony glazings, are usually suitable for only one purpose, for instance balcony glazing, and only for glass panels and rollers of a certain thickness. Moreover, the current glazing systems are invariably either top hung or bottom rolling (no choice) i.e. the glass panel is suspended on either a top or a bottom guide rail via a suitable set of rollers.

[0003] In most (balcony) glazing systems, the sliding mechanism of the glass panels is inside the top guide rail, whereas the bottom guide rail only contains a piece directing the movements of the panel without a sliding mechanism. The systems also have small installation tolerances, which demand a broader competence from the installer in order to guarantee the sliding of the glass panels. In addition, the supporting structures to which the guide rails of the glazing systems are attached may, over time, be subject to considerable vertical movement, which may push the guide rails of the glazing system down by several millimeters, making it difficult to move the glass panels until an installer has readjusted the system.

Description of the invention

[0004] With the problems mentioned above in the level of technology in mind, the starting point of the inventor was to design a guide rail for vertical panel elements, especially glass panels, which would better tolerate the movements of the supporting structures of the guide rail. Another key point in the design was to create a glazing system which would enable the use of glass panels of varying thickness in the same glazing system. Furthermore, the aim was to generate a glazing system where the same guide rail could be used either as a top or a bottom rail, so that the glazing system could, by choice, be either top hung or bottom rolling for a glass panel.

[0005] In this context, a panel element refers to a plane element attached to a profile. A glass panel refers to a glass element attached to a glass profile.

[0006] The objectives mentioned above are achieved with the guide rail of patent claim 1.

[0007] To be precise, the invention applies to a glazing system or equivalent which has at least one guide rail for a panel element / panel elements and at least one panel element, adjustable to a guide rail, comprising a plane element attached to a profile, attachable via the profile to at least one, preferably two rollers adjustable to a guide rail comprising two sides, connected by the base of the rail, whereupon the inner surface of one side of the guide rail has a guide groove attached to it or has been formed into a guide groove longitudinal to the rail, whereupon the horizontal roller of the guide rail may be adjusted to the guide groove so that the roller may be slid or rolled along said groove. The guide groove on the first side of the guide rail is considerably wider than the wheel of the roller moving in said groove in the vertical direction of the side, and the other side of the guide rail has at least one seal groove so that the seal/seals installed into the seal groove/seal grooves support the roller when it is in contact with the guide groove.

[0008] This structure of a guide groove and the seal opposite it supports the roller as it moves in the base of the guide groove. The seal pushes the roller against the guide groove of the rail and eliminates the rattle caused by the rocking of the roller, softens the movements of the roller and reduces the noise caused by the movements of the roller.

[0009] In a preferred embodiment of the invention, at least in one roller, the side facing the base of the guide rail has a hinge bolt or a similar hinge block with a groove or equivalent on the side facing the base of the guide rail, and in addition, the base or the base section of the rail has a set of hinge pins, preferably with a thread, and their free end has a head which is adjustable to the groove of a hinge bolt or equivalent and the distance between the head and the base or the base section of the rail may be adjusted.

[0010] In a preferred embodiment of the invention, the hinge pins are hinged screws whose head is slightly smaller than the groove of the hinge bolt to establish a tight fit between the head of the screw and the groove of the hinge bolt. The distance between the head of the screw and the surface of the base of the guide rail may be adjusted by turning the hinged screw.

[0011] The number of hinge pins is preferably the same as the number of panel elements. The hinge pins are located in the base of the guide rail so that the distance between two adjacent hinge pins in the longitudinal direction of the rail depends on the thickness of the panel element and especially the thickness of the profile of the panel element.

[0012] The guide groove is preferably formed by the longitudinal groove of the guide rail which is attached via a material bridge to the side of the rail and where the base of the groove is approximately level and its width is the same as the distance between the upper and the lower edge of the groove directed to the inside the rail, in the depth of the rail. This width is also the adjustment tolerance of the roller in the guide groove.

[0013] The vertical adjustability of the hinge pins with a thread and a head attached to the integrated bottom profile of the guide rail, especially hinged screws, ensures the functionality of the hinges regardless of which

part of the adjustment tolerance of the rail's groove the roller's prevailing rolling area is located in. The freedom to define the distance of the hinged screws allows the use of panel elements of varying thickness in the system, thus creating new methods of application. Moreover, with hinged screws, it is not necessary to attach separate hinge blocks, prone to breaking, to the base of the guide rail, such as cases containing several evenly placed hinges. This gains the considerable advantage of eliminating the need to replace parts due to the breaking of the hinge cases, which significantly reduces system service costs and maintenance time. The hinged screws attached to the base or the base section of the guide rail also speed up the manufacturing process and create a possibility for the use of automation in working and dimensioning the holes.

[0014] The adjustment tolerance of the guide groove intended for the roller positioned in the guide rail, in its turn, facilitates and speeds up the installation of the system and thus assists the installer to reach a high-quality outcome where moving the vertical elements such as glass panels on the installation rails is effortless. At the same time, the adjustment tolerance of the roller in the rail decreases the weakening of system functionality in case of possible movements of the supporting structures.

[0015] The adjustable ramps attached on the top edge of the guide rail enable vertical variation in the immersion depth of the rail. The ramps cover the gap between the rail and the opening in the floor and facilitate crossing the profile with, for instance, a wheelchair.

[0016] The guide rail applying to the invention may be used in the installation of panel elements such as glass panels in balcony and terrace glazings. However, the rail may also be used in the installations of other types of panel elements, such as indoor room dividers and sliding, opening aluminium lattices. When the guide rail is used as a bottom rail, the panel elements are usually suspended on conventional rollers or equivalents sliding or rolling in the top rail. A guide rail applying to the invention may be used in all previously mentioned applications as a top rail as well, whereupon the weight of the vertical elements rests on the rollers or equivalents sliding or rolling in the bottom rail.

[0017] When using the guide rail as a bottom rail in balcony glazings, it may be attached behind the balcony railing with mounting angles, installed directly on top of the railing or a balcony slab or immersed in the floor level.

[0018] A guide rail applying to the invention may also be used as a top rail in the installations of terrace glazings, indoor room dividers or sliding, opening aluminium lattices.

[0019] In the next section, the invention is described in more detail by references to enclosed figures.

Figure 1 is a view of the cross-sectional profile of the guide rail and the roller in the cross-sectional profile. For clarity, the glass panel was excluded from the figure.

Figure 2 is an exploded view of the components of a guide rail applying to the invention in a cross-sectional profile.

Figures 3A and 3B are cross-sectional views of a glass panel whose top and bottom are installed to different guide rails which have different rollers.

Figure 4A is a straight overhead view of a part of the guide rail applying to the invention.

Figure 4B is an overhead diagonal perspective view of the guide rail of Figure 4A with the other side removed.

Figure 5 is a view of a guide rail applying to the invention and a glass panel with rollers.

Figure 6 is a view of three glass panels installed on a guide rail, two of which are of same thickness and one thicker than the other glass panels, turned at an angle around their hinged screws. For clarity, the hinged screws are presented separately from the hinge bolts with threads.

Figure 7 is a view of three similar glass panels turned at an angle around the hinged screws.

Figures 8A and 8B are a view of a glass panel with the top and bottom installed on two different guide rails.

[0020] The following section describes the invention with references to Figures 1 -8.

[0021] As we may see in Figure 1, a glazing system applying to the invention comprises guide rail 1 and roller 3, whose support block 30 may be attached with glass panel 9 via its glass profile 92. The structure of glass profile 92 and the glass element 91 attached to it is customary and, when it comes to their detailed structure, the known level of technology in the field is referred to. Roller 3 rotates horizontally and is circular in its lengthwise section and placed in the guide groove 6 of the guide rail 1 so that the rotation axis P of the roller 3 is approximately in a vertical position, i.e. parallel to the base 1c of the guide reel. This allows the ring-surface 3a of the roller 3, oriented towards the sides 1a, 1b of the guide rail 1, to lean on the base 6c of the guide groove 6 of the guide rail 1 and the seal 40 of the sealing 400, opposite each other. In the direction of the rotation axis P of the roller 3, support block 30 has been installed on roller 3, and glass panel 9, i.e. glass profile 92 and glass element 91 attached to it may be attached to support block 30 (cf. Figure 2). Each glass panel 9 is always attached via two similar bottom rollers 3 or top rollers 3, by support block 30, to the guide rail, depending on whether guide rail 1, applying to the invention, is used as a bottom rail or a top rail. Top and bottom rollers 3 are usually situated in

the front and rear edge of profile 92 of glass panel 9, as can be seen, for instance, in Figures 5, 7 and 8. In the direction of the rotation axis P or the roller 3, hinge bolt 5 is attached to the hinge side of roller 3, i.e. the roller's side facing the base 1c of the guide rail 1 (for instance in Figure 1, to the underside of roller 3), or the surface is formed into hinge bolt 5 with groove 5a facing hinged screw 2 on the base 1c or the base section of the guide rail 1.

[0022] The width of groove 5a is such that head 2a of hinged screw 2 is easily adapted to said groove 5 to establish a relatively tight fit between groove 5a of hinge bolt 5 and head 2a of hinged screw 2. When hinge bolt 5 is attached to the hinge side of roller 3, hinge bolt 5 is turned around head 2a of hinged screw 2 in opening glass panel 9 so that glass panel 9 turns on the pivot point formed by groove 5a of the hinge bolt and head 2a of the hinged screw and its free end turns away, i.e. approximately in a right angle from the longitudinal axis of guide rail 1 and at the same time, the horizontal movement of glass panel 9 is prevented (Figure 7). When groove 5a of hinge bolt 5 placed on hinged screw 2 is turned perpendicular to side 1a or 1b equipped with the hole of guide rail 1, glass panel 9 simultaneously adheres to support block 30 on roller 3 and is locked onto its place horizontally.

[0023] Roller 3 has a certain width in the direction of its rotation axis P. The width of roller 3, measured from the outer rim of wheel 3a of roller 3, is considerably narrower vertically, i.e. in the direction of rotation axis P of the roller, than the width of base 6c of guide groove 6.

[0024] Guide rail 1, applying to the invention, contains guide groove 6 and seal 400 opposite guide groove 6 and preferably also hinged screw 2.

[0025] Guide groove 6 is formed of guide groove 6, longitudinal to side 1a and to the guide rail attached or formed to side 1a of guide rail 1. The guide groove is considerably wider than wheel 3a of roller 3, moving in the groove, in the vertical direction of the guide rail, and than the height of side 1a, i.e. in the vertical direction. In embodiment applying to figure 1, guide groove 6 is formed of groove 6, longitudinal to guide rail 1, which is attached to the side of the rail via a material bridge leading from the base of the groove, in Figure 1a to the righthand side 1a (Figure 1a). Base 6c of guide groove 6 is approximately level and its width is determined by the distance between upper edge 6a and lower edge 6b of guide groove 6 and the depth of the guide rail, i.e. in a vertical direction, i.e. in the direction of the rotation axis P of the roller 3 installed on the guide rail (vertical direction). The lower edge of the adjustment tolerance of roller 3 is thus formed of lower edge 6b of guide groove 6, arched inwards into the guide rail. The upper edge of groove 6, in its turn, is formed of upper edge 6a of the guide groove, arched inwards into the guide rail, which at the same time is part of the upper edge of the guide rail. The width of the adjustment tolerance of guide groove 6 is approximately the width of base 6c of guide groove 6. Hinged screw 2 is still preferably included in guide rail 1, and is attached to the fixing area attached to hinged screw 2 on base 1c of guide rail 1, i.e. to the base section on base 1c of the guide rail. The base section of the guide rail is preferably level, such as a planar component.

[0026] Hinges screws 2 may also be attached straight to the base 1c of the guide rail, the material strength of which has been enhanced in order to attach the hinged screws. The vertical distance of the head 2a of hinged screw 2 from the base 1c of the guide rail, and thus also from the base section, may be adjusted by turning hinged screw 2. When hinged screw 2 is turned, its distance also changes in relation to the hinge bolt 5 attached to the hinge side of roller 3, which enables changing both the vertical position of roller 3 and the contact point of the circular outer surface of the roller and base 6c of guide groove 6. The hinged screws 2 are located approximately in the midpoint of the width of guide rail 1. The mutual distances of hinged screws 2 depend on the width of the panel element 9 in question (Figures 4, 5 and 6).

[0027] Sealant 400 of guide rail 1 comprises seal 40 which is placed in seal groove 4 or in seal grooves 4; 41, 42. Each seal groove 4 comprises pockets 41,42, which are longitudinal to the guide rail, are formed into the opposite side 1b of guide groove 6 of guide rail 1, and usually span the length of the rail in the longitudinal direction. Mouths 41a, 42a of pockets 41, 42 open perpendicularly towards base 6c of guide groove 6, attached or formed to opposite side 1a of guide rail 1. Mouths 41a, 42a of pockets 41, 42 and base 6a of guide groove 6 are thus located in depth, i.e. vertical direction, of guide rail 1, approximately in the same point viewed from base 1c of guide rail 1. At least a part of the seal groove is located on the first side 1a of the guide rail so that the seal placed there faces the guide groove on the other side 1b of the guide rail, approximately on the same vertical height of the guide rail from base 1c of the guide rail. In this case, the seal pushes roller 3 against the base of guide groove 6 as roller 3 rolls or slides on the base of said guide groove.

[0028] Figure 1 shows how, in the cross-sectional profile of guide rail 1, two pocket-like guide grooves 4; 41and 4; 42, are formed on the left side 1b, and seal 40 is attached onto their mouths in the longitudinal direction of the guide rail. The material of seal 40 is weatherproof and flexible, such as suitable synthetic rubber. The purpose of seal 40 is to support roller 3 as it rolls in the groove base 6; 6c. Seal 40 pushes roller 3 against guide groove 6 of guide rail 1 and eliminates the rattle caused by the rocking of roller 3, softens the movements of roller 3 and reduces the noise caused by the movements of the roller.

[0029] Roller 3 moving in guide rail 1 is attached to movable glass element 91 via a suitable profile 92, the underside or which is attached to roller 3 via support block 30. To each movable glass element 91 there are always two rollers 3, the other in the front end and the other in the back end of the element. Rollers 3 are meant to roll

freely in guide groove 6 of the guide rail when moving glass element 91, without having to support the glass element from below or to push it from above. The rolling area of roller 3 is the same as the roller's adjustment tolerance between upper edge 6a and lower edge 6b of guide groove 6, i.e. bottom 6c of the guide groove. As roller 3 hits lower edge 6b of the adjustment tolerance (the guide rail acting as a bottom rail), roller 3 leans to lower edge 6b of the adjustment tolerance, but continues rolling, as the lower edge of the adjustment tolerance is shaped in accordance with the roller. Lower edge 6b of the adjustment tolerance simultaneously prevents movable glass element 91 from dropping too much, so that the lower edge of the element does not come in contact with upper edge 6a of guide rail 1. In these situations, the suspension of movable glass element 91 becomes partially bottom rolling. Upper edge 6a of the adjustment tolerance of the roller stops roller 3 to its highest rolling level. Upper edge 6a of the adjustment tolerance of the roller is also shaped in accordance with the wheel. The above-mentioned points function in reverse when using the guide rail as a top rail.

[0030] In case water leaks into guide rail 1 along panel element 9, the water outlet tube steers it to the bottom corner of the rail, where it can be drained through a water outlet hole cut into the rail.

[0031] When using guide rail 1 immersed into floor level, ramps 15 with adjustable height may be added to guide rail 1.

Claims

1. A glazing system or equivalent having at least one guide rail (1) for panel element/panel elements (9) and at least one panel element (9) adjustable to a guide rail and comprising a plane element (91), attached to a profile (92), connectable via the profile to at least one, preferably two rollers (3) adjustable to a guide rail (1) and the guide rail (1) comprising two sides (1a, 1b) connected by the base (1c) of the guide rail, whereupon the inner surface of one side of the guide rail has or is formed into a guide groove (6) longitudinal to guide rail (1), whereupon the roller (3) rolling horizontally in the guide rail may be adjusted so that the roller (3) may be slid or rolled along said guide groove (6), **characterized in that** the guide groove (6) on the first side (1a, 1b) of the guide rail is considerably wider than the wheel (3a) of the roller (3) moving in said guide groove in the vertical direction of said side, and the other side (1a, 1b) of the guide rail (1) having at least one seal groove (4) so that the seal/seals (40) installed into the seal groove/seal grooves (4) support the roller (3) in contact with the guide groove (6).

2. The system of claim 1, **characterized in that** the seal groove/seal grooves (4) and the base of the guide groove (6;6a) are situated relative to each other so that the seal placed in the seal groove/seal grooves pushes the roller (3) against the guide groove (6) of the guide rail.

3. The system of claims 1 or 2, **characterized in that** the side facing the base (1c) of the guide rail of at least one roller (3) has a a hinge bolt (5) having a groove (5a) or equivalent on the side facing the base of the the guide rail, whereupon the base (1c) or base section of the guide rail (1) has a set of hinge pins (2), preferably having a thread, having a head (2a) on the free end adjustable to the groove (5a) of the hinge bolt (5) or equivalent and having an adjustable distance from the base (1c) of the guide rail.

4. The system of one of the preceding claims, **characterized in that** the base of the guide rail (1) having a set of hinged screws (20) having a head (2a) slightly larger than the groove (5a) of the hinge bolt (5) to establish a tight fit between the head (2a) of each screw (2) and the groove (5a) of the hinge bolt (5) and having a distance between the head (5a) of the screw (5) and the surface of the base (1c) of the guide rail (1) which may be adjusted by turning the hinged screw (2).

5. The system of claim 4, **characterized in that** the number of the hinge pins (2) in the guide rail (1) is the same as the number of panel elements (9) adjustable to the end of the guide rail (1) via a roller/rollers (3), whereupon the hinge pins (2) are located on the base (1c) or the base section of the guide rail (1) so that the distance of two adjacent hinge pins (2) in the longitudinal direction of the guide rail (1) depends on the thickness of the guide panel (9), especially on the thickness of the profile (92) of the guide panel.

6. The system of one of the preceding claims, **characterized in that** the hinge pins (2) are attached to the base of the guide rail (1c), and the material strength of the base is enhanced for the attachment the hinge pins (2).

7. The system of one of the preceding claims, **characterized in that** the material of the seal (40) is elastic polymer or elastomer.

8. The system of one of the preceding claims, **characterized in that** at least a part of the seal groove/seal grooves (4) and the base of the guide groove (6;6a) are located approximately in the same distance from the base of the guide rail (1;1c) in the vertical direction of the guide rail

9. The system of one of the preceding claims, **characterized in that** the guide groove (6) is formed of the

groove longitudinal to the guide rail (1) which is attached via a material bridge to the side of the guide rail (1a, 1b), whereupon the base of the guide groove (6; 6c) is approximately level and its width in the vertical direction of the guide rail is approximately the same as the distance between the upper edge (6c) and the lower edge (6b) of the guide groove inside the guide rail in the vertical direction of the guide rail, and the width of the base of the guide groove is also the adjustment tolerance of the vertical rolling area of the roller (3) in the guide groove (6).

10. The system of claim 7, **characterized in that** the lower edge (6b) and the upper edge (6a) of the guide groove (6) are shaped to guide the roller based on their shape.

11. The system of claim 8, **characterized in that** the lower edge (6b) and the upper edge (6a) of the guide groove (6) arch towards the inside of the guide rail.

12. The system of one of the preceding claims, **characterized in that** the panel element is a glass panel, a room divider or an aluminium lattice.

13. The system of claim 1, **characterized in that** the panel element (9), for instance a glass element, comprises a level element (91), such as a glass element, attached to a profile (92) on its top or bottom edge and a roller is attached to the profile (92) via a support block (30).

14. The system of one of the preceding claims, **characterized in that** the system is a glazing system, where the glass panel (9) is attached via two bottom or top rollers to a corresponding bottom or top rail.

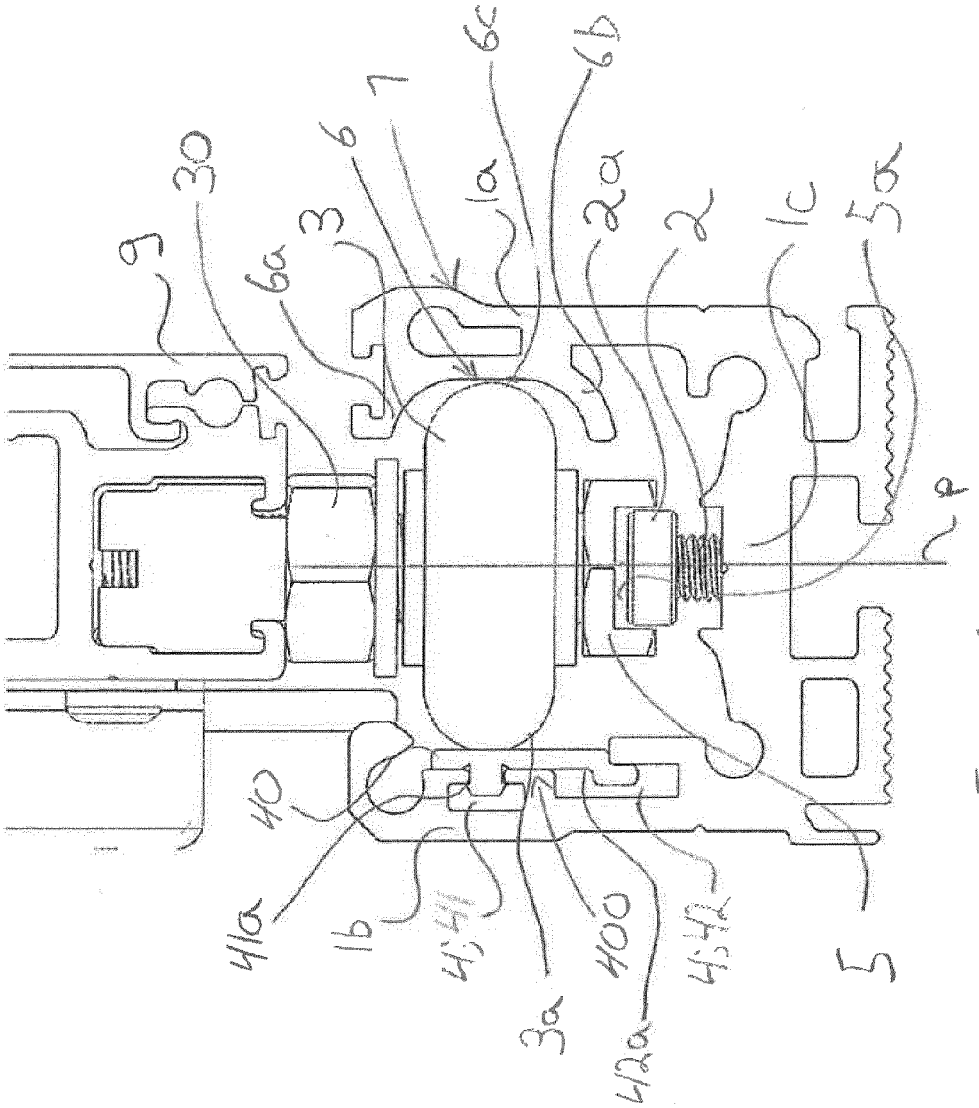

Fig. 1

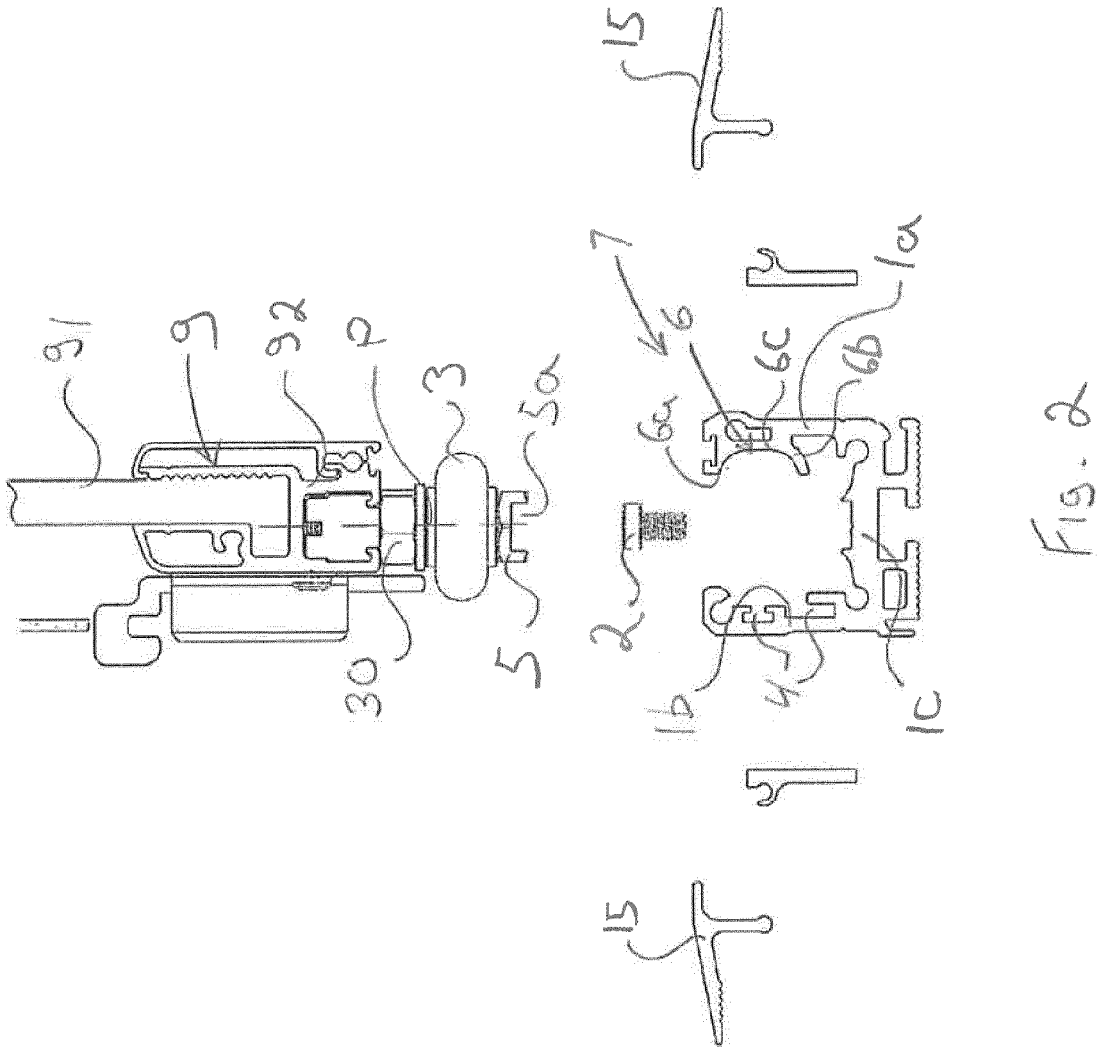

Fig. 2

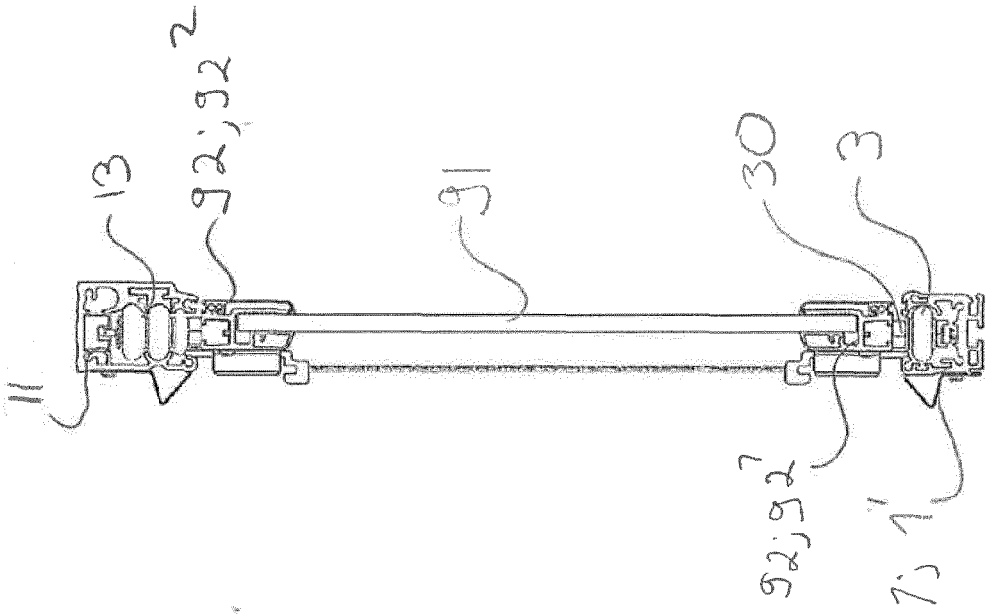

Fig. 3A

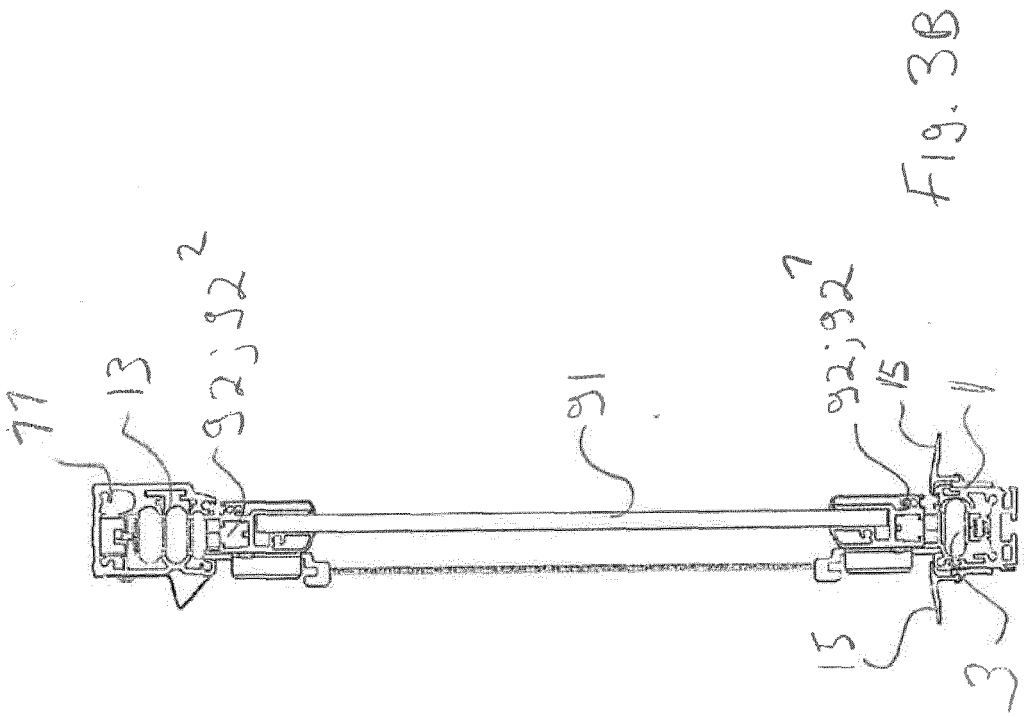

Fig. 3B

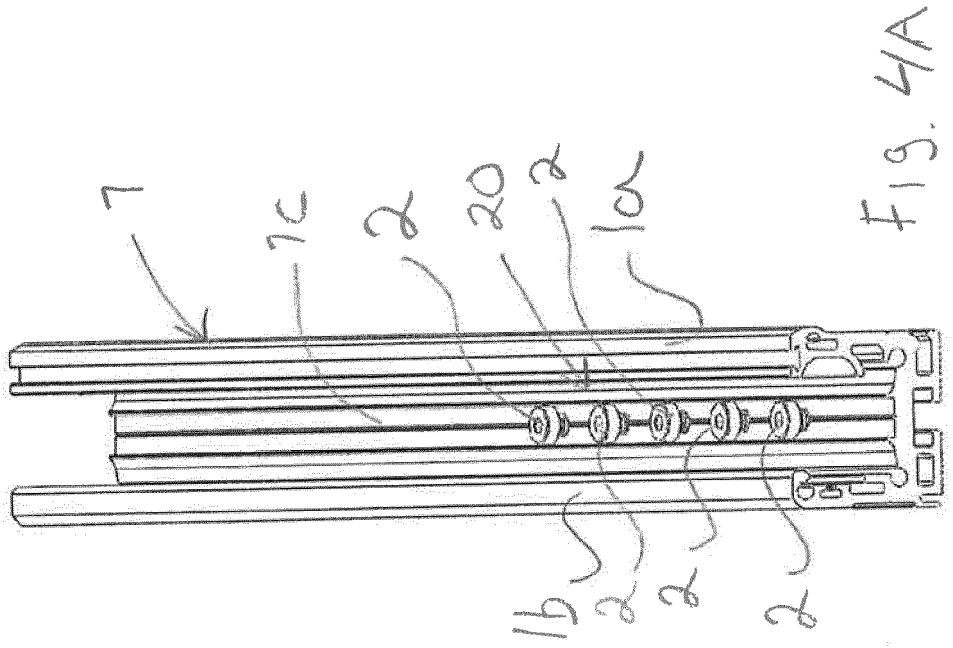

FIG. 4A

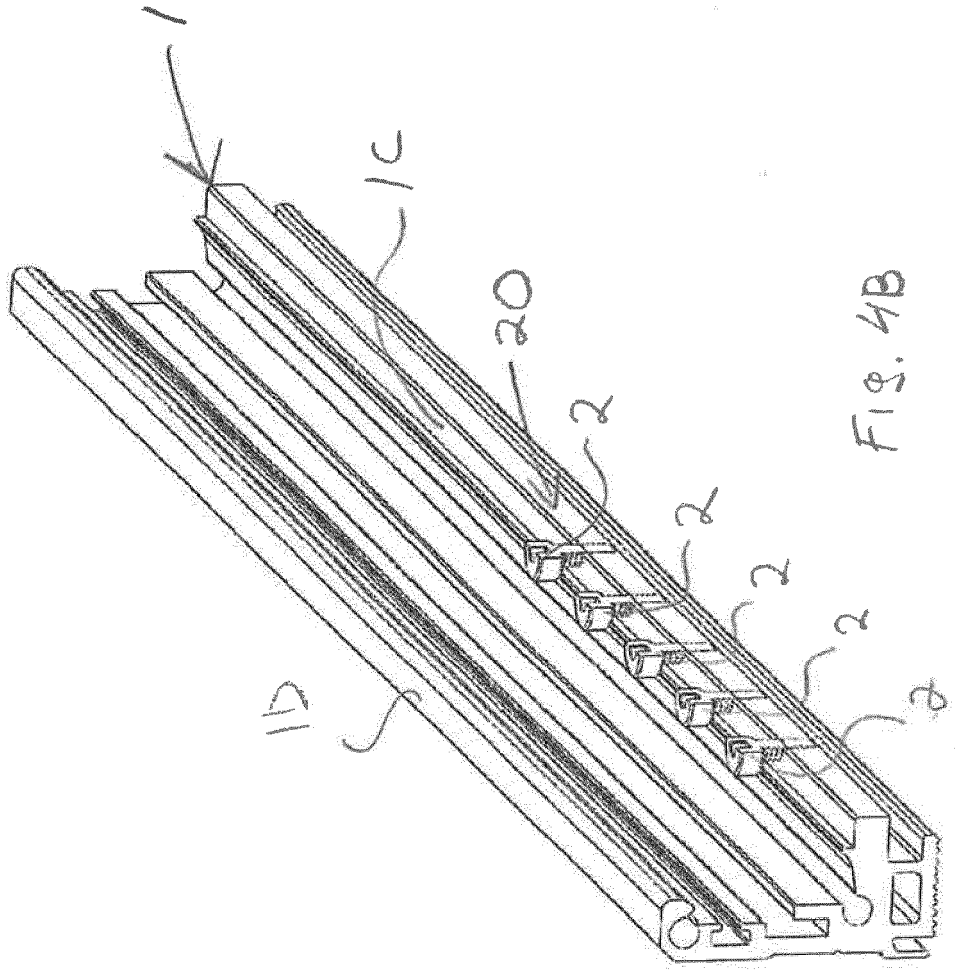

Fig. 4B

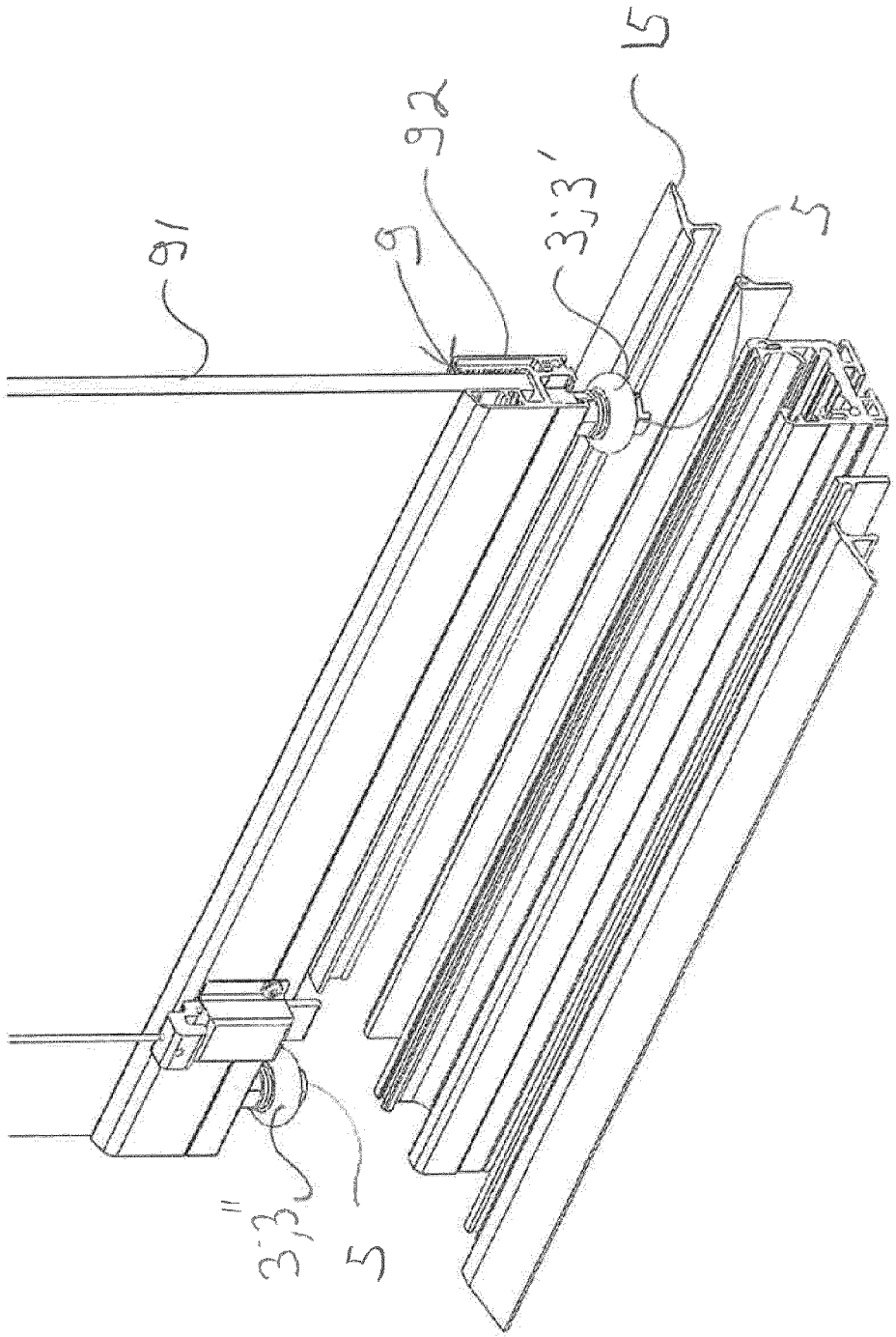

FIG-5

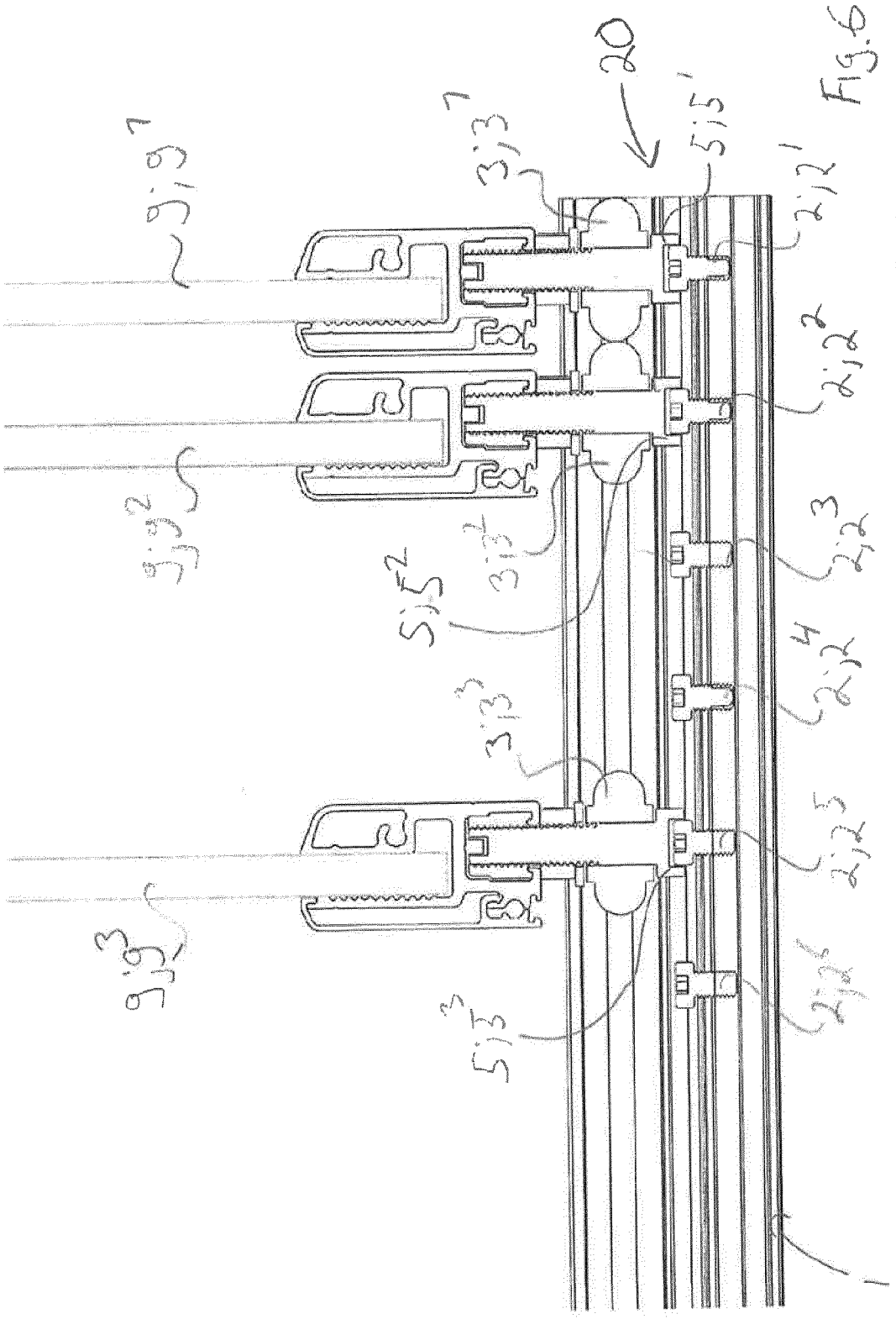
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Fig.6

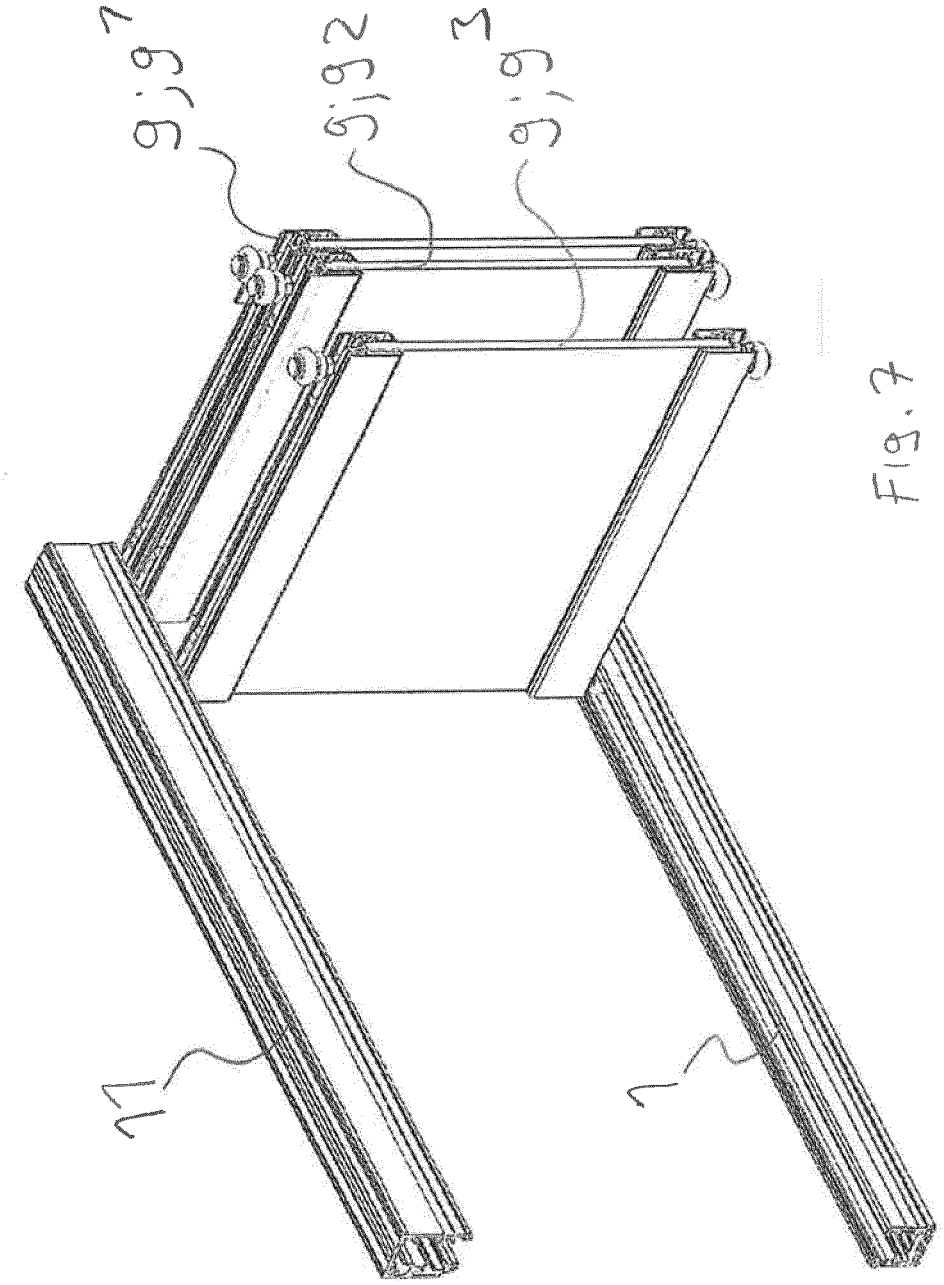

Fig. 7

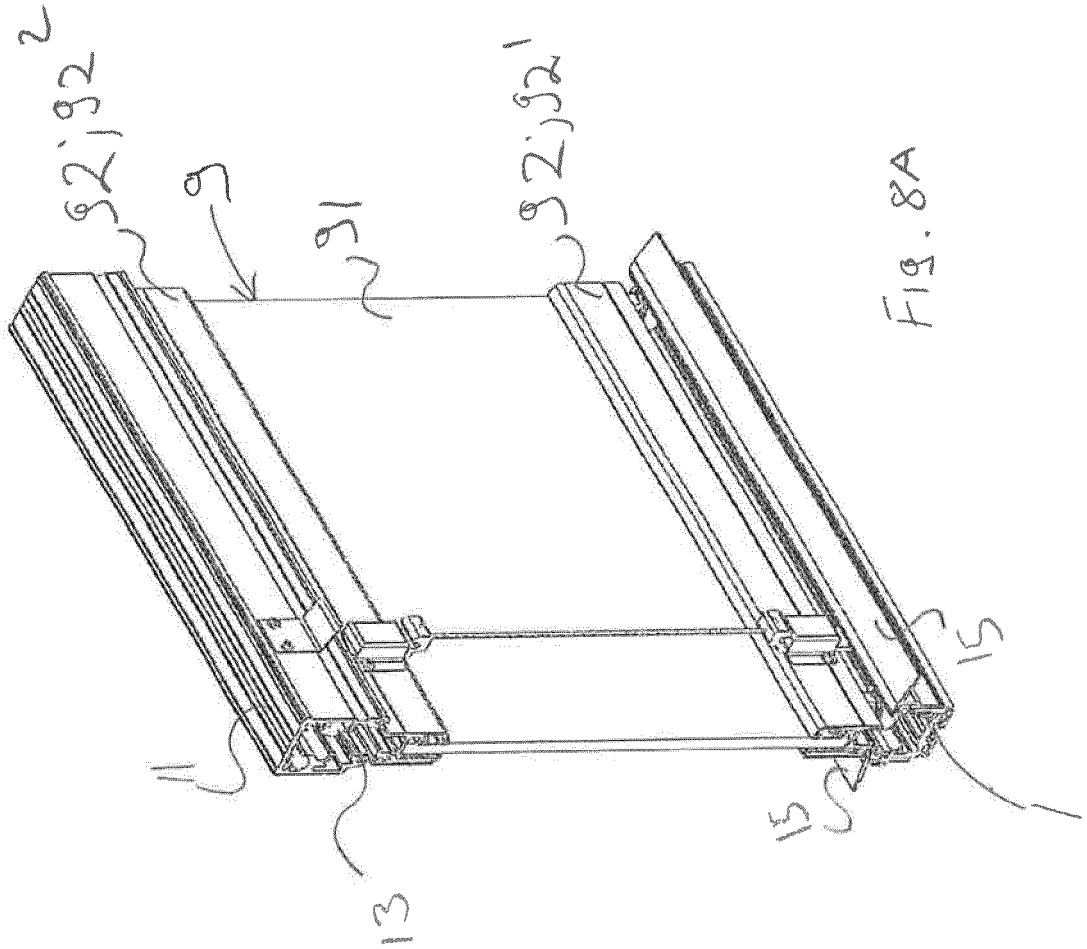

Fig. 8A

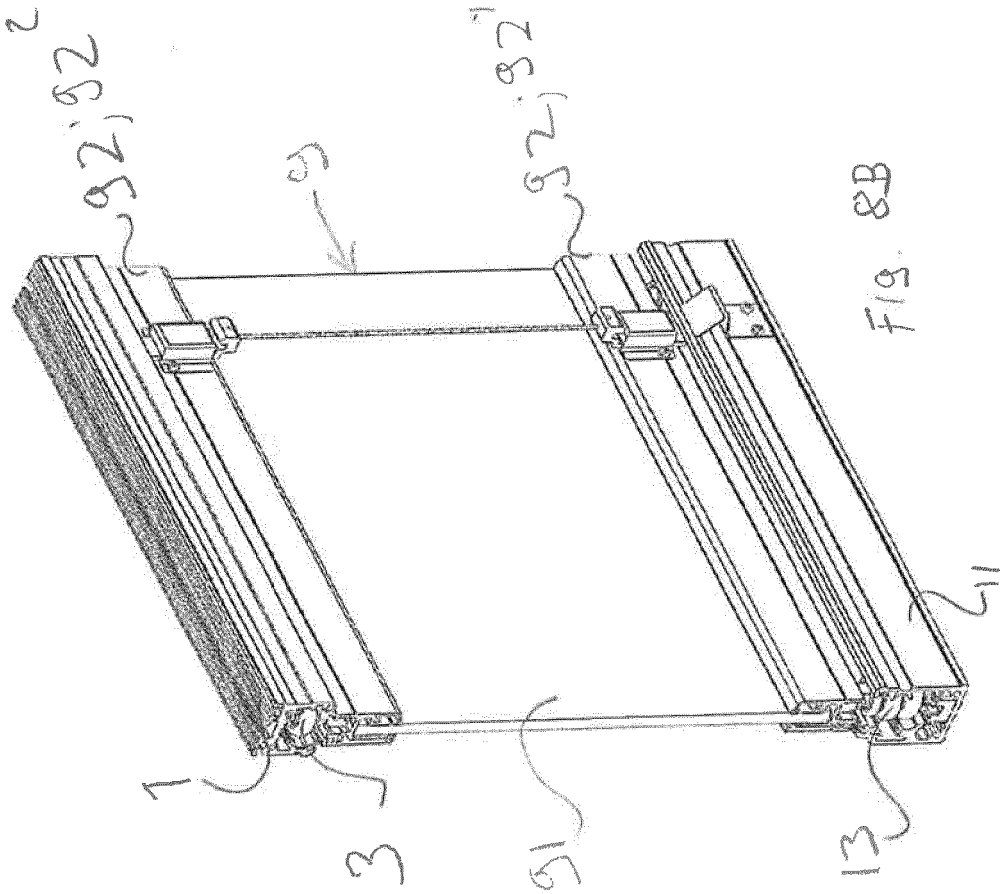

Fig. 8B