



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
27.02.2008 Bulletin 2008/09

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

(21) Application number: **07397029.5**

(22) Date of filing: **15.08.2007**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC MT NL PL PT RO SE SI SK TR
Designated Extension States:
AL BA HR MK YU

(71) Applicant: **Lumon Oy**
45130 Kouvola (FI)

(72) Inventor: **Hilliaho, Esa**
33560 Tampere (FI)

(74) Representative: **Rahkonen, Erkki Juhani**
Tampereen Patenttitoimisto Oy,
Hermiankatu 12 B
33720 Tampere (FI)

(30) Priority: **16.08.2006 FI 20065518**

(54) **A panel system and the control of its locking**

(57) A panel system comprising: a panel (1) that can be moved and turned; an upper first guide track (4) and a lower second guide track (5), between which the panel is suspended; a first guide track part (3) coupled to the panel and arranged to follow the first guide track; an opening (16) which is provided in the first guide track and through which the first guide track part moves out of the first guide track when the first guide track part is in a predetermined location for turning of the panel; and a

first guiding member (17) fastened to the first guide track and supporting the panel. The panel system also comprises: a second guiding member (21) fastened to the first guide track and supporting the panel during the turning. For example, the panel system comprises a counter element (22) which is fastened to the panel and by means of which the panel is supported to the guiding member (21) during the turning of the panel, wherein the counter element is coupled to the second guide track part (6) and is placed at a distance (L1) from the rotation axis (X1).

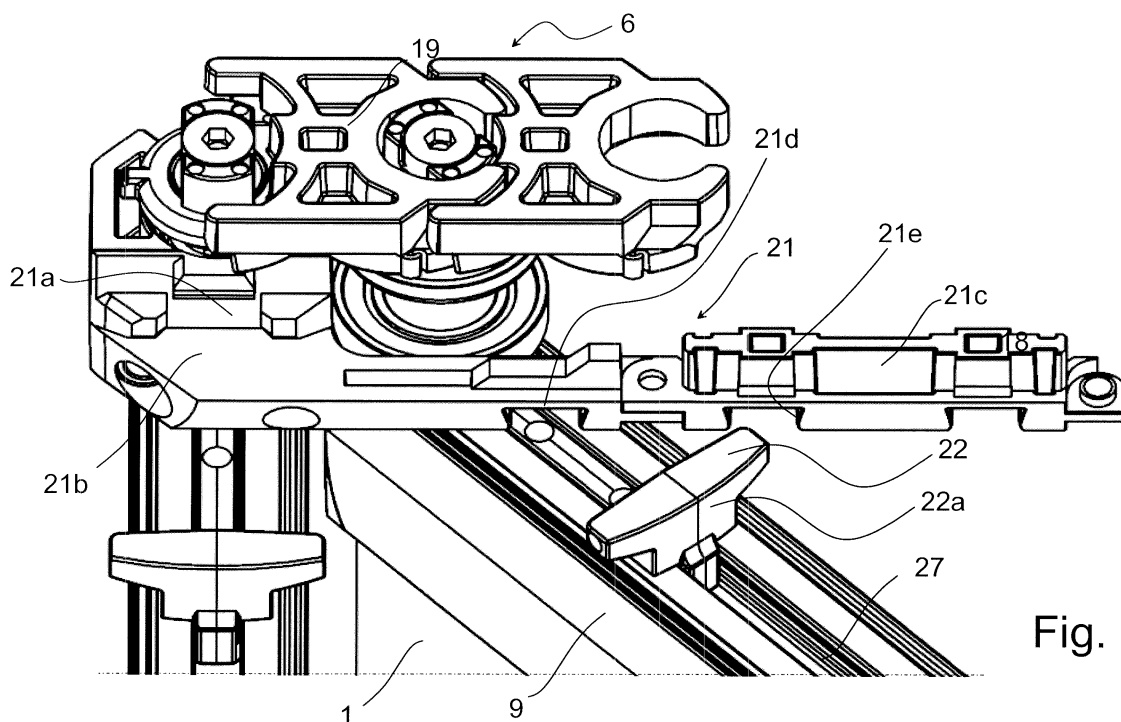


Fig. 6

Description

[0001] The invention relates to a panel system.

[0002] Balcony facilities of a building are equipped with glazing systems of prior art, which are called e.g. balcony glazings. The systems typically comprise an upper profile and a lower profile, or another corresponding guide track, inside which the necessary guide track parts are placed, between which, in turn, the single glass panes are suspended. The glass panes are used as panels which limit the space or protect it, for example, from weather conditions, for example on balconies or terraces, or divide the space into several parts and partition spaces, like in rooms or business facilities, in which the panels form doors and walls. Typically, the profiles extend in the horizontal direction and are fastened to the structures of the building. By means of guide track parts, single panels can be opened and closed, normally around a vertical axis of rotation, and profiles can be moved. The panels can be moved aside when they are not needed or when a larger space or passage is to be taken into use. Some known balcony glazings are presented in the publications FI-84645-B and FI-90796-B. The panels may also extend down to the floor.

[0003] The panels are normally separate, and openable panels comprise, at least on one edge of the panel, at its lower end and upper end, a guide track part that acts simultaneously as a hinge when the panel is turned aside. Furthermore, the panel comprises at least one guide track part, in many cases two guide track parts or guiding members which are supported to the upper profile and/or the lower profile, preventing the opening of the panel. When the panel is turned, the panel is supported to only two guide track parts, wherein the opening of the panel is allowed in a certain position only. In said position, the guide track parts are interlocked to the guide track parts of the adjacent opened panel, for example by means of locking and hinge mechanisms of WO 03/042482 A1, or to a locking arranged inside the upper profile. The locking prevents the upper edge of the panel from moving and letting the panel in an inclined position. In many cases, the upper profile is also provided with a guiding member with a guiding surface, to which the guide track part is supported until the locking has engaged reliably. Normally, the locking requires accurate positioning of the panel. The guiding member is placed at an opening in the upper profile, through which the guide track part comes out of the profile. The guiding member secures the effective locking by keeping the panel in the correct position for locking or unlocking. Guiding members supported to guide track parts are disclosed in documents EP 1 538 292 A2, DE 10333612 A1, US 5,272,839, and WO 03/042478 A1.

[0004] The opening in the profile must be kept as small as possible, so that the panel does not open before entering the turning position. For this reason, those guide track parts which are located closest to the opening edge of the panel, must be placed in a slightly different position

in each panel, as presented in documents WO 00/79088 A1, US 5,749,172 and SE 512602 C2. The guide track parts can be placed in the corners of the panels, according to the documents SE 509554 C2 and US 5,448,855, wherein the passage through the corner of the profile becomes easier and the panels do not hit, for example, a railing or the walls of the balcony.

[0005] If the panels are still to be opened, the opening at the edge of the profile must be enlarged in a corresponding manner, because now the guide track part of each panel is placed in a different location from the guide track part of the preceding panel. As a result, the guide track parts of the panels to be turned first come to the opening even long before the guide track parts acting as a hinge are in the location where locking is possible. Document FI 115989 B (FI 20041265 A1) discloses a long opening and a guiding member capable of supporting the panel when the roller acting as the guide track part is at the long opening. The guiding member can keep the roller inside the profile which can be arranged to support the roller and the panel. The turning of the panel is allowed first after the piece fastened to the panel has passed the guiding member, because in said position of the panel, the panel is capable of being locked to another panel or profile.

[0006] Guiding members protruding from the profile disturb the installation of curtains and shields or their fastenings and suspensions, so that their length must be limited. However, a short guiding member does not support the panel so long that the different parts of the locking mechanism would be interlocked in a reliable manner. The guiding member must also support the panel at the initial stage of the interlocking, which prevents damage to the locking mechanism due to great forces.

[0007] It is an aim of the invention to develop a usable panel system with its guiding members, which is simple to use and to install. The invention makes it possible to move the panel safely and to open it without extra measures.

[0008] The panel system according to the invention is presented in claim 1. The panel system according to the invention is also presented in claim 19.

[0009] The guiding members of the guide track parts can be made shorter and smaller by means of the use of the invention. In spite of its small size, the guiding member according to the invention makes it possible to support the panel in a large angular range. The invention is also suitable for use with other guiding members. The invention is suitable for various panels that can be opened, irrespective of the placement of the guide track part. The location point of the different parts of the invention is standardized in relation to the hinging, which enables accurate and easy installation.

[0010] The invention can be applied in panels intended e.g. for balconies as well as in panels which partition or limit various spaces in buildings and extend down to the floor, also on balconies.

[0011] In the following, the invention will be illustrated

in more detail by means of a preferred embodiment, wherein reference will also be made to the appended drawings, in which

- Fig. 1 shows the panel system according to a first example of the invention in a principle view,
- Fig. 2 shows the operation according to a second example of the invention during the transfer of the panel,
- Fig. 3 shows the operation of the examples of Figs. 1 and 2 in more detail,
- Fig. 4 shows the operation of an example after the panel has been transferred to its location for turning, and
- Fig. 5 shows the operation according to the example of Fig. 4 when the panel is being opened, and
- Fig. 6 shows the operation of the example of Fig. 4 when the panel is being opened more.

[0012] Figure 1 shows a panel according to a first example and a panel system that is simultaneously, for example, a glazing for e.g. balconies, or a wall limiting a space. The panel system normally comprises several successive glass panes which are movable. The panels 1 are normally rectangular, wherein they are normally in an upright position and form a closed wall or a large window when placed one after the other. They can be transferred in the direction of the guide tracks, which is typically the horizontal direction. The panels 1 can be opened into a position which is normally perpendicular to the closed position shown in Fig. 1. In the open position, the panels 1 are placed side by side close to each other, wherein they are stored, for example, on one side of the opening of a balcony in a building, where they have first been moved along the guide tracks. The upper guide track 4 and the lower guide track 5 are placed in the horizontal direction, and an upper guide track part 6 and a lower guide track part 7 are placed inside them and are simultaneously used as guiding members, between which the panels 1 are fixed from above and from below, and the panel is in the vertical plane. The guide tracks are normally profiles made of aluminium and provided with a long groove for the guide track parts. The panel 1 preferably consists of a glass pane, whose lower and upper edges are provided with fillets 8 and 9, to which the guide track parts, in turn, are fastened.

[0013] One example of the guide track parts is shown in Figs. 1 and 3, in which the principles known from WO 03/042482 A1 are applied. The panel 1 is normally provided with a fillet 9, to which a hinge pin 10 is fastened. The hinge pin 10 is shaped and unrotatable in relation to the panel 1, and a locking piece 12 is locked to the hinge pin 10. The hinge pin 10 of the guide track part 7 allows

the turning of the panel 1 and its rotation around a vertical rotation axis X1 from the closed position to the open position, and *vice versa*. The rotating takes place around the hinge pin 10. The guide track part 6 is suspended by the guide track 4 and is supported to it by means of, for example, horizontal rollers, which are normally two in number and which are fixed around the hinge pin 10. The rollers support the panel 1, and by means of the rollers, the panel 1 moves along the guide track 4. A locking piece 13 sliding in the guide track 4 guides the movement and interlocks the different panels, if necessary. The locking piece 13 remains aligned to the guide track 4, and the panel 1 is capable of turning in relation to it. In this example, the locking piece 13 is locked to the hinge pin of the guide track part of the adjacent corresponding panel. The guide track 4 is also provided with a corresponding locking piece 12, to which the first panel 1 to be turned is locked. The rollers of the guide track part 6 correspond to the rollers 11 of the guide track part 7.

[0014] The structure of the guide track part 6 placed in the guide track 5 corresponds substantially to the guide track part 7. The guide track parts 6 and 7 are placed on the same vertical rotation axis X1, wherein the opening of the panel 1 is possible, and they are normally placed close to the first edge of the panel 1 and close to the corners of the panel 1. The guide track part 6 is provided with a locking piece 26 that is locked to the adjacent panel. The guide track part 6, in turn, is locked to a locking piece 19 provided in a frame part 21a.

[0015] Another upper guide track part 3, in turn, whose hinge pin 2 is fixed to the fillet 9, is placed close to the second edge of the panel 1, which is an openable edge and opposite to the first edge. The guide track part 3 is suspended by the guide track 4 and is supported to it by means of, for example, horizontal rollers 14 fixed around the hinge pin 2. The rollers 14 support the panel 1, and by means of the rollers 14, the panel 1 moves along the guide track 4. When inside the guide track 4, the rollers 14 are supported to the structure 15 inside the guide track 4, supporting the panel. The structure of the guide track part 3 may vary from the structure of the guide track part 6, and it is placed inside the guide 4, keeping the panel 1 closed. The function of the guide track part 3 is to guide the opening edge of the panel 1 during the transfers, and it is placed close to the corner of the panel 1 in the example of Fig. 1. A guide track part or a simple guide pin 20 can be placed at the lower edge of the panel 1, in the corner close to the other edge of the panel, to prevent bouncing of the panel 1. In the example of Fig. 1, the guide track part or guiding pin 20 must be lifted up from the guide track 5 before opening the panel 1. The guide track 5 can also be placed lower than the floor surface. Said guide track part or guide pin 20 and the hinge pin 2 are placed on the same vertical rotation axis X2, if the panel 1 is moved across the corners of the guide track 5 and the guide track part or the guide pin 20 is lowered down.

[0016] For opening the panel 1, an opening 16 is pro-

vided at the side of the guide track 4, through which at least one guide track part 3 can come out of the guide track 4 for the turning. Thus, the panel 1 to be opened has been transferred to the opening position, in which the panel 1 is to be opened. It is a predetermined location A where the panel is to be opened and where it can be opened. The opened panels are aligned next to each other, wherein the guide track part of each panel that can be opened and is placed in the opening position is placed in a slightly different location in the guide track 4. The length of the opening 16 is selected the greater, the more panels there are to be opened. In Fig. 3, the first panel 27 to be turned is mounted in a fixed position and it cannot be transferred. The panel 27 is provided with similar members as in the panel 1, but movable guide track parts are not necessary, wherein the hinge pin of the panel 27 is fixed to the frame part 21a in a rotating manner. A corresponding frame part is mounted to the guide track 5.

[0017] As the panel 1 is moved to the opening position shown in Fig. 1, 2 or 3, where the panel 1 can be turned and opened, the guide track part 3 is moved to the opening 16 before the first and second guide track parts 6, 7 are in contact with e.g. the locking piece 19. As shown in Fig. 2, the guide track part 3 is kept supported to the structures 15 of the guide track 4 so that the panel 1 is not allowed to open or to turn in an inclined position.

[0018] In the example of Fig. 1, the panel 1 or the fillet 9 fixed to it is provided with a counter element 18 which, in turn, is placed against the guiding member 17 in the guide track 4, when the guide track 3 is being transferred to the location of the opening 16 or just moving into the opening 16. The counter element 18 has, for example, a rectangular shape. The panel 1 is supported to the guiding member 17 by means of the counter element 18 only. The guiding member 17 comprises a counter surface parallel to the panel and in contact with the counter element 18. The counter element 18 has a side surface which acts as a counter surface and along which the counter surface of the guiding member 17 slides. The length of the side surface of the counter element 18 is clearly greater than the length of the side surface of the guiding member 18, typically multiple.

[0019] The guiding member 17 extends to a distance from the guide track 4 in the direction in which the panel 1 opens, wherein the side surface of the guiding member 17 acts as a counter surface and keeps the guide track part 6 pushed against the locking piece 19 when the panel 1 is turned. Figure 1 shows a situation, in which the side surface of the guiding member 17 and the counter surface of the counter element 18 are placed in a mutual position such that allows the opening of the panel 1. The counter element 18 has passed the counter element 17. The counter surface of the counter element 18 can slide against the side surface of the guiding member 17 when the panel 1 is opened.

[0020] The guiding member 17 can also be provided with a function where the side surface is allowed to rock around a vertical rotation axis, wherein it will conform

better to the movement of the counter element 18 during the turning. The operation can also be arranged so that the counter element 18 is supported to the guiding member 17 during the transfer of the panel 1 only, when the guide track part 3 moves at the opening 16, but the counter element 18 is not supported to the guiding member 17 during the turning. Thus, during the turning, the panel 1 is supported either by another member fastened to the guide track 4, or by the locking only. Thus, the function of the counter element 18 is solely to prevent the turning.

[0021] The guiding member 17 is fixed in place in the guide track 4. The counter elements of all panels, corresponding to the counter element 18, are placed in different locations in the different panels. The counter element 18 can be installed on the fillet 9 provided with a fastening groove 27 shown in Fig. 4, where also the guide track parts 3 and 6 are fastened. The counter element 18 and the guiding member 3 are separate parts, and their distance can be adjusted.

[0022] Figure 2 shows another panel system whose parts correspond primarily to the example of Fig. 1. In the example of Fig. 2, the opening 16 is narrow, and the guiding member 17 is placed at the opening 16. The guiding member 17 is fastened to the guide track 4, and the guiding member 17 comprises a counter surface which may be rocking and which is in contact with the guide track part 3 when the panel 1 is opened. The rollers 14 of the guide track part 3 roll along the guiding member 17. The guide track part 3 enters the opening 16 in the opening position A. The guiding member 17 extends to a distance from the guide track 4, wherein the counter surface of the guiding member 17 keeps the guide track part 6 pushed against the locking piece 19 when the panel 1 is turned. The guide track parts of each panel, corresponding to the guide track part 3, are placed in different locations in the panels. In this example, the guide track part or the hinge pin 20 passes out of the guide track 5 via the opening.

[0023] Figures 1 and 2 also show an example of a guiding member 21 fastened to the guide track 4. The guide track 4 has typically a turned U-shape, and the guiding member 21 is fastened to the underside of that wall of the guide track 4 to which the guiding member 17 is fastened and which is provided with the opening 16. The guiding member 21 consists of one or more openings 21d, via which the counter element 23 can pass, as shown in Fig. 5. The counter surface 22a of the counter element 23 is in contact with the counter surface 21e of the guiding member 21, wherein the counter surface 21e of the guiding member 21 keeps the guide track part 6 pushed against the locking piece 19, when the panel 1 is turned. The counter surfaces 22a and 21e are substantially transverse to the longitudinal direction of the guide track 4. The counter element 22 is installed on the fillet 9 in the fastening groove 27. The counter elements of each panel, which correspond to the counter element 22, are placed in the same location in the panels and at the same distance L1 from the rotation axis X1. More

precisely, the counter surface 22a is located at the distance L1.

[0024] In the presented example, the distances L2 and L3 of the openings 21d are equal, and they correspond to the distance between the guide track part 6 and the corresponding guide track part of the next corresponding panel, when the panels are adjacent and interlocked. As shown in Fig. 3, the distance L4 between the rotation axis X3 of the panel 27 and the counter surface 21e corresponds substantially to the distance L4. In the presented examples, openings are provided for three turnable panels, wherein the first opening on the left hand side is for the panel 27 and its counter element. The counter element 22 is placed close to the guide track part 6, closer than the counter element 18 in Fig. 1 or closer than the guiding member 17 or the guide track part 3. Because the counter element 22 is close to the guide track part 6, the counter element 22 can be made smaller in relation to the guiding member 17, which is farther away. By making the counter element 22 larger, the panel 1 can be supported longer than with merely the guiding member 17. The panel 1 is capable of opening to a very large angle and remaining supported by the guiding member 21 all the time, wherein the locking is facilitated and secured. The guiding member 21 can be used to improve the function of various lockings and to supplement the operation of the guiding member 17 or to replace the guiding member 17 either in whole or in part.

[0025] Those minimum and maximum opening angles, at which the panel 1 is supported by the guiding member 21, can be influenced by the design of the counter element 22 and by a suitable selection of the length of the counter surface 21e. In the presented example, the length of the counter surface 22a is greater than the length of the counter surface 21e shown in Fig. 5.

[0026] Figure 4 shows a system according to one example and its operation in a situation in which the panel 1 is in the opening position, the locking is ready to be engaged and the counter element 22 is ready to be transferred via the guiding member 21. The counter surface of the guiding member is arranged to be convex, wherein it is placed better against the guiding member 21 during the turning. Figure 4 also shows the panel structure 27 fastened to the guide track 21. In Fig. 5, the counter element 22 is in contact with the guiding member 21 and the locking is already partly engaged. In the situation of Fig. 6, the locking is engaged and prevents the movement of the panel, and the counter element 22 has been disengaged from the guiding member 21. In Figs. 4 to 6, the guide track 6 has been omitted to expose the structure of the guiding member and the guide track part.

[0027] Figure 3 shows in more detail the guiding member 21 of the examples of Figs. 1 and 2, wherein the guide track 4 is partly opened. The guiding member 21 comprises a frame part 21a which is placed inside the guide track 4 and mounted in its place. The frame part 21a is also provided with a locking piece 19, in which the locking piece 26 of the guide track part 6 is fitted and the hinge

pin 25 is locked. The locking piece 19 is fastened, for example, by means of the hinge pin.

[0028] The position of the frame part 21a determines the position of the panel 27 to be opened, which, in turn, determines the opening position of the next panel 1 to be transferred and opened. The guiding member of each panel to be opened will pass through a separate opening. The guiding member 21 is provided with an extension part 21b integrated in the frame part 21a and comprising at least one opening for the panel 27 and placed underneath the guide track 4. During the installation, the opening 21d of the extension part 21b is automatically placed at such a distance L4 from the frame part 21a that corresponds to the distance between the counter element of the panel 27 and the frame part 21a. More precisely, there is a distance L4 between the rotation axis X4 and the counter surface 21e. The rotation axis X1 and the counter surface 21e are placed at a predetermined distance L1 from each other, corresponding to the distance L4, when the panel 1 is in the opening position, wherein the distance between the rotation axes X1 and X4 corresponds to the distance L2. At least one elongation part 21c can be placed after the extension part 21b, normally provided with one or more openings 21d. The elongation part 21c is fastened to the guide track 4. Between the extension part 21b and the elongation part 21c, as well as between the elongation parts, there is a coupling 23 which comprises joint faces and by means of which the elongation parts and their openings are automatically placed, during the installation, at such distances from the frame part 21a that correspond to the distance between the counter elements corresponding to the counter element 22 and the frame part 21a. Also, a corresponding coupling used as a fitting can be placed between the frame part 21a and the extension part 21b. In the example, the different parts are fastened to the guide track 4 and to each other by means of, for example, a screw at the joint 23.

[0029] In the example of Fig. 3, the counter element 22 is integrated in the hinge pin 25 of the guide track part 6 by means of an interconnector 24. The interconnector 24 is placed in a fastening groove 27 in the fillet 9, and the counter element 22 extends upwards from the fillet 9 towards the guide track 6 up to the opening 21d. The counter element 22 must be capable of leaving the guide track 6 also when the panel 1 is moved across a corner in the guide track 4. For this reason, the extension part 21b and the elongation parts 21c are placed in an area between the frame part 21a and the opening 16, or between the guiding member 17 and the frame part 21a. The counter element 22 does not extend so high that it would hit the wall of the guide track 4. The counter element 22 allows the turning of the panel 1 only when the counter element 22 is at the opening 21d. By means of the interconnector 24, the counter surface 22a of the counter element 22 is placed, during the installation, automatically at the distance L1 from the guide track part 6. The counter element 22 is turned around the rotation

axis X1 together with the panel 1. In the presented example, only one counter element is needed in each panel, placed close to the guide track part used as a hinge. Several counter elements may be fastened to the guide track part by means of the interconnector, when the distance between the openings is constant. The panel is thus supported to at least two counter surfaces of the guiding member. The counter element may also be separate, and two counter elements may be connected by the interconnector. Each panel may also comprise a series of counter elements, in which case the guiding member comprises a series of counter surfaces.

[0030] The type of the locking may differ from the design shown in Fig. 3, but the frame part 21a can be modified so that those parts of the locking which require accurate positioning in relation to the guide track part 6 are engaged or fastened to it. If the frame part 21a does not comprise parts of the locking, it is used, for example, as a stopper for stopping the panel 1 in the opening position. Alternatively, a kind of a locking is used as a stopper, in which case the panel and the frame part are placed at a predetermined distance from each other, wherein simultaneously the extension part and the elongation part are placed in their correct positions in relation to the panel and its counter element. Thus, it is also possible to apply the above-presented couplings which place the parts at correct distances from each other in the guide track 4. A corresponding frame part can be placed and fastened to the guide track 5, but the use of an extension part will not be necessary.

[0031] The invention is not restricted solely to the embodiments presented above. The shapes of the guide track, the fillets and the profiles may vary to a desired extent.

Claims

1. A panel system comprising:

- a panel (1) that can be moved and turned,
- an upper first guide track (4) and a lower second guide track (5), between which the panel is suspended,
- a first guide track part (3) coupled to the panel and arranged to follow the first guide track,
- an opening (16) which is provided in the first guide track and through which the first guide track part moves out of the first guide track when the first guide track part is in a predetermined location for the turning of the panel, and
- a first guiding member (17) fastened to the first guide track and supporting the panel,

characterized in that the panel system also comprises:

- a second guiding member (21) fastened to the

first guide track and supporting the panel during the turning.

2. The panel system according to claim 1, **characterized in that** the first guiding member (17) supports the panel either 1) during the turning, when the first guide track part is moving away from the first guide track, or 2) during the transfer, when the first guide track part is at the opening but not yet placed in the predetermined location for the turning of the panel, or 3) during both the turning and the transfer.
3. The panel system according to claim 1 or 2, **characterized in that** the panel system further comprises a first counter element (22) which is fastened to the panel and by means of which the panel is supported to the second guiding member (21) during the turning of the panel.
4. The panel system according to claim 3, **characterized in that** the panel system further comprises a second counter element (18) which is fastened to the panel and by means of which the panel is supported to the first guiding member (17) to prevent the turning of the panel when the first guiding member is at the opening but not yet placed in the predetermined location for the turning of the panel.
5. The panel system according to claim 4, **characterized in that** the panel is further arranged to be supported by means of the second counter element (18) to the first guiding member (17) during the turning, when the first guiding member is moving away from the first guide track.
6. The panel system according to claim 5, **characterized in that** the second counter element (18) comprises a first counter surface which is placed against the first counter surface of the first guiding member (17) during the turning, and a second counter surface which is placed against the second counter surface of the first guiding member (17) during the transfer of the panel.
7. The panel system according to claim 1, 2 or 3, **characterized in that** the first guiding member (17) is placed at the opening (16) and arranged to support the first guiding member during the turning, when the first guiding member is moving away from the first guide track.
8. The panel system according to any of the claims 3 to 6, **characterized in that** the first counter element (22) comprises at least one counter surface (22a) which is placed against the second guiding member (21) during the turning, and the second guiding member (21) comprises at least one counter surface (21e) which is placed against the counter surface (22a)

of the first counter element (22) during the turning.

9. The panel system according to any of the claims 3 to 6 or 8, **characterized in that** the second guiding member (21) comprises several openings which are provided successively in the direction of the first guide track and through which the counter elements corresponding to the first counter element (22) can pass for the turning of the other panels.
10. The panel system according to any of the claims 3 to 6, 8 or 9, **characterized in that** the second guiding member (21) comprises several counter surfaces (21 e) which are successive in the direction of the first guide track and which are placed against the counter elements corresponding to the first counter element (22) during the turning of the other panels.
11. The panel system according to claim 8 or 9, **characterized in that** the second guiding member (21) comprises three or more of said counter surfaces (21 e), arranged at constant distances (L2, L3) from each other.
12. The panel system according to any of the claims 6, 8 or 9, **characterized in that** the second guiding member (21) comprises a frame part (21 a) which is connected to the first guide (4) and which comprises an extension part (21 b) arranged to be placed against the first counter element (22) during the turning, wherein the frame part (21 a) also comprises a locking piece (19) for locking the panel in a predetermined location (A) for the turning.
13. The panel system according to claim 12, **characterized in that** one or more elongation parts (21 c) are fitted as an elongation to the extension part and placed against counter elements corresponding to the first counter element (22) during the turning of the other panels.
14. The panel system according to claim 13, **characterized in that** a coupling (23) is provided between the extension part and the elongation part, by means of which the elongation part can be fitted in a predetermined location in relation to the frame part and the extension part.
15. The panel system according to any of the claims 1 to 14, **characterized in that** the panel structure also comprises an upper second guide track part (6), by means of which the panel is coupled to the first guide track and which allows the opening of the panel to the side, wherein the first counter element (22) is coupled to the second guide track part at a predetermined distance (L1) from the second guide track part and is arranged to be turned with the panel during the turning.

16. The panel system according to claim 15, **characterized in that** the panel structure also comprises a lower third guide track part (7), by means of which the panel is coupled to the second guide track and which allows the opening of the panel to the side, wherein the second and the third guide track parts comprise a locking piece (13, 26) arranged to guide the panel to a predetermined location (A) for the turning.

17. The panel system according to any of the claims 1 to 16, **characterized in that** the second guiding member (21) is arranged to support the panel during the turning, until the panel is locked.

18. The panel system according to any of the claims 1 to 17, **characterized in that** the panel (1) is made of glass, comprising an upper first fillet (9), to which the first counter element is fastened.

19. A panel system comprising:

- a panel (1) that can be transferred and turned,
- an upper first guide track (4) and a lower second guide track (5), between which the panel is suspended,
- a first guide track part (3) and a second guide track part (6), which are coupled to the panel and arranged to follow the first guide track, wherein the second guide track part allows the turning of the panel around a rotation axis (X1), and
- an opening (16) which is provided in the first guide track and through which the first guide track part moves out of the first guide track when the first guide track part is in a predetermined location for the turning of the panel, and

characterized in that the panel system also comprises:

- a guiding member (21) fastened to the first guide track and arranged to support the panel during the turning, when the first guide track part is moving away from the first guide track,
- a counter element (22) which is fastened to the panel and by means of which the panel is supported to the guiding member (21) during the turning of the panel, wherein the counter element is coupled to the second guide track part (6) and is placed at a distance (L1) from the rotation axis (X1).

20. The panel system according to claim 19, **characterized in that** a locking piece (19) is coupled to the guiding member to lock the panel in a predetermined location (A).

21. The panel system according to claim 19 or 20, **characterized in that** the counter element comprises at least one counter surface (22a) which is placed against the guiding member (21) during the turning, and the guiding member (21) comprises at least one counter surface (21 e) which is placed against the counter surface (22a) of the counter element during the turning. 5
22. The panel system according to claim 21, **characterized in that** the guiding member (21) further comprises at least one counter surface which is placed at a distance (L2) from the counter surface (21e) and is arranged to be placed against the counter piece of another panel during the turning. 10 15
23. The panel system according to claim 19 or 20, **characterized in that** the guiding member (21) further comprises at least one elongation part (21 c) which is coupled to the guiding member (21) and is arranged to be placed against the counter piece of another panel during the turning. 20
24. The panel system according to any of the claims 19 to 23, **characterized in that** the panel system further comprises a second guiding member (17) which is fastened to the first guide track, wherein the second guiding member (17) is arranged to support the panel either 1) during the turning, when the first guide track part is moving away from the first guide track, or 2) during the transfer, when the first guide track part is at the opening but not yet placed in the predetermined position for the turning of the panel, or 3) during both the turning and the transfer. 25 30 35

40

45

50

55

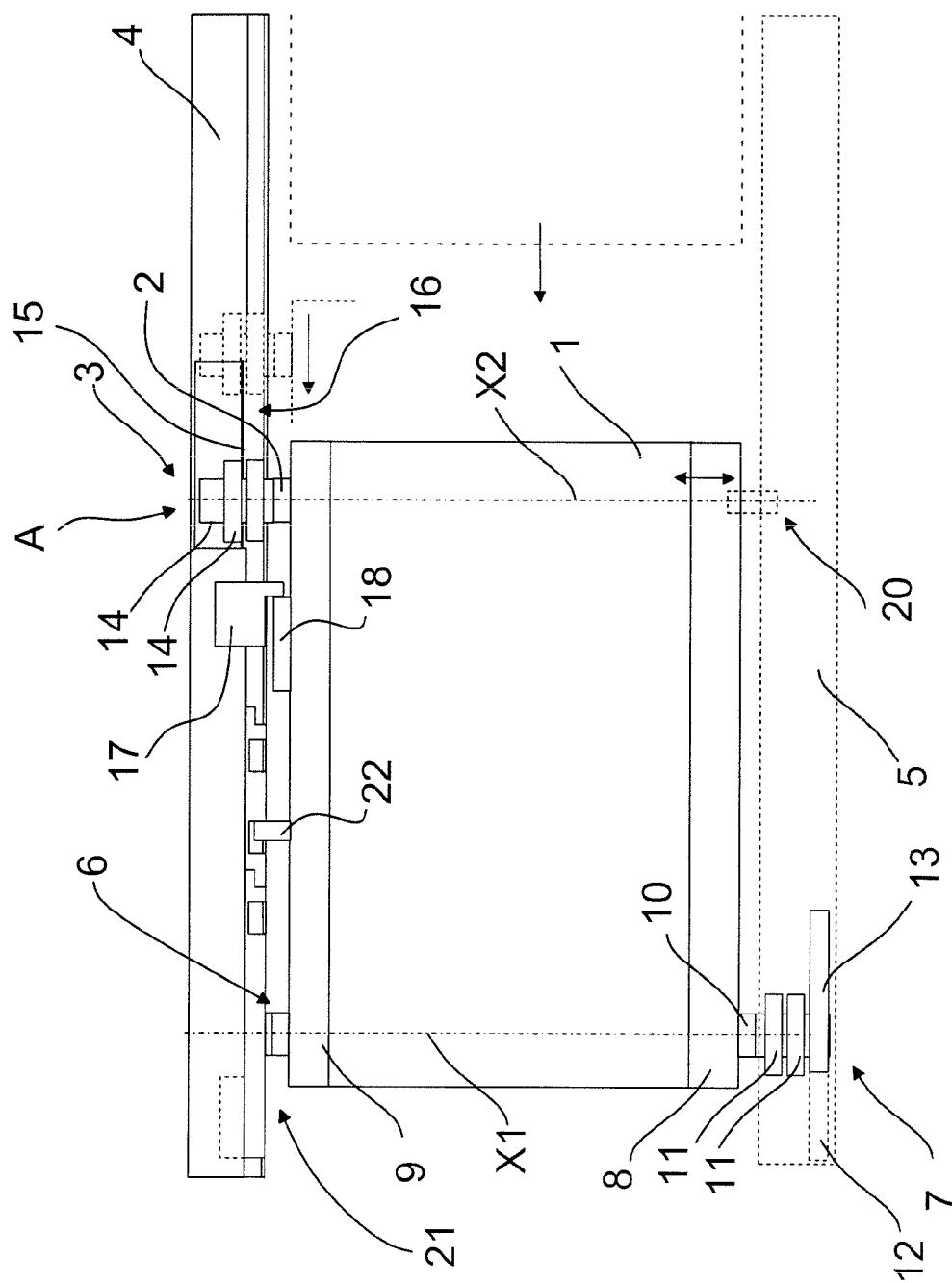


Fig. 1

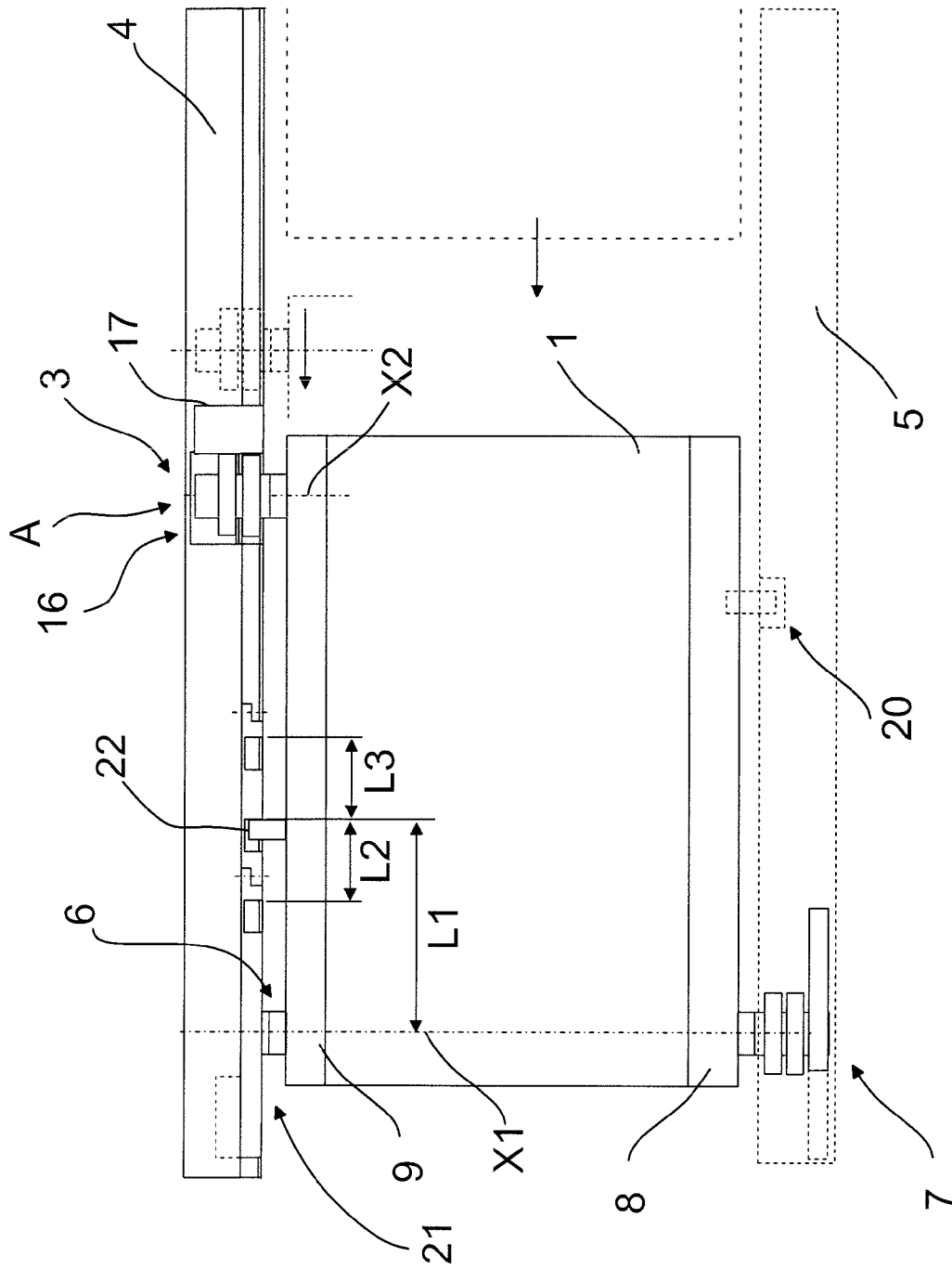


Fig. 2

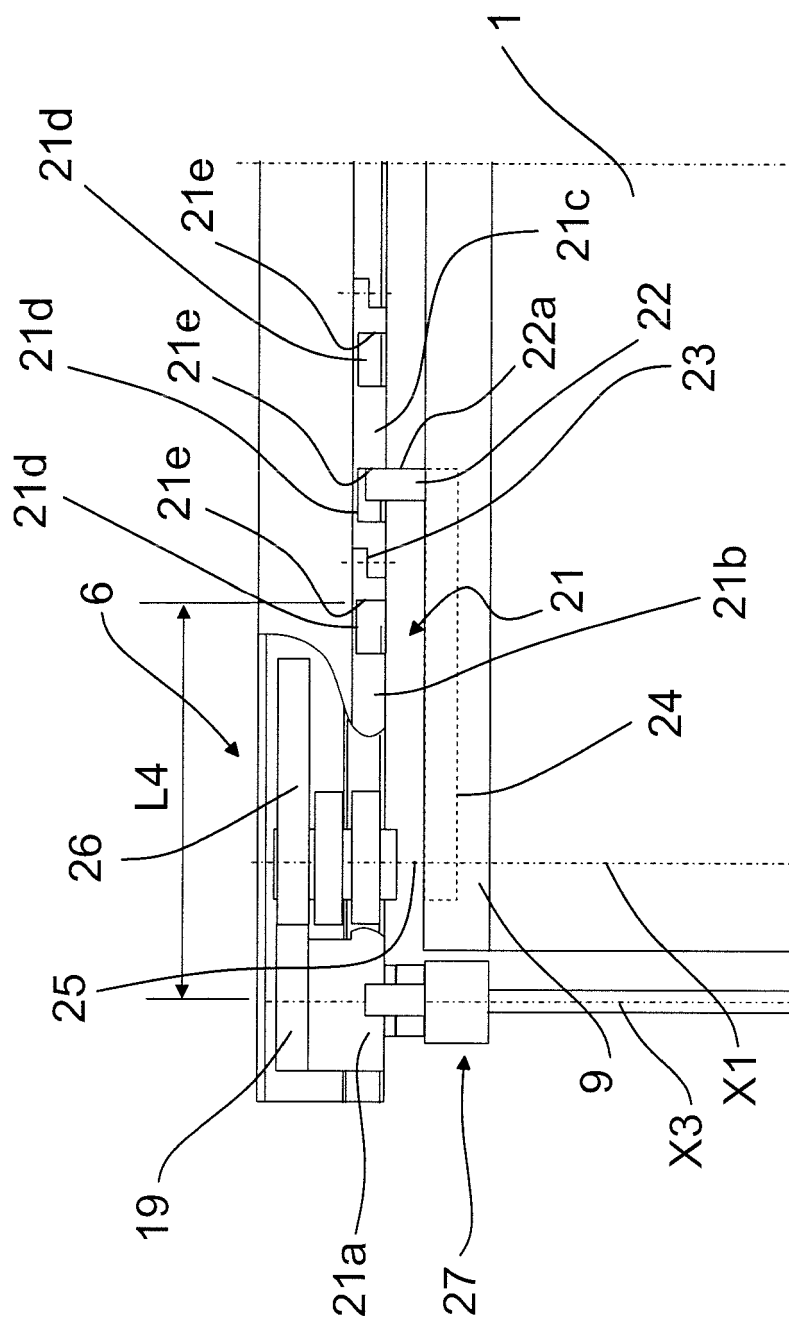
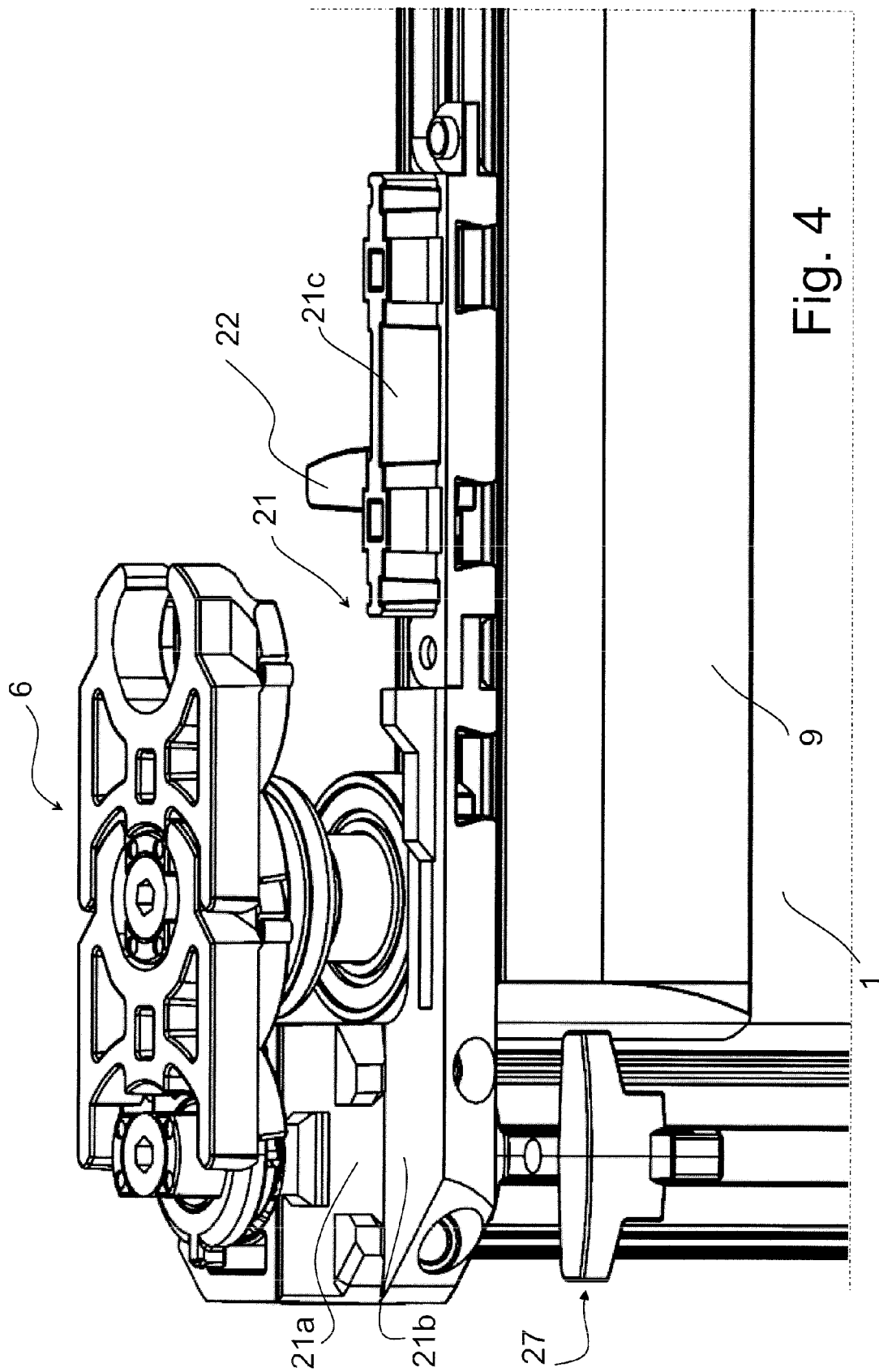


Fig. 3



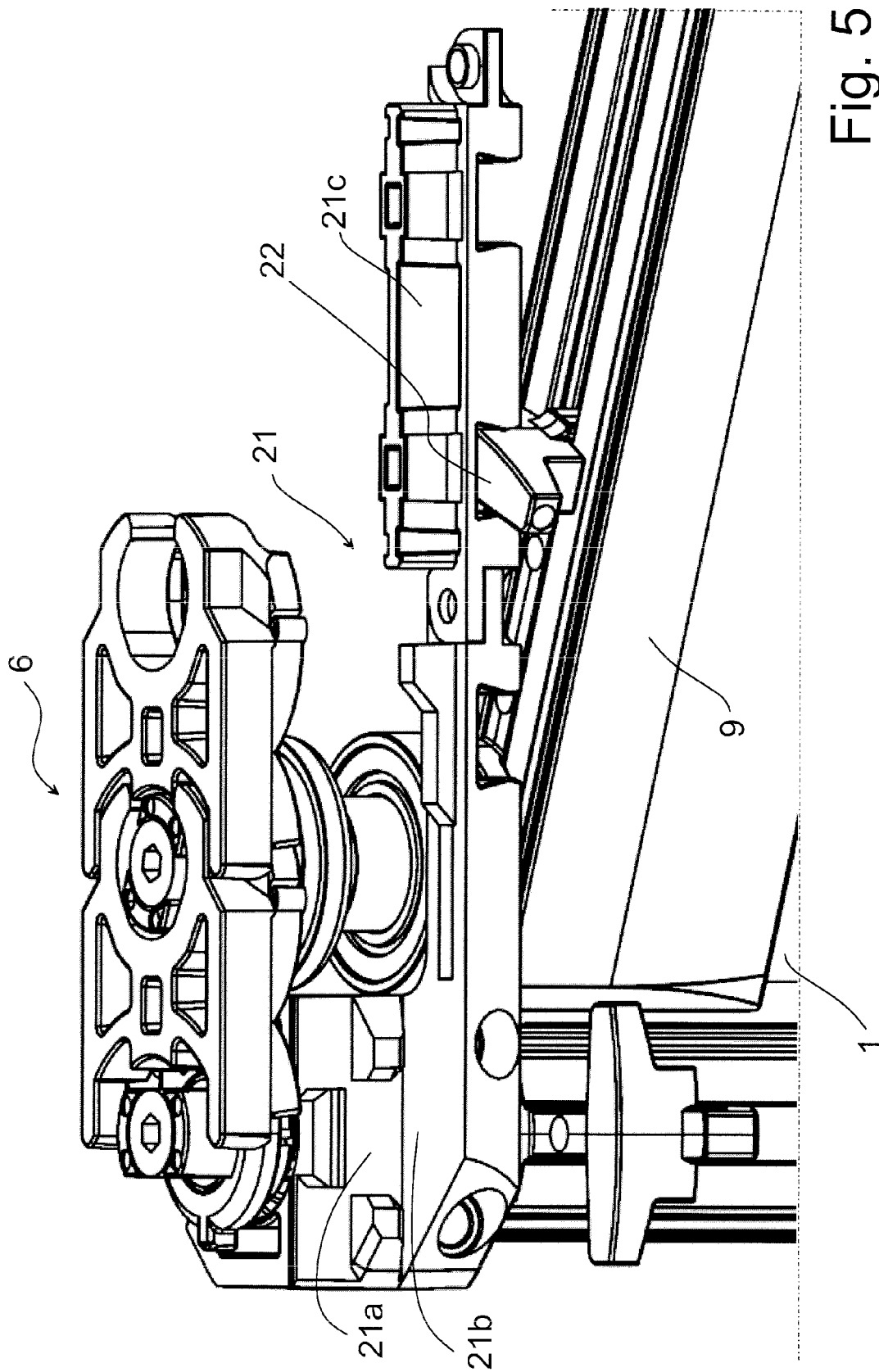


Fig. 5

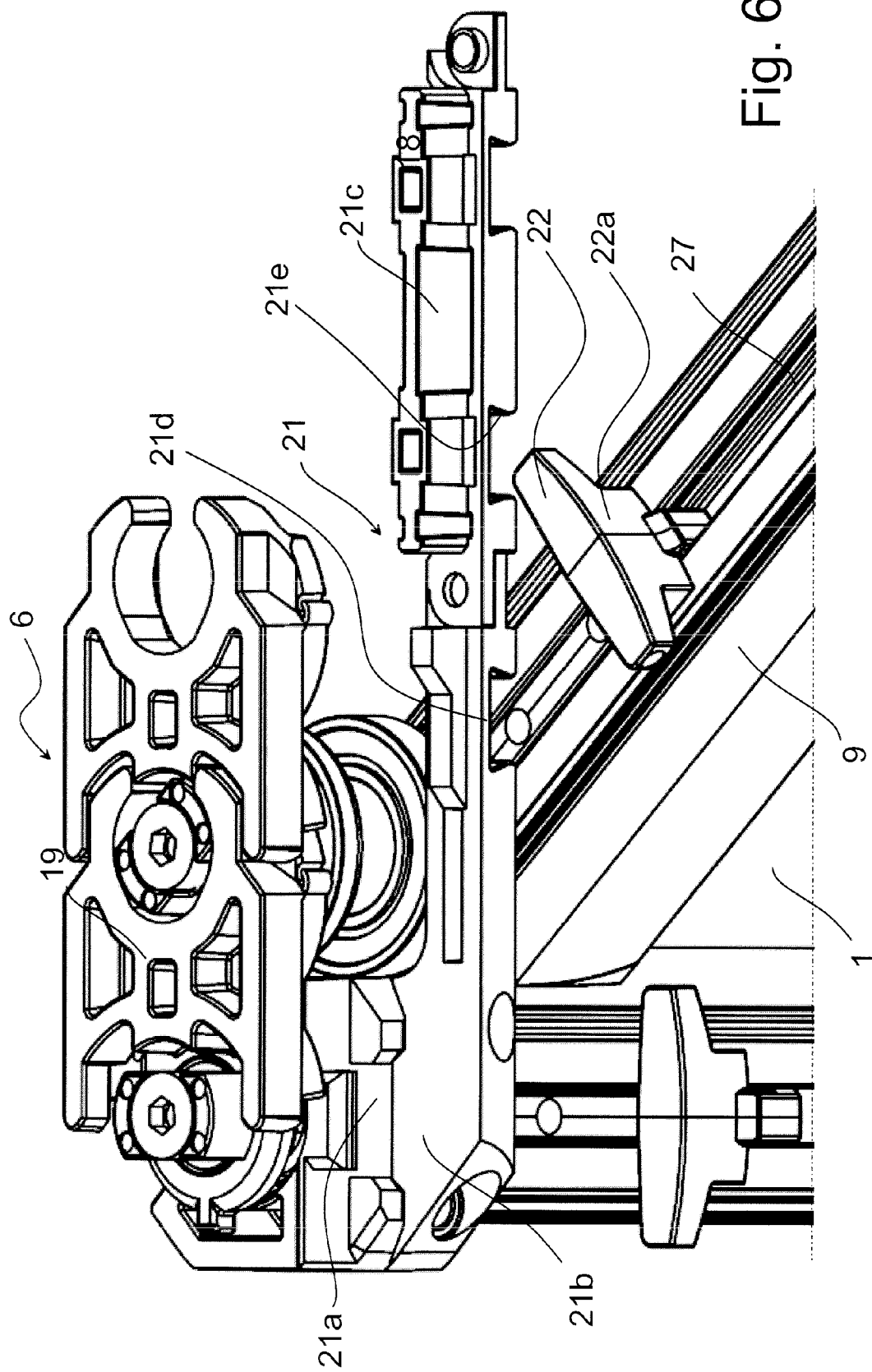


Fig. 6



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	US 2 574 312 A (CAMANI ALTUBE JUAN MANUEL) 6 November 1951 (1951-11-06)	1-7, 19	INV. E05D15/58
A	* column 1, line 52 - column 4, line 2; claims 1,2; figures 1-6 *	8-18, 20-24	
D, Y	FI 90 796 B (LAHDEN PARVEKELASITUS OY [FI]) 15 December 1993 (1993-12-15)	1-7, 19	E05D E06B
A	* page 4, line 17 - page 6, line 3; claim 1; figures 1-7 *	8-18, 20-24	
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 24 October 2007	Examiner Balice, Marco
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

4

EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 07 39 7029

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

24-10-2007

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 2574312	A	06-11-1951	NONE	

FI 90796	B	15-12-1993	NONE	

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- FI 84645 B [0002]
- FI 90796 B [0002]
- WO 03042482 A1 [0003] [0013]
- EP 1538292 A2 [0003]
- DE 10333612 A1 [0003]
- US 5272839 A [0003]
- WO 03042478 A1 [0003]
- WO 0079088 A1 [0004]
- US 5749172 A [0004]
- SE 512602 C2 [0004]
- SE 509554 C2 [0004]
- US 5448855 A [0004]
- FI 115989 B [0005]
- FI 20041265 A1 [0005]