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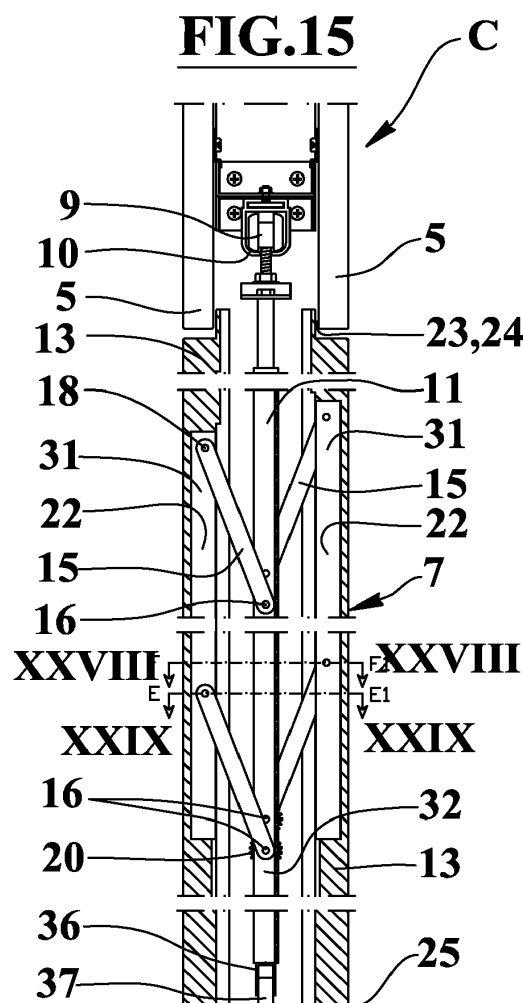
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(54) **Closing device with sliding door leaf**

(57) A closing device with sliding door leaf comprises a wall frame (3) assigned to be fixed to a wall or furniture opening to achieve a door. The frame (3) has at least one side upright (4), an upper cross member (5) extending from the top of said upright (4) to an opposed upper end of a seat means (6) assigned to house a door leaf (7) in a door open condition (A), such upright (4), cross member (5) and seat means (6) form a portal and they lie on a geometrical plane that, in a device (1) operating condition, is vertical or almost vertical.

Said device (1) also includes a set of trolleys (9) supporting the door leaf (7) and sliding along a guide (10) extended almost horizontally, along such cross member (5) connected to the guide (10). The door leaf (7) comprises a frame means (11) fixed to the trolleys (9) and comprises two parallel and facing panels (13) constituting the two door leaf (7) main faces and connected to the interposed frame means (11) by means of a plurality of respective connecting rod means (15).

Each connecting rod means (15) has a first rotational pin mean (16), horizontal and parallel to the geometrical plane of the frame means (11) and fixed to the latter (11) and a second rotational pin means (18), parallel to the first pin means (16), fixed to the respective panel (13) and placed at a height higher than the first pin means (16).



Description

[0001] The present invention refers to the field concerning door leafs for doors, wardrobes and furniture in general and refers to a closing device with sliding pocket door, with one or both faces of the leaf coplanar to the faces of the respective wall in the closing condition.

[0002] There are known sliding doors assigned, in the closing condition, to put one face of the leaf door on the same geometric plane of a wall face to which is associated the door to get a coplanar closure.

[0003] One disadvantage of such known sliding doors is that they are made for protruding installation, outside of the wall, and the respective guides and trolleys are always exposed and/or visible.

[0004] Other drawback of said known doors consists in that realize the coplanarity of the wall and the door only at one side of the wall while at the opposite side the wall and the door leaf faces are offset.

[0005] Further drawback of the known doors with one coplanar face consists in that they are bulky, complex and expensive.

[0006] There are also known doors with sliding pocket door leaf and comprising a fixed frame, for example that can be walled up in a wall or fixed to a furniture, provided with an internal seat means assigned, in an opening condition of the door, to contain a door leaf that can slide along one or more guides of such doors. The sliding of the door leaf allows to remove it from the fixed frame seat for the door closing.

[0007] One disadvantage of such known pocket sliding doors consists in that both faces of the sliding door leaf are staggered with respect to the wall faces and, therefore, are not coplanar.

[0008] Other drawback of said known pocket doors consists in that they offer little resistance to the sound passage because, even if they include a sound absorbent material, they must be very thin to be able to slide into the respective fixed frame.

[0009] A disadvantage of the known sliding doors mentioned above is that the doors leaf, in the closed condition, not bear with the edges of the wall opening to which they are applied in a sufficiently precise manner leaving slots and spaces that allow the passage of air currents, odors, dust and noise.

[0010] Document WO 2009/139016 A2 discloses a closing device with sliding door comprising the features of the preamble of claim 1.

[0011] One object of the present invention is to propose a closing device with sliding door leaf that, in the closed condition, has at least one face of the door leaf coplanar with respect to the corresponding wall face or furniture to which the device is associated.

[0012] Another object is to propose a pocket sliding door device which is simple, relatively cheap and that can be made with thicknesses also very reduced to allow the walling up the coupling or integration thereof in walls or structures even very thin and almost of any kind and

nature.

[0013] Further object is to propose a device that in the closed condition presents both faces of the door leaf coplanar with respect to the corresponding faces of the wall or furniture to which the device is associated.

[0014] Another object is to propose a device whose door leaf, in the door closing condition, provides an excellent barrier against the passage of sounds.

[0015] Further object is to propose a device whose door leaf, in the door closing condition match with at least the side and upper edges of the wall opening to which the device is associated.

[0016] Another object is to propose a device whose door leaf, in the door closing condition, match also with the floor.

[0017] The characteristics of the invention are highlighted in the following with particular reference to the enclosed drawings in which:

- Figures 1 and 2 show schematic and frontal views of the closing device with sliding door leaf, subject of the present invention, in respectively partially and fully closed conditions;
- Figure 3 shows a schematic and frontal view of two elements of an adjustable frame in a condition next to the mutual connection;
- Figures 4 and 5 show the adjustable frame of Figure 3 in respective conditions of adjustment and fixing respectively to an extension close to the maximum and the minimum extension;
- Figure 6 shows the sliding door leaf of Figure 1 fixed to the frame of Figure 5;
- Figure 7 shows a top view of the device of Figure 1 in an almost total opening condition and in which some parts have been removed to better highlight others;
- Figures 8 and 9 show top view of the door leaf of Figure 7 respectively in mutual abutment and spaced out conditions of two panels of such door leaf;
- Figure 10 shows a partial view of the device of Figure 7 from a point of view placed on the sliding plane of the door leaf;
- Figure 11 shows a view of the device of Figure 1 sectioned by the plane XI - XI;
- Figure 12 shows a view of the device of Figure 2 in which some parts have been removed to better highlight others and in which the panels of the leaf are in the mutual abutment condition;
- Figure 13 shows a view of the device of figure 2 sectioned by the plane XIII - XIII in which the panels of the leaf are in the mutual spacing condition;
- The Figures 14 and 15 show partially sectional views respectively according to the plans XIV - XIV and XV - XV of Figures 7 and 9;
- The figures 16 and 17 show partially sectional views respectively according to the plans XVI - XVI and XVII - XVII of Figures 7 and 9;
- The Figures 18 and 19 show partial views and in

horizontal section of a fixing detail from one side of an elastic means in exploded and assembled condition, respectively;

- Figure 20 shows a detail of mutual mesh of the two rod means closed and spaced ;
- Figure 21 shows a partial, horizontal section and exploded view of an elastic means;
- Figure 22 shows the elastic means of Figure 21 in an assembled condition;
- Figure 23 shows partial and frontal section view of a particular fixing of the elastic means on the opposite side to that of Figures 18 and 19;
- Figures 24 to 27 show cross-sectional views, respectively, according to the plans XXIV - XXIV, XXV - XXV, XXVI - XXVI and XXVII - XXVII of Figure 14;
- Figures 28 and 29 show sectional views respectively according to the plans XXVIII - XXVIII, XXIX - XXIX of Figure 15;
- Figures 30 and 31 show axonometric views, from respective points of view, of a detaching and approaching device in an approaching condition;
- Figures 32 and 33 show axonometric views, from respective points of view, of the detaching and approaching device in a spaced condition;
- Figures 34 to 37 show respectively frontal side, top, and axonometric partial views of a variant of the previous figures device;
- Figures 38 and 39 show partial and enlarged views of respective details of Figure 37.

[0018] With reference to Figures 1 - 33, 1 indicates the closing device with sliding door leaf comprising wall frame 3 assigned to be fixed to a bricks, concrete, plasterboard, timber or other material made wall opening, or to be fixed to a furniture opening to made a door.

[0019] The wall frame 3 is equipped with at least one side upright 4, an upper cross member 5 and a seat means 6 assigned to removably accommodate the door leaf 7 in an open condition A of the door.

[0020] The internal volume of the seat means 6 is sized and shaped to accommodate the door leaf and it is open at the side facing the side upright 4 for the incoming and outgoing of said door leaf.

[0021] In a device operating condition, the upright 4 the cross member 5 and the seat means 6 can be applied to a wall or furniture, and in particular they are sized and made of material suitable to the integrated walling up to a wall without protruding from it.

[0022] In the operating condition of the device 1, such upright 4, cross member 5 and seat means 6 lie on a geometrical almost vertical plane parallel or coincident with that of the wall.

[0023] In the present document, the terms upper, lower, height, high and low, refer to a vertical orientation of the device 1 and of its components in working condition.

[0024] The upper cross member 5 is horizontal and starts from the side upright 4 and reaches the opposite end of the seat means 6 passing over the door opening.

[0025] The upper cross member 5 is equipped with a horizontal guide 10 which extends for the entire longitudinal dimension of upper cross member 5 itself.

[0026] The device 1 also comprises a set of trolleys 9 supporting the door leaf 7 and sliding along the guide.

[0027] The guide 10 is fixed within a longitudinal cavity and opened downwards of the upper cross member and consists, for example, in a tubular section lower opened by a longitudinal slit.

[0028] Each trolley 9, for example of the type provided with two, four or more idle gears, slides within the section of the guide 10 and a respective lower stem, passing through the longitudinal slit, is connected to a frame means 11 of the door leaf 7 by means of screws and female screws connections assigned to allow the frame means and the respective door leaf adjustment. Of course, guide and trolleys can be of different types.

[0029] The door leaf 7 also includes two parallel and facing panels 13, connected to the interposed frame means 11 and which made the respective face of the door leaf 7 itself.

[0030] Each panel is connected to the frame means 11 by a set of respective connecting rod means 15 of elongated rectilinear shape, for example made of metallic material.

[0031] The lower end of each connecting rod means bears a first rotational pin means 16, horizontal and parallel to the geometrical plane of the frame means 11 to which 11 is fixed.

[0032] The upper end of each connecting rod means bears a second rotational pin means 18 parallel to the first and fixed to the respective panel 13.

[0033] Preferably, the first and second pin means of each panel are placed on the same side of the frame means.

[0034] The second pin means 18 is higher than the first pin means 16.

[0035] In the open condition A, the second pin means 18 is kept by frictional forces, for example associated to the pins or connecting rods, and/or by elastic forces, for example generated by springs, to a predetermined upper height and at a minimum distance from the median geometrical plane of the frame means 11 to confer to the door leaf 7, a minimum thickness, smaller than the transverse dimension of the seat means 6.

[0036] In a closed condition C of the door, in which the door leaf 7 is close to or in abutment with the upright 4, it is possible to overcome those forces applying to the panel 13, either manually or through operative members, a detaching force outward said frame means causing the rotation of each connecting rod means 15 around the respective first pin means 16 in detaching direction from the frame means and lowering the respective second pin means 18 and the panel 13 and moving it 13 away from the frame means 11 until the abutment of the panel edges with edges at least of the upright 4, of the cross member 5 and of the mouth of the seat means 6.

[0037] In the configuration shown in the figures, the

connecting rod means are configured as reverse pendulums and even when they are at the maximum height, they are in an unstable position.

[0038] Alternatively, the invention provides that in the opening condition A, in which the panels are in mutual abutment or in any case at the minimum distance, the inclination of the connecting rod means is opposite, in respect to the vertical, to that illustrated for example in Figure 14; this can be achieved, for example by removing the first pin means and approaching the second pin means to the geometrical plane average of the frame means.

[0039] In this way the upper pins passing from the closed condition and the door leaf maximum width to the open condition, run a circular trajectory that sweep up to a maximum height and then come down slightly until the rotation is prevented by the mutual abutment of the panels.

[0040] In this way the connecting rod means in the open condition have a stable position to exit from which it is necessary to overcome the potential threshold achieved with the maximum height of the second pin.

[0041] Alternatively, it is also provided, for some particular applications, for example in furniture, that one of the two panels of the leaf is immovably fixed to the frame or that the door is made by a single mobile panel and from the frame.

[0042] Returning to the preferred embodiment illustrated in the figures in object, in which the door leaf 7 comprises the two panels 13 connected to the interposed frame means 11 by connecting rod means 15, it is provided that these rod means are placed in pairs where one of them is connected to a panel and the other connecting rod means is connected to the other panel.

[0043] The connecting rod means 15 are all of equal length and each of them 15 is rigidly connected to a respective toothed wheel 20 whose geometrical axis coincides with that of the corresponding first pin means 16 which, as seen, is horizontal and parallel to the geometrical plane of the frame means.

[0044] The toothed wheels 20 of the connecting rod means 15 of each pair are mutually engaged so that the angles formed by the connecting rod means of one of the panels with the geometric plane of the frame means are equal to the corresponding angles formed by the connecting rod means of the other panel, in such ways the panel height is always equal to the height of the other panel 13.

[0045] To save transverse space and to simplify the device realization, the rotation axes of the first pin means 16, and therefore of the toothed wheels 20, of the connecting rod means 15 of a pair are vertically staggered and they are preferably the one above the other, so the connecting rod means of a pair are staggered and asymmetrically placed while forming equal angles with the vertical.

[0046] To maintain the panels 13 verticality, the pairs of connecting rod means are distributed on at least two

different height in order to achieve deformable parallelogram movements.

[0047] The toothed wheels 20 of the connecting rod means 15 pivoted to the same panel, and placed at the same height, are coaxial and rigidly axially connected by a synchronization shaft 21 whose ends are fixed to the respective first pin means of such toothed wheels.

[0048] The toothed wheels 20 and the synchronization shaft 21 transmit, in a symmetrical way, the removal movement from the frame means given to a panel, to another panel also ensuring the mutual parallelism.

[0049] The pairs of connecting rod means 15, the pin means 16, 18, the toothed wheels 20 and the synchronization shaft 21 constitute a kind of detaching and approaching device of the panels of the door leaf.

[0050] The faces of the two panels 13 facing one another are equipped with respective hollows 22 to accommodate the frame means 11, the connecting rod means 15 and the elements directly connected to them at least in the open condition A of the device.

[0051] The side and the upper edges of each of said panels 13 are provided with respective perimeter protrusions 23 assigned to mutual contact in the open condition A of the device and/or to the abutment with respective seats 24 made in the inner side edges of the upright 4, of the cross member 5 and of the mouth of the seat means 6.

[0052] The lower edges of each of said panels 13 are provided with respective supports 25 assigned to abut with the floor in the device closed condition C.

[0053] Such device configuration, not only allows to obtain the perfect coplanarity of both faces of the door leaf with the wall faces to which is associated the device but also allows to block air flow, smells and noises thanks to the abutment of the perimeter protrusions 23 with the respective seats and of the supports with the floor.

[0054] Furthermore, the wide interspace that is formed in the door in the closed and coplanarity condition, and the absence of direct and rigid connections between the two panels in such condition, break down the sound transmission realizing an effective sound insulation.

[0055] Preferably the device 1 is provided with elastic means 27, assigned to transmit to the two panels the elastic force needed for keeping the second pins 18 at the predetermined upper height balancing the weight of the panels themselves, each 27 fixed to one or other of the faces turned one to the other of the two panels 13 and acting on the frame means 11 or on elements fixed into it, or vice versa.

[0056] Each of said elastic means 27 is made of resilient material, for example harmonic steel, and it is shaped as a lengthened foil, that in absence of forces is flat, or shaped as a crossbow limb.

[0057] One end of each elastic means 27 is fixed by means of screws 29 and/or of interlock 30 to the respective panel 13 directly or preferably through a connection means 31; the opposite end of said elastic means 27 acts preferably in contact with one of the synchronization

shafts 21 or with another element of the frame means 11.

[0058] The connection means 31 consists of a plate element fixed to the hollow 22 wall and shaped with a flat portion for fixing one end of an elastic means 27 and a vertically oriented concave portion, assigned to the fixing and housing of the second pin means 18 and the respective end of the corresponding connecting rod means 15.

[0059] The frame means 11 comprises at least two vertical elements 33 and a plurality of transverse elements 34 joining the vertical elements 33 where those elements 33, 34 consist of metal section bar, for example steel tubular with rectangular or shaped section, and the vertical elements 33 are of adjustable and lockable length, for example of telescopic type with screw lock of the sliding element.

[0060] The frame means 11 is provided with a plurality of support elements 32 having "S" shaped cross-section with two longitudinal hollow seats vertically oriented, open on opposite sides, and fixed to, or made in a single body with the two vertical elements 33.

[0061] The two longitudinal and vertical seats of each support element 32 house the first pin means 16 and the corresponding ends of at least a pair of connecting rod means 15.

[0062] The lower portion of the frame means 11 has a first horizontal sliding element 36, for example in the form of inverted "U" shape section bar, slidably engaged to a second sliding element 37 of complementary shape to the first 36 and horizontally fixed to the lower inner portion of the seat means 6.

[0063] The invention provides a sufficient vertical inter-space between the first 36 and second 37 sliding elements mutually engaged, to allow height adjustment and frame orientation by screw adjustments of the connections to the trolleys.

[0064] The panels 13 can virtually be of any natural synthetic and composite material, for example in metal, also reinforced resin, wood and its derivatives or substitutes.

[0065] The panel can integrate to the own internal or on the inner concave face, a frame of reinforced or possibly connected or integrated to the connection means 31.

[0066] The operation of the device 1 provides, starting from a complete opening condition in which the door leaf 7 is at minimum thickness and it is totally contained in the seat means 6, the door leaf is manually slid until the abutment with the side upright 4 of the wall frame 3.

[0067] By acting, for example manually, on the handle of the door leaf panel in front of the user and applying to the panel a tensile force directed toward the user, the panel approaches the user and the opposite panel has gone away until reaching the coplanarity of the two faces of the door leaf with the two faces of the wall.

[0068] The return to the initial condition is obtained by pressing the panel in the direction perpendicular to it and directed toward the other panel or rather detaching it from the user until the minimum thickness of the door leaf is

reached; afterwards it is possible to slide the door until the seat means 6.

[0069] It is also provided that the panels mutual detachment can be realized by horizontal rods sliding between the panels and provided with wedges or inclined planes acting on roller or sliding strikers fixed to the inner faces of the panels when the rods are placed in axial movement by abutment with matching elements protruding from the side upright 4 of the wall frame 3.

[0070] It is also provided that the door leaf and panels translation and/or the opening is carried out by electric actuators.

[0071] In the variant of the device of figures 34 - 37 the connecting rod means 15 are "J" shaped where the free end of the curved portion is connected to the first pin means 16 and the end of the straight portion is connected to the second pin means 18.

[0072] One advantage of the present invention is to provide a closing device with sliding door leaf closing device with pocket sliding door leaf that, in the closed condition, has at least one face of the door leaf coplanar with respect to the corresponding wall face or furniture to which the device is associated.

[0073] Another advantage is to provide a pocket sliding door device which is simple, relatively cheap and workable that can be made with thicknesses also very reduced to allow the walling up, the coupling or integration thereof in walls, walls or structures even very thin and almost of any kind and nature.

[0074] Further advantage is to provide a device that in the closed condition presents both faces of the door leaf coplanar with respect to the corresponding faces of the wall or furniture to which the device is associated.

[0075] Another advantage is to provide a device whose door leaf, in the door closing condition, provides an excellent barrier against the passage of sounds.

[0076] Further advantage is to provide a device whose door leaf, in the door closing condition bears match with at least with the side and upper edges of the wall opening to which the device is associated.

[0077] Another advantage is to provide a device whose door leaf, in the door closing condition, bears match also with the floor.

Claims

1. Closing device with sliding door leaf comprising a wall frame (3) assigned to be fixed to a wall or furniture opening to achieve a door and equipped with at least one side upright (4), an upper cross member (5) extending from the top of said upright (4) to an opposed upper end of a seat means (6) assigned to house a door leaf (7) in a door open condition (A), such upright (4), cross member (5) and seat means (6) form a portal and they lie on a geometrical plane that, in a device (1) operating condition, is vertical or almost vertical; said device (1) also includes a set of

- trolleys (9) supporting the door leaf (7) and sliding along a guide (10) extended almost horizontally, along such cross member (5) connected to the guide (10); the door leaf (7) comprises a frame means (11) fixed to the trolleys (9) and comprises two parallel and facing panels (13) constituting the two door leaf (7) main faces and connected to the interposed frame means (11) by means of a plurality of respective connecting rod means (15); each connecting rod means (15) having a first rotational pin mean (16), horizontal and parallel to the geometrical plane of the frame means (11) and fixed to the latter (11) and a second rotational pin means (18), parallel to the first pin means (16), fixed to the respective panel (13) and placed at a height higher than the first pin means (16); said device (1) being **characterized in that** the facing panels (13) are mutually parallel and they are connected to the interposed frame means (11) by a plurality of pairs of the respective connecting rod means (15) of equal length where each of these connecting rod means (15) is rigidly connected to a respective toothed wheel (20) whose geometrical axis coincides with that of the corresponding first pin means (16), where the toothed wheels (20) of the two connecting rod means (15) of each pair are mutually meshed and where the angles formed by the connecting rod means (15) of one of the panels (13) with the geometric plane of the frame means (11) are equal to the corresponding angles formed by the connecting rod means (15) of the other panel (13).
2. Device according to claim 1 **characterized in that** the toothed wheels (20) of at least two connecting rod means (15) pivoted to the same panel, are coaxial and rigidly axially connected by a synchronization shaft (21).
 3. Device according to claim 1 **characterized in that** the faces of the two panels (13) facing one another are provided with respective hollows (22) to house the frame means (11), the connecting rod means (15) and the elements directly connected to them at least in the device open condition (A), the upper and side edges of each of said panels (13) are provided with respective perimeter protrusions (23) assigned to the mutual contact in the device open condition (A) and/or to abut with respective seats (24) made in the inner side edges of the upright (4), of the cross member (5) and of the entrance of the seat means (6); the lower edges of each said panels (13) are provided with respective supports (25) for abutting the floor in the device closed condition (C).
 4. Device according to any previous claims and claim 2 **characterized by** comprising elastic means (27) each secured to one or other faces facing one another of the two panels (13) and acting on the frame means (11) or on elements secured to it, or vice versa; the elastic means (27) are assigned to transmit to the two panels the elastic force required to maintain the second pins (18) at the upper predetermined height balancing the panels weight; each of said elastic means (27) is elongated plate-shaped, flat in the absence of forces, or crossbow limb shaped with one end fixed by means of screw (29) and/or of interlock (30) to the respective panel (13) directly or by means of a connection means (31) and the opposite end acting in contact with one of the synchronization shafts (21) or with another element of the frame means (11).
 5. Device according to claims 3 and 4 **characterized in that** the connection means (31) is a plate element secured to the hollow (22) surface and shaped with a flat portion for fixing one end of the elastic means (27) and a vertically oriented hollow portion for fixing and housing the second pin mean (18) and of the corresponding end of the respective connecting rod means (15).
 6. Device according to any of the previous claims **characterized in that** the connecting rod means (15) are rectilinear or "J" shaped where the free end of the curved portion is connected to the first pin means (16) and the straight portion free end is connected to the second pin means (18).
 7. Device according to any previous claims **characterized in that** the frame means (11) comprises at least two vertical elements (33) and a plurality of transverse elements (34) joining together the vertical elements (33) where these elements (33, 34) are metal section bars and at least the vertical elements (33) have adjustable and lockable length.
 8. Device according to claim 7 **characterized in that** the frame means (11) has a plurality of support elements (32) having "S" shaped cross-section with two longitudinal hollow seats vertically oriented, open on opposite sides, and fixed to, or made as a single body, with the vertical elements (33) where the two longitudinal and vertical seats of each support element (32) house the first pin means (16) and the corresponding ends of at least a pair of connecting rod means (15).
 9. Device according to any previous claims **characterized in that** the frame means (11) is fixed to the trolleys (9) by adjustable screw and nut connections and its (11) lower portion bears a first horizontal sliding element (36) engaged to a second sliding element (37) complementary to the first (36) and horizontally fixed to the inner portion of the lower seat means (6).

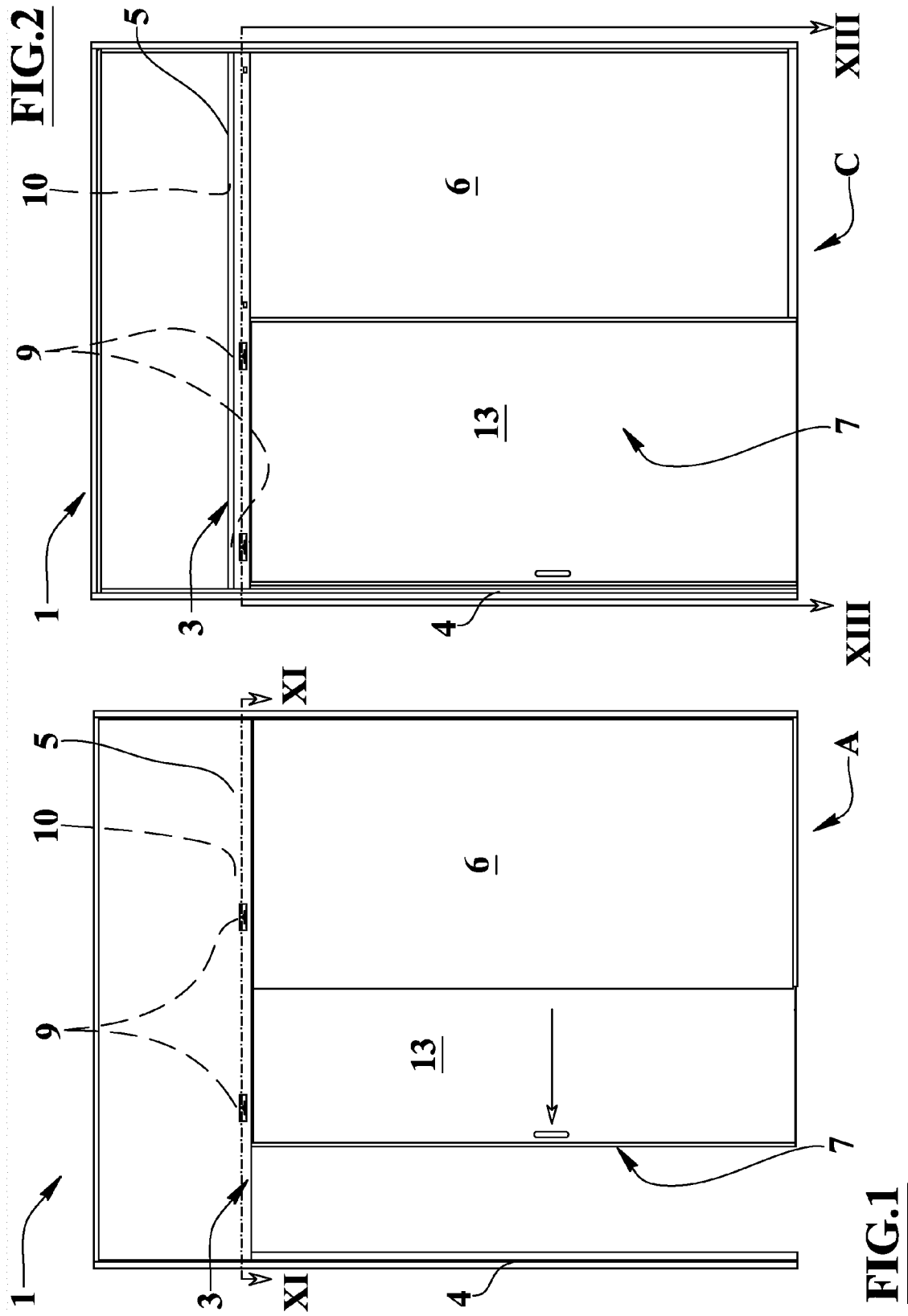


FIG.3

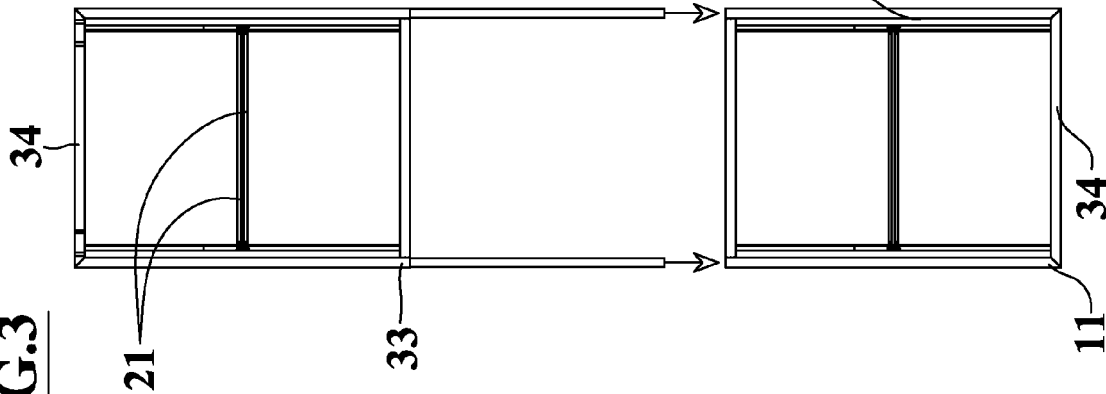


FIG.4

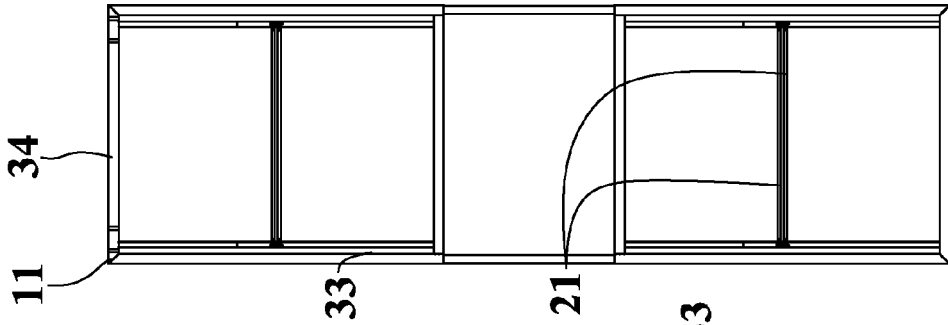


FIG.5

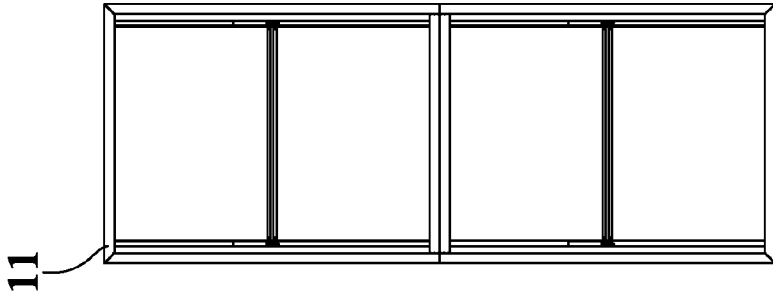
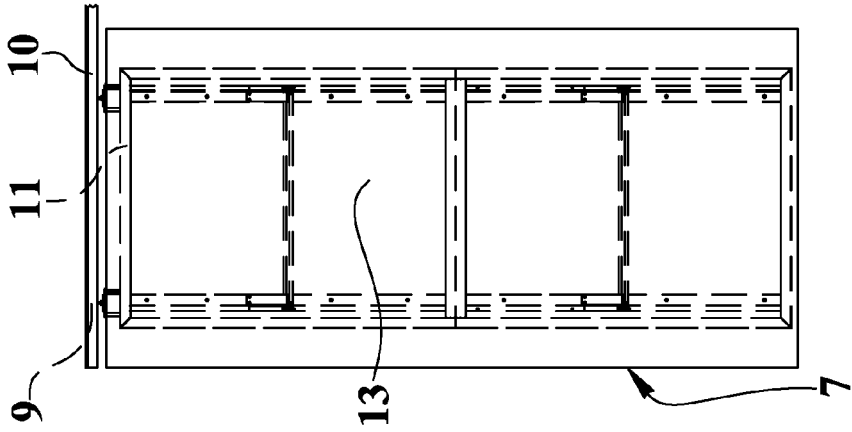


FIG.6



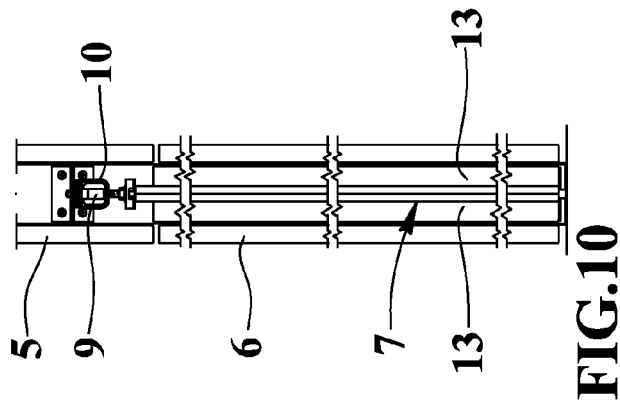
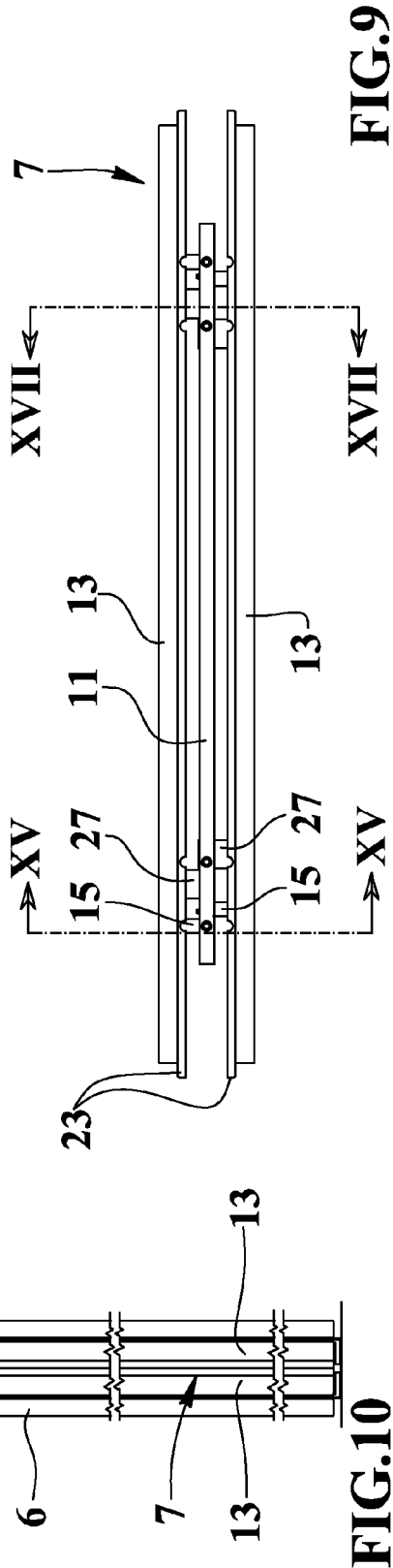
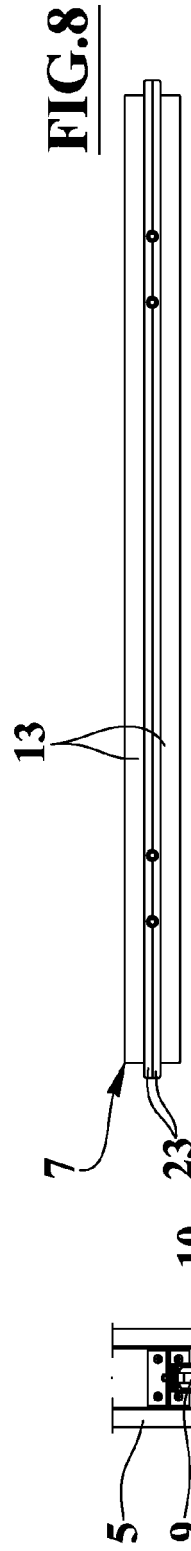
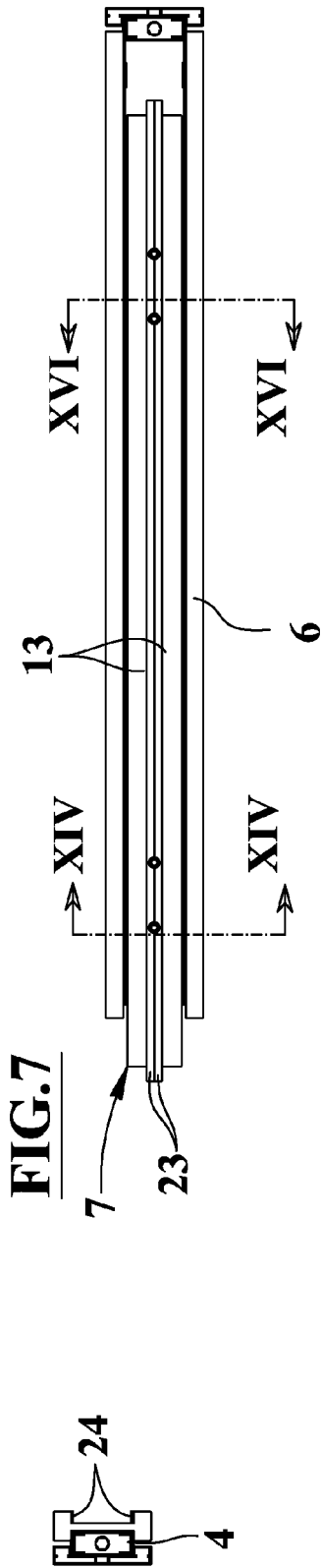


FIG.11

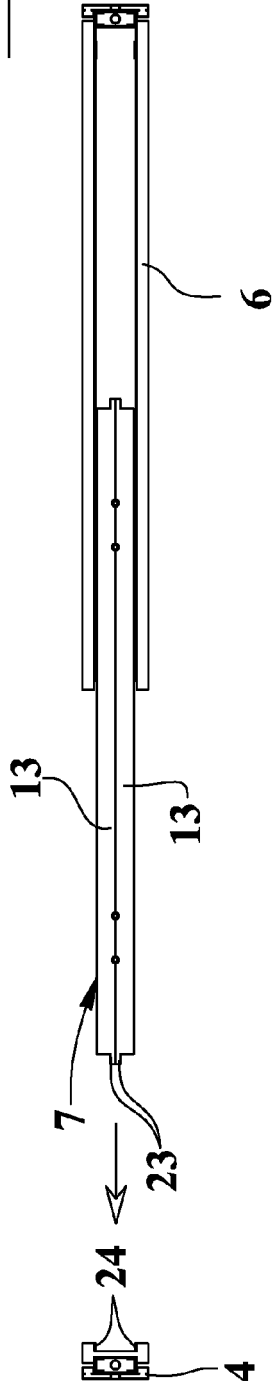


FIG.12

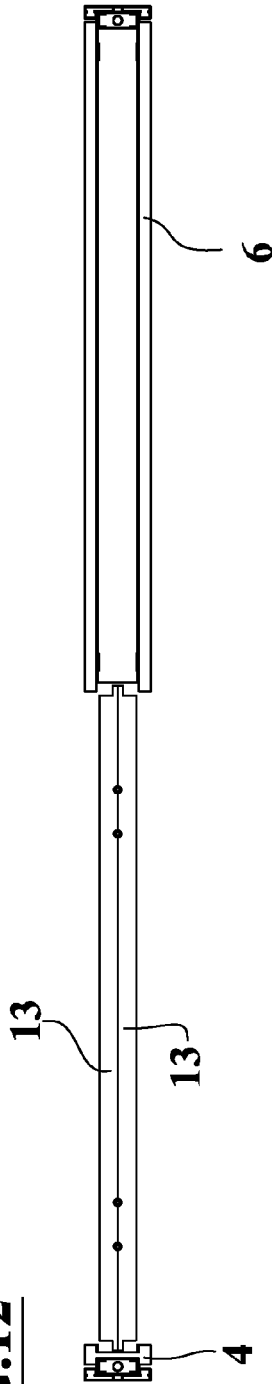


FIG.13

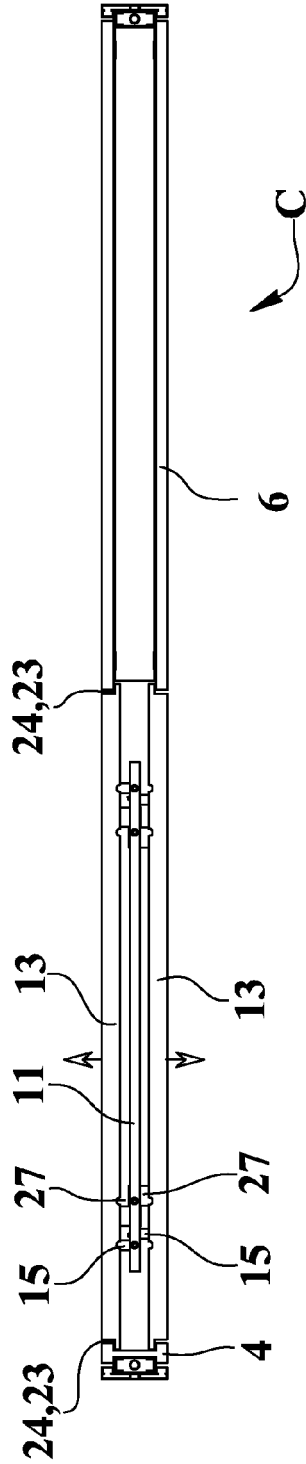


FIG.14

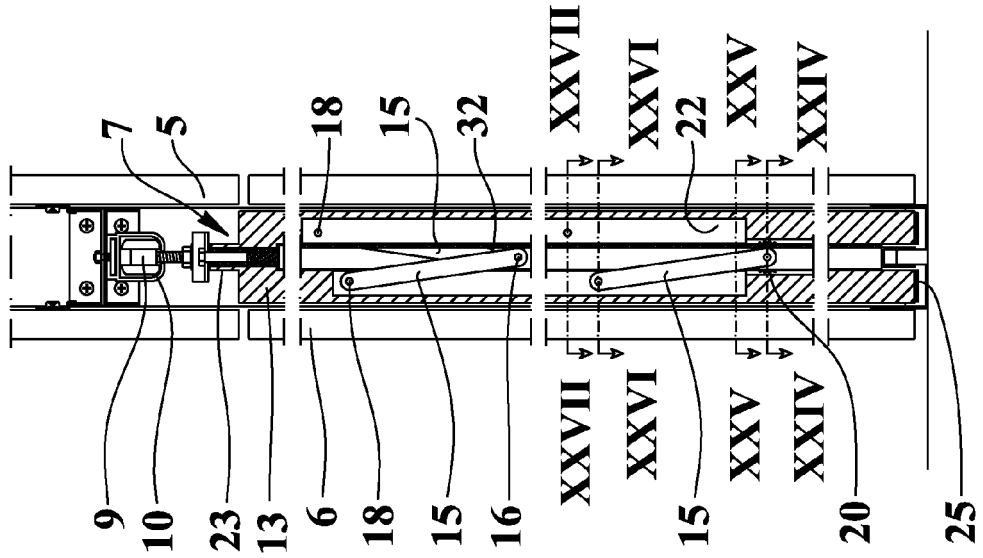


FIG.15

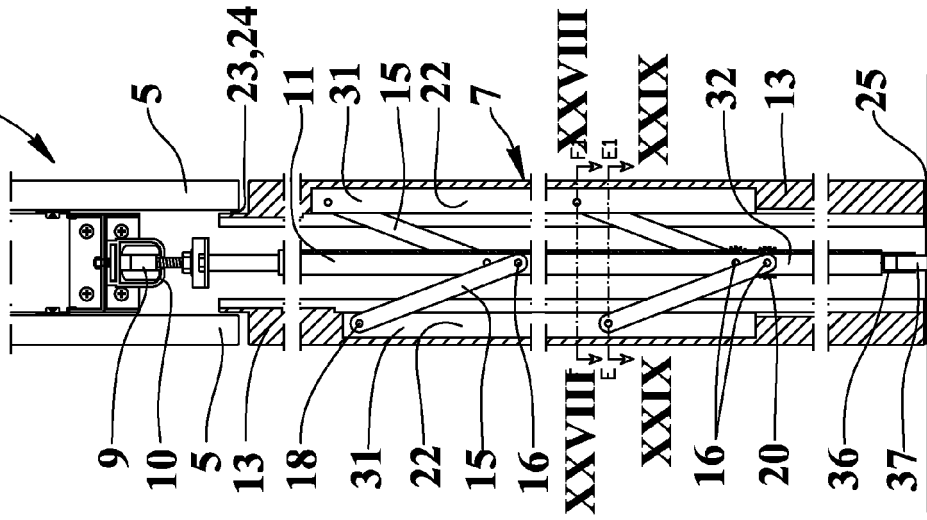


FIG.15

C

FIG.18

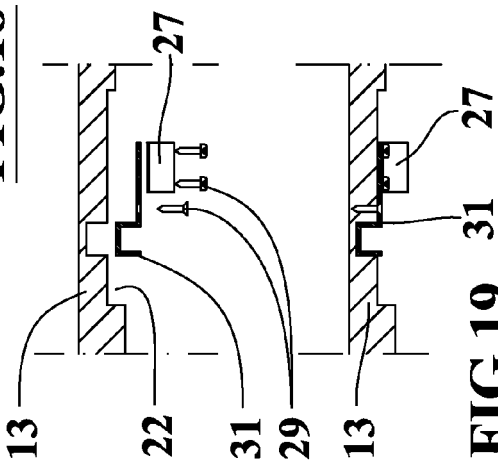


FIG.19

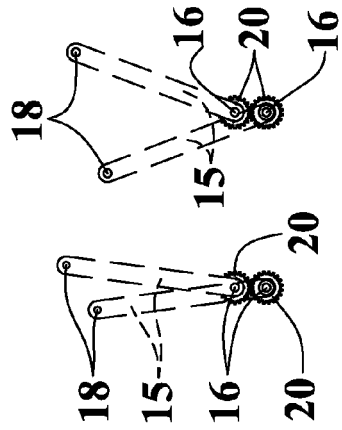


FIG.20

FIG.16

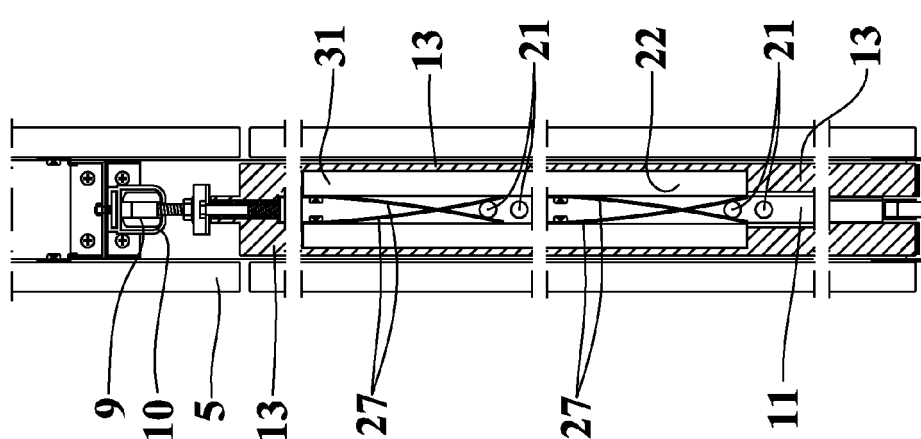


FIG.17

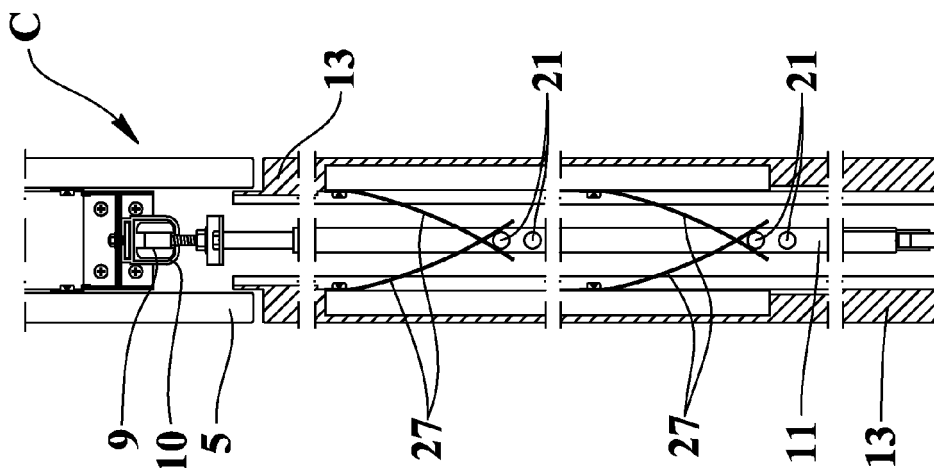


FIG.21

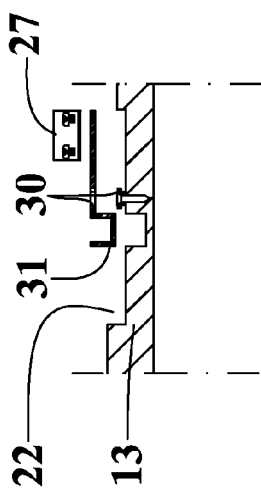


FIG.22

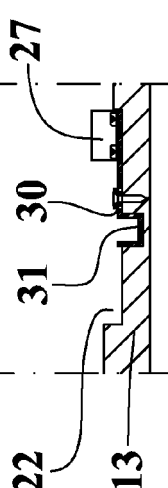


FIG.23

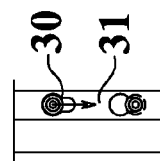


FIG.24

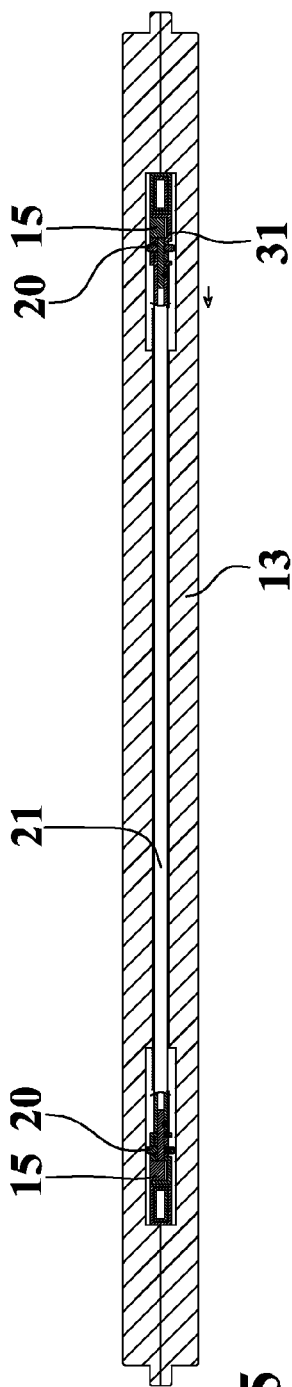
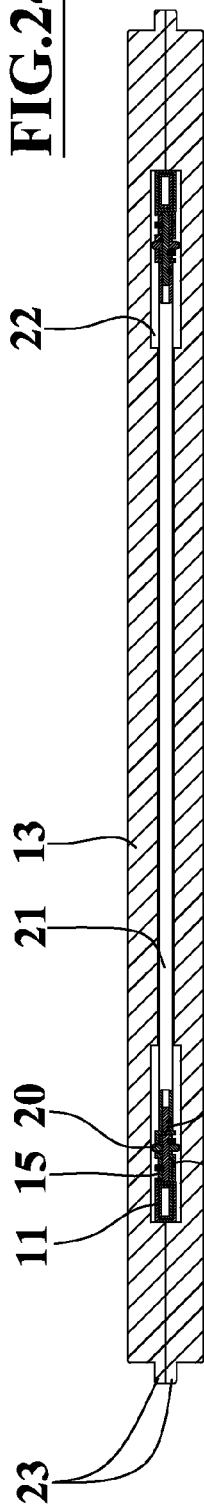


FIG.25

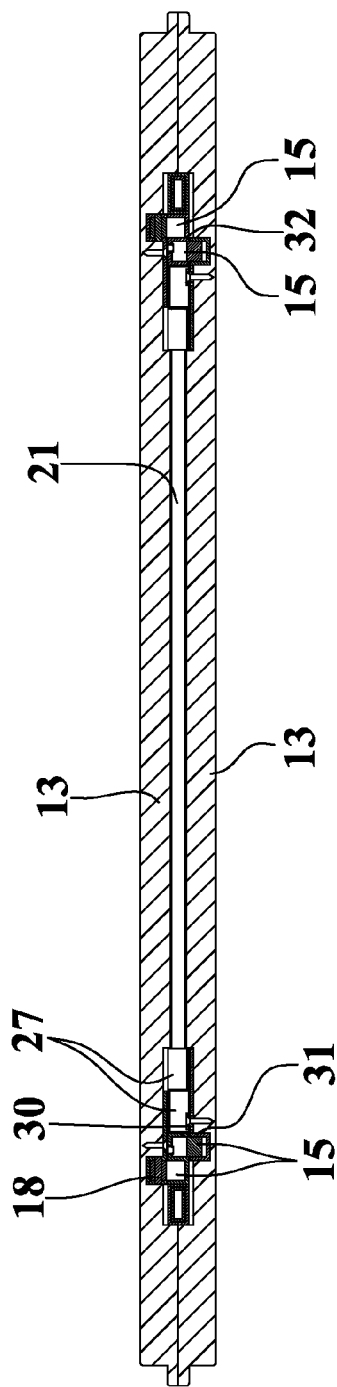


FIG.26

FIG.27

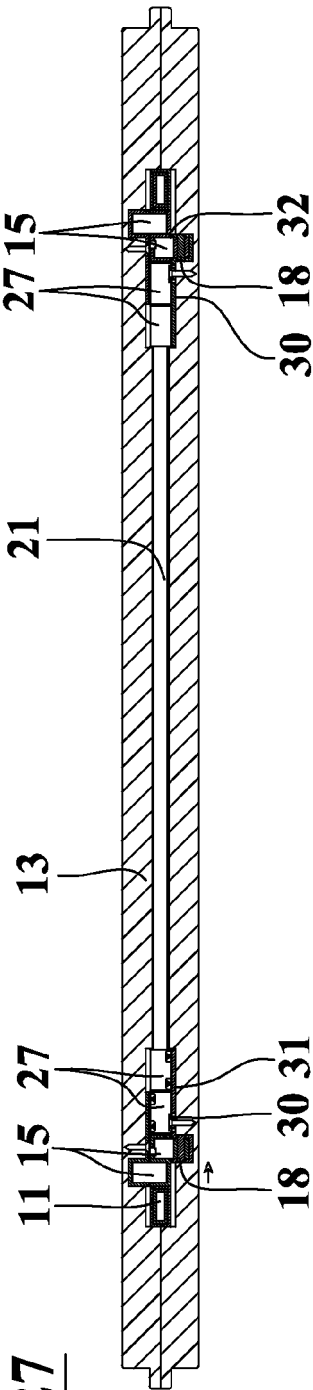


FIG.28

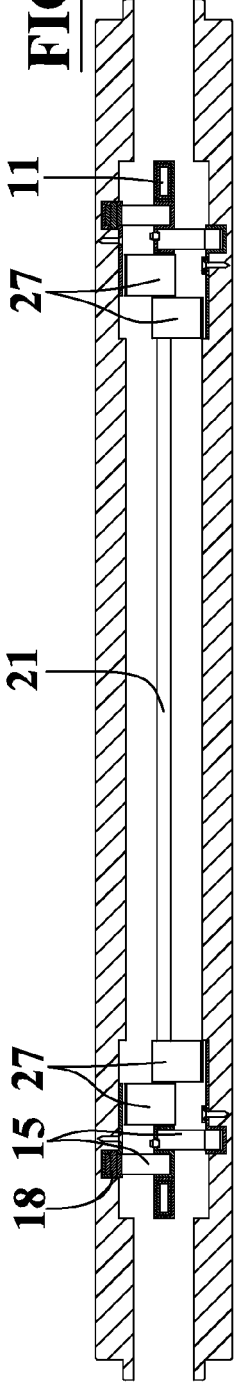


FIG.29

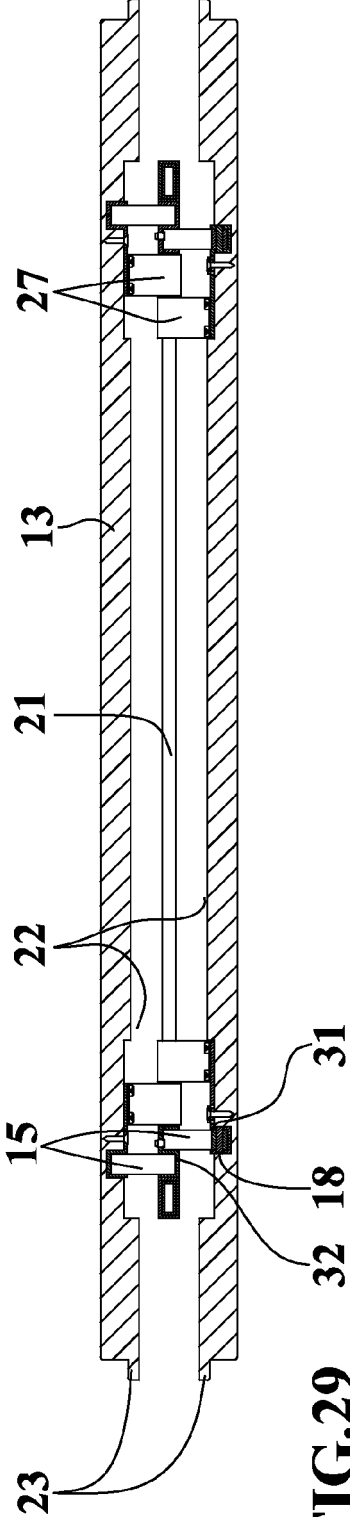


FIG.32

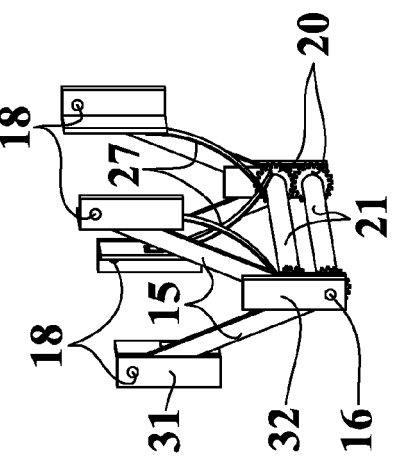


FIG.33

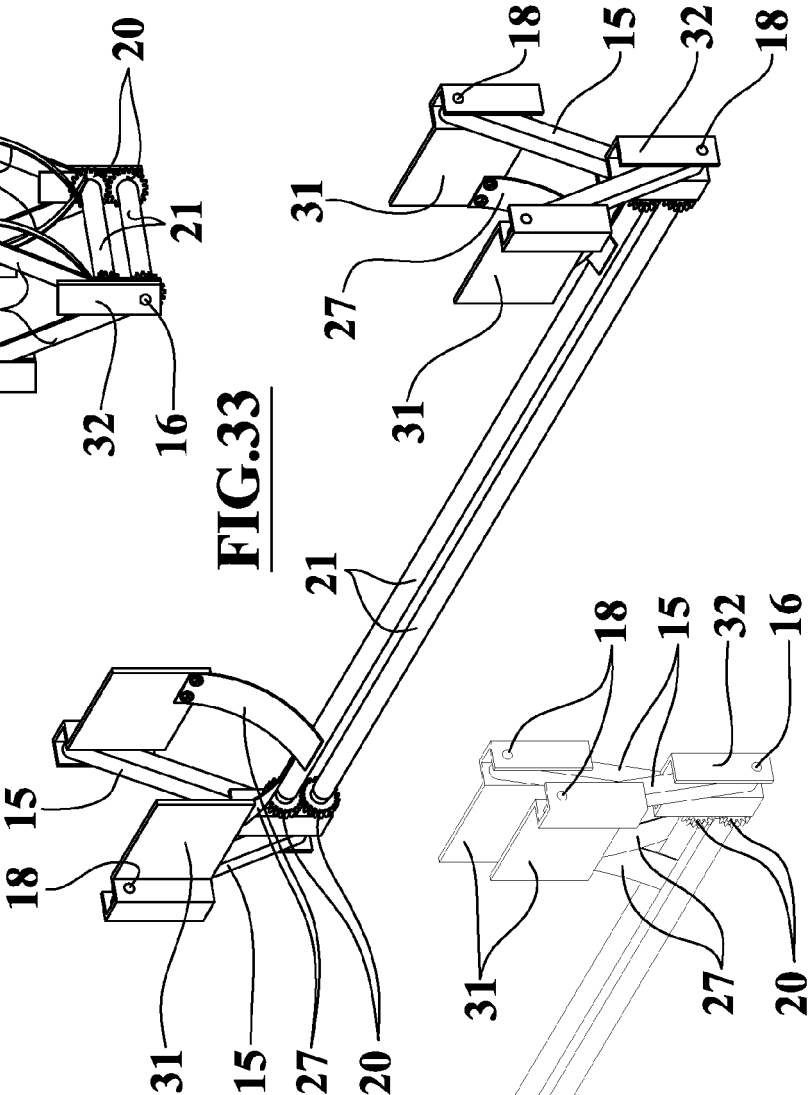


FIG.31

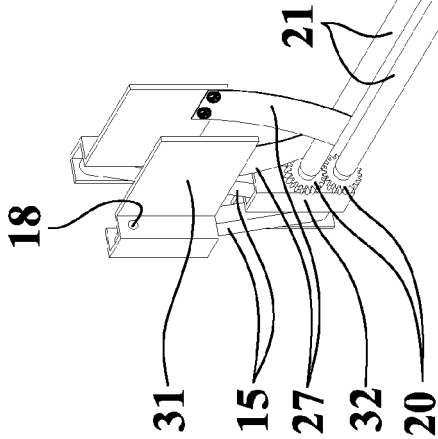
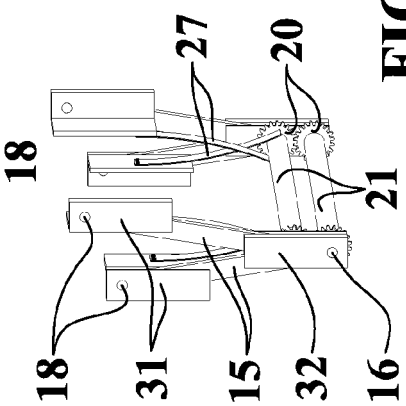
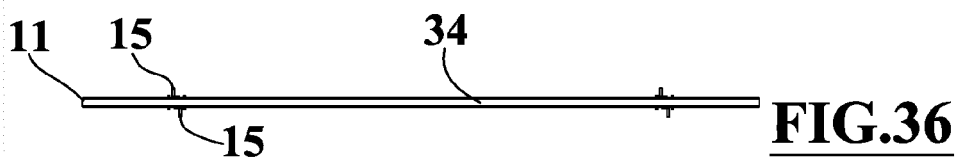
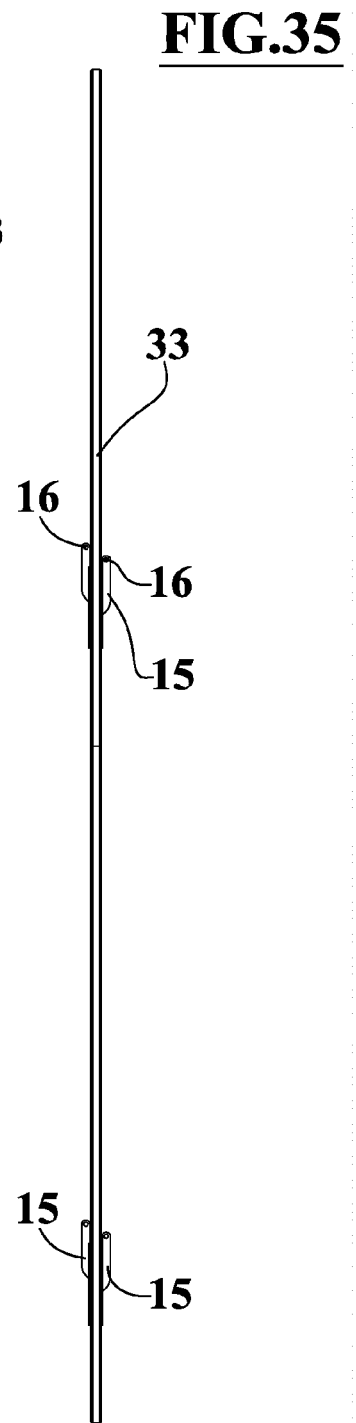
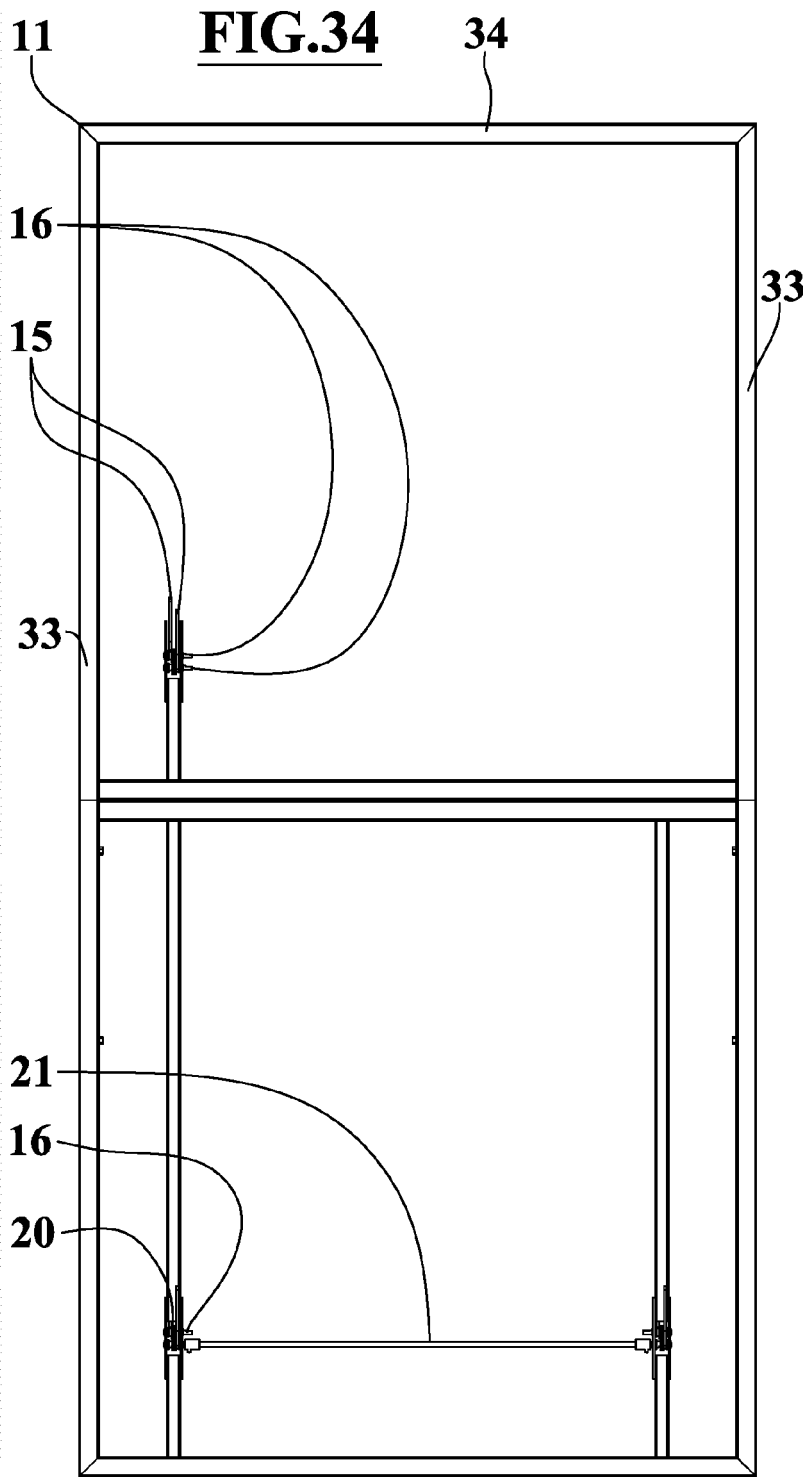


FIG.30





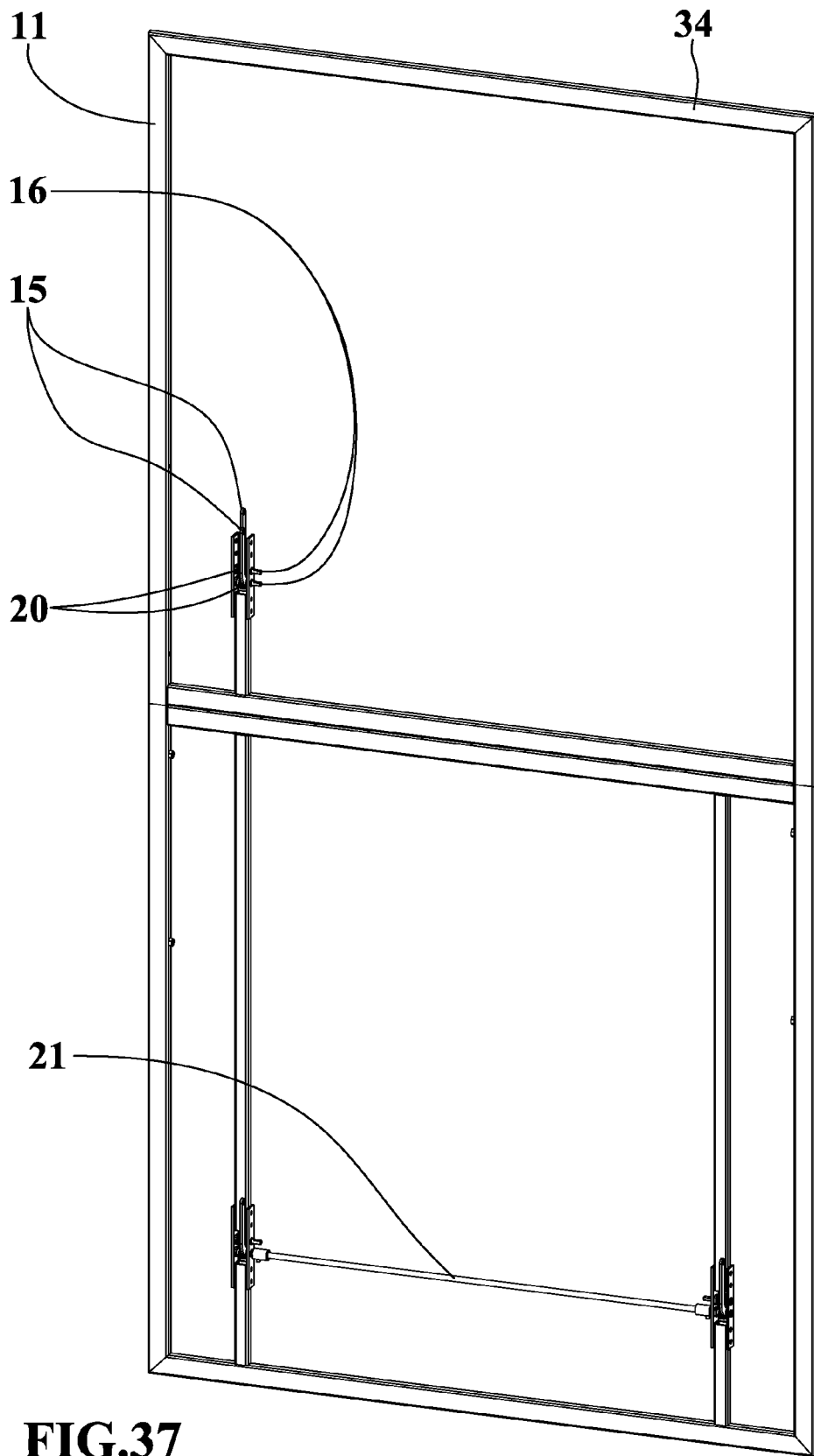


FIG.37

FIG.39

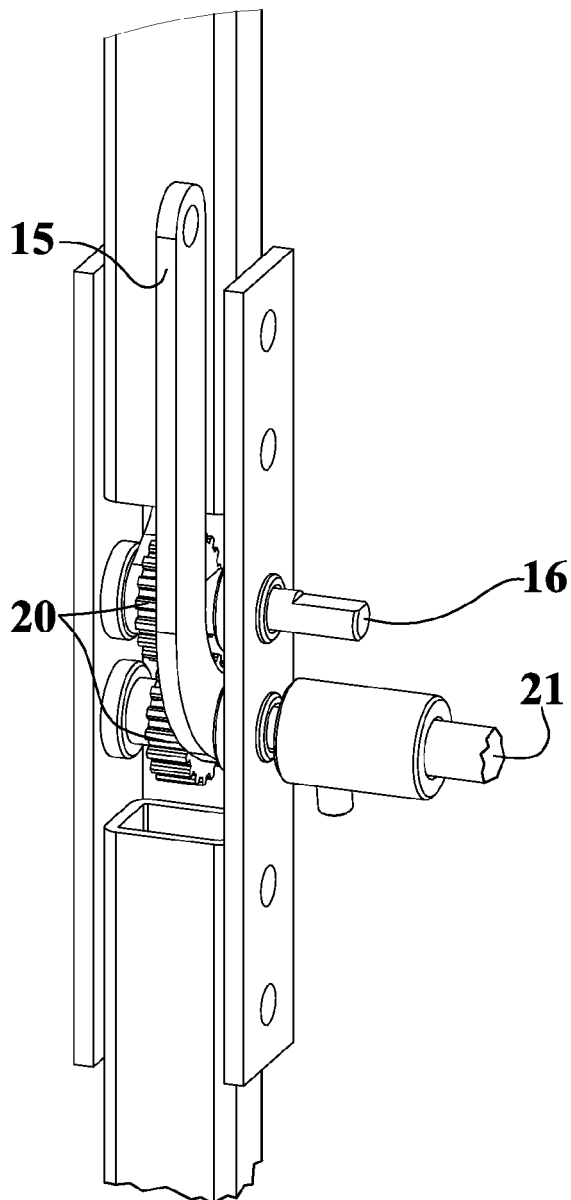
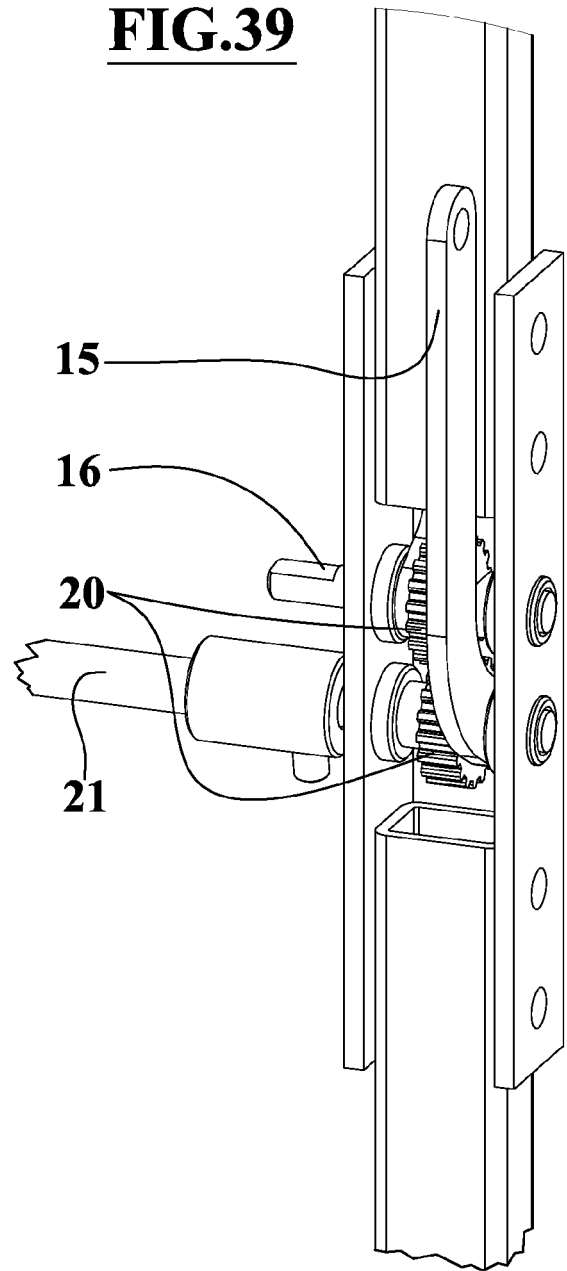


FIG.38



EUROPEAN SEARCH REPORT

 Application Number
EP 14 19 2571

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	WO 2009/139016 A2 (MIX SRL [IT]; MATINO CIRO [IT]) 19 November 2009 (2009-11-19) * page 3, line 24 - page 4, line 27 * * figures 1-5 * -----	1-9	INV. E05D15/10 E05D15/06 E06B3/46
			TECHNICAL FIELDS SEARCHED (IPC)
			E05D E06B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 5 March 2015	Examiner Klemke, Beate
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05-03-2015

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2009139016 A2	19-11-2009	NONE	

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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- WO 2009139016 A2 [0010]