



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
08.03.2023 Bulletin 2023/10

(51) International Patent Classification (IPC):
E05B 65/10 ^(2006.01) **E05B 63/14** ^(2006.01)
E05B 53/00 ^(2006.01)

(21) Application number: **22191947.5**

(52) Cooperative Patent Classification (CPC):
E05B 65/1066; E05B 53/00; E05B 63/14

(22) Date of filing: **24.08.2022**

(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
Designated Validation States:
KH MA MD TN

(71) Applicant: **AMS Australia Pty Ltd
Mitchell, ACT 2911 (AU)**

(72) Inventor: **LEISK, Trevor
Mitchell ACT, 2911 (AU)**

(74) Representative: **Savi, Massimiliano et al
Notarbartolo & Gervasi S.p.A.
Viale Achille Papa, 30
20149 Milano (IT)**

(30) Priority: **24.08.2021 AU 2021221534**

(54) **DUAL LOCK ACTUATOR**

(57) A dual lock actuator 100 for a door. The door has a first lock having a retractable first bolt extendable from the door and a second lock having a retractable second bolt extendable from the door. The dual lock actuator 100 includes a crash bar 120 that is locatable on a side of the door; a first engagement feature for coupling

the crash bar with the first bolt; and a second engagement feature for coupling the crash bar with the second bolt. The crash bar 120 is operable to retract the first bolt when extended via the first engagement feature and operable to retract the second bolt when extended via the second engagement feature.

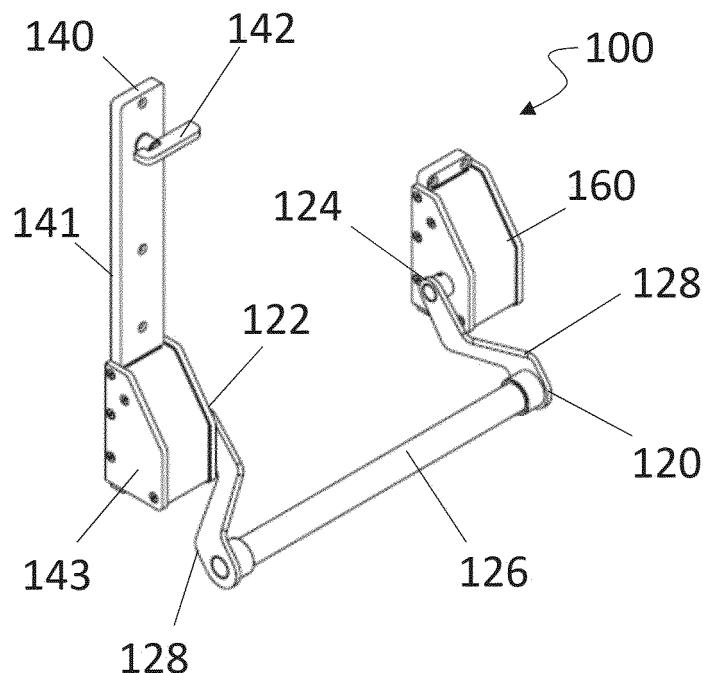


FIGURE 1A

Description

Field

[0001] The present invention relates to a dual lock actuator.

Background

[0002] An existing double door lock is used with doors of a residential dwelling, a commercial establishment, or a government establishment to provide extra security for restricting access to a secure space. In some applications, the use of dual locks is mandated for security reasons. Each lock comprises a respective bolt movable from an extended position to engage a frame surround the door and prevent opening of the door and a retracted position. The locks are separately operable to retract the respective bolts and thereby allow the door to be opened. To enter a secure space, both locks would need to be separately operated to extract each respective bolt to gain access into the secure space and, subsequently, the locks would need to be separately locked and/or may be self-locking. Similarly, to exit the secure space, both locks need to be separately unlocked for egress. In the event of an emergency (e.g. a fire or earthquake), the extra time needed to separately unlock both locks would be undesirable and hinder evacuation from the secure space. Accordingly, the Building Code of Australia (BCA) requires simultaneous operation and release of door locks for egress for safety reasons.

Summary of Invention

[0003] Preferred embodiments of the present invention seek to overcome one or more of the problems in the existing locks described above and/or to at least provide the public with a useful choice.

[0004] An aspect of the present invention provides a dual lock actuator for a door, the door having a first lock having a retractable first bolt extendable from the door and a second lock having a retractable second bolt extendable from the door, the dual lock actuator including: a crash bar that is locatable on a side of the door; a first engagement feature for coupling the crash bar with the first bolt; and a second engagement feature for coupling the crash bar with the second bolt, wherein the crash bar is operable to retract the first bolt when extended via the first engagement feature and operable to retract the second bolt when extended via the second engagement feature.

[0005] The dual lock actuator preferably further includes an interface locatable on the same side of the door as the crash bar, the interface being operable to extend the first bolt. This interface may be a snib for example.

[0006] The dual lock actuator preferably further includes a gear assembly that is rotatable upon operation

of the crash bar. The second engagement feature preferably includes a first axle driven by the gear assembly for coupling with the second bolt, wherein the first axle is rotatable to extend or retract the second bolt. The gear assembly may include a first gear engaged with the crash bar, the first gear being rotatable about a first axis upon operation of the crash bar, and a second gear engaged with the first gear, the second gear being rotatable about a second axis upon rotation of the first gear, the second axis being perpendicular to the first axis. The first axle is preferably driven by the second gear for coupling with the second bolt.

[0007] The first engagement feature preferably includes a second axle that is rotatable to extend or retract the first bolt, and a linkage that couples the first axle to the second axle such that the second axle is rotatable with the first axle at least when the first bolt is extended.

[0008] In a preferred embodiment, the side of the door on which the crash bar is locatable is a second side of the door. The dual lock actuator preferably further includes: a first door lock having: the retractable first bolt, and a first interface locatable on a first side of the door, opposite to the second side, that is operable to retract the first bolt; and a second door lock having: a retractable second bolt, a second interface that is locatable on the first side of the door and that is operable to retract the second bolt, and the crash bar. The interfaces of the first and second door locks that are locatable on the first side of the door are preferably separately operable to retract the respective first and second bolts.

[0009] The interface on the first side of the door may include a mechanical/physical interface, an electronic interface, or an electromechanical interface. The interface on the first side may include a key-operated interface. Alternatively, the interface may include a keypad with physical buttons that are actuatable by the user such that the bolt is retracted upon a correct actuation of buttons. Alternatively, the interface may include an electronic lock system for receiving a user input such that the bolt is retracted upon a receiving a correct input from the user. The electronic lock system may be an electronic keypad, a card reader (e.g. a RFID card or barcode reader), or a biometric sensor for receiving one or more biometrics of the user.

[0010] The second bolt may be biased to extend from the door. In some examples, the first bolt is additionally or alternatively biased to extend from the door.

[0011] The dual lock actuator according to any aspect of the present invention is preferably retrofittable to a door that has two door locks with respective interfaces on one side of the door, the crash bar being located on the other side and being operable to retract bolts of the door locks.

Brief Description of Drawings

[0012] Preferred embodiments of the invention will now be described, by way of non-limiting example, with

reference to the accompanying drawings, in which:

Figures 1A to 1D show a schematic perspective view, a schematic front view, a schematic side view, and a schematic rear view of a lock actuator according to an embodiment of the present invention.

Description of Embodiments

[0013] Figures 1A to 1D show a dual lock actuator 100 according to an embodiment of the present invention. The dual lock actuator 100 is for installation on a door that is hingedly mounted to a doorframe. As shown in the figures, the lock actuator 100 is cooperable with, a first door lock (not shown) and a second door lock (not shown), each of these door locks having respective retractable bolts that are extendable from the door for engaging a doorframe to thereby secure the door relative to the doorframe. In a preferred embodiment, the top lock is a deadbolt lock and the bottom lock is a deadlatch lock. Alternatively, in other embodiments, both of the top and bottom locks may be deadlatches. The dual lock actuator 100 further includes a crash bar 120, mounted on one side of the door operatively coupled to each of the first and second locks by means of respective first and second engagement features and wherein the crash bar is operable to retract the first bolt when extended via the first engagement feature and operable to retract the second bolt when extended via the second engagement feature.

[0014] When the door is in a secured configuration at least one of the first and second bolts are extended relative to the door, and when the door is in an openable configuration, both first and second bolts are retracted. Herein the first door lock is an upper door lock, while the second door lock is a lower door lock. That is, when the actuator 100 is installed, the first door lock is above the second door lock with respect to the door. When mounted to the door, the first and second door locks are vertically spaced with respect to each other and the respective bolts are retractably extendable from the door at respective different respective height elevations with respect to the door.

[0015] The door in which the dual lock actuator 100 is installed covers an access passageway from a first area or space to a second area or space. The second area is a secure room or area in which security is desirable. The door is pivotable relative to the doorframe outwardly away from the second area to reveal the access passageway to allow for entry into or exit/egress from the first area. The door has a first side and a second side. The first side or exterior side of the door presents a securable barrier to entry to the secure area, while a second side of the door or interior allows for convenient egress by means of the dual lock actuator. The term "exterior" and "interior" are used herein with respect to secure area and not necessarily with respect to a building exterior/interior. When the door is closed, the first side of the door faces the first area while the second side of the door faces the second area. The second side is a pushable-

side of the door or a room-facing side.

[0016] Each of the first and second locks includes a respective interface for operation of the bolt. Each lock includes an interface on the exterior side of the door separately/independently operable to unlock and retract the bolts to allow the door to be opened. In some examples, the interfaces on this other side of the door are also separately/independently operable to extend and lock the bolts to secure door relative to the doorframe.

[0017] As used herein, an 'interface' may include a mechanical/physical interface, an electronic interface, or an electromechanical interface. For example, the interface may include a snib (or lever) or may include a security interface to restrict operation of the lock. For instance in some embodiments the security interface is engageable with a key that is actuatable to lock or unlock a bolt with which the interface is engaged. Alternatively, the interface may include an electronic lock system for receiving a user input such that the bolt is retracted upon a receiving a correct input from the user. The electronic lock system may be, a card reader (e.g. a RFID card or barcode reader), or a biometric sensor for receiving one or more biometrics of the user. In preferred embodiments, the interfaces on the exterior side of the door are engageable with respective key to unlock and retract the bolts or includes a card reader, while the interface on the interior side of the door includes a snib.

[0018] The dual lock actuator 100 includes a crash bar (or a panic bar) 120 having a first end portion 122 that is coupled to a first housing 140 of the actuator 100, a second end portion 124 that is coupled to a mount 160 of the actuator 100, and an elongate body portion 126 with which a user can interact. The elongate body portion 126 is connected to the first and second end portions 122, 124 via respective arm portions 128. The first housing 140 and the mount 160 are mounted to the second side of the door and the crash bar 120 is pivotably mounted to the first housing 140 and to the mount 160. When the user operates the crash bar 120, by pushing against elongate body portion 128 of the crash bar 120 in a first direction towards the door, the dual lock actuator 100 would allow the door to be pushed outwardly relative to the doorframe. The process of operating the crash bar and opening the door relative to the doorframe involves a continuous motion of the user on the crash bar, i.e. a continuous pushing motion of the user on the crash bar to push the door outwardly.

[0019] The crash bar 120 may be of the second door lock. The crash bar 120 is coupled to the retractable bolt of the second door lock such that operation of the crash bar 120 causes retraction of the associated bolt. The second door lock additionally includes an interface on the first side the door opposite to the second, pushable, side of the door. The interface on the first side is operable by a user to retract the second bolt. Thereby, when the user is in the first area, the user can retract the bolt of the second door lock by operating the interface of the second door lock on the first side of the door and, when the user

is in the second area, the user can retract bolt of the door lock by operating the crash bar on the second side of the door.

[0020] The crash bar 120 is movable between a first position and a second position. Movement from the first position to the second position causes the first and/or second bolts to retract. Preferably the first position is further spaced from the door than the second position such that a direction of force applied to the bar to move the crash bar from the first position to the second position is generally consistent with the direction of force required to open the door. The crash bar 120 is pivotable relative to the housing 140 and the mount 160 between the first position and the second position. In this embodiment the first position is raised with respect to the second position. In addition, the crash bar 120 is biased to return to first position such that when the crash bar is released from the second position, the crash bar will return automatically to the first position. Bias means biasing the crash bar 120 to the first position are preferably in the form of a spring member (not shown) housed in the mount 160.

[0021] The housing 140 of the dual lock actuator 100, that is mountable to the second side of the door, includes an elongate face plate 141, a snib (or lever) 142 at an upper region of the elongate face plate 141, and a mount 143 at a lower region of the elongate face plate 141. The first end 122 of the crash bar 120 is pivotably mounted to the mount 141. The mount 143 has a profile that is identical or substantially similar to the mount 160 to which the second end 124 of the crash bar 120 is pivotably mounted. The mount 143 is mounted on the face plate 141.

[0022] The face plate 141 has a front side (shown in Figure 1B) and a rear side (shown in Figure 1D). The mount 143 is a cover that is mounted on the front side of the face plate 141 such that a first (forward) compartment is defined by a portion of the front side of the face plate 141 and the mount 143. The face plate 141 has an elongate base portion and flange (or peripheral wall) portions extending around the base portion to define, with a portion of the second side of the door, a second (rear) compartment. Components of a lock assembly are locatable in the respective first and second compartments. The components of the lock assembly may include one or more features that are described in Australian patent publication 2010202397 A1 titled 'Single handle opening of multiple independently operable locks' in the name of AMS Australia Pty Ltd, the subject of which is incorporated herein by reference. When mounted to the door, the flange portion rests substantially flush on the second side of the door. The face (base) plate 141 has a plurality of apertures for receiving respective fasteners for securing the housing 140 to the door.

[0023] The snib 142 is an interface of, or for, the first door lock and is locatable on the second side of the door. The snib 142 is coupled to the retractable bolt of the first door lock and is operable to extend or retract the bolt of the first door lock independently of operation of the sec-

ond lock and second bolt. The snib 142 is rotatable relative to the housing between a first position that corresponds to the bolt being extended and a second position that corresponds to the bolt being retracted. When the bolt is extended, operating the crash bar 120 would retract the extended bolt and move the snib 142 from the first position to the retracted position. On the other hand, when the bolt of the first door lock is retracted, operating the crash bar 120 would not change the state of that bolt and the snib 142 remains in the second position. Thereby, pushing the crash bar 120 against the door would retract both the extended first and second bolts allowing the door to be subsequently opened. In the event of an emergency therefore, a user inside the second area would simply need to push against the crash bar 120. The user inside the second area would not need to separately unlock the first door lock and the second door lock to exit the second area as operating the crash bar 120 would automatically retract the extended bolts. In other embodiments of the dual lock actuator, the handle 142 may not be provided on the second side of the door. According to these other embodiments, the bolt of the first door lock may be a deadlatch that is biased to an extended position and operation of the crash bar 120 on the second side of the door would retract the extended bolts of the respective first and second door locks.

[0024] The first door lock further includes an interface on the first side of the door. The interface of the first door lock on the first side is operable to retract the bolt of the first door lock. As previously described, the second door lock also includes an interface on the first side of the door. The interfaces of the respective first and second door locks on the first side of the door are separately operable to retract the respective bolts. On the other hand, the crash bar 120 on the second side of the door is operable to retract the bolt of the first door lock, when extended, and to retract the bolt of the second door lock.

[0025] The lock-actuation assembly includes a first gear 151 that is engaged with the crash bar 120. The first gear 151 is a bevel gear. The first gear 151 is rotatable about a first axis upon operation of the crash bar 120. In particular, the first end portion 122 of the crash bar has a shaft portion that is rotatable about the first rotation axis upon a pivoting movement of the crash bar 120. The shaft portion is engaged with and drives the first gear 151 such that as the crash bar 120 is pivoted relative to the housing 140, the shaft portion rotates that, in turn, causes the first gear 151 to also rotate about the first rotation axis. The first gear 150 is rotatably mounted to a side wall portion of the mount 143 and is provided on the front side of the face plate 141. A pivoting movement of the crash bar 120 towards the door causes a rotation of the first gear 151 in a first direction about the first rotation axis. On other hand, a rotation of the first gear in a second direction (opposite to the first direction) about the first rotation axis corresponds to the crash bar 120 returning to a raised position (i.e. a depressed, reset, or home in which the crash bar 120 is in a position away from the door). The

first gear 151 has a range of rotation of up to about 50°, preferably between about 25° and 45°, more preferably between about 30° and 40°, further preferably about 38°.

[0026] The lock-actuation assembly includes a second gear 152 that is engaged with the first gear 151. The second gear 152 is a bevel gear. The second gear 152 is rotatable about a second axis upon rotation of the first gear 151, the second axis being perpendicular to the first axis. The second gear 152 is rotatably mounted on the front side of the elongate face plate 141 of the housing 140, next to the first gear 151, such that rotation of the first gear 151 causes a corresponding rotation of the second gear 152. A rotation of the first gear 151 in a first direction about the first rotation axis causes rotation of the second gear 152 in a first direction about the second rotation axis. On the other hand, a rotation of the first gear 151 in a second direction about the first rotation axis causes rotation of the second gear 152 in a second direction about the second rotation axis. The second gear 152 has a range of rotation of up to about 90°, preferably between about 50° and 70°, more preferably between about 55° and 65°, further preferably about 57°.

[0027] The first and second gears 151, 152 are provided on the front side of the face plate 141. The mount 143 covers these components such that they are not accessible when the actuator 100 is installed. In this regard, Figure 1B shows a schematic front view of the dual lock actuator 100 with the mount 143 removed while Figure 1C shows a schematic side view of the actuator 100 with the mount 143 provided but with a side wall portion thereof removed for the purposes of illustrating the location of the first and second gears 151, 152 and their interaction with the crash bar 120.

[0028] The second gear 152, which is provided on the front side of the face plate 141, is coupled to a first axle (or spindle) 153 that passes through the face plate 141. The first axle 153 is rotatable about the second axis upon rotation of the second gear 152. The axle 153 is an elongate portion having a square-sectional profile. The axle 153 is for driving components of the lock-actuation assembly that are provided on the rear side of the face plate 141. In addition, the axle 153 is engageable with the retractable bolt of the second door lock described previously above such that rotation of the first axle 153 about the second axis also causes the bolt of the second door lock to extend or retract.

[0029] Figure 1D shows components of the lock-actuation assembly on the rear side of the face plate 141 of the housing 141. The lock actuation assembly includes a first rotatable member (or first plate) 154 with which the first axle 153 is engageable. The first plate 154 has a square-shaped aperture for complementarily receiving the first axle 153. Thereby, the first plate 154 on the rear side of the face plate 141 is rotatable in unison with the second gear 152 on the front side of the face plate 141 about the second axis. The first plate 154 has an irregular shape.

[0030] The first plate 154 has a lobe portion 154a to

which an arm 155 is pivotably connected. The arm 155 is a rigid member that drives a disc 156 that is rotatable about a third rotational axis. The third rotational axis is parallel with the second rotation axis. One end of the arm 155 is pivotably connected to the lobe portion 154a of the first plate 154 while the other end of the arm 155 is pivotably connected to the disc 156 at a first region thereof. The disc 156 rotates in a counter direction to a rotation direction of the first plate 154. The first region is offset relative to the third rotational axis about which the disc 156 is rotatable. The first region is located near an edge or perimeter of the disc 156.

[0031] The plate 141 has a nib portion 154b. The nib portion 154b is for engaging a stop member or stop portion 144 of the housing that is provided on the rear side of the face plate 141. Thereby, the engagement of the nib portion 154b with the stop member 144 restricts a range of rotation of the first plate 154 relative to the housing 140. The stop member 144 is formed in, or mounted on the face plate 141.

[0032] The first plate 154 has a tongue portion 154c. The tongue portion 154c is on a plane that is substantially at right angles to the plane of the rest of the first plate 154. The tongue portion 154c may be bent portion of the first plate 154. The tongue portion 154c engages a return spring to bias the first plate 141 towards a position that corresponds to the crash bar 120 being in the raised position. Thereby, when the crash bar 120 is released from the lowered position, the crash bar 120 will return the raised position.

[0033] The disc 156 includes a first arcuate slot and a second arcuate slot on respective opposite halves of the disc 156. The first and second arcuate slots allow for a left-hand side mount or a right-hand side mount of the handle 142 of the lock actuator 100 to the door. The centre of curvature of the first and second arcuate slots coincides with the third axis about which the disc 156 is rotatable.

[0034] The lock-actuation assembly includes an elongate member (or a connecting rod) 157 having one end portion 157a that is coupled to a respective one of the arcuate slots in the disc 156 and an opposite end portion 157b that is coupled to a second rotatable member (or second plate) 158 with which the bolt of the first door lock is coupled. The second rotatable member 158 is largely obscured in Figure 1D however, rotates around a second axle (or spindle) 159 that is engageable with the retractable bolt of the first door lock. The second axle 159 is rotatable in unison with the second rotatable member 158 to extend or retract the bolt. The elongate member 157 is moveable linearly relative to the housing 140 in a downward or upward direction in response to the rotation of the disc 156 about the third rotation axis. The first end portion 157a of the elongate member 157 has an L-shape having a free end that is insertable in a respective one of the arcuate slots of the disc 156. The first free end portion 157a is slidable along the respective arcuate slot. When the snib 142 is in the first position corresponding

to the bolt of the first door lock being extended, the free end portion 157a is located at or near an upper end of the respective arcuate slot of the disc 156. On the other hand, when the snib 142 is move towards the second position corresponding to the bolt of the first door lock being extended, the free end portion 157a slides downwards along the respective arcuate slot of the disc 156 towards the lower end of the arcuate slot.

[0035] The dual lock actuator 100 has a first engagement feature for coupling the crash bar 120 with the bolt of the first door lock and a second engagement feature for coupling the crash bar 120 with the bolt of the second door lock. The first engagement feature includes the first gear 151, the second gear 152, and the first axle 153, the first plate 154, the arm 155, the disc 156, the elongate member 157, the second rotatable member 158, and the second axle 159 previously described above. The second engagement feature includes the first gear 151, the second gear 152, and the first axle 153.

[0036] When the crash bar 120 is in a raised position with the bolts of the first and second door locks being in the extended position, the first end portion 157a of the elongate member 157 is located at or near an upper end of the respective arcuate slot of the disc 156 as shown in Figure ID. When the crash bar 120 is pressed against the door to assume the lowered position, the axle 153 is rotated, which causes the bolt of the second door lock to be retracted. In addition, the rotation of the axle 153 causes the first plate 154 to rotate in unison therewith about the second rotation axis. With reference to Figure ID, when the crash bar is pressed against the door, the first plate 154 is rotated in a counterclockwise direction such that the nib portion 154a of the first 154 moves upwardly and around the axle 153. In turn, the arm 155 that is pivotably mounted to the nib portion 154a plate is pushed upwardly, which causes the disc 156 to rotate in a clockwise direction. The first end portion 157a is or becomes braced against the upper end of the respective arcuate slot of the disc 156 and is dragged downwardly (in a first linear direction) relative to the housing 140 upon rotation of the disc 156 in the clockwise direction. Also, in this position, the tongue portion 154c of the first plate 154 acts against the biasing provided by the return spring to which the tongue portion 154c is couple. Holding the crash bar 120 down maintains the first plate 154 in this position against the biasing provided by the return spring. The nib portion 154b of the first plate is abutable against the stop member 144 of the housing 140 to restrict the rotation of the first plate 154 when the crash bar 120 is released. The downward movement of the elongate member 157 rotates the second rotatable member 158 which in turn causes the axle 159 to also rotate in unison with the second rotatable member 158 to retract the extended bolt of the first door lock. As both bolts of the first and second door locks are retracted, the door can be opened.

[0037] On the other hand, when the crash bar 120 is in a raised position with the bolt of the second door lock

being in the extended position and the bolt of the first lock being in the retracted position (in response to the snib 142 being in the second position), the first end portion 157a of the elongate member 157 is located at or near a lower end of the respective arcuate slot of the disc 156. When the crash bar 120 is pressed against the door to assume the lowered position, the axle 153 is rotated, which causes the bolt of the second door lock to be retracted. In addition, the rotation of the axle 153 causes the first plate 154 to rotate in unison therewith about the second rotation axis. With reference to Figure ID, when the crash bar is pressed against the door, the first plate 154 is rotated in a counterclockwise direction such that the nib portion 154a of the first 154 moves upwardly and around the axle 153. In turn, the arm 155 that is pivotably mounted to the nib portion 154a plate is pushed upwardly, which causes the disc 156 to rotate in a clockwise direction. As the first end portion 157a is at or near the lower end of the respective arcuate slot of the disc 156, the elongate member 157 does not move linearly relative to housing 140 as the disc 156 rotates. Thereby, the bolt of the first lock assembly is retained in the retracted position. Also, in this position, the tongue portion 154c of the first plate 154 acts against the biasing provided by the return spring to which the tongue portion 154c is couple. Holding the crash bar 120 down maintains the first plate 154 in this position against the biasing provided by the return spring. The nib portion 154b of the first plate is abutable against the stop member 144 of the housing 140 to restrict the rotation of the first plate 154 when the crash bar 120 is released. As both bolts of the first and second door locks are retracted, the door can be opened.

[0038] When the crash bar 120 is released, the return spring to which the tongue portion 154c of the 154 is coupled returns the first plate 154 to the position shown in Figure ID which corresponds to the crash bar 120 being in the raised position. As biasing provided by the return spring causes the first plate 154 to rotate about the second axis in a clockwise direction, the first axle 153 rotates in unison with the first plate 154 to extend the bolt of the second door lock. In addition, as the first axle 153 rotates, the first and second gears 151, 152 also rotate to return the crash bar 120 to the raised position from the lowered position. As the first plate 154 rotates in the clockwise direction, the arm 155 that is pivotably mounted to the nib portion 154a moves downwardly about the axle 153, which causes the disc 156 to rotate in a counterclockwise direction.

[0039] From the retracted position of the bolt of the first door lock, the snib 142 on the second side of the door or the interface of the first door lock on the first side of the door is operated to extend the bolt of the first door lock. The extension of the bolt causes the first end portion 157a of the elongate member 157 to move along the arcuate slot of the disc 156 upwardly (in a second linear direction) relative to the housing 140.

[0040] The various embodiments of the present invention described above have been presented by way of

example only, and not by way of limitation. It will be apparent to a person skilled in the relevant art that various changes in form and detail can be made therein without departing from the spirit and scope of the invention. The present invention should not be limited by any of the exemplary embodiments described above. 5

Claims

1. A dual lock actuator for a door, the door having: 10

a first lock having a retractable first bolt extendable from the door, and
a second lock having a retractable second bolt extendable from the door, 15

the dual lock actuator including:

a crash bar that is locatable on a side of the door; 20
a first engagement feature for coupling the crash bar with the first bolt; and
a second engagement feature for coupling the crash bar with the second bolt,
wherein the crash bar is operable to retract the 25
first bolt when extended via the first engagement feature and operable to retract the second bolt when extended via the second engagement feature. 30

2. The dual lock actuator of claim 1, further including an interface locatable on the same side of the door as the crash bar, the interface being operable to extend and/or retract the first bolt. 35

3. The dual lock actuator of claim 1 or 2, further including a gear assembly that is rotatable upon operation of the crash bar,
wherein the second engagement feature includes a first axle driven by the gear assembly for coupling 40
with the second bolt, wherein the first axle is rotatable to extend or retract the second bolt. 45

4. The dual lock actuator of claim 3, wherein the first engagement feature includes: 45
a second axle that is rotatable to extend or retract the first bolt, and
a linkage that couples the first axle to the second axle such that the second axle is rotatable with 50
the first axle at least when the first bolt is extended. 55

5. The dual lock actuator of any one of claims 1 to 3, wherein the side of the door on which the crash bar is locatable is a second side of the door and the dual lock actuator further includes:

a first interface locatable on a first side of the door, opposite to the second side, that is operable to retract the first bolt; and
a second interface that is locatable on the first side of the door and that is operable to retract the second bolt.

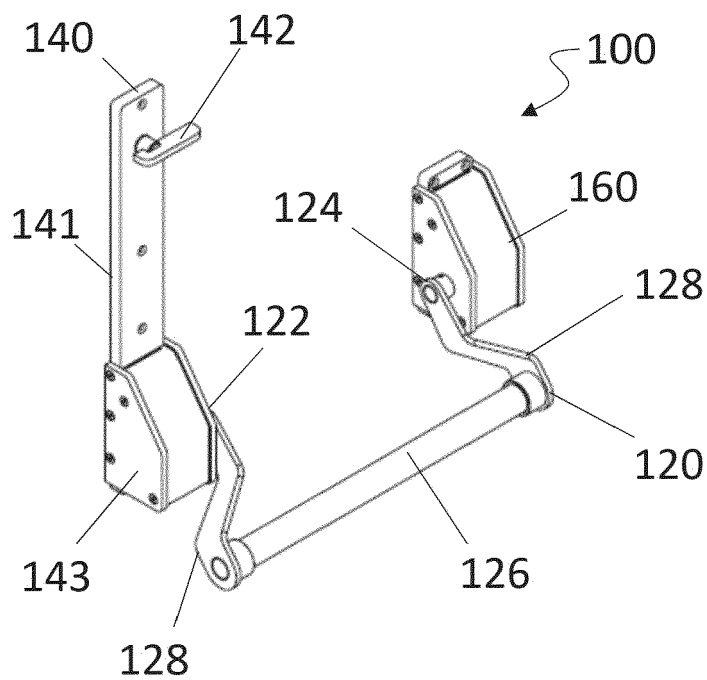


FIGURE 1A

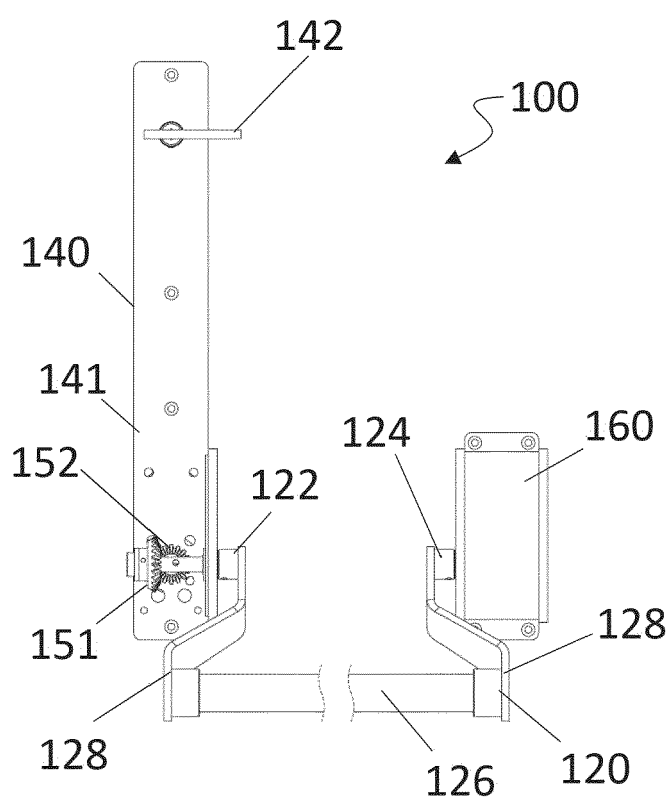


FIGURE 1B

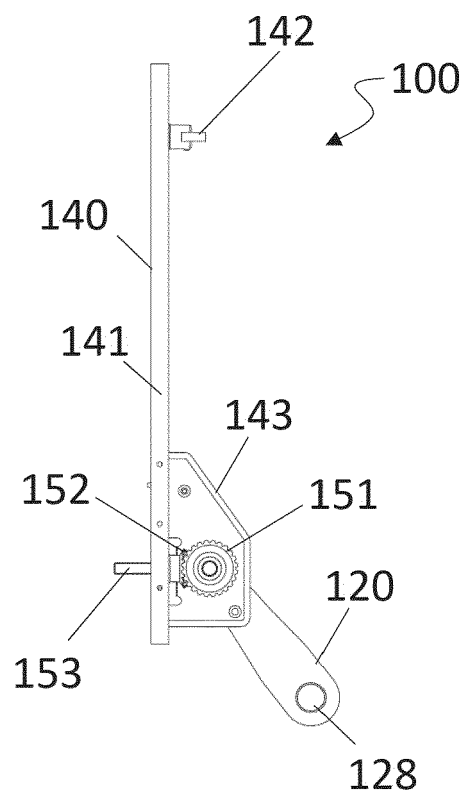


FIGURE 1C

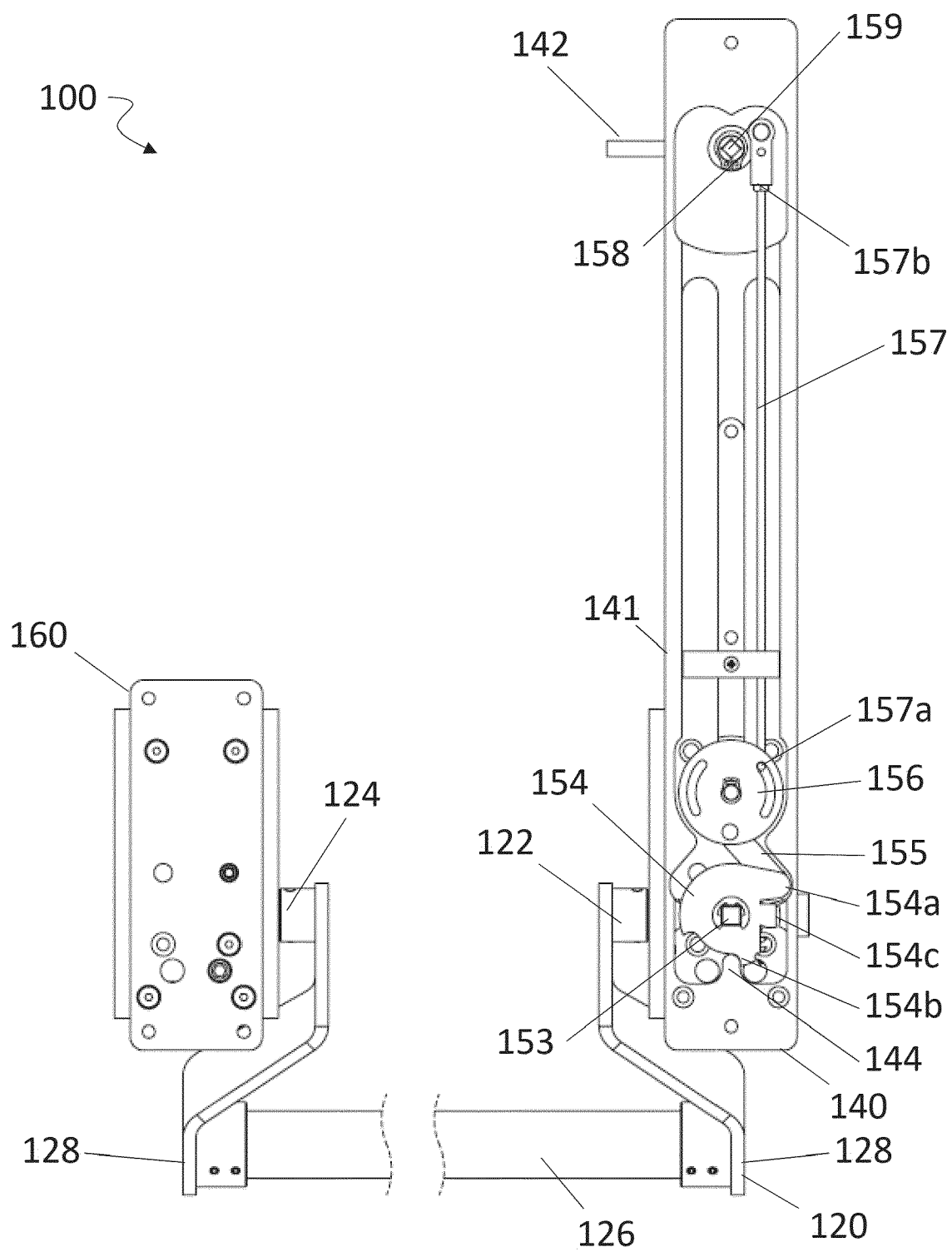


FIGURE 1D



EUROPEAN SEARCH REPORT

Application Number

EP 22 19 1947

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	EP 0 989 268 B1 (EXIT PAINIKE KY [FI]) 16 April 2003 (2003-04-16) * the whole document *	1-4	INV. E05B65/10 E05B63/14 E05B53/00
X	US 2019/194975 A1 (DUNNIGAN ADAM [US] ET AL) 27 June 2019 (2019-06-27) * the whole document *	1-5	
X	EP 3 023 562 A1 (ASSA ABLOY AUBE ANJOU [FR]) 25 May 2016 (2016-05-25) * paragraph [0022] - paragraph [0039]; figures 1-10 *	1-5	
X	US 10 597 910 B2 (SHANGHAI MINGWEI HARDWARE CO LTD [CN]) 24 March 2020 (2020-03-24) * column 4, line 37 - column 10, line 44; figures 1-16 *	1, 3, 4	
X	US 1 646 990 A (BERTRAM BOLLES WILLIAM) 25 October 1927 (1927-10-25) * page 1, line 57 - page 4, line 36; figures 1-5 *	1-4	TECHNICAL FIELDS SEARCHED (IPC) E05B
The present search report has been drawn up for all claims			

1

EPO FORM 1503 03:82 (P04C01)

Place of search The Hague	Date of completion of the search 25 January 2023	Examiner Koster, Michael
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		

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

EP 22 19 1947

5

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.

25-01-2023

10

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0989268 B1	16-04-2003	AT 237725 T	15-05-2003
		EP 0989268 A1	29-03-2000
		FI 981889 A	05-03-2000
US 2019194975 A1	27-06-2019	NONE	
EP 3023562 A1	25-05-2016	EP 3023562 A1	25-05-2016
		ES 2654175 T3	12-02-2018
		FR 3027936 A1	06-05-2016
US 10597910 B2	24-03-2020	NONE	
US 1646990 A	25-10-1927	NONE	

15

20

25

30

35

40

45

50

55

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- AU 2010202397 A1 [0022]