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(54) **System for supplying and distributing electricity and configured to equip a shelving device**

(57) The invention provides a system for a shelving device, comprising a vertical column (3) having a cavity (15) and openings (16), a support device (24) comprising a body having a main wall (29) disposed against an internal face (30) of said column and on which are mounted a first conductive member (37), and an end wall (31) comprising an inclined portion (32), a connecting device (25) comprising a base (41), a head (42) protruding from said base (41), received in said cavity thanks to an opening and comprising a free end portion (59) cooperating with said end wall, and an actuating device having a second configuration in which a pusher and a rod are in a second position and said rod acts both on a second conductive member (54) and on a locking member (70) of said connecting device for positioning the latter relative to said support device in a predetermined position wherein said second conductive member are constraints on said first conductive member.

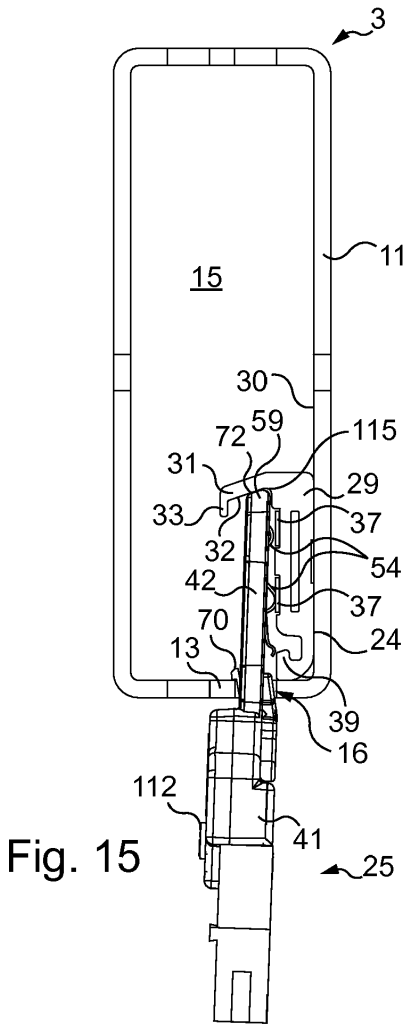

Fig. 15

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Description

FIELD OF THE INVENTION

[0001] The invention relates to systems for supplying and distributing electricity and which equip shelving devices comprising at least one moveable shelf for displaying articles.

[0002] The invention further relates to a shelving device comprising such a system.

BACKGROUND ART

[0003] Shelving devices, also named gondola, are well known and generally comprise a base, two vertical columns which extend from the base, a back panel directly mounted on and between the vertical columns, and a plurality of shelves, also named sales shelves for displaying articles, each mounted on and hung to the vertical columns.

[0004] The shelving device described in the German utility model DE 20 2013 101 760 also comprises a rail mounted inside the vertical column and configured for supplying electricity to the shelving device and a connector mounted onto the vertical column and configured to mechanically and electrically cooperate with the rail in order to distribute the electricity for instance to the shelves.

[0005] In particular, the vertical column has a section of rectangular shaped defining a cavity and comprises two first portions which face each other, two second portions which face each other and which join each the two first portions, and a plurality of openings formed in the two second portions and configured for hanging the shelves to the vertical columns.

[0006] The rail comprises a body made in plastic material and located in the center of the cavity of the vertical column. The body comes into abutment against an internal face of each first portion and is clamped there between. The body comprises a first face and a second face opposite to the first face, and from each of which extend two lateral walls substantially parallel and remote to the first portions. Each couple of lateral walls defines a reception area there between. The rail further comprises a plurality of conductive tracks mounted on each of the lateral walls, on the side of the reception areas and thus not on the side of the internal faces of the respective first portions.

[0007] The connector comprises a base, a connecting head having two conductive pins and extending from the base and a connecting interface also extending from the base at the opposite of the connecting head. The connecting head and the connecting interface are electrically linked together. The base is configured to be partially introduced into an opening of the vertical column such that the connecting head is received in the reception area between two respective lateral walls, the conductive pins of the connecting head being in contact with the respective conductive tracks of the respective lateral walls of the rail. The base comprises a latching member or a guiding member configured to cooperate with the vertical column at the vicinity of the opening in which the head passes through in order to lock and/or to guide the connector relative to the vertical column.

SUMMARY OF THE INVENTION

[0008] The invention is directed to a system for supplying and distributing electricity and which equips a shelving device having a plurality of moveable shelves, the system being particularly simple and convenient to operate and also particularly efficient in term of electrical continuity.

[0009] The invention accordingly provides a system for supplying and distributing electricity and configured to equip a shelving device comprising at least one moveable shelf, said system comprising:

- a vertical column forming by a hollow rectangular tube defining a cavity and in which are formed a plurality of openings configured for hanging said at least one shelf;
- a support device located in said cavity and comprising at least one first electrical conductive member; and
- a connecting device comprising at leats one second electrical conductive member and a locking member and being configured to be partially introduced into one said opening and received in said cavity such that said second electrical conductive member establish an electrical contact with said first electrical conductive member of said support device and said locking member cooperates with said vertical column for fastening said connecting device to said vertical column;

said system being characterized in that:

- said support device comprises a body having a main wall disposed against an internal face of said vertical column and on which are mounted said first electrical conductive member, said body further having an end wall linked to said main wall and comprising an inclined portion which faces said main wall;
- said connecting device comprises a base configured to stay outside of said cavity of said vertical column, a head protruding from said base and configured to be at least partially received in said cavity, said head comprising a free end portion configured to cooperate with said end wall of said support device, and an actuating device comprising a pusher mounted moveable relative to said base and a rod connected to said pusher and which extends both in said base and in said head; said actuating device having a first configuration in which said pusher and said rod are in a first position and a second configuration in which

said pusher and said rod are in a second position and said rod acts both on said second electrical conductive member and on said locking member of said connecting device for positioning the latter relative to said support device in a predetermined position wherein said second electrical conductive member is respectively constraints on said first electrical conductive member.

[0010] Thanks to the invention, the connecting device is partially housed in the support device. When the actuating device is in its second configuration, the rod of the actuating device puts the connecting device in the predetermined position in which the electrical connection is enhanced and the electrical continuity is ensured.

[0011] In such a predetermined position, the configuration of the second electrical conductive member of the connecting device with regard to the first electrical conductive member of the support device is further obtained thanks to the cooperation of the free end portion of the head of the connecting device with the free end portion of the support device, and also thanks to the cooperation between the locking member of the connecting device and the vertical column.

[0012] The system according to the invention thus facilitates the introduction and the locking of the connecting device relative to the support device, because the system has members which allows to repositionning ou correctly positionning the connecting device relative to the support.

[0013] Furhtermore, the support device is invisible from the outside of the vertical column and the connecting device is placed into an opening advantageously in the vicinity of another opening for fastening the shelf. Thus, the openings may be used for hanging a shelf or for the introduction of the conencting device and the system does not need supplemental openings formed in the vertical column.

[0014] The system according to the invention is thus particularly simple and convenient to operate and also particularly efficient in term of electrical continuity.

[0015] According to features preferred as being very simple, convenient and economical for embodying the system according to the invention:

- said support device extends longitudinally and has, in section, a L-shaped, said vertical column comprises a first wall, a second wall opposite to the first wall, a third wall joined both to said first wall and to said second wall, and a fourth wall opposite to said third wall and joined both to said first wall and to said second wall, at least said third wall having a plurality of said openings; and said main wall of said support device is disposed against said first wall and said end wall of said support device is disposed substantially facing one of said opening of said third wall;
- said support device comprises at least a longitudinal groove in which is clamped said first electrical conductive member, the latter being formed by a conductive track, and said second electrical conductive member are formed by a metallic flexible piece having an arcuate free end which is configured to come into contact with said conductive track;
- said connecting device comprises a longitudinal tongue having a free pushing end, said main wall of said support device comprises a support edge opposite to said end wall, and said rod of said actuating device is configured for acting on said longitudinal tongue in said second configuration of said actuating device, said free pushing end abutting against said support edge for positioning said connecting device relative to said support device;
- said longitudinal tongue is fastened to said head of said connecting device, at the vicinity of said free end portion of said head, such that, when said actuating device is in its second configuration, said longitudinal tongue brings said head closer to said main wall of said support device;
- said locking member of said connecting device comprises a latching tab formed in said head and said rod of said actuating device comprises a pushing portion configured to act on said latching tab;
- said pushing portion has an inclined face which is formed by a recess made in said rod, such that said latching tab is progressively move away from a rest position when said actuating device is in its second configuration and said pusher and said rod are displaced from said first position to said second position;
- said pusher and said rod are in an intermediate position during the passage of said actuating device from its first configuration to its second configuration, intermediate position in which said free pushing end of said rod abuts against said support edge of the support device and in which said latching tab is in its rest position;
- said pusher comprises a locking strip and said base comprises a window configured for receiving at least partially said locking strip when said pusher is in its second position in order to maintain said actuating device in its second configuration;
- said actuating device further comprises a spring member acting both on said pusher and on said base, said spring member being configured to return said pusher in its first position and thus said actuating device in its first configuration when said locking strip is released from said window;
- said base comprises a plug having third conductive member electrically linked with said second conductive member;
- the system further comprises a power supply device configured to be mounted on said support device, said power supply device comprising fourth electrical conductive member configured to establish an electrical contact with said first electrical conductive

member of said support device; and/or

- said power supply device has a main body located against said main wall of said support device and a lateral edge protruding from said main body and being housed in a channel formed in said main wall of said support device, at the opposite of said end wall; such that said power supply device is housed in said support device.

[0016] The invention further accordingly provides a shelving device comprising at least one system for supplying and distributing electricity as described above and at least one shelf hung to said vertical column of said system.

[0017] According to features preferred as being very simple, convenient and economical, the shelving device according to the invention comprises a base, two vertical columns extending from said base, a back panel structure extending from said base and disposed between said two vertical columns, a plurality of shelves hung to said two vertical columns and which overhang said base, at least one support device mounted in at least one of said vertical columns, at least one connecting device fastened to said vertical column and located in a predetermined position relative to said at least one support device.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] The description of the invention now continues with a detailed description of a preferred embodiment given hereinafter by way of non-limiting example and with reference to the appended drawings. In these drawings:

- Figure 1 is a perspective and partial view of a shelving device comprising a system for supplying and distributing electricity according to the invention;
- Figure 2 represents partially a first detail of the shelving device illustrated in Figure 1, showing in particular a vertical column partially cut, a support device and a connecting device;
- Figure 3 is a perspective view of the support device and the connecting device illustrated in Figure 2, taken isolated;
- Figure 4 represents partially a second detail of the shelving device illustrated in Figure 1, showing in particular the vertical column partially cut and a supplying device;
- Figures 5 and 6 are perspective views of the support device and the supplying device illustrated in Figure 4, taken isolated;
- Figures 7 and 8 represent the connecting device according to different view angles, in a first configuration and taken isolated;
- Figures 9a and 9b are similar to Figures 7 and 8, the connecting device being in an exploded state;
- Figures 10 and 11 represent the connecting device according to different view angles, in a second configuration and taken isolated;
- Figures 12a and 12b are similar to Figure 10, the connecting device being in an exploded state; and
- Figures 13 to 15 are respectively partial and section views showing the connecting device in different positions relative to the support device.

DETAILED DESCRIPTION OF PREFERED EMBODIMENTS

[0019] Figure 1 shows a shelving device 1, also named gondola, which is used to display articles (not represented).

[0020] The shelving device 1 is configured to be disposed for instance in a supermarket and to receive articles to display for instance for sale.

[0021] The shelving device 1 comprises a base 2, two vertical columns 3 extending from the base 2, a back panel structure 4 also extending from the base 2 and disposed between the two vertical columns 3 and a plurality of shelves 5 (only one is illustrated), also named support for displaying articles, which are hung to the vertical columns 3 thanks to brackets 6.

[0022] The base 2 is made from metal and comprises horizontal stringers (not represented) which form a frame, four side walls whose only two side walls 7 and 8 are visible on Figure 1 and a panel 9 which covers the frame.

[0023] The panel 9 is flat and comprises a ledge 10 extending in front of the side wall 8.

[0024] The base 2 further comprises feet (not represented) whose only two are visible on Figure 1.

[0025] The two vertical columns 3 are made from metal and have each a general shape of a hollow tube having a rectangular section.

[0026] Each vertical column 3 comprises an interior lateral wall 11, also named first wall, an exterior lateral wall 12, also named second wall, opposite to the interior lateral face 11, a front wall 13, also named third wall, and a back wall 14, also named fourth wall, opposite to the front wall 13.

[0027] The front wall 13 and the back wall 14 are each linked both to the interior lateral wall 11 and to the exterior lateral wall 12.

[0028] The walls 11 to 14 define a cavity 15 in each of vertical column 3.

[0029] A plurality of first openings 16 are provided both in the front wall 13 and in the back wall 14 and a plurality of second openings 17 are provided both in the interior lateral wall 11 and in the exterior lateral wall 12.

[0030] Each first opening 16 and each second opening 17 have a rectangular general shape, the second opening 17 being here bigger than the first opening 16.

[0031] The front wall 13 and the back wall 14 comprise here two rows of first openings 16 which are arranged in a vertical superposition from the bottom to the top of the shelving device 1, while the interior lateral wall 11 and the exterior lateral wall 12 comprises only one row of second openings 17 which are also arranged in a vertical

superposition from the bottom to the top of the shelving device 1.

[0032] The back panel structure 4 comprises a plurality of flat metal back panel modules 18 which are arranged in a vertical superposition from the bottom to the top of the shelving device 1 and sandwiched between the two vertical columns 3, and some spacers 19 interposed between two adjacent back panel modules 18. In particular, a spacer 19 is here interposed between each group of three back panel modules 18 vertically superimposed.

[0033] Each back panel module 18 comprises a first lateral end and a second lateral end opposite to the first lateral end, which are each mounted on a respective front wall 13 of a vertical column 3 thanks to hook member 27 (see Figure 2) introduced into the respective first openings 16.

[0034] Each spacer 19 is mounted between the two vertical columns 3 on the same manner that the back panel modules 18.

[0035] The shelf 5 is configured to be hung to the two vertical columns 3 thanks to the brackets 6 which support laterally the shelf 5 and which comprise hook members (not shown) configured to be introduced into respective first openings 16 of the front walls 13 of the vertical columns 3.

[0036] The shelf 5 is further configured to be removable from the vertical columns 3.

[0037] The shelf 5 comprises an upper face 20, a lower face (not shown), two lateral faces 21 (only one is visible) which are opposite to each other and a front face (not shown). The lateral faces 21 and the front face are configured to form a roof-deck for the shelf 5.

[0038] The shelf 5 further comprises a label holder 22 configured for receiving a digital label and/or a lighting system (not shown) formed for instance by an illuminating strip (not shown).

[0039] Such a digital label and/or a lighting system need to be electrically supplied.

[0040] The shelving device 1 thus comprises a system for supplying and distributing electricity which is formed by one or the two vertical columns 3 and which further comprises at least one support device 24 located in the cavity 15 of one of the vertical columns 3 (see Figure 2), at least one power supply device 23 mounted on the support device 24 (see Figure 4), at least one connecting device 25 mounted on the vertical column 3 and connected to the support device 24, and at least one electrical connection cord 26 connected both to the connecting device 25 and to the digital label and/or a lighting system.

[0041] The electrical connection cord 26 is here configured to connected indirectly to the digital label and/or to the lighting system thanks to an electrical module 53 which is configured to be plug in with the digital label and/or with the lighting system.

[0042] The electrical connection cord 26 comprises a male connector (not represented) at a first extremity, a female connector 52 at a second extremity opposite to the first extremity, and a cord interposed between and linking these male/femal connectors.

[0043] The female connector 52 here receives a male part of the electrical module 53, the latter further comprising a printed circuit configured to cooperate with the digital label and/or with the lighting system.

[0044] In reference in particular to Figures 2 and 3, the support device 24, which is made in plastic material, extends longitudinally and has, in section, an L-shaped.

[0045] The support device 24, also named rail, is housed vertically in the cavity 15 of the vertical column 3 and thus extends longitudinally substantially from the bottom to the top of the shelving device 1.

[0046] The rail 24 comprises a body 28 having a main wall 29 configured to be disposed against an internal face 30 of the interior lateral wall 11 of the vertical column 3.

[0047] The body 28 further has an end wall 31 linked to the main wall 29 and comprising an inclined portion 32 which faces the main wall 29.

[0048] The end wall 31 is disposed substantially facing a first opening 16 formed in the front wall 13.

[0049] The body 28 further has a free edge 33 protruding from the end wall 31 and extending substantially parallel to the main wall 29.

[0050] The arrangement of the main wall 29, the end wall 31 and the free edge 33 create a first reception area 34.

[0051] The main wall 29 forms a first arm of the L and the end wall 31 together with the free edge 33 form a second arm of the L, the first arm being longer than the second arm.

[0052] The rail 24 further comprises two independent grooves 35 formed in an internal face 36 of the main wall 29 and two conductive tracks 37, also named first electrical conductive members, which are clamped in the respective grooves 35. The conductive tracks 37 are insulated one from each other and thus may be of distinct polarity.

[0053] The rail 24 further comprises a recess 38 formed next to the grooves 35 in the main wall 29. The recess 38 allows deformation of the main wall 29 in the vicinity of the two conductive tracks 37.

[0054] The rail 24 further comprises a support edge 39 opposite to the end wall 31, protruding from an end of the main wall 29 and which define a channel 40.

[0055] As shown in Figure 2, the rail 24 does not block the second openings 17 formed in the interior lateral wall 11 of the vertical column 3, nor one of the rows of first openings 16 formed in the front wall 13.

[0056] The rail 24 has here an overall size which obstructs substantially quarter (or less) of a volume of the cavity 15 of the vertical column 3.

[0057] Therefore, the vertical column 3 may comprise up to four rail 24 in its cavity 15, correctly arranged inside.

[0058] The connecting device 25 comprises a base 41 configured to stay outside of the cavity 15 of the vertical column 3, and a head 42 protruding from the base 41 and configured to be at least partially received in this cavity 15 by passing through the first opening 16 which

substantially face the end wall 31 of the rail 24 (see in detail below).

[0059] The power supply device 23 is here located at the bottom of the shelving device 1 and housed in the rail 24.

[0060] The power supply device 23 comprises a main body 43 disposed against the internal face 36 of the main wall 29 of the rail 24 and a first lateral edge 44 protruding from the main body 43 and partially introduced into the channel 40 of the rail 24.

[0061] The main body 43 is also received by a second edge 45 opposite to the first lateral edge 44, in the first reception area 34 of the rail 24; the second edge 45 of the main body 43 being disposed against the inclined portion 32 of the end wall 31 of the rail 24 and being maintained in the reception area 34 by the free edge 33 of the rail 24.

[0062] The power supply device 23 further comprises two conductive tongues 46, also named fourth electrical conductive members, which emerge from respective windows 47 provided in the main body 43 and which protrudes from a contact face 48 of the main body 43. Each conductive tongue 46 comes against a respective conductive track 37 of the rail 24 and thus establishes an electrical contact therewith for electrically supplying the two conductive tracks 37.

[0063] The power supply device 23 comprises at least one fastening screw 50 passing through the main body 43 and having an actuating head protruding from an external face 51 of the main body 43, opposite to the contact face 48, and a stem protruding from the contact face 48 and configured to be secured to the rail 24.

[0064] The power supply device 23 further comprises a power cable 49 having electrical wires (not represented) which are electrically linked to the two conductive tongues 46.

[0065] We will now describe in detail the connecting device 24 in particular in reference to Figures 7 to 12.

[0066] In reference to Figures 7 and 8, the connecting device, also named connector 25, further comprises two second electrical conductive members 54 which emerge from a first longitudinal face 55 of the head 42 and which are configured to establish an electrical contact with the two conductive tracks 37 of the rail 24.

[0067] The connector 25 further comprises a locking member 56 emerging from a second longitudinal face 57 of the head 42, opposite to the first longitudinal face 55, and configured to be partially introduced into one first opening 16 and received in the cavity 15 and also configured to cooperate with the vertical column 3 for fastening the connector 25 thereto.

[0068] The head 42 here comprises a free end portion 59, opposite to the base 41, and configured to cooperate with the end wall 29 of the rail 24.

[0069] The base 41 comprises a plug 58 formed by a female connector having two third conductive members 60 electrically linked with the two second electrical conductive members 54 and which is configured to receive the male connector of the electrical connection cord 26 thanks to an aperture 61 provided in the plug 58.

[0070] The connector 25 further comprises an actuating device 62 having a pusher 63 mounted moveable relative to the base 41 and a rod 64 (see Figures 9 and 12) cooperating with the pusher 63 and which extends both in the base 41 and in the head 42.

[0071] The actuating device has a first configuration (Figures 7 to 9) in which the pusher 63 and the rod 64 are in a first position and a second configuration (Figures 10 to 12) in which the pusher 63 and the rod 64 are in a second position.

[0072] In the second configuration, the rod 64 is configured to act both on the two second electrical conductive members 54 and on the locking member 56 for positioning the connector 25 relative to the rail 24 in a predetermined position wherein the two second electrical conductive members 54 are respectively constraints on the two conductive tracks 37.

[0073] In reference to Figures 9a, 9b, 12a and 12b, the connector 25 and in particular the base 41 and the head 42 are partially formed by a first shell 65 and by a second shell 65 which are latched one to each other.

[0074] The first shell 65 (Figures 7, 9a and 12b) comprises a first head wall 67 and a first base wall 68 made in a single piece.

[0075] The first head wall 67 comprises two external and longitudinal grooved edges 69, the free end portion 59 opposite to the first base wall 68 and the locking member 56 which is formed both by an aperture 71 and by a latching tab 70 extending in the aperture 71.

[0076] The free end portion 59 has an external inclined face 72 which is configured to cooperate substantially in a complementary manner with the inclined face 32 of the end wall 29 of the rail 24.

[0077] The latching tab 70 comprises an external detent defining a shoulder configured to cooperate with the vertical column 3, and an internal tooth configured to cooperate with the rod 64.

[0078] The first base wall 68 comprises a hollow 73 for the passage of a screw 74, two latching hooks 75 (see in particular Figure 12b) and a window 76 of substantially cross-shaped.

[0079] The second shell 66 (Figures 8, 9b, 10 and 12a) comprises a second head wall 77 and a second base wall 78 made in a single piece, and also a flange 79 partially covering the second base wall 78 and snap fitted on the second head wal 77.

[0080] The second head wall 77 comprises a plurality of detent members 80 configured to cooperate with the external and longitudinal grooved edges 69 of the first head wall 67, and corresponding windows 81 for the access of the detent members 80 in order to disengage them from the external and longitudinal grooved edges 69.

[0081] In the second head wall 77, two of the windows 81 are further used for the passage of snap member (not represented) of the flange 79.

[0082] The second head wall 77 further comprises two openings 82 through which emerge the two second conductive members 54, one of the openings 82 being formed together with one of the windows 81.

[0083] The second head wall 77 comprises a plurality of pins 83 configured for fastening the two second conductive members 54 in the head 42.

[0084] The second head wall 77 further comprises a longitudinal aperture 87 interrupted by an external bridge portion 86, and an internal bridge portion 84 located between a free end of the second head wall 77 and the external bridge portion 86 and facing a section of the longitudinal aperture 87; a central hollow 85 being provided on the internal bridge portion 84.

[0085] The second base wall 78 comprises a receiving part 89 for the screw 74, a cavity 90 configured to receive the pusher 63, an internal wall 91 delimiting at least partially the cavity 90 and two studs 92 which protrude from the internal wall 91 and which extend in the cavity 90.

[0086] The second base wall 78 further comprises a channel 93 and an exit 94 at an end of the channel 93, the latter forming a path for the two third electrical conductive members 60.

[0087] The second base wall 78 comprises two notches 95 located from either side of the cavity 90 and configured to cooperate with the two latching hooks 75 of the first shell 65.

[0088] The connector 25 comprises an internal space (not represented) in which are housed the actuating device 62, at least partially the two second electrical conductive members 54 and at least partially the two third electrical conductive members 60.

[0089] The connector 25 further comprises an entrance 96 for the reception of the pusher 63 in the cavity 90 provided in the second shell 66.

[0090] The plug 58 is assembled to an upper part of the base 41 of the connector 25, defined by the first and second base walls 68 and 78.

[0091] The plug 58 is located in front of the exit 94, the aperture 61 of the plug 58 being opposite to this exit 94. An aperture (not represented) is formed on the back of the plug 58 for the routing of the two third electrical conductive members 60.

[0092] The two second electrical conductive members are each formed by a metallic flexible piece 54 having an arcuate free end 97 which are configured to come into contact with a respective conductive track 37 of the rail 24.

[0093] Each arcuate free end 97 protrudes from the head 42 by emerging from a corresponding opening 82 provided in the second shell 66.

[0094] Each metallic flexible piece 54 further has a longitudinal strip 98 in which are provided holes 99 and an end portion 101 (Figure 9a), opposite to the respective arcuate free end 97.

[0095] Each end portion 101 has substantially a shape of gutter and is configured to receive a section of a respective third electrical conductive member 60 for establishing an electical connection there between.

[0096] The longitudinal strip 98 of each metallic flexible piece 54 is fastened on the second shell 66 thanks to the pins 83 which pass through the holes 99 and also thanks to a respective bracket 100 (Figures 9b and 12a) which is applied against the longitudinal strip 98 and which is fixed, for instance by crimping, with the pins 83.

[0097] The actuating device 62 further comprises a longitudinal tongue 102 having a protuberance (not shown) at an extremity and a free pushing end 103 opposite to the protuberance.

[0098] The longitudinal tongue 102 extends substantially and partially along the longitudinal aperture 87 of the second shell 66, and is clamped between the internal bridge portion 84 and the external bridge portion 86 of the second shell 66, the protuberance of the longitudinal tongue 102 being inserted in the hole 85 provided in the internal bridge portion 84.

[0099] The longitudinal tongue 102 further comes into abutment against an internal protuberance 104 (see Figure 9a) provided in the first head wall 67 of the first shell 65, for positionning the free pushing end 103 in the longitudinal aperture 87 when the longitudinal tongue 102 is not solicited and thus at rest.

[0100] The pusher 63 and the rod 64 of the actuating device 62 are here two distinct pieces which mecanically cooperate together.

[0101] The pusher 63 is configured to be moved under a solicitation of a user and to cause moving of the rod 64, each from a first position towards a second position.

[0102] The rod 64 comprises a finger 105 at a free end, which protrudes from a first side of the rod 64.

[0103] The finger 105 is configured for acting on the longitudinal tongue 102 in the second configuration of the actuating device 62, the free pushing end 103 of the tongue 102 abutting against the support edge 39 of the rail 24 for positioning the connector 25 relative to said rail 24.

[0104] More generally, the longitudinal tongue 102 being fastened to the head 42, at the vicinity of its free end portion 59, when the actuating device 62 is in its second configuration, the longitudinal tongue 102 brings the head 42 closer to the main wall 29 of the rail 24.

[0105] The rod 64 is configured to slip on the protuberance 104 for displacing the longitudinal tongue 102 and for putting the free pushing end 103 of this tongue 102 out from the longitudinal aperture 87 in order to meet the support edge 39.

[0106] The rod 64 further comprises a pushing portion 106 provided on a second side of the rod 64, opposite to the first side, and configured to act on the latching tab 70 for fastening the connector 25 relative to the front wall 13 of the vertical column 3.

[0107] The pushing portion 106 has an inclined face 107 which is formed by a recess 108 made in the second side of the rod 64, such that the latching tab 70 is progressively move away from a rest position when the actuating device 62 is in its second configuration and when

the pusher 63 and the rod 64 are displaced from the first position to the second position.

[0108] The rod 64 extends through the internal wall 91 of the second base wall 78 of the second shell 66 and is received in an internal space (not represented) of the pusher 63.

[0109] The pusher 63 comprises a hollow body 109 delimiting the internal space and having a rim 110 facing the internal wall 91 and configured to be stopped by a stop edge (not represented) of the base 41 when the pusher 63 is in its second position, and a bearing face 111, opposite to the rim 110, and configured to be solicited by the user for moving the pusher 63.

[0110] The pusher 63 further comprises a locking strip 112 which is configured to be at least partially received in the window 76 provided in the first base wall 68 of the first shell 65, when the pusher 63 is in its second position, in order to maintain the actuating device 62 in its second configuration.

[0111] The locking strip 112 is at least partially flexible and comprises two extensions 113 (only one is visible) which are configured to cooperate with the cross-shaped window 76 for maintaining the pusher 63 in its second position.

[0112] The actuating device 62 further comprises two spring members 114 having each a first end in abutment against the internal wall 91 and a second end, opposite to the first end, received in the internal space of the pusher 63; such that the spring members 114 act both on the pusher 63 and on the base 41.

[0113] The spring members 114 are configured to return the pusher 63 from its second position to its first position and thus the actuating device 62 from its second configuration to its first configuration when the extensions 113 of the locking strip 112 are released from the window 76.

[0114] We will now describe in particular in reference to Figures 13 to 15, the assembling of the connector 25 with the vertical column 3 and with the rail 24.

[0115] Figure 13 represents the connector 25 in a first state relative to the rail 24 and to the vertical column 3, wherein the actuating device 62 is in its first configuration. The pusher 63 and the rod 64 are thus in the respective first position.

[0116] The head 42 of the connector 25 is introduced into the opening 16 which face the end wall 31 of the rail 24, the inclined face 72 of the free end portion 59 of the head 42 being received in the first reception area 34.

[0117] The head 42 is remote to the main wall 29 of the rail 24 and the inclined face 72 of the free end portion 59 of the head 42 comes into abutment against both the inclined portion 32 of the end wall 31 and the free edge 33.

[0118] The arcuate free ends 97 of the metallic flexible pieces 54 are only slightly in contact or are not in contact with the respective conductive tracks 37.

[0119] Both the latching tab 70 and the longitudinal tongue 102 are in a respective rest position, respectively in which the latching tab 70 is located in the first opening 16 and is not snap fitted on the front wall 13 of the vertical column 3, and in which the longitudinal tongue 102 is located in the longitudinal aperture 87 and its free push end 103 is remote to and thus not in contact with the support edge 39 of the rail 24.

[0120] Figure 14 represents the connector 25 in a second state relative to the rail 24 and to the vertical column 3, wherein the actuating device 62 is moved from its first configuration to its second configuration. The pusher 63 and the rod 64 are each in an intermediate position.

[0121] The pusher 63 is moved and causes the displacement of the rod 64.

[0122] The finger 105 acts on the longitudinal tongue 102 and the free pushing end 103 of the tongue 102 abuts against the support edge 39 of the rail 24.

[0123] The head 42 is moved towards the main wall 29 of the rail 24 and the inclined face 72 of the free end portion 59 of the head 42 slips on the inclined portion 32 of the end wall 31. This inclined face 72 is thus moved away from the free edge 33 and moved close to the main wall 29.

[0124] The arcuate free ends 97 of the metallic flexible pieces 54 are in contact with the respective conductive tracks 37.

[0125] The latching tab 70 may be in its rest position or may be slightly moved relative to its rest position, depending of the stroke traveled by both the pusher 63 and the rod 64.

[0126] The latching tab 70 is here located at least partially in the cavity 15 of the rail 24 but is not snap fitted on the front wall 13 of the vertical column 3.

[0127] Figure 15 represents the connector 25 in a third state relative to the rail 24 and to the vertical column 3, wherein the actuating device 62 is in its second configuration. The pusher 63 and the rod 64 are thus in the respective second position.

[0128] The pusher 63 is moved to the stop, wherein the rim 110 comes into abutment against the internal wall 91, and causes the displacement of the rod 64.

[0129] The finger 105 further acts on the longitudinal tongue 102 and the free pushing end 103 of the tongue 102 abuts against the support edge 39 of the rail 24.

[0130] The latching tab 70 is moved away from its rest position and is here located in the cavity 15 of the rail 24 and is now snap fitted on the front wall 13 of the vertical column 3.

[0131] The head 42 is further moved towards the main wall 29 of the rail 24 and the inclined face 72 of the free end portion 59 of the head 42 further slips on the inclined portion 32 of the end wall 31. This inclined face 72 is thus remote to the free edge 33 and comes into abutment against or is at least close to the main wall 29, in particular at the junction 115 of this main wall 29 and of the end wall 31.

[0132] The flexible pieces 54 are at least slightly distorted and the arcuate free ends 97 of these pieces 54 are constraints on the respective conductive tracks 37.

[0133] In variants that are not shown:

- a spacer may be interposed between each group of two or four or more back panel modules which are vertically superimposed;
- the back panel modules and/or the spacer are mounted on the respective interior lateral walls rather than on the front wall, thanks to hook member introduced into the respective second openings;
- the electrical connection cord may be connected directly to the digital label and/or to the lighting system thanks to a corresponding plug provided on the second extremity of the electrical connection cord;
- the flexible metallic pieces may have a straight free ends rather than arcuate free ends;
- the plug is formed by a male connector rather than a female connector; and/or
- there are not two but one or more than two, for instance three of four of the first, second, third and fourth electrical conductive members.

[0134] It should be noted more generally that the invention is not limited to the examples described and represented.

Claims

1. System for supplying and distributing electricity and configured to equip a shelving device (1) comprising at least one moveable shelf (5), said system comprising:

- a vertical column (3) forming by a hollow rectangular tube defining a cavity (15) and in which are formed a plurality of openings (16) configured for hanging said at least one shelf (5);
- a support device (24) located in said cavity (15) and comprising at least one first electrical conductive member (37); and
- a connecting device (25) comprising at least one second electrical conductive member (54) and a locking member (56) and being configured to be partially introduced into one said opening (16) and received in said cavity (15) such that said second electrical conductive member (54) establish an electrical contact with said first electrical conductive member (37) of said support device (24) and said locking member (56) cooperates with said vertical column (3) for fastening said connecting device (25) to said vertical column (3);

said system being **characterized in that**:

- said support device (24) comprises a body (28) having a main wall (29) disposed against an internal face (30) of said vertical column (3) and on which are mounted said first electrical conductive member (37), said body (28) further having an end wall (31) linked to said main wall (29) and comprising an inclined portion (32) which faces said main wall (29);
- said connecting device (25) comprises a base (41) configured to stay outside of said cavity (15) of said vertical column (3), a head (42) protruding from said base (41) and configured to be at least partially received in said cavity (15), said head (42) comprising a free end portion (59) configured to cooperate with said end wall (31) of said support device (24), and an actuating device (62) comprising a pusher (63) mounted moveable relative to said base (41) and a rod (64) conected to said pusher (63) and which extends both in said base (41) and in said head (42); said actuating device (62) having a first configuration in which said pusher (63) and said rod (64) are in a first position and a second configuration in which said pusher (63) and said rod (64) are in a second position and said rod (64) acts both on said second electrical conductive member (54) and on said locking member (56) of said connecting device (25) for positioning the latter relative to said support device (24) in a predetermined position wherein said second electrical conductive member (54) is respectively constraints on said first electrical conductive member (37).

2. System according to claim 1, wherein said support device (24) extends longitudinally and has, in section, a L-shaped, said vertical column (3) comprises a first wall (11), a second wall (12) opposite to said first wall (11), a third wall (13) joined both to said first wall (11) and to said second wall (12), and a fourth wall (14) opposite to the third wall (13) and joined both to said first wall (11) and to said second wall (12), at least said third wall (13) having a plurality of said openings (16); and said main wall (29) of said support device (24) is disposed against said first wall (11) and said end wall (31) of said support device (24) is disposed substantially facing one of said opening (16) of said third wall (13).

3. System according to one of claims 1 and 2, wherein said support device (24) comprises at least a longitudinal groove (35) in which is clamped said first electrical conductive member (37), the latter being formed by a conductive track, and said second electrical conductive member (54) is formed by a metallic flexible piece having an arcuate free end (97) which is configured to come into contact with said conductive track.

4. System according to any one of claims 1 to 3, wherein said connecting device (25) comprises a longitudinal tongue (102) having a free pushing end (103), said main wall (29) of said support device (24) comprises a support edge (39) opposite to said end wall (31), and said rod (64) of said actuating device (62)

is configured for acting on said longitudinal tongue (102) in said second configuration of said actuating device (62), said free pushing end (103) abutting against said support edge (39) for positioning said connecting device (25) relative to said support device (24).

5. System according to claim 4, wherein said longitudinal tongue (102) is fastened to said head (42) of said connecting device (25), at the vicinity of said free end portion (59) of said head (42), such that, when said actuating device (62) is in its second configuration, said longitudinal tongue (102) brings said head (42) closer to said main wall (29) of said support device (24).

6. System according to any one of claims 1 to 5, wherein said locking member of said connecting device (25) comprises a latching tab (70) formed in said head (42) and said rod (64) of said actuating device (62) comprises a pushing portion (106) configured to act on said latching tab (70).

7. System according to claim 6, wherein said pushing portion (106) has an inclined face (107) which is formed by a recess (108) made in said rod (64), such that said latching tab (70) is progressively move away from a rest position when said actuating device (62) is in its second configuration and said pusher (63) and said rod (64) are displaced from said first position to said second position.

8. System according to claims 4 and 7, wherein said pusher (63) and said rod (64) are in an intermediate position during the passage of said actuating device (62) from its first configuration to its second configuration, intermediate position in which said free pushing end (103) of said rod (64) abuts against said support edge (39) of the support device (24) and in which said latching tab (70) is in its rest position.

9. System according to any one of claims 1 to 8, wherein said pusher (63) comprises a locking strip (112) and said base (41) comprises a window (76) configured for receiving at least partially said locking strip (112) when said pusher (63) is in its second position in order to maintain said actuating device (62) in its second configuration.

10. System according to claim 9, wherein said actuating device (62) further comprises a spring member (114) acting both on said pusher (63) and on said base (41), said spring member (114) being configured to return said pusher (63) in its first position and thus said actuating device (62) in its first configuration when said locking strip (112) is released from said window (76).

11. System according to any one of claims 1 to 10, wherein said base (41) comprises a plug (58) having at least a third conductive member (60) electrically linked with said second conductive member (54).

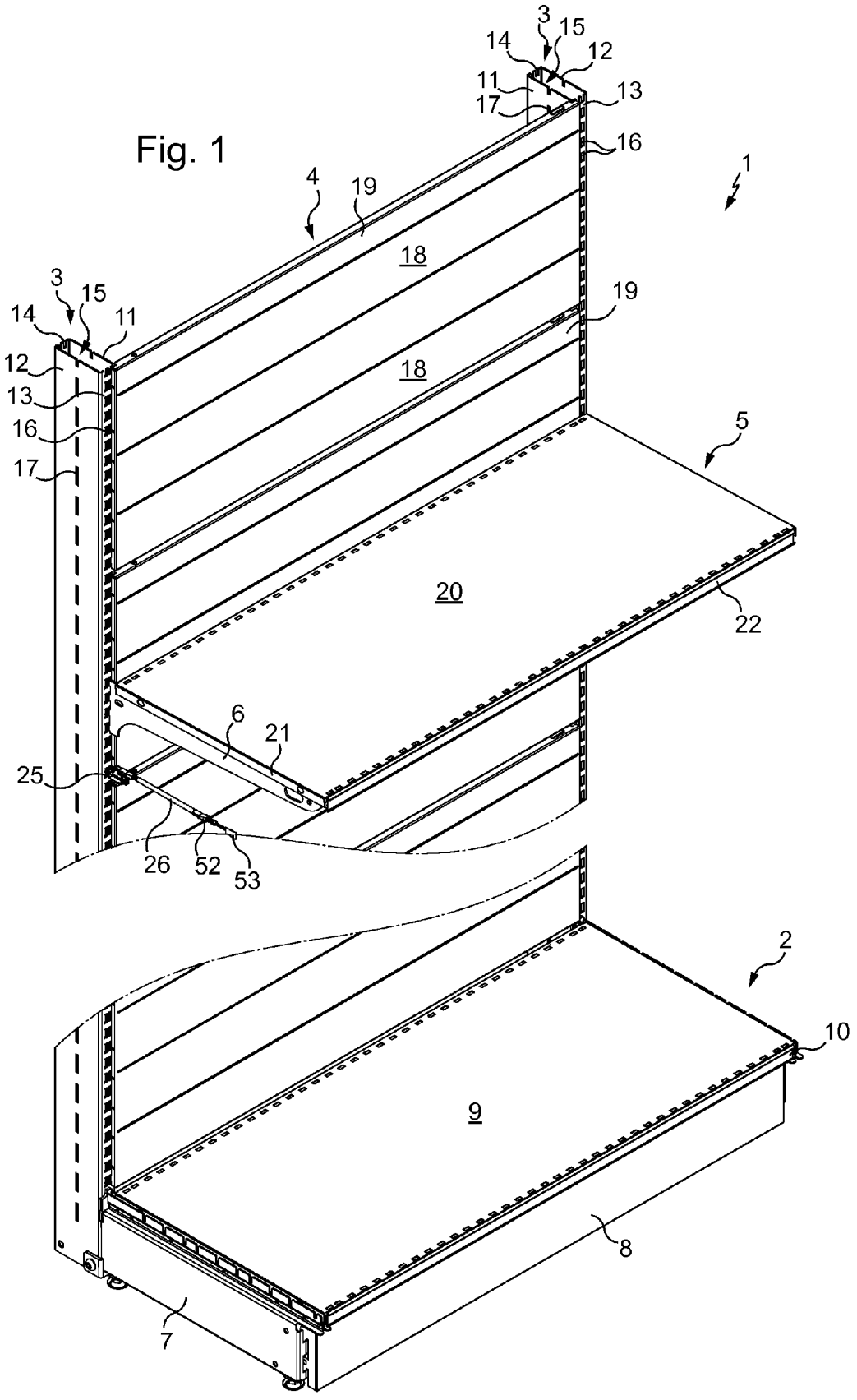
12. System according to any one of claims 1 to 11, further comprising a power supply device (23) configured to be mounted on said support device (24), said power supply device (23) comprising fourth electrical conductive member (46) configured to establish an electrical contact with said first electrical conductive member (37) of said support device (24).

13. System according to claim 12, wherein said power supply device (23) has a main body (43) located against said main wall (29) of said support device (24) and a lateral edge (44) protruding from said main body (43) and being housed in a channel (40) formed in said main wall (29) of said support device (24), at the opposite of said end wall (31).

14. Shelving device for displaying articles, comprising at least one system for supplying and distributing electricity according to any one of claims 1 to 13 and at least one shelf (5) hung to said vertical column (3) of said system.

15. Shelving device according to claim 14, comprising a base (2), two vertical columns (3) extending from said base (2), a back panel structure (4) extending from said base (2) and disposed between said two vertical columns (3), a plurality of shelves (5) hung to said two vertical columns (3) and which overhang said base (2), at least one support device (24) mounted in at least one of said vertical columns (3), at least one connecting device (25) fastened to said vertical column (3) and located in a predetermined position relative to said at least one support device (24).

Fig. 1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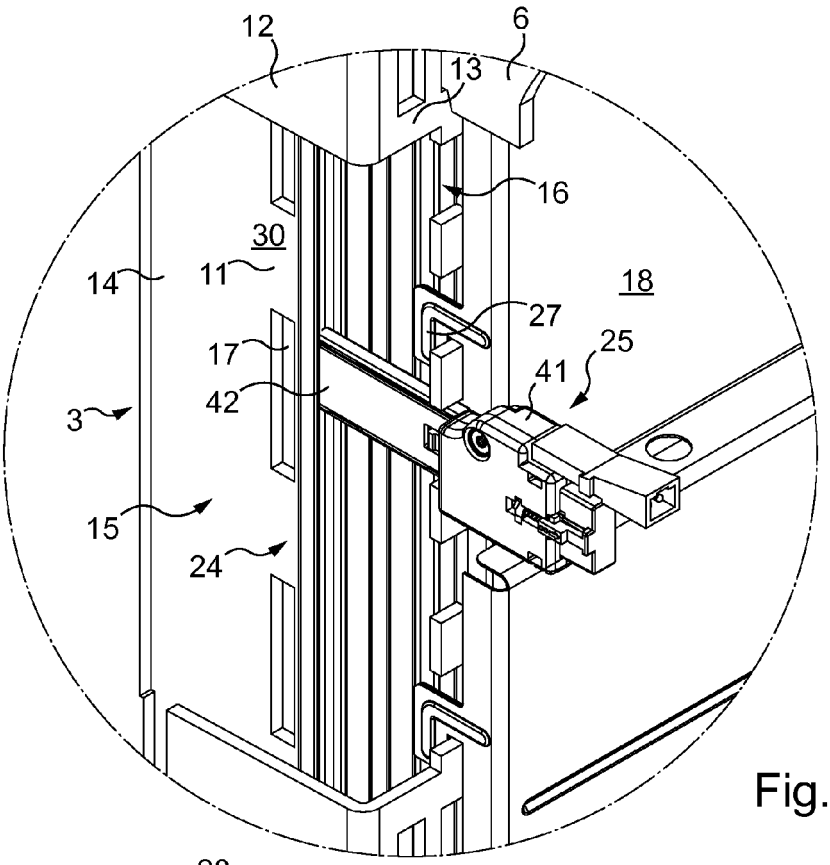
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Fig. 2

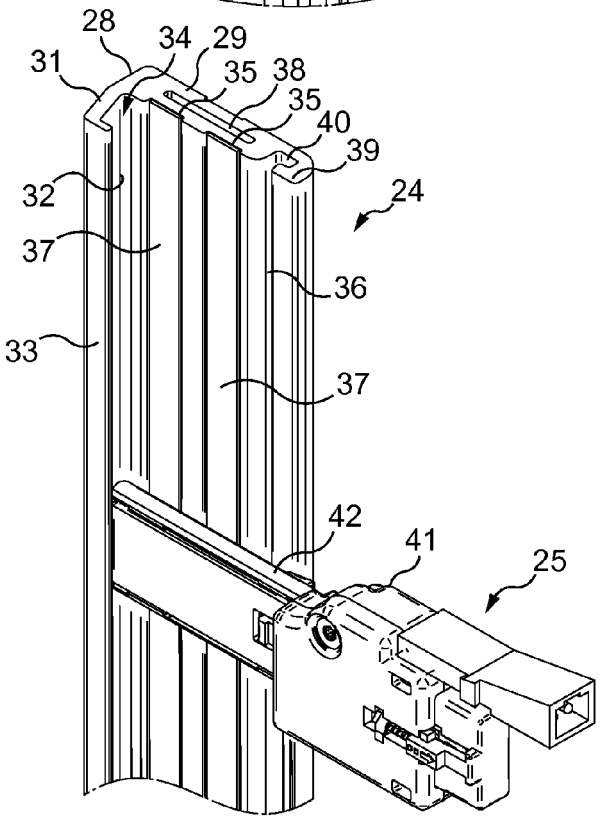
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Fig. 3

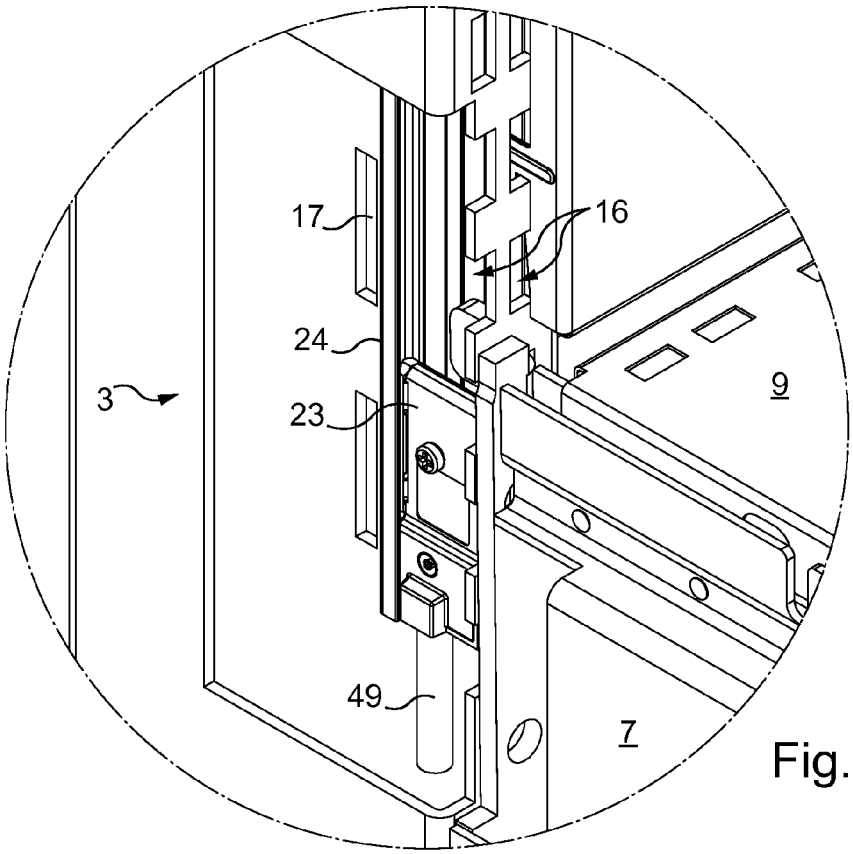


Fig. 4

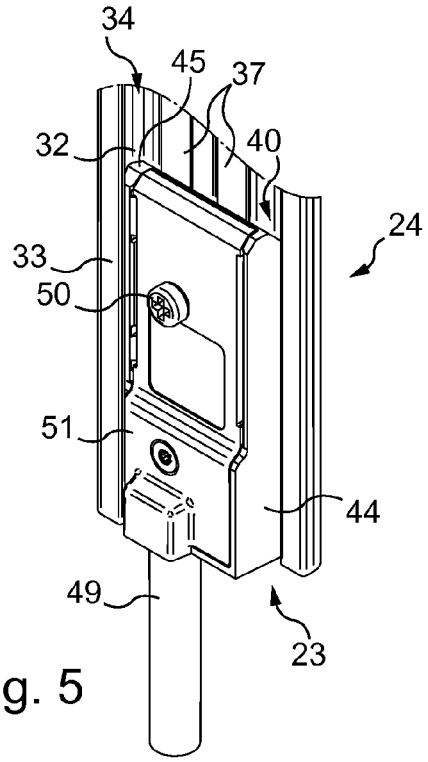


Fig. 5

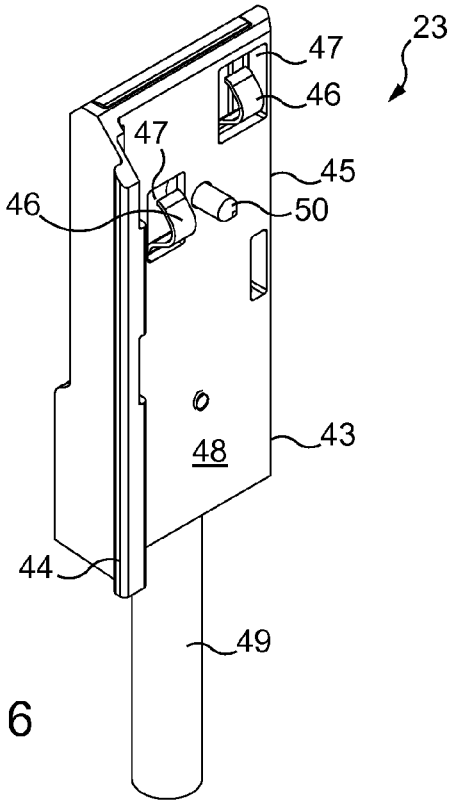
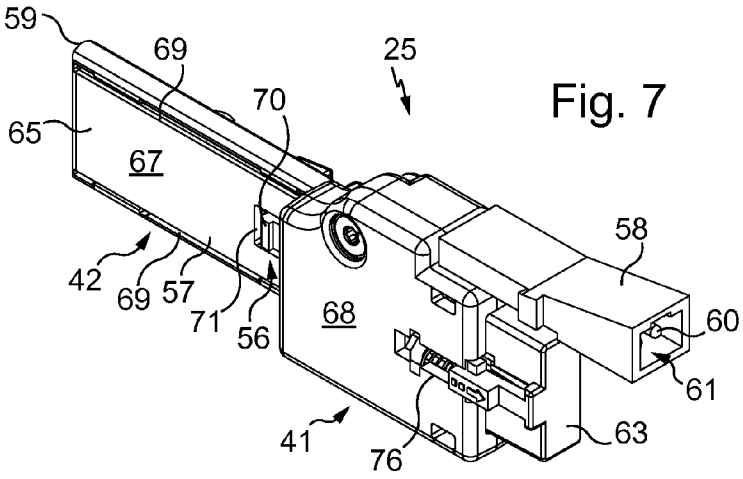


Fig. 6



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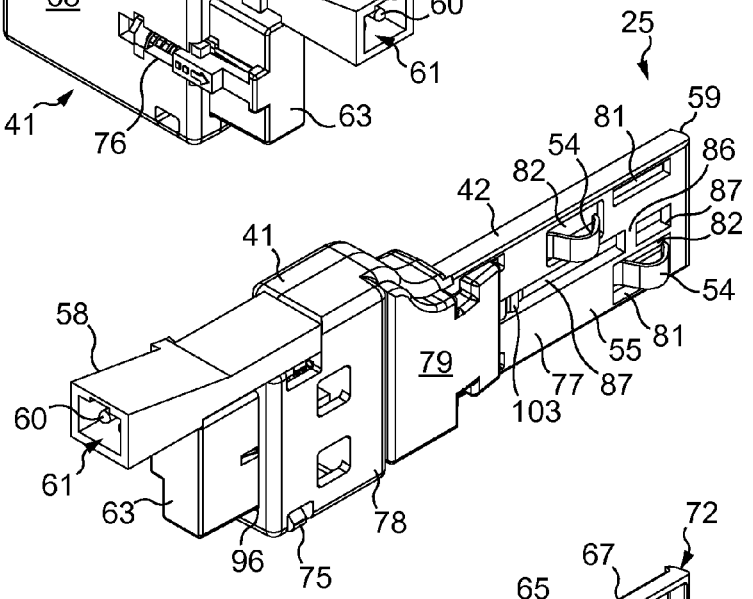


Fig. 8

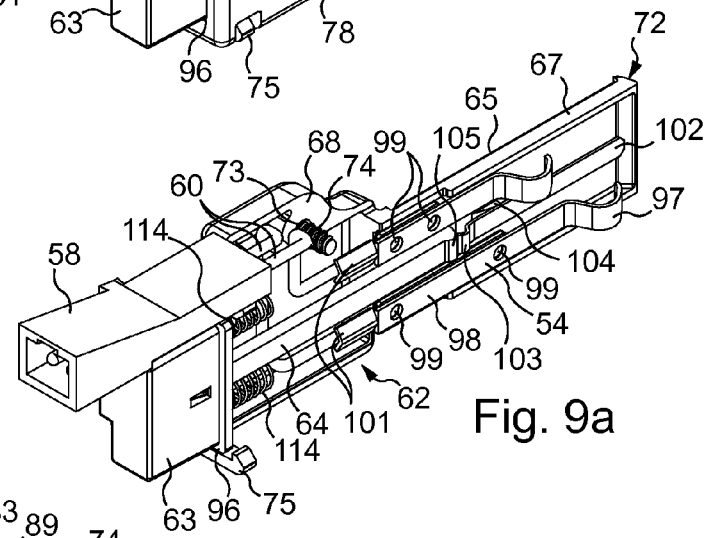


Fig. 9a

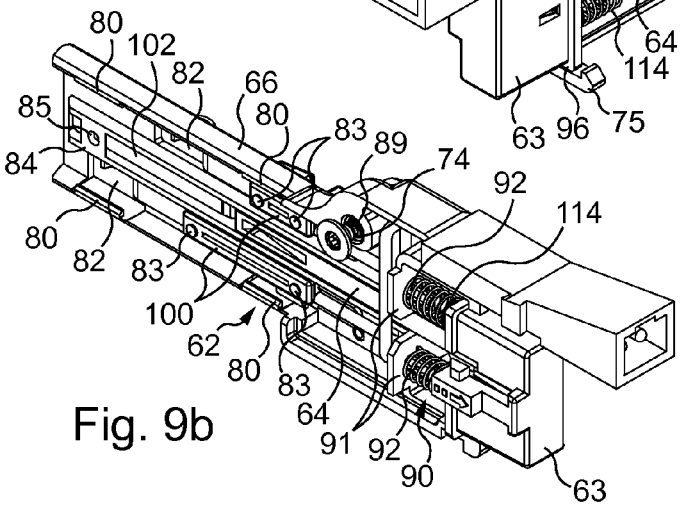
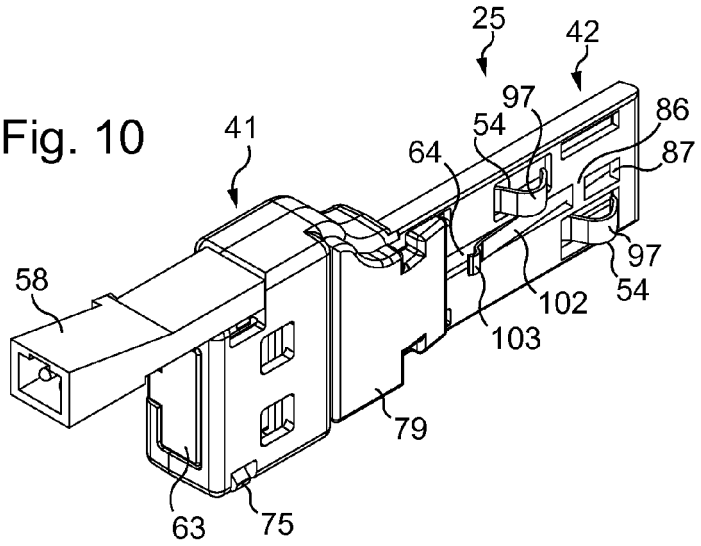


Fig. 9b

Fig. 10



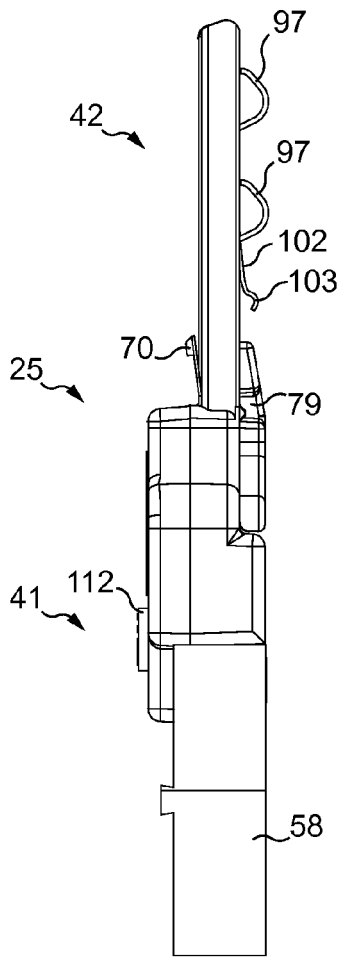
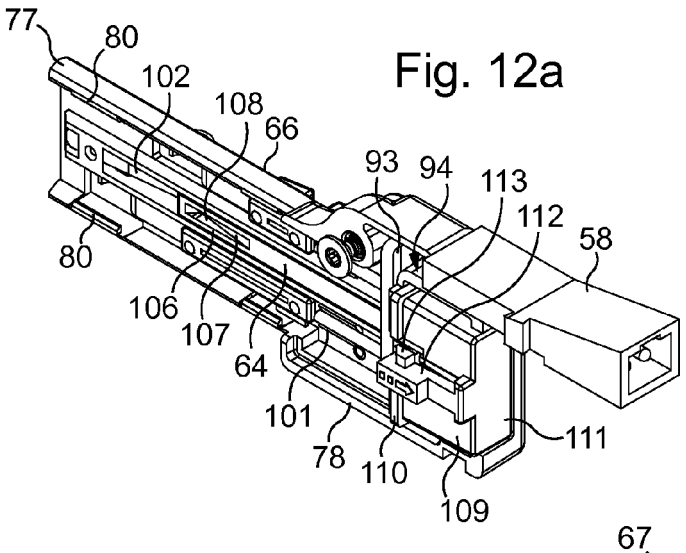


Fig. 11

Fig. 12a



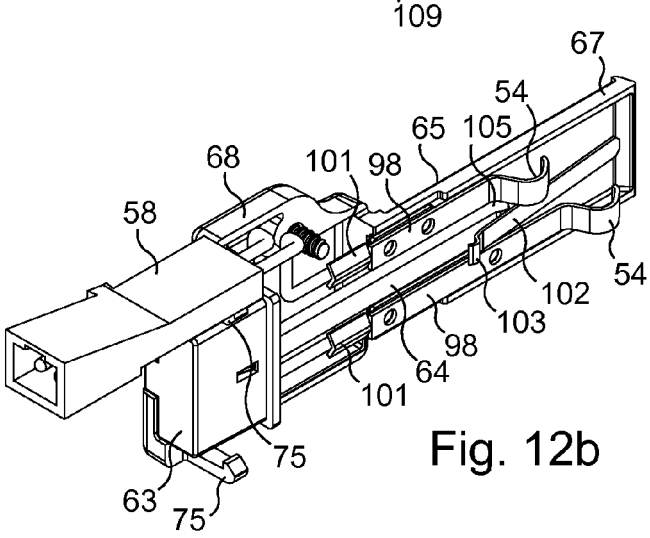


Fig. 12b

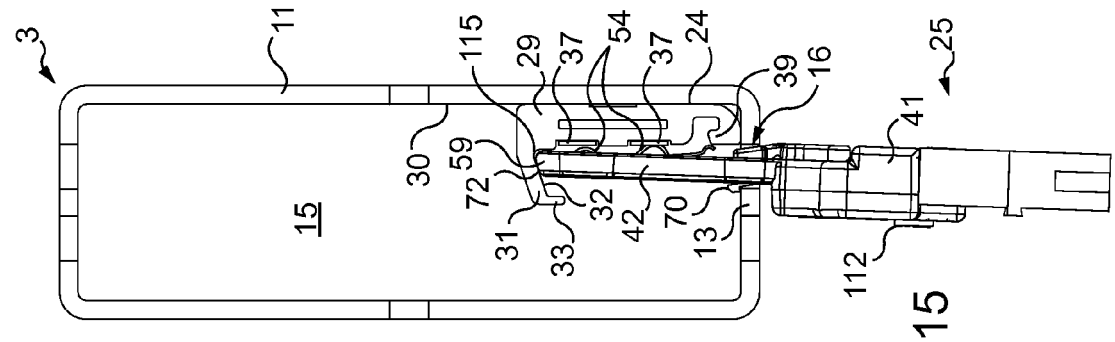


Fig. 15

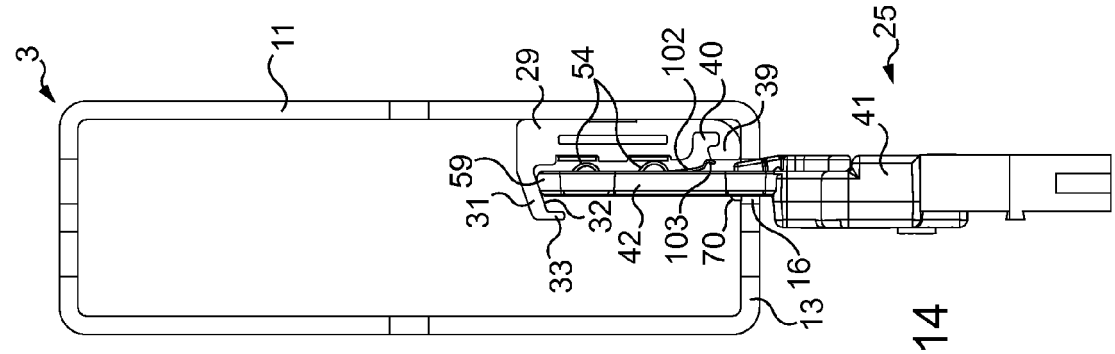


Fig. 14

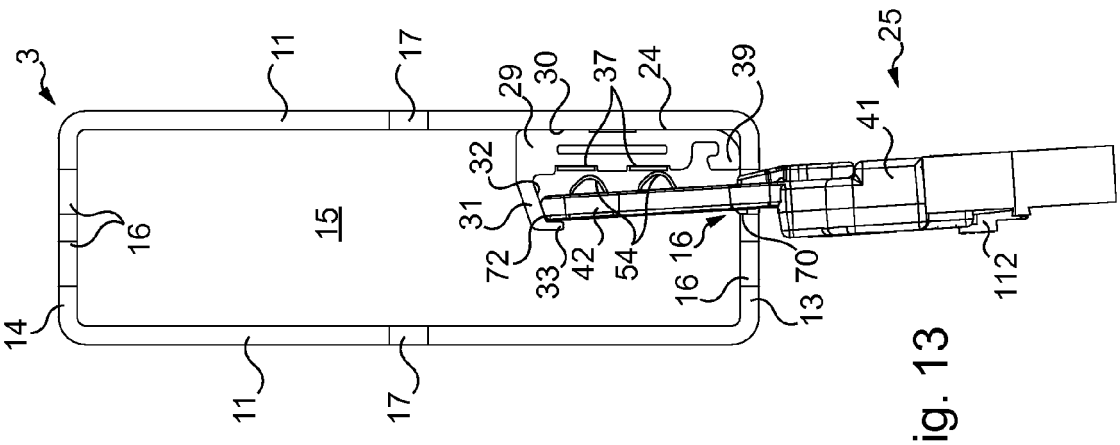


Fig. 13

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EUROPEAN SEARCH REPORT

Application Number
EP 15 30 5285

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X A	EP 0 588 654 A2 (FARHAM HOWDEN WESLEY [ZA]) 23 March 1994 (1994-03-23) * column 5, line 35 - line 46 * * column 6, line 8 - column 7, line 35 * * figures 1,2,4,5,12-18 *	1-6 7	INV. A47F11/10 F21V33/00 F21V21/35 H01R25/16
A	DE 20 2012 008355 U1 (VISPLAY INT AG [CH]) 24 October 2012 (2012-10-24) * paragraph [0064] - paragraph [0067] * * figures 13-16 *	1	ADD. A47F5/10
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TECHNICAL FIELDS SEARCHED (IPC)

A47F
F21V
F21W
H01R

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	30 July 2015	Bitton, Alexandre

CATEGORY OF CITED DOCUMENTS

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