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(54) SLAT CONTROL SYSTEM

(57) A slat control system configured to control the tilting of two or more slats which are mounted tiltably in an opening of a slat frame, the slat control system comprising at least two coupling pieces and an operating means, wherein each of the at least two coupling pieces is respectively couplable at a first outer end to a side of one of the two or more slats and is couplable at a second outer end to the operating means so that the operating means extends along the two or more slats and is configured to tilt the two or more slats substantially synchronously between a first tilting position and a second tilting position when the operating means moves, wherein in the first tilting position the slats close the opening of the slat frame and in the second tilting position the slats leave the opening of the slat frame at least partially open.

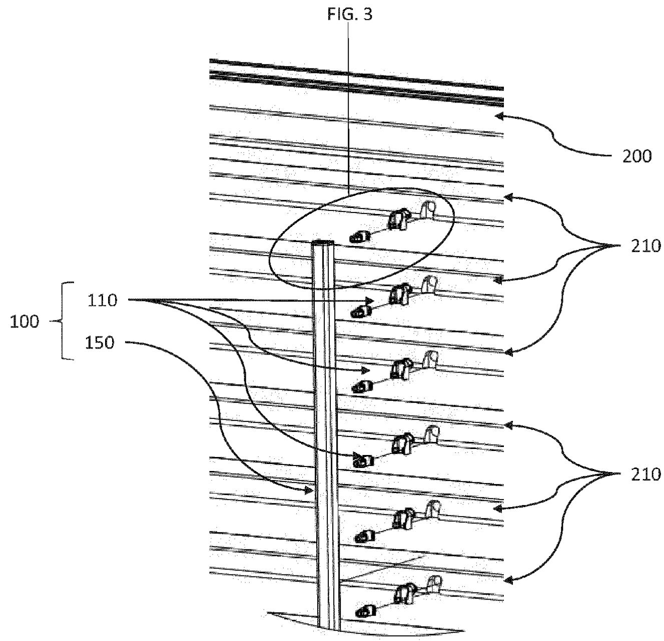

FIG. 2

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Description

Field of the invention

[0001] The invention relates to a slat control system. The invention further relates to a slat frame with the slat control system and to a structure with the slat frame.

Background

[0002] Slats are typically used for protecting an area against weather and wind, for instance for protecting a terrace against the sun. The slats are attached at each outer end to a first profile of a slat guide. A second profile of the slat guide is then mounted in a frame and allows a relative movement of the first and the second profile in order to tilt the slats synchronously.

[0003] A drawback of these slat guides is that they are complex in respect of installation, are aesthetically less attractive, and are difficult to repair when damaged.

Summary of the invention

[0004] Embodiments of the invention have the object of providing a slat control system which can be installed in simple manner, can be easily operated and can be repaired in simple manner.

[0005] According to a first aspect, the invention provides for this purpose a slat control system which is configured to control the tilting of two or more slats which are mounted tiltably in an opening of a slat frame. The slat control system comprises at least two coupling pieces and an operating means, wherein each of the at least two coupling pieces is couplable at a first outer end to a lateral side of one of the two or more slats and is couplable at a second outer end to the operating means. The operating means extends along the two or more slats in this way. The operating means is configured to tilt the two or more slats substantially synchronously between a first tilting position and a second tilting position when the operating means moves, wherein in the first tilting position the slats close the opening of the slat frame and in the second tilting position the slats leave the opening of the slat frame at least partially open.

[0006] This has multiple advantages. A first advantage of the slat control system is the accessibility thereof. Because the operating means extends along the lateral side of the two or more slats and couples them to each other via the at least two coupling pieces, the tilting position of the slats is controllable in operationally very simple manner. This is because the movement of the operating means results in tilting of the slats in the slat frame. The operating means is moreover easily reachable. A second advantage hereof is based on the insight that, in the case of a slat guide as known in the prior art, the person must use his or her hand on the slats themselves in order to tilt them. This entails the risk of the hand or fingers becoming trapped between slats due to a gust of wind or inattentiveness, resulting in physical injury. Use of the operating means thus also avoids physical injuries. A further advantage is based on the insight that, because the operating means couples the two or more slats to each other via the coupling pieces, the slats are easier to install. This is because these slats can be mounted rotatably in the frame in simple manner and individually, for instance with a bearing in the frame which receives a shaft of the slat. Placing of the operating means can furthermore be carried out independently of mounting of the slats on the slat frame. On one hand, this simplifies assembly of the slat frame, and on the other it also simplifies repairs thereto. Each component of the slat control system and the slats themselves can thus be repaired or replaced separately in simple manner.

[0007] Each coupling piece preferably comprises a first coupling piece part and a second coupling piece part, wherein the first and the second coupling piece part are connectable for relative rotation about a shaft and are each provided with a mounting means which is configured to mount the first coupling piece part and the second coupling piece part on respectively the operating means and one of the two or more slats. In this way the operation of the locking system is improved further. More specifically, this allows the changing orientation of the operating means relative to the two or more slats to be accommodated with the first and the second coupling piece part when the slats tilt. In other words, the coupling piece functions as a hinge between the two or more slats and the operating means. This further has the advantage that both the operating means and the coupling pieces are adaptable to almost any situation of the slat frame in very simple and modular manner. The coupling pieces can for instance be supplied in bulk, and the operating means can also be supplied in bulk in generic manner. A number of coupling pieces corresponding with the number of slats to be coupled can then be arranged in the slats. The operating means can then be cut to size and be connected to the coupling pieces, more specifically the second coupling piece part. Because the first and second coupling piece part are mutually connectable and rotatable, the slat control system therefore allows highly modular operation, the slat frame can thus for instance comprise a plurality of sections, wherein each section of slats is individually controllable by a control system.

[0008] The mounting means is preferably provided with one or more protrusions which extend from the mounting means in a direction radially of an outer surface of the mounting means. More preferably, each protrusion comprises an insertion surface and a stop surface, wherein the stop surface lies at right angles to the outer surface of the mounting means and the insertion surface has an oblique angle with the stop surface and the outer surface, wherein the insertion surface is directed toward the first outer end. This allows the coupling piece to be used in combination with a plurality of different types of material. More specifically, the protrusions anchor the mounting means, and consequently the first and the second coupling piece, in an opening in both the slats and the operating means in simple manner. More preferably provided are a plurality of protrusions, which are arranged distributed over the outer surface of the mounting means. This further improves the mounting of the coupling piece part in one of the operating means and the slat. According to a further preferred embodiment, wherein the operating means is a hollow profile with two or more mounting openings which are provided for mounting a mounting means in, the stop surface also engages a surface of the hollow profile when it is arranged through an opening in the hollow profile. This allows the first coupling piece part to be mounted on the operating means in rapid and simple manner. The two or more mounting openings are more preferably placed at a regular pitch distance from each other. This simplifies placing of the operating means further and increases the modularity of the control system further.

[0009] The first coupling piece part is preferably provided at a proximal outer end with a shaft and the second coupling piece part is provided at a distal outer end with a shaft engaging means which is configured to engage the shaft of the first coupling piece part. Because the shaft is provided at the proximal outer end of the first coupling piece part and the shaft engaging means is provided at the distal outer end, the first and second coupling piece parts are mutually connectable in simple manner.

[0010] The first coupling piece part is preferably provided at a proximal outer end with a recess comprising two opposite inner walls, wherein the shaft has two shaft segments, each extending partially into the recess from a respective inner wall, and the shaft engaging means is provided to extend between the two shaft segments and comprises on either side two cavities which are each configured to receive one of the two shaft segments. In this way the shaft segments are directed inward. The space between the two shaft segments allows the shaft engaging means to be aligned and arranged therebetween in simple manner. The cavities then allow the two shaft segments of the first coupling piece part to be coupled to the second coupling piece part in efficient manner.

[0011] More preferably, each shaft segment comprises an outer surface having an at least partially circular cross-section, wherein the two cavities comprise an inner wall which is shape-compatible with the outer surface of the shaft segment. In this way the shaft segments and cavities facilitate a rotating movement of the first coupling piece part relative to the second coupling piece part, and vice versa. The outer surface of each shaft segment more preferably comprises at least one cut-out portion which forms a stop surface extending along a longitudinal axis of the shaft segment, wherein the inner wall has a flat portion compatible with the stop surface. This allows the first coupling piece part and the second coupling piece part to be temporarily locked in the position in which the stop surface coincides with the flat portion.

[0012] Each shaft segment preferably comprises at a distal outer end a first surface which is oriented transversely of a longitudinal direction of the shaft segment and comprises a second surface which lies at an angle to the first surface so that the second surface is directed outward relative to the recess. The first surface, which is oriented transversely, has the advantage that a clearance between the shaft segment and the cavities is substantially constant. This therefore limits the freedom of movement of the second coupling piece part in the longitudinal direction of the shaft segment. The second surface, which lies at an angle, allows for the second coupling piece part to be guided to a position in which the coupling piece part is connected to the two shaft segments. The resistance while arranging the second coupling piece part on the first coupling piece part is moreover limited so that the shaft segments are less inclined to break off, or tend not to do so at all.

[0013] The two cavities are preferably bounded at least partially by a rib, wherein the rib is configured to extend over an edge of the inner walls. The rib functions on one hand as a stop, so that the second coupling piece part is prevented from being arranged too far into the recess of the first coupling piece part. On the other hand, the rib also functions as rotation limiting means.

[0014] The slat control system preferably further comprises a damping means which is mountable on the slat frame and is connectable to one of the two or more slats, wherein the damping means is configured to damp a tilting movement of the slat. The damping means is more preferably connected to the slat via a gear transmission.

[0015] According to a second aspect, the invention provides a slat frame comprising a plurality of slats which are mounted tiltably in an opening of a slat frame, wherein two or more slats are connected for mutual control via a slat control system as described above.

[0016] According to a third aspect, the invention provides a structure, preferably a terrace covering, comprising a slat frame, preferably a slidable slat frame with said slat control system.

[0017] The advantages stated in respect of the slat control system apply *mutatis mutandis* for the slat frame and a structure comprising the slat frame.

Brief description of the figures

[0018] The above stated and other advantageous features and objects of the invention will become more apparent, and the invention better understood, on the basis of the following detailed description when read in combination with the accompanying drawings, in which:

Figure 1 shows a perspective view of a slat frame according to a preferred embodiment;

Figure 2 shows an exploded view of a portion of the slat frame shown in figure 1 with a plurality of slats which are mutually connectable by a slat control system according to a preferred embodiment;

Figure 3 shows a perspective view of a portion of the slat control system shown in figure 2, in which the operating means, the coupling piece and the slat are shown in more detail;

Figure 4 shows a perspective exploded view of a coupling piece comprising a first and a second coupling piece according to a preferred embodiment;

Figure 5 shows a damping means according to a further preferred embodiment of the slat control system;

Figure 6 shows a height control means according to a preferred embodiment;

Figure 7 shows a perspective view of a locking system according to a preferred embodiment;

Figures 8A and 8B show respectively a cross-section of the locking system in a locking position and a releasing position;

Figure 9 shows a perspective view of a partially cutaway assembly of the locking system in a sliding frame in a structure.

Detailed embodiments

[0019] The following detailed description relates to determined specific embodiments. The teaching hereof can however be applied in different ways. The same or similar elements are designated in the drawings with the same reference numerals.

[0020] The present invention will be described with reference to specific embodiments. The invention is however not limited thereto, but solely by the claims.

[0021] As used here, the singular forms "a" and "the" comprise both the singular and plural references, unless clearly indicated otherwise by the context.

[0022] The terms "comprising", "comprises" and "composed of" as used here are synonymous with "including". The terms "comprising", "comprises" and "composed of" when referring to stated components, elements or method steps also comprise embodiments which "consist of" the components, elements or method steps.

[0023] The terms first, second, third and so on are further used in the description and in the claims to distinguish between similar elements and not necessarily to describe a sequential or chronological order, unless this is specified. It will be apparent that the thus used terms are mutually interchangeable under appropriate circumstances and that the embodiments of the invention described here can operate in an order other than described or illustrated here.

[0024] Reference in this specification to "one embodiment", "an embodiment", "some aspects", "an aspect" or "one aspect" means that a determined feature, structure or characteristic described with reference to the embodiment or aspect is included in at least one embodiment of the present invention. The manifestations of the sentences "in one embodiment", "in an embodiment", "some aspects", "an aspect" or "one aspect" in different places in this specification thus do not necessarily all refer to the same embodiment or aspects. As will be apparent to a skilled person in this field, the specific features, structures or characteristics can further be combined in any suitable manner in one or more embodiments or aspects. Although some embodiments or aspects described here comprise some but no other features which are included in other embodiments or aspects, combinations of features of different embodiments or aspects are further intended to fall within the context of the invention and to form different embodiments or aspects, as would be apparent to the skilled person. In the appended claims all features of the claimed embodiments or aspects can for instance be used in any combination.

[0025] The same or similar elements are designated in the drawing with the same reference numeral.

[0026] Figure 1 shows a slat frame 200 in which a plurality of slats 210 are arranged. The slat frame 200 can be used as a wall in an outdoor structure, for instance for protecting a terrace against wind and sun. The slat frame 200 can also be used as a ceiling for the outdoor structure. Slat frame 200 can be arranged both statically and displaceably in the outdoor structure. Slat frame 200 can thus be suspended from a guide in order to displace slat frame 200 along the guide. In order to compensate for a height difference between two outer ends of the outdoor structure a height control means as shown in figure 6 can be provided.

[0027] Slat frame 200 comprises a plurality of slats 210. A slat 210 is typically strip-like with a substantially elongate primary dimension, as seen in the longitudinal direction, and a secondary dimension which is significantly smaller than the primary dimension. The slats 210 can be manufactured from various materials such as aluminium, wood or plastic, which are arranged tiltably on frame 200.

[0028] Slats 210 are arranged tiltably in an opening O of slat frame 200. In the context of this application the tilting of slats is defined as rotating the slat 200 around a longitudinal axis of the slat. More specifically, slats 200 are mounted tiltably in an opening O defined by the slat frame 200, so that they are tiltable between a first tilting position and a second tilting position. In the first tilting position slats 210 close the opening O of slat frame 200. In this position mutually adjacent slats 210 connect closely to each other by lying with their mutually adjacent lateral sides against or substantially against each other. In other words, an opening between adjacent slats is minimized. This substantially prevents incidence of light, so that the area behind slat frame 200 is shaded. It will be apparent that, in this position, wind is also partially blocked. In the second tilting position slats 210 leave the opening of slat frame 200 at least partially open. This means that the slats still lie in the field of vision of the opening O, but are positioned such that the opening between adjacent slats 210 is considerably greater than in the first tilting position.

[0029] In order to control the tilting of slats 210 a slat control system 100 according to a preferred embodiment is provided. As shown in figure 1, it is not essential for all slats 210 in slat frame 200 to be controlled with the same slat control system 100. A plurality of zones, three zones O1, O2, O3 are shown in the figure, can thus be realized in slat frame 200 using the slat control system 100. Each of the slats 210 in each zone can be controlled by a respective slat control system 100. It is further also possible to adapt a slat zone, for instance zone O3, into a full zone, wherein the zone is covered fully by a plate. Alternatively or in combination, a zone can also comprise no slats. The proposed slat control system 100 allows slat frames to be constructed and controlled in highly creative, aesthetically attractive and modular manner.

[0030] Figure 2 shows an exploded view of a portion of the slat frame shown in figure 1. Figure 2 shows in more detail that the slat control system 100 comprises at least two coupling pieces 110 and an operating means 150. Figure 2 shows six coupling pieces 110. It will however be apparent that only some of the coupling pieces comprised in figure 1 are shown, and that more than or less than six coupling pieces can also be provided.

[0031] Each of the at least two coupling pieces 110 is couplable at the position of a first outer end to a lateral side of a slat 210. The lateral side is a side of the slat 210 which extends in the longitudinal direction of the slat and is situated at a distance from an axis of the slat. The lateral side is distinguishable from the end surface of the slat. This end surface is particularly connected rotatably to the slat frame (not shown). Each of the at least two coupling pieces 110 is further couplable at a second outer end to the operating means 150. Operating means 150 extends in this way along the two or more slats 210. In the figure the operating means 150 extends along six slats 210. A first advantage van het slat control system 100 is the accessibility thereof. Because operating means 150 extends along the lateral side of the two or more slats 210 and couples them to each other via the at least two coupling pieces 110, the tilting position of the slats is controllable in operationally very simple manner. This is because the movement of the operating means results in tilting of the slats in the slat frame, as will be further elucidated below. Operating means 150 moreover also lies at a distance from the slats 210. This improves the accessibility and reachability of operating means 150 and moreover reduces the risks of fingers or hands becoming jammed between the slats. Operating means 150 is configured to tilt the two or more slats 210 substantially synchronously between the first tilting position and the second tilting position when operating means 150 moves. Synchronous tilting is understood to mean that the different slats 210 which are coupled via coupling pieces 110 to operating means 150 take up substantially the same orientation relative to the slat frame at the same time. According to the embodiment shown in figure 2, slats 210 have a lying orientation, whereby a person can see substantially through the openings between slats 210. In this orientation the lateral side of slat 210 is directed substantially transversely of the plane formed by the opening of slat frame 200. When operating means 150 is operated, slats 210 can have an angle to the plane of slat frame 200, the mutual connections between the slats and the operating means ensuring that all slats connected to the operating means 150 will have a similar angle.

[0032] It will further be apparent on the basis of figure 2 that the operating means 150 couples the two or more slats 210 to each other via the coupling pieces. Slats 210 are thus easier to install. These slats 210 can be mounted rotatably in slat frame 200 in simple manner and individually, for instance with a bearing in the frame which receives a shaft of the slat. The placing of operating means 150 can furthermore be carried out independently of the slats 210 being mounted on the slat frame. On one hand, this simplifies assembly of the slat frame, and on the other it also simplifies repairs thereto. Each component of the slat control system 100 and the slats themselves can thus be repaired or replaced separately in simple manner.

[0033] Figure 3 shows a perspective view of a portion of the slat control system 100 shown in figure 2, in which operating means 150, coupling piece 110 and slat 210 are shown in more detail. Figure 3 more specifically shows that each coupling piece 110 preferably comprises a first coupling piece part 120 and a second coupling piece part 130, wherein the first coupling piece part 120 and the second coupling piece part 130 are connectable for relative rotation about an axis. Each coupling piece part is furthermore provided with a mounting means 121, 131 which is configured to mount respectively the first coupling piece part 120 and the second coupling piece part 130 on respectively the operating means 150 and the slat 210. This further improves the operation of the slat control system 100. More specifically, this allows the changing orientation of the operating means relative to the two or more slats to be accommodated with the first and the second coupling piece part when the slats tilt. In other words, coupling piece 110 functions as a hinge between the two or more slats and the operating means. This further has the advantage that both operating means 150 and coupling pieces 110 are adaptable to almost any situation of the slat frame in very simple and modular manner. The coupling pieces 110 can for instance be supplied in bulk, and the operating means can also be supplied in bulk in generic manner. A number of coupling pieces 110 corresponding to the number of slats to be coupled can then be arranged in the slats. In the embodiment of figure 3 this would thus be six slats that must be coupled correspondingly to a coupling piece. In this situation, six coupling pieces would thus have to be provided. Depending on the number of slats and the distance therebetween, operating means 150 can be cut to size and then be connected to the coupling pieces, more specifically the second coupling piece part 130. Because the first and second coupling piece parts 120, 130 are mutually connectable and rotatable, the slat control system 100 therefore allows highly modular operation, the slat frame can thus for instance comprise a plurality of sections, wherein each section of slats is individually controllable by a slat control system, as was elucidated with reference to figure 1.

[0034] Figure 4 shows a perspective exploded view of a coupling piece 110 comprising a first and a second coupling piece part 120, 130 according to a preferred embodiment.

[0035] As described above, coupling piece 110 preferably comprises a first coupling piece part 120 and a second coupling piece part 130 which are connected for relative rotation about an axis. Each coupling piece part 120, 130 is moreover provided with a mounting means 121, 131 which is configured to mount respectively the first coupling piece part 120 and the second coupling piece part 130 on respectively operating means 150 and slat 210.

[0036] Mounting means 121, 131 can be provided with one or more protrusions 121a, 121b, 121c, 121d, 121e, 131a, 131b, 131c which extend from mounting means 121, 131 in a direction radially of an outer surface of mounting means 121, 131. The protrusions preferably have an insertion surface and a stop surface, wherein the stop surface lies at right angles to the outer surface of the mounting means and the insertion surface lies at an oblique angle to the stop surface and the outer surface, wherein the insertion surface is directed toward the outer end of the respective coupling piece part. In this way the mounting means can be arranged in a recess arranged in the operating means or slat in relatively simple manner. The combination of stop surface and insertion surface form a barb whereby the mounting means 121, 131 is also mountable in said recess in simple and robust manner. More preferably provided are a plurality of protrusions, which are arranged distributed over the outer surface of the mounting means. The distribution can be seen both along the periphery of the mounting means and in the length direction thereof, or a combination. The mounting means 121 of the first coupling piece part 120 is thus shown with two (visible rows of) protrusions, the first row of which is designated with reference numerals 121a, 121b, 121c, 121d, 121e. This row is formed by a plurality of protrusions 121a, 121b, 121c, 121d, 121e, which lie adjacently of each other as seen in a length direction of the mounting means 121. Further arranged at a distance from the first row is a second row (and third and fourth row, although not visible in the figure). This further improves the mounting of the coupling piece part in one of the mounting means 150 and the slat 210. The mounting means 121 of the first coupling piece part 120 need not necessarily be identical to the mounting means 131 of the second coupling piece part 130, as shown in figure 4. The mounting means 131 of the second coupling piece part 130 thus comprises four protrusions (three of which are shown) 131a, 131b, 131c, which are distributed along the periphery. Such protrusions are advantageous in a further preferred embodiment wherein the operating means 150 is a hollow profile with two or more mounting openings (not shown) which are provided for mounting a mounting means 131 in, and the stop surface also engages a surface of the hollow profile when it is arranged through an opening in the hollow profile. This allows the first coupling piece part to be mounted on the operating means in rapid and simple manner. The two or more mounting openings are preferably placed at a regular pitch distance from each other, the openings for instance being placed at a mutual distance corresponding to the distance between the slats. This simplifies placing of the operating means further and increases the modularity of the control system further. The operating means can moreover be cut to size depending on the zone O1, O2 or O3 to be controlled.

[0037] Figure 4 further shows that the first coupling piece part 120 can be provided at a proximal outer end P1 with a shaft 122a, 122b and the second coupling piece part 130 can be provided at a distal outer end D2 with a shaft engaging means 132 which is configured to engage the shaft of the first coupling piece part. Because the shaft 122a, 122b is provided at the proximal outer end P1 of the first coupling piece part 120 and the shaft engaging means 132 is provided at the distal outer end D1, the first and second coupling piece parts 120, 130 are mutually connectable in simple manner.

[0038] The first coupling piece part 120 is more preferably provided at a proximal outer end P1, provided with a recess which comprises two opposite inner walls 123. These inner walls 123 can lie adjacently of the drilled hole formed in the slat, see figure 3. The shaft further has two shaft segments 122a, 122b, each extending partially into the recess from a respective inner wall. In this way a space is created between the outer ends of the two shaft segments 122a, 122b. The shaft engaging means 132 can further be provided to extend between the two shaft segments 122a, 122b, i.e. in the space, and the shaft engaging means 132 further comprises on either side two cavities 133 (the second cavity is not visible due to the perspective view) which are each configured to receive one of the two shaft segments 122a, 122b. The space between the two shaft segments 122a, 122b allows the shaft engaging means 132 to be aligned and arranged therebetween in simple manner. The cavities 133 then allow the two shaft segments of the first coupling piece part 120 to be coupled movably to the second coupling piece part 130 in efficient manner. The cavities 133 and the shaft segments 122a, 122b co-act correspondingly and in this way form components of a snap-fit connection.

[0039] In order to facilitate a rotating movement of the first coupling piece part 120 relative to the second coupling piece part 130 and vice versa, each shaft segment 122a, 122b preferably comprises an outer surface having an at least partially circular cross-section. The two cavities 133 moreover have an inner wall which is shape-compatible with the outer surface of the shaft segment 122a, 122b. The outer surface of each shaft segment 122a, 122b more preferably comprises at least one cut-out portion which forms a stop surface 124 extending along a longitudinal axis of the shaft segment. The stop surface 124 is directed outward in a direction of the second coupling piece part. In other words, the stop surface 124 lies substantially vertically and is oriented in a direction away from the distal outer end D1 of the first coupling piece part 120. In combination herewith, the inner wall of the shaft engaging means has a flat portion 136 compatible with the stop surface. This allows the first coupling piece part and the second coupling piece part to be temporarily locked in the position in which the stop surface coincides with the flat portion.

[0040] Figure 4 further shows that each shaft segment 122a, 122b can comprise at a distal outer end thereof a first surface 125 which is oriented transversely of a longitudinal direction of the shaft segment 122a and comprises a second surface 126 which lies at an angle to the first surface so that the second surface is directed outward relative to the recess. The first surface 125, which is oriented transversely, has the advantage that a clearance between the shaft segment and the cavities is substantially constant. This therefore limits the freedom of movement of the second coupling piece part 120 in the longitudinal direction of the shaft segment 122a. The second surface 126, which lies at an angle, allows for the second coupling piece part to be guided to a position in which the second coupling piece part 130 is connected to the two shaft segments. The resistance while arranging the second coupling piece part on the first coupling piece part is moreover limited so that the shaft segments are less inclined to break off, or tend not to do so at all. This resistance can be altered by adjusting the angle between the first surface 125 and the second surface 126.

[0041] The two cavities 133 are preferably bounded at least partially by a rib 134, wherein the rib is configured to extend over an edge 127 of the inner walls. The rib 134 functions on one hand as a stop so that the second coupling piece part 130 is prevented from being arranged too far into the recess of the first coupling piece part 120. On the other hand, the rib also functions as rotation limiting means. The rotation of the first coupling piece part 120 relative to the second coupling piece part 130 can be partially limited by adjusting the arc length through which the rib 134 extends. By increasing the arc length of rib 134 the edge of the wall of the first coupling piece part 120 will hit the rib sooner and will prevent a further rotation from taking place in this same direction.

[0042] Figure 5 shows a damping means for use with the slat control system. The damping means 140 is mountable on the slat frame 200 and is connectable to one of the two or more slats 210. Damping means 140 is configured to damp a tilting movement of slat 210. Because the two or more slats are connected by the operating means, these slats are therefore also indirectly connected to the damping means 140. The damping means can be connected to any of the slats connected to the operating means and need only be fixed to the frame. The figure shows that the damping means is fixed in a profile of the frame using a bracket 170 which can be clamped between two legs of the profile. Figure 5 further shows that the damping means is preferably connected via a gear transmission 160 to the slat. This allows the damping force to be controlled depending on the intended purpose.

[0043] Figure 6 shows a height control means 180 according to a preferred embodiment. The height control means 180 is configured to guide the slat frame along a T-shaped guide (not shown). The advantage thereof is based on the insight that outdoor structures, such as a terrace, typically have an oblique ground surface in order to realize drainage. The T-shaped guide thus lies higher on one side than on the other. In other words, the one outer end of the T-guide lies higher than the other outer end. In order to compensate for the difference in height caused thereby, the slat control system can further comprise a height control means 180 with a slot 181 which is intended to surround the upward directed leg of the T-shaped guide. The height control means 180 further comprises a mounting means 183 which is configured to mount the height control means on the slat frame. The mounting means is mounted on an underside of the slat frame. The height control means is arranged for rotation relative to mounting means 183 so that, when the slat frame moves along the T-guide, the height control means 180 is held on the T-guide gravitationally and the slot limits the lateral movement of the slat frame relative to the guide. In order to hold the height control means on the T-guide the height control means can be disposed elastically. For this purpose a resilient element 182 is provided, which drives the height control means 180 toward the T-guide.

[0044] In this way the height control means 180 is held on the T-guide in a robust manner, irrespective of the position of the slat frame.

[0045] Figure 7 shows a perspective view of a locking system 300 according to a preferred embodiment. The locking system 300 is configured to be mounted on a structure, for instance a terrace covering, in a profile of a sliding frame. The sliding frame can be a frame as shown in figure 1. The locking system 300 is configured to lock the sliding frame relative to the structure. For this purpose the locking system 300 is provided with a locking means 310 which is coupled displaceably to a base 320. The base 320 is configured to be mounted in the profile, see figures 8A, 8B and 9.

[0046] The locking means 310, illustrated as a pin, is displaceable between a releasing position and a locking position. The locking means 310 is provided to lock the location of the sliding frame relative to the structure in the locking position.

[0047] Figure 7 further shows that locking system 300 can be connectable to an actuator 330. The actuator 330 is coupled to the locking means 310. Actuator 330 is movable between a first and a second position such that a movement from the first to the second position displaces locking means 310 from the releasing position to the locking position and vice versa. Although not shown, actuator 330 extends at least partially through the profile. For this purpose the profile can be provided with an opening so that the actuator is freely accessible from the outside. Because the position of the actuator is correlated to the position of the locking means, a user can thus operate the locking system in very simple manner via the actuator. Actuator 330 further comprises a connecting means 331 which extends between the actuator 330 and the locking means 310. Further features of the connecting means will be elucidated with reference to figures 8A and 8B.

[0048] Figure 8A shows a cross-section of the locking system in a locking position. Figure 8B shows a cross-section of the locking system in a releasing position. For the sake of further clarity, figure 9 shows a perspective view of the locking system in a releasing position as according to figure 8B.

[0049] Figures 8A, 8B and 9 thus show a transverse beam 1000 of a structure, for instance a transverse beam of a terrace covering. Provided on an underside of transverse beam 1000 is a rail 1100. In this embodiment the sliding frame is arranged slidably in the rail 1100. This allows the sliding frame to slide along the length of the transverse beam, this length typically corresponding with the length or at least a part of the length of the terrace covering.

[0050] More specifically, figures 8A and 8B show that locking system 300 further comprises a lock 350 which is fixed to the structure 1000 and comprises at least one locking provision 351. The at least one locking provision 351 is visible in figure 9. Figure 8A shows that the locking provision 351 is configured to receive locking means 310 when the locking means 310 is in the locking position. The lock 350 limits the freedom of movement of locking means 310 in a direction of movement of rail 1100. Because locking means 310 is connected to the sliding frame, the locking means 310 in the locking position thus also limits the freedom of movement of the sliding frame in the direction of movement of rail 1100. Figure 8 further shows that locking system 300 is arranged in the profile 200a, 200b in compact manner, i.e. on an inner side of the profile. In this way only an outer side of the profiles is visible from the outside, and a neatly finished and aesthetically modern appearance is realized. Locking system 300 is further robust in that the base 320 is enclosed almost wholly by the profile. In order to connect locking means 310 to the locking provision 351 the locking means 310 extends through profile 200b. Locking means 310 can extend through the profile both in the locking position and in the releasing position. It is thus only essential for the locking means 310 to be surrounded by the locking provision 351 of lock 350 in the locking position.

[0051] Figures 8A and 8B show that the actuator comprises a connecting means 331 which extends between the actuator and the locking means 310. This allows the actuator to be placed at a distance from the locking means, for instance in an upright profile of the sliding frame. The advantage hereof is based on the insight that the locking means 310 and the lock are preferably provided at the position of an upper or lower segment of the sliding frame. Connecting means 331 for instance allows operation of locking means 310 halfway along the sliding frame, where the actuator may be provided. Connecting means 331 is more preferably strip-like, as shown in figure 7. As already described, a strip-like connecting means is advantageous because a strip, as seen in a length direction, is considerably longer than it is in the width direction thereof. The strip has a thickness direction perpendicularly of the width direction. The strip-like connecting means 331 is relatively stiff as seen in the width direction, but flexible in the thickness direction. This allows a span between actuator and locking means to be accommodated in relatively simple manner with the strip-like connecting means 331. This bridging is shown visibly in figures 8A and 8B. The bridging is caused in that the sliding frame is typically suspended displaceably in the rail 1100, which has a central guide opening. In this configuration locking means 310 must thus also move through the central guide opening of rail 1100, and is therefore situated at a bridgeable distance from a side wall of the sliding frame on which actuator 330 can be provided in easily reachable manner.

[0052] The strip-like connecting means 331 further has the advantage that the connecting means can be partially received at the edges thereof in a slot 201a which can be formed in the profile 200a. The slot 201a limits the freedom of movement of connecting means 331 in a width direction thereof so that only a movement in the longitudinal direction of the slot and consequently connecting means 331 is possible. In order to realize the connection between the slot and the connecting means a portion of the connecting means can have a first part and a second part with different widths. At the position of the first part the width of the connecting means 331 is smaller than the distance between two opposite slots. This means that the connecting means 331 fits between the slots but does not slide therein. At the position of the second part the width of the connecting portion is such that the edges of the connecting means slide in the slots. In this way a movement is thus allowed only in the longitudinal direction of the slots. In the figure the longitudinal direction is the same as an upward direction of the sliding frame.

[0053] Figures 8A and 8B show that, according to a preferred embodiment, the actuator is connected via a force transmission structure to the locking means 310. The force transmission structure has a lifting arm base 311 with a proximal outer end 311p and a distal outer end 311d. At the proximal outer end 311p the lifting arm base 311 is connected via a pivoting connection to actuator 331. At the distal outer end the lifting arm base 311 has a connecting piece 312 which is connected pivotally to the base 320. The lifting arm base 311 is thus connected on one side to the actuator and on the other side to the base 320. The lifting arm base 311 can also be directly pivotally connected to the base 320. Figures 8A and 8B further show that the locking means 310 is connected pivotally to the lifting arm base 311 between the proximal outer end 311p and the distal outer end 311d. Because the lifting arm base is disposed pivotally in the base and the locking means 310 is connected pivotally to the lifting arm base between the proximal and distal outer end thereof, a rotation of the lifting arm base results in an at least partial upward or downward movement of the locking means 310. The force transmission structure has the advantage that the locking means is less inclined to move out of lock 350, for instance due to wind rattling the sliding frame. The force transmission structure further has the advantage that an equal or greater force on the locking means 310 is realized with less force.

[0054] The connecting piece 312 also comprises a distal outer end 312d and a proximal outer end 312p. It is preferred for the connecting piece to be connected pivotally to the base 320 at the proximal outer end 312p. In order to control a distance over which locking means 310 is displaceable the distance between pivoting connection 312p and lifting arm base 311 can be adjusted. A greater distance results in a greater displacement of locking means 310.

[0055] Base 320 can further comprise a guide which is configured to guide locking means 310 in substantially vertical direction. The lifting arm base can further also be mounted rotatably in a guide in base 320. This guide can be directed substantially vertically and allows the lifting arm base to be movable upward and downward in the guide. Coupling the lifting arm base rotatably to the guide further provides a similar force transmission structure as described above, with the additional advantage that the upward and downward displacement of the locking means is also guided by the lifting arm base in the guide. The connecting piece 312 can further be connected via a sliding piece 313 which lies opposite pivoting connection 312p and is connected to the locking means. Sliding piece 313 is connected slidably to locking means 310 and in this way further improves the robustness of the locking system. More specifically, the degrees of freedom of the connecting piece and the locking means are reduced further.

[0056] Figure 9 shows a perspective view of a front and upper segment of a sliding frame. The figure more specifically shows that a portion of transverse beam 1000 has been cut away in order to show the lock 350. Figure 9 further shows that the sliding frame can be provided with a slat control system as elucidated with reference to figures 1-5.

[0057] According to the illustrated preferred embodiment, lock 350 comprises a plurality of locking provisions 351 which are arranged distributed relative to the structure. This allows the sliding frame to be locked at multiple locations along the rail 1100.

[0058] Figure 9 further shows that locking means 310 is preferably arranged at a front segment of the sliding frame, preferably at the position of a corner of the sliding frame. The advantage hereof is based on the insight that the profiles are preferably connected to each other in mitred manner. This has an aesthetically attractive appearance and can moreover be manufactured in relatively simple manner. At the position of the corner of the sliding frame with profiles coupled in mitred manner, only profile 200a being shown in the figure, the inner space of each of the profiles coincides. This space can be utilized optimally by providing the locking means and the base at the position of the corner. This further has the advantage that the actuator and the connecting means are connectable directly to the base and the locking means, wherein the base has an outer dimension adapted to fit in an opening of the profile.

[0059] The skilled person will appreciate on the basis of the above description that the invention can be embodied in different ways and on the basis of different principles. The invention is not limited here to the above described embodiments. The above described embodiments and the figures are purely illustrative and serve only to increase understanding of the invention. The invention is not therefore limited to the embodiments described herein, but is defined in the claims.

[0060] The above described aspects and features of the slat control system can further be combined with a locking system configured to be mounted in a profile of a sliding frame on a structure, for instance a terrace covering, and to lock the sliding frame relative to the structure. The locking system comprises a locking means which is coupled displaceably to a base configured to be mounted in the profile, wherein the locking means is displaceable between a releasing position and a locking position wherein the locking means protrudes through the profile. The locking system further comprises a lock which is configured to be fixed to the structure and which comprises at least one locking provision configured to receive the locking means when the locking means is in the locking position. Because the locking system is arranged in the profile in compact manner, i.e. on an inner side of the profile, practically only the profiles are visible from the outside. In this way a neatly finished and aesthetically modern appearance is realized. The locking system is further robust in that the base is enclosed almost wholly by the profile.

[0061] The locking system preferably comprises an actuator which extends at least partially through the profile, wherein the actuator is coupled to the locking means and is movable between a first and a second position such that a movement from the first to the second position displaces the locking means from the releasing position to the locking position and vice versa. Because the actuator extends at least partially through the profile, the actuator is freely accessible from the outside. Because the position of the actuator is correlated to the position of the locking means, a user can thus operate the locking system in very simple manner via the actuator.

[0062] The actuator preferably comprises a connecting means which extends between the actuator and the locking means. This allows the actuator to be placed at a distance from the locking means. The advantage hereof is based on the insight that the locking means and the lock are preferably provided at the position of an upper or lower segment of the sliding frame. The connecting means for instance allows the locking means to be operated halfway along the sliding frame, where the actuator may be provided. The connecting means is more preferably strip-like. A strip-like connecting means is advantageous because a strip is considerably longer as seen in a length direction than it is in the width direction thereof. The strip has a thickness direction perpendicularly of the width direction. The strip-like connecting means is relatively stiff as seen in the width direction, but flexible in the thickness direction. This allows a span between actuator and locking means to be accommodated in relatively simple manner with the strip-like connecting means. The strip-like connecting means further has the advantage that the connecting means can be partially received at the edges thereof in a slot which can be formed in the profile. The slot limits the freedom of movement of the connecting means in a width direction so that only a movement in the longitudinal direction of the connecting means is possible. A length of the connecting means is more preferably controllable.

[0063] The actuator is preferably connected via a force transmission structure to the locking means, wherein the force transmission structure has a lifting arm base with a proximal outer end and a distal outer end, wherein the lifting arm base is connected via a pivoting connection to the actuator at the proximal outer end, and wherein the lifting arm base comprises at the distal outer end a connecting piece which is connected pivotally to the base, wherein the locking means is connected pivotally to the lifting arm base between the proximal outer end and the distal outer end.

[0064] The base preferably comprises a guide which is configured to guide the locking means in substantially vertical direction, and wherein the connecting piece is connected to the locking means via a sliding piece lying opposite the pivoting connection. In this way the robustness of the locking system is improved further. More specifically, the degrees of freedom of the connecting piece and the locking means are reduced further.

[0065] The locking means is preferably arranged at a front segment of the sliding frame, preferably at the position of a corner of the sliding frame. The advantage hereof is based on the insight that the profiles are preferably connected to each other in mitred manner. At the position of the corner of the sliding frame with profiles coupled in mitred manner the inner space of each of the profiles coincides. This space can be utilized optimally by providing the locking means and the base at the position of the corner. This further has the advantage that the actuator and the connecting means are connectable directly to the base and the locking means.

[0066] The lock preferably comprises a plurality of locking provisions which are arranged distributed relative to the structure. This allows the sliding frame to be locked at multiple locations.

[0067] The base preferably has an outer dimension adapted to fit in an opening of the profile.

Claims

1. A slat control system (100) configured to control the tilting of two or more slats (210) which are mounted tiltably in an opening of a slat frame (200), the slat control system (100) comprising at least two coupling pieces (110) and an operating means (150), wherein each of the at least two coupling pieces is couplable at a first outer end (D1) to a lateral side of one of the two or more slats and is couplable at a second outer end (P2) to the operating means (150) so that the operating means extends along the two or more slats and is configured to tilt the two or more slats substantially synchronously between a first tilting position and a second tilting position when the operating means moves, wherein in the first tilting position the slats close the opening of the slat frame and in the second tilting position the slats leave the opening of the slat frame at least partially open.

2. The slat control system (100) according to the foregoing claim, wherein each coupling piece (110) comprises a first coupling piece part (120) and a second coupling piece part (130), wherein the first and the second coupling piece part are connectable for relative rotation about a shaft and are each provided with a mounting means (121; 131) which is configured to mount the first coupling piece part (120) and the second coupling piece part (130) on respectively the operating means and one of the two or more slats.

3. The slat control system (100) according to the foregoing claim, wherein the mounting means (121, 131) is provided with one or more protrusions (121a, ..., 121e; 131a...131c) which extend from the mounting means in a direction radially of an outer surface of the mounting means.

4. The slat control system (100) according to the foregoing claim, wherein each protrusion (121a, ..., 121e; 131a...131c) comprises an insertion surface and a stop surface, wherein the stop surface lies at right angles to the outer surface of the mounting means and the insertion surface lies at an oblique angle to the stop surface and the outer surface, wherein the insertion surface is directed toward the outer end of the respective coupling piece part.

5. The slat control system (100) according to any one of the foregoing claims 3-4, wherein a plurality of protrusions, which are arranged distributed over the outer surface of the mounting means, are provided.

6. The slat control system (100) according to any one of the foregoing claims, wherein the first coupling piece part is provided at a proximal outer end (P1) with a shaft (123); and wherein the second coupling piece part (130) is provided at a distal outer end (D2) with a shaft engaging means (132) which is configured to engage the shaft (123) of the first coupling piece part.

7. The slat control system (100) according to the foregoing claim, wherein the first coupling piece part (120) is provided at a proximal outer end (P1) with a recess comprising two opposite inner walls (123), wherein the shaft (122) has two shaft segments (122a, 122b), each extending partially into the recess from a respective inner wall; and wherein the shaft engaging means (132) is provided to extend between the two shaft segments and comprises on either side two cavities (133) which are each configured to receive one of the two shaft segments.

8. The slat control system (100) according to the foregoing claim, wherein each shaft segment (122a, 122b) comprises an outer surface having an at least partially circular cross-section, and wherein the two cavities (133) comprise an inner wall which is shape-compatible with the outer surface of the shaft segment.

9. The slat control system (100) according to the foregoing claim, wherein the outer surface of each shaft segment comprises at least one cut-out portion which forms a stop surface (124) extending along a longitudinal axis of the shaft segment, and wherein the inner wall has a flat portion (136) compatible with the stop surface.

10. The slat control system (100) according to any one of the claims 7-9, wherein each shaft segment comprises at a distal outer end a first surface (125) which is oriented transversely of a longitudinal direction of the shaft segment and comprises a second surface (126) which lies at an angle to the first surface so that the second surface is directed outward relative to the recess.

11. The slat control system (100) according to any one of the foregoing claims 7-10, wherein the two cavities (133) are bounded at least partially by a rib (134), wherein the rib is configured to extend over an edge of the inner walls.

12. The slat control system (100) according to any one of the foregoing claims 2-11, wherein the operating means is a hollow profile with two or more mounting openings which are provided for mounting a mounting means in.

13. The slat control system (100) according to the foregoing claim, wherein the two or more mounting openings are placed at a regular pitch distance from each other.

14. The slat control system (100) according to any one of the foregoing claims, further comprising a damping means (140) which is mountable on the slat frame and is connectable to one of the two or more slats, wherein the damping means is configured to damp a tilting movement of the slat, wherein, optionally, the damping means is connected to the slat via a gear transmission.

15. A slat frame comprising a plurality of slats which are mounted tiltably in an opening of the slat frame, wherein two or more slats are connected for mutual control via a slat control system 100 according to any one of the foregoing claims.

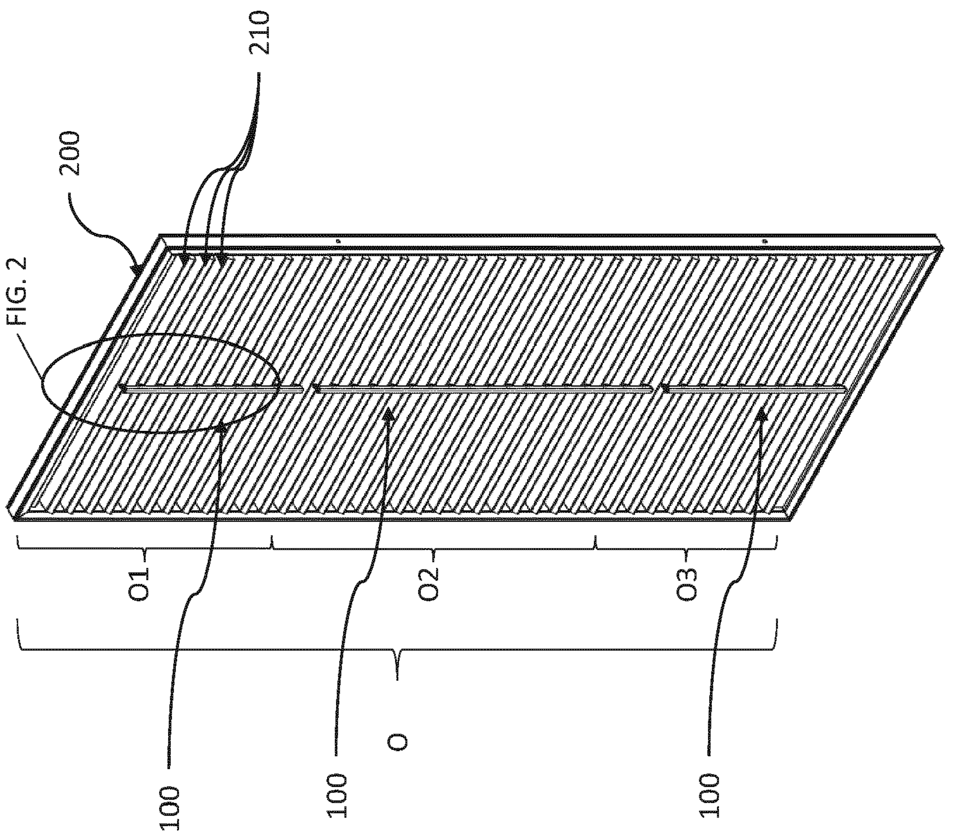


FIG. 1

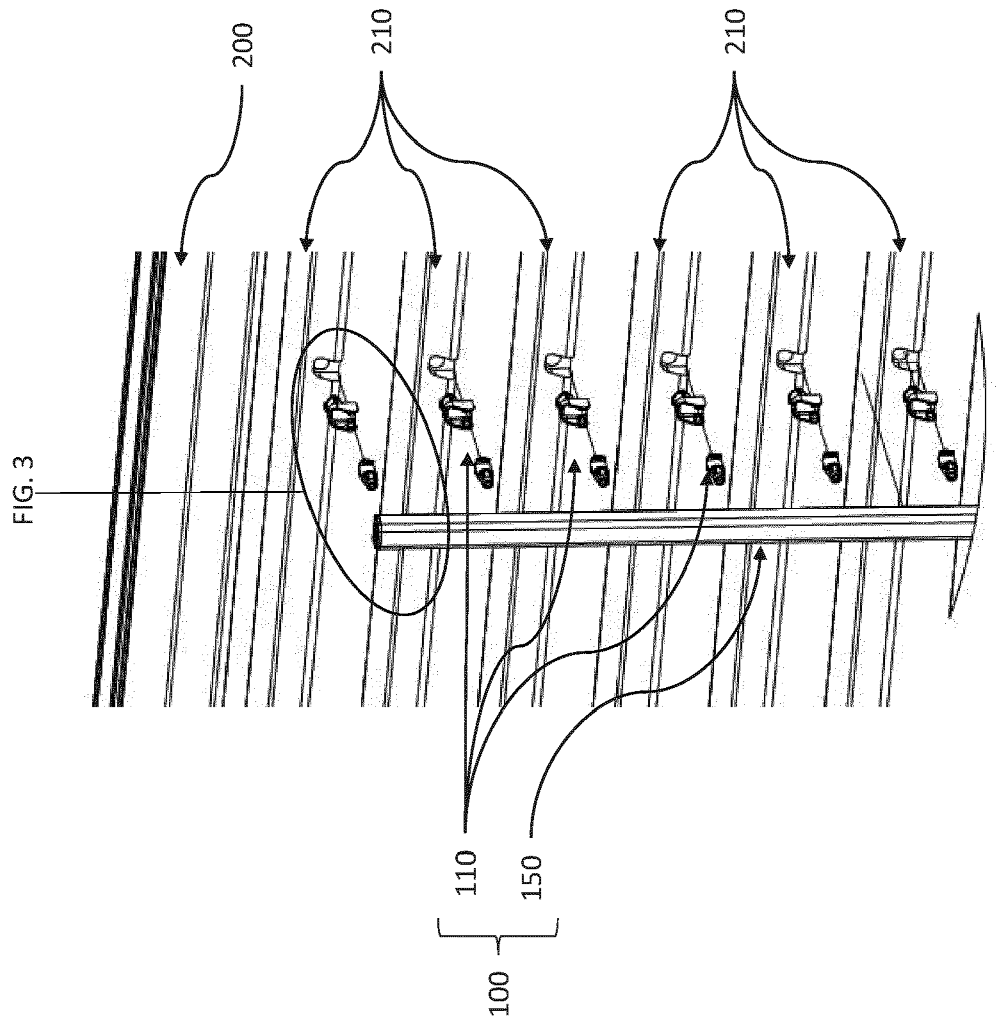


FIG. 2

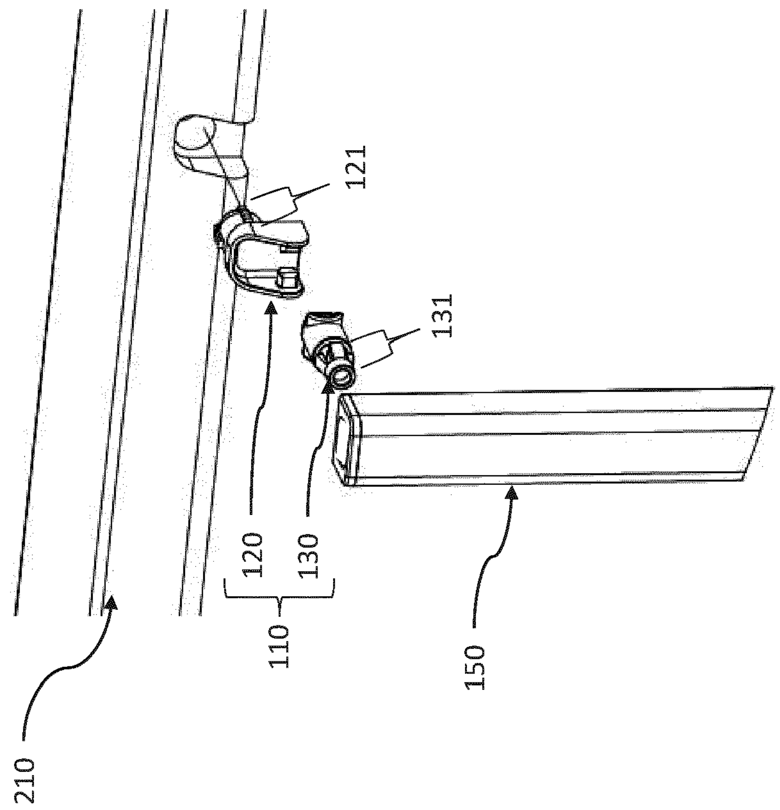
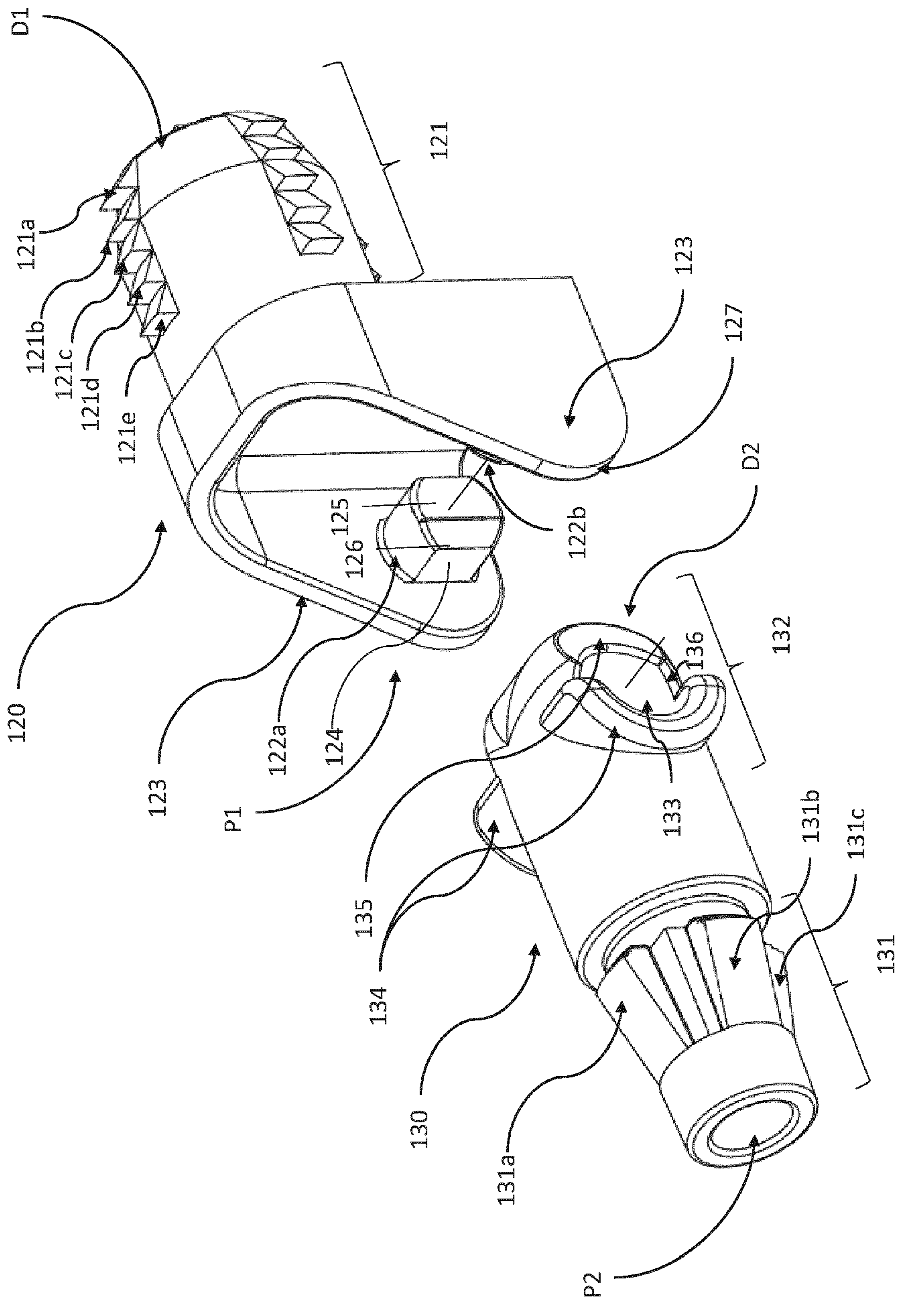


FIG. 3


D1
121
121a
121b
121c
121d
121e
123
127
120
125
126
122b
D2
123
122a
124
P1
132
136
133
135
134
131b
131c
131
130
131a
P2

110

FIG. 4

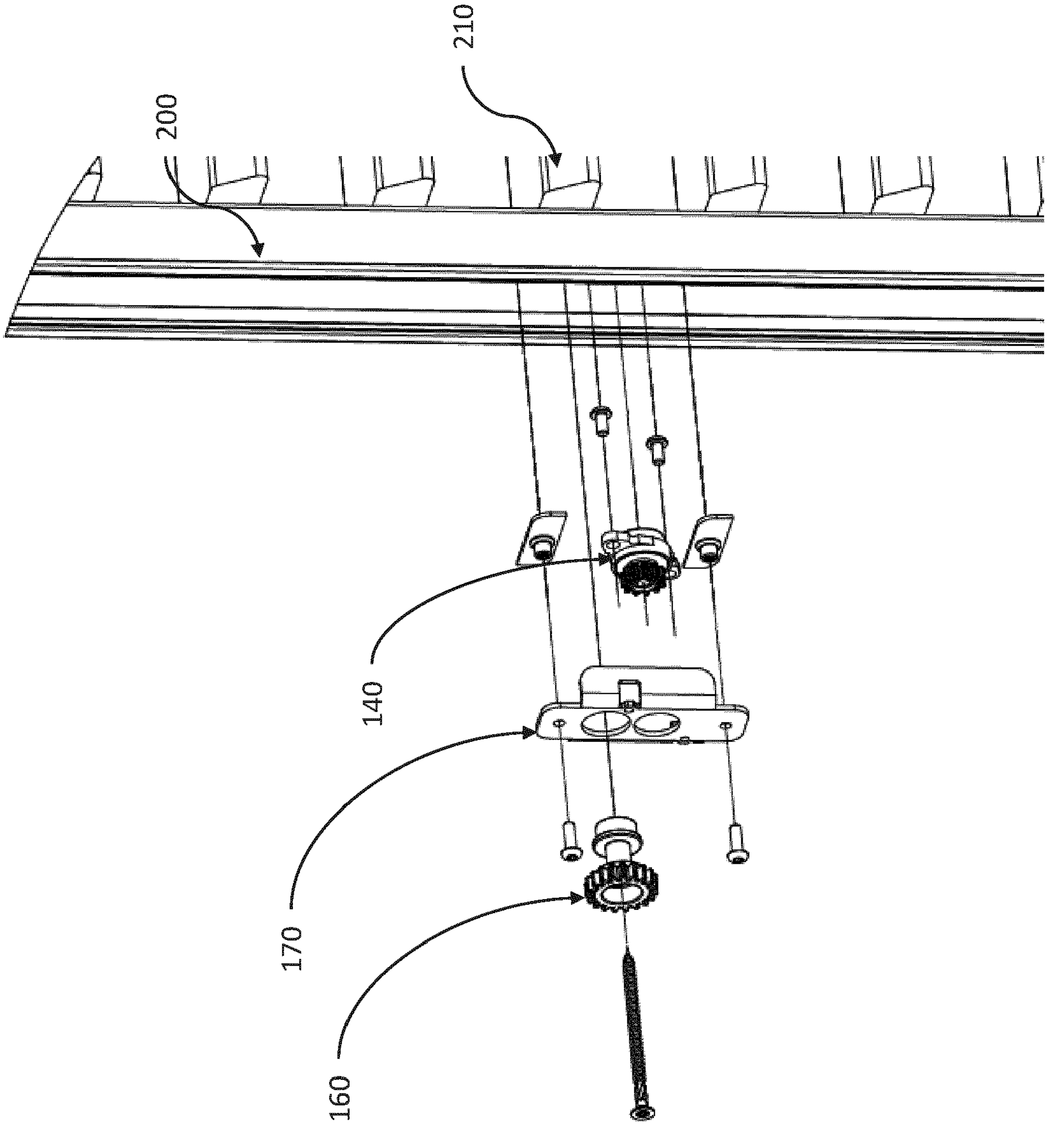


FIG. 5

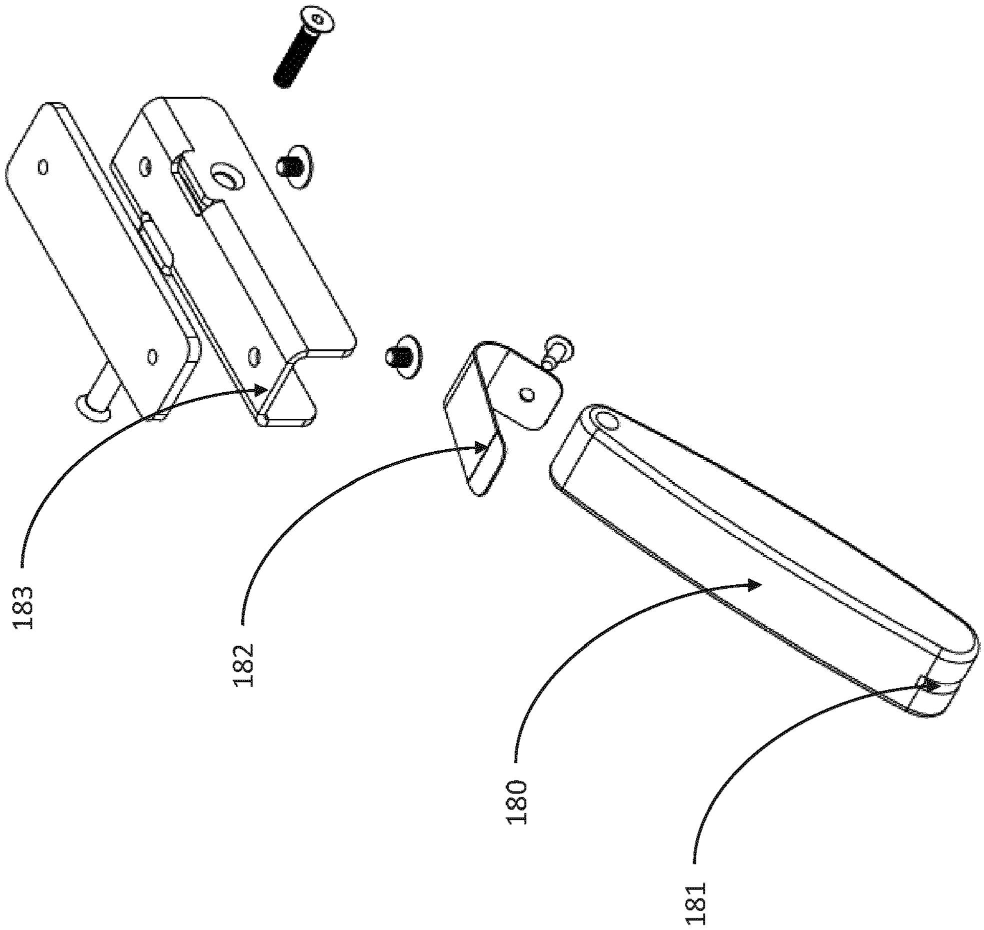


FIG. 6

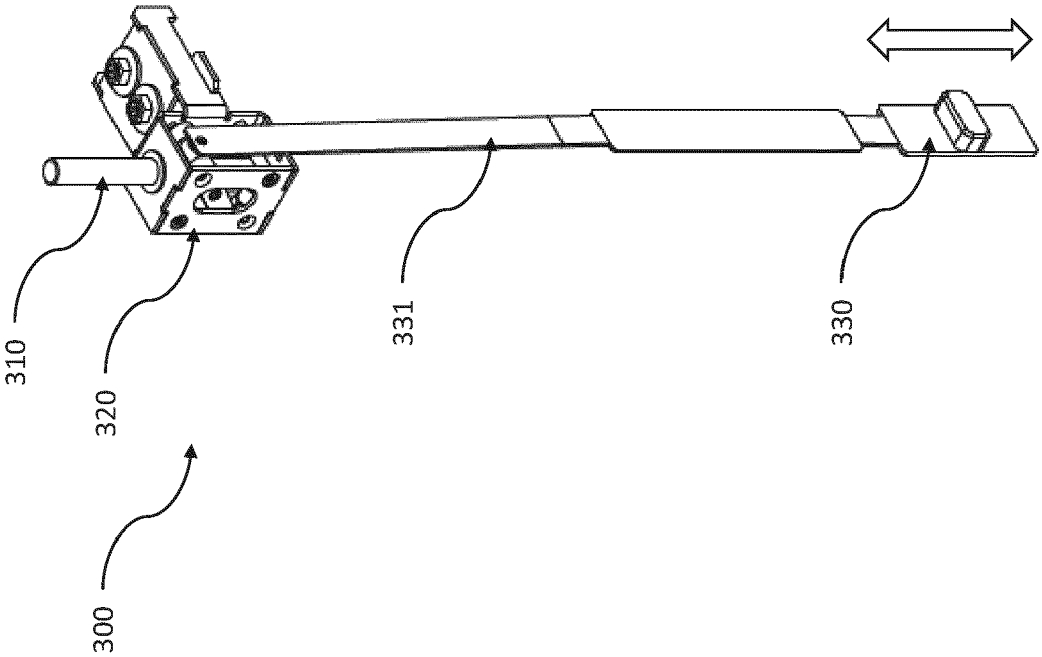
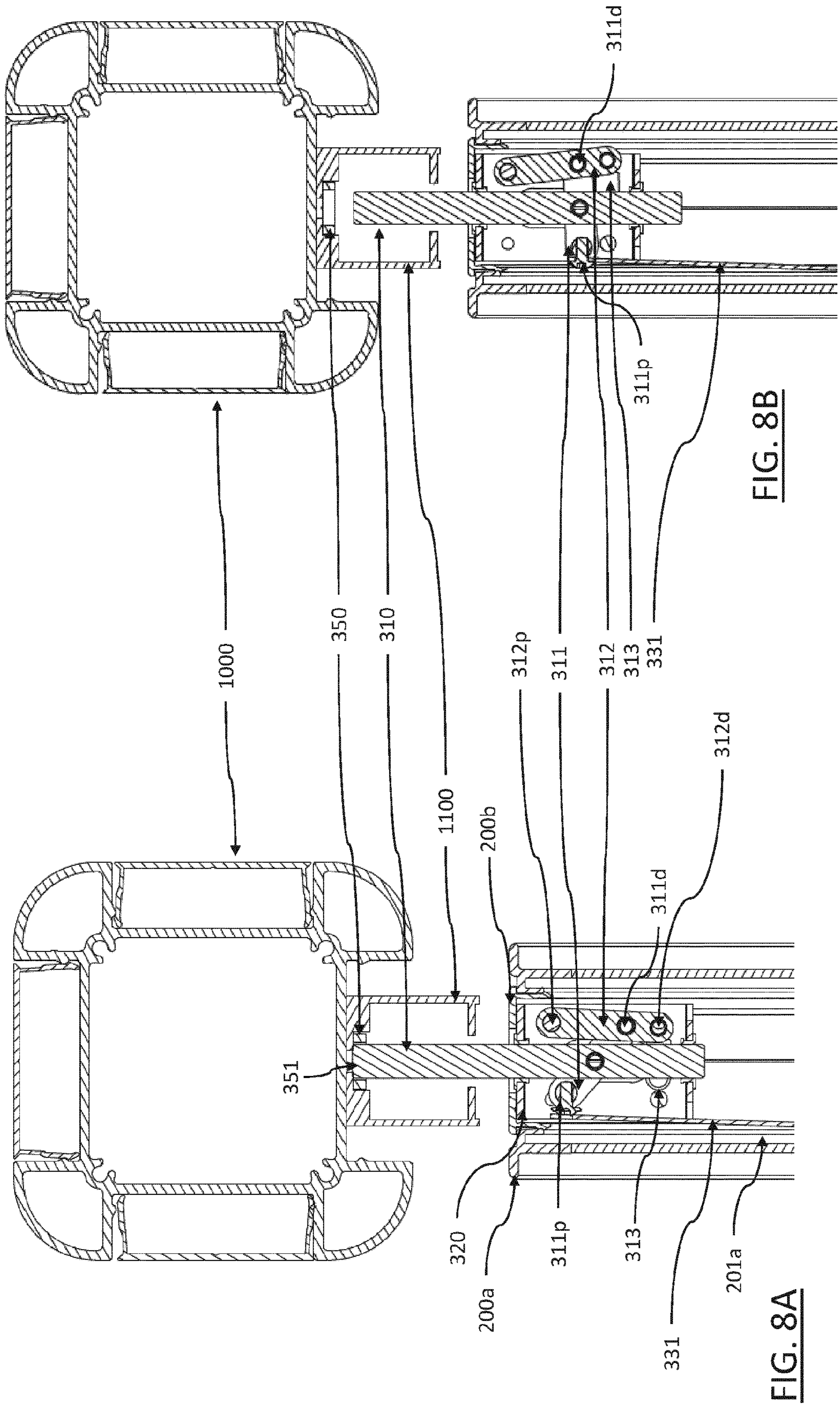


FIG. 7



1000
350
310
1100
312p
311
312
313
331
311d
311p
200b
351
312d
320
200a
201a

FIG. 8A

FIG. 8B

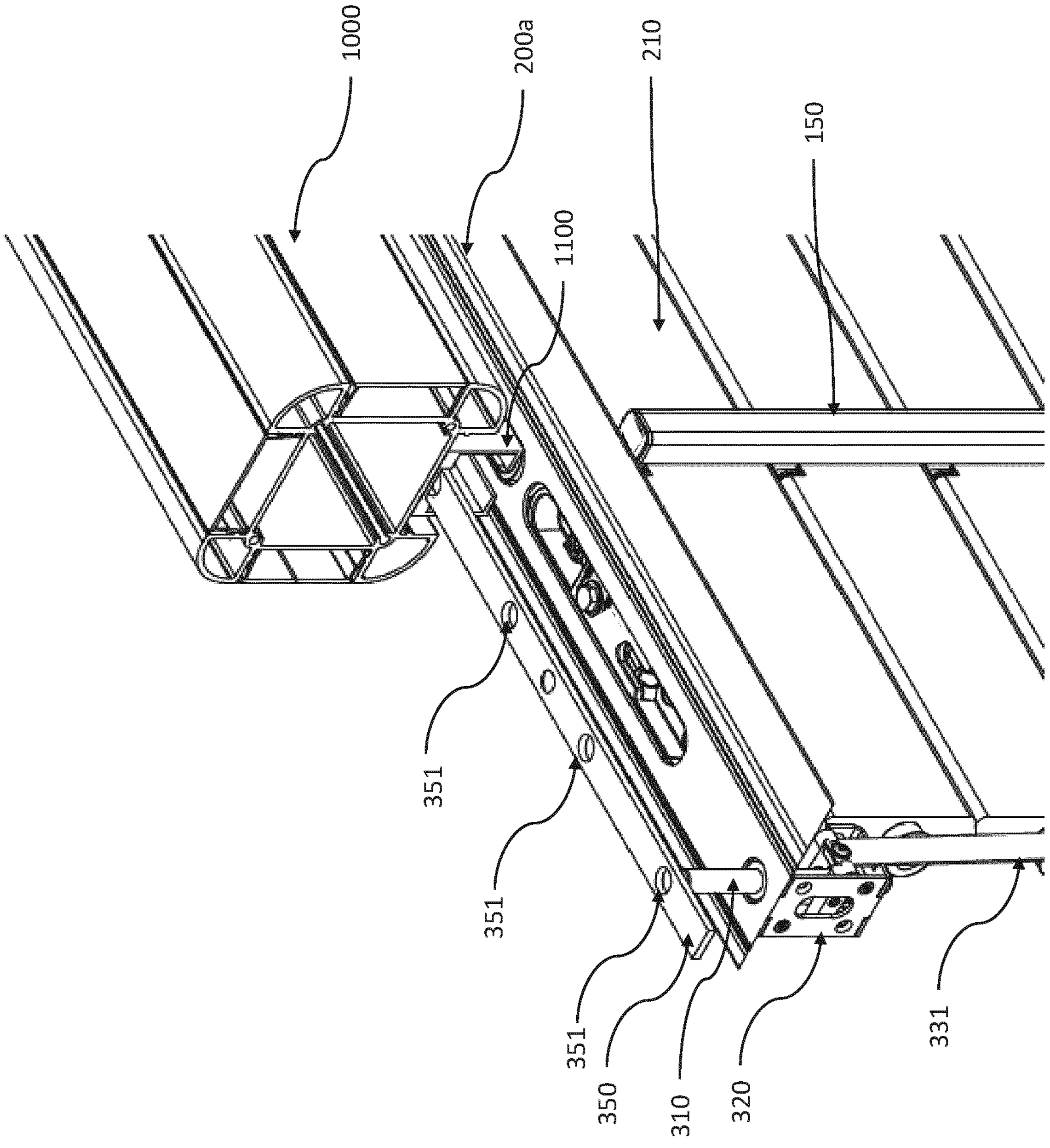


FIG. 9

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EUROPEAN SEARCH REPORT

Application Number
EP 23 15 8421

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 A	US 2004/025438 A1 (MAROCCO NORBERT [CA]) 12 February 2004 (2004-02-12) * paragraphs [0045] - [0061]; figures 2, 5-8 *	1-6, 12-15 7-11	INV. E06B7/086
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Y	EP 1 873 345 A1 (NIEN MADE ENTPR CO LTD [TW]) 2 January 2008 (2008-01-02) * paragraph [0018]; figures 5, 9A-9B *	14	

TECHNICAL FIELDS SEARCHED (IPC)

E06B
E04F
E05B

The present search report has been drawn up for all claims

1

Place of search	Date of completion of the search	Examiner
Munich	21 June 2023	Kofoed, Peter

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21-06-2023

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