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(54) **Electrical connection unit for motorised systems of shades, roll-up blinds and rolling shutters in general**

(57) The invention refers to an electrical connection unit for motorised systems of shades, roll-up blinds and rolling shutters in general, of the type comprising a geared motor associated with an end-of-travel assembly (9), both housed inside a metal cylindrical case (4) inserted in the take-up roll of a shade or roll-up blind, characterised in that a section (10b) of the cylindrical

support of the end-of-travel assembly (9), which is completely made of metal, interferes with the internal walls of the case (4) in order to create earth continuity for the connector (14) that provides electrical power supply to the geared motor, when the connector (14) is coupled to a socket housed in a suitable niche (12) located in the support of the end-of-travel assembly (9).

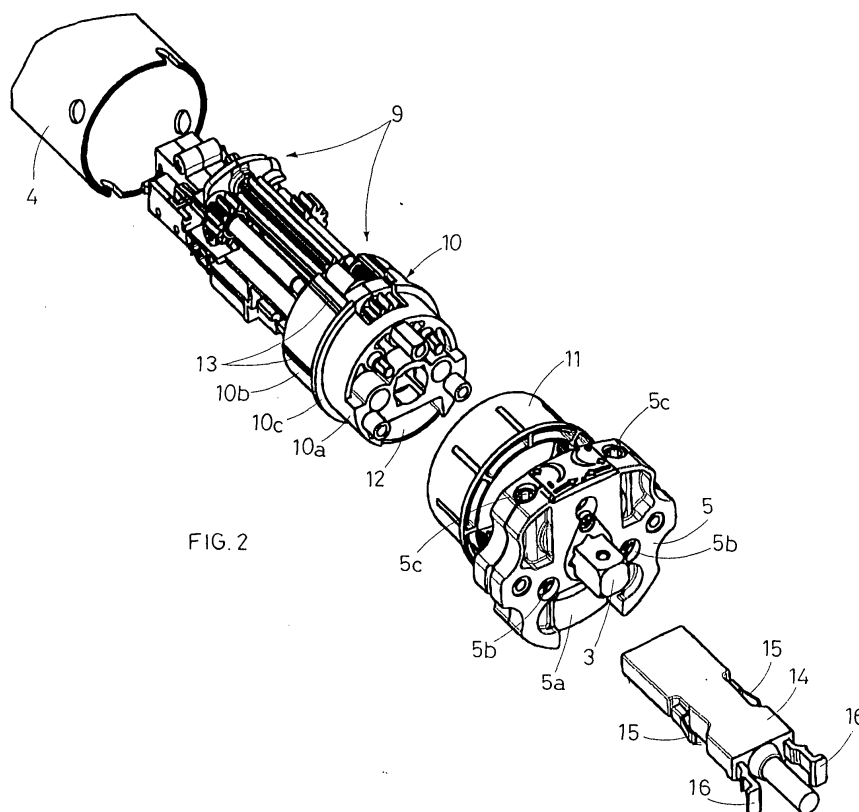


FIG. 2

Description

[0001] The present patent application refers to an electrical connection unit for motorised systems of shades, roll-up blinds and rolling shutters in general

[0002] Shades, roll-up blinds and rolling shutters in general are normally provided with electrical motorised systems used to roll them up or down.

[0003] According to the most common technology, each motorised system is provided with a geared motor housed in a metal cylindrical case inserted in the hollow take-up roll of a shade, roll-up blind and similar item; it being also provided that the geared motor is equipped with an end-of-travel assembly housed inside the same metal case.

[0004] In order to guarantee the stable housing of geared motor and end-of-travel assembly inside the case and in order to support the case, a special plastic moulded plate is permanently fixed to the wall with suitable supports, the most common being a central pin with horizontal axis.

[0005] The central pin is normally one of the two wall fixing points of the take-up roll.

[0006] The shaft of the geared motor axially protrudes from the most internal part of the cylindrical case and is coupled with the central hole of a driving pulley fixed on the inside of the take-up roll.

[0007] The actuation of the geared motor in either direction determines alternate rotations of the take-up roll, which correspond to the rolling up or down of the shade or roll-up blind fixed to it.

[0008] The operation of the geared motor is obviously determined by the presence of electrical power supply.

[0009] Being the geared motor housed inside the metal case, the power supply cables have to pass through the support plate that covers the opening of the case and through the end-of-travel assembly located immediately behind it.

[0010] According to the most common technology, after passing through the aforementioned parts, the ends of the cables are fixed directly to the geared motor; this solution, however, makes the installation of the take-up assembly difficult, because of the dangling cables that interfere with the installer's movements.

[0011] For this reason, the structure of end-of-travel assembly support and take-up roll plate has been recently modified in order to make it compatible with a fast coupling connector mounted at the ends of the cable used for connection to the electrical mains.

[0012] In particular, the support plate has been provided with a hole for the connector, and the support of the end-of-travel assembly has been provided with a socket for the connector; it is worthless saying that the socket is electrically connected with the geared motor so that, once connected, the connector can provide mains power to the geared motor.

[0013] The electrical connection can also be carried out after the installer has completed the assembly of the

take-up device, that is to say when the cables that connect the take-up roll to the electrical mains no longer interfere with the installer's movements.

[0014] In spite of being practical and effective, this technology is however impaired by a significant problem, that is to say the need to make an electric bridge connection between the connector and the cylindrical case that houses the aforementioned components of the motorised systems.

[0015] This requirement, which is established by the current accident-prevention regulations, must be complied with in order to create earth continuity between the connector and the metal structure of the case.

[0016] The solutions that have been proposed so far to guarantee earth continuity between the metal case that houses the automatic take-up roll and the connector for power supply are excessively complicated.

[0017] As a possible solution, a metal insert has been embedded in the plastic structure of the end-of-travel assembly support that houses the socket for connection with the connector.

[0018] The insert has been designed in such a way as to act as conducting bridge between the earth contact of the socket mounted on the end-of-travel assembly support and the metal structure of the cylindrical case.

[0019] As an alternative solution, a long curved metal claw electrically connected with the earth contact of the connector has been incorporated into the connector for mains power supply.

[0020] Once the connector is connected to the socket of the end-of-travel assembly, the ending section of the claw comes into direct contact with the external wall of the metal case, thus creating earth continuity between the two components.

[0021] The precarious nature of the traditional solutions used to provide earth continuity appears evident since both of them require a modification to the structure of traditional parts (in the first case the structure of the plastic support of the end-of-travel assembly, in the second case the structure of the connector) with significant costs and difficulties.

[0022] The solution with the claw protruding from the connector to provide power supply to the motorised system appears especially complicated and delicate.

[0023] The purpose of the present invention is to provide a practical, safe and economic means to create the connection between a power supply connector and the actuation unit of the take-up roll of shades, roll-up blinds and similar items; in particular, this connection can advantageously provide the necessary continuity between the earth contact of the connector and the metal case that usually houses the geared motor with accessories.

[0024] The purpose of the invention has been achieved by providing a completely metal structure of the front support of the end-of-travel assembly housed in the case and coupled with the support plate of the take-up roll.

[0025] In particular, reference is made to the front sup-

port of the end-of-travel assembly that incorporates the socket connected to the connector that provides power supply.

[0026] The support of the end-of-travel assembly has a basically cylindrical shape and is provided with longitudinal ribs on the perimeter. Once the end-of-travel assembly is inserted in the metal cylindrical case, the longitudinal ribs come in contact with the internal walls of the case, thus creating an electric bridge connection between the case and the metal support of the end-of-travel assembly.

[0027] The connector of the present invention has a flat, elongated shape that has been especially designed to reduce volumes; this allows for minimising the dimensions of the socket incorporated on the metal support of the end-of-travel assembly and the dimensions of the through hole on the support plate of the take-up roll.

[0028] Another characteristic of the connector of the invention is represented by the internal presence of a metal sheet connected to the earth wire and provided with two lateral wings that protrude out of the plastic structure of the connector on opposite sides.

[0029] When the connector is engaged in the end-of-travel assembly support, after passing through the opening on the support plate, the female elements (of faston type) of the connector are coupled with the male elements of the socket, and the external wings of the connector interfere with the lateral walls of the niche that houses the socket.

[0030] In view of the metal structure of the niche (and of the metal structure of the front end of the end-of-travel assembly), the interference creates earth continuity between the metal case and the external lateral wings of the connector of the invention.

[0031] For major clarity the description of the invention continues with reference to the enclosed drawings, which are intended for purposes of illustration only and not in a limiting senses, whereby:

- Fig. 1 is a diagrammatic cross-sectioned view of the take-up roll located between the two ending supports, showing the motorised system housed inside it;
- Fig. 2 is an exploded axonometric view, showing the structure of the electrical connection unit of the invention;
- Fig. 3 is an axonometric rear view of the connector of the invention;

[0032] According to the current technique, the take-up roll (1) is supported by two ending pins (2, 3) fixed to the wall, with the possibility of rotating around its longitudinal axes, as shown in Fig. 1.

[0033] As shown in Fig. 1, a metal cylindrical case (4) is inserted in the take-up roll (1) and supported by an ending plate (5) and a pulley (6) joined to the take-up roll and splinted on the shaft (7) of the geared motor (8)

housed in the cylindrical case (4).

[0034] The case (4) also houses the end-of-travel assembly (9) associated with the geared motor (8) in order to interrupt power supply when the shade or roll-up blind fixed to the take-up roll (1) reaches the end of the ascending or descending travel.

[0035] The end-of-travel assembly (9) is provided with a front support (10) on which a driving ring (11) located on the back of the plate (5) is inserted, with possibility of rotation.

[0036] As shown in Fig. 1, the driving ring (11) is externally joined to the take-up roll and internally engaged with the gears (9a) of the end-of-travel assembly (9).

[0037] Fig. 2 shows the metal cylindrical case (4) designed to be axially inserted in the take-up roll (1) of a shade or roll-up blind; the end-of-travel assembly (9) is in turn inserted in the case (4) and provided with a front support (10) with basically cylindrical configuration, characterised in that it is provided with a completely metal structure.

[0038] The front support (10) is provided with two sections (10a, 10b) with different cross-section joined by an intermediate annular step (10c); in particular, the tapered front section (10a) is characterised in that it incorporates frontally the niche (12) that houses a socket, whose elements are electrically connected with the geared motor (8) inserted in the case (4).

[0039] The back section (10b) with higher cross-section is characterised in that it has an external regular series of longitudinal ribs (13) capable of interfering with the internal walls of the cylindrical case (4) and creating an electric bridge connection when the end-of-travel assembly (9) is inserted in the case (4).

[0040] As shown in Fig. 2, the plate (5) is provided with a through opening (5a) exactly in the same position as the niche (12) of the socket incorporated in the support (10) of the end-of-travel assembly (9).

[0041] As shown in Fig. 2, the plate (5) has a rather complicated, yet traditional, structure with holes (5b) for fixing to the support (10) of the end-of-travel assembly (9), the pin with horizontal axis (3) to support the take-up roll to the wall, and housings (5c) to access the adjustment screws used to adjust the mechanisms provided on the end-of-travel assembly (9) to select the correct end point of the geared motor (8) that actuates the take-up roll (1).

[0042] After describing the first component of the electrical connection unit of the invention, that is to say the front support (10) completely made of metal, the description continues with the second component of the electrical connection unit of the invention.

[0043] It is a special connector (14) with flat, elongated shape and rectangular cross-section, which is provided with three female elements (14a) of faston type, designed to be engaged with the corresponding male elements of the socket located on the bottom of the niche (12) incorporated in the support (10) of the end-of-travel assembly (9).

[0044] As mentioned earlier, the connector (14) is characterised by the presence on opposite sides of flexible metal wings (15) that protrude from a metal sheet embedded in the plastic structure of the connector (14) and connected with the earth wire.

[0045] In order to provide electrical power supply to the geared motor (8) housed in the metal case (4), the connector (14) is inserted in the through opening (5a) on the plate (5) and coupled with corresponding elements of the socket housed in the niche (12) of the end-of-travel assembly (9).

[0046] In this same occasion the interference between the lateral metal wings (15) of the connector (14) and the lateral metal walls of the niche (12) housing the socket is produced.

[0047] As mentioned earlier, in this same condition the earth continuity between the cylindrical case (4), the metal support (10) of the end-of-travel assembly (9) and the earth contacts - i.e. the aforementioned external wings (15) - of the connector (14) of the invention is established.

[0048] Finally, it must be noted that the back of the connector (14) incorporates a longitudinal pair of shaped springs (16) that tend to spread apart and are designed to interfere with the lateral walls of the opening (5a) of the plate (5).

[0049] The springs (16) are provided with undercuts that allow for coupling to the lateral walls of the opening (5a) in order to prevent the accidental release of the connector (14) from the socket.

[0050] If necessary, the connector (14) can be released by pressing the springs (16) one against the other in order to uncouple them from the lateral walls of the opening (5a).

Claims

1. Electrical connection unit for motorised systems of shades, roll-up blinds and shutters in general, of the type comprising a geared motor (8) associated with an end-of-travel assembly (9), both housed inside a metal cylindrical case (4) inserted in the take-up roll (1) horizontally supported onto the wall by means of a special plate (5) provided with through opening (5a) in which an electrical connector (14) is inserted and coupled with a corresponding socket housed in a suitable niche (12) located in the cylindrical support (10) of the end-of-travel assembly (9) in order to provide electrical power supply to the geared motor (8) that causes the rotation of the take-up roll (1), **characterised in that:**

- the front support (10) of the end-of-travel assembly (9) has a basically cylindrical structure, which is completely made of metal, provided with a section (10b) capable of interfering with the internal walls of the metal cylindrical case

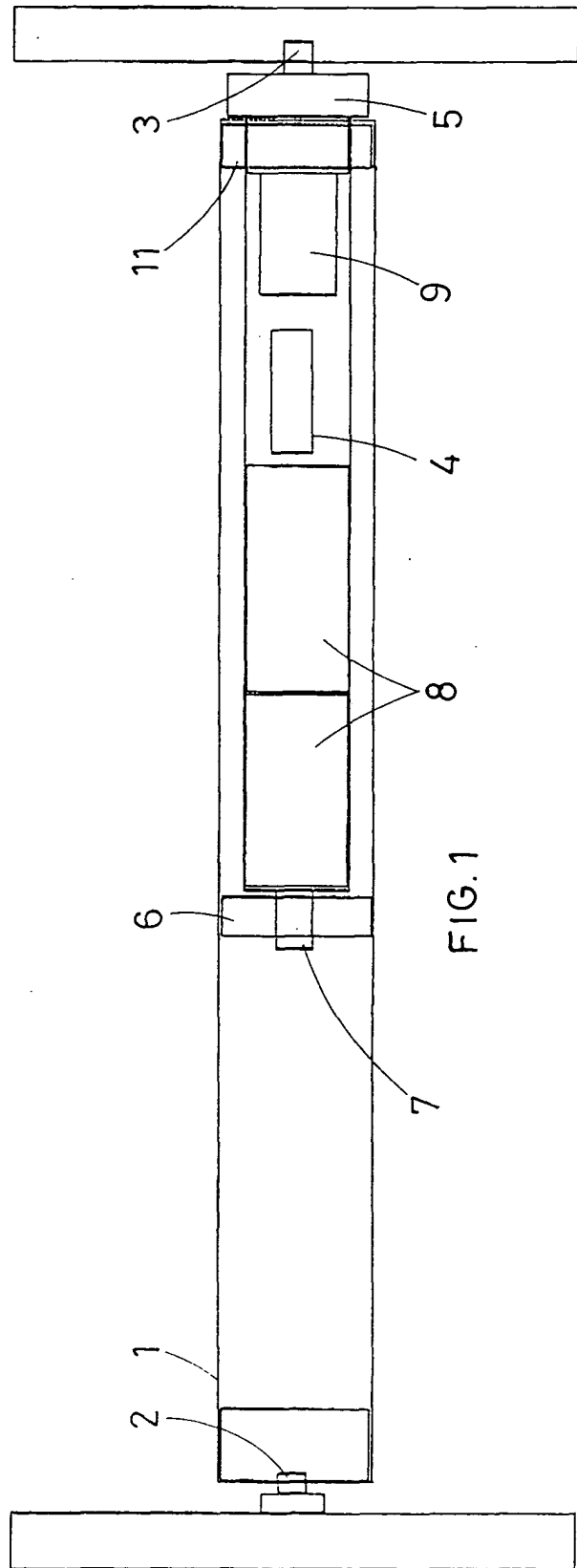
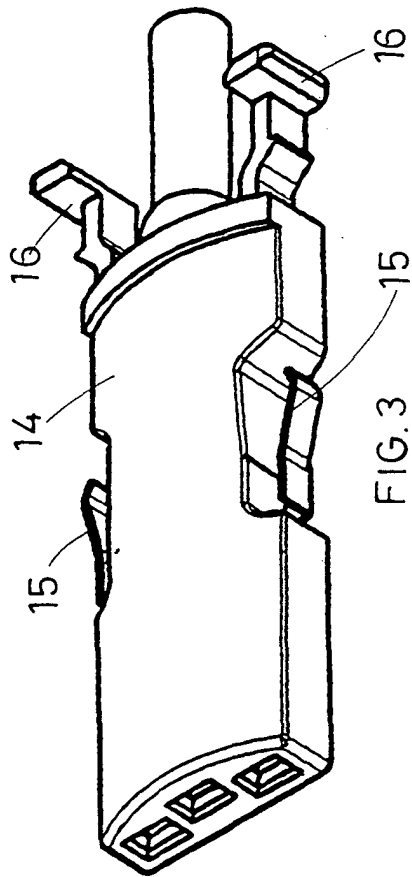
(4);

- the electrical connector (14) with flat, elongated shape and rectangular cross-section, is provided with three or more elements (14a) coupled with corresponding elements of the socket located in the front niche (12) of the support (10) of the end-of-travel assembly (9); it being also provided that the connector (14) is provided on opposite sides with flexible metal wings (15) connected with the earth wire of the connector (14) and capable of interfering with the lateral walls of the niche (12) that houses the socket, when the connector (14) is coupled with the socket.

2. Connection unit as defined in claim 1, **characterised in that** the section (10b) of the front support (10) of the end-of-travel assembly (9) interferes with the internal walls of the metal case (4) thanks to a regular series of longitudinal ribs (13) on the external perimeter.

3. Connection unit as defined in the first or both preceding claims, **characterised in that** the metal lateral wings (15) of the connector (14) protrude from a metal sheet embedded in the plastic structure of the connector (14) and directly connected with the earth wire of the connector (14).

4. Connection unit as defined in one or more of the preceding claims, **characterised in that** the connector (14) incorporates a longitudinal pair of shaped springs (16) that tend to spread apart and are designed to interfere and couple with the lateral walls of the opening (5a) of the plate (5) when the connector (14) is coupled with the socket located on the front of the support (10) of the end-of-travel assembly (9).



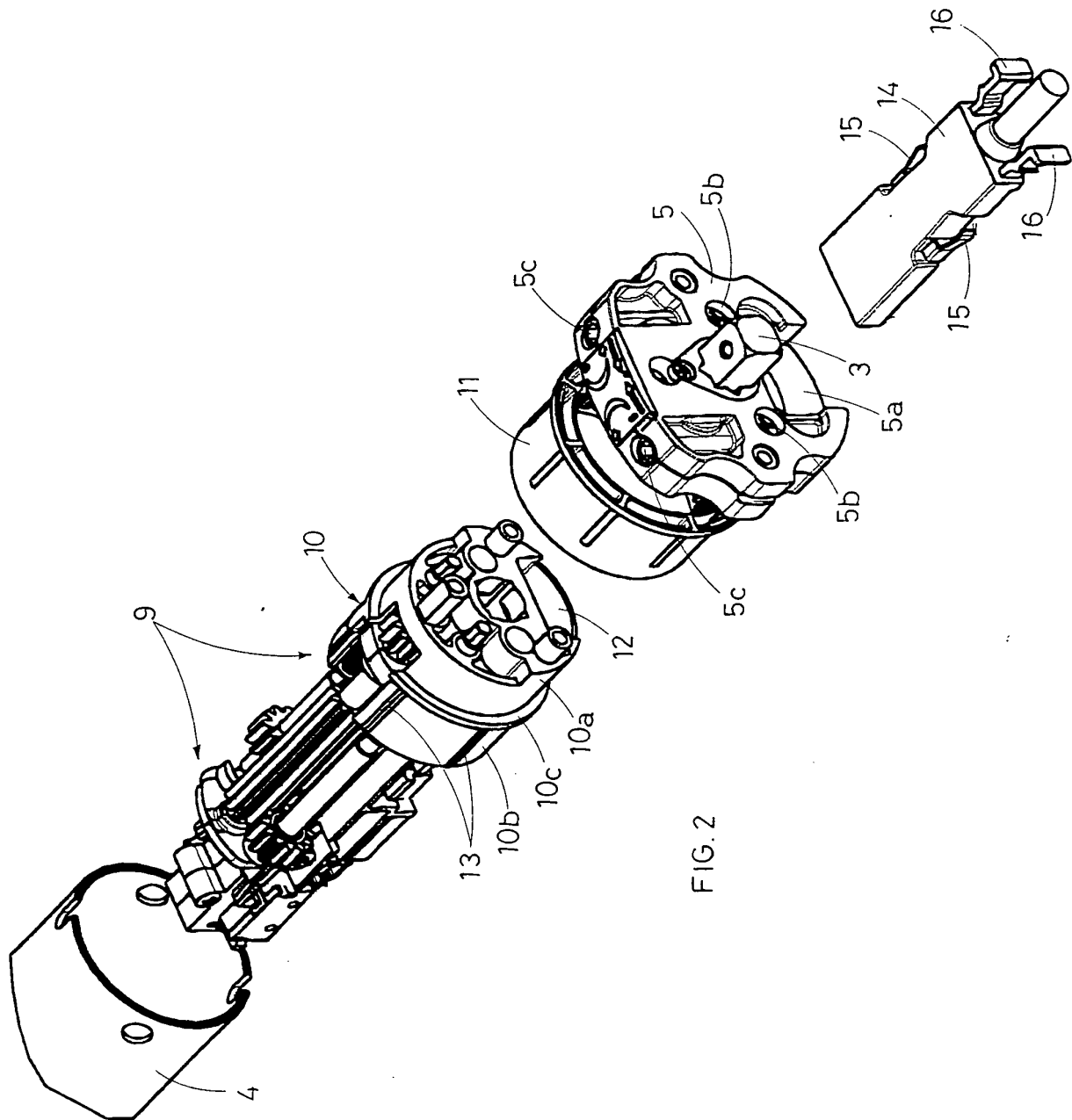


FIG. 2