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(54) **LOCKING DEVICE FOR SLIDING DOORS**

(57) The invention relates to a locking device (10) comprising: a first locking section (1), movable between a locked position and an unlocked position; a second locking section (2) arranged such that the first locking section (1), when in the unlocked position, is at least partially housed inside the second locking section (2); operating means (3), joined to the second locking section (2), rotatable between a first position and a second position; a first rod (4) and a second rod (5) connected to the op-

erating means (3). According to the invention, the first locking section (1) is mechanically coupled to the first and second rods (4, 5) by means of first and second mechanical conversion means (60, 70) configured to convert an entry movement into an exit movement perpendicular to the entry movement, the first locking section being configured to push the panels, keeping the panels pressed together.

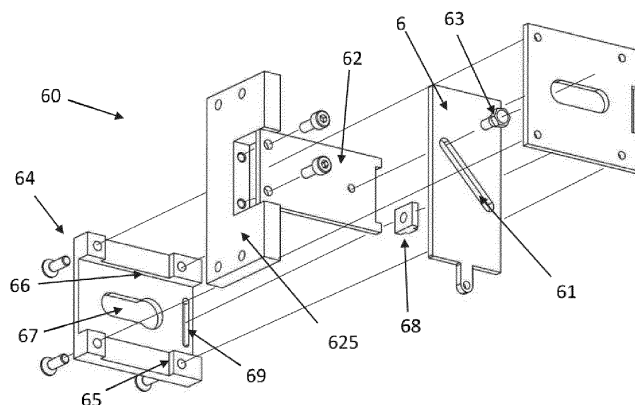


Fig. 5

Description

APPLICATION FIELD

[0001] This invention belongs to the technical field of panel enclosure systems made of glass and aluminum, PVC or equivalent materials and are of the type that are usually found in any type of sliding windows or doors.

BACKGROUND

[0002] Enclosure systems that use panels made from glass or materials with similar mechanical characteristics are usually formed mainly by an assembly of panels supported and guided by upper and lower rails that are mounted on the ceiling and ground of the compartment upon which closure is to be carried out.

[0003] There are sliding and pivoting enclosure systems on the market with panel sections that are gathered together by sliding to one or both sides of said sections. In these systems, the opening and closing of these panels is carried out by means of a fixed panel called door panel with which a locking device interacts with the upper and lower guide rail of the system. The door panel is fixed, without the possibility of sliding by means of the system, and has several extra components that are not in conventional panels, which increases the system cost or limits the possibilities thereof. In some cases, it involves avoiding the installation of locks and their corresponding mortises in the glass, aiming to avoid the visual impact that a lock has in these glazing systems. That fact that the locks require the use of tempered glass is another limitation that is eliminated with the invention described in this document, since it is possible to use laminated glass.

[0004] Utility model document ES-1149237-U describes in detail how these doors, which are fixed, function as compared to those that are described in this model which intends to forego them.

[0005] Patent document ES-2365575-A1 shows an enclosure system with independent panels which are also supported on the lower rail, the upper rail only being used as a guide; this enclosure system has a number of improvements such as: the design of the rails for displacement, which make the system watertight against possible water leakage, and lower profiles that are adjustable, which allows for a certain margin of error in the manufacturing of the glass.

[0006] The current enclosure systems have joints made of a flexible plastic material that are located between panels, which may or may not come in contact with the vertical sides of said panels with the lateral closure, that act as a lateral sealing element, such that the proper closing (upon forcing the vertical sides of the panels with the plastic joints to come in contact) and sealing of the enclosure system improve security as well as sealing thereof. Since the panels are subjected to constant pressure by the lateral closure, vibrations and possible

noises caused by the action of wind are reduced. The final result is a system that is more robust against severe weather conditions and safer against possible tampering that intends to force the system in order to pass through it. In traditional systems, it is possible to insert an object between panels in order to create a gap and be able to pass through the system or easily break the glass. With the solution object of the present invention, it is not possible to insert any object between the panels since the panels are pressed together and there is no available space to insert an object between the panels.

[0007] Therefore, the course of action for opening and closing the panels in a more comfortable manner, without needing to use fixed door panels in the system nor locks that entail the use of mortises in the glass (something that is only possible when the glass is tempered, not when it is laminated), and with only the device object of this invention has been studied.

DESCRIPTION OF THE INVENTION

[0008] This problem is solved with a locking device according to claim 1. The dependent claims define preferred embodiments of the invention.

[0009] The invention relates to a locking device characterized in that it comprises:

- a first locking section; arranged in a movable manner between a locked position and an unlocked position;
- a second locking section arranged such that the first locking section, when in the unlocked position, is at least partially housed inside the second locking section;
- operating means, joined to the second locking section, arranged such that they can rotate between a first position and a second position;
- a first rod connected on a first end to a first point of the operating means;
- a second rod connected on a first end to a second point of the operating means;
- wherein the first locking section is mechanically coupled to a second end of the first rod by means of first mechanical conversion means configured to convert an entry movement into an exit movement perpendicular to the entry movement, the first rod being connected to an upper entry part of the first mechanical conversion means and the first locking section connected to an upper exit part of the first mechanical conversion means, such that upon movement of the first rod, the first locking section moves in a direction perpendicular to the first rod;
- wherein the first locking section is mechanically coupled to a second end of the second rod by means of second mechanical conversion means configured to convert an entry movement into an exit movement perpendicular to the entry movement, the second rod being connected to a lower entry part of the second mechanical conversion means and the first lock-

ing section connected to a lower exit part of the second mechanical conversion means, such that upon movement of the second rod, the first locking section moves in a direction perpendicular to the second rod.

[0010] This locking device prevents the use of door panels and locks in a system, unifying the whole in the locking device, which can be installed in one end of the window or door system, thereby significantly increasing the sealing of said window or door system. This is achieved because the first locking section is configured to push the panels, keeping the panels pressed together, such that the possible gaps and spaces that may exist therebetween are eliminated.

[0011] However, when the first locking section moves to the unlocked position, said first locking section is displaced in the opposite direction, thereby opening a gap to be able to displace the adjacent panel and make it pivot, such that the panels can be moved until they reach the opening area, pivot and remain open, successively.

[0012] The mechanical conversion means receive the movement of the rods. Since the rods are joined to specific points of a same solid (the operating means), they move together when the operating means move. Therefore, the mechanical conversion means also move together.

[0013] In some embodiments, the first mechanical conversion means comprise

an upper entry part to which the second end of the first rod is coupled in an articulated way, the upper entry part comprising a first upper groove;

an upper base fixed to the second locking section;

an upper bolt fixed to the upper base, the upper bolt being inserted in the first upper groove of the upper entry part; an upper exit part, the upper exit part comprising a first upper guide, configured to limit the movement of the upper entry part according to a vertical direction, and a second upper guide, configured to limit the movement of the upper exit part with respect to the upper base according to a horizontal direction, the upper exit part further comprising a second upper groove in which the upper bolt is inserted;

wherein the first upper groove forms an angle between 30° and 60° with the second upper groove and the second upper groove is located according to the horizontal direction.

[0014] These particular embodiments achieve the technical effect of the invention by means of the use of simple and reliable parts in the first mechanical conversion means, obtaining a robust and durable system which further enables, by means of the adjustment of one or two parts, the variation of the reduction ratio of the transmission system or the distance that the first locking section protrudes with respect to the second locking section when it moves from the unlocked position to the locked position.

[0015] In some particular embodiments, the second mechanical conversion means comprise

a lower entry part to which the second end of the second rod is coupled in an articulated way, the lower entry part comprising a first lower groove;

a lower base fixed to the second locking section;

5 a lower bolt fixed to the lower base, the lower bolt being inserted in the first lower groove of the lower entry part; a lower exit part, the lower exit part comprising a first lower guide, configured to limit the movement of the lower entry part according to a vertical direction, and a second lower guide, configured to limit the movement of the lower exit part with respect to the lower base according to a horizontal direction, the lower exit part further comprising a second lower groove in which the lower bolt is inserted; wherein the first lower groove forms an angle between 30° and 60° with the second lower groove and the second lower groove is located according to the horizontal direction.

[0016] These particular embodiments achieve the technical effect of the invention by means of the use of simple and reliable parts in the second mechanical conversion means, obtaining a robust and durable system which further enables, by means of the adjustment of one or two parts, the variation of the reduction ratio of the transmission system or the distance that the first locking section protrudes with respect to the second locking section when it moves from the unlocked position to the locked position.

[0017] In some particular embodiments, at least one of among the first upper groove and the first lower groove comprises a main segment with two ends and two vertical portions that start from the ends of the main segment and extend in a direction that is essentially perpendicular to the second lower groove or to the second upper groove, respectively.

35 **[0018]** The adjective "vertical" refers to the orientation thereof in a position of use, the perpendicular orientation thereof only being relevant to the second lower groove, in the case of vertical segments of the first lower groove, or only relevant to the second upper groove, in the case of vertical segments of the first upper groove.

40 **[0019]** The purpose of these vertical segments is to prevent the movement of the assembly when the operating means are not engaged. As such, if the operating means are not engaged, despite efforts to move the system by means of the movement of the first locking section, in other words, by the movement of the fixing plate, the upper bolt remains in one of the vertical portions, such that a horizontal movement, like that of the fixing plate, will not cause it to exit that vertical portion. On the contrary, when the operating means are engaged, since they do cause vertical movement, they successfully remove the upper bolt from the vertical portions and move the system.

55 **[0020]** In some particular embodiments, the first locking section is connected to the upper exit part by means of an upper auxiliary part that is fixed to the first locking section and inserted in an upper vertical auxiliary groove comprised in the upper exit part, such that the horizontal

movement is transmitted between the upper exit part and the upper auxiliary part. The upper vertical auxiliary groove allows this upper auxiliary part to be displaced in the direction of the groove, thereby being able to adjust the position of the first locking section with respect to the rest of the components.

[0021] The inclusion of this upper auxiliary part makes it possible to have a larger surface to which the first locking section is fixed, such that the transmission of movement is easier.

[0022] In some particular embodiments, the first locking section is connected to the lower exit part by means of a lower auxiliary part that is fixed to the first locking section and inserted in a lower vertical auxiliary groove comprised in the lower exit part, such that the horizontal movement is transmitted between the lower exit part and the lower auxiliary part.

[0023] The inclusion of this lower auxiliary part makes it possible to have a larger surface on which the first locking section is fixed, such that the transmission of movement is easier. The lower vertical auxiliary groove allows this lower auxiliary part to be displaced in the direction of the groove, thereby being able to adjust the position of the first locking section with respect to the rest of the components.

[0024] In some particular embodiments, the operating means have a rotation axis, and the first point and the second point are located symmetrically with respect to said rotation axis.

[0025] The operating means can be engaged from inside or outside the system.

[0026] This arrangement of the first and second points of the operating means makes it possible so that, with rotation between 0° and 90°, the operating means can change the position of the first locking section between the locked position and the unlocked position. In a second embodiment, the operating means enables rotation between 0° and 180°.

[0027] In some particular embodiments, the operating means comprise a lock that enables locking the position thereof. The lock can be engaged from inside and/or outside the system.

[0028] This lock is suitable for when the locking device can be accessed by third parties, or can provide access to areas with items that need to be protected.

[0029] In some particular embodiments, the operating means are accessible from opposite faces of the second locking section.

[0030] This enables the closure device to be actuated from both sides thereof, facilitating the use thereof in closed rooms or outdoor installations.

[0031] In some particular embodiments, the first locking section comprises a housing that enables the vertical side of a panel to be partially housed in the inside thereof.

[0032] These embodiments prevent the panel from flexing, for example, due to sufficiently strong winds, since one of the sides of the panel is housed in the first panel groove, which prevents it from flexing.

[0033] In some particular embodiments, the closure device further comprises a U-shaped or L-shaped complementary section, such that the closure device is suitable for housing a series of panels between the first locking section and the complementary section, and the complementary section comprises a housing suitable for partially housing the vertical side of the panel in the inside thereof.

[0034] The use of these groove and/or U-shaped or L-shaped sections enables all the panels to function as one, which is further enclosed along the entire perimeter thereof in aluminum sections. This embodiment will prevent air and/or water from passing through the system, providing total sealing of the system.

BRIEF DESCRIPTION OF THE DRAWINGS

[0035] To complete the description, and for the purpose of helping to make the invention more readily understandable, the following set of figures is provided. These figures are an integral part of the description and they show one or more specific embodiments, which should not be interpreted as if they restrict the scope of protection of the invention, but rather simply an example of how the invention can be carried out. This set comprises the following figures:

Figures 1a and 1b show different elements of a same embodiment of a locking device according to the invention; in this case, the operation means rotate between 0° and 90°.

Figures 2a and 2b show front views of the first and second locking sections and of the operating means of an embodiment of a locking device, in a locked and unlocked position, respectively. Figures 2c and 2d show perspective views of the locking device shown in Figures 2a and 2b, respectively.

Figure 2e shows a perspective view of an alternative embodiment of the locking device shown in Figure 2c.

Figures 2f and 2g show transverse cross section views of the embodiment of the locking device shown in Figure 2e, in an unlocked and locked position, respectively.

Figures 3a and 3b show different elements of a second embodiment of a locking device according to the invention; in this case, the operation means rotate between 0° and 180°.

Figure 4 shows the operation means of the second embodiment of a locking device according to the invention.

Figure 5 shows an exploded view of first mechanical conversion means that belong to a locking device according to the invention.

Figure 6 shows an exploded view of second mechanical conversion means that belong to a locking device according to the invention.

Figures 7a and 7b show second mechanical conver-

sion means in the locked and unlocked positions, respectively.

Figures 8a and 8b show an alternate arrangement of second mechanical conversion means in the unlocked and locked positions, respectively.

Figure 9 shows an exploded view of the first conversion means of an alternative embodiment of a locking device according to the invention.

Figure 10 shows an exploded view of the second conversion means of an alternative embodiment of a locking device according to the invention.

DETAILED DESCRIPTION OF THE INVENTION

[0036] Figure 1a shows some of the elements of a locking device 10 according to the invention:

operating means 3 (e.g., a handle);
a first rod 4 connected on a first end to a first point 31 of the operating means 3; and
a second rod 5 connected on a first end to a second point 32 of the operating means 3.

[0037] If the operating means 3 are on both sides of the second locking section 2, the locking device of the invention can be used to both enter and exit the room where the locking device of the invention is installed.

[0038] The operating means 3 are arranged such that they can rotate between a first position and a second position with an operating means 3 suitable for rotating between 0° and 90°. When the operating means are located in the first position, each of the first end of the first rod 4 and the first end of the second rod 5 is located on each side of the operating means 3.

[0039] This figure also shows how the first rod 4 has a second end opposite the first end, this second end of the first rod being connected to the entry of first mechanical conversion means 60, configured to convert an entry movement into an exit movement perpendicular to the entry movement.

[0040] Likewise, the second rod 5 also has a second end opposite the first end, this second end of the second rod being connected to the entry of second mechanical conversion means 70, configured to convert an entry movement into an exit movement perpendicular to the entry movement.

[0041] Therefore, as shown in Figures 1a and 1b, when the operating means 3 change their position from a first position to a second position, the first 4 and second 5 rods are displaced, causing vertical displacement at the entry of the first 60 and second 70 mechanical conversion means, which is converted into horizontal movement at the exit of said first 60 and second 70 mechanical conversion means.

[0042] Figures 2a, 2b, 2c and 2d show a first locking section 1 and a second locking section 2; in the embodiment shown, they are U-shaped sections (although other shapes are possible). The second locking section 2 is

arranged such that the first locking section 1, when in the unlocked position, is at least partially housed inside the second locking section 2. Furthermore, the operating means 3 are fixed to the second locking section 2, on one or both faces of the section, which further covers and houses the first and second rods and the first and second mechanical conversion means. The exit of the first and second mechanical conversion means are joined to the first locking section 1, such that the horizontal movement that occurs at the exit of said first and second mechanical conversion means leads to horizontal displacement of said first locking section with respect to the second locking section 2, as shown in Figures 2a-2d.

[0043] In other words, by means of the locking device of the invention, by actuating on the operating means, the first locking section 1 is acted on, which, in the unlocked position thereof (Figures 2b and 2d), it is at least partially housed inside the second locking section 2. This movement of the first locking section 1 inside the second locking section 2 modifies the full extension occupied by the first and second locking sections (in the sliding direction of the panels), which makes it possible to open a gap in order to move a first panel (not shown in the figures) of the enclosure system, adjacent to the locking device 10 of the invention.

[0044] In Figures 2e, 2f and 2g, an alternative embodiment of the locking device shown in Figures 2c-2d is shown. The embodiment shown in Figures 2e and 2f only has one operating means on one of the two sides of the second locking section 2. In this case, the locking device cannot be actuated from both sides, but instead it can only be actuated from one of the two sides.

[0045] In Figure 2f, the locking device shown in the position equal to that of Figures 2b and 2d, in other words, in the unlocked position; and in Figure 2g, it is in the locked position (equal to that of Figures 2a and 2c). In this alternative embodiment of the locking device, the first locking section 1 further comprises a U-shaped complementary section 1'. The vertical side of one of the panels of the enclosure system can be assembled or coupled to this complementary section 1'.

[0046] In the transverse cross section views shown in Figures 2f and 2g, some of the elements of the locking device are seen, such as: the first rod 4, the upper entry part 6, the upper base 62, the fixing plate 625 and the upper exit part 64.

[0047] By means of the operating means 3, the first and second locking sections 1, 2 (U-shaped sections) expand and contract. If a lock is also included, it locks the movement of the operating means 3 from both the inside and the outside.

[0048] Figure 3a shows some of the elements of a locking device 10' according to another possible embodiment of the invention comprising operating means 3' suitable for rotating between 0° and 180°:

operating means 3';
a first rod 4 connected on a first end to a first point

31 of the operating means 3'; and
a second rod 5 connected on a first end to a second point 32 of the operating means 3'.

[0049] The operating means 3' are arranged such that they can rotate between a first position and a second position. However, in this embodiment, when the operating means are located in the first position, the first end of the first rod 4 and the first end of the second rod 5 are located above and below the operating means 3'.

[0050] This figure also shows how the first rod 4 has a second end opposite the first end, this second end of the first rod being connected to the entry of first mechanical conversion means 60, configured to convert an entry movement into an exit movement perpendicular to the entry movement.

[0051] Likewise, the second rod 5 also has a second end opposite the first end, this second end of the second rod being connected to the entry of second mechanical conversion means 70, configured to convert an entry movement into an exit movement perpendicular to the entry movement.

[0052] However, the position of the first 60 and second 70 mechanical conversion means is not symmetrical.

[0053] This is due to the different operation of the operating means 3' in this embodiment. When the operating means are in a first position, the first end of the first rod 4 is in its farthest position with respect to the first mechanical conversion means 60 and, at the same time, the first end of the second rod 5 is in the closest position with respect to the second mechanical conversion means 70. The internal operation of these operating means 3' will be seen later on.

[0054] When the operating means 3' change their position from a first position to a second position, as shown in Figure 3b, the first 4 and second 5 rods are displaced linearly in the same direction; now the first end of the first rod 4 is in its closest position with respect to the first mechanical conversion means 60 and, at the same time, the first end of the second rod 5 is in the farthest position with respect to the second mechanical conversion means 70.

[0055] These movements cause vertical displacement at the entry of the first 60 and second 70 mechanical conversion means, which is converted into horizontal movement at the exit of said first 60 and second 70 mechanical conversion means. In this embodiment, the first 60 and second 70 mechanical conversion means are not exactly symmetrical, meaning that they have the same effect, in other words, pushing or pulling the first locking section 1, although they are in opposite positions.

[0056] Figure 4 shows the internal operation of the operating means 3' used in this second embodiment of the invention.

[0057] These operating means 3' comprises a rigid compensating part 33 that contains the first point 31 and the second point 32. This rigid compensating part 33 has a gear rail, such that when the operating means 3' move

from a first position to the second position, they move the gear rail such that the rigid compensating part 33 is displaced vertically, making the first 4 and second 5 rods swing between their closest and farthest position with respect to their corresponding mechanical conversion means. Since it is a rigid part, when one of the rods is in its closest position with respect to its corresponding conversion means, the other rod is in its farthest position with respect to its corresponding conversion means.

[0058] Figure 5 shows an exploded view of the first mechanical conversion means 60 contained in a particular example of a locking device according to the invention.

[0059] These first mechanical conversion means 60 comprise

an upper entry part 6 to which the second end of the first rod 4 is coupled in an articulated way, the upper entry part 6 comprising a first upper groove 61;

an upper base 62 fixed to the second locking section 2; an upper bolt 63 fixed to the upper base 62, the upper bolt 63 being inserted in the first upper groove 61 of the upper entry part 6;

an upper exit part 64, the upper exit part 64 comprising a first upper guide 65, configured to limit the movement of the upper entry part 6 according to a vertical direction, and a second upper guide 66, configured to limit the movement of the upper exit part 64 with respect to the upper base 62 according to a horizontal direction, the upper exit part 64 further comprising a second upper groove 67 in which the upper bolt 63 is inserted;

[0060] As shown in this figure, the first upper groove forms a 45° angle with the second upper groove and the second upper groove is located according to the horizontal direction.

[0061] Furthermore, an upper auxiliary part 68 is located in these first mechanical conversion means 60, which is inserted in an upper vertical auxiliary groove 69 comprised in the upper exit part 64, such that the horizontal movement is transmitted between the upper exit part 64 and the upper auxiliary part 68. The first locking section 1 is connected to the upper exit part 64 by means of an upper auxiliary part 68 that is fixed to the first locking section 1. The fact that the upper auxiliary part 68 is free to be displaced along the upper vertical auxiliary groove 69 enables the position of the first locking section 1 to be adjusted with respect to the rest of the components of the system.

[0062] As shown in this figure, it is understood that when the first rod 4 is displaced due to the position change of the operating means 3, the upper entry part 6 is displaced according to the vertical component of the movement of the first rod 4, since the upper entry part 6 is limited by the first upper guide 65. This vertical movement causes the upper bolt 63, which is arranged to slide along the first upper groove 61 contained in the upper entry part 6, to be displaced so that it remains in said upper groove 61 while the upper entry part 6 is displaced. Since the upper bolt 63 is also limited by a second upper

groove 67, it is displaced along it, dragging the entire upper base 62 to which it is fixed. Therefore, the movement of the first rod 4 causes relative horizontal movement between the upper base 62 and the upper exit part 64 and, therefore, relative movement of the first locking section 1, which is fixed to this upper exit part 64 by means of the upper auxiliary part 68, and the second locking section 2, which is fixed to the upper base 62. In the embodiment shown in this figure, the upper base 62 is fixed to the second locking section 2 by means of an upper fixing plate 625.

[0063] As shown in Figure 6, the second mechanical conversion means 70 operate similarly to the first mechanical conversion means 60 by means of the following elements:

a lower entry part 7 to which the second end of the second rod 5 is coupled in an articulated way, the lower entry part 7 comprising a first lower groove 71; a lower base 72 fixed to the second locking section 2; a lower bolt 73 fixed to the lower base 72, the lower bolt 73 being inserted in the first lower groove 71 of the lower entry part 7;

a lower exit part 74, the lower exit part 74 comprising a first lower guide 75, configured to limit the movement of the lower entry part 7 according to a vertical direction, and a second lower guide 76, configured to limit the movement of the lower exit part 74 with respect to the lower base 72 according to a horizontal direction, the lower exit part 74 further comprising a second lower groove 77 in which the lower bolt 73 is inserted. In the embodiment shown in this figure, the lower base 72 is fixed to the second locking section 2 by means of a lower fixing plate 725.

[0064] As shown in this figure, the first lower groove forms a 45° angle with the second lower groove and the second lower groove is located according to the horizontal direction.

[0065] Furthermore, a lower auxiliary part 78 is located in these second mechanical conversion means 70, which is inserted in a lower vertical auxiliary groove 79 comprised in the lower exit part 74, such that the horizontal movement is transmitted between the lower exit part 74 and the lower auxiliary part 78. The first locking section 1 is connected to the lower exit part 74 by means of this lower auxiliary part 78 that is fixed to the first locking section 1.

[0066] Figures 7a and 7b show the details of second mechanical conversion means 70 in their locked and unlocked positions, respectively. The displacement of the lower entry part 7 causes the displacement of the lower bolt 73 along the second lower groove 77, displacing the assembly with respect to the lower base 72. The lower auxiliary part 78, housed in the lower vertical auxiliary groove 79, is intended to be joined to the first locking section 1, thereby transferring the horizontal displacement.

[0067] Figures 8a and 8b show the details of another possible embodiment of second mechanical conversion means 70 in their locked and unlocked positions, respectively. In this case, with regard to the embodiment shown in Figures 7a and 7b, the first lower groove 71 is perpendicular to the lower groove shown in these other two figures. In this embodiment, like in the other embodiment, the displacement of the lower entry part 7 causes the displacement of the lower bolt 73 along the second lower groove 77, displacing the assembly with respect to the lower base 72. The lower auxiliary part 78, housed in the lower vertical auxiliary groove 79, is intended to be joined to the first locking section 1, thereby transferring the horizontal displacement. However, in this case, the horizontal movement caused by the displacement of the lower bolt 73 occurs in the direction opposite that of the embodiment shown in Figures 7a and 7b, due to this change in the direction of the first lower groove 71.

[0068] These different embodiments would be used properly in each of the embodiments described above. On one hand, in the embodiment described in reference to Figures 1a, 1b, 2a and 2b, first mechanical conversion means equal to the second mechanical conversion means of Figures 7a and 7b, along with the second mechanical conversion means of Figures 7a and 7b, will be used. This makes it possible for the operation to be symmetrical, which is consistent with the arrangement of the operating means in this first embodiment.

[0069] On the other hand, in the embodiment described in reference to Figures 3a and 3b, first mechanical conversion means equal to the second mechanical conversion means of Figures 7a and 7b, along with the second mechanical conversion means of Figures 8a and 8b, will be used. This makes it possible for the operation to be asymmetrical, which is consistent with the arrangement of the operating means in this second embodiment.

[0070] Figure 9 shows an exploded view of an alternative embodiment of the first mechanical conversion means 60 contained in a particular example of a locking device according to the invention.

[0071] The main difference between the first mechanical conversion means shown in this figure and those shown in Figure 5 is based on the shape of the first upper groove 61. In this embodiment, this first upper groove 61 comprises a main segment 611, equal to the entirety of the first upper groove of the example of Figure 5, and it further comprises two vertical portions 612, 613 that start from the ends of said main segment 611. These vertical portions are essentially perpendicular to the second upper groove 67 and aim to prevent the movement of the assembly when the operating means are not engaged. As such, if the operating means are not engaged, despite efforts to move the system by means of the movement of the first locking section, in other words, by the movement of the fixing plate, the upper bolt remains in one of the vertical portions, such that a horizontal movement, like that of the fixing plate, will not cause it to exit that vertical portion. On the contrary, when the operating

means are engaged, since they do cause vertical movement, they successfully remove the upper bolt from the vertical portions and move the system.

[0072] Figure 10 shows an exploded view of an alternative embodiment of the second mechanical conversion means 70 contained in a particular example of a locking device according to the invention.

[0073] The second mechanical conversion means 70 shown in this embodiment comprise a modification similar to that of the first conversion means 60 shown in Figure 9. In this case, the first lower groove 71 is the groove that comprises one main segment 711 and two vertical portions 712, 713 that start from the ends of said main segment 711. The operation of this improvement is equal to that described with respect to the first mechanical conversion means of Figure 9.

List of references

[0074]

(1)	First locking section	
(1')	Complementary section	
(10, 10')	Locking device	
(2)	Second locking section	
(3, 3')	Operating means	
(31)	First point of the operating means	
(32)	Second point of the operating means	
(4)	First rod	
(5)	Second rod	
(6)	Upper entry part	
(60)	First mechanical conversion means	
(61)	First upper groove	
(611)	Main segment of the first upper groove	
(612, 613)	Vertical segments of the first upper groove	
(62)	Upper base	
(625)	Fixing plate	
(63)	Upper bolt	
(64)	Upper exit part	
(65)	First upper guide	
(66)	Second upper guide	
(67)	Second upper groove	
(68)	Upper auxiliary part	
(69)	Upper vertical auxiliary groove	
(7)	Lower entry part	
(70)	Second mechanical conversion means	
(71)	First lower groove	
(711)	Main segment of the first lower groove	
(712, 713)	Vertical segments of the first lower groove	
(72)	Lower base	
(725)	Fixing plate	
(73)	Lower bolt	
(74)	Lower exit part	
(75)	First lower guide	
(76)	Second lower guide	
(77)	Second lower groove	
(78)	Lower auxiliary part	
(79)	Lower vertical auxiliary groove	

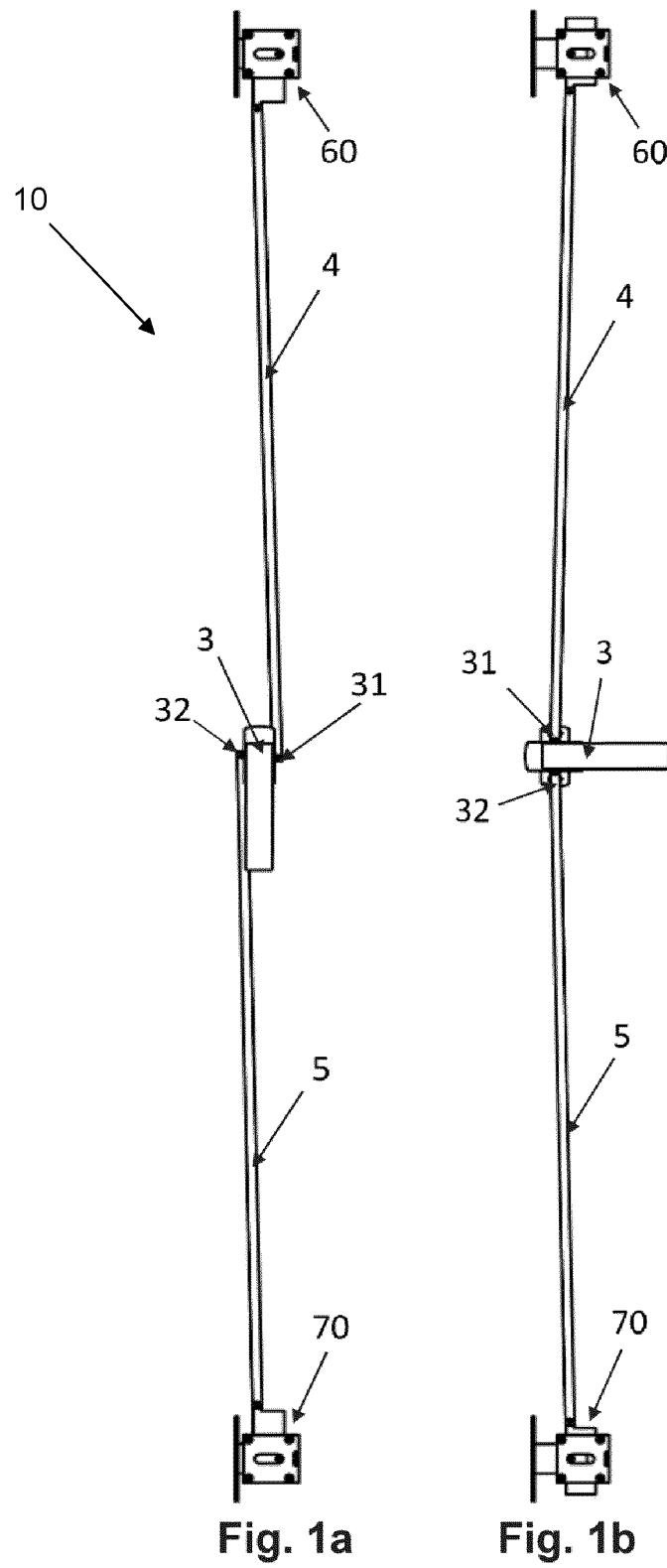
Claims

1. A closure device (10, 10') **characterized in that** it comprises:

a first locking section (1); arranged in a movable manner between a locked position and an unlocked position;
a second locking section (2) arranged such that the first locking section (1), when in the unlocked position, is at least partially housed inside the second locking section (2);
operating means (3, 3'), joined to the second locking section (2), arranged such that they can rotate between a first position and a second position;
a first rod (4) connected on a first end to a first point (31) of the operating means (3, 3');
a second rod (5) connected on a first end to a second point (32) of the operating means (3, 3'); wherein the first locking section (1) is mechanically coupled to a second end of the first rod (4) by means of first mechanical conversion means (60) configured to convert an entry movement into an exit movement perpendicular to the entry movement, the first rod (4) being connected to an upper entry part (6) of the first mechanical conversion means (60) and the first locking section (1) connected to an upper exit part (64) of the first mechanical conversion means (60), such that upon movement of the first rod (4), the first locking section (1) moves in a direction perpendicular to the first rod (4);
wherein the first locking section (1) is mechanically coupled to a second end of the second rod (5) by means of second mechanical conversion means (70) configured to convert an entry movement into an exit movement perpendicular to the entry movement, the second rod (5) being connected to a lower entry part (7) of the second mechanical conversion means (70) and the first locking section (1) connected to a lower exit part (74) of the second mechanical conversion means (70), such that upon movement of the second rod (5), the first locking section (1) moves in a direction perpendicular to the second rod (5).

2. The closure device (10, 10') of claim 1, **characterized in that** the first mechanical conversion means (60) comprise
an upper entry part (6) to which the second end of the first rod (4) is coupled in an articulated way, the upper entry part (6) comprising a first upper groove (61);
an upper base (62) fixed to the second locking section (2);
an upper bolt (63) fixed to the upper base (62), the

- upper bolt (63) being inserted in the first upper groove (61) of the upper entry part (6);
 an upper exit part (64), the upper exit part (64) comprising a first upper guide (65), configured to limit the movement of the upper entry part (6) according to a vertical direction, and a second upper guide (66), configured to limit the movement of the upper exit part (64) with respect to the upper base (62) according to a horizontal direction, the upper exit part (64) further comprising a second upper groove (67) in which the upper bolt (63) is inserted;
 wherein the first upper groove forms an angle between 30° and 60° with the second upper groove and the second upper groove is located according to the horizontal direction.
3. The closure device (10, 10') of claim 2, **characterized in that** the second mechanical conversion means (70) comprise
 a lower entry part (7) to which the second end of the second rod (5) is coupled in an articulated way, the lower entry part (7) comprising a first lower groove (71);
 a lower base (72) fixed to the second locking section (2);
 a lower bolt (73) fixed to the lower base (72), the lower bolt (73) being inserted in the first lower groove (71) of the lower entry part (7);
 a lower exit part (74), the lower exit part (74) comprising a first lower guide (75), configured to limit the movement of the lower entry part (7) according to a vertical direction, and a second lower guide (76), configured to limit the movement of the lower exit part (74) with respect to the lower base (72) according to a horizontal direction, the lower exit part (74) further comprising a second lower groove (77) in which the lower bolt (73) is inserted;
 wherein the first lower groove forms an angle between 30° and 60° with the second lower groove, and the second lower groove is located according to the horizontal direction.
4. The closure device (10, 10') of claim 3, **characterized in that** at least one of the first upper groove (61) and the first lower groove (71) comprises a main segment (611, 711) with two ends and two vertical portions (612, 613, 712, 713) that start from the ends of the main segment and extend in a direction that is essentially perpendicular to the second lower groove or to the second upper groove respectively.
5. The closure device (10, 10') of any of the preceding claims, **characterized in that** the first locking section (1) is connected to the upper exit part (64) by means of an upper auxiliary part (68) that is fixed to the first locking section (1) and inserted in an upper vertical auxiliary groove (69) comprised in the upper exit part (64), such that the horizontal movement is transmitted between the upper exit part (64) and the upper auxiliary part (68).
6. The closure device (10, 10') of any of the preceding claims, **characterized in that** the first locking section (1) is connected to the lower exit part (74) by means of a lower auxiliary part (78) that is fixed to the first locking section (1) and inserted in a lower vertical auxiliary groove (79) comprised in the lower exit part (74), such that the horizontal movement is transmitted between the lower exit part (74) and the lower auxiliary part (78).
7. The closure device (10, 10') of any of the preceding claims, **characterized in that** the operating means have a rotation axis, and the first point (31) and the second point (32) are located symmetrically with respect to said rotation axis.
8. The closure device (10, 10') of any of the preceding claims, **characterized in that** the operating means comprise a lock that enables locking the position thereof.
9. The closure device (10, 10') of any of the preceding claims, **characterized in that** the operating means (3, 3') are accessible from opposite faces of the second locking section (2).
10. The closure device (10, 10') of any of the preceding claims, **characterized in that** the first locking section (1) comprises a housing that enables the vertical side of a panel to be partially housed in the inside thereof.
11. The closure device (10, 10') of any of the preceding claims, **characterized in that** it further comprises a U-shaped or L-shaped complementary section (1'), such that the locking device (10) is suitable for housing a series of panels between the first locking section (1) and the complementary section, and the complementary section (1') comprises a housing suitable for partially housing the vertical side of the panel in the inside thereof.



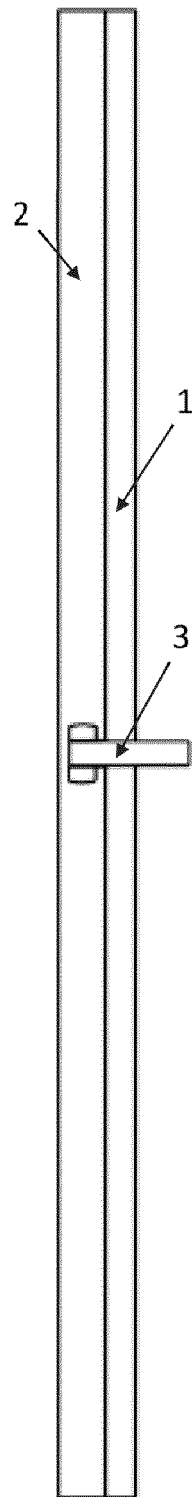


Fig. 2a

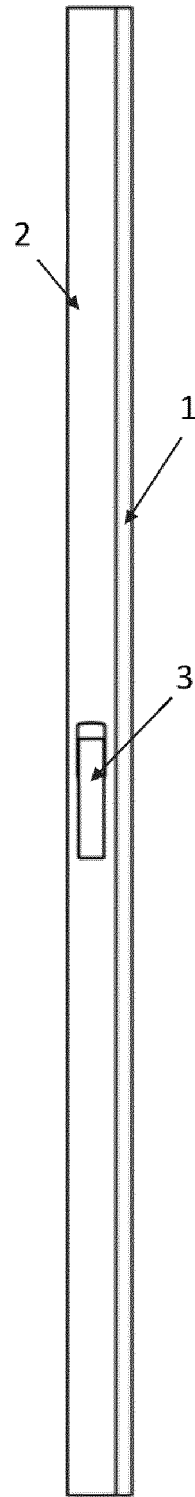


Fig. 2b

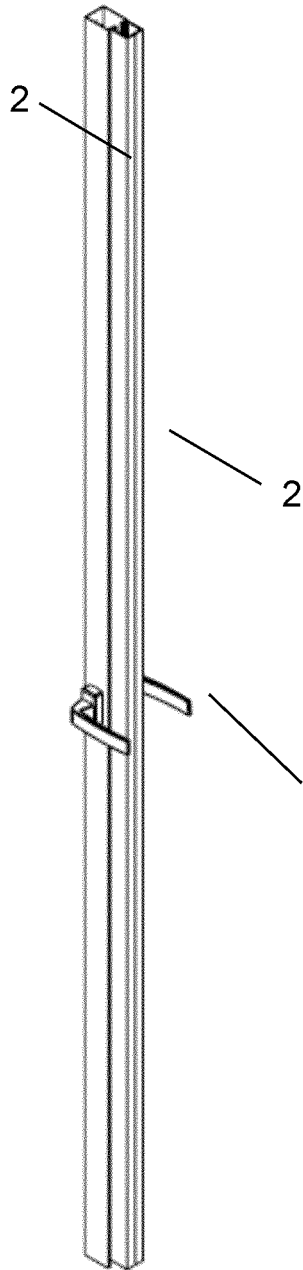


Fig. 2c

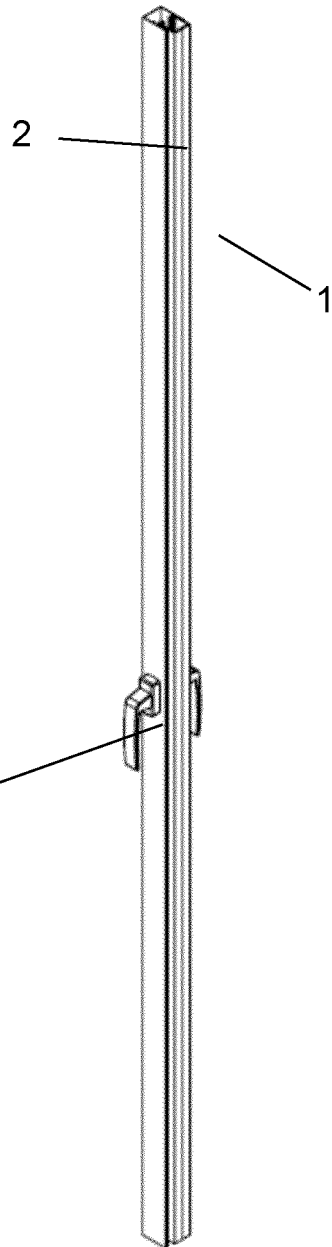


Fig. 2d

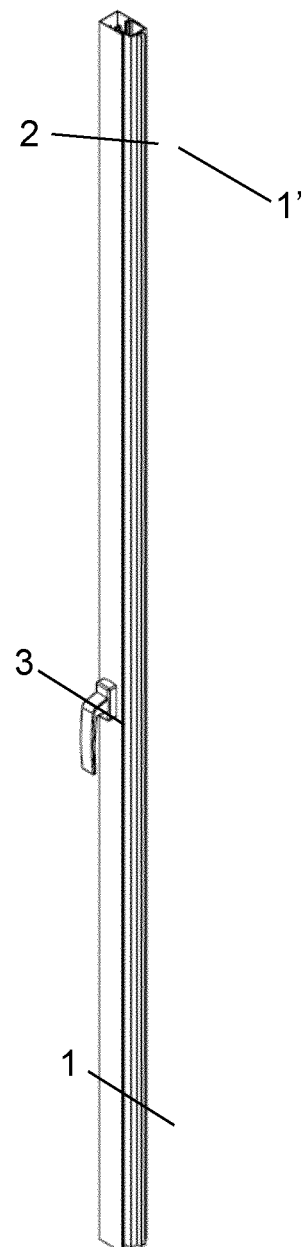


Fig. 2e

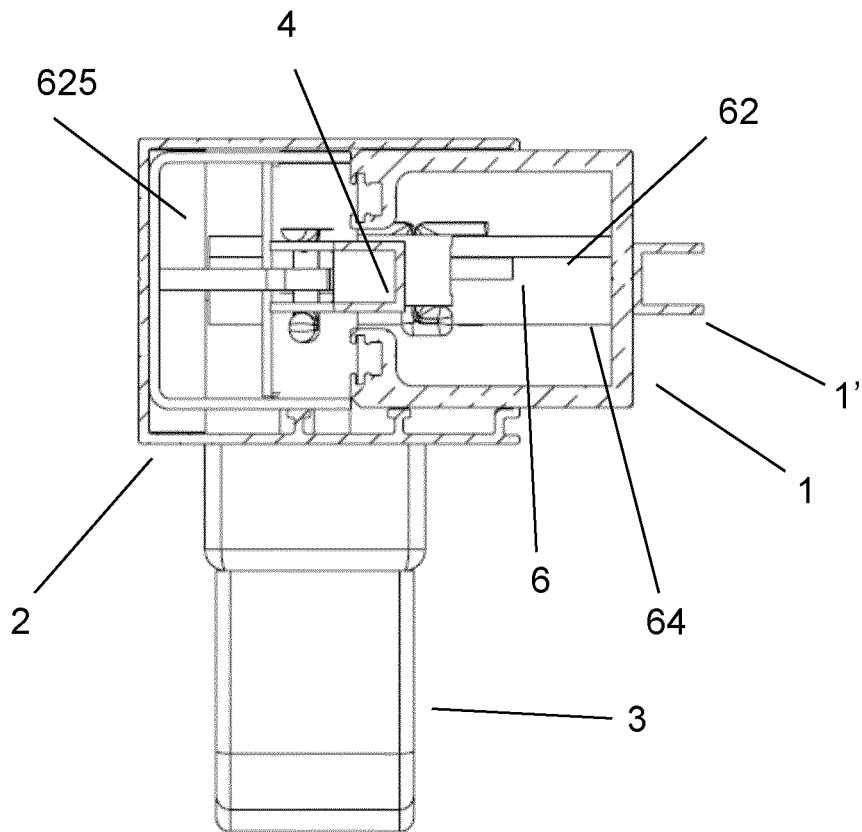


Fig. 2f

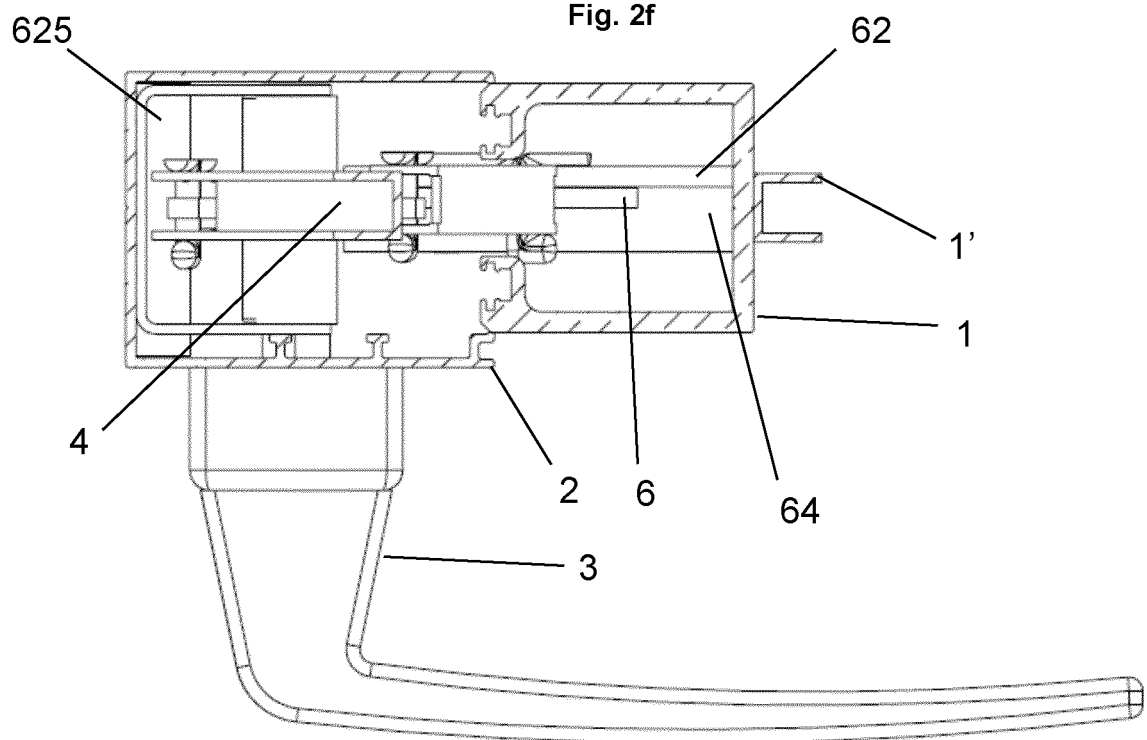


Fig. 2g

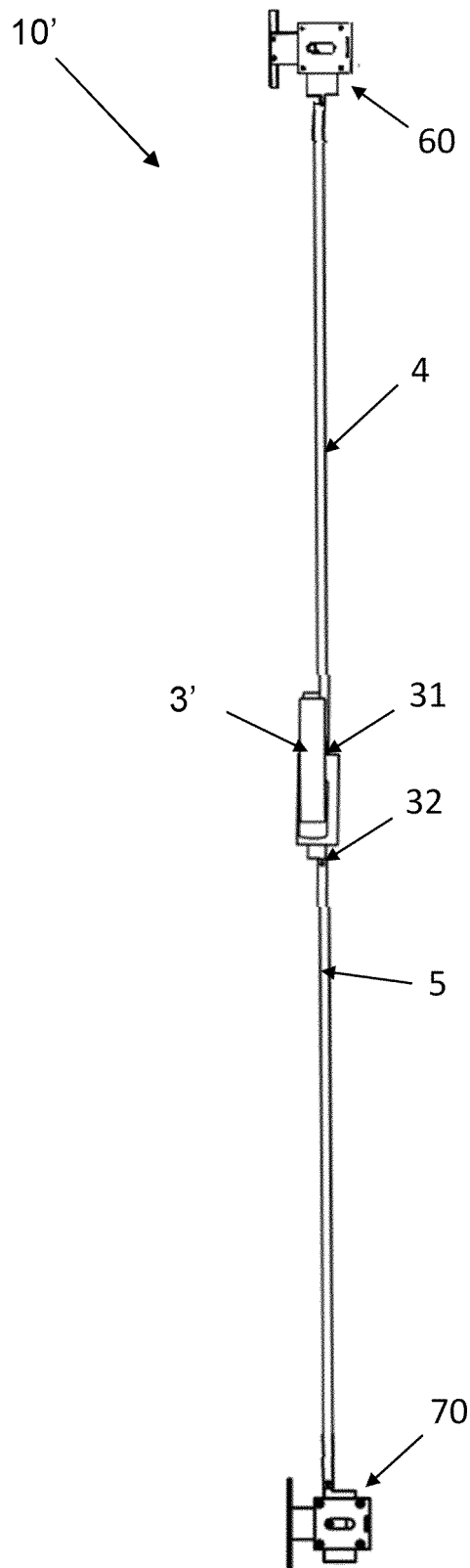


Fig. 3a

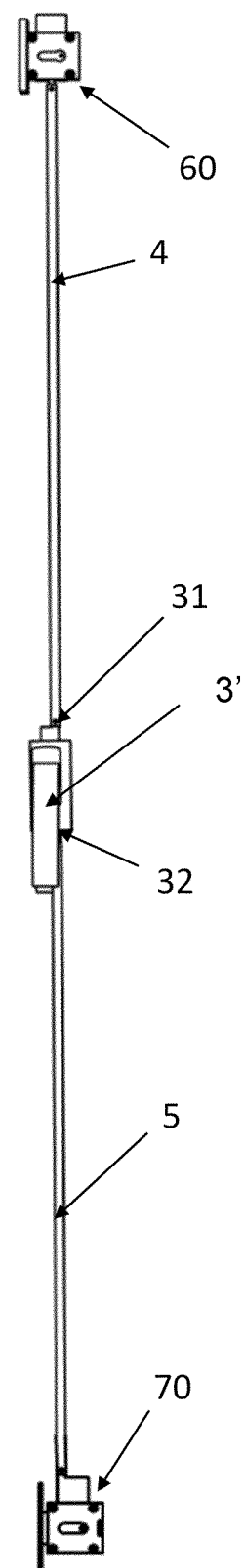


Fig. 3b

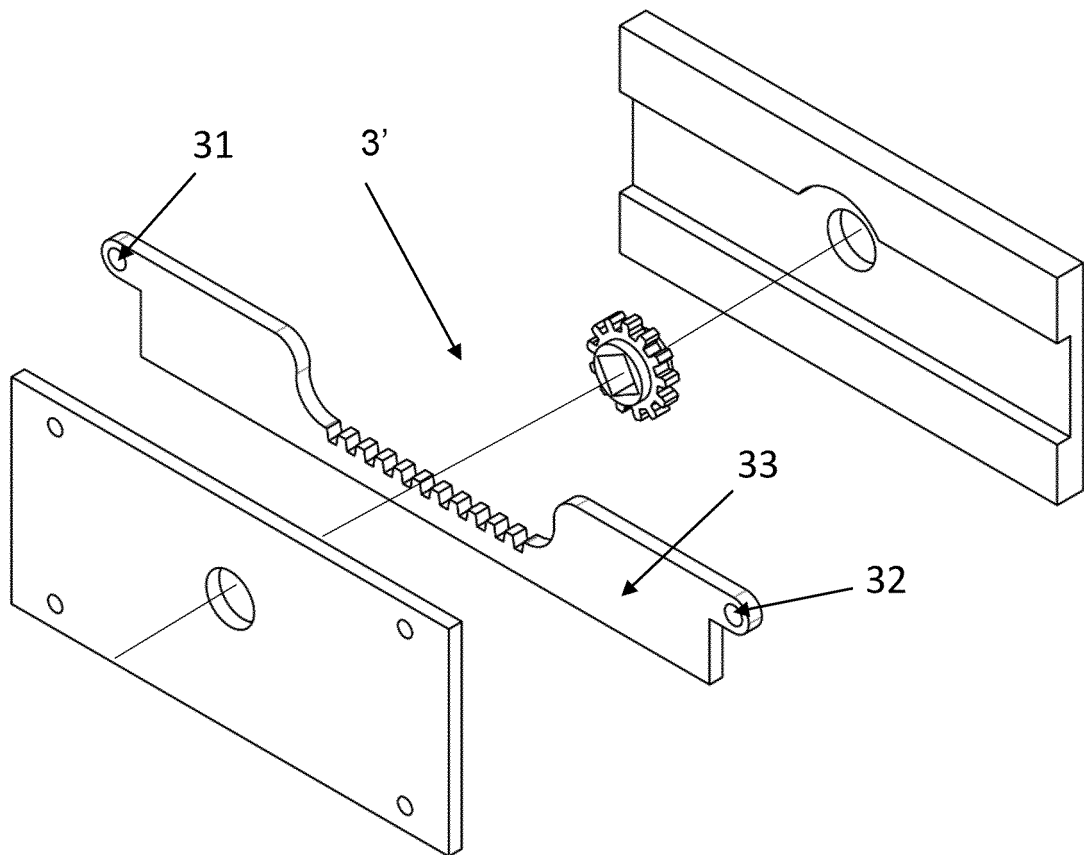


Fig. 4

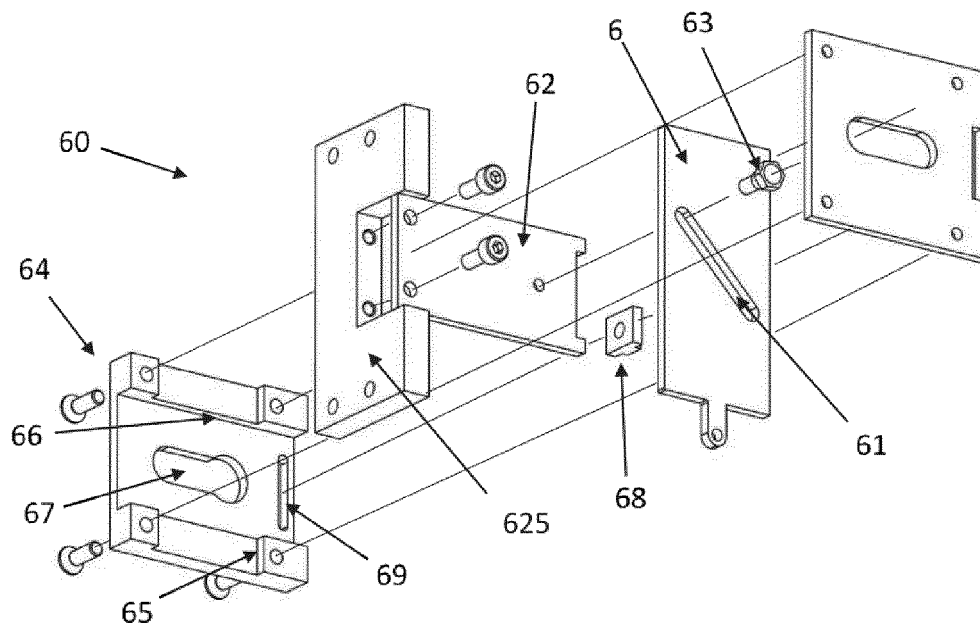


Fig. 5

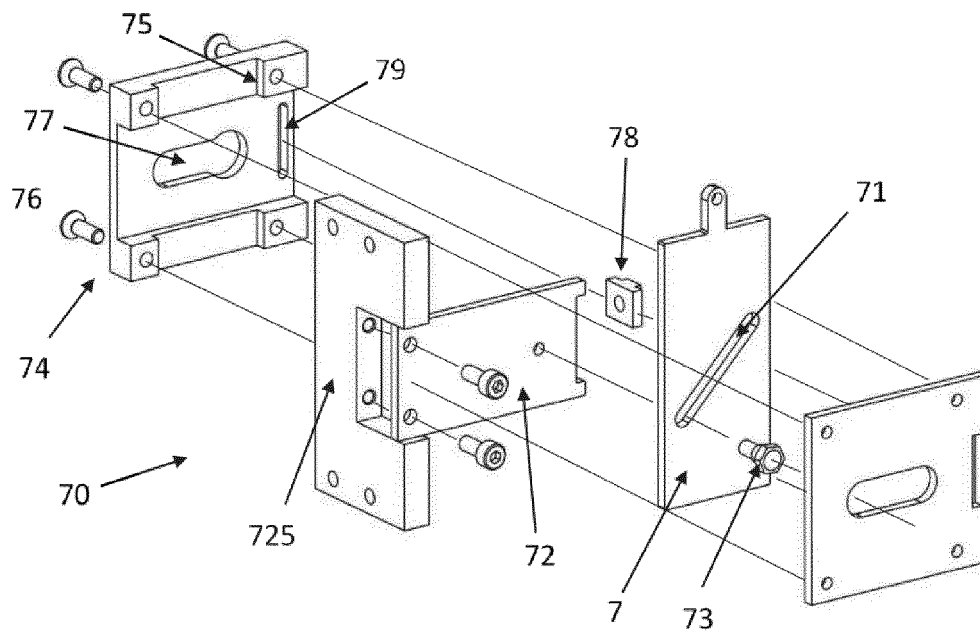


Fig. 6

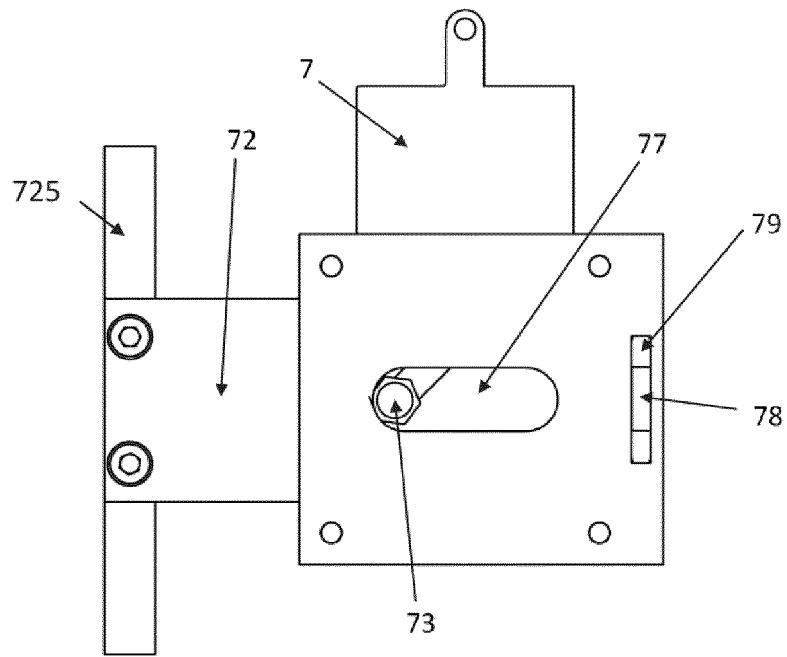


Fig. 7a

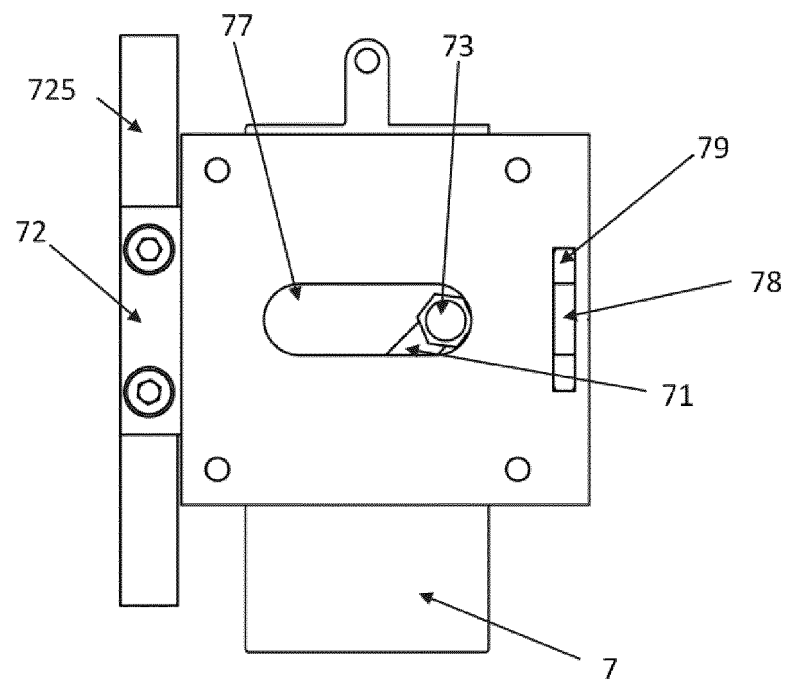


Fig. 7b

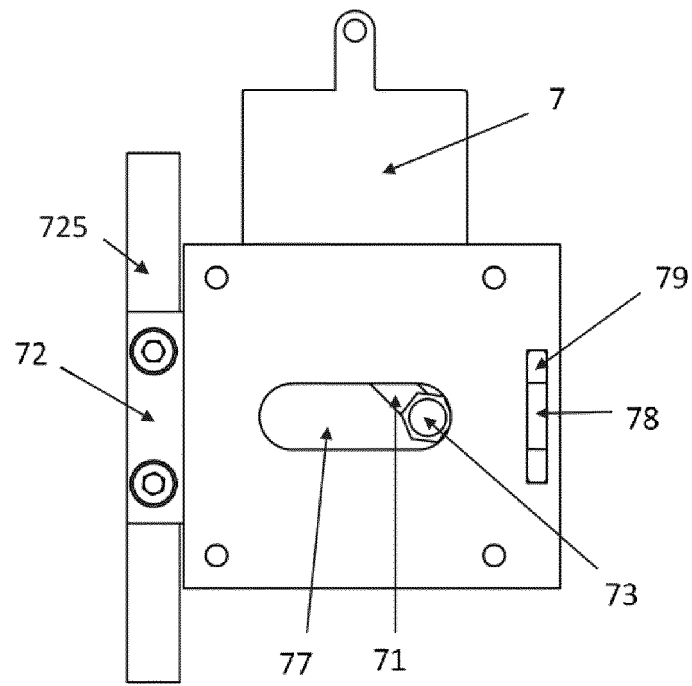


Fig. 8a

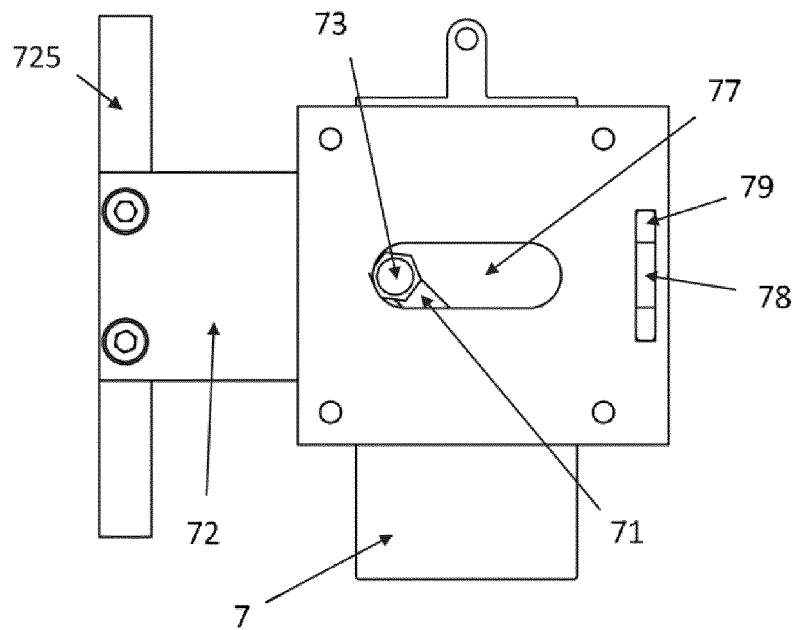


Fig. 8b

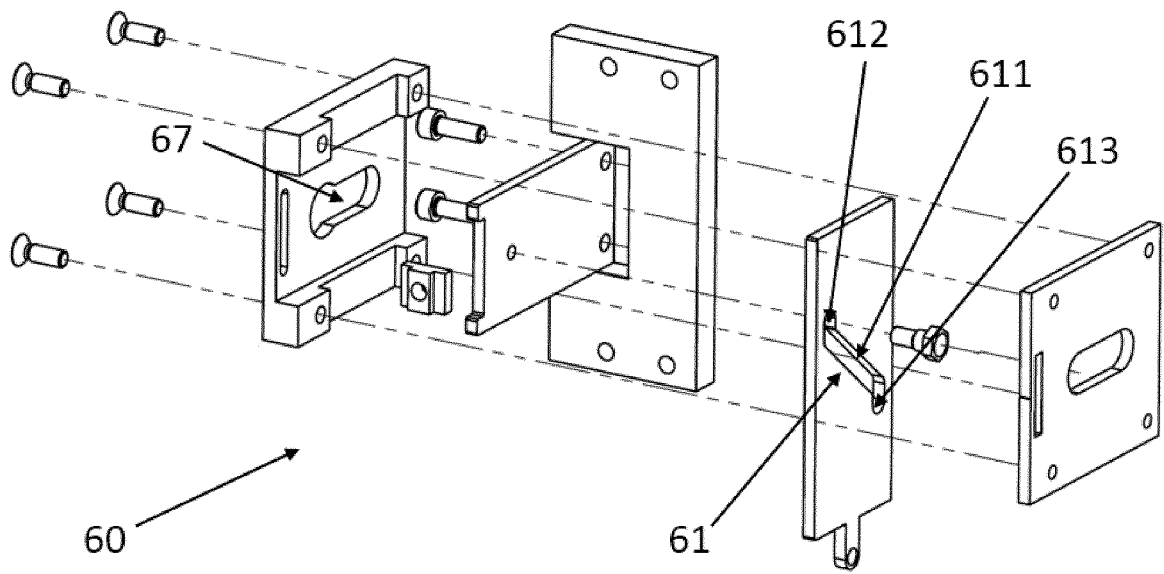


Fig. 9

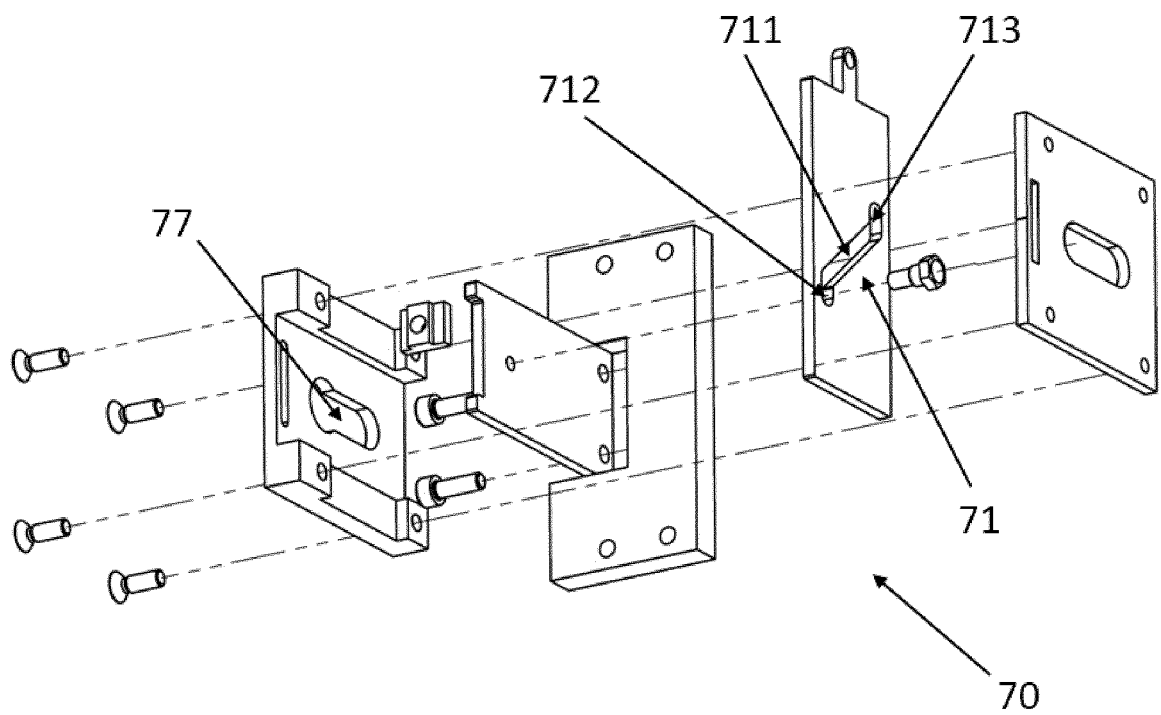


Fig. 10

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- ES 1149237 U [0004]
- ES 2365575 A1 [0005]