**PATENT REQUEST: STANDARD PATENT**

1. We, being the person(s) identified below as the Applicant, request the grant of a patent to the person identified below as the Nominated Person, for an invention described in the accompanying standard complete specification.

   Full application details follow.

<table>
<thead>
<tr>
<th>[71] Applicant</th>
<th>John Russell Watts</th>
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<tr>
<td>Address</td>
<td>87 Wel St Brighton</td>
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<th>[70] Nominated Person</th>
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<tr>
<th>[54] Invention Title</th>
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<td>An Electric Lock</td>
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<tr>
<th>[72] Name(s) of actual inventor(s)</th>
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<tr>
<td>John Russell Watts</td>
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<table>
<thead>
<tr>
<th>[74] Address for service in Australia</th>
</tr>
</thead>
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<tr>
<td>87 Wel St Brighton 3186</td>
</tr>
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**ASSOCIATED PROVISIONAL APPLICATION(S) DETAILS**

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<tr>
<th>[60] Application Number(s) and Date(s)</th>
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<td>1114 440 16/11/94</td>
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**BASIC CONVENTION APPLICATION(S) DETAILS**

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**DIVISIONAL APPLICATION DETAILS**

<table>
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<tr>
<th>[62] Original application number</th>
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Person by whom made

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I am an *opponent / *eligible person described in Sections 33 - 36 of the Act.

To be completed if the complete specification relates to a microorganism.

For the purposes of Section 40, the specification relies on Section 6 of the Act.

* Delete as appropriate
NOTICE OF ENTITLEMENT

(To be filed before acceptance)

I/we, John Russell Watt

of 87 Wall St Brighton 3186

being the applicant in respect of Application No.

state the following:

Part 1 - Must be completed FOR ALL APPLICATIONS.

The person(s) nominated for the grant of the patent:

*is / are the actual inventor(s)

or

*has entitlement from the actual inventor(s)

(eg by assignment, by mesne assignment, as legal representative of ..., etc)

Part 2 - Must be completed IF THE APPLICATION IS ASSOCIATED with one or more PROVISIONAL APPLICATIONS.

The person(s) nominated for the grant of the patent:

*is / are the applicant(s) of the provisional application(s) listed on the patent request form

or

has entitlement to make a request under Section 113 in relation to the provisional application(s) listed on the patent request form

(eg by assignment, by agreement, etc)

(If the applicant is a Company or other legal entity, also indicate the name and standing of the authorized signatory.)

* Omit/Delete if not appropriate

Note: Use form P/00/008b where details for PCT, convention priority, microorganism deposit, additional or divisional application, are required.
An operating means comprising, an operable means including an operable first member and a second member said first member being selectively angularly displaceable in relation to the second member, locking means including a cross member mutually engageable with the first member and second member to restrain relative displacement therebetween, operable unlocking means responsive to electric current to urge the cross member out of mutual engagement to allow relative displacement between the first member and the second member.
Field of the Invention
This invention relates to locks particularly to cylindrical locksets for hotel doors which are electronically controlled.

Discussion of Prior Art
A commonly available lockset is described in Australian patents 16744/67, 71571/74 and 30700/67 by Ogden. Locks according to these patents comprise lever and rose assemblies positioned one of each side of a door interconnected by a drive shaft which passes through a latch bolt assembly and by which it is actuated; that is the drive shaft caused to rotate by lever rotation causes the latch bolt to retract. Within the lever and rose subassembly there is a drive shaft and a cross member controlled by a cage having helical engagement with the cross member. Rotation of the cage by a key operable cylinder causes the cage to move the cross member between
a position where it locks the lever and a position where it engages the drive shaft and is free to rotate.

With a need to provide increased control and security, hotels are increasingly using electronically controlled, magnetic card operated locks. More popular manufacturers are Schlagge, Arrow, Newman Tonks and many others. These companies provide locks which are expensive and difficult to repair and usually require the complete replacement of existing locks.

Summary of the Invention

According to one aspect of the invention there is provided an operating means comprising, an operable means including an operable first member and a second member said first member being selectively angularly displaceable in relation to the second member,

locking means including a cross member mutually engageable with the first member and second member to restrain relative displacement therebetween,

operable unlocking means responsive to electric current to urge the cross member out of mutual engagement to allow relative displacement between the first member and the second member.

According to another aspect of the invention there is provided an operating means comprising, an operable means including an operable first member and a drive shaft,

coupling means including a cross member mutually engageable with the first member and drive shaft to provide operable coupling therebetween,

operable engaging means responsive to electric current to urge the cross member towards mutual engagement.
Preferably the operable unlocking means includes the operable engaging means and preferably the locking means includes the coupling means.

In a preferred embodiment the operable means comprises an external hand operable lever including an elongated cylindrical portion which is supported within an elongated cylindrical aperture in the second member comprising a fixed rose. Preferably the cylindrical portion is slotted and axially recessed and the rose includes a recess adjacent the slot said slot and recess being mutually engageable by the cross member. Preferably the operable unlocking means comprises an electric motor having a motor drive shaft said motor being supported within the axial recess and and being operably coupled to the cross member.

In a preferred embodiment the operable means comprises an external hand operable lever including an elongated cylindrical portion which is supported coaxially with the drive shaft said drive shaft being engageable with the operable lever. Preferably the cylindrical portion is slotted and axially recessed and the drive shaft includes a recess adjacent the slot said slot and recess being mutually engageable by the cross member. Preferably the operable engaging means comprises an electric motor having a motor drive shaft said motor being supported within the axial recess and and being operably coupled to the cross member.

Preferably the "responsive to electric current to urge the cross member" is accessible through an externally accessible key operable plug.

Embodiments of the present invention will now be described, by way of example only, with reference to the accompanying drawings, in which:-
Description of the Drawings

Figure 1 is partial sectional plan view of a lever assembly with a cross member supported in the lever and engaging the rose and disengaged from the drive shaft.

Figure 2 is a partial sectional plan view of a lever assembly with a cross member supported in the lever not engaging the rose but engaging the drive shaft the drive shaft.

Figure 3 is a schematic cross sectional view through the cross member of Figure 1.

Figure 4 is a schematic cross sectional view through the cross member of Figure 2.

Figure 5 is a schematic representational view showing a latch bolt assembly supported between a pair of lever assemblies.

Figure 6 is a schematic representational view showing a latch bolt assembly with a operating cam having a rectangular recess and a lever assembly having a projecting drive shaft and an interconnecting shaft.

Description of the Preferred Embodiment

The accompanying drawings illustrate embodiments of the operating means.

The operating means comprises a lever 10 having an elongated cylindrical boss 11 and a shoulder portion 12, the boss being supported in a rose 20 and secured there by an anular washer 30 and circlip 31; the rose effectively being retained on the cylindrical lever boss 11 between the washer 30 and the shoulder 12 of the lever.

Interspaced between the lever and rose is a spring 32 by which the lever is biassed towards an undisplaced
position in relation to the boss.

The washer 30 also supports an internally splined drive shaft 33 which is supported coaxial with the cylindrical boss portion of the lever. The protruding end of the drive shaft 34 couples with an interconnecting shaft 100; depending on the application it may be necessary to provide an adaption member to accommodate differences in the shafts.

The elongated cylindrical boss 11 has an elongated cylindrical recess 13 and the peripheral walls 11 have opposite slots 14 through which the outer ends 41 of cross member 40 protrude. Within the cross member is a coaxial aperture 42 through which an elongated nut 60 has passage. On the under side of the cross member is a compression spring 61 for biasing the cross member towards the lever and for biasing the drive shaft away from the lever.

The nut 60 on one end has a shoulder 62 engageable with the cross member adjacent the position of passage and on the lever side so that displacement of the nut away from the lever displaces the cross member away from the lever. On passing through the cross member the boss has an elongated externally splined portion 63 engageable with the internal splining on the drive shaft 33.

Positioned above the nut and retained against rotation is an electric motor 70 having a motor shaft 71 coupled to a threaded shaft 72 which engages within the nut 60. The nut 60 can be made to move towards or away from the motor through motor operation resulting from supply of current to the motor.

The cross member 40 can be moved away from the motor by the nut but is moved towards the motor by the biasing spring 61.

The motor is supported by an anular washer 72 and
biassed away from the washer 72 by a spring 73, the motor and nut subassembly being free to displaced within limits inwardly.

Above the motor and plugging an aperture 15 in the lever is an interchangeable core which is key removeable to provide access to the motor. In the event of malfunction the core 73 may be removed and the motor displaced inwardly to displace the cross member to an unlocked position.

In the locked position shown in Figure 1, the cross member protruding ends 41 locate in pocket recesses 21 in the rose 20. Because the cross member protrudes from longitudinal slots 14 in the boss 11 and because the cross ends are engaged within recesses in the rose the lever is thereby restricted from displacing in relation to the rose. Below the recesses 21 the rose has a coaxial peripheral opening 22 in which the cross member 40 is free to move. During unlocking the cross member 40 is displaced into this opening to disengage the lever from the rose.

In the locked position shown in Figure 1, the cross member within the lever internal recess 13 is disengaged from the drive shaft 33. The drive shaft has a slotted peripheral boss 36 similar to the lever boss 11 with the openings to the slot predisposed towards the cross member. When the cross member moves downwards away from the rose recesses 21 it moves into engagement with the slots 37 in the drive shaft as shown in Figure 2 to provide engagement between the lever and drive shaft.

Three embodiments are provided by the invention:

The lever can be free to rotate at all times with the cross member selectively moveable between positions where it engages and is disengaged from the drive shaft 33 the operating means in effect providing a clutch mechanism. This is achieved by adapting the coaxial peripheral open-
The lever can be engaged with the drive shaft at all times by adapting the slotted peripheral boss 36 by increasing its height. The lever would be selectively locked against rotation through engagement of the cross member with recesses 21.

The lever can be locked against rotation while disengaging the drive shaft and the cross member can be moved to engage the drive shaft while disengaging the rose.

The electric motor is supplied electricity from an electronic control unit which is responsive to the insertion of a magnetic stripe card. On recognizing a card as an acceptable opening card the control unit supplies current to cause the motor to rotate in a direction which pushes the nut towards the cross member to cause the cross member to move to unlock the lock. The cross member is retained in this position for a predetermined time such as six seconds to provide sufficient time for the normal usage of the lever such as withdrawing the bolt of a latch bolt assembly. After the preset time the nut is reversed to the undisplaced position and the spring 61 moves the cross member back to the locked position. Obstructions to nut movement and other difficulties are addressed by the electronic controller.

To ensure an adequate audit trail a microswitch 101 is provided which is actuated and informs the controller if the removeable core is removed. When the removeable core is removed the motor may be depressed to unlock the lock thereby providing manual operation.
The meaning of forward, back, outward, under above and other such spatially descriptive prepositions is not absolute and such terms are used solely to assist description in relation to the Figures.
THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. An operating means comprising, an operable means including an operable first member and a second member said first member being selectively angularly displaceable in relation to the second member,
   locking means including a cross member mutually engageable with the first member and second member to restrain relative displacement therebetween,
   operable unlocking means responsive to electric current to urge the cross member out of mutual engagement to allow relative displacement between the first member and the second member.

2. An operating means comprising, an operable means including an operable first member and a drive shaft,
   coupling means including a cross member mutually engageable with the first member and drive shaft to provide operable coupling therebetween,
   operable engaging means responsive to electric current to urge the cross member towards mutual engagement.

3. An operating means according to claims 1 and 2 wherein the operable unlocking means includes the operable engaging means.

4. An operating means according to claims 1 and 2 wherein the locking means includes the coupling means.

5. An operating means according to any of claims 1 to 4.

6. An operating means for a lock according to any of claims 1 to 4.

7. An operating means for a lock according to claim 6 when dependent on claim 1 wherein the operable means comprises an external hand operable lever including an elongated cylindrical portion which is supported within an elongated cylindrical aperture in the second member comprising a fixed rose.

8. An operating means for a lock according to claim 7 wherein the cylindrical portion is slotted and axially recessed and the rose includes a recess adjacent the slot said slot and recess being mutually engageable by the cross member.
9 An operating means for a lock according to claim 7 wherein the operable unlocking means comprises an electric motor having a motor drive shaft said motor being supported within the axial recess and and being operably coupled to the cross member.

10 An operating means for a lock according to claim 6 when dependent on claim 2 wherein the operable means comprises an external hand operable lever including an elongated cylindrical portion which is supported coaxially with the drive shaft said drive shaft being engageable with the operable lever.

11 An operating means for a lock according to claim 10 wherein the cylindrical portion is slotted and axially recessed and the drive shaft includes a recess adjacent the slot said slot and recess being mutually engageable by the cross member.

12 An operating means for a lock according to claim 10 wherein the operable engaging means comprises an electric motor having a motor drive shaft said motor being supported within the axial recess and and being operably coupled to the cross member.

13 An operating means for a lock according to any of the above claims wherein the "responsive to electric current to urge the cross member" is accessible through an externally accessible key operable plug.

14 An operating means substantially as described herein with reference to and as illustrated in the accompanying drawings.

15 An operating means for a lock substantially as described herein with reference to and as illustrated in the accompanying drawings.
ABSTRACT

The Invention provides an operating means comprising, an operable means including an operable first member and a second member said first member being selectively angularly displaceable in relation to the second member, locking means including a cross member mutually engageable with the first member and second member to restrain relative displacement therebetween, operable unlocking means responsive to electric current to urge the cross member out of mutual engagement to allow relative displacement between the first member and the second member.