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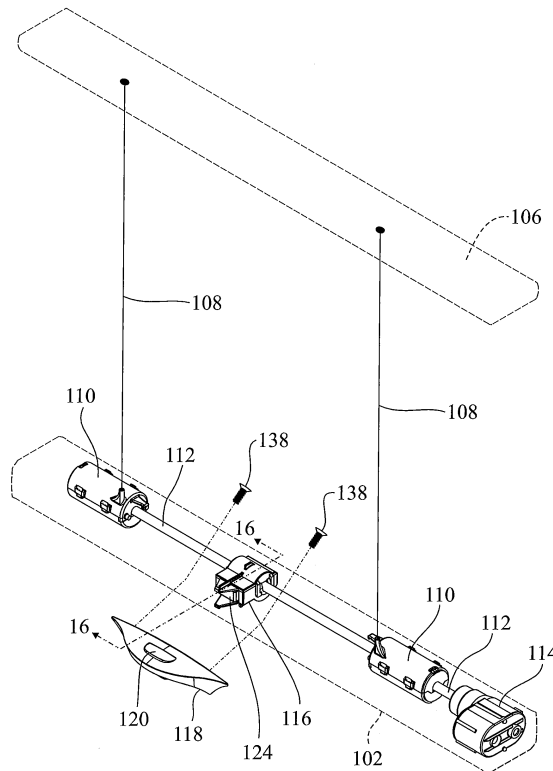
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(54) **ARRANGEMENT FOR MOUNTING AN ACTUATOR BUTTON ONTO A RAIL OF A WINDOW**

(57) An arrangement for mounting an actuator button (120,214) to a bottom rail (102) of a window covering wherein the fastener (138,218) for securing the button housing (118,220) to the rail (102) is hidden from view of the user.



**FIG 2**

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**Description****BACKGROUND**

**[0001]** The present invention relates to an arrangement for mounting an actuator button onto a rail of a window covering and an arrangement for a component housing having a base and a cover for use in a rail of a window covering.

**SUMMARY**

**[0002]** The present invention provides a simple, secure, inexpensive arrangement for securing an actuator button onto a rail of a window covering wherein the fasteners that secure the button housing onto the rail are concealed by the actuator button.

**[0003]** The present invention further provides a simple, secure, inexpensive, and fast arrangement for releasably securing a cover to a base of a component for use in a rail of a window covering.

**[0004]** According to the present invention, there is provided a cordless window covering comprising: a shade material; a hollow rail at the bottom of said shade material; and an actuator button mounted on said hollow rail, said actuator button comprising: a button housing secured to said hollow rail by a fastener; and a button mounted on said button housing for movement relative to said button housing; wherein said button conceals the fastener from view from the exterior of said hollow rail.

**[0005]** According to the present invention, there is also provided cordless window covering comprising: a shade material; and a hollow rail at the bottom of said shade material; an actuator button mounted on said hollow rail, said actuator button comprising: a button housing mounted on said hollow rail; a button mounted on said button housing for movement relative to said button housing; and a pusher extending from a back surface of said button facing said hollow rail to be moved toward said hollow rail upon pushing said button toward said hollow rail.

**[0006]** Preferably, said hollow rail provides a handle surface for extending and retracting said shade material, said button being positioned for being pushed by a user's finger when the user grasps said hollow rail as a handle.

**[0007]** According to the present invention, there is provided an actuator button for a window covering comprising a shade material and a hollow rail at the bottom of the shade material, said actuator button comprising: a button housing configured for mounting on the hollow rail; a button mounted on said button housing for movement relative to said button housing; and a pusher extending from a back surface of said button facing said hollow rail to be moved toward said hollow rail upon pushing said button toward said hollow rail.

**[0008]** Preferably, said pusher moves toward the hollow rail and into the hollow rail to engage a brake within the hollow rail upon pushing said button toward the hollow rail.

**BRIEF DESCRIPTION OF THE DRAWINGS****[0009]**

5 Figure 1 is a perspective view of a cellular shade product with a handle secured to the movable rail; Figure 2 is a schematic, partially exploded, perspective view of the drive mechanism of Figure 1 including the handle and a brake;

10 Figure 3 is a section view along line 3-3 of Figure 1, with the cellular shade product omitted for clarity; Figure 4 is a section view, similar to Figure 3, but with the brake release mechanism depressed to release the brake;

15 Figures 5-7 show the handle and brake mechanism of Figure 3 with the lift rod omitted for clarity, and with the brake portion in three different axial positions relative to the handle portion to illustrate that the brake portion does not have to be precisely located in order for the pusher to actuate the brake release mechanism;

Figure 8 is a perspective view of the brake portion of the brake and handle mechanism of Figure 7;

Figure 9 is an exploded perspective view of the brake portion of Figure 8;

20 Figure 10 is a section view along line 10-10 of Figure 8;

Figure 11 is a perspective view of a brake, similar to the brake of Figure 8, but with a surface mounted button actuator instead of the handle of Figures 5-7, and showing a broken-away view of the rail;

Figure 12 is a partially exploded perspective view of the brake and button arrangement of Figure 11;

Figure 13 is a further exploded perspective view of the brake and button arrangement of Figure 12;

Figure 14 is a section view along line 14-14 of Figure 11;

Figure 15 the same as Figure 14 but with the button in the depressed position;

40 Figure 16 is an enlarged perspective view of the housing and button of Figure 12;

Figure 17 is a partially broken-away, perspective view of a rail and brake, similar to the brake of Figure 11, but with a recess-mounted button actuator;

Figure 18 is a partially exploded perspective view of the brake and button arrangement of Figure 17;

Figure 19 is a further exploded perspective view of the brake and button arrangement of Figure 18;

Figure 20 is a section view along line 20-20 of Figure 17;

Figure 21 is the same as Figure 20 but with the button depressed; and

Figure 22 is an enlarged perspective view of the housing and housing adapter of Figure 19.

**DESCRIPTION**

**[0010]** Figure 1 is a perspective view of a cellular shade

104, having an upper rail 106, a movable lower rail 102, and a handle 118 mounted on the lower rail 102. As will be explained later, the handle 118 also may be mounted on the upper rail 106 or on any intermediate movable rails (not shown).

**[0011]** Figure 2 is a schematic showing the rails 102, 106 in phantom, with the cellular shade itself omitted for clarity. The lower rail 102 is suspended from the upper rail 106 by means of left and right lift cords 108 which wind onto lift spools (not shown) in lift stations 110 (when raising the shade 104), or unwind from the spools of the lift stations 110 (when lowering the shade 104). The lift stations 110 are functionally interconnected by an elongated lift rod 112 that extends in the elongated direction of the rail, such that the lift rod 112 and lift spools of the lift stations 110 rotate in unison. The lift rod 112 extends through the rightmost lift station 110 and is connected to a spring motor 114 which provides a force to aid the user in lifting the shade 104. As the rod 112 rotates in one direction about its axis of rotation, the lift cords 108 wind up onto the lift spools of the lift stations 110 to retract the shade, and as the rod 112 rotates in the opposite direction, the lift cords 108 unwind from the lift spools and extend the shade or covering 104.

**[0012]** In this embodiment, the spring motor 114 is underpowered such that it is unable to raise the shade 104 alone and needs additional input (referred to as a catalytic force) from the user to accomplish that task. This particular spring motor 114 also is unable to hold the bottom rail 102 in place once it is released by the user. The weight of the bottom rail 102 (together with the components found in the bottom rail 102 and the weight of the shade material) overwhelms the force provided by the spring motor 114 such that the bottom rail 102 will continue to drop once released by the user unless it is stopped by other means. To stop the bottom rail from dropping, a brake 116 is functionally connected to the lift rod 112 and to the bottom rail 102 to stop the lift rod 112 from rotating in at least one direction relative to the bottom rail 102, as explained in more detail later.

**[0013]** The handle 118 includes an actuator button 120 which, when depressed by the user, releases the brake 116, which allows rotation of the lift rod 112 in both clockwise and counterclockwise directions, as explained in more detail later. The handle 118 is secured to the rail 102 using screws 138, which may be concealed from view from the exterior of the rail 102 by the handle 118.

**[0014]** The brake 116 can be mounted anywhere along the lift rod 112 and does not have to be precisely located relative to the handle 118 in order for the actuator button 120 to function to release the brake 116. This is advantageous, as it permits the handle to be secured to the rail 102 from inside the rail with the brake 116 out of the way, and then permits the brake 116 to be slid along the lift rod 112 into a position that is generally opposite the handle 118, without having to worry about the precise location of the brake 116.

**[0015]** As shown in Figures 5-7, the brake 116 may be

located anywhere along the axial length of the rail 102 as long as it is aligned approximately in the vicinity of the pusher 122, which in this embodiment is a shaft. As long as the pusher 122 abuts the contact plate 124 of the brake 116, the handle and brake combination 100 will operate as designed.

**[0016]** Figure 9 shows the details of the brake 116. The brake 116 includes a housing base 154, a slide element 156, a coil spring 158, a splined sleeve 160 and a housing cover 162. The housing base 154 is a substantially rectangular box having a flat back wall 164, a flat front wall 166 which defines a large central opening 168, and a forwardly extending fixed tab 170 secured to the front wall 166 for mounting the housing base 154 on the rail 102. The housing base 154 includes side walls 172, 174, which define aligned, "U"-shaped openings 176, 178 which provide bearing surfaces to rotationally support the splined sleeve 160. The housing base 154 also defines an internal projection 180 designed to receive and engage one end 182 of the coil spring 158. The other end 184 of the coil spring 158 is received in a partitioned cavity 186 on the slide element 156, in order to bias the slide element 156 in the forward (braking) direction, which is transverse to the axis of rotation of the lift rod 112, as will be described in more detail later.

**[0017]** The slide element 156 has a contact plate 124, which is pushed against by the actuator in the handle 118, in a direction opposite to the braking direction, in order to disengage the brake. The slide element 156 is received in the housing base 154, with the contact plate 124 of the slide element 156 projecting through the opening 168 in the housing 154. The slide element 156 is guided by the housing base 154 so its movement is restricted to forward and backward movement in the direction of the arrow 188 relative to the housing base 154. Shoulders 190, 192 on the slide element 156 limit the movement of the slide element 156 in the forward direction as they impact the front wall 166 of the housing 154. As indicated above, the coil spring 158 biases the slide element 156 in the forward direction (which as explained later, is the braked position). The rear wall 194 of the slide element 156 defines a left-to-right directed ridge 196, which extends parallel to the front and rear walls 124, 194 of the slide element 156 and parallel to the lift rod 112.

**[0018]** The splined sleeve 160 is a generally cylindrical body defining a hollow through shaft 198 having a non-circular profile. In this particular embodiment, the hollow through shaft 198 has a "V" projection profile. The lift rod 112 (See Figure 2) has a complementary "V" notch. The lift rod 112 is sized to match the internal profile of the hollow through shaft 198, with the "V" projection of the hollow through shaft 198 being received in the "V" notch of the lift rod 112, such that the splined sleeve 160 and the lift rod 112 are positively engaged to rotate together. Thus, when the splined sleeve 160 is prevented from rotation, the lift rod 112 is likewise prevented from rotation.

**[0019]** The splined sleeve 160 also defines a plurality of radially extending splines 200. The ends of the splined sleeve 160 define smooth stub shafts 201 which are rotationally supported on the "U"-shaped bearing surfaces 176, 178 of the housing base 154. The slide element 156 has recessed arms 210, 212, which permit the slide element 156 to move forwardly and backwardly within the housing base 154 without interfering with the stub shafts 201.

**[0020]** As shown in Figure 10, when the slide element 156 is pushed forward by the biasing spring 158, which is its normal, braked position, the ridge 196 on the rear wall 194 of the slide element 156 is received between two of the splines 200 of the splined sleeve 160, which prevents rotation of the splined sleeve 160 and of the lift rod 112 (and of the lift drums in the lift stations 110), thereby preventing the movable rail 102 from being raised or lowered.

**[0021]** When the slide element 156 is pushed rearwardly by pushing against the contact plate 124, the ridge 196 moves out of engagement with the splined sleeve 160, allowing the splined sleeve 160, the lift rod 112, and the lift drums to rotate in order to raise or lower the movable rail 102.

**[0022]** A housing cover 162 snaps onto the housing base 154 to substantially enclose the slide element 156 and the coil spring 158, as well as the splined sleeve 160 within the housing of the brake 116. As shown in Figure 10, a channel 202 on the housing cover 162 and a corresponding channel 204 on the housing base 154 receive corresponding lips 206, 208 on the rail 102, and ribs 207, 209 on the housing cover 162 and housing base 154 engage the lips 206, 208 on the rail 102 (See Figure 10) to mount the brake 116 onto the rail 102. This mounting arrangement for the cover 162 and base 154 of the brake 116 firmly secures the body of the brake 116 to the front wall 13 of the rail 102 while allowing the brake 116 to slide in the longitudinal direction along the rail 102.

**[0023]** Referring now to Figure 9, the base 154 defines bosses 220, 222 on the outer surfaces of the opposite side walls 172, 174. The upper portion of each boss 220, 222 defines ramped surfaces 228 to help the cantilevered yokes 224, 226 on the opposite ends of the cover 162 slide over the bosses 220, 222 and snap over the bosses 220, 222, as described in more detail later. The cantilevered yokes 224, 226 on the cover 162 define an internal opening 230, for receiving the respective boss 220, 222, with the sides and bottom portions of the cantilevered yokes 224, 226 contacting the sides and bottom of the respective boss 220, 222.

**[0024]** It will be noted that the cantilevered yokes 224 on the left end of the cover 116 (shown in Figures 8 and 9) are slightly different from the cantilevered yokes 226 on the right end of the cover 116 (shown in Figures 3-7), with the cantilevered yokes 224 on the left end of the cover 116 being connected together at the bottom to form a U-shape that wraps completely around the bottom of the boss 220, and the cantilevered yokes 226 on the right

end of the cover 116 being made of separate legs that only partially wrap around the bottom of the boss 222. It would alternatively be possible for both of the cantilevered yokes 224, 226 to be identical to each other, either both yokes being U-shaped, with their legs connected together to form the "U", or both having separate legs, with each leg being "J"-shaped to wrap partially around the bottom of their respective boss.

**[0025]** Figure 9 shows the cantilevered yokes 224, 226 projecting downwardly from each end of the cover 162. These cantilevered yokes 224, 226 are sized and located such that they receive their corresponding boss 220, 222 when the cover 162 is assembled onto the base 154, as best shown in Figures 8 and 9. As the cover 162 is pushed down onto the base 154, the yokes 224, 226 ride along the ramped surfaces 228 on the upper portion of the bosses 220, 222, which cause the yokes 224, 226 to flex outwardly so the yokes can pass over the bosses 220, 222. Once the yokes 224, 226 clear their respective bosses 220, 222, the yokes 224, 226 snap back to their at-rest condition, wrapping around and snugly receiving their respective bosses 220, 222 in the openings 230.

**[0026]** Referring briefly to Figure 2, it may be appreciated that the lift rod 112 extends through the brake component 116, extending through the openings 230 in the yokes 224, 226 on the housing cover 116, and through the arcuate openings 176, 178 in the housing base 154. The rod 112 extends through the openings 230 defined by the cantilevered yokes 224, 226, through the U-shaped openings 176, 178 in the base 154, and through the hollow shaft 198 in the rotating element that is supported on the housing, which, in this case, is the splined sleeve 160, which is housed in the component housing.

**[0027]** It will be understood by those skilled in the art that other components mounted on the rail, in addition to the brake component 116, could also have a housing with a similar yoke-and-boss arrangement, in which the elongated rod 112 would extend through, and possibly rotate with, a rotating component, such as the splined shaft 160. Furthermore, the cantilevered yoke portion may be on the cover or on the base, and the boss portion may also be on the cover or the base. It also should be noted that a ramped surface could be on the lower portion of the inner surface of the yoke 224, 226 instead of or in addition to being on the upper portion of the outer surface of the boss 220, 222.

#### **Assembly:**

**[0028]** Referring to Figure 9, to assemble the brake portion 116, the front end 184 of the coil spring 158 is placed inside the cavity 186 of the slide element 156 lying just inside the contact plate 124. The slide element 156 then is slid into the housing 154, with the contact plate 124 projecting through the front opening 168. The back end 182 of the coil spring 158 then is slid over the internal projection 180 on the housing base 154 so as to capture the coil spring 158, with the coil spring 158 biasing the

slide element 156 in the forward, braked position. The splined sleeve 160 is dropped in between the recessed arms 210, 212 of the slide element 156 such that the stub shafts 201 of the splined sleeve 160 are rotationally supported on the "U"-shaped bearing surfaces 176, 178 of the housing base 154 and the ridge 196 is received between two of the splines 200. Finally, the housing cover 162 is snapped onto the housing base 54.

**[0029]** The assembled brake 116 is then mounted into the rail 102 (See Figure 10) by sliding it in from one of the ends of the rail 102, making sure that the upper and lower channels 202, 204 of the brake portion 116 are engaged with the lips 206, 208 of the rail 102. The brake 116 is slid axially along the rail 102 (See Figure 2) until at least a portion of the contact plate 124 of the brake portion 116 is in alignment with the blunt distal end 142 of the actuator arm 122 of the handle 118 (See Figures 7-9). Finally the lift rod 112 is inserted through the hollow through shaft 198 of the splined sleeve 160 and the remaining elements, such as the lift stations 110 and the spring motor 114 are mounted onto the lift rod 112.

**[0030]** The following numbered paragraphs form part of the disclosure:

1. An arrangement for a component for use on the rail of a window covering, comprising:

a component housing, comprising a cover and a base;  
 first and second opposed, outwardly projecting bosses on first and second end walls of one of said cover and base;  
 corresponding first and second opposed, cantilevered yokes projecting from the other of said cover and base, wherein said first and second cantilevered yokes define opposed first and second openings, respectively, and wherein at least one of said first boss and said first cantilevered yoke defines a ramped surface which enables the first cantilevered yoke to flex outwardly in order to ride over the first boss and then to snap back to receive the first boss in the respective opposed opening in the first cantilevered yoke when said cover and base are brought together, and wherein, when the cover and base are brought together, the second cantilevered yoke receives the second boss.

2. An arrangement for a component for use on the rail of a window covering as recited in paragraph 1, and further comprising an elongated rail for a window covering, wherein said housing is mounted on said rail.

3. An arrangement for a component for use on the rail of a window covering as recited in paragraph 2, and further comprising an elongated rod having an axis extending in the elongated direction of said rail, said elongated rod extending through at least one of

said first and second opposed openings in said first and second cantilevered yokes.

4. An arrangement for a component for use on the rail of a window covering as recited in paragraph 3, and further comprising a rotating element mounted on said rod for rotation with said rod, said rotating element being housed within said component housing.

5. An arrangement for a component for use on the rail of a window covering as recited in paragraph 4, wherein said first and second end walls define U-shaped openings which support said rotating element.

6. An arrangement for a component for use on the rail of a window covering as recited in paragraph 5, wherein said elongated rod extends through both of said first and second opposed openings in said first and second cantilevered yokes.

7. An arrangement for a component for use on the rail of a window covering as recited in paragraph 6, wherein an elongated channel on one of the housing and rail receives a corresponding elongated lip on the other of the housing and rail to slidably mount the housing on the rail so the housing can slide axially along the elongated rod.

8. An arrangement for a component for use on the rail of a window covering as recited in paragraph 6, wherein said rotating element is a splined sleeve.

9. An arrangement for a component for use on the rail of a window covering as recited in paragraph 1, wherein at least one of the cantilevered yokes is U-shaped and wraps completely around the respective boss.

10. An arrangement for a component for use on the rail of a window covering as recited in paragraph 1, wherein at least one of the cantilevered yokes includes first and second legs, which only partially wrap around the respective boss.

11. An arrangement for a component for use on the rail of a window covering as recited in paragraph 4, wherein at least one of said base and said cover defines bearing surfaces which support said rotating element.

12. An arrangement for a component for use on the rail of a window covering as recited in paragraph 11, wherein said elongated rod extends through both of said first and second opposed openings in said first and second cantilevered yokes.

13. An arrangement for a component for use on the rail of a window covering as recited in paragraph 12, wherein at least one of the cantilevered yokes is U-shaped and wraps completely around the respective boss.

14. An arrangement for a component for use on the rail of a window covering as recited in paragraph 12, wherein at least one of the cantilevered yokes includes first and second legs, which only partially wrap around the respective boss.

### Rail-Mounted Button Actuator

**[0031]** As discussed earlier, Figures 1-7 show a brake 116 mounted onto a movable rail 102 wherein an actuator button 120 on the handle 118 actuates a pusher 122 which impacts against a contact plate 124 to disengage the brake 116, allowing the rail 102 to be raised or lowered by the user. Figures 11-16 show an alternative embodiment of an actuator button 216\*, with a surface-mounted button arrangement 214\*, in which the rail 102 itself acts as a handle, wherein the user, as he grabs the rail 102, pushes on the actuator button 216\* to disengage the brake 116\*, allowing him to raise or lower the rail 102. As the user releases the rail 102, he also releases the button 216\*, which then allows the brake 116\* to re-engage to prevent further movement of the rail 102.

**[0032]** Figures 17-22 show a similar embodiment, but for a recess-mounted button arrangement 214\*\* for disengaging the brake 116\*. It should be noted that in both embodiments the screws securing the button housings to the rail are hidden from view from the exterior of the rail by the actuator buttons.

**[0033]** Referring now to Figures 11-14, the surface-mount button arrangement 214\* includes an actuator button 216\*, two fasteners 218\*, which in this embodiment are screws, a button housing 220\*, and a brake 116\*, all mounted to the rail 102. The brake 116\* is similar to the brake 116 of Figures 8 and 9, including the contact plate 124\* (See Figure 14) and the mounting tabs 202\*, 204\* which allow the brake 116\* to be affixed to the rail 102, preferably by sliding the brake 116\* in from one end of the rail 102. As was described earlier with respect to the handle 118 with button 120 (See Figures 5-7), the exact location of the brake 116\* with respect to the actuator button 216\* is not critical as long as the pusher 122\* of the actuator button 216\* makes contact with the contact plate 124\*.

**[0034]** Referring to Figure 16, the button housing 220\* is a four-sided box 224\* which is open to the front (to receive the button 216\*) and has a wall 222\* closing off the rear of the box 224\*. The rear wall 222\* defines two through openings 226\* for receiving the screws 218\* and one through opening 228\* for receiving the pusher 122\* on the rear of the actuator button 216\*. The openings 226\* align with corresponding openings 230\* on the rail 102 so that the housing 220\* is releasably secured to the rail 102 using the fasteners 218\* (as shown also on Figures 12 and 13). The pusher opening 228\* is defined by a hollow shaft 232\* which projects from the rear wall 222\* of the button housing 220\*. This hollow shaft 232\* guides and supports the pusher 122\* which projects from the back of the button 216. The front of the box 224\* includes a frame 233\*, which defines the front end of two opposed, upper and lower parallel, slots 234\* (See Figures 14-16). These slots 234\* receive respective barbed, hook projections 236\* on the actuator button 216\* to allow restricted, linear, in-and-out motion of the actuator button 216\* relative to the rail 102 and housing 220\* as the projections

236\* ride linearly in the tracks formed by the slots 234\* so that the pusher 122\* may push inwardly against the contact plate 124\* of the brake 116\* to disengage the brake 116\*. The frame 233\*, defining the front of the slots 234\*, locks the actuator button 216\* inside the box 224\* of the housing 220\* relative to the housing 220\*

**[0035]** It should be noted that the barbed, hook projections 236\* have a ramped rear surface facing inwardly, toward the brake 116\* and a flat, vertical front face which abuts the vertical face of the frame 233\* at the front end of the slot 234\* when the actuator button is in its forward-most position. The ramped rear surface helps assemble the button 216\* onto the housing 220\*, helping the projections 236\* flex as they contact the frame 233\* at the front of the housing 220\* until they get into the slots 234\*, at which point they return to their original shape, with the vertical front face of each projection 236\* abutting the vertical face of the frame 233\* at the front of the slot 234\*, to retain the button 216\* on the housing 220\*. Once the actuator button 216\* is installed in the housing 220\*, the actuator button 216\* conceals the screw fasteners 218\* so that the screw fasteners 218\* are not visible from the exterior of the rail 102.

### Assembly

**[0036]** To assemble the surface-mount actuator button arrangement 214\*, the button housing 220\* is mounted to the rail 102 using the screw-type fasteners 218\*, which extend through the openings 226\* on the housing 220\* and are threaded into the openings 230\* in the rail 102. The actuator button 216\* is then snapped into the box 224\* of the housing 220\*. The ramped rear surfaces of the barbed projections 236\* push against the forward frame 233\*, causing the projections 236\* to momentarily deflect until the projections 236\* pass through the frame 233\* and reach the slots 234\*, where the projections 236\* spring back out to lock the actuator button 216\* in the housing 220\*, while still allowing the actuator button 216\* to move linearly in a front-to-rear direction within the housing 220\*, with the projections 236\* moving in and out along the tracks formed by the slots 234\* as shown in Figures 14 and 15. The pusher 122\* extends through the opening 228\* of the hollow shaft 232\* of the housing 220\* and projects out the back of the hollow shaft 232\*. The brake 116\* is then installed by sliding it into position along the length of the rail 102 until it is generally in the area of the button 216\* such that pressing the button 216\* results in the pusher 122\* pushing inwardly against the contact plate 124\* of the brake 116\* so as to disengage the brake 116\*.

### Alternative Rail-Mounted Button Actuator

**[0037]** Referring now to Figures 17-22, the button arrangement 214\*\* is recess-mounted on the rail 201\*\*. The rail 102\*\* is wider than the rail 102, which provides enough room to recess the actuator button into the rail.

Otherwise, the button of Figures 17-22 functions in the same manner as the previous embodiment.

**[0038]** The recess-mount actuator button arrangement 214\*\* includes an actuator button 216\*\*, two screw fasteners 218\*\*, a button housing 220\*\*, a button housing adapter 240\*\*, and a brake 116\*, all mounted to the rail 102\*\*. The brake 116\* is identical to the brake 116\* described above for the surface-mount button arrangement 214\*.

**[0039]** Referring to Figure 22, the housing 220\*\* is very similar to the housing 220\*, described earlier with respect to the surface-mount button arrangement 214\*. However, in this embodiment, the frame 242\*\* at the front of the box 224\*\* is a flange, with a rear surface abutting the rail 102\*\* at the single large opening 238\*\* (See Figure 19) such that the housing 220\*\* itself is recessed into the rail 102\*\* with only the flanged frame 242\*\* projecting outside of the rail 102\*\* and mounted flush against the rail 102\*\*.

**[0040]** The housing adapter 240\*\* is located inside the rail 102\*\* and includes two vertical walls 244\*\*, each defining an internally threaded opening 246\*\*, which receive the two screw fasteners 218\*\* after the screw fasteners 218\*\* extend through the openings 226\*\* in the button housing 220\*\* so as to secure both the button housing adapter 240\*\* and the button housing 220\*\* to the rail 102\*\*, with the front wall of the rail 102\*\* trapped between the button housing adapter 240\*\* and the flanged frame 242\*\* of the button housing 220\*\*. The button housing adapter 240\*\* defines two rearwardly-directed wings 248\*\*, with each wing 248\*\* defining a distal-end lip 250\*\* (See also Figure 20) to slidably engage the mounting tabs 202\*, 204\* on the brake 116\*.

**[0041]** As was the case for the button housing 220\*, the button housing 220\*\* is a four-sided box 224\*\* which is open to the front (to receive the button 216\*\*) and has a wall 222\*\* closing off the rear of the box 224\*\*. The rear wall 222\*\* defines two through openings 226\*\* for receiving the screw fasteners 218\*\* and a central opening 228\*\* for receiving the pusher 122\*\*. The screw openings 226\*\* align with the corresponding openings 246\*\* on the button housing adapter 240\*\* so that the housing 220\*\* may be releasably secured to the button housing adapter 240\*\* using the screw fasteners 218\*\*. The central opening 228\*\* is defined by a hollow shaft 232\*\* which projects from the rear wall 222\*\* of the housing 220\*\*. This hollow shaft 232\*\* guides and supports the pusher 122\*\* which projects from the back of the actuator button 216\*\*. The box 224\*\* also defines upper and lower slots 234\*\* which receive corresponding barbed, hook projections 236\*\* on the button 216\*\* to lock the button 216\*\* inside the box 224\*\* of the housing 220\*\* and to allow restricted, linear, in-and-out motion of the button 216\*\* relative to the housing 220\*\* as projections 236\*\* ride in the track formed by the slots 234\*\* so that the pusher 122\*\* can push against the contact plate 124\* of the brake 116\* to disengage the brake 116\*.

## Assembly

**[0042]** To assemble the recess-mount button arrangement 214\*\*, the housing 220\*\* is mounted to the rail 102\*\* using the screw fasteners 218\*\* going through the openings 226\*\* on the housing 220\*\* and threading into the openings 246\*\* in the button housing adapter 240\*\*, with the front wall of the rail 102\*\* trapped between the flanged frame 242\*\* of the housing 220\*\* and the front edge of the housing adapter 240\*\*. The actuator button 216\*\* is then snapped into the box 224\*\* of the housing 220\*\*. The barbed projections 236\*\* momentarily deflect as they pass by the flanged frame 242\*\*, until the projections 236\*\* reach the slots 234\*\*, where the projections 236\*\* spring back out to lock the button 216\*\* in the housing 220\*\*, restricting the button 216\*\* to linear movement along the tracks formed by the slots 234\*\*. The pusher 122\*\* of the button 216\*\* fits through the opening 228\*\* of the hollow shaft 232\*\* of the housing 220\*\* and projects rearwardly. The brake 116\* is then installed by sliding it into position along the length of the rail 102\*\* until it is generally in the area of the button 216\*\* such that pressing the button 216\*\* results in the pusher 122\*\* pushing against the contact plate 124\* of the brake 116\* so as to disengage the brake 116\*. Once the actuator button 216\*\* is installed onto the housing 220\*\*, the actuator button 216\*\* conceals the screw fasteners 218\*\* so they cannot be seen from the exterior of the rail 102\*\*.

**[0043]** While, in the embodiments described above, the actuator button is used to actuate a brake, it is understood that the same actuator button mounting arrangement could be used for an actuator button to actuate a different function on the window covering, if desired. The following numbered paragraphs form part of the disclosure

15. An arrangement for mounting an actuator button onto a rail of a window covering, comprising:

a hollow rail defining an exterior and an interior; a window covering mounted on said hollow rail; a button housing secured to said hollow rail by a fastener; and an actuator button mounted on said button housing for movement relative to said button housing, said button being accessible from the exterior of the rail and concealing said fastener from view from the exterior of the rail.

16. An arrangement for mounting an actuator button onto a rail of a window covering as recited in paragraph 15, wherein said actuator button includes a pusher rod that is directed into the interior of the rail when the actuator button is mounted on the button housing.

17. An arrangement for mounting an actuator button onto a rail of a window covering as recited in paragraph 16, wherein said button housing defines at

least two parallel slots, and said actuator button has at least two projections received respectively in said two parallel slots to restrict the actuator button to linear, in-and-out movement relative to the rail.

18. An arrangement for mounting an actuator button onto a rail of a window covering as recited in paragraph 17, wherein said housing defines a forward frame, which defines a forward termination of each of said parallel slots, and each of said projections has a ramped rear surface which allows the actuator button to be pushed rearwardly into said forward frame for assembly of the actuator button onto the button housing, with the tapered rear surfaces abutting the forward frame and causing the projections to flex until the projections pass through the forward frame and into the parallel slots, thereby securing the actuator button on the button housing.

19. An arrangement for mounting an actuator button onto a rail of a window covering as recited in paragraph 18, and further comprising a brake mounted inside said hollow rail, wherein pushing the actuator button inwardly causes the pusher rod to release the brake.

20. An arrangement for mounting an actuator button onto a rail of a window covering as recited in paragraph 19, wherein said brake is operatively connected to a lift rod, which is operatively connected to a plurality of lift spools, which are operatively connected to lift cords, which are operatively connected to the window covering.

21. An arrangement for mounting an actuator button onto a rail of a window covering as recited in paragraph 20, wherein said fastener secures said button housing to said rail by extending through said housing and into a housing adapter and sandwiching said rail between the forward frame of the housing and the housing adapter.

22. An arrangement for mounting an actuator button onto a rail of a window covering as recited in paragraph 16, wherein said fastener secures said button housing to said rail by extending through said housing and into a housing adapter and sandwiching said rail between the housing and the housing adapter.

23. A window covering comprising:

- a shade material;
- a hollow rail at the bottom of said shade material;
- and
- an actuator button mounted on said hollow rail, said actuator button comprising:

- a button housing secured to said hollow rail by a fastener; and
- a button mounted on said button housing for movement relative to said button housing;
- wherein said actuator button conceals the fastener from view from the exterior of said

hollow rail.

24. A window covering as in paragraph 23, wherein said actuator button has a rear surface which abuts a front wall of said hollow rail.

25. A window covering as in paragraph 23, further comprising a pusher positioned to be pushed by said button into said hollow rail.

26. A window covering as in paragraph 23, wherein a portion of said button housing extends through an opening in said hollow rail.

27. A window covering as in paragraph 26, wherein the fastener includes two fasteners extending through said button housing and through fastener openings in said hollow rail formed on either side of the opening through which said portion of said button housing extends.

28. A cordless window covering comprising:

- a shade material; and
- a hollow rail at the bottom of said shade material;
- an actuator button mounted on said hollow rail, said actuator button comprising:

- a button housing mounted on said hollow rail;
- a button mounted on said button housing for movement relative to said button housing; and
- a pusher arranged with respect to said button to be moved toward said hollow rail upon pushing said button toward said hollow rail.

29. A cordless window covering as in paragraph 28, further comprising a brake mounted in said hollow rail, wherein said pusher moves toward said hollow rail and into said hollow rail to engage said brake upon pushing said button toward said hollow rail.

30. A cordless window covering as in paragraph 29, wherein said pusher includes a free end distal to said button for abutting against a surface of said brake within said hollow rail.

31. A cordless window covering as in paragraph 30, wherein said free distal end of said pusher remains uncoupled to another element.

32. A cordless window covering as in paragraph 29, wherein said brake is operatively connected to a lift rod operatively connected to a plurality of lift spools operatively connected to lift cords operatively connected to said window covering.

33. A cordless window covering as in paragraph 29, wherein pushing said button inwardly causes said pusher to release said brake.

34. A cordless window covering as in paragraph 28, wherein said pusher includes a free end distal to said button and uncoupled to another element.

35. A cordless window covering as in paragraph 28, wherein:

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said button has a finger engaging a ramped proximal end of said pusher; and downward movement of said button with respect to said button housing moves said button finger against said ramped proximal end of said pusher to move said pusher inwardly into said hollow rail.

36. An actuator button for a window covering comprising a shade material and a hollow rail at the bottom of the shade material, said actuator button comprising:

a button housing configured for mounting on the hollow rail;  
a button mounted on said button housing for movement relative to said button housing; and  
a pusher arranged with respect to said button to be moved toward the hollow rail upon pushing said button toward the hollow rail.

37. An actuator button as in paragraph 36, wherein said pusher includes a free end distal to said button and uncoupled to another element.

38. An actuator button as in paragraph 36, wherein:

said button has a finger engaging a ramped proximal end of said pusher; and downward movement of said button with respect to said button housing moves said button finger against said ramped proximal end of said pusher to move said pusher inwardly into the hollow rail.

[0044] It will be obvious to those skilled in the art that modifications may be made to the embodiments described above without departing from the scope of the present invention as claimed.

**Claims**

1. A cordless window covering comprising:

a shade material;  
a hollow rail at the bottom of said shade material; and  
an actuator button mounted on said hollow rail, said actuator button comprising:

a button housing secured to said hollow rail by a fastener; and  
a button mounted on said button housing for movement relative to said button housing;  
wherein said button conceals the fastener from view from the exterior of said hollow rail.

2. A cordless window covering as in claim 1, wherein a portion of said button housing extends through an opening in said hollow rail.

3. A cordless window covering as in claim 2, wherein the fastener includes two fasteners extending through said button housing and through fastener openings in said hollow rail formed on either side of the opening through which said portion of said button housing extends.

4. A cordless window covering as in claim 1, 2 or 3 further comprising a housing adapter positioned within said hollow rail, wherein the fastener secures said button housing to said hollow rail by extending through said button housing and into said housing adapter and sandwiching said hollow rail between said button housing and said housing adapter.

5. A cordless window covering as in any preceding claim, wherein said button housing defines at least two parallel slots, and said button has at least two projections received respectively in said two parallel slots to restrict said button to linear, in-and-out movement relative to said hollow rail.

6. A cordless window covering as in claim 5, wherein said button housing defines a forward frame with a forward termination of each of said parallel slots, and each of said projections has a ramped rear surface which allows said button to be pushed rearwardly into said forward frame for assembly of said button onto said button housing, with the tapered rear surfaces abutting said forward frame and causing said projections to flex until said projections pass through said forward frame and into said parallel slots, thereby securing said button on said button housing.

7. A cordless window covering comprising:

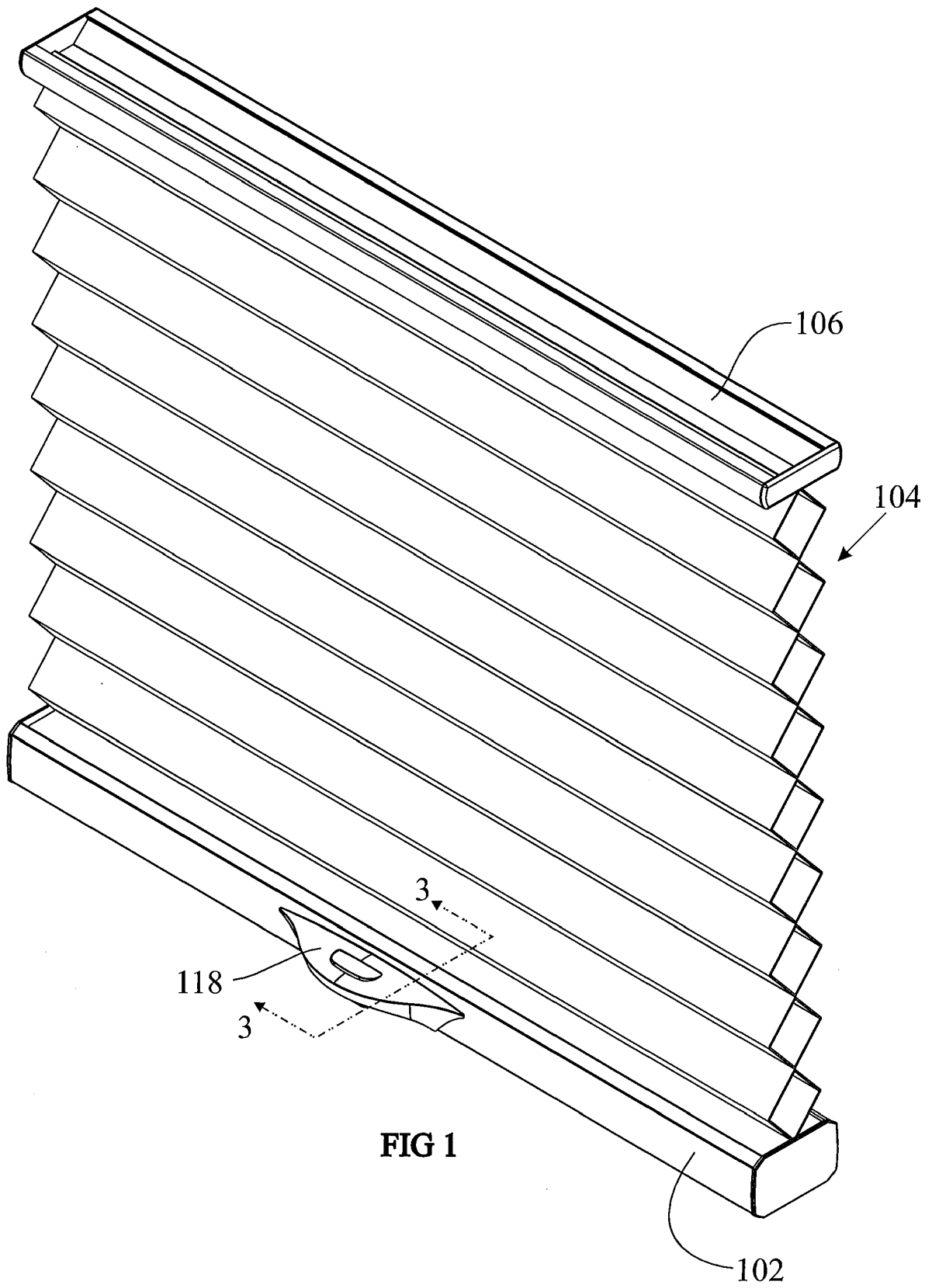
a shade material; and  
a hollow rail at the bottom of said shade material; an actuator button mounted on said hollow rail, said actuator button comprising:

a button housing mounted on said hollow rail;  
a button mounted on said button housing for movement relative to said button housing; and  
a pusher extending from a back surface of said button facing said hollow rail to be moved toward said hollow rail upon pushing said button toward said hollow rail.

8. A cordless window covering as in claim 7, further comprising a brake mounted in said hollow rail, wherein said pusher moves toward said hollow rail

and into said hollow rail to engage said brake upon pushing said button toward said hollow rail.

9. A cordless window covering as in claim 8, wherein said pusher has a free end distal to said button for abutting against a surface of said brake within said hollow rail and wherein said free distal end of said pusher may remain uncoupled to another element. 5
10. A cordless window covering as in claim 8, wherein said brake is operatively connected to a lift rod operatively connected to a plurality of lift spools operatively connected to lift cords operatively connected to said window covering. 10  
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11. A cordless window covering as in claim 8, wherein pushing said button inwardly causes said pusher to release said brake.
12. A cordless window covering as in claim 7, wherein said button housing comprises a shaft configured to support said pusher. 20
13. An actuator button for a window covering comprising a shade material and a hollow rail at the bottom of the shade material, said actuator button comprising: 25  
     a button housing configured for mounting on the hollow rail;  
     a button mounted on said button housing for movement relative to said button housing; 30  
     and a pusher extending from a back surface of said button facing said hollow rail to be moved toward said hollow rail upon pushing said button toward said hollow rail. 35
14. An actuator button as in claim 7 or 13, wherein said pusher includes a free end distal to said button and uncoupled to another element. 40
15. A cordless window covering as in claim 7 or 14, wherein said pusher has a proximal end coupled to a back surface of said button. 45  
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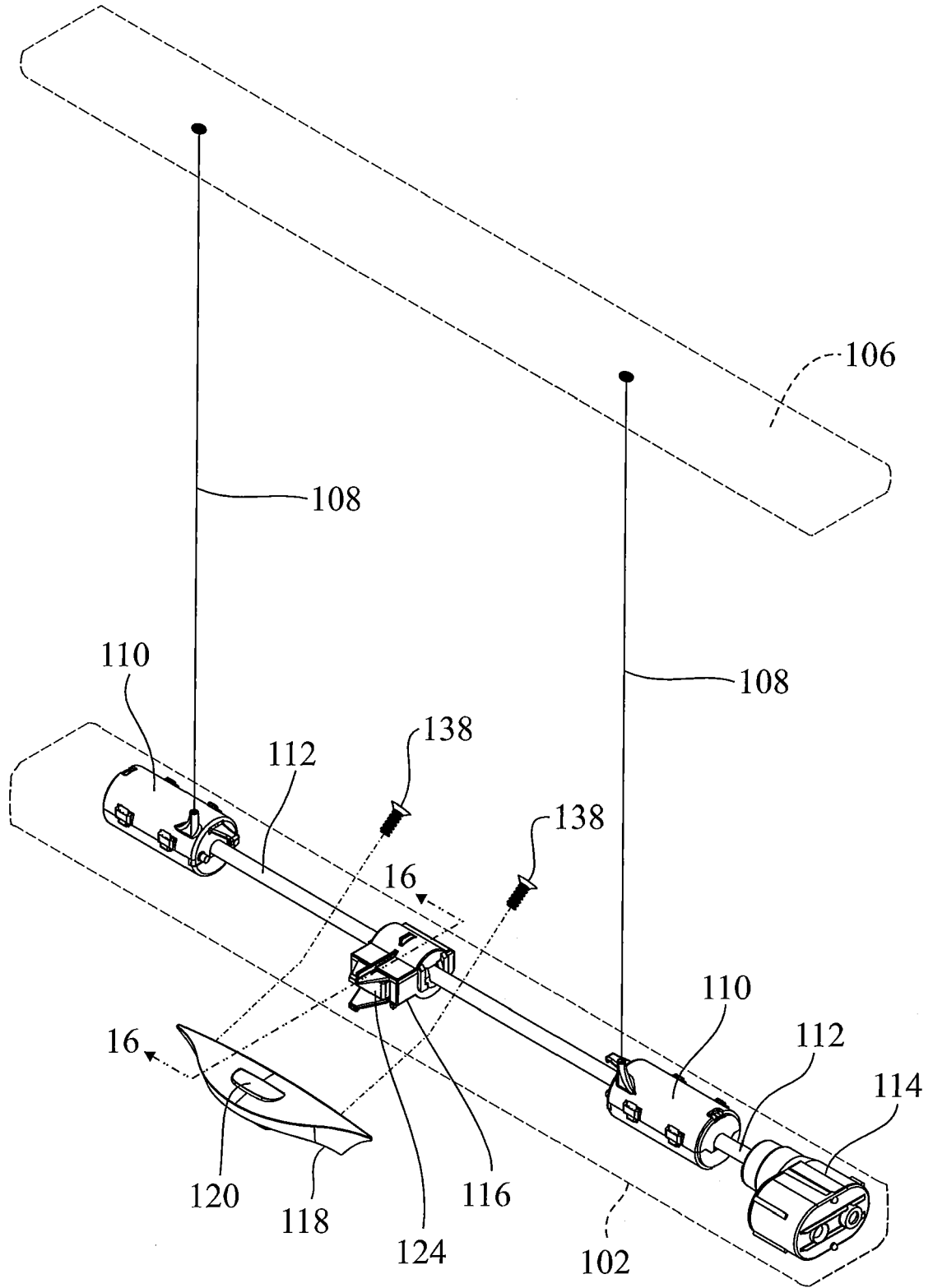


FIG 2

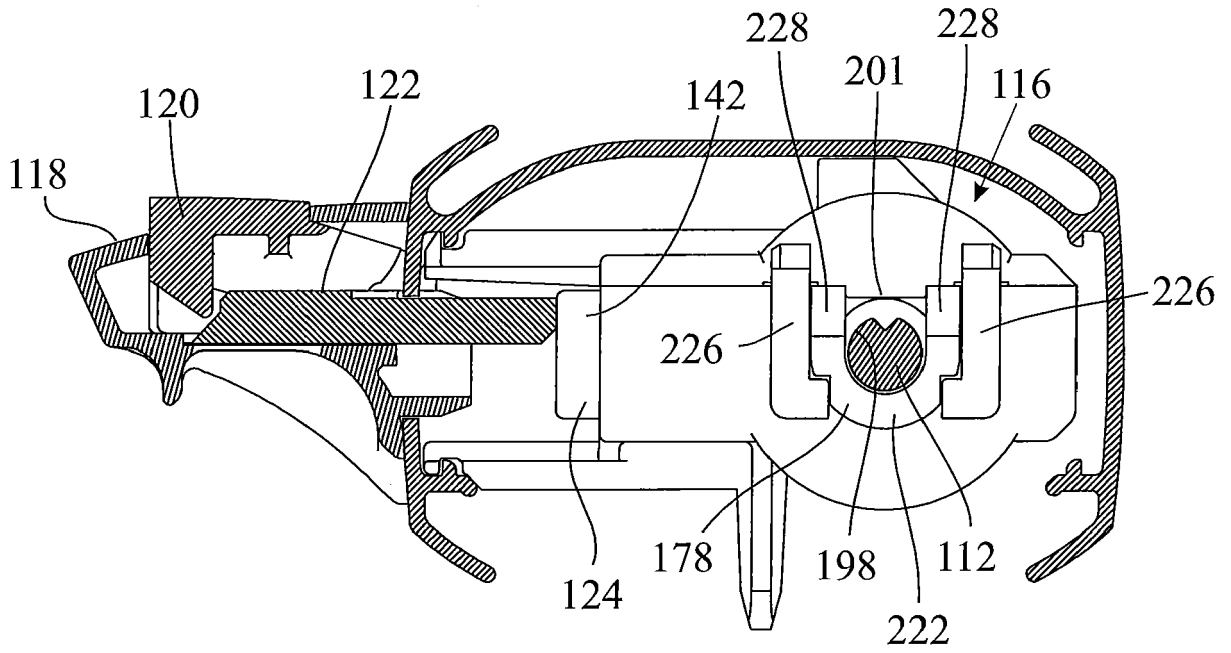


FIG 3

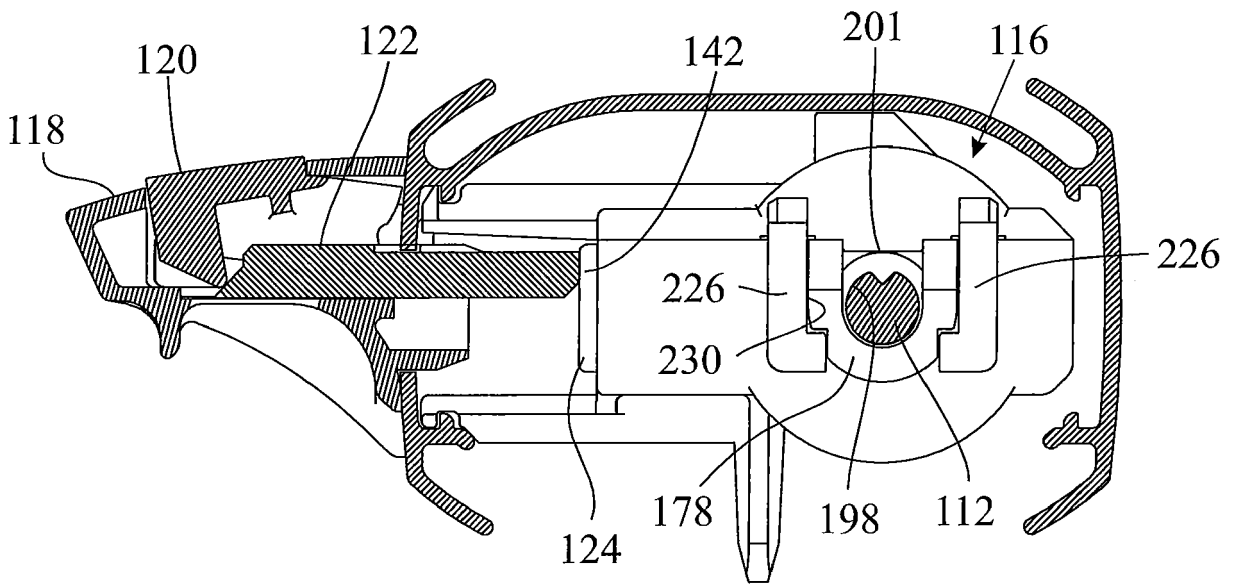
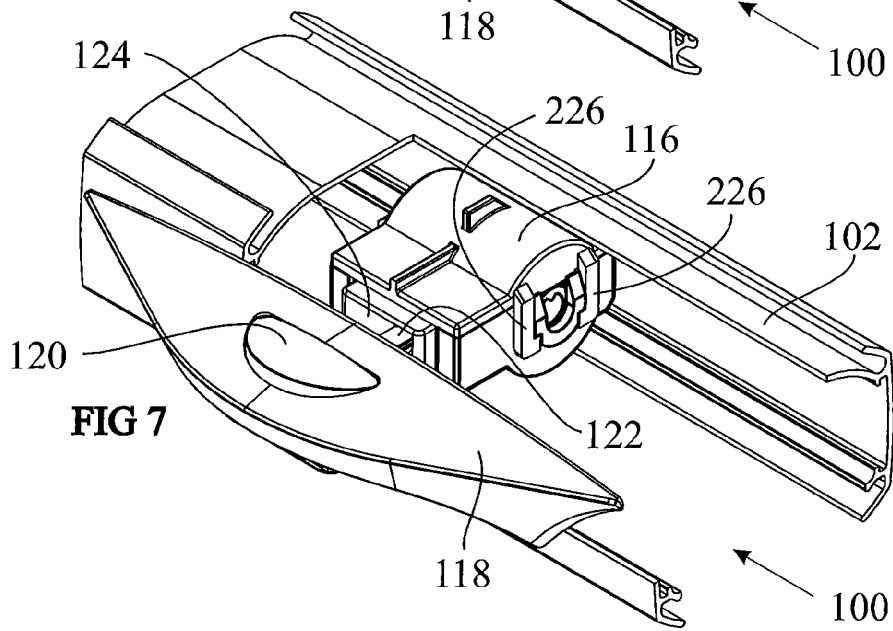
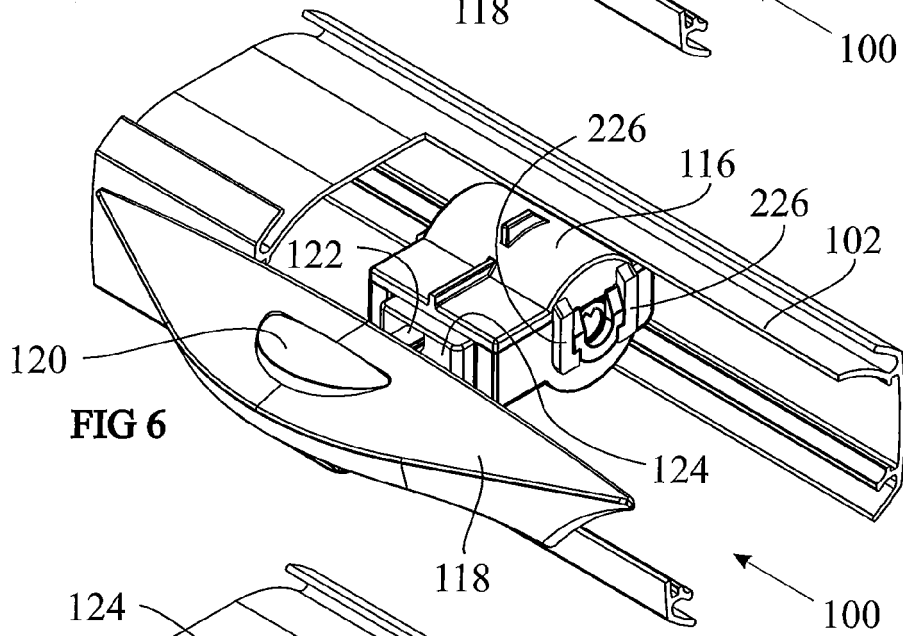
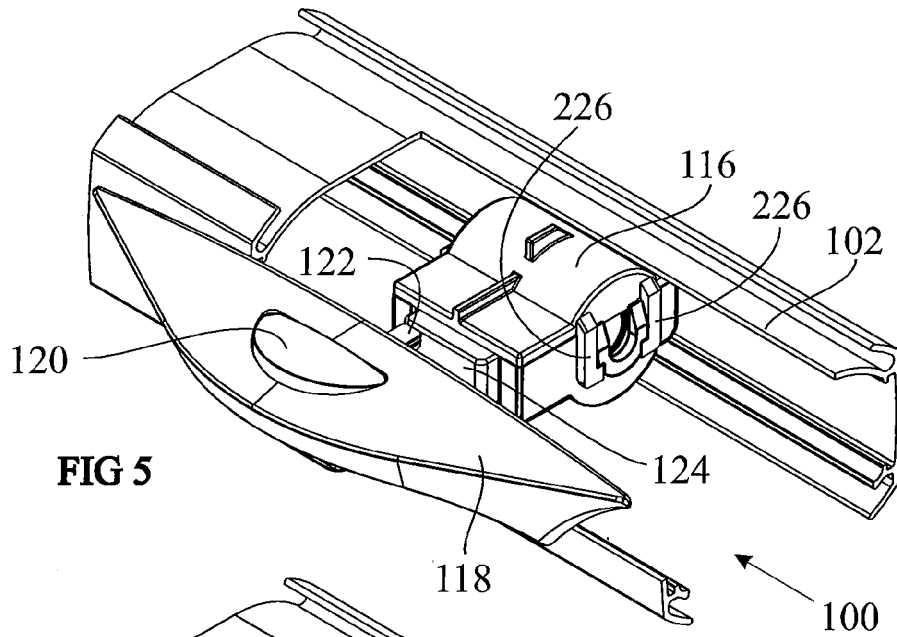
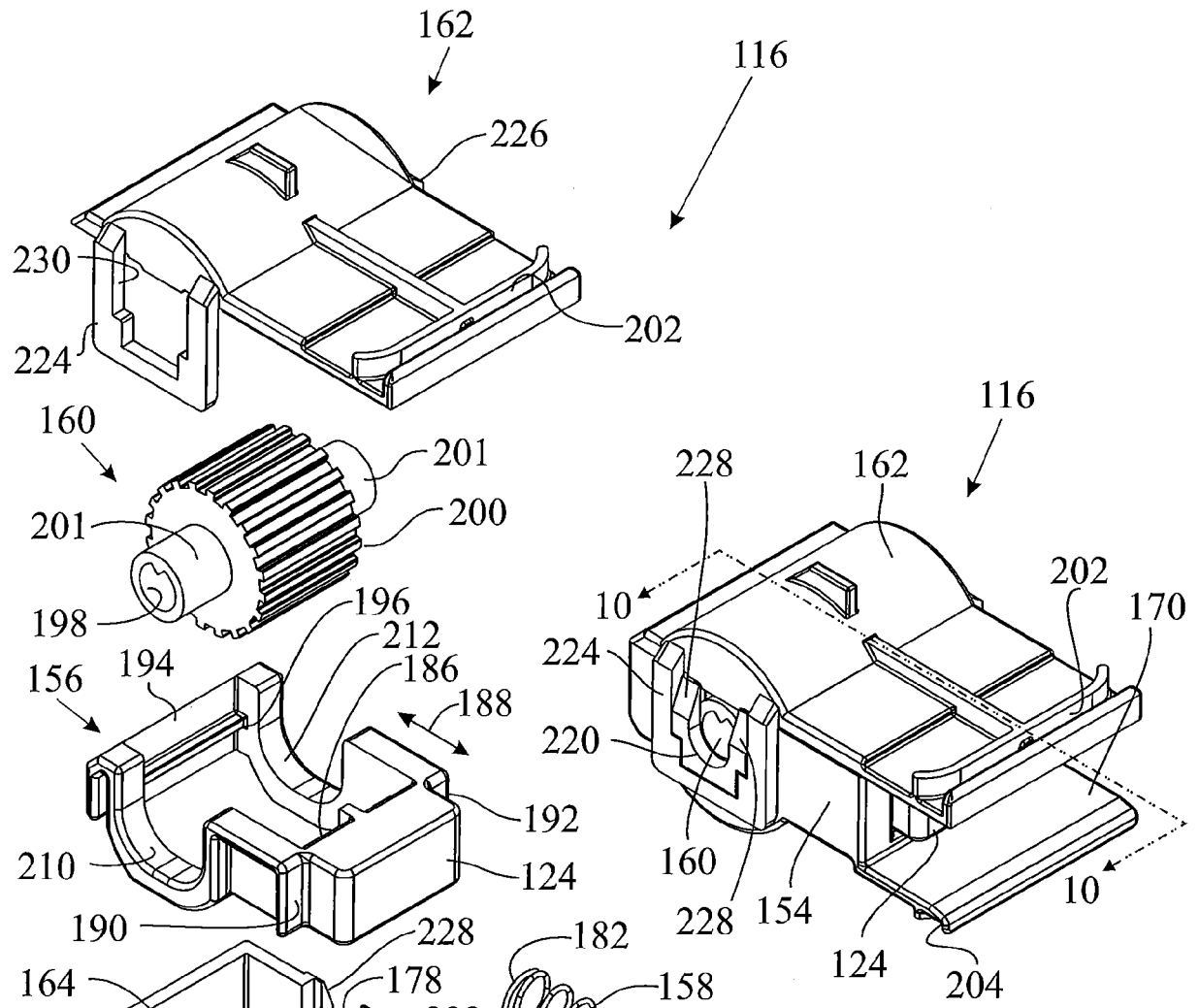
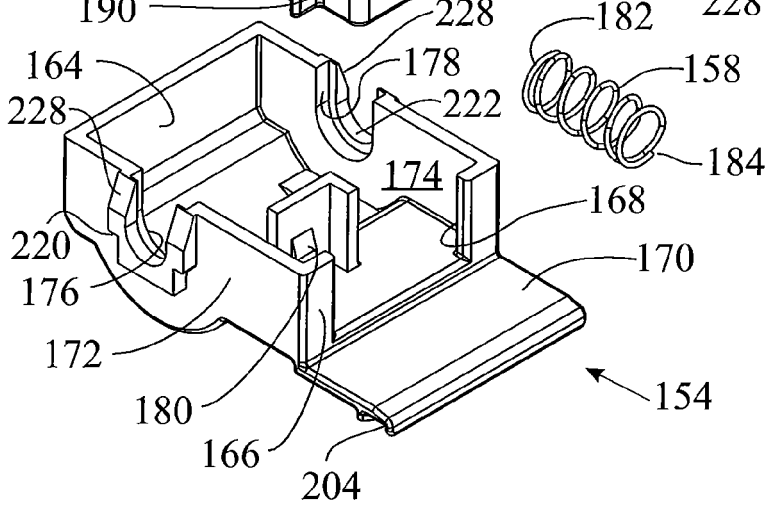


FIG 4





**FIG 8**



**FIG 9**

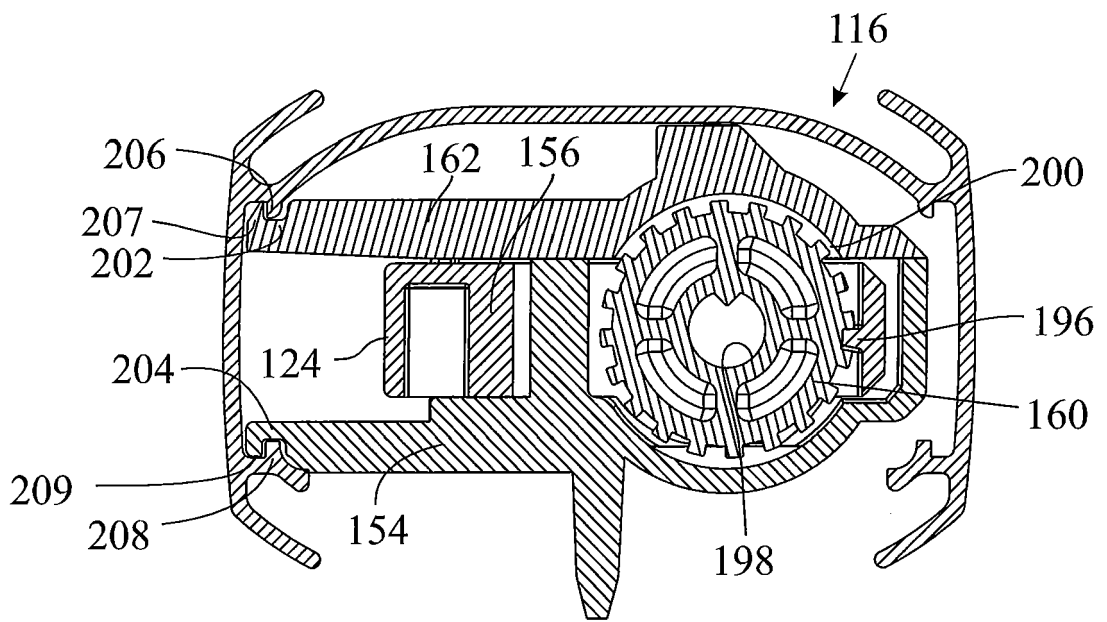


FIG 10

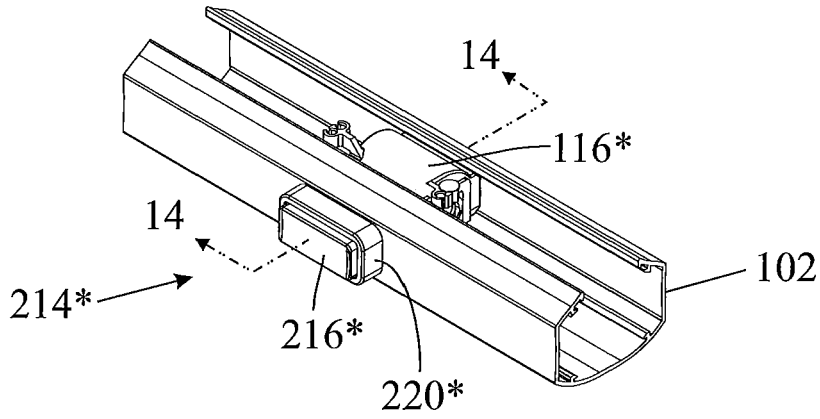


FIG 11

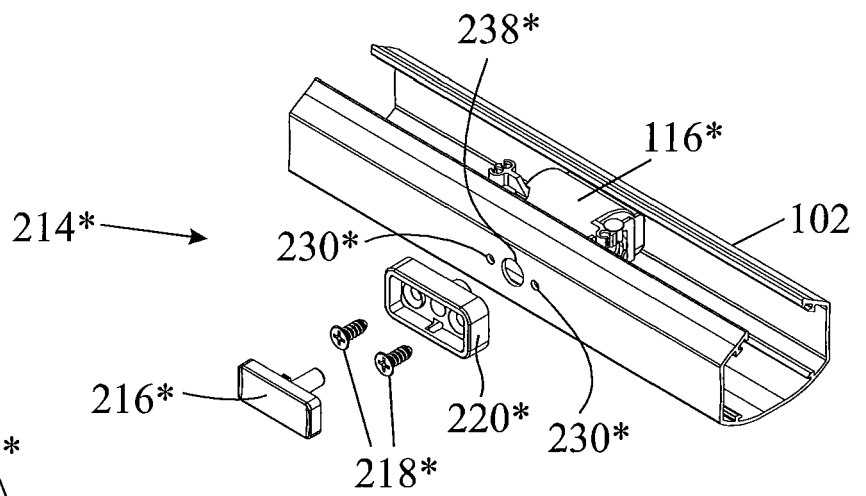


FIG 12

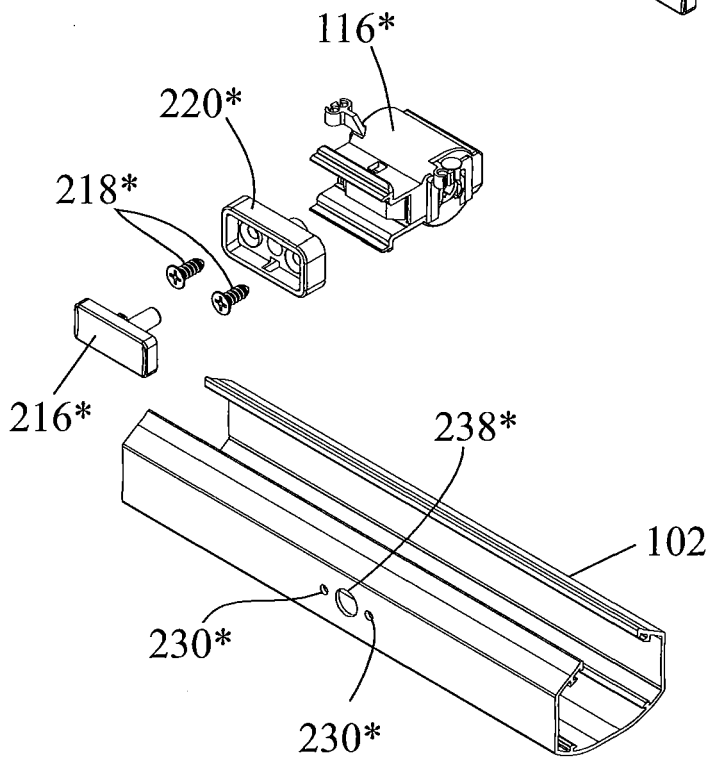


FIG 13

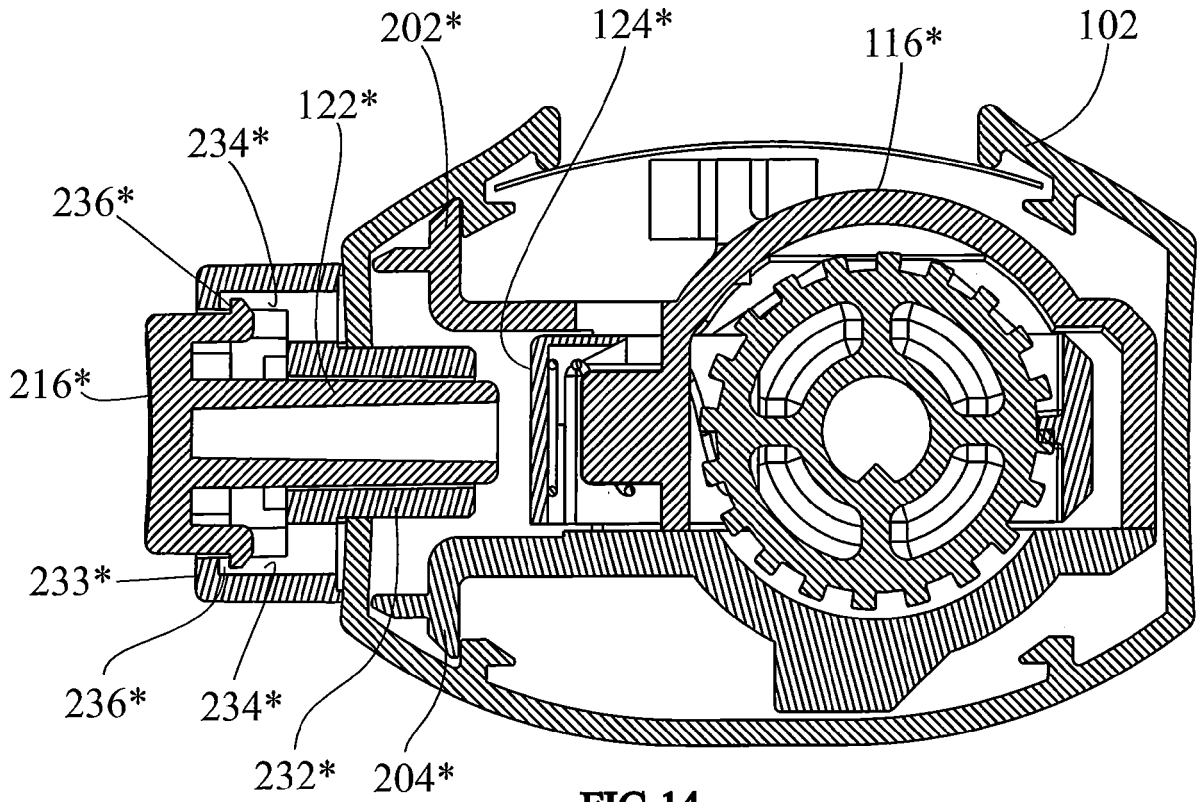


FIG 14

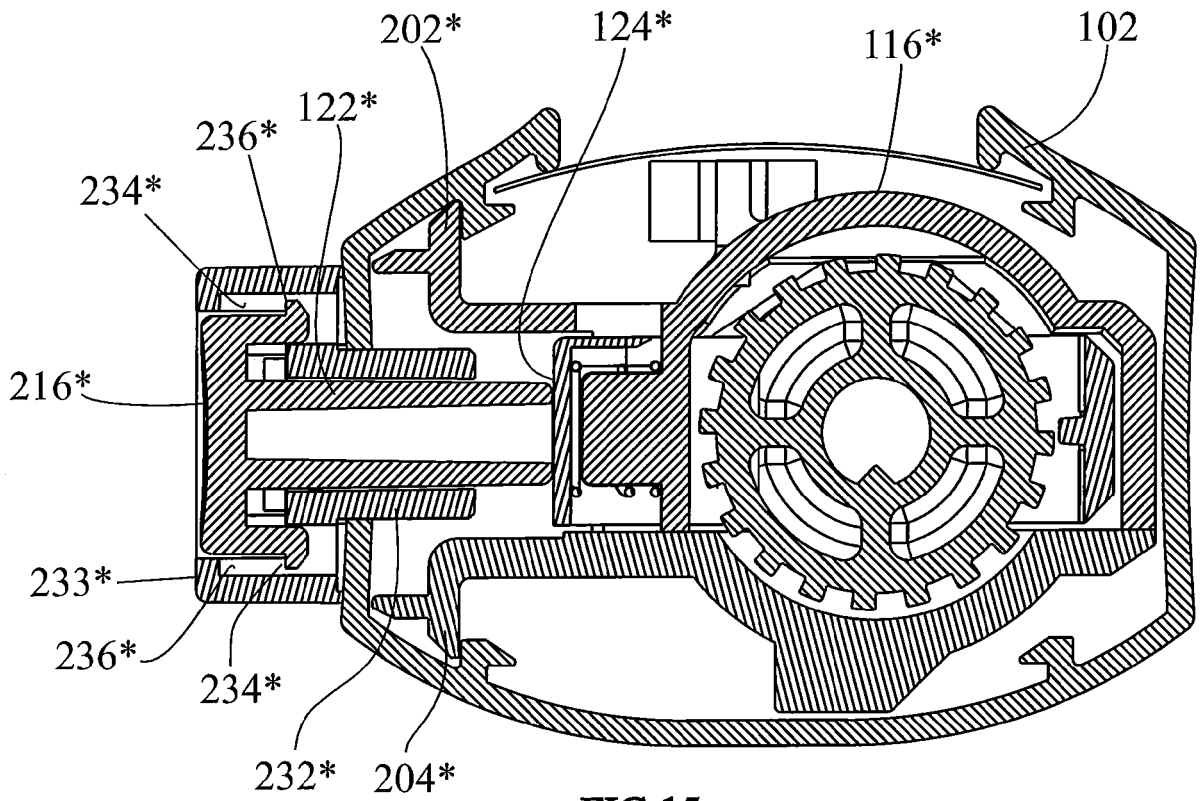


FIG 15

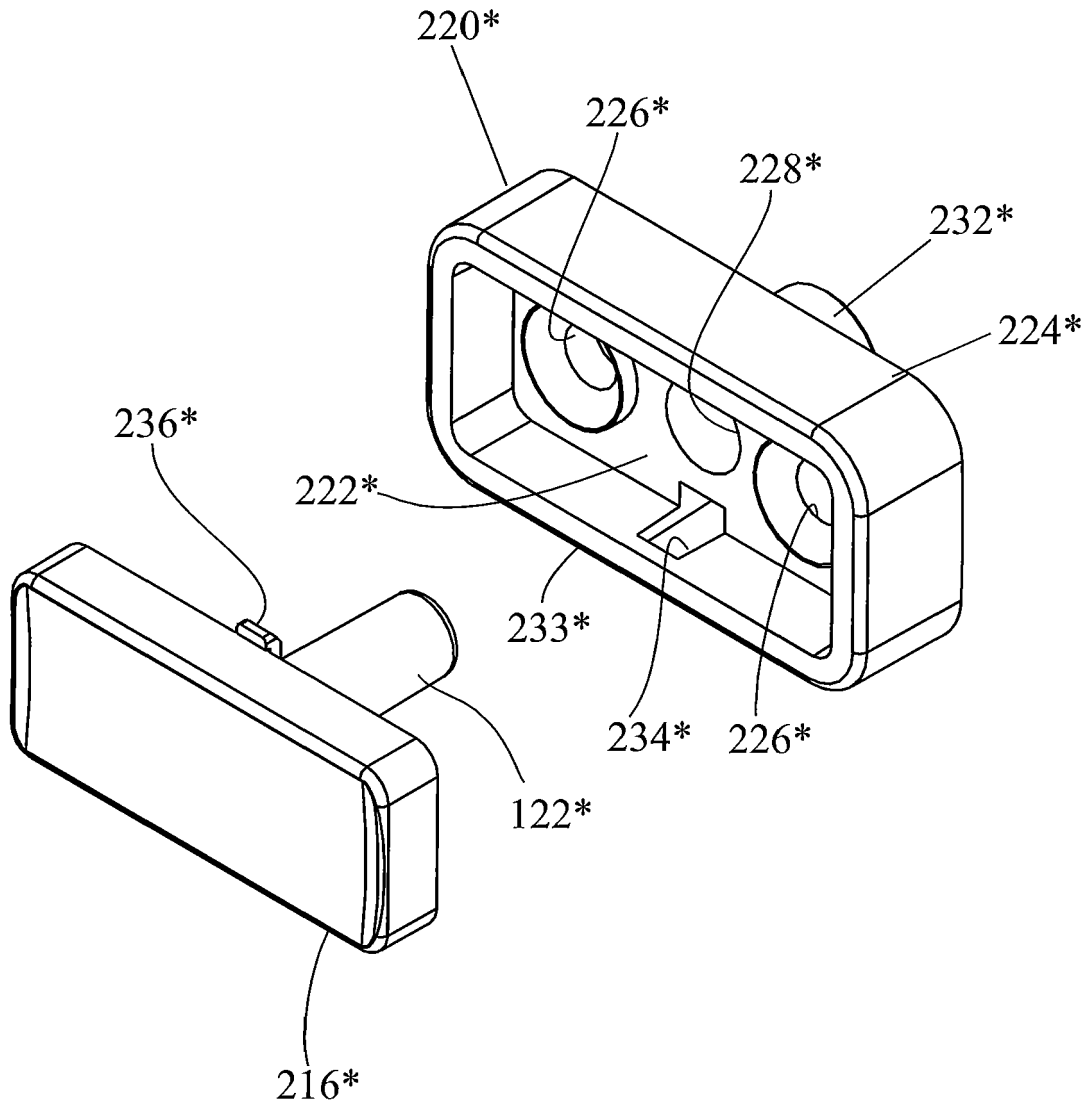


FIG 16

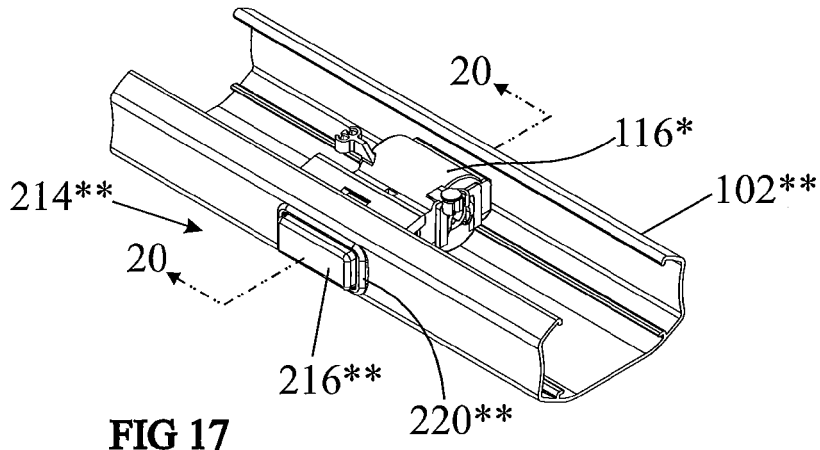


FIG 17

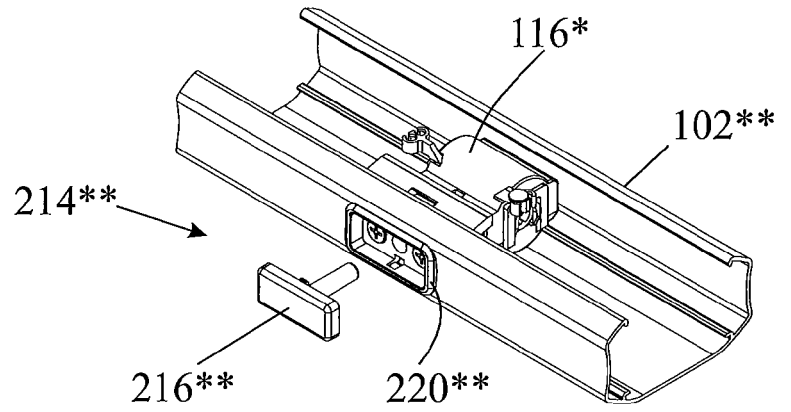


FIG 18

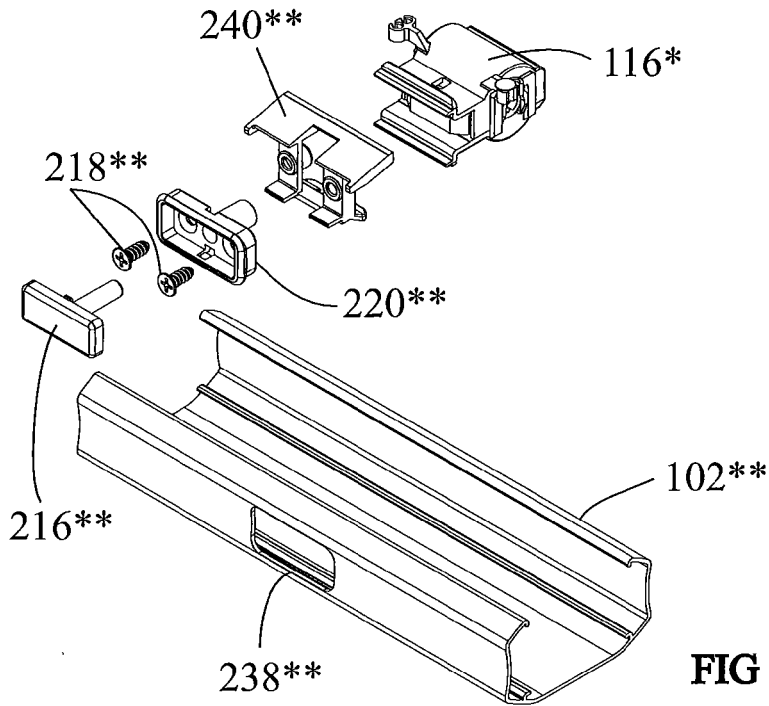


FIG 19

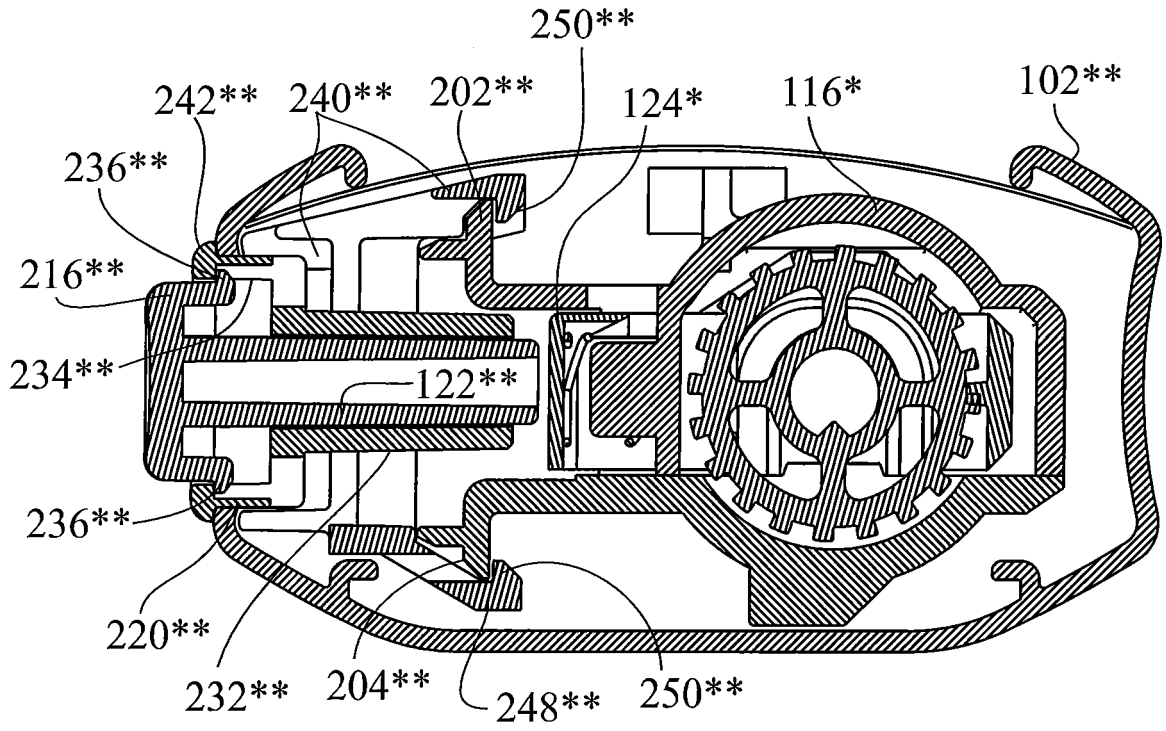


FIG 20

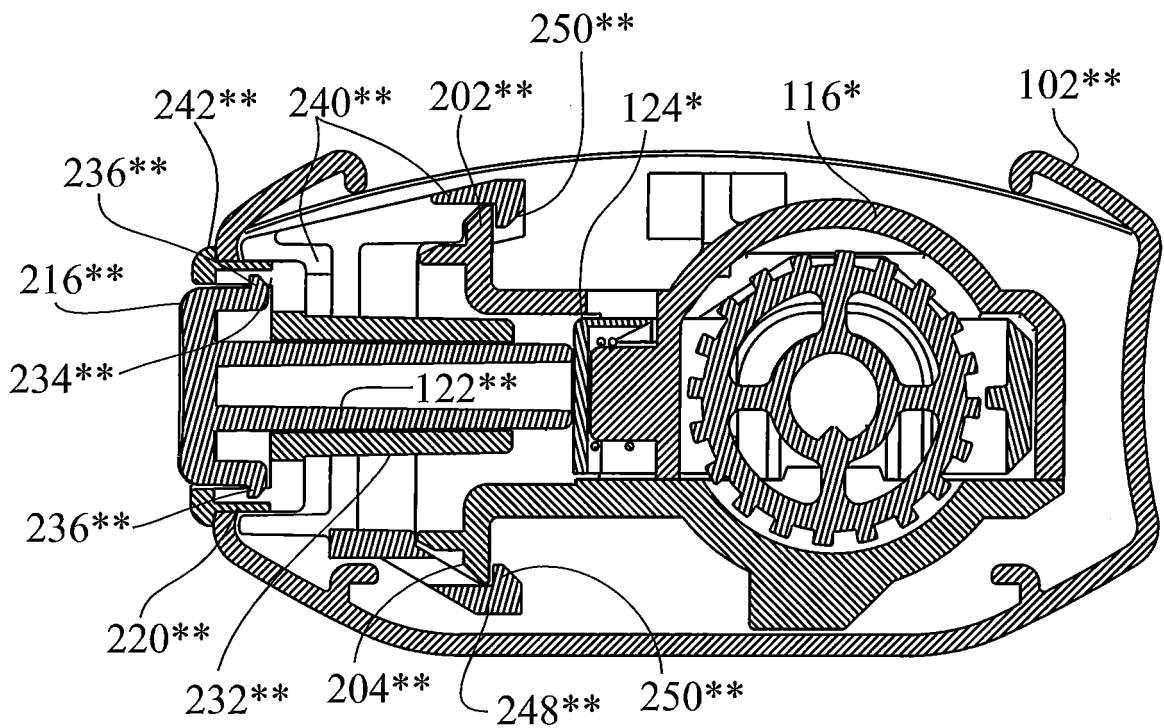


FIG 21

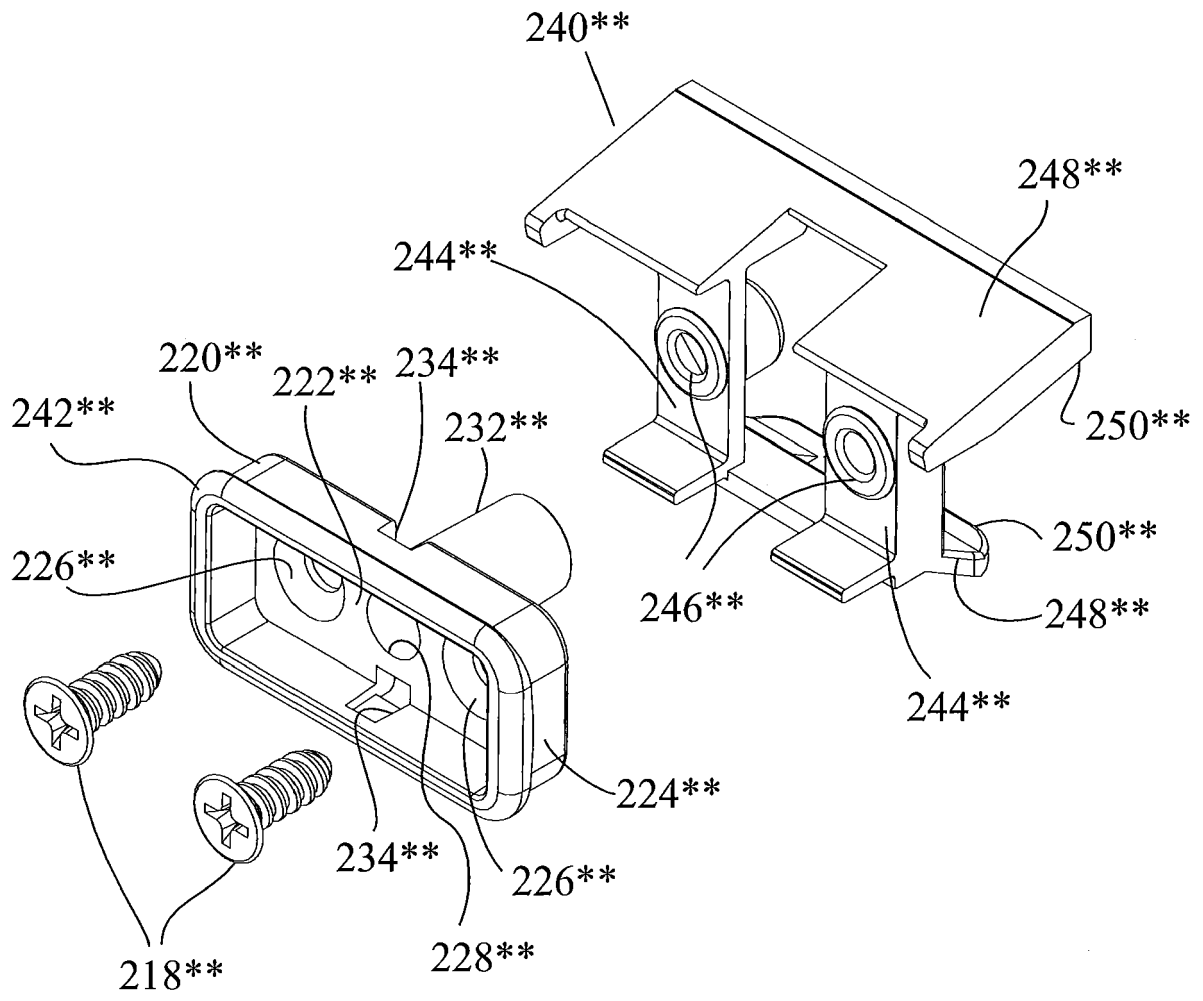


FIG 22



**PARTIAL EUROPEAN SEARCH REPORT**

Application Number

under Rule 62a and/or 63 of the European Patent Convention.  
This report shall be considered, for the purposes of subsequent proceedings, as the European search report

EP 16 16 0991

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 2013/129918 A1 (HUNTER DOUGLAS IND BV [NL]) 6 September 2013 (2013-09-06)	1	INV. E06B9/322 E06B9/388 E06B9/90
A	* figures 1-14 *	2-6	
A	----- EP 2 826 944 A2 (HUNTER DOUGLAS [US]) 21 January 2015 (2015-01-21) * figures 1-20 *	1-6	
A	----- EP 2 740 878 A2 (HUNTER DOUGLAS [US]) 11 June 2014 (2014-06-11) * figures 11,31, *	1-6	
			TECHNICAL FIELDS SEARCHED (IPC)
			E06B
INCOMPLETE SEARCH			
The Search Division considers that the present application, or one or more of its claims, does/do not comply with the EPC so that only a partial search (R.62a, 63) has been carried out.			
Claims searched completely :			
Claims searched incompletely :			
Claims not searched :			
Reason for the limitation of the search: see sheet C			
Place of search		Date of completion of the search	Examiner
Munich		31 October 2016	Merz, Wolfgang
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone		T : theory or principle underlying the invention	
Y : particularly relevant if combined with another document of the same category		E : earlier patent document, but published on, or after the filing date	
A : technological background		D : document cited in the application	
O : non-written disclosure		L : document cited for other reasons	
P : intermediate document		& : member of the same patent family, corresponding document	

EPO FORM 1503 03.82 (P04E07)

**INCOMPLETE SEARCH  
SHEET C**Application Number  
EP 16 16 0991

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Claim(s) completely searchable:  
1-6

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Claim(s) not searched:  
7-15

Reason for the limitation of the search:

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According to the requirements of Rule 62a EPC, only the first independent claim of a category (device and method) and the respective dependent claims were searched. Therefore the search was limited to claims 1-6 since no response has been received upon the communication pursuant to Rule 62a(1) EPC (invitation to indicate the claims on which a search is to be based) within the set time limit of two months from the notification.

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ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.

EP 16 16 0991

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
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31-10-2016

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EPO FORM P0459

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