



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
28.01.2015 Bulletin 2015/05

(51) Int Cl.:
E05B 65/10 (2006.01) **E05B 59/00** (2006.01)
E05B 41/00 (2006.01) **E05B 17/22** (2006.01)

(21) Application number: **14178031.2**

(22) Date of filing: **22.07.2014**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(72) Inventors:
• **FINNHULT, Mikael**
SE-212 36 MALMÖ (SE)
• **SJÖHOLM, Jan**
SE-233 42 SVEDALA (SE)
• **JÖNSSON, Inge**
SE-216 17 LIMHAMN (SE)

(30) Priority: **22.07.2013 EP 13177440**

(71) Applicant: **Instrumentfirman Sjöholm AB**
213 74 Malmö (SE)

(74) Representative: **Ström & Gulliksson AB**
P.O. Box 4188
203 13 Malmö (SE)

(54) **An adapter for a lock case**

(57) An adapter for a lock case, having a handle unit (131) to be connected to a door handle and arranged to be rotated about a first axis (A') when the door handle is pushed down or pulled up in order to move a latch bolt in and out from said lock case. The adapter further has a lock unit (132) to be connected to a lock follower extending through said lock case and arranged to rotate

about a second axis (B') for moving a lock bolt in and out from said lock case. The handle unit (131) comprises an end portion (137) and the lock unit (132) comprises an end portion (143) which are engaged with each other in such a way that when the handle unit (131) starts to rotate about the first axis (A') the lock unit (132) starts to rotate about the second axis (B').

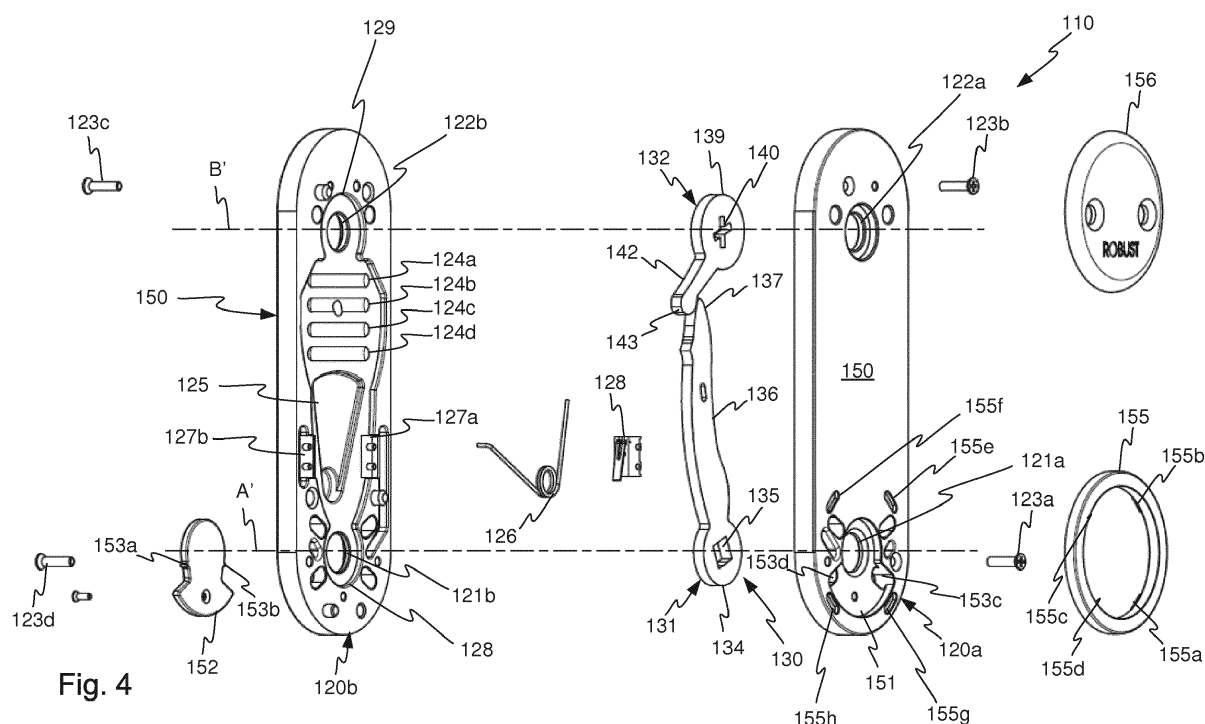


Fig. 4

Description

TECHNICAL FIELD

[0001] The present invention relates to an adapter for a lock case for opening a locked door without a key or a locking knob. In particular, the present invention relates to an adapter to be connected to a lock case for always allowing a person to open a door from the inside without a key, a knob or a handle, even if said door is locked.

BACKGROUND

[0002] There are many situations where it is of importance to be able to open a door without needing a key or a locking knob. Today there are systems used for this purpose in e.g. escape routes, in hotel doors and in schools so that people e.g. can escape a potential danger. A common system used today is called a split spindle system which is arranged to disengage the inner handle from the outer handle in such way the door may be opened from the inside even though it is locked from the outside. Hence, such split spindle solution may be utilized such that the inner door handle always is connected to the lock bolt, whereby the outer door handle is disconnected from the lock bolt.

[0003] One disadvantage is that the installation of the split spindle system usually is made in extremely small or narrow areas or surfaces inside the lock case, which areas and/or surfaces may get worn out if the door is constantly used; doors in schools are one example. When the split spindle gets worn out the entire system may stop working and the door may not be opened. Such damage will result in the inner door handle to always be disengaged from the lock bolt which means that if the door is locked, a person entrapped inside the door will have no possibility to exit.

[0004] Further, since the split-spindle system operates on small and narrow surfaces it may be complicated to install the system, for new installations as well as when it needs to be replaced or maintained.

SUMMARY

[0005] An object of the present invention is to provide a new adapter for a lock case, which is improved over prior art. This object is achieved by a technique defined in the appended independent claims; certain embodiment being set forth in the related dependent claims.

[0006] In one aspect of the invention there is provided an adapter for a lock case including a handle unit to be connected to a door handle and arranged to be rotated about a first axis when the door handle is pushed down or pulled up for moving a latch bolt in and out from said lock case. The adapter further includes a lock unit to be connected to a lock follower extending through said lock case and arranged to rotate about a second axis for moving a lock bolt in and out from said lock case. The handle

unit comprises an end portion and the lock unit comprises an end portion which are engaged with each other in such a way that when the handle unit starts to rotate about the first axis the lock unit starts to rotate about the second axis. Also, the adapter includes a first cover portion and a second cover portion, where the first and second cover portion in an assembled state are configured to enclose the handle unit and the lock unit. The adapter further has a lock washer connected to the outside surface of at least one of the first and second cover portions opposite the connection between said handle unit and the door handle. An advantage with the presented adapter is that it provides a secure transmission of the movement between the handle and the latch bolt/lock bolt so that a user at any time may open the door, e.g. in the case of an emergency. The adapter is further a safe and reliable adapter which when there are two separate handle follower, one from each side, prevents the followers to engage with each other. This is advantageous since there is otherwise a risk of e.g. damaging the components of the adapter.

[0007] In an embodiment of the invention the adapter is adapted to be arranged on one side of a door, between a door leaf and the door handle. This is advantageous when the adapter is used on a door which is used as e.g. an emergency door or a hotel door where it is necessary and desired to be able to open the locked door and get out.

[0008] In another embodiment the adapter is adapted to be detachable from said door which is advantageous since it is possible to then post-install the adapter to a door which is already installed.

[0009] In an alternative embodiment the end portions of the handle unit and the lock unit are in constant contact with each other. Since the lock unit always is in contact with the handle unit the adapter never has to be switched on to function.

[0010] In an embodiment the handle unit is biased such that it automatically returns to an idle state, corresponding to a horizontally aligned position of the door handle, when a force pushing down or pulling up the door handle has been released. This is as above also an assurance that the door is always locked except for when the handle is pushed down, which is advantageous for e.g. emergency doors.

[0011] In yet another alternative embodiment the adapter further comprises an indicator configured to indicate an active and/or inactive state of said adapter, which is advantageous since it provides a clear indication whether the adapter is able to accomplish its function.

[0012] In another aspect of the invention there is provided a door lock assembly for mounting to a door leaf, comprising a lock case including a latch bolt to be operated by at least one door handle connected to a door handle follower of said lock case, a lock bolt in connection with a lock follower of said lock case, and an adapter as described above, connected to said lock case.

[0013] In yet another aspect of the invention there is

provided a door comprising a door lock assembly mentioned above.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] Embodiment of the invention will be described in the following; reference being made to the appended drawings which illustrate non-limiting examples of how the inventive concept can be reduced into practice.

Fig. 1 is an exploded view of an adapter according to an embodiment,
 Fig. 2 shows the adapter in Fig. 1 in a locked state,
 Fig. 3 shows the adapter in Fig. 1 in an unlocked state,
 Fig. 4 is an exploded view of an adapter according to a second embodiment,
 Fig. 5 shows the adapter in Fig. 4 in a locked state,
 Fig. 6 shows the adapter in Fig. 4 in an unlocked state,
 Fig. 7 is an exploded view of an adapter according to a third embodiment,
 Fig. 8 shows the adapter in Fig. 7 in a locked state, and
 Fig. 9 shows the adapter in Fig. 7 in an unlocked state.

DETAILED DESCRIPTION OF EMBODIMENTS

[0015] With reference to Fig. 1 an adapter 10 is shown, including a casing 20 and a transmission 50 which is suitable to use together with a lock case of a door. The casing 20 comprises a cover portion 21 which comprises a base member 22 and a side member 23 surrounding the base member 22 along its periphery and extending perpendicularly from said base member 22. The base member 22 and the side member 23 are in this case integrally formed and made in one piece, casted in preferably zinc. In an alternative embodiment the base member 22 may be mounted, e.g. by welding, to one edge of the side member 23 such that they together may accommodate a support portion 24. In another embodiment the base member 22 and the side member 23 may be made in one piece.

[0016] The cover portion 21 further includes a first circular opening 25a which is centered arranged about a first axis A, and a second circular opening 26a which is centered arranged about a second axis B. The first opening 25a of the cover portion 21 corresponds to a first opening 25b of the support portion 24 which is also centered arranged about the first axis A. In the same way the second opening 26a of the cover portion 21 corresponds to a second opening 26b of the support portion 24 and centered arranged about the second axis B.

[0017] The support portion 24 is preferably made in a solid piece which has the same outer shape and size as the base member 22 of the cover portion 21. In an assembled state the base member 22 and the side member

23 of the cover portion 21 enclose the support portion 24 with the exception of the rear outer surface of the support portion 24, adapted to be in close contact with the door. The cover portion 21 and the support portion 24 are assembled by means of fastening means, in this case screws 27a-d which are inserted into threaded holes 28a-h in the cover portion 21 and the support portion 24. The two portions 21, 24 are preferably made of a castable material such as metal or plastic.

[0018] The support portion 24 further comprises a spring recess 29 for receiving a spring 40 and at least one sensor recess 30a, 30b for receiving an electronic sensor 41. Close to the second opening 26b of the support portion 24 a curved track 31 is arranged for receiving a guide member 57 which will be described further below. The recesses 29, 30a, 30b and the track 31 may preferably be shaped by molding or milling.

[0019] Accommodated within the casing 20 is the spring 40, the optional electronic sensor 41, a door handle bushing 42 arranged with four outer grooves 43 a-d and a square centered opening 44 and a lock bushing 45 with two outer grooves 46a-b and a rectangular centered opening 47. In another embodiment the axles 42, 45 may of course have another suitable appearance for providing a suitable fitting with regards to the lock case. The handle bushing 42 is arranged in the first openings 25a, 25b of the cover portion 21 and the support portion 24 and its square opening 44 is arranged to receive a handle follower which is connected to a handle on one side, in this case on the inside, of a door. The lock bushing 45 is arranged in the second openings 26a, 26b of the cover portion 21 and the support portion 24 and its rectangular opening 47 is arranged to receive a lock follower which is in operation with a lock bolt within the lock case. To be able to support the handle bushing 42 and the lock bushing 45 in their right places the first and second openings 25a, 25b, 26a, 26b are provided with an edge or a stop close to the outer surface of the cover portion 21 and support portion 24, so that the bushing 42, 45 do not fall out of the casing 20. The handle bushing 42 and the lock bushing 45 are however always free to rotate about the first and second axis A, B.

[0020] The casing 20 further accommodates a transmission 50 including a handle lever 51 which is provided with an opening 52 at its first end 53. The shape of the opening 52 corresponds to the outer shape of the handle bushing 42, where the opening 52 has four protrusion 54a-d which are configured to slide into the outer grooves 43a-d of the handle bushing 42 when assembling the two parts 42, 51 together. The handle lever 51 is connected to the handle bushing 42 in such a way that it is required to rotate with the handle bushing 42. Further, the handle lever 51 has an elongated hole 54 on its intermediate part 55 for receiving the spring 40 arranged in the spring recess 29. The handle lever 51 is, in an assembled state, located in an recess of the support portion 24 which allows the handle lever 51 to rotate a certain number of degrees, preferably between 10° and 30° which corre-

sponds to a normal movement a handle being pushed down, about the first axis A. In alternative embodiments the preferred degrees of rotation may be different depending on the features of the handle and door, e.g. in some embodiments the handle has to be rotated up to 360° which may lead to the adapter further including gear means (not shown). The second end 55 of the handle lever 51 has a side surface 56 which is allowed to engage with a guiding member 57 and during rotation may push on the guiding member 57 which is arranged to be guided in the curved track 31.

[0021] Besides from the guiding member 57 the transmission 50 further includes a lock lever 58 to which the guiding member 57 is fixedly connected. In an alternative embodiment the guiding member 57 and the lock lever 58 may be formed integrally and made in one piece and yet in another embodiment the guiding member 57, the lock lever 58 and the lock bushing 45 may be made in one piece. The lock lever 58 is at its first end 59 provided with an opening 60 for receiving the guiding member 57, the shape of the guiding member 57 then should preferably correspond to the shape of the opening 60. The first end 59 is slightly elevated relative to the second end 61 of the lock lever 58 so that e.g. the lock lever 58 does not risk to affect the side surface 56 of the handle lever 51 as it rotates. In an alternative embodiment there is no elevation between the first end and the second end.

[0022] The second end 61 of the lock lever 58 is provided with an opening 62 configured to receive the lock bushing 45. The opening 62 has two protrusions 63a-b which corresponds to the two outer grooves 46a-b of the lock bushing which together in an assembled state provides a strong connection for securing rotational fixation between the lock lever 58 and the lock axle 45. The appearances of the handle bushing 42, the handle lever 51, the guiding member 57, the lock lever 58 and the lock bushing 45 may of course in other embodiments have another shape suitable for its purpose. These parts may preferably be made of plastic or metal.

[0023] In an alternative embodiment, e.g. where the adapter is arranged to a lock case in which the handle follower and the lock follower has the same rotational direction there may be a direct connection between the handle lever and the second end of the lock lever or the lock follower.

[0024] In another embodiment the transmission has a handle unit including the handle lever and the handle bushing, and a lock unit including the lock bushing, the lock lever and the guiding member. The handle unit and lock unit may each be manufactured as one single piece, i.e. not consist of two or three separate components.

[0025] Fig. 2 shows the adapter 10 mounted to a door leaf 70 and an inner handle 80, in a first idle state when the handle 80 is in a resting position. This handle 80 is configured to be left hand rotated, if the handle is right hand rotated the appearance of the adapter 10 is inverted in relation to what is shown in Fig. 2. The handle 80 is connected to the handle bushing 42 through an optional

handle follower (not shown). The handle lever 51 is in an idle state resting against one side of the recess, in this case to the right. The lock lever 61 and its guiding member 57 are also located to the right in the idle state and in contact with the side surface 56 of the handle lever 51. The lock bushing 45 is connected to a biased lock follower (not shown) leading to a lock bolt 81.

[0026] Fig. 3 then shows the adapter 10 in a second state where the inside door handle 70 has been pushed down. As soon as the handle 70 is pushed down the handle bushing 42 with the handle lever 51 starts to rotate about the first axis A. The second end 55 of the handle lever 51 then starts to move towards the left side of the recess, pushing the first end 59 of the lock lever 58 and the guiding member in the same direction. As the handle lever 51 rotates the spring 40 is strained. As the first end 59 of the lock lever 58 is pushed to one side the second end 61 and the lock bushing 45 starts to rotate about the second axis B, leading to rotation of the biased lock follower. The lock bolt 81 is before rotation of the lock follower in an idle state protruding from the door leaf 70 leaving the door locked. When the lock follower rotates the lock bolt 81 is pulled into the door leaf 70 unlocking the door.

[0027] As soon as the person pushing the handle 80 down lets go of it, it returns to its resting position, shown in Fig. 2, by means of the strained spring 40 acting on the handle lever 51. The spring 40 pulls back the handle lever 51 leading to the handle bushing 42 rotating the handle follower and the handle 80 back to its resting position. At the same time the biased lock follower rotates back to its idle state resulting in that the lock bolt 81 is pushed out of the door leaf 70 locking the door and that the lock bushing 45 and lock lever 58 returns the position shown in Fig. 2.

[0028] The rotation of the handle lever 51 also affects the optional electronic sensor 41 which may be located in one of the two sensor recesses 30a, 30b in such a way that either when the contact between the sensor 41 and the handle lever 51 is broken or generated the sensor can send a signal to the, in this embodiment, an electronic locker which from the outside preferably is opened by means of a card or a code. The sensor 41 may be used to by-pass a possible alarm or pass system when a person opens the door from the inside.

[0029] The adapter 10 is detachable and preferably mounted in close contact with a door leaf on the inside, facing the room. Since it is detachable it is possible to mount the adapter 10 to an already existing lock case and also remove it if necessary which makes the installation easier for a mechanic. A door lock assembly including the lock case and the adapter is less sensitive to hard wear since the assembly is not dependent on small and narrow margins during operation, which leads to less breakage and maintenance than prior systems. If the assembly however needs maintenance work it is just to disassemble the adapter and perform necessary work on site.

[0030] Fig. 4 is an exploded view of an adapter 110 according to an alternative embodiment. Like in the previous described embodiments the adapter 110 has a casing unit 120 and a transmission 130 which is suitable to use together with a lock case of a door. The casing unit 120 comprises two identical cover portions 120a, 120b which together, in an assembled state, encloses the transmission 130. The cover portions 120a, 120b are preferably made in one piece, which means great manufacturing advantages, and are preferably casted in zinc. The cover portion 120a, 120b may of course in other embodiments be made of another suitable material, such as other metals or plastics.

[0031] The cover portions 120a, 120b each comprises a first circular opening 121a, 121b which is centered arranged about a first axis A', and a second circular opening 122a, 122b which is centered arranged about a second axis B'. The first opening 121a, 121b of each cover portions 120a, 120b correspond to each other and the same go for the second opening 122a, 122b of the cover portions 120a, 120b. Fastening means, such as e.g. screws 123a-d are used to assembly the two cover portions 120a, 120b.

[0032] Further, the cover portions 120a, 120b comprises a spring recess 125 for receiving a spring 126 and at least one sensor recess 127a, 127b for receiving an electronic sensor 128. Accommodated within the casing 120 are the spring 126, the optional electronic sensor 128, and the transmission 130. Depending on the type of door and on which side the adapter 110 is to be mounted the spring 126 and the sensor 128 may be installed in either one of the two cover portions 120a, 120b, which is also why it is advantageous for the cover portions 120a, 120b to be identical.

[0033] The transmission 130 includes a handle unit 131 and a lock unit 132 which together are configured to transmit a force from a handle of the door and the handle follower, which occurs when the handle is pushed down, to the lock bolt or a dead bolt by the lock follower, in order to unlock the door. The handle unit 131 has a circular-shaped first end portion 134 with a square-shaped central opening 135 that is centered about the first axis A', around which the handle unit 131 may rotate, and that is designed to receive the handle follower of the door handle. The handle unit 131 is kept in place by a recess 128 in the cover portions 120a, 120b which is shaped in such a way that the first end portion 134 is centered about the first axis A' and only allowed to rotate about the axis A', and that the rest, an elongated portion 136, of the handle unit 131 is able rotate and move within the recess 128. The elongated portion 136 is integrated with the first end portion 134. The handle unit 131 further comprises a tapered second end portion 137 which is configured to be engaged with a second end portion 143 of the lock unit 132, and which is configured to move between a first position, see Fig. 5 which is an idle position, and a second position, see Fig. 6, when the handle unit 131 is rotated about the first axis A', i.e. when the door handle is pressed

down or pulled up. The opening 135 may of course have another suitable shape in order to correspond to the shape of the handle follower of the door handle.

[0034] The lock unit 132 includes a circular-shaped first end portion 139 having a cross-shaped central opening 140 that is centered about the second axis B', around which the lock unit 132 may rotate, and that is designed to receive the lock follower which is connected to the lock bolt of the door lock. The lock unit 132 is kept in place by a recess 129 in the cover portions 120a, 120b which is shaped in such a way that the first end portion 139 is centered about the second axis B' and only allowed to rotate about the axis B', and that the rest, an elongated arm 142, of the lock unit 132 is able rotate and move within the recess 129. The elongated arm 142 is integrated with the circular-shaped first end portion 139. The lock unit 132 further includes, as mentioned, a second end portion 143 which is in engagement with the second end portion 137 of the handle unit 131, and which is movable between a first position, see Fig. 5 which is an idle position, and a second position, see Fig. 6, when the lock unit 132 by means of the handle unit 131 is rotated about the second axis B'. The second end portion 137 of the handle unit 131 and the second end portion 143 of the lock unit 132 are preferably always in contact with each other. This is an advantage since the rotation of the handle unit 131, the rotation of the lock unit 132 and the transmission of the force then always is predicted.

[0035] The handle unit 131 further has an elongated opening 154 located in the elongated portion 136, for receiving the spring 126 arranged in the spring recess 125. The spring 126 is in its idle state when the handle unit 131 is in its first position; see Fig. 5, i.e. when the door handle is in its idle state. The spring 126 is configured to always pull back the handle unit 131 to this first position when the force applied to the door handle 80 is released. At the same time the lock bolt 81, or dead bolt, is biased which means that the bolt 81 always strives to go back to its locked state, when protruding out from the door, which means that the idle state of the lock unit 132 is its first position, shown in Fig. 2 and Fig. 5. This means that the when a user e.g. pulls down the door handle the handle unit 131 starts to rotate pushing on the lock unit 132 by means of its second end portion 137 so that the lock unit 132 starts to rotate so that the lock bolt 81 is pulled in towards the door leaf, which is shown in Fig. 3 and 6. As soon as the user lets go of the door handle both the lock unit 132 and the handle unit 131 returns to their first positions, i.e. their idle states.

[0036] The handle unit 131 and the lock unit 132 are, in an assembled state, located in their recesses 128, 129 of the cover portions 120a, 120b which allows the handle unit 131 and lock unit 132 to rotate about the first and second axis A', B' a certain number of degrees, preferably between 10° and 30° which corresponds to a normal movement a door handle being pushed down. In alternative embodiments the preferred degrees of rotation may be different depending on the features of the handle

and door, e.g. in some embodiments the handle has to be rotated up to 360° which may lead to the adapter further including gear means (not shown).

[0037] Each cover portion 120a, 120b are also provided with grooves 124, in this case four grooves 124a-d, on its inside surface around the area where the handle unit 131 and the lock unit 132 meet and in the area where the two units 131, 132 move due to the rotation. These grooves 124a-d together with a lubricant enable a desired lubrication of the handle unit 131 and the lock unit 132 which prolongs the working life of the units 131, 132 and therefor also the working life of the adapter 110.

[0038] On the opposite side of the inner grooves 124 of each cover portion 120a, 120b, i.e. on the outside surface 150 of each cover portion 120a, 120b, there is a recess 151 provided for receiving a stop washer 152. The lock washer 152 is connected to the outside surface 150 of at least one of the first and second cover portions 120a, 120b opposite the connection between the handle unit 131 and the door handle 80. The stop washer 152 is provided to prevent outer mechanisms from affecting the adapter 110 and interrupt its functionality. Outer mechanisms could be components from the handle or lock construction on the opposite side of the door leaf. The main purpose of the stop washer 152 is to prevent the separated handle followers of each door handle from engaging each other. The stop washer 152 and its recess 151 may have any suitable shape and size. In this embodiment the stop washer 152 has two protrusions 153a, 153b arranged on each side of the stop washer 152 opposite each other. The protrusions 153a, 153b are configured to engage with the inner surface of the recess 151 in order to prevent the stop washer from 152 from moving around within the recess 151. Optionally there is also provided fastening means (not shown) to be inserted into the oval holes 153c, 153d in the cover portion 120a, 120b within the recess 151 to even more secure the stop washer 152 from moving.

[0039] Each cover portion 120a, 120b is further provided, on the opposite outer surface 150 with respect to the location of the stop washer 152, with a spacer 155 which creates a larger space for a door handle in a case, due to the construction of the door handle, when this is necessary. The spacer has four protrusions 155a-d which are inserted into four hole 155e-h of the cover portion 120a, 120b preferably with the same shape as the protrusions 155a-d when assembling. The spacer 155 is a removable, optional feature. Another optional feature is a cover plate 156 which is to be mounted to the same outside surface 150 as the spacer 155 and which is configured to cover the second circular opening 122a and to protect the inside of the adapter 110 from dirt, water, etc.

[0040] Figs 7-9 show yet another embodiment similar to the embodiment shown in Figs 4-6. This embodiment is an adapter 210 which is adapted for a door lock where the rotation of the lock unit 232 has to be inverted, i.e. have the same rotational direction as the handle unit 231 which is a counter clockwise rotation. The handle unit

231, like in the previous described embodiment, has a circular-shaped first end portion 234 with a square-shaped central opening 235 that is centered about the first axis A', around which the handle unit 231 may rotate, and that is designed to receive the handle follower of the door handle. The handle unit 231 is kept in place by a recess 228 in the cover portions 220a, 220b which is shaped in such a way that the first end portion 234 is centered about the first axis A' and only allowed to rotate about the axis A', and that the rest, an elongated portion 236, of the handle unit 231 is able to rotate and move within the recess 228. The elongated portion 236 is integrated with the first end portion 234. The handle unit 231 further comprises a tapered second end portion 237 which is configured to be engaged with a lock element 240 of the lock unit 232, and which is configured to move between a first position, see Fig. 5 which is an idle position, and a second position, see Fig. 6, when the handle unit 239 is rotated about the first axis A', i.e. when the door handle is pressed down or pulled up. The opening 235 may of course have another suitable shape in order to correspond to the shape of the handle follower of the door handle.

[0041] The lock unit 232 however includes a gear wheel engagement 239 between a lock element 240 and a lock bushing 241 each having a toothed portion 242a, 242b. The lock element 240 is rotatably connected to one of or both cover portions 220a, 220b by its circular-shaped end portion 243 and in constant contact with the handle unit 231 by an end portion 244 of an elongated arm 245, where the elongated arm 245 is integrated with the circular-shaped end portion 243. The lock element 240 rotates about its point of connection P when the handle unit 231 starts to rotate. By means of its toothed portion 242a it immediately start to affect the toothed portion 242b of the lock bushing 241 making it to rotate about the second axis B' in the same direction as the handle unit 231. The circular-shaped lock bushing 241 is kept in place by a recess 229 in the cover portions 220a, 220b preferably with the same shape as the lock bushing 241.

[0042] Also, this embodiment includes, on the outside surface 250 of each cover portion 220a, 220b, a recess 251 provided for receiving a stop washer 252. The lock washer 252 is connected to the outside surface 250 of at least one of the first and second cover portions 220a, 220b opposite the connection between the handle unit 231 and the door handle 80. The stop washer 252 is provided to prevent outer mechanisms from affecting the adapter 210 and interrupt its functionality. Outer mechanisms could be components from the handle or lock construction on the opposite side of the door leaf. The main purpose of the stop washer 252 is to prevent the separated handle followers of each door handle from engaging each other.

[0043] Figs 2 and 3 show, as described above, the unlocking and locking procedure when the adapter 10, 110, 210 is mounted to the door leaf 70. The procedures are the same for every embodiment of the adapter even

though Fig. 2 and 3 are described with reference to the embodiment in Fig. 1. Also the different embodiments of the adapter may be combined in a way suitable for its application and is not limited by the described features. An advantage with the present adapter is that it may be used on existing lock cases with no split spindle functionality. Hence, the present adapter may, together with such lock case without split spindle, replace split spindle lock cases for improving the reliability of the door lock thus always allowing persons on the inside of the locked door to exit the door.

[0044] In an alternative embodiment the adapter may include an indicator (not shown) which is configured to indicate an active and/or inactive state of the adapter. The active state is when the components of the adapter are able to interact with each other so that locked door opens if the handle on one side is pressed down. The indicator is preferably an electrical indicator which indicates the active and/or inactive state with light, sound or movement. In an alternative embodiment it could be a mechanical indicator.

[0045] It should be appreciated that even though numerous characteristics and advantages of the present invention have been set forth in the foregoing description, together with details of the structure and function of the invention, the description is only illustrative and changes may be made in detail, especially in matters of shape, size and arrangement of parts within the scope of the invention to the full extent indicated by the appended claims.

Claims

1. An adapter for a lock case, comprising
 - a handle unit (131; 231) to be connected to a door handle (80) and arranged to be rotated about a first axis (A') when the door handle (80) is pushed down or pulled up for moving a latch bolt in and out from said lock case,
 - a lock unit (132; 232) to be connected to a lock follower extending through said lock case and arranged to rotate about a second axis (B') for moving a lock bolt (81) in and out from said lock case, wherein said handle unit (131; 231) comprises an end portion (137; 237) and said lock unit (132; 232) comprises an end portion (143; 244) which are engaged with each other in such a way that when the handle unit (131; 231) starts to rotate about the first axis (A'), the lock unit (132; 232) starts to rotate about the second axis (B'),
 - a first cover portion (120a; 220a),
 - a second cover portion (120b; 220b), wherein the first and second cover portion (120a, 120b; 220a; 220b) in an assembled state are configured to enclose the handle unit (131; 231) and the lock unit (132; 232), and
 - a lock washer (152; 252) connected to the outside
2. The adapter according to claim 1, wherein the adapter (10) is adapted to be arranged on one side of a door, between a door leaf (70) and the door handle (80), wherein said lock case is inserted into a recess of said door leaf (70).
3. The adapter according to claim 2, wherein the adapter (10) is adapted to be detachable from said door leaf (70).
4. The adapter according to any one of the claims 1-3, wherein the end portions (137, 143; 237, 244) of the handle unit (131; 231) and the lock unit (132; 232) are in constant contact with each other.
5. The adapter according to any one of the preceding claims, wherein the handle unit (131; 231) is biased such that it automatically returns to an idle state, corresponding to a horizontally aligned position of the door handle (80), when a force pushing down or pulling up the door handle (80) has been released.
6. The adapter according to any one of the preceding claims, wherein the end portion (137; 237) of the handle unit (131; 231) is arranged to push on the end portion (143; 244) of the lock unit (132; 232) as it rotates about the first axis (A'), affecting the lock unit (132; 232) to rotate about the second axis (B').
7. The adapter according to any one of the preceding claims, wherein the handle unit (131; 231) is made in one piece.
8. The adapter according to any one of the preceding claims, wherein the lock unit (132) is made in one piece.
9. The adapter according to any one of the preceding claims, wherein the handle unit (131) is configured to rotate about the first axis (A') in a first direction and the lock unit (132) is configured to rotate about the second axis (B') in a second direction opposite the first direction.
10. The adapter according to any one of the claims 1-7, wherein the lock unit (232) comprises a lock element (240) and a lock bushing (241) connected to each other by means of a gear wheel engagement (239), wherein the lock element (240) is engaged with the handle unit (232) and the lock bushing (241) is connected to the lock follower.
11. The adapter according to claim 10, wherein the han-

the unit (231) is configured to rotate about the first axis (A') in a first direction and the lock bushing (241) is configured to rotate about the second axis (B') in the same direction as the handle unit (231).

5

12. The adapter according to any one of the preceding claims, wherein the first cover portion (120a; 220a) and the second cover portion (220b, 220b) are identical.

10

13. The adapter according to any one of the preceding claims, further comprising an indicator (128; 228) configured to indicate an active and/or inactive state of said adapter.

15

14. A door lock assembly for mounting to a door leaf, comprising a lock case including a latch bolt to be operated by at least one door handle (80) connected to a door handle follower of said lock case, a lock bolt (81) in connection with a lock follower (not shown) of said lock case, and an adapter (110; 210) according to any of the preceding claims connected to said lock case.

20

15. A door comprising a door lock assembly according to claim 10.

25

30

35

40

45

50

55

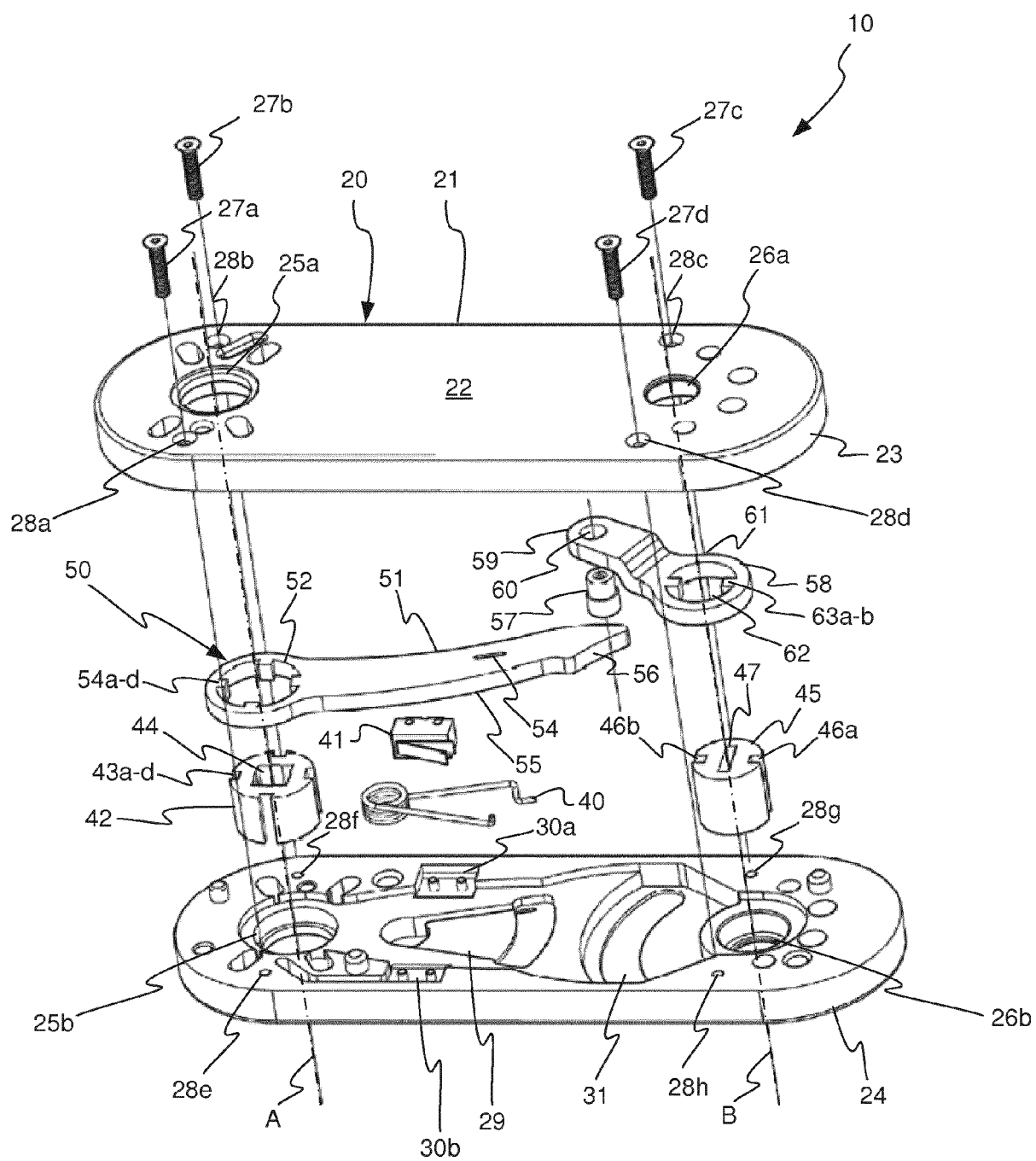
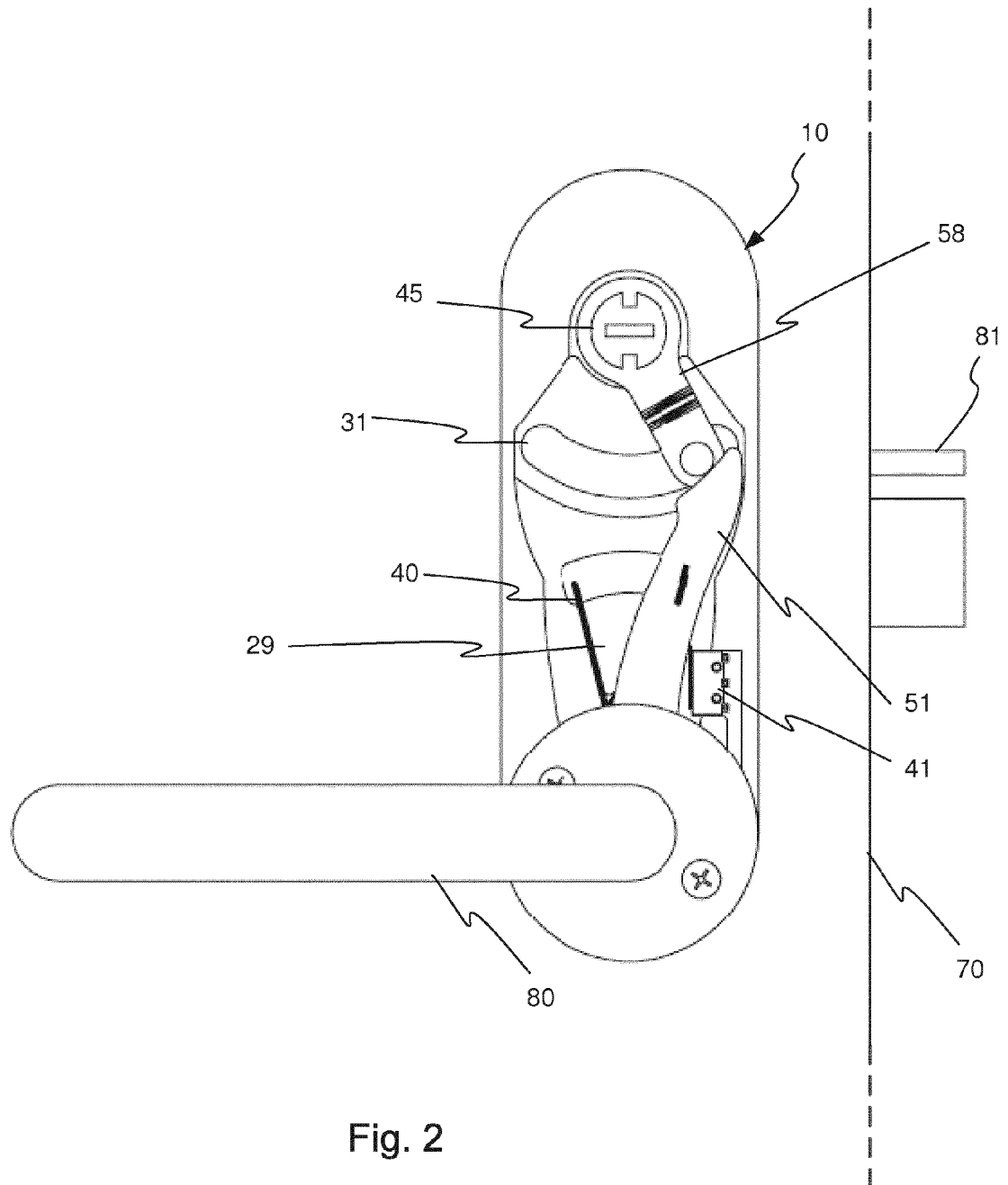
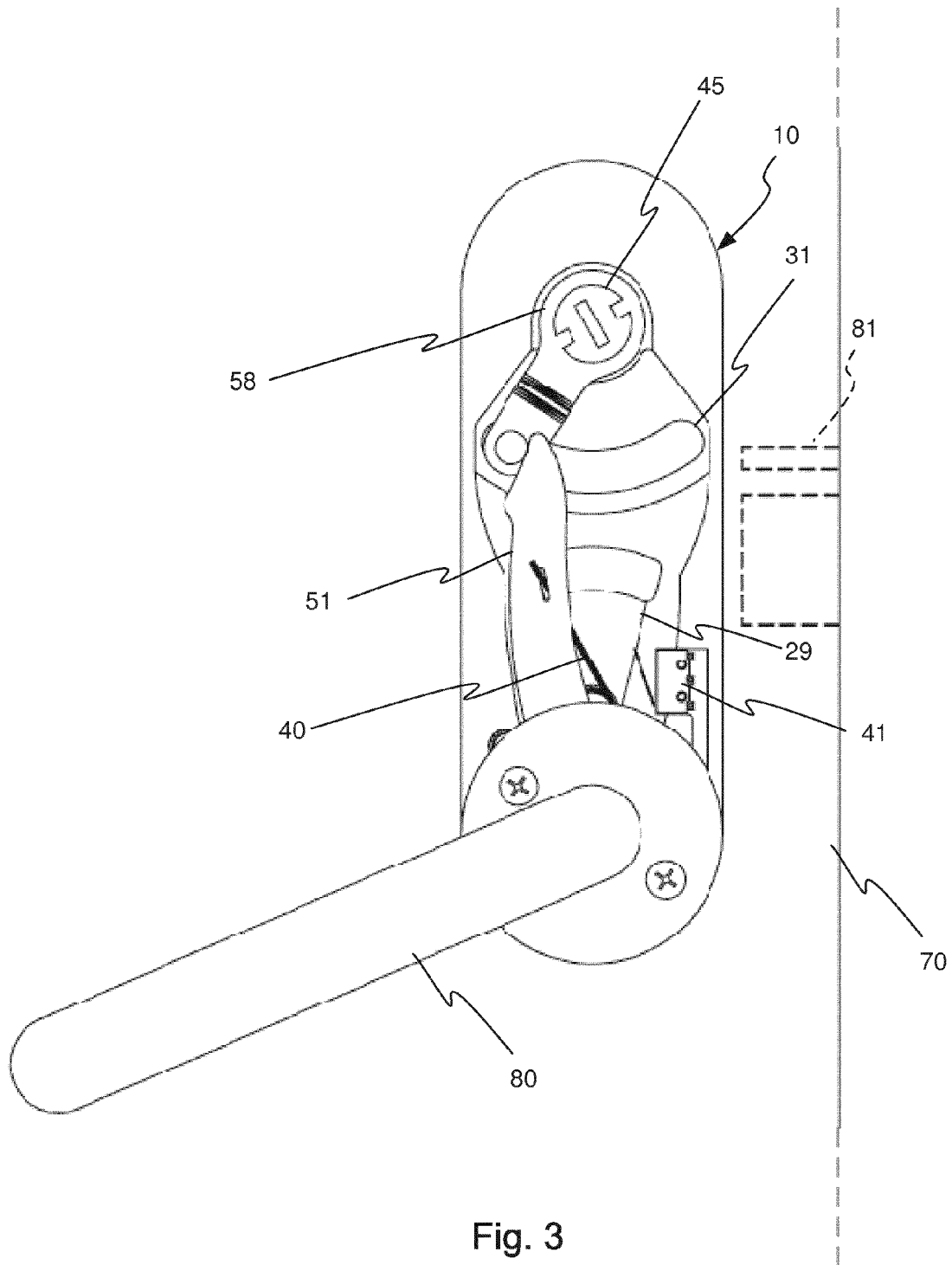


Fig. 1





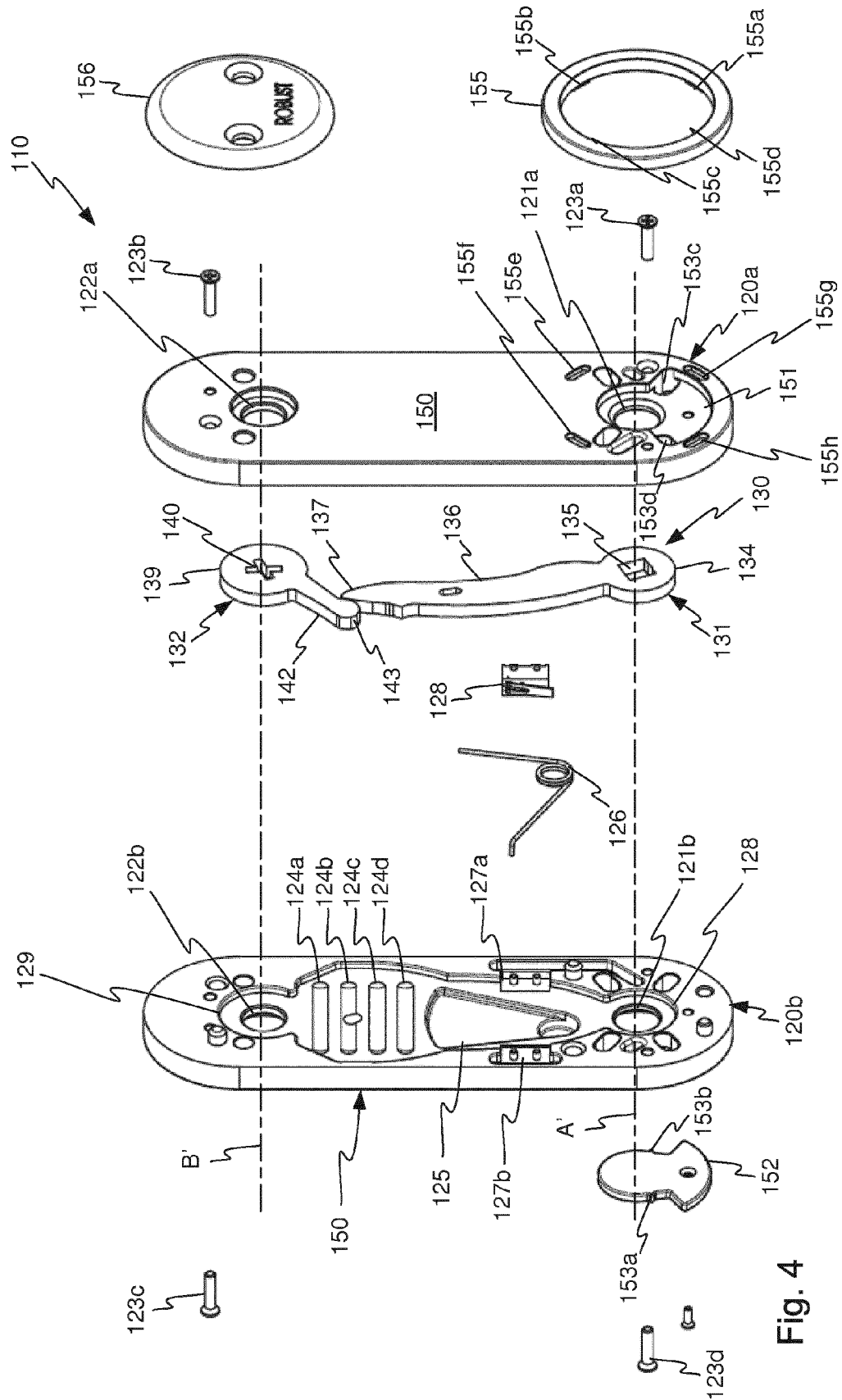


Fig. 4

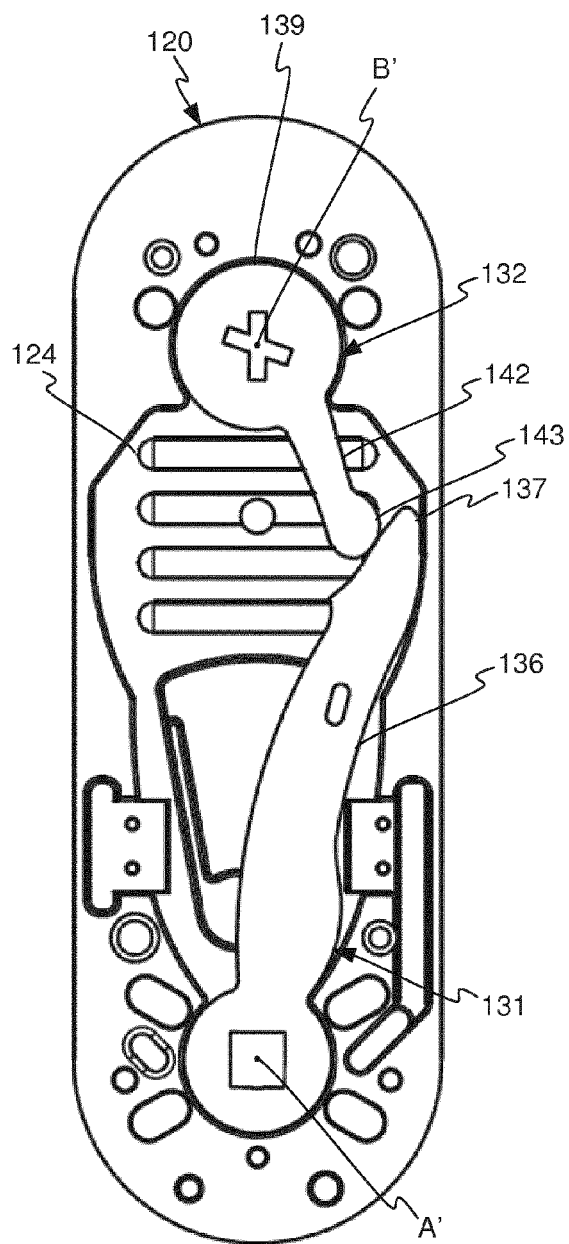


Fig. 5

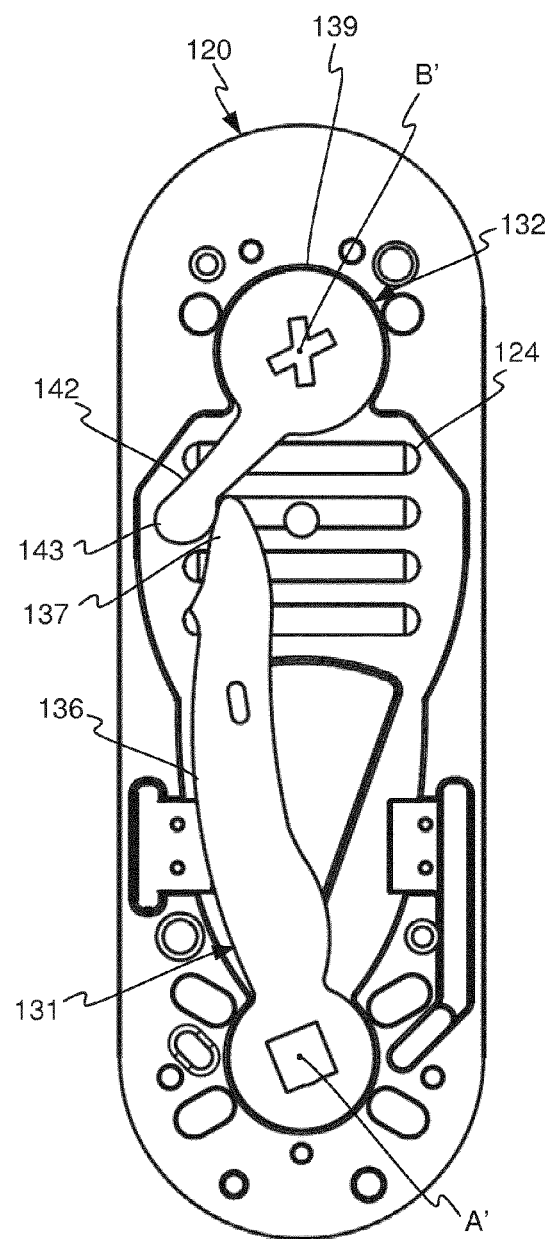


Fig. 6

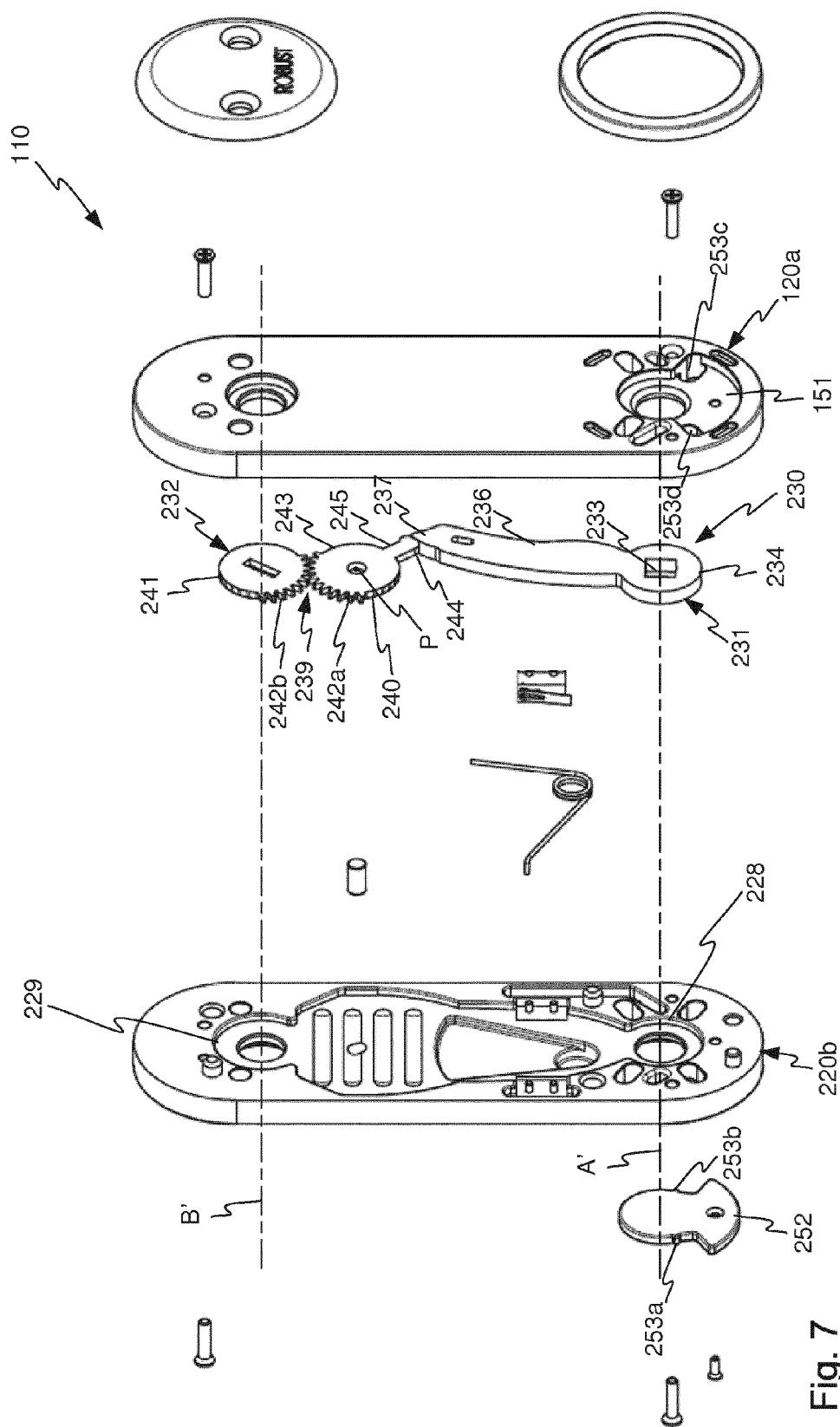
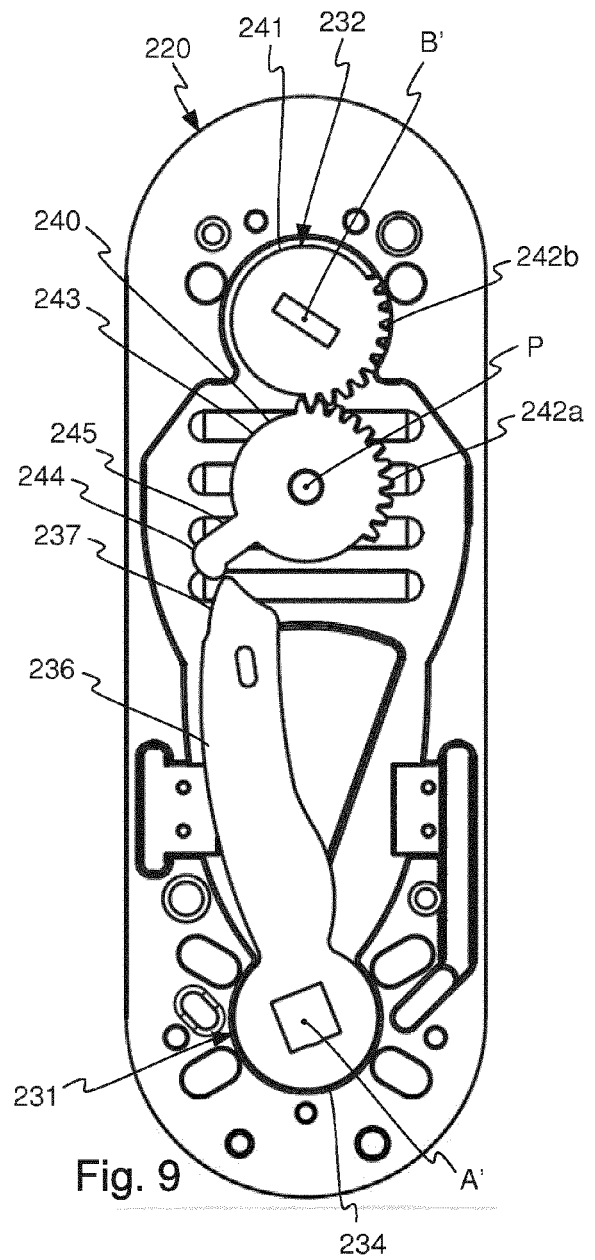
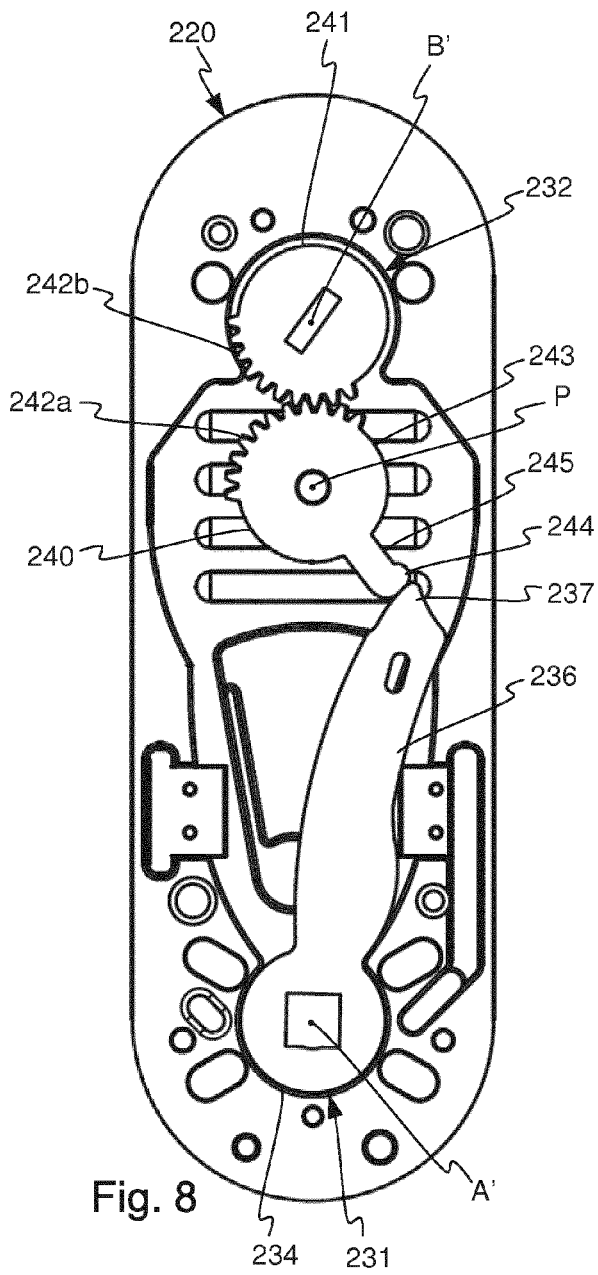


Fig. 7





EUROPEAN SEARCH REPORT

 Application Number
EP 14 17 8031

5

10

15

20

25

30

35

40

45

50

55

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 4 276 760 A (NOLIN ROGER J) 7 July 1981 (1981-07-07)	1-3,5,7, 8,14,15	INV. E05B65/10
Y	* column 7, line 31 - column 10, line 49; figures 5-7 *	4,6,9-13	E05B59/00
Y	DE 196 04 442 A1 (TALLERES ESCORIAZA SA [ES]) 8 August 1996 (1996-08-08)	4,6,9,13	ADD. E05B41/00 E05B17/22
A	* the whole document *	1-3,5,8, 14,15	
Y	US 2006/191303 A1 (SHVARTS VLADIMIR [US]) 31 August 2006 (2006-08-31)	10,11	
A	* paragraph [0064] - paragraph [0079]; figures 1-7 *	1-8	
Y	US 4 129 019 A (URDAL JAN) 12 December 1978 (1978-12-12)	12	
A	* column 2, line 56 - line 59; claim 1; figure 3 *	1-8,11, 14,15	
A	US 4 183 563 A (STEVENS WILLIAM [US]) 15 January 1980 (1980-01-15)	1-5,14, 15	TECHNICAL FIELDS SEARCHED (IPC)
	* column 2, line 35 - column 6, line 22; figures 1-4 *		E05B
A	US 2011/314876 A1 (FANG GUAN-CHEN [CN]) 29 December 2011 (2011-12-29)	1-4,9, 14,15	
	* paragraph [0045] - paragraph [0046]; figures 1-12 *		
A	US 3 875 772 A (EBERSMAN JUSTIN S ET AL) 8 April 1975 (1975-04-08)	1-3,9, 14,15	
	* column 3, line 28 - page 6, line 11; figures 1-6 *		
A	US 2004/107747 A1 (CHANG SHIH-CHUNG [TW]) 10 June 2004 (2004-06-10)	1-3,7, 11,14,15	
	* paragraph [0015] - paragraph [0023]; figures 1-4 *		
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		17 November 2014	Pérez Méndez, José F
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03.82 (P04C01)

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

EP 14 17 8031

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

17-11-2014

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4276760 A	07-07-1981	CA 1135520 A1	16-11-1982
		US 4276760 A	07-07-1981
DE 19604442 A1	08-08-1996	DE 19604442 A1	08-08-1996
		ES 2135986 A1	01-11-1999
		FR 2730266 A1	09-08-1996
		GB 2297797 A	14-08-1996
		US 5809812 A	22-09-1998
US 2006191303 A1	31-08-2006	AU 2006218948 A1	08-09-2006
		CA 2597674 A1	08-09-2006
		CN 101160441 A	09-04-2008
		IL 185115 A	30-12-2010
		KR 20070115914 A	06-12-2007
		NZ 560510 A	25-06-2010
		TW 1363128 B	01-05-2012
		US 2006191303 A1	31-08-2006
		US 2008141740 A1	19-06-2008
		WO 2006093684 A2	08-09-2006
US 4129019 A	12-12-1978	NONE	
US 4183563 A	15-01-1980	CA 1107786 A1	25-08-1981
		US 4183563 A	15-01-1980
US 2011314876 A1	29-12-2011	NONE	
US 3875772 A	08-04-1975	NONE	
US 2004107747 A1	10-06-2004	NONE	