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

(11) **EP 2 644 813 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: **13161557.7**

(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) **System, such as glazing system**

(57) The invention applies to a system having a guide rail (1) for a panel element/panel elements (9) where each panel element (9) comprises a plane element (91) attached to a profile (92), connectable 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 at least one inner surface of the 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) may be adjusted to the guide groove (6) so that the roller (3) may be slid or rolled along said groove (6). In the invention, the side facing the base (1 c) 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 hinge side, and the base (1 c) 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 (1 c) of the guide rail.

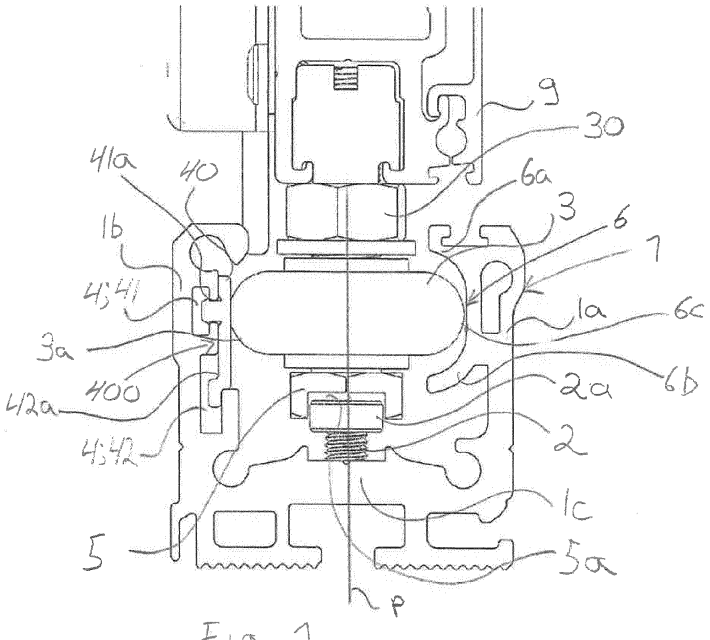

Fig. 1

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Description

Branch of technology

[0001] The invention applies, in accordance with the preamble of the patent claim 1, to a system such as a glazing system with a guide rail for a panel element/panel elements where the panel element comprises a planar element attached to a profile.

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 system 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 system such as a glazing system which has a guide rail for a panel element / panel elements, where each panel element comprises 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 at least 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 side facing the base of the guide rail of at least one roller has a hinge bolt 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 of the rail may be adjusted.

[0008] 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.

[0009] 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.

[0010] In another preferred embodiment of the invention, a guide groove longitudinal to the guide rail is attached or formed on the other of the guide rail's sides, and the width of the groove in the vertical direction of the side is considerably larger than the width of the roller moving in the groove in the vertical direction of the side, and the other of the guide rail's sides has one or more seal grooves so that the seal/seals installed into the seal groove/seal grooves support the roller rolling approximately around its vertical rolling axis in contact with the guide groove.

[0011] The guide groove is thus 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, and this width is also the adjustment tolerance of the roller in the guide groove.

[0012] 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.

[0013] 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.

[0014] 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.

[0015] 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.

[0016] 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.

[0017] 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.

[0018] 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.

[0019] The following section describes the invention with references to Figures 1 -8.

[0020] 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. 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.

[0021] 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.

[0022] 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.

[0023] Guide rail 1, applying to the invention, contains guide groove 6 and seal 400 opposite guide groove 6 and preferably also hinged screw 2.

[0024] Guide groove 6 is formed of guide groove 6 longitudinal to side 1a, formed or attached to the other of the guide rail's 1 sides 1a, and its width in the vertical direction of said side 1a is considerably larger than the width of wheel 3a of roller 3 moving in the groove in the direction of its rotation axis. In embodiment applying to figure 1, guide groove 6 is formed of groove 6, longitudinal to guide rail 1, attached to the side of the rail via a material bridge leading from the base of the groove, in Figure 1a to the right-hand 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 in the depth of the guide rail, 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.

[0025] 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 of the guide rail. The base section is preferably level, such as a planar component, attached on base 1c of the guide rail.

[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. Figure 1 shows how, in the cross-sectional profile of guide rail 1, two pocket-like guide grooves 4; 41 and 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.

[0028] 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.

[0029] 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.

[0030] When using guide rail 1 immersed into floor level, ramps 15 with adjustable height may be added to guide rail 1.

Claims

1. A system, such as a glazing system or equivalent, with a guide rail (1) for a panel element/panel elements (9) where each panel element (9) comprises a planar element (91) attached to a profile (92) connectable to at least one, preferably two rollers (3) adjustable to a guide rail (1) comprising two sides (1a, 1b) connected by the base (1c) of the guide rail, whereupon at least one inner surface of the side of a guide rail is attached or formed to a guide groove (6) longitudinal to guide rail (1), whereupon the horizontally rollable roller (3) may be adjusted to the groove so that the roller (3) may be slid or rolled along said guide groove (6), **characterized in that** the side facing the base (1c) of the guide rail of at least one roller (3) has a hinge bolt (5) whose side facing the base of the guide rail has a groove (5a) or equivalent, and that the base (1c) of the guide rail (1) has a set of hinge pins (2), preferably with a thread, whose free end has a head (2a) attachable to the groove (5a) of a hinge bolt (5) or equivalent and the head's (2a) distance from the base (1c) of the guide rail may be adjusted.

2. The system of claim 1, **characterized in that** the base or the base section of the guide rail (1) has 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).

3. The system of claim 1 or 2, **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.

4. 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).

5. The system of one of the preceding claims, **characterized in that** the first of the guide rail's two longitudinal sides (1a, 1b) is formed to a guide groove (6) or the inner surface of said side has a guide groove (6) longitudinal to the guide rail and its guide groove is considerably wider in the vertical direction of the side (1a, 1b) than the wheel (3a) of the roller (3) moving in the guide groove, and the other of the guide rail's (1) sides has one or more seal grooves (4) so that the seal/seals (40) installed into the seal groove/seal grooves support the roller (3) rolling approximately around its vertical rotation axis (P) in contact with the guide groove (6).

6. The system of claim 5, **characterized in that** the seal (40) pushes the roller (3) in contact with the guide groove (6) or the guide rail (1), whereupon the roller (3) leans on the base (6c) of the guide groove (6) and on the seal (40) of the sealant (400), whereupon the base of the guide groove and the seal (40) are located on the sides (1a, 1b) of the guide rail opposite each other.

7. The system of claim 5, **characterized in that** the material of the seal (40) is elastic polymer or elastomer.

8. The system of claim 6 or 7, **characterized in that** the guide groove (6) is formed of the groove longitudinal to the guide rail (1) attached via a material bridge to the side (1a) of the guide rail and where the base (1c) of the guide groove is approximately level and its width is the distance between the upper edge (1c) of the guide groove, turned inside the guide rail, and the lower edge (1b) in the depth of the guide rail and its width is also the adjustment tolerance of the roller (3) in the guide groove (6).

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

10. The system of one of the preceding claims, **charac-**

terized in that the panel element is a glass panel, a room divider or an aluminium lattice.

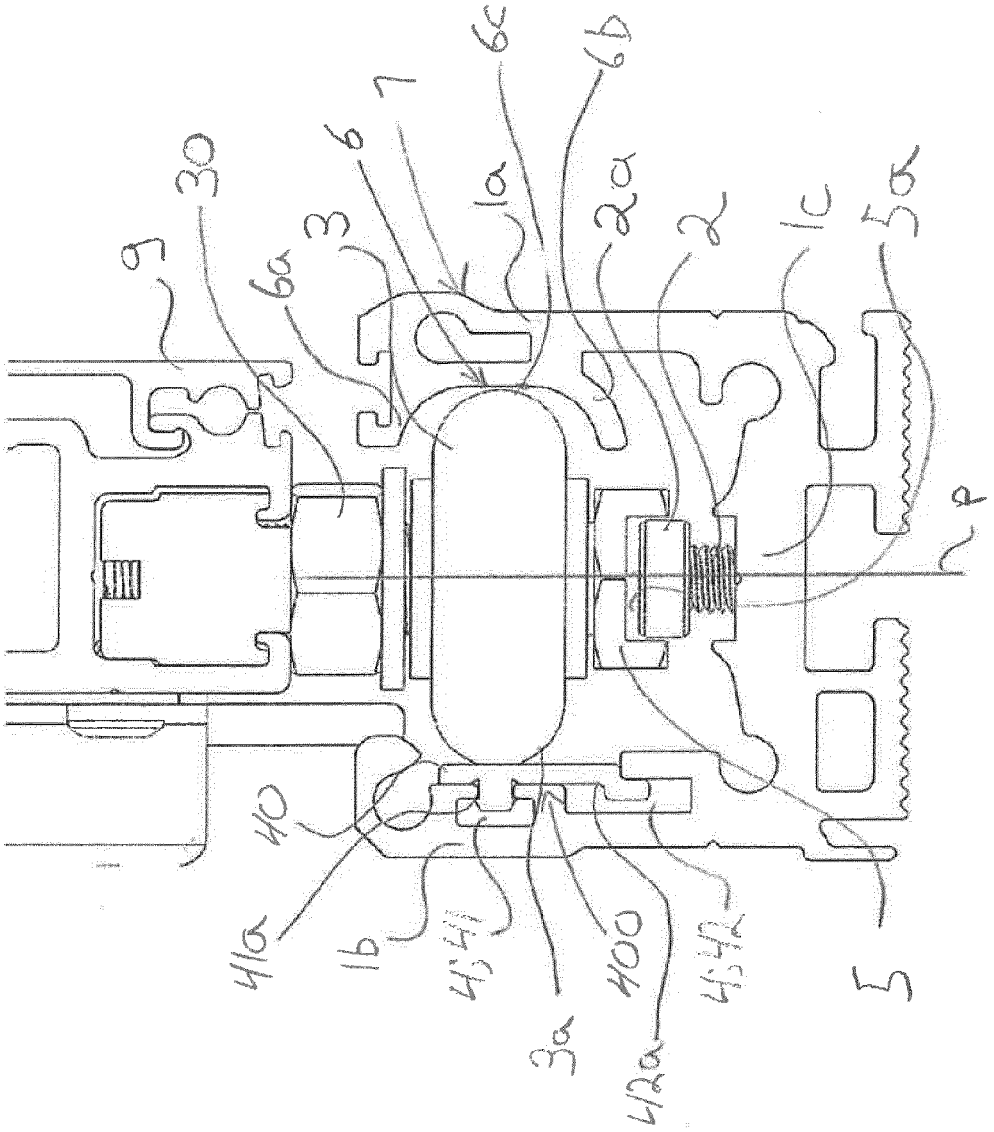

Fig. 1

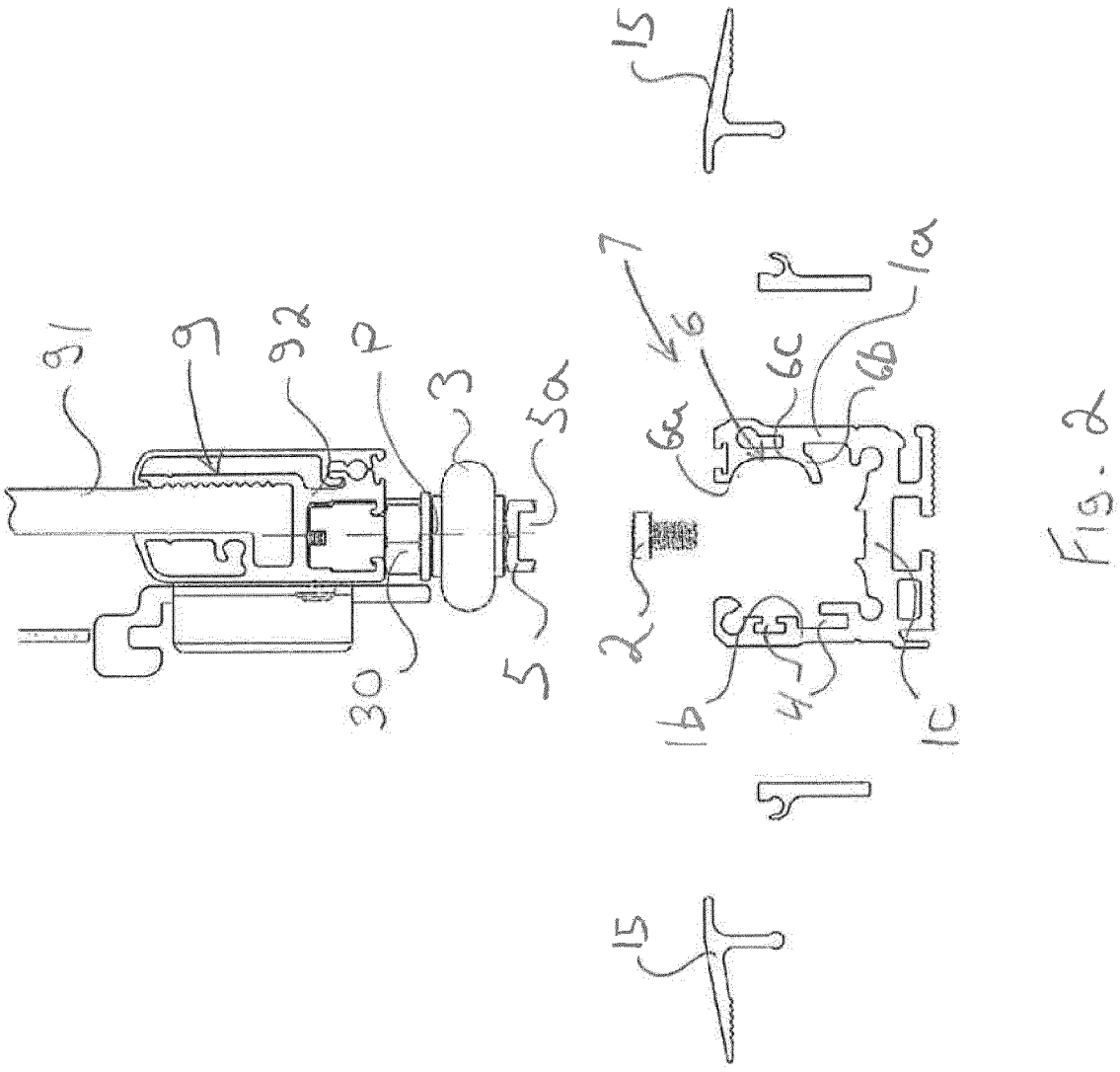

Fig. 2

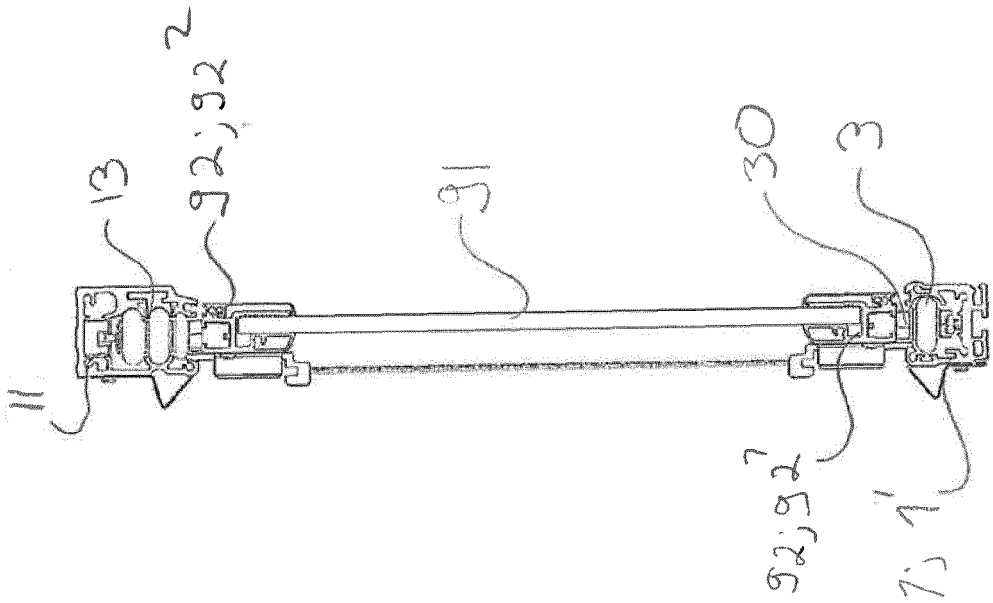

Fig. 3A

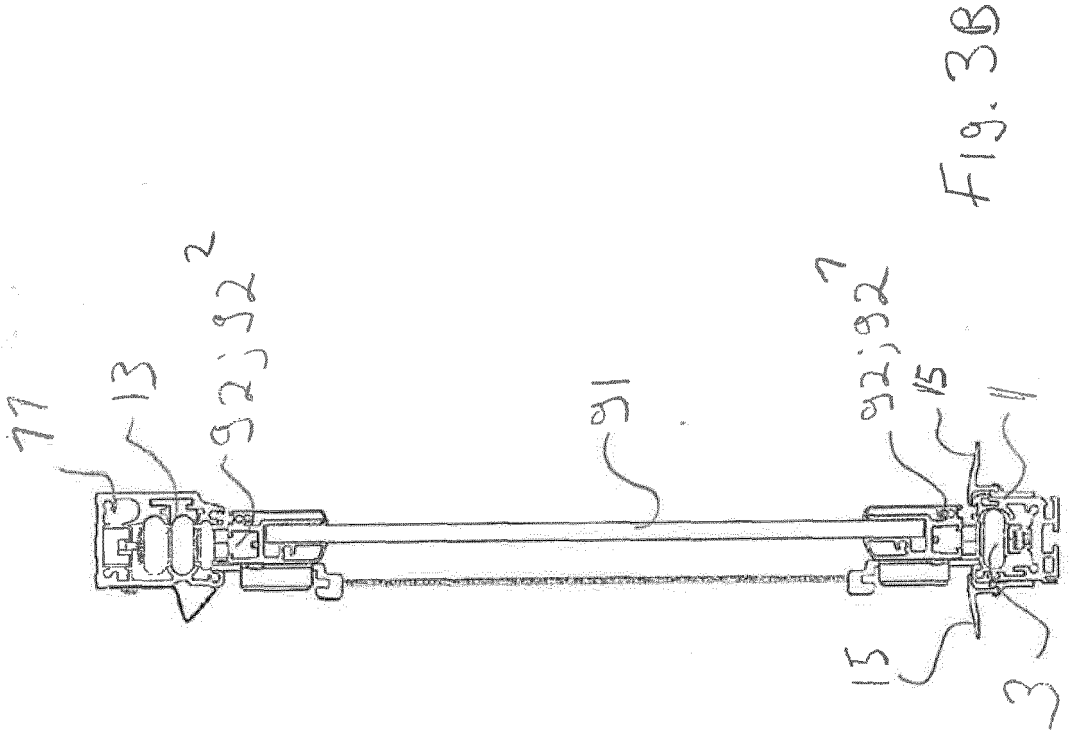

Fig. 3B

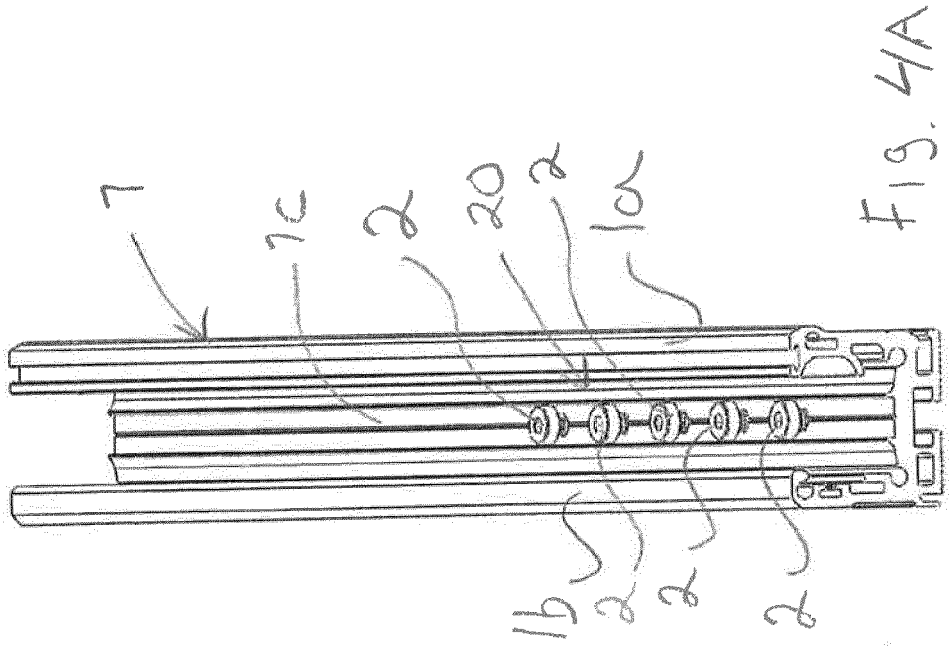

FIG. 4A

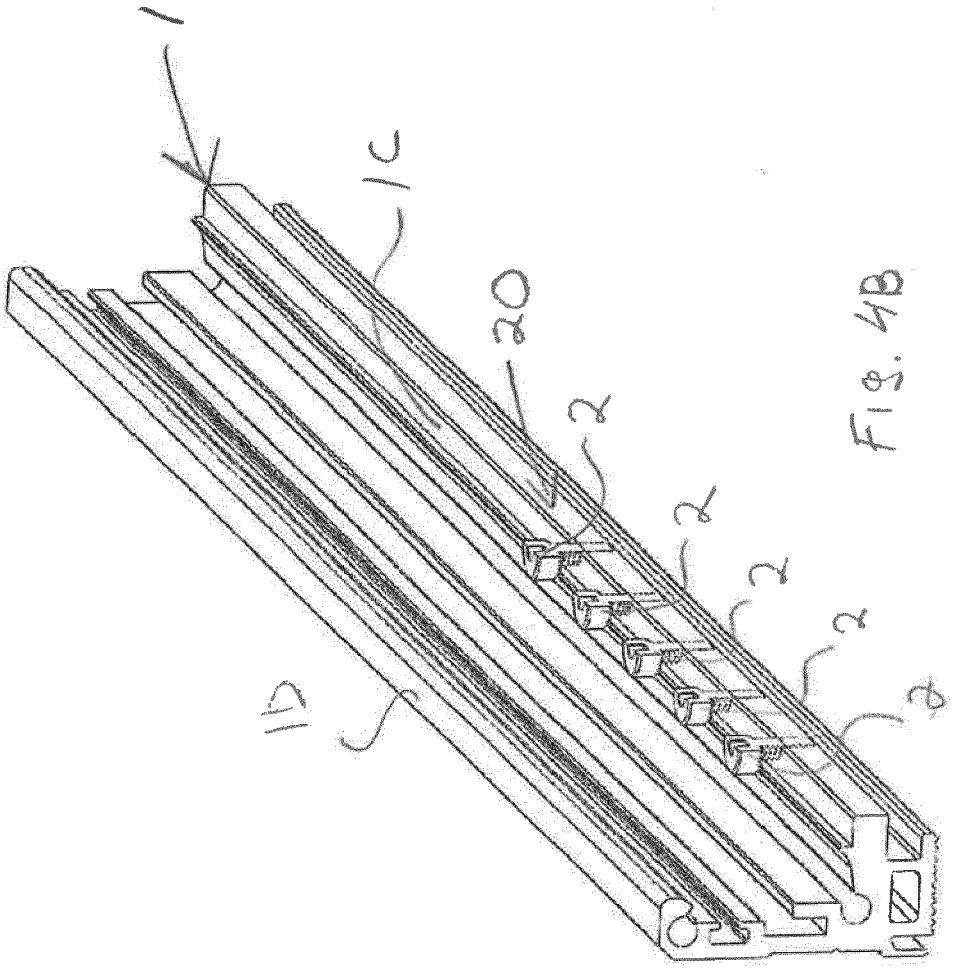

Fig. 4B

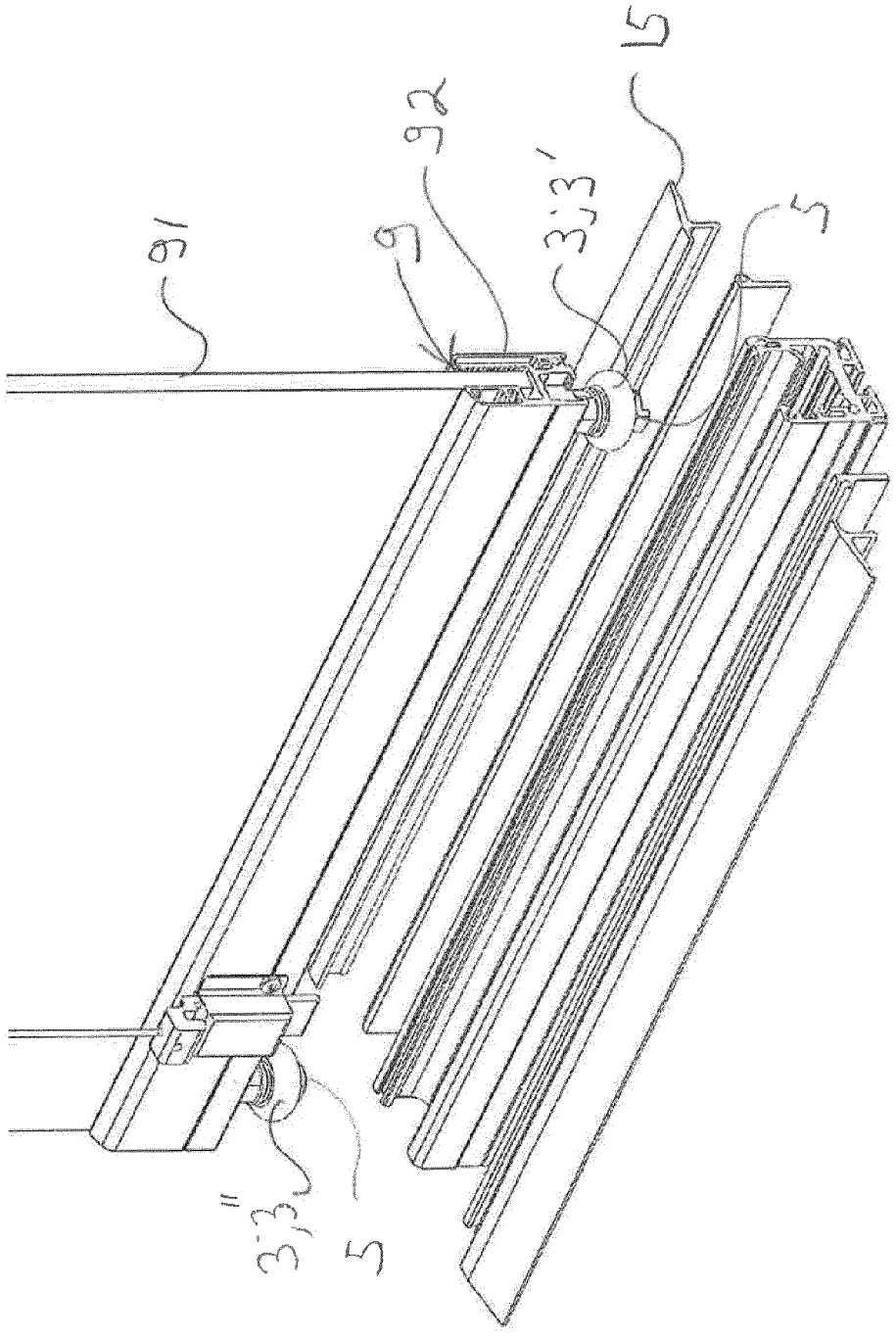

FIG-5

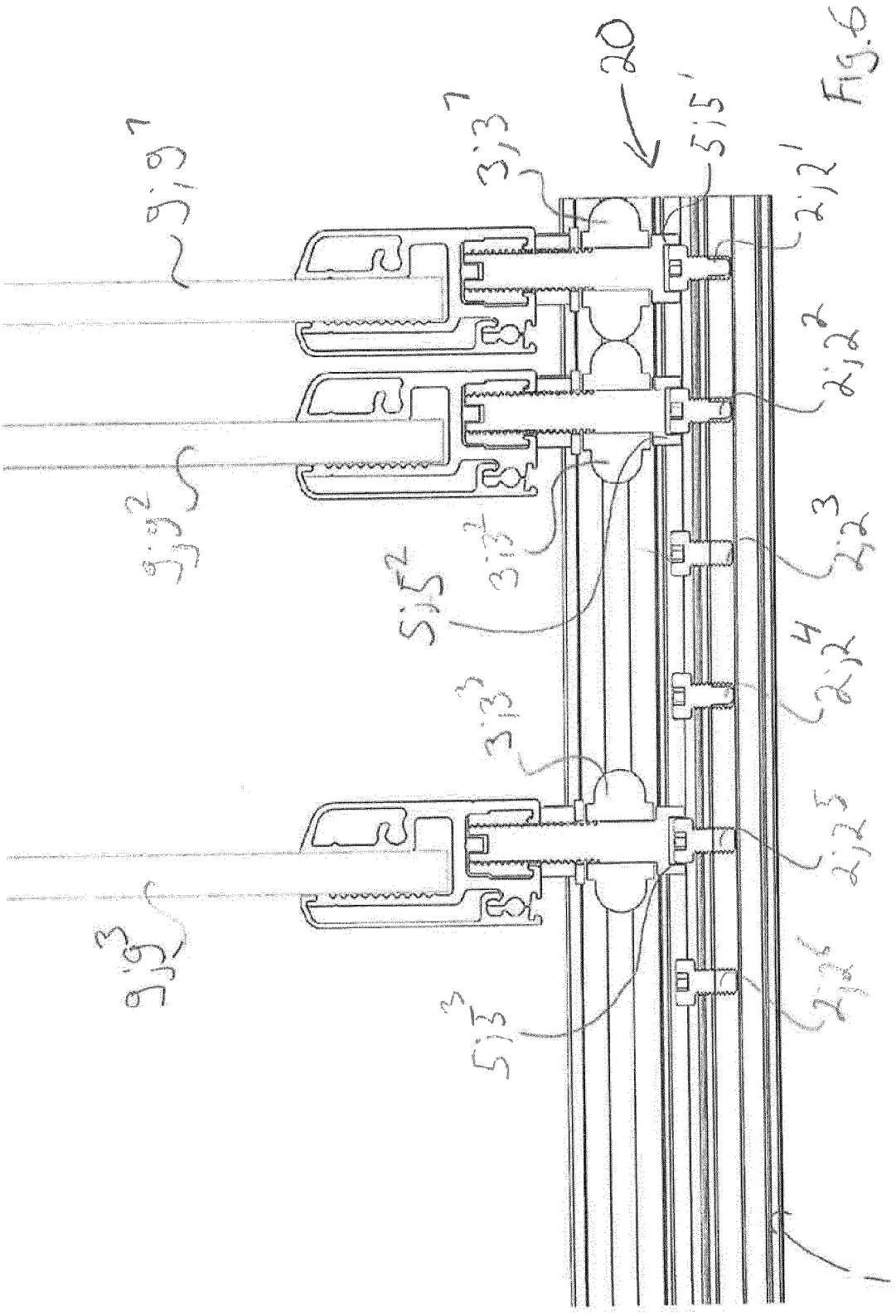
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Fig.6

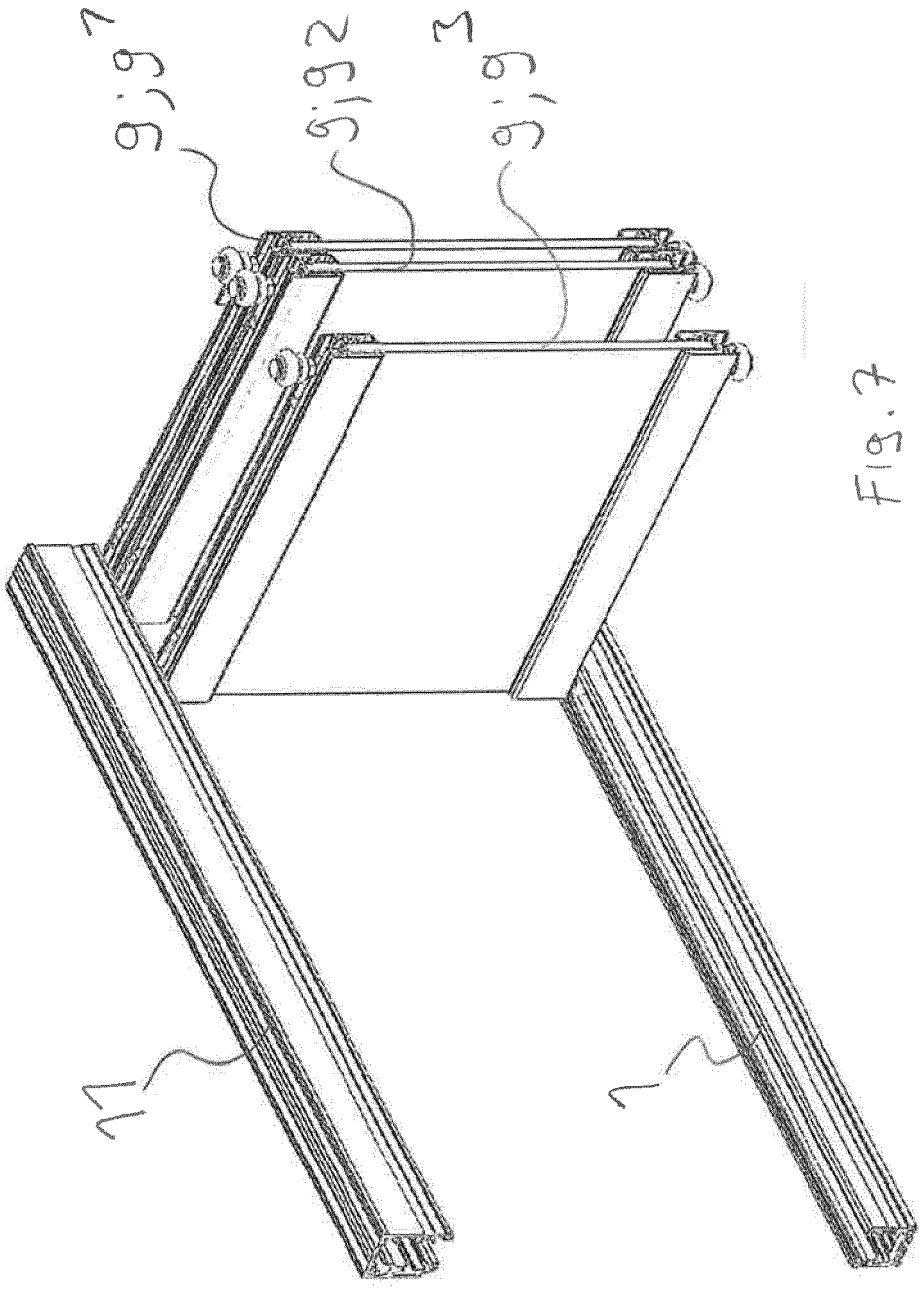

Fig. 1

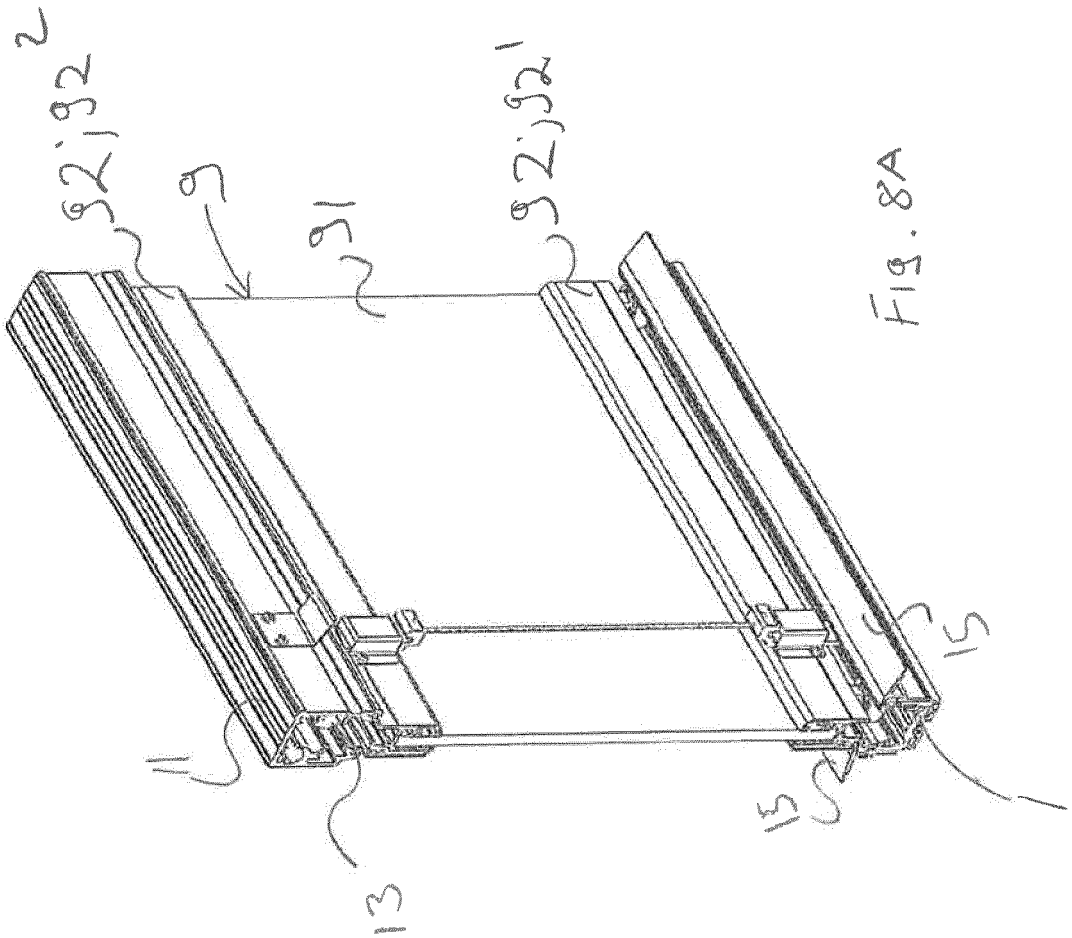

Fig. 8A

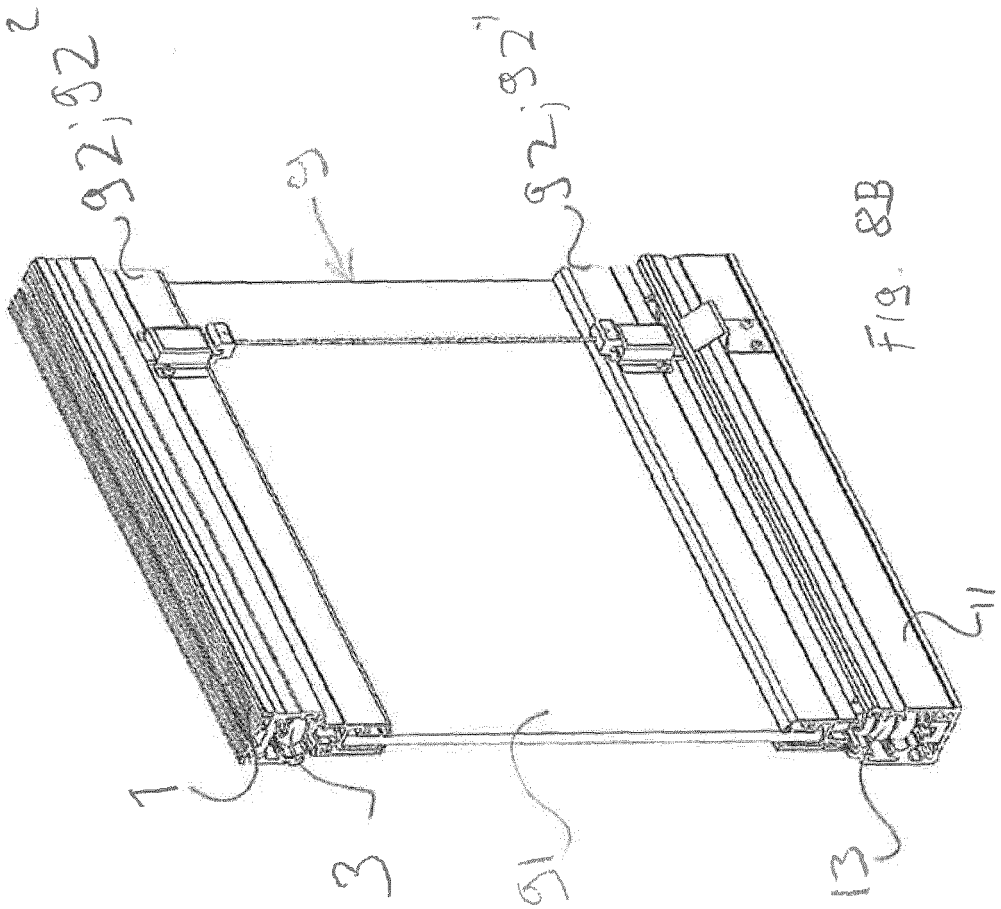

Fig. 8B