



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
04.06.2014 Bulletin 2014/23

(51) Int Cl.:
E06B 9/58 (2006.01)
E06B 9/68 (2006.01)
E06B 9/64 (2006.01)

(21) Application number: **13195306.9**

(22) Date of filing: **02.12.2013**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(71) Applicant: **VKR Holding A/S**
2970 Hørsholm (DK)

(72) Inventor: **Knudtzen, Søren Risager**
DK-6900 Skjern (DK)

(74) Representative: **Rørdam, Troels Peter et al**
Awapatent A/S
Rigensgade 11
1316 Copenhagen K (DK)

(30) Priority: **03.12.2012 DK 201270749**

(54) **A screening arrangement for a window**

(57) A screening arrangement (1) for a roof window comprising a frame (2) with an electrical outlet (25, 26), the screening arrangement (1) comprising a top element (4), two side rails (8, 9) and a bottom element (7) being movable between a non-screening position and a screening position by means of an electrical motor (710) and at least one electrical connection device (714, 715) for providing electrical power to the motor (710) arranged in said bottom element (7), and at least one electrical guide (811, 812; 911, 912) extending substantially in a longitudinal direction (L) of at least one of the side rails (8, 9),

wherein the top element (4) comprises an electrical connection element (410, 411) for establishing an electrical connection between the electrical outlet (25, 26) and the at least one electrical guide (811, 812; 911, 912) such that electrical power is provided to the at least one electrical guide (811, 812; 911, 912), and wherein the at least one electrical connection device (714, 715) is for being in electrical connection with the at least one electrical guide (811, 812, 911, 912) such that electrical power is provided to the motor (710).

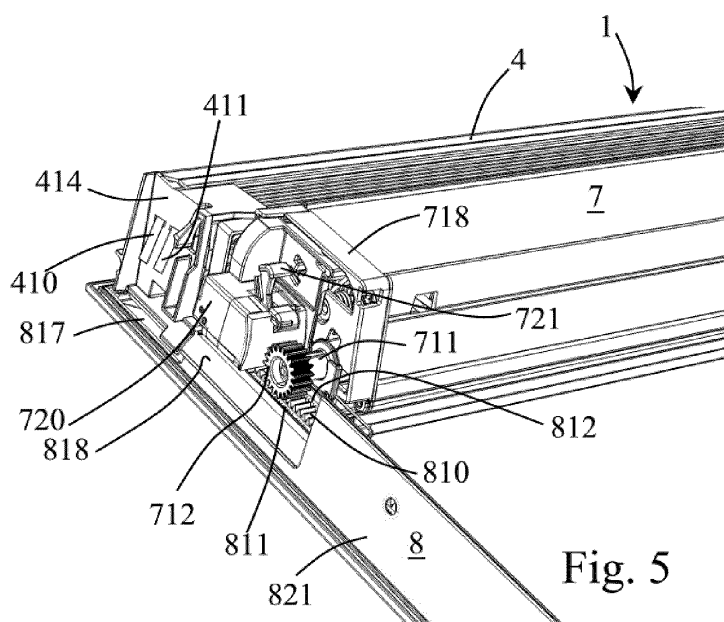


Fig. 5

Description

[0001] The present invention relates to a screening arrangement for a window, preferably a roof window, comprising a frame with a top piece, a bottom piece and two side pieces, at least one of the two side pieces comprising an electrical outlet, the screening arrangement comprising a top element, a bottom element and two side rails, the bottom element being movable with respect to the two side rails between a first non-screening position and a second screening position by means of an electrical drive means comprising an electrical motor, a first transmission means, and at least one electrical connection device for providing electrical power to the motor arranged in said bottom element, and a second transmission means arranged in each of the two side rails, and at least one electrical guide extending substantially in a longitudinal direction L of at least one of the side rails.

[0002] A well known problem with prior art screening arrangements, and particularly those for windows, lies in the complexity of the mounting procedure which is normally carried out by the end user. Some prior art screening arrangements for windows, preferably roof windows, comprise a number of cords for guiding the movement of the bottom element of the screening arrangement, see e.g. the applicant's WO 2009/052822. These strings are complicated to mount, and may be broken, mounted erroneously or become tangled in the process, thus causing the screening arrangement to malfunction or even be broken.

[0003] This problem has been attempted solved with a screening arrangement of the type mentioned initially. Such a screening arrangement is known from JP 11-152974 A, which describes a shutter with a bottom element, two side rails and a screening device in which an electrical motor is arranged in the bottom element of the screening arrangement together with batteries for providing electrical power to the motor. Furthermore, a plug and socket system is provided on the bottom element and the lintel, respectively, for recharging the batteries when the shutter is in the completely open position.

[0004] This arrangement has the drawback that the shutter needs to be completely open in order to recharge the batteries, which in turn implies a risk of that the batteries not being sufficiently recharged. Furthermore, the batteries will need replacement at the end of their life time.

[0005] Another drawback lies in the mounting process, which is still rather complicated in that the plug and socket system, or indeed any other battery recharging system, must be arranged with great precision to ensure proper recharging of the batteries and to avoid full power drain or damage to the recharging system during use of the shutter.

[0006] Therefore, it is the object of the invention to provide a screening device of the type mentioned in the introduction, whereby the power supply to the electrical motor is simplified, and whereby the mounting process

may be carried out in a simple and straightforward manner. Further it is an object to provide a screening device with slim side rails.

[0007] According to a first aspect of the invention, this is obtained by a screening device of the type described in the introduction, in which the top element comprises an electrical connection element adapted for, in a mounted position of the screening arrangement on the frame of the window, establishing an electrical connection between the electrical outlet and the at least one electrical guide, such that electrical power is provided to the at least one electrical guide, and in which the at least one electrical connection device is adapted for, in the mounted position of the screening arrangement, being in electrical connection with the at least one electrical guide, such that electrical power is provided to the motor.

[0008] With such a screening device electrical power may be lead from the electrical outlet in the frame through the electrical connection element of the top element, the at least one electrical guide of the side rail, the electrical connection device of the bottom element and finally to the electrical motor driving the screening arrangement.

[0009] Thereby a steady supply of electrical power to the motor is ensured at all times after mounting of the screening device. Thus, the need for guide cord systems, batteries and recharging systems are eliminated, which in turn ensures a screening device being lightweight, very simple and straight forward to mount on a window or indeed another opening in a building which it is desired to screen.

[0010] According to a preferred embodiment the electrical outlet is provided with a mounting bracket comprising at least one electrical contact point, and the top element comprises a connection element adapted for engagement with the mounting bracket, the connection element comprising the at least one electrical connection element, the at least one electrical connection element being adapted for electrical contact with the at least one electrical contact point of the mounting bracket.

[0011] Thereby a particularly simple and durable way of leading electrical power from the electrical outlet in the frame through the electrical contact means and to the at least one electrical guide of the side rail is obtained. Also, such an arrangement provides for a particularly simplified procedure for mounting a screening arrangement on a frame.

[0012] According to a preferred embodiment the at least one electrical connection element comprises at least one electrical contact element adapted for electrical contact with a contact element of the electrical outlet, whereby a particularly simple electrical connection with the electrical outlet is obtained.

[0013] The at least one electrical connection element may be any one of a contact pin, a contact plug, a contact terminal, a contact plate, a contact pad and a contact spring.

[0014] According to a preferred embodiment the at least electrical connection element is arranged on a side

surface of the top element. Thereby a solution being particularly simple to mount is obtained, as the electrical connection element and the electrical outlet may simply be connected simultaneously with mounting the top element.

[0015] According to a preferred embodiment the at least one electrical connection device is any one of a brush-type contact and a sliding contact, thereby providing for a particularly well functioning solution with which the electrical contact between the electrical guide and the electric motor may be obtained and upheld in all positions of the bottom element relative to the side rails.

[0016] According to a preferred embodiment the at least one electrical connection device is mounted in a slide shoe, whereby a particularly robust and durable solution is obtained.

[0017] According to a further preferred embodiment the slide shoe is arranged on the bottom element in such a way that, in a mounted position of the screening arrangement on the frame of the window, it is aligned with the side rail and movable in relation to the bottom element. Thereby a screening device is provided which may be adapted to the actual width of the window or other opening in a building, in a particularly simple and robust manner.

[0018] According to a preferred embodiment the screening arrangement further comprises a biasing means arranged on the bottom element and adapted for urging the electrical connection device against the electrical guide, whereby an improved electrical connection between electrical guide and electric motor is obtained.

[0019] According to a preferred embodiment the first transmission means comprises a shaft rotatable by means of the motor and a gear wheel at opposite ends of the shaft, and the second transmission means comprises a rack extending in the longitudinal direction, L, of each of the side rails. Thereby a screening device with a particularly well functioning and robust transmission system is obtained.

[0020] According to a preferred embodiment the screening arrangement further comprises at least one suspension element arranged on the bottom element, the suspension element being adapted for allowing the first transmission means to be movable between a first position in which the first transmission means and the second transmission means are in mutual engagement and a second position in which the first transmission means and the second transmission means are disengaged. Thereby a screening arrangement is obtained which may be operated manually, e.g. in case the electrical drive means malfunctions.

[0021] According to a preferred embodiment the screening arrangement further comprises at least one suspension element arranged on the bottom element, the suspension element being adapted to move the electrical connection device between a first position in which the electrical connection device is in electrical connection with the electrical guide and a second position in which

the electrical connection device is not in electrical connection with the electrical guide. Thereby a screening arrangement is obtained in which a possibility for manual disruption of the electrical driving system is included, which may be of advantage particularly during mounting of the device, but also e.g. when it is desired to operate the screening device manually.

[0022] According to a preferred embodiment the side rails further comprise an outer profile and an inner profile arranged such as to form between them a guide slot for guiding the bottom element. Thereby a particularly robust and well functioning guidance of the bottom element is obtained, which in turn also leads to a more stable electrical connection between electrical guide and electric motor.

[0023] According to a preferred embodiment the side rails further comprise a bevelled end section adapted for receiving the first transmission means and guiding it into engagement with the second transmission means when connecting the bottom element to the side rails. Thereby a screening arrangement being even more simple and straight forward to mount is obtained.

[0024] According to a second aspect of the invention the above mentioned problems are solved by means of a method for mounting a screening arrangement on a frame of a window, the frame comprising a top piece, a bottom piece, two side pieces and at least one electrical outlet, the method comprising the steps of:

providing a screening arrangement according to the first aspect of the invention,
mounting the top element in a position extending in parallel with the top piece and perpendicular to the side pieces and in such a way that the electrical connection element is brought into electrical connection with the at least one electrical outlet, wherein the method further comprises the further steps of:

connecting the side rails to the top element in such a way that the side rails extend substantially in parallel with the respective side pieces, providing electrical power to the at least one electrical guide by bringing at least one electrical guide into electrical connection with the at least one electrical connection element,
connecting the bottom element to the side rails in such a way that the bottom element extends substantially in parallel with the top element and that the first transmission means and the second transmission means are brought into mutual engagement, and
providing electrical power to the motor by bringing the at least one electrical connection device into electrical connection with the at least one electrical guide.

[0025] The invention will be described in more detail below by means of a non-limiting example of an embod-

iment and with reference to the schematic drawings, in which

Fig. 1 shows a screening arrangement according to the invention mounted on the frame of a window,
 Fig. 2 shows the screening arrangement according to Fig. 1 in a partially exploded view,
 Fig. 3 shows a top view of an embodiment of a screening arrangement according to the invention in the assemble state,
 Fig. 4 shows a perspective view of the top left corner of the screening arrangement according to Fig. 3, in which the electrical connection element of the bottom element and the electrical guide of the side rail are in electrical connection,
 Fig. 5 shows a perspective view of the top left corner of the screening arrangement according to Fig. 3, in which the electrical connection element of the bottom element and the electrical guide of the side rail are not in electrical connection,
 Fig. 6 shows a perspective view of the top left corner of the screening arrangement according to Fig. 3, in which the bottom element and the side rail are in electrical connection and in which the top element and the housing of the slide shoe has been removed,
 Fig. 7 shows a schematic perspective view of a side rail and a bottom element of a screening arrangement according to the invention,
 Fig. 8 shows a perspective view of the top left corner of a second embodiment of a screening arrangement according to the invention in which the bottom element comprises a suspension element shown in a position in which the screening arrangement may be electrically operated,
 Fig. 9 shows a perspective view of the top left corner of the screening arrangement according to Fig. 8 in which the suspension element is shown in a position in which the screening arrangement may be manually operated,
 Fig. 10 shows an example of a mounting bracket for mounting a screening arrangement according to the invention comprising a side rail with a connection element, and
 Fig. 11 shows an example of a suspension element for a bottom element of a screening arrangement according to the invention.

[0026] Figs 1 and 2 show an embodiment of a screening arrangement generally designated 1. As shown in Fig. 1, the screening arrangement 1 is adapted to be mounted on a frame constituted by a frame 2 representing a window. The frame 2 is preferably a pivotable frame, but may likewise be a stationary frame, which in a mounted position of the window lines an opening in a building. It is noted that the term "frame" is to be understood as incorporating any substantially rectangular structure positioned in any opening in a building, whether in a wall or the roof, and surrounding an aperture to be screened.

The screening arrangement 1 may thus be utilized in connection with e.g. windows having a frame only, windows having a sash and a frame, or in doors.

[0027] The frame 2 has a top piece 21, a bottom piece 22 and two side pieces 23 and 24 surrounding an aperture, which is covered by a suitable panel element such as a glazing in the form of an insulating pane (not shown). The frame 2 furthermore comprises two electrical outlets 25, 26 (cf. Fig. 2), one on each side piece 23, 24. It is noted that in other embodiments only one electrical outlet may be provided, and/or the electrical outlet(s) may be arranged on the top piece 21 or even the bottom piece 22.

[0028] In the embodiment shown, the screening arrangement 1 comprises a top element 4 positioned at the top piece 21, a screening body 6 (shown in Fig. 2 only) and a bottom element 7. At its upper end edge, the screening body 6 is accommodated in the top element 4 and its opposed, lower end edge is fastened to the bottom element 7. According to the invention, the bottom element 7 is adapted to be electrically operated during operation of the screening arrangement 1, i.e. when moving the bottom element 7 and hence the screening body 6 between the non-screening position shown in Figs 1 and 3 and a screening position, in which the screening body 6 covers the frame aperture partly or fully. To this end the bottom element comprises an electric motor 710, cf. Fig. 3.

[0029] Furthermore, as shown on Fig. 3, the screening arrangement 1 comprises two side rails 8 and 9 adapted to be connected to a respective side piece 23 and 24 of the frame 2 by means of fastening elements, such as screws, and to the top element 4, e.g. by means of a snap or click connection or a plug and socket connection. In the mounted position of the screening arrangement 1, opposite ends of the bottom element 7 and opposite side edges of the screening body 6 are guided in these side rails 8 and 9. In the embodiment shown, the screening arrangement comprises a roller blind having as its screening body 6 a cloth or fabric, and of which the top element 4 includes a spring-biased roller bar. However, other screening arrangements having other kinds of screening bodies and other configurations of the top element are conceivable as well. Hence, it is noted that as used herein the term "screening body" is intended to encompass all feasible types of screening bodies, examples being blinds, pleated blinds, venetian blinds, curtains, insect screens, awnings, roller shutters and shades.

[0030] Turning now to Fig. 3 depicting the screening arrangement 1 according to the invention, it may be seen that the top element 4 has a left-hand side surface 414 and a right-hand side surface 415, each comprising a connection element 412 and 413, respectively.

[0031] Furthermore, with reference also to Figs. 4 and 5, the bottom element 7 and the two side rails 8, 9 are shown. As may be seen, the screening arrangement 1 comprises an electrical drive means. Arranged in the bottom element 7, the electrical drive means comprises an

electric motor 710, a first transmission means 711, 712, 713 and at least one electrical connection device 714, 715 for providing electrical power to the motor 710.

[0032] In the embodiment shown, the first transmission means 711, 712, 713 comprises a shaft 711 arranged such as to be rotatable by means of the electric motor 710 and gear wheels 712, 713 arranged at opposite ends of said shaft 711.

[0033] Arranged in the side rail 8 the electrical drive means comprises a second transmission means 810 and two electrical guides 811, 812 (or electrical carriers) extending substantially in a longitudinal direction L of the side rail 8. Similarly, arranged in the side rail 9 the electrical drive means comprises a second transmission means 910 and two electrical guides 911, 912 extending substantially in a longitudinal direction of the side rail 9.

[0034] In the embodiment shown the second transmission means comprises a rack 810, 910 extending in the longitudinal direction L of each of the side rails 8, 9.

[0035] It is noted that other configurations of the first transmission means 711, 712, 713 and the second transmission means 810 are feasible. For instance, the second transmission means may be a rail or a track, while the first transmission means comprise wheel(s) adapted for being guided in or on the rail or track.

[0036] It is noted that the first transmission means 711, 712, 713 and the second transmission means 810 may be mounted in such a way with respect to each other that smaller variations in the width of the frame, on which the screening arrangement 1 is mounted, may be absorbed. For instance, the gear wheels 712 and 713 may be mounted in such a way as to be movable with respect to the shaft 711, and thereby in a direction perpendicular to the longitudinal extension of the rack 810. Alternatively the entire first transmission means 711, 712, 713 may be mounted in such a way as to be movable with respect to the remaining bottom element 7 in a direction parallel with the shaft 711, and thereby in a direction perpendicular to the longitudinal extension of the rack 810.

[0037] It is noted that in principle only one of the side rails 8, 9 need to be equipped with the electrical guides described above, and that another number than two electrical guides, particularly one electrical guide although in principle also more than two, may be provided in one of or each of the side rails.

[0038] In the following the screening arrangement 1 will be described with reference to the side rail 8 and the adjacent end of the bottom element 7 comprising the gear wheel 712. It is noted, however, that in the embodiment shown, the opposite side rail 9 and the adjacent opposite end of the bottom element 7 comprising the gear wheel 713 are intended to be constructed in the same way.

[0039] With reference to Figs. 4 and 5 the top element 4 comprises two electrical connection elements 410, 411. The electrical connection elements 410, 411 are adapted for, in a mounted position of the screening arrangement 1 on the frame 2 of the window, establishing an electrical connection between the electrical outlet 25 and the at

least one electrical guide 811, 812 such that electrical power is provided to the at least one electrical guide 811, 812.

[0040] The electrical connection elements 410, 411 are arranged on a side surface 414 of the top element 4, the side surface facing the frame 2 in the mounted position of the screening arrangement 1. Furthermore, although not visible on the figures, the electrical connection elements 410, 411 are extending in the top element 4 in such a way as to have a respective section or end opposite the section or end, which is visible in the figures, arranged such as to provide the electrical connection with the electrical guides 811, 812 of the side rail 8 in the mounted position of the screening arrangement 1. In an alternative embodiment an electrical connection, such as a suitable electrical wiring, e.g. an electrical wiring leading from the electrical connection elements 410, 411 to another pair of electrical terminals adapted for abutment with the electrical guides 811, 812, or a plug-in connection, may be provided for connecting the electrical connection elements 410, 411 with the electrical guides 811, 812 during assembly of the screening arrangement.

[0041] During installation and assembly of the screening arrangement the side rail 8 is slid through the bottom element and slid into the top element 4. Electricity is connected from the electrical contact means 410, 411 to the electrical guides 811, 812. For example by a contact shoe located inside the top element (not visible) which connects power to the electrical guides 811, 812.

[0042] Other arrangements of the electrical connection elements on the top element are also feasible. For instance, the electrical connection elements may in embodiments where the electrical outlet is arranged on the top piece of the frame be arranged on a section or surface of the top element intended for facing the top piece of the frame when mounted thereon.

[0043] As shown the electrical connection elements 410, 411 are provided as contact terminals biased towards contact with corresponding terminals of the electrical outlet 25. In other embodiments other suitable types of electrical connection elements fitting corresponding contact means of the electrical outlet on the frame may be provided. Examples are, without being limited thereto, contact pins, contact plugs, contact sockets, contact terminals, contact plates, contact pads and contact springs.

[0044] The two electrical connection devices 714, 715 of the bottom element 7 are adapted for, in the mounted position of the screening arrangement 1, being in electrical connection with the at least one electrical guide 811, 812 such that electrical power is provided to the motor 710. In the embodiment shown the electrical connection devices 714, 715 are brushes arranged on a conductor, which in turn is connected electrically to the motor 710, either directly or by means of electrical wiring arranged in the bottom element 7. The connection devices 714, 715 are biased by a spring (or a flexible portion) towards the electrical guide 811, 812 to ensure proper contact. In other embodiments other suitable types of elec-

trical connection devices suitable for providing a continuous electrical connection during movement of the bottom element along the side rail, and thus of the electrical connection devices along the electrical guides, may be provided. Non-limiting examples are a slide contact and a contact pin adapted for being guided in a track provided in the electrical guide on the side rail.

[0045] In this way electrical power is provided to the electric motor 710 from the electrical outlet via the electrical connection elements 410, 411, the electrical guides 811, 812 and the electrical connection devices 714, 715.

[0046] The casing of the top element 4, the profiles 817, 818, 821 of the side rail 8 and the casing of the bottom element 7, are all preferably made of aluminium or a like lightweight and durable material. For safety reasons, the electrical connection elements 410, 411, the electrical guides 811, 812 and the electrical connection devices 714, 715 are therefore preferably arranged such as to be electrically insulated from the casing of the top piece 4, the profiles 817, 818, 821 of the side rail 8 and the casing of the bottom element 7, respectively.

[0047] Furthermore, the bottom element 7 comprises a biasing means (not shown) adapted for urging the electrical connection device 714, 715 against the electrical guide 811, 812. The biasing means is preferably a suitable spring element which may be provided as a part of or in connection with the electrical connection devices 714, 715.

[0048] Referring also to Fig. 10, the side surface 414 of the top element is furthermore provided with a connection element 412, and the electrical outlet 25 is provided with a mounting bracket 27 (cf. Fig. 10) comprising at least one electrical contact point 271, 272. Such a mounting bracket is known per se, cf. the applicant's WO 2007/110072 A1.

[0049] The connection element 412 is adapted for engagement with the mounting bracket 27. The connection element 412 comprises the electrical connection elements 410, 411. The electrical connection elements 410, 411 are adapted for electrical contact with the electrical contact points 271, 272 of the mounting bracket 27, and for electrical contact with the electrical guides 811, 812 of the side rail 8 (cf. Fig. 6).

[0050] In another embodiment, in the case that the connection element 412 and the mounting bracket 27 do not directly fit each other, an adapter element (not shown) may be provided for insertion between the connection element 412 and the mounting bracket 27. In another embodiment, the connection element 412 may be omitted, and the electrical connection elements 410, 411 arranged on the top element 4 may be adapted for direct contact with the electrical contact points 271, 272 of the mounting bracket 27. In yet another embodiment the connection element 412 and the mounting bracket 27 may be omitted altogether and the electrical connection elements 410, 411 may be adapted for direct electrical connection with the electrical outlet 25.

[0051] In the embodiment shown, a similar electrical

connection system may be provided in the side surface 415 of the top element 4 opposite the side surface 414, the side surface 415 being located adjacent to the side rail 9 and the end of the bottom element 7 comprising the gear wheel 713. In another embodiment it is likewise feasible that the electrical connection system described above is provided in only the side surface 415 of the top element 4.

[0052] Furthermore, referring now to Figs. 4, 5 and 6 the bottom element 7 comprises, at the end comprising the gear wheel 712, a slide shoe 716 in which the electrical connection devices 714, 715 are arranged. The slide shoe 716 is arranged on the bottom element 7 in such a way that, in a mounted position of the screening arrangement 1 on the frame 2 of the window, it is aligned or even fixed in relation to the side rail 8 and movable in relation to the bottom element 7. The electrical connection devices 714, 715 may be mounted in or on the slide shoe 716 in any suitable way, examples being moulding, soldering, riveting, snap connection or frictional connection.

[0053] The slide shoe 716 is arranged on the bottom element 7 in such a way that it is movable, e.g. about a pivot axis, between a first position in which the electrical connection devices 714, 715 are in electrical contact with the electrical guides 811, 812 (cf. Figs. 4 and 6) and a second position in which the electrical connection devices 714, 715 are out of electrical contact with the electrical guides 811, 812 (cf. Fig. 5).

[0054] The biasing means 717 may likewise be arranged in or on the slide shoe 716, e.g. as a suitable spring element affecting the pivot axis around which the slide shoe 716 is movable.

[0055] The slide shoe 716 may be manually operable by means of a handle element 721. The slide shoe 716 may furthermore comprise a housing 720 (cf. Figs. 4, 5, 8 and 9) for protective purposes. The handle element 721 preferably extends through an opening in the housing 720 as shown on Figs. 8 and 9. The sliding shoe may be automatically operable. For example a ramp may automatically lift and lower the shoe 716, so the electrical connection devices 714, 715 are connected to the electrical guides 811, 812 when the side rail 8,9 is inserted through the bottom element 7.

[0056] The slide shoe is mounted adjacent to the gear wheel as shown in the figures. Alternatively the slide shoe may be mounted in such a way that the shaft extends into the slide shoe, the gear wheel being arranged in the slide shoe, preferably in the housing of the slide shoe, or that the shaft extends through the slide shoe.

[0057] It is noted that the slide shoe 716 is an optional yet preferred feature of the screening arrangement, and that a similar slide shoe may be provided at the end of the bottom element 7 comprising the gear wheel 713.

[0058] It is furthermore noted that the slide shoe 716 and/or the electrical connection devices 714, 715 may also, alternatively or in addition to the first transmission means 711, 712, 713 and the second transmission

means 810 as described above, be mounted in such a way with respect to the bottom element 7 that smaller variations in the width of the frame, on which the screening arrangement 1 is mounted, may be absorbed. For instance, the slide shoe 716 and/or the electrical connection devices 714, 715 may be mounted in such a way as to be movable in a direction substantially in parallel with the shaft 711, and thereby in a direction perpendicular to the longitudinal extension of the electrical guide 811, 812.

[0059] With reference to Fig. 7, the construction of the side rail 8 will now be described. The side rail 8 comprises a longitudinal direction L, a width direction W and a depth direction D being mutually perpendicular.

[0060] The side rail 8 comprises, as mentioned above, a track 810 and two electrical guides 811, 812 extending parallel with each other in the longitudinal direction L.

[0061] The side rail 8 further comprises a profile element, which is made, preferably extruded, moulded or cast, of a metal such as aluminium or of plastic. The profile element comprises an outer profile 817, an inner profile 818 and a side profile 821. The track 810 and the two electrical guides 811, 812 are mounted on the inner profile 818. The outer profile 817 and the inner profile 818 form between them a guide slot 819 adapted to guide a protrusion, such as a flange 727, formed on the bottom element 7 such as to stabilize and guide the movement of the bottom element 7 on the side rail 8. Upon assembly the side rail 8 is slid through the bottom element 7. A ramp guide may automatically engage and disengage i.e. lift and/or lower the shoe 716, so the electrical connection devices 714, 715 are connected to the electrical guides 811, 812 when the side rail 8 is slid through the bottom element 7. A ramp guide for automatically lifting and/or lowering the shoe 716 has the advantage that the screening easily may be disassembled if the installer needs to take the screening apart.

[0062] The side rail 8 may furthermore optionally comprise a bevelled or ramp-shaped end section 820 with the purpose of making it easier for the user to bring the bottom element 7 and the side rail 8 into engagement with each other.

[0063] It is noted that with regard to the profiles and the track the other side rail 9 is identical, albeit mirror inverted about a mirror axis extending in the longitudinal direction L, to the side rail 8.

[0064] Referring now to Figs. 8 and 9, the bottom element 7 furthermore comprises at each opposite end surface a suspension element 718 and 719, respectively (cf. also Fig. 3). Such a suspension element is known per se and has been described in the applicant's WO 02/068786 A1. The suspension elements 718, 719 serve the purpose of allowing the first transmission means 711, 712, 713 to be movable between a first position in which the first transmission means 711, 712, 713 and the second transmission means 810, 910 are in mutual engagement, and in which the screening arrangement 1 is thus electrically operable, and a second position in which the first trans-

mission means 711, 712, 713 and the second transmission means 810, 910 are disengaged, whereby the screening arrangement 1 may be operated manually.

[0065] The suspension elements 718, 719 are therefore mounted on the bottom element 7 in such a way as to be movable between the said first and second positions, while the shaft 711 and the gear wheel 712, 713 are fixed in relation to the suspension elements 718, 719.

[0066] Preferably, the suspension elements 718, 719 are biased towards the first position in which the first transmission means 711, 712, 713 and the second transmission means 810, 910 are in mutual engagement by means of a biasing element, e.g. the spring means 723 shown in Fig. 11, arranged in the bottom element 7.

[0067] Furthermore, the suspension elements 718, 719 may alternatively or in addition to the above serve the purpose of moving the electrical connection device 714, 715 between a first position in which the electrical connection device 714, 715 is in electrical connection with the electrical guide 811, 812 and a second position in which the electrical connection device 714, 715 is not in electrical connection with the electrical guide 811, 812; 911, 912. In this case the slide shoe 716 may be omitted or alternatively be made immobile in relation to the suspension element 718 and/or the bottom element 7.

[0068] In addition to the above functions, the suspension element 718 also absorbs physical variations in the height and/or width of the side rail(s).

[0069] With reference to Fig. 11, an embodiment of the suspension element 718 is shown. The suspension element 718 comprises a protrusion member 722 connecting the suspension element 718 to the bottom element 7 in a hinged manner allowing for the movability described above. The protrusion member 722 is connected with a biasing element, shown as a spring 723, through a linking element 725 to apply a force to the suspension means biasing it towards the first position as described above. The protrusion member 722 may in itself provide a recoiling action towards the first position as described above. Various other embodiments of the suspension element and biasing element are also feasible.

[0070] It is noted that in embodiments where the bottom element 7 comprises a suspension element 718, 719, the flange 727 may form part of the suspension element 718, 719 - e.g. of the protrusion member 722.

[0071] It is noted that the suspension elements 718, 719 is an optional yet preferred feature of the screening arrangement.

[0072] The spring 724 shown on Fig. 11 is connected to the slide shoe 716 via the connecting piece 726 and serves to limit the movement of the slide shoe 716, and thereby of the electrical connection device 714, 715, relative to the electrical guide 810 in the width direction W of the side rail 8. Thereby correct placement of the electrical connection device 714, 715 with respect to the electrical guide 810 is ensured. It is noted, however, that the spring 724 is an optional feature of the screening arrangement according to the invention.

[0073] The invention should not be regarded as being limited to the described embodiments. Several modifications and combinations of the different embodiments will be apparent to the person skilled in the art.

Claims

1. A screening arrangement (1) for a window, preferably a roof window, comprising a frame (2) with a top piece (21), a bottom piece (22) and two side pieces (23, 24), at least one of the two side pieces (23, 24) comprising an electrical outlet (25, 26), the screening arrangement (1) comprising:

a top element (4),
a bottom element (7), and
two side rails (8, 9),
the bottom element (7) being movable with respect to the two side rails (8, 9) between a first non-screening position and a second screening position by means of an electrical drive means comprising
an electrical motor (710), a first transmission means (711, 712, 713), and at least one electrical connection device (714, 715) for providing electrical power to the motor (710) arranged in said bottom element (7), and
a second transmission means (810, 910) arranged in each of the two side rails (8, 9) and at least one electrical guide (811, 812; 911, 912) extending substantially in a longitudinal direction (L) of at least one of the side rails (8, 9) **characterized in that**
the top element (4) comprises an electrical connection element (410, 411) adapted for, in a mounted position of the screening arrangement (1) on the frame (2) of the window, establishing an electrical connection between the electrical outlet (25, 26) and the at least one electrical guide (811, 812; 911, 912) such that electrical power is provided to the at least one electrical guide (811, 812; 911, 912), and that
the at least one electrical connection device (714, 715) is adapted for, in the mounted position of the screening arrangement (1), being in electrical connection with the at least one electrical guide (811, 812, 911, 912) such that electrical power is provided to the motor (710).

2. A screening arrangement according to claim 1, **characterized in that** the electrical outlet (25, 26) is provided with a mounting bracket (27) comprising at least one electrical contact point (271, 272), and **in that** the top element (4) comprises a connection element (412, 413) adapted for engagement with the mounting bracket (27), the connection element (412, 413) comprising the at least one electrical connection element (410, 411), the at least one electrical connection element (410, 411) being adapted for electrical contact with the at least one electrical contact point (271, 272) of the mounting bracket (27).

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3. A screening arrangement according to claim 1 or 2, **characterized in that** the at least one electrical connection element (410, 411) comprises at least one electrical contact element (410, 411) adapted for electrical contact with a contact element of the electrical outlet (25, 26).

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4. A screening arrangement according to any one of claims 1 to 3, **characterized in that** the at least one electrical connection element (410, 411) is any one of a contact pin, a contact plug, contact socket, a contact terminal, a contact plate, a contact pad and a contact spring.

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5. A screening arrangement according to any one of claims 1 to 4, **characterized in that** the at least electrical connection element (410, 411) is arranged on a side surface (414) of the top element (4).

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6. A screening arrangement according to any one of claims 1 to 5, **characterized in that** the at least one electrical connection device (714, 715) is any one of a brush-type contact and a sliding contact.

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7. A screening arrangement according to any one of claims 1 to 6, **characterized in that** the at least one electrical connection device (714, 715) is mounted in a slide shoe (716).

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8. A screening arrangement according to claim 7, **characterized in that** said slide shoe (716) is arranged on the bottom element (7) in such a way that, in a mounted position of the screening arrangement (1) on the frame (2) of the window, it is aligned in relation to the side rail (8, 9) and movable in relation to the bottom element (7).

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9. A screening arrangement according to any one of claims 1 to 8, **characterized in that** it further comprises a biasing means (717) arranged on the bottom element (7) and adapted for urging the electrical connection device (714, 715) against the electrical guide (811, 812; 911, 912).

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10. A screening arrangement according to any one of claims 1 to 9, **characterized in that** the first transmission means comprises a shaft (711) rotatable by means of the motor (710) and a gear wheel (712, 713) at opposite ends of said shaft (711), and that the second transmission means comprises a rack (810, 910) extending in the longitudinal direction (L) of each of the side rails (8, 9).

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11. A screening arrangement according to any one of claims 1 to 10, **characterized in that** it further comprises at least one suspension element (718, 719) arranged on the bottom element (7), the suspension element (718, 719) being adapted to move the first transmission means (711, 712, 713) between a first position in which the first transmission means (711, 712, 713) and the second transmission means (810, 910) are in mutual engagement and a second position in which the first transmission means (711, 712, 713) and the second transmission means (810, 910) are disengaged. 5
12. A screening arrangement according to any one of claims 1 to 11, **characterized in that** it further comprises at least one suspension element (718, 719) arranged on the bottom element (7), the suspension element (718, 719) being adapted to move the electrical connection device (714, 715) between a first position in which the electrical connection device (714, 715) is in electrical connection with the electrical guide (811, 812; 911, 912) and a second position in which the electrical connection device (714, 715) is not in electrical connection with the electrical guide (811, 812; 911, 912). 10 20 25
13. A screening arrangement according to any one of claims 1 to 12, **characterized in that** the side rails (8, 9) further comprise an outer profile (817, 917) and an inner profile (818, 918) arranged such as to form between them a guide slot (819, 919) for guiding the bottom element (7). 30
14. A screening arrangement according to any one of claims 1 to 13, **characterized in that** the side rails (8, 9) further comprise a bevelled end section (820, 920) adapted for receiving the first transmission means (711, 712, 713) and guiding it into engagement with the second transmission means (811, 812, 813) when connecting the bottom element (7) to the side rails (8, 9). 35 40
15. A screening arrangement according to any one of claims 1 to 14 comprising a window. 45
16. Method for mounting a screening arrangement (1) on a frame (2) of a window, the frame (2) comprising a top piece (21), a bottom piece (22), two side pieces (23, 24), and at least one electrical outlet (25, 26), the method comprising the steps of: 50
- providing a screening arrangement (1) according to any one of the above claims, mounting the top element (4) in a position extending in parallel with the top piece (21) and perpendicular to the side pieces (23, 24) and in such a way that the electrical connection element (410, 411) is brought into electrical con- 55

nection with the at least one electrical outlet (25, 26),
characterized in that it comprises the further steps of:

connecting the side rails (8, 9) to the top element (4) in such a way that the side rails extend substantially in parallel with the respective side pieces (23, 24), providing electrical power to the at least one electrical guide (811, 812; 911, 912) by bringing at least one electrical guide (811, 812; 911, 912) into electrical connection with the at least one electrical connection element (410, 411), connecting the bottom element (7) to the side rails (8, 9) in such a way that the bottom element extends substantially in parallel with the top element (4) and that the first transmission means (711, 712, 713) and the second transmission means (811, 812, 813) are brought into mutual engagement, and providing electrical power to the motor (710) by bringing the at least one electrical connection device (714, 715) into electrical connection with the at least one electrical guide (811, 812, 911, 912).

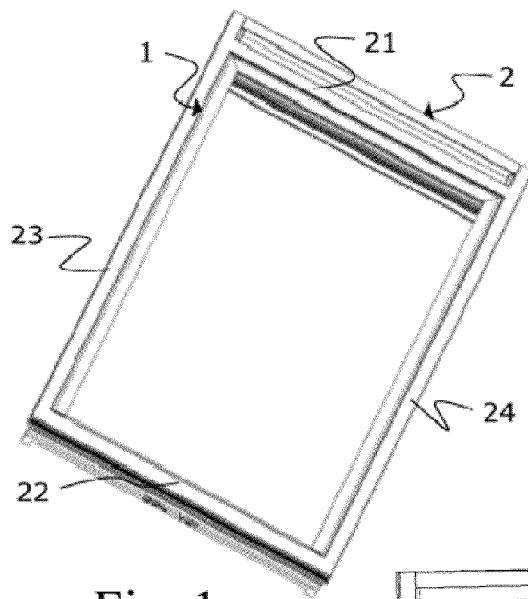


Fig. 1

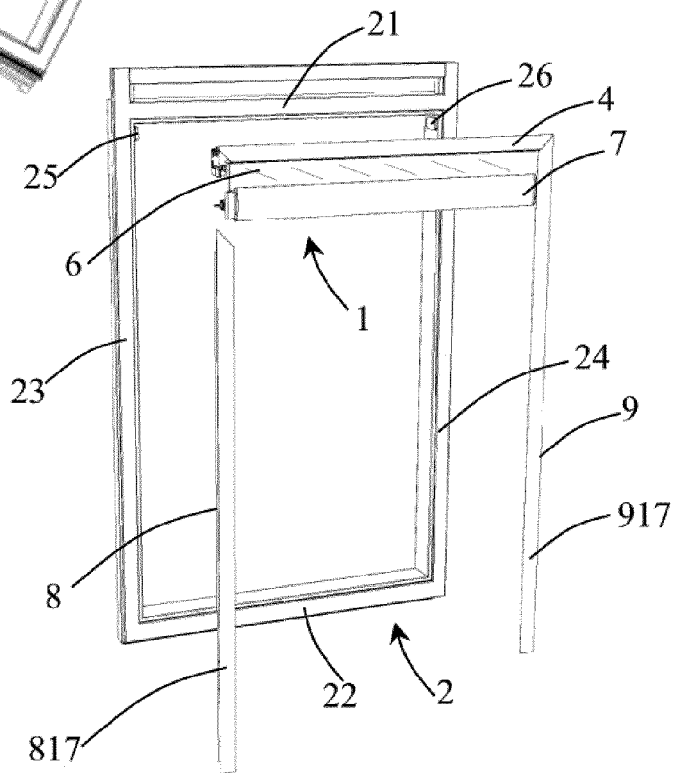


Fig. 2

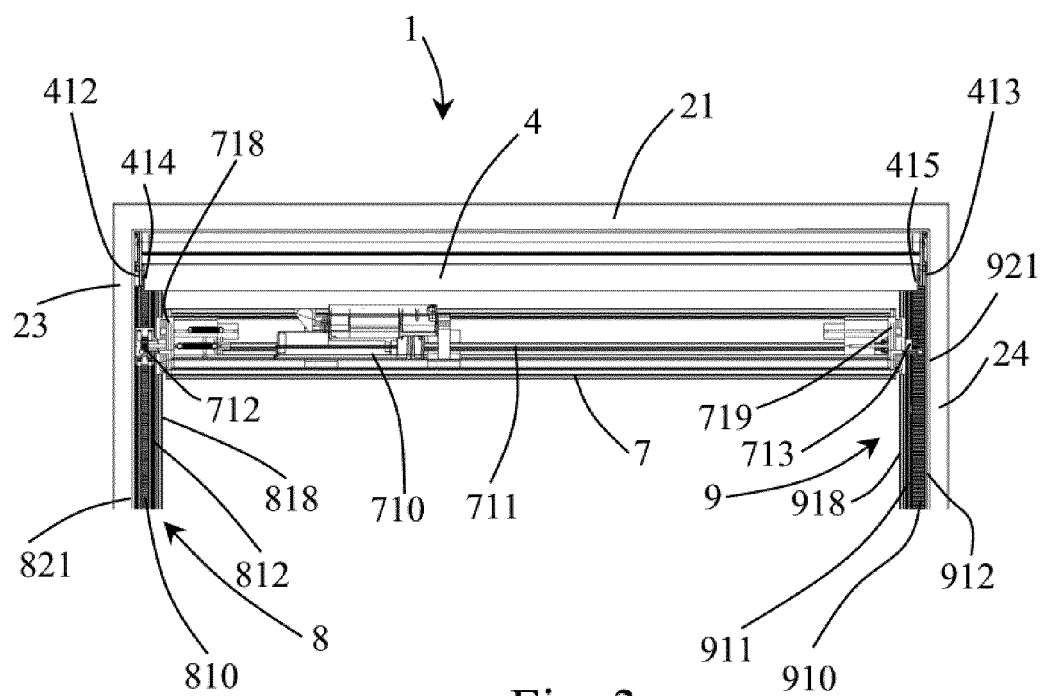
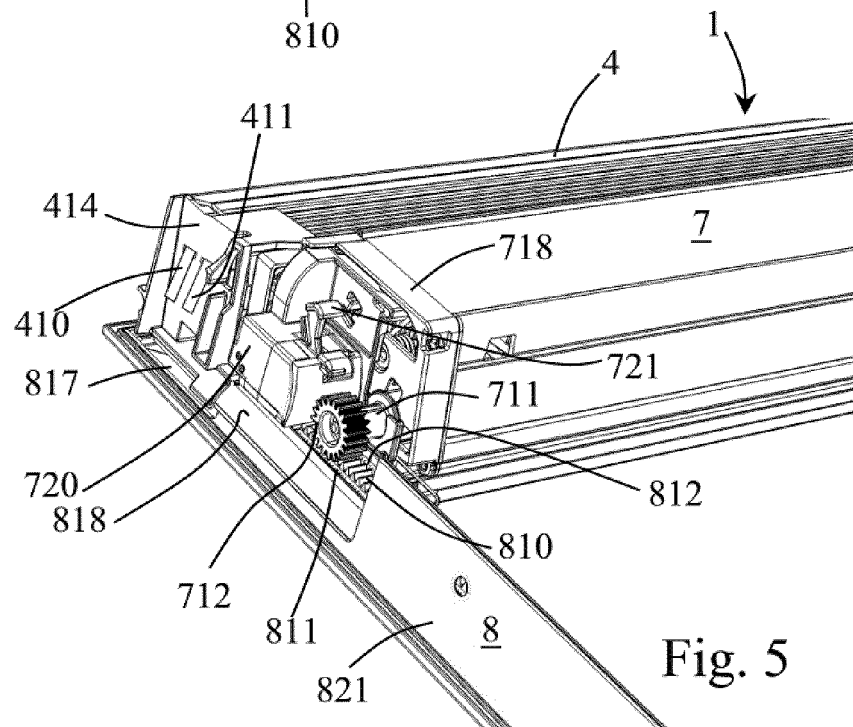
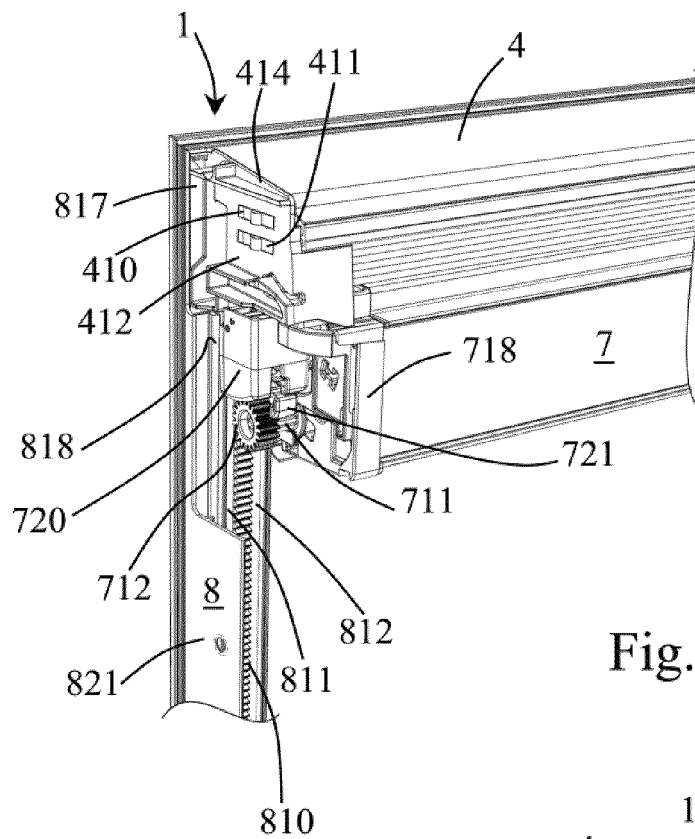
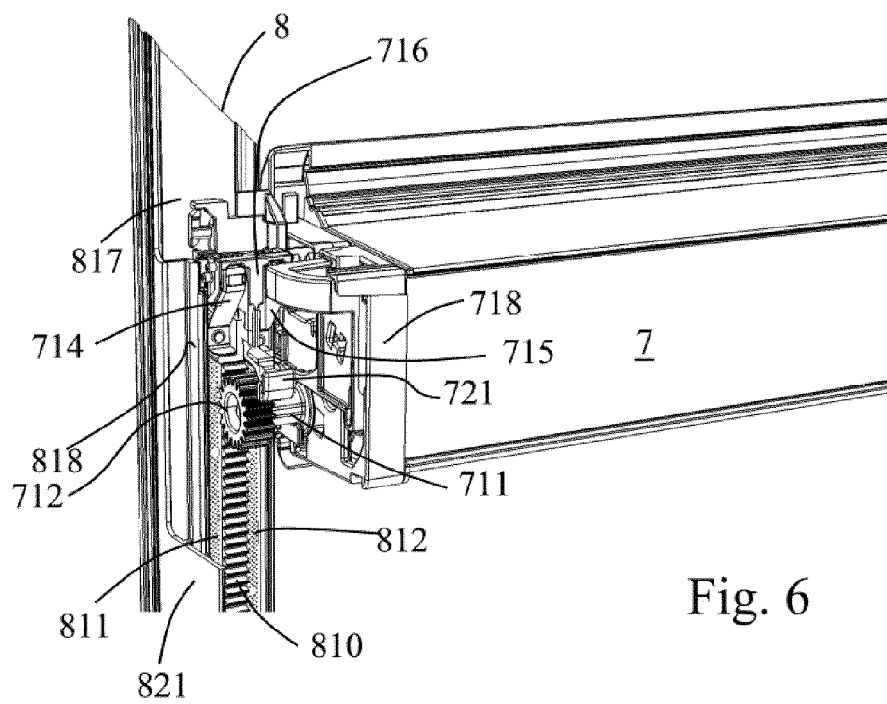


Fig. 3





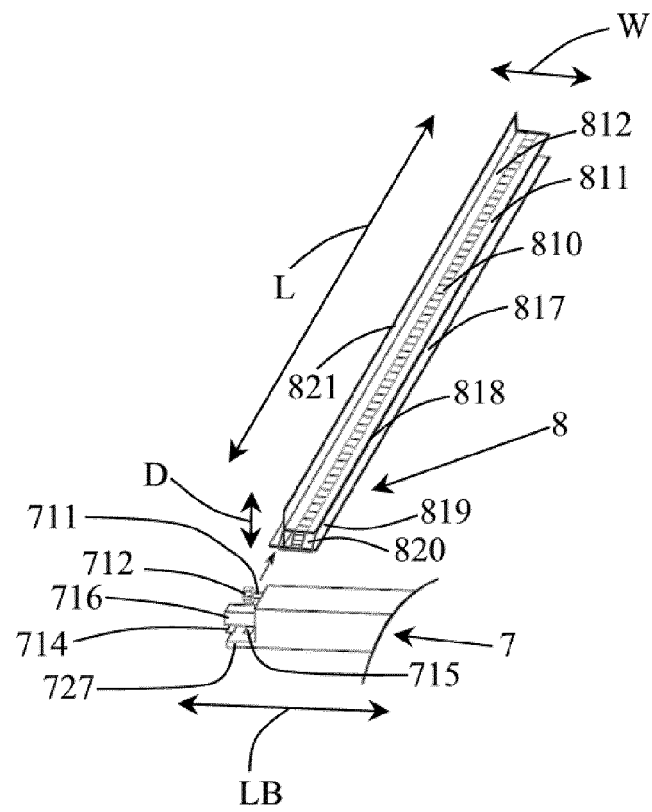
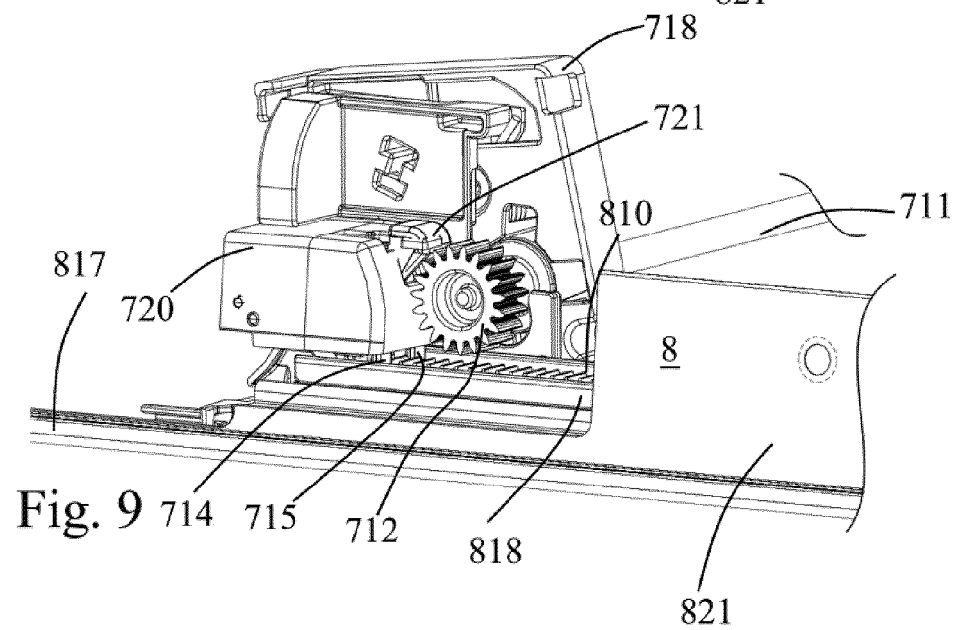
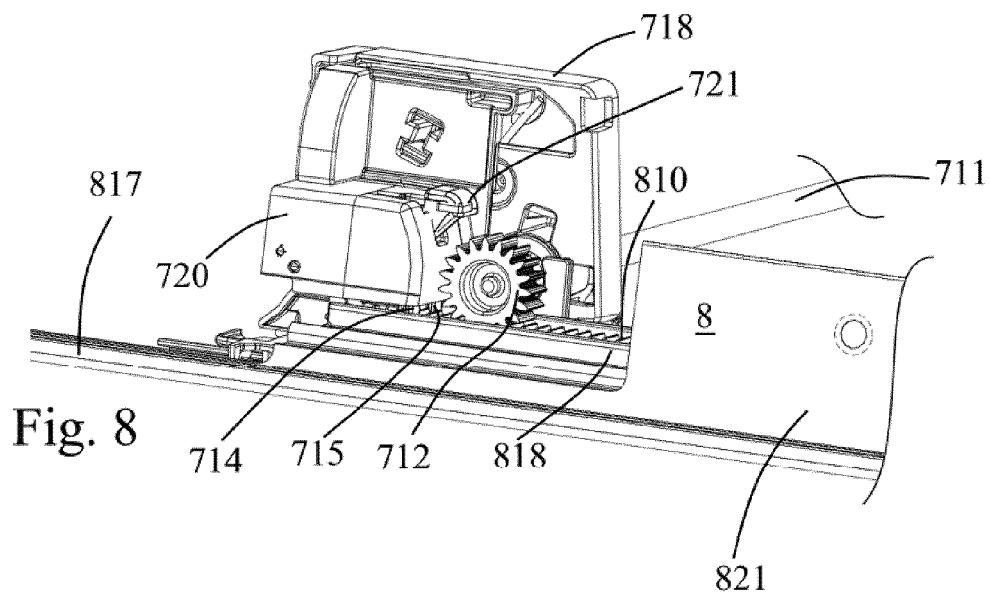


Fig. 7



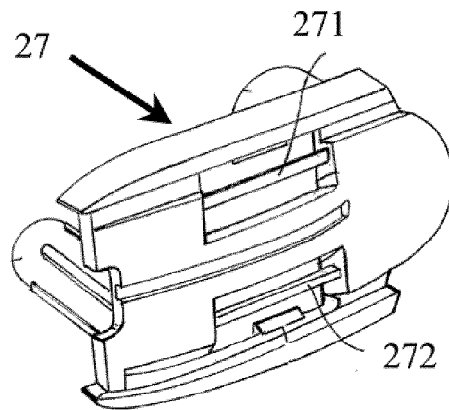


Fig. 10

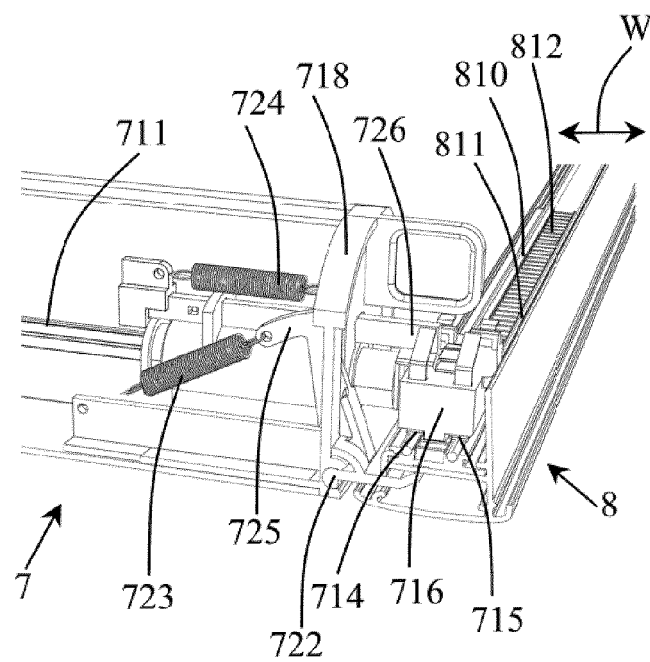


Fig. 11



EUROPEAN SEARCH REPORT

Application Number
EP 13 19 5306

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 21 January 2014	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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**ANNEX TO THE EUROPEAN SEARCH REPORT
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The members are as contained in the European Patent Office EDP file on
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