



(11) **EP 3 431 676 A1**

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
23.01.2019 Bulletin 2019/04

(51) Int Cl.:
E04B 2/82 (2006.01) **E05D 15/06** (2006.01)
E06B 3/50 (2006.01) **E06B 3/92** (2006.01)
E05D 15/58 (2006.01)

(21) Application number: **17713335.2**

(22) Date of filing: **10.03.2017**

(86) International application number:
PCT/ES2017/070137

(87) International publication number:
WO 2017/158218 (21.09.2017 Gazette 2017/38)

(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
Designated Validation States:
MA MD

(71) Applicant: **Distribuidora de Sistemas de Cierre, S.L.**
29570 Cártama (Málaga) (ES)

(72) Inventor: **ONA GONZALEZ, Francisco Javier**
29004 Malaga (ES)

(74) Representative: **Balder IP Law, S.L.**
Paseo de la Castellana 93
5ª planta
28046 Madrid (ES)

(30) Priority: **14.03.2016 ES 201630330 U**

(54) **CLOSURE DEVICE FOR A DOOR WHICH SLIDES AND PIVOTS**

(57) The invention relates to a closure device (100) characterized in that it comprises a lower rail (12), a lower pivot (1) fastened to the lower rail (12), a fixed door (58) and a sliding door (52). The lower pivot (1) comprises a selective retention element (104) and a guide element (103) that comprises a lower longitudinal passage slot (105) with a width and lower rotation space (106) with a circular shape through which the lower longitudinal passage slot (105) passes, the lower rotation space (106)

having a diameter. The sliding door (52) comprises a lower fitting (2) with a lower protrusion (204). The selective retention element (104) comprises a surface (107) and an open cavity (108), accessible in a sliding direction (X), said cavity (108) comprising retention means (109) suitable for retaining the lower protrusion (204) when it is located in said cavity (108). The cavity (108) has a size equal to or smaller than the width of the longitudinal passage slot (105).

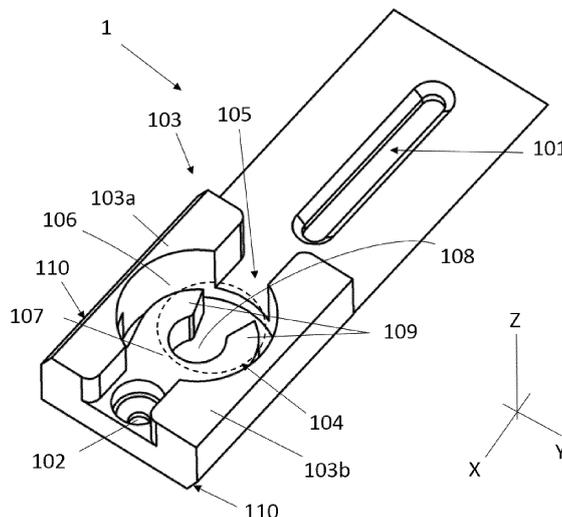


Fig. 2

EP 3 431 676 A1

Description**TECHNICAL FIELD**

[0001] This invention belongs to the technical field of enclosure systems for sliding panels made from glass.

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 enclosure systems on the market with panels that are retracted via sliding on the rails, and they end up being stored at one end or divided between both ends of said rails. These systems have a panel that is called a door, which may be opened and closed by rotation on a virtual fixed axis that joins the upper and lower rails, and thus, it is not possible to slide it along the section. Therefore, in these systems, the door is always relegated to one of the ends of the sections, since, as it cannot slide along the rails, if it were not located at one of the ends, it would hinder the passage of the panels and they could not be easily retracted.

[0004] The patent application ES2324273 A1 describes one of these enclosure systems with independent panels that move guided by an upper rail and another lower one. The weight of each of the panels is evenly and longitudinally distributed along the lower rail, whereby the upper rail only serves as a guide. Each panel can move individually. The enclosure system, in addition to the independent panels, has a door, which is the last panel and does not move longitudinally from the retracted position. Otherwise, said door has a configuration that is similar to the rest of the panels, although it includes a locking system.

[0005] The utility model ES1149237 U describes in detail how these doors function.

[0006] Patent applications ES2365575 A1 and WO 2012/175754 A1 show improvements to this type of enclosure system with independent panels.

[0007] These systems are very common in business and restaurant terraces wherein, due to these limitations, customers exit from one end or side of the enclosure, which is not comfortable or convenient from a safety point of view.

DESCRIPTION OF THE INVENTION

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

[0009] In a first inventive aspect, the invention relates to a closure device, comprising:

a lower rail;

a lower pivot, fastened to the lower rail, the lower pivot in turn comprising a selective retention element and a lower guide element that comprises a lower longitudinal passage slot with a width and lower rotation space with a circular shape through which the lower longitudinal passage slot passes, the lower rotation space having a diameter;

a fixed door; and

a sliding door;

wherein the sliding door, in turn, comprises a lower fitting, which, in turn, comprises a lower protrusion suitable for being retained by the selective retention element,

wherein the selective retention element of the lower pivot comprises a surface and a cavity comprised on said surface, said cavity being open such that it is accessible in a sliding direction, therefore being suitable for allowing the entry of the lower protrusion, and said cavity comprising retention means suitable for retaining the lower protrusion when it is located in said cavity; and wherein the cavity has a size equal to or smaller than the width of the longitudinal passage slot.

[0010] Advantageously, this closure device allows there to be both panels and doors, fixed and sliding, in the same device, all of them being able to slide along the lower rail, except for the fixed door, but in such a way that only the desired sliding door is retained by the selective retention element, while the remaining panels can pass over the lower pivot without being retained. The fastening caused by the selective retention element enables the rotation axis of the sliding door to be defined.

[0011] In a particular embodiment, the lower fitting further comprises a pivot piece, the width of which is smaller than the width of the lower longitudinal passage slot and the plan cross section of which is enclosed in a circumference with a diameter that is the diameter of the lower rotation space.

[0012] This pivot piece enables the lower fitting of the sliding door to remain in contact with the lower pivot during the rotation movement of the sliding door, reinforcing the exact position of the rotation axis.

[0013] In a particular embodiment, the closure device further comprises an intermediate separation element, which may slide along the lower rail, the intermediate separation element comprising a support piece intended to slide along the lower rail; and a separation piece suitable for separating two elements that are on the lower rail.

[0014] This element can operate perfectly without the need for doors or panels, since its operation consists of separating any two elements that are being guided on the lower rail. In this particular embodiment, it serves to separate the lower fitting of the sliding door from the lower fitting of a panel. This function is useful when the panels are retracted and rotated, in other words, when the device must be open and the panels withdrawn. In this case, the panels slide to one side of the lower rail and once in that

position, they can leave the lower and upper rails by rotating, as if they were doors. When the sliding door reaches that end, since the finish of the rigid sheet may have protrusions or beveled edges, it is desirable to leave a certain distance between the sliding door and the panels that are already retracted. To do this, an intermediate element of separation is introduced between the sliding door and the adjacent panel on the side that has the lower fitting.

[0015] In a particular embodiment, the retention means of the cavity of the selective retention element of the lower pivot are clipping retention means, wherein the selective retention element comprises flexible ends that allow elastic deformation in order to receive an element and that recover their shape after deformation in order to retain said element.

[0016] The retention means of the cavity of the selective retention element aim to retain the lower protrusion in a reversible manner. Clipping can only be overcome by applying sufficient force in the sliding direction, which only occurs when the panels are going to be retracted, since, if the pivot piece is not aligned with the longitudinal rotation slot, said pivot piece butts against said slot, and the lower fitting cannot move.

[0017] In a particular embodiment, the lower guide element of the lower pivot comprises two pieces facing each other, such that the separation between them constitutes the lower longitudinal passage slot and the lower rotation space.

[0018] In a particular embodiment, each piece of the lower guide element comprises two straight segments joined by a circular segment, said pieces being arranged such that the straight segments of both pieces are parallel or oblique and the circular segments of both pieces correspond to segments with the same circumference.

[0019] In a particular embodiment, the lower pivot further contains a chamfer on each of the pieces of the lower guide element, which is intended to facilitate the insertion, extraction and maneuverability of said lower pivot on the lower rail.

[0020] In a particular embodiment, the closure device further comprises:

- an upper rail;
- an upper pivot, fastened to the upper rail, the upper pivot in turn comprising an upper guide element that comprises an upper longitudinal passage slot and an upper rotation gap with a circular shape opened by the upper longitudinal passage slot;
- and wherein the sliding door further comprises an upper fitting, which in turn comprises an upper plate joined to an upper frame; and a rigid sheet joined to the upper frame and the lower frame.

[0021] In a particular embodiment, the upper guide element of the upper pivot comprises two pieces facing each other, such that the separation between them constitutes the upper longitudinal passage slot and the upper

rotation space.

[0022] In a particular embodiment, the upper pivot further contains a chamfer on each of the pieces of the guide element, which is intended to facilitate the insertion, extraction and maneuverability of said upper pivot on the upper rail.

[0023] In a particular embodiment, the rigid sheet is a glass sheet. In a particular embodiment, the upper frame comprises an upper guide protrusion.

[0024] In a particular embodiment, the upper rail comprises an upper mortise, the width of which is larger than or equal to the length of the upper guide protrusion, such that the distance between the center of the lower rotation space and the upper mortise is equal to the distance between the center of the lower circular protrusion and the upper guide protrusion.

[0025] In a particular embodiment, the closure device further comprises a stop joined to the upper rail and intended to limit the movement of the upper frame when it leaves the upper rail.

BRIEF DESCRIPTION OF THE DRAWINGS

[0026] To complete the description and to improve understanding of the invention, the following set of figures is provided. Said figures are an integral part of the description and they show one or more specific embodiments, which should not be interpreted as restricting the scope of protection of the invention, but rather simply as an example of how the invention may be carried out. This set comprises the following figures:

Figure 1 shows a perspective view of a closure device according to the invention.

Figure 2 shows a detailed view of the lower pivot of a closure device according to the invention.

Figure 3 shows a detailed view of the lower fitting of a sliding door of a closure device according to the invention.

Figure 4 shows a detailed view of the separation element of a closure device according to the invention. Figure 5 shows a detailed view of the lower guide element of a closure device according to the invention.

Figure 6 shows a detailed view of the upper pivot of a closure device according to the invention.

Figure 7 shows a detailed view of the upper fitting of the sliding door of a closure device according to the invention.

Figure 8 shows a detailed view of the stop of a closure device according to the invention.

DETAILED DESCRIPTION OF THE INVENTION

[0027] In figure 1, a perspective view of a closure device (100) according to the invention may be seen, in which some elements have moved from their original position to allow all elements to be seen. This closure device

(100) comprises the following elements:

an upper rail (11);
 a lower rail (12);
 a lower pivot (1);
 a lower fitting (2);
 an intermediate separation element (3), which may slide along the lower rail (12);
 a lower guide element (4);
 an upper pivot (5);
 an upper fitting (6);
 a stop (7);
 an upper guide element (8);
 a plurality of panels (51);
 a fixed door (58);
 a sliding door (52) that comprises a lower frame (55), an upper frame (56) and a rigid sheet (57);
 a lower mortise (53); and
 an upper mortise (54).

[0028] The upper rail (11) and the lower rail (12) are moved from their original position so that the lower pivot (1), the lower fitting (2), the intermediate separation element (3), the upper pivot (5), the upper fitting (6) and the upper guide element (8) may be seen. The lower guide element (4) is shown in the detailed view in the figure.

[0029] In this figure, three directions have also been shown, to better define the elements involved in the present description.

[0030] The sliding direction (X) is considered to be the longitudinal direction along which the upper and lower rails are extended.

[0031] The vertical direction (Z) is considered to be the direction perpendicular to the sliding direction (X) that is contained on the plane of the sliding door.

[0032] The width direction (Y) is considered to be the direction perpendicular to the sliding direction (X) and the vertical direction (Z).

[0033] Both the panels (51) and the sliding door (52) are elements intended to slide along the lower rail (12), and they comprise a lower fitting, a lower frame, a rigid sheet, preferably made of glass, an upper frame and a lower fitting. The difference is that the elements of the sliding door (52) are such that, in combination with the elements of the closure device (100), they enable the sliding door (52) to open, leaving the plane defined by the sliding (X) and vertical (Z) directions, while the elements of the panels (51) do not enable it to have any other position that is not that of the fixed door when said panels are retracted. In this particular embodiment, these elements of the sliding door (52) are: a lower fitting (2), a lower guide element (4) and an upper fitting (6) and an upper guide element (8). Furthermore, in this particular embodiment, the elements of the closure device (100) that collaborate with these elements of the sliding door are: a lower pivot (1), an upper pivot (5) and a separation element (3), along with lower (53) and upper (54) mortises.

[0034] Figure 2 shows a detailed view of the lower pivot (1) separated from the lower rail (12), although its position within the closure device (100) is fastened to said lower rail (12). This lower pivot (1) comprises the following parts:

a selective retention element (104)
 a lower guide element (103) that comprises a lower longitudinal passage slot (105) and a lower rotation space (106) with a circular shape through which the lower longitudinal passage slot (105) passes, and a plurality of through holes (101, 102).

[0035] The selective retention element (104) comprises a flat surface (107) and a circular cavity (108) comprised in said flat surface (107). This circular cavity (108) is open, in other words, the circular cavity (108) can be accessed from the flat surface (107), from where the circular cavity (108) has the shape of a cross section of a circumference, as well as from the sliding direction (X). The fact that this circular cavity (108) is open and can be accessed from the sliding direction (X) enables the lower circular protrusion (204) of the lower fitting (2) to access the circular cavity (108). Said circular cavity (108) further comprises retention means (109) suitable for retaining an element that is located in said circular cavity (108). In this case, these retention means (109) are the flexible ends of the circular cavity (108). These flexible ends (109) allow elastic deformation in order to receive an element and they recover their shape after deformation in order to retain said element. Therefore, in this particular case, the circular cavity (108) must be larger than a semicircle, since in a semicircle the ends cannot retain the element that enters into the circular cavity. As can be seen in the figure, the circular cavity (108) reproduces a circular sector, in other words, part of what would be a complete or closed circular cavity. If the circular cavity is considered to be complete or closed, it would be 360°; in this particular embodiment, the opened circular cavity of the invention runs approximately between 240° and 300°. Nevertheless, other retention means are possible and compatible with this invention, such as leaving a circular cavity of barely 180° and providing different retention means for the circular cavity, such as auxiliary pins, a magnet, a two-level ramp or any other retention means that can retain in a reversible manner an element within said circular cavity. In any case, although the circular cavity does not have a full circumference, the circumference defined by said circular cavity can be known, and this circumference has a diameter that can be calculated.

[0036] The lower guide element (103) comprises a lower longitudinal passage slot (105) and a lower rotation space (106) that has a circular shape through which the lower longitudinal passage slot (105) passes. In this particular embodiment, the lower longitudinal passage slot (105) and the lower rotation space (106) are defined by the space that exists between two pieces (103a, 103b). Each of these pieces (103a, 103b) comprises two straight

segments joined by a circular segment, and are arranged such that the straight segments of both pieces are parallel and the circular segments of both pieces correspond to segments with the same circumference. Thus, the space between the straight segments of both pieces configures the lower longitudinal passage slot (105), and the space between the circular segments, which form part of the same circumference, constitutes the lower rotation space (106), which has a circular shape, but which is passed through by the lower longitudinal passage slot (105), since the circular segments do not form a complete circumference given that it is necessary that the lower longitudinal passage slot (105) passes through said lower rotation space (106). In any case, although the circular segments do not form a complete circumference, the circumference defined by the circular segments can be known, and this circumference has a diameter that can be calculated.

[0037] In other embodiments, the straight segments are not arranged in a parallel manner, but rather oblique manner. In these embodiments, the space between the straight oblique segments continues to be the lower longitudinal passage slot (105).

[0038] In this embodiment, the width, measured on the width axis (Y), between the straight segments of the pieces (103a, 103b) is constant, such that it can be said that the width of the lower longitudinal passage slot (105) is a constant value, which is the distance between said straight segments of the pieces (103a, 103b). In the embodiments in which the straight segments are oblique, it is considered that width of the lower longitudinal passage slot (105) is the smallest distance existing between the straight segments. Therefore, this distance corresponds in both cases to the width, measured on the width axis (Y) of the piece with the largest width through which the lower longitudinal passage slot (105) may pass.

[0039] The circular cavity (108) of the selective retention element (104) has a diameter equal to or smaller than said width of the lower longitudinal passage slot (105).

[0040] With this configuration, a piece is obtained that enables the passage of elements, that are high enough to butt against the lower guide element (103), but not high enough to butt against the selective retention element (104); and it does not enable the passage of elements that are high enough to butt against the selective retention element (104). Furthermore, if said elements have a particular configuration, they are retained by said selective retention element (104), as shall be seen further on.

[0041] This lower pivot (1) further contains a chamfer (110) on each of the pieces (103a, 103b) of the lower guide element (103), which is intended to facilitate its insertion, extraction and maneuverability once introduced on the lower rail (12). In this embodiment, the chamfer is located on the upper half of a piece (103a) and on the lower half of the other (103b).

[0042] The through holes (101,102) serve to join the

lower pivot (1) to the lower rail (12) by means of screws. In other embodiments, the lower pivot (1) is joined to the lower rail (12) by means of gluing or by any other fastening means that makes it possible to maintain the lower pivot (1) fastened on the lower rail (12) supporting lateral movement loads.

[0043] Figure 3 shows a lower fitting (2) of the sliding door (52). This lower fitting (2) comprises a lower plate (202) joined to a rigid sheet (57), for example made of glass, and for sliding along the lower rail (12); a pivot piece (203);

a lower circular protrusion (204) suitable for being retained by the selective retention element (104) of the lower pivot (1), joined to the pivot piece (203); and a lateral support (206).

[0044] The circular protrusion (204) has a diameter substantially identical to the diameter of the circumference defined by the circular cavity (108) of the selective retention element (104), or it can even be slightly larger, since in this case, by having the circular cavity (108) formed by flexible ends (109), said circular cavity (108) admits a lower circular protrusion (204) with a slightly larger diameter. This circular protrusion (204) is intended to be fitted into said selective retention element (104), in a way that shall be described further on.

[0045] Likewise, the pivot piece (203) has two main dimensions: width and length. The length is the dimension measured in the sliding direction (X), and the width in the width direction (Y), which determines whether the pivot piece (203) can pass through the longitudinal passage slot (105). The width of the pivot piece (203) is smaller than the width of the longitudinal passage slot (105). The length and width of the pivot piece (203) are such that their plan cross section, which is the cross section seen from the vertical direction (Z), is enclosed in a circumference with a diameter that is the diameter of the rotation space (106). This ensures that the pivot piece (203) has suitable dimensions that enable it to rotate without clearance in the rotation space (106), once the circular protrusion (204) is retained by the selective retention element (104).

[0046] The operation mode is as follows: when the lower fitting (2) of a sliding door (52) slides along the lower rail (12), it reaches the area of the lower rail (12) where the lower pivot (1) is fastened. At this time, the circular protrusion (204) of the lower fitting (2) reaches the lower pivot (1) and when the circular protrusion (204) reaches the selective retention element (104), it is retained by it. Since both the circular protrusion (204) and the circular cavity (108) have a circular shape, the only movement that enables this coupling is circular movement.

[0047] Once the circular protrusion (204) is retained by the selective retention element (104), the pivot piece (203) is placed in the rotation space (106). Since the dimensions of the pivot piece (203) are such that said pivot piece (203) is enclosed in the circumference of the rotation space (106), said pivot piece (203) is able to serve as a guide for the lower fitting (2), and therefore, for the

sliding door (52) so that it can rotate with respect to a fixed axis that passes through the center of the circular cavity (108) and that is parallel to the vertical direction (Z).

[0048] In this and in other particular embodiments, the lower plate (202) is a monoblock piece, made from a single piece, and it has a transverse cross section in the shape of a cross, with a main surface parallel to the plane defined by the sliding (X) and width (Y) directions and two ribs, one of them on each side of the main surface, in order to provide greater stability to the path of the plate (202) along the lower rail (12).

[0049] The lateral support (206) is an element of the lower fitting (2) adjacent to the pivot piece (203). It aims to separate the lower fitting (2) of the sliding door (52) from the lower fittings of the panels (51), providing said lower fitting (2) with a length additional to the length of the pivot piece (203). So as to not interfere with the passage of the pivot piece (203) through the lower pivot (1), the lateral support (206) has a height, measured in the vertical direction (Z), smaller than the height of the pivot piece (203).

[0050] As for the panels (51), they also have lower fittings, but these lower fittings of the panels (51) are different from the lower fitting (2) of the sliding door (52), since they do not have any circular protrusions. As these lower fittings of the panels (51) pass through the lower pivot (1), since they do not comprise any circular protrusion, they are not retained by the selective retention element (104), but rather they are free to continue sliding along the lower rail (12).

[0051] Figure 4 shows another element comprised of a closure device (100) according to the invention. It is an intermediate separation element (3). In this embodiment, this intermediate separation element (3) is placed on the lower rail (12), being slidable along it. This intermediate separation element (3) comprises a support piece (301) and a separation piece (303).

[0052] The support piece (301) is the part of the intermediate separation element (3) that is intended to slide on the lower rail (12), thus enabling the intermediate separation element (3) to slide on the lower rail (12). Moreover, the separation piece (303) is intended to separate any two elements that are on the lower rail (12), such that said elements are not required to specifically be doors or panels, but rather serve to separate any element.

[0053] In this particular case, its sides have a shape and size that would make it butt against the adjacent panels when the panels (51) and the sliding door (52) are retracted. For this reason, the intermediate separation device (3) is introduced onto the lower rail (12), such that the separation piece (303) separates the pivot piece (203) from the lower fitting (2) of the sliding door (52) of a piece contained in the lower fitting of a panel (51).

[0054] Figure 5 shows a lower guide element (4) suitable for being placed on the lower frame (55) of the sliding door (52), serving as a guide for sliding the sliding door (52) along the lower rail (12). This guide element (4) com-

prises holes (401) to join the lower guide element (4) to the lower frame (55) of the sliding door (52) and a guide flange (403). The aim of this guide flange (403) is twofold: on one hand, it has a width, measured in the width direction (Y), which is substantially equal to the width of the lower rail (12), thereby serving as a guide for the movement of the lower frame (55) along said rail. On the other hand, its length, measured in the sliding direction (X), is smaller than the length of the guide flanges of the lower guide elements located on the panels (51). The lower rail (12) comprises a lower mortise (53) which has a width, measured in the sliding direction (X), which is substantially equal to the length of the guide flange (403) of the guide element (4) of the sliding door (52). In this way, the sliding door (52) is able to pass through the lower rail (12) via said lower mortise (53). Since the guide flanges of the lower guide elements located on the panels (51) have a greater length, said guide flanges cannot pass through the lower rail (12) via said lower mortise (53).

[0055] Figure 6 shows a detailed view of the upper pivot (5) separated from the upper rail (11), although its position within the closure device (100) is fixed to said upper rail (11). This upper pivot (5) comprises the following parts:

- an upper guide element (503) that comprises an upper longitudinal passage slot (505) and an upper rotation space (506) with a circular shape through which the upper longitudinal passage slot (505) passes;
- an upper stop element (504); and
- a plurality of through holes (501, 502).

[0056] The upper guide element (503) comprises an upper longitudinal passage slot (505) and an upper rotation space (506) with a circular shape through which the upper longitudinal passage slot (505) passes. In this particular embodiment, the upper longitudinal passage slot (505) and the upper rotation space (506) are defined by the space that exists between two pieces (503a, 503b). Each of these pieces (503a, 503b) comprises two straight segments joined by a circular segment, and are arranged such that the straight segments of both pieces are parallel and the circular segments of both pieces correspond to segments with the same circumference. Thus, the space between the straight segments of both pieces configures the upper longitudinal passage slot (505) and the space between the circular segments, which form part of the same circumference, constitute the upper rotation space (506), which has a circular shape, but is passed through by the upper longitudinal pass slot (505), since the circular segments do not form a complete circumference, since it is necessary that the upper longitudinal passage slot (505) passes through said rotation space. In any case, although the circular segments do not form a complete circumference, the circumference defined by the circular segments can be known, and this

circumference has a diameter that can be calculated.

[0057] In other embodiments, the straight segments are not arranged in a parallel manner, but rather an oblique manner. In these embodiments, the space between the straight oblique segments continues to be the upper longitudinal slot passage (505).

[0058] In this embodiment, the width, measured on the width axis (Y), between the straight segments of the pieces (503a, 503b) is constant, such that it can be said that the width of the upper longitudinal passage slot (505) is a constant value, equal to the distance between the straight segments of the pieces (503a, 503b). In the embodiments in which the straight segments are oblique, it is considered that the width of the longitudinal passage slot (505) is the smallest distance existing between the straight segments. This distance, therefore, corresponds in both cases to the width, measured on the width axis (Y) of the piece with the largest width through which the upper longitudinal passage slot (505) can pass.

[0059] This upper pivot (5) further contains a chamfer (510) on each of the pieces (503a, 503b) of the guide element (503) which is intended to facilitate its insertion, extraction and maneuverability once introduced on the upper rail (11). In this embodiment, the chamfer is on the upper half of a piece (503a) and on the lower half of the other (503b).

[0060] The upper stop element (504) is located between the pieces (503a, 503b) of the upper guide element (503), and has the function of preventing the passage of the elements whose dimensions are sufficient enough to butt against it and of enabling the passage of the elements whose dimensions are not sufficient enough to butt against it.

[0061] The through holes (501,502) serve to join the upper pivot (5) to the upper rail (11) by means of screws. In other embodiments, the upper pivot (5) is joined to the upper rail (11) by means of gluing or by any other fastening means that makes it possible to maintain the upper pivot (5) fastened on the upper rail (11) supporting lateral movement loads.

[0062] Figure 7 shows an upper fitting (6) of a sliding door (52). This upper fitting (6) comprises

- an upper plate (602) joined to a rigid sheet (57) suitable for being guided along the upper rail (11);
- a pivot piece (603);
- a guide piece (605); and
- a hole (601) to join the upper fitting to the upper frame (56) and a hole (604) to join the pivot piece (603) to the rest of the upper fitting (6).

[0063] The pivot piece (603) has two main dimensions: width and length. The length is the dimension measured in the sliding direction (X), and the width in the width direction (Y), which determines whether the pivot piece (603) can pass through the longitudinal passage slot (505) of the upper pivot (5). The width of the pivot piece (603) is smaller than the width of the longitudinal passage

slot (505). The length and width of the pivot piece (603) are such that their plan cross section, which is the cross section seen from the vertical direction (Z), is enclosed in a circumference with a diameter that is the diameter of the rotation space (506) of the upper pivot (5). This ensures that the pivot piece (603) has suitable dimensions that enable it to turn without clearance in the rotation space (506) once it has butted against the upper stop element (504).

[0064] The operation mode is as follows: when the lower fitting (6) of the sliding door (52) slides guided along the upper rail (11), it reaches the area of the upper rail (11), wherein the upper pivot (5) is fastened. At this time, the pivot piece (603) of the upper fitting (6) reaches the upper pivot (5) and butts against the upper stop element (504).

[0065] Once the pivot piece (603) is stopped by the upper stop element (504), said pivot piece (603) is located in the rotation space (506). Since the dimensions of the pivot piece (603) are such that said pivot piece (603) is enclosed in the circumference of the rotation space (506), said pivot piece (603) is able to serve as a guide for the upper fitting (6), and therefore, for the sliding door (52) so that it can rotate with respect to a fixed axis that passes through the center of the rotation space (506) and that is parallel to the vertical direction (Z).

[0066] As for the panels (51), they also have upper fittings, but these upper fittings of the panels (51) are different from the upper fitting (6) of the sliding door (52), since its pivot piece has a smaller dimension on the vertical dimension (Z) than the pivot piece (603) of the lower fitting (6) of the sliding door (52). When these lower fittings of the panels (51) pass through the upper pivot (5), they do not butt against the upper stop element (504), but rather are free to continue advancing along the upper rail (11).

[0067] Figure 8 shows a stop (7) intended to be joined to the upper rail (11). The function of this stop (7) is to limit the movement of the upper frame (56) when it leaves the upper rail (11) when the sliding door (52) is opened. This stop comprises two holes (702) to join the upper rail (11) and a stop element (701) intended to limit the movement of the upper frame (56) when it leaves the upper rail (11) when the sliding door (52) is opened.

[0068] Additionally, both the sliding door (52) and the panels (51) comprise upper guide elements (8) located on the upper frame (56). The upper rail (11) comprises an upper mortise (54), the width of which, measured in the sliding direction (X), is greater or equal to the length of the upper guide element (8) measured in said sliding direction (X). In this way, when the sliding door (52) opens, the upper guide element (8) can cross the upper rail (11) by means of said upper mortise (54).

[0069] List of references

[0069]

(100)	Closure device		
(1)	Lower pivot		
(101, 102)	Holes		
(103)	Lower guide element, with pieces (103a, 103b)	5	
(104)	Selective retention element		
(105)	Lower longitudinal passage slot		
(106)	Lower rotation space		
(107)	Flat surface		
(108)	Circular cavity	10	
(109)	Flexible ends		
(110)	Chamfer		
(11)	Upper rail		wherein the sliding door (52), in turn, comprises
(12)	Lower rail		
(2)	Lower fitting	15	
(202)	Lower plate		
(203)	Pivot piece		
(204)	Circular protrusion		
(206)	Side support		
(3)	Separation element	20	
(301)	Support piece		
(303)	Separation piece		
(4)	Lower guide element		
(401)	Joint holes		
(403)	Guide flange	25	
(5)	Upper pivot		
(501, 502)	Holes		
(503)	Upper guide element, with pieces (503a, 503b)		
(504)	Upper stop element	30	
(505)	Upper longitudinal passage slot		
(506)	Upper rotation space		
(510)	Chamfer		
(6)	Upper fitting		
(601)	Joint hole	35	
(602)	Upper plate		
(603)	Pivot piece		
(604)	Joint hole		
(605)	guide piece		
(7)	Stop	40	
(701)	Holes		
(702)	Stop element		
(51)	Panel		
(52)	Sliding door		
(53)	Lower mortise	45	
(54)	Upper mortise		
(55)	Lower frame		
(56)	Upper frame		
(57)	Rigid sheet		
(58)	Fixed door	50	

Claims

1. A closure device (100) **characterized in that** it comprises:
 - a lower rail (12),

a lower pivot (1), fastened to the lower rail (12), the lower pivot (1) in turn comprising a selective retention element (104) and a guide element (103) that comprises a lower longitudinal passage slot (105) with a width and lower rotation space (106) with a circular shape through which the lower longitudinal passage slot (105) passes, the lower rotation space (106) having a diameter;

a fixed door (58), and

a sliding door (52);

wherein the sliding door (52), in turn, comprises

a lower fitting (2), which, in turn, comprises a lower protrusion (204) suitable for being retained by the selective retention element (104), wherein the selective retention element (104) of the lower pivot (1) comprises a surface (107) and a cavity (108) comprised on said surface (107), said cavity (108) being open such that it is accessible in a sliding direction (X), therefore being suitable for allowing the entry of the lower protrusion (204), and said cavity (108) comprising retention means (109) suitable for retaining the lower protrusion (204) when it is located in said cavity (108); and

wherein the cavity (108) has a size equal to or smaller than the width of the longitudinal passage slot (105).

2. The closure device (100) according to claim 1, **characterized in that** the lower fitting (2) further comprises a pivot piece (203), the width of which is smaller than the width of the lower longitudinal passage slot (105) and the plan cross section of which is enclosed in a circumference with a diameter that is the diameter of the lower rotation space (106).

3. The closure device (100) according to any of the preceding claims, **characterized in that** it further comprises an intermediate separation element (3), which may slide along the lower rail (12), the intermediate separation element (3) comprising

a support piece (301) intended to slide along the lower rail (12); and

a separation piece (303) suitable for separating two elements that are on the lower rail (12).

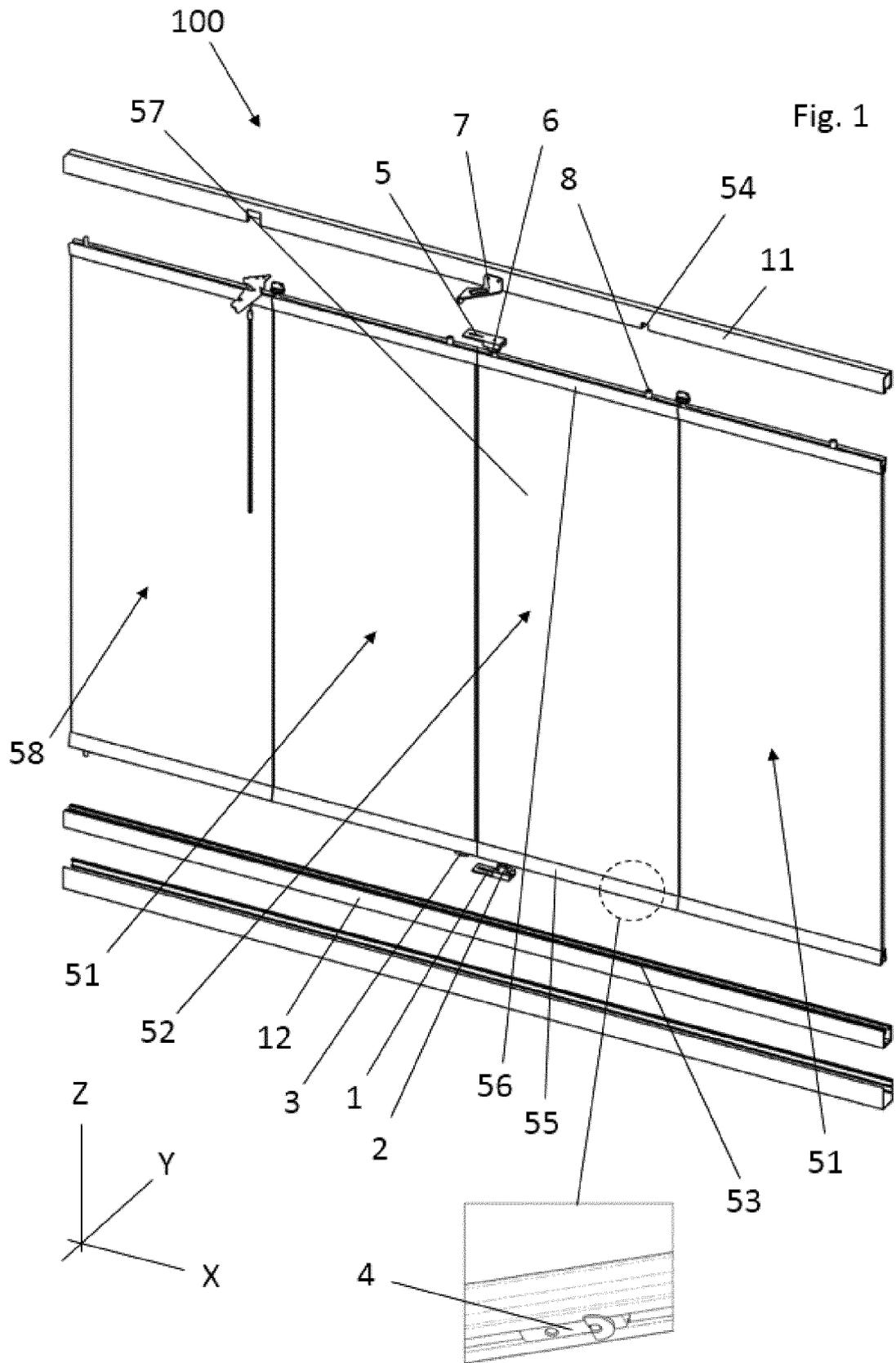
4. The closure device (100) according to any of the preceding claims, **characterized in that** the retention means of the cavity of the selective retention element (104) of the lower pivot (1) are clipping retention means, wherein the selective retention element (104) comprises flexible ends (109) that allow elastic deformation in order to receive an element and that recover their shape after deformation in order to re-

tain that element.

5. The closure device (100) according to any of the preceding claims, **characterized in that** the lower guide element (103) of the lower pivot (1) comprises two pieces (103a, 103b) facing each other, such that the separation between them constitutes the lower longitudinal passage slot (105) and the lower rotation space (106). 5
6. The closure device (100) according to claim 5, **characterized in that** the lower pivot (1) further contains a chamfer (110) on each of the pieces (103a, 103b) of the lower guide element (103), which is intended to facilitate the insertion, extraction and maneuverability of said lower pivot (1) on the lower rail (12). 10
7. The closure device (100) according to any of the claims 5 or 6, **characterized in that** each piece (103a, 103b) of the guide element comprises two straight segments joined by a circular segment, said pieces (103a, 103b) being arranged such that the straight segments of both pieces are parallel or oblique and the circular segments of both pieces correspond to segments with the same circumference. 20
8. The closure device (100) according to any of the preceding claims, **characterized in that** it further comprises: 25
- an upper rail (11);
 an upper pivot (5), fastened to the upper rail (11), the upper pivot (5) in turn comprising an upper guide element (503) that comprises an upper longitudinal passage slot (505) and an upper rotation gap with a circular shape opened by the upper longitudinal passage slot (505);
 and wherein the sliding door (52) further comprises
 an upper fitting (6), which in turn comprises an upper plate (602) joined to an upper profile (56);
 and
 a rigid sheet (57) joined to the upper profile (56) and the lower profile (55). 30
9. The closure device (100) according to claim 8, **characterized in that** the upper guide element (503) of the upper pivot (5) comprises two pieces (503a, 503b) facing each other, such that the separation between them constitutes the upper longitudinal passage slot (505) and the upper rotation space (506). 35
10. The closure device (100) according to claim 9, **characterized in that** the upper pivot (5) further contains a chamfer (510) on each of the pieces (503a, 503b) of the guide element (503), which is intended to facilitate the insertion, extraction and maneuverability 40

of said upper pivot (5) on the upper rail (11).

11. The closure device (100) according to any of the claims 8 to 10, **characterized in that** the rigid sheet (57) is a glass sheet and the upper frame (56) comprises an upper guide protrusion (8). 45
12. The closure device (100) according to claim 11, **characterized in that** the upper rail (11) comprises an upper mortise (54), the width of which is greater than or equal to the length of the upper guide protrusion (8), such that the distance between the center of the lower rotation space (106) and the upper mortise (54) is equal to the distance between the center of the lower circular protrusion (204) and the upper guide protrusion (8). 50
13. The closure device (100) according to any of the claims 8 to 12, **characterized in that** it further comprises a stop (7) joined to the upper rail (11) and intended to limit the movement of the upper frame (56) when it leaves the upper rail (11). 55



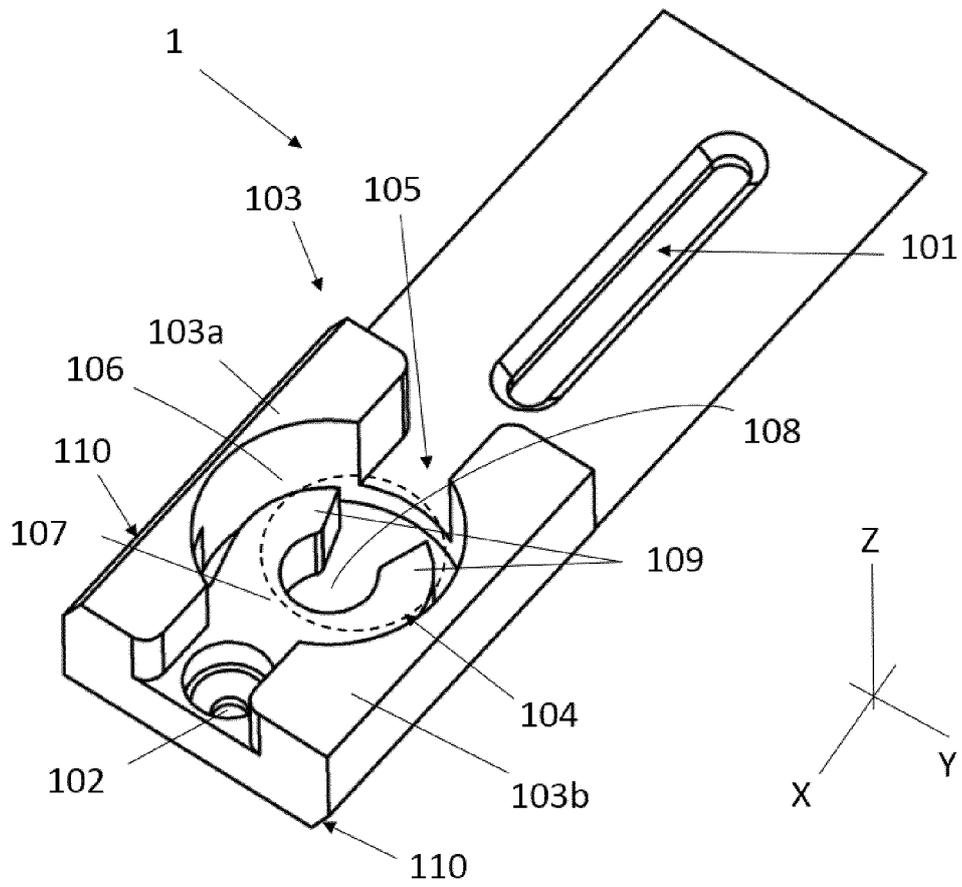


Fig. 2

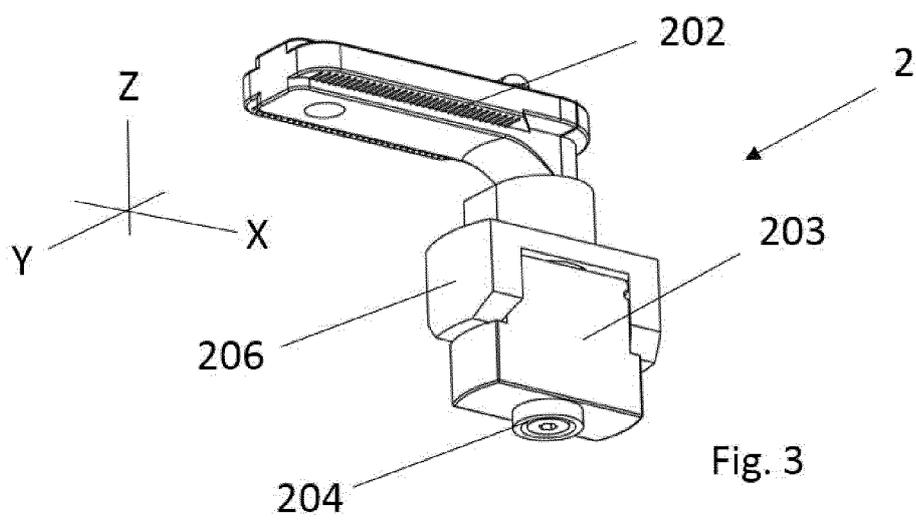


Fig. 3

Fig. 4

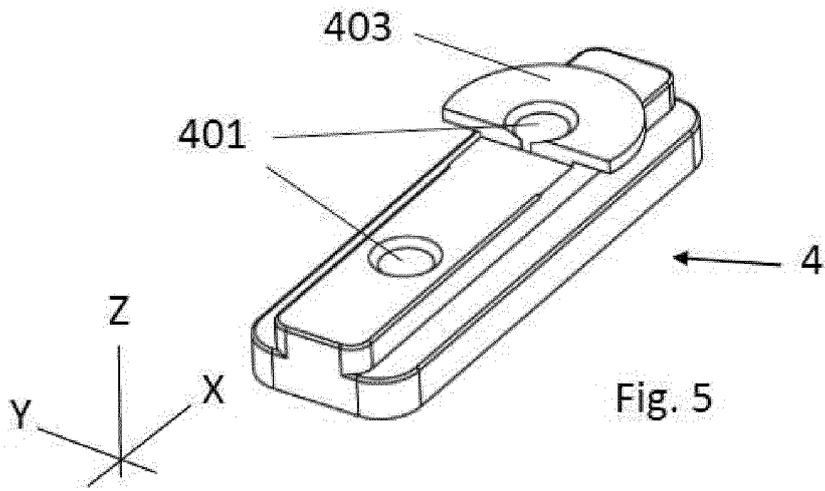
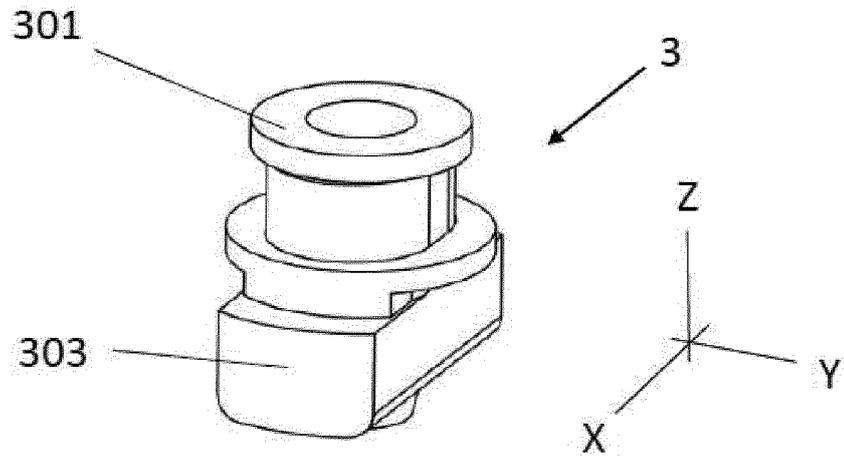


Fig. 5

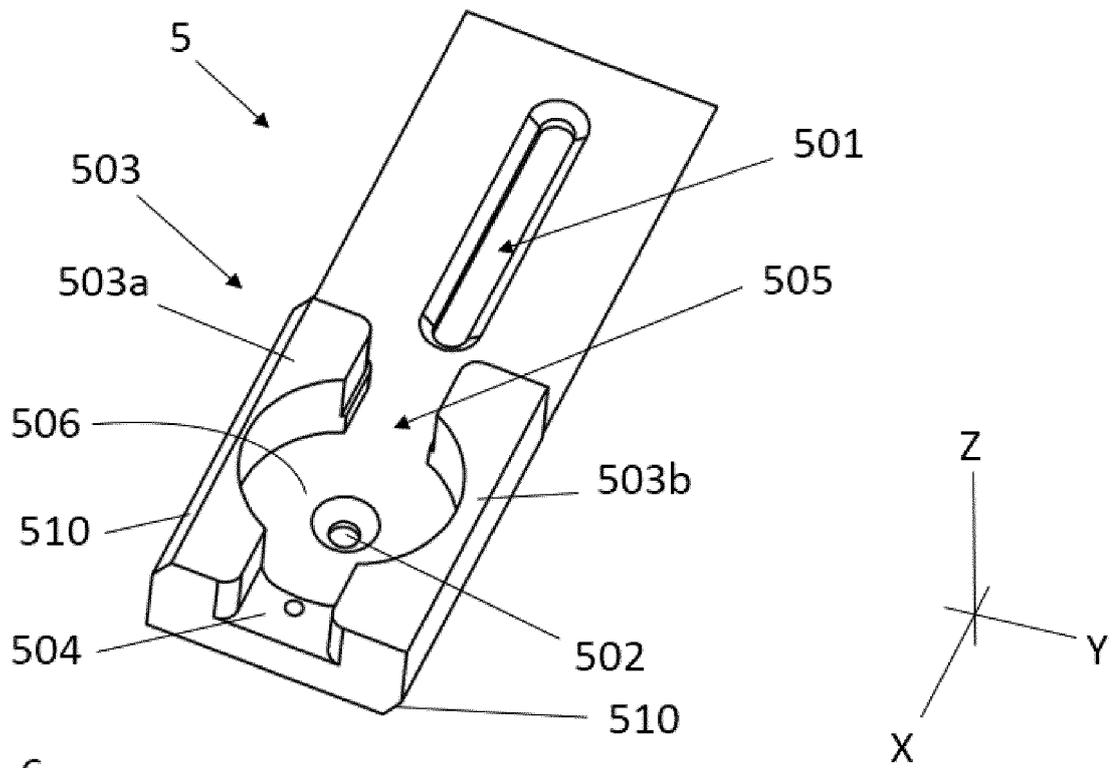


Fig. 6

Fig. 7

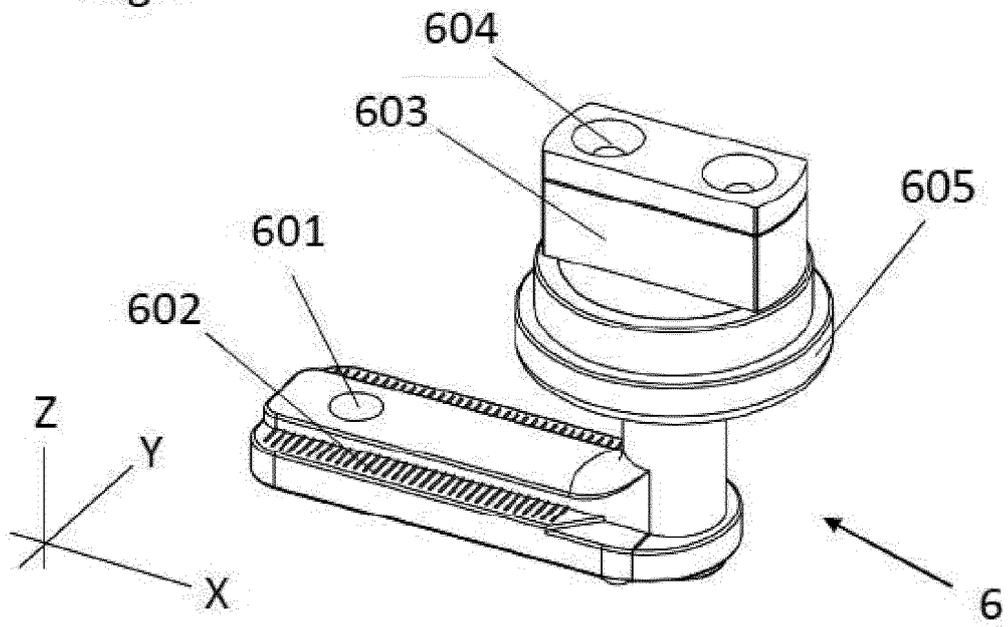
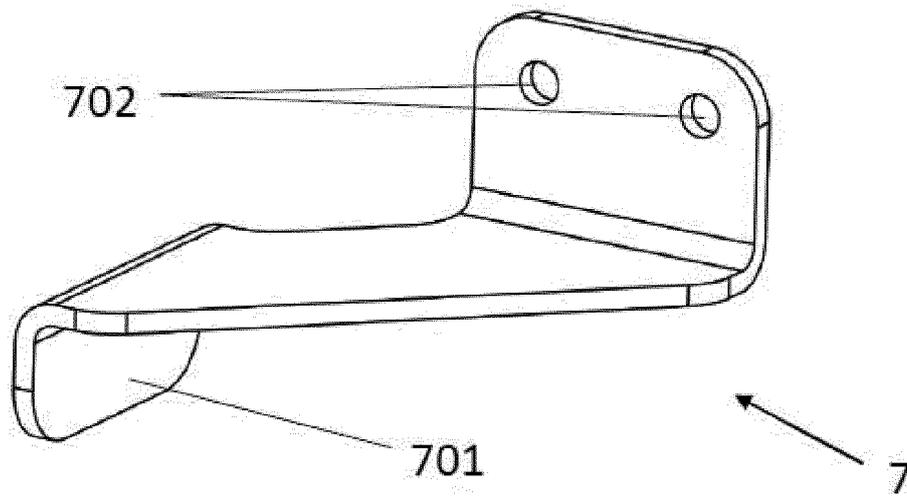


Fig. 8



INTERNATIONAL SEARCH REPORT

International application No
PCT/ES2017/070137

5

A. CLASSIFICATION OF SUBJECT MATTER
 INV. E04B2/82 E05D15/06 E06B3/50 E06B3/92 E05D15/58
 ADD.
 According to International Patent Classification (IPC) or to both national classification and IPC

10

B. FIELDS SEARCHED
 Minimum documentation searched (classification system followed by classification symbols)
 E04B E05D E06B
 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

15

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
 EPO-Internal, WPI Data

20

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 446 546 A1 (LUMON OY [FI]) 18 August 2004 (2004-08-18)	1-4, 6, 8
Y	paragraph [0014] - paragraph [0025] figures	5-7, 9-13
Y	----- ES 2 324 273 A1 (CLEAR GLASS CURTAINS S L [ES]) 3 August 2009 (2009-08-03) cited in the application page 5, line 46 - page 8, line 34 figures	5-7, 9-12
Y	----- DE 10 2010 038084 A1 (DORMA GMBH & CO KG [DE]) 22 September 2011 (2011-09-22)	13
A	paragraph [0020] - paragraph [0026] figures	4

40

Further documents are listed in the continuation of Box C. See patent family annex.

45

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

50

Date of the actual completion of the international search 15 May 2017	Date of mailing of the international search report 23/05/2017
--	--

2

Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer López-García, G
--	---------------------------------------

55

EP 3 431 676 A1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/ES2017/070137

5
10
15
20
25
30
35
40
45
50
55

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1446546	A1	18-08-2004	AT 451530 T 15-12-2009
			CN 1582361 A 16-02-2005
			DK 1446546 T3 12-04-2010
			EP 1446546 A1 18-08-2004
			ES 2337988 T3 03-05-2010
			FI 20012130 A 06-05-2003
			NO 20041843 A 04-05-2004
			PT 1446546 E 01-03-2010
			WO 03042482 A1 22-05-2003

ES 2324273	A1	03-08-2009	EP 2351899 A1 03-08-2011
			ES 2324273 A1 03-08-2009
			US 2011088326 A1 21-04-2011
			WO 2009095519 A1 06-08-2009

DE 102010038084	A1	22-09-2011	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

- ES 2324273 A1 [0004]
- ES 1149237 U [0005]
- ES 2365575 A1 [0006]
- WO 2012175754 A1 [0006]