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(71) Applicant: **Flos Bespoke S.r.l.**
25060 Collebeato, Brescia (IT)

(72) Inventor: **GANDINI, Piero**
I-25060 Collebeato, BRESCIA (IT)

(74) Representative: **Gualeni, Nadia**
Jacobacci & Partners S.p.A.
Piazza della Vittoria, 11
25122 Brescia (IT)

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(54) **SHELVING OR ELECTRIFIED DISPLAY**

(57) Shelving (1) comprising a support rail (3) on which a shelf (200) is fixed by means of two connection devices (300). Each connection device (300) comprises

a body (304) in which both mechanical connection means (350), which comprise a button (207), and electrical connection means (370) are housed. [Fig. 3a]

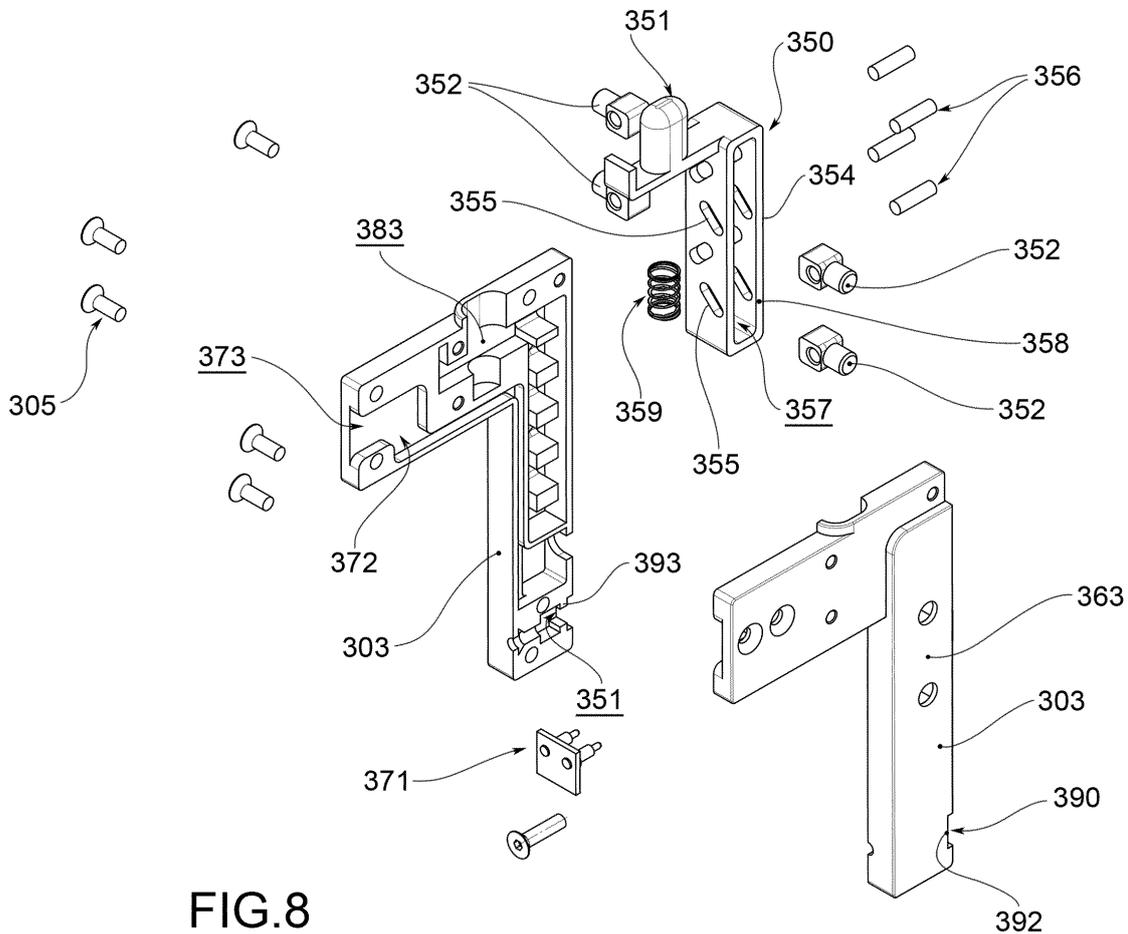


FIG.8

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Description

[0001] The present invention relates to shelving equipped with shelves having an integrated or supported lighting device, and in particular a device for connecting these shelves.

[0002] According to another aspect of the invention, a generic electrified display is provided, which supports a lighting device, for example a spotlight.

[0003] The field of lighting devices is characterized by a strong tendency to develop new products that are technologically and aesthetically innovative.

[0004] In particular, the field of shelving equipped with shelves having light sources, that is provided with LEDs, which are particularly suitable for producing specific architectural and lighting effects, is becoming extremely popular.

[0005] There is a large need in this field to conceal all the electrical connections required for supplying power to the LED modules from the user's view. This need is particularly difficult to meet in shelving because the shelf not only needs to be provided with the suitable electrical connections, but also be to correctly fixed in position to the shelving frame.

[0006] The object of the present invention is to provide shelving that can meet the requirements mentioned above.

[0007] This object is achieved by shelving according to claim 1.

[0008] The features and the advantages of the shelving according to the present invention will become clear from the description given below by way of non-limiting example and in accordance with the attached drawings, in which:

- Fig. 1 shows an embodiment of shelving according to the present invention in a wall-mounted and flush-mounted version;
- Fig. 2 shows an embodiment of shelving according to the present invention in a ceiling-mounted and visible version;
- Fig. 3 shows a module of shelving according to the present invention;
- Fig. 3A shows a detail of Fig. 3, in particular the connection between the shelf and the respective rail;
- Fig. 4 shows an embodiment of a rail of the shelving according to the present invention;
- Fig. 5 shows another embodiment of a rail of the shelving according to the present invention;
- Fig. 6A and 6B are a lateral front view and a lateral rear view, respectively, of a connection device 300 of the shelving according to the present invention;
- Fig. 7 is a sectional view of the connection device 300 as per Fig. 6; and
- Fig. 8 is an exploded view of the connection device 300 as per Fig. 6.

[0009] With reference to the attached drawings, in par-

ticular Fig. 1 and 2, reference numeral 100 represents shelving 100 equipped with shelves 200.

[0010] The shelving 100 comprises at least one support rail 3 on which at least one shelf 200 is fixed by means of at least one connection device 300.

[0011] In the embodiment in Fig. 1, the shelving 100 comprises walls, that is the rails 3 are fixed to a wall. In this example, the shelves 200 are only accessible from the front, the back resting against or facing the supporting wall.

[0012] In the embodiment in Fig. 1, the shelving 100 is also flush-mounted shelving, that is the rails 3 are positioned in suitable openings 4 arranged between adjoining cover panels 1, for example made of plasterboard. The cover panels 1 are provided with a visible surface 2 that constitutes the surface of a ceiling or a side wall of an environment. The opening 4 into which the rail 3 is inserted can also be arranged between a cover panel 1 and an actual wall.

[0013] In the embodiment in Fig. 2, the shelving 100 is stand-up shelving, that is the rails 3 are fixed to the ceiling and/or to the floor. In this example, the shelves 200 are accessible from both sides.

[0014] The shelving 100 can therefore comprise visible rails 3, as in the examples as per Fig. 2 and 3, or hidden rails 3, as in the example as per Fig. 1.

[0015] As shown in Fig. 3, the shelving 100 comprises at least one pair of rails 3 that define a support frame, to which at least one shelf 200 is fixed by means of at least one connection device 300.

[0016] Fig. 4 and 5 show embodiments of the rail 3.

[0017] The rail 3 comprises a support structure 10 that extends in a longitudinal direction X and forms at least one inner compartment 12. In the embodiment in Fig. 1, in which the shelving 100 is flush-mounted, the inner compartment 12 is accessible from the opening 4 made between adjacent cover panels 1.

[0018] The support structure 10 is preferably formed by an extrusion, for example an aluminum extrusion.

[0019] The support structure 10 is preferably in the shape of an upside-down "U," comprising two facing side walls 14 and a bottom wall 18, which joins the two side walls 14 and closes the inner compartment 12 at the top.

[0020] In one embodiment, for example in that in Fig. 5, the support structure 10 forms just one inner compartment 12.

[0021] In another embodiment, for example in that in Fig. 4, the support structure 10 forms two inner compartments 12, which are next to one another in parallel and are separated by a partition 15.

[0022] Preferably, the rail 3 comprises cover elements 16, 17 intended to cover the rail 3, at least in part.

[0023] In one embodiment, for example in that in Fig. 4 in which the rails 3 are hidden, the cover element is a casing 17 that extends in the longitudinal direction X and forms an internal seat 13 that can house the support structure 10. The casing 17 is preferably in the shape of an upside-down "U," comprising two side walls that face

one another and a bottom wall that joins the two side walls and closes the internal seat 13 at the top. The casing 17 preferably also comprises bearing portions 19 that protrude outwards from the side walls, preferably spaced apart from the free end of said side walls, so as to form an abutment for the panel 1 and a cover for the thickness of said panel.

[0024] In another embodiment, for example in that in Fig. 5 in which the rails 3 are visible, the cover element is a plate 16, which extends in the longitudinal direction and can be attached to the side wall 14 of the support structure 10 in an interlocking manner.

[0025] The rail 3 also comprises at least one functional group 40 that can be coupled to the support structure 10 and is completely housed in the inner compartment 12 of said structure 10.

[0026] The functional group 40 comprises a support profile 42, for example an aluminum extrusion, which extends along a longitudinal axis Z with a predefined length, preferably less than the length along the longitudinal axis X of the support structure 10.

[0027] In other words, in a support structure 10 made up of just one element or a plurality of elements aligned along the longitudinal axis X, just one, or a plurality of, support profiles 42 can be inserted so as to be aligned.

[0028] The support profile 42 comprises side walls 44 and a bottom wall 46, which collectively form the shape of an upside-down "U" so as to form an inner compartment 48.

[0029] The support profile 42 preferably comprises grooves 50 on the inside, which are made in the side walls 44 and extend along the longitudinal axis Z.

[0030] Furthermore, the functional group 40 comprises an electrical connection support 80, which is housed in the inner compartment 48 of the support profile 42. The electrical connection support 80 is provided with fixed electrical contacts 82, in the form of rails, which extend along the longitudinal axis Z.

[0031] The connection support 80 preferably comprises a strip 84 of insulating material, for example silicon, provided with an outer surface 86 on which the fixed electrical contacts 82 are formed in the form of rails.

[0032] The connection support 80 also comprises at least one electrical connector 90, which is arranged on the strip 84, for example, on the side that is opposite the outer surface 86.

[0033] Furthermore, the connection support 80 is preferably inserted into the grooves 50 in the side walls 44 of the support profile 42 such that the outer surface 86 of said strip is exposed to the external environment.

[0034] The electrical connector 90 can be connected to a secondary power supply cable for supplying electric current to the fixed electrical contacts 82 in the form of rails present on the electrical connection support 80.

[0035] The functional group 40 preferably also comprises fixed magnetic means, which are housed in the support profile 42, for example, and can interact magnetically. For example, said fixed magnetic means comprise

a foil 70 made of a suitable metal material, which is housed in the inner compartment 48 of the support profile 42, and is in particular inserted into the grooves 50 in said compartment.

[0036] Furthermore, the foil 70 of the fixed magnetic means is preferably provided with a located opening 72, into which the electrical connector 90 of the connection support 80 can be inserted. When the foil 70 is provided, the connection support 80 is preferably inserted into the grooves 50 in the side walls 44 of the support profile 42 such that the strip 84 overlaps the foil 70.

[0037] Fig. 3 shows an example of a shelf 200.

[0038] The shelf 200 comprises a frame 201 made up of a front edge 202 and a rear edge 203 that are connected by side edges 204, within which a ledge 205 is housed.

[0039] The shelf 200 is provided with at least one light source, for example at least one LED module, housed in the frame 201 and/or in the ledge 205, for example, in order to illuminate the shelf 200 at the top and/or the bottom and/or the side.

[0040] The shelf 200 is fixed to the respective rails 3 by means of the frame 201, preferably by means of the front edges 204.

[0041] For example, as shown in Fig. 3, the side edges 204 protrude backwards from the rear edge 203, that is to say that the side edges 204 are provided with attachment ends 206 that protrude backwards with respect to the rear edge 203 of the frame 201.

[0042] The attachment ends 206 of the side edges 204 are intended to be accommodated in the inner compartment 12 of the support profile 10 of the rails 3, above the functional group 40.

[0043] The attachment end 206 of at least one of the side edges 204 is provided with a seat 207, for example a groove or a compartment, which can accommodate a connection device 300.

[0044] With reference to the attached drawings, and in particular Fig. 6 to 8, reference numeral 300 represents a connection device 300 that can form the mechanical and electrical connection between the shelf 200 and the relative support rails 3 in order to form the shelving 100.

[0045] In the shelving 100, the mechanical and electrical connection between the shelf 200 and at least one of the relative support rails 3 is formed by at least one connection device 300.

[0046] The connection device 300 comprises a rail connection portion 301, which is intended to be accommodated in the inner compartment 12 of the support profile 10 of the rails 3, joined to a shelf connection portion 302 that is intended to be accommodated in the seat 207 in the side edges 204 of the frame 201 of the shelf 200.

[0047] The rail connection portion 301 extends along a longitudinal axis K while the shelf connection portion 302 extends along a longitudinal axis Y that is substantially orthogonal to the direction K. The plane defined between the axes K and Y is defined as the plane of the device, and, furthermore, the axis that is orthogonal to

the plane of the device is defined as the orthogonal axis R. During use, that is when the connection device 300 is inserted into the rail 3, the longitudinal axis K is substantially parallel to the longitudinal axis X of the rail 3.

[0048] The connection device 300 comprises a body 304 preferably made up of two half-shells 303 joined to one another by fixing means 305 (for example screws 305). The body 304 defines a plurality of compartments in its interior, in which mechanical connection means 350 and electrical connection means 370, as well as possible stabilization means 390, are housed, at least in part.

[0049] The electrical connection means 370 comprise an electrical socket 371 that is connected to a power supply cable (not shown) intended to supply electric current to the light source of the shelf 200.

[0050] In particular, the electrical socket 371 is arranged in the rail connection portion 301 that is intended to be inserted into the inner compartment 12 of the support profile 10 of the rails 3, above the electrical connection support 80 that is provided with fixed electrical contacts 82. Therefore, during use, that is when the connection device 300 is inserted into the rail 3, the electrical socket 371 is connected to the fixed electrical contacts 82 of the functional group 40. Preferably, the electrical socket 371 is arranged in the plane of the device.

[0051] An electric cable (not shown) extends from the electrical socket 371, which cable is received in an insulated compartment 372 arranged inside the body 304 and leaves via a suitable slot 373 provided in the shelf connection portion 302. Preferably, the slot 373 is arranged in the plane of the device.

[0052] The mechanical connecting means 350 are intended to mechanically connect the shelf 200 to the relative rail 3.

[0053] The mechanical connecting means 350 comprise a button 351 for moving movable elements 352 by means of a cam system 353. Said movable elements 352 can move in a direction R that is orthogonal to the plane of the device. The movable elements 352 are intended to be inserted in suitable fixing seats 37 arranged in the rail 3, and in particular along the side walls 14 of the support structure 10.

[0054] The button 351 is positioned in the shelf connection portion 302 and the movable elements 352 are arranged in the rail connection portion 301.

[0055] The button 351 preferably protrudes from a top face 361 of the shelf connection portion 302. In a different embodiment, the button 351 protrudes from a bottom face 362 of the shelf connection portion 302.

[0056] The movable elements 352 preferably protrude from a lateral face 363 of the rail connection portion 301. Preferably, the rail connection portion 301 is provided with at least one movable pin 353 that protrudes from each lateral face 363. Even more preferably, the rail connection portion 301 is provided with at least one pair of movable elements 352 on each lateral face 363.

[0057] The connection device 300 comprises a rail connection portion 301 that is intended to be received in

the inner compartment 12 of the support profile 10 of the rails 3 and is joined to a shelf connection portion 302 that is intended to be received in the seat 207 of the side edges 204 of the frame 201 of the shelf 200.

[0058] In particular, the cam system 353 comprises a main body 354 (that extends along the axis K), comprising facing walls 358 that define a compartment 357 therebetween that can house the movable elements 352. The walls 358 are also provided with slits 355, each of which guides in movement, in the plane defined between the axes K and R, a cam 356 that is inserted in said slit. A movable pin 352 is passed through each cam 356. Therefore, each movable pin 352 is fitted on, and guided in motion by, a relative cam 356 inserted in and guided in motion by a relative slit 355. Each movable pin 352 can move in the orthogonal direction R.

[0059] The main body 354 of the cam system 353 and the button 351 are connected, preferably made in one piece.

[0060] The button 351 is also provided with return means 359, for example a spring.

[0061] During use, the pressure exerted by the operator on the button 351 causes the movement of the main body 354 along the longitudinal axis K, which drags the cams 356 along with it that, when each cam is guided by the relative slit 355, each move a relative movable pin 352 in the orthogonal direction R.

[0062] In particular, in the rest state, that is when no pressure is exerted on the button 351, the movable elements 352 are in an advanced state, that is they leave the body 304, at least in part, in the orthogonal direction R (as shown in Fig. 6A).

[0063] The pressure exerted by the operator on the button 351 causes the movable elements 352 to retract in the orthogonal direction R until they reach a retracted state, in which they are completely received in the body 304.

[0064] When the operator releases the button 351, the return means 359 cause the main body 354 to move in the opposite direction along the longitudinal axis K and, with that, the movable elements 352 to advance in the orthogonal direction R until they have returned to the advanced state (shown in Fig. 6A).

[0065] As shown in Fig. 7, the mechanical connecting means 350, and in particular the cam system 353, are received in a compartment 383 provided inside the body 304.

[0066] The connection device 300 also comprises stabilization means 390.

[0067] The stabilization means 390 preferably comprise a cavity 391 that is accessible via an opening 392 made in the rail connection portion 301. The opening 392 is preferably made in a rear face 364 of the rail connection portion 301.

[0068] The cavity 391 is preferably provided with at least one abutment means 393 on the inside, in the form of a protrusion, for example, with which a relative stabilization bar 77 engages that protrudes into the inner com-

partment 12 of the support profile 10 of the rail 3.

[0069] When inserting the connection device 300 into the inner compartment 12, once the stabilization bar 77 has engaged therein, the cavity 391 acts as a pin for the rotation of the connection device 300 towards the inside of the rail 3. The connection device 300 is advantageously guided in a simple manner into the correct position inside the inner compartment 12, that is such that the movable elements 352 are correctly aligned with the relative fixing seats 37.

[0070] Taking as reference the longitudinal axis X, the electrical socket 371 is preferably arranged between the cavity 391 and the movable elements 352. Advantageously therefore, once the connection device 300 has been inserted into the inner compartment 12 (that is to say that the stabilization bar 77 has engaged in the cavity 391 and the movable elements 352 have been inserted into the relative fixing seats 37), the electrical socket 371 is pushed against the fixed electrical contacts 82 of the functional group under pressure, ensuring a stable and safe electrical connection.

[0071] In order to install the shelving 100, the support structure 10 is mounted to a side wall or a ceiling of an environment so as to allow access to the inner compartment 12.

[0072] The functional group 40 is then inserted into the support structure 10, thus connecting thereto, for example so as to be flush therewith.

[0073] In a support structure or in a sequence of support structures mounted so as to be aligned with one another, it is possible to insert just one, or a plurality of, functional groups 40 into predefined portions of said support structure.

[0074] The connection devices 300, at least one for each shelf 200, are then inserted into the support structure 10 and mechanically connected to the support structure 10 by inserting the movable elements 352 into the relative fixing seats 37, and electrically connected to the functional group 40 by means of the contact between the electrical socket 371 and the fixed electrical contacts 82.

[0075] The electrical contact is then established between the light source of the shelf 200 and the electric cable coming out of the slot 373 in the connection device 300.

[0076] Lastly, the shelf is fixed to the connection device 300 by fitting the attachment end 206 of the side edge 204 above the shelf connection portion 302 of the connection device 300 (as in Fig. 3).

[0077] For the sake of clarity, the description given above illustrates one variant of the invention in which the shelf comprises light sources, which function as a lighting device and are integrated in the structure of said shelf. According to one variant of the invention, a lighting device is supported by the shelf and electrically connected as needed.

[0078] According to another aspect of the invention, a generic electrified display is provided that comprises at least one support rail 3 to which at least one lighting de-

vice is fixed, for example a spotlight, by means of at least one connection device 300.

[0079] The rail 3 comprises the support structure 10 that extends in the longitudinal direction X and forms at least one inner compartment 12 that is delimited at the sides by the side walls 14 and at the bottom by the bottom wall 18, in which said inner compartment 12 houses at least one functional group 40 provided with the fixed electrical contacts 82.

[0080] The connection device 300 comprises the body 304, in which both the mechanical connection means 350 that mechanically connect the lighting device and the support structure 10 of the relative rail 3, and the electrical connection means 370 that electrically connect the lighting device and the fixed electrical contacts 82 of the functional group 40 are housed.

[0081] The mechanical connection means 350 of the connection device 300 operate laterally, engaging with the side walls 14, while the electrical connection means operate frontally towards the bottom wall 18 in order to electrically connect the lighting device and the fixed electrical contacts 82 of the functional group 40.

[0082] Innovatively, the shelving provided with shelves having integrated or supported lighting devices according to the present invention is particularly simple to assemble, since the mechanical and electrical connection between the shelf 200 and the relative support rails 3 is simultaneously formed by just one element, that is by the connection device 300.

[0083] The connection device 300 according to the present invention is advantageously simple to form and easy to use, succeeding in simultaneously forming the mechanical and electrical connection between the shelf 200 and the relative support rails 3 of the shelving 100.

Claims

1. Shelving (1) comprising at least one support rail (3) on which at least one shelf (200) is attached through at least one connection device (300), wherein:

- the rail (3) comprises a support structure (10) extending in a longitudinal direction (X), forming at least one inner compartment (12) provided with fixing seats (37) for the connection device (300) and wherein is housed at least one functional group (40) provided with fixed electrical contacts (82) arranged on a visible outer surface (86);

- the shelf (200) comprises a lighting device or supports a lighting device, electrically connected;

- the connection device (300) comprises a body (304) wherein are accommodated both mechanical connection means (350), which mechanically connect the shelf (200) and the support structure (10) of the relative rail (3), and electrical

- connection means (370), which electrically connect the light source of the shelf (200) and the fixed electrical contacts (82) of the functional group (40); **characterized in that** the mechanical connection means (350) of the connection device (300) comprise movable elements (352), intended to be inserted into the fixing seats (37) of the support structure (10), and a button (351) intended to move said movable elements (352) between an advanced configuration, wherein they emerge at least partially from the body (304), and a retracted configuration, wherein they are accommodated inside the body (304).
2. Shelving (1) according to claim 1 wherein the connection device (300) comprises a rail connection portion (301), intended to be accommodated in the inner compartment (12) of the support profile (10), joined to a shelf connection portion (302), intended to be accommodated in a seat (207) provided in the shelf (200), and wherein the button (351) is positioned on the shelf connection portion (302) and the movable elements (352) are arranged on the rail connection portion (301).
 3. Shelving (1) according to claim 1 or 2 wherein the button (351) moves the movable elements (352) by means of a cam system (353) comprising a main body (354) equipped with at least one pair of slits (355) each capable of guiding in motion a respective cam (356) inserted therein, and wherein each movable pin (352) is fitted on and guided in motion by a relative cam (356).
 4. Shelving (1) according to claim 3 wherein the main body (354) of the cam system (353) and the button (351) are made in one piece.
 5. Shelving (1) according to any one of the preceding claims wherein the button (351) is equipped with return means (359) suitable to bring said movable elements (352) from the retracted configuration to the advanced configuration.
 6. Shelving (1) according to any one of the preceding claims wherein the connection device (300) comprises a rail connection portion (301), intended to be accommodated in the inner compartment (12) of the support profile (10), together with a shelf connection portion (302), intended to be accommodated in a seat (207) provided in the shelf (200), and wherein the electrical connection means (370) comprise an electrical socket (371) located on the rail connection portion (301) and connected to an electric cable accessible from outside the connection device (300) through a slot (373) provided in the shelf connection portion (302).
 7. Shelving (1) according to any one of the preceding claims wherein the connection device (300) comprises stabilization means (390) comprising a cavity (391) intended to engage a stabilizing bar (77) arranged protruding inside the inner compartment (12) of the support profile (10) of the rail (3).
 8. Shelving (1) according to claim 7, when dependent on claims 2 and 6, wherein, taking as reference the longitudinal axis (X), the electrical socket (371) is placed between the cavity (391) and the movable elements (352) .
 9. Shelving (1) according to any one of the preceding claims wherein the movable elements (352) are movable along an orthogonal direction (R) relative to the plane of the device.
 10. Shelving (1) according to any one of the preceding claims wherein the shelf (200) comprises a frame (201) provided with at least one attachment end (206) to be accommodated in the inner compartment (12) of the support profile (10) and at least one seat (207) suitable to accommodate at least partially the connection device (300) .
 11. Electrified display comprising at least one support rail (3) on which at least one lighting device is fixed through at least one connection device (300), wherein:
 - the rail (3) comprises a support structure (10) extending along a longitudinal direction (X), forming at least one inner compartment (12) delimited laterally by side walls (14) and on the bottom by a bottom wall (18), wherein in said inner compartment (12) there being housed at least one functional group (40) provided with fixed electrical contacts (82);
 - the connection device (300) comprises a body (304) wherein are accommodated both mechanical connection means (350), which mechanically connect the lighting device and the support structure (10) of the relative rail (3), and electrical connection means (370), which electrically connect the lighting device and the fixed electrical contacts (82) of the functional group (40);**characterized in that** the mechanical connection means (350) of the connection device (300) operate laterally, engaging with the side walls (14), while the electrical connection means operate frontally towards the bottom wall (18) to electrically connect the lighting device and the fixed electrical contacts (82) of the functional group (40) .

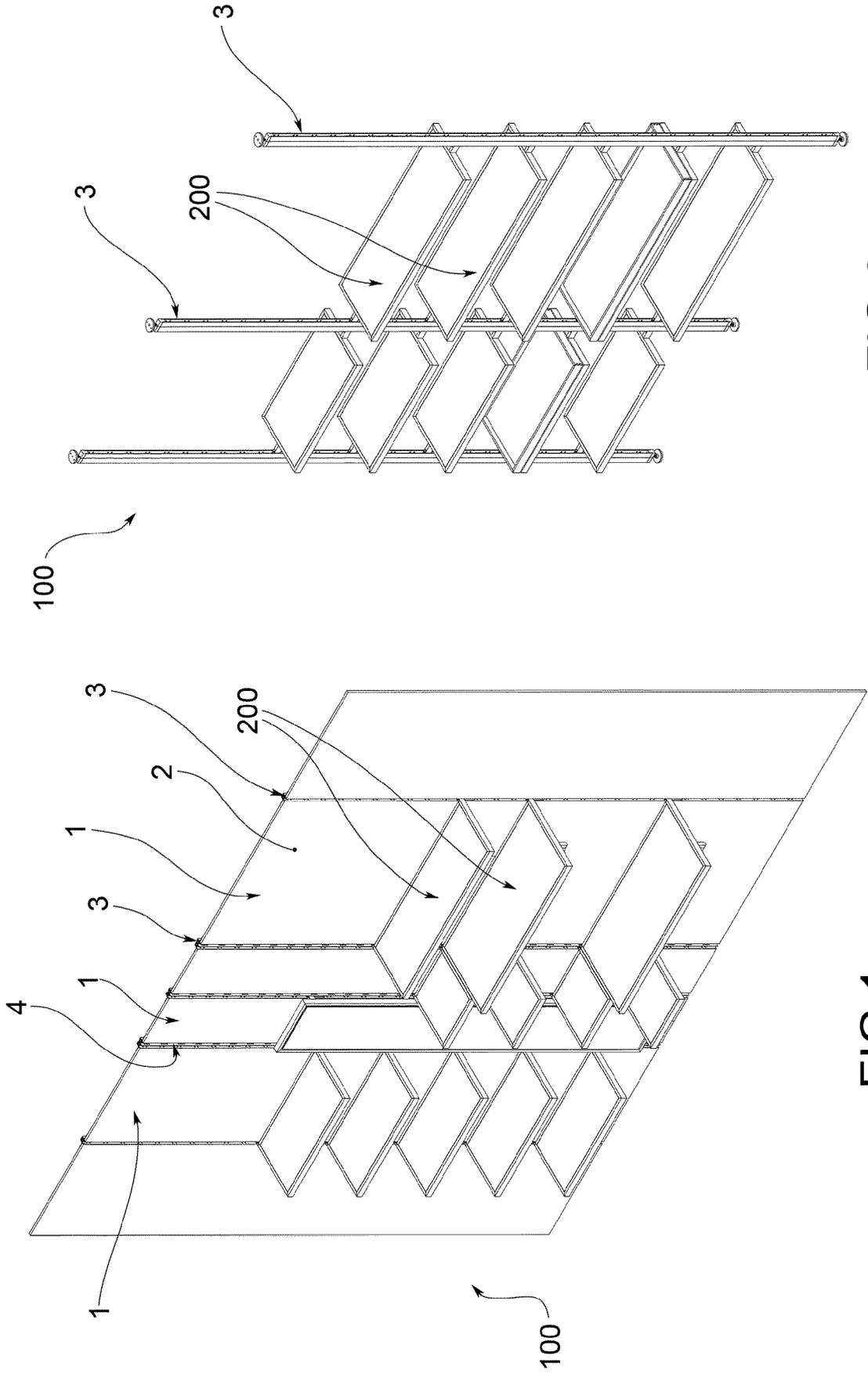


FIG.2

FIG.1

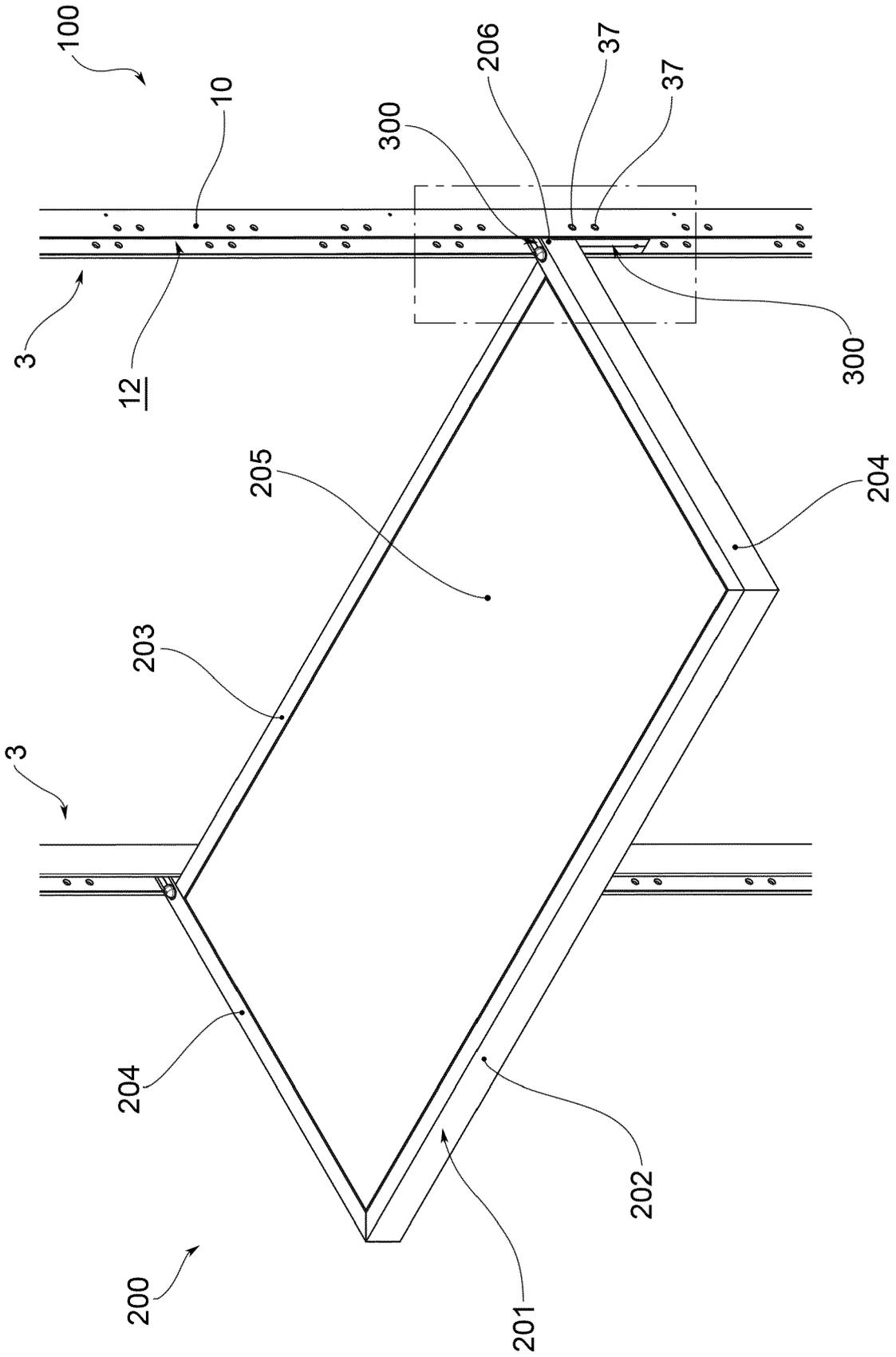


FIG.3

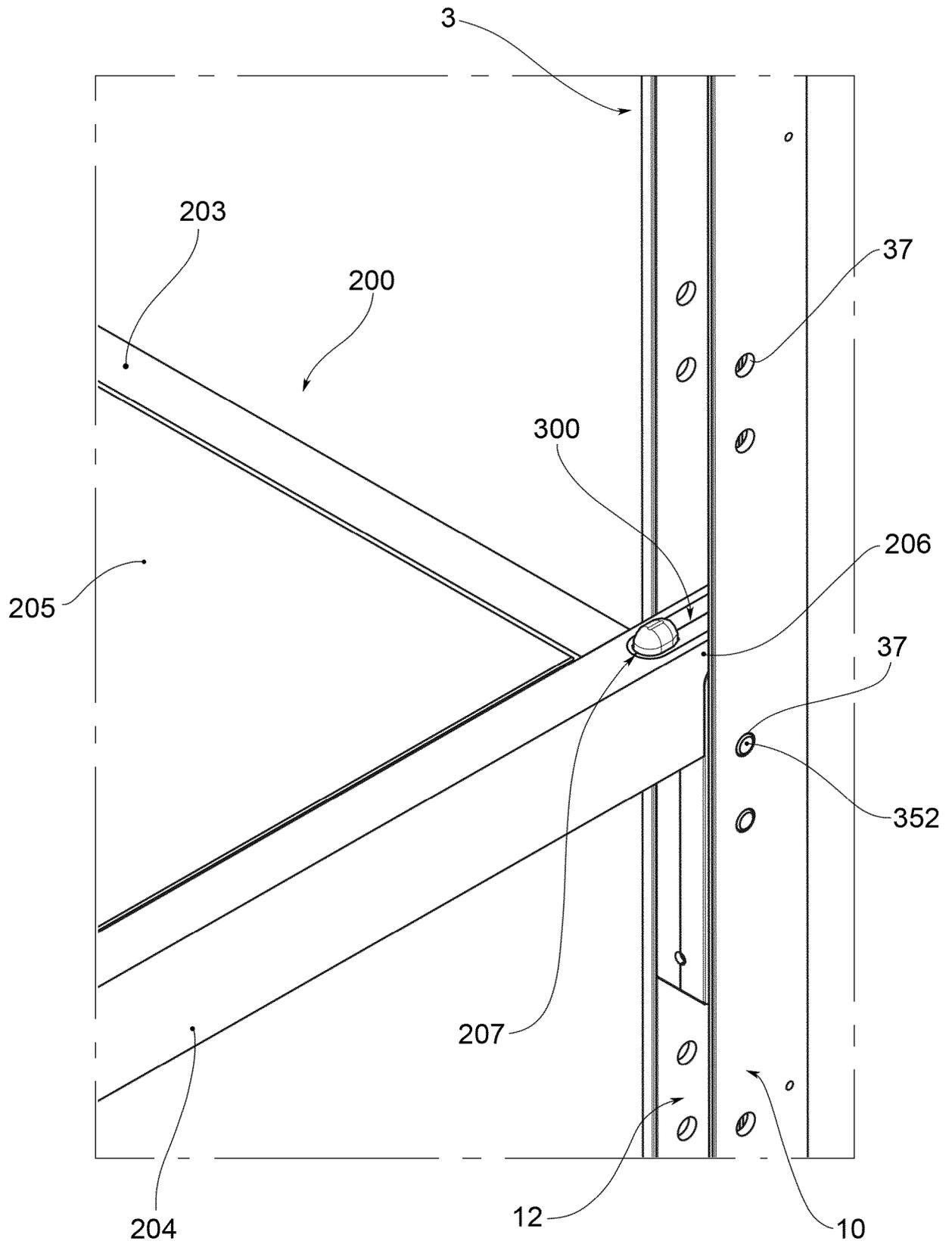


FIG.3a

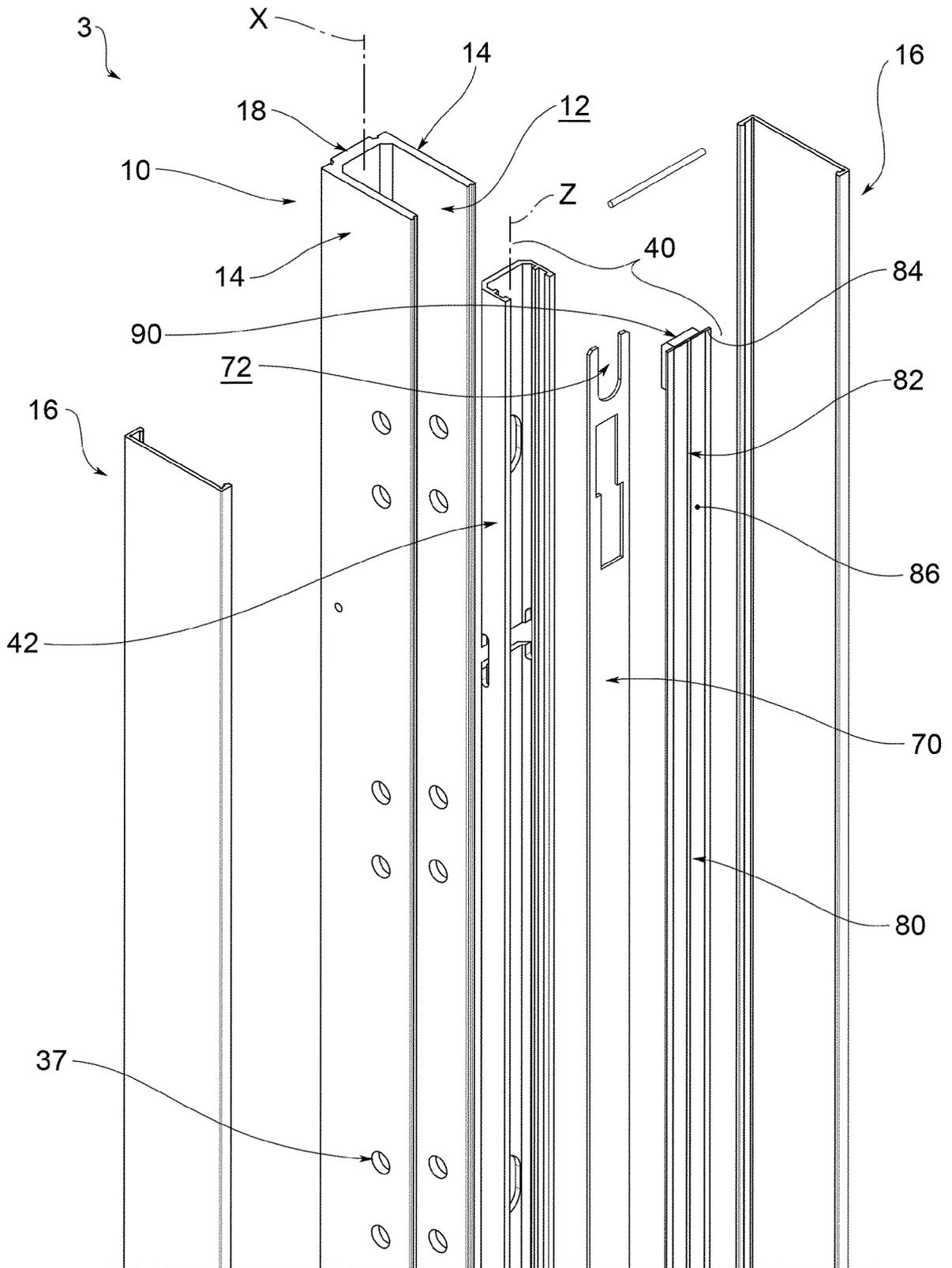


FIG.5

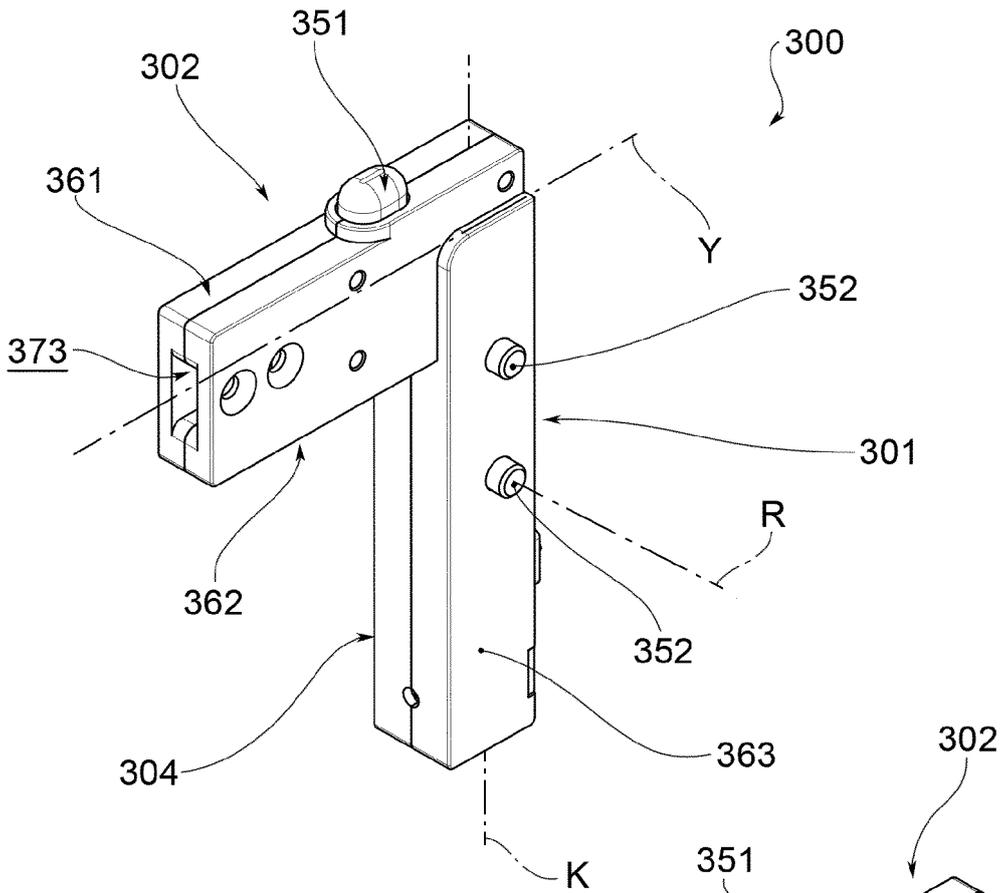


FIG. 6a

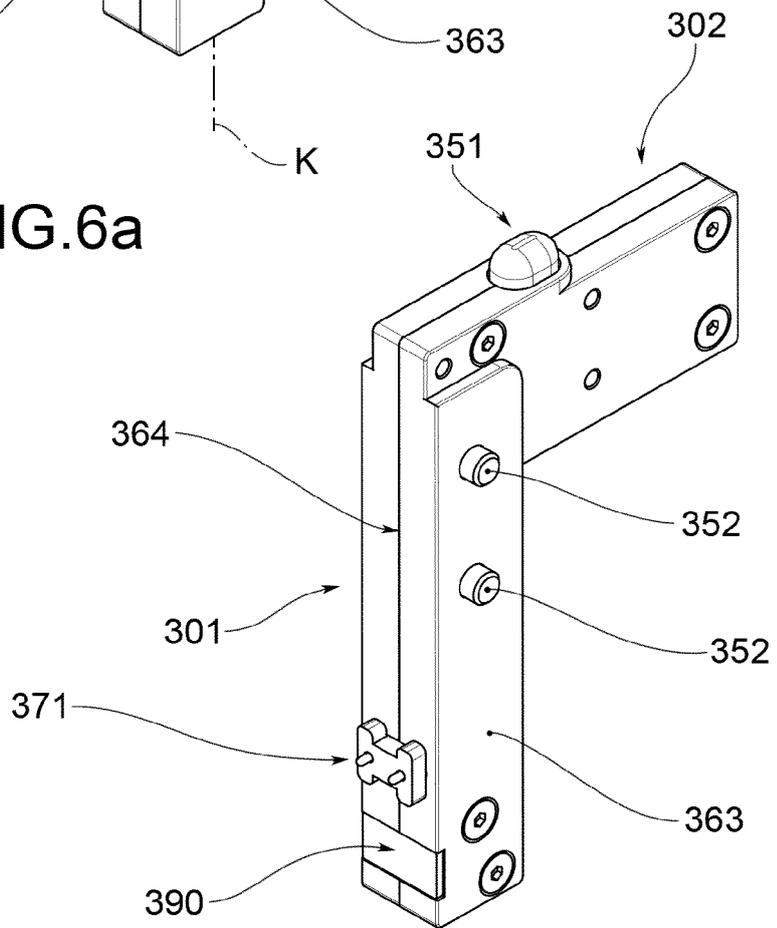


FIG. 6b

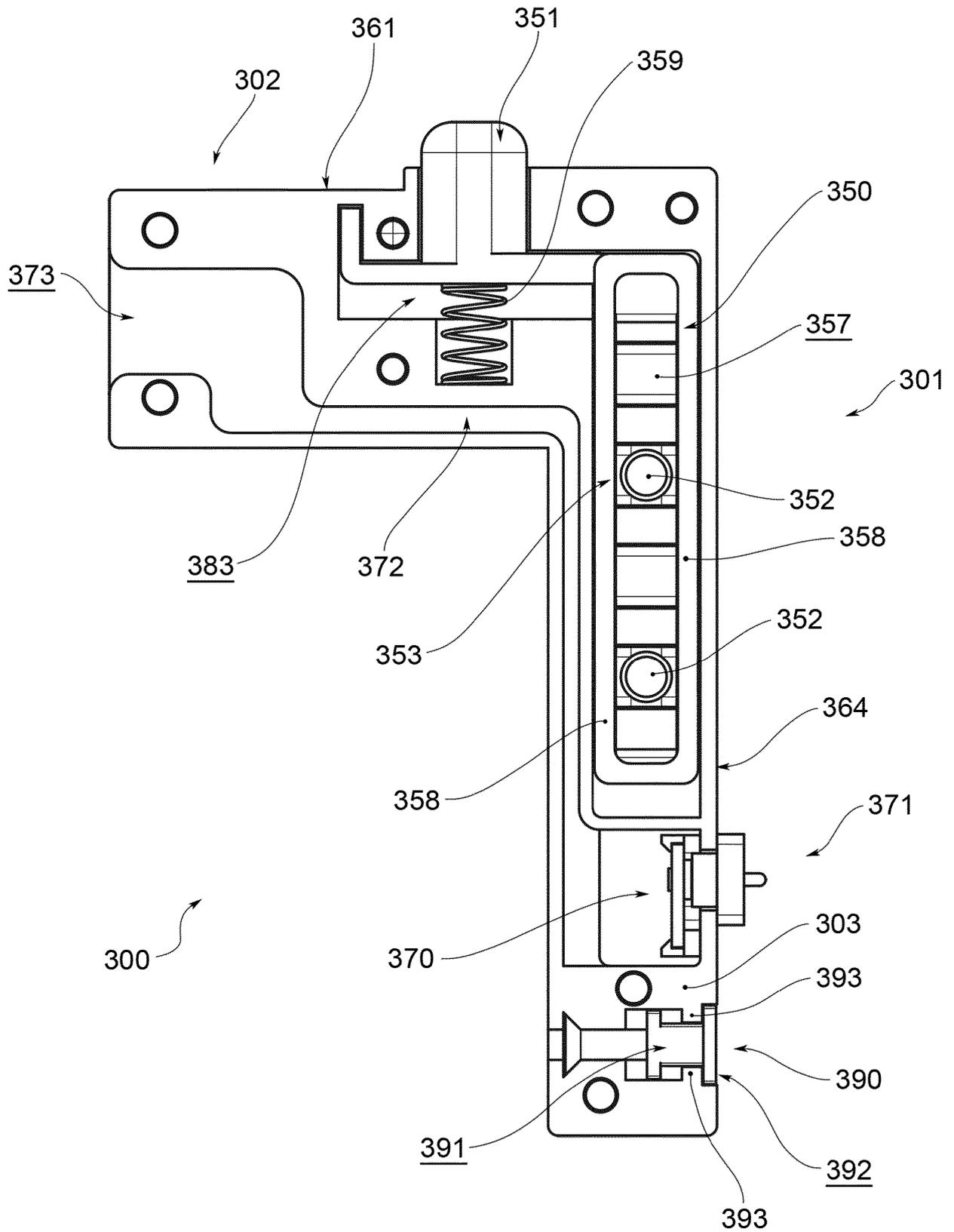


FIG. 7



EUROPEAN SEARCH REPORT

Application Number
EP 20 16 6432

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ANNEX TO THE EUROPEAN SEARCH REPORT
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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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