Title: A MORTICE LOCK ASSEMBLY

Abstract: A mortice lock assembly (20) including a housing (22) and at least one electrical switch (76). The housing (22) is adapted for positioning in a recess in a door. The at least one electrical switch (76) is positioned for access thereto without requiring removal of the housing (22) from the recess. The switch (76) is settable to alter at least one function or attribute of the mortice lock assembly (20).
A MORTICE LOCK ASSEMBLY

Field of the Invention

The present invention relates to a mortice lock assembly. The invention has been developed for use with an electrically controllable and/or electrically powered mortice lock and will be described hereinafter with reference to this application. However, it will be appreciated that the invention is not limited to this particular use and is also suitable for use in other types of locks.

Background of the Invention

Mortice locks utilise two hubs, each associated with a lever or other handle on each side of a door. They can be configured to provide any one only of four different pairs of functions when locked or unlocked. Configuring a lock in the desired one of the four function pairs is known as handing the locking mechanism and allows the lock installer to ensure that the pair of functions best matches the requirement of a particular door. The ability to hand a lock assembly: saves the lock manufacturer from having to make stock and sell four different assemblies, one for each condition; saves a customer from having to know which lock to order for which door; and avoids an incorrectly handed lock assembly from being delivered. These last two requirements can be particularly important when purchasing a large number of lock assemblies for installation in, for example, a multi-storey building with many doors.

Mortice locks have the majority of their componentry contained within a housing that is installed within a recess in a door. Electrically controllable and/or electrically powered mortice locks are known which have components that allow monitoring and sensing of the lock’s status and/or movement of lock components. Locks are also known which include switches that can be set to change which components are monitored/sensed and/or how the lock functions.

However, a disadvantage of such locks is that the switches are located on the lock’s housing in positions which are not accessible unless the lock is removed from the recess in the door. This makes changing a setting difficult, time consuming and can often require the services a locksmith. Further, the correct installation or mechanical function of the lock can be compromised during the removal and reinstallation required for the switch setting.
Object of the Invention

It is the object of the present invention to overcome or at least ameliorate one or more of the above disadvantages.

Summary of the Invention

Accordingly, in a first aspect, the present invention provides a mortice lock assembly, the mortice lock assembly including:

a housing adapted for positioning in a recess in a door; and

at least one electrical switch positioned for access thereto without requiring removal of the housing from the recess,

wherein the switch is settable to alter at least one function or attribute of the mortice lock assembly.

The housing is preferably adapted for positioning in the recess with a side of the housing substantially adjacent a free side edge of the door and the at least one electrical switch is preferably positioned substantially adjacent said housing side.

The lock assembly preferably includes a face plate releasably mountable to said housing side and the at least one electrical switch is positioned substantially adjacent said housing side for concealment by the face plate, or a part associated with the face plate, when mounted on the housing.

The lock assembly preferably includes a face plate releasably mountable to said housing side and the at least one electrical switch is positioned substantially adjacent said housing side on the face plate, or a part associated with the face plate.

The mortice lock assembly is preferably electrically controllable, electrically powered, or electrically controllable and electrically powered.

The part associated with the face plate preferably includes: a sub face plate connectable to the face plate; or a patch, button or blanking plug mountable in an opening in the face plate.

The mortice lock assembly preferably includes a mounting plate between the housing and the face plate, the mounting plate forming all or part of said housing side.

The mounting plate preferably including at least one opening for access to the at least one switch.

In one form, the lock assembly includes a plurality of said electrical switches.
Brief Description of the Drawings

A preferred embodiment of the present invention will now be described, by way of an example only, with reference to the accompanying drawings in which:

Fig. 1 is a perspective view of an embodiment of a lock assembly;

Fig. 2 is a perspective view of the lock assembly shown in Fig. 1 with a side cover removed;

Fig. 3 is a perspective view of the lock assembly shown in Fig. 1 with a face plate removed;

Fig. 4 is a perspective view of the lock assembly shown in Fig. 1 installed within a recess in a door; and

Fig. 5 is a perspective view of the installed lock assembly shown in Fig. 4 with the face plate removed.

Detailed Description of the Preferred Embodiment

Fig. 1 shows a first embodiment of an electrically controlled and powered lock assembly 20. The lock assembly 20 includes a housing 22 with a side cover 24. The lock assembly 20 also includes a (housing side) mounting plate 26 and a (door edge side) face plate 28.

In the embodiment shown, the housing 22 has a side, defined by the mounting plate 26, which is positioned substantially adjacent the free (ie. non-hinged) side edge 27a of a door 27 when the lock assembly 20 is installed in a recess in the door 27 (see Figs. 4 and 5).

The face plate 28 is mounted to the housing 22 by face plate fasteners, in the form of screws 29a. The mounting plate 26 is similarly mounted to the housing 22 by screws 29b (see Fig 3).

A latch bolt 30 and an auxiliary latch bolt 32 pass through the mounting plate 26 and the face plate 28 for engagement with a strike plate (not shown) in a door jamb.

The lock assembly 20 also includes an opening 34 that receives a key cylinder 35 (see Figs. 4 and 5). The key cylinder 35 is retained within the opening 34 with a key cylinder retaining pin (not shown). After the key cylinder 35 has been inserted into the opening 34, and the key cylinder retaining pin inserted into the key cylinder 35, the key cylinder retaining pin is prevented from releasing its engagement with the key cylinder 35 by engagement of the face plate 28 with the housing 22.
The lock assembly 20 also includes a first hub 36 with a square cross-section opening 38 therein, which is adapted to engage with a square cross-section drive shaft (not shown) of a first external lever 39 (see Figs. 4 and 5). A similar second hub is also provided on the opposite side of the lock assembly 20.

The construction and operation of the above described components are all well understood by persons skilled in the art.

Fig. 2 shows the latch bolt 30 connected to a latch bolt shaft 52 which is in turn connected to a latch bolt carriage 54. The auxiliary bolt 32 is connected to an auxiliary bolt shaft 56 which is in turn connected to an auxiliary bolt carriage 58. The latch bolt 30 and the auxiliary bolt 32 are biased towards the latching position shown in Fig. 3 by a latch spring 60 and an auxiliary latch spring 62 respectively. A carriage retraction arm 63 is pivotally mounted to the housing 22 at shaft 64 and biased towards the latching position shown in Fig. 2 by a spring 66. The arm 63 can be moved, under certain conditions, to a non-latching or door opening position retracting the latch bolt 30 and the auxiliary bolt 32, in response to movement of the first or second handles or the key cylinder, as will be well understood by persons skilled in the art.

Fig. 2 also shows an electrically controlled and powered first solenoid 68 which is controlled to move a first hub locker 70 via a first motion transfer mechanism 72 to selectively prevent or allow rotation of the first hub 36 in response to turning of the handle associated with the first hub 36. A second solenoid 73 similarly interacts with the second hub via a second motion transfer mechanism and a second hub locker.

Fig. 2 also shows electrical switches 80, 82 and 84 associated with the operation of the latch bolt 30, the auxiliary latch bolt 32 and the first solenoid 70 respectively. A further electrical switch (not shown) is associated with the operation of the second solenoid 73. The switches provide information about the status and operation of the lock assembly 20, including the locked status of each of the hubs, by sensing the position of each of the hub lockers, and the deadlatching status of the lock, by sensing the position of the latch bolt and the auxiliary bolt. This information can be used remotely at a control centre or used internally in the lock to switch other electrical circuits. Further switches (not shown) can be associated with other lock features to provide other information or functionality.

Figs. 3 and 5 show the lock assembly 20 with the face plate 28 removed. The removal of the face plate 28 provides access to the mounting plate 26, and to electrical
switches 76, via an opening 77. The switches 76 are settable to alter functions or attributes within the lock assembly 20 that may include but are not limited to:

a. the handing function pair of the lock assembly;
b. the electrical signal the lock assembly issues for a given internal state;
c. the wiring associated with the first and second solenoids; and
d. the operating voltage settings of the lock assembly.

Advantageously, the positioning of the dip switches 76 substantially adjacent the door edge side of the lock housing 22, concealed under the face plate 28, allows easy and quick changing or correction of the desired electrical settings in the lock assembly 20 without having to remove the lock assembly 20 with the housing 22 from within the recess in the door 27, or utilise a locksmith.

The lock assembly 20 finds particular application with, but is not limited to, the lock assembly disclosed in Australian provisional patent application No. 201 1900195 filed 21 January 2011 by the Applicant and corresponding International PCT patent application. Those applications disclose a lock assembly in which face plate removal, which could lead to unauthorised tampering of the switch settings, or attempts to do so, can immediately be brought to the attention of a building's owner or security or any other relevant personnel. Alternatively and/or additionally, the signal or signals can trigger a tamper indicator on the lock assembly itself or door, such as a light, buzzer or a siren and/or disable the lock. Further, any unauthorised tampering of any other aspect of the lock assembly's functions or attributes, or attempts to do so, can similarly immediately be brought to the attention of a building's owner or security or any other relevant personnel and/or trigger a tamper indicator on the lock assembly itself or door and/or disable the lock.

Although the invention has been described with reference to preferred embodiments, it will be appreciated by persons skilled in the art that the invention can be embodied in many other forms. For example, in another embodiment (not shown), the housing does not have a mounting plate and the switches are accessed via an opening in the housing. The opening in the housing is positioned substantially adjacent the free (ie. non-hinged) side edge of a door when the housing is mounted in a recess in a door. In a further embodiment (not shown), the switches are mounted in the face plate and accessable without removal of the face plate. In a yet further embodiment (not shown), the switches are mounted in the housing and accessed directly through apertures in the
face plate and mounting plate (if present), without removal of the face plate or mounting plate.
Claims:

1. A mortice lock assembly, the mortice lock assembly including:
   a housing adapted for positioning in a recess in a door; and
   at least one electrical switch positioned for access thereto without requiring
   removal of the housing from the recess,
   wherein the switch is settable to alter at least one function or attribute of the
   mortice lock assembly.
2. The mortice lock assembly as claimed in claim 1, wherein the housing is preferably
   adapted for positioning in the recess with a side of the housing substantially adjacent a
   free side edge of the door and the at least one electrical switch is preferably positioned
   substantially adjacent said housing side.
3. The mortice lock assembly as claimed in claim 1 or 2, further including a face plate
   releasably mountable to said housing side and the at least one electrical switch being
   positioned substantially adjacent said housing side for concealment by the face plate, or a
   part associated with the face plate, when mounted on the housing.
4. The mortice lock assembly as claimed in claim 1 or 2, further including a face plate
   releasably mountable to said housing side and the at least one electrical switch is
   positioned substantially adjacent said housing side on the face plate, or a part associated
   with the face plate.
5. The mortice lock assembly as claimed in any one of the preceding claims wherein the
   mortice lock assembly is electrically controllable.
6. The mortice lock assembly as claimed in any one of claims 1 to 4, wherein the mortice
   lock assembly is electrically powered.
7. The mortice lock assembly as claimed in any one of claims 1 to 4, wherein the mortice
   lock assembly is electrically controllable and electrically powered.
8. The mortice lock assembly as claimed in claim 3 or 4, wherein the part associated with
   the face plate includes: a sub face plate connectable to the face plate; or a patch, button or
   blanking plug mountable in an opening in the face plate.
9. The mortice lock assembly as claimed in any one of claims 3 to 4, further including a
   mounting plate between the housing and the face plate, the mounting plate forming all or
   part of said housing side.
10. The mortice lock assembly as claimed in claim 9, wherein the mounting plate
    includes at least one opening for access to the at least one switch.
11. The mortice lock assembly as claimed in any one of the preceding claims, further including a plurality of said electrical switches.
FIG. 2
A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl. E05B 17/22 (2006.01) E05B 47/00 (2006.01) E05B 49/00 (2006.01) E05B 63/08 (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic database consulted during the international search (name of database and, where practicable, search terms used)

WPI. EPODOC: IPC E05B 47/-, 49/-, 17/-, 63/08/low, 65/- & Keywords: switch, dial, control, select, alter, status, hand, function, conceal, face, plate, solenoid, power and like terms.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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<td>X</td>
<td>US 3513357 A (DITTMORE) 19 May 1970 See item 24 in figures 1-3, col. 1 lines 48-60 and col. 2 line 15-col. 3 line 5.</td>
<td>1-1 1</td>
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<tr>
<td>X</td>
<td>GB 2225466 A (MONARCH ALUMINIUM LIMITED et al.) 30 May 1990 See items 15, 16, 17 in figures 1-3, page 5 lines 22-25, page 7 line 10-page 8 line 19 and page 15 lines 14-25.</td>
<td>1-1 1</td>
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<td>DE 3509646 A1 (ZEISS IKON AG) 25 September 1986. English abstract retrieved from EPODOC database.</td>
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<td>See item 8 in figure 3 and abstract.</td>
<td>1-1 1</td>
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<td>US 2003/0079508 A1 (LIN) 1 May 2003 See figure 10 and paragraphs 0050-005 1.</td>
<td>1-1 1</td>
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Further documents are listed in the continuation of Box C [X] See patent family annex

* Special categories of cited documents:
  "A" document defining the general state of the art which is not considered to be of particular relevance
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  "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
  "&" document member of the same patent family

Date of the actual completion of the international search
01 February 2012

Date of mailing of the international search report
10 February 2012

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Form PCT/ISA/210 (second sheet) (July 2009)
This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

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Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.

END OF ANNEX