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(54) **Locking assembly**

(57) A locking mechanism for a door or window has a plurality of locking bolts, an actuation mechanism for actuating the locking bolts, and at least one roller catch. the roller catch is moveable independently of the actuation mechanism thus automatically securing the door closed independently of the locking bolts and actuation mechanism. <Figure 3>

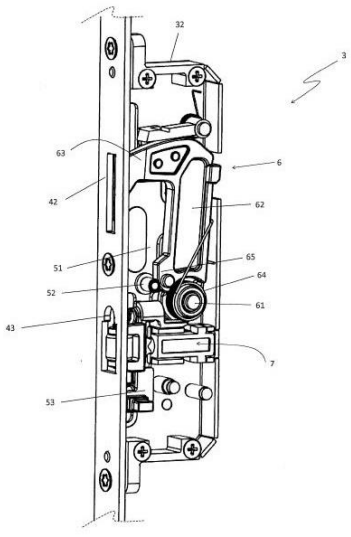

FIGURE 3

Locking Assembly

Field of Invention

The following invention relates to locking assemblies for doors and windows. More specifically, the invention relates to multi-point locks (MPLs) for doors and windows.

Background

Multi-point locks (MPLs) are well-known for use in securing doors and windows, and are particularly common in modern extruded PVC doors, although they are also used for timber, metal and composite doors. MPLs have multiple locking bolts which are engaged when the door (and thus the locking mechanism) is locked by a user.

More recently, it has become desirable for the locking mechanisms of MPLs to engage automatically when a door is closed. An example of such a locking mechanism for an MPL is described by the present Applicant in GB 2564225 A. The locking mechanism has a central gearbox which is connected to remote locking units, which in turn have additional locking bolts which are engaged when the door is closed.

Furthermore, there is increasing demand for locking mechanisms for MPLs which do not comprise a handle, or at least which are not manually actuated by a user via the handle. A number of MPLs are on the market which comprise a series of locking bolts and latch bolts, all of which are retractable via the key only.

Summary of Invention

The present inventors have identified that one problem with many existing locking mechanisms is that the force required to retract the locking bolts and latch bolts is very high. In locking mechanisms in which the locking bolts and latch bolts are retractable via the key only, all of this force must be transferred through the key. This can cause difficulties for users when turning the key. This can also require keys to be relatively bulky, in order to provide a sufficiently large area for the user to hold the key firmly when applying a significant force through the key, and to give the key adequate torsional strength and leverage.

The present invention attempts to resolve or ameliorate one or more of the problems with locking mechanisms for windows and doors, or provide a useful alternative.

According to a first aspect of the invention, there is provided a locking mechanism for a door or window. The locking mechanism may comprise a plurality of locking bolts. The locking mechanism may comprise an actuation mechanism for actuating the locking bolts. The locking mechanism may comprise at least one roller catch. The at least one roller catch may be moveable independently of the actuation mechanism.

The locking mechanism may be fittable to a door or window leaf. The locking mechanism may be fittable to a leading edge of the door or window leaf. The locking mechanism may be configured to engage the adjacent door or window frame when the door or window is in the closed position.

The invention is advantageous, since it provides a high level of security thanks to multiple locking bolts which can be actuated (i.e. extended and retracted) via the actuation mechanism. Furthermore, the at least one roller catch is able to retain the door or window leaf in a desired position e.g. wherein the locking bolts are aligned with a keep or formation in a door or window frame. Since the roller catch is moveable independently of the actuation mechanism, there are fewer components to move during retraction of the locking bolts. Thus, the force required to retract the locking bolts and thereby unlock or open the door or window is significantly reduced in comparison to existing locking mechanisms in which one or more latch bolts must also be retracted. This, in turn, can make the locking mechanism easier for a user to actuate.

The Inventors have realised that by using one or more roller catches to perform the function of one or more of the latch bolts within an MPL, the need for latch bolts is reduced, or even negated. Since latch bolts comprise a spring which must be overcome in order to retract the latch bolts, reducing the number of latch bolts within the mechanism significantly reduces the force required to unlock the locking mechanism. Latch bolts are typically useful in MPLs since they can be used to apply a lateral force to pull a door into alignment with a frame and thus provide compressive force on compression seals and gaskets extending around the perimeter of a door frame. As described by the present Applicant in GB 2564225 A, the latch bolts can also

be used to improve alignment of locking bolts with a keep e.g. to counter warping of the door. Typically, the lateral forces exerted by a roller catch on a door are lower than latch bolts. However, the present inventors have found that a similar result is achievable with a reduced number of latch bolts by using roller catches, since the at least one roller catch can be configured to be able to apply the necessary lateral forces to compress the seals and provide alingment.

The locking bolts may comprise hook bolts, straight bolts, rotating bolts, or any other form of locking bolt and combinations thereof. The locking bolts may be deadbolts. Hook bolts may be particularly advantageous, since they may be at least partially gravity powered, and thus easier to actuate (i.e. extend and retract). Combinations of different forms of locking bolt may be advantageous, since it may be more difficult for an attacker to overcome multiple types of locking bolt within a single locking mechanism.

In a series of embodiments, the actuation mechanism may be an automatic actuation mechanism. The automatic actuation mechanism may comprise a trigger to initiate actuation of the locking bolts. That is, activation of the trigger causes the locking bolts to move from a retracted position to an extended position. Activation of the trigger may comprise depressing a trigger portion. Alternatively, activation of the trigger may comprise a magnetic mechanism and/or an electronic sensor. In some embodiments, the automatic actuation mechanism may be configured to retract the plurality of locking bolts using a key. For example, the actuation mechanism may be configured so that the rotation of a door handle is not required to retract the locking bolts. In such embodiments, since the force required to unlock the door or window is reduced as noted above, a user need only apply a lesser force to the key. Since the roller catches are independent of the actuation mechanism, they can be overcome simply by pushing or pulling on the door itself without requiring their retraction in advance.

The locking mechanism may further comprise a faceplate e.g. an elongate faceplate. The faceplate may connect the plurality of locking bolts and the at least one roller catch. In some embodiments, the faceplate may form part of a gearbox housing or locking unit housing. The gearbox housing or locking unit housing may contain at least part of the actuation mechanism. In such embodiments, connecting the plurality of locking bolts and the at least one roller catch allows for simpler installation in a door or

window assembly, since the need for fixing and aligning multiple discrete components is negated.

In some embodiments, the locking mechanism may comprise a gearbox and one or more remote locking units spaced along the faceplate and apart from the gearbox. The gearbox may comprise one or more of the locking bolts and/or the one or more remote locking units may comprise one or more of the locking bolts. In some embodiments, each of the gearbox and remote locking units comprises a locking bolt. The at least one roller catch may be located in the gearbox and/or the one or more remote locking units. In some embodiments, a roller catch may be located adjacent to one or more of the locking bolts or each of the locking bolts.

The roller catch may be moveable between a first position and a second position. In the first position, the roller catch may project from the faceplate. For example, the roller catch may be moveable between an extended position and a depressed position. The roller catch may be moveable in a direction perpendicular to the length and width of the faceplate. In the second position, the roller catch may project from the faceplate a lesser amount than in the first position. Alternatively, in the second position, the roller catch may be located so that it does not project from the faceplate. For example, in the second position, the roller catch may lie flush with the faceplate or be depressed into the gearbox housing or locking unit housing.

In some embodiments, the first position of the roller catch may be adjustable relative to the faceplate. The roller catch may be adjustable so that the extended position is closer to or further from the faceplate. For example, the projection or extension of the roller catch may be adjustable. In some embodiments, the length of the roller catch may be adjustable.

The locking mechanism may further comprise a limiter. The limiter may be configured to limit movement of the roller catch beyond the faceplate. The limiter may be adjustable. The limiter may be configured so that adjusting the limiter adjusts the first position of the roller catch. In other words, the limiter may be configured to limit the projection of the roller catch. The limiter may comprise a stop portion. The stop portion may limit the movement of the roller catch relative to the faceplate.

The limiter may be connectable to the roller catch. The limiter may comprise a stop portion connectable to the roller catch by a threaded member. The stop portion may engage a surface of the faceplate to prevent movement of the stop portion beyond the faceplate. The limiter may be moveable in the lengthwise direction of the roller catch by adjusting the threaded member. Thus, the extended position of the roller catch may be adjustable by adjusting the limiter e.g. via the threaded member. Alternatively, the limiter may be connectable to the faceplate, and the stop portion may engage a surface of the roller catch to prevent movement of the surface of the roller catch beyond the stop portion.

In some embodiments, the limiter may comprise a support. The support may comprise a foot. The support may comprise a support surface. The foot may be configured to bear upon and/or slide upon the support surface, for example, the support may bear upon a guide housing of the roller catch. The support may be configured to transfer a force applied to the stop portion to the support surface. The support may connected to the threaded member and may be configured to prevent damage to the threaded member. In some embodiments, the limiter may be offset relative to the axis of the roller catch. The support may be configured to prevent twisting of the roller catch caused by the offset between the axis of the roller catch and the limiter.

The roller catch may comprise a biasing means. The biasing means may be configured to bias the roller catch into the first position. The biasing means may be configured to apply a biasing force in an axial direction along the axis of the roller catch.

The biasing means may be overcome, and the roller catch depressed, by applying a force to the roller catch in the direction opposite to the force applied by the biasing means. The biasing force may be in a direction perpendicular to the plane of the faceplate. The biasing means may comprise a spring, such as a compression, extension, or torsion spring.

The roller catch may comprise a guide housing and a catch portion. The catch portion may be receivable within the guide housing. The catch portion may be moveable relative to the guide housing. The biasing means may be configured to act between the roller catch and the guide housing.

The catch portion may comprise a rotatable bearing. The rotatable bearing may be cylindrical or spherical or any other suitable shape. The catch portion may comprise a bracket to retain the bearing. The catch portion may comprise a shaft portion connected to the rotatable bearing e.g. via the bracket.

The guide housing may comprise a channel configured to receive the shaft portion. The channel may receive the biasing means. For example, the channel may be provided with a spring for applying a biasing force to the catch portion. The shaft may comprise a shoulder for engaging the biasing means.

The guide housing may be formed from a plastics material. The guide housing may be moulded, such as injection moulded.

The guide housing may comprise a first housing portion and a second housing portion. The first and second housing portions may comprise connectors for connecting the first and second housing portions to each other. The first and second housing portions may each comprise part of the channel for receiving the shaft portion. The connectors may comprise one or more projecting formations configured to interlock with corresponding formations on the other housing portion.

The locking mechanism may further comprise at least one gearbox housing or remote locking unit housing. The gearbox housing or locking unit housing may house or comprise at least one of the locking bolts and the at least one roller catch. Such embodiments are advantageous, since providing a roller catch adjacent to a locking bolt within a remote locking unit ensures alignment of the locking bolt with a keep, since the roller catch can pull the door into alignment. Combining both parts into a remote locking unit also aids installation, as discussed above, since only a single object needs to be installed.

The guide housing may comprise at least one locating tab for locating and/or securing the guide housing e.g. within a gearbox housing or locking unit housing. The locating tab may be located on one or both housing portions. The locating tab may be configured to be received within an aperture or recess in a housing body e.g. a gearbox housing or locking unit housing. Alternatively, the guide housing may be provided with

a locating recess for receiving a locating tab provided in a gearbox housing or locking unit housing.

In some embodiments, the locking mechanism does not include a latch bolt. A door or window leaf can be held in a desired position (e.g. wherein the locking bolts are aligned with a keep or formation in a door or window frame) solely by the at least one roller catch. By avoiding the need for a latch bolt, the force required to unlock or open the door or window is significantly reduced, and the locking mechanism is easier for a user to actuate.

According to a second aspect of the invention, there is provided a keep for a locking assembly. The keep may comprise a first body portion and a second body portion. The second body portion may be moveable relative to the first body portion. The second body portion may be provided with a recess for receiving a roller catch.

In use, the keep may be securable to a door or window frame or jamb. Thus, the recess may be moveable relative to the roller catch in use. The recess may be configured to releasably retain the roller catch. Thus the alignment of the locking mechanism may be adjustable relative to the keep by adjusting the position of the second body portion.

The keep may comprise a ramp surface adjacent to the recess for engaging a roller catch of a locking mechanism. The ramp surface may be configured to depress the roller catch. For example, in use, the ramp surface may be configured to depress the roller catch as the locking mechanism aligns with the keep (i.e. as the door or window is closed). The ramp surface may be provided on the second body portion. The ramp surface may be moveable relative to the first body portion.

The recess may comprise a second ramp surface. The recess and/or the second ramp surface may be configured to depress the roller catch when the locking mechanism is moved out of alignment with the keep e.g. as the door or window is opened.

According to a third aspect of the invention, there is provided a locking assembly comprising the locking mechanism and the keep described herein.

Brief Description of the Figures

Embodiments of the invention will now be described, by way of example only, with reference to the following drawings, in which:

Figure 1 is a side view of a multi-point lock;

Figures 2A and 2B are end-on and perspective view of the region A of Figure 1;

Figure 3 is the perspective view of Figure 2B with a cover plate removed;

Figure 4 is a perspective view of a roller catch;

Figure 5 is a perspective view of a roller catch with part of a guide housing removed; and

Figure 6 is a perspective view of a keep.

Specific Description

It will be understood that the use of terms such as vertical, horizontal, left, right etc. are for descriptive purposes only to aid comprehension, and thus do not preclude alternative orientations or configurations of the disclosed invention.

Turning now to Figure 1, there is shown a multi-point lock 1. The multi-point lock 1 has a central gearbox 2 and a pair of locking units 3, connected to the gearbox 2 via faceplate 4 and drive bars 8. The gearbox 2 comprises a locking bolt (not shown) and houses an automatic actuation mechanism for firing the locking bolt when the trigger 5 is depressed. Similarly, each of the locking units 3 comprise locking bolts (6, Figures 2A & 3) which are actuated simultaneously by the automatic actuation mechanism. In other words, activation of the trigger 5 causes the locking bolts 6 to move from a retracted position to an extended position in which opening of a door or window leaf is prevented. Each of the locking units 3 and the gearbox 2 are provided with a roller catch 7 located adjacent to the locking bolts 6. In the embodiment shown, the locking bolt in the gearbox 2 is a straight deadbolt, but any form of locking bolt (such as hook bolts) may be used.

Within the gearbox 2 is an automatic actuation mechanism, similar to that described by the present Applicant in GB 2564225 A. The automatic actuation mechanism comprises a gearbox drive plate, which is moveable vertically (i.e. in the direction Z of

Fig. 2A-B). The gearbox drive plate is retained in a primed position by the trigger 5. When the trigger 5 is depressed, it disengages the gearbox drive plate which then drops under the force of gravity or a biasing mechanism. The gearbox drive plate is connected to the locking bolt by a linkage, which drives the locking bolt outwards, into an extended (locked) position. Similarly, the gearbox drive plate is connected to upper and lower drive bars which connect to the automatic actuation mechanism within the remote locking units 3. The downward motion of the gearbox drive plate and the drive bars thus drives the locking bolts 6 into the extended (locking) positions.

To retract the locking bolts 6, a user inserts a key (not shown) into a cylinder lock (not shown) received within the gearbox aperture 21. The cylinder lock is connected to the gearbox drive plate, such that rotation of the cam of the cylinder lock via the key lifts the gearbox drive plate. As the gearbox drive plate rises, the motion of the locking bolt and the locking bolts 6 is reversed, and they are retracted within the gearbox 2 and locking units 3 respectively. The trigger 5 comprises a biasing means which engages the trigger to retain the gearbox drive plate in position once the gearbox drive plate has been lifted into alignment with the trigger. Thus the mechanism is automatically reset by retracting the locking bolts 6.

Turning now to Figures 2A, 2B, and 3, there is shown a locking unit 3. The locking unit 3 has a locking unit housing 30 formed from a housing box 32 and a cover plate 31. The cover plate 31 and housing box 32 are connected by screws 33. In Figure 3 the cover plate 31 has been removed to show the internal components.

The locking unit 3 is connected to the faceplate 4 by a pair of fasteners 41, with the faceplate 4 forming an end face of the locking unit 3. The faceplate 4 is provided with a first aperture 42 located adjacent to the locking bolt 6 and a second aperture 43 located adjacent to the roller catch 7. The first and second apertures 42, 43 are shaped so as to permit an end of the locking bolt 6 and roller catch 7 respectively to extend through the faceplate 4. A similar arrangement in the faceplate 4 is provided at the gearbox 2. The housing box 32 and cover plate 31 have a combined depth equal to the width of the faceplate 4 (i.e. in the X direction). In use, the locking unit 3 would be recessed into a leading edge of a door or window leaf, with the faceplate 4 lying flush with the door or window surface.

As shown in Figure 3, within the locking unit 3, there is a locking bolt 6, in the form of a pivoting hook bolt. The locking bolt 6 has a shaft 62 which has pivot 61 at a first end thereof. At an opposite end is provided a hook head 63, which extends away from the shaft 62 to form a hook shape. The pivot 61 is fixed relative to the cover plate and housing box 31, 32. The locking bolt 6 is pivotable around the pivot 61 between a first position, wherein the hook head extends through the first aperture 42, and a second position (as shown) wherein the locking bolt 6 is fully retracted and positioned within the locking unit housing 30.

Around the pivot 61 is provided a locking bolt biasing mechanism 64. The locking bolt biasing mechanism 64 is configured to apply a force to the locking bolt 6 and thereby bias it into the first position. In the embodiment shown, the locking bolt biasing mechanism 64 is formed by a torsion spring which bears upon the shaft 62.

The locking bolt 6 is retained in the second position by a projection 52 located on a drive plate 51. The drive plate 51 is moveable within the locking unit housing 30 in the direction Z, and is driven up and down by a drive bar 8. The drive bar 8 is connected to a first drive bar arm 53 provided adjacent a lower end of the locking unit housing 30. Thus, by moving the drive bars 8 up and down (in the direction Z), the drive plate 51 and projection 52 are moved in the same directions. The projection 52 contacts a drive surface 65 of the locking bolt 6 and either 'lifts' the locking bolt 6 i.e. rotates the hook bolt clockwise as pictured, or the projection 52 moves downwards and away from contact with the drive surface 65. Thus, the locking bolt biasing mechanism 64 is able to bias the locking bolt 6 into the first position e.g. by rotating the locking bolt 6 around the pivot 61 in the anti-clockwise direction (as shown).

Figure 3 shows an upper locking unit 3 located within region A of Figure 1. For a lower unit 3, internal configuration is the same as in the embodiment of Figures 2 and 3, with the exception of the drive bar 8 being connected to the drive plate 51 by a second drive bar arm provided at the opposite end of the locking unit housing 30. The drive bars 8 and the drive plate 51 form part of the automatic actuation mechanism configured to extend the locking bolts 6 wherein the trigger 5 is depressed.

Located within the locking unit housing 30 is a roller catch 7. The roller catch 7 is configured to operate independently of the locking bolt 6 and the automatic actuation mechanism, as will be described with further reference to Figures 4 and 5.

Figure 4 shows a roller catch 7, which has a first portion comprising a bearing 71, bearing axle 72 and bracket 73 for retaining the bearing axle 72 and bearing 71 in position. The rear face of the bracket 73 is connected to an elongate catch shaft 74. The catch shaft 74 is housed within a second portion of the roller catch, comprising a guide housing 75. The guide housing 75 is formed from a first housing portion 76a and second housing portion 76b which are connectable to each other via connecting portions 77, 78. The assembled guide housing 75 defines an internal channel 79 in which the catch shaft 74 is located. The channel 79 is closed at one end by an end wall 710 and is open at the opposite end for the catch shaft 74 to be inserted into. Within the channel 79 is a roller catch biasing means 711. In the embodiment shown, the roller catch biasing means 711 is a compression spring. The compression spring extends around the outside of the catch shaft 74 and contacts a shaft shoulder 712 at a first end of the spring and contacts the end wall 710 of the housing 75 at the opposite end of the spring. The first portion is moveable relative to the second portion against the biasing force of the roller catch biasing means 711. In use, the bearing will contact a surface which then applies a compressive force to the first portion of the roller catch. Thus, the first portion moves toward the end wall 710, and the overall length of the roller catch 7 is reduced, as shown in Figure 3. Once the force is removed from the bearing 71, the roller catch biasing means biases the roller catch into a default, extended position.

The housing 75 is approximately cuboidal in shape, with the first and second housing portions comprising side walls, upper wall portions and lower wall portions. The side walls are provided with a locating projection 713. The locating projection 713 extends from the surface of the housing and is configured to engage an opening 714 in the locking unit housing 30 (figure 2). The locating projection 713 has a rectangular profile (viewed end on) which corresponds with the rectangular shape of the opening 714. The engagement of the locating projection and the opening thus provide a simple mechanism by which to retain the housing 75 and thus the roller catch 7 in position within the locking unit 3.

The roller catch 7 is also provided with a limiter 720 by which the extension of the roller catch may be adjusted. The bracket 73 has a bracket shoulder 731 with an opening extending therethrough. The opening receives a threaded member 732, such as a grub screw or similar. The threaded member 732 is freely rotatable relative to the bracket shoulder 731. The limiter 720 engages the threaded member by a corresponding threaded region. Rotation of the threaded member 732 thus drives the movement of the stop portion 721 toward and away from the bracket shoulder 731. The limiter has a stop portion 721 which, in use, contacts an inner surface of the faceplate 4 and thus prevents further outward movement of the first portion of the roller catch 7. By adjusting the position of the stop portion 721 relative to the bearing 71, the length of the roller catch 7 projecting beyond the surface of the faceplate 4 can be adjusted. As shown in Figure 3, the second aperture 43 in the faceplate is shaped so that the head of the threaded member 732 is accessible when installed in a door or window leaf. The limiter 720 has a foot 723. The foot 723 is configured to bear on and slide upon the upper surface of the housing 75. Since the force applied by the roller catch biasing means 711 is offset relative to the threaded member 732, the force of the stop contacting the faceplate causes a twisting motion which can quickly wear the threaded member with repeat use. The foot 723 spreads some of the force applied to the limiter 720 onto the housing, and thus prevents excessive wear to the threaded member 732.

Turning now to Figure 6, there is shown a keep 200 for use with the multi-point lock 1. The keep 200 has a first body portion 210 and a second body portion 220. The first body portion 210 is elongate in shape and comprises a first connector hole 211 at each end for receiving a mechanism fastener for fixing the keep 200 to a door or window frame. The first body portion 210 has a first recess 212 which is configured to receive, in use, one of the locking bolts (not shown) of the multi-point lock (not shown).

The first body portion 210 has a raised region 213 and is provided with a strike plate 214. The strike plate 214 is curved and configured to extend around the edge of the door or window frame member. Thus, the strike plate 214 is the first portion of the keep which is contacted by the roller catch 7 in use. The raised region 213 has two second connector holes 215 which receive fasteners 216 for connecting to the second body portion 220. The raised region 213 is configured to receive the second body portion 220 underneath. The second connector 215 holes are elongate, and have their longest dimension aligned laterally of the keep 200. The second body portion 220 is thus

moveable relative to the first body portion 210 i.e. in the direction of the length of the second connector holes. The second body portion 220 can be fixed in location relative to the first body portion by tightening the mechanical fasteners 216.

The second body portion 220 has a recess 221 for receiving the roller catch 7 of the multi-point lock 1. The second body portion 220 is provided with a ramp surface 222. The ramp surface 222 is provided adjacent to the recess 221. The position of the ramp surface 222 can be adjusted relative to the first body portion 210 by moving the second body portion 220.

In use, the roller catch 7 of the multi-point lock 1 moves relative to the fixed keep 200 when a user closes the door or window leaf to which the multi-point lock is fixed. The bearing 71 of the roller catch 7 first contacts the strike plate 214 and is compressed/pushed inwards e.g. into the door or window leaf. The bearing 71 rides on the surface of the raised region until the bearing contacts the ramp surface 222 wherein the roller catch is further compressed. As the door continues to be closed by a user, the roller catch 7 comes into alignment with the recess 221, and projects thereinto under the biasing force of the roller catch biasing means 711. The internal surface of the recess 221 is angled, so that when the door is opened, the angled surface compresses the roller catch 7 without requiring prior retraction. The roller catch biasing means thus provides a small amount of force to pull the door/window leaf into alignment with the keep, and ensure that the locking bolts 6 are adjacent top their respective recesses 212. By moving the second body portion 220 relative to the first body portion 210, the alignment of the door/window leaf (when in the closed position) can be finely adjusted e.g. so as to align with any necessary seals and thus provide the desired weather sealing.

The inventors have found that the embodiment described herein is particularly advantageous for a number of reasons.

Compared to existing conventional MPLs, there is no need to have an external door handle. As described above with reference to Figure 1, the locking mechanism can be retracted using only a key, and can be engaged automatically simply by closing the door. In conventional MPLs, the door handle is turned by a user to drive the lock mechanism. As the locking bolts and/or deadbolts are extended, they engage the

edges of the keep and pull the door laterally against the compression seals to provide suitable weather proofing. In the present invention, the at least one roller catch has been found to provide sufficient lateral force to seal the door against any seals or gaskets.

Compared to automatic MPLs, such as those described by the present Applicant in GB 2564225 A, there is a lesser or no requirement to provide latch bolts in the current invention. Previously, the latch bolts were believed necessary in automatic MPLs in order to ensure alignment of the locking bolts and deadbolts with the keeps. Without the lateral force of the latch bolts, it was found that the locking bolts either did not engage the keeps properly, and thus the door was not secure, or that a strong spring mechanism was required to ensure the engagement of the locking bolts. Some users may find that the strong spring mechanism is difficult to retract using only a key.

Surprisingly, the present inventors have found that a sufficient force can be supplied by at least one roller catch such that the number of latch bolts can be reduced or the latch bolts omitted entirely. Roller catches are conventionally only used on internal doors or cabinet doors in order to loosely hold the door in a closed position. Where the conventional latching mechanism is replaced with roller catches, a user can simply push/pull the door to open/close it, while the door is still retained safely in the closed position when aligned with the keep. To unlock and open a door with a multi-point lock without a handle, it is necessary to retract all of the locking bolts (such as the hook bolts and straight deadbolts described above) and the latch bolts using only a key. Thus, since the roller catches are independent of the actuation mechanism and act just by pushing/pulling the door, they do not need to be retracted using the key. With fewer latch bolts (or no latch bolts at all) for the user to retract, the required force a user must apply through the key is reduced.

CLAIMS:

1. A locking mechanism for a door or window, the locking mechanism comprising:

a plurality of locking bolts and an actuation mechanism for actuating the locking bolts, and

at least one roller catch, the roller catch being moveable independently of the actuation mechanism.

2. The locking mechanism according to claim 1, wherein the actuation mechanism is an automatic actuation mechanism and comprises a trigger to initiate actuation of the locking bolts.

3. The locking mechanism according to claim 2, wherein activation of the trigger causes the locking bolts to move from a retracted position to an extended position.

4. The locking mechanism according to either preceding claim, further comprising a faceplate connecting the plurality of locking bolts and the at least one roller catch.

5. The locking mechanism according to claim 4, wherein the roller catch is moveable between a first position and a second position, wherein when in the first position, the roller catch projects from the faceplate.

6. The locking mechanism according to claim 5, wherein the first position of the roller catch is adjustable relative to the faceplate.

7. The locking mechanism according to claim 6, further comprising a limiter configured to limit movement of the roller catch beyond the faceplate.

8. The locking mechanism according to claim 7, wherein the limiter is adjustable, and configured so that adjusting the limiter adjusts the first position.

9. The locking mechanism according to any one of claims 5 to 8, wherein the roller catch comprises a biasing means configured to bias the roller catch into the first position.

10. The locking mechanism according to claim 9, wherein the roller catch comprises:

a guide housing and a catch portion receivable within and moveable relative to the guide housing.

11. The locking mechanism according to claim 10, wherein the guide housing comprises a first housing portion and a second housing portion, wherein the first and second housing portions comprise connectors for connecting the first and second housing portions to each other.

12. The locking mechanism according to any one of the preceding claims, further comprising at least one gearbox housing or locking unit housing, the gearbox housing or locking unit housing comprising at least one of the locking bolts and the at least one roller catch.

13. The locking mechanism according to claim 12 when dependent upon either claim 9 or 10, wherein the guide housing comprises at least one locating tab for locating and/or securing the guide housing within the gearbox housing or locking unit housing.

14. The locking mechanism according to any one of the preceding claims, wherein the automatic actuation mechanism is configured to retract the plurality of locking bolts using a key.

15. A keep for a locking assembly, the keep comprising a first body portion and a second body portion, wherein the second body portion is moveable relative to the first body portion and is provided with a recess for receiving a roller catch.

16. The keep according to claim 15, wherein the keep comprises a ramp surface adjacent to the recess for engaging a roller catch of a locking mechanism.

17. The keep according to claim 16, wherein the ramp surface is provided on the second body portion, and is moveable relative to the first body portion.

18. A locking assembly comprising the locking mechanism according to any one of claims 1 to 14 and the keep according to any one of claims 15 to 17.

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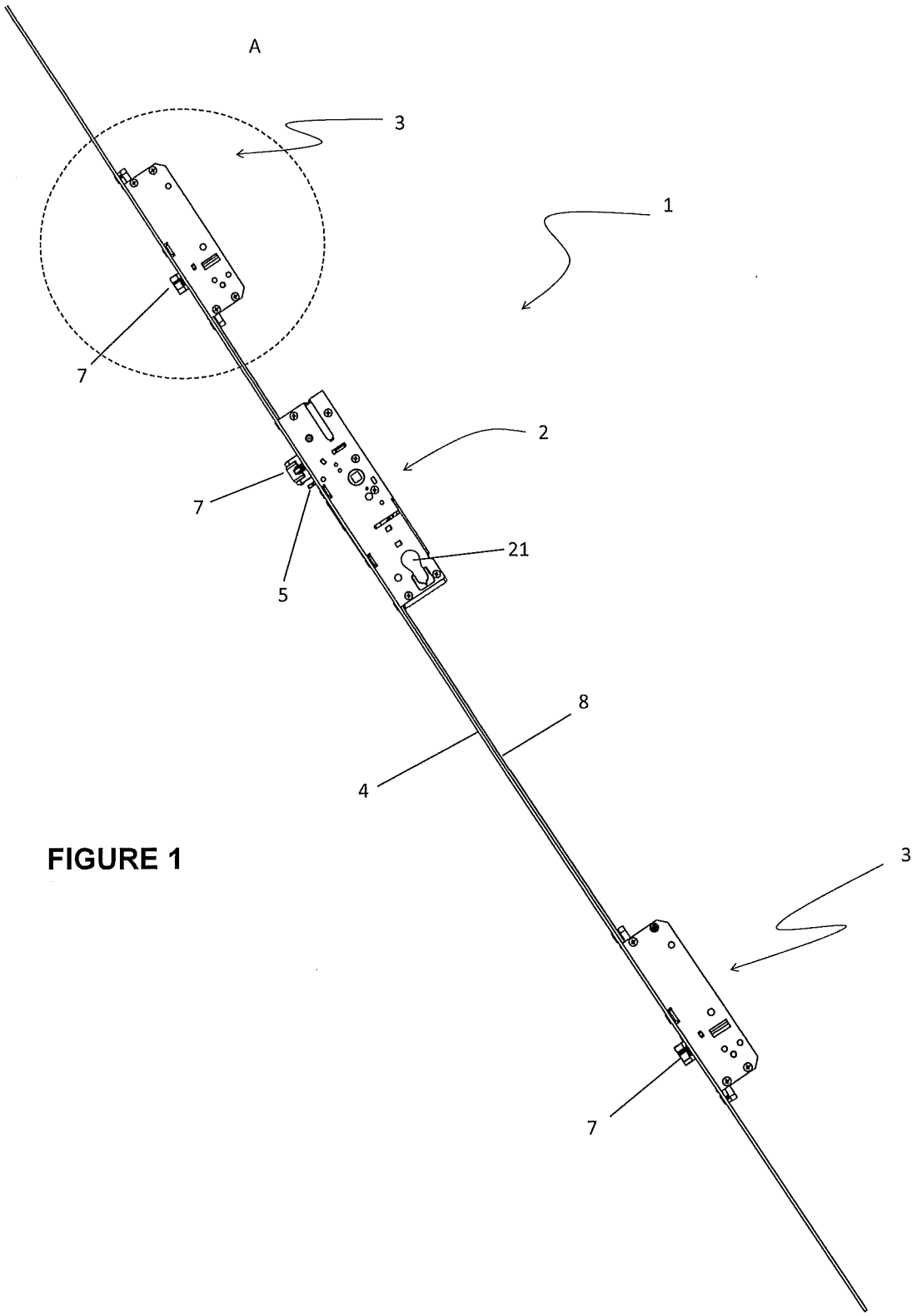

FIGURE 1

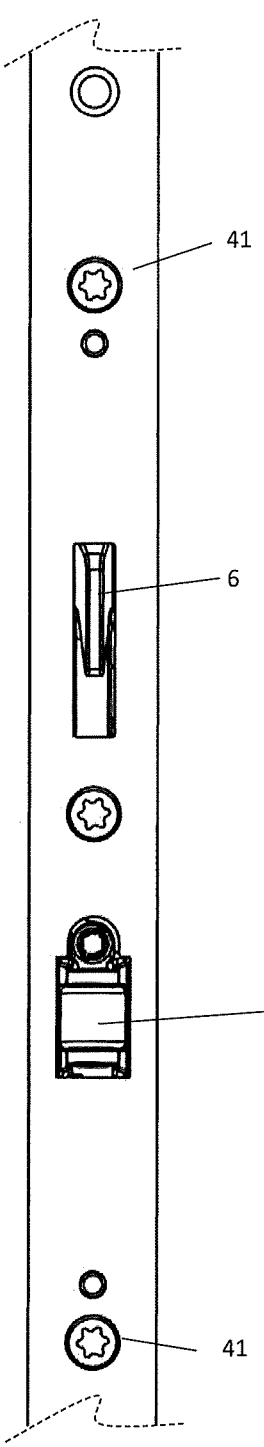

FIGURE 2A

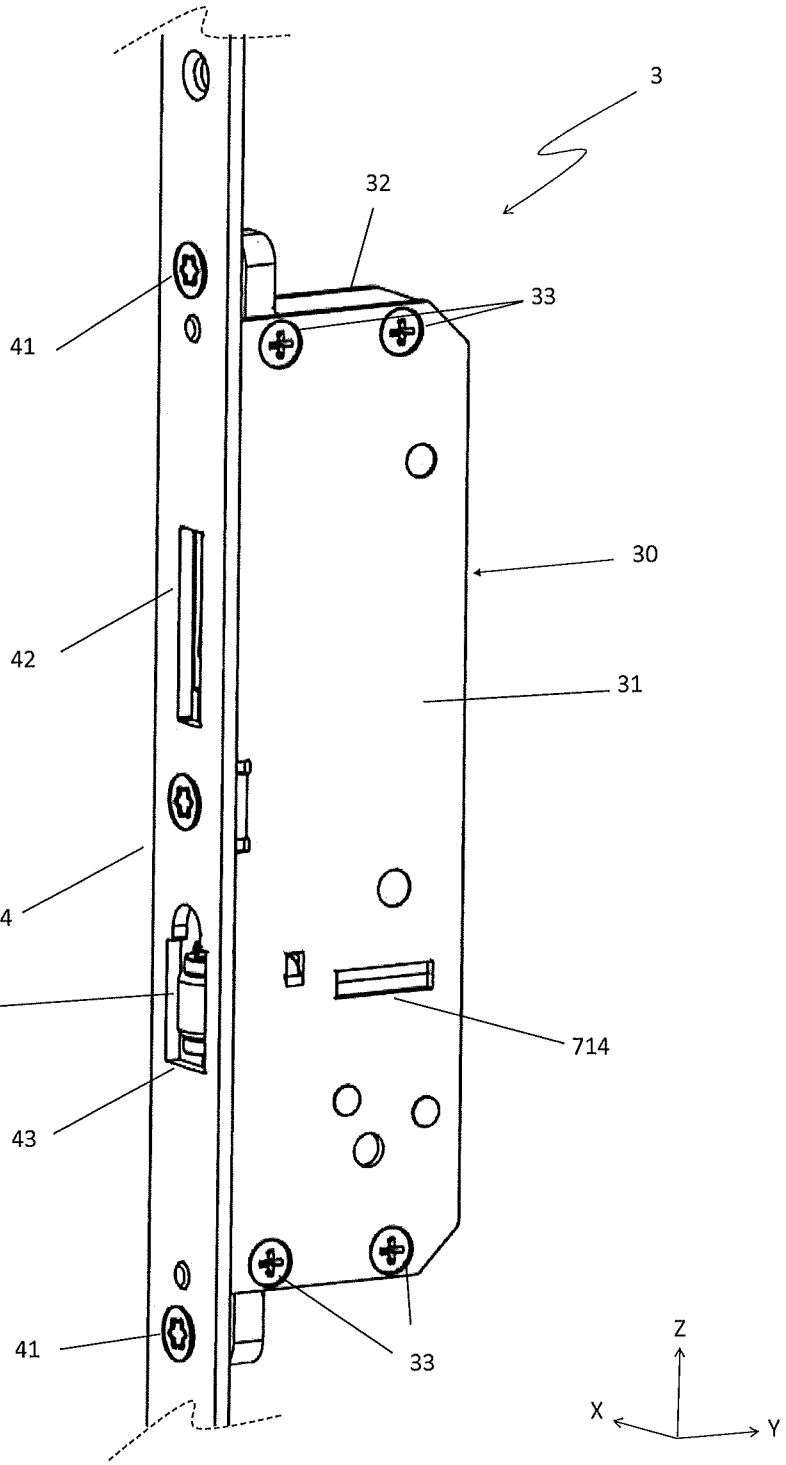

FIGURE 2B

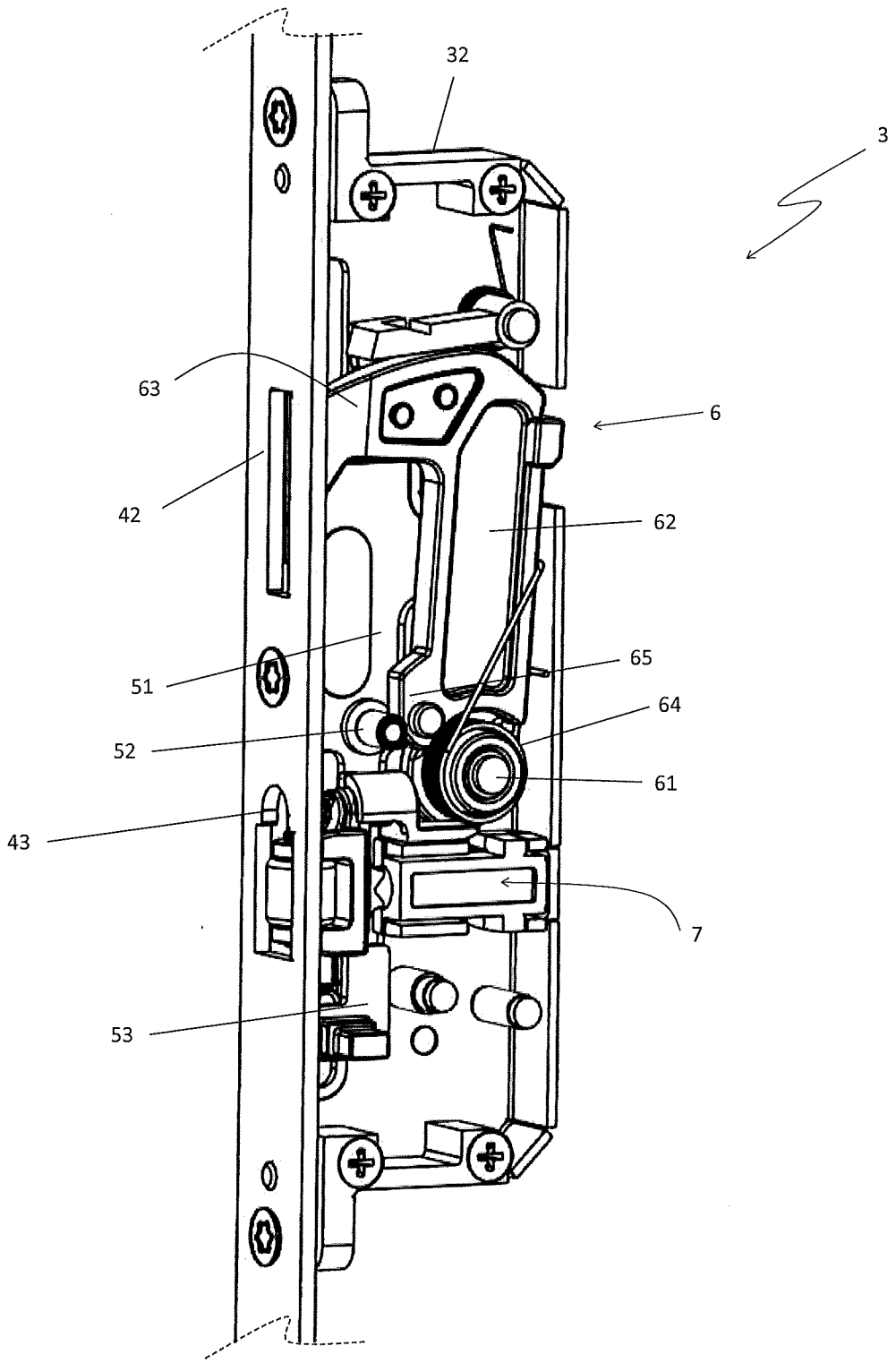

FIGURE 3

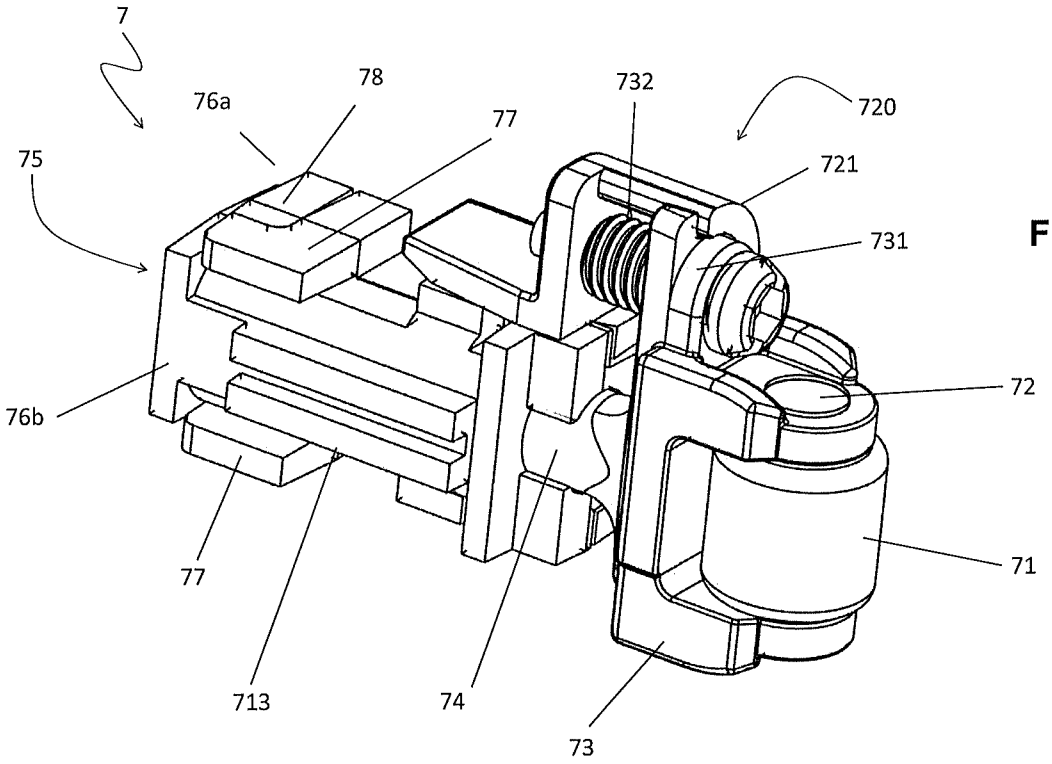

FIGURE 4

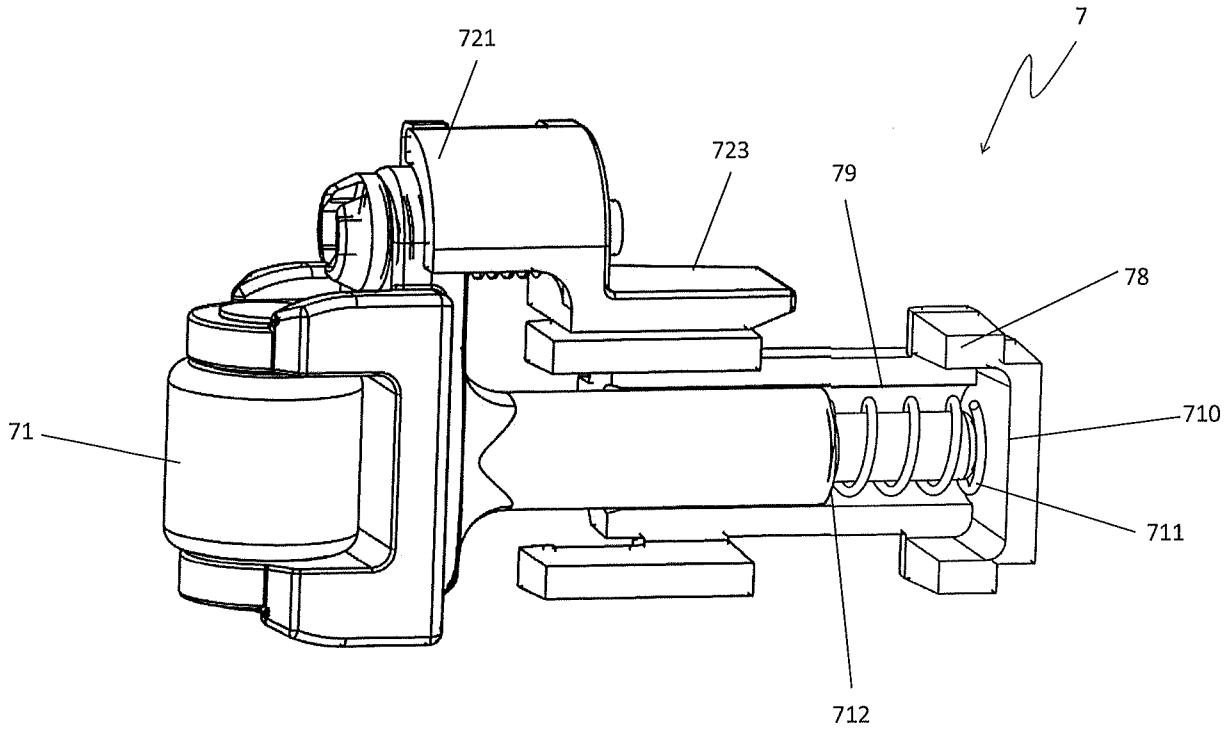

FIGURE 5

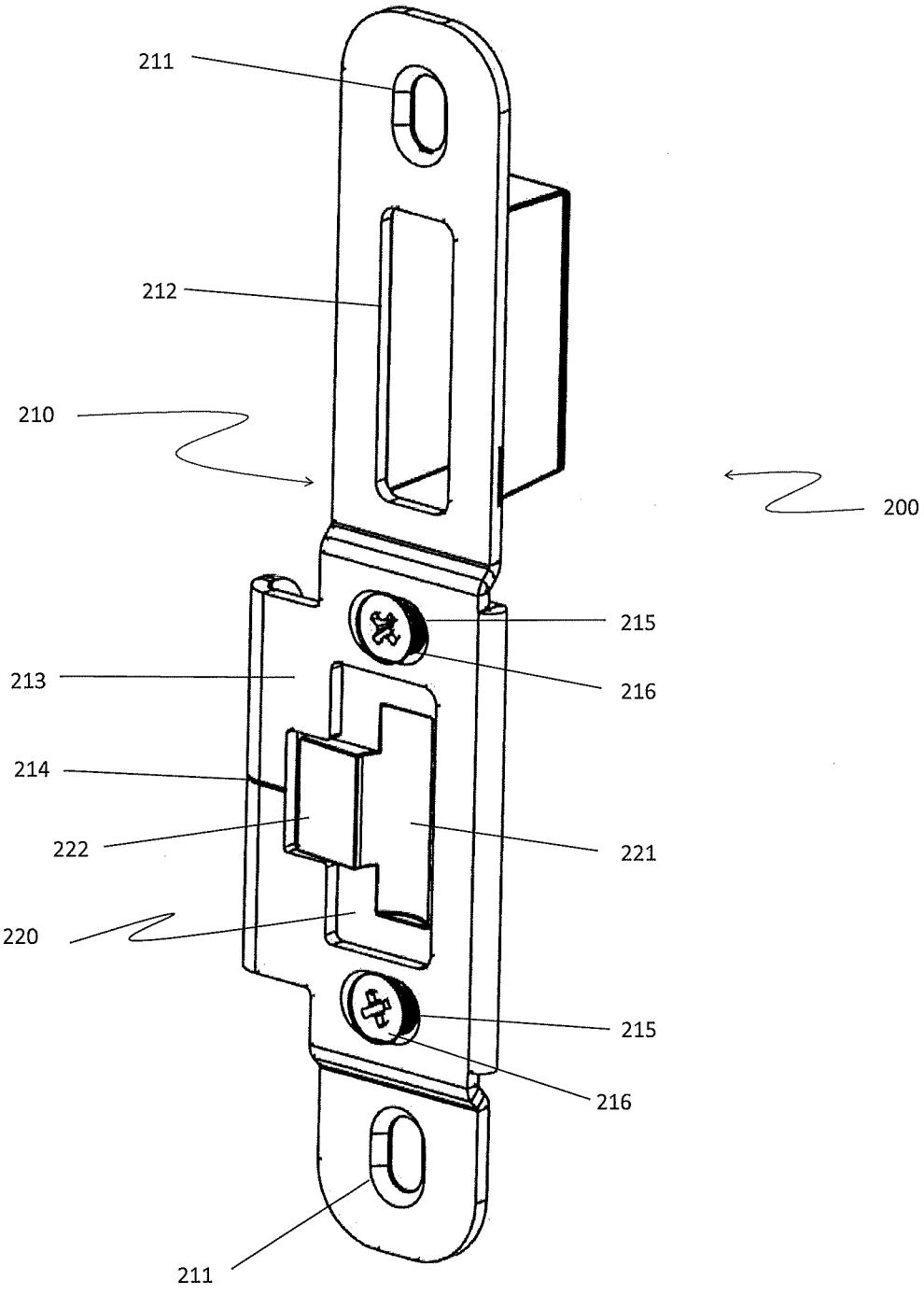

FIGURE 6