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(54) **A LOCKING MECHANISM**

(57) A locking mechanism for a closure, which includes: a gear arrangement; a first supporting arm; a second supporting arm comprising a moveable portion; and one or more couplers. The moveable portion of the second supporting arm is mounted to the first supporting arm via the one or more couplers. The gear arrangement is

secured, mounted or otherwise coupled to the moveable portion of the second supporting arm and is moveable, in use, between two or more positions to adjust the spacing between the gear arrangement and the first supporting arm.

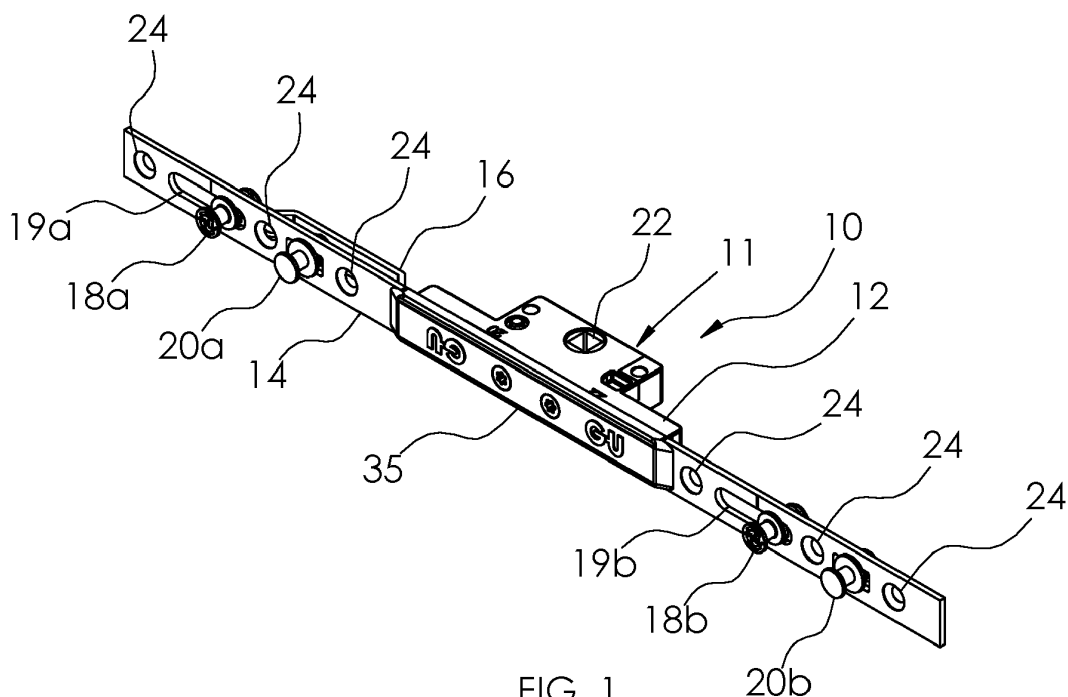


FIG. 1

Description

Technical Field of the Invention

[0001] The present invention relates to a locking mechanism and specifically to a locking mechanism for a door or window.

Background to the Invention

[0002] Locking mechanisms for closures such as windows and doors generally consist of a pair of supporting arms which are moveable with respect to one another. A supporting arm is typically mounted (e.g. via screws or other fixings) to the window or door sash, with the second supporting arm being able to slide with respect to first supporting arm to move one or more cams mounted thereto.

[0003] The cams provide a point of contact or engagement with a corresponding slot or aperture, for example in a frame associated with the window or door. Movement of the second supporting arm with respect to the first, and hence movement of the cams is generally controlled under the operation of a handle coupled to a gear arrangement. For instance, turning or otherwise acting on the handle may cause rotation of the gear mechanism. This is translated into linear movement (e.g. sliding) of the second supporting arm along the first supporting arm to move the cams.

[0004] Conventionally, mechanisms of this type, and specifically the gear arrangement is provided in two (or more) separate sizes/depths, typically 20mm and 22mm (measured with reference to the distance between an aperture within the gear arrangement for receiving a spindle of an operating handle and the major surface of the locking mechanism - i.e. the outer surface of the mechanism when mounted to a door or window sash). This can be problematic as the correct locking mechanism for a particular closure may be any one of at least two different sizes. For new closures this may not be overly problematic as the correct locking mechanism is likely to be supplied with the closure. However, for pre-existing closures, where one might want to replace the locking mechanism due to wear and tear or damage but without the expense of replacing the whole closure, there is a need to have access to at least two differently sized locking mechanisms to ensure the replacement mechanism is the correct size.

[0005] It would be advantageous to provide a locking mechanism which is fully adjustable to account for these different size requirements such that a single locking mechanism type may be used in multiple different situations.

[0006] It is an aim of an embodiment or embodiments of the invention to overcome or at least partially mitigate problems associated with the prior art.

Summary of the Invention

[0007] According to an aspect of the invention there is provided a locking mechanism for a closure, the locking mechanism comprising: a gear arrangement; and first and second supporting arms; wherein the gear arrangement is secured, mounted or otherwise coupled to a moveable portion of the second supporting arm and is moveable, in use, between two or more positions to adjust the spacing between the gear arrangement and the first supporting arm.

[0008] According to an aspect of the invention there is provided a locking mechanism for a closure, the locking mechanism comprising: a gear arrangement; a first supporting arm; a second supporting arm comprising a moveable portion; and one or more couplers; wherein the moveable portion of the second supporting arm is mounted to the first supporting arm via the one or more couplers; and wherein the gear arrangement is secured, mounted or otherwise coupled to the moveable portion of the second supporting arm and is moveable, in use, between two or more positions to adjust the spacing between the gear arrangement and the first supporting arm.

[0009] Advantageously, in this way the locking mechanism of the invention allows for the gear arrangement to be moved relative to the first supporting arm. This allows for the depth of the gear arrangement, for instance measured with reference to the spacing between an aperture within the gear arrangement for receiving a spindle of an operating handle and the major surface of the locking mechanism - i.e. the outer surface of the mechanism when mounted to a door or window sash, to be adjusted as required.

[0010] In some embodiments the gear arrangement comprises a gear. The gear may comprise one or more teeth for engaging with one or more corresponding slots provided on or within a further component of the locking mechanism. For example, the locking mechanism may comprise one or more slots on or within the second supporting arm of the locking mechanism. The one or more slots may be provided on or within the moveable portion of the second supporting arm.

[0011] In use, rotation of the gear causes the one or more teeth to engage with the one or more slots of the second supporting arm to cause linear movement of the second supporting arm in a direction corresponding to the direction of rotation of the gear. The gear may include an aperture therein for receiving a spindle of an operating handle. In use, with the spindle of the operating handle provided within the aperture, rotation of the handle may cause corresponding rotation of the gear, and hence movement of the second supporting arm of the locking mechanism.

[0012] The gear arrangement may comprise a housing provided about one or more components of the locking mechanism. For example, in some embodiments a housing may be provided about one or more of the gears of the gear arrangement, the one or more couplers, and the

moveable portion of the second supporting arm. The housing may be formed of two or more parts which may be suitably joined together to form the housing.

[0013] The gear arrangement may comprise a connecting member provided in an abutting or near abutting relationship with the moveable portion of the second supporting arm. In such embodiments, movement of the moveable portion in one or more directions may cause a corresponding movement of the connecting member. The connecting member may be integrally formed or otherwise connected within the gear arrangement such that movement of the connecting member in one or more directions causes a corresponding movement of the gear arrangement, in use, e.g. between the two or more positions. Equally, movement of the connecting member, for example under the application of a force to the gear assembly by a user may result in the movement of the moveable portion.

[0014] The connecting member may be secured to the moveable portion. In preferred embodiments the connecting member is not secured to the moveable portion but is rather configured such that the moveable portion may move linearly (e.g. slide) with respect to the connecting member without causing a corresponding movement of the connecting member.

[0015] The moveable portion of the second supporting arm may be positioned in use between the connecting member and an internal surface of the housing. In this way, the moveable portion and housing (or gear arrangement as a whole) may move as one component with respect to the first supporting arm.

[0016] The first supporting arm may comprise an elongate supporting arm. The elongate supporting arm may be substantially planar. The first supporting arm may include one or more apertures or slots therein. The one or more apertures or slots may be configured to receive fixing means in the form of screws, bolts or the like for securing the locking mechanism to a closure, in use. Additionally or alternatively, the first supporting arm may include one or more apertures or slots therein for receiving one or more locking cams. Where the first supporting arm comprises one or more slots, the one or more slots may be configured to allow a locking cam to move along the slot, for example upon movement of the second supporting arm with respect to the first supporting arm.

[0017] The second supporting arm may comprise one or more fixed portions. When used here and throughout the specification the term "fixed portion" of the second supporting arm is intended to cover a portion which is fixed in the direction of movement of the moveable portion of the second supporting arm - i.e. fixed in terms of the spacing between the fixed portion of the second supporting arm and the first supporting arm. The term "fixed" is not to be interpreted as limiting in terms of the overall movement of the supporting arm which, as discussed herein, may slide with respect to the first supporting arm, in use, whilst maintaining a set spacing therebetween.

[0018] The one or more fixed portions may be coupled

to the moveable portion of the second supporting arm via the one or more couplers. In embodiments, the second supporting arm comprises a pair of fixed portions. In such embodiments, a first fixed portion may be coupled to the moveable portion via a first coupler of the one or more couplers, and a second fixed portion may be coupled to the moveable portion via a second coupler of the one or more couplers. In some embodiments the fixed and moveable portions of the second supporting arm are coupled at ends thereof. For example, in some embodiments the moveable portion comprises a central moveable portion of the second supporting arm coupled at a first end thereof to a first fixed portion and at a second end thereof to a second fixed portion.

[0019] The first and/or second supporting arms may be fixedly mounted to the one or more couplers. For example, in some embodiments the first and/or second supporting arms may be fixedly mounted at an end of the one or more couplers.

[0020] In embodiments, at least the moveable portion of the second supporting arm may be moveably mounted to the one or more couplers. For example, the one or more couplers may comprise an elongate portion provided through a corresponding aperture in the moveable portion of the second supporting arm. The moveable portion may be configured to slide along the elongate portion of the one or more couplers. Advantageously, configuring the locking mechanism in this manner allows for the moveable portion (and hence the gear arrangement) to move between the at least two positions without affecting the coupling between the moveable portion and the fixed portion(s) of the second supporting arm. This allows for the second supporting arm to slide linearly with respect to the first supporting arm (e.g. under operation of an associated operating handle) irrespective of the position / height of the moveable portion between its at least two positions.

[0021] In embodiments, the first supporting arm is fixedly mounted at or proximal to a first end of the or each coupler, a fixed portion of the second supporting arm is fixedly mounted at or proximal to a second end of the or each coupler, and the moveable portion of the second supporting arm is moveably mounted to the or each coupler between the first and second ends and is moveable therebetween.

[0022] The one or more couplers may comprise one or more rivets. The one or more rivets may comprise a spun rivet or a threaded rivet and reciprocal connector, for example.

[0023] The gear arrangement may be moveable between a first position corresponding to a first spacing between the gear arrangement and the first supporting arm, and a second position corresponding to a second spacing between the gear arrangement and the first supporting arm. The first spacing may correspond to a first depth of the gear arrangement. The second spacing may correspond to a second depth of the gear arrangement. The first and/or second depths of the gear arrangement may

be measured with respect to the distance between an aperture within the gear arrangement - e.g. an aperture for receiving a spindle of an associated operating handle - and the outermost surface of the locking mechanism, in use. The outermost surface may comprise an outer surface of the first supporting arm. Alternatively, the outermost surface may comprise an outer surface of a housing or casing provided about one or more components of the locking mechanism, for instance a housing or casing for the gear arrangement itself.

[0024] The first depth of the gear arrangement may be at least 20mm, for example approximately 22mm or approximately 25mm. The second depth of the gear arrangement may be at least 18mm, for example approximately 20mm or approximately 22mm. In embodiments, the locking mechanism may be configured such that the gear arrangement may be adjusted between a first depth of approximately 22mm and a second depth of approximately 20mm. In further embodiments, the locking mechanism may be configured such that the gear arrangement may be adjusted between a first depth of approximately 25mm and a second depth of approximately 22mm.

[0025] The locking mechanism may include one or more locking cams. The one or more locking cams may be configured to be mounted on the first and/or second supporting arm and be configured to engage with a corresponding slot or aperture, in use, to close or lock an associated closure. The one or more locking cams may be adjustable between two or more axial positions and/or between two or more rotational positions.

[0026] The locking mechanism may comprise an operating handle. The operating handle may comprise a spindle. The spindle may be configured to be received, in use, within an aperture in the gear arrangement. In embodiments, rotation of the spindle within the aperture (e.g. under operation of the operating handle) may cause a corresponding rotation of the gear mechanism for controlling operation of the locking mechanism.

[0027] The locking mechanism may comprise a case-ment espagnolette type arrangement, for example, for providing a locking mechanism for a window. The locking mechanism may comprise a tilt and turn type arrangement, for example, for providing a locking mechanism for a window or door. The locking mechanism may comprise a parallel slide and tile type arrangement, for example, for providing a locking mechanism for sliding doors such as patio doors. The locking mechanism may comprise a multipoint lock type arrangement, for example, for providing a locking mechanism for a window or door.

[0028] According to a further aspect of the invention there is provided a closure comprising a locking mechanism of any preceding aspect of the invention.

[0029] The closure may comprise a window or door sash. The closure may comprise a tilting, turning or sliding closure arrangement. In embodiments the closure comprises a frame into which a window or door sash may be positioned.

[0030] Within the scope of the claims it is expressly

intended that the various aspects, embodiments, examples and alternatives set out in the preceding paragraphs, in the claims and/or in the following description and drawings, and in particular the individual features thereof, may be taken independently or in any combination.

Detailed Description of the Invention

[0031] In order that the invention may be more clearly understood one or more embodiments thereof will now be described, by way of example only, with reference to the accompanying drawings, of which:

Figure 1 is a perspective view of an embodiment of a locking mechanism of the present invention;

Figure 2 is a side cross sectional view of the locking mechanism shown in Figure 1;

Figure 3 is a further side cross sectional view of the locking mechanism shown in Figures 1 and 2, specifically showing section A of Figure 2;

Figures 4A and 4B are further side cross sectional views of the locking mechanism shown in the preceding Figures illustrating its operational use; and

Figure 5 is a perspective view of the locking mechanism of the preceding Figures shown in use.

[0032] An embodiment of the invention is illustrated in the Figures. It relates to a locking mechanism 10 for a closure such as a window or door. The locking mechanism 10 comprises a gear arrangement 11, a first supporting arm 14 and a second supporting arm 16. As is described herein, the gear arrangement 11 is secured, mounted or otherwise coupled to a moveable portion 32 of the second supporting arm 16 and is moveable, in use, between two or more positions to adjust the spacing between the gear arrangement 11 and the first supporting arm 14.

[0033] In general, the first supporting arm 14 and second supporting arm 16 are mounted within the locking mechanism 10 such that they are moveable with respect to one another. Specifically, the first supporting arm 14 and second supporting arm 16 may slide with respect to one another. As described herein, this may be caused through operation of the gear arrangement 11 of the lock mechanism 10, specifically acting on the second supporting arm 16.

[0034] The gear arrangement 11 comprises a gear 26 having teeth 28. The teeth 28 are configured such that they can be received in and engage with corresponding slots 30 provided within the second supporting arm 16, and specifically within the moveable portion 32 of the second supporting arm 16. In use, rotation of the gear 26 causes the teeth 28 to engage with a corresponding slot 30 to cause linear movement of the second support-

ing arm 16 in a direction corresponding to the direction of rotation of the gear 26. The gear includes an aperture 22 therein for receiving a spindle of an operating handle (not shown). In use, rotation of the operating handle causes a corresponding rotation of the gear 26, and hence movement of the second supporting arm 16 of the locking mechanism 10.

[0035] The gear arrangement additionally includes a housing 12 which houses components of the locking mechanism 10, specifically the gear 26 and the moveable portion 32 of the second supporting arm 16. In effect, the housing 12 defines a volume within which moveable components of the locking mechanism 10 may move to move the gear arrangement 11 between its two or more positions. In the illustrated embodiment, the housing additionally defines a major surface 35 of the locking mechanism 10, the major surface 35 forming an outermost surface of the locking mechanism 10 when installed as part of a closure.

[0036] As shown, the gear arrangement 11 additionally includes a connecting member 33 provided in an abutting relationship with the moveable portion 32 of the second supporting arm 16. Specifically, the connecting member 33 comprises a projection integrally formed as part of an internal wall of the housing 12. In use, movement of the moveable portion 32, specifically upwards and downwards in the orientation shown in the Figures causes a corresponding movement of the connecting member 33 and hence the housing 12 and gear arrangement 11 as a whole, and vice versa with movement of the gear arrangement 11 causing a corresponding movement of the moveable portion 32.

[0037] The first supporting arm 14 comprises an elongate and substantially planar structure. As shown, the first supporting arm 14 includes a series of apertures 24 and slots 19a, 19b therein. The apertures 24 are configured to receive fixing means in the form of screws, bolts or the like for securing the locking mechanism 10 to a closure, in use. The slots 19a, 19b are configured to receive corresponding locking cams 18a, 18b. Slots 19a, 19b allow for the respective locking cams 18a, 18b to move along the slot upon movement of the second supporting arm 16 with respect to the first supporting arm 14.

[0038] The second supporting arm 16 comprises a central moveable portion 32 and a pair of fixed portions 16a, 16b coupled to opposing ends of the central moveable portion 32. This coupling is provided by couplers in the form of rivets 34a, 34b, with rivet 34a coupling a first fixed portion 16a to a first end of the moveable portion 32 and rivet 34b coupling a second fixed portion 16b to a second end of the moveable portion 32. The first and second fixed portions 16a, 16b are fixed to the respective rivets 34a, 34b at an end thereof whereas the moveable portion 32 is moveably mounted to the rivets 34a, 34b, specifically allowing the moveable portion 32 to be displaced along a length of the rivets 34a, 34b - upwards and downwards in the orientation shown in the Figures. The first supporting arm 14 is fixed to the rivets 34a, 34b

at an opposing end to the fixed portions 16a, 16b of the second supporting arm 16 thereby defining a length of travel/displacement for the moveable portion 32.

[0039] The locking mechanism 10 illustrated in the Figures comprises two pairs of locking cams, specifically locking cams 18a, 18b and locking cams 20a, 20b. As described above, locking cams 18a, 18b are configured such that they may move along respective slots 19a, 19b in the first supporting arm 14 upon movement of the second supporting arm 16. In contrast, cams 20a, 20b are fixed in position with respect to the first supporting arm 14. In use, the locking cams 18a, 18b, 20a, 20b are configured to provide a point of contact or engagement with a corresponding slot or aperture provided on a complementary part of the closure. For example, where the locking mechanism 10 is secured to a window or door sash, the corresponding slots or apertures may be provided on the complementary frame for engagement with the locking cams 18a, 18b, 20a, 20b for closing and/or securing the closure.

[0040] The operational use of the locking mechanism 10 is illustrated in Figures 4A and 4B.

[0041] In Figure 4A, the locking mechanism 10 is shown in a first configuration with the gear arrangement 11 in a first position. This first position corresponds to a first depth of the gear arrangement 11. In this position, the moveable portion 32 of the second supporting arm 16 is found at a lower (in the orientation shown in the Figures) end of the rivets 34a, 34b, proximal to the end at which the first and second fixed portions 16a, 16b are coupled to respective rivets 34a, 34b.

[0042] Figure 4B shows the locking mechanism 10 is a second configuration with the gear arrangement 11 in a second position. The second position corresponds to a second depth of the gear arrangement, less than the first depth shown in Figure 4A. In this position, the moveable portion 32 of the second supporting arm 16 is found at an upper (in the orientation shown in the Figures) end of the rivets 34a, 34b, proximal to the end at which the first supporting arm 14 is coupled to the rivets 34a, 34b. The moveable portion 32 is able to move to this position from the first position shown in Figure 4A by moving along an elongate central portion of the rivets 34a, 34b. In the illustrated embodiment this movement is caused through manual interaction by a user, for instance by compressing the housing 12 of the gear assembly 11.

[0043] Figure 5 shows the locking mechanism 10 in position on a closure sash 50, which may be a door or window sash. The locking mechanism 10 is secured in position using suitable fixing means, e.g. screws or the like, received through apertures 24 in the first supporting arm 14 as discussed herein. Similarly, the closure sash 50 includes apertures 54a, 54b for receiving fixing means for securing an operating handle (not shown) to the closure sash 50 for operating the locking mechanism 10.

[0044] The closure sash 50 additionally includes an aperture 52 for receiving an operating spindle (not shown) of the operating handle which, as discussed here-

in, is received within aperture 22 in the locking mechanism 10 to allow for the locking mechanism 10 to be operated by the operating handle. Advantageously, the present invention allows for movement of the gear arrangement 11 between two (or more) positions to enable the aperture 22 in the locking mechanism 10 to be aligned with the aperture 52 in the closure sash 50.

[0045] The one or more embodiments are described above by way of example only. Many variations are possible without departing from the scope of protection afforded by the appended claims.

Claims

1. A locking mechanism for a closure, the locking mechanism comprising:

a gear arrangement;
a first supporting arm;
a second supporting arm comprising a moveable portion; and
one or more couplers;
wherein the moveable portion of the second supporting arm is mounted to the first supporting arm via the one or more couplers; and
wherein the gear arrangement is secured, mounted or otherwise coupled to the moveable portion of the second supporting arm and is moveable, in use, between two or more positions to adjust the spacing between the gear arrangement and the first supporting arm.

2. A locking mechanism as claimed in claim 1, wherein the gear arrangement comprises a connecting member provided in an abutting or near abutting relationship with the moveable portion of the second supporting arm.

3. A locking mechanism as claimed in claim 2, wherein the connecting member is integrally formed or otherwise connected within the gear arrangement such that movement of the connecting member in one or more directions causes a corresponding movement of the gear arrangement.

4. A locking mechanism as claimed in any preceding claim, wherein the second supporting arm comprises one or more fixed portions.

5. A locking mechanism as claimed in claim 4, wherein the one or more fixed portions are coupled to the moveable portion of the second supporting arm via the one or more couplers.

6. A locking mechanism as claimed in claim 5, wherein the second supporting arm comprises a pair of fixed portions, comprising a first fixed portion coupled to

the moveable portion via a first coupler of the one or more couplers, and a second fixed portion coupled to the moveable portion via a second coupler of the one or more couplers.

7. A locking mechanism as claimed in claim 6, wherein the moveable portion comprises a central moveable portion of the second supporting arm coupled at a first end thereof to a first fixed portion of the second supporting arm and at a second end thereof to a second fixed portion of the second supporting arm.

8. A locking mechanism as claimed in any preceding claim, wherein the first and/or second supporting arms are fixedly mounted to the one or more couplers.

9. A locking mechanism as claimed in any preceding claim, wherein at least the moveable portion of the second supporting arm is moveably mounted to the one or more couplers.

10. A locking mechanism as claimed in claim 9, wherein the one or more couplers comprise an elongate portion provided through a corresponding aperture in the moveable portion of the second supporting arm, and wherein the moveable portion is configured to slide along the elongate portion of the one or more couplers.

11. A locking mechanism as claimed in claim 9 or claim 10, wherein the first supporting arm is fixedly mounted at or proximal to a first end of the or each coupler, a fixed portion of the second supporting arm is fixedly mounted at or proximal to a second end of the or each coupler, and the moveable portion of the second supporting arm is moveably mounted to the or each coupler between the first and second ends and is moveable therebetween.

12. A locking mechanism as claimed in any preceding claim, wherein the gear arrangement is moveable between a first position corresponding to a first spacing between the gear arrangement and the first supporting arm, and a second position corresponding to a second spacing between the gear arrangement and the first supporting arm; optionally wherein the first spacing corresponds to a first depth of the gear arrangement, and wherein the second spacing corresponds to a second depth of the gear arrangement.

13. A locking mechanism as claimed in any preceding claim, comprising one or more locking cams; optionally wherein the one or more locking cams are configured to be mounted on the first and/or second supporting arm and are configured to engage with a corresponding slot or aperture in use to close or lock an associated closure.

14. A locking mechanism as claimed in claim 13, wherein the or each locking cam is adjustable between two or more axial positions and/or between two or more rotational positions.

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15. A closure comprising a locking mechanism of any preceding claim.

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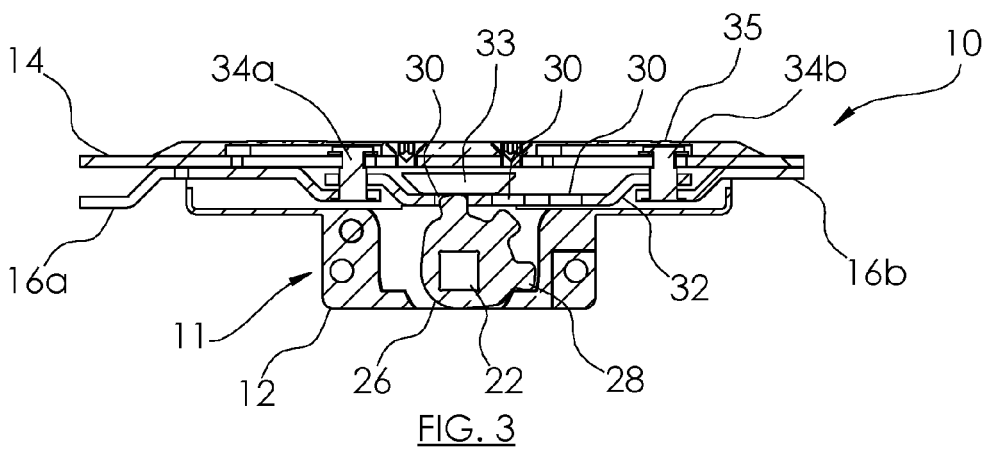
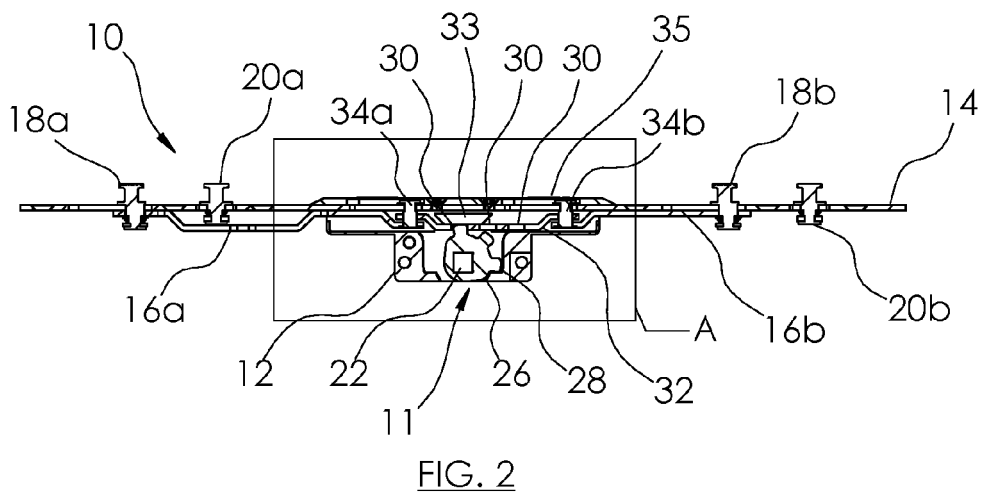
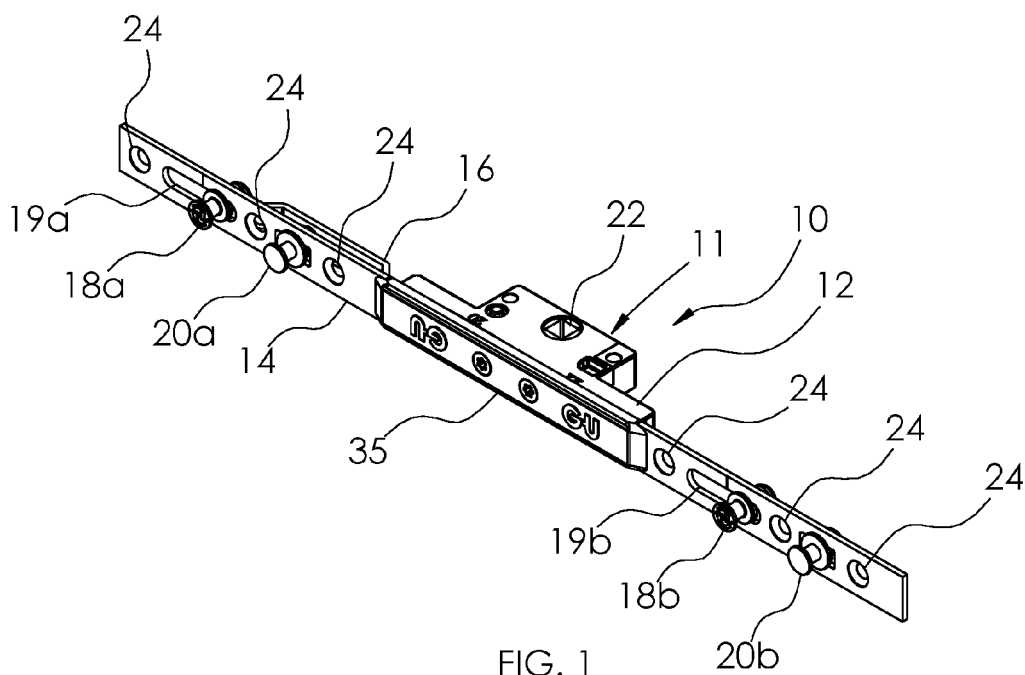
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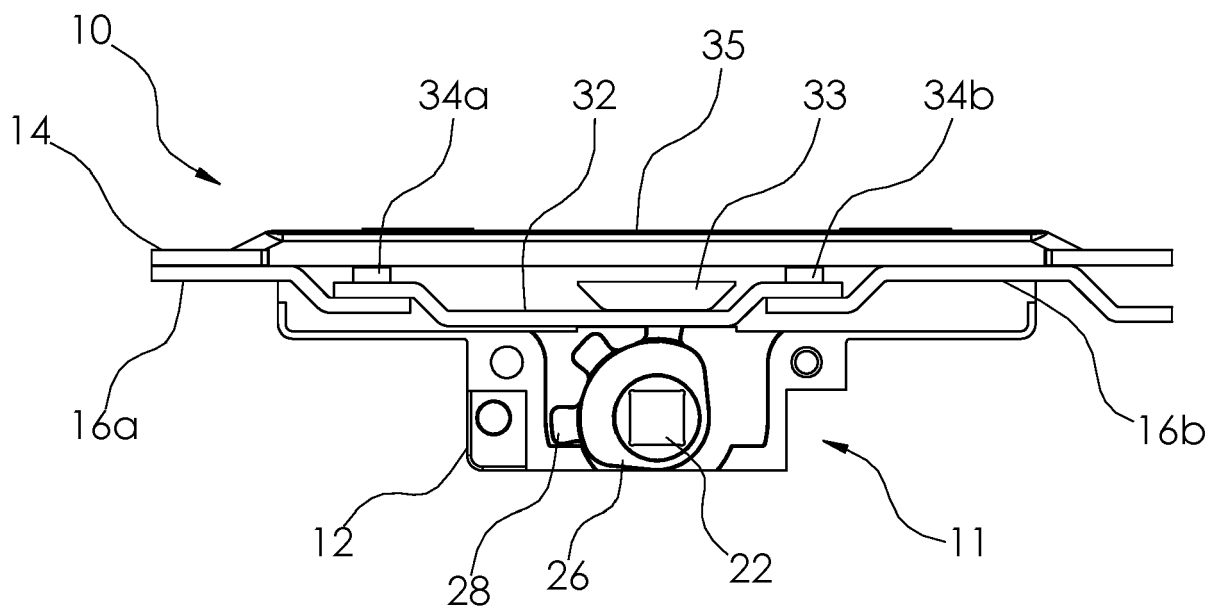


FIG. 4A

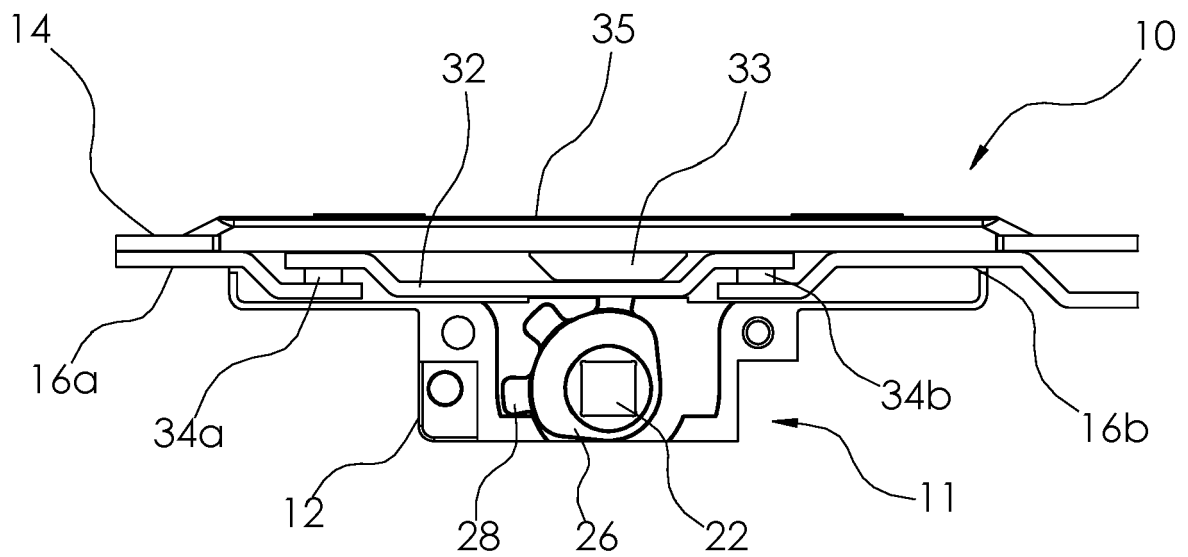


FIG. 4B

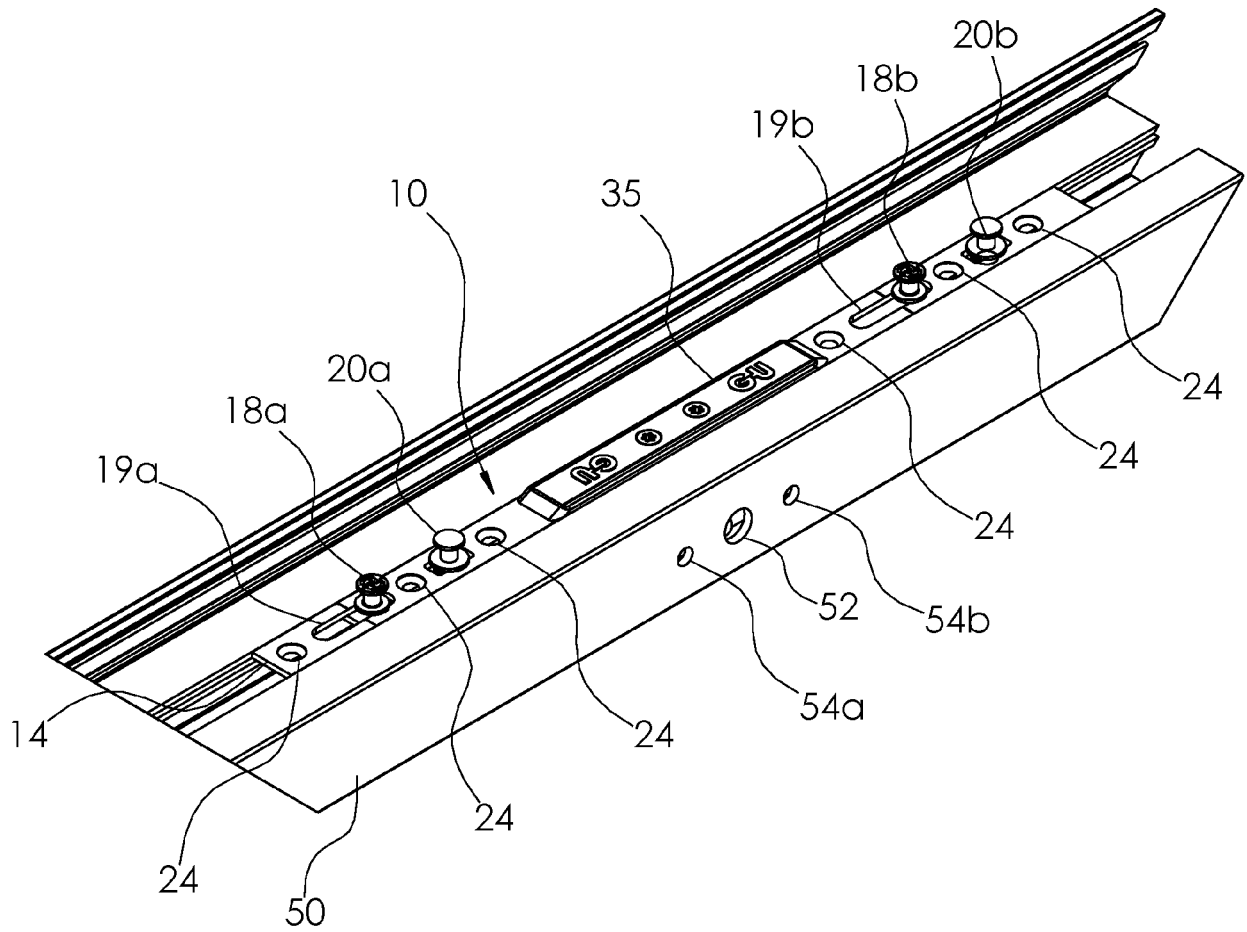


FIG. 5

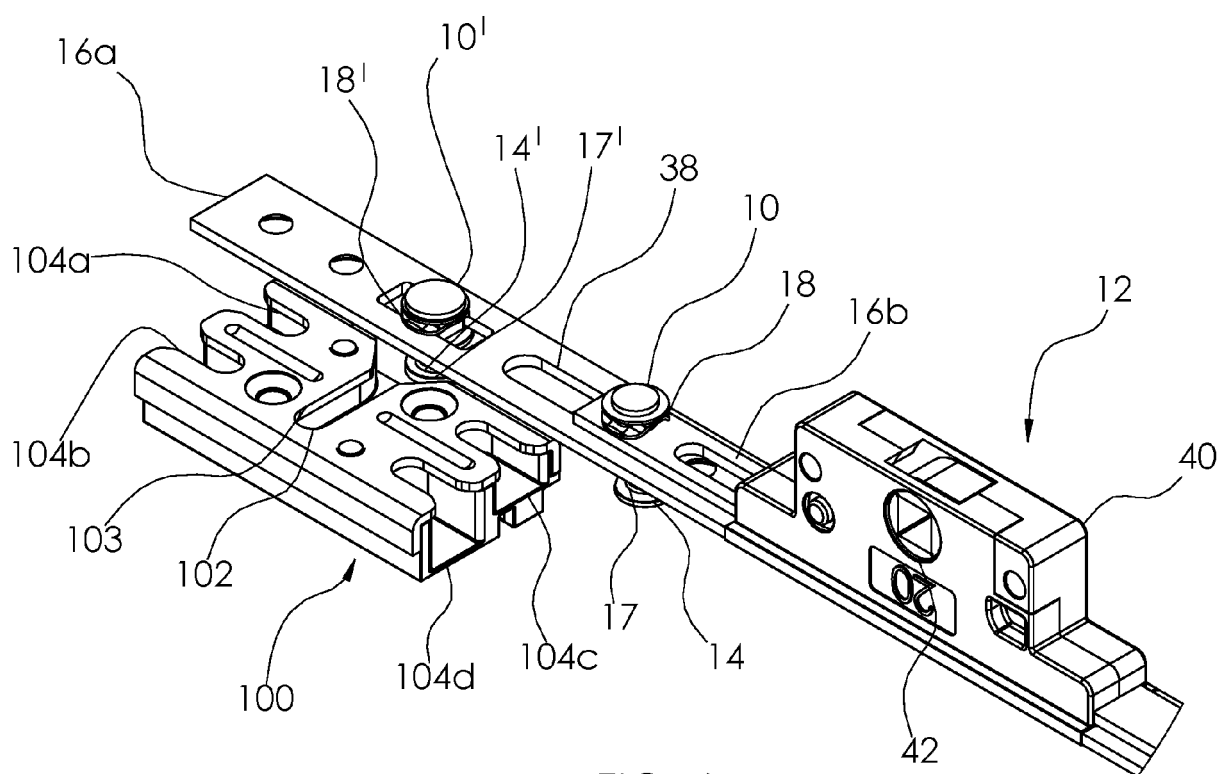


FIG. 6

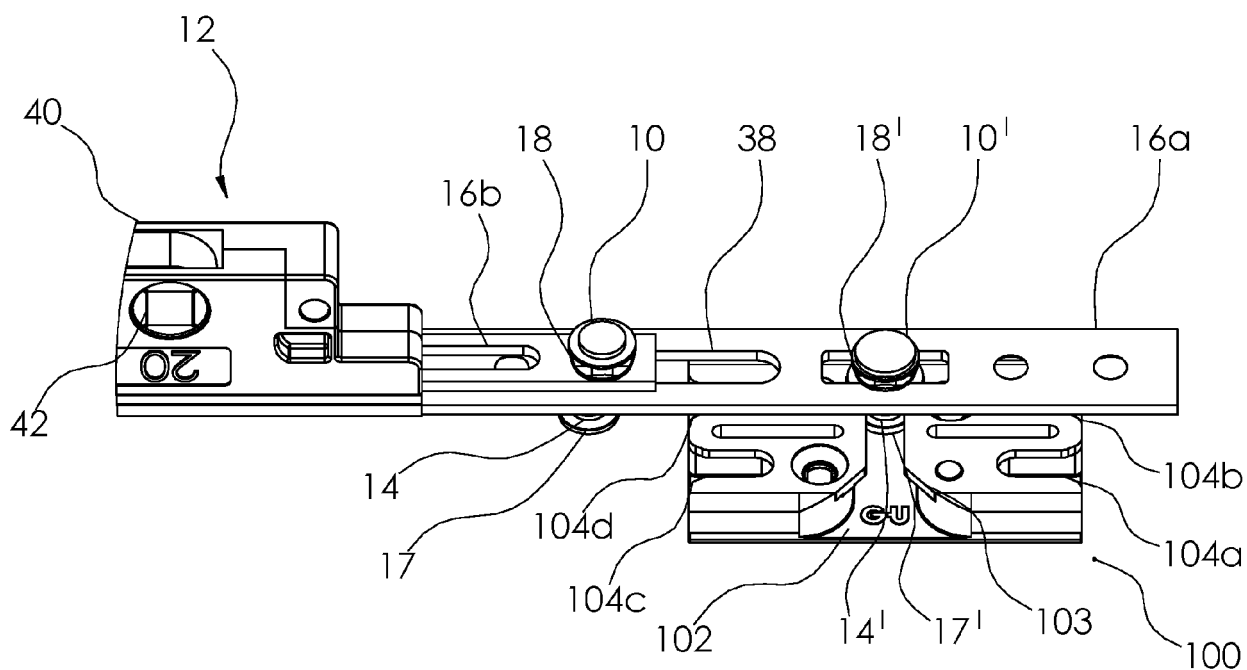


FIG. 7



EUROPEAN SEARCH REPORT

 Application Number
EP 20 27 5165

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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 2 March 2021	Examiner Geerts, Arnold
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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