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(54) **AN ACTUATOR DEVICE COMPRISING A CIRCUIT BOARD DISPLACER**

(57) The present disclosure relates to an actuator device (10) for a fenestration covering arrangement (20). The actuator device (10) comprises an elongated, tubular housing (12, 50) with an interior space (12a). The elongated, tubular housing (12, 50) extends in a longitudinal direction (LD), and at least a drive arrangement (40) comprising an electric motor (41), and at least one circuit board (2) comprising electronic circuitry, are arranged in said interior space (12a). The circuit board (2) is arranged proximate a service access opening (4) located at a first housing end (E1) of the housing (12, 50). The actuator device (10) comprises a circuit board displacer (8), and

the circuit board (2) is arranged at the circuit board displacer (8). The circuit board displacer (8) is configured to be displaced (DP1) relative to the housing (12, 50) in a first displacement direction from a retracted position (POS1) and to an extended position (POS2) so that the circuit board (2) is displaced towards the service access opening (4). The circuit board (2) comprises one or more electrical connectors (6a, 6b). The one or more electrical connectors (6a, 6b) is arranged proximate the first end (2E1) of the circuit board (2), and the first end (2E1) of the circuit board is arranged proximate the service access opening (4).

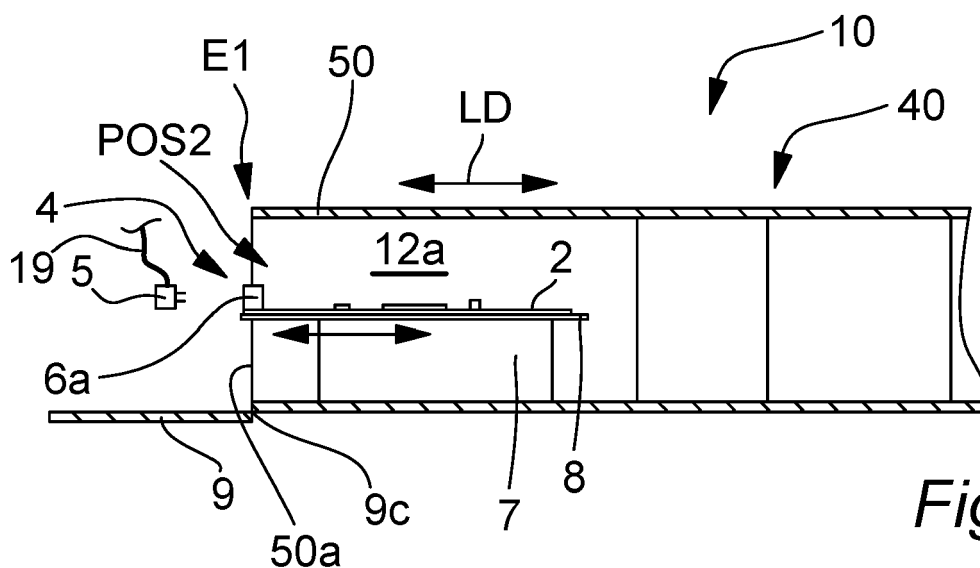


Fig. 8

Description

[0001] The present disclosure relates to an actuator device for a fenestration covering arrangement, and a method of connecting electronic equipment. Moreover, the present disclosure relates to a fenestration covering arrangement, and a fenestration comprising a fenestration covering arrangement.

Background

[0002] Building aperture covers, such as windows, may be supplied with window covering arrangement such as a sun cover, for example a roller blind or roller shutter. This is provided in order to enable a user to provide sun screening so that less sunlight enters into the building where the window covering arrangement is installed. The window covering arrangement comprises a sun covering part such as a sheet. The sheet can be moved to cover a major surface of a glass unit of the window. In order to move the covering part, the window covering arrangement may comprise an actuator device. The actuator device comprises an electric motor that, when a control signal is received, induces the electric motor to move the sun covering part. The actuator device may comprise a control unit comprising a circuit board for controlling e.g. the motor and/or for facilitating or providing other tasks such as battery recharging, radio communication, battery charging control and/or the like. This circuit board is often arranged inside an elongated housing together with e.g. an electric motor, a gearing or the like.

[0003] Various electric components may be needed to be connected to the electronic circuitry at the circuit board when the window covering arrangement is installed. These components may e.g. comprise a power supply, such as a photovoltaic panel, an antenna and/or the like. However, as a general desire may be to provide space saving covering solutions, the space for accessing the control unit is often limited.

[0004] In order to solve this, some solutions suggests to place one or more connectors, such as plug or sockets, to be accessible through an opening in an end wall of the elongated housing so as to enable easy connection. This may however e.g. provide issues with regards to e.g. water protection and/or protection from foreign objects. Patent document US2017167191 A1 discloses a tubular motor with an end bracket having an electric connector. Another solution may be to place the connector behind a lid in the end wall. This may however provide a solution where access to the connector(s) is made difficult.

[0005] It may e.g. be an object of the present disclosure to solve one or more of the above-mentioned disadvantages. Additionally or alternatively, it may be an object of the present disclosure to provide a user friendly and/or space saving solution for when electrical equipment is to be connected to electronic circuitry of an actuator device.

Summary

[0006] The present disclosure relates to an actuator device for a fenestration covering arrangement. The actuator device comprises an elongated, tubular housing with an interior space. The elongated, tubular housing extends in a longitudinal direction. At least a drive arrangement comprising an electric motor, and at least one circuit board comprising electronic circuitry, are arranged in said interior space. The circuit board is arranged proximate a service access opening located at a first housing end of the housing.

[0007] The actuator device comprises a circuit board displacer, wherein the circuit board is arranged at the circuit board displacer. The circuit board displacer is configured to be displaced relative to the housing in a first displacement direction from a retracted position and to an extended position so that the circuit board is displaced towards the service access opening. The entire circuit board is configured to be arranged inside the housing when the circuit board displacer is arranged at the retracted position. The circuit board comprises one or more electrical connectors. Said one or more electrical connectors is/are arranged proximate the first end of the circuit board. The first end of the circuit board is arranged proximate the service access opening.

[0008] A small diameter of a tubular motor may often be desired. The present disclosure may provide a space saving solution. At the same time, it enables more easy access to the electrical connectors at the circuit board.

[0009] Tubular motors/actuators are often installed at locations that are hard to access and/or with limited space, which may make the installation of electric connections by means of connectors at a circuit board, difficult and user-un-friendly. The solution according to the present disclosure, comprising the circuit board being displaceable by means of the circuit board displacer, may help to reduce this issue.

[0010] Service may be relevant over the life time of the actuator device in order to e.g. connect and/or replace a power supply (mains and/or one or more photovoltaic panels) or another part connected to the electrical connector of the circuit board. Such service may be made more user friendly by means of a solution according to embodiments of the present disclosure.

[0011] Additionally or alternatively, the solution according to the present disclosure may make later fault diagnosing and service after actuator installation less cumbersome.

[0012] When the circuit board is in the extended position, this may provide easier access to the connectors in order to e.g. connect or disconnect an antenna connector, a power supply connector and/or the like to the electronic circuitry at the circuit board. On the other hand, when the circuit board displacer, and hence the circuit board, is arranged at the retracted position, this may e.g. provide a space saving solution.

[0013] In the extended position, the electrical connec-

tor(s) may be accessible and e.g. adapted to be grasped by the human installer's fingers. Hereby the electric connection and release may more easily be done by hand.

[0014] In the extended position, the electrical connector(s) may be accessible without inserting any objects, such as hand held tools, into the tubular motor tube/housing.

[0015] Tubular motors may in some situations be installed side by side so space saving longitudinal dimensions may also be desired. The present disclosure may help to provide a solution that may be space saving and also user friendly when power supply, antenna or the like is to be connected, and/or when a switch is to be connected, to the circuit board.

[0016] The present disclosure may additionally help to reduce the number of plug connections needed and/or may help to reduce installation mistakes.

[0017] Additionally or alternatively, the present disclosure may help to provide a solution that may enable faster assembly during manufacturing of the actuator device and/or may help to reduce assembly errors during manufacturing.

[0018] For example, in some embodiments of the present disclosure, in case a part of a lid for covering the access opening is provided, the lid may be provided at a part of the space where a part of the circuit board displacer and/or the circuit board was located in the extended position.

[0019] In one or more embodiments of the present disclosure, the circuit board displacer may comprise and/or may be connected to a lid. The lid is configured to be arranged in an open lid position and a closed lid position. The lid is configured to allow access to at least the one or more electrical connectors in the open lid position. The lid may be configured to cover the service access opening and/or the one or more electrical connectors in the closed lid position.

[0020] This may e.g. provide a user-friendly solution and/or a solution where protection of the interior of the housing and/or the circuit board may be provided when the lid is in the closed lid position.

[0021] In the open lid position, more easy access to the connector(s) and the interior of housing the may be provided than when the lid is in the closed position.

[0022] When the lid is in the closed position it may cover the service access opening and the electrical connector(s) located at the first housing end.

[0023] In one or more embodiments of the present disclosure, the lid may be an integrated part of the circuit board displacer, such as integrated with a part of a slide body of the circuit board displacer.

[0024] This may e.g. provide a mechanically simple solution and/or a cost efficient solution. Also it may help to provide a cost efficient and yet space saving solution.

[0025] In one or more embodiments of the present disclosure, the lid may be attached to the circuit board displacer by means of a hinge connection comprising a weakening portion. This may e.g. provide a cost efficient

and/or more mechanically simple solution. In other embodiments, another type of hinge connection(s) may be provided, such as a snap connection, a recess/protrusion connection, a rotatable hinge connection and/or the like.

[0026] In one or more embodiments of the present disclosure, the lid may comprise a first mechanical locking part, such as a snap lock part or a screw, configured to engage with a second locking part when the lid is in the closed lid position so as to maintain the lid in the closed lid position.

[0027] This may e.g. provide an improved assurance of that the circuit board is remained in the retracted position, for example, despite that parts in the motor interior, such as cables/wires or the like provides a direct or indirect force on the circuit board displacer when the circuit board displacer is in the retracted position.

[0028] In one or more embodiments of the present disclosure, the lid comprises a gripping part body. The gripping part body may be grabbed and pulled by human hand, and the circuit board displacer may be configured so that a pulling force provided by human hand at the gripping part body in the longitudinal direction of the housing provides the displacement of the circuit board displacer.

[0029] This may e.g. provide a lid with a dual functionality where the lid in the closed lid position is used as a covering part, whereas the lid in the open lid position provides a handle part to be used for user interaction when moving the circuit board from the retracted position to the extended position and preferably also from the extended position to the retracted position again.

[0030] In one or more embodiments of the present disclosure, the lid may comprise a retraction prevention part configured to prevent the circuit board displacer from returning to the retracted position when the lid is in the open lid position.

[0031] This may e.g. provide and/or enable a user friendly and/or intuitive control of a retraction prevention solution.

[0032] In one or more embodiments of the present disclosure, a movement inducing member, such as actuator means, such as comprising a spring, may be configured to provide said displacement of the circuit board displacer towards the extended position.

[0033] This may e.g. provide and/or enable a user friendly solution. In other embodiments, it is however understood that such a movement inducing member may be omitted.

[0034] In one or more embodiments of the present disclosure, the circuit board displacer may comprise a slide body configured to support on, and be displaced relative to, one or more support members during said displacement. The circuit board may rests on and/or be attached to the slide body.

[0035] This may e.g. provide a more reliable solution and/or a solution with improved structural integrity. Additionally it may enable a mechanically simple solution.

[0036] In one or more embodiments of the present dis-

closure, a retraction prevention arrangement may be configured to prevent the circuit board displacer from returning to the retracted position from the extended position until a releasing operation has been provided.

[0037] This may e.g. provide a more user-friendly solution. The retraction prevention arrangement may help to provide a counter force when e.g. a connecting part, such as a plug or socket, is pressed to engage with the electrical connector(s) of the circuit board. Hence the user will not experience that the circuit board is pushed towards the retracted position when connecting e.g. a power supply, antenna or the like to the electrical connector(s). This may enable easy and user-friendly connection of the connecting part(s) with the electrical connector(s) of the circuit board.

[0038] The retraction prevention arrangement may in some embodiments of the present disclosure comprise or be a locking arrangement.

[0039] The retraction prevention arrangement may in some embodiments of the present disclosure be provided by means of one or more protrusion and/or recesses configured to engage when the circuit board displacer is in the extended position.

[0040] In one or more embodiments of the present disclosure, the releasing operation comprises a displacement of at least a part of the circuit board displacer, such as the slide, in a direction transverse to the longitudinal direction of the housing.

[0041] This may e.g. help to provide a reliable and/or mechanically simple retraction prevention arrangement.

[0042] This may e.g. be allowed due to the resiliency of one or more parts of the circuit board displacer and/or other parts, so that the circuit board displacer may be e.g. be pushed into a disengagement position/state by means of the releasing operation.

[0043] In one or more embodiments of the present disclosure, said releasing operation may be configured so as to be controllable and/or triggerable by means of the lid.

[0044] This may e.g. provide a cost efficient solution, and/or a mechanically simple solution, that may be user friendly.

[0045] In one or more embodiments of the present disclosure, the extended position may be a predetermined position.

[0046] In one or more embodiments of the present disclosure, the extended position may be a predetermined position, and a stop arrangement may be configured to limit, such as stop, the circuit board displacer from being displaced further in the first displacement direction when the predetermined, extended position is reached.

[0047] This may e.g. help to reduce the risk of malfunction or damage. Additionally or alternatively, it may provide a user friendly and controlled displacement solution.

[0048] In one or more embodiments of the present disclosure, the one or more electrical connectors may comprise an engagement side configured for engaging with a connecting part, such as a plug or socket.

[0049] In some embodiments of the present disclosure, said engagement side may face towards the access opening, at least when the circuit board displacer is in the retracted position.

[0050] This provides that when the circuit board is displaced towards the service access opening, easy access to the engagement side of the connector(s) is provided.

[0051] The engagement side may e.g. be a side where one or more electrical connections of the electrical connector(s) is/are accessible.

[0052] In one or more embodiments of the present disclosure, the circuit board comprises a second circuit board end arranged distant to the first circuit board end, wherein the one or more electrical connectors comprises an engagement side for engaging with a connecting part, such as a plug or socket, wherein said engagement side faces away from the second circuit board end.

[0053] In one or more embodiments of the present disclosure, a displacement limiter arrangement may be configured to limit the displacement distance of the circuit board between the retracted position and the extended position to be no more than 5 cm, such as no more than 3 cm, such as no more than 1.5 cm.

[0054] This provides a controlled circuit board displacement and may help to reduce user mistakes and/or help to protect components of the actuator device.

[0055] In one or more embodiments of the present disclosure, the displacement limiter arrangement may comprise a stop part configured to limit the displacement of the circuit board when the circuit board is pushed towards the retracted position.

[0056] This may help to provide a long lasting and/or reliable and controlled displacement of the circuit board.

[0057] In one or more embodiments of the present disclosure, the circuit board may be configured to be displaced with a displacement distance of at least 0.5 cm, such as at least 0.9 cm, such as at least 1.2 cm.

[0058] This provides a user friendly solution that may also help to enable space optimization.

[0059] In one or more embodiments of the present disclosure, one or more electrical wire connections, such as one or more insulated, flexible, electrical wire connections, may interconnect the circuit board with further electrical equipment in the interior space. In embodiments of the present disclosure, said flexible wire connection may comprise a wire buffer section configured so as to allow a part of the one or more wire connections to move together with the circuit board when the circuit board displacer is displaced in the interior space towards the extended position.

[0060] This may e.g. help to provide a reliable and/or cost efficient solution for allowing the circuit board to be displaced between the extended position and the retracted position, despite that electrical connections are provided between the circuit board and further electrical equipment. This may also help to provide a user friendly solution as the user may not need to disconnect internal wire connections in order to displace the circuit board

displacer.

[0061] In some embodiments of the present disclosure, the wire buffer section may comprise one or more of a coiled, bended and/or looped wire section.

[0062] In one or more embodiments of the present disclosure, the service access opening may have an inner diameter that is less than 60 mm, such as less than 45 mm, such as less than 37 mm.

[0063] Such access openings may make it difficult to sufficiently access the connector(s) and/or the like at the circuit board when connecting or disconnecting a connecting member to the connector(s) at the circuit board. However, the displacement of the circuit board enables a more user friendly installation process as the circuit board, and hence the connector(s), can thereby be moved closer to the access opening.

[0064] In one or more embodiments of the present disclosure, the service access opening may have a diameter that is larger than 15 mm such as larger than 25 mm.

[0065] In one or more embodiments of the present disclosure, the circuit board may comprise a second circuit board end arranged distant to the first circuit board end.

[0066] The length of the circuit board extending between the first and second circuit board ends may in embodiments of the present disclosure be more than 4 cm, such as more than 6 cm, such as between 4 cm and 10 cm.

[0067] In some embodiments of the present disclosure, the circuit board may be longitudinal, and the longitudinal direction of the circuit board may extend parallel to the longitudinal direction of the housing. The length of the circuit board may hence extend in the longitudinal direction of the housing.

[0068] The length of the circuit board may in embodiments of the present disclosure be larger than the internal width or internal diameter of the motor housing.

[0069] In one or more embodiments of the present disclosure, a guiding body comprises one or more of:

- A retraction prevention part configured to prevent the circuit board displacer from returning to the retracted position from the extended position until a releasing operation has been provided,
- a stop part configured to limit the circuit board displacer from being displaced further in the first displacement direction when the extended position is reached, and/or
- a stop part configured to limit, such as stop, the displacement of the circuit board when the circuit board is pushed towards the retracted position.

[0070] The guiding body may be part of an insert, in some embodiments of the present disclosure.

[0071] In some embodiments, said retraction prevention part and one or both of said stop parts may be integrated in, such as shaped by moulding or cutting, the same guiding body structure.

[0072] In one or more embodiments of the present dis-

closure, one or more batteries, such as one or more rechargeable batteries, is arranged inside said housing.

[0073] This may e.g. enable a space saving actuator solution and/or a solution that may be more easy to install.

[0074] In one or more embodiments of the present disclosure, the circuit board displacer may be arranged in, such as integrated in, a circuit board holder, such as a circuit board holder insert, which is inserted into the end of the housing.

[0075] This may e.g. provide a solution that is cost efficient and/or easy to assemble.

[0076] In one or more embodiments of the present disclosure, said insert comprises a guiding body.

[0077] In one or more embodiments of the present disclosure, the entire electrical connector may be maintained inside the housing when the circuit board displacer is arranged in the extended position, at a location that is closer to the service access opening than when the circuit board displacer is arranged in the retracted position.

[0078] In one or more embodiments of the present disclosure, the electrical connector may be arranged at least partly or fully outside the housing when the circuit board displacer is arranged in the extended position.

[0079] In one or more embodiments of the present disclosure, the one or more electrical connectors at the circuit board may comprise one or more plugs and/or one or more sockets for receiving a connecting part.

[0080] In one or more embodiments of the present disclosure, the one or more electrical connectors may comprise at least one connector configured to receive a power supply, such as a power supply from a photovoltaic panel.

[0081] In one or more embodiments of the present disclosure, the one or more electrical connectors may comprise at least one connector configured to receive a connecting part which is connected to an antenna.

[0082] In one or more embodiments of the present disclosure, the longitudinal, tubular housing may be a motor housing.

[0083] In one or more embodiments of the present disclosure, the one or more electrical connector(s) is/are rigidly fixated to the circuit board.

[0084] In one or more embodiments of the present disclosure, the one or more electrical connector(s) may be arranged within the 1/7, such as the of the 1/10, such as the 1/15 of the circuit board length that is closes to the first circuit board end.

[0085] This may e.g. enable more easy access to the electrical connector(s).

[0086] In some embodiments, the electrical connector(s) may be substantially flush with, or overlap, the circuit board end.

[0087] In one or more embodiments of the present disclosure, the circuit board displacer may be configured to be displaced in the longitudinal direction of the housing between the retreated position and the extended position.

[0088] In one or more embodiments of the present disclosure, the circuit board displacer, and hence the circuit

board, may be configured to reciprocate between the extended position and the retracted position.

[0089] In one or more embodiments of the present disclosure, the circuit board displacer may be configured to be displaced in the longitudinal direction LD of the housing to the extended position so that the one or more electrical connectors is/are more easily accessible at the first end of the housing than when the circuit board displacer is arranged in the retracted position.

[0090] The present disclosure further relates, in a second aspect, to a method of connecting electronic equipment to electric circuitry arranged inside an actuator device according to one or more of the preceding embodiments.

[0091] Said method at least comprises the steps of:

- displacing the circuit board from the retracted position towards the service access opening to the extended position by means of the circuit board displacer,
- connecting one or more connecting parts, such as one or more plugs or sockets, to the one or more electrical connectors, and
- displacing the circuit board from the extended position to the retracted position by means of the circuit board displacer.

[0092] This method may e.g. provide a user friendly and/or space saving solution.

[0093] Said electronic equipment may in some embodiments e.g. comprise a power supply, an antenna, a wired control panel and/or the like.

[0094] In one or more embodiments of said method, the method comprises providing a releasing operation so as to release a retraction prevention arrangement, wherein the retraction prevention arrangement, such as a locking arrangement, is configured to prevent the circuit board displacer from returning to the retracted position from the extended position until the releasing operation has been provided.

[0095] In one or more embodiments of said method, said releasing operation may be provided prior to and/or during said displacement of the circuit board from the extended position to the retracted position.

[0096] In one or more embodiments of said method, the method may comprise opening a lid so as provide the lid into an open lid position prior to displacing the circuit board from the retracted position and towards the service access opening, and/or wherein said method comprises providing the lid into a closed lid position either prior to, during or after said displacing of the circuit board from the extended position to the retracted position.

[0097] In one or more embodiments of said method, said displacing of the circuit board from the retracted position and towards the service access opening may involve pulling a gripping part body of a lid.

[0098] In one or more embodiments of said method, said displacing of the circuit board from the retracted po-

sition and towards the service access opening may involve pulling by hand.

[0099] In one or more embodiments of said method, the power supply comprises a photovoltaic panel, such as a photovoltaic panel configured to be arranged at, such as installed at, the fenestration or fenestration covering arrangement at which the actuator device is installed.

[0100] The present disclosure moreover relates, according to a third aspect of the present disclosure, to a fenestration covering arrangement, such as a window covering arrangement, such as a sun covering, wherein the fenestration covering arrangement comprises an actuator device according to one or more of the preceding embodiments, wherein the actuator device is configured so as to move a sun covering part, such as a sheet.

[0101] In one or more embodiments of the third aspect, the fenestration covering arrangement may comprise or be a sun covering, such as a roller blind, an awning or a roller shutter.

[0102] The present disclosure moreover relates, according to a fourth aspect of the present disclosure, to a fenestration covering arrangement, such as a window covering arrangement, such as a sun covering. The fenestration covering arrangement comprises an elongated, tubular housing with an interior space. The elongated, tubular housing extends in a longitudinal direction, and at least a drive arrangement comprising an electric motor, and at least one circuit board comprising electronic circuitry, are arranged in said interior space. The circuit board is arranged proximate a service access opening located at a first housing end of the housing. The fenestration covering arrangement moreover comprises a circuit board displacer, wherein the circuit board is arranged at the circuit board displacer. The circuit board displacer is configured to be displaced relative to the housing in a first displacement direction from a retracted position and to an extended position so that the circuit board is displaced towards the service access opening. The entire circuit board may be configured to be arranged inside the housing when the circuit board displacer is arranged at the retracted position. The circuit board comprises one or more electrical connectors. The one or more electrical connectors is/are arranged proximate the first end of the circuit board, and the first end of the circuit board is arranged proximate the service access opening.

[0103] In some embodiments of the fourth aspect, the fenestration covering arrangement comprises an actuator device according to one or more of the above described embodiments.

[0104] In some embodiments of the fourth aspect, the actuator device is configured so as to move a sun covering part, such as a sheet.

[0105] The present disclosure additionally relates, according to a fifth aspect of the present disclosure, to a fenestration comprising a fenestration covering arrangement according to one or more of the above mentioned embodiments and/or aspects, such as according to the

third or fourth aspect, wherein the sun covering part is configured to partly or substantially fully cover a major surface of an insulated glass unit of the window.

[0106] In some embodiments of the present disclosure, the fenestration may be a window such as a roof window.

Figures

[0107] Aspects of the present disclosure will be described in the following with reference to the figures in which:

figs. 1-2 : illustrates a building aperture cover comprising a window covering arrangement, according to embodiments of the present disclosure,

fig. 3 : illustrates an actuator device for a window covering arrangement, according to embodiments of the present disclosure,

figs. 4A-4C : illustrates an actuator device comprising a circuit board displacer, according to embodiments of the present disclosure,

fig. 5 : illustrates an actuator device comprising a wire connection configured to interconnect the circuit board with further electrical equipment in an interior space of the actuator housing, according to embodiments of the present disclosure,

fig. 6 : illustrates an actuator device comprising a wire connection which comprises a wire buffer section, according to embodiments of the present disclosure,

fig. 7 : illustrates an actuator device comprising a circuit board holder housing which is arranged inside an actuator housing at a first end of the actuator housing, according to embodiments of the present disclosure,

fig. 8 : illustrates an actuator device comprising a lid pivotably attached to an actuator housing, according to embodiments of the present disclosure,

fig. 8 : illustrates an actuator device comprising a lid pivotably attached to an actuator housing, according to embodiments of the present disclosure,

fig. 9 : illustrates an actuator device comprising a lid, where the lid comprises a stop part,

fig. 10 : illustrates an electrical connector which is arranged at least partly outside an actuator housing when the circuit board displacer is arranged in an extended position, according to embodiments of the present disclosure,

fig. 11 : illustrates a circuit board displacer comprising a slide body, according to embodiments of the present disclosure,

fig. 12 : illustrates a circuit board according to embodiments of the present disclosure,

figs. 13-14 : illustrates a solution comprising fixators, according to different embodiments of the present disclosure, and

fig. 15 : illustrates an embodiment of the present disclosure, wherein actuator means are configured to move, or help moving, a circuit board displacer towards an extended position.

Detailed description

[0108] Fig. 1 illustrates schematically a building aperture cover 200 comprising a fenestration covering arrangement 20 for covering the building aperture cover 200, according to embodiments of the present disclosure. The building aperture cover 200 may in embodiments of the present disclosure be a fenestration 200. In figs. 1 and 2, the fenestration 200 is a window 200. The window 200 may in some embodiments be a "vertical" window such as a window for installation in a building facade. In other embodiments of the present disclosure (not illustrated), the fenestration 200 may be a roof window or a door.

[0109] The fenestration 200 may comprise a fixation frame for fixating the fenestration 200 to the building. In some embodiments, the fenestration 200 may comprise a movable unit, e.g. comprising a movable frame, such as a sash, and an insulated/insulating glass unit 201 attached to and supported by the movable frame. The movable unit is configured to move to open and close, relative to the fixation frame by means of a hinge arrangement. In other embodiments, the fenestration 200 may not comprise a movable unit and hence, the insulated/insulating glass unit 201 may be configured to be in a continuous, fixed and unmovable position when the fenestration has been installed.

[0110] The fenestration covering arrangement 20 comprises a covering part 25 such as a sun covering part. This covering part 25 is configured to partly or substantially fully cover a major surface 202 of an insulated/insulating glass unit 201 of the building aperture cover 200. The fenestration covering arrangement 20 is attached to the building aperture cover 200, and may be a covering

device comprising the covering part 25, a storage for storing an un-extended part of the covering part 25, and also, the fenestration covering device 20 comprises an actuator device 10.

[0111] The fenestration covering arrangement 20 may in some embodiments be a sun cover comprising or being a roller blind, a venetian blind, a shutter, and/or the like.

[0112] Fig. 3 illustrates schematically an actuator device 10 for a fenestration covering arrangement 20, such as the fenestration covering arrangement 20 illustrated in figs. 1 and 2, according to embodiments of the present disclosure.

[0113] The actuator device 10 in fig. 3 comprises an elongated housing 50 with an interior space 12a. Interior inserts 12, such as interior housings 12H (see figs. 4A-4C), may be provided inside the housing 50. As illustrated in fig. 3, the housing 50 may in embodiments of the present disclosure be tubular such as a tube.

[0114] The elongated housing 50 may in some embodiments of the present disclosure be made from plastic, a metal such as steel or aluminium and/or the like.

[0115] The elongated housing 50 extends in a longitudinal direction LD. The length of the elongated housing 50 may be at least 30 cm, such as at least 40 cm, such as at least 50 cm.

[0116] At least a drive arrangement 40 comprising an electric motor 41, and a circuit board 2 comprising electronic circuitry 3, are arranged inside the interior space 12a of the housing 50.

[0117] In one or more embodiments of the present disclosure, as illustrated in fig. 3, a gear 42, such as a reduction gear, which is connected to the motor 41, may be arranged inside the space 12a.

[0118] In one or more embodiments of the present disclosure, as illustrated in fig. 3, one or more batteries 30, such as one or more rechargeable batteries, may be arranged inside the space 12a. This/these batteries 3 may be configured to provide electric power to the electric motor 41, the electronic circuitry 3 and/or the like.

[0119] In one or more embodiments of the present disclosure, as illustrated in fig. 3, one or more further electrical equipment 15, such as one or more circuit boards separate to the circuit board 2, may be arranged inside the space 12a.

[0120] One, more or all of these parts 2, 30, 15, 40, 41, 42 may in embodiments of the present disclosure be arranged in the space 12a in continuation of each other, such as consecutively, in the longitudinal direction LD.

[0121] The actuator device 10 comprises a first end E1 and a second, oppositely directed, end E2. The elongated housing 50 extends between these ends E1, E2.

[0122] A lid 9 is arranged at the first end E1 and provides access to the interior of the housing 50 when the lid 9 is in an open lid position. In fig. 3, the lid 9 is in a closed lid position. The lid 9, when in an open lid position, allows access to a service access opening 4 at the end E1 of the actuator device 10, whereas the lid 9 covers the service access opening 4 when the lid 9 is in the

closed lid position.

[0123] In some embodiments of the present disclosure, wherein the access opening 4 may have an inner width and/or an inner height, such as an inner diameter, that is less than 60 mm, such as less than 45 mm, such as less than 37 mm. In some embodiments, the access opening 4 may have an inner width and/or an inner height, such as an inner diameter that is larger than 15 mm such as larger than 25 mm.

[0124] The housing 50 may be configured to extend inside an elongated drum part (not illustrated) of the covering arrangement 20. The housing 50/actuator device 10 may in some embodiments be configured to be fixed and un-rotatable during operation, and the said drum part may be configured to rotate relative to the housing 50, around the housing 50, by means of the drive arrangement 40.

[0125] Figs. 4A-4C illustrates schematically a cross section of an actuator device 10 comprising a circuit board displacer 8, according to embodiments of the present disclosure.

[0126] The circuit board displacer 8 is arranged inside an elongated housing at a first end E1 of the housing 12. The housing 12 illustrated in fig. 4A-4C may be the primary actuator device 10 housing 12. In other embodiments of the present disclosure, this housing 12 may be an insert 12 housing 12H for being installed inside an exterior, elongated housing 50 as e.g. illustrated in fig. 3 (see also fig. 7), such as an elongated main housing.

[0127] A service access opening 4 is located in the first housing end E1 of the housing 12. As can be seen in fig. 4A, the service access opening 4 may be covered by a lid 9.

[0128] When the lid is opened, access is made available to the interior 1a of the housing 12 proximate the end E1.

[0129] The circuit board 2 is arranged proximate the first end E1 in the interior space 12a of the housing, near the access opening 4.

[0130] The circuit board 2 comprising electronic circuitry 3. In some embodiments of the present disclosure, the electronic circuitry 3 at the circuit board may be configured to handle/control and/or execute one or more of:

- Wireless radio communication (such as transmitting and/or receiving wireless control signals or information signals) to and from a remote control or other devices
- Battery charging control,
- Signal transmission handling in order to e.g. generate, handle and/or control signal transmission to other electronic parts/equipment inside the housing such as to other circuit boards, the electric motor,
- Signal transmission handling in order to e.g. generate, handle and/or control signals from a wired user control panel, such as control signals relating to controlling the drive arrangement of the actuator device
- Sensor input receipt and/or control

- Measurement of one or more parameters such as voltage, current, temperature and/or the like.

[0131] The circuit board 2 may in embodiments of the present disclosure be a printed circuit board (PCB). The electronic circuitry 3 may in embodiments of the present disclosure comprise one or more hardware processors, one or more data storages, one or more measurement circuitry, one or more power transmission circuitry and/or the like. The circuit board 2 may act as a control unit.

[0132] The circuit board 2 may in some embodiments of the present disclosure comprise one or more interconnection connectors 18 such as one or more male plugs and/or female sockets. This/these one or more interconnection connectors 18 may be configured so as to connect to one or more insulated, flexible, electrical wire connections 14 that interconnects the circuit board 2 with one or more further electrical equipment 15, 40 in the actuator device 10 housing. This is described in more details further below, see e.g. fig. 5.

[0133] The circuit board 2 is arranged at the circuit board displacer 8. The circuit board displacer 8 is arranged proximate the service access opening 4 located at the first housing end E1 of the housing 12.

[0134] As illustrated in fig. 4C, the circuit board displacer 8 is configured to be displaced DP1 relative to the housing 12 in a first displacement direction from a retracted position POS 1 and to an extended position POS2. Hereby, the circuit board 2 is displaced towards the service access opening 4.

[0135] The circuit board displacer 8 is configured to be displaced in the longitudinal direction LD.

[0136] As can be seen from figs. 4A and 4B, the entire circuit board 2 may be configured to be arranged inside the housing 12, at least when the circuit board displacer 8 is arranged at the retracted position POS 1.

[0137] The circuit board 2 moreover comprises one or more electrical connectors 6a arranged proximate the first end 2E1 of the circuit board. One connector 6a is illustrated in figs. 4a-4c, but it is understood that a plurality of electrical connectors 6a may be provided, such as e.g. two (see e.g. 6a, 6b of fig. 5), three four five or even more electrical connectors may be provided at the circuit board 2.

[0138] The one or more electrical connector(s) 6a at the circuit board 2 may in embodiments of the present disclosure comprise one or more plugs and/or one or more sockets.

[0139] The one or more electrical connector(s) 6a may in embodiments of the present disclosure comprise a connector body CB made from a non-electrically conducting material, such as a plastic material, and may comprise one or more metal pins or receptacles (not illustrated in figs. 4a-4C).

[0140] In some embodiments of the present disclosure, one or more soldering connections, screw connections, clips connections and/or the like may directly or indirectly galvanically interconnect the one or more metal

pins and/or metal receptacles of the one or more electrical connector(s) 6a to the other electronic circuitry 3 at the circuit board 2. For example through/by means of circuit board tracks such as PCB tracks of the circuit board 2.

[0141] The one or more electrical connector(s) 6a may in embodiments of the present disclosure be rigidly fixated to the printed circuit board 2. The electrical connector body may in some embodiments be mechanically and/or chemically attached to the circuit board 2 body.

[0142] As illustrated in figs 4A-4C, the first end 2E1 of the circuit board 2 is arranged proximate the service access opening 4. The one or more electrical connectors 6a is/are arranged proximate or at the first end 2E1 of the circuit board 2. Thus, when the circuit board displacer 8 (and hence the circuit board 2) is displaced from a retracted position POS1 to the extended position POS2, the one or more electrical connectors 6a is/are moved towards the service access opening 4. This provides that the one or more electrical connectors 6a is/are more easily accessible for a service person when the circuit board displacer 8 is in the extended position POS2 than when the circuit board displacer 8 is in the retracted position POS1.

[0143] In some embodiments of the present disclosure, a lid 9, such as a lid of the actuator device 10, may be configured to cover the service access opening 4 when the circuit board displacer 8 is in the retracted position POS1, See figs. 4A and 4B.

[0144] When the circuit board displacer 8, and hence the circuit board 2, is in the extended position POS2, the one or more connecting parts 5 such as e.g. a plug or socket, can be connected to the one or more electrical connector(s) 6a. For example so as to assure electric contact between the circuit board 2 circuitry/circuitries 3 and one or more external, electronic equipment. Such external, electronic equipment may in embodiments of the present disclosure comprise one or more of

- one or more power supplies (such as mains supply and/or one or more power supplies from one or more photovoltaic panel),
- one or more antennas,
- a wired user control panel with or more buttons,
- electric service and/or configuration and/or update tools

and/or the like.

[0145] The one or more power supplies may be configured, when connected through the one or more electrical connector(s) 6a, 6b, to power the electric motor, power the electric circuitry, recharge the rechargeable battery and/or the like.

[0146] The power supply 19 may in some embodiments of the present disclosure be configured to be a wired mains power supply of 110-120V AC or 220-230V Ac.

[0147] The power supply 19 may additionally or alter-

natively, in some embodiments of the present disclosure, be configured to be a DC power supply that is determined by and/or provided by a photovoltaic panel. This voltage may be a direct or indirect result of the number and/or configuration of photovoltaic cells (ac cell e.g. providing a voltage of between 0.5 and 0.8V) of the photovoltaic panel. In some embodiments, the power supply from the photovoltaic panel may be configured to be a DC voltage between 3V and 50V, such as between 4V and 20V, such as between 5V and 12V.

[0148] The connecting part 5, such as a plug or socket, may provide an electrical connection to the power supply 19, and hence provide an electrical connection between the power supply 19 and one or more parts of the electric circuitry 3 at the circuit board 2.

[0149] Additionally or alternatively, the connecting part 5, or another connecting part, such as a plug or socket, may provide an antenna (not illustrated) connection to one or more parts of the electric circuitry 3 at the circuit board 2.

[0150] It is understood that the antenna may be used during radio communication with e.g. a remote control, a control system of another, remote actuator and/or the like.

[0151] These/these connections between the connecting part 5, such as a plug or socket, and the one or more electrical connectors 6a, such as a counter plug or counter socket, is to be provided when the circuit board displacer 8 is in the extended position POS, so that the electrical connector(s) 6a of the circuit board 2 is hence more easy accessible.

[0152] The method of connecting electronic equipment, such as a power supply and/or an antenna, to electric circuitry 3 at the circuit board 2 may hence, in some embodiments, comprise one or more of the below steps. Initially, the lid 9 is in a closed, covering lid position PLP2 and the circuit board 2 is in the retracted position. See fig. 4A.

[0153] Then the lid 9 is opened by arranging it in an open lid position LP1. See fig. 4B.

[0154] Then the circuit board 2 is displaced DP1 from the retracted position POS1 and towards the service access opening 4 to the extended position POS2. This displacement DP1 is provided by means of the circuit board displacer 8.

[0155] Then the one or more connecting parts 5, such as one or more plugs or sockets, are connected to the one or more electrical connectors 6a, 6b, while the circuit board 2 is in the extended position POS2.

[0156] Thereafter, the circuit board 2 can be returned/displaced from the extended position POS2 to the retracted position POS1 again (not illustrated) by means of the circuit board displacer 8, this time while the one or more connecting parts 5 and the one or more electrical connectors 6a, 6b are interconnected/engaged.

[0157] The lid 9 may be provided/arranged into the closed lid position LP2 before, during and/or after the circuit board displacer 8 (and hence the circuit board) is

returned to the retracted position POS1 in the direction opposite to the displacement direction DP1. This may depend on e.g. one or more of the design of the circuit board displacer 8, the design of the lid 9 the design of the housing 12, 50 and/or the design of the circuit board 2.

[0158] In some embodiments of the present disclosure, as e.g. illustrated in figs. 4A-4C, a retraction prevention arrangement 13a, 13a1 may be provided.

[0159] The retraction prevention arrangement 13a, 13a1 may e.g. comprise a locking arrangement.

[0160] The retraction prevention arrangement 13a, 13a1 is configured to prevent the circuit board displacer 8, and hence the circuit board 2, from returning to the retracted position POS1 from the extended position POS2 until a releasing operation has been provided.

[0161] In fig. 4C, the circuit board displacer 8 is arranged in the extended position POS2. This provides that parts of the retraction prevention arrangement 13a, 13a1 engages and resist a pushing/movement of the circuit board displacer 8 towards the retracted position POS1.

This provides that the retraction prevention arrangement 13a, 13b help to provide a counter force when e.g. a connecting part 5, such as a plug or socket, is pressed to engage with the electrical connector(s) 6a of the circuit board 2. Hence the human user will not experience that the circuit board 2 and the connector(s) 6a, 6b is/are pushed towards retracted position again, and easier connection of the connecting part 5 and the electrical connector(s) 6a may thus be provided when the circuit board displacer 8 is in the extended position POS2.

[0162] In embodiments of the present disclosure, the circuit board displacer may comprise a slide body 11, such as a plate shaped slide body, configured to support on, and be displaced relative to, one or more support members 13a, 13b during the displacement DP1. The circuit board 2 may rest on and/or be attached to the slide body 11.

[0163] The circuit board displacer 8 may in some embodiments of the present disclosure e.g. comprise one or more holding parts 31 for fixating the circuit board 2 to the circuit board displacer 8. Additionally or alternatively, the circuit board 2 may in some embodiments of the present disclosure e.g. comprise one or more holding parts (not illustrated) for fixating the circuit board 2 to the circuit board displacer 8.

[0164] In figs. 4A-4C, the circuit board displacer 8 comprises a part 13a1 of the retraction prevention arrangement, in this case a protruding part 13a1. This protruding part 13a1 comprises a wedge part with an inclining wedge surface 26 that inclines relative to the longitudinal direction LD. When moving the circuit board displacer 8 towards the extended position POS2, the wedge surface 26 slides over another counter-protrusion 13a thereby displacing at least a part of the circuit board displacer 8 in a direction transverse to the longitudinal direction LD of the housing.

[0165] When the circuit board displacer 8 is in the extended position POS1, a stop surface 27 of the protrusion

13a1 is configured to engage with the counter-protrusion 13a. This is provided so as to hinder/ prevent, the circuit board displacer 8 from moving to the retracted position POS1 again when a pushing force is provided at the circuit board 2 and/or circuit board displacer 8 in the longitudinal direction LD.

[0166] In some embodiments of the present disclosure (not illustrated), the retraction prevention arrangement may be designed so that the releasing operation involves a substantial pushing force (releasing operation) being higher than the pushing force needed to interconnect the parts 6a, 5, in order to allow that movement from POS2 to POS1.

[0167] In the example of fig. 4a-4C, the releasing operation in order to allow return of the circuit board displacer 8 towards the retracted position may comprise a displacement of at least a part of the circuit board displacer 8, such as the slide part 11, in a direction transverse to the longitudinal direction LD of the housing. This may help to disengage the surface 27 from the part 13a.

[0168] The releasing operation may in embodiments of the present disclosure be configured so as to be controllable and/or triggerable by means of the lid 9.

[0169] For example this disengagement of the parts 13a, 13a1 may in some embodiments be provided by transversally displacing, such as lifting, the circuit board displacer 8 relative to the longitudinal direction LD, by e.g. pulling or pushing the lid 9.

[0170] In some embodiments of the present disclosure, (not illustrated) the protrusion 13a may be pushed down by the surface 26 rather than the protrusion 13a1 being lifted/displaced.

[0171] In some embodiments, instead of using the locking system 13a1, 13a as illustrated, other types of locking systems may be provided, such as e.g. a snap-lock solution, a latch/notch solution and/or the like.

[0172] The extended position POS2 may in some embodiments be a predetermined position.

[0173] In some embodiments of the present disclosure, a stop arrangement 13b, 13b 1 may be configured to limit, such as stop, the circuit board displacer 8 from being displaced further in the first displacement direction DP1 when the predetermined, extended position POS2 is reached. This may be provided by means of e.g. oppositely directed stop parts 13b, 13b 1, such as protrusions. These are configured to engage (see fig 4C) and define when the predetermined, extended position POS2 is reached, e.g. in combination with the retraction prevention arrangement 13a, 13a1. When in the circuit board displacer 8 is in the extended position POS2, the retraction prevention arrangement 13a, 13a1 will help to prevent the circuit board displacer from returning to the retracted position POS1 when a plug/socket 5 is connected to the circuit board 2 or just due to wires or the like pulling the circuit board 2. The stop arrangement 13b, 13b 1 prevents the circuit board 2 from being pulled further out of, or further out of, the service access opening 4. The circuit board displacer 8 may hence be substantially

locked in the extended position POS2 until the releasing operation is provided to e.g. disengage the locking system 13a, 13b.

[0174] A displacement limiter arrangement 13b, 13b1, 13c, 13c1 may be configured so as to limit the displacement distance DIS1 of the circuit board 2 between the retracted position POS1 and the extended position POS2 to be a predefined displacement distance DIS1.

[0175] In some embodiments, the circuit board displacer 8 may be designed so that the maximum displacement distance DIS1 between POS1 and POS2 is configured to be no more than 5 cm, such as no more than 3 cm, such as no more than 1.5 cm.

[0176] In some embodiments of the present disclosure, the maximum displacement distance DIS1 between the positions POS1, POS2 may be configured to be at least 0.4 cm such as at least 0.7 cm, such as at least 0.9 cm.

[0177] The displacement limiter arrangement may as illustrated, in some embodiments, comprise a stop part 13c configured to limit the displacement of the circuit board 2 when the circuit board 2 is pushed towards the retracted position POS1.

[0178] Additionally or alternatively, the displacement limiter arrangement may comprise the stop arrangement 13b, 13b 1 configured to limit, such as stop, the circuit board displacer 8 from being displaced further in the first displacement direction DP1 when the predetermined, extended position POS2 is reached.

[0179] In one or more embodiments of the present disclosure, the actuator device 10, such as the insert 12, may comprise a guiding body 7. The guiding body is arranged to support the circuit board displacer 8 in the first and second position POS1, POS2, and during the displacement DP1. The circuit board displacer 8 may be slidably connected to the guiding body 7, and the guiding body 7 may be configured to be in a substantially fixed position during the displacement DP1. The guiding body 7 may be provided by or connected to the housing 50. An insert 12 may comprise the guiding body 7. The insert 12 may be configured to be attached to and/or inserted inside a tubular housing 50. See e.g. fig. 3 or 7.

[0180] The guiding body 7 may in one or more embodiments of the present disclosure comprise one or more of:

- the retraction prevention part 13a, configured to prevent the circuit board displacer 8 from returning to the retracted position POS1 from the extended position POS2 until a releasing operation has been provided,
- the stop part 13b configured to limit the circuit board displacer 8 from being displaced further in the first displacement direction DP1 when the extended position POS2 is reached, and/or
- a stop part 13c configured to limit, such as stop, the displacement of the circuit board 2 when the circuit board is pushed towards the retracted position POS1.

[0181] The circuit board displacer 8 is configured to be attached to and/or displace relative to the guiding body 7. Hence, the sliding body 11 may be configured to engage with one or more parts 13a, 13b, 13c of the guiding body 7 in order to be able to operate according to various embodiments as e.g. described above and/or below. The guiding body 7 may be integrated with, comprise or be directly or indirectly connected (such as attached) to a housing 12H of the insert 12.

[0182] As also indicated above, the actuator device 10 may in embodiments of the present disclosure comprise a lid 9 configured to cover the service access opening 4.

[0183] The lid 9 is configured to be arranged in an open lid position LP1 and a closed lid position LP2. The lid 9 is configured to allow access to at least the one or more electrical connectors 6a, 6b in the open lid position LP1. Moreover, the lid 9 is configured to cover (see fig. 4C) the one or more electrical connectors 6a in the closed lid position LP2.

[0184] In the various embodiments of figs. 4A-4C, the circuit board displacer 8 comprises and/or is connected to a lid 9. In the embodiments illustrated in fig. 4, the lid 9 is an integrated part (such as by means of moulding) of the circuit board displacer 8, and the lid may thus, as illustrated be integrated with a part of a slide body 11 of the circuit board displacer 8. The lid 9 is attached to/integrated in the circuit board displacer 9 by means of a hinge connection 9c comprising a weakening portion. In other embodiments, other types of hinge connections 9c may be provided, such as a snap hinge connection, a recess/protrusion connection, a rotatable hinge connection and/or the like.

[0185] The lid 9 may in embodiments of the present disclosure be configured to be held/locked in the closed lid position LP2 by means of a lid locking system 9a, 9b.

[0186] As illustrated, the lid 9 may in embodiments of the present disclosure comprise a first mechanical locking part 9a, such as a snap lock part 9a (as illustrated) or a screw.

[0187] The first locking part 9a is configured to engage with a second locking part 9b when the lid 9 is in the closed lid position LP2 so as to maintain the lid 9 in the closed lid position (LP2). The second locking part 9b may e.g. be arranged at or in a part or wall of the insert 12 or at or in the housing 50 (see fig. 3). In fig. 4A, the second locking part 9b comprises a recess, but it may also or alternatively comprise a protrusion. The same applies for the first locking part 9a.

[0188] The lid 9 comprises a gripping part body 9d that can be grabbed and pulled by human hand. Thereby, the circuit board displacer 8 is configured so that a pulling force F1 (see fig. 4B) provided by human hand at the gripping part body 9d, in the longitudinal direction LD of the housing, provides the displacement DP1 of the circuit board displacer 8.

[0189] The circuit board displacer 8, the guiding body 7 and/or the like may be made from or comprise a plastic material. In some embodiments, one or both of these 8,

7 may be configured to be elastic so as to ease operation of the circuit board displacer 8, for example so as to allow engagement and/or disengagements of engaging parts 13a, 13a1. On or more snap connections 9a, 9b, 13a, 13b, or the like may be integrated in the same material.

[0190] The one or more electrical connectors 6a at the circuit board may comprise an engagement side 6s. The connector 6a is configured to receive the connecting part 5, such as a plug or socket, at the engagement side 6a.

[0191] In figs. 4A-4C, the said engagement side 6s faces towards the access opening 4 at least when the circuit board displacer 8 is in the retracted position POS1.

[0192] In one or more embodiments of the present disclosure, the circuit board 2 may comprise a second circuit board end 2E2 distant to the first circuit board 2E1. The one or more electrical connectors 6a may comprise the engagement side 6s for engaging with the connecting part 5 where said engagement side 6s faces away from the second circuit board end 2E2.

[0193] In other embodiments of the present disclosure, the engagement side 6s may e.g. face towards one of the circuit board 2 sides (extending between the ends 2E1, 2E2), or face away from the circuit board 2 plate body.

[0194] The circuit board displacer 8, and hence the circuit board 2, may be configured to reciprocate between the extended position POS2 and the retracted position POS1.

[0195] Figs. 5 and 6 illustrates schematically a perspective view (fig. 5) and a cross section example (fig. 6), respectively of an actuator device 10, according to embodiments of the present disclosure. Here, the actuator device 10 comprises one or more interconnecting, flexible, electrical wire connections 14. This/these 14 may e.g. comprise one or more insulated (electrically insulated) wire connections. These/this wire connections 14 interconnects the circuit board 2 with further electrical equipment 15 in the interior space 12a so as to e.g. provide/transfer electrical power, transfer, command signals, measurement signals and/or the like.

[0196] For example, the further electrical equipment 15 may comprise another circuit board arranged further away from the access opening 4, it may comprise the electrical motor, the battery 30 (if present) and/or the like

[0197] The flexible wire connection 14 may in some embodiments of the present disclosure comprise one or more wire buffer sections 14a. The wire buffer section(s) is/are configured so as to allow a part of the one or more wire connections 14 to move together with the circuit board 2 when the circuit board displacer 8 is displaced in the interior space 12a, in the longitudinal direction, towards the extended position POS2.

[0198] The wire buffer section(s) 14a may e.g. comprise one or more of one or more coiled, bended and/or looped wire section(s) of the wire connection 14.

[0199] The wire connection(s) 14 may in embodiments of the present disclosure comprise one or more flat cables or ribbon cables, such as flat ribbon cables, it may com-

prise one or more individually insulated wires or cables, such as round wires or cables, and/or the like. The individually insulated wires or cables may be bundled together in a wire bundle by one or more bundling means. In the flat cables or ribbon cables, the wires are preferably already held together by the inherent cable structure.

[0200] Fig. 5 moreover illustrates a further embodiment of the present disclosure, where the circuit board 2 comprises a plurality of electrical connectors 6a, 6b at the first circuit board end 2E1. These 6a, 6b are placed side by side and both connectors 6a, 6b comprises the access side 6s facing the access opening (and facing the lid 9 when the lid is in the closed position).

[0201] Figs. 5 and 6 moreover illustrates a further embodiment of the present disclosure, where a part of the end E1 of the actuator device 10 is configured to be continuously covered by an end cover part 95. The end cover part 95 and the lid 9 may hence, when the lid 9 is in the closed lid position LP2, together cover the end E1 of the actuator- When lid 9 is in the open position LP1 and/or when the circuit board displacer is in the extended position, the end cover part 95 may be maintained in the same position to cover a part of the end of the actuator 50.

[0202] The circuit board 2 may in further embodiments comprise one or more hardware switches 35, such as a reset switch, a main on/off switch, a "configure" switch, a pairing switch (for pairing the actuator 10 with another actuator or a wireless remote control) and/or the like. This/these switch(es) 35 may be made more easy accessible when the circuit board 2 is in the extended position POS2. The switch(es) 35 may either be moved out of the service access opening 4 due when the circuit board 2 is in the extended position POS2, or it/they may be accessible by hand through the opening 4 when the circuit board 2 is in the extended position POS2. The part/side of the switch 35 comprising a user interface part to be manipulated by hand may as illustrated face the opening 4 and lid 9 (if present) at least when the circuit board is in the retracted position POS1.

[0203] The switch(es) 35 is placed proximate the first circuit board end 2E1.

[0204] Fig. 7 illustrates schematically a cross section of an actuator device 10 according to embodiments of the present disclosure. Here, an insert 12 comprising an insert housing 12H arrangement, comprising the displacement arrangement comprising the circuit board displacer 8 and the guiding body 7, has been inserted/installed inside an exterior main housing 50, so that the service access opening is arranged at the first housing end E1.

[0205] As can be seen, the entire electrical connector 6a, 6b may be maintained inside the housing 12, 50 when the circuit board displacer 8 is arranged in the predefined, extended position POS2, at a location that is closer to the service access opening 4 than when the circuit board displacer 8 is arranged in the retracted position POS1.

[0206] However, the circuit board 2 and/or the entire electrical connector 6a, 6b may not (as illustrated in fig.

7) enter through the service access opening 4 during the displacement from POS1 to POS2, but may be maintained inside the housing 5 also in the second position POS2. It is understood that in some embodiments, the service access opening 4 may be defined by or enclosed by an outermost housing rim part 50a at the end E1 of the actuator device, which that encloses the opening 4. In some embodiments, this rim part may be provided by an attached part, (not illustrated), such as an annular part, such as a plastic part. This part may be a fixation part or an insert at the housing end E1, which is connected to the housing 50 and/or insert 12. In other embodiments, the service access opening 4 may be enclosed by the housing 50 body rim 50a at the first end.

[0207] Fig. 8 illustrates schematically a cross section of an actuator device 10 according to embodiments of the present disclosure. Here, the electrical connector(s) 6a, 6b is/are arranged partly outside the actuator housing 12, 50 when the circuit board displacer 8 is arranged in the extended position POS2. Hence, the electrical connector(s) 6a, 6b are moved at least partly or fully through the service access opening when the circuit board is displaced DP1 towards the extended position by means of the circuit board displacer 8.

[0208] Fig. 8 moreover illustrates an embodiment of the present disclosure, where the lid 9 is not connected to the circuit board displacer 8. Instead, it 9 is connected (either directly or indirectly) to the housing 50. In some embodiments of the present disclosure, the lid 9 may be connected to or integrated in the guiding body 7 (see e.g. figs. 4-4c and fig 5). In such embodiments, the lid 9 may not be displaced in the longitudinal direction LD of the actuator device housing 50 when the circuit board displacer 8 is displaced.

[0209] Fig. 9 illustrates schematically a cross section of an actuator device 10 according to embodiments of the present disclosure. Here, the lid comprises a retraction prevention part 17a configured to engage with a counterpart 17b so as to prevent the circuit board displacer 8 from returning to the retracted position POS1 when the lid 9 is in the open lid position LP1. The retraction prevention part 17a of the lid 9 engages with the counterpart 17b when the lid is in the open lid position LP1.

[0210] The retraction prevention part 17a may be part of a locking system, or it may in other ways hinder/prevent the circuit board 2 and the circuit board displacer 8 from being returned to the retracted position POS1 (see e.g. POS1 of fig. 4A and 4B.). The retraction prevention part 17a may e.g., in embodiments of the present disclosure, comprise one or more of one or more protrusions, one or more recessed portions in the lid 9, one or more snap lock parts, one or more latches or notches and/or the like.

[0211] In the embodiment of fig. 9, the retraction prevention part 17a acts as a part of a retraction prevention arrangement as e.g. described in relation to figs. 4A-4C, and hence, a retraction prevention arrangement that may include a part of the circuit board displacer and/or a part

of the guiding the guiding body 7 (see 13a and 13a1 of figs. 4A-4C) may be omitted.

[0212] As can be seen from fig. 9 (and several other figures described above), the lid 9 may be connected to, and configured to slide together with, the circuit board displacer 8, thus making it possible to arrange or integrate a part of the retraction prevention arrangement at or in the lid 9.

[0213] It can be seen that the counterpart 17b of the retraction prevention arrangement, in some embodiments of the present disclosure, may e.g. be arranged at a fixed part of the housing 50, such as in an end wall part 17c that is configured so as not to be displaced together with the circuit board displacer 8. In other embodiments (not illustrated) it 17b may be arranged in a tubular housing 50 wall structure, it may be arranged at the guiding body 7 and/or the like.

[0214] Fig. 10 illustrates schematically a cross section of an actuator device 10 according to embodiments of the present disclosure. Here, the electrical connector(s) 6a, 6b is/are arranged fully outside the actuator housing 12, 50 when the circuit board displacer 8 is arranged in the predefined, extended position POS2.

[0215] Fig. 10 moreover illustrates an embodiment of the present disclosure, wherein the power supply 19 comprises a photovoltaic panel 90, the panel 90 may be configured to be arranged at, such as installed at, the fenestration 200, such as the window, at which the fenestration covering device 20 is installed. One or more photovoltaic panel 90 may be installed or retrofitted to be connected to the circuit board 2 by means of the one or more electrical connectors 6a, 6b.

[0216] Fig. 11 illustrates schematically and in perspective a circuit board displacer 8 according to embodiments of the present disclosure. Fig. 11 is seen partly towards the bottom 8b of the sliding body 11.

[0217] The retraction prevention arrangement 13a, 13a1 are illustrated in fig. 11. In this case two protruding parts 13a1, are illustrated, each comprising a wedge surface 26 that inclines relative to and in the longitudinal direction LD when the circuit board displacer 8 is installed. When moving the circuit board displacer 8 towards the extended position POS2, Each wedge surface 26 slides over the related counter-protrusion 13a thereby displacing at least a part of the circuit board displacer 8 in a direction transverse to the longitudinal direction LD of the housing. This is also described in relation to figs. 4A-4C. The displacement of the circuit board displacer 8 in a direction transverse to the longitudinal direction LD of the housing 50 may be allowed due to the resiliency of one or more parts of the circuit board displacer 8 and/or other parts 7, 13a, so that the circuit board displacer may be e.g. be displaced such as pushed into a disengagement position by means of a releasing operation.

[0218] When the circuit board displacer 8 is arranged to rest on/ connected to the guiding body 7, an elongated steering protrusion 13x extending in the longitudinal direction LD, such as parallel to the longitudinal direction

LD, of the circuit board displacer extends into an elongated slit 13y provided by elongated wall parts 13z. In other embodiments of the present disclosure (not illustrated), the steering protrusion may be a pin.

[0219] In some embodiments of the present disclosure (not illustrated), the steering protrusion 13x may be placed at the guiding body 7 and the elongated slit 13y may be provided at/by the circuit board displacer 8 instead.

[0220] As can be seen in fig. 11, the sliding body 11 may in some embodiments comprise a plate shaped, flat sliding body. The sliding body 11 may be elongated and arranged to extend in the longitudinal direction LD when installed.

[0221] One or more snap connections 45x may be configured to hold the circuit board displacer 8 slidably connected to the guiding body 7 when installed. In further embodiments, the one or more fixators 45x, such as snap connections, may additionally be arranged to prevent the circuit board 2 from being removed from the circuit board displacer 8.

[0222] Fig. 12 illustrates schematically a circuit board 2 according to embodiments of the present disclosure, seen towards the major top surface of the circuit board 2. The circuit board comprises the first circuit board end 2E1 and a second circuit board end 2E2 arranged distant to the first circuit board end 2E1.

[0223] The circuit board 2 has a circuit board length 2L extending between the first and second circuit board ends 2E1, 2E2.

[0224] The circuit board length 2L may in embodiments of the present disclosure be more than 4 cm, such as more than 6 cm, such as between 4 cm and 10 cm.

[0225] The one or more connector(s) 6a, 6b and/or switch(es) 35 may in one or more embodiments of the present disclosure be arranged within the 1/7, such as the part/area 80 of the 1/10, such as the 1/15 of the circuit board length 2L that is closes to the first end 2E1. In some embodiments, the one or more connector(s) 6a, 6b and/or switch(es) 35 may be arranged to overlap or be substantially flush with the printed circuit board 2 end 2E1 edge.

[0226] Fig. 13 illustrates schematically the circuit board 2 and circuit board displacer 8 seen towards the first end 2E1 of the circuit board 2. A can be seen, the circuit board displacer may comprise one or more circuit board 2 fixators 45x, such as snap connection parts, for preventing the circuit board 2 from being removed from the displacer 8.

[0227] Fig. 14 illustrates schematically the circuit board 2 and circuit board displacer 8 seen towards the first end 2E1 of the circuit board 2. The guiding body 7 is also illustrated. A can be seen, the guiding body 7 for guiding and/or steering the displacement DP1 of the circuit board displacer 8 may comprise one or more fixators 45x, such as snap connection parts, for preventing the circuit board 2 from being removed from the displacer 8 and for preventing the circuit board displacer 8 from being removed

from the guiding body 7. In this figure 14, the fixators 45x (in this case two but fewer or more 45x may be provided) extends in over the major surface of the circuit board 2, whereby they 45x both prevent the circuit board 2 from being removed from the displacer 8, and prevent the displacer 8 from being removed from the guiding body 7.

[0228] The one or more electrical connector(s) 6a as also described previously, may comprise the connector body CB made from or comprising e.g. a non-electrically conducting material, such as a plastic material, and may comprise one or more metal pins CP or receptacles for providing electrical connections to the circuitry 3 of the circuit board 2.s

[0229] In some embodiments of the present disclosure, one or more soldering connections, screw connections, clips connections and/or the like may directly or indirectly galvanically interconnect the one or more metal pins and/or metal receptacles of the one or more electrical connector(s) 6a to the other electronic circuitry 3 at the circuit board 2. For example through/by means of circuit board tracks such as PCB tracks of the circuit board 2.

[0230] In some embodiments of the present disclosure, the circuit board displacer may be configured to be pulled to the extended position POS2 alone human hand.

[0231] Fig. 15 illustrated a further embodiment of the present disclosure, wherein a movement inducing member 16, such as actuator means, such as a spring member 16, induces the circuit board displacer 8 to move towards the extended position POS2. The actuator means 16 may e.g. be arranged between, and/or attached directly or indirectly to, the guiding body 7 and the circuit board displacer 8. Alternatively, the actuator means 16 may e.g. be arranged between, and/or attached directly or indirectly to, another part of the actuator device 10 and the circuit board displacer 8. Hence, when the lid 9 is opened, the circuit board displacer 8 may, automatically or in response to a user interaction, be pushed or pulled towards the extended position POS2, at least partly or fully by means of the actuator means 16.

[0232] In other embodiments (not illustrated), the lid 9 may be movably connected to the displacement arrangement so that a movement of the lid 9 between the closed and open lid positions LP1, LP2 (see e.g. figs 4A-4C) provides the displacement DP1 of the circuit board displacer. In this embodiment, the lid 9 may e.g. be movably attached to the housing 50 and/or 12 (see e.g. fig. 8 or 10), and a movement inducing member, such as a mechanical connection, may be provided between the circuit board displacer 8 and the lid 9.

[0233] In other embodiments of the present disclosure, the movement inducing member may be omitted, and the displacement DP1 of the circuit board displacer 8 and circuit board 2 between the extended position POS2 and the retracted position POS1 may be configured to be provided/obtained by human hand, e.g. by means of pulling and/or pushing forces in the longitudinal direction LD of the housing which are applied directly or indirectly at the

circuit board displacer 8 or the lid 9.

Items

5 **[0234]** Various embodiments of the present disclosure are moreover described in the below items.

10 1. An actuator device (10) for a fenestration covering arrangement (20), wherein the actuator device (10) comprises an elongated, tubular housing (12, 50) with an interior space (12a),

wherein the elongated, tubular housing (12, 50) extends in a longitudinal direction (LD), and wherein at least a drive arrangement (40) comprising an electric motor (41), and at least one circuit board (2) comprising electronic circuitry (3, 6a, 6b, 18), are arranged in said interior space (12a),

wherein the circuit board (2) is arranged proximate a service access opening (4) located at a first housing end (E1) of the housing (12, 50), wherein the actuator device (10) moreover comprises a circuit board displacer (8), wherein the circuit board (2) is arranged at the circuit board displacer (8),

wherein the circuit board displacer (8) is configured to be displaced (DP1) relative to the housing (12, 50) in a first displacement direction from a retracted position (POS1) and to an extended position (POS2) so that the circuit board (2) is displaced towards the service access opening (4),

wherein the entire circuit board (2) is configured to be arranged inside the housing (12, 50) when the circuit board displacer (8) is arranged at the retracted position (POS1),

wherein the circuit board (2) comprises one or more electrical connectors (6a, 6b), wherein the one or more electrical connectors (6a, 6b) is/are arranged proximate the first end (2E1) of the circuit board (2), and wherein the first end (2E1) of the circuit board is arranged proximate the service access opening (4).

2. An actuator device (10) according to item 1, wherein the circuit board displacer (8) comprises and/or is connected to a lid (9), wherein the lid (9) is configured to be arranged in an open lid position (LP1) and a closed lid position (LP2), wherein the lid (9) is configured to allow access to at least the one or more electrical connectors (6a, 6b) in the open lid position (LP1), and wherein the lid (9) is configured to cover the one or more electrical connectors (6a, 6b) in the closed lid position (LP2).

3. An actuator device (10) according to item 2, wherein the lid (9) is an integrated part of the circuit board

displacer (8), such as integrated with a part of a slide body (11) of the circuit board displacer (8).

4. An actuator device (10) according to item 2 or 3, wherein the lid (9) comprises a first mechanical locking part (9a), such as a snap lock part or a screw, configured to engage with a second locking part (9b), when the lid (9) is in the closed lid position (LP2) so as to maintain the lid (9) in the closed lid position (LP2).

5. An actuator device (10) according to one or more of claims 2-4, wherein the lid (9) comprises a gripping part body (9d) to be grabbed and pulled by human hand, and wherein the circuit board displacer (8) is configured so that a pulling force (F1) provided by human hand at the gripping part body (9d) in the longitudinal direction (LD) of the housing (12, 50) provides the displacement (DP1) of the circuit board displacer (8).

6. An actuator device (10) according to one or more of items 2-5, wherein the lid comprises a retraction prevention part (17a) configured to prevent the circuit board displacer (8) from returning to the retracted position (POS1) when the lid (9) is in the open lid position (LP1).

7. An actuator device (10) according to any of the preceding items, wherein a movement inducing member (16), such as actuator means, such as comprising a spring member, is configured to provide said displacement of the circuit board displacer (8) towards the extended position (POS2).

8. An actuator device (10) according to any of the preceding items, wherein the circuit board displacer (8) comprises slide body (11) configured to support on, and be displaced relative to, one or more support members (13a, 13b) during said displacement (DP1), wherein the circuit board rests on and/or is attached to the slide body (11).

9. An actuator device (10) according to any of the preceding items, wherein a retraction prevention arrangement (13a, 13a1, 17a, 17b), such as a locking arrangement, is configured to prevent the circuit board displacer (8) from returning to the retracted position (POS1) from the extended position (POS2) until a releasing operation has been provided.

10. An actuator device (10) according to item 9, wherein the releasing operation comprises a displacement of at least a part of the circuit board displacer (8), such as the slide (11), in a direction transverse to the longitudinal direction (LD) of the housing.

11. An actuator device (10) according to item 9 or 10 and according to one or more of items 2-6, wherein said releasing operation is configured so as to be controllable and/or triggerable by means of the lid (9).

12. An actuator device (10) according to any of the preceding items, wherein the extended position (POS2) is a predetermined position, and wherein a stop arrangement (13b, 13b1) is configured to limit, such as stop, the circuit board displacer (8) from being displaced further in the first displacement direction (DP1) when the predetermined, extended position (POS2) is reached.

13. An actuator device (10) according to any of the preceding items, wherein the one or more electrical connectors (6a, 6b) comprises an engagement side (6s) for engaging with a connecting part (5), such as a plug or socket, wherein said engagement side (6s) faces towards the access opening (4), at least when the circuit board displacer (8) is in the retracted position (POS1).

14. An actuator device (10) according to any of the preceding items, wherein a displacement limiter arrangement (13b, 13b1, 13c, 13c1) is configured to limit the displacement distance (DIS1) of the circuit board (2) between the retracted position (POS1) and the extended position (POS2) to be no more than 5 cm, such as no more than 3 cm, such as no more than 1.5 cm.

15. An actuator device (10) according to item 14, wherein the displacement limiter arrangement comprises a stop part (13c) configured to limit the displacement of the circuit board (2) when the circuit board (2) is pushed towards the retracted position (POS1).

16. An actuator device (10) according to any of the preceding items, wherein the circuit board (2) is configured to be displaced with a displacement distance (DIS1) of at least 0.5 cm, such as at least 0.9 cm, such as at least 1.2 cm.

17. An actuator device (10) according to any of the preceding items, wherein one or more electrical wire connections (14), such as one or more insulated, flexible, electrical wire connections, interconnects the circuit board (2) with further electrical equipment (15) in the interior space (12a), wherein said flexible wire connection (14) comprises a wire buffer section (14a), such as a coiled, bended and/or looped wire section, wherein the wire buffer section (14a) is configured so as to allow a part of the one or more wire connections (14) to move together with the circuit board (2) when the circuit

board displacer (8) is displaced in the interior space (12a) towards the extended position (POS2).

18. An actuator device (10) according to any of the preceding items, wherein the service access opening (4) has an inner diameter less than 60 mm, such as less than 45 mm, such as less than 37 mm, preferably wherein the access opening has a diameter larger than 15 mm such as larger than 25 mm.

19. An actuator device (10) according to any of the preceding items, wherein the circuit board (2) comprises a second circuit board end (2E2) arranged distant to the first circuit board end (2E1), wherein the length (2L) of the circuit board extending between the first and second circuit board ends (2E1, 2E2) is more than 4 cm, such as more than 6 cm, such as between 4 cm and 10 cm.

20. An actuator device (10) according to any of the preceding items, wherein a guiding body (7) comprises one or more of:

- A retraction prevention part (13a), configured to prevent the circuit board displacer (8) from returning to the retracted position (POS1) from the extended position (POS2) until a releasing operation has been provided,
- a stop part (13b) configured to limit the circuit board displacer (8) from being displaced further in the first displacement direction (DP1) when the extended position (POS2) is reached, and/or
- a stop part (13c) configured to limit, such as stop, the displacement of the circuit board (2) when the circuit board is pushed towards the retracted position (POS1).

21. An actuator device (10) according to any of the preceding items, wherein one or more batteries, such as one or more rechargeable batteries, is arranged inside said housing (12, 50).

22. An actuator device (10) according to any of the preceding items, wherein the circuit board displacer (8) is arranged in, such as integrated in, a circuit board holder (12), such as a circuit board holder insert (12), which is inserted into the end of the housing (50).

23. An actuator device (10) according to any of the preceding items, wherein the entire electrical connector (6a, 6b) is maintained inside the housing (12, 50) when the circuit board displacer (8) is arranged in the extended position (POS2), at a location that is closer to the service access opening (4) than when the circuit board displacer (8) is arranged in the retracted position (POS1).

24. An actuator device (10) according to any of items 1-23, wherein the electrical connector (6a, 6b) is arranged at least partly outside the housing (12, 50) when the circuit board displacer (8) is arranged in the extended position (POS2).

25. An actuator device (10) according to any of the preceding items, wherein the one or more electrical connectors (6a, 6b) at the circuit board (2) comprises one or more plugs and/or one or more sockets for receiving a connecting part (5).

26. An actuator device (10) according to any of the preceding items, wherein the one or more electrical connectors (6a, 6b) comprises at least one connector configured to receive a power supply (19), such as a power supply from a photovoltaic panel (90).

27. An actuator device (10) according to any of the preceding items, wherein the one or more electrical connectors (6a, 6b) comprises at least one connector configured to receive a connecting part (5) which is connected to an antenna.

28. An actuator device (10) according to any of the preceding items, wherein the longitudinal, tubular housing (12, 50) is a motor housing.

29. An actuator device (10) according to any of the preceding items, wherein the one or more electrical connector(s) (6a, 6b) is/are rigidly fixated to the circuit board (2).

30. An actuator device (10) according to any of the preceding items, wherein the one or more electrical connector(s) (6a, 6b) is/are arranged within the 1/7 of, such as the 1/10 of, such as the 1/15 (80) of, the circuit board length (2L) that is closes to the first circuit board end (2E1).

31. An actuator device (10) according to any of the preceding items, wherein the circuit board displacer (8) is configured to be displaced in the longitudinal direction LD of the housing.

32. An actuator device (10) according to any of the preceding items, wherein the circuit board displacer (8) is configured to be displaced in the longitudinal direction LD of the housing to the extended position (POS2) so that the one or more electrical connectors (6a, 6b) is/are more easily accessible at the first (E1) end of the housing (50, 12) than when the circuit board displacer (8) is arranged in the retracted position (POS1).

33. A method of connecting electronic equipment, such as a power supply and/or an antenna, to electric circuitry arranged inside an actuator device (10) ac-

cording to any of the preceding items,
wherein said method comprises the steps of:

- displacing (DP1) the circuit board (2) from the retracted position (POS1), towards the service access opening (4) to the extended position (POS2) by means of the circuit board displacer (8), 5
- connecting one or more connecting parts (5), such as one or more plugs or sockets, to the one or more electrical connectors (6a, 6b), and 10
- displacing the circuit board (2) from the extended position (POS2) to the retracted position (POS1) by means of the circuit board displacer (8). 15

34. A method according to item 33, wherein the method comprises providing a releasing operation so as to release a retraction prevention arrangement (13a, 13a1, 17a, 17b), 20

wherein the retraction prevention arrangement (13a, 13a1, 17a, 17b), such as a locking arrangement, is configured to prevent the circuit board displacer (8) from returning to the retracted position (POS1) from the extended position (POS2) until the releasing operation has been provided, 25

wherein said releasing operation is provided prior to and/or during said displacement of the circuit board (2) from the extended position (POS2) to the retracted position (POS1). 30

35. A method according to item 33 or 34, wherein the method comprises opening a lid (9) to provide the lid (9) into an open lid position (LP1) prior to displacing (DP1) the circuit board (2) from the retracted position (POS1), towards the service access opening (4), 35

wherein said method further comprises providing the lid (9) into the closed lid position either prior to, during or after said displacing of the circuit board (2) from the extended position (POS2) to the retracted position (POS1). 40

36. A method according to any of items 33-35, wherein said displacing (DP1) of the circuit board (2) from the retracted position (POS1) and towards the service access opening (4) involves pulling a gripping part body (9d) of a lid (9). 45

37. A method according to any of items 33-36, wherein the power supply (19) comprises a photovoltaic panel, such as a photovoltaic panel (90) configured to be arranged at, such as installed at, the fenestration (200) or covering arrangement (20) at which the actuator device (10) is installed. 50

38. A fenestration covering arrangement (20), such as a window covering arrangement, such as a sun covering, wherein the fenestration covering arrangement (20) comprises an actuator device (10) according to any of the preceding items, wherein the actuator device (10) is configured so as to move a sun covering part (25), such as a sheet.

39. A fenestration covering arrangement (20) according to item 38, wherein the fenestration covering arrangement comprises or is a sun covering, such as a roller blind, an awning or a roller shutter.

40. A fenestration covering arrangement (20), such as a window covering arrangement, such as a sun covering, wherein the fenestration covering arrangement (20) comprises an elongated, tubular housing (12, 50) with an interior space (12a),

wherein the elongated, tubular housing (12, 50) extends in a longitudinal direction (LD), and wherein at least a drive arrangement (40) comprising an electric motor (41), and at least one circuit board (2) comprising electronic circuitry (3, 6a, 6b, 18), are arranged in said interior space (12a),

wherein the circuit board (2) is arranged proximate a service access opening (4) located at a first housing end (E1) of the housing (12, 50),

wherein the fenestration covering arrangement (20) moreover comprises a circuit board displacer (8), wherein the circuit board (2) is arranged at the circuit board displacer (8),

wherein the circuit board displacer (8) is configured to be displaced (DP1) relative to the housing (12, 50) in a first displacement direction from a retracted position (POS1) and to an extended position (POS2) so that the circuit board (2) is displaced towards the service access opening (4),

wherein the entire circuit board (2) is configured to be arranged inside the housing (12, 50) when the circuit board displacer (8) is arranged at the retracted position (POS1),

wherein the circuit board (2) comprises one or more electrical connectors (6a, 6b), wherein the one or more electrical connectors (6a, 6b) is/are arranged proximate the first end (2E1) of the circuit board (2), and wherein the first end (2E1) of the circuit board is arranged proximate the service access opening (4).

41. A fenestration covering arrangement (20) ac-

cording to item 40, wherein the fenestration covering arrangement (20) comprises an actuator device (10) according to any of items 1-32.

42. A fenestration covering arrangement (20) according to item 40 or 41, wherein the actuator device (10) is configured so as to move a sun covering part (25), such as a sheet, of the fenestration covering arrangement (20).

43. A fenestration (200) comprising a fenestration covering arrangement (20) according to any of items 38-42, wherein the sun covering part (25) is configured to partly or substantially fully cover a major surface (202) of an insulated glass unit (201) of the window.

44. A fenestration (200) according to item 43, wherein the fenestration (200) is a window such as a roof window.

[0235] In general, it is to be understood that the present disclosure is not limited to the particular examples described above but may be adapted in a multitude of varieties within the scope of the invention as specified in e.g. the claims and/or items. Accordingly, for example, one or more of the embodiments described above and/or the embodiments described in the claims and/or items may be combined to provide further embodiments of the present disclosure.

Claims

1. An actuator device (10) for a fenestration covering arrangement (20), wherein the actuator device (10) comprises an elongated, tubular housing (12, 50) with an interior space (12a),

wherein the elongated, tubular housing (12, 50) extends in a longitudinal direction (LD), and wherein at least a drive arrangement (40) comprising an electric motor (41), and at least one circuit board (2) comprising electronic circuitry (3, 6a, 6b, 18), are arranged in said interior space (12a),

wherein the circuit board (2) is arranged proximate a service access opening (4) located at a first housing end (E1) of the housing (12, 50), wherein the actuator device (10) moreover comprises a circuit board displacer (8), wherein the circuit board (2) is arranged at the circuit board displacer (8),

wherein the circuit board displacer (8) is configured to be displaced (DP1) relative to the housing (12, 50) in a first displacement direction from a retracted position (POS1) and to an extended position (POS2) so that the circuit board (2) is

displaced towards the service access opening (4),

wherein the entire circuit board (2) is configured to be arranged inside the housing (12, 50) when the circuit board displacer (8) is arranged at the retracted position (POS1),

wherein the circuit board (2) comprises one or more electrical connectors (6a, 6b), wherein the one or more electrical connectors (6a, 6b) is/are arranged proximate the first end (2E1) of the circuit board (2), and wherein the first end (2E1) of the circuit board is arranged proximate the service access opening (4).

2. An actuator device (10) according to claim 1, wherein the circuit board displacer (8) comprises and/or is connected to a lid (9), wherein the lid (9) is configured to be arranged in an open lid position (LP1) and a closed lid position (LP2), wherein the lid (9) is configured to allow access to at least the one or more electrical connectors (6a, 6b) in the open lid position (LP1), and wherein the lid (9) is configured to cover the one or more electrical connectors (6a, 6b) in the closed lid position (LP2).

3. An actuator device (10) according to claim 2, wherein the lid (9) is an integrated part of the circuit board displacer (8), such as integrated with a part of a slide body (11) of the circuit board displacer (8).

4. An actuator device (10) according to claim 2 or 3, wherein the lid (9) comprises a first mechanical locking part (9a), such as a snap lock part or a screw, configured to engage with a second locking part (9b), when the lid (9) is in the closed lid position (LP2) so as to maintain the lid (9) in the closed lid position (LP2).

5. An actuator device (10) according to one or more of claims 2-4, wherein the lid (9) comprises a gripping part body (9d) to be grabbed and pulled by human hand, and wherein the circuit board displacer (8) is configured so that a pulling force (F1) provided by human hand at the gripping part body (9d) in the longitudinal direction (LD) of the housing (12, 50) provides the displacement (DP1) of the circuit board displacer (8).

6. An actuator device (10) according to any of the preceding claims, wherein a retraction prevention arrangement (13a, 13a1, 17a, 17b), such as a locking arrangement, is configured to prevent the circuit board displacer (8) from returning to the retracted position (POS1) from the extended position (POS2) until a releasing operation has been provided.

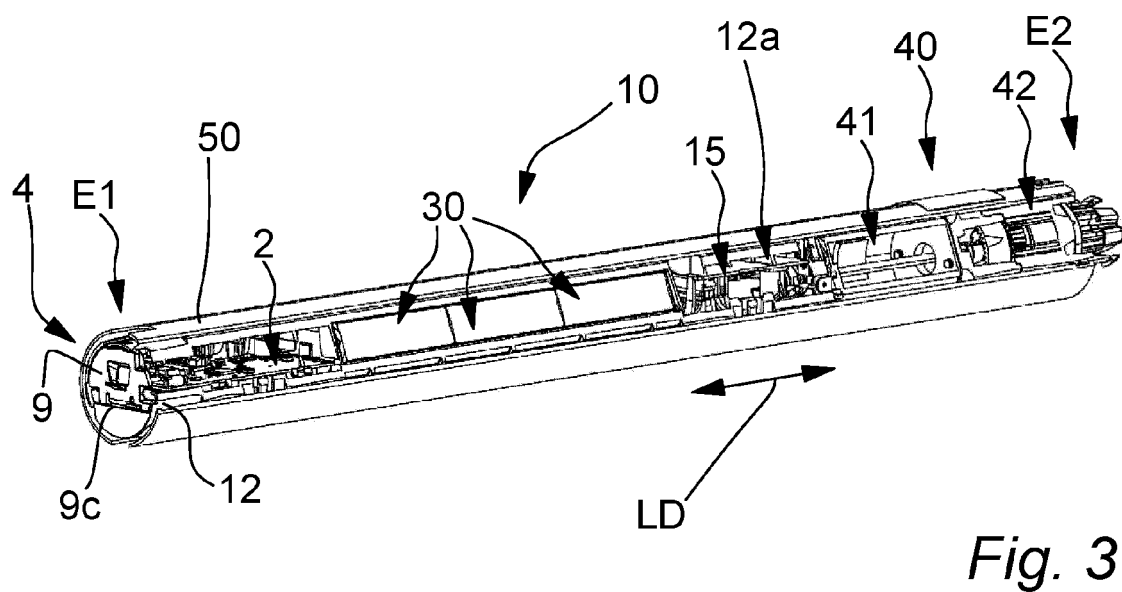
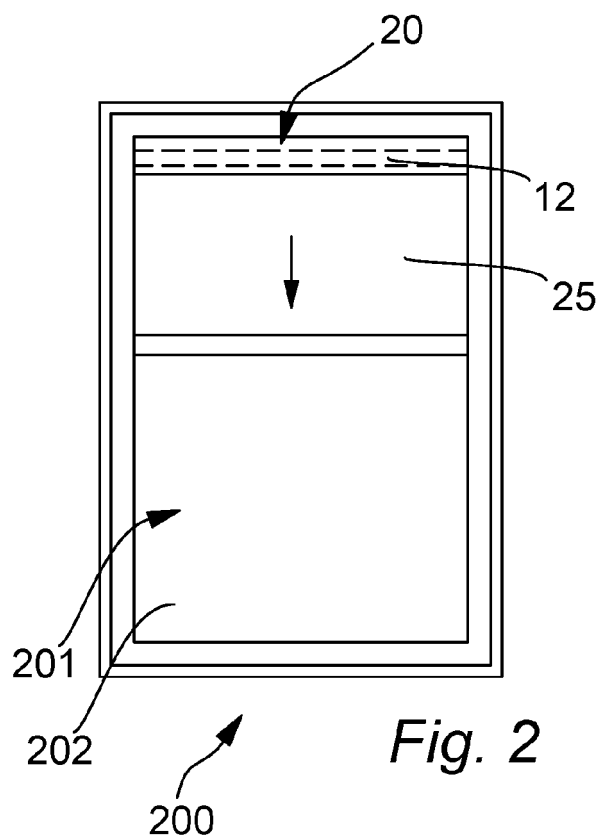
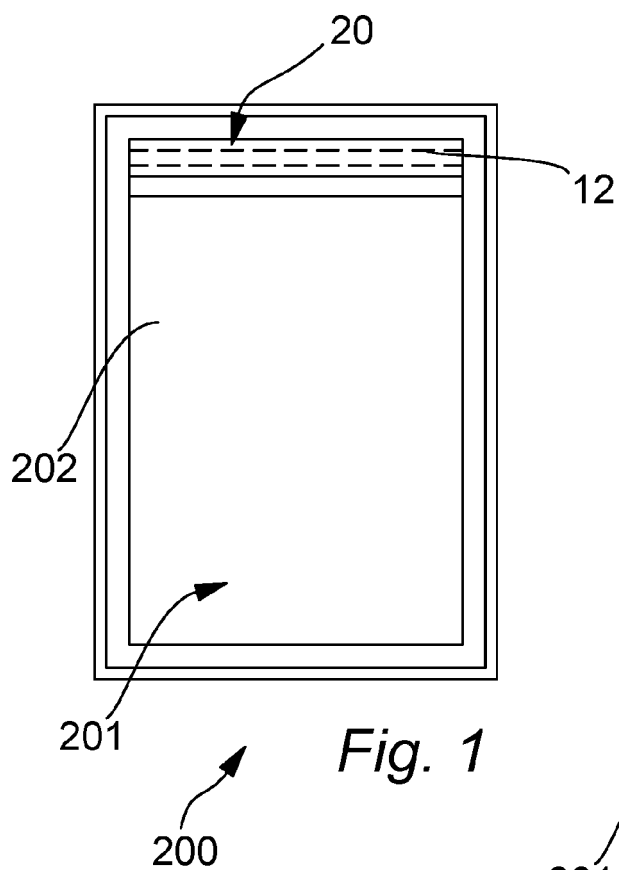
7. An actuator device (10) according to claim 6 and according to one or more of claims 2-5, wherein said

releasing operation is configured so as to be controllable and/or triggerable by means of the lid (9).

8. An actuator device (10) according to any of the preceding claims, wherein the extended position (POS2) is a predetermined position, and wherein a stop arrangement (13b, 13b1) is configured to limit, such as stop, the circuit board displacer (8) from being displaced further in the first displacement direction (DP1) when the predetermined, extended position (POS2) is reached. 5
9. An actuator device (10) according to any of the preceding claims, wherein the one or more electrical connectors (6a, 6b) comprises an engagement side (6s) for engaging with a connecting part (5), such as a plug or socket, wherein said engagement side (6s) faces towards the access opening (4), at least when the circuit board displacer (8) is in the retracted position (POS1). 10 15 20
10. An actuator device (10) according to any of the preceding claims, wherein a displacement limiter arrangement (13b, 13b1, 13c, 13c1) is configured to limit the displacement distance (DIS1) of the circuit board (2) between the retracted position (POS1) and the extended position (POS2) to be no more than 5 cm, such as no more than 3 cm, such as no more than 1.5 cm. 25 30
11. An actuator device (10) according to any of the preceding claims, wherein one or more electrical wire connections (14), such as one or more insulated, flexible, electrical wire connections, interconnects the circuit board (2) with further electrical equipment (15) in the interior space (12a), wherein said flexible wire connection (14) comprises a wire buffer section (14a), such as a coiled, bended and/or looped wire section, wherein the wire buffer section (14a) is configured so as to allow a part of the one or more wire connections (14) to move together with the circuit board (2) when the circuit board displacer (8) is displaced in the interior space (12a) towards the extended position (POS2). 35 40 45
12. A method of connecting electronic equipment, such as a power supply (19, 90) and/or an antenna, to electric circuitry arranged inside an actuator device (10) according to any of the preceding claims, wherein said method comprises the steps of 50
 - displacing (DP1) the circuit board (2) from the retracted position (POS1), towards the service access opening (4) to the extended position (POS2) by means of the circuit board displacer (8), 55
 - connecting one or more connecting parts (5), such as one or more plugs or sockets, to the one

or more electrical connectors (6a, 6b), and
 - displacing the circuit board (2) from the extended position (POS2) to the retracted position (POS1) by means of the circuit board displacer (8).

13. A method according to claim 12, wherein the method comprises providing a releasing operation so as to release a retraction prevention arrangement (13a, 13a1, 17a, 17b),
 wherein the retraction prevention arrangement (13a, 13a1, 17a, 17b), such as a locking arrangement, is configured to prevent the circuit board displacer (8) from returning to the retracted position (POS1) from the extended position (POS2) until the releasing operation has been provided,
 such as wherein said releasing operation is provided prior to and/or during said displacement of the circuit board (2) from the extended position (POS2) to the retracted position (POS1).
14. A fenestration covering arrangement (20), such as a window covering arrangement, such as a sun covering, wherein the fenestration covering arrangement (20) comprises an actuator device (10) according to any of the preceding claims, wherein the actuator device (10) is configured so as to move a sun covering part (25), such as a sheet, of the fenestration covering arrangement (20).
15. A fenestration (200), such as a window, comprising a fenestration covering arrangement (20) according to claim 14, wherein the sun covering part (25) is configured to partly or substantially fully cover a major surface (202) of an insulated glass unit (201) of the fenestration (200).



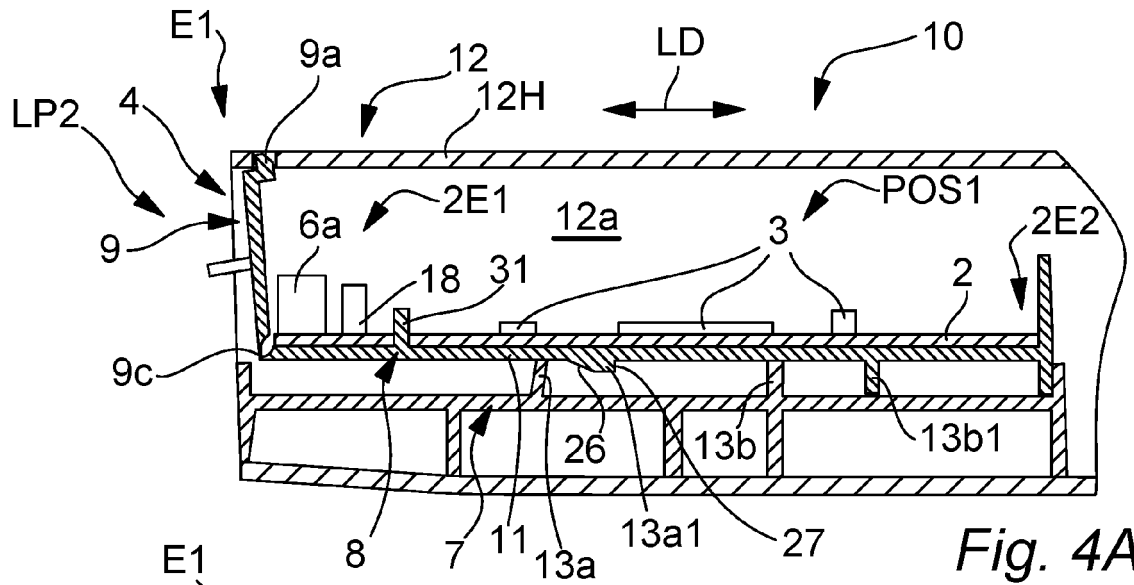


Fig. 4A

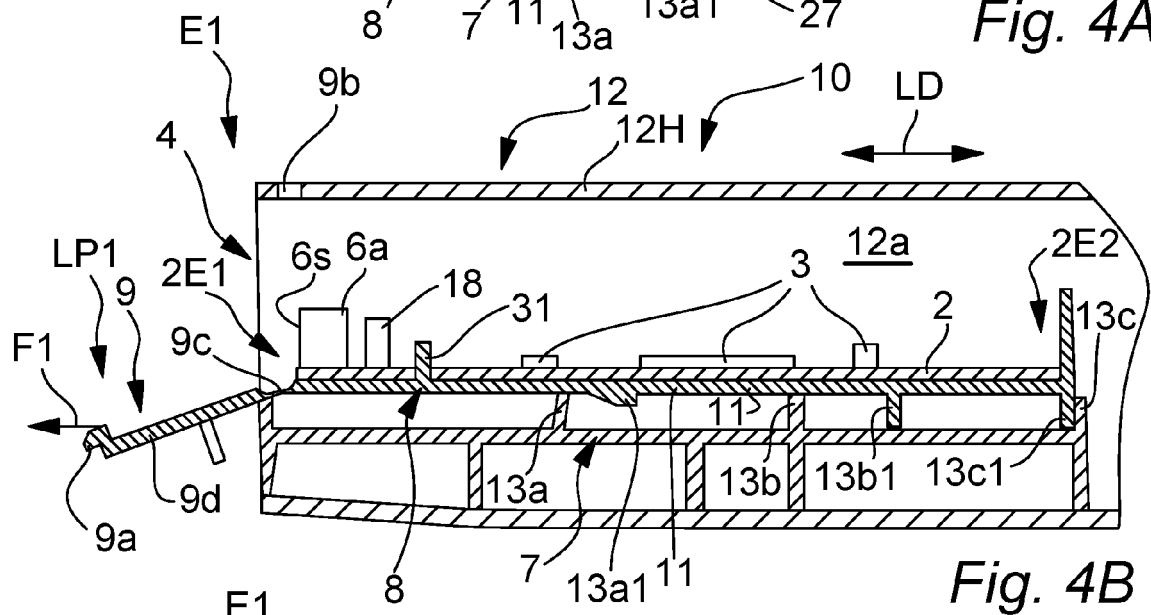


Fig. 4B

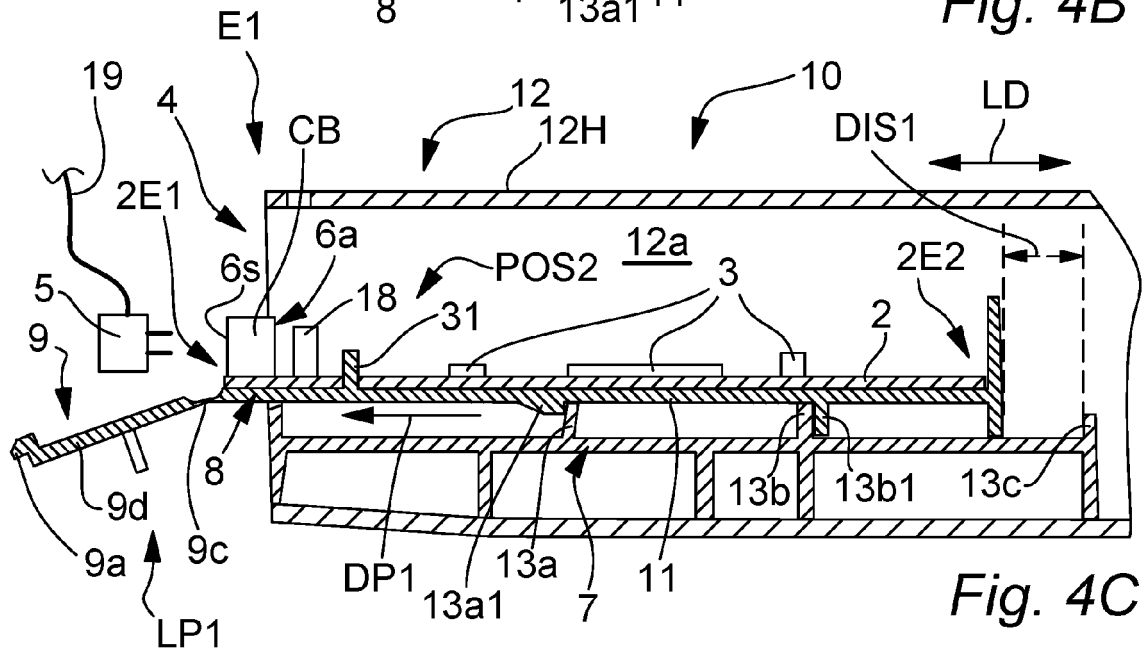
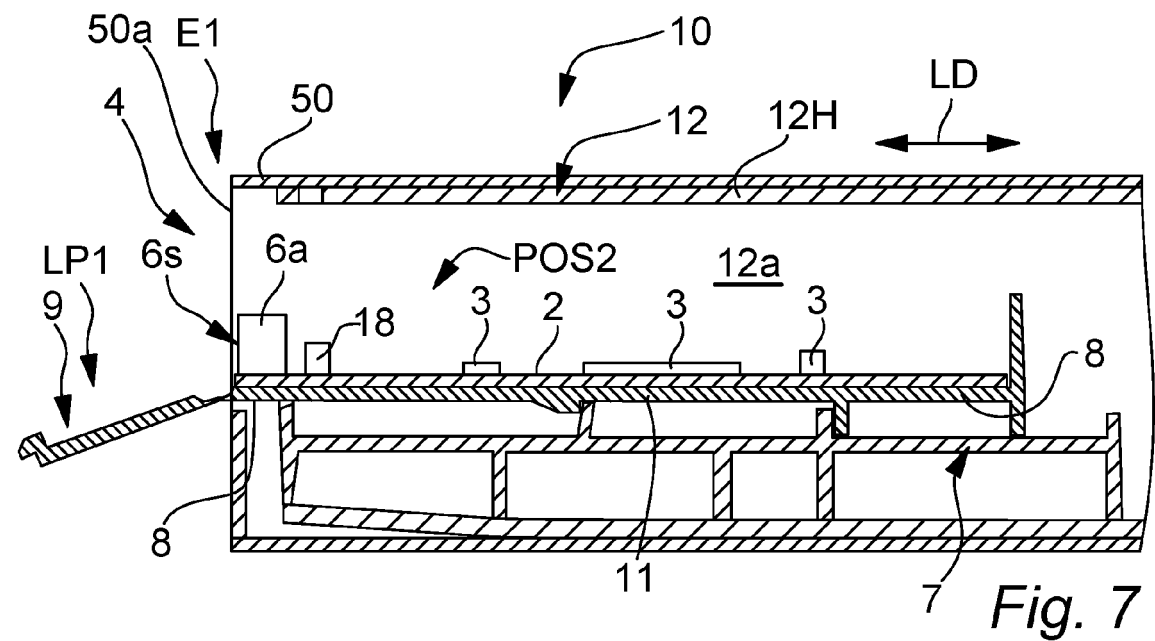
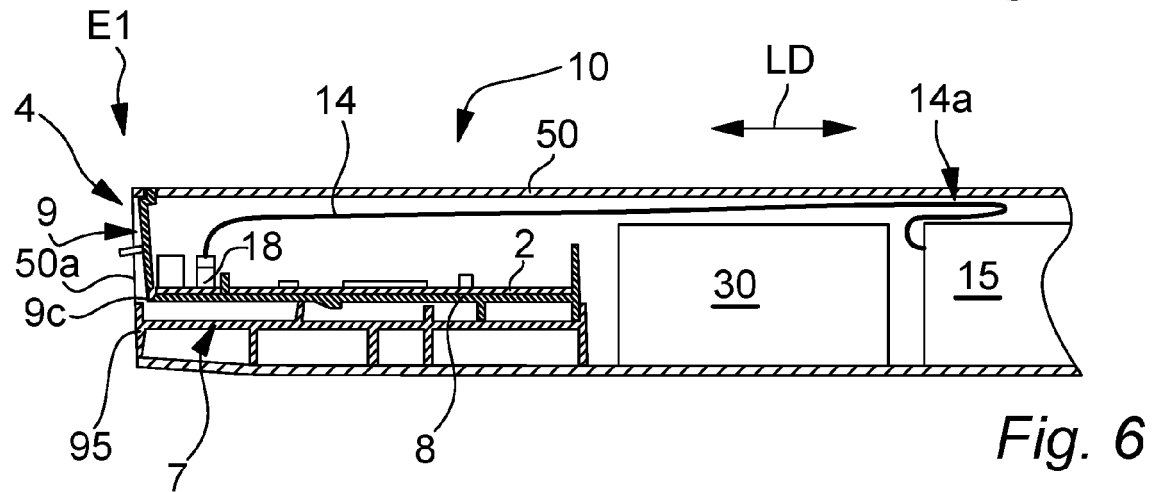
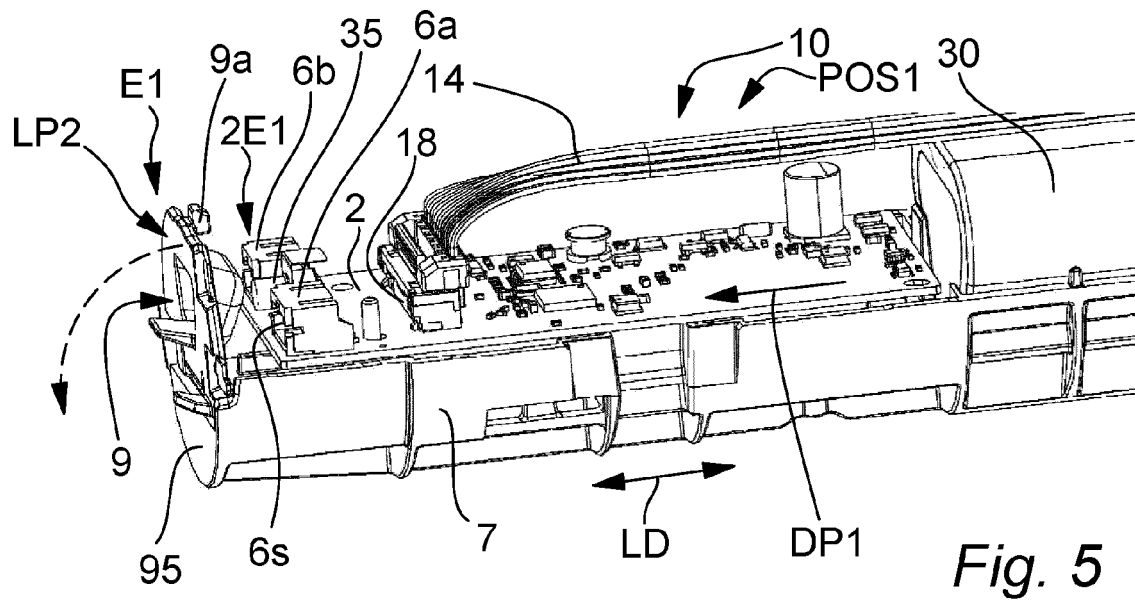


Fig. 4C



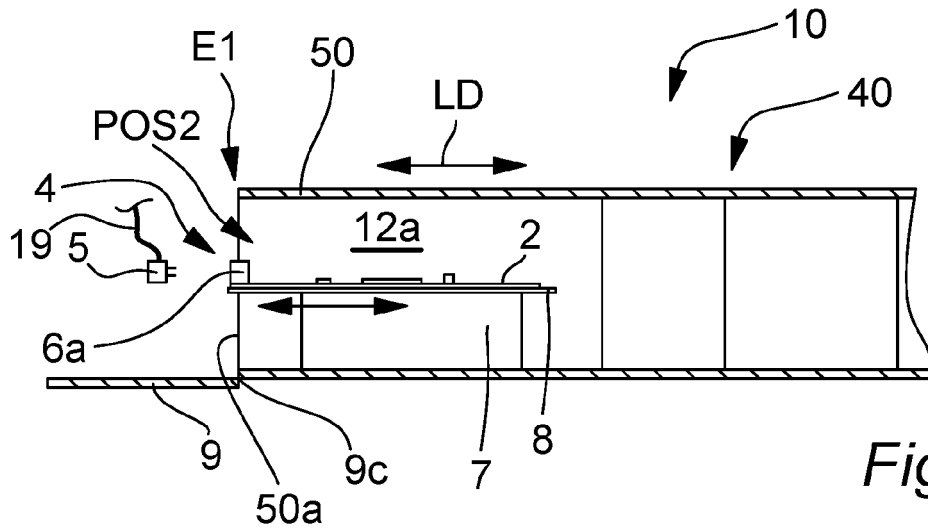


Fig. 8

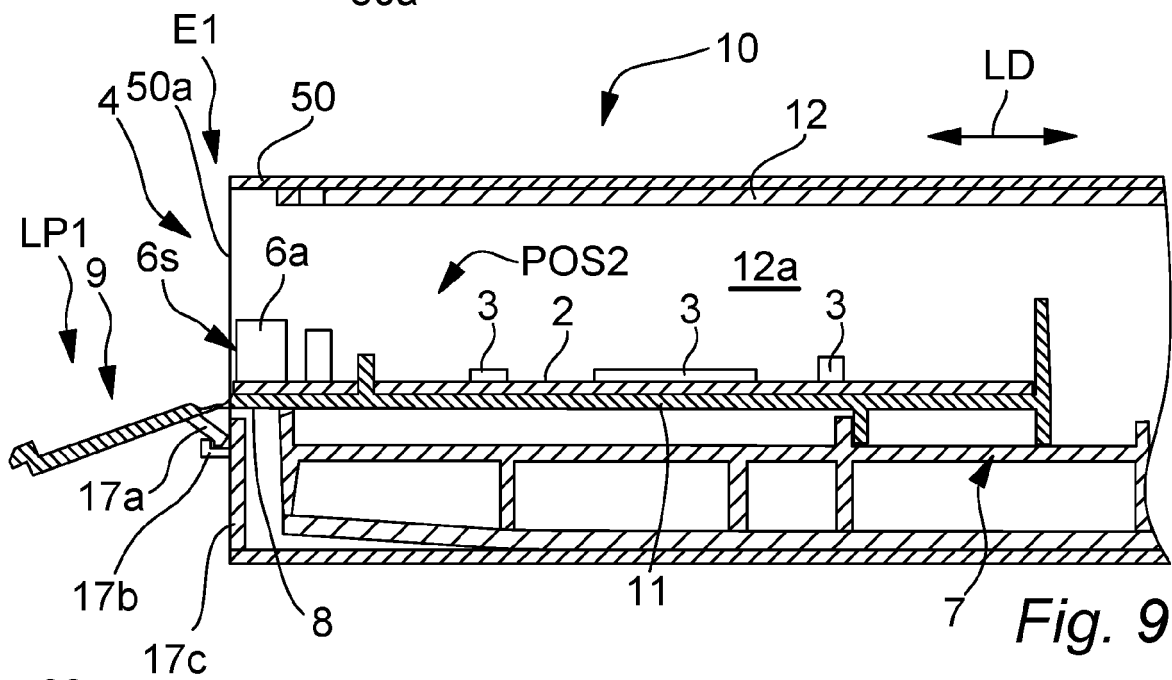


Fig. 9

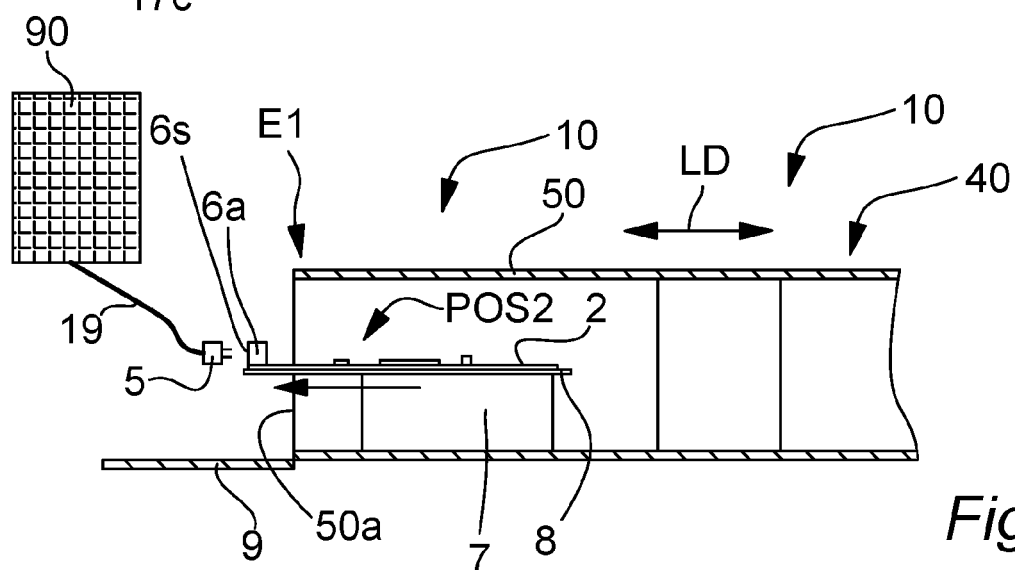
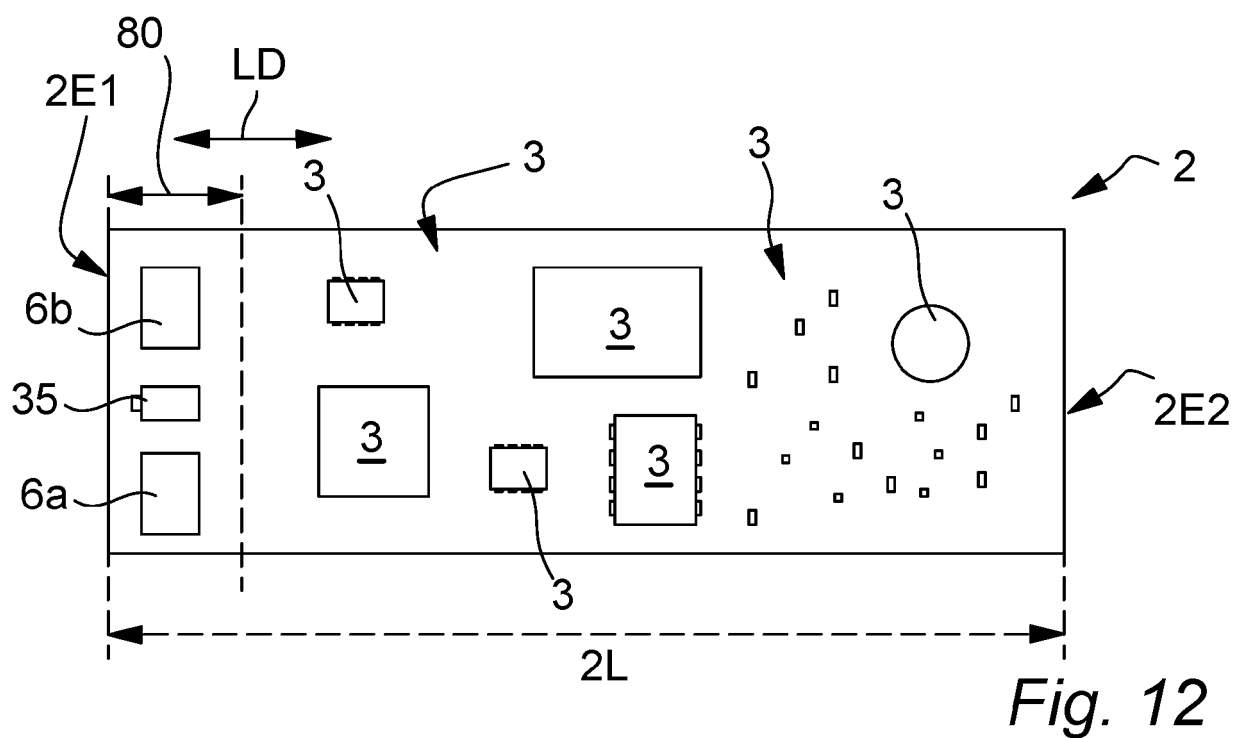
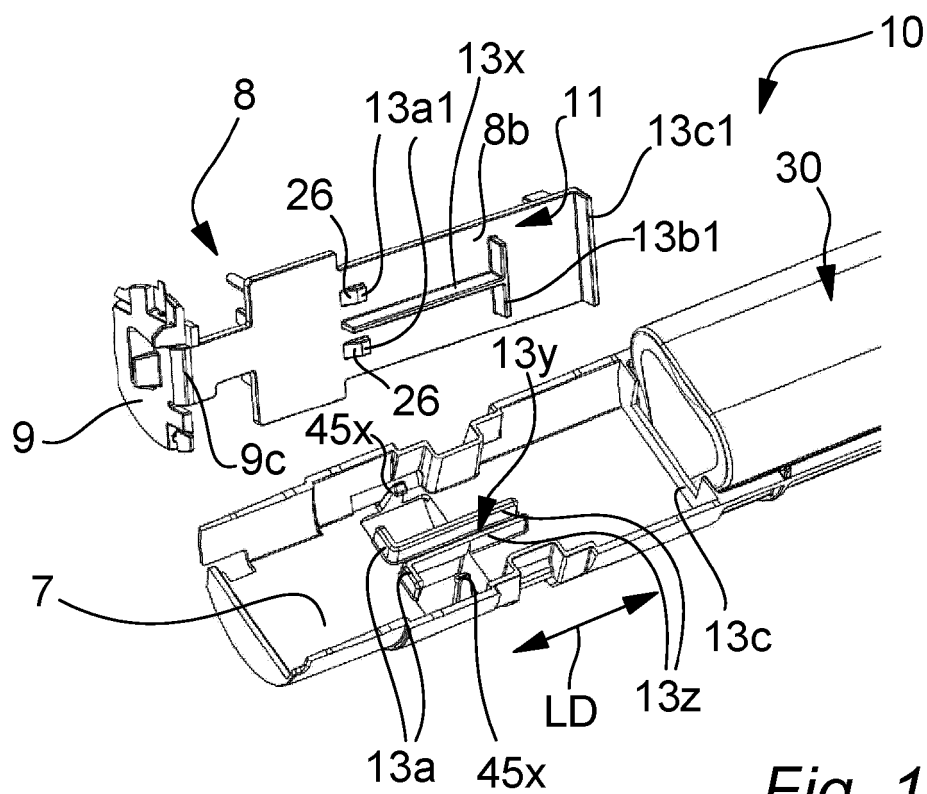


Fig. 10



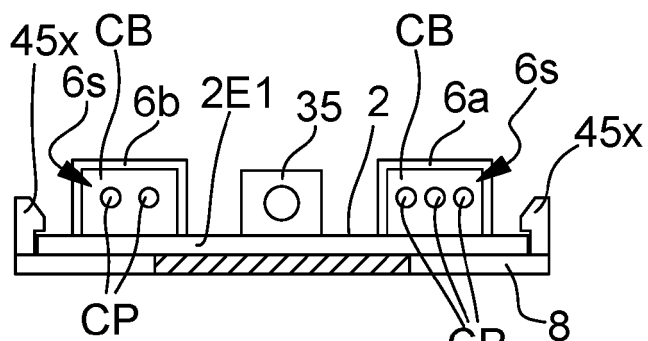


Fig. 13

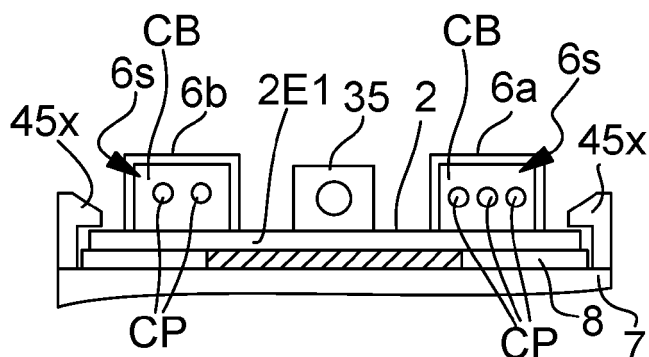


Fig. 14

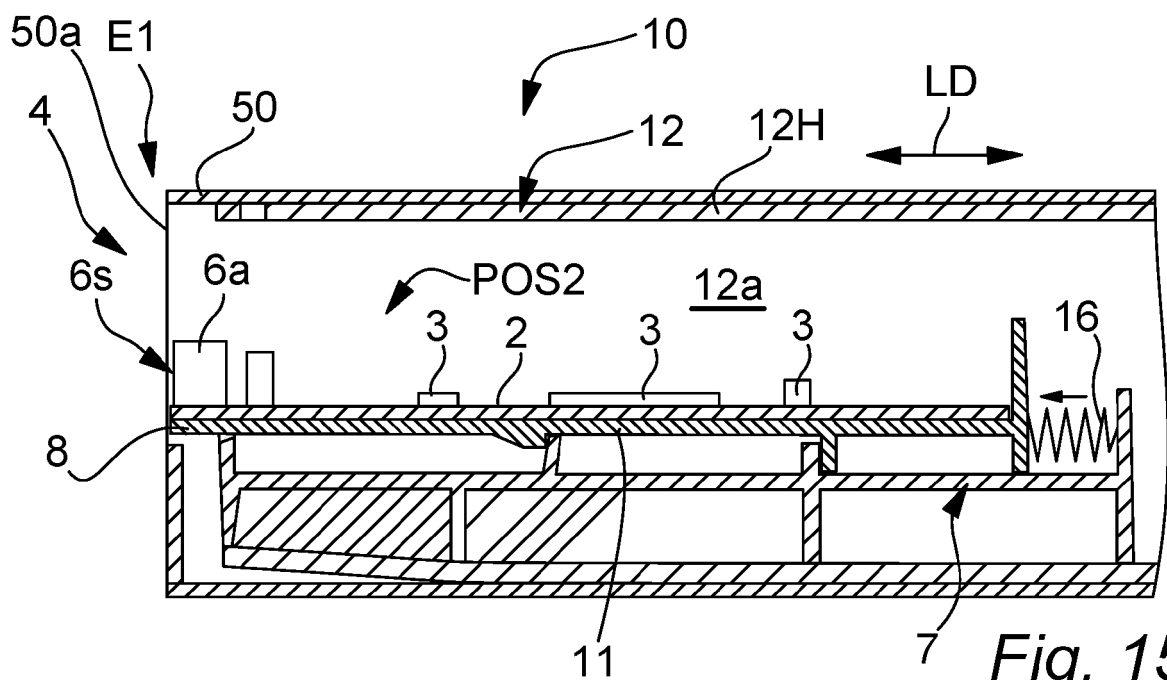


Fig. 15



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Application Number

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A,D	US 2017/167191 A1 (BODET FLORIAN [FR] ET AL) 15 June 2017 (2017-06-15) * paragraphs [0049], [0119]; figures 3-6 *	1-15	
			TECHNICAL FIELDS SEARCHED (IPC)
			E06B H01R
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 18 September 2023	Examiner Kofoed, Peter
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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ON EUROPEAN PATENT APPLICATION NO.**

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