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(54) **Door wing sliding supporting device**

Gleithalterungsvorrichtung für Türflügel

Dispositif de support de battant de porte coulissante

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Description

Field of the invention

[0001] The present invention relates to a wing sliding supporting device for a sliding door, or the like, which allows to fix the wing to a wall or to a structure of a piece of furniture in its upper part and which further allows the closing and opening movement by sliding along the plane of the wing.

State of the art

[0002] Many devices for supporting a sliding wing or door so that it is fixed with the upper part thereof to a building structure or to the body of a piece of furniture over the compartment or opening to be opened and closed are known. One type of device made so as to allow the wing to slide along the laying plane thereof so as to move between two extreme opening and closing positions is known. Such devices consist, in general, of one of more guides kinematically connected to one another in various manners, which combine the function of supporting the wing with that of sliding.

[0003] Doors sliding along the plane thereof are used particularly in environments in which sufficient space for installing a door allowing the door, if it were of the type hinged to the wall, to turn about its hinges is not available. Furthermore, doors of this kind are used not only in working environments but, above all, in residential environments for reasons of appearance. Indeed, there are customers who prefer to have sliding doors instead of hinged doors in their homes considering the first more functional or of better appearance. However, many supporting and sliding mechanisms of the doors suggested in the prior art are not very suitable for residential use having been mainly designed for use in working or industrial environments.

[0004] This recent market demand has spurred manufacturers to provide supporting devices which can be inserted also in residential environments, and which are consequently particularly appealing from point of view of appearance and are not very conspicuous to sight. Indeed, the sliding door supporting and sliding guides of known type are very conspicuous and cumbersome, much more than hinges turning about their axis.

[0005] Attempts have been made to improve the door supporting and sliding devices so that when they are fitted on the wall, over the passage compartment, with the door closed, they remain completely concealed by the wing itself, i.e. no rails or other parts of the device protrude from the sides of the closed wing or are visible from the front.

[0006] Despite such efforts, the known supporting and sliding devices for doors display some disadvantages in all cases. Total extraction devices of the constituent parts, which are approximately formed by three reciprocally sliding rails kinematically connected to one another, of which one part is fixed to the wall, a second part is arranged in intermediate position and a third part is fixed to the door, are designed with a precise sense of assembly, and thus two models must be made, one with leftward sense and one with rightward sense, according to the direction towards which the door is intended to be opened.

[0007] Partial extraction supporting devices, which approximately consist of two parts reciprocally sliding by means of rails and pads or sliding wheels, one part of which is fixed to the wall and a second part of which is fixed to the wing, have the disadvantage that the wing they support must be wider than the width of the passage in order to cover the supporting and sliding device when the door is closed, otherwise parts of the mechanism would protrude from the side of the opening riser of the wing. Furthermore, when the wing is completely open, by width, the door occupies by several centimeters with opening from the side of the opening riser in order to provide a greater support to the wing.

Summary of the invention

[0008] It is the object of the present invention to provide a supporting and sliding device of a sliding wing, e.g. of a sliding door, which is not very conspicuous both in the open and in the closed position.

[0009] Another object of the invention is to provide a sliding wing supporting device which has a high loading capacity so as to be used also for heavy doors, which is simple to construct and which can be applied indifferently to fixtures the wing of which opens either rightwards or leftwards with respect to the opening.

[0010] It is the object of the present invention to provide a sliding door wing supporting device, in accordance with claim 1.

[0011] The door supporting device of the invention thus consists in a telescopic mechanism consisting of two total extraction kinematic sliding pairs of the compartment to be closed, in which no predetermined opening sense is provided and which may be used for wings intended to open either rightwards or leftwards. It may be used for external wings hanging from a wall, without there being a protrusion of the mechanism from the door side when the door is closed.

[0012] The dependent claims describe preferred embodiments of the invention, forming an integral part of the present description.

Brief description of the drawings

[0013] Further features and advantages of the invention will be more apparent in light of the detailed description of preferred, but not exclusive, embodiments, of a sliding and supporting device for sliding doors, wings and the like, for fixtures or furniture, illustrated by way of non-limitative example, with the aid of the accompanying drawings, in which:

Fig. 1 shows a front view of a sliding door on which the supporting and sliding device of the invention is installed,
Fig. 2 shows a side view of a section taken along the line AA in figure 1,
Fig. 3 shows an enlargement of detail S in figure 2,
Fig. 4 shows an axonometric exploded view of the device of the invention,
Fig. 5 shows an axonometric exploded view of the device of the invention from a different direction than that shown in fig. 4,
Fig. 6 shows an enlarged section view of detail S in fig. 2 from an opposite direction,
Fig. 7 shows an axonometric view of the device of the invention in an operating position,
Fig. 8 shows an axonometric view of the device of the invention in different operating position,
Fig. 9 shows an axonometric view of an embodiment of the device of the invention;
Fig. 10 shows an exploded axonometric view of an embodiment of the device of the invention;
Fig. 11 shows an enlarged section view of detail S in fig. 2 from an opposite direction, of a further embodiment of the device of the invention,
Fig. 12 shows an enlarged section view of detail S in fig. 2 from an opposite direction, of a further embodiment of the device of the invention.
Fig. 16a, 16b, 16c show two embodiments of an enlarged detail of the device of the invention.

[0014] The same reference numbers and letters in the figures refer to the same elements or components.

Detailed description of preferred embodiments of the invention

[0015] With particular reference to figure 1, there is shown the use of a sliding and supporting device of the invention, indicated globally by reference numeral 1, on a sliding door consisting of a single wing 4. If necessary, a fixed guide or base rail 5 may be provided to improve stability and/or sliding of the door. The door 4 has the function of closing the passage compartment 3 in the building structure 2 by sliding along the laying plane thereof. The supporting device 1 is shown in greater detail in its position mounted on a wing 4, e.g. made of wood, in which a seat is made in the thickness of the door, e.g. by L-shape or C-shape milling or other method, to accommodate part of the supporting device 1 itself, thus reducing the protrusion of the door from the surface of the wall.

[0016] The supporting device 1 is better described in greater detail in the following figures. It comprises a fixing plate 10, preferably having the shape of elongated parallelepiped with the length, in the sliding direction of the device, much longer than the other two directions (thickness and height), but other shapes of the device are possible providing they are structurally compatible with the intended use of the device and the width of the wing to be supported. The fixing plate 10 has, fixed thereto, wheels 13a, 13b, 13c, 13d and 14a, 14b, 14c, 14d which can turn about the axes thereof and which are grouped to form two friction pads. The wheels may be alternatively arranged aligned and grouped in different manner, preferably arranged at regular distances along the extension of the fixing plate 10. The fixing plate 10 also includes the presence of fixing means to the wall, not shown in detail in the figures, which may be chosen according to the weight of the door to be supported and to the material of the structure. For example, the fixing plate 10 is fixed to the building wall by means of fixing means, such as nails, screws, glue or similar fixing means, while if the wall is made of wood the fixing means may be of the type most appropriate to this type of material.

[0017] An intermediate rail 11 is arranged by the side of the plate 10 and is slidingly fixed to the latter. The fixing plate 10 works as sliding guide for the intermediate rail 11 by means of wheels 13a, 13b, 13c, 13d and 14a, 14b, 14c, 14d which are engaged in two parallel grooves 15 and 16 which guide them, determining the sliding direction of the entire device 1. In this manner, the intermediate rail 11 slides along the longitudinal direction thereof defined by the two guides 15 and 16 with respect to the fixing plate 10. In mounted position on the wall the plate 10 remains immobile and the intermediate rail 11 may slide between two extreme positions defined by the stroke end stops 17 and 18 arranged on the opposite ends of the intermediate rail 11 on which the wheels of the fixing plate 10 stop at the two ends of the sliding stroke. The device 1 may be such that the position of all stroke end stops used thereon are adjustable in addition to being removable to facilitate the assembly and adjust the maximum stroke of the two pairs of kinematic sliding pairs which form it.

[0018] The wheels of the fixing plate 10 are arranged so that during the sliding of the intermediate rail 11 along the guides 15 and 16 the fixing plate 10 never protrudes from the ends of the rail 11, choosing a particularly short length of the plate 10, e.g. a fraction of the length of the entire supporting device 1, considered in the direction of sliding.

[0019] The intermediate rail 11, on the opposite side of which the grooves 15 and 16 are obtained, has a plurality of wheels 19a, 19b, 19c, 19d and 20a, 20b, 20c, 20d, grouped so as to form rolling pads. The figures show embodiments with pads formed by groups of four wheels, but also a lower or preferably higher number may be provided so as to have, for instance, pads consisting of six or eight wheels, although higher numbers of wheels are not excluded. This intermediate rail 11 has the shape of a very elongated parallelepiped with respect to width, the length of which is determined by the maximum width of the wing to be supported which, preferably, must cover the intermediate rail 11 when the door is closed. The supporting device 1 of the wing 4 comprises an outer rail 12 which is used to fix the wing 4. The outer rail 12 has

the shape of an elongated parallelepiped and small thickness, of length substantially equal to the intermediate rail 11 which, on one side, has two longitudinal grooves 21 and 22 which constitute the guides. The intermediate rail 11 works, in turn, as an outer rail 12 by means of the kinematic coupling of the wheels 19a, 19b, 19c, 19d e 20a, 20b, 20c, 20d with the grooves 21 and 22 within which they slide. The maximum sliding of the outer rail 12 with respect to the intermediate rail 11 is determined by the end stops 23 and 24, which are preferably removable to allow easy assembly and disassembly of the two rails 11 and 12 on one another in addition to being as mentioned adjustable in position.

[0020] The outer surface 25 of the outer rail 12 is flat to receive the surface of a wing 4, however also other different shapes from flat may be chosen if the shape is more appropriate for creating a shape or force coupling, shape and material of the door to be suspended. The wing 4 is fixed to the outer rail 12 by means of appropriate fixing means, not shown in the figures, chosen according to the type of material forming the wing, e.g. nails, screws, glue etc.

[0021] In open door position, only part of the intermediate rail 11 remains in sight uncovered by the wing 4. In this open position, the intermediate rail occupies only a fraction of the width of the passage opening 3 left open by the wing 4.

[0022] By virtue of the arrangement chosen for the guides and the sliding means which engage them only the back part of the intermediate rail is thus visible from the outside, having the sliding guides 15 and 16 only on the side not in sight facing the wall to which the device 1 is fixed. This back surface part of such a rail is only designed for appearance purposes, such a side back part not displaying any functional or structural element. Furthermore, because the sliding guides 15 and 16 and the sliding means comprise, for example wheels or friction pads or a series of balls or other equivalent means are arranged only on the side of the intermediate rail 11, 11', 11" not in sight or in the intermediate rail surface portion 11, 11', 11" which always remains covered by the outer rail 12, 12', 12" also when the device 1 is in its maximum extension position the accumulation of dirt on the parts constituting the sliding means and the guides is greatly either avoided or reduced. Naturally, the same advantage is provided for the particular conformation of the outer rail 12, 12', 12".

[0023] The intermediate rail segment of length X is the maximum segment in which the device of the invention remains in sight and is, in all cases, smaller than the part remaining in sight when used on sliding doors devices of the prior art which show elements extending beyond at least the opening length of the door and sometimes extend further beyond. In the open door position, as shown in figure 1, corresponding to the position of the device 1 shown in figure 8, the device 1 is only visible for a part of the intermediate rail 11 which covers the fixing plate 10 in the extended position corresponding to a length V, indicated in the figures. Such a length V is defined by the position of the outermost wheels 19a and 19c and which, in the maximum extension position of the two intermediate 11 and outer rails 12, abut against the end stop 23 of the outer rail 12. Stroke stop means which are not constituted by the friction pads but which are separated therefrom may be provided.

[0024] Figure 8 also shows by how much the intermediate rail 11 protrudes beyond the fixing plate 10. The segment x of rail 11 which protrudes beyond the end of the fixing plate 10 is in a range comprised between 1/3 and 2/3 of the length of the intermediate rail 11, and preferably equal to half the length of the intermediate rail 11.

[0025] The figure 7 shows instead the position of the supporting device 1 corresponding to the closed door position. In this position, the intermediate 11 and outer 12 rails are covered perfectly also because they are preferably, but not necessarily of the same length. In this closing position of device 1, the relative position between the fixing plate 10 and the intermediate rail 11 is with the plate resting by abutting on the end stop 18 opposite to the stop 17 against which it rests in the maximum opening position of the door.

[0026] The intermediate rail 11 and the outer rail 12 fixing the wing are made of metallic material chosen according to the rigidity and strength required by the supporting device and, not last, also according to the appearance required by the market. The fixing plate 10, may be made of either the same or different material, while the plate 10 remains visible when the device 1 is fitted on the wall 2, with the door 4 fitted on the device 1. The three main elements 10, 11, 12 may be made by means of machining of various type, including milling, molding, extrusion, fusion etc. according to the use which is required and to the appearance effect which derives after assembly.

[0027] Other embodiments of the invention are possible in addition to the preferred one described above and are described below. The elements of the embodiments of the device 1 not expressly indicated by the reference numbers remain the same in all embodiments.

[0028] The embodiment in figure 9 shows a supporting device 1 like the one described above to which a closing or opening movement damping device 31 is associated, according to the position in which it is arranged. Such a door sliding damping device is actuated by an element 3 fixed to the building structure or to the fixing plate 10 or to the outer rail 12 in the position most suited to damping.

[0029] A further embodiment which may be combined to each of the embodiments of the supporting device 1 already described above, by either partially or totally eliminating the elements which have the same functions, is shown in figures 10 and 11. The device 1, instead of comprising sliding wheels which allow the intermediate rail to slide with respect to the fixing plate and the outer rail to slide with respect to the intermediate rail, includes the replacement of the wheels with friction pads 40, 41.

These friction pads 40 and 41, fixed to the plate 10' and inserted in guides 45 and 46 and/or central guides of appropriate shape, visible in the section view in figure 11, obtained in the body of the rail 11', allowing the intermediate rail 11' to slide in relation to the fixing plate 10'. The pads have further central T-shaped sliding guides 36, 37, 38, 39 in the middle of the guide transversal to the extension plane of the wing which contribute to the vertical support of the wing 4.

[0030] In a further embodiment a series of balls 50, 51, 60, 61 are provided which are inserted in specific guides 52, 53, 54, 55, 62, 63, 64, 65 obtained in part in the thickness of the fixing plate 10", in part in the thickness of the intermediate rail 11 " and in part in the outer rail 12". This embodiment shows in section in figure 12 and, also in this case, the balls allow the relative sliding between the intermediate rail 11" and the fixing plate 10" and between the outer rail 12" and the intermediate rail 11 ".

[0031] The pads 40, 41, 42, 43 are made of specific low coefficient self-lubricating material so as to allow a relative sliding of the various sliding parts without particular effort of intensity similar to that needed when wheels and balls are used. The embodiments described above may also be combined in variable manner to one another, choosing the various sliding means described or other equivalent means not described in detail, and therefore it is possible to arrange the pads in various manners consisted by wheels along with friction pads and/or rolling balls.

[0032] It is also possible to arrange the sliding means, balls, wheels, friction pads and equivalent, and the respective guides in kinematically reversed manner on the fixing plate on the intermediate rail and on the outer rail without because of this departing from the scope of the invention.

[0033] Segment V is preferably chosen in case of use of the support device for the doors of homes, for structural reasons equal to, or close to the length of the fixing plate 10, 10', 10". Segment V corresponds to the part of intermediate rail 11, 11', 11" which remains in sight, not covered by the body of the door 4, when the door is open. The segment V of the portion of intermediate rail 11, 11', 11" in sight is determined by appropriately positioning the stroke end stops 23 on the intermediate rail which abut against the wheels 19a, 19c when the outer rail 12, 12', 12" is in its maximum extension with respect to the intermediate rail 11, 11', 11". In an embodiment not shown, the position of the stroke end stops 23 along the outer rail and/or the position of the wheels 19a and 19c along the intermediate rail may be adjustable so as to determine the length V of the segment of intermediate rail which remains in sight. The length of segment V is comprised between 1/3 and 2/3 of the total length of the intermediate rail 11, 11', 11", and is generally equal to the length of the fixing plate 10, 10', 10" for reasons of structural stability of the door. Preferably, the length of segment V is equal to approximately half the length of the intermediate rail 11, 11', 11". A further embodiment of the supporting and sliding device of the invention includes the presence of mechanical catches operating by friction or snapping. Such an embodiment, two embodiments of which are shown in figures 16a and 16b, may be used in combination with each of the other embodiments of the device of the invention. A first embodiment of the catch in figure 16a is constituted by a piston or pad 71 which is maintained in a seat obtained in the body of the intermediate rail 11 by a plaque 72. The spring 70, helical or of other equivalent type, presses on the pad 71 and when it comes into contact with one of the friction wheels of the outer rail 12, or of the fixing plate 10, not shown here, the sliding of the intermediate rail makes the wheel go beyond the wheel against which it abuts, thus generating a block which prevents the door from moving from the open or closed position in which it is in that moment. In order to release the catch, a pressure simply needs to be exerted by hand against the door, which overcomes the pressure force exerted by the spring 70 on the pad 71 which overcomes the wheel against which it abuts in other sense.

[0034] The catch shown in figure 16b consists of a disc 73, e.g. made of rubber or natural rubber or other material with a high friction coefficient, fixed to the intermediate rail 11 covered by a plaque, which engages a surface segment of a guide of the outer rail 12 or of the adjacent fixing plate preventing an undesired sliding of the door. Figure 16c is a partial section view of a detail of the device of the invention showing the catch of the embodiment in figure 16b in the braked engaged position. In this illustration, which is an example for all the other positions of the catches, the disc 73 presses on the wheel 41 c, which is fixed to the fixing plate 10, thus braking the rotation thereof. In this manner, the disc 73 makes the reciprocal sliding of the fixing plate 10 and of the intermediate rail 11 subject to a force which exceeds the friction forces between disc 73 and wheel 14c.

[0035] Although only one position of the catch on an end of the intermediate rail 11 is shown by way of example, it is apparent that for a person skilled in the art these catches can be inserted in those positions along the supporting plate of the intermediate rail and of the outer rail where it is necessary to prevent undesired movements of the door wings where these could occur.

[0036] For example, in the device embodiment in which friction pads or balls are provided to create one or more kinematic sliding pairs between fixing plate, intermediate rail or outer rail, either alternatively or in combination with the wheels, the pad 71 or the disc 73 are jammed in specific cavities obtained in specific protrusions made in appropriate points of the surface of one of the elements of the aforesaid devices.

[0037] These stops 71, 72 and 73, 74, which in these figures are advantageously arranged in chosen points of the intermediate 11 and outer 12 rail, are activated when the door is in the all open and/or all closed state, so that in case of imperfect leveling of the supporting device the door does not move along moving from the mentioned

end positions due to its weight, but it is easily moveable by a person. The catches can also have calibration devices of the spring 70, e.g. a register which works on the spring 70 by increasing or decreasing the preload of the same in order to increase or decrease the braking force.

[0038] In other cases, the braking force between the elements of the device 1 is adjusted by replacing parts 73 or 70 or by changing its shape.

[0039] Other shape embodiments of the catch just described may be used both by applying them in different positions or on different faces of the fixing plate, of the intermediate rail or of the outer rail, by preferably choosing a position in which the catch remains not in sight when the supporting device is in the all extended position or all retracted position when it is mounted on the door.

[0040] The advantages of the supporting and sliding device of the invention described above, which are apparent to a person skilled in the art, definitely include the sense, i.e. the fact that the door can be open either rightwards or leftwards without leaving rails or other protruding from the side of the door in the closed state using the same device, in relation to the device is fixed to the wall. The device allows easy application to standard thickness doors made of wood without there being thickening on the upper edge of the door. The device allows total opening of the door with respect to the door passage compartment or opening thus the wing does not engage at all the passage opening on the side of the opening riser with the door all open.

[0041] Another advantage offered by the device of the invention is that of having a door centered in closed position with respect to the passage opening. Preferably, the width of the door exceeds that of the door compartment only by few millimeters on each side, otherwise the door can be dimensioned as wide as the width of the device of the invention or may be a slightly wider or slightly shorter according to needs.

[0042] The end user may have sliding door or wing made of any material with the two "joined" vertical side edges, i.e. not provided with "L" or "C"-shaped grooved sides, thus it is possible to cover, on the sides of the wing, the part of the supporting and sliding device which is fixed to the wing itself.

[0043] In the preferred embodiment described above, the device, after having been mounted on the wall and the door is fixed thereto, occupies only approximately half the width of the door passage, and is thus particular acceptable from the point of view of appearance by the market because the plate fixed to the wall is not as long as the length of the device in folded position, and, as a whole, is particularly compact with respect to the devices of the prior art.

[0044] The device of the invention may be used to support doors made of wood or glass or metal or any other material with which doors of homes or furniture are made. According to the type of material used for the fixtures, the fixing means provided on the fixing rail may be different and the flexibility offered by the supporting device of the invention in use is apparent to a person skilled in the art.

[0045] Another advantage of the device is that, due to its construction simplicity, it may be provided with mechanical catches like those described above which are not very conspicuous and which are simple to mount, thus ensuring a greater safety in sliding door activation.

[0046] For the same reason, a decelerated recalling mechanism can be added on the sliding door supporting device, as described above, which is activated in the final closing and/or maximum opening position of the door for reducing the violence of the collisions which are produced during the final closing or opening.

[0047] Obviously, what described above for application of the supporting device 1 to door fixtures can be transferred without any difference, except for the dimensions of the compartment and of the various construction elements, to applications on wings for furniture.

[0048] A further advantage is that of being able to use the sliding of the reciprocal sliding of the wheels/bearing with tapered ring for stabilizing the movement on the profiles provided with specifically shaped guides or ball systems or friction pads as explained above to reduce production costs, if needed.

Claims

1. A sliding door wing supporting device (1), for closing and opening an aperture, defining a sliding direction of the supporting device (1), and comprising:

a fixing plate (10, 10', 10"), adapted to be fixed to a structure in which the aperture is present, forming a first member of a first kinematic sliding pair, defining a first length,

an intermediate rail (11, 11', 11"), arranged by a side of the fixing plate (10, 10',10"), forming a second member of the first kinematic sliding pair and also forming a first member of a second kinematic sliding pair, defining a second length,

an outer rail (12, 12', 12") for fixing a wing (4) of said sliding door, arranged by the side of the intermediate rail (11, 11', 11 ") and forming a second member of the second kinematic sliding pair,

wherein the outer rail (12, 12', 12") has a length substantially equal to the second length in the way of the sliding direction,

wherein the supporting device (1) can slide between two extreme positions, a retracted position in which the fixing plate (10, 10', 10"), the intermediate rail (11, 11', 11"), the outer rail (12, 12', 12") have a respective first aligned end, and a position of maximum extension in which the intermediate rail (11, 11', 11") protrubes beyond the fixing plate (10, 10', 10") by a segment X, and the outer rail (12, 12', 12") protrubes beyond

the intermediate rail (11, 11', 11") by a segment V, so as to leave only a segment of intermediate rail (11, 11', 11") not covered by the outer rail (12, 12', 12")

wherein the first kinematic sliding pair allows the intermediate rail (11, 11', 11 ") to slide with respect to the fixing plate (10, 10', 10") along said sliding direction through first sliding means, and the second kinematic sliding pair allows the outer rail (12, 12', 12") to slide with respect to the intermediate rail (11, 11 ', 11 ") along said sliding direction through second sliding means, wherein the second sliding means are arranged only in surface portion of the intermediate rail (11, 11', 11") which always remains covered by the outer rail (12, 12', 12"),

characterised in that the first length is smaller than the second length, and

in that the first sliding means (13, 14, 40, 41) are arranged on the fixing plate (10, 10', 10") so that during sliding between the two extreme positions the fixing plate (10, 10', 10") does not protrude from the ends of the intermediate rail (11, 11', 11 ").

2. A supporting device according to claim 1, wherein the fixing plate (10, 10', 10") comprises fixing means with respect to the structure and the outer rail (12, 12', 12") comprises fixing means with respect to the door wing (4).

3. A supporting device according to claim 2, wherein said first sliding means comprise one or more first guides obtained in the intermediate rail and wheels integral with the fixing plate and sliding in the one or more first guides.

4. A supporting device according to claim 3, wherein the second sliding means comprise one or more second guides provided in the outer rail and wheels integral with the intermediate rail and sliding in the one or more second guides.

5. A supporting device according to claim 2, wherein the first sliding means comprise one or more first guides provided in the intermediate rail and friction pads integral with the fixing plate and sliding in the one or more first guides.

6. A supporting device according to claim 5, wherein the second sliding means comprise one or more second guides provided in the outer rail and friction pads integral with the intermediate rail and sliding in the one or more second guides.

7. A supporting device according to claim 2, wherein the first sliding means comprise one or more first guides provided in the intermediate rail and one or more corresponding second guides provided- in the fixing plate and rolling balls interposed between the first and second guides.

8. A supporting device according to claim 7, wherein the second sliding means comprise one or more first guides provided in the intermediate rail and one or more corresponding second guides provided in the outer rail and rolling balls interposed between the first and second guides.

9. A supporting device according to one of the preceding claims, wherein the first and second segments X, V are substantially equal to the length of the fixing plate (10, 10', 10").

10. A supporting device according to one of the preceding claims, wherein in the position of maximum extension of the device, the relative positions of said fixing plate (10, 10', 10"), intermediate rail (11, 11 ', 11") and outer rail (12, 12', 12") are determined by stroke end means comprising first and second sliding means (13a, 13c, 14b, 14c, 17, 18, 19a, 19c, 20b, 20d, 23, 24).

11. A sliding door comprising a supporting device according to one of the claims from 1 to 10.

Patentansprüche

1. Gleittürflügel-Halterungsvorrichtung (1) zum Schließen und Öffnen einer Öffnung, wobei diese Vorrichtung die Gleitrichtung dieser Halterungsvorrichtung (1) festlegt und umfasst:

- eine Befestigungsplatte (10, 10', 10"), welche so ausgelegt ist, dass sie an dem Bauwerk, in welchem sich die Öffnung befindet, befestigt wird, und welche ein erstes Teil eines ersten kinematischen Gleitpaares bildet, welches eine erste Länge festlegt,
- eine Zwischenschiene (11, 11', 11"), welche auf einer Seite der Befestigungsplatte angeordnet ist und welche ein zweites Teil des ersten kinematischen Gleitpaares bildet und auch ein erstes Teil eines zweiten kinematischen Gleitpaares bildet, welches eine zweite Länge festlegt,
- eine Außenschiene (12, 12', 12") zum Befestigen eines Flügels (4) der genannten Gleittür, wobei diese Außenschiene auf der Seite der Zwischenschiene (11, 11', 11") angeordnet ist und ein zweites Teil des zweiten kinematischen Gleitpaares bildet,

wobei die Außenschiene (12, 12', 12") eine Länge aufweist, welche im Wesentlichen gleich der zweiten Länge auf dem Weg der Gleitrichtung

ist,
wobei die Halterungsvorrichtung (1) zwischen zwei Extremstellungen gleiten kann, einer eingefahrenen Stellung, in welcher die Befestigungsplatte (10, 10', 10"), die Zwischenschiene (11, 11', 11") und die Außenschiene (12, 12', 12") ein zugehöriges erstes ausgerichtetes Ende aufweisen, und einer maximal ausgefahrenen Stellung, in welcher die Zwischenschiene (11, 11', 11") über die Befestigungsplatte (10, 10', 10") um ein Segment X hinausragt und die Außenschiene (12, 12', 12") über die Zwischenschiene (11, 11', 11") um ein Segment V hinausragt, so dass nur ein Segment der Zwischenschiene (11, 11', 11") verbleibt, welches von der Außenschiene (12, 12', 12") nicht bedeckt ist, wobei das genannte Segment X und des genannte Segment V sich im Bereich von 1/3 bis 2/3 der Länge der Zwischenschiene (11, 11', 11") befinden bzw. wodurch die Zwischenschiene (11, 11', 11") so konfiguriert ist, dass sie nur einen Bruchteil der Breite der Öffnung einnimmt, wobei das erste kinematische Gleitpaar ermöglicht, dass die Zwischenschiene (11, 11', 11") in Bezug auf die Befestigungsplatte (10, 10', 10") längs der genannten Gleitrichtung durch die ersten Gleitmittel hindurch gleitet, und wobei das zweite kinematische Gleitpaar ermöglicht, dass die Außenschiene (12, 12', 12") in Bezug auf die Zwischenschiene (11, 11', 11") längs der genannten Gleitrichtung durch die zweiten Gleitmittel hindurch gleitet, wobei die zweiten Gleitmittel nur in dem Oberflächenbereich der Zwischenschiene (11, 11', 11") angeordnet sind, welcher stets von der Außenschiene (12, 12', 12") bedeckt bleibt,
dadurch gekennzeichnet, dass die erste Länge kürzer als die zweite Länge ist, und
dadurch, dass die ersten Gleitmittel (13, 14, 40, 41) dergestalt auf der Befestigungsplatte (10, 10', 10") angeordnet sind, dass während des Gleitens zwischen den beiden Extremstellungen die Befestigungsplatte (10, 10', 10") nicht über die Enden der Zwischenschiene (11, 11', 11") hinaus ragt.

2. Halterungsvorrichtung nach Anspruch 1, bei welcher die Befestigungsplatte (10, 10', 10") Befestigungsmittel zum Anbringen am Bauwerk umfasst und die Außenschiene (12, 12', 12") Befestigungsmittel zum Anbringen am Türflügel (4) umfasst.

3. Halterungsvorrichtung nach Anspruch 2, bei welcher die genannten ersten Gleitmittel eine oder mehrere erste Führungen umfassen, welche sich in der Zwischenschiene befinden, sowie Räder, die fester Bestandteil der Befestigungsplatte sind und in der einen oder den mehreren ersten Führungen gleiten.

4. Halterungsvorrichtung nach Anspruch 3, bei welcher die zweiten Gleitmittel eine oder mehrere zweite Führungen umfassen, welche sich in der Außenschiene befinden, sowie Räder, die fester Bestandteil der Zwischenschiene sind und in der einen oder den mehreren zweiten Führungen gleiten.

5. Halterungsvorrichtung nach Anspruch 2, bei welcher die ersten Gleitmittel einen oder mehrere erste Führungen umfassen, welche sich in der Zwischenschiene befinden, sowie Reibungskissen, welche fester Bestandteil der Befestigungsplatte sind und in der einen oder den mehreren ersten Führungen gleiten.

6. Halterungsvorrichtung nach Anspruch 5, bei welcher die zweiten Gleitmittel eine oder mehrere zweite Führungen umfassen, welche sich in der Außenschiene befinden, sowie Reibungskissen, welche fester Bestandteil der Zwischenschiene sind und in der einen oder den mehreren zweiten Führungen gleiten.

7. Halterungsvorrichtung nach Anspruch 2, bei welcher die ersten Gleitmittel eine oder mehrere erste Führungen umfassen, welche sich in der Zwischenschiene befinden, sowie eine oder mehrere entsprechende zweite Führungen, welche sich in der Befestigungsplatte befinden, sowie Rollkugeln, die zwischen der bzw. den ersten und der bzw. den zweiten Führung/en gelagert sind.

8. Halterungsvorrichtung nach Anspruch 7, bei welcher die zweiten Gleitmittel eine oder mehrere erste Führungen umfassen, welche sich in der Zwischenschiene befinden, sowie eine oder mehrere entsprechende zweite Führungen, welche sich in der Außenschiene befinden, sowie Rollkugeln, die zwischen der bzw. den ersten und der bzw. den zweiten Führung/en gelagert sind.

9. Halterungsvorrichtung nach einem der vorangehenden Ansprüche, bei welcher das erste und das zweite Segment, X, V, im Wesentlichen gleich der Länge der Befestigungsplatte (10, 10', 10") sind.

10. Halterungsvorrichtung nach einem der vorangehenden Ansprüche, bei welcher in der Stellung der maximalen Auslenkung der Vorrichtung die relativen Positionen der genannten Befestigungsplatte (10, 10', 10"), der Zwischenschiene (11, 11', 11") und der Außenschiene (12, 12', 12") durch Hubwegbegrenzungsmittel festgelegt werden, die erste und zweite Gleitmittel (13a, 13c, 14b, 14c, 17, 18, 19a, 19c, 20b, 20d, 23, 24) umfassen.

11. Gleittür, welche eine Halterungsvorrichtung nach einem der Ansprüche 1 bis 10 umfasst.

Revendications

1. Dispositif de support d'aile de porte coulissante (1), pour fermer et ouvrir une ouverture, définissant une direction de coulissement du dispositif de support (1), et comprenant :

une plaque de fixation (10, 10', 10''), adaptée pour être fixée à une structure dans laquelle l'ouverture est présente, formant un premier membre d'une première paire coulissante cinématique, définissant une première longueur, un rail intermédiaire (11, 11', 11''), agencé à côté de la plaque de fixation (10, 10', 10''), formant un second membre de la première paire coulissante cinématique et formant également un premier membre d'une seconde paire coulissante cinématique, définissant une seconde longueur, un rail extérieur (12, 12', 12'') pour fixer une aile (4) de ladite porte coulissante, agencé à côté du rail intermédiaire (11, 11', 11'') et formant un second membre de la seconde paire coulissante cinématique,

dans lequel le rail extérieur (12, 12', 12") possède une longueur sensiblement égale à la seconde longueur dans la direction de coulissement,

dans lequel le dispositif de support (1) peut coulisser entre deux positions extrêmes, une position rétractée dans laquelle la plaque de fixation (10, 10', 10''), le rail intermédiaire (11, 11', 11''), le rail extérieur (12, 12', 12'') possèdent une première extrémité alignée respective et une position d'extension maximum dans laquelle le rail intermédiaire (11, 11', 11'') fait saillie au-delà de la plaque de fixation (10, 10', 10") selon un segment X, et le rail extérieur (12, 12', 12'') fait saillie au-delà du rail intermédiaire (11, 11', 11'') selon un segment V, afin de laisser seulement un segment de rail intermédiaire (11, 11', 11'') non couvert par le rail extérieur (12, 12', 12''),

dans lequel ledit segment X et ledit segment V sont dans la plage de 1/3 à 2/3 de la longueur du rail intermédiaire (11, 11', 11''), respectivement, le rail intermédiaire (11, 11', 11'') étant configuré pour occuper seulement une fraction de la largeur de l'ouverture,

dans lequel la première paire coulissante cinématique permet au rail intermédiaire (11, 11', 11'') de coulisser par rapport à la plaque de fixation (10, 10', 10") le long de ladite direction de coulissement par l'intermédiaire de premiers moyens coulissants, et la seconde paire coulissante cinématique permet au rail extérieur (12, 12', 12'') de coulisser par rapport au rail intermédiaire (11, 11', 11'') le long de ladite direction de coulissement par l'intermédiaire de seconds moyens coulissants, dans lequel les seconds moyens coulissants sont agencés seulement dans une portion de surface du rail intermédiaire (11, 11', 11'') qui reste toujours couverte par le rail extérieur (12, 12', 12"),

caractérisé en ce que la première longueur est plus petite que la seconde longueur, et **en ce que** les premiers moyens coulissants (13, 14, 40, 41) sont agencés sur la plaque de fixation (10, 10', 10'') pour que, durant le coulissement entre les deux positions extrêmes, la plaque de fixation (10, 10', 10'') ne fasse pas saillie à partir des extrémités du rail intermédiaire (11, 11', 11'').

2. Dispositif de support selon la revendication 1, dans lequel la plaque de fixation (10, 10', 10'') comprend des moyens de fixation par rapport à la structure et le rail extérieur (12, 12', 12'') comprend des moyens de fixation par rapport à l'aile de porte (4).

3. Dispositif de support selon la revendication 2, dans lequel lesdits premiers moyens coulissants comprennent un ou plusieurs premiers guidages obtenus dans le rail intermédiaire et des roues faisant partie intégrante de la plaque de fixation et coulissant dans le ou les premiers guidages.

4. Dispositif de support selon la revendication 3, dans lequel les seconds moyens coulissants comprennent un ou plusieurs seconds guidages prévus dans le rail extérieur et des roues faisant partie intégrante du rail intermédiaire et coulissant dans le ou les seconds guidages.

5. Dispositif de support selon la revendication 2, dans lequel les premiers moyens coulissants comprennent un ou plusieurs premiers guidages prévus dans le rail intermédiaire et des plaquettes de frottement faisant partie intégrante de la plaque de fixation et coulissant dans le ou les premiers guidages.

6. Dispositif de support selon la revendication 5, dans lequel les seconds moyens coulissants comprennent un ou plusieurs seconds guidages prévus dans le rail extérieur et des plaquettes de frottement faisant partie intégrante du rail intermédiaire et coulissant dans le ou les seconds guidages.

7. Dispositif de support selon la revendication 2, dans lequel les premiers moyens coulissants comprennent un ou plusieurs premiers guidages prévus dans le rail intermédiaire et un ou plusieurs seconds guidages correspondants prévus dans la plaque de fixation et des billes roulantes interposées entre les premiers et seconds guidages.

8. Dispositif de support selon la revendication 7, dans lequel les seconds moyens coulissants compren-

nent un ou plusieurs premiers guidages prévus dans le rail intermédiaire et un ou plusieurs seconds guidages correspondants prévus dans le rail extérieur et des billes roulantes interposées entre les premiers et seconds guidages.

9. Dispositif de support selon l'une des revendications précédentes, dans lequel les premier et second segments X, V sont sensiblement égaux à la longueur de la plaque de fixation (10, 10', 10'').

10. Dispositif de support selon l'une des revendications précédentes, dans lequel, dans la position d'extension maximum du dispositif, les positions relatives de ladite plaque de fixation (10, 10', 10''), dudit rail intermédiaire (11, 11', 11'') et dudit rail extérieur (12, 12', 12'') sont déterminées par des moyens de fin de course comprenant des premiers et seconds moyens coulissants (13a, 13c, 14b, 14c, 17, 18, 19a, 19c, 20b, 20d, 23, 24).

11. Porte coulissante comprenant un dispositif de support selon l'une des revendications 1 à 10.

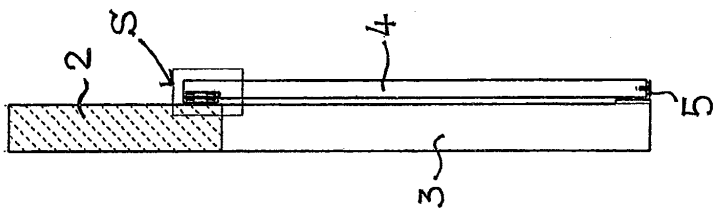


FIG.2

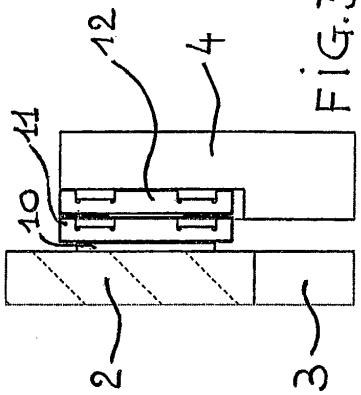


FIG.3

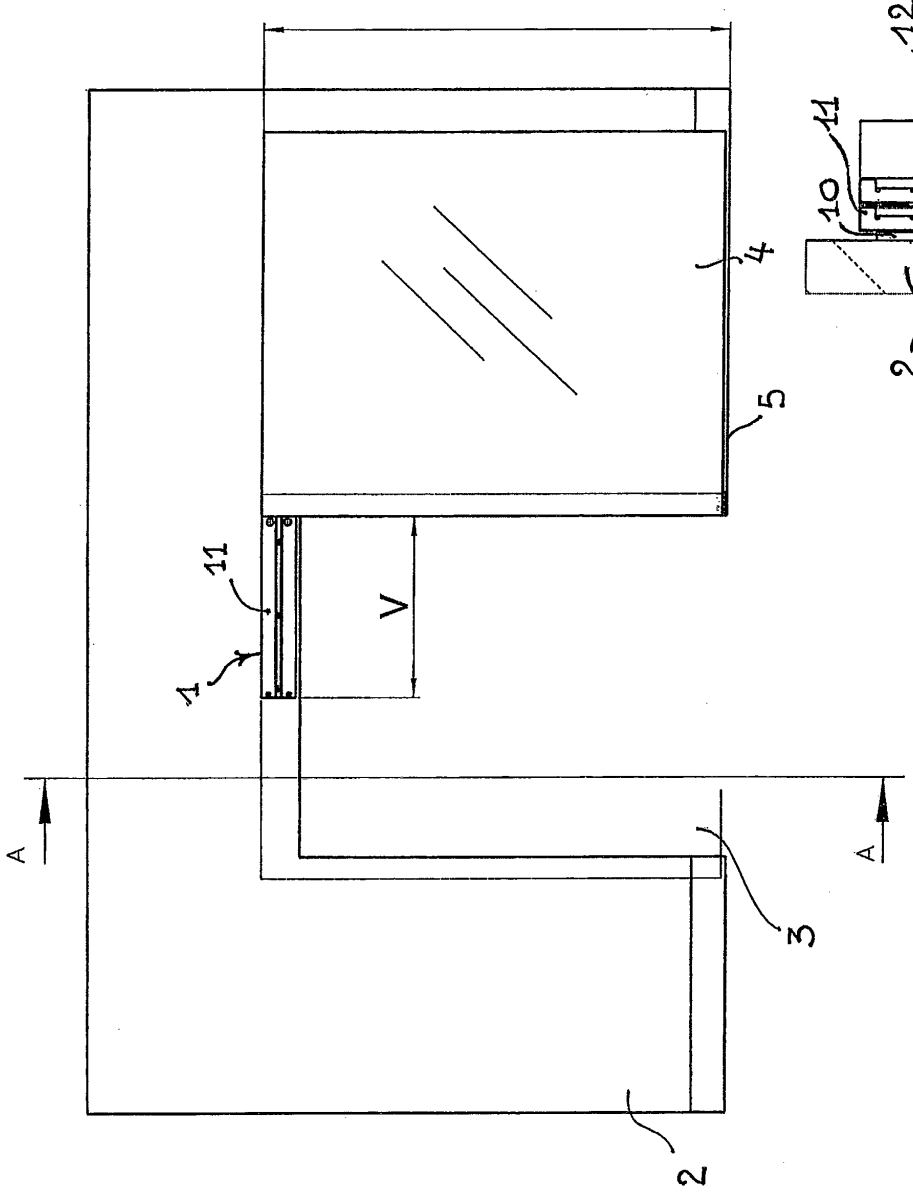


FIG.1

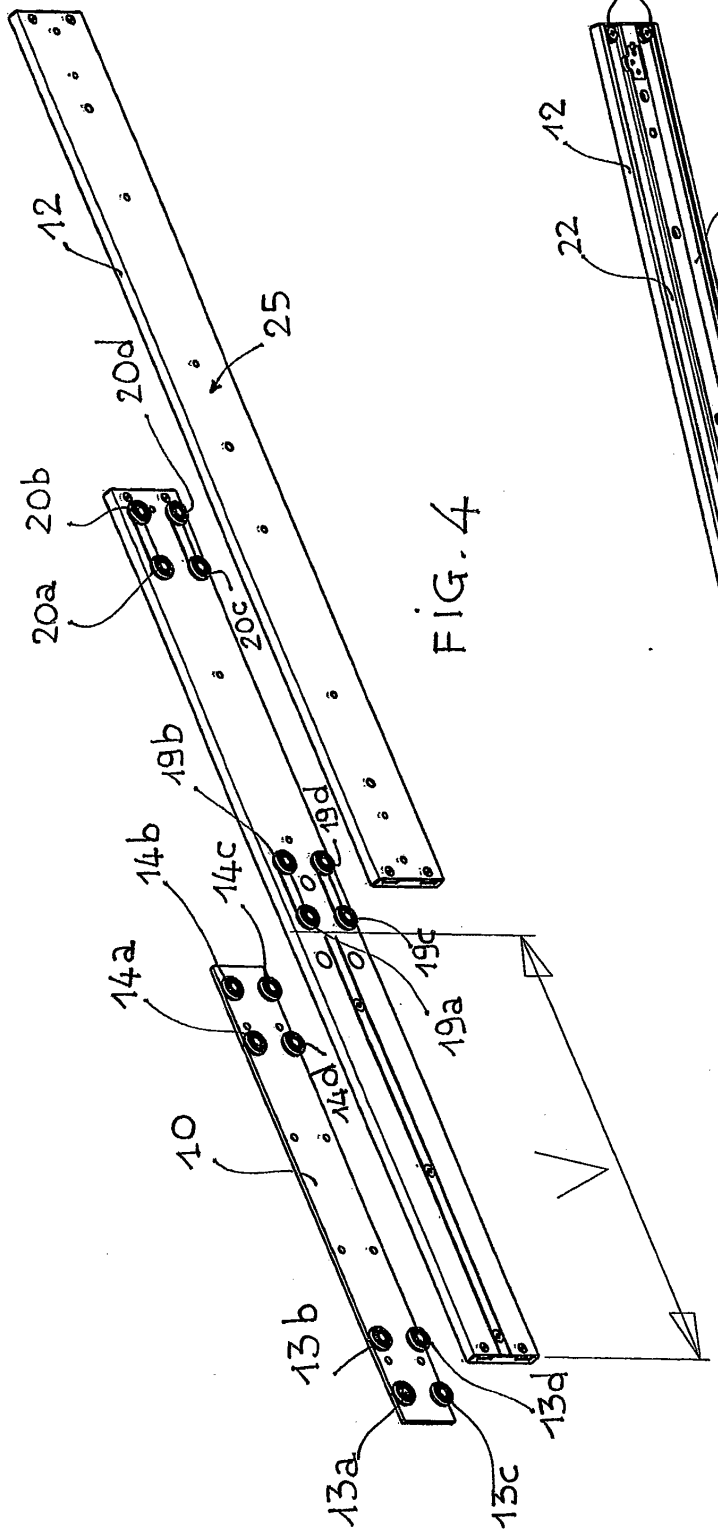

12
25
20d
20b
20a
20c
19b
19d
14b
14c
19c
14a
19a
14d
10
13b
13d
13a
13c

FIG. 4

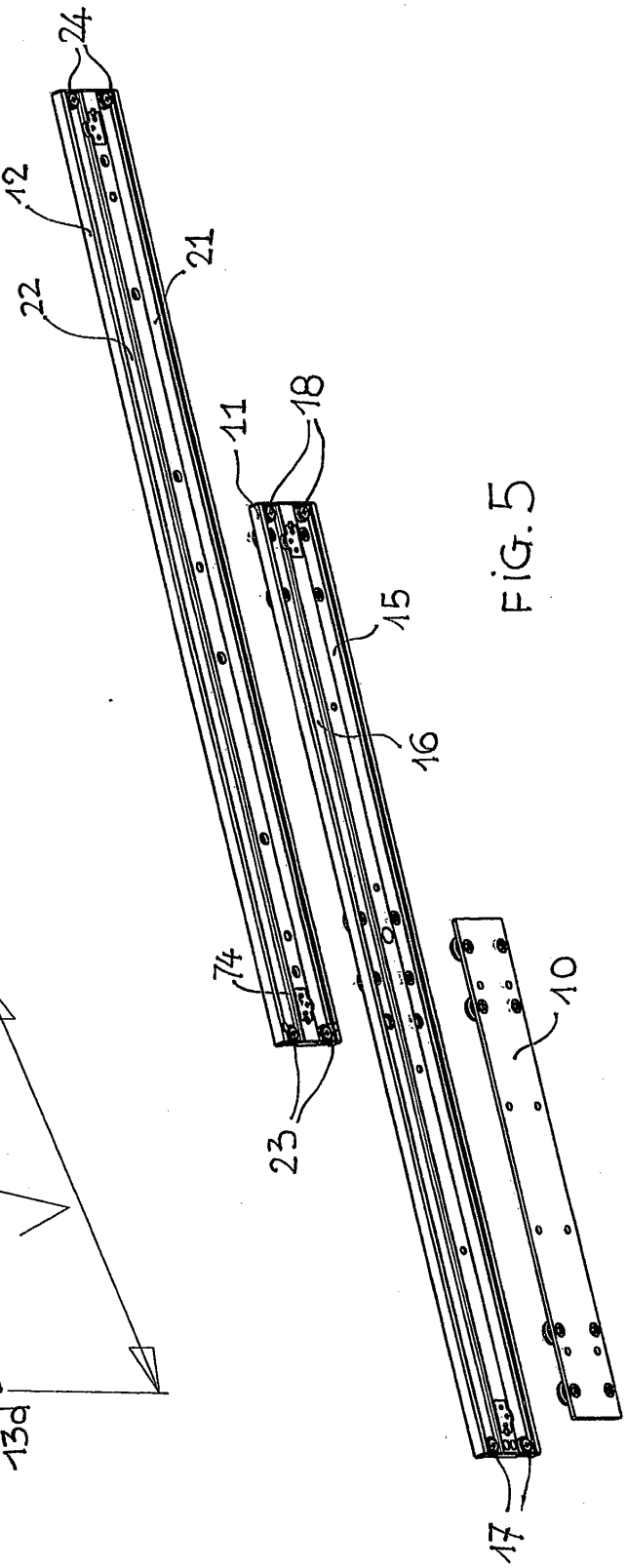

24
12
21
22
11
18
15
16
74
10
23
17

FIG. 5

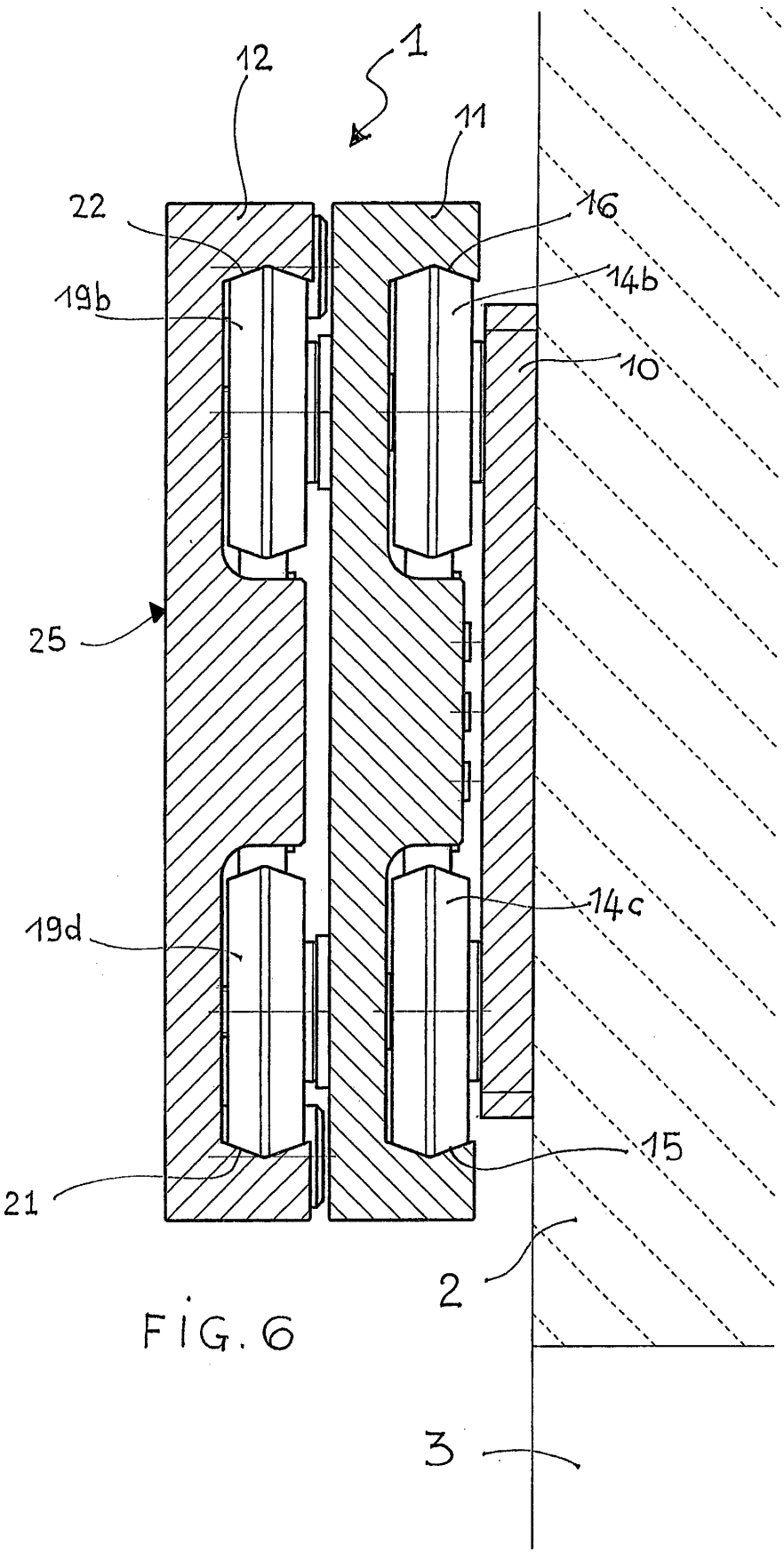


FIG. 6

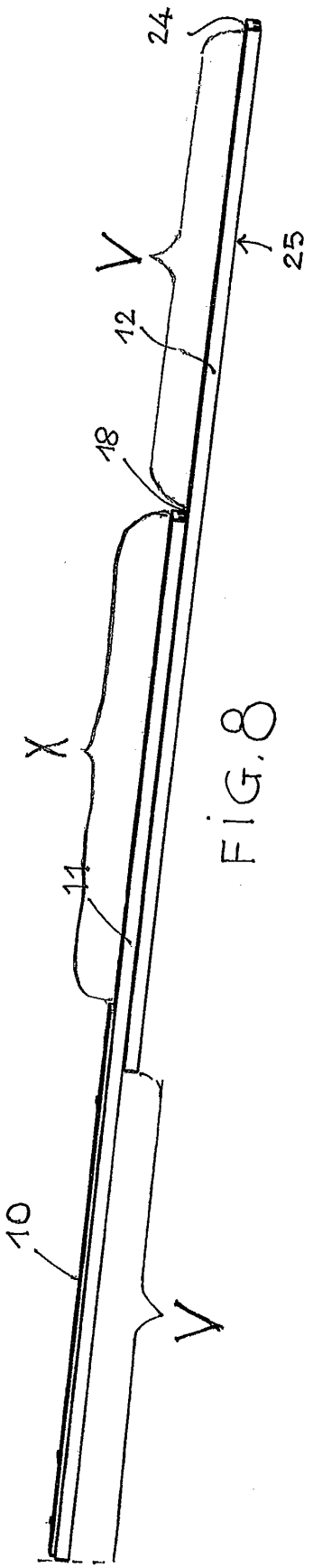


FIG.8

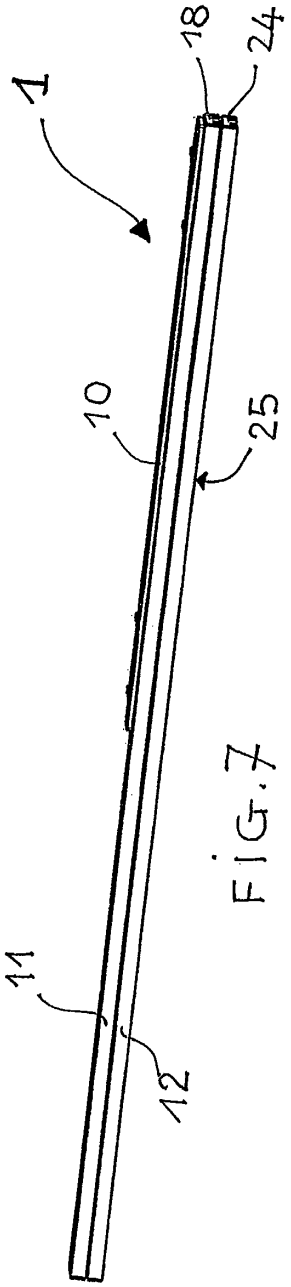


FIG.7

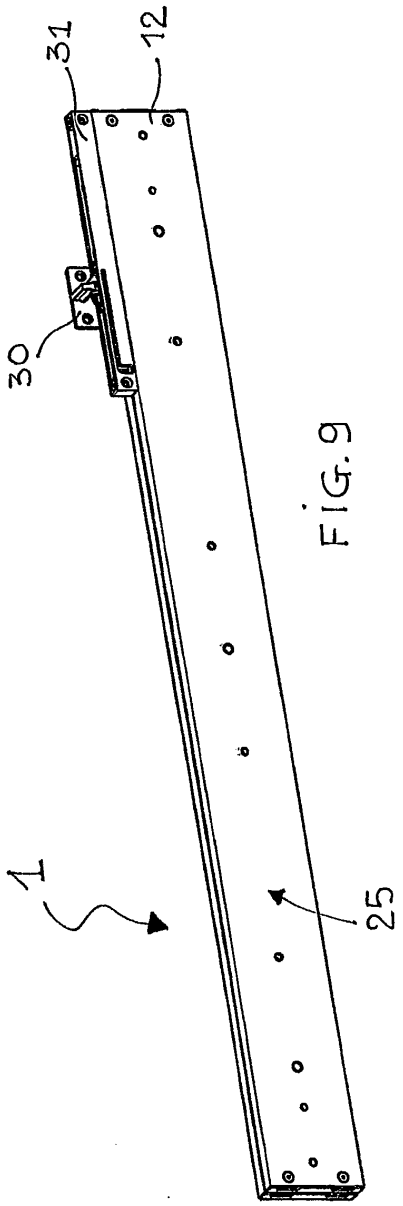


FIG. 9

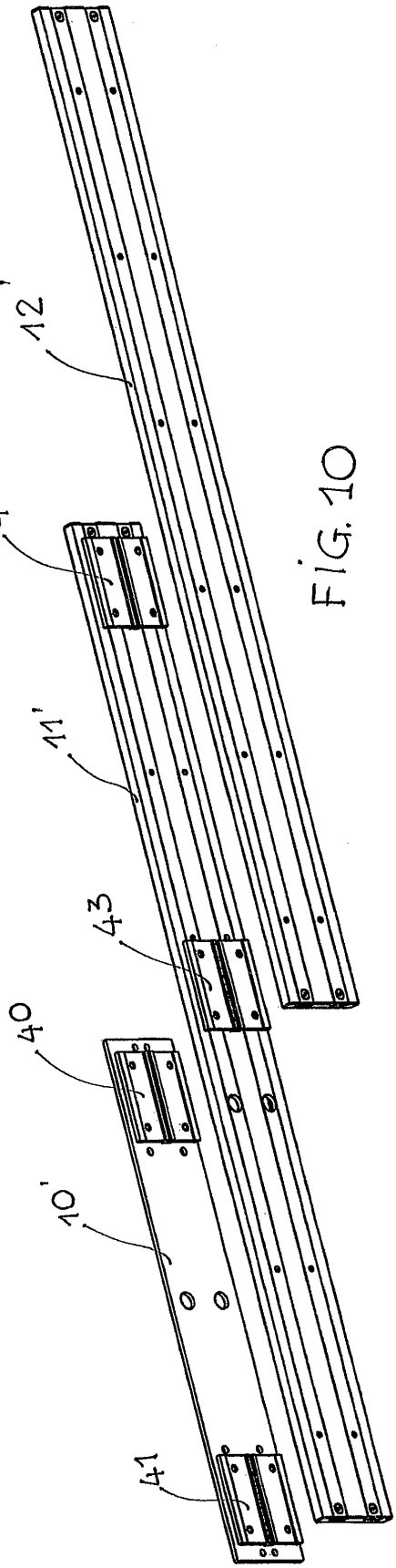


FIG. 10

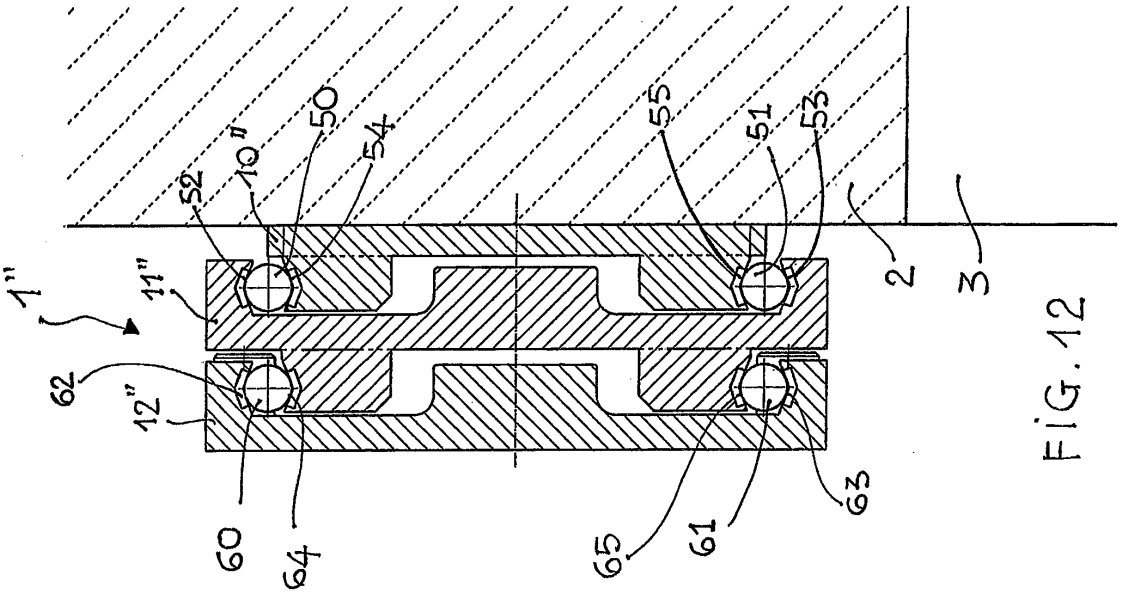

1''
11''
12''
62
60
64
65
61
63
52
10''
50
54
55
51
53
2
3

FIG. 12

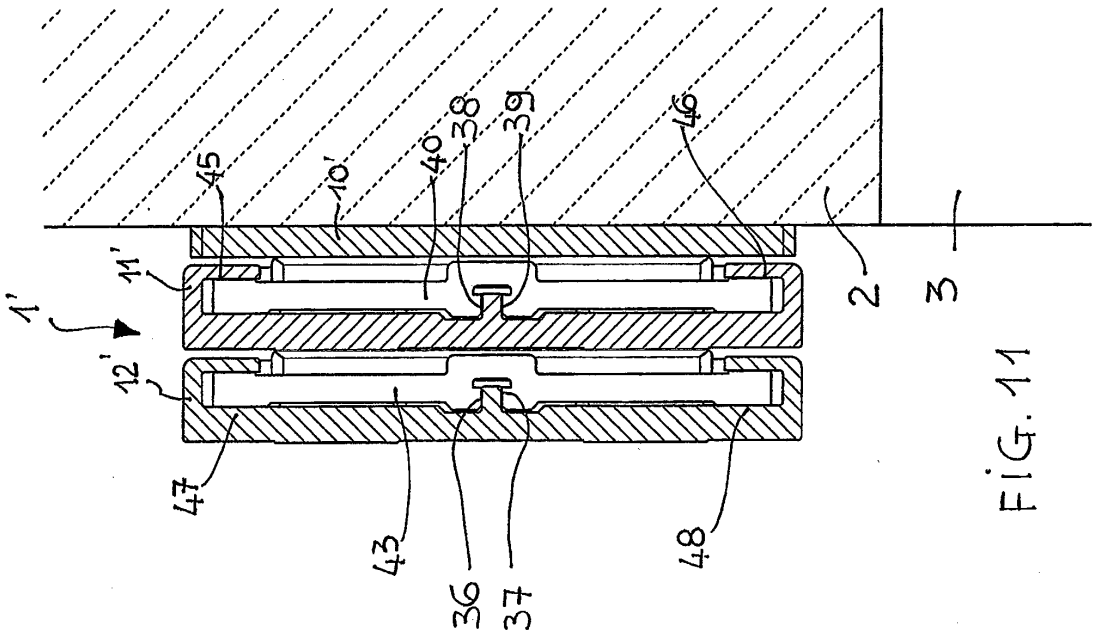

1'
11'
12'
45
10'
40
38
39
46
47
43
36
37
48
2
3

FIG. 11

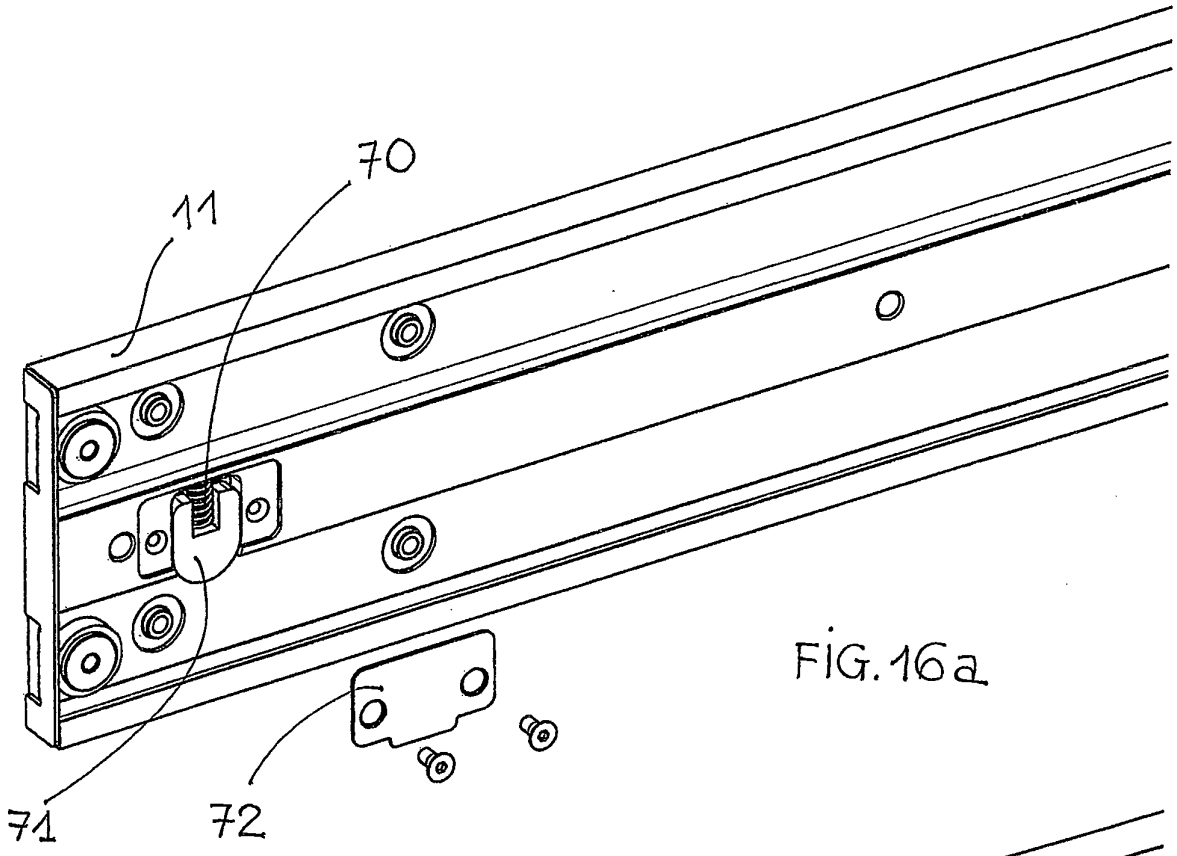


FIG. 16a

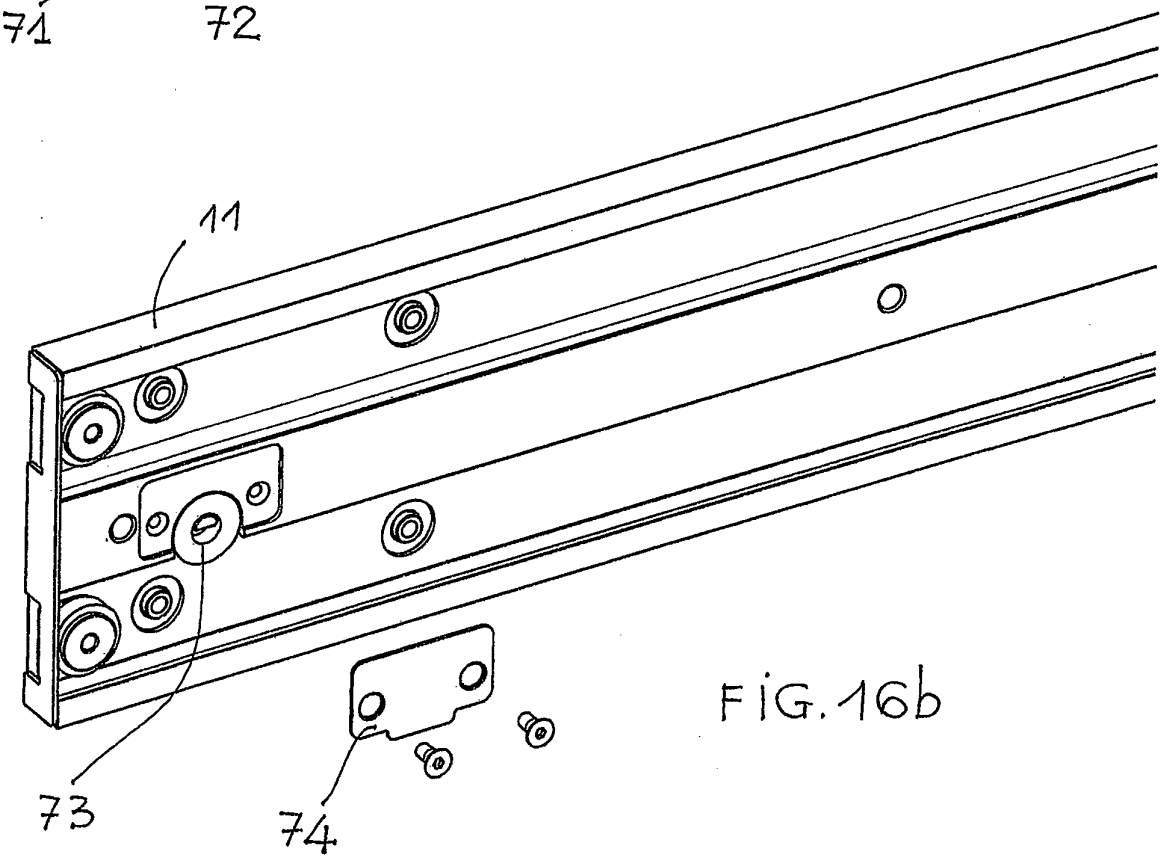


FIG. 16b

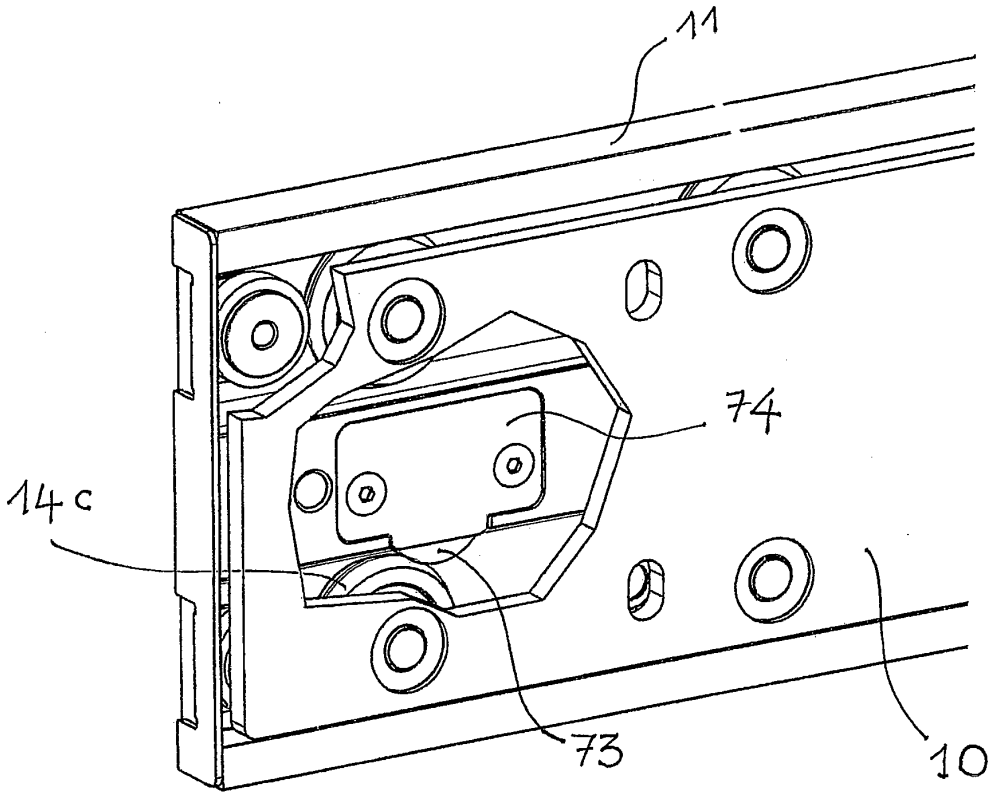


FIG. 16c