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(54) Lock assemblies

(57) A multipoint lock assembly comprising an elongate faceplate arrangement is disclosed. A lockbox is mounted on the faceplate arrangement, a first connecting rod linkage extends along the faceplate from the lockbox to a first remote gearbox, the first remote gearbox including a locking member that is movable by longitudinal movement of the first connecting rod between a locking position and a released position. The elongate faceplate arrangement is provided with a first opening and the first remote gearbox is mountable on the faceplate arrangement in a first position at which the locking member of the first remote gearbox is able to pass through the first opening at least in its locking position. The elongate faceplate arrangement is further provided with a second opening longitudinally spaced from the first opening and the first remote gearbox is mountable on the faceplate arrangement in a second position, longitudinally spaced from the first position, at which the locking member of the first remote gearbox is able to pass through the second opening at least in its locking position.

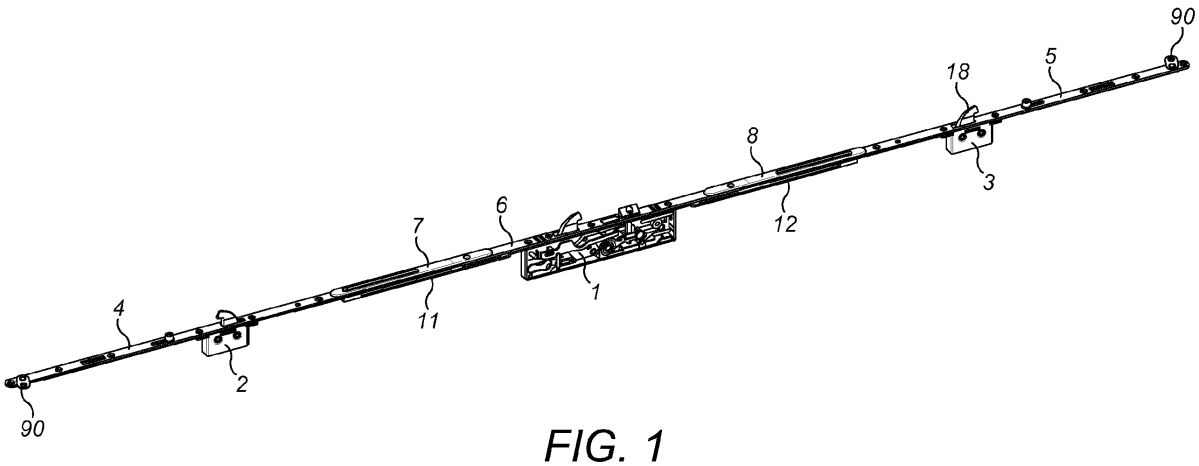

FIG. 1

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Description

[0001] This invention relates to the field of lock assemblies. The invention relates particularly, but not exclusively, to multipoint lock assemblies and to components for such assemblies.

[0002] Multipoint lock assemblies are now common and are used especially, but not exclusively, on doors having metal, plastic or other frames formed of extruded members. Such frames tend not themselves to be very strong structurally and it is therefore desirable that a fastening of the door be provided at more than one location along the frame.

[0003] There is no one standard set of dimensions for a multipoint lock and this is a particular problem when it is desired to fit or retrofit such a lock.

[0004] It is a general object of the invention to facilitate fitting or retrofitting of a lock.

[0005] More particularly it is an object of a first aspect of the invention to provide a multipoint lock assembly having a lockbox and a remote gearbox which can be fitted in more than one position.

[0006] More particularly, it is an object of a second aspect of the invention to provide a multipoint lock assembly having a lockbox and a remote gearbox which is driven by a connecting rod linkage whose length can be adjusted.

[0007] More particularly, it is an object of a third aspect of the invention to provide a mushroom roller suitable for use in a multipoint lock assembly and able to be adjustably mounted to allow the distance of the head of the mushroom roller from a connecting rod linkage to be adjusted.

[0008] More particularly, it is an object of a fourth aspect of the invention to provide a fixing arrangement for a faceplate of a multipoint lock system that allows considerable flexibility in the positions of screw fasteners for securing the faceplate.

[0009] According to a first aspect of the invention there is provided a multipoint lock assembly comprising an elongate faceplate arrangement, a lockbox mounted on the faceplate arrangement, a first connecting rod linkage extending along the faceplate from the lockbox to a first remote gearbox, the first remote gearbox including a locking member that is movable by longitudinal movement of the first connecting rod between a locking position and a released position, the elongate faceplate arrangement being provided with a first opening and the first remote gearbox being mountable on the faceplate arrangement in a first position at which the locking member of the first remote gearbox is able to pass through the first opening at least in its locking position, wherein the elongate faceplate arrangement is further provided with a second opening longitudinally spaced from the first opening and the first remote gearbox is mountable on the faceplate arrangement in a second position, longitudinally spaced from the first position, at which the locking member of the first remote gearbox is able to pass through the second opening at least in its locking position.

[0010] By providing an assembly in which a faceplate arrangement is already prepared for receiving a remote gearbox in more than one position, it can become easier to fit the assembly to a variety of different profiles and different sizes of doors. Changing of routing details of the profile that might be necessary with a standard multipoint lock assembly may be avoided. Usually adjustment of the position of a gearbox would require substantial and time consuming alterations to the faceplate arrangement but that can be avoided in accordance with a first aspect of the invention.

[0011] Where reference is made to a "first" component of some kind, that should not be understood as implying that there is necessarily a "second" component of the same kind, although there may be. For example, according to the first aspect of the invention, there may be only one remote gearbox, although there may be more than one.

[0012] The assembly may, for example, be employed to secure a door or a window. In the case of a door, the assembly will usually be secured to a vertical edge of the door. In the case of a window the assembly may be secured to either a vertical or a horizontal edge. In this specification, where reference is made to an edge of a door or window or the like, it should be understood that the "edge" is to be regarded as the narrow face of the door between the two opposite main faces.

[0013] Typically in a multipoint lock assembly, a connecting rod linkage is disposed immediately behind, but is freely slidable relative to, a faceplate arrangement and that is a preferred arrangement in the present invention. Whilst the linkage to the remote gearbox is commonly called a connecting "rod", that should not be taken as implying any particular cross-sectional shape. Most commonly the "rod" is in the shape of a flat elongate bar.

[0014] The locking member of the first remote gearbox may take any of a wide variety of forms including locking bolts mounted for linear movement, chamfered latches and mushroom rollers; for most applications the locking member is preferably a hook latch. The hook latch may be pivotally mounted in the gearbox and arranged to be rotated about its axis of pivoting by linear movement of the connecting rod.

[0015] Preferably the assembly further includes a blank for covering over the first or second opening. A blank can be used to cover over any opening that is not receiving a remote gearbox. Spring clips may be provided to retain the blank in the opening. To the extent that there are holes such as screw holes associated with the vacant opening, they may also be covered over or may be used to receive fastening screws.

[0016] The elongate faceplate arrangement preferably includes other formations in the region of each of the first and second openings for mounting the first remote gearbox. For example, holes for fasteners such as screws may be provided around the opening.

[0017] In multipoint locks it is common to provide a

central lockbox with remote gearboxes on opposite sides of the lockbox. The present invention is able to be applied to such an arrangement. Preferably, there is a second connecting rod linkage extending along the faceplate from the lockbox to a second remote gearbox on the opposite side of the lockbox from the first remote gearbox, the second remote gearbox including a locking member that is movable by longitudinal movement of the second connecting rod linkage between a locking position and a released position, the elongate faceplate arrangement being provided with a third opening and the second remote gearbox being mountable on the faceplate arrangement in a third position at which the locking member of the second remote gearbox is able to pass through the third opening at least in its locking position, wherein the elongate faceplate arrangement is further provided with a fourth opening longitudinally spaced from the third opening and the second remote gearbox is mountable on the faceplate arrangement in a fourth position, longitudinally spaced from the third position, at which the locking member of the second remote gearbox is able to pass through the fourth opening at least in its locking position.

[0018] The second remote gearbox is preferably of substantially the same construction as the first remote gearbox. More particularly, the arrangement of the second remote gearbox, the second connecting rod and the interaction of the elongate faceplate with those parts is preferably substantially the same as in the case of the first remote gearbox and the first connecting rod. That reduces the number of different parts required for the assembly.

[0019] The lockbox preferably includes a mechanism arranged to drive the first and second connecting rods simultaneously in opposite directions for driving the locking members of the first and second gearboxes. Such mechanisms are known per se; in the present case they are especially advantageous because the design of the remote gearboxes can then be simplified enabling them to be compact. Whilst it is conventional to drive the first and second gearboxes in both directions from the lockbox, it is possible for the drive to be in only one direction with resilient biasing in the gearboxes providing a drive in the opposite direction.

[0020] Generally it will only be desired to have one gearbox on each side of the lockbox, but it is within the scope of the invention to provide more than one gearbox on each side of the lockbox with the gearboxes connected in tandem to an appropriate connecting rod linkage. Any number of gearboxes may be connected and the number on one side of the lockbox need not be the same as the number on the other side.

[0021] Whilst the multipoint assembly has been referred to as a multipoint lock assembly and reference has also been made to a lockbox, it should be understood that it is within the scope of the invention for the assembly to be, for example, manually actuated without any key or other access control.

[0022] It is sometimes desirable to use a multipoint "lock" assembly in such a situation. That is especially, but not exclusively, the case where the assembly is fitted to a window. More commonly, however, the lockbox includes a key-operated locking device, for example a key-operated cylinder assembly.

[0023] The first connecting rod linkage, and the second linkage if provided, may comprise a single member extending between the lockbox and the gearbox, as is conventional. In that case it may be necessary to change the member or crop it if the position of the lockbox is changed. However, in an especially advantageous form of the first aspect of the invention, which combines first and second aspects of the invention, the first connecting rod linkage includes a first link connected to a second link, the connection between the first and second links being able to be varied to adjust the combined length of the first and second links. Conventionally, altering the length of a connecting rod linkage would have involved cropping of the linkage but in this arrangement that can be avoided, adding to the versatility and ease of adaption of the assembly to a particular application.

[0024] Whilst reference is made above the first connecting rod linkage including first and second links, it should be understood that there may be one or more further links and the inter-link connections of those links may also be variable.

[0025] The first and second links are preferably releasably coupled together via toothed formations, the combined length of the links being able to be adjusted by disengaging one toothed interengagement, moving one link longitudinally relative to the other and re-engaging another toothed interengagement. This enables the combined length of the links to be adjusted in a very simple manner.

[0026] One of the first and second links is preferably provided with an internally toothed block, the other of the first and second links being provided with an externally toothed part engaging teeth of the toothed block. The externally toothed part is preferably of bar shape having a substantially rectangular cross-section and comprising opposite faces and opposite sides of substantially shorter width than the faces, at least one of the opposite sides being toothed. Preferably both of the opposite sides of the externally toothed part are toothed. The internally toothed block may of generally cuboidal shape and is preferably closed (but not necessarily completely covered over) on three sides and open on a fourth side. The opposite ends of the block are open to allow passage through the block of the link received in the block. The opposite closed sides are preferably both toothed on their inside if both of the opposite sides of the externally toothed part are toothed, whereas only one of the opposite closed sides is preferably toothed if only one of the opposite sides of the externally toothed part are toothed.

[0027] The first link may be coupled at one end to the lockbox and may be generally in the shape of an elongate bar having a substantially rectangular cross-section and comprising opposite faces and opposite sides of sub-

stantially shorter width than the faces, the bar being orientated with the opposite faces of the bar substantially parallel to a front face of the faceplate arrangement. Such a rectangular cross-section is conventional in multipoint locks where the depth of the lock is often restricted. The first link is preferably cranked towards the end coupled to the lockbox to define a first portion of the first link between the lockbox and the crank and a second portion of the link between the crank and the second link, with the first portion of the link closer to the front face of the faceplate arrangement than the second portion of the link. Such cranking of a link between the lockbox and the gearbox is a special feature of the assembly and is advantageous in allowing space for the engagement of the first and second links without causing the assembly to project too far forwards.

[0028] The elongate faceplate arrangement preferably includes a first plate extending over the lockbox, a second plate extending over the first remote gearbox and a third plate extending over a gap between the first and second plates. With such an arrangement maintenance of a front covering of the mechanisms in the lock can be maintained even though the position of the remote gearbox is variable.

[0029] As already indicated, in multipoint locks it is common to provide a central lockbox with remote gearboxes on opposite sides of the lockbox and the present invention is able to be applied to such an arrangement. Accordingly, there may be a second connecting rod linkage extending along the faceplate from the lockbox to a second remote gearbox on the opposite side of the lockbox from the first remote gearbox, the second remote gearbox including a locking member that is movable by longitudinal movement of the second connecting rod linkage between a locking position and a released position, wherein the second connecting rod linkage includes a third link connected to a fourth link, the connection between the third and fourth links being able to be varied to adjust the combined length of the third and fourth links.

[0030] The second connecting rod linkage is preferably of substantially the same construction as the first connecting rod linkage. That reduces the number of different parts required for the assembly.

[0031] In an especially advantageous form of the first aspect of the invention, which combines first and third aspects of the invention, the assembly further includes a mushroom roller locking member, the mushroom roller locking member comprising a locking head and a stem mounted on a connecting rod of the first connecting rod linkage, the stem extending from the locking head to a distal end, wherein a portion of the stem away from the distal end is provided with a screw thread engaging in a threaded hole of the connecting rod to couple the mushroom roller to the connecting rod to drive the mushroom roller when the connecting rod is driven and allowing the spacing of the locking head from the connecting rod to be adjusted. The ability to adjust the spacing of the locking head of the mushroom roller from the connecting rod on which it is mounted can facilitate adjustment of the assembly to allow for tolerances or changes in relative positions of the lock assembly and a strike or keep. Thus, again the retrofitting of the assembly can be facilitated.

[0032] It should be understood that the connecting rod referred to in the paragraph immediately above may be, but need not be, the first or second link of the connecting rod linkage described above.

[0033] Where reference is made in this specification to a "mushroom roller" it should be understood that the the kind of roller being referred to is one which has an upstanding stem extending forwardly from a front face of a multipoint lock assembly and a head on the end of the stem. Whilst the term "mushroom" is employed, that should not be taken as implying that the head is a mushroom shape. It could for example be of a non-circular cross-section and it need not be domed like a mushroom. Also, as will be understood, although the term used is "roller" the mushroom roller does not rotate during use; it is only rotated by an engineer to set the degree of projection of the head.

[0034] The mushroom head preferably has a formation facilitating its rotation by a tool. The formation may comprise a slot across the outer end of the locking head, as in a construction described below. Such a slot can receive a screwdriver blade. Other formations, for example to receive a hex key, may alternatively be adopted.

[0035] The threaded portion of the mushroom roller is preferably a high friction thread that inhibits rotation of the mushroom head during ordinary use. For example, the threaded portion of the mushroom roller may have a patch thread.

[0036] Preferably, the distal end of the stem of the mushroom roller is unable to pass through the threaded opening in the connecting rod. In that way the mushroom roller can be retained on the connecting rod.

[0037] Preferably the distal end of the stem of the mushroom roller is riveted over to prevent it passing through the threaded opening in the connecting rod. The distal end may be treated in some other way to achieve the same purpose.

[0038] The stem of the mushroom roller is preferably provided with a peripheral flange partway along its length, at least some of the portion of the stem between the peripheral flange and the distal end of the stem being threaded. The elongate faceplate arrangement preferably has a slot through which the stem of the mushroom roller passes, the faceplate arrangement being located between the head of the mushroom roller and the connecting rod. In the case where the stem of the mushroom roller is provided with a peripheral flange, that flange is preferably disposed between the head of the mushroom roller and the faceplate arrangement and is preferably unable to pass through the slot in the elongate faceplate.

[0039] In an especially advantageous form of the first aspect of the invention, which combines first and fourth aspects of the invention, the assembly further includes a tab movably mounted in a first region on the faceplate

arrangement and including in a second region an opening for receiving a fastener for securing the faceplate arrangement. Such a tab is able to provide an alternative fastening point for a screw or the like and can be especially helpful where an existing potential fastening point for a conventional fastening has already been damaged.

[0040] The tab is preferably pivotally connected to the faceplate arrangement. The tab may be pivotally connected by a rivet. A secure fixing that allows mobility of the tab may be provided in that way.

[0041] The second region of the tab can be positioned to one side of the faceplate arrangement on which it is mounted and/or it can be positioned beyond an end of the faceplate arrangement on which it is mounted.

[0042] A plurality of tabs may be movably mounted in different regions of the faceplate arrangement. That can provide a more secure fixing and/or increase the number of potential fixing points available to a fitter.

[0043] According to a second aspect of the invention, a multipoint lock assembly comprises an elongate faceplate arrangement, a lockbox mounted on the faceplate arrangement, a first connecting rod linkage extending along the faceplate from the lockbox to a first remote gearbox, the first remote gearbox including a locking member that is movable by longitudinal movement of the first connecting rod linkage between a locking position and a released position, wherein the first connecting rod linkage includes a first link connected to a second link, the connection between the first and second links being able to be varied to adjust the combined length of the first and second links.

[0044] As already indicated, altering the length of a connecting rod linkage would conventionally have involved cropping of the linkage but in this arrangement according to the second aspect of the invention that can be avoided, adding to the versatility and ease of adaption of the assembly to a particular application.

[0045] The first and second links may be releasably coupled together via toothed formations, the combined length of the links being able to be adjusted by disengaging one toothed interengagement, moving one link longitudinally relative to the other and re-engaging another toothed interengagement.

[0046] It may be that one of the first and second links is provided with an internally toothed block and the other of the first and second links is provided with an externally toothed part engaging teeth of the toothed block.

[0047] The externally toothed part may be of bar shape having a substantially rectangular cross-section and comprising opposite faces and opposite sides of substantially shorter width than the faces, at least one of the opposite sides being toothed.

[0048] Both of the opposite sides of the externally toothed part may be toothed.

[0049] The internally toothed block may be of generally cuboidal shape and be closed on three sides and open on a fourth side.

[0050] The first link may be coupled at one end to the lockbox and be generally in the shape of an elongate bar having a substantially rectangular cross-section and comprising opposite faces and opposite sides of substantially shorter width than the faces, the bar being orientated with the opposite faces of the bar substantially parallel to a front face of the faceplate arrangement.

[0051] The first link may be cranked towards the end coupled to the lockbox to define a first portion of the first link between the lockbox and the crank and a second portion of the link between the crank and the second link, with the first portion of the link closer to the front face of the faceplate arrangement than the second portion of the link.

[0052] The elongate faceplate arrangement may include a first plate extending over the lockbox, a second plate extending over the first remote gearbox and a third plate extending over a gap between the first and second plates.

[0053] There may be a second connecting rod linkage extending along the faceplate from the lockbox to a second remote gearbox on the opposite side of the lockbox from the first remote gearbox, the second remote gearbox including a locking member that is movable by longitudinal movement of the second connecting rod linkage between a locking position and a released position, wherein the second connecting rod linkage includes a third link connected to a fourth link, the connection between the third and fourth links being able to be varied to adjust the combined length of the third and fourth links.

[0054] The second connecting rod linkage may be of substantially the same construction as the first connecting rod linkage.

[0055] The assembly may further include a mushroom roller locking member, the mushroom roller locking member comprising a locking head and a stem mounted on a connecting rod of the first connecting rod linkage, the stem extending from the locking head to a distal end, wherein a portion of the stem away from the distal end is provided with a screw thread engaging in a threaded hole of the connecting rod to couple the mushroom roller to the connecting rod to drive the mushroom roller when the connecting rod is driven and allowing the spacing of the locking head from the connecting rod to be adjusted.

[0056] The mushroom head may have a formation facilitating its rotation by a tool.

[0057] The threaded portion of the mushroom roller may be a high friction thread that inhibits rotation of the mushroom head during ordinary use.

[0058] The threaded portion of the mushroom roller may be a patch thread.

[0059] It may be that the distal end of the stem of the mushroom roller is unable to pass through the threaded opening in the connecting rod.

[0060] The distal end of the stem of the mushroom roller may be riveted over to prevent it passing through the threaded opening in the connecting rod.

[0061] The stem of the mushroom roller may be provided with a peripheral flange partway along its length,

at least some of the portion of the stem between the peripheral flange and the distal end of the stem being threaded.

[0062] The elongate faceplate arrangement may have a slot through which the stem of the mushroom roller passes, the faceplate arrangement being located between the head of the mushroom roller and the connecting rod.

[0063] It may be that the assembly may further includes a tab movably mounted in a first region on the faceplate arrangement and includes in a second region an opening for receiving a fastener for securing the faceplate arrangement.

[0064] The tab may be pivotally connected to the faceplate arrangement.

[0065] The tab may be pivotally connected by a rivet.

[0066] It may be that the second region of the tab can be positioned to one side of the faceplate arrangement on which it is mounted.

[0067] It may be that the second region of the tab can be positioned beyond an end of the faceplate arrangement on which it is mounted.

[0068] The features described above in respect of the first aspect of the invention may also be incorporated in this aspect of the invention and are not repeated again here. Other comments made above in respect of the first aspect of the invention also apply in this case. For example, where reference is made to a "first" component of some kind, that should not be understood as implying that there is necessarily a "second" component of the same kind, although there may be. As another example, the assembly may be employed to secure a door or a window. In the case of a door, the assembly will usually be secured to a vertical edge of the door. In the case of a window the assembly may be secured to either a vertical or a horizontal edge. In this specification, where reference is made to an edge of a door or window or the like, it should be understood that the "edge" is to be regarded as the narrow face of the door between the two opposite main faces.

[0069] According to a third aspect of the invention, there is provided an assembly comprising a connecting rod and mushroom roller locking member, the mushroom roller locking member comprising a locking head and a stem mounted on a connecting rod of a locking or latching mechanism, the stem extending from the locking head to a distal end, wherein a portion of the stem away from the distal end is provided with a screw thread engaging in a threaded hole of the connecting rod to couple the mushroom roller to the connecting rod to drive the mushroom roller when the connecting rod is driven and allowing the spacing of the locking head from the connecting rod to be adjusted.

[0070] As already indicated, the ability to adjust the spacing of the locking head of the mushroom roller from the connecting rod on which it is mounted can facilitate adjustment of the assembly to allow for tolerances or changes in relative positions of the lock assembly and a strike or keep. Thus, again the retrofitting of the assembly and post-installation adjustment can be facilitated.

[0071] The mushroom head may have a formation facilitating its rotation by a tool.

[0072] The threaded portion of the mushroom roller may be a high friction thread that inhibits rotation of the mushroom head during ordinary use.

[0073] The threaded portion of the mushroom roller may be a patch thread.

[0074] It may be that the distal end of the stem of the mushroom roller is unable to pass through the threaded opening in the connecting rod.

[0075] The distal end of the stem of the mushroom roller may be riveted over to prevent it passing through the threaded opening in the connecting rod.

[0076] The stem of the mushroom roller may be provided with a peripheral flange partway along its length, at least some of the portion of the stem between the peripheral flange and the distal end of the stem being threaded.

[0077] The assembly may further include a faceplate, the faceplate having a slot through which the stem of the mushroom roller passes, the faceplate being located between the head of the mushroom roller and the connecting rod.

[0078] The features described above in respect of the first and second aspects of the invention may also be incorporated in this aspect of the invention and are not repeated again here. Other comments made above in respect of the first and second aspects of the invention also apply in this case. For example, where reference is made to a "first" component of some kind, that should not be understood as implying that there is necessarily a "second" component of the same kind, although there may be. As another example, the assembly may be employed to secure a door or a window. In the case of a door, the assembly will usually be secured to a vertical edge of the door. In the case of a window the assembly may be secured to either a vertical or a horizontal edge. In this specification, where reference is made to an edge of a door or window or the like, it should be understood that the "edge" is to be regarded as the narrow face of the door between the two opposite main faces.

[0079] According to the third aspect of the invention, there is also provided a mushroom roller locking member for use in an assembly according to the third aspect of the invention, the roller comprising a locking head and a stem for mounting on a connecting rod of a locking or latching mechanism, the stem extending from the locking head to a distal end, wherein a portion of the stem away from the distal end is provided with a screw thread for engaging in a threaded hole of a connecting rod for driving the mushroom roller, for allowing the spacing of the locking head from the connecting rod to be adjusted.

[0080] Whilst the mushroom roller is shown in the drawings of this specification as applied to a special form of multipoint locking system, it should be understood that mushroom rollers of conventional design are employed

in a wide variety of applications and the mushroom roller according to the third aspect of the invention may be employed in any of those applications.

[0081] According to a fourth aspect of the invention, there is provided a lock system for securing an openable unit to a frame in which it is mounted, the system including a lock assembly for mounting along an edge of the openable unit adjacent to the frame and including a first elongate faceplate arrangement for fixing to the edge of the openable unit, and a strike or keep assembly including a second elongate faceplate arrangement for fixing to the frame adjacent to the elongate faceplate arrangement of the lock assembly, wherein the system includes a tab movably mounted in a first region on the first or second faceplate arrangement and including, in a second region, an opening for receiving a fastener for securing the tab to the edge of the openable unit or to the frame.

[0082] As already indicated, such a tab is able to provide an alternative fastening point for a screw or the like and can be especially helpful where an existing potential fastening point for a conventional fastening has already been damaged.

[0083] Whilst the tab is shown in the drawings of this specification as applied to a special form of multipoint lock system, where it is particularly advantageous, it should be understood that the tab can be employed in a wide variety of applications. It should be noted in particular that the tab may, if desired, be employed to secure the faceplate arrangement of any multipoint lock assembly, strike or keep, or even a single point lock assembly, or a strike or keep for such a single point lock assembly.

[0084] The tab may be pivotally connected to the first or second faceplate arrangement.

[0085] The tab may be pivotally connected by a rivet.

[0086] It may be that the second region of the tab can be positioned to one side of the faceplate arrangement on which it is mounted.

[0087] It may be that the second region of the tab can be positioned beyond an end of the faceplate arrangement on which it is mounted.

[0088] According to the fourth aspect of the invention there is also provided a faceplate arrangement for use in a lock system according to the fourth aspect of the invention, the arrangement including a tab movably mounted in a first region on the faceplate arrangement and including in a second region an opening for receiving a fastener for securing the tab to the edge of the openable unit or to the frame.

[0089] The arrangement may be for use in a multipoint lock system.

[0090] Whilst various aspects of the invention have been described above, it should be understood that, as already implied, features described in one context may also be provided in another context, even when that is not explicitly stated. For example, a tab according to the fourth aspect of the invention may be provided in combination with a mushroom roller according to the third aspect of the invention, even without either of the first or second aspects of the invention being present.

[0091] By way of example certain embodiments of the invention will now be described with reference to the accompanying schematic drawings, of which:

Fig. 1 is an isometric view of a multipoint lock assembly;

Fig. 2 is an exploded isometric view of the lock assembly of Fig. 1;

Fig. 3 is an isometric view to a larger scale of a part of the lock assembly shown in Figs. 1 and 2;

Fig. 4 is an isometric view to a larger scale of another part of the lock assembly shown in Figs. 1 and 2,

Fig. 5 is an isometric view from the rear of a keep assembly for use with the lock assembly of Figs. 1 and 2,

Fig. 6 is an isometric view to a larger scale of a portion of the lock assembly shown in Figs. 1 and 2;

Fig. 7 is an isometric view of a mushroom roller suitable for use as part of the lock assembly of Figs. 1 and 2; and

Fig. 8 is a sectional view of the edge of the door, fitted with the mushroom roller of Fig. 7.

[0092] The parts shown in the drawings are in many respects the same as in conventional multipoint lock assemblies and such parts will not be described in detail below. Rather the description below will focus on the special features introduced according to one or more aspects of the invention.

[0093] Referring first to Figs. 1 and 2, the multipoint lock assembly shown in those drawings generally comprises a lockbox 1, a first remote gearbox 2, a second remote gearbox 3, and a faceplate arrangement including faceplates 4 and 5 associated with the remote gearboxes 2 and 3 respectively, a faceplate 6 associated with the lockbox 1 and cover plates 7 and 8. The lock assembly further generally comprises first and second connecting rod linkages that extend from the lockbox 1 in opposite directions below the faceplate arrangement. In Fig. 2 a first link 11 of a connecting rod linkage for driving the remote gearbox 2 is visible and a third link 12 of a second connecting rod linkage for driving the gearbox 3 is visible.

[0094] The internal construction of the lockbox 1 may be of a kind known per se that drives the connecting rod linkages towards and away from the lockbox in unison. The construction will not be described further here. The gearboxes 2 and 3 are of a very simple construction and simply provide a pivotal mounting of the hook latches 18 and house a driving connection of the connecting rod linkages to the hook latches 18: the end of the connecting rod engages a cog on the hook bolt so that linear movement of the connecting rod is converted into rotary movement of the latch 18.

[0095] Referring now also to Fig. 3, the gearbox 2 is shown in a first position with its hook latch 18 in an extended, locking position. The hook latch 18 passes through a first opening 20 in the faceplate 4. The gearbox

is secured to the faceplate by screws 22 which pass through the faceplate into fixing tabs 24 of the gearbox. A second opening 28 is provided in the faceplate 4 and provides an alternative location for the gearbox 2. As illustrated by the arrow in Fig. 3, the gearbox 2 can be removed from the opening 20 and installed in the opening 28. Holes 30 are provided in the faceplate 4 to enable the screws 22 to secure the gearbox in that alternative position.

[0096] With the gearbox in the position shown in Fig. 3, a blanking plate may be fixed over the opening 28 and held in position by spring clips. The holes 30 may receive fastening screws that fasten the faceplate to an edge of a door to which it is fitted.

[0097] Fig. 4 shows the cover plate 7 to a larger scale than it is shown in Figs. 1 and 2. It can be seen that the cover plate has a hole 32 for receiving a fastening screw and a slot 34 for receiving another fastening screw. The provision of the slot 34 allows the separation of the faceplates 4 and 6 to be altered whilst retaining a cover over the whole length of the faceplate arrangement. As will be understood, the cover plate 8 is of the same construction as the cover plate 7.

[0098] Fig. 5 shows from the rear a keep assembly 36 that may be used in conjunction with the gearbox 2. The keep assembly is provided with an opening 38 for receiving the hook latch 18 when the gearbox is mounted in the opening 20 and with an opening 40 for receiving the hook latch 18 of the gearbox 2 when it is mounted in the opening 28.

[0099] The ability to adjust the position of the remote gearboxes adds considerably to the number of different frame arrangements that can accept the assembly.

[0100] Fig. 6 shows the connecting rod linkage extending from the lockbox 1 to the remote gearbox 2. The linkage comprises the first link 11 and a second link 44. The link 11 has a short root portion 46 which enters the lockbox 1 and is driven by the lockbox in a manner known per se. The first link 11 is formed with a crank at 47 and has a longer portion 48 on the opposite side of the crank 47 to the root portion 46. At the distal end of the portion 48, a connection block 50 of cuboidal shape is secured. One end of the link 44 is received in the block 50; as can be seen from Fig. 6, an end portion of the link 44 of substantial length is of generally rectangular cross-section having a pair of opposite, relatively wide, side faces 52 and a pair of opposite, relatively narrow, side faces 54 which are toothed. The interior side faces of the connecting block 50 that are immediately adjacent to the toothed faces 54 are also provided with toothed formations (not visible in Fig. 6). The rear side face of the block 50 is fixed to the end of the link 11. The end faces of the block 50 are open to allow passage of the link 11 and the front side face of the block 50 is also open. The formations in the link 44 and the connecting block 50 are able to interengage and, when so interengaged, prevent relative longitudinal movement of the links 11 and 44; the position at which they interengage can, however, be adjusted simply by passing the link 44 out of the connecting block by moving it forwards through the open front side face of the block 50, away from the link 11. The relative longitudinal positions of the links can then be adjusted and the toothed formations interengaged with the links 11 and 44 in different relative longitudinal positions. In this way, the overall length of the linkage between the lockbox 1 and the gearbox 2 can be altered as desired without cropping any members.

[0101] As will be understood, the connecting rod linkage between the lockbox 1 and the gearbox 3 is substantially the same, having a third link 12 and a fourth link (not clearly visible in Figs. 1 and 2), and employs corresponding components. It will not therefore be described again here.

[0102] As will be understood, once the lengths of the connecting rod linkages have been set and the parts assembled, the assembly can be installed in an appropriate groove in the edge of a door or window, for example in a Eurogroove. Once so installed the toothed connection is secure because the front side face of the block 50 is closed over by the rear of the faceplate arrangement.

[0103] The operation of the connecting rod linkages, and of the whole assembly, is as in a conventional multipoint lock assembly, but the ability to adjust the lengths of the connecting rod linkages without any special tools makes the installation significantly quicker and easier than if the connecting rod linkages had to be cropped to size.

[0104] Referring now to Figs. 7 and 8, there is shown a mushroom roller 60 suitable for use in the multipoint lock assembly described above, but also suitable for use in other multipoint lock assemblies. The mushroom roller generally comprises a locking head 62 and a stem 64 which is formed with an integral peripheral flange 66 partway along its length. A portion of the stem away from the mushroom head is provided with a high friction screw thread 68 which in this particular example is a patch thread. The head 62 of the roller is provided with a slot 70 for engagement by a screwdriver blade.

[0105] Fig. 8 shows the mushroom roller 60 installed in a multipoint lock assembly which may be of any of a wide variety of designs including the design described above with reference to the drawings but also other multipoint lock assemblies which may in all other respects be entirely conventional. In Fig. 8 there is shown a faceplate 72 and a connecting rod 74 of a multipoint lock assembly. The multipoint lock assembly is shown fixed in a frame profile 76, that frame profile typically being the profile of an edge of a door or window. The screw thread 68 of the mushroom roller passes freely through an elongate slot 80 in the faceplate 72 and is in threaded engagement with the connecting rod 74 behind the faceplate 72. As can readily be understood from Fig. 8, if the mushroom roller is rotated by engaging a screwdriver blade in the slot 70, it can be screwed in or out of the connecting rod 74 moving it towards or away from the faceplate 72. In Fig. 8, the distal end of the mushroom

roller is shown riveted over to form an enlarged distal end 82 which prevents the mushroom roller from being removed from the connecting rod 74. Of course, that enlargement is carried out after the assembly of the faceplate 72, the connecting rod 74, and the mushroom roller 60 has been made and prevents the mushroom roller 60 being removed thereafter.

[0106] The provision of a mushroom roller which has a head that can readily be moved towards or away from a faceplate arrangement of a multipoint lock assembly without special tools is a valuable feature which can be of assistance during any installation but also during maintenance or retrofitting of a new lock assembly.

[0107] Figs. 1 to 3 above show tabs 90 connected to the faceplates 4 and 5. Each tab 90 is of approximately oval shape and has two holes 92 and 94. A rivet is passed through the hole 92 and a hole (not visible) in the faceplate 4 or 5 to securely connect the tabs to the faceplate, whilst allowing pivotal movement of the tab about the axis of the rivet. The hole 94 of the tab can then be positioned to one side of the faceplate 4 or 5 and a fastening screw inserted through the hole 94 in the tab to provide additional fastening of the faceplate to the door frame.

[0108] The provision of such tabs can be of advantage when first fitting a multipoint lock system, but is of particular advantage when retrofitting part or all of such a system because there may be existing screw holes or other obstructions at other set locations for fastening screws.

[0109] As should now be understood, the features described above are able to contribute to the design of a very versatile multipoint lock assembly which can be used in a wide variety of applications as a new fit or as a retrofit.

Claims

1. A multipoint lock assembly comprising an elongate faceplate arrangement, a lockbox mounted on the faceplate arrangement, a first connecting rod linkage extending along the faceplate from the lockbox to a first remote gearbox, the first remote gearbox including a locking member that is movable by longitudinal movement of the first connecting rod between a locking position and a released position, the elongate faceplate arrangement being provided with a first opening and the first remote gearbox being mountable on the faceplate arrangement in a first position at which the locking member of the first remote gearbox is able to pass through the first opening at least in its locking position, wherein the elongate faceplate arrangement is further provided with a second opening longitudinally spaced from the first opening and the first remote gearbox is mountable on the faceplate arrangement in a second position, longitudinally spaced from the first position, at which the locking member of the first remote gearbox is able to pass through the second opening at least in its locking position.

2. An assembly according to claim 1, in which there is a second connecting rod linkage extending along the faceplate from the lockbox to a second remote gearbox on the opposite side of the lockbox from the first remote gearbox, the second remote gearbox including a locking member that is movable by longitudinal movement of the second connecting rod linkage between a locking position and a released position, the elongate faceplate arrangement being provided with a third opening and the second remote gearbox being mountable on the faceplate arrangement in a third position at which the locking member of the second remote gearbox is able to pass through the third opening at least in its locking position, wherein the elongate faceplate arrangement is further provided with a fourth opening longitudinally spaced from the third opening and the second remote gearbox is mountable on the faceplate arrangement in a fourth position, longitudinally spaced from the third position, at which the locking member of the second remote gearbox is able to pass through the fourth opening at least in its locking position.

3. An assembly according to claim 2, in which the second remote gearbox is of substantially the same construction as the first remote gearbox and the arrangement of the second remote gearbox, the second connecting rod and the interaction of the elongate faceplate with those parts is substantially the same as in the case of the first remote gearbox and the first connecting rod.

4. An assembly according to any of claims 2 to 3, in which the lockbox includes a mechanism arranged to drive the first and second connecting rods simultaneously in opposite directions for driving the locking members of the first and second gearboxes.

5. An assembly according to any preceding claim, in which the first connecting rod linkage includes a first link connected to a second link, the connection between the first and second links being able to be varied to adjust the combined length of the first and second links.

6. An assembly according to claim 5, in which the first and second links are releasably coupled together via toothed formations, the combined length of the links being able to be adjusted by disengaging one toothed interengagement, moving one link longitudinally relative to the other and re-engaging another toothed interengagement.

7. An assembly according to any of claims 5 to 6, in which the first link is coupled at one end to the lock-

box and is generally in the shape of an elongate bar having a substantially rectangular cross-section and comprising opposite faces and opposite sides of substantially shorter width than the faces, the bar being orientated with the opposite faces of the bar substantially parallel to a front face of the faceplate arrangement.

8. An assembly according to claim 7, in which the first link is cranked towards the end coupled to the lockbox to define a first portion of the first link between the lockbox and the crank and a second portion of the link between the crank and the second link, with the first portion of the link closer to the front face of the faceplate arrangement than the second portion of the link.

9. An assembly according to any of claims 5 to 8, in which there is a second connecting rod linkage extending along the faceplate from the lockbox to a second remote gearbox on the opposite side of the lockbox from the first remote gearbox, the second remote gearbox including a locking member that is movable by longitudinal movement of the second connecting rod linkage between a locking position and a released position, wherein the second connecting rod linkage includes a third link connected to a fourth link, the connection between the third and fourth links being able to be varied to adjust the combined length of the third and fourth links.

10. An assembly according to claim 9, in which the second connecting rod linkage is of substantially the same construction as the first connecting rod linkage.

11. An assembly according to any preceding claim further including a mushroom roller locking member, the mushroom roller locking member comprising a locking head and a stem mounted on a connecting rod of the first connecting rod linkage, the stem extending from the locking head to a distal end, wherein a portion of the stem away from the distal end is provided with a screw thread engaging in a threaded hole of the connecting rod to couple the mushroom roller to the connecting rod to drive the mushroom roller when the connecting rod is driven and allowing the spacing of the locking head from the connecting rod to be adjusted.

12. An assembly according to claim 11, in which the distal end of the stem of the mushroom roller is unable to pass through the threaded opening in the connecting rod.

13. An assembly according to any preceding claim, further including a tab movably mounted in a first region on the faceplate arrangement and including in a second region an opening for receiving a fastener for securing the faceplate arrangement.

14. An assembly according to claim 13, in which the tab is pivotally connected to the faceplate arrangement.

15. An assembly according to any of claims 13 to 14, in which the second region of the tab can be positioned to one side of the faceplate arrangement on which it is mounted.

16. An assembly according to any of claims 13 to 15, in which the second region of the tab can be positioned beyond an end of the faceplate arrangement on which it is mounted.

17. A multipoint lock assembly comprising an elongate faceplate arrangement, a lockbox mounted on the faceplate arrangement, a first connecting rod linkage extending along the faceplate from the lockbox to a first remote gearbox, the first remote gearbox including a locking member that is movable by longitudinal movement of the first connecting rod linkage between a locking position and a released position, wherein the first connecting rod linkage includes a first link connected to a second link, the connection between the first and second links being able to be varied to adjust the combined length of the first and second links.

18. An assembly comprising a connecting rod and mushroom roller locking member, the mushroom roller locking member comprising a locking head and a stem mounted on a connecting rod of a locking or latching mechanism, the stem extending from the locking head to a distal end, wherein a portion of the stem away from the distal end is provided with a screw thread engaging in a threaded hole of the connecting rod to couple the mushroom roller to the connecting rod to drive the mushroom roller when the connecting rod is driven and allowing the spacing of the locking head from the connecting rod to be adjusted.

19. A lock system for securing an openable unit to a frame in which it is mounted, the system including a lock assembly for mounting along an edge of the openable unit adjacent to the frame and including a first elongate faceplate arrangement for fixing to the edge of the openable unit, and a strike or keep assembly including a second elongate faceplate arrangement for fixing to the frame adjacent to the elongate faceplate arrangement of the lock assembly, wherein the system includes a tab movably mounted in a first region on the first or second faceplate arrangement and including, in a second region, an opening for receiving a fastener for securing the tab to the edge of the openable unit or to the frame.

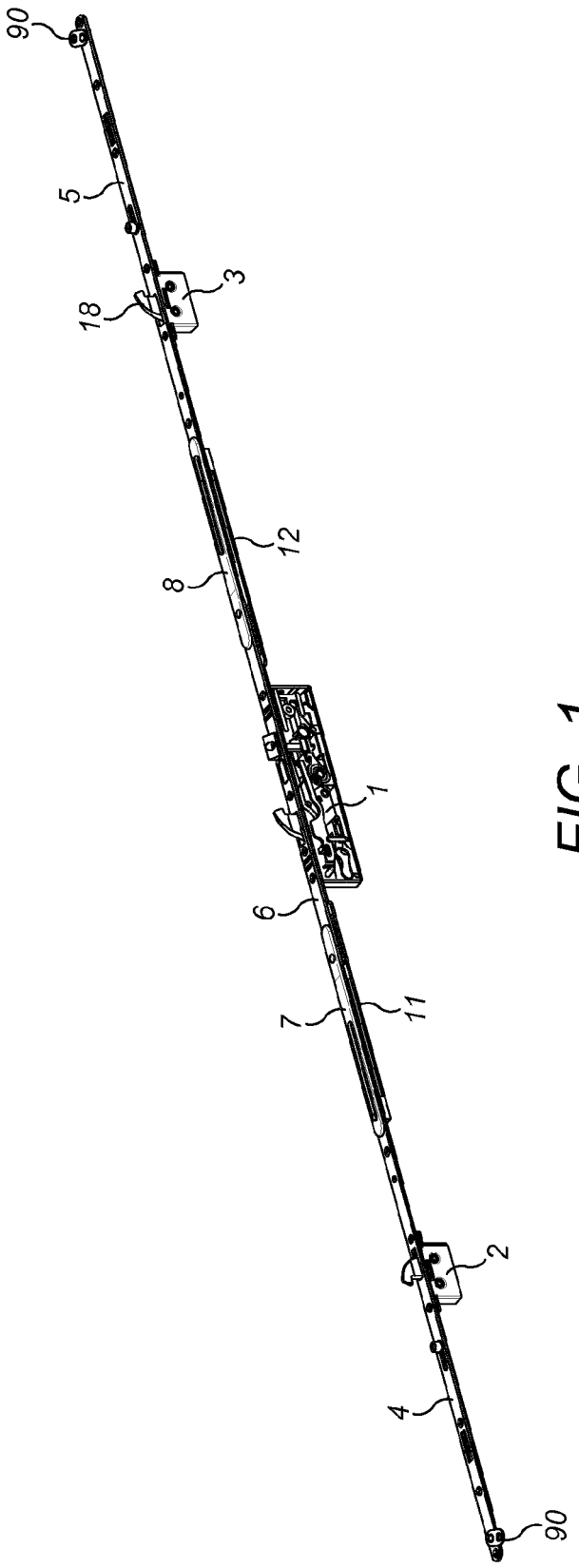

FIG. 1

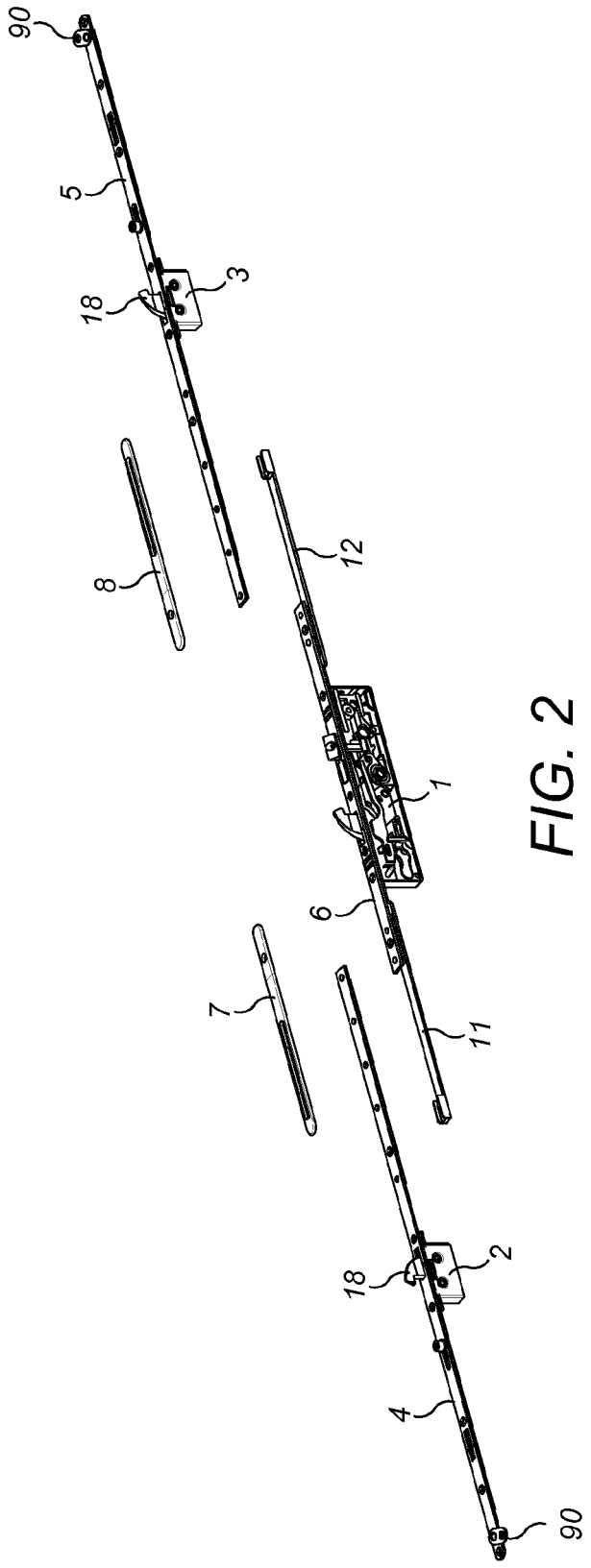

FIG. 2

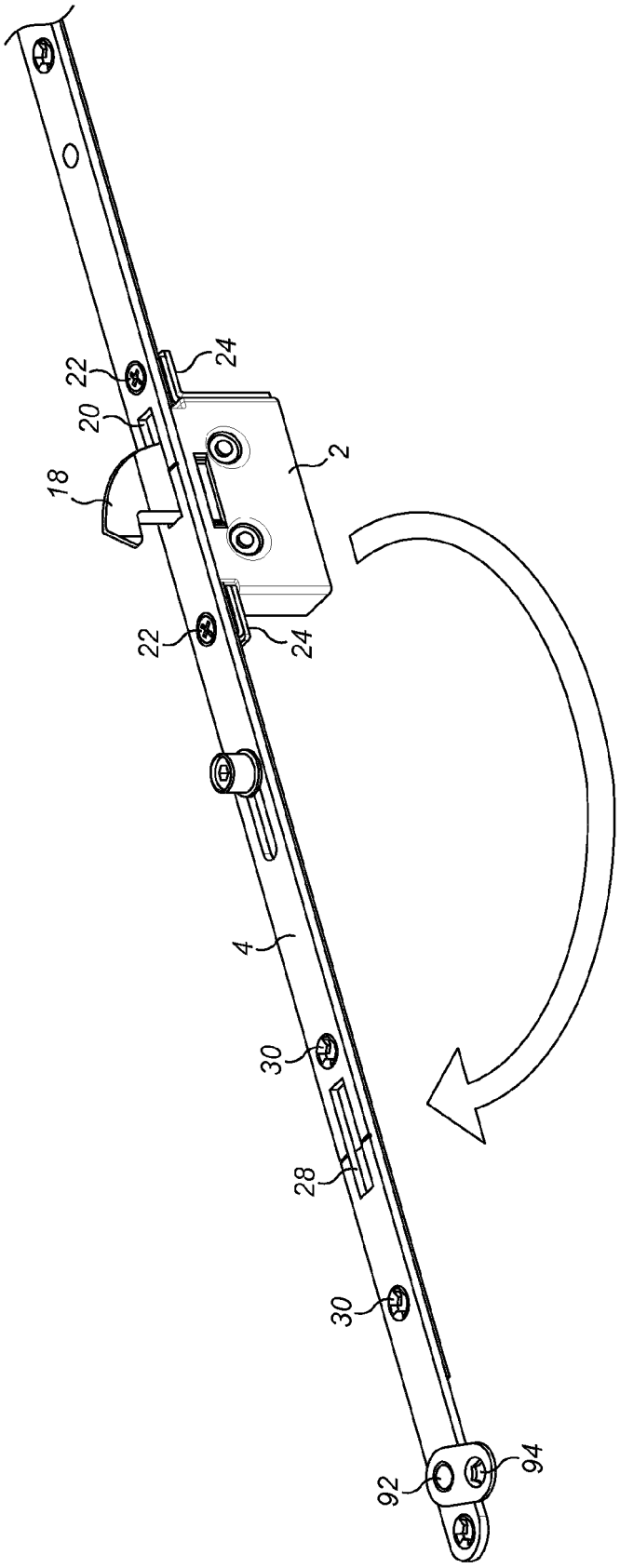

FIG. 3

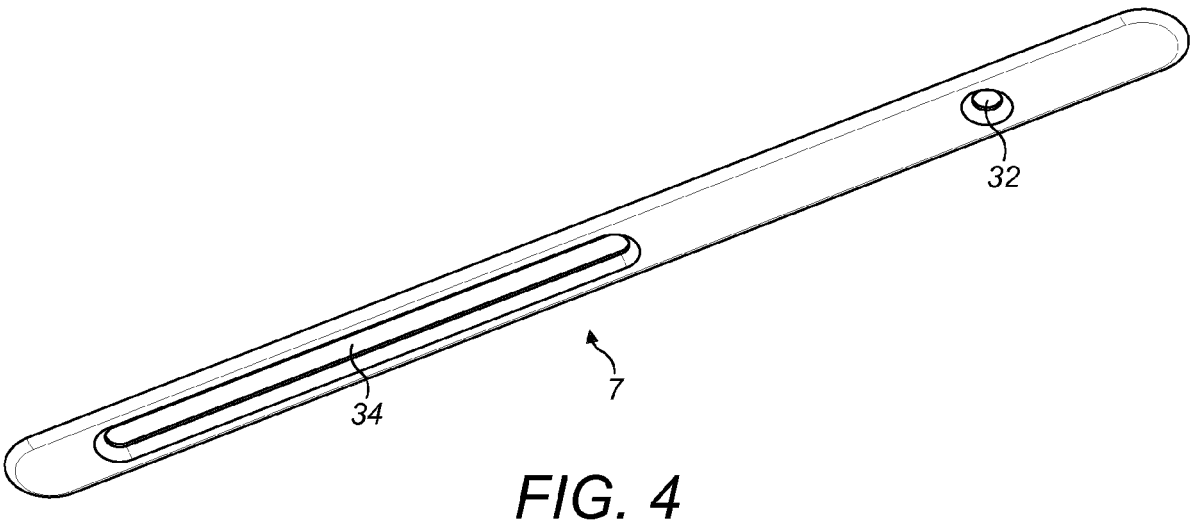

FIG. 4

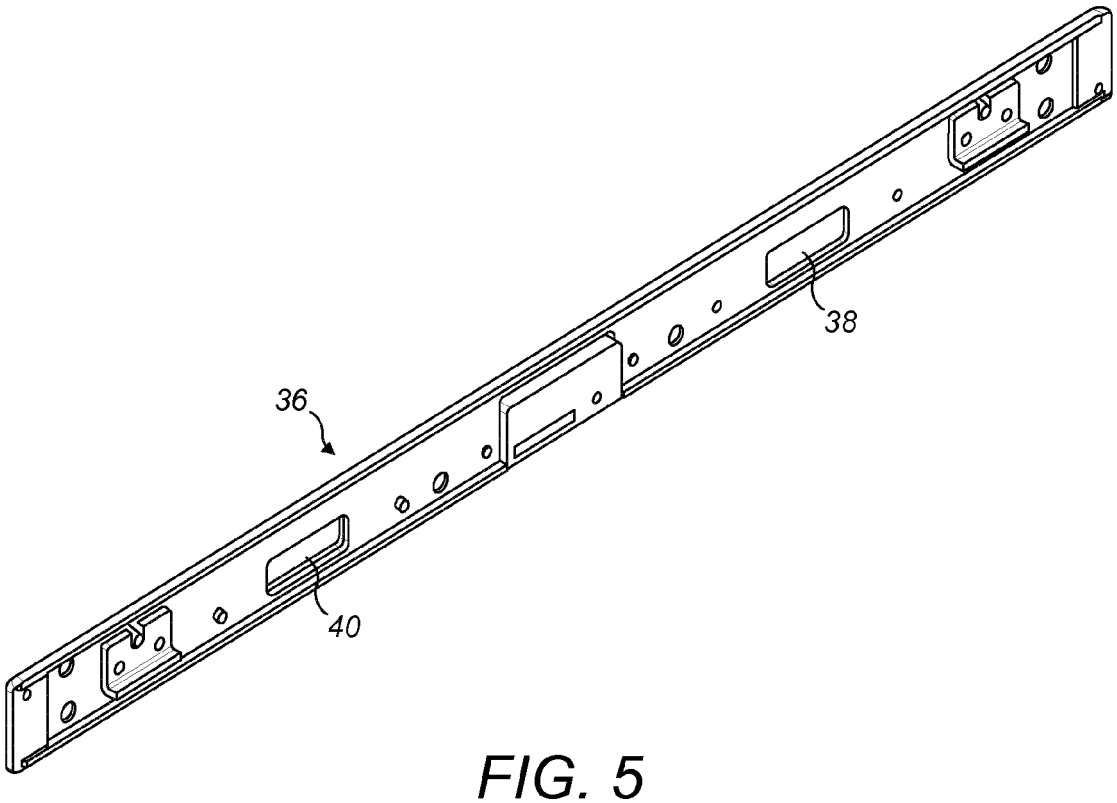

FIG. 5

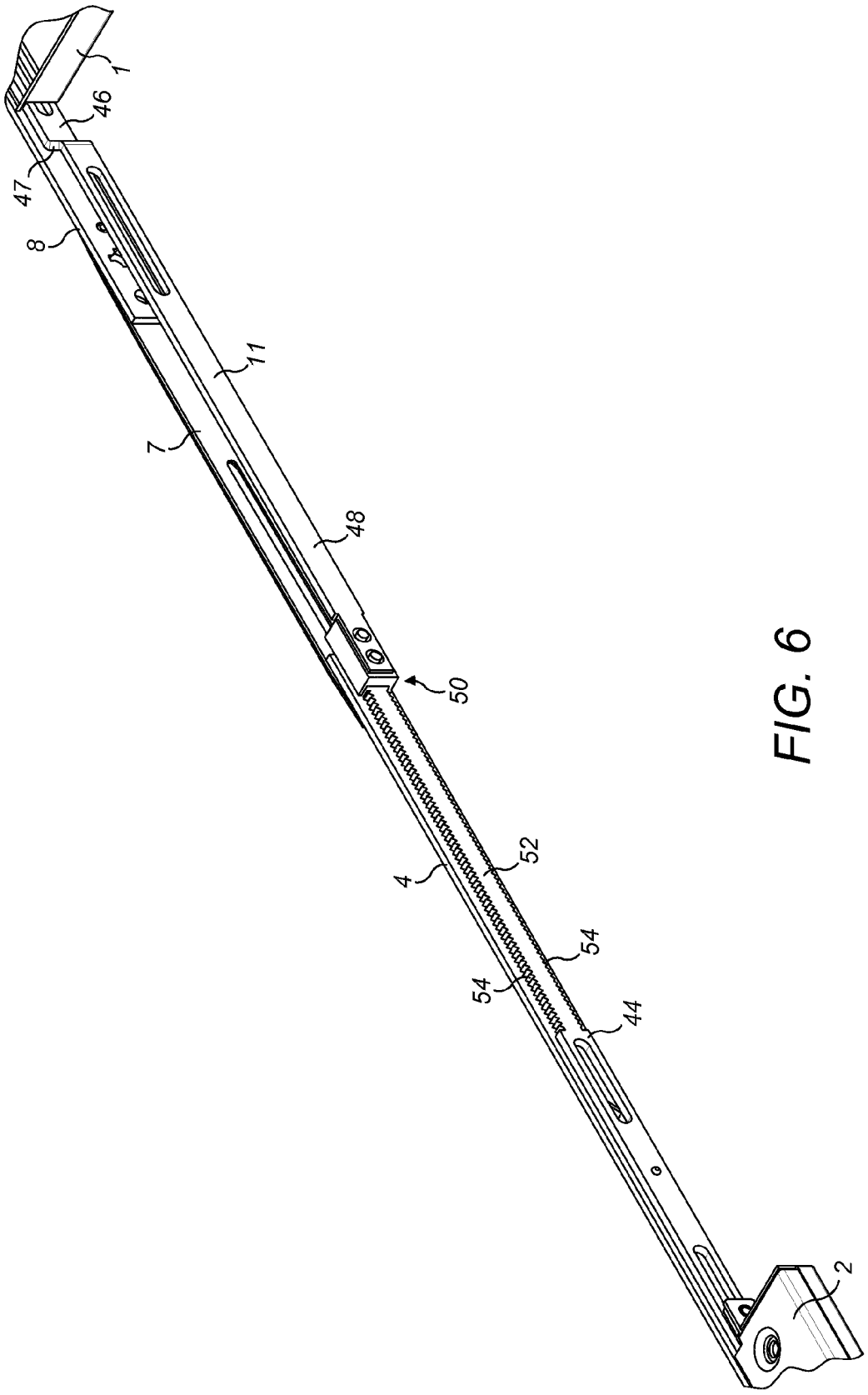

FIG. 6

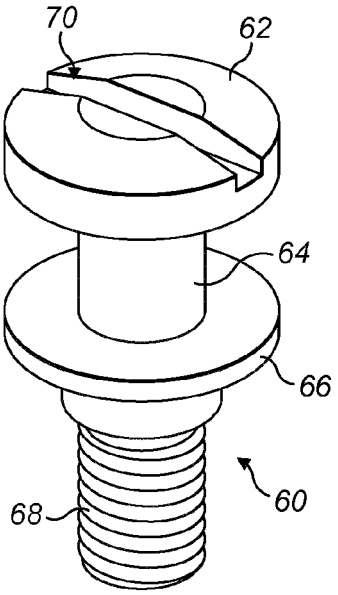

FIG. 7

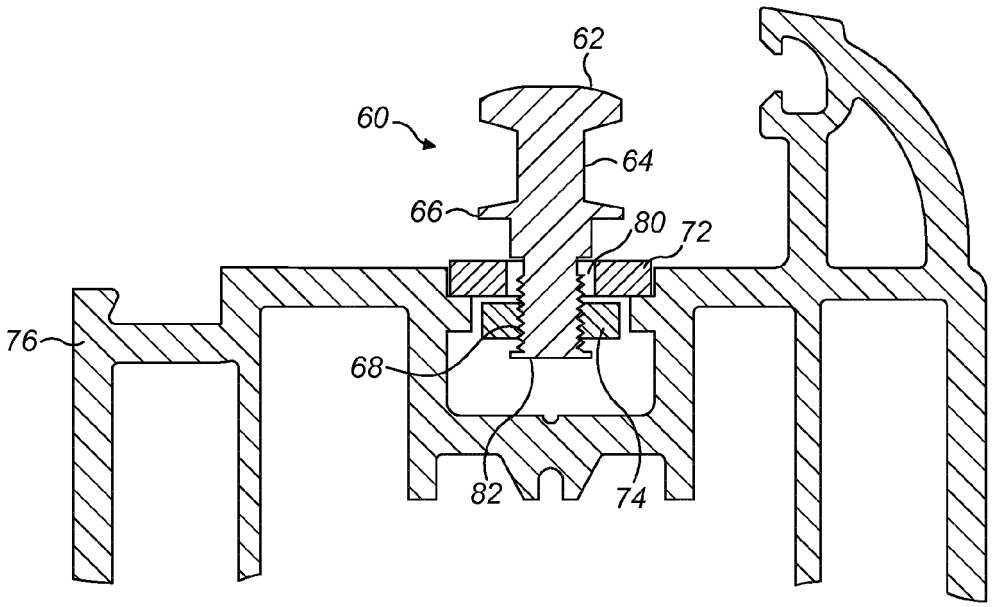

FIG. 8