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(54) **FABRIC SUNBLIND SYSTEM FOR CURTAIN WALL CONSTRUCTIONS**

(57) A system (400) for a fabric sunblind, comprising modules (600), wherein a module (600) comprises:
- a screen roller (601) that can be rotated about an axis direction;
- a screen that can be rolled up onto and down from the screen roller (601);
- a casing (602) comprising surfaces that are substantially parallel to the axis direction;
- a first end face element (603) situated in a plane that is substantially perpendicular to the axis direction, wherein the first end face element (603) comprises a support element and a female connecting element (609), and
- a second end face element (604) situated in a plane that is substantially perpendicular to the axis direction, wherein the second end face element (604) comprises a support element and a male connecting element (610), wherein the module (600) forms a unit bounded by the casing (602), the first end face element and the second end face element (603 and 604, respectively); and in mounted condition the modules (600) are slidably connected to each other via the male connecting element (610) and the female connecting element (609).

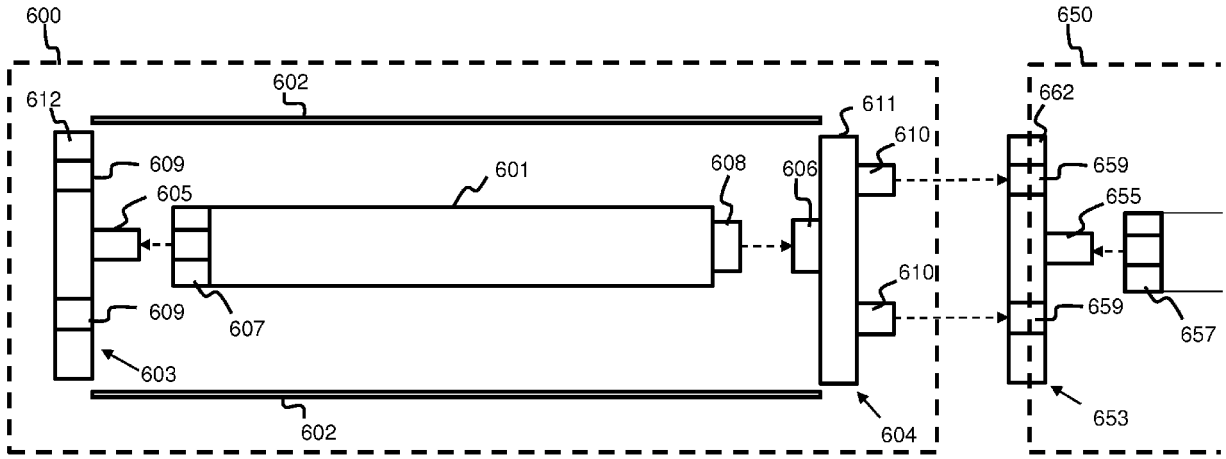

Fig. 6

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Description

Field of the invention

[0001] The present invention generally relates to a system for a fabric sunblind, in other words: a system including a sunblind made of fabric material that is placed at the exterior of a building. In particular the invention relates to a system for a fabric sunblind that is suitable for curtain wall constructions, with a limited installation time per individual system, and with a limited measure of freedom during installation.

Background of the Invention

[0002] The use of curtain walls is an increasingly popular trend in construction. A curtain wall is a non-bearing façade built up from a lightweight material, usually glass. The large quantity of glass, however, does require a solution for keeping the building cool during sunshine. A fabric sunblind, wherein a sunblind consisting of fabric material is arranged at the exterior of the windowpane, is an efficient solution.

[0003] For regular windows that are for instance placed within a brickwork fagade, various standard products for fabric sunblinds are available. The standard solutions for windows, however, cannot be used for a curtain wall just like that. Covering the entire surface area of the curtain wall for instance, requires a large number of fabric sunblind systems to be placed next to each other. However, within the curtain wall only a narrow connecting profile is present between two glass surfaces, resulting in limited space for arranging a vertical guide rail for the fabric screens.

[0004] In addition, placing each individual fabric sunblind system requires a specific installation time, so that in the case of curtain walls requiring a large number of fabric sunblind systems to be placed, the installation time (and as a consequence the installation costs) may increase a lot.

[0005] To conclude with, the producer of the fabric sunblind system is dependent on an external fitter for the installation. Considering the complexity of the installation, which includes many separate parts that need to be placed correctly and accurately, errors or inaccuracies may occur during the various steps in the installation process. As a consequence, the producer currently does not have full control over the delivered quality.

[0006] As a consequence, there is a general need for a solution for fabric sunblinds suitable for curtain walls, wherein the installation time per individual system is limited, and wherein the manufacturer has greater control over the delivered quality after installation.

[0007] Fabric sunblind systems are known, the design of which is bespoke and which are made for a specific curtain wall project. Renson, for instance, has designed and installed such a bespoke solution for a curtain wall construction, as represented in Figure 1, Figure 2 and Figure 3. In this known bespoke solution, use is made of a double-a sided vertical profile 30. This double-sided vertical profile 30 comprises a groove guide rail 31 on two sides allowing to guide both adjacent screens, without having to use two vertical one-sided channels. By mounting it on the vertical component 33, the vertical profile 30 is positioned between two glass surfaces 32 of the curtain wall. The screen roller, including the screen that can be rolled up and rolled down, is placed inside a horizontal casing 10, wherein on one side the casing 10 is fixedly positioned relative to the vertical profile 30. Furthermore, on one side at the location of the end face, the casing 10 is closed off by an end face plate 21. Tabs 20 are provided on this end face plate 21 which tabs allow the next casing 10 to connect. Once installed, this also allows the casings 10 to shift relative to each other to set off thermal expansion. This bespoke solution by Renson is suitable for a curtain wall construction. However, considering the fact that in this solution all parts are supplied individually (horizontal casings, screen rollers, motors, vertical guide rails, etc.) it requires the external fitter to carry out a lot of actions during installation (placing the casing, securing it, positioning the screen roller in the casing, etc.). The fitter also needs to decide on a number of things himself, for instance how to extend the electricity cable from the casing or where to house a Hirschmann plug. As a consequence, the installation of this known bespoke solution requires a lot of time, and due to the large measure of freedom during installation there is a lot of room for errors and inaccuracies.

[0008] Another fabric sunblind system is described in EP0576933. A solution is described where several awnings may be combined into a series system, allowing to cover a large area. Each individual awning has two bearing brackets for supporting the winding shaft. A bearing bracket of one awning is connected to a bearing bracket of an adjacent awning by means of a specifically designed coupling device and connecting piece. The latter connecting piece also allows to connect with a guiding rail between the two adjacent awnings. This solution has the advantage that every individual awning can be dismantled separately, without affecting the other awnings. However, it requires the assembly of multiple individual parts: coupling devices and connecting pieces need to be mounted, covers need to be plugged, screws need to be applied to secure adjacent bearing brackets, the connecting pieces and the coupling devices, etc. This results in an increased installation time. Moreover, two end shields of adjacent bearing brackets are secured to each other, such that awnings are held in a fixed position relative to each other. Consequently, once installed, differences in thermal expansion cannot being compensated for, which may result in stresses and for instance breaking of the glass of the curtain wall.

[0009] It is an object of the present invention to describe a system for fabric sunblinds that overcomes one or more of the above-mentioned drawbacks of the solutions in the state of the art. More specifically, it is an object

of the present invention to describe a system for fabric sunblinds that is suitable for curtain walls, requiring a limited installation time per individual system, and having a limited measure of freedom during installation.

Summary of the Invention

[0010] According to the present invention the objects identified above are achieved by a system for a fabric sunblind as defined in claim 1, wherein this system comprises modules, and wherein a module comprises:

- a screen roller that can be rotated about an axis direction;
- a screen that can be rolled up onto and down from this screen roller;
- a casing comprising surfaces that are substantially parallel to said axis direction;
- a first end face element situated in a plane that is substantially perpendicular to the axis direction, wherein the first end face element comprises:
    - ◦ a support element adapted for supporting the screen roller; and
    - ◦ a female connecting element, and
- a second end face element situated in a plane that is substantially perpendicular to the axis direction, wherein the second end face element comprises:
    - ◦ a support element adapted for supporting the screen roller; and
    - ◦ a male connecting element,

  wherein
    - the module forms a unit bounded by the casing, the first end face element and the second end face element; and
    - in mounted condition the modules are slidably connected to each other via the male connecting element and the female connecting element.

[0011] In other words: the invention relates to a system for a fabric sunblind comprising modules. A module comprises the screen roller including a screen that can be rolled up and rolled down, and is bounded parallel to the axis direction of the screen roller by a casing. At the surfaces that are substantially perpendicular to the axis direction, each module is bounded by a first end face element and a second end face element. This may for instance be a plate or casting that is attached to the casing. Both end face elements each comprise a support element serving to support the screen roller. For instance, this is a pin over which the opening of a slide bearing is slid, or a slide in which an outer end of the screen roller is positioned. A module forms an individual unit bounded by the casing and both end face elements. The module does not necessarily have to be hermetically closed, but does form a unit in which the screen roller and other parts are mounted beforehand such that the casing or end face elements do not need to be opened anymore during installation. This permits the internal elements, such as for instance the screen roller, a screen motor or electric wiring, to be correctly positioned within the module prior to the installation. In that way modules including all components present inside of it can be manufactured prefab and assembled. The advantage of this is that during installation a lesser measure of freedom is left, providing the manufacturer with greater control over the quality delivered. Installing such prefab modules also requires fewer actions during installation, which is beneficial to the installation time.

[0012] Furthermore, each module comprises a female connecting element, present within the first end face element, and a male connecting element, present within the second end face element. During installation the modules are linked to each other via the female and male connecting element. In a possible embodiment, the female connecting element is for instance configured as holes, and the male connecting element is for instance configured as pins, wherein during mounting the pins slide in the corresponding holes. In another embodiment, the female connecting element for instance comprises a profile having an O-, U-, or Z-cross-section, and in which a male connecting element of a corresponding cross-section can be slid. In yet another embodiment the female connecting element comprises a groove or slit, whereas the male connecting element comprises a slat that can be slid into the groove or slit. Providing male and female connecting elements that slide into each other permits making a connection between the adjacent modules in a compact manner, which makes the system suitable for curtain walls wherein the consecutive fabric screens need to connect closely to each other. This also contributes to a quick installation, wherein prefab modules simply need to be slid into each other during placement. Moreover, this permits a simple installation with less risk of inaccuracies. Sliding male connecting elements into female connecting elements for instance contributes to a correct alignment of the modules relative to each other.

[0013] In the mounted condition the modules are slidably connected to each other via the male and the female connecting element. This means that after mounting, sliding, namely a relative linear movement according to the axis direction, is still possible. The modules therefore are not fixedly attached to each other during mounting; they are not screwed to each other for instance. In a possible embodiment, for instance the second end face element is fixedly positioned relative to the surrounding area of the system, whereas in case the casing expands thermally, the first end face element shifts towards the second end face element of the adjacent module. The female connecting elements (for instance holes, hollow profiles, grooves, ...) may then for instance slide over the male connecting elements (for instance pins, hollow or solid

profiles, slats, ...). Connecting the modules to each other so as to slide, permits setting off the differences in thermal expansion once installed, and in that way prevent that stress might arise and for instance the glass of the curtain wall might break. Moreover, a slit between adjacent modules, for setting off thermal expansion after installation, can easily be provided by not sliding the adjacent casings entirely against each other when connecting the modules. If in case of a bespoke design the modules are dimensioned such that the casings of the linked modules do not take up the full length of the curtain wall, slits between the modules will arise of their own accord during installation. In that way the fitter is automatically assisted in providing a solution for setting off thermal expansion/shrinkage.

[0014] Optionally, as defined by claim 2, the module further comprises a securing element intended for securing the module relative to the surrounding area of the system. This securing element is for instance configured as openings arranged in the second end face element, so that the module can be screwed to an existing construction by means of screws through these openings. Due to the presence of such a securing element on the module, the simplicity and speed of installation is improved.

[0015] Optionally, as defined by claim 3, the first end face element comprises a plate that is substantially perpendicular to the axis direction, and the female connecting element is configured as holes arranged in this plate. For instance, three holes are provided, wherein each hole is arranged in a different corner point of the plate. Also optionally, according to claim 3, the second end face element comprises a casting having an end face that is substantially perpendicular to the axis direction, and the male connecting element is configured as pins arranged substantially perpendicular to this end face. For instance, three pins are provided, wherein each pin is arranged in a different corner point of the end face of the casting. Also optionally, according to claim 3, in the mounted condition the pins are slid into the holes. Such a manner of connecting, using pins that slide into holes, permits a simple and quick installation of the modules, and contributes to the modules being correctly aligned. Moreover, a design having for instance three pins may contribute to space being left to exit an electrical cable via the casting. This also contributes to the simplicity and speed of installation.

[0016] Optionally, according to claim 4, the pins serving as male connecting elements have a length of at least five millimeters when measured according to the axis direction. In that way it is possible to provide a slit of approximately five millimeters between adjacent modules, which is appropriate for setting off thermal expansion of an aluminum casing.

[0017] Optionally, as defined by claim 5, the support element within the first end face element is a pin placed according to the axis direction, adapted for supporting the bearing of the screen roller, and wherein this bearing is slidable over the pin according to the axis direction. The screen roller for instance has a slide bearing, wherein the opening of this slide bearing is slid over the pin in order to support the screen roller in that way. Moreover, this bearing is also able to slide over the pin after mounting. This permits that in case of a difference in thermal expansion between the casing (for instance made of aluminum) and the screen roller (for instance made of steel) the screen roller is able to slide over the pin. Such mounting of the screen roller bearing over the pin can already take place prefab. This contributes to limiting the measure of freedom during installation and limiting the installation time.

[0018] Optionally, according to claim 6, the screen roller further comprises a motor that is placed on the motor side of said screen roller. Such a motor, for instance an electromotor configured as tubular motor, permits making an automated operation of the fabric sunblind system possible. Also optionally according to claim 6, the support element within the second end face element is a motor slide in which the motor side of the screen roller is positioned. The screen roller is for instance fixedly positioned in the motor slide, wherein differences in thermal expansion between the casing and screen roller on the bearing side of the screen roller need to be set off.

[0019] Optionally, as defined by claim 7, a module comprises a cover adapted for in mounted condition covering an opening between the casings of linked modules. A cover is for instance built up from surfaces that are placed over the surfaces of the casing at the location of the connection between linked modules. The advantage of such a cover is that the expansion slit between two modules becomes invisible, whereas the sliding of the modules relative to each other in case of thermal expansion is still possible. This also contributes to a solution that is more attractive to the eye.

[0020] Optionally, according to claim 8, the cover is attached to the second end face element at surfaces that are substantially parallel to the casing by means of a snap system. A snap system permits a simple and quick mounting, which contributes to the quality of installation and limiting the installation time.

[0021] Optionally, according to claim 9, a module further comprises an electrical cable. Such an electrical cable permits supplying electric power from outside of the system to the screen motor inside the module. The cable is for instance connected to the motor inside the module and exits through the second end face element. In that way, the module can be supplied prefab with the motor inside it, wherein the cable exits the module or a connection for an external cable is provided on the module. As a consequence, the fitter can easily make the connection to an external power supply, without having to drill a hole in the casing. There is also the possibility of extending the cable through to a next module. This contributes to the simplicity of installation, with a lesser measure of freedom, and to limiting the installation time.

[0022] Optionally, according to claim 10, a module fur-

ther comprises room for an electrical connector. This may for instance be a Hirschmann plug, a splash-proof connector that is often used in fine-tuning the automated operation of roller shutters and sunblinds. By providing room in the module to plug in such a plug, the fitter no longer needs to provide a solution to this issue (for instance by housing the plug somewhere in the cavity). This contributes to limiting the measure of freedom during installation and to limiting the installation time.

[0023] Optionally, as defined by claim 11, the system further comprises vertical profiles placed in a direction that is substantially perpendicular to the axis direction, wherein a vertical profile comprises a double-sided guide rail. In the mounted condition, such a guide rail guides the screens of linked modules when rolling up and rolling down. Moreover, a screen guide rail ensures that the fabric in rolled-down condition always remains tightly stretched, and does not flap in case of wind. A double-sided guide rail means that for two linked modules each of the screens is guided on one side by a guide rail on the joint vertical profile between the two modules. This makes the system suitable for curtain wall constructions wherein the room between adjacent glass surfaces is limited.

[0024] Optionally, according to claim 12, in the mounted condition the second end face element of a module is fixedly positioned relative to the corresponding vertical profile. This can for instance be done using a pin or stick, which ensures that at the location of the second end face element the module retains a fixed position relative to the vertical guide rail.

[0025] Optionally, according to claim 13, the vertical profile further has room to comprise an electrical cable, an electrical connector, or an electrical cable and an electrical connector. This permits that electrical cables and/or connectors, intended for power supply and/or fine-tuning the screen motor, can be integrated into the system in an elegant and simple manner. This contributes to the quality of placement and limiting the installation time.

[0026] Optionally, as defined by claim 14, the vertical profile has a width of 50 millimeters at the most when measured according to the axis direction. Such a limited width of the vertical profile is advantageous in curtain wall constructions where there is only a narrow connecting profile between consecutive glass surfaces. Moreover, this contributes to a minimal visual impact of the vertical profiles, which is desired in modern trends in construction.

Brief Description of the Drawings

[0027]

Figure 1 is a front view of a vertical profile, and horizontal casings including end face plate with tabs, according to the known bespoke solution by Renson for a curtain wall construction.

Figure 2 is a front view of an end face plate with tabs, according to the known bespoke solution by Renson for a curtain wall construction.

Figure 3 is a cross-section of a vertical profile placed in glass, according to the known bespoke solution by Renson for a curtain wall construction.

Figure 4 is a view in perspective of a system for a fabric sunblind, in mounted condition, according to the invention.

Figure 5 is a view in perspective of the various parts of the system for a fabric sunblind according to the invention, depicted in an exploded view.

Figure 6 is a schematic representation of a module according to the invention.

Figure 7 is a view in perspective of the support of the screen roller at the location of the first end face element according to the invention.

Figure 8 is a view in perspective of the support of the screen roller at the location of the second end face element according to the invention.

Figure 9 is a side view, front view, second side view, and top view of the first end face element according to the invention.

Figure 10 is a side view, front view, and second side view of the second end face element according to the invention.

Figure 11 is a side view of the second end face element in two different embodiments according to the invention.

Figure 12 is a side view, front view, and a second side view of the first end face element and the second end face element in connected condition according to the invention.

Figure 13 is a front view of two consecutive connected modules in mounted condition according to the invention.

Figure 14 is a front view of a cover in mounted condition, and a front view and side view of this cover.

Figure 15 is a side view of the cover in mounted condition according to the invention.

Figure 16 is a side view of the second end face element including connection of an electrical cable, according to the invention.

Figure 17 is a side view and a front view of the second end face element including connection of an electrical cable, according to the invention.

Figure 18 is a cross-section of the casing perpendicular to the axis direction, a Hirschmann plug being present inside the casing, according to the invention.

Figure 19 is a cross-section of a vertical profile according to the invention, in three different embodiments.

Figure 20 is a side view of a vertical profile including cover plate, a cross-section of the vertical profile including cover plate, a top view of the cover plate, and a side view and a front view of the cover plate, all according to the invention.

Detailed Description of the Embodiments

[0028] Figure 4 shows a system 400 for a fabric sunblind in mounted condition, according to a preferred embodiment of the invention. In this case the horizontal modules 600 are linked to each other, typically along the full length of the curtain wall. Covers 1400 each hide the slit for expansion between the linked modules 600 from the user's view. The casings 602 and the covers 1400 are visible to the user and are for instance painted in the same color. Figure 4 also shows vertical profiles 401, which are positioned in vertical direction at the location of the connection between linked modules 600. A vertical profile 401 is also positioned at each of the outer ends of the system 400. When placing the system 400, the fitter receives the modules 600 from the manufacturer, which modules have already been fully assembled in the factory and in which all internal parts have already been positioned prefab. When being placed by the fitter, a first module 600 is positioned and secured relative to the surrounding area, subsequently a next module 600 is linked, wherein a slit for expansion is left open between both modules 600. Finally, the covers 1400 are placed over the slits for expansion. The vertical profiles 401 are mounted onto the profiles of the curtain wall, which profiles are made available by the manufacturer of the curtain wall. The system 400 is mounted onto the exterior of the curtain wall, that means the side situated in the outside air.

[0029] Figure 5 shows the various parts of the system 400 according to a preferred embodiment of the invention in detail, at the location of a connection between two modules 600. The parts are represented in an exploded view, so that it is clearly visible which internal parts are present inside a module and how the various parts fit into each other. However, Figure 5 is not a representation of how the various (internal) parts are placed by the fitter. The various parts will be described in detail in the figures below.

[0030] Figure 6 shows a schematic representation of a module 600 according to a preferred embodiment of the invention. The module 600 in this case forms a unit, bounded by a casing 602 and two end face elements 603 and 604, and comprises the screen roller 601 including a screen that can be rolled up and rolled down. For the sake of clarity of the representation, these parts are represented slightly apart. The casing 602 comprises surfaces that are substantially parallel to the axis direction of the screen roller 601. Typically, these are rectangular surfaces, as can be seen in Figure 4. The casing is for instance made of aluminum, or an alloy such as zamak. The casing is typically painted in a wanted color. The end face elements 603 and 604 bound the module at the planes substantially perpendicular to the axis direction of the screen roller 601.

[0031] The screen roller 601 is for instance made of steel, and is supported in support elements present within the end face elements 603 and 604. The support element within the first end face element 603 for instance is a pin 605 that is slid through the opening of a slide bearing 607. The support element within the second end face element 604 for instance is a slide 606 in which an outer end 608 of the screen roller is positioned. Within the prefab module, the slide bearing 607 is mounted over the pin 605, and the outer end 608 of the screen is mounted in the slide 606. For the sake of clarity of the representation, these parts were represented slightly apart in Figure 6.

[0032] The end face elements 603 and 604 further comprise a female connecting element and a male connecting element, respectively. The female connecting element is for instance configured as holes 609 arranged in a plate 612. The male connecting element is for instance configured as pins 610 arranged on a casting 611.

[0033] Figure 6 further shows an adjacent module 650. This adjacent module 650 in terms of design is similar to a module 600. In Figure 6 a limited number of components of the module 650 are represented, including the first end face element 653, the plate 662, the holes 659, the pin 655, and the screen bearing 657. These components are configured similar to the corresponding components of module 600, namely the first end face element 603, the plate 612, the holes 609, the pin 605, and the screen bearing 607, respectively. When connecting the modules 600 and 650, the pins 610 of module 600 slide into the holes 659 of module 650. By not sliding the casings of both modules 600 and 650 fully against each other, a slit for expansion for setting off thermal expansion/shrinkage can easily be provided. During installation this slit can for instance be 5 millimeters, which is appropriate for setting off expansion/shrinkage of an aluminum casing. In a preferred embodiment of the invention, the casting 611 is fixedly positioned relative to the surrounding area. If in the mounted condition, the casing (for instance made of aluminum) expands more than the screen roller (for instance made of steel), the plate 662 will as a consequence move towards the casting 611 according to the axis direction, wherein the holes 659

slide over the pins 610. The pin 655 will in that case also slide in the screen bearing 657.

[0034] Figure 7 shows the support of the screen roller 601 at the location of the first end face element 603 according to a preferred embodiment of the invention. The screen bearing 607 then slides over the pin 605. Figure 7 further shows how the pins 610 arranged on a casting 611 slide into the holes 609 arranged in the plate 612 when two adjacent modules are connected. The casting 611 is fixedly positioned relative to the vertical profile 401. The casting 611 also comprises openings 800, which serve as securing element. The casting 611 can be secured to an existing construction by means of screws through these openings 800.

[0035] Figure 8 shows the support of the screen roller 601 at the location of the second end face element 604 according to a preferred embodiment of the invention. The outer end 608 of the screen is then slid into a motor slide 606 according to a vertical direction and secured by means of a securing element 801. The motor slide 606 can for instance form a unity with the casting 611 or be attached to the casting 611. The screen roller 601 may comprise a screen motor, for instance an electromotor configured as tubular motor. In a preferred embodiment of the invention, the screen motor is situated on the side where the screen roller 601 is supported in the second end face element 604. The casting 611 is fixedly positioned relative to the vertical profile 401, and comprises openings 800 permitting the casting 611 to be secured relative to the surrounding area of the system 400.

[0036] Figure 9 shows the first end face element 603 according to a preferred embodiment of the invention, in side view, front view, second side view and top view. The first end face element 603 comprises a plate 612, for instance made of stainless steel, in which holes 609 are arranged. These holes 609 serve as connecting element. There are for instance four holes 609, positioned at four corner points of the plate 612. The first end face element 603 also comprises a pin 605, which serves as support element. The pin 605 is for instance made of stainless steel, and is for instance attached to the plate 612 by means of a screw.

[0037] Figure 10 shows the second end face element 604 according to a preferred embodiment of the invention, in side view, front view and second side view. The second end face element 604 comprises a casting 611 on which pins 610 are attached serving as connecting element. The casting 611 is for instance made of cast aluminum, and the pins 610 are for instance made of stainless steel. There are for instance three pins 610, positioned in three different corner points of the end face. In the remaining corner point for instance an opening 1002 is provided which permits an electrical cable, for supplying power to the screen motor, to be arranged through the casting 611. The second end face element 604 also comprises a motor slide 606 in which an outer end of the screen can be supported. In the rear surface of the casting 611 two openings 800 are arranged permitting to secure the casting relative to the surrounding area of the system 400 by means of screws.

[0038] Figure 11 again shows the second end face element 604 according to a preferred embodiment of the invention. The securing elements are indicated here in the form of holes 800 in the upper surface or rear surface of the casting 611. Screws 1100 inserted through the holes 800 permit the casting 611 to be secured at the upper surface or rear surface, respectively. The fitter can then choose whether securing is effected at the upper side or at the rear side.

[0039] Figure 12 shows the first end face element 603 and the second end face element 604 in connected condition, according to a preferred embodiment of the invention. The pins 610 on the casting 611 are in this case slid into the corresponding holes 609 of the plate 612. Use of three pins 610 slid into three corresponding holes 609 permits a firm connection and a proper alignment of the modules 400. Figure 12 also shows screws 1100 intended to secure the casting 611 at the rear side relative to the surrounding area of the system 400. Finally, screw holes 1200, 1201 can be seen in Figure 12, which holes permit the plate 612 and the casting 611, respectively, to be screwed to the casing 602.

[0040] Figure 13 shows two consecutive connected modules 600 and a vertical profile 401, according to a preferred embodiment of the invention. A module 600 is bounded at the first end face by the plate 612, and at the second end face by the casting 611. A slit for expansion (for instance of 5 millimeters) is provided by not sliding the plate 612 fully against the end face of the casting 611 during installation. At the location of the casting 611, the module 600 is secured relative to an existing construction external to the system 400 by means of screws 1100. The casting 611 is further fixedly positioned relative to the vertical profile 401 by means of a stick or pin 500, as can be seen in Figure 5.

[0041] Figure 14 shows a cover 1400 according to a preferred embodiment of the invention. A cover 1400 for instance comprises three surfaces, which are placed substantially parallel to the upper surface, front surface and bottom surface, respectively, of the casing 602. As can be seen on the left hand side of Figure 14, in the mounted condition the cover 1400 is placed over the slit for expansion between the casings 602 of two adjacent modules 600, so that the slit becomes invisible to the user. The cover 1400 for instance is made of aluminum and for instance is painted in the same color as the casing 602. The cover 1400 is for instance snapped onto the casting 611 by means of a snap system. For that purpose, snap elements 1401 are provided on the cover 1400, and corresponding elements 1001 are provided on the casting 611. The elements 1001 are part of the casting 611 and are visible in Figure 10. The snap action between the cover 1400 and the casting 611 is realized by means of synthetic clips 802. Such synthetic clips 802 are depicted in Figure 8.

[0042] Figure 15 further shows two different embodi-

ments of the cover 1400. The dimension according to the bottom surface of the casing 602 is then adapted to the depth of the vertical profile 401.

[0043] Figure 16 shows three different embodiments according to the invention, wherein each time an opening 1002 is provided in the end face of the casting 611 which permits power to be supplied easily to the screen motor via an electrical cable 1600. Typically, the manufacturer has already provided an electrical cable 1600 in the delivered module 600, which cable is connected to the screen motor and which exits the module 600 via the opening 1002. As can be seen in Figure 16, the electrical cable 1600 can be extended to the outside in various ways, namely via the upper surface, the rear surface or the bottom surface, respectively.

[0044] Figure 17 shows an embodiment according to the invention wherein an electrical cable 1700 is passed through the module 600. Within the module 600 a cable duct can for instance be provided for simply extending the power supply from the one module 600 to the other.

[0045] Figure 18 shows an embodiment according to the invention wherein room is provided for placing a connector, for instance a Hirschmann plug 1800 within the casing 602.

[0046] Figure 19 shows three different embodiments of the vertical profile 401 according to the invention. The vertical profile 401 comprises a screen guide rail 1900, which in the figure is configured double-sided. This means that the vertical profile comprises a guide rail on two sides, intended for each guiding one side of the screen of adjacent modules 600. For the vertical profiles at the outer ends of the system 400, a one-sided screen guide rail 1900 is used. The screen guide rails guide the screen when being rolled up and rolled down, and ensure that the screen remains tightly stretched in the rolled-out condition. This for instance is a PVC groove guide rail. A possible embodiment of a guide rail is for instance provided in Belgian patent BE1017146. The screen guide rails 1900 are attached in a vertical screen guide rail holder 1902, as can also be seen in Figure 5. During installation the screen guide rail 1900 is for instance slid from the top down into the screen guide rail holder 1902 and then screwed down. At the front of the vertical profile 401, that means the side that is visible to the user, the vertical profile 401 is bounded by a vertical cover 1901. It for instance has a width of 50 millimeters, so that a minimal visual impact on the user is obtained. During installation the vertical cover 1901 is for instance snapped onto the screen guide rail holder 1902. The screen guide rail holder 1902 is attached to a vertical slat 1903, which is mounted onto the curtain wall profile 1904. During installation the vertical slat 1903 is for instance snapped onto the curtain wall profile 1904 and then screwed down. The curtain wall profile 1904 is provided by the manufacturer of the curtain wall, and differs from one manufacturer to the next. The manufacturer of the fabric sunblind system may for instance tailor the vertical slat 1903 to the dimensions a specific curtain wall manufacturer requires. It is also possible that the manufacturer of the fabric sunblind tailors the vertical cover 1901, the screen guide rail holder 1902, the screen guide rail 1900, and the vertical slat 1903 that form an integrated unity, to the dimensions a specific curtain wall manufacturer requires, and that it is snapped onto the curtain wall profile 1904 as one unity during installation. As shown in Figure 19, various depths of the vertical cover 1901 are possible. In case of larger depth there is room within the vertical profile 401 for instance to house electrical cabling 1905 or a Hirschmann plug 1906 in there.

[0047] Figure 20 shows an embodiment of the vertical profile 401 according to the invention. In this case the vertical profile 401 comprises a cover plate 2000 at the bottom, which cover plate for instance serves to keep the interior of the vertical profile 401 clean, or to fixedly position the screen guide rail holder 1902 and the screen guide rail 1900. The dots 2001 on the cover plate 2000 indicate where the fitter needs to drill holes, intended to allow water or snow to pass through.

[0048] Although the present invention was illustrated on the basis of specific embodiments, it will be clear to the expert that the invention is not limited to the details of the above illustrative embodiments, and that the present invention can be configured including various changes and amendments without departing from the scope of the invention. The present embodiments therefore have to be considered illustrative in all aspects and not restrictive, wherein the scope of the invention is described by the attached claims and not by the above description, and all changes that fall within the meaning and scope of the claims, will therefore be included herein. In other words: it is taken as starting point that all changes, variations or equivalents that fall within the scope of the underlying basic principles and of which the essential characteristics are claimed in this patent application, are included. Moreover, the reader of this patent application will understand that the words "comprising" or "comprises" do not preclude other elements or steps, that the word "a/an" does not preclude the plural. Any references in the claims should not be taken as a limitation of the claims in question. The terms "first", "second", "third", "a", "b", "c" and the like, when used in the description or in the claims are used to make a difference between similar elements or steps and not necessarily describe a sequence or chronological order. Likewise, the terms "upper side", "lower side", "over", "under" and the like are used for the sake of the description and they do not necessarily refer to relative positions. It should be understood that under the right circumstances, those terms are interchangeable and that embodiments of the invention are capable of functioning according to the present invention in different orders or orientations than those described or illustrated in the above.

Claims

1. System (400) for a fabric sunblind, comprising modules (600), wherein a module (600) comprises:

   - a screen roller (601) that can be rotated about an axis direction;
   - a screen that can be rolled up onto and down from said screen roller (601);
   - a casing (602) comprising surfaces that are substantially parallel to said axis direction;

   characterized in that said module (600) further comprises:

   - a first end face element (603) situated in a plane that is substantially perpendicular to said axis direction, wherein said first end face element (603) comprises:

     ◦ a support element adapted for supporting said screen roller (601); and
     ◦ a female connecting element (609), and

   - a second end face element (604) situated in a plane that is substantially perpendicular to said axis direction, wherein said second end face element comprises:

     ◦ a support element adapted for supporting said screen roller; and
     ◦ a male connecting element (610),

   wherein

   - said module (600) forms a unit bounded by said casing (602), said first end face element (603) and said second end face element (604); and
   - in mounted condition said modules (600) are slidably connected to each other via said male connecting element (610) and said female connecting element (609).

2. System for a fabric sunblind according to one of the preceding claims, wherein said module (600) further comprises a securing element (800) adapted for securing said module (600) relative to the surrounding area of the system (400).

3. System for a fabric sunblind according to claim 1,
   wherein said first end face element (603) comprises a plate (612) that is substantially perpendicular to the axis direction, and said female connecting element comprises holes (609, 659) that are arranged in said plate (612), and
   wherein said second end face element comprises a casting (611), and said male connecting element comprises pins (610) that are arranged substantially perpendicular to the end face of said casting (611), and wherein in the mounted condition said pins (610) slide in said holes (609, 659).

4. System for a fabric sunblind according to claim 3,
   wherein said pins (610) have a length of at least five millimeters when measured according to said axis direction.

5. System for a fabric sunblind according to one of the preceding claims,
   wherein said support element within said first end face element (603) is a pin (605) placed according to said axis direction, adapted for supporting the bearing (607) of said screen roller (601), and wherein said bearing (607) is slidable over said pin (605) according to said axis direction.

6. System for a fabric sunblind according to one of the preceding claims,
   wherein said screen roller (601) further comprises a motor that is placed at the motor side of said screen roller (601), and
   wherein said support element within said second end face element (604) is a motor slide (606) in which said motor side of said screen roller (601) is placed.

7. System for a fabric sunblind according to one of the preceding claims,
   wherein said module (600) further comprises a cover (1400) adapted for in mounted condition covering an opening between said casings (602) of said linked modules (600).

8. System for a fabric sunblind according to claim 7,
   wherein by means of a snap system said cover (1400) is attached to said second end face element (604) at surfaces that are substantially parallel to said casing (602).

9. System for a fabric sunblind according to one of the preceding claims,
   wherein said module further comprises an electrical cable (1600).

10. System for a fabric sunblind according to one of the preceding claims,
    wherein said module further comprises room for an electrical connector (1800).

11. System for a fabric sunblind according to one of the preceding claims,
    wherein said system further comprises vertical profiles (401) placed in a direction that is substantially perpendicular to said axis direction, wherein said vertical profile (401) comprises a double-sided guide rail (1900) adapted for in the mounted condition guid-

ing said screens of said linked modules (600) when rolling up and rolling down.

12. System for a fabric sunblind according to claim 11, wherein in the mounted condition said second end face element (604) of a said module (600) is fixedly positioned relative to said vertical profile (401).

13. System for a fabric sunblind according to claim 11, wherein said vertical profile (401) further comprises room to house an electrical cable (1905), an electrical connector (1906), or an electrical cable (1905) and an electrical connector (1906).

14. System for a fabric sunblind according to claim 11, wherein said vertical profile (401) has a width of 50 millimeters at the most when measured according to said axis direction.

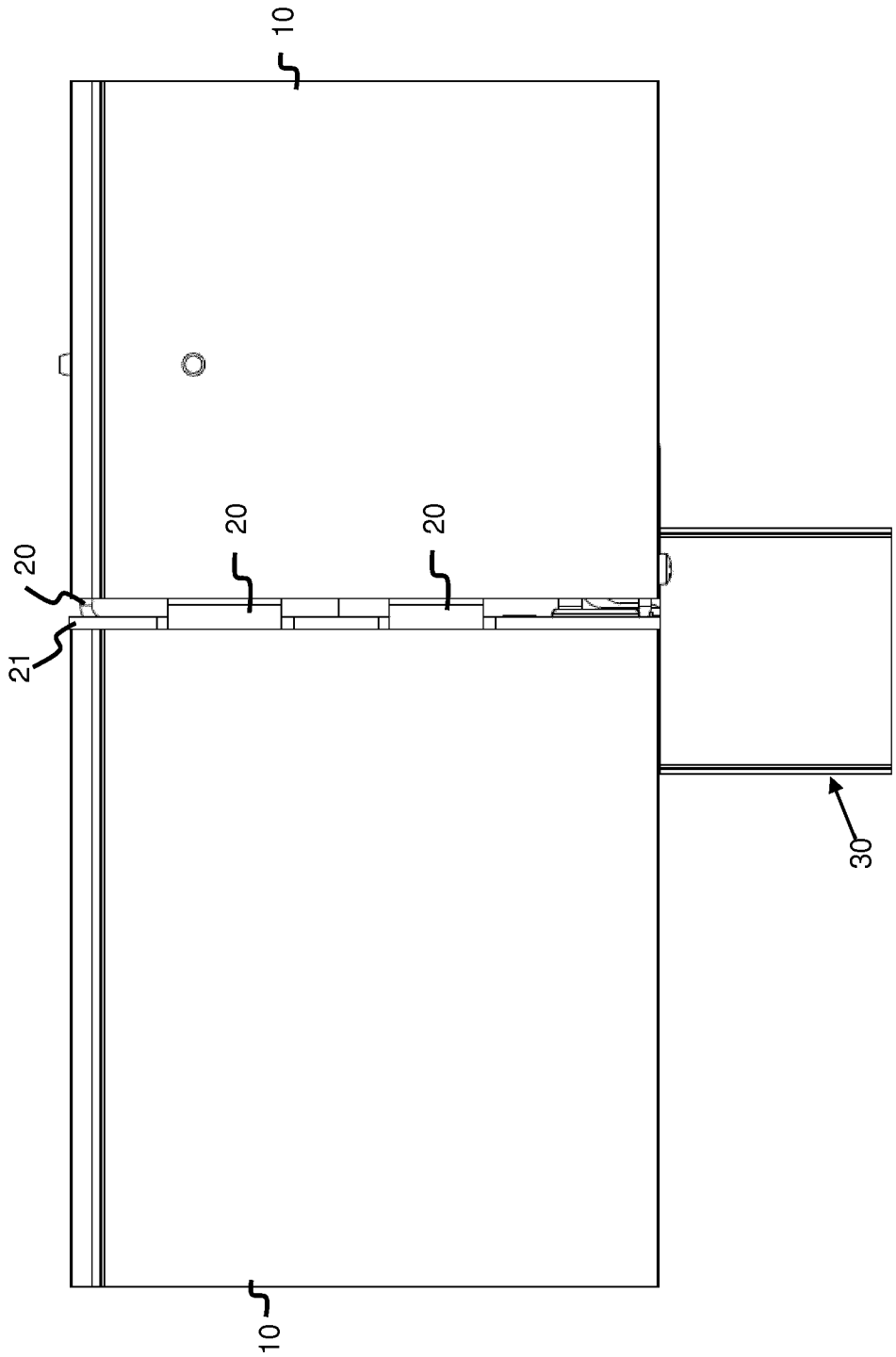

Fig. 1 (Prior art)

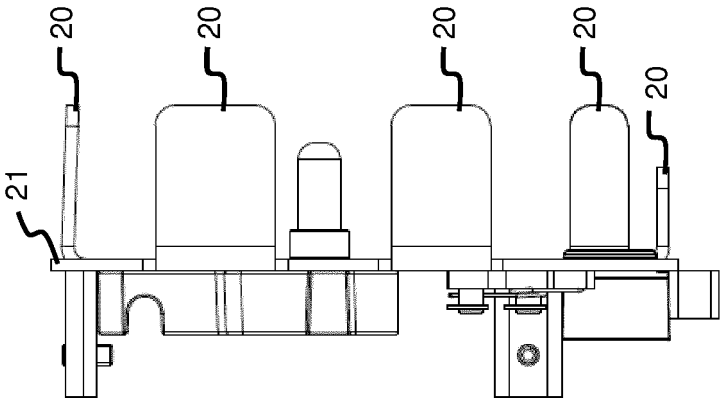

Fig. 2 (Prior art)

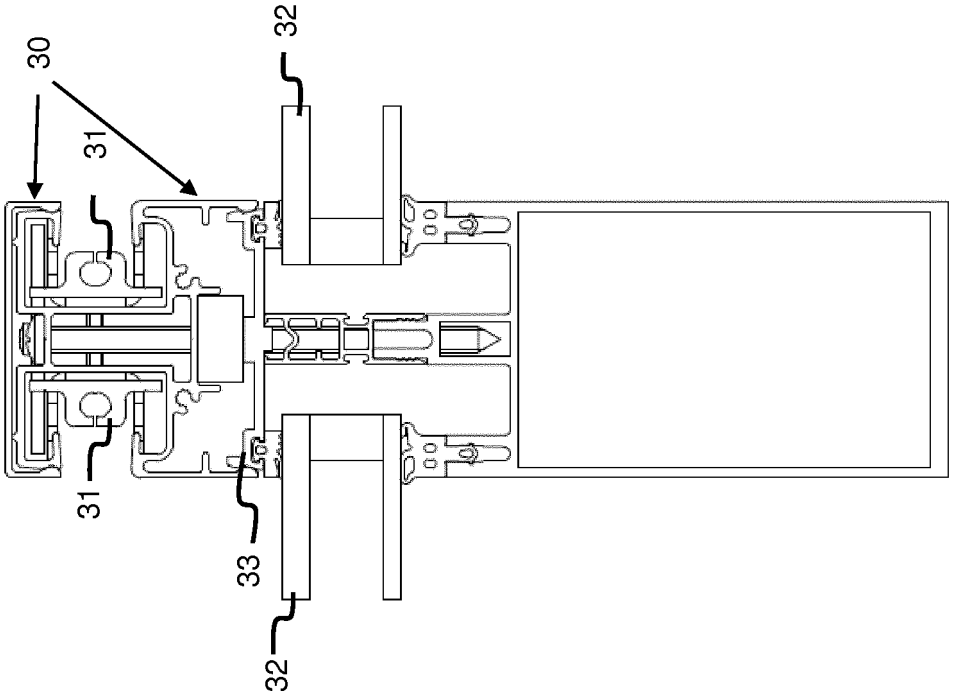

Fig. 3 (Prior art)

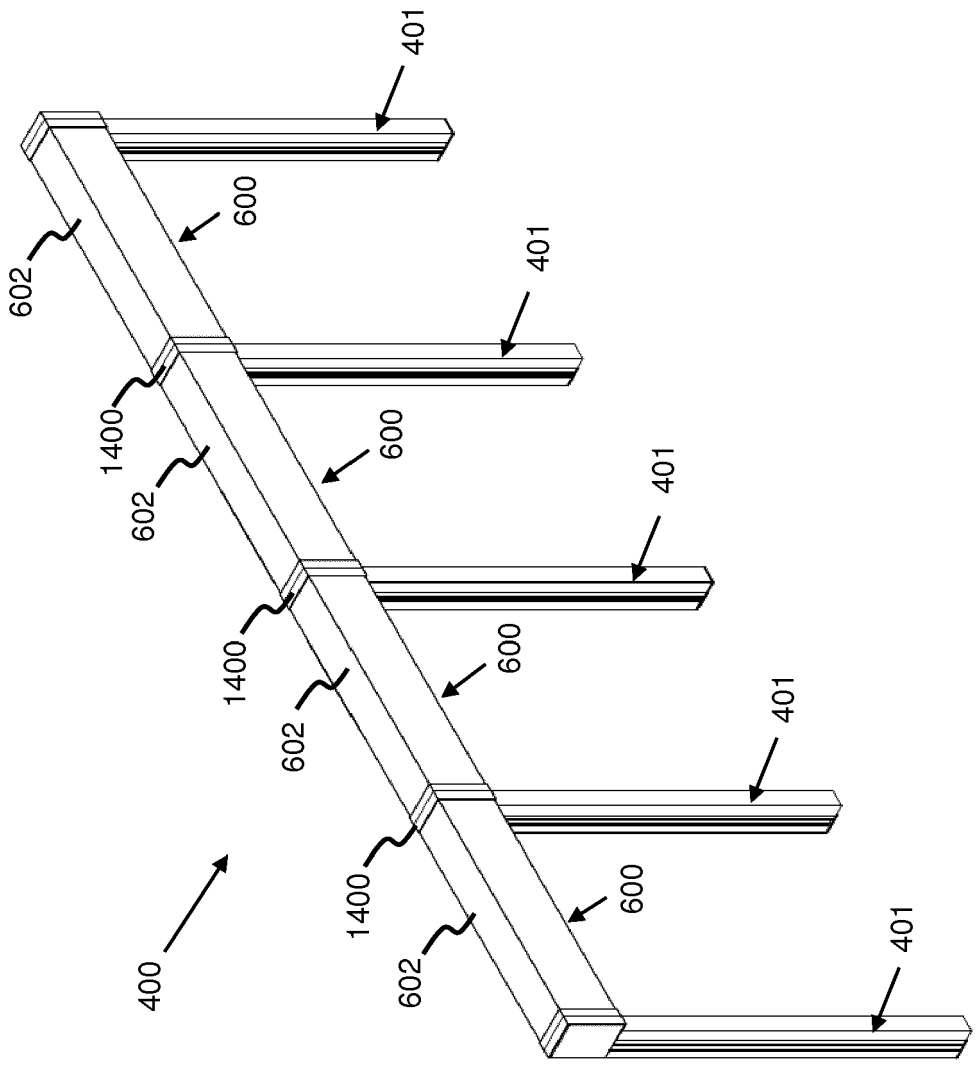
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Fig. 4

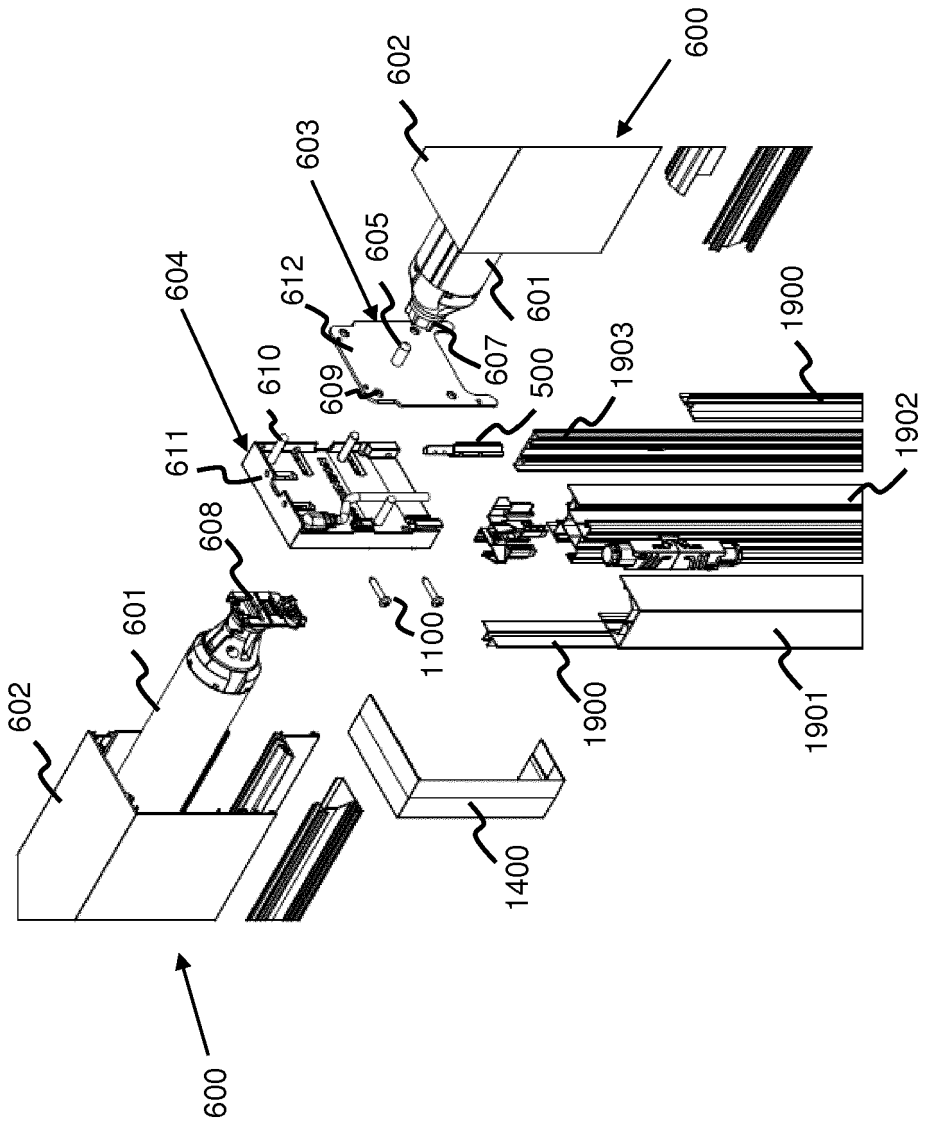
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Fig. 5

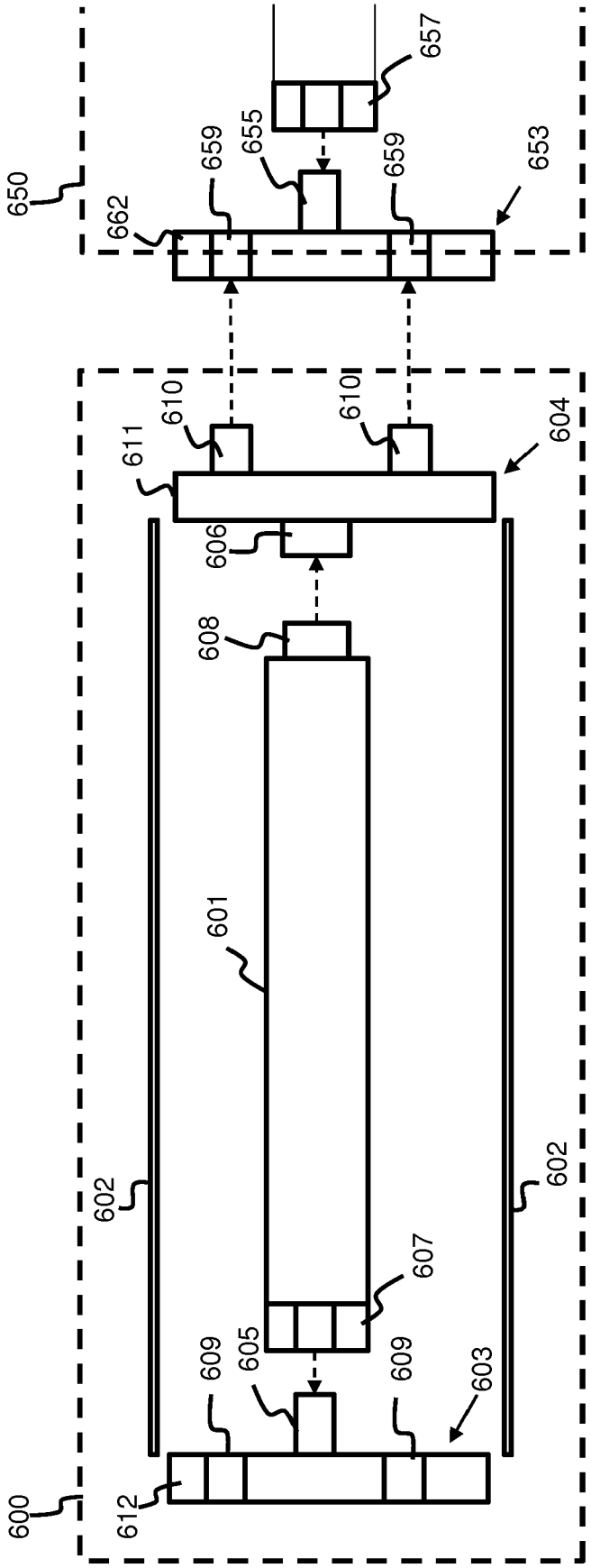
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Fig. 6

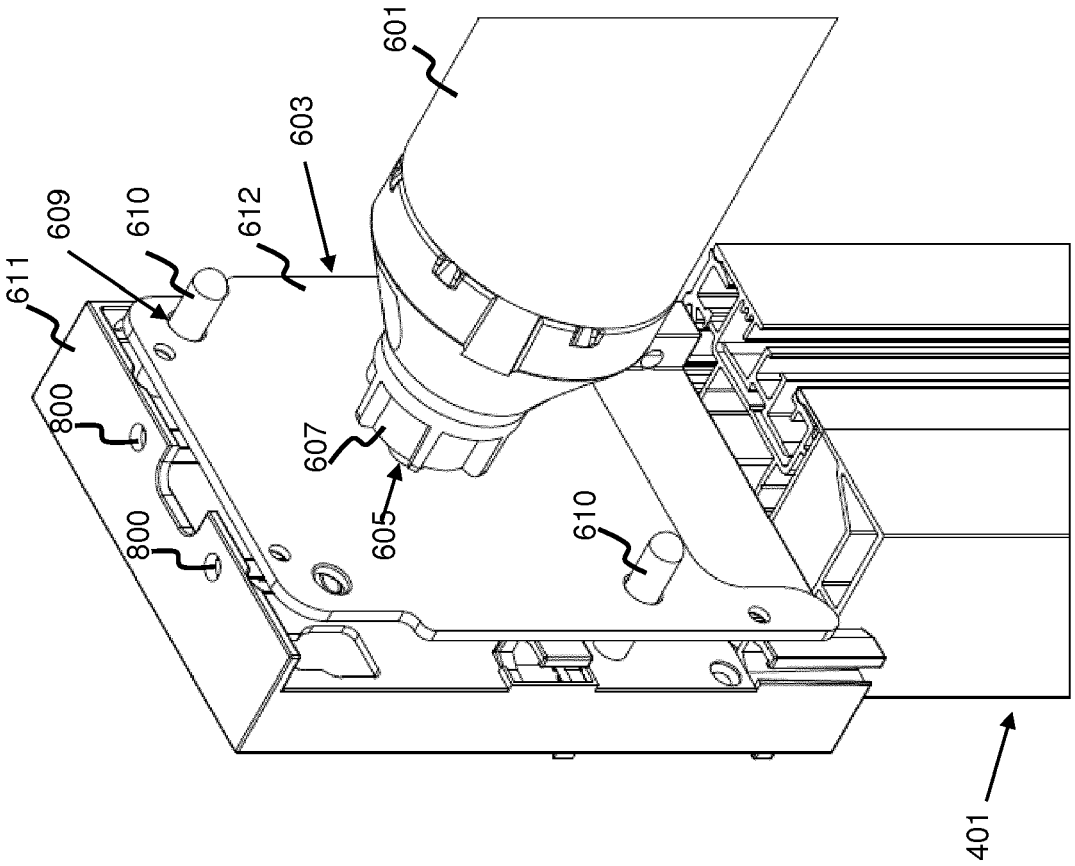

Fig. 7

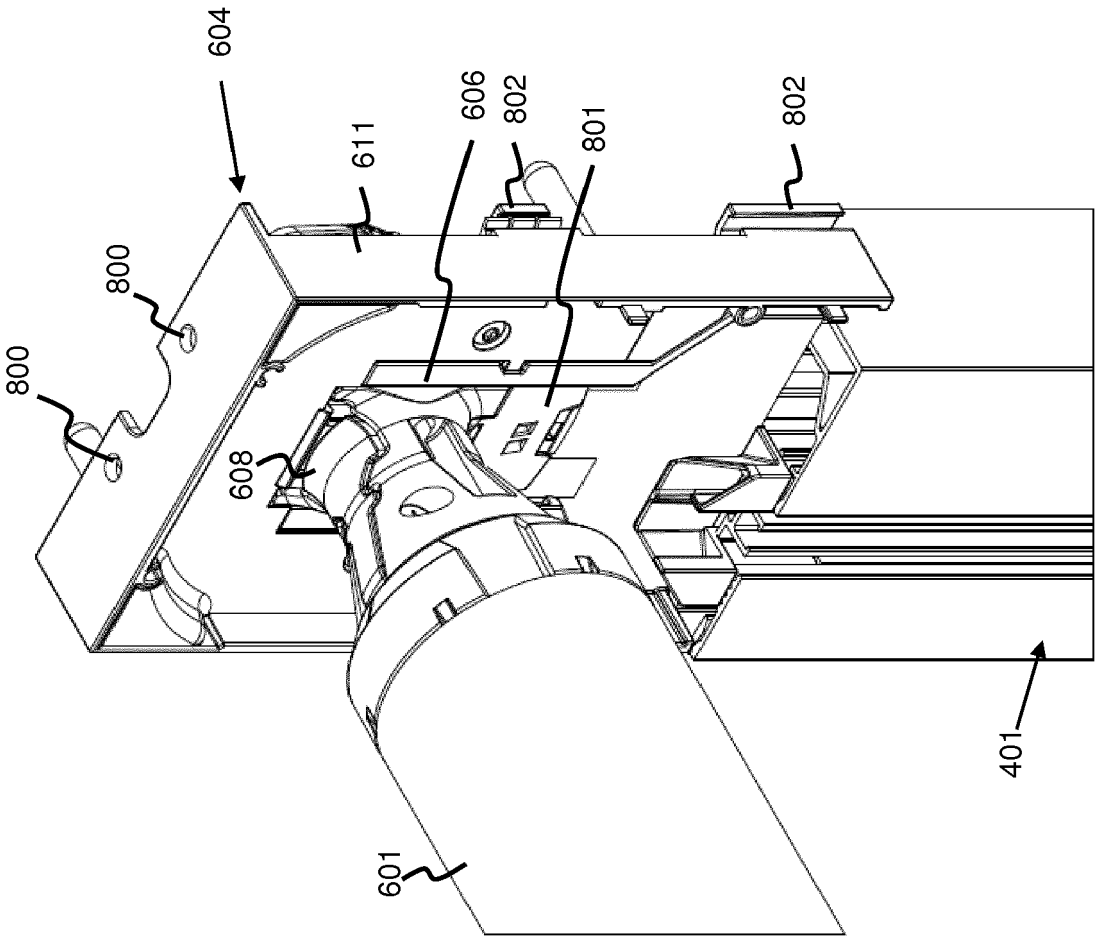

Fig. 8

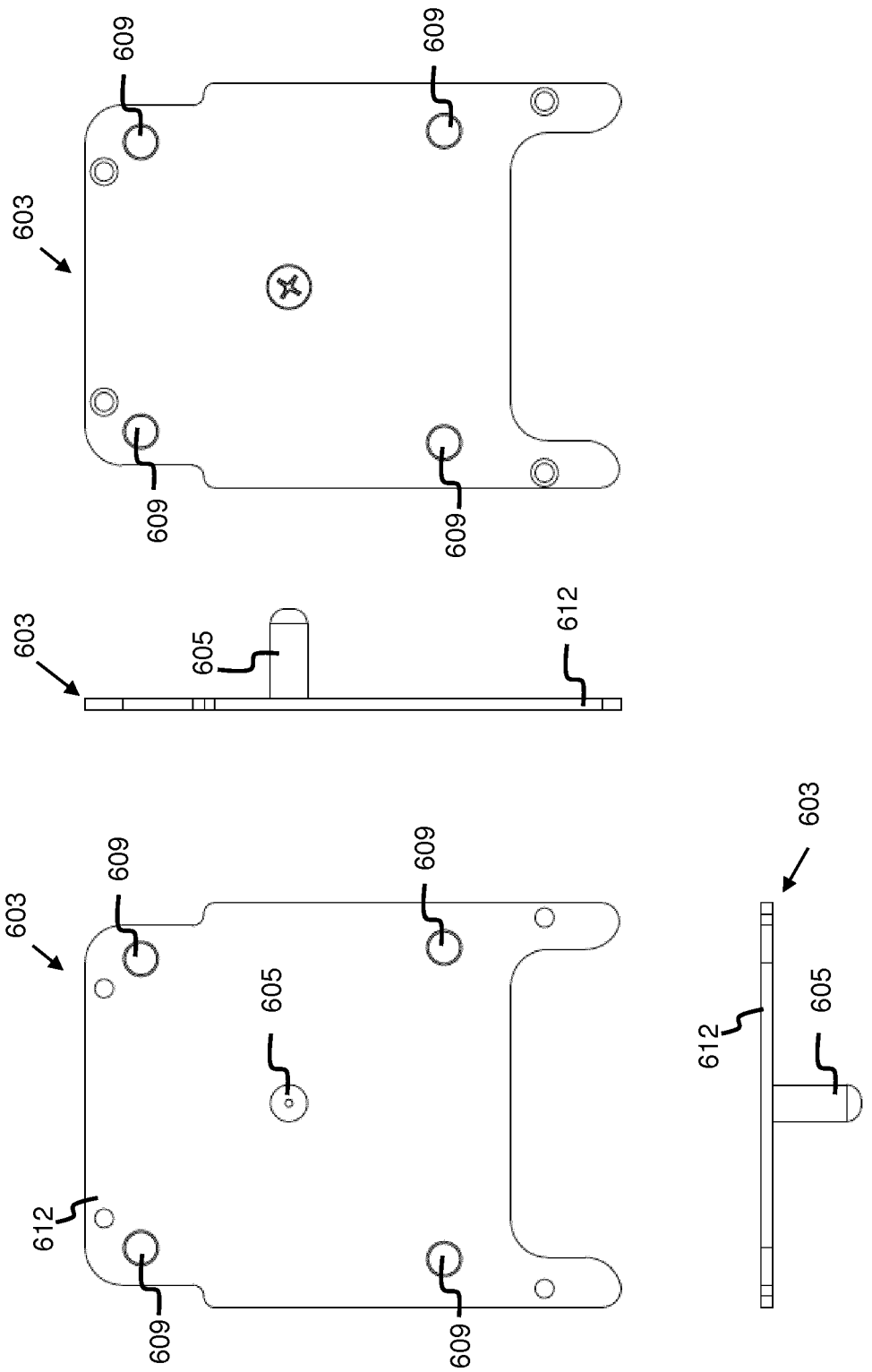
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Fig. 9

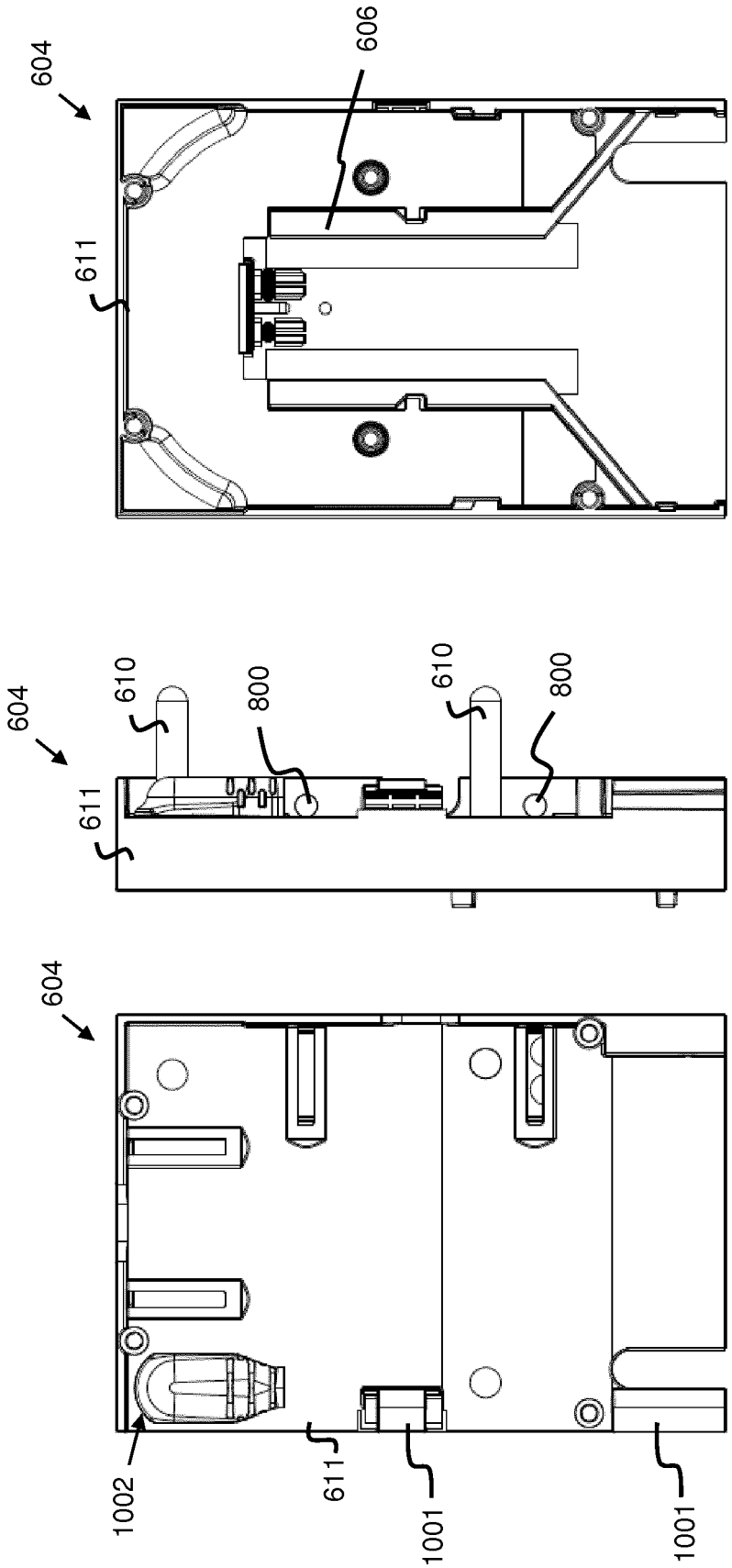

Fig. 10

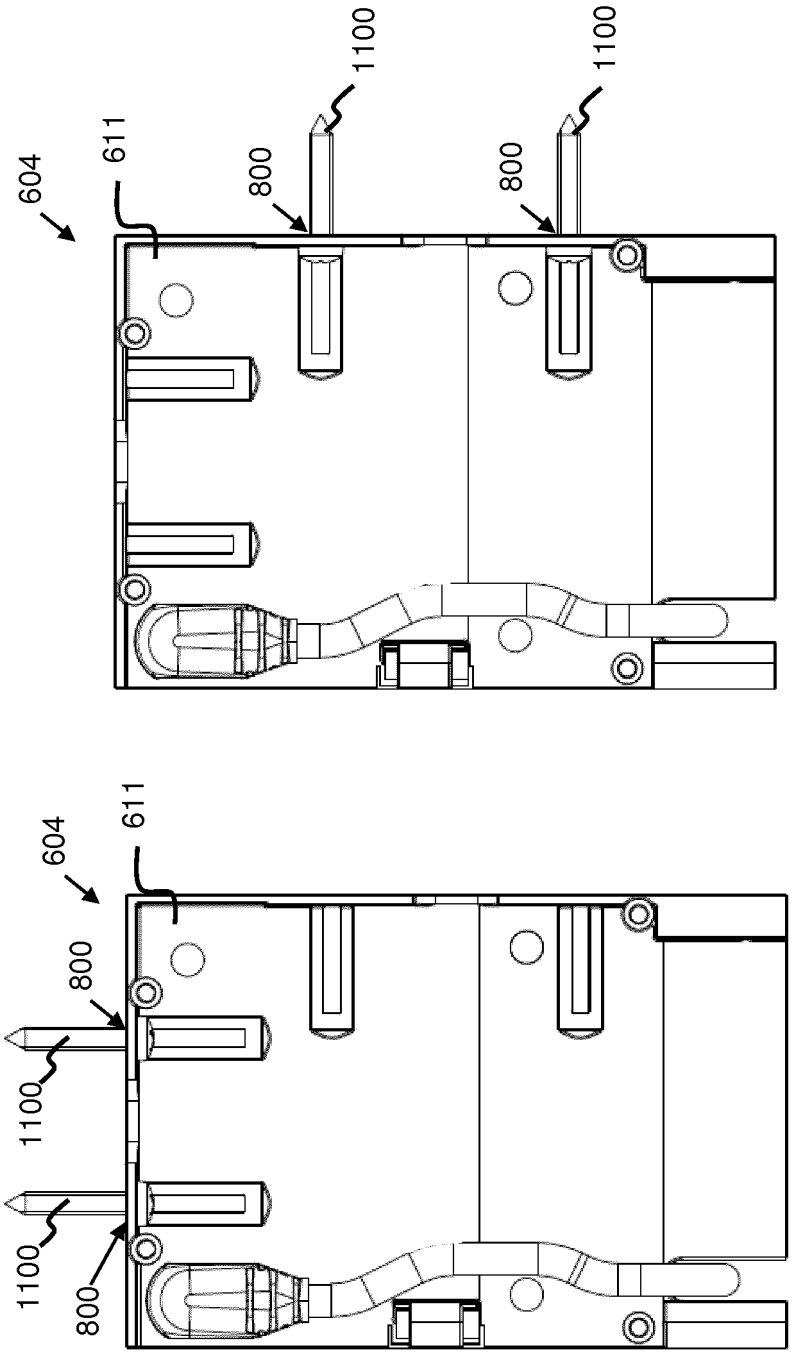

Fig. 11

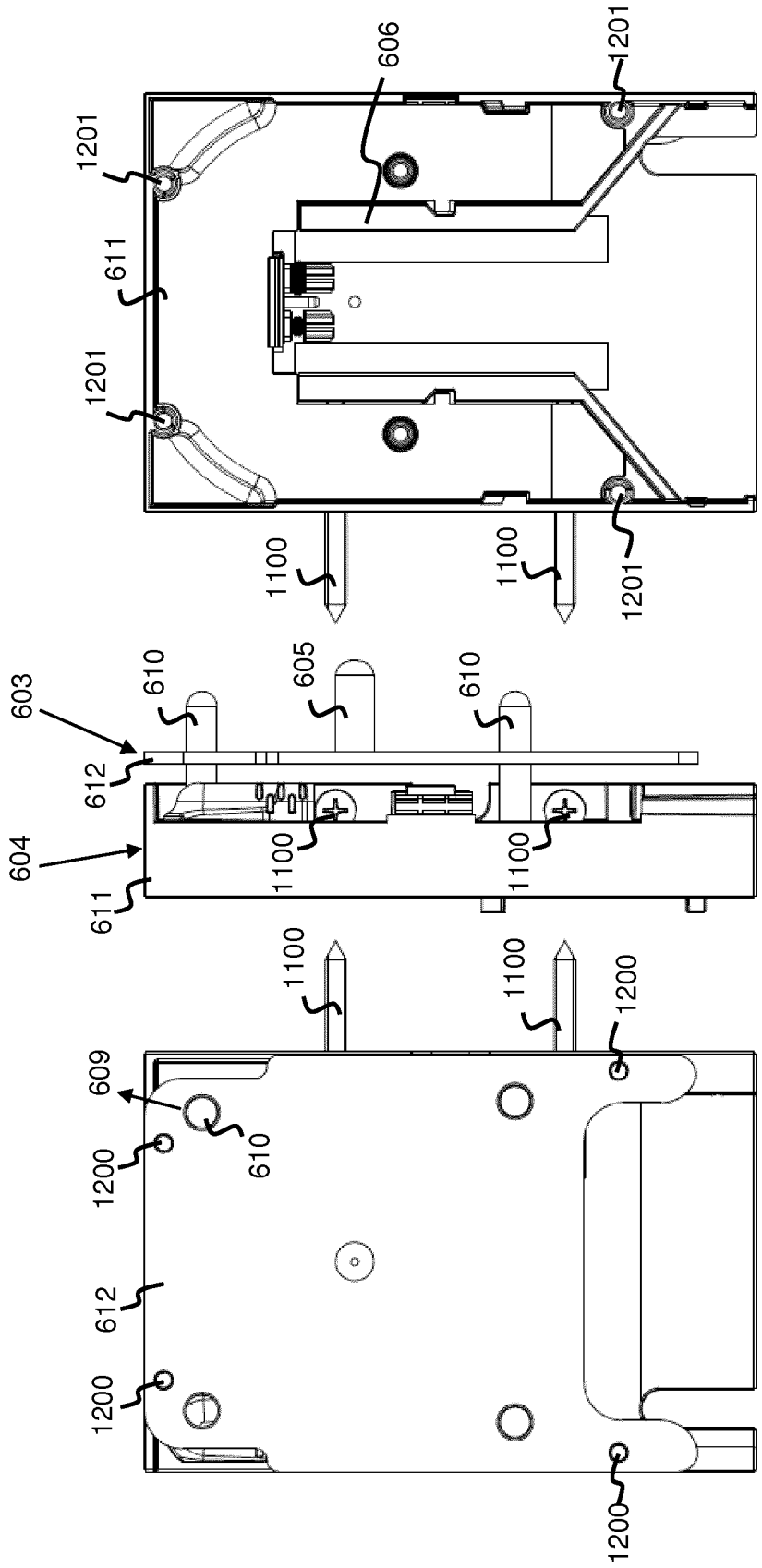
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Fig. 12

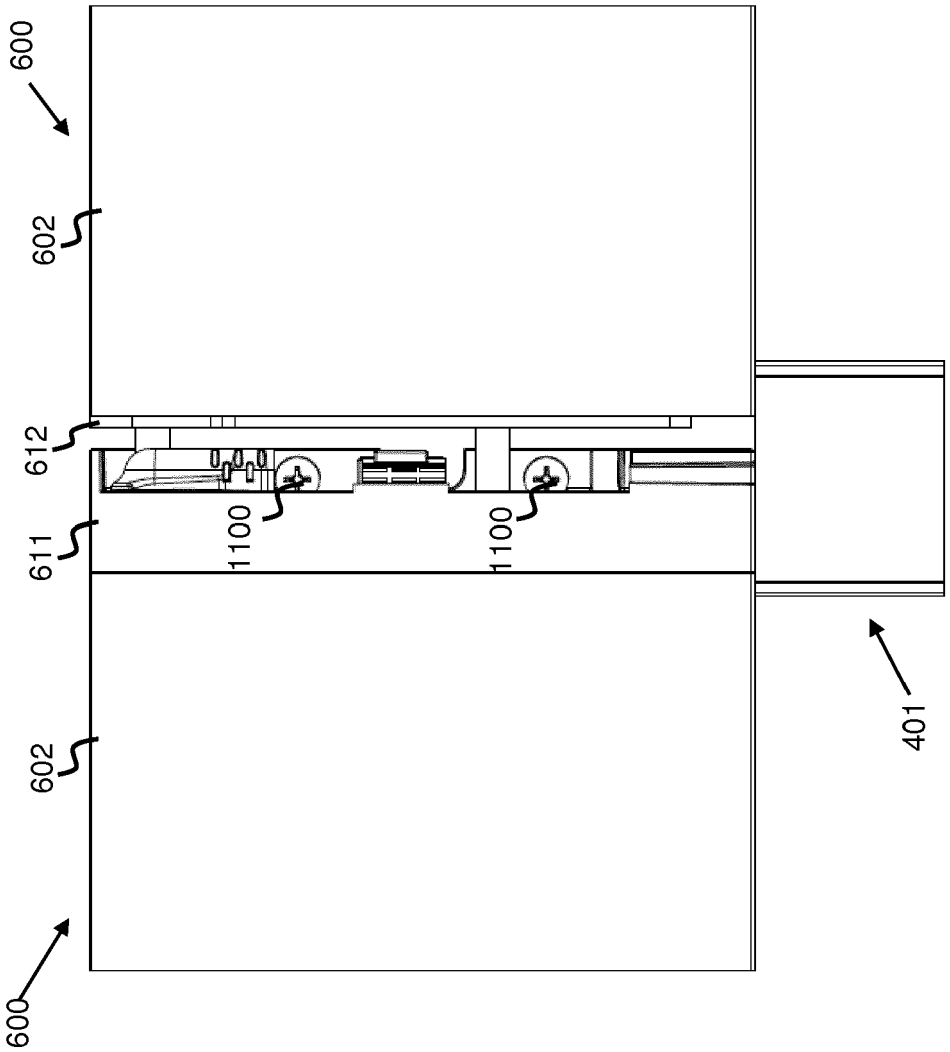

Fig. 13

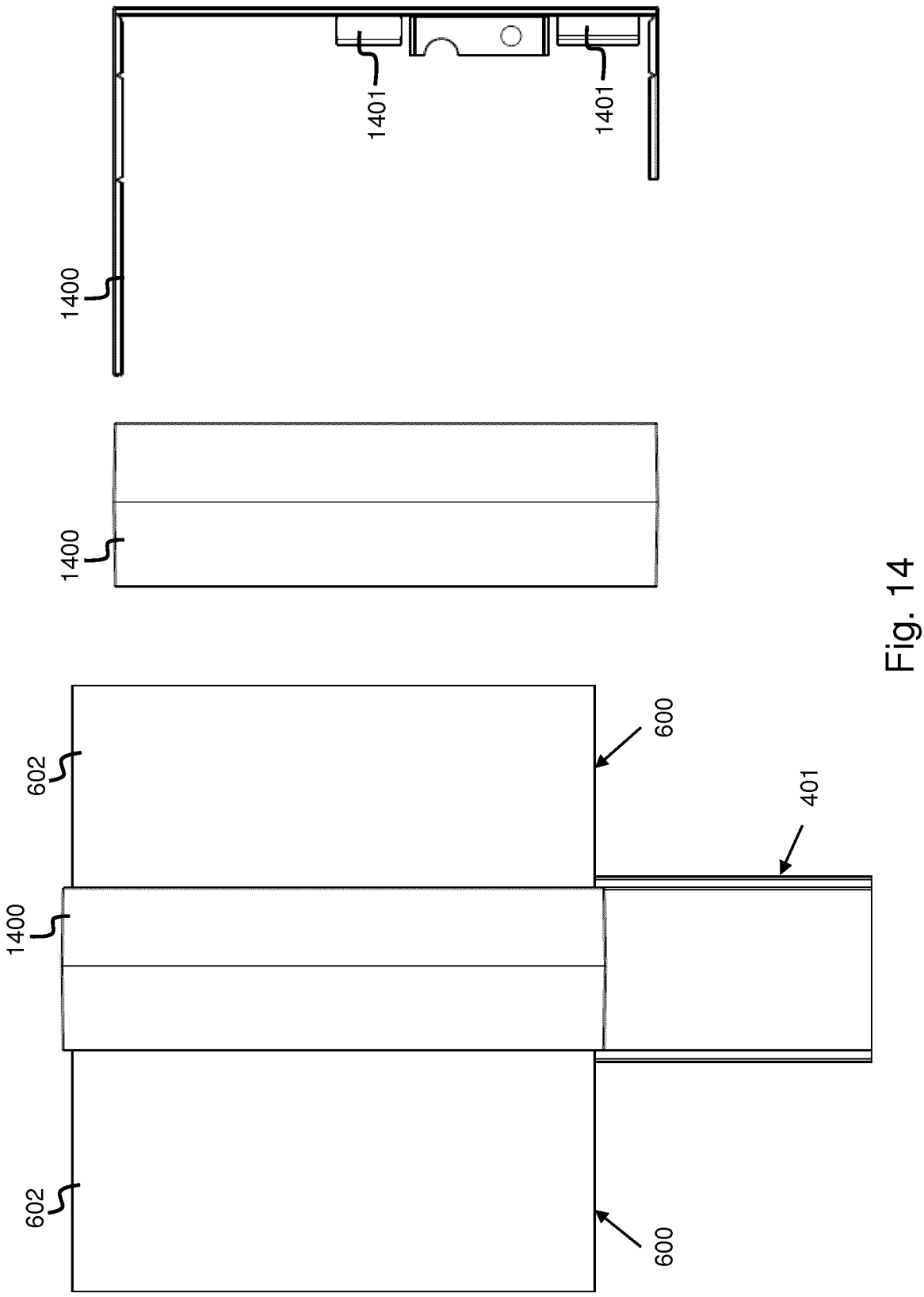

Fig. 14

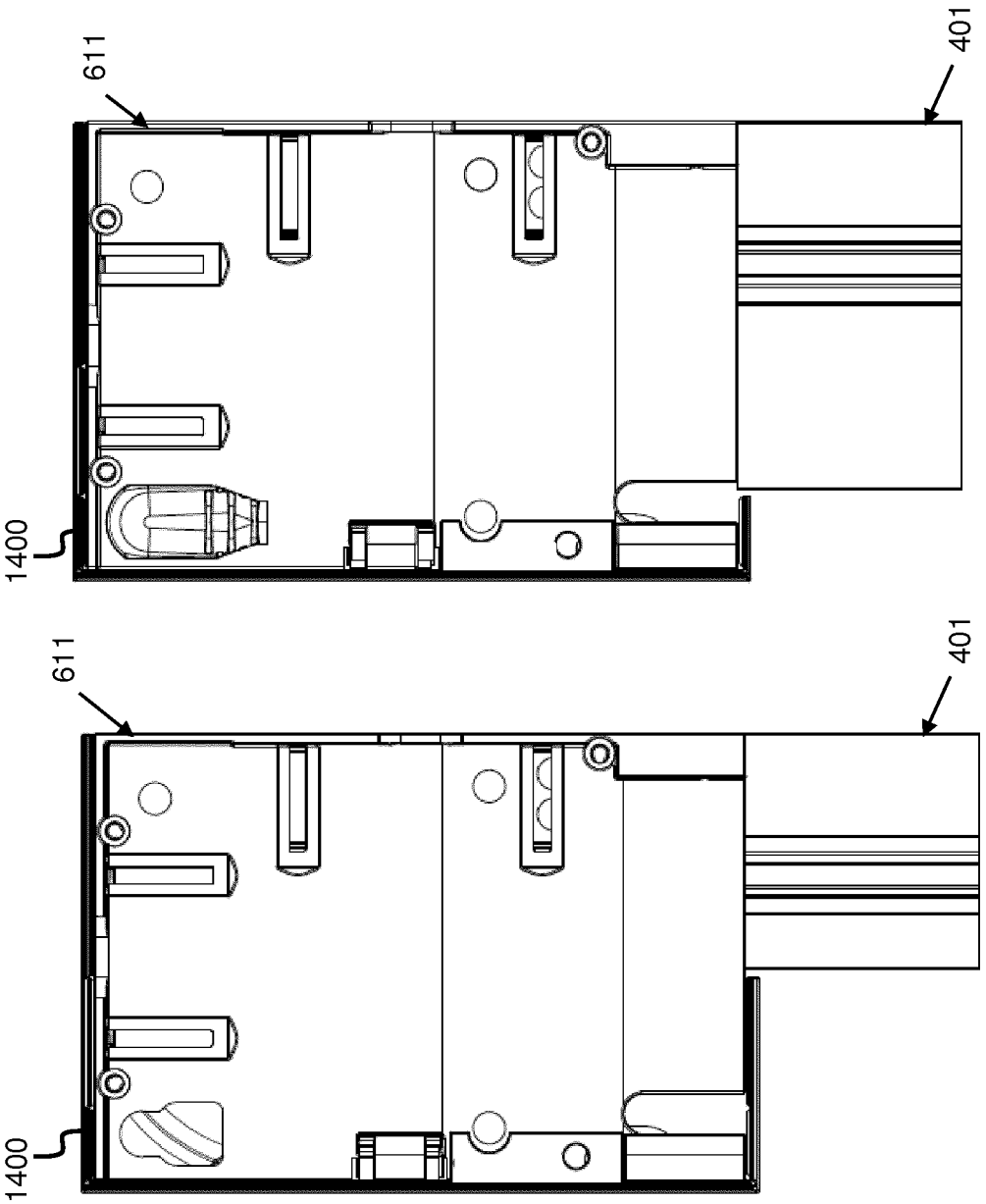

Fig. 15

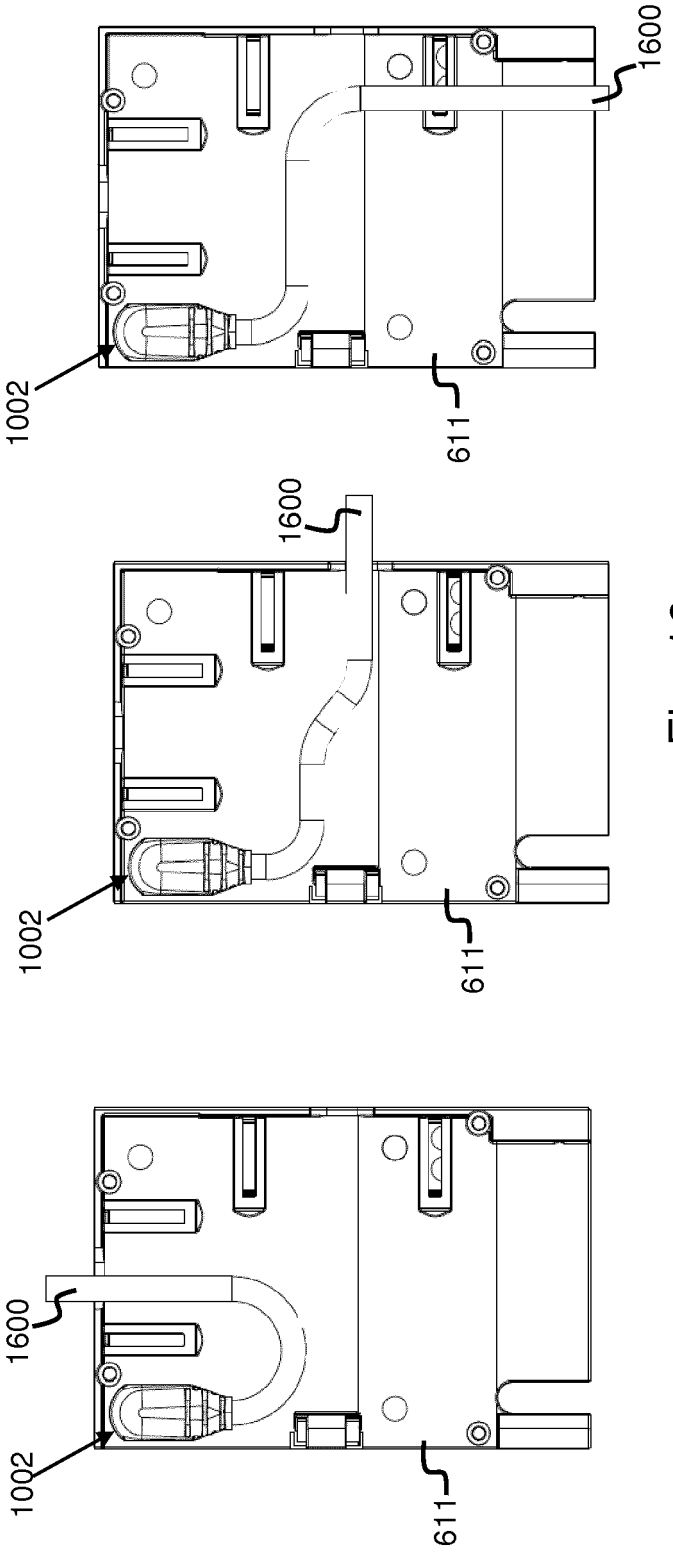

Fig. 16

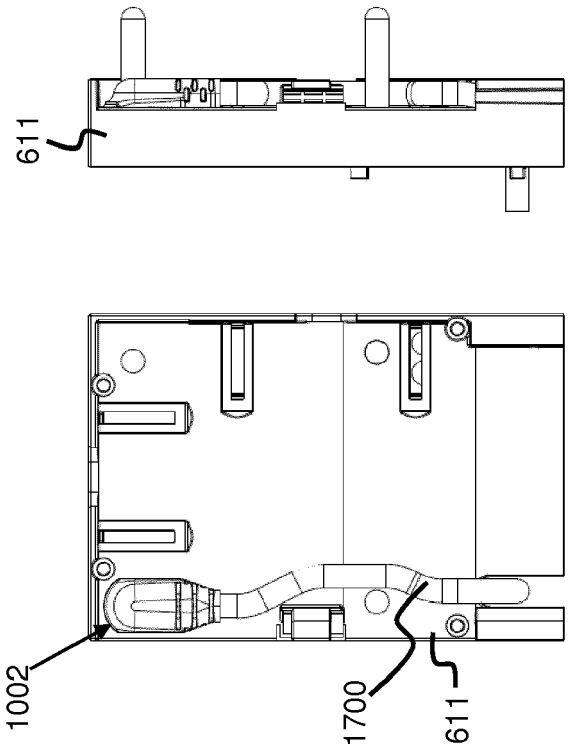

Fig. 17

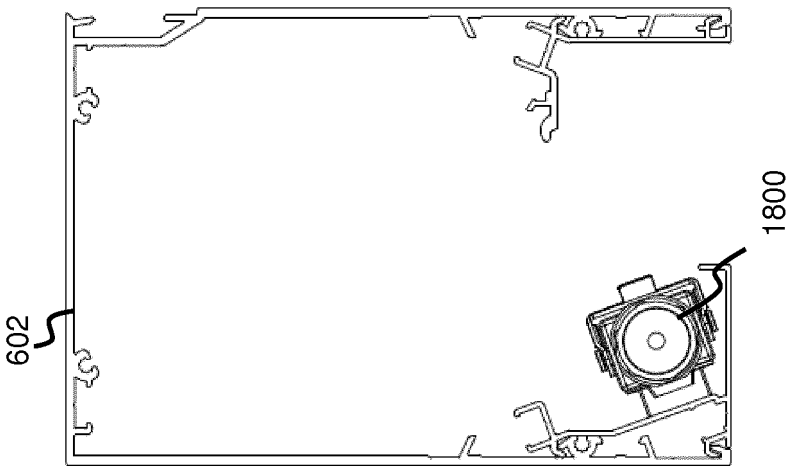

Fig. 18

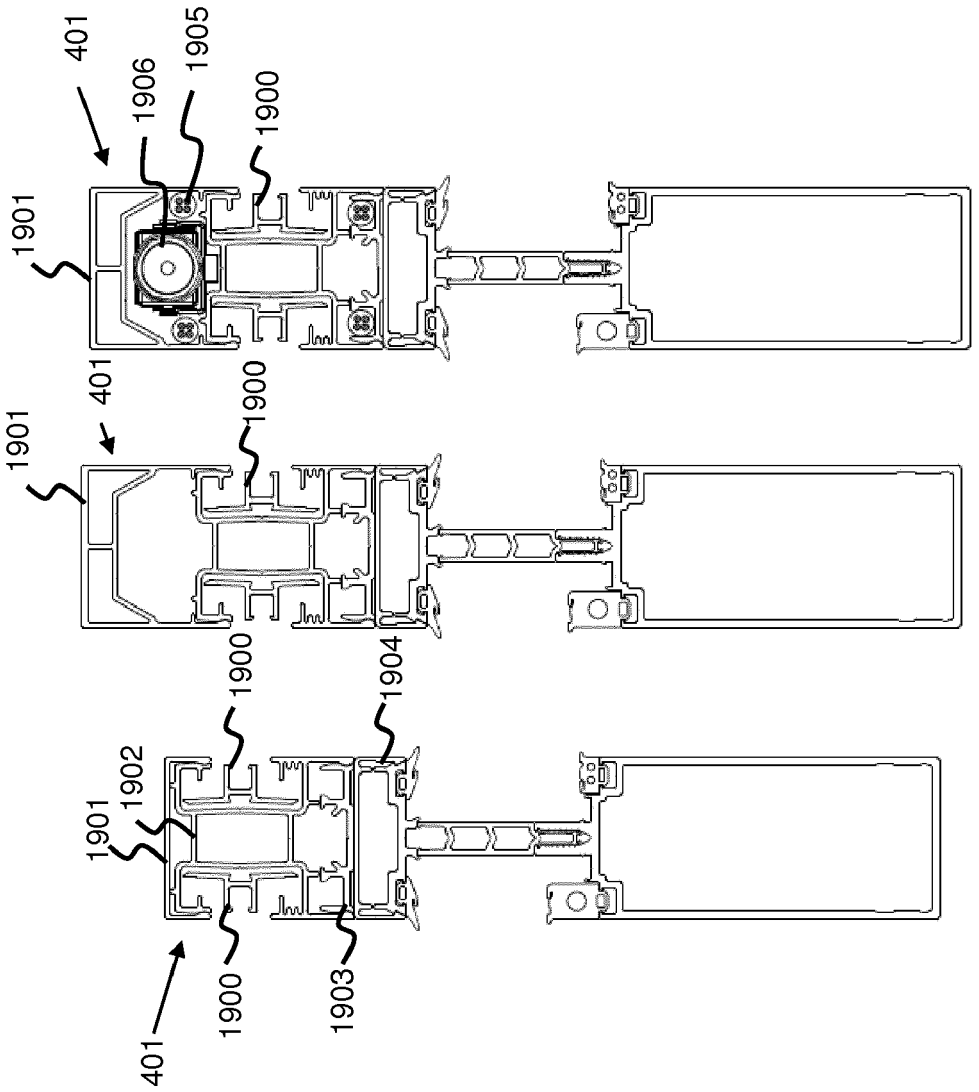
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Fig. 19

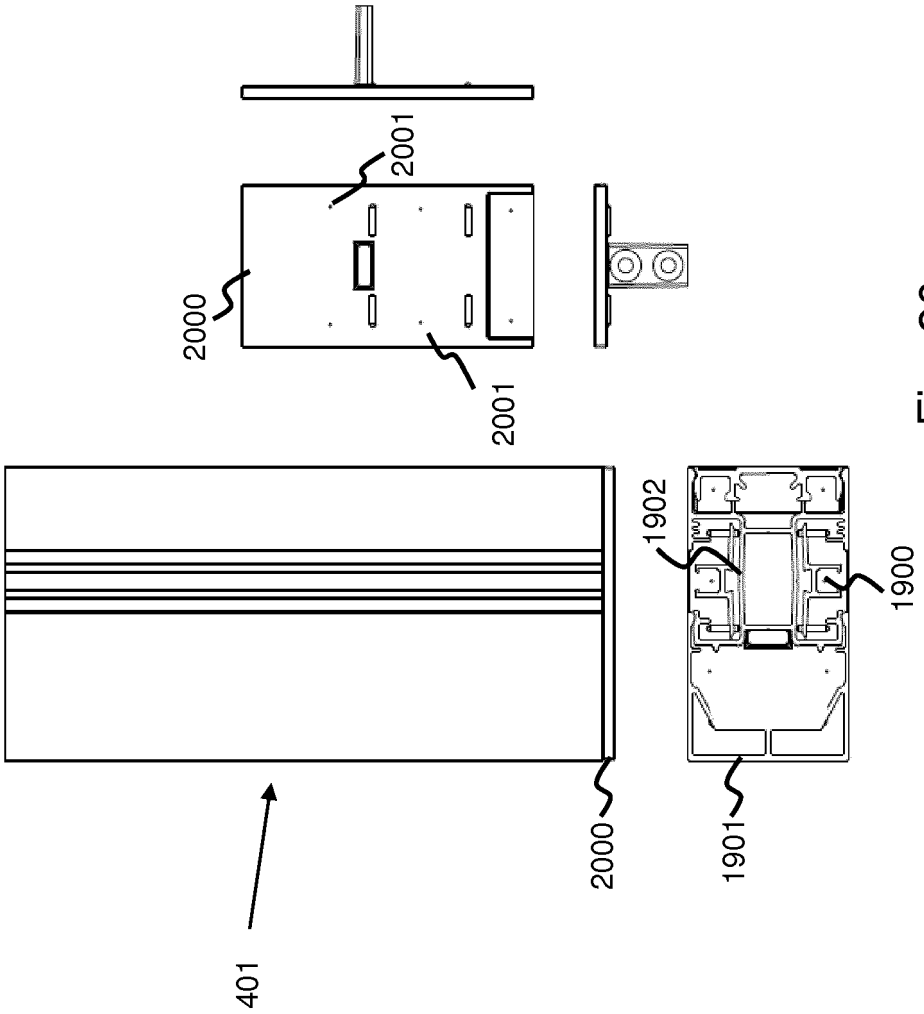

Fig. 20

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EUROPEAN SEARCH REPORT

Application Number
EP 19 20 7779

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	EP 0 576 933 A1 (CLAUSS MARKISEN [DE]) 5 January 1994 (1994-01-05) * the whole document *	1-14	INV. E06B9/42 E06B9/50 E06B9/58 E06B9/174 E04F10/06
A	DE 20 2017 006404 U1 (ERHARDT MARKISENBAU GMBH [DE]) 15 January 2018 (2018-01-15) * paragraph [0027]; figure 2 *	1-14	

TECHNICAL FIELDS SEARCHED (IPC)

E06B
E04F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	23 January 2020	Kofoed, Peter

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 19 20 7779

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23-01-2020

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0576933 A1	05-01-1994	DE 4221590 A1	05-01-1994
		EP 0576933 A1	05-01-1994
DE 202017006404 U1	15-01-2018	DE 202017006404 U1	15-01-2018
		EP 3502502 A1	26-06-2019

EPO FORM P0459

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

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Patent documents cited in the description

- EP 0576933 A **[0008]**
- BE 1017146 **[0046]**