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LOCKS

The present invention relates to locks and more particularly to door locks having provision for selective actuation by a handle at each side of the door.

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Certain door locks, usually of mortice type, have provision for selective actuation by a handle at each side of the door. Typically, such a lock will comprise a latch bolt or tongue, and a lock bar movable between unlocking and locking positions by operation of a key or a turn adaptor. In the unlocking position of the lock bar, the tongue can be released by
10 rotation of the handles at both sides of the door. In the locking position of the bar, either a selected one of the handles is rendered ineffective to operate the tongue from that side of the door or both handles are rendered ineffective to release the tongue. In effect, therefore one or both handles are "locked" selectively in accordance with the particular circumstances by which access is to be permitted or denied. The appropriate selectivity is
15 set up within the lock prior to installation and this is known as changing or setting the "handing" of the lock to provide a so-called vestibule or combination function. Certain prior forms of lock with provision for changing the handing achieve this without the need to dismantle the lock, by incorporating into the lock bar one or more locking members movable, by access from outside of the lock casing, between positions in which tongue
20 actuators associated with the respective handles are either locked or unlocked when the lock bar is in its locking position.

The present invention relates to a system for changing the handing of the lock which is simple to achieve.

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According to one aspect of the present invention there is provided a door lock comprising a tongue movable from an extended to a retracted position relative to a lock casing by operation of one or other of a pair of rotary actuators each independently actuable by a handle at a respective side of the door, a lock member movable between an unlocking
30 position in which either handle can be operated to cause retraction of the tongue and a locking position, and a lock handing system associated with the lock member for

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selectively rendering a selected one or both of the actuators inoperative to cause retraction of the tongue by operation of the associated handle when the lock member is in the locking position, wherein the lock handling system comprises, for each actuator, a respective handling screw selectively insertable into a threaded aperture in the lock member to block
5 tongue-retracting movement of the associated actuator when the screw is present, the retracting movement of the actuator being enabled in the absence of the screw from the aperture, insertion and removal of each screw being enabled from externally of the casing via an aperture in the casing.

10 Advantageously, movement of the lock member from its unlocking to its locking position and vice versa is a key-actuated function. Alternatively, the movement can be effected by a turn adaptor.

In one preferred form, the lock member is configured to provide a recess into which both
15 actuators can move in the absence of the handling screws when the lock member is in the locking position. The recess is defined between parallel side walls with each actuator lying adjacent a respective one of the side walls when in a tongue-retracting position. Each side wall includes a threaded aperture accessible from outside the lock casing, and the handling screw is insertable into the aperture so that the shank of the screw extends into the recess to
20 lie in a position in which the shank of the screw blocks retracting movement of the associated actuator when the lock member is in its locking position. Advantageously the screw is of such a length that when the screw is inserted with a head of the screw in engagement with the outer surface of the side wall, the shank of the screw extends into the recess by a distance sufficient only to block retracting movement of the actuator associated
25 with that side wall without interfering with retracting movement of the other actuator.

Preferably, the lock is supplied prior to installation with two handling screws whereby the lock can be selectively set up to provide a condition in which neither actuator is able to retract the tongue when the lock member is in its locking position. When either a right
30 hand or left hand handling function is required, only one of the two screws will be used. Possibly, the casing may be provided with a threaded aperture for storage of the unused

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screw in that condition.

In the preferred embodiment of the invention, the lock member is in the form of a lock bar movable linearly between the unlocking and locking positions with the lock bar being
5 positioned in the casing rearwardly of the actuators.

Although it is preferred that the handing screws are inserted into the lock member from each side in the manner defined, in an alternative configuration it would be possible for the screws to be inserted from the rear so that that two screws lie side-by-side in a direction
10 parallel to the direction of tongue movement.

Preferably the lock incorporates a so-called kick-off function (sometimes called "anti-lockout") which causes the lock member to be moved to its unlocking position in response to retraction of the tongue. In one form, the kick-off function is provided by a screw
15 removably insertable into the lock member from externally of the casing such that when the lock member is in its locking position the screw will lie within the path of movement of a component which moves with the tongue whereby retraction of the tongue will, by interaction between said component and the screw, cause the lock member to be displaced into its unlocking position. When the kick-off function is not required the screw is
20 removed. Possibly, it can be stored in a threaded aperture provided for that purpose on the casing. In one preferred form, the component which interacts with the screw has a ramped surface which engages with a head of the screw upon retraction of the tongue.

The kick-off function defined above also has utility in locks with different forms of
25 handing system associated with the lock member to that defined above.

Accordingly, a further aspect of the present invention provides a door lock comprising a tongue movable from an extended to a retracted position relative to a lock casing by operation of one or other of a pair of rotary actuators each independently actuable by a
30 handle at a respective side of the door, a lock member movable between an unlocking position and a locking position, and a lock handing system associated with the lock

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member for selectively rendering a selected one or both of the actuators inoperative to cause retraction of the tongue by operation of the associated handle when the lock member is in the locking position, wherein the lock incorporates a selectively operative kick-off function to cause the lock member to be moved from its locking position to its unlocking position in response to retraction of the tongue, the kick-off function being provided by a screw removably insertable into the lock member from externally of the casing such that when the lock member is in its locking position the screw will lie within the path of movement of a component which moves with the tongue whereby upon retraction of the tongue the component will interact with the screw to cause displacement of the lock member to its unlocking position.

In one preferred form the component has a ramped surface which engages with a head of the screw upon retraction of the tongue.

When the kick-off function is not required the screw is removed. Possibly, it is able to be stored in a threaded aperture provided for that purpose on the casing.

An embodiment of the invention will now be described by way of example only with reference to the accompanying drawings in which:

Figure 1 is a side view of a lock in accordance with a preferred embodiment of the invention, the side wall of the lock casing being omitted to show the lock mechanism; this figure shows the mechanism in a condition in which a lock bar is in an unlocking position and the lock tongue is extended;

Figure 2 is a view similar to Figure 1 and showing the mechanism when the tongue has been retracted by operation of an actuator associated with one of the handles;

Figure 3 is a view similar to Figure 1 and showing the lock bar having moved into a locking position in which rotation of the actuator is blocked by the presence of a handing screw on the lock bar;

Figure 4 is a view similar to Figure 3 but with the handing screw removed to thereby permit retraction of the tongue by the actuator, the tongue being shown in a partly retracted position in this figure; and

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Figure 5 is an exploded view showing the lock bar in conjunction with the handing screws and a further screw which provides a kick-off function.

The lock shown in the accompanying drawings comprises a casing 1 having a latch bolt or tongue 2 movable against a spring bias between an extended or latched position (see Figure 1) and a retracted or released position (see Figure 2) by rotation of a handle (such as a lever handle or a knob) at each side of the door. For this purpose, each handle is linked to a separate rotary actuator 4 having an arm 4a which cooperates with a stop 3 slidably mounted on a rear extension of the tongue 2, in practice formed by a carrier 8 on which the tongue 2 is mounted, in order to draw the tongue 2 inwardly against the spring bias upon rotation of the actuator by rotation of the associated handle. Each handle is linked to its associated actuator 4 by a rectangular-sectioned stub shaft engaged in a central hub 4c of the actuator 4. Figure 1 also shows a deadlatch slide 9 in an extended position. This cooperates with the tongue 2 in a conventional manner to deadlatch the tongue 2 against forced retraction as will be well understood by those skilled in the art.

A lock bar 10 is mounted within the rear part of the casing for linear movement in a direction perpendicular to the direction of movement of the tongue 2 between an unlocking position and a locking position. In the particular configuration shown, the unlocking position of the bar 10 is the raised position shown in Figures 1 and 2 and the locking position is the lowered position of the bar 10 shown in Figures 3 and 4. Movement of the lock bar 10 from its unlocking to its locking position, and, normally, also the reverse movement is effected by operation of a rotatable cam having an arm 12 which interacts with the lock bar 10. The cam itself is driven by rotation of a key-operated cylinder or turn adaptor for example coupled to a turn snib. This cam is not visible in the Figures as it is behind a further cam 14 which is rotatable to cause retraction of the tongue 2 also by rotation of the key-operated cylinder or turn adaptor. In the unlocking position of the lock bar 10, each of the two actuators 4 is able to be operated by rotation of its associated handle in order to cause retraction of the tongue 2. In the locking position of the lock bar 10, locking members carried by the bar interact with the actuators 4 in a selective manner according to the desired handing of the lock in order to prevent a selected one of the

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actuators 4 or both actuators 4 from being operated by their associated handles. The present invention particularly relates to the cooperation between the actuators 4 and the lock bar 10 in its locking position and the locking members carried thereby, and this will now be described in detail in relation to the preferred embodiment of the invention.

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The lock bar 10 is shown in detail in Figure 5. Adjacent its upper end, the lock bar 10 has a recess 20 in which sits the cam arm 12 in order to drive the lock bar 10 downwardly or upwardly consequent on rotation of the key operated cylinder or turn adaptor. At its lower end portion, the bar 10 is formed with a recess 22 which opens onto the lower end of the
10 bar and also onto the forward face of the bar, the recess 22 being defined between parallel side walls 24. The recess 22 is so configured that when the lock bar 10 is in its lowered locking position, it lies behind and in alignment with the two actuators 4 such that operation of the associated handle to cause retraction of the tongue 2 will result in displacement of the rear edge of the actuator 4 into the recess 22 and this displacement is
15 essential to enable the actuator 4 to cause retraction of the tongue 2. In its rearwardly displaced position each actuator 4 will lie immediately adjacent a respective one of the two side walls 24. It is to be understood that the width of the recess 22 is such that it can accommodate both actuators 4 being withdrawn into the recess although this condition is unlikely to arise in practice unless the two handles are simultaneously actuated.

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The locking members associated with the lock bar 10 to provide selective handing of the lock consist of two handing screws 26 selectively engageable into threaded apertures 28 in the two side walls 24. Each screw 26 is a headed screw of such a length that when it is inserted fully into the threaded aperture 28 in one of the side walls 24 so that its head bears
25 against the outer surface of that side wall, it will project into the interior of the recess 22 by a distance sufficient to interact with the actuator 4 which lies adjacent that side wall without interacting with the actuator lying adjacent the other side wall. When the screw 26 is present in the aperture 28 in one or other of the side walls 24 and the lock bar 10 is in its locking position, the screw will lie immediately behind the rear edge of the corresponding
30 actuator 4 to thereby block rotation of that actuator in a sense to cause retraction of the tongue 2. Accordingly the associated handle is effectively locked as that handle cannot be

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turned to cause release of the tongue 2.

Each handing screw 26 is accessible from outside of the casing 1 via a slot in the casing and aligned with the threaded aperture 28. Accordingly, in order to set the required
5 handing of the lock all that is necessary prior to installation is for the installer to insert or remove the handing screw 26 at the relevant side of the lock. When the screw 26 is present at one side, the handle at that side will be locked when the lock bar 10 is in its locking position whereas the handle at the other side can still be operated to cause retraction of the tongue 2. In that case opening of the door from the locked side can only be achieved by
10 key or turn adaptor operation from that side in order to cause displacement of the lock bar 10 to its unlocked position. If handing screws 26 are present at both sides, neither handle can be used to open the door once the lock bar 10 is in its locking position thereby requiring key or turn adaptor operation to effect unlocking.

15 Figure 3 illustrates the blocking relationship between the outermost actuator 4 (as viewed in Figures 1 to 4) and the associated handing screw 26 when present, and Figure 4 illustrates how that actuator is able to displace into the recess 22 with the screw 26 removed.

20 The lock will be supplied with a pair of handing screws 26. When, as will usually be the case, only a single screw will be used to provide either a left hand or right hand operation. It is possible that the second screw can be held in a threaded storage aperture on the outside of the casing for future use. In that case, two such storage apertures will be provided, one for each screw so that both screws can be stored in the event that it is desired
25 to temporarily set the lock in a disabled state in which irrespective of the position of the lock bar, both handles can be used to retract the tongue.

The handing screws achieve the handing function in a relatively simple manner without risk of malfunction.

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The lock in accordance with a preferred embodiment of the invention preferably also

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includes a so-called kick-off or anti-lockout function which is selectively operable to cause the lock bar 10 to be displaced from its locking to its unlocking position in response to retraction of the tongue. The kick-off function is provided by a screw 30 engageable in a threaded aperture 32 in a recess 34 formed in one of the two side faces of the lock bar 10.

5 When the lock bar 10 is in its locking position the head of the screw 30 is aligned with a ramp 36 formed at the rear end of a rear extension of the tongue carrier 8; this is shown in Figures 3 and 4. When the tongue 2 is retracted, the ramp 36 moves backwards into engagement with the head of screw 30 to thereby cause the lock bar 10 to be displaced upwardly (in the configuration shown) into its unlocking position in which both handles

10 can subsequently be operated to retract the tongue 2 until such time that the lock bar 10 is returned into its locking position by rotation of the key operated cylinder or turn adaptor; this kick-off action will occur however the tongue is retracted, such as by operation of a handle which is not "locked", by engagement of the tongue 2 with a striker plate on the door jamb if the door is closed with the lock bar 10 in its locking position or even by

15 rotation of the further 14 cam associated with the key-operated cylinder or turn adaptor.

The kick-off screw 30 is also accessible through an aperture in the side wall of the casing 1 so that it can be engaged and removed from externally of the casing without having to dismantle the lock. Possibly a threaded storage recess for the screw 30 maybe provided at

20 a suitable position on the exterior of the casing to permit storage when not in use.

Although it is preferred that the lock incorporates the selectively operable kick-off function described, that is not essential and other versions of the lock might not have that capability. Conversely, the described kick-off capability has utility in locks in which adjustment of the

25 handing is effected in a different manner to that described above, for example locks using a rotary locking head carried by the lock bar to control the handing or lock members mounted retractably within the lock bar.

Only the handing system and kick-off function, both associated with the lock bar 10, have

30 been described in detail. In other respects the mechanism of the lock is substantially conventional and will be well understood by those skilled in this art.

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Throughout this specification and claims which follow, unless the context requires otherwise, the word "comprise", and variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated integer or group of integers or steps but not
5 the exclusion of any other integer or group of integers.

The embodiment of the invention has been described by way of example only and modifications are possible within the scope of the invention.

CLAIMS:

1. A door lock comprising a tongue movable from an extended to a retracted position relative to a lock casing by operation of one or other of a pair of rotary actuators each
5 independently actuatable by a handle at a respective side of the door, a lock member movable between an unlocking position in which either handle can be operated to cause retraction of the tongue and a locking position, and a lock handling system associated with the lock member for selectively rendering a selected one or both of the actuators inoperative to cause retraction of the tongue by operation of the associated handle when
10 the lock member is in the locking position, wherein the lock handling system comprises, for each actuator, a respective handling screw selectively insertable into a threaded aperture in the lock member to block tongue-retracting movement of the associated actuator when the screw is present, the retracting movement of the actuator being enabled in the absence of the screw from the aperture, insertion and removal of each screw being enabled from
15 externally of the casing via an aperture in the casing.
2. A lock according to claim 1, wherein movement of the lock member between its unlocking and its locking position is effected by operation of a key.
- 20 3. A lock according to claim 1, wherein movement of the lock member between its unlocking and its locking position is effected by operation of a turn adaptor.
4. A lock according to any one of claims 1 to 3, wherein the lock member is configured to provide a recess into which both actuators, during tongue-retracting
25 movement, can enter in the absence of the handling screws when the lock member is in the locking position.
5. A lock according to claim 4, wherein the recess is defined between parallel side walls of the lock member with each actuator lying adjacent a respective one of the side
30 walls when in a tongue-retracting position, each side wall including a threaded aperture accessible from outside the lock casing via the aperture therein, and the handling screw

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being insertable into the threaded aperture so that the shank of the screw extends into the recess to lie in a position in which the shank of the screw blocks tongue-retracting movement of the associated actuator when the lock member is in its locking position.

- 5 6. A lock according to claim 5, wherein the screw is of such a length that when the screw is inserted with a head of the screw in engagement with the outer surface of the side wall, the shank of the screw extends into the recess by a distance sufficient only to block retracting movement of the actuator associated with that side wall without interfering with retracting movement of the other actuator.

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7. A lock according to any one of claims 1 to 6, wherein the lock is supplied prior to installation with two handing screws whereby the lock can be selectively set up to provide a condition in which neither actuator is able to retract the tongue when the lock member is in its locking position, or a condition in which either a right hand or left hand handing
15 function is provided by use of only one of the two screws.

8. A lock according to claim 7, wherein the casing is provided with a threaded aperture for storage of one of the two screws not in use.

- 20 9. A lock according to any one of claims 1 to 8, wherein the lock member is in the form of a lock bar movable linearly between the unlocking and locking positions with the lock bar being positioned in the casing rearwardly of the actuators.

10. A lock according to any one of claims 1 to 9, having a kick-off function which
25 causes the lock member to be moved to its unlocking position in response to retraction of the tongue.

11. A lock according to claim 10, wherein the kick-off function is provided by a screw removably insertable into the lock member from externally of the casing such that when
30 the lock member is in its locking position the screw will lie within the path of movement of a component which moves with the tongue whereby retraction of the tongue will, by

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interaction between said component and the screw, cause the lock member to be displaced into its unlocking position.

12. A lock according to claim 11, wherein the component which interacts with the
5 screw has a ramped surface which engages with a head of the screw upon retraction of the tongue.

13. A door lock comprising a tongue movable from an extended to a retracted position
relative to a lock casing by operation of one or other of a pair of rotary actuators each
10 independently actuatable by a handle at a respective side of the door, a lock member
movable between an unlocking position and a locking position, and a lock handling system
associated with the lock member for selectively rendering a selected one or both of the
actuators inoperative to cause retraction of the tongue by operation of the associated handle
when the lock member is in the locking position, wherein the lock incorporates a
15 selectively operative kick-off function to cause the lock member to be moved from its
locking position to its unlocking position in response to retraction of the tongue, the kick-
off function being provided by a screw removably insertable into the lock member from
externally of the casing such that when the lock member is in its locking position the screw
will lie within the path of movement of a component which moves with the tongue
20 whereby upon retraction of the tongue the component will interact with the screw to cause
displacement of the lock member to its unlocking position.

14. A lock according to claim 13, wherein the component has a ramped surface which
engages with a head of the screw upon retraction of the tongue.
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15. A lock according to claim 13 or claim 14, wherein the lock casing has a threaded
aperture for storage of the screw when removed from the lock member to render the kick-
off function inoperative.