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(54) **Closing device**

(57) A closing device for compartments or rooms comprising a plurality of elongated and roughly flat slat means (3), whose side ends are connected to respective side handling means (5) that move the slat means (3) from a closed condition (C), wherein said slat means lie on a closure geometric plane, to an opened condition (A), wherein said slat means are tilted with respect to said closure geometric plane and each other placed side by side in mutual contact or nearly, and vice versa; wherein each slat means (3) has a first longitudinal edge (11) that in the closed condition (C) is facing to the opening direction and a second longitudinal edge (13) which, in the closure movement, comes first the correspondent first edge and wherein each slat means (3) has a first main face (15) and a second main face (17) that in the closed condition are facing respectively outside and inside the respective compartment or room.

A first longitudinal border strip (21) of the slat means (3) comprising the first longitudinal edge (11) of each slat means (3) is offset or bended with respect to the remaining portion of the slat means (3) in such a direction that in the closed condition (C) the first longitudinal border strip (21) is internal and in that in the closed condition (C) the handling means (5) put the slat means (3) at a mutual distance smaller then the width of a slat means (3) causing the overlapping of a second longitudinal border strip (25) comprising the second longitudinal edge (13) of a slat means (3) at the first longitudinal border strip (21) of a slat means (3) adjacent, wherein the first longitudinal border strip (21) is inside compartment or room with respect to the second longitudinal border strip (25).

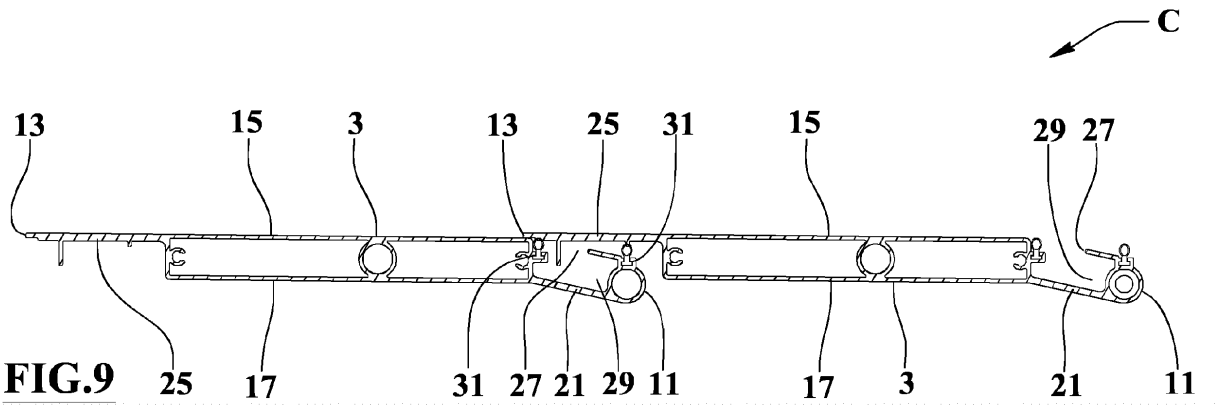


FIG.9

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Description

[0001] The present invention relates to frames for building industry and refers to a closing device suitable for roofs also fairly slopped and optionally having shading function.

[0002] There are know closing cover devices, for example, used in winter gardens, greenhouses or buildings in general, comprising several slats that can be arranged on a plane, each other adjacent, to close or cover a ceiling or an upper portion of a building or can be arranged each other placed side by side in mutual contact or nearly realizing a sort of pack to open cover or ceiling.

[0003] One disadvantage of such known closing cover devices consists in that they must be installed in such a way that the plane in which they lie in the closed condition has a significant slope to prevent the meteoric water, such as rain, dew, melting snow or ice , can cross causing flooding and damage in the underlying space.

[0004] Another disadvantage of such devices consists in that they don't allow to effectively modulate the sunlight penetration in the underlying space.

[0005] Another disadvantage of such known devices consists in that they are very complex, expensive and unsafe.

[0006] Document WO 99/61742 A1 discloses a closing device for rooms or habitats comprising a plurality of elongated slat means being roughly flat, whose side ends are connected to respective side move means that move the slat means from a closed condition, wherein said slat means lie on a closure geometric plane, to an opened condition, wherein said slat means are tilted with respect to said closure geometric plane and each other placed side by side in mutual contact, and vice versa; wherein each slat means has a first longitudinal edge that in the closed condition is facing to the opening direction and a second longitudinal edge that in the closure movement is above the correspondent first edge and wherein each slat means has a first main face and a second main face that in the closed condition are facing respectively to the outside and to the inside of the respective rooms or habitats.

[0007] One object of the present invention is to propose a closing device that can be used to cover having almost null sloping, avoiding water infiltration.

[0008] Another object is to propose a device that can also be used to close also vertical openings such as windows and doors.

[0009] Further object is to propose a device having shading function suitable to change the intensity of the external light incoming in the habitat or compartment associated with the device.

[0010] Another object is to propose a device relatively simple, inexpensive and extremely safe.

[0011] The characteristics of the invention are highlighted in the following with particular reference to the accompanying drawings in which:

- Fig. 1 shows an isometric view of a simple embodiment of the closing device object of the present invention, disposed in association with a roof or covering, slightly sloped, of a building and in a fully closed condition;
- Fig. 2 shows an isometric view of the device of Fig. 1 in a fully opened condition;
- Fig. 3 shows a partial view and enlarged of a top detail of Fig. 1;
- Fig. 4 and 5 show plan views of the device of Fig. 1 respectively in closed and opened conditions;
- Fig. 6 to 8 show section views of the device respectively according to the plans VI-VI, VII-VII and VIII-VIII of Fig. 4 and 5;
- Fig. 9 illustrates a cross-sectional and enlarged view of two adjacent slats of Fig. 1;
- Fig. 10 shows a plan view of a slat of Fig. 1 with some side elements fixed thereto;
- Fig. 11 shows a section view along the plane XI-XI of Fig. 10;
- Fig. 12 shows an isometric view of the slat and elements of Fig. 10;
- Fig. 13 shows a side view of the slat and elements of Fig. 10;
- Fig. 14 shows a sectional view along the plane XIV-XIV of Fig. 13;
- Fig. 15 shows a partially exploded isometric view of a top and lateral portion of the device of Fig. 2 in the opened condition;
- Fig. 16 shows a side view of a top portion of the device of Fig. 2 wherein some parts have been removed for better underlining others in the opened condition;
- Fig. 17 to 19 show partial and enlarged views of a top portion of the device of Fig. 1 in the closed condition, sectioned according to planes longitudinal and perpendicular with respect to the device and progressively more peripheral than the device itself;
- Fig. 20 shows a side view of the device portion of Fig. 19;
- Fig. 21 shows an isometric and partial view of a variant of the device of Fig. 1 in a closed condition;
- Fig. 22 and 23 show partial views of the device of Fig. 21 in closing conditions and respectively releasing and locking of the slats;
- Fig. 24 and 25 show isometric views of the device of Fig. 21 in closing conditions and initial and the rotation of the slats;
- Fig. 26 shows an isometric view of the device of Fig. 25 in the closed condition and the total rotation of the slats wherein some parts have been removed for better underlining others;
- Fig. 27 shows an isometric view of the device of Fig. 26 wherein some parts have been removed better underlining others;
- Fig. 28 shows an isometric and partial view of a variant of the device of Fig. 21 in an opened condition;
- Fig. 29 and 30 show respectively in plane and side

views of a portion of the device of Fig. 21;

- Fig. 31 shows a sectional view taken along a plane longitudinal and orthogonal with respect to the device of Fig. 21 in a closed and slats releasing condition ;
- Fig. 32 and 33 show sectional views respectively according to the planes XXXII-XXXII and XXXIII-XXXIII of Fig. 31;
- Fig. 34 shows a view of a portion of the variant of the device of Fig. 21 in a closed and slats releasing condition and wherein some parts have been removed for better underlining others;
- Fig. 35 shows a section view taken along a longitudinal and orthogonal plane with respect to the device of Fig. 21 in a closed and locking condition of the slats;
- Fig. 36 shows a sectional view taken along a longitudinal and orthogonal plane with respect to the device of Fig. 21 in a closed and initial rotation condition of the slats;
- Fig. 37 shows a section view taken along a longitudinal and orthogonal plane with respect to the device of Fig. 21 in a closed and fully rotated condition of the slats;
- Fig. 38 shows a sectional view along the plane XXXVIII-XXXVIII of Fig. 37;
- Fig. 39 shows a section view taken along a longitudinal and orthogonal plane with respect to the device of Fig. 21 in an opened condition;
- Fig. 40 and 41 show isometric and partial views respectively assembled and exploded of a slat of Fig. 21 with the respective lateral elements;
- Fig. 42 shows a partial and partially exploded axonometric view of the device variant of Fig. 21 in a closed condition;
- Fig. 43 to 45 show partial and partially exploded isometric views of the device variant of Fig. 21 in a closed and fully rotated condition of the slats and from their respective points of view.

[0012] The invention provides, in addition to the complete embodiment of the invention, also a simplified embodiment without some elements of the complete embodiment.

[0013] To better understand and for an easy disclosure, in the following it is first of all described the simplified embodiment shown in Fig. 1 to 20 and suddenly the complete one.

[0014] With reference to Fig. 1 to 20, numeral 1 indicates the simplified closing device for rooms or habitats, object of the present invention assigned to be associated to an opening or to place over a building realizing the compartment or room. Such a closing device for spaces or rooms comprises several slat means 3 shaped as very elongated rectangular approximately flat and with a thickness ranging between about 1:25 and about 1:5, preferably about 1:15, of the width of slat means.

[0015] In the following, the term "longitudinal" associated to the slat means indicates a direction parallel to the longer side of the means itself.

[0016] These slat means 3 can be realized, for example, by extrusion of aluminum or plastic material.

[0017] The ends of the slat means 3 are connected to respective side handling means 5 that handle these slat means 3 from a closed condition C, in which said slat means lie on a geometric plane of closure and close the opening or cover compartment, to an open condition A, in which said slat means are tilted with respect to said closure geometric plane and each other placed side by side in mutual contact or nearly, in order to open this opening or coverage. Obviously, the handling means 5 allow also the opposite handling from the opened condition to the closed condition.

[0018] Each slat means 3 has a first longitudinal edge 11 which in the closed condition C is turned toward the direction of opening and a second longitudinal edge 13 which in the closing movement precedes the corresponding first edge.

[0019] Each slat means 3 has the first 15 and second 17 main faces, which in the closed condition C are directed respectively towards the outside and towards the inside of the respective compartment or habitat.

[0020] A longitudinal portion of each slat means 3, comprising the first longitudinal edge 11 and having a width ranging between 1:3 and 1:10, preferably about 1:6, of the width of the slat means, constitutes a first longitudinal strip 21 which is offset or folded with respect to the remaining part of the slat means 3 in a direction such that in the closed condition C the first longitudinal strip 21 is internal or facing the compartment or room.

[0021] In the closed condition C the handling means 5 put the slat means 3 at a mutual distance less than the width of a slat means 3, said distance between the first 11 and second 13 longitudinal edges of the flap means, causing the overlapping of a second longitudinal strip 25 comprising the second longitudinal edge 13 of a slat means 3 to the first longitudinal strip 21 of an adjacent slat means 3, where the first longitudinal strip 21 is internal to the compartment or habitat compared to the second longitudinal strip 25.

[0022] Each second strip 25 has a longitudinal width, i.e. a dimension transverse to the slat means, equal to or greater than the width of the first longitudinal strip 21. In correspondence of the second longitudinal strip 25, the thickness of the slat means is reduced greatly resulting between about 1:20 to 1:4 of the thickness of the remaining portions of the slat means, in other words the second longitudinal strip 25 can be constituted by only one wall extruded realizing the first main face 15 of the slat means.

[0023] The first main face 15 is interrupted by a longitudinal opening 27 at the root of the first longitudinal strip 21 which contains an open longitudinal channel 29 along the longitudinal opening 27.

[0024] Almost one of a first longitudinal strip 21 and second strip 25 contains longitudinal seats 31 for longi-

tudinal sealing means 33 between these first 21 and second longitudinal strip 25 in the closed condition C.

[0025] If, in a closed condition and almost horizontal place of the device 1 covering the compartment, the water overcomes the longitudinal sealing means 33, consisting for example of linear seals of the tubular type, the water infiltrates through the longitudinal openings 27 and collects in channels 29 and emerge from the ends and then falling into lateral outflow channels that dispose of without damaging the compartment.

[0026] The handling means 5 comprise a pantograph means 35 for each side of the device 1 perpendicular to the slat means 3, when each half pantograph 35 comprises, for each strip means, a pair of arms first 37 and second 39 centrally and mutually articulated scissor thanks to a central pin 41 and the ends of which are linked to the corresponding ends of the adjacent pairs of arms 37, 39 via outer 43 and inner 45 pins. Preferably the arms 37, 39 are made of full metal material, but they may alternatively be made of plastic or resin also reinforced with fibers.

[0027] Such handling means 5 further comprise a pair of side guides 49.

[0028] The side guides can be realized in a single piece or in multiple longitudinal elements mutually fixed and consisting of metal profiles and/or elements of bent sheet metal.

[0029] In the following, the term "longitudinal" concerning the side rails indicates a direction parallel to the main development of the guides themselves and orthogonal to the slat means.

[0030] Each side rail 49 is equipped with a sliding channel 51 for longitudinal rolling means 53, such as wheels, bearings or low-friction sliding elements, fixed to the end of the inner pins 45 projecting laterally.

[0031] Each side guide 49 also contains a flexible annular means 55, for example consisting of a toothed belt or a chain, engaged in pulleys 57, 59 located at the ends of the side guide 49.

[0032] One of these pulleys 59 is motorized, preferably placed at the end of the collection of the slat means in the open condition.

[0033] This annular means 55 is connected to the pair of arms 37, 39 on the end of a pantograph means 35 concordant with the closing direction. The other pair of arms 37, 39 is fixed with respect to its extreme lateral guide 49 which is locked thereto.

[0034] Each slat means 3 is connected to a respective first arm 37 whose length is less than the width of the slat means 3 or the distance between the first 11 and second longitudinal edges 13 of the flap means.

[0035] Each first arm 37 is approximately expanse "S" shaped and, in the closed condition, puts the respective inner 45 and outer 43 pins respectively most internal and external to the compartment with respect to the central pin 41.

[0036] Each first arm 37 is rigidly fixed to a respective lateral end of the corresponding slat means 3, for example by rivets, gluing, welding, interlocking or preferably by screws.

[0037] Each first arm 37 bears a concavity 61 placed in correspondence of the outlet side of the channel 29 of the corresponding slat means 3 to allow the escape of any water and the passage of the same into the respective side flow channel which is fixed to the side rail 49 or parallel thereto.

[0038] The operability of the simplified device provides that a user activates or deactivates the motor-driven pulley to put the device in the conditions of opening and closing, or in intermediate conditions. As seen it is possible to install the device in correspondence of doors or windows, and in respect of covers also almost horizontal while avoiding dripping of rain water or other compartment.

[0039] In the complete embodiment of the device, shown in Fig. 21 to 45, the first 37 and second 39 arm of the pantograph means 35 are almost straight and equal.

[0040] Each side end of each slat means 3 is equipped with a balance means 63 rigidly secured to it, for example by rivets, gluing, welding, interlocking or preferably by screws. The rocker means are preferably made of metallic material, alternatively can be plastic or resin also reinforced with fibers.

[0041] Each balance means 63 is centrally rotably engaged to a protrusion of the respective central pin 41 of the pantograph means 35 to allow rotation of the slat means 3 at least in the closed condition C.

[0042] Therefore, the slat means are connected through the pantograph 35 through the rocker means.

[0043] The device comprises drive means 65 housed in at least one of the lateral guides 49, preferably two in number and each housed in its respective lateral guide, and assigned to rotate the slat means 3 at least in the closed condition C.

[0044] Each balance means 63 comprises a first coupling means 67 and each of the actuating means 65 comprises a rod means 69 provided with a second coupling means 71 for each rocker arm means 63. The rod means 69, preferably consists of a full metal section, length slightly less than that of the lateral guides and with a rectangular section with great differences in length of the sides.

[0045] Each second coupling means 71 is engageable in a corresponding of first coupling means 67.

[0046] Such rod means 69, at least in the closed condition C, is moved by displacement means 75 that move on a sliding geometrical plane perpendicular to the geometric plane of closure between a plurality of positions of disengagement, in which the first coupling means 67 and the second coupling means 71 are disengaged, and a plurality of positions of engagement, in which the first coupling means 67 and the second coupling mean 71 are mutually engaged in a sliding way.

[0047] In these positions of mutual engagement between the first 67 and second 71 coupling means, the displacement means 75, moving the rod means 69, rotate

the rocker arm means 63 and the slat means 3 between a obscured condition O, in which the slat means lie on the geometrical plane of closure, and a shading condition F in which are all together tilted with respect to the closure geometrical plane allowing the external light to penetrate into the compartment.

[0048] Preferably the first coupling means 67 consists in a slot open at one end and tilted with respect to the side guide means49 and the second coupling means 71 consists of a pin compatible with this slot.

[0049] Each rod means 69 is provided with a plurality of slots 79 "L" shaped opened with an arm parallel to the respective side rail 49 and an arm inclined with respect thereto.

[0050] Each shaped slot 79 is slidably engaged by a respective constraint pin 81 that, when flows, due to the displacement means 75, from the free end to the opposite end of the tilted arm of the respective shaped slot 79, due to the approach and engagement of the second coupling means 71 to the openings of the slots of the first coupling means 67 and vice versa.

[0051] When each constraint pin 81 slides into the parallel arm of the respective shaped slot 79 causes the sliding of the second coupling means 71 in the first coupling means 67 and then the rotation of the slat means in the closed and shading condition.

[0052] The invention optionally provides that, when the securing pin 81 is placed in the section of the tilted arm of the shaped slot 79 near its section parallel, the second coupling means 71 are placed in contact with a block portion 83 of the rocker arm means 63, for example consisting of a peripheral portion of the fitting balance means 63 near the opening first coupling means 67. In this condition or when each second coupling mean 71 abuts against the corresponding block portion 83, is prevented from rotation of the rocker means 63 and the slat means realizing a safety closing condition of the device.

[0053] Each of the displacement means 75 comprises a first carriage means 87 fixed to the annular means 55 and sliding along the respective guide rail 49 formed in, or attached to, the respective side rail 49. In an end portion of the movement of the annular means 55 in the closed condition C, the first carriage means 87 engages, via a removable constraint of transmission of longitudinal motion, the rod means 69 by pulling it with a component parallel to the guide means. The overall motion direction of the rod 69 is determined by the shape of the shaped slots 79 which, as well as to permit longitudinal translation will require the approaching and distancing from the rocker means 63.

[0054] The first carriage means 87 is connected by an extensible elastic means 89, for example consisting of a helical spring operating in traction, with a second carriage means 91 sliding along the side guide 49 and connected to the pair of arms 37, 39 placed at one end of a pantograph means 35 and thereby connected to the annular means 55.

[0055] One end of each rocker arm means 63 is equipped with a spring pin 95, slidably housed in a cylindrical seat housed in the rocker arm means and the slat means; such elastic pin 95 is maintained elastically projecting in the opposite direction to the corresponding slat means 3 by a helical spring housed in the same cylindrical seat.

[0056] Said elastic pin 95 is assigned, at least in the open A and closed C and obscured O conditions, to be engaged in a concave seat 97 formed or fixed to the end of the outer pin 43 or preferably the internal pin 45 facing the pantograph means35.

[0057] Such a concave seat 97 is cup-shaped with a projecting rim and is equipped with a radial window 99, which interrupts the rim and sized and oriented allowing the passage of the spring pin 95 only in the closed condition C.

[0058] The portion of each rocker arm means 63 which extends from the position of the central pin 41 toward the second longitudinal edge 13 of the slat means 3 is almost straight, and the opposite portion of the rocker arm means 63, between the position of the central pin 41 and the elastic pin 95 is approximately "S" shaped with the loop nearest to the position of the central pin 41 embodying the open slot of the first coupling means 67 and with the loop closest to the elastic pin 95 shaped as concavity 101 placed at the outlet side of the channel 29 of the corresponding slat means 3 to allow any water escape.

[0059] If the device is mounted tilted or almost horizontal, this output water from the outlet side of each channel 29 passes into the respective flow channel 47.

[0060] Such side flow channel 47 is preferably fixed to the inside of the corresponding side guide 49 via elastic hinges that allow the rotation and the displacement when it is in contact with the rocker means 63 and/or with the slat means at least in the solar shading condition.

[0061] The operation of the device provides for the transition from the opened condition to the closed and obscured condition the user active the motorized pulleys until the slat means are arranged on the closure geometrical plane and the second coupling means 71 of the rod means 69 with the block portions 83 of the rocker means 63 blocking the slat means. A further activation of the motorized pulleys allows to reach the shadings positions adjusting the inclination of the slat means. The pulleys activation in the opposite direction allows to reach before the closed and obscured condition and subsequently the opened condition.

[0062] One advantage of the present invention is to provide a closing device that can be used to cover having almost null sloping, avoiding water infiltration.

[0063] Another advantage is to provide a device that can also be used to close also vertical openings such as windows and doors.

[0064] Further advantage is to provide a device having shading function suitable to change the intensity of the external light incoming in the habitat or compartment associated with the device.

[0065] Another advantage is to provide a device rela-

tively simple, inexpensive and extremely safe.

Claims

1. Closing device for compartment or room comprising a plurality of elongated and roughly flat slat means (3), whose side ends are connected to respective side handling means (5) that move the slat means (3) from a closed condition (C), wherein said slat means lie on a closure geometric plane, to an opened condition (A), wherein said slat means are tilted with respect to said closure geometric plane and each other placed side by side in mutual contact or nearly, and vice versa; wherein each slat means (3) has a first longitudinal edge (11) that in the closed condition (C) is facing to the opening direction and a second longitudinal edge (13) which, in the closure movement, comes first the correspondent first edge and wherein each slat means (3) has a first main face (15) and a second main face (17) that in the closed condition are facing respectively outside and inside the respective compartment or room; said device (1) being **characterized in that** a first longitudinal border strip (21) of the slat means (3) comprising the first longitudinal edge (11) of each slat means (3) is offset or bended with respect to the remaining portion of the slat means (3) in such a direction that in the closed condition (C) the first longitudinal border strip (21) is internal and **in that** in the closed condition (C) the handling means (5) put the slat means (3) at a mutual distance smaller then the width of a slat means (3) causing the overlapping of a second longitudinal border strip (25) comprising the second longitudinal edge (13) of a slat means (3) at the first longitudinal border strip (21) of a slat means (3) adjacent, wherein the first longitudinal border strip (21) is inside compartment or room with respect to the second longitudinal border strip (25).

2. Device according to the claim 1 **characterized in that** the first main face (15) is interrupted by a longitudinal opening (27) at the root of the first longitudinal border strip (21) containing a longitudinal channel (29) leading to a longitudinal opening (27).

3. Device according to the claim 2 **characterized in that** at least one of first longitudinal border strip (21) and second longitudinal border strip (25) has longitudinal seats (31) for longitudinal seal means (33) between said longitudinal border strips first (21) and second (25) in the closed condition (C).

4. Device according to the any of the preceding claims **characterized in that** the handling means (5) comprise a pantograph means (35) for each side of the device (1) perpendicular to the slat means (3) where each pantograph means (35) comprises, for each slat means, a couple of arms first (37) e second (39) centrally and reciprocally articulated as scissor by a median pivot (41) and whose ends are articulated at the correspondent end of the adjacent couples of arms (37, 39) by external (43) and internal (45) pivots.

5. Device according to claim 4 **characterized in that** said handling means (5) comprise also a couple of side guides (49) each having a slide channel (51) for rolling means (53) fixed to the protruding ends of the internal pivots (45); each side guide (49) contains also a flexible annular means (55) engaged in pulley means (57, 59) at the ends of the side guide (49) and one of the pulley means (59) is motorized; said annular means (55) being connected to a couple of arms (37, 39) placed at an end of the pantograph means (35), the other extreme couple of arms (37, 39) being fixed with respect to side guides (49); each slat means (3) is connected to a respective first arm (37) whose length is smaller then the distance between the longitudinal first (11) and second (13) edges of the slat means.

6. Device according the claims 2 and 4 or 5 **characterized in that** each first arm (37) is roughly "S" lying shaped and, in the closed condition, put the respective inner (45) and outer (43) pin respectively more inside and outside with respect to the room respect to the median pivot (41); each first arm (37) is rigidly fixed to a respective side end of the correspondent slat means (3); each first arm (37) has a concavity (61) placed at the side outlet of the channel (29) of the correspondent slat means (3) to allow drainage of any water and the passage thereof into a respective outlet channel (47) lateral or parallel to the side guide (49).

7. Device according to any of claims 4 - 6 **characterized in that** each side end of each slat means (3) has a rocker arm means (63) firmly fixed thereto and centrally engaged in a ratably way to a protrusion of the median pivot (41) of the pantograph means (35) to allow the rotations of the slat means (3) at least in the closed condition (C) and **characterized in that** it comprises drive means (65) placed in at least on of the side guides (49) and assigned to rotate slat means (3) at least in the closed condition (C).

8. Device according to the claim 7 **characterized in that** each rocker arm means (63) comprises a first hooking means (67); each drive means (65) comprises a rod means (69) having a second hooking means (71), for each rocker arm means (63), engageable in the first hooking means (67), said rod means (69), at least in the closed condition (C) is moved by move means (75) on a sliding geometric perpendicular with respect to the closure geometric

plane between a plurality of disengagement position, wherein the first hooking means (67) and the second hooking means (71) are disengaged, and a plurality of engagement position, wherein the first hooking means (67) and the second hooking means (71) are engaged each other and wherein the move means (75) moving the rod means (69) rotate the rocker arm means (63) and the slat means (3) between a obscured condition (O), wherein they lie on a closure geometric plane, and a sunshade condition (F) wherein are all together tilted with respect to closure geometric plane.

9. Device according to the claim 8 **characterized in that** the first hooking means (67) is a slot opened at an end and tilted with respect to the side guide means (49) and the second hooking means (71) is a pin compatible with the slot.

10. Device according to the claim 9 **characterized in that** each rod means (69) has a plurality of shaped slot (79) having an open "L" shape with a parallel arm with respect to the respective side guide (49) and a tilted arm, each shaped slot (79) engaged in a sliding way by a respective constraint pin (81) which when sliding, due to the move means (75), from the free end to the opposite end of the tilted arm of the respective shaped slot (79), cause the approach and the engagement of the second hooking means (71) to the openings of the slots of the first hooking means (67) and vice versa and that when sliding in the parallel arm with respect to the respective shaped slot (79), cause the sliding of the second hooking means (71) in the first hooking means (67) e then the rotation of the slat means in the closed and sunshade condition.

11. Device according to the claim 10 **characterized in that** the positioning of the constraint pin (81) in the portion of the tilted arm of the shaped slot (79) near its parallel portion, put the second hooking means (71) in contact to a stop member (83) of the rocker arm means (63) near the opening of the first hooking means (67).

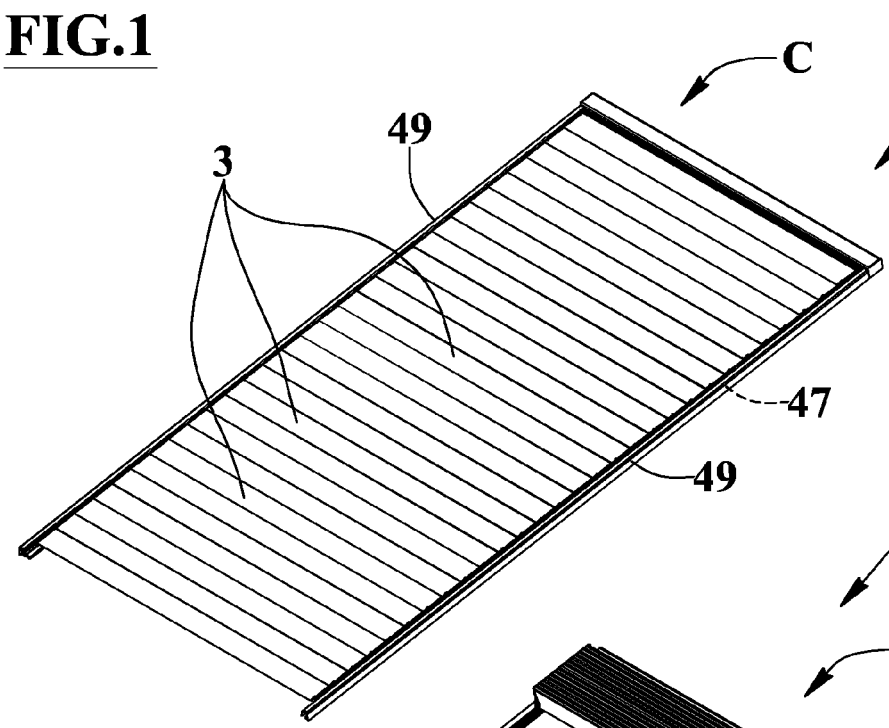
12. Device according to claims 5 and 8 **characterized in that** each move means (75) comprises a first carriage means (87) fixed to the annular means (55) and sliding along the respective side guide (49) engaging, in an ending portion of the movement of the annular means (55) in the closed condition (C) to the rod means (69).

13. Device according to claim 12 **characterized in that** the first carriage means (87) is connected by a resilient means (89) extendable to a second carriage means (91) sliding along the side guide (49) and connected to the couple of arms (37, 39) placed at an end of the pantograph means (35) and then connected to the annular means (55).

14. Device according to claim 7 **characterized in that** an end of each rocker arm means (63) has a spring operated pin (95) elastically kept projecting in an opposite direction with respect to the respective slat means (3) and at least in the opened (A) and closed (C) and obscured (O) condition assigned to be engaged in a concave housing (97) formed or fixed at the end of the external (43) or internal (45) pivot facing the pantograph means (35) wherein said concave housing (97) has a window (99) dimensioned and oriented to allow the passage of the spring operated pin (95) only in the closed condition(C).

15. Device according to claims 8 and 14 **characterized in that** the portion of each rocker arm means (63) which extends from the position of the median pivot (41) towards the second longitudinal edge (13) of the slat means (3) is almost straight and that the opposite portion, between the position of the median pivot (41) and the spring operated pin (95) is roughly "S" shaped with the closest loop with respect to the position of the median pivot (41) having the open loop of the first hooking means (67) and with the closest loop with respect to the spring operated pin (95) shaped as a concavity (101) placed at the outlet side of the channel (29) of the respective slat means (3) to allow drainage of any water and the passage thereof into a respective outlet channel (47) elastically hinged in the side guide (49).

FIG.1



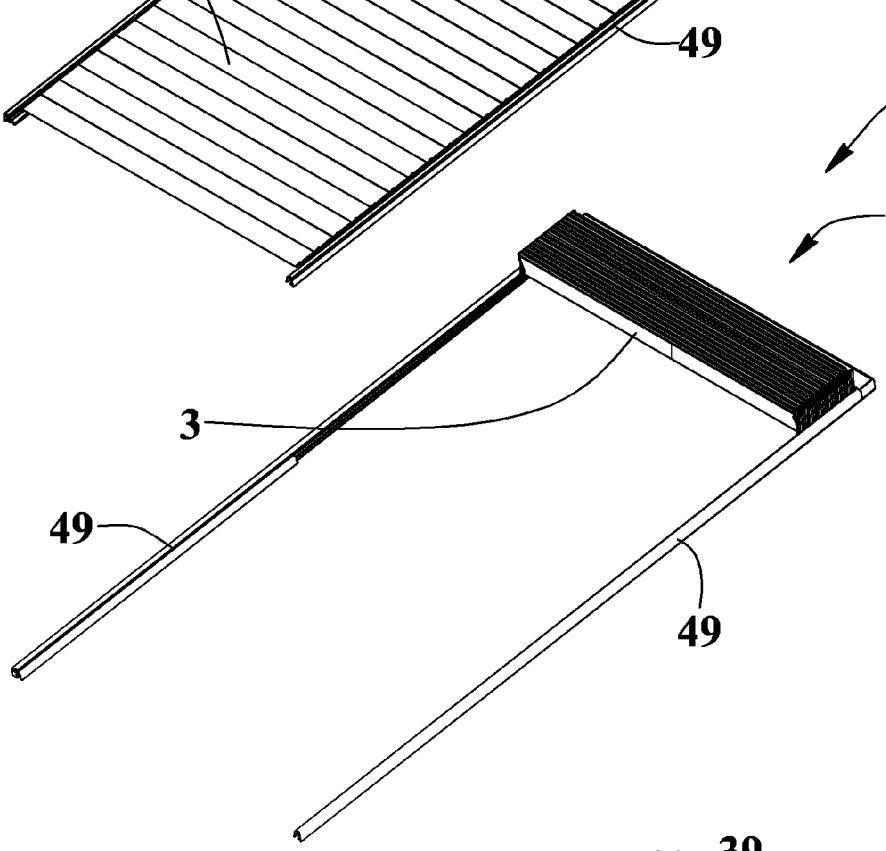


FIG.2

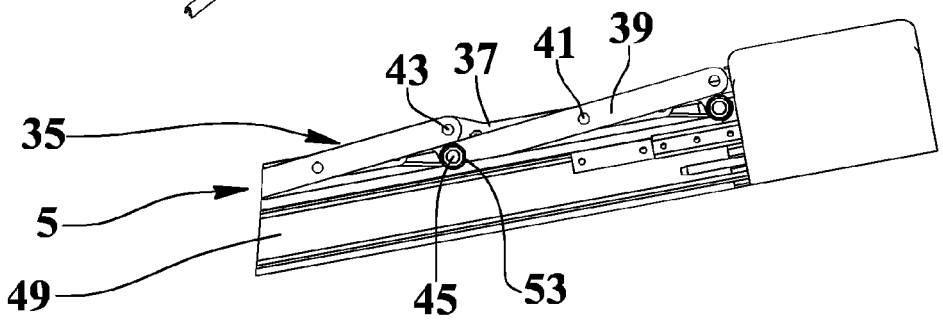


FIG.3

FIG.6

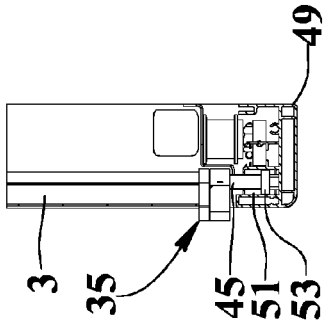
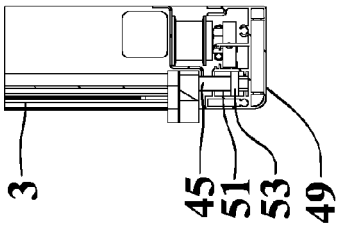


FIG.7



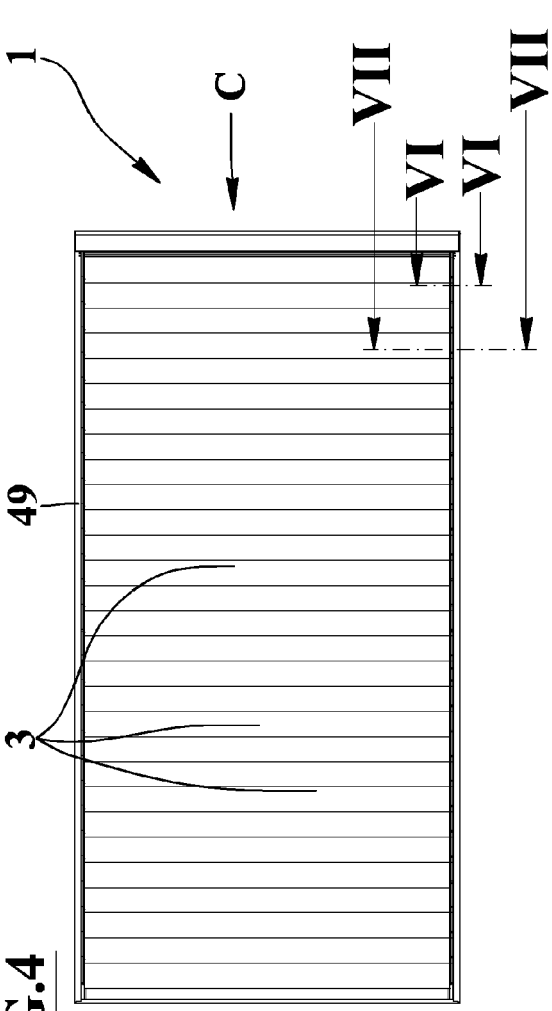


FIG.4

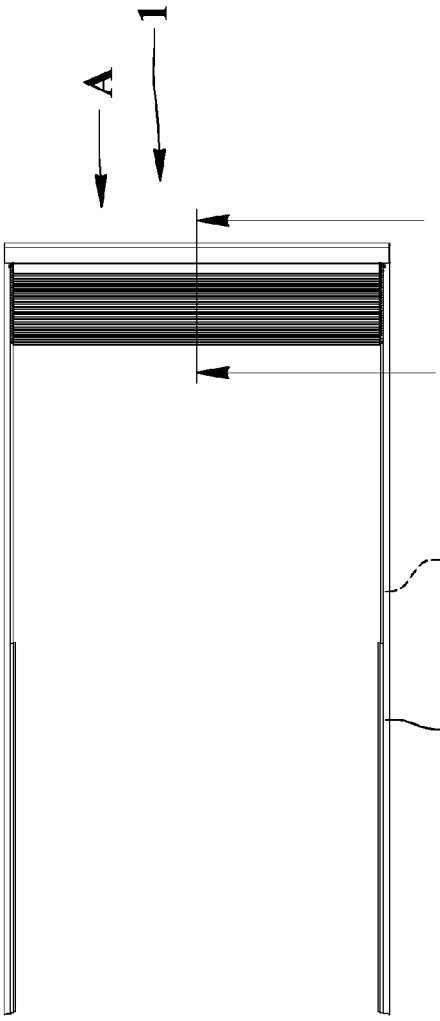


FIG.5

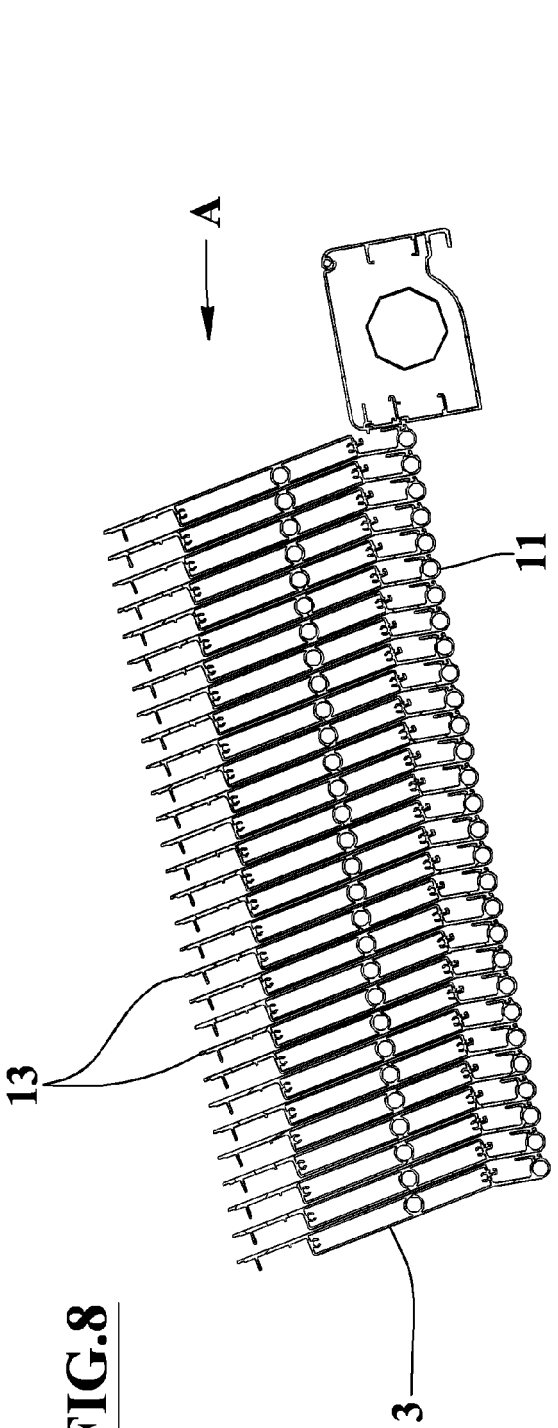


FIG.8

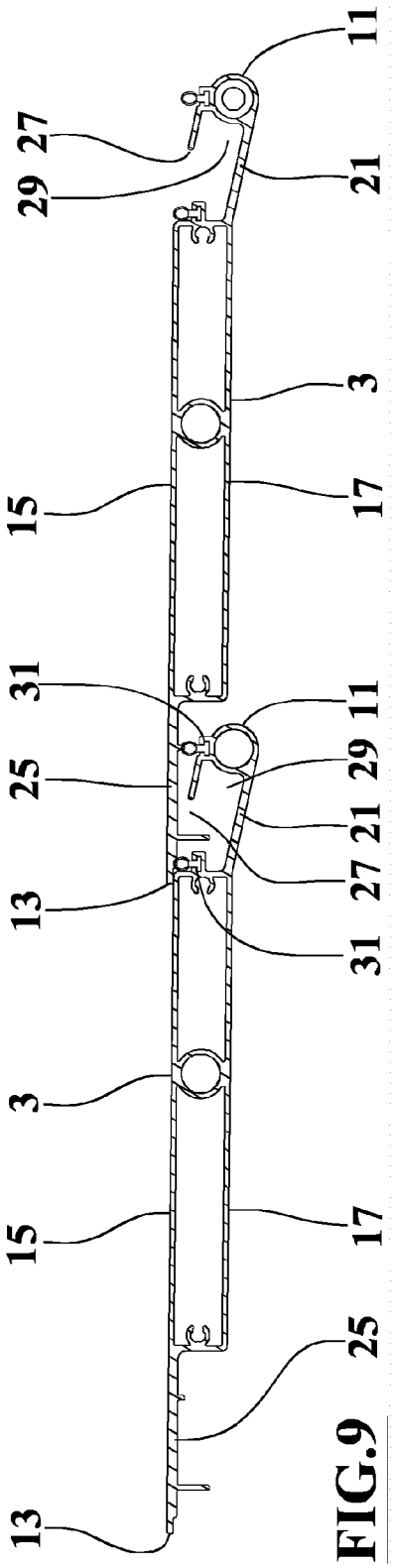


FIG.9

FIG.12

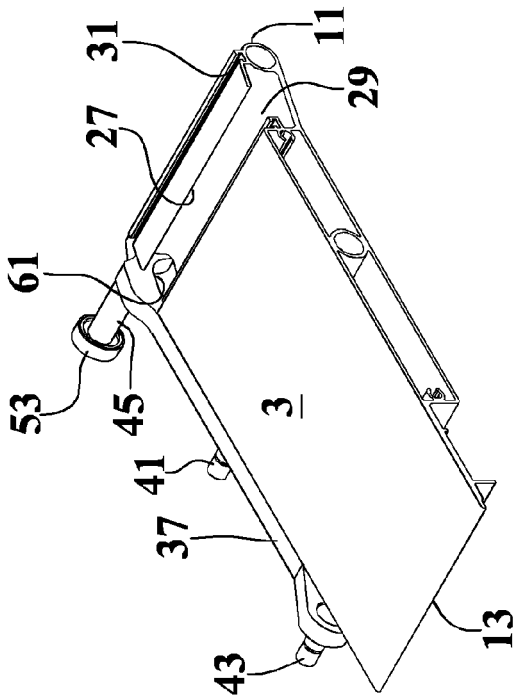


FIG.14

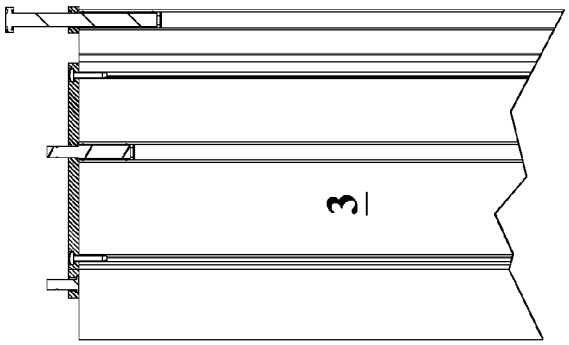


FIG.10

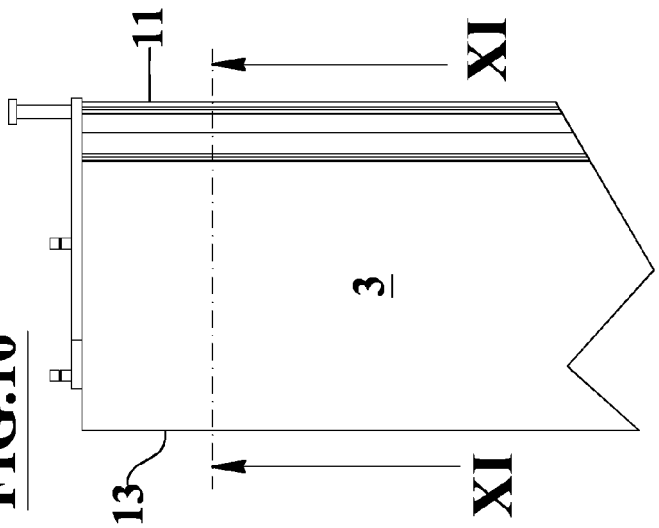


FIG.13

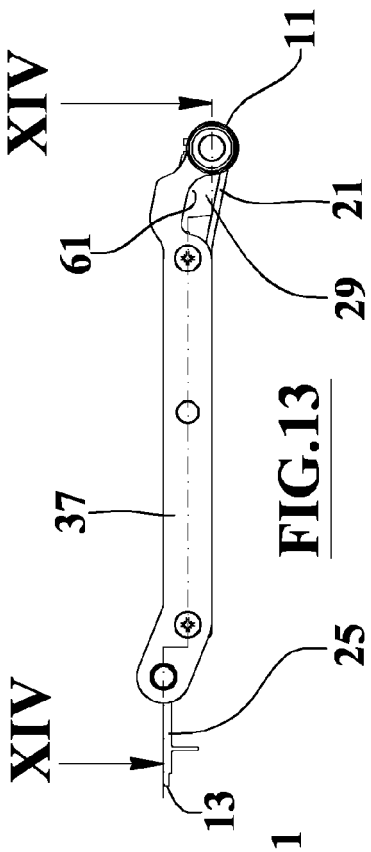
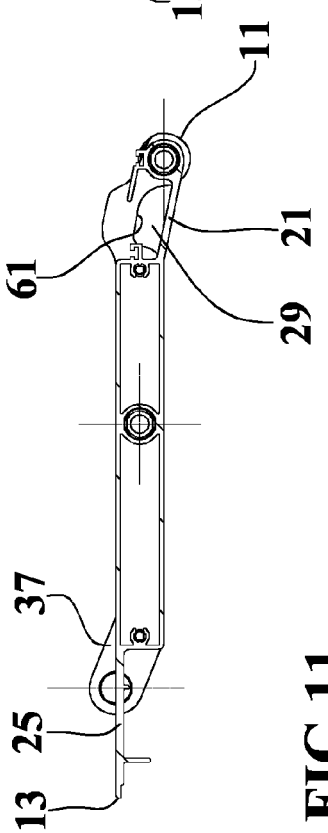


FIG.11



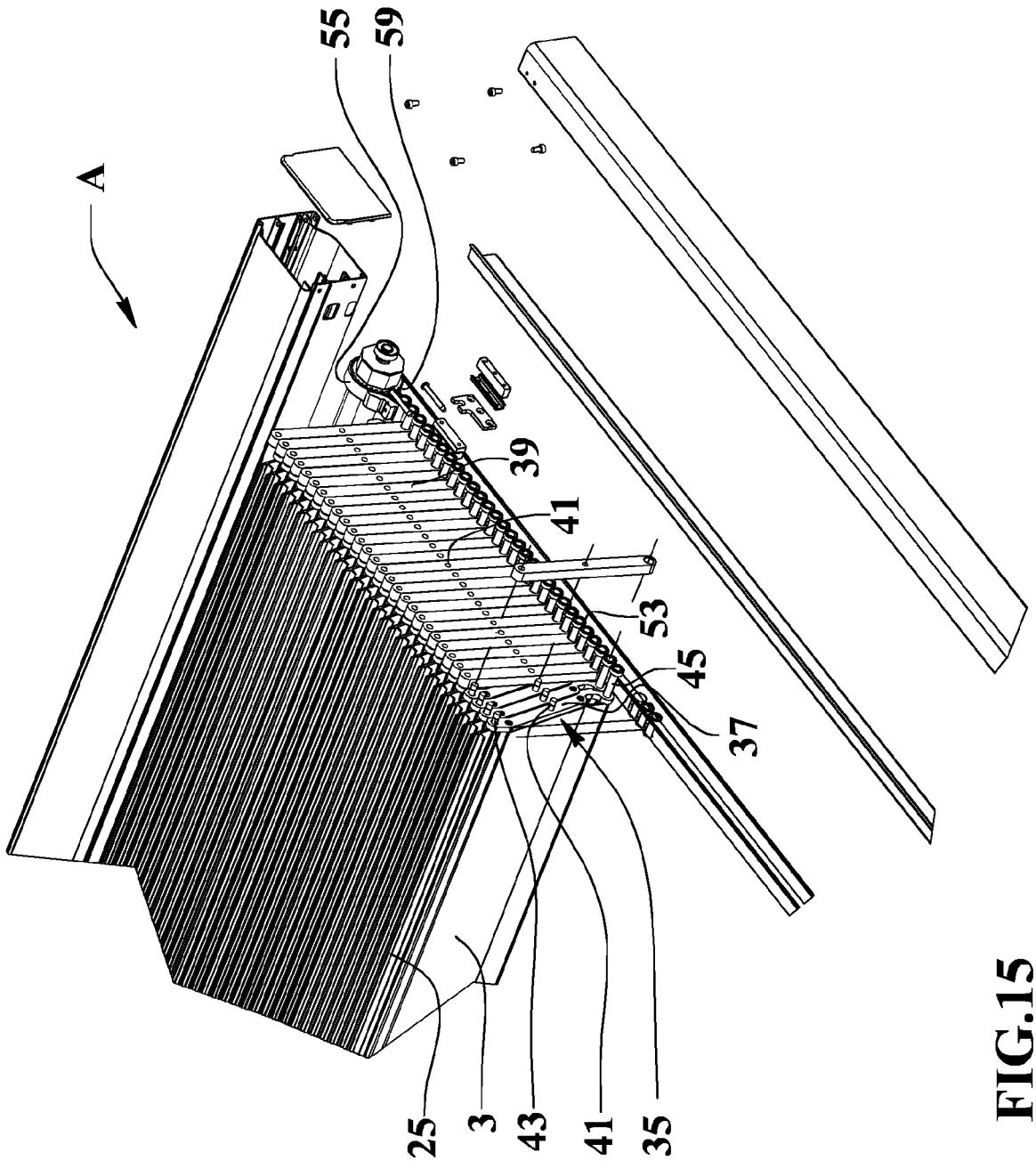


FIG.15

FIG.16

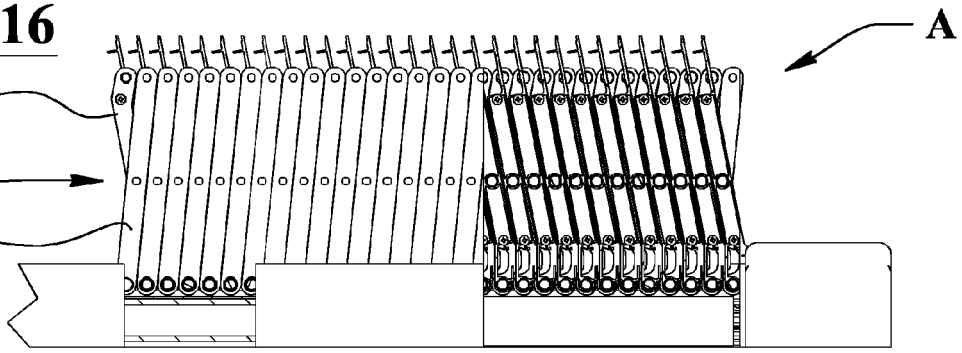


FIG.17

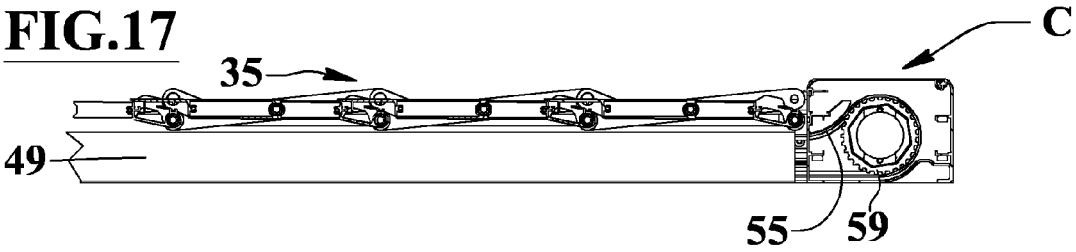


FIG.18

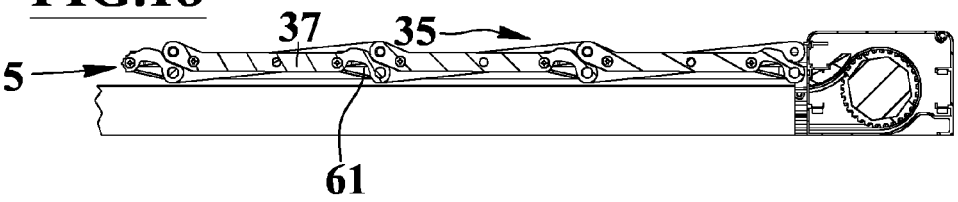
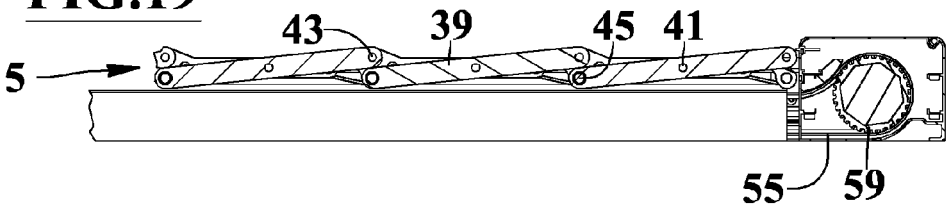


FIG.19



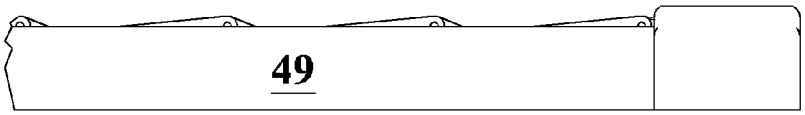


FIG.20

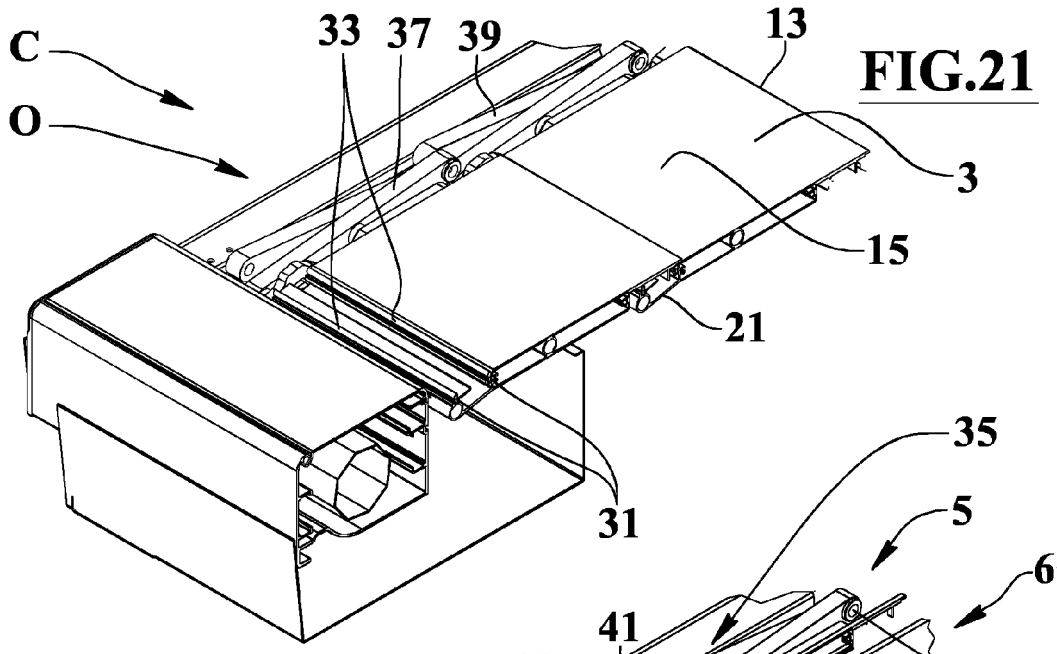


FIG.21

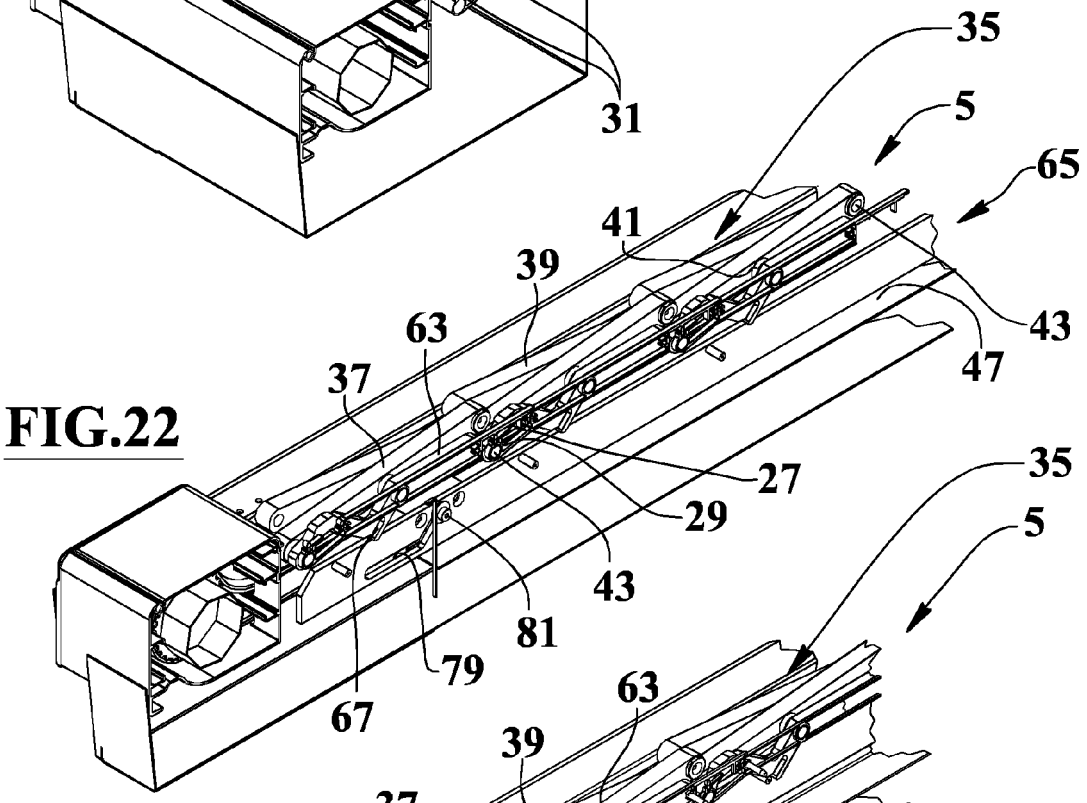


FIG.22

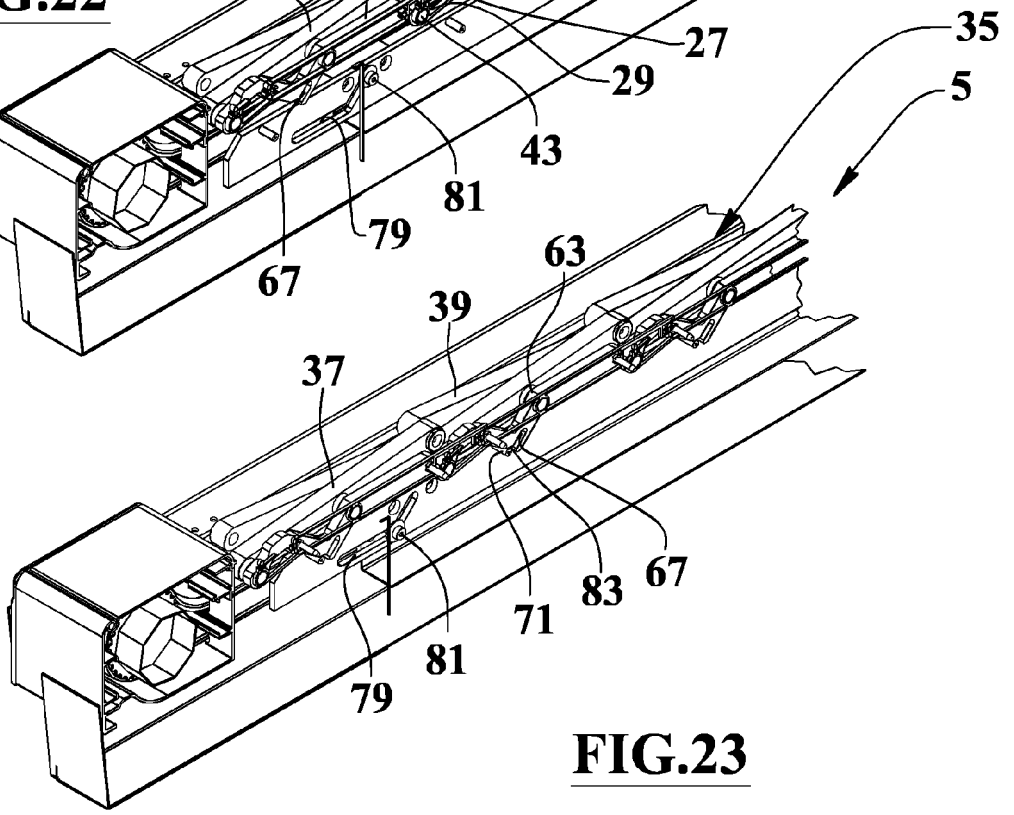
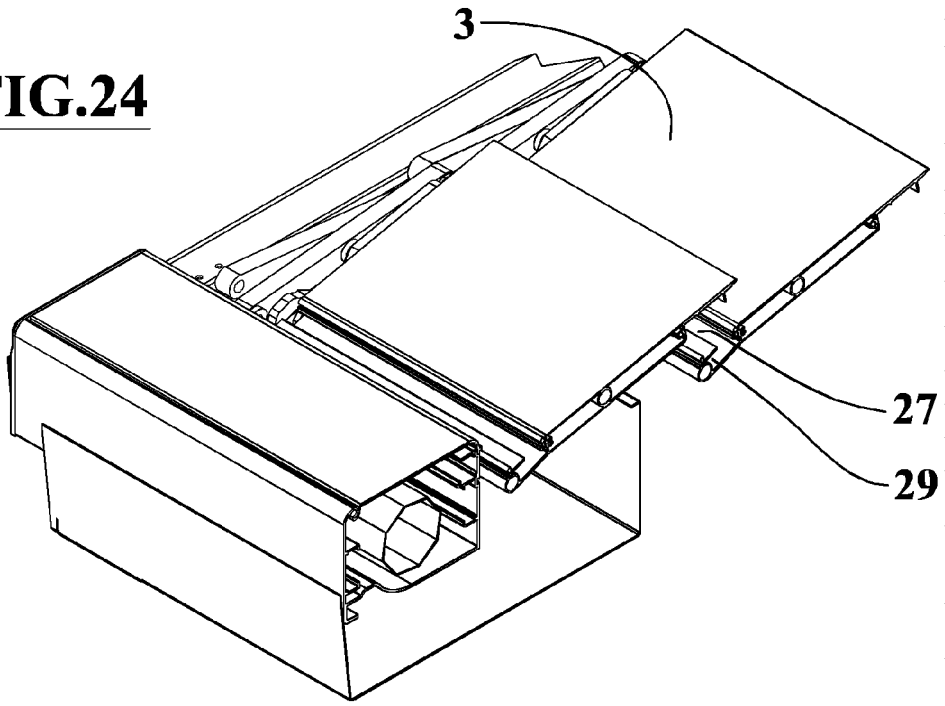


FIG.23

FIG.24



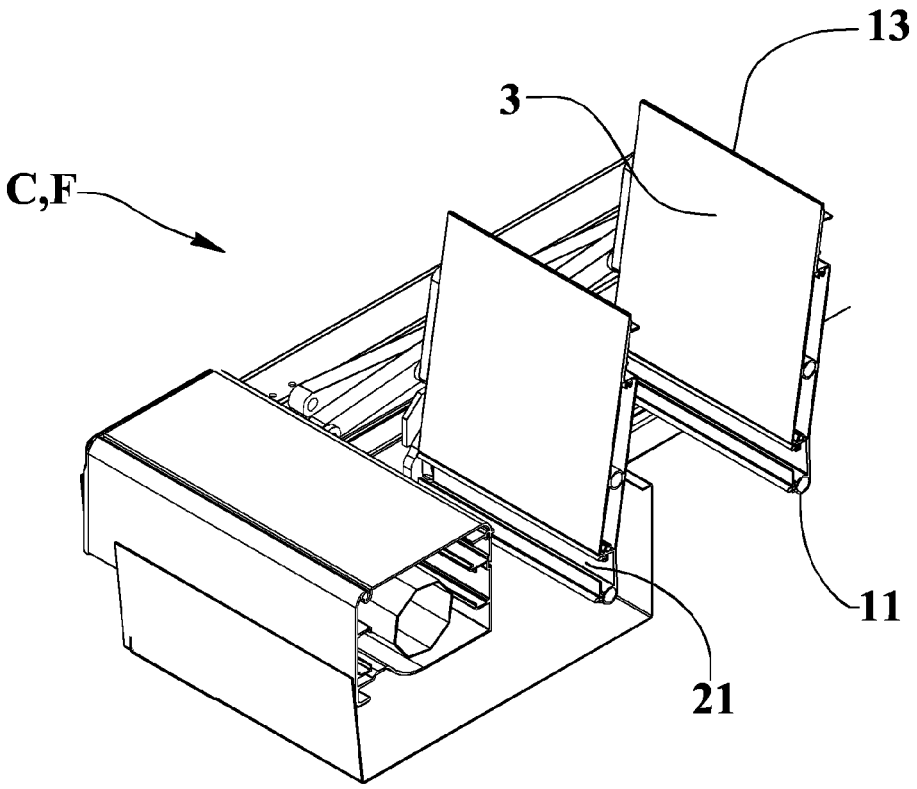
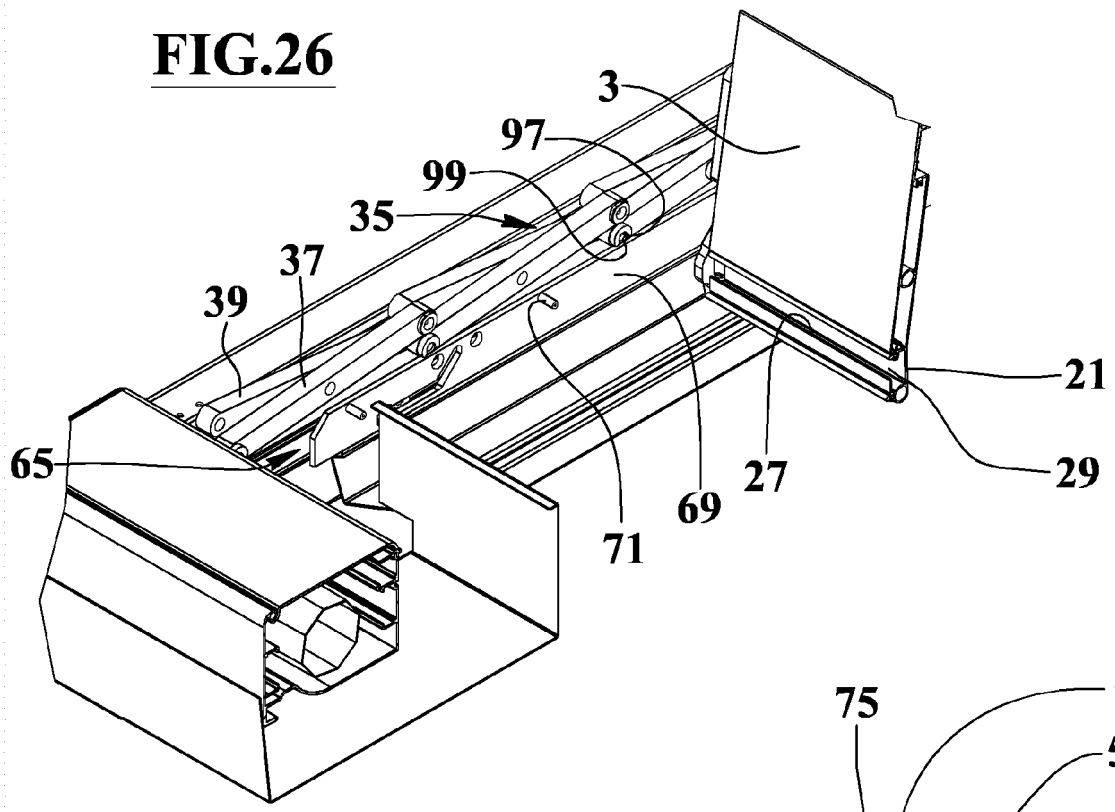


FIG.25

FIG.26


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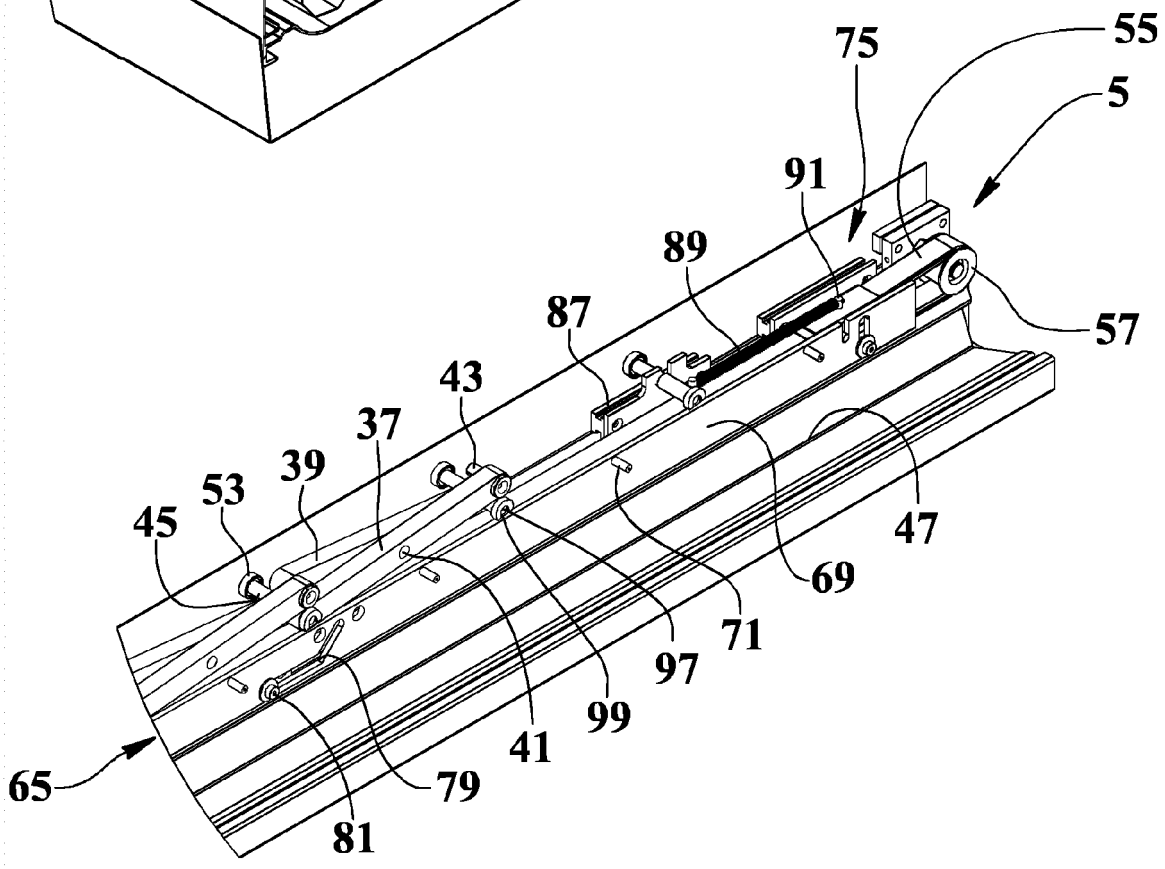

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FIG.27

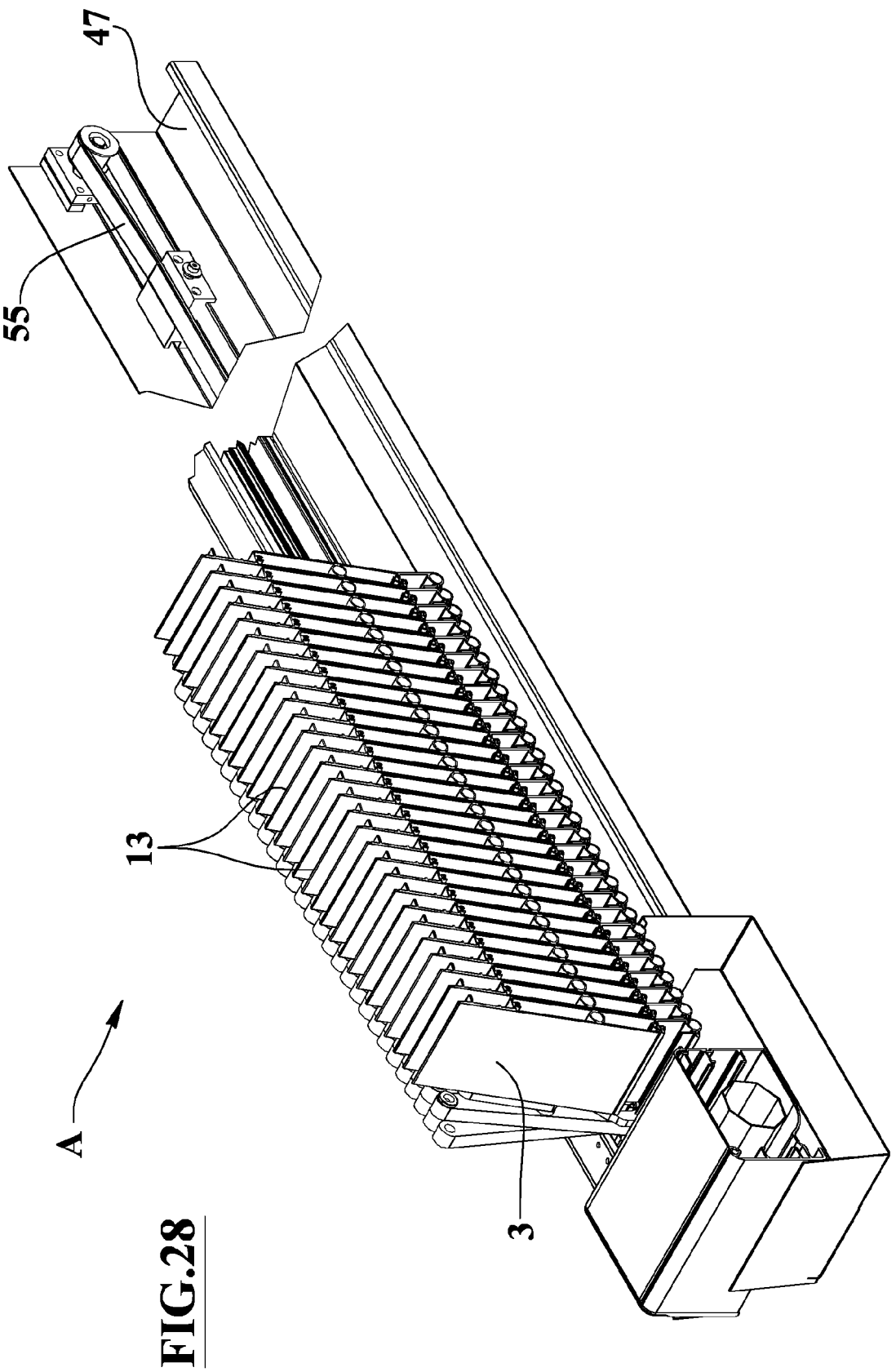
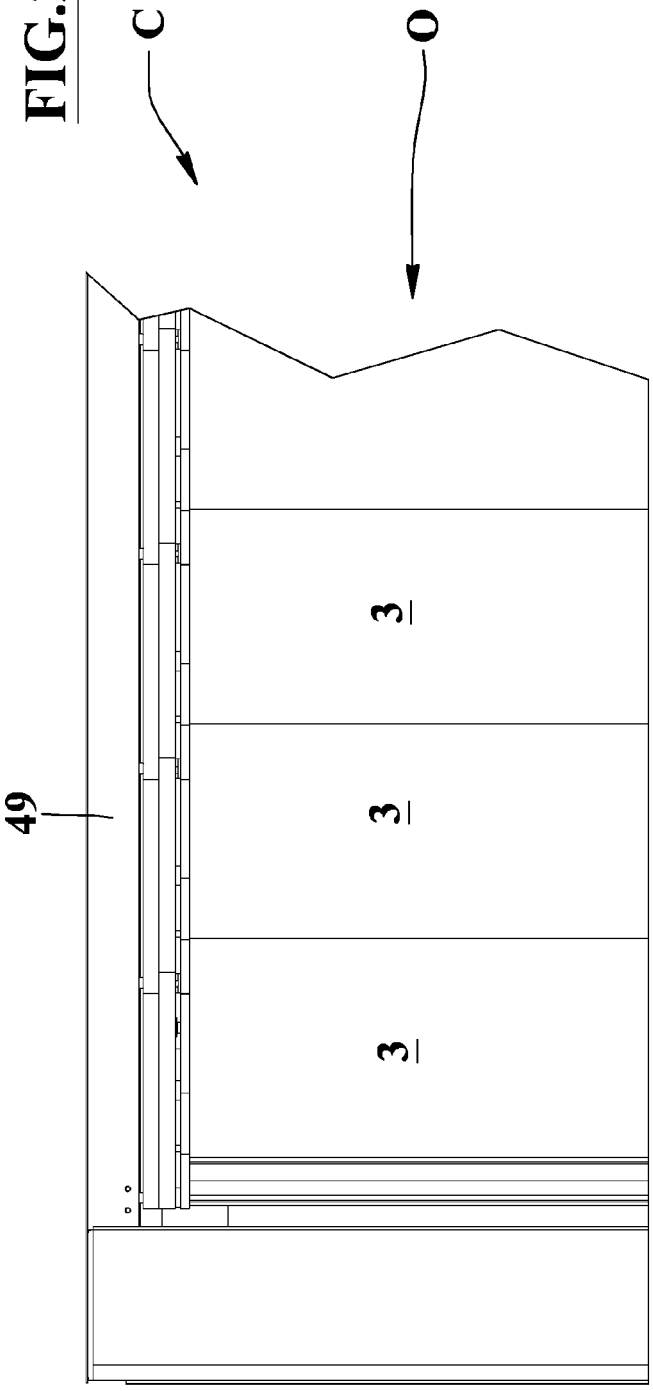


FIG.28

FIG.29



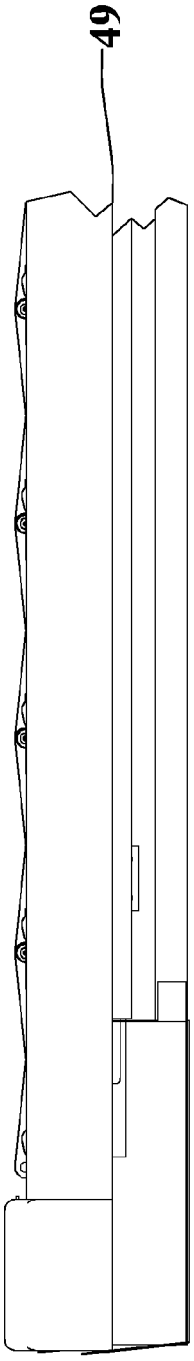


FIG.30

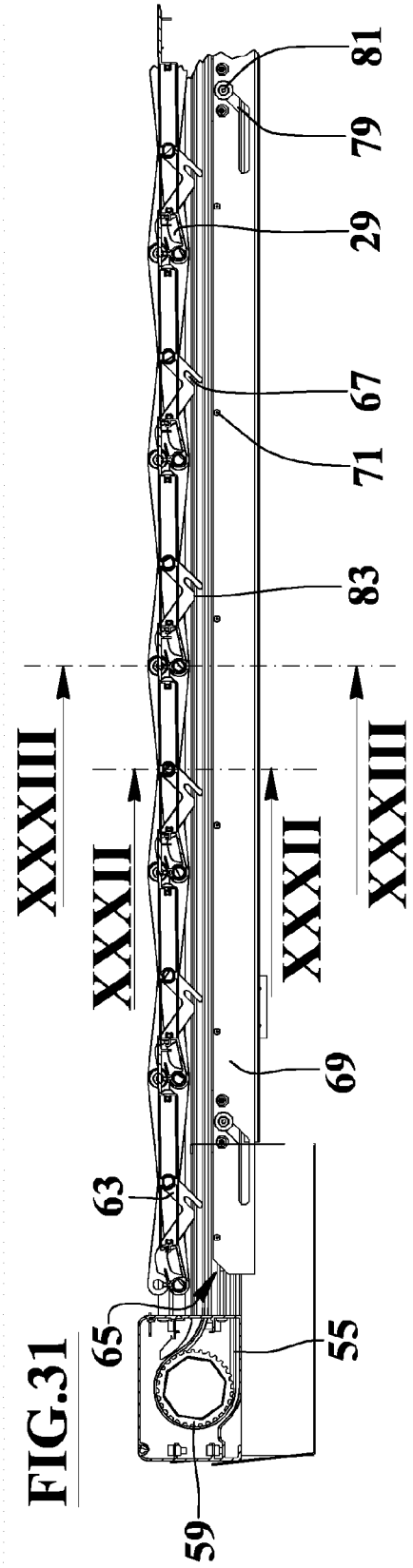


FIG.31

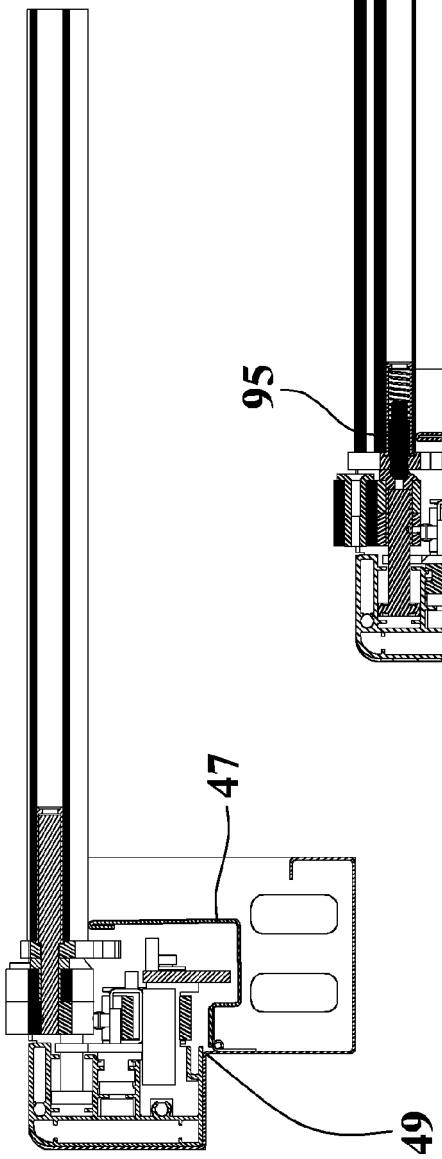


FIG.32

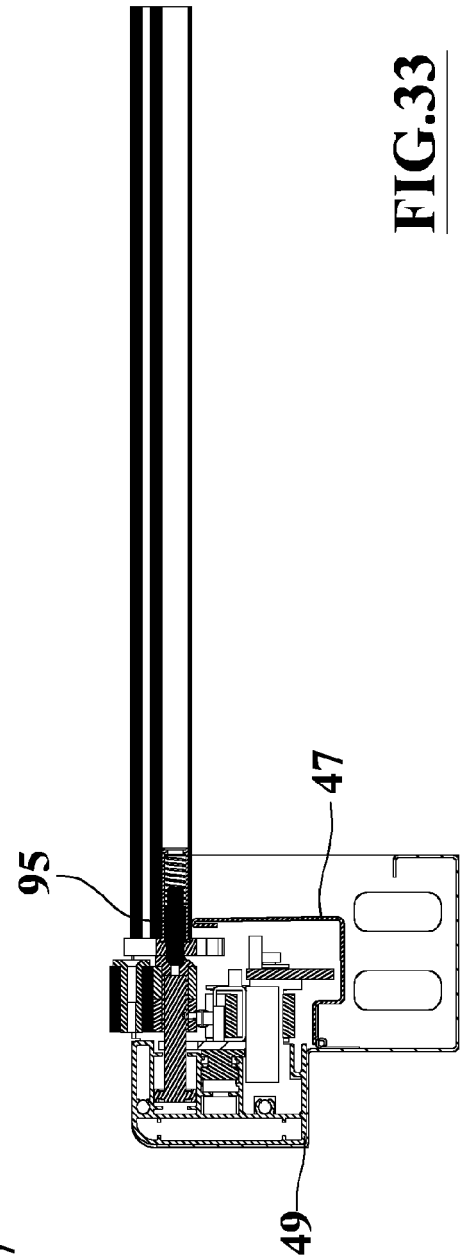


FIG.33

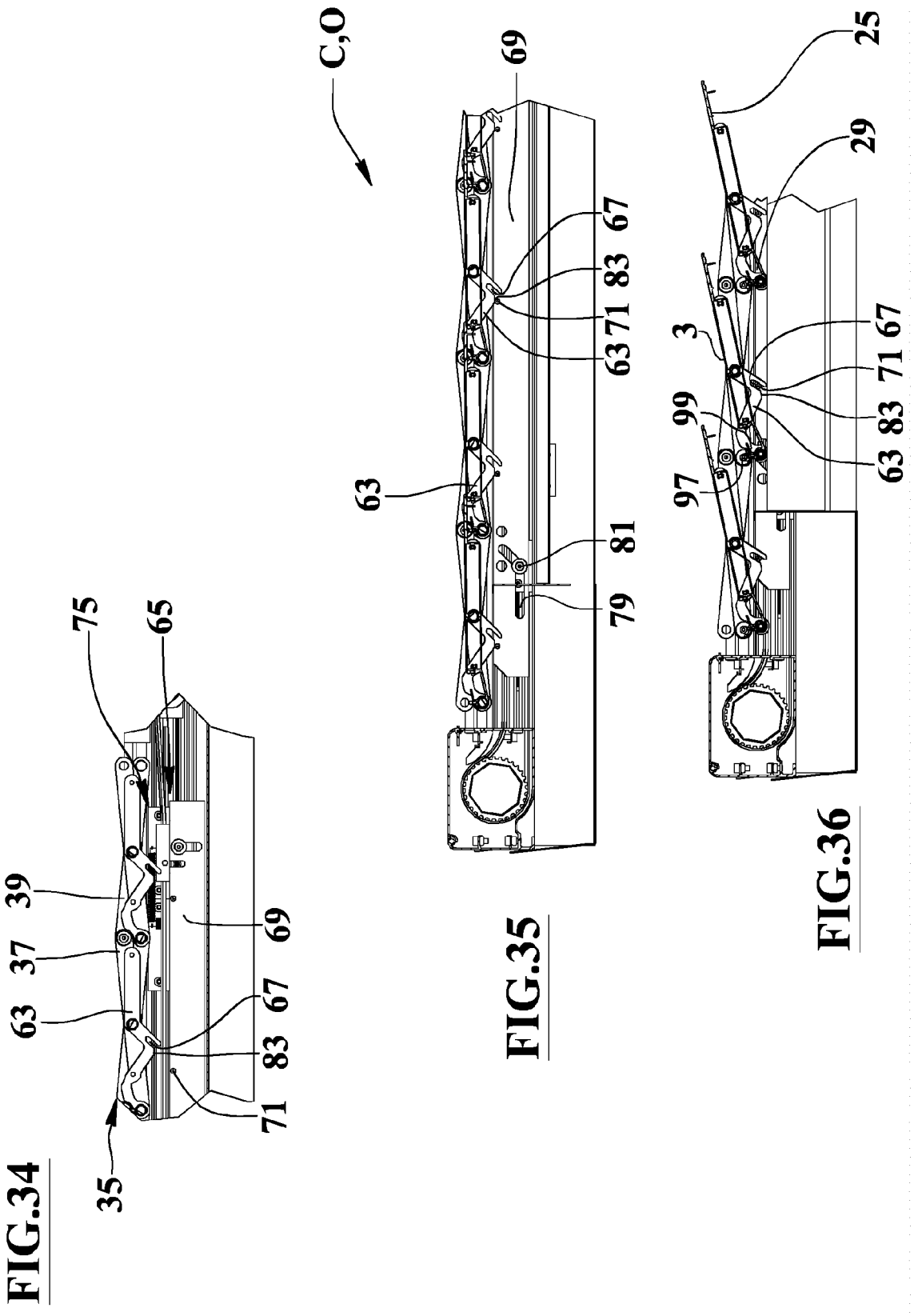


FIG.34

FIG.35

FIG.36

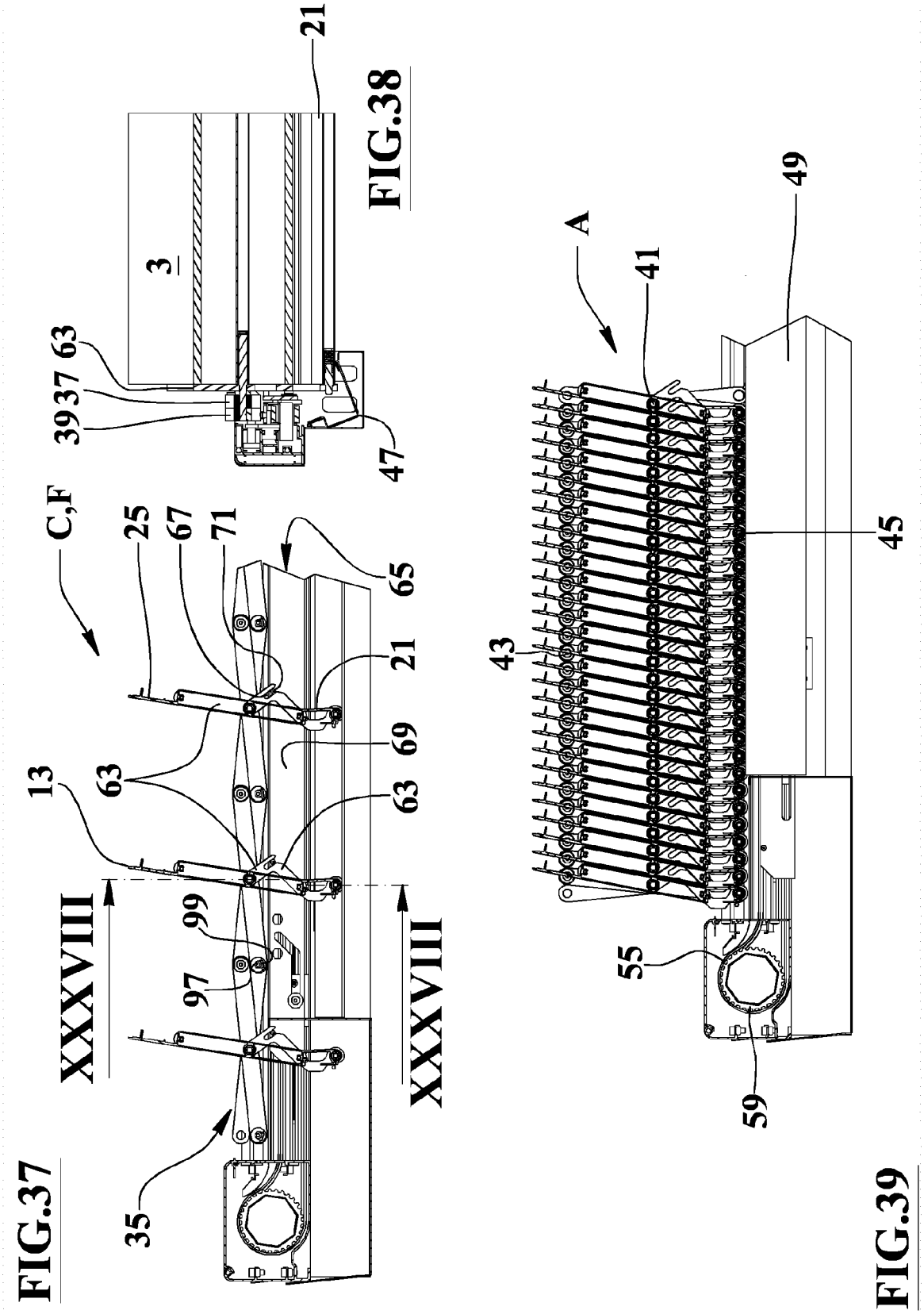

FIG.37
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FIG.38
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FIG.39
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FIG.40

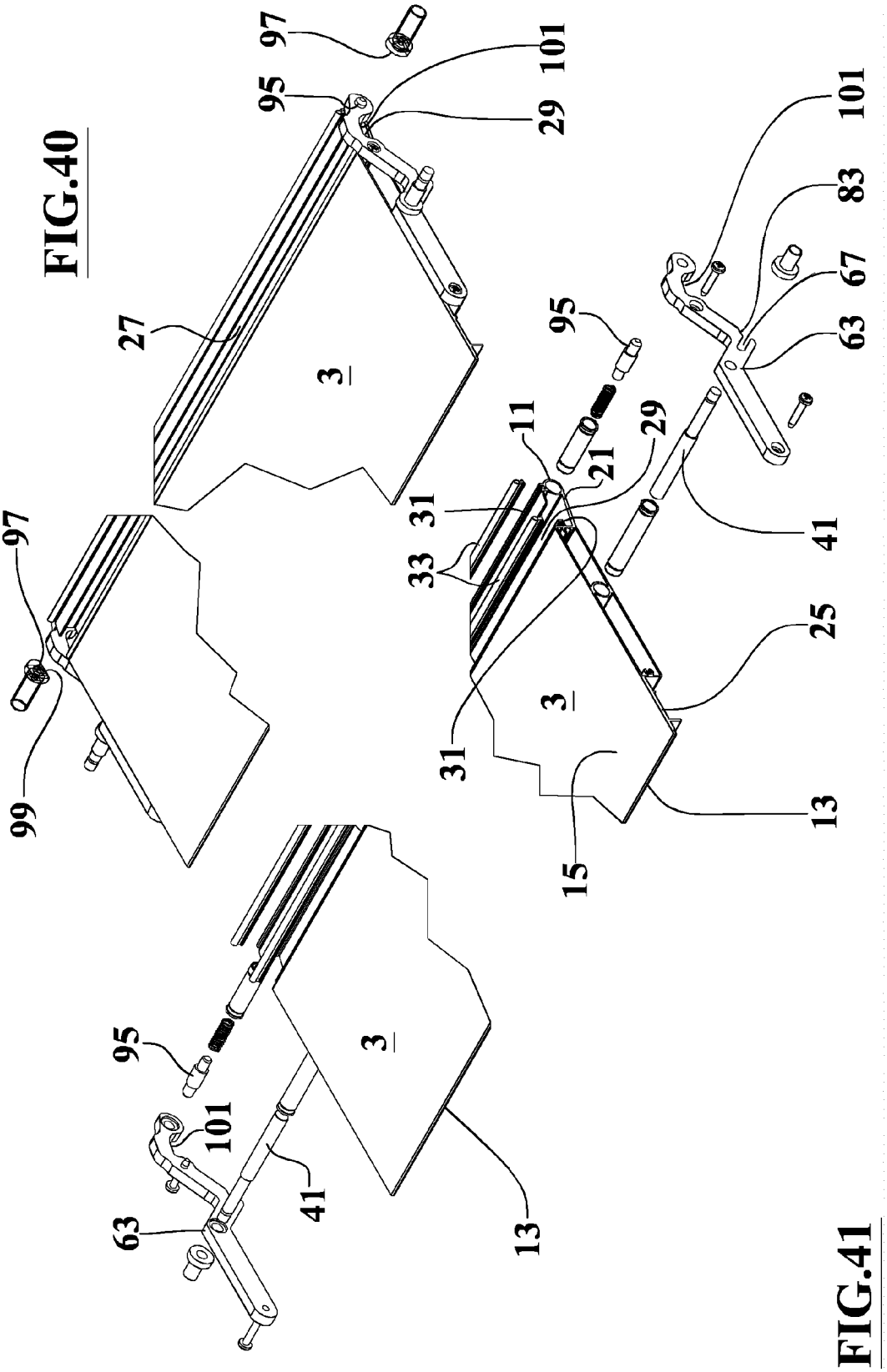

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FIG.41

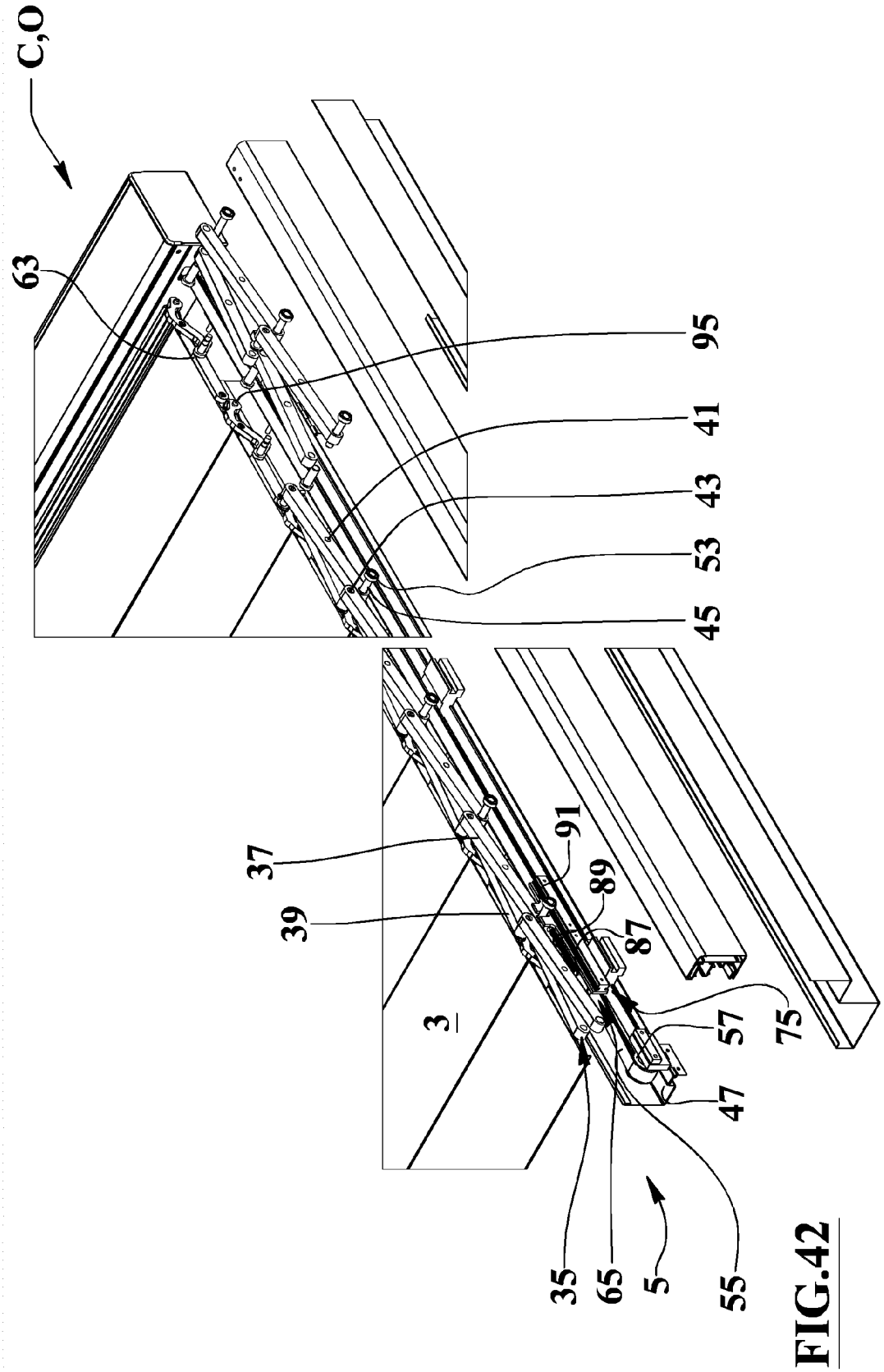


FIG.42

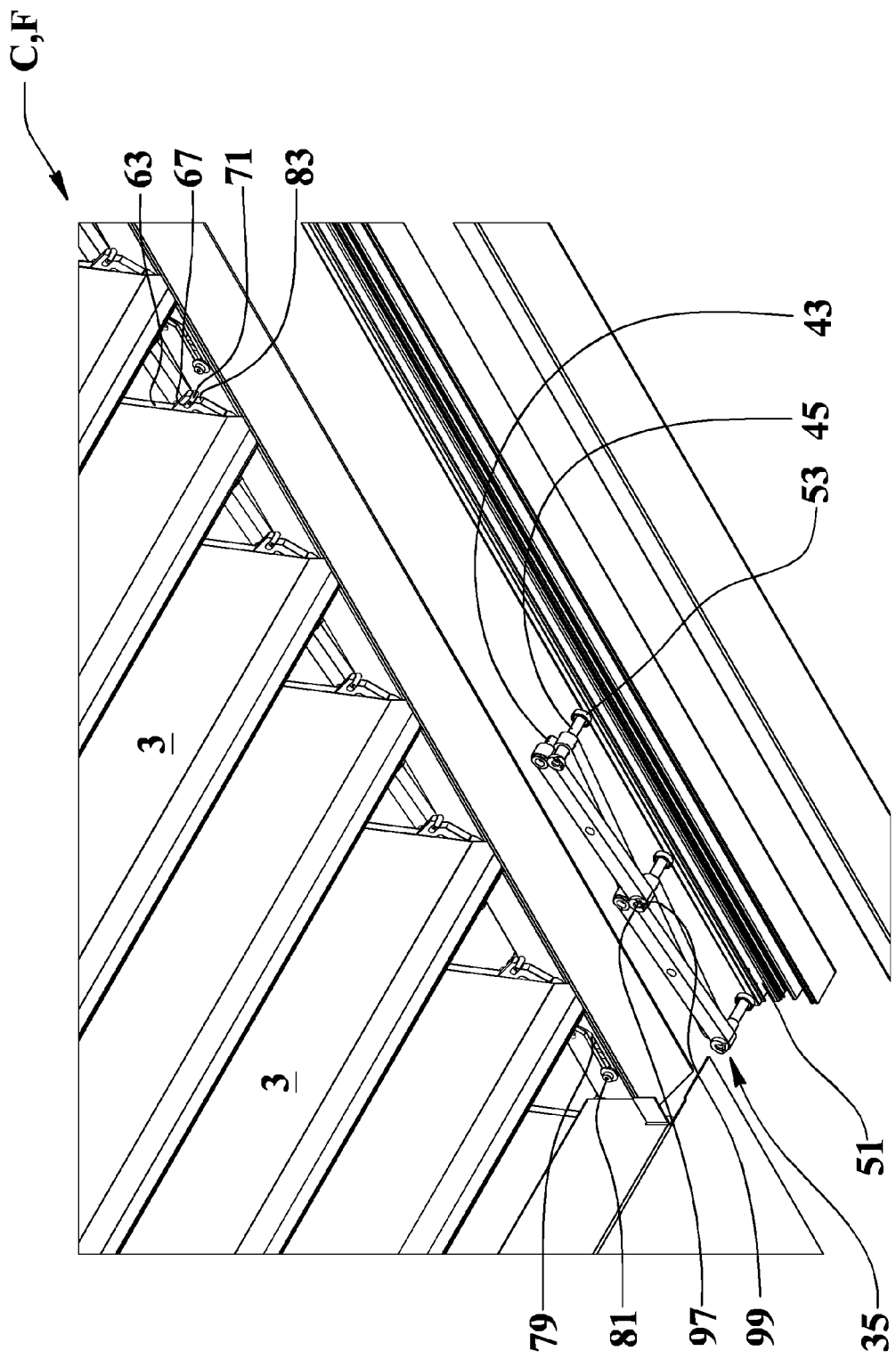


FIG.43

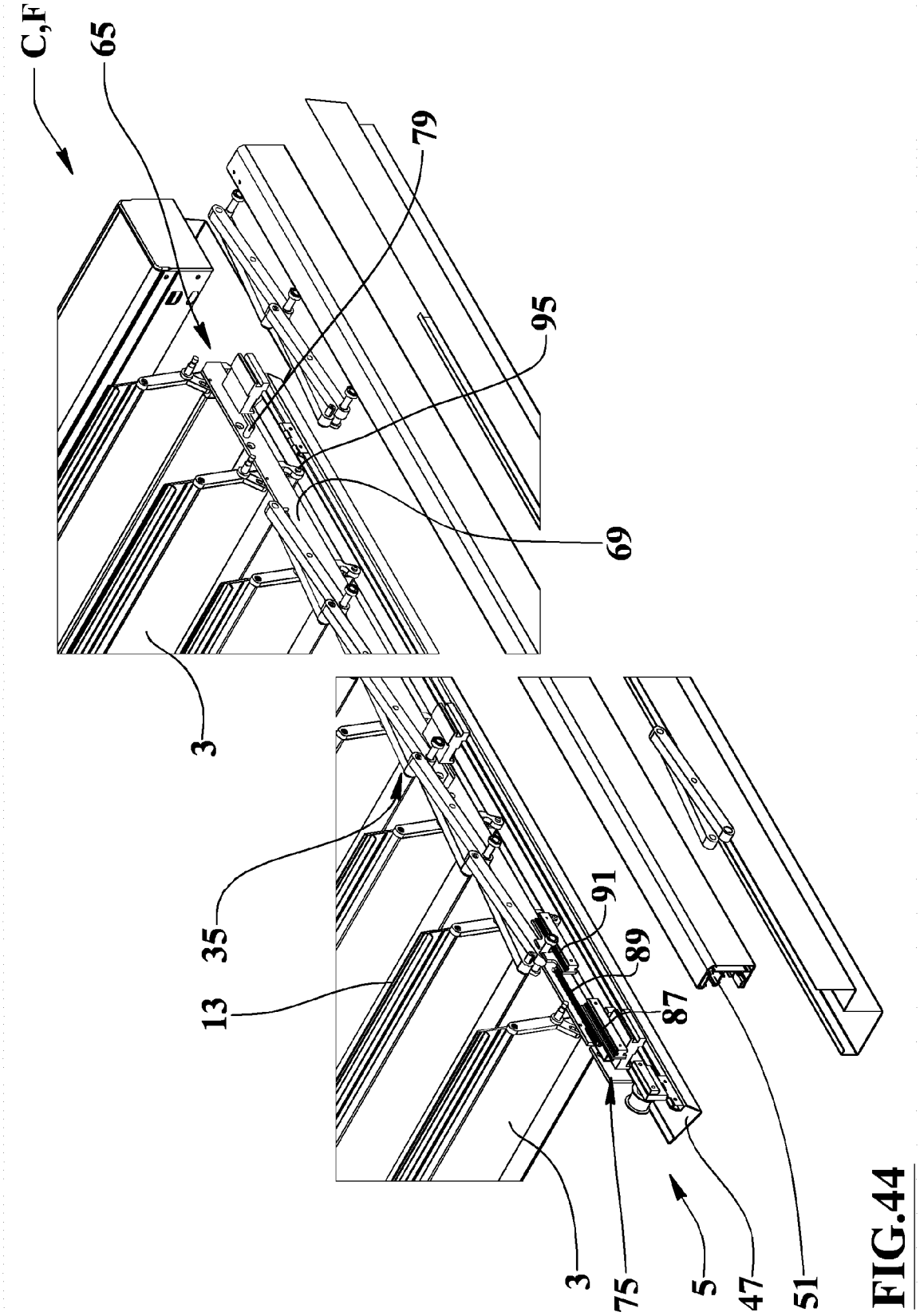


FIG.44

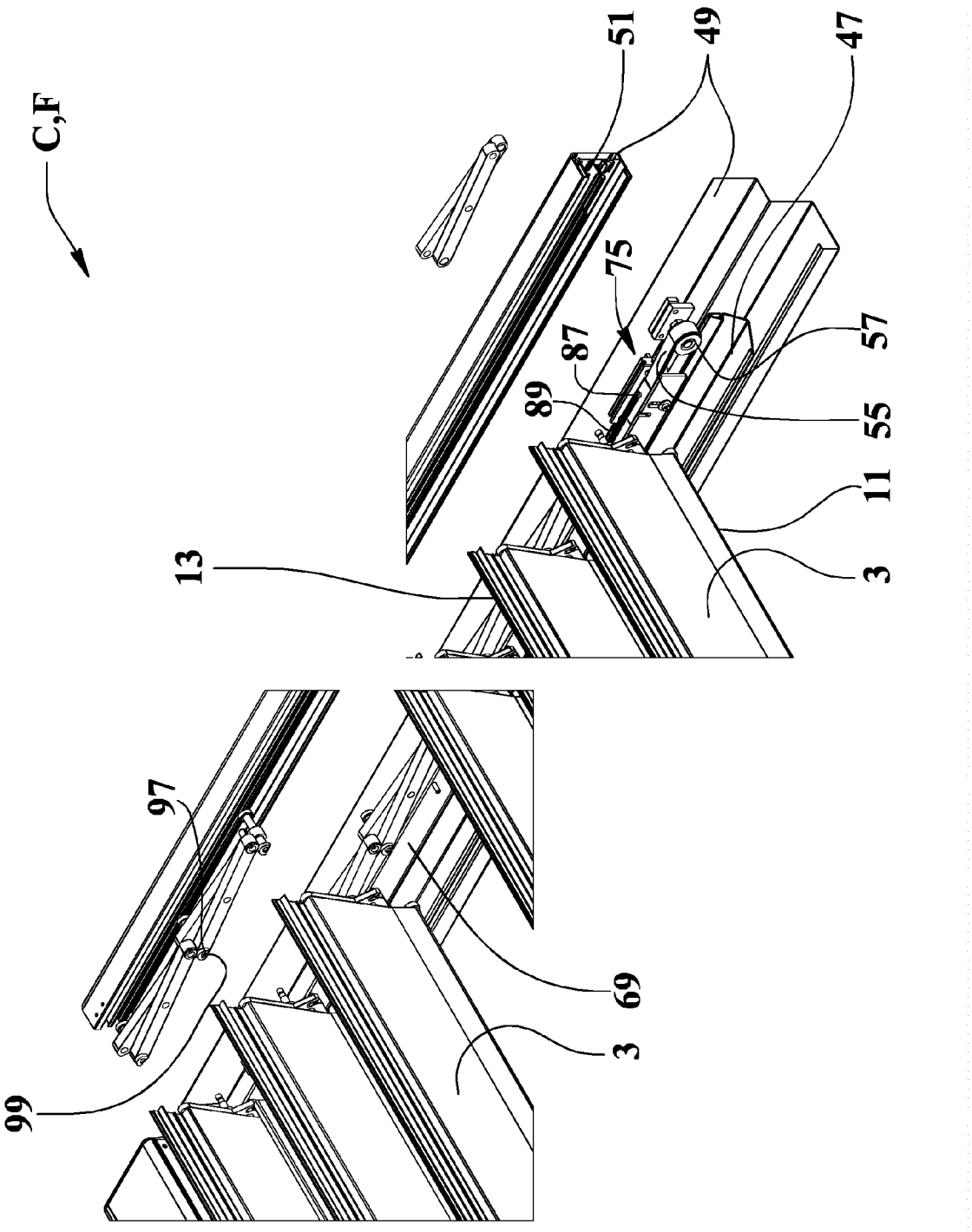


FIG.45

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EUROPEAN SEARCH REPORT

Application Number
EP 13 16 6335

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,D	WO 99/61742 A1 (CROSSOUT PTY LTD [AU]; SCHUBERT WOLFGANG LUDWIG [AU]; CASSAR FRANCIS L) 2 December 1999 (1999-12-02) * figures 1,4,6,7 * -----	1-10	INV. E04F10/10 ADD. E06B9/06
A	WO 2010/010542 A2 (TURNER RIAN STEWART [ZA]) 28 January 2010 (2010-01-28) * figures 1,3,5 * -----	1-10	

TECHNICAL FIELDS SEARCHED (IPC)
E04F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	9 August 2013	Tänzler, Ansgar

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1

EPO FORM 1503 03.82 (P04C01)

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09-08-2013

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9961742 A1	02-12-1999	NONE	
WO 2010010542 A2	28-01-2010	NONE	

EPO FORM P0459

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

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Patent documents cited in the description

- WO 9961742 A1 **[0006]**