

CYLINDRICAL LOCK SET AND BOLT ASSEMBLY

5 This invention relates to a cylindrical lock assembly, and a bolt assembly for location in a door and other such movable members adapted to close an access opening. It will be convenient to hereinafter describe the invention with particular reference to doors, but the invention has wider application.

10 A cylindrical lock assembly is a kind of assembly having a chassis for location in a substantially cylindrical bore formed between an inner surface of the door panel and an outer surface. The chassis is operatively connected at the perimeter of the cylindrical bore closest to an edge of the door to a bolt assembly located in a transverse bore extending from the edge of the door to the cylindrical bore.

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The installation of a cylindrical lock assembly of the foregoing kind requires a cylindrical bore to be drilled into the face of a door panel to accommodate the chassis of the lock assembly. The cylindrical bore is located at a specified distance from the edge of the door panel according to the back set of the bolt assembly. The bolt assembly is generally produced as a long back set, a short back set or a short back set with insert to convert to a long back set. Furthermore the prior bolt assembly tend to be suitable for hinged doors only.

25 A problem with lock assemblies in general is that it can be difficult to ascertain the extent to which the assembly is locked. More specifically when deadlocking a lock assembly it is often necessary for a key to rotate an element of the lock assembly through to a deadlock position, and it can be difficult to ascertain if this deadlocking position has been reached. This is particularly so from the outside of a cylindrical lock assembly that does not have an actuator such as a turn knob or the like for the user to test. While when the user is in the inside they can test the inner actuator, it may not always be convenient to have to test the actuator to confirm the lock is deadlocked. This can result in the lock remaining undeadlocked, which can have serious security implications.

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Another problem with lock assemblies in general is that there is a trade off between making the assembly relatively small so as to be discrete whilst being sufficiently robust to resist forced circumvention. This is particularly the case with cylindrical lock assemblies as the majority of the lock assembly is required to locate within a relatively small cylindrical bore formed in the door panel.

It is often necessary for locksmiths or the like to reconfigure the tumbler coding of cylinder locks used in cylindrical lock assemblies. A common frustration with such a task is the amount of disassembly of the cylindrical lock assembly required to gain access to the lock cylinder.

It would therefore be desirable to provide a cylindrical lock assembly that addressed at least one of these problems. In particular it would be advantageous to provide a cylindrical lock assembly that was easier to install and adapt. Furthermore it would be advantageous to provide a cylindrical lock assembly that provides the user with an indication that it is deadlocked. It would also be advantageous for the cylindrical lock assembly to be relatively robust. Still furthermore it would be preferable for the bolt assembly to be more adaptable.

The above discussion of lock elements and the like is included in this specification solely for the purpose of providing a context for the present invention. It is not suggested or represented that any of these matters formed part of the prior art base or were common general knowledge in the field relevant to the present invention as it existed in Australia before the priority date of this invention.

The present invention is herein described and defined with reference to its common application. Terms such as inner and outer are to be construed in light of the normal orientation of the assembly in this application. It will be appreciated that other orientations are possible.

According to one aspect of this invention there is provided a cylindrical lock assembly for use with a door panel, the lock assembly including;

a bolt assembly for location in a transverse bore formed in the door panel extending from an edge of the panel, the bolt assembly including a bolt being
5 linearly movable between an operative position and an inoperative position;

a chassis for location in a cross bore formed in the door panel and extending between opposing faces of the door panel so as to connect with the transverse bore, the chassis being operatively connected to the bolt assembly, the chassis includes a housing that houses a shuttle that moves linearly relative
10 to the housing between a first and second position so as to move the bolt between the operative and inoperative positions respectively;

an actuator means including a rotatable member that when the actuator means is operable is rotatable about a rotation axis relative to the housing to move the shuttle between the first and second position, the actuator means
15 being operable from an outer side of the lock assembly by a first key operable lock to rotate the rotatable member and being operable from an inner side of the lock assembly by a hand engagable means to rotate the rotatable member; and

deadlocking means that when in an active condition renders the actuator means inoperable to rotate the rotatable member from both the inner and outer
20 side.

It is preferred that the first key operable lock is operable to render condition of the deadlocking means as either active or inactive. It is further preferred that the cylindrical lock assembly include a second key operable lock
25 which is operable to render condition of the deadlocking means as either active or inactive.

It is preferred that the deadlocking means acts between the rotatable member and the housing fixing the rotational position of the rotatable member
30 relative to the housing. It is preferred to that the deadlocking means includes at least one detent that is movable in a direction transverse to the rotational axis between an active position and an inactive position so as to render the actuator inoperable and operable respectively. It is preferred to include a detent biasing means for urging the at least one detent towards the inactive position.

It is preferred that the cylindrical lock assembly include visual indication means for visually indicating the operational condition of the deadlocking means.

5 It is preferred that the shuttle includes a retractor for operatively engaging the bolt assembly, and a slide for operatively engaging the actuator and acting between the actuator and the retractor so that rotational movement of the rotational member causes linear movement of the retractor and movement of the bolt. It is further preferred that the retractor includes at least one jaw for
10 engaging the bolt assembly. It is further preferred that the slide includes a pocket for accommodating a projection associated with the rotation member when the shuttle is moved between the first and second position. It is further preferred that to include a shuttle biasing means for urging the shuttle towards either the first or second position. It is further preferred that the shuttle biasing
15 means includes a spring that is engaged by a lug whereby rotation of the rotatable member causes relative movement between the spring and the lug to store potential energy in the spring when the shuttle is between the first and second position and to release the stored energy when the shuttle approaches the first or second position. It is preferred that the spring is associated with the
20 housing and the lug is associated with the rotatable member.

It is preferred to include tactile indication means producing a tactile signal when the operational condition of the deadlocking means changes from inoperable to operable. It is further preferred that the tactile indication means
25 includes a biasing means for urging a responsive element, the biasing means storing potential energy when the operational condition of deadlocking means inoperable and releasing the stored energy when the operational condition of the deadlocking means changes from inoperable to operable thereby the biasing means moves the responsive element to engage a surface of the lock
30 assembly to produce a tactile signal.

According to another aspect of this invention there is provided an adjustable bolt assembly for connection to a chassis of a cylindrical lock

assembly, the cylindrical lock assembly being operable to move a bolt of the bolt assembly between an inoperative position and an operative position and back to the inoperative position, the bolt assembly being operable between a short or long back set mode and including;

5 a housing;

a bolt being movable between an operative position and an inoperative position so as to extend from and retract into the housing respectively;

a draw bar having a head end connected to the bolt;

a tail bar having a tail end for connection in use to the chassis; and

10 wherein the tail bar is adjustably connected the draw bar to adjust the relative position of the head end of the draw bar to the tail end of the tail bar to adjust the mode of operation of the bolt assembly between short backset and long backset, the connection of the tail bar to the draw bar allowing for said movement of the bolt between the inoperative position and the operative position and back to the
15 inoperative position.

It is preferred that the tail bar be connected to the draw bar by a fastening means.

20 It is preferred that the fastening means includes a slot that extends in the longitudinal axis of the bolt assembly. It is further preferred that the slot is located in the tail bar and receives a fastening element there through which is located in an aperture formed in the draw bar.

25 It is preferred that the tail bar includes a further slot for accommodating a lug associated with the draw bar, so as to assist the draw bar to move linearly relative to the tail bar when adjusting between the short backset and a long backset.

It is preferred that an adjustable bolt assembly wherein the bolt is connected
30 to the draw bar by a pin.

According to further still another embodiment of this invention there is provided a bolt assembly for forming part of a cylindrical lock assembly by connection to a chassis of the cylindrical lock assembly, which in use engages a
35 strike, the bolt assembly including;

a housing having a longitudinal axis;

a link member being connected to the chassis and movable therewith and movable relative to the housing in the direction of the longitudinal axis;

two hook bolts movable relative to the link member in a direction substantially perpendicular to the longitudinal axis between an extended position, which in use engages the strike, and a retracted position, which in use disengages the hooks from the strike.

It is preferred that a bolt assembly include a face plate which is connected to a backing plate associated with the housing, the face plate having an aperture through which at least a portion of each hook extends when the hooks are in the extended position, wherein each hook bolt includes an engaging portion which in use engages the strike when the hook bolt is in the extended position, and an interaction portion that interacts with the face plate when the hook bolt moves towards the extended position.

It is preferred that each hook bolt pivots about an axis substantially perpendicular to the longitudinal axis of the housing.

It is preferred that the pivot axis of each hook bolt is coaxial.

It is preferred that both of the hook bolts pivot about a single pin.

It is further preferred that a portion of the link member extends through the aperture in the face plate when the hook bolts are in the extended position.

It is further preferred that the link member is adjustable in a length dimension so as to operate in either a short backset or a long backset mode. The link member preferably includes a draw bar and a tail bar which are adjustably attached to each other so as to adjust the length dimension

According to further still another aspect of this invention there is provided a cylindrical lock set including a cylindrical lock assembly as herein before defined, a bolt assembly as herein before defined.

It will be convenient to hereinafter describe a number of embodiments of the invention in detail with reference to the accompanying drawings. It ought to be appreciated however that the detailed description and the accompanying
5 drawings are merely illustrative of how the invention might be put into effect. The specific form and arrangement of the various features shown and described is not to be understood as limiting on the invention which is defined by the claims.

10 Figure 1 is a partly exploded view of the cylindrical lock assembly in proximity to a door panel.

Figure 2 is an exploded view of the cylindrical lock assembly with the bolt assembly removed.

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Figure 3 is an exploded view of a first embodiment of the bolt assembly suitable for a hinged door.

20 Figure 4 is an exploded rear view of the rotatable member, shuttle and housing.

Figure 5 is an exploded view of a second embodiment of the bolt assembly suitable for a sliding door.

25 Referring initially to Figure 1 which shows component parts of the cylindrical lock assembly including an inner part 1, an outer part 2 and a bolt assembly 3. The inner part 1 would normally be located on the inside of the door panel 4 and the outer part 2 located on the outside of the door panel 4 with the two parts connected by a pair of fixing screws (not shown). Clearly this
30 orientation is not essential. The inner part 1 includes a chassis 5 for location in a cross bore 6 formed in the face of the door panel 4. The bolt assembly 3 is located in a transverse bore extending from an edge of the door 7. The chassis 5 includes a housing 8 and a shuttle 9, only the jaws 10 of which can be seen in Figure 1. Whilst the functionality of the shuttle 9 relative to the housing 8 will be

described with reference to latter illustrations it is important to note from Figure 1 that the jaws 10 of the shuttle engage a connector element 11 the bolt assembly 3. The shuttle 9 is movable relative to the housing 8 so as to move the bolt 12 of the bolt assembly 3 between an operative extended position
5 shown in Figure 1 and an inoperative retracted position not shown.

Referring now to Figure 2 which illustrates the inner part 1 and outer part 2 in an exploded view. Focusing firstly on the outer part 2 which includes an outer cylindrical housing 3 formed with an aperture 14 to receive the first or
10 outer key operable lock 15. The key operable lock 15 illustrated includes a housing 16 within which a barrel 17 is rotatable when an authorised key 18 is inserted into a keyway of the barrel. The barrel 17 is operatively connected to a tail bar 19 so that rotation of the barrel 17 causes rotation of the tail bar 19. The tail bar 19 in turn is connected to elements of the inner part 1 of the cylindrical
15 lock assembly to function in a manner that will be described later in the specification.

The inner part 1 illustrated in Figure 2 shows the chassis 5 with the housing 8 which houses the shuttle 9. The shuttle 9 is formed from two parts
20 including a shoe 20 on one side of the housing 8 and a retractor plate 21 on the other side. The shoe 20 includes the jaws 10 which engage the bolt assembly 3 and the retractor plate 21 is engaged by a rotatable member 23 of an actuator 22. The retractor plate 21 is connected to the shoe 20 through slots 24 formed in a base of the housing 8 by two lugs 25 so as to limit movement of the shuttle
25 relative to the housing to linear movement. Furthermore the length of the slots also limit the length of the linear movement. The lugs 25 are best seen in Figure 4.

The retractor plate 21 includes a pocket 26 within which a lug 27
30 associated with the rotatable member 22 is locatable. The lug 27 of the actuator is obscured from the view in Figure 2 and can be seen in Figure 4. The arrangement of the lug 27 and the pocket 26 enable rotation of the rotatable member 22 to cause movement of the retractor plate 21. A further lug 28 on the rear surface of the rotatable member 22 engages a biasing plate 29 so as to

urge the rotatable member 22 and therefore the shuttle 9 towards either a retracted or extended position.

5 The rotation of the rotatable member 22 is achieved for the inside by rotation of a hand engageable means which is illustrated in Figure 2 as a turn knob 30. The rotatable member 22 can also be rotated from the outside by rotation of the tail bar 19.

10 The cylindrical lock assembly also includes deadlocking means 31 which in the embodiment illustrated includes a pair of detents 32 which are associated with the rotatable member 22. The deadlocking means also includes a drive member 34 that when rotated in one direction towards a lock position causes the detents 32 to move radially to an extended or active position. When in the active position the detents 32 partially locate in recesses (not shown) formed in
15 an inner cylindrical housing 35. As the inner cylindrical housing 35 is fixed relative to the door 4, this locks the position of the rotatable member 22 relative to the housing 35 to stop it from being rotated. The drive member 34 is rotatable by operation of either the first or outer lock cylinder lock 15 or second or inner cylinder lock 36. While rotation of the barrel in the opposite direction will result
20 in rotation of the drive member 34 away from the lock position and further rotation of the barrel causes rotation of the rotatable member 22 and movement of the detents 32 away from the active position. A biasing means in the form of a spring 33 may be included to assist moving the detents 32 away from the active position however this is not essential.

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The drive member 34 of the deadlocking means is also operatively connected to an indication means 37 located in the hand engageable turn knob. The indication means 37 provides a visual and tactile indication of the status of the deadlocking means. The visual indicator illustrated includes a pivotable two
30 part member 38 which interacts with the window 39 of the turnknob 30. The member 38 pivots about an axis transverse to the axis X-X. The member 38 includes a pair of faces 38a, 38b which are preferably coloured red and green respectively, whereby the red coloured face 38a locates within the window 39 when the deadlocking means 31 is active. Conversely the green face 38b

locates within the window 39 when the deadlocking means 31 is inactive. The tactile indicator means includes a ball 40 urged by a compression spring 41 to positively engage one of two recesses formed in the turn knob 30 when the deadlocking means reaches either the active or inactive condition. This provides
 5 the user with a tactile indication that the deadlocking means is either active or inactive.

Referring now to Figure 3 which illustrates the bolt assembly 3 in an exploded view. The bolt assembly illustrated includes a two part housing 42,43
 10 which houses the bolt 12, a draw bar 44 and a tail bar 45. The housing element 43 engages an outer surface of an over housing 65 of the inner part 1 of the cylindrical lock assembly (see fig 2), while a connector element 52 engages an inner surface of the over housing 65. This fixes the position of the housing element 43 relative to the cylindrical lock assembly. The housing element 42 is
 15 movable axially relative to the housing element 43 between a short backset setting and a long backset setting. The housing elements 42, 43 are retained in a selected setting by the interaction of a locking ring 66 with a lug of the housing element 42, and an arm 68 of the housing element 43.

20 The draw bar 44 illustrated is connected to the bolt 10 by a pin 46 which extends through a bore 47 through the rear end of the bolt 12. The head 48 of the draw bar 44 is formed with an aperture 63 through which the pin 46 extends.

The draw bar 44 is connected to the tail bar 45 by a fastener 49 which in
 25 the embodiment illustrated is in the form of a screw. Naturally this form of fastener may vary. The shank of the screw extends through a slot 50 in the tail bar 45 to be secured in the threaded aperture 51 of the draw bar 44. The tail bar 45 illustrated includes a second slot 62 which accommodates a guide lug 63 of the draw bar 44. This slot arrangement allows the user to slide the draw bar 44
 30 relative to the tail bar 45 to select either a short backset or long backset for the bolt assembly.

A T formation 69 of the tail bar 45 which is formed to connect with the jaws 10 of the shuttle 9, so that the tail bar moves with the shuttle 9.

The bolt assembly is also provided with a face plate 33. Four fixing screws can pass through the apertures in the face plate 53 and the housing 42 for fixing the bolt assembly 3 to the edge of the door 4.

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Referring now to Figure 5 which illustrates an alternative embodiment of the bolt assembly 3 suitable for use principally in a sliding door. Like features from the embodiment illustrated in figure 3 are given like reference numerals. The bolt assembly 3 includes a housing 70 and connecting element 52 which is
10 to be connected to the chassis 5 of the cylindrical lock assembly in a manner similar to that described with reference to figure 3.

The bolt assembly 3 of this preferred embodiment includes a link member 71 which in the embodiment illustrated includes a bolt 12 and a draw
15 bar 72 connected to the bolt 12 by way of a pin 46. The draw bar 72 can be connected to the chassis 5 of the cylindrical lock assembly in a manner substantially identical to that as described with reference to the embodiment illustrated in Figure 3. In particular movement of the shuttle 9 will move the bolt
20 12 relative to the housing 70. Whilst the embodiment illustrated shows only a draw bar, a tail bar may also be incorporated so as to allow this embodiment to adjust between a long and a short backset in a manner similar to that described with reference to figure 3.

The embodiment of the bolt assembly 3 illustrated in Figure 5 differs from
25 that illustrated in figure 3 in that it includes a pair of hook bolts 73,74. These hook bolts move relative to the bolt 12 of the link member 71 in a direction which is substantially perpendicular to the longitudinal axis YY of the housing 70. It is preferred that the hook bolts 73,74 pivot about a single pin 75 which extends through an aperture 76 formed in the bolt 12 however other forms of
30 movement and attachment of the hook bolts 73, 74 may be possible.

Each hook bolt 73,74 has an engaging portion 76,77 and an interaction portion 78,79. The engaging portion 76,77 engages the strike 80 whilst the

interaction portion 78,79 interacts with a face plate 81 which is connected to a backing plate 82 associated with the housing 70.

5 The hook bolts 73,74 are located within the bolt 12 within the housing 70 when they are in a retracted position. In order to move the hook bolts 73,74 to an extended position the link member 71 is moved in the direction of the longitudinal axis YY towards the strike 80. The hook bolts 73,74 extend through an aperture 83 formed in the face plate 81 so that the interaction portion 78,79 of each hook 73,74 catches on a rear surface of the face plate as the link
10 member 71 is moved. This causes the hook bolts 73,74 to pivot moving each engaging portion 76,77 to locate behind the rear surface of the strike 80. Conversely moving the link member 71 away from the strike 80 will cause the hook bolts 73,74 to disengage from the strike 80 and retract into the housing 70.

15 It will be appreciated from the foregoing description that the present invention provides a cylindrical lock assembly that is relatively easy to install. The ability of adjusting the backset of the bolt assembly without using additional elements is a preferred advantage. Furthermore providing the user with a visual and or tactile indication of a condition of the deadlocking means is a further
20 preferred advantage. The ability of the bolt assembly to be suitable for a sliding door arrangement is also an advantage.

Various alterations, modifications and/or additions may be introduced into the constructions and arrangements of parts previously described without
25 departing from the spirit or ambit of the invention as defined by the claims.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A cylindrical lock assembly for use with a door panel, the lock assembly
5 including;
a bolt assembly for location in a transverse bore formed in the door panel
extending from an edge of the panel, the bolt assembly including a bolt being
linearly movable between an operative position and an inoperative position;
a chassis for location in a cross bore formed in the door panel and extending
10 between opposing faces of the door panel so as to connect with the transverse
bore, the chassis being operatively connected to the bolt assembly, the chassis
includes a housing that houses a shuttle that moves linearly relative to the housing
between a first and second position so as to move the bolt between the operative
and inoperative positions respectively;
15 an actuator means including a rotatable member that when the actuator
means is operable is rotatable about a rotation axis relative to the housing to move
the shuttle between the first and second position, the actuator means being
operable from an outer side of the lock assembly by a first key operable lock to
rotate the rotatable member and being operable from an inner side of the lock
20 assembly by a hand engagable means to rotate the rotatable member; and
deadlocking means that when in an active condition renders the actuator
means inoperable to rotate the rotatable member from both the inner and outer
side.
- 25 2. A cylindrical lock assembly according to claim 1 wherein the first key operable
lock is operable to render condition of the deadlocking means as either active or
inactive.
3. A cylindrical lock assembly according to claim 1 or 2 including a second key
30 operable lock which is operable to render condition of the deadlocking means as
either active or inactive.
4. A cylindrical lock assembly according to claim 1 wherein the deadlocking
means acts between the rotatable member and the housing fixing the rotational
35 position of the rotatable member relative to the housing.

5. A cylindrical lock assembly according to claim 1 or 2 wherein the deadlocking means includes at least one detent that is movable in a direction transverse to the rotational axis between an active position and an inactive position so as to render the actuator inoperable and operable respectively.

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6. A cylindrical lock assembly according to claim 3 including detent biasing means for urging the at least one detent towards the inactive position.

7. A cylindrical lock assembly according to any one of the preceding claims including visual indication means for visually indicating the operational condition of the deadlocking means.

8. A cylindrical lock assembly according to any one of the preceding claims wherein the shuttle includes a retractor for operatively engaging the bolt assembly, and a slide for operatively engaging the actuator and acting between the actuator and the retractor so that rotational movement of the rotational member causes linear movement of the retractor and movement of the bolt.

9. A cylindrical lock assembly according to claim 8 wherein the retractor includes at least one jaw for engaging the bolt assembly.

10. A cylinder lock assembly according to claim 8 or 9 wherein the slide includes a pocket for accommodating a projection associated with the rotation member when the shuttle is moved between the first and second position.

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11. A cylindrical lock assembly according to any one of claims 8 to 10 including shuttle biasing means for urging the shuttle towards either the first or second position.

12. A cylindrical lock assembly according to claim 11 wherein the shuttle biasing means includes a spring that is engaged by a lug whereby rotation of the rotatable member causes relative movement between the spring and the lug to store potential energy in the spring when the shuttle is between the first and

second position and to release the stored energy when the shuttle approaches the first or second position.

13. A cylindrical lock assembly according to claim 12 wherein the spring is
5 associated with the housing and the lug is associated with the rotatable member.

14. A cylindrical lock assembly according to any one of the preceding claims
including tactile indication means producing a tactile signal when the operational
condition of the deadlocking means changes from inoperable to operable.
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15. A cylindrical lock assembly according to claim 14 wherein the tactile indication
means includes a biasing means for urging a responsive element, the biasing
means storing potential energy when the operational condition of deadlocking
means inoperable and releasing the stored energy when the operational condition
15 of the deadlocking means changes from inoperable to operable thereby the biasing
means moves the responsive element to engage a surface of the lock assembly to
produce a tactile signal.

16. An adjustable bolt assembly for forming part of a cylindrical lock assembly by
20 connection to a chassis of the cylindrical lock assembly, the cylindrical lock
assembly being operable to move a bolt of the bolt assembly between an
inoperative position and an operative position and back to the inoperative position,
the bolt assembly being operable between a short or long back set mode and
including;

25 a housing;
a bolt being movable between an operative position and an inoperative
position so as to extend from and retract into the housing respectively;

a draw bar having a head end connected to the bolt;
a tail bar having a tail end for connection in use to the chassis; and

30 wherein the tail bar is adjustably connected the draw bar to adjust the relative
position of the head end of the draw bar to the tail end of the tail bar to adjust the
mode of operation of the bolt assembly between short backset and long backset,
the connection of the tail bar to the draw bar allowing for said movement of the bolt
between the inoperative position and the operative position and back to the
35 inoperative position.

17. An adjustable bolt assembly according to claim 16 wherein the tail bar is connected to the draw bar by a fastening means.

18. An adjustable bolt assembly according to claim 17 wherein the fastening
5 means includes a slot that extends in the longitudinal axis of the bolt assembly.

19. An adjustable bolt assembly according to claim 18 wherein the slot is located in the tail bar and receives a fastening element there through which is located in an aperture formed in the draw bar.

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20. An adjustable bolt assembly according to claim 19 wherein the tail bar includes a further slot for accommodating a lug associated with the draw bar, so as to assist the draw bar to move linearly relative to the tail bar when adjusting between the short backset and a long backset.

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21. An adjustable bolt assembly according to any one of claims 16 to 20 wherein the bolt is connected to the draw bar by a pin.

22. A bolt assembly for forming part of a cylindrical lock assembly by
20 connection to a chassis of the cylindrical lock assembly, which in use engages a strike, the bolt assembly including;

a housing having a longitudinal axis;

a link member being connected to the chassis and movable therewith and movable relative to the housing in the direction of the longitudinal axis;

25 two hook bolts movable relative to the link member in a direction substantially perpendicular to the longitudinal axis between an extended position, which in use engages the strike, and a retracted position, which in use disengages the hooks from the strike.

30 23. A bolt assembly according to claim 22 including a face plate which is connected to a backing plate associated with the housing, the face plate having an aperture through which at least a portion of each hook extends when the hooks are in the extended position.

24. A bolt assembly according to claim 23 wherein each hook bolt includes an engaging portion which in use engages the strike when the hook bolt is in the extended position, and an interaction portion that interacts with the face plate when the hook bolt moves towards the extended position.

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25. A bolt assembly according to any one of claims 22 to 24 wherein each hook bolt pivots about an axis substantially perpendicular to the longitudinal axis of the housing.

10 26. A bolt assembly according to claim 25 wherein the pivot axis of each hook bolt is coaxial.

27. A bolt assembly according to claim 26 wherein both of the hook bolts pivot about a single pin.

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28. A bolt assembly according to claim 23 or 24 wherein a portion of the link member extends through the aperture in the face plate when the hook bolts are in the extended position.

20 29. A bolt assembly according to any one of claims 22 to 28 wherein the link member is adjustable in a length dimension so as to operate in either a short backset or a long backset mode.

25 30. A bolt assembly according to claim 29 wherein the link member includes a draw bar and a tail bar which are adjustably attached to each other so as to adjust the length dimension.

30 31. A cylindrical lock set including a cylindrical lock assembly according to any one of claims 1 to 15 and a bolt assembly according to any one of claims 16 to 30.