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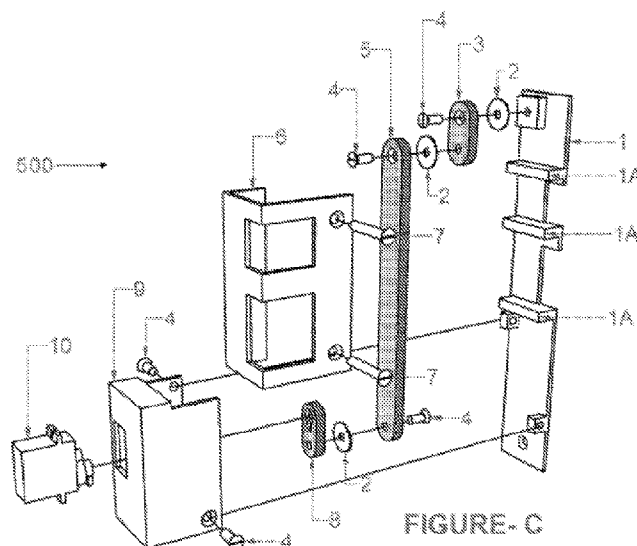
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(54) Title: SMART LOCK CONVERTER



(57) Abstract: Described herein is a smart receptacle 500 for a locking system 1000. The smart receptacle 500 includes a movable restricting member 5 for restricting and releasing one or more locking arms L of a locking mechanism. The restricting member 5 is a longitudinal member that is capable of swiveling in a locking position and an unlocking position. In the locked position, the restrictor 5 blocks the locking arms L of the locking mechanism inside the main body 200. In the unlocked position, the restrictor 5 exposes the locking arms L, thereby enabling opening of the door even without unlocking the locking mechanism.



SMART LOCK CONVERTER

The following specification particularly describes the invention and the manner in which it is to be performed

TECHNICAL FIELD

The present invention belongs to the field of electro mechanical device, In particular, the present invention relates to smart lock converter for locks fitted in doors of a building or a premise for the purpose of safe guarding and preventing
5 thefts and burglary.

BACKGROUND

Technology has revolutionized the way of living in today's world. With increased technological developments, there is an increase in security threat as well. In order to counter security threats, improved secured access to a building, premise, offices
10 etc. is required. With the advent of science and technology, improvements in many aspects of locking and safe guarding systems can be achieved. In particular, the development of smart locking systems has resulted in an increased security over a period of time. However, conventional locking systems are developed on linear thinking. In other words, even the development of smart locks typically done
15 towards designing a new product and replacing the old one with a new one. Such smart lock systems result in wastage of money and material.

A conventional locking system is depicted in Figure 1. The locking system generally comprises two parts. First part of the locking system is the main lock 200 that is fitted on a door 100 and houses various locking mechanisms. The second part of
20 the locking system is a small metal "receptacle or strike plate" 300 that gets fitted into the door frame 400. The purpose of the second part is to hold the extended arm of the main lock 200 in locked position. At present, smart locks are manufactured as new products and have a receptacle or the strike plate, which goes into the frame as usual. Some locks are known to be operated only
25 electronically while rest can be operated by a key.

Figure A1 illustrates a conventional locking system in a locked position.

In the current general approach at smart locks, the existing lock on the door, no matter how expensive it is, becomes redundant and literally reaches the value of scrap metal when replaced with smart locks available in the market. Also, all the keys are made go to waste when the old lock is discarded during the switch over
5 to the smart locking system.

Nevertheless, many people prefer the age-old key systems while some prefer graduating to the new electronic and “connected” systems. Therefore, many smart locks that do away with keys altogether, alienate the people who want the old analog system of being satisfied by turning a key.

10 Therefore, there is a well felt need for a locking system that overcomes the aforementioned drawbacks, is capable of converting a conventional lock with or without key systems and / or electronic systems into a smart locking system and that enables replacement of a locking mechanism without major modifications in the system.

15 **SUMMARY**

An object of the present subject matter is to deviate from the linear thinking of designing a new locking system and of replacing the old locking system with a new one.

Another object of the present subject matter is to convert a conventional locking
20 system with key into a smart locking system without major modifications.

Yet another object of the present subject matter is to minimize replacement cost of a conventional locking system.

Yet another object of the present subject matter is to employ a key system as well as an electronic system in a locking mechanism.

25 Yet another object of the present subject matter is to provide a receptacle or a strike plate that is capable of holding the extended arm of a lock for efficiently securing the locking system in a locked position.

Yet another object of the present subject matter is to provide a receptacle or a strike plate for a locking system that can be operated electronically, by using internet, GSM, Wi-Fi, Bluetooth, wireless, wired or any other connectivity network.

- 5 Yet another object of the present subject matter is to provide a receptacle or a strike plate for a locking system that can be operated by a remote control, a mobile phone, a tablet or any other communication device.

Yet another object of the present subject matter is to provide a receptacle or a strike plate for a locking system that can be operated by voice command, video
10 command, face recognition or any other similar command.

Yet another object of the present subject matter is to provide a receptacle or a strike plate for a locking system that can be moved between a locked position and an unlocked position.

Yet another object of the present subject matter is to provide a smart locking
15 system that is economical and has minimal service and replacement cost.

Yet another object of the present subject matter is to provide a smart receptacle or a strike plate for a locking system.

Yet another object of the present subject matter is to provide a smart receptacle or a strike plate that is capable of being powered by a power cord or a battery.

20 The subject matter described herein relates to a smart receptacle for a locking system, the smart receptacle comprising a movable restricting member for restricting and releasing one or more locking arms of a locking mechanism.

In an embodiment of the present subject matter, the restricting member is a longitudinal member that is capable of swiveling or sliding or folding or rolling or
25 moving in a locking position and an unlocking position. In another embodiment of the present subject matter, the smart receptacle further comprises one or more pivoting arms for providing swiveling motion to the movable restricting member.

In yet another embodiment of the present subject matter, the at least one of the pivoting arms is rotated or slid or folded or rolled or moved into place by a motor or an electronically triggered device such as an actuator, bi-metallic expansion etc.

In yet another embodiment of the present subject matter, the motor is powered
5 by a communication device or is directly powered by a power module, such as an AC adaptor, rechargeable battery etc. or a solar module for a remote location lock, like for an animal cage in a jungle.

In yet another embodiment of the present subject matter, the communication
10 device comprises a remote control, a mobile phone, a tablet, finger print sensor, voice, retina scan or the like.

In yet another embodiment of the present subject matter, the motor is actuated by an electronic circuit through an electronic circuit.

In yet another embodiment of the present subject matter, the movable restricting member and the one or more pivoting arms are pivotably mounted on a base plate
15 having one or more guides.

In yet another embodiment of the present subject matter, the motor is mounted inside a motor casing.

In yet another embodiment of the present subject matter, the connection of the communication device with the electronic circuit is wired or unwired, through
20 GSM or Bluetooth or WiFi.

BRIEF DESCRIPTION OF ACCOMPANYING DRAWINGS

Figure A illustrates a line drawing of a door mounted with a conventional locking system.

Figure A1 illustrates a three-dimensional view of a conventional locking system in a locked position.

Figure B illustrates a top view, a front view and a side view of a smart receptacle of a locking system in accordance with one embodiment of the present subject
5 matter.

Figure C illustrates an exploded view of a smart receptacle of a locking system in accordance with one embodiment of the present subject matter.

Figure D illustrates a three-dimensional view of a smart receptacle of a locking system in accordance with one embodiment of the present subject matter.

10 Figure E illustrates three-dimensional views of a lock with smart receptacle in an unlocked and a locked position in accordance with one embodiment of the present subject matter.

Figure F illustrates three-dimensional views of a smart receptacle of a locking system in locked and unlocked positions in accordance with one embodiment of
15 the present subject matter.

Figure G illustrates a block diagram depicting operation of a smart receptacle of a locking system in accordance with preferred embodiments of the present subject matter.

20 DETAILED DESCRIPTION OF THE INVENTION WITH REFERENCE TO DRAWING/EXAMPLES

The present subject matter is based on the approach of retaining original lock systems exactly as they are and operating not only with a key as it always did, but also electronically, as “connected” and / or “smart” locks. All this is done with less than half the cost or materials that are used in an existing smart lock. Even fitting
25 the system according to the present subject matter takes the same time as it does with a conventional lock.

This present subject matter relates to a smart lock converter and deals with the idea of conversion of existing door lock into a smart lock by providing a receptacle or a “strike plate” of the lock as a smart device. Further, there exists a dual provision of continuing to use key as well as a remote control or an internet /
5 connected device like a mobile phone, tablet, computer and so on. This conversion can be carried out with less cost, which means the old lock that is already used for locking purpose need not be discarded and the same can be used in this set up.

A door locking system has a main lock body that is installed in a door. One or more small arms / parts are retained in the main lock body in a retracted position. One
10 of arms / parts may be spring loaded with a chamfer for locking when the door is shut. The other arms / parts are thicker, stronger pieces that are used as the main lock and are operated by a key. When the key is turned, the other arms / parts project out of the lock installed in the door and enter a strike plate that is installed in the door frame. This makes sure that the door is not opened unless the key is
15 turned, and the projecting pieces are retracted from the strike plate.

In accordance with the present subject matter, the strike plate has been re-designed such that a front part of the strike plate restricts / holds the extended arms / parts in the locked position and can be moved away using a sliding or swiveling mechanism. Once the front part of the strike plate has moved away, the
20 door is now free to open even in the “locked position” of the main lock. The front part is termed as a restricting member or a restrictor in the present application.

This action of moving away of the restrictor can be done in multiple ways and although the present invention has been described in relation to specific embodiments thereof, many other variations and modifications and other
25 methods will become apparent to those skilled in the art. It is preferred, therefore, that the present subject matter be limited not by the specific disclosure herein.

Figure B illustrates a top view, a front view and a side view of a smart lock converter or a smart receptacle 500 of a locking system in accordance with one

embodiment of the present subject matter. Figure C and Figure D illustrate an exploded view and a three-dimensional view respectively of a smart receptacle 500 of a locking system in accordance with one embodiment of the present subject matter.

5 In accordance with the present subject matter, the smart receptacle 500 includes a plurality of components. For example, and by no way limiting the scope of the present subject matter, the smart receptacle 500 includes a main base plate 1, one or more guides 1A, a plurality of pivoting arms 3 & 8, a restrictor 5, a strike plate / receptacle 6, a motor casing 9 and a motor 10. In an embodiment of the present
10 subject matter, the motor 10 is a servo motor 10. The components of the smart receptacle 500 are also provided with a plurality of washers 2 and screws 4 & 7, wherever needed. The pivoting arms 3 & 8 are provided at opposite ends of the restrictor 5 and are pivoted at one of their respective ends by screws 4 & 7. The restrictor 5 is capable of swiveling to move to front or back, i.e. inwards or
15 outwards, with the help of the pivoting arms 3 & 8. In other embodiments, the restrictor 5 may be capable of sliding or folding or rolling or moving in a desired position for performing its function. The pivoting arms 3 & 8 are directly connected to the motor 10 in a preferred embodiment. The restrictor 5 itself is perfectly secured by a required number of guides 1A. The guides 1A provide additional
20 strength to the restrictor 5. Any impact of the extended arms / parts on the restrictor 5 in the open-door position or otherwise gets transferred to the guides 1A and hence, the restrictor 5 is protected from getting damaged.

The motor 10 is mounted inside a motor casing 9 and is connected to an electronic circuit 700, as shown in Figure G. The electronic circuit 700 is provided as a
25 separate component and gets plugged into the electrical socket in an embodiment of the present subject matter. In another embodiment, the electronic circuit 700 can be housed in the smart receptacle 500 and only a power cord is needed to connect to a plug point. In yet another embodiment, a rechargeable battery unit is placed inside the smart receptacle 500. All these embodiments of the electronic

circuit 700 just provide means to an end, where the end is simply giving the electronic signal to the motor 10 in the smart receptacle 500, for positioning the restrictor 5 in locking or unlocking position. As would be clear to a person skilled in the art, the method of moving the restrictor 5 in locking and unlocking positions
5 can be varied and that the present invention should not be limited by the specific disclosure herein. The strike plate / receptacle 6 becomes the outer shield for the restrictor 5 in an assembled condition. Further, the motor 10 may be replaced by an electronically triggered device such as an actuator, bi-metallic expansion etc. as would be clear to a person skilled in the art.

10 Figure E illustrates three-dimensional views of a smart locking system 1000 having a main body 200 and the smart receptacle 500 in an unlocked and a locked position in accordance with one embodiment of the present subject matter. Figure F illustrates three-dimensional views of the smart receptacle 500 of the locking system 1000 in locked and unlocked positions in accordance with an embodiment
15 of the present subject matter. As can be seen in Figures E and F, the pivoting arms 3 & 8 and the restrictor 5 are aligned vertically in an unlocked position. However, in the locked position, the pivoting arms 3 & 8 take a horizontal position by rotating in an anticlockwise direction, thereby swiveling the restrictor 5 towards the right. The pivoting arms 3 & 8 are rotated by the motor 10. In a preferred
20 embodiment, the motor 10 rotates the pivoting arm 8 that attached to the bottom end of the restrictor 5 in an anticlockwise direction upon receiving a signal. In other embodiments, the pivoting arms 3 & 8 are slid or folded or rolled or moved into place for performing the desired function. The movement of the pivoting arm
25 8 swivels the lower end of the restrictor 5 towards the right. The other pivoting arm 3 attached to the upper end of the restrictor 5 follows the anticlockwise movement by the swiveling action of the restrictor 5. In the locked position, the locking arms L of the locking mechanism inside the main body 200 are blocked by the restrictor 5 whereas in the unlocked position, the restrictor 5 moves towards left, thereby exposing and unlocking the locking arms L. Therefore, in the unlocked

position of the smart receptacle 500, the door with the main body 200 can be opened even without unlocking the locking mechanism inside the main body 200.

Figure G illustrates a block diagram depicting the operation of the smart receptacle 500 of the locking system 1000 in accordance with preferred embodiments of the present subject matter. The entire electro mechanical flow of action in a preferred embodiment of the present subject matter is as follows:

The smart receptacle 500 can be operated by a proprietary software or commonly available software that are open sourced and can be programmed to run a secure lock system. Beyond the programming, a remote device such as a remote control, a mobile phone, tablet, last top, finger print sensor, voice, retina scan etc., anything that is a communication device 600, is used. In another embodiment, the communication device may comprise a solar module for a remote location lock, like for an animal cage in a jungle. The communication device 600 sends two signals to the motor 10. One signal to move the motor in one direction for performing the locking operation and another signal for reversing the motor 10 for performing the unlocking operation. In an embodiment, an additional communication, like voice, video etc., can be used. However, the present invention should not be limited by the specific disclosure herein.

The communication device 600 requires connectivity with the electronic circuit 700 of the smart receptacle 500, which can be by way of GSM (phone network), Wi-Fi, Bluetooth, wireless, wired, etc. Once again, the present invention is limited not by the specific disclosure herein. The electronic circuit 700 of the smart receptacle 500 has a matching communication hardware and software to the communication device/s 600. This matching communication is processed by a processor that sends electronic signals to the battery. Here again it is important to note, there could be additional communications like voice, video etc., if required. However, it is preferred, that the present invention be limited not by the specific disclosure herein.

On receipt of a signal, the motor 10 moves in one direction to lock and in the other direction to unlock, via the restrictor 5. This electronic circuit 700 and the motor 10 of the smart receptacle 500 is powered either by a rechargeable battery or a power adaptor as a power module 800. The power module 800 can be a built-in
5 or an external unit, linking to the smart receptacle 500 via power and communications cords to the smart receptacle 500.

While the preferred embodiments of the present invention have been described hereinabove, it should be understood that various changes, adaptations, and modifications may be made therein without departing from the spirit of the
10 invention and the scope of the appended claims. It will be obvious to a person skilled in the art that the present invention may be embodied in other specific forms without departing from its spirit or essential characteristics. The described embodiments are to be considered in all respects only as illustrative and not restrictive.

15

**Patent Agent for the Applicant****IN/PA-1348**

I claim:

1. A smart receptacle 500 for a locking system 1000, the smart receptacle 500 comprising a movable restricting member 5 for restricting and releasing one or more locking arms L of a locking mechanism.
2. The smart receptacle 500 as claimed in claim 1, wherein the restricting member 5 is a longitudinal member that is capable of swiveling or sliding or folding or rolling or moving in a locking position and an unlocking position.
3. The smart receptacle 500 as claimed in claims 1 or 2 further comprising one or more pivoting arms 3 & 8 for providing swiveling motion to the movable restricting member 5.
4. The smart receptacle 500 as claimed in claim 3, wherein the at least one of the pivoting arms 3 & 8 is rotated or slid or folded or rolled or moved into place by a motor 10 or an electronically triggered device such as an actuator, bi-metallic expansion etc.
5. The smart receptacle 500 as claimed in claim 4, wherein the motor 10 is powered by a communication device 600 or is directly powered by a power module 800, such as an AC adaptor, rechargeable battery etc. or a solar module for a remote location lock, like for an animal cage in a jungle.
6. The smart receptacle 500 as claimed in claim 5, wherein the communication device 600 comprises a remote control, a mobile phone, a tablet, finger print sensor, voice, retina scan or the like.

7. The smart receptacle 500 as claimed in claims 4 to 6, wherein the motor 10 is actuated by an electronic circuit 700 through an electronic circuit.
8. The smart receptacle 500 as claimed in any one of previous claims, wherein the movable restricting member 5 and the one or more pivoting arms 3 & 8 are pivotably mounted on a base plate 1 having one or more guides 1A.
9. The smart receptacle 500 as claimed in any one of previous claims, wherein the motor 10 is mounted inside a motor casing 9.
10. The smart receptacle 500 as claimed in any one of previous claims, wherein the connection of the communication device 600 with the electronic circuit 700 is wired or unwired, through GSM or Bluetooth or WiFi.

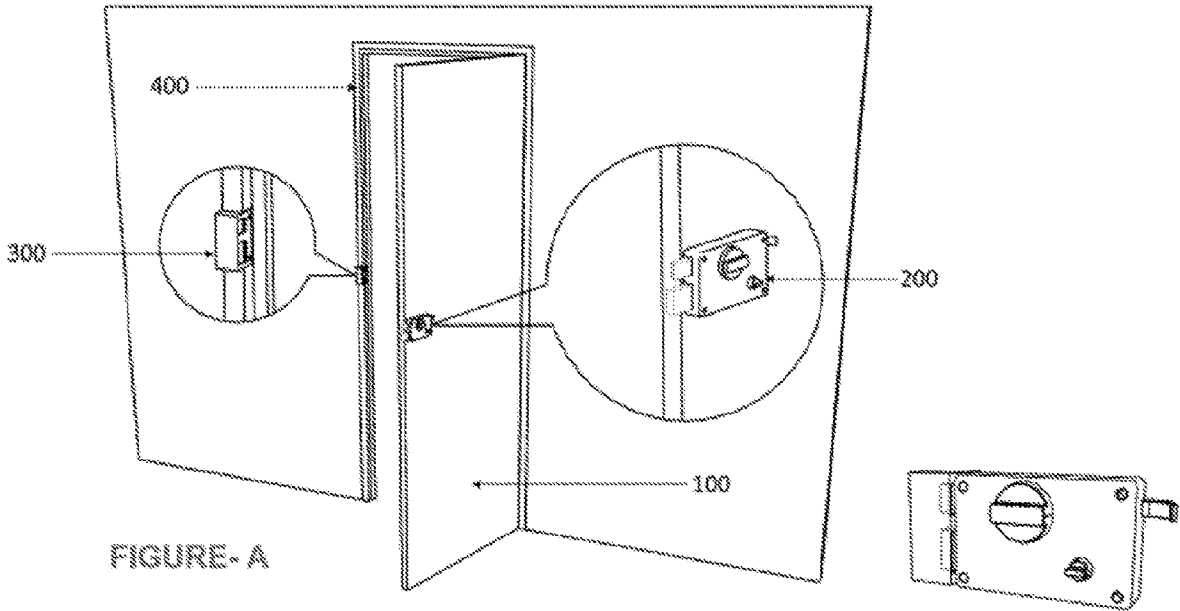


FIGURE-A

FIGURE-A1

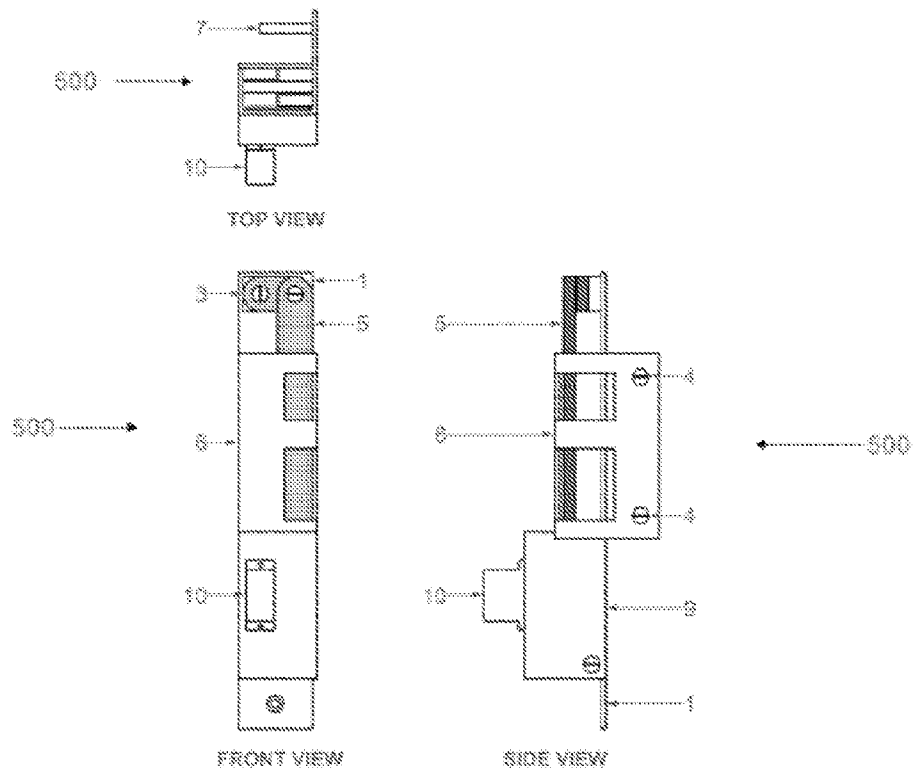
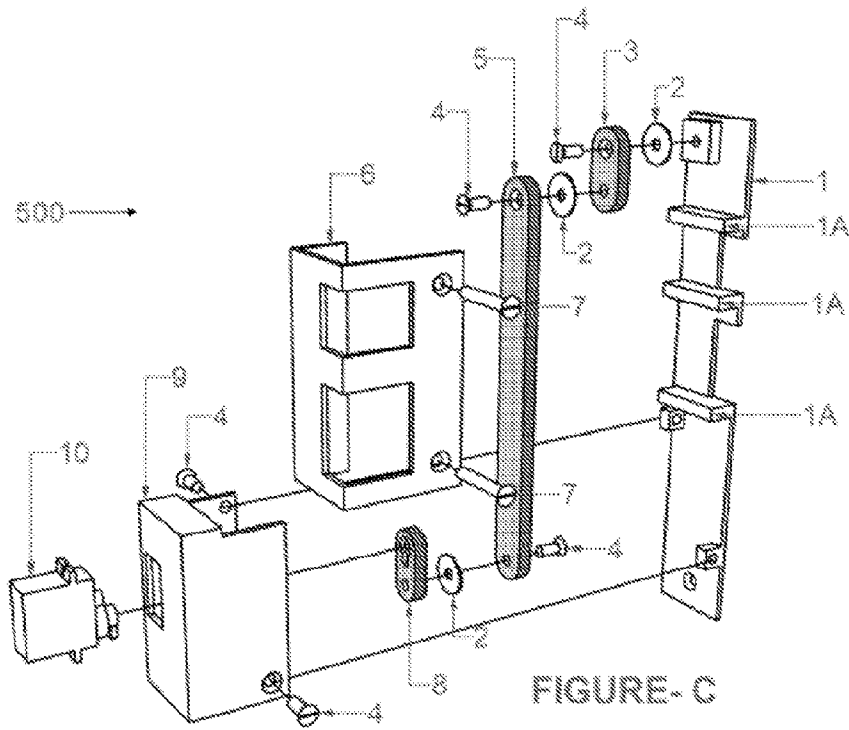


FIGURE- 8



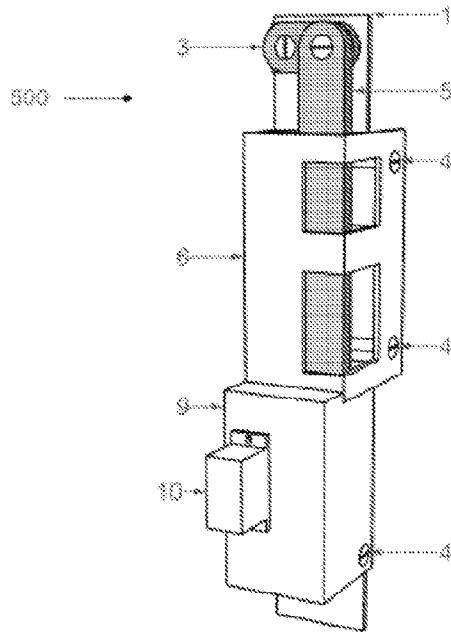
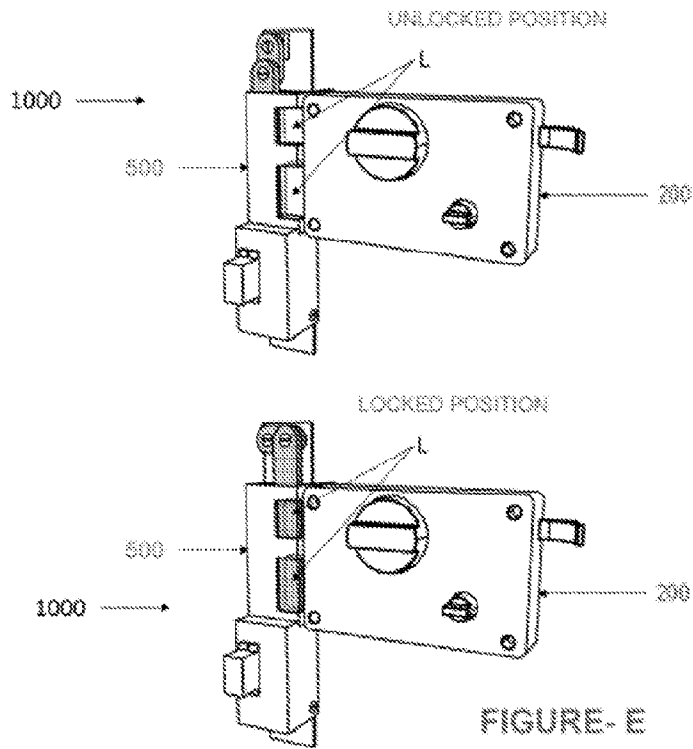


FIGURE - D



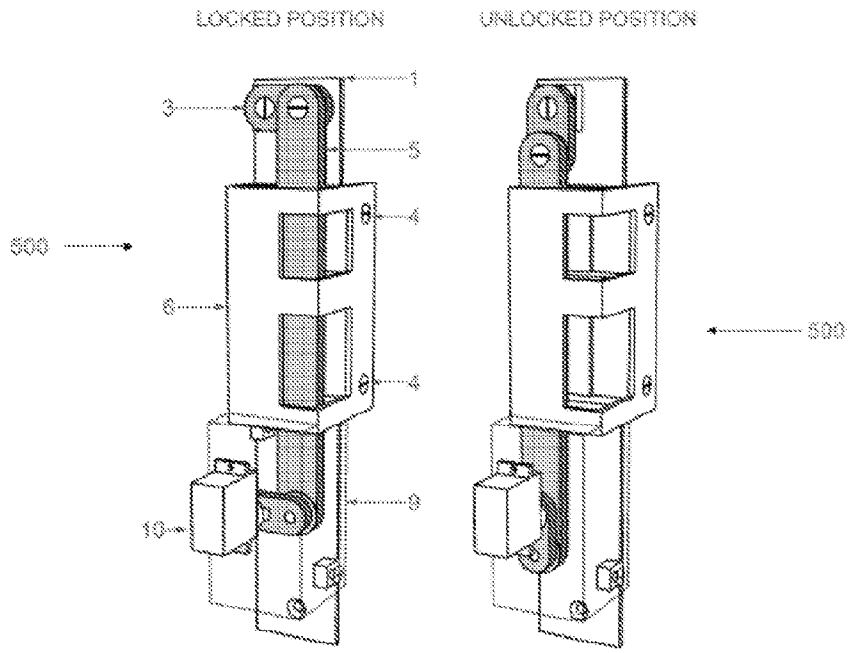


FIGURE- F

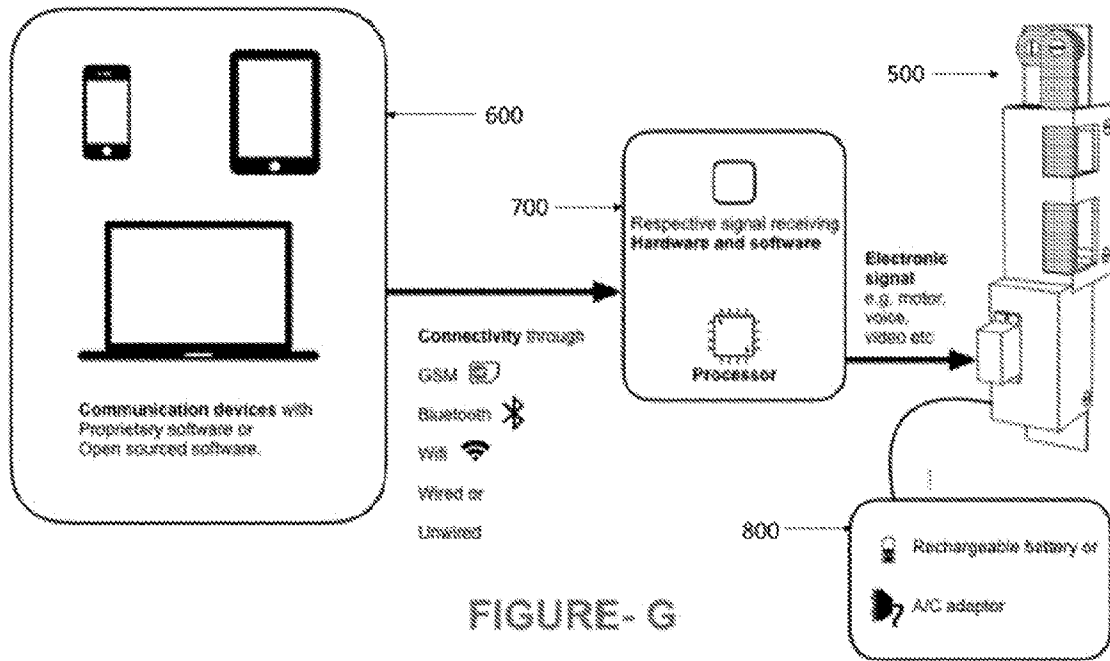


FIGURE- G

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IN2018/050673

A. CLASSIFICATION OF SUBJECT MATTER
E05B47/00 Version=2019.01

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)

E05B

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

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

TotalPatent One, IPO Internal Database

KEYWORDS: receptacle, locking arms, pivot, battery, motor, communication

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US4056276 A (JARVIS Kenneth W) 1 NOVEMBER 1977 (01.1.1977) Abstract; Column 3, Line 60-68; Figures 2,3; Column 4, Line 66-68; Column 5, Line 1-10; Claim 1	1-3
Y	Abstract; Column 3, Line 60-68; Figures 2,3; Column 4, Line 66-68; Column 5, Line 1-10; Claim 1	4, 5, 7, 8
Y	US6116067 A (FORT LOCK CORPORATION) 12 SEPTEMBER 2000 (12.09.2000) Abstract; Column 3, Line 56-65; Column 4, Line 1-8; Column 6, Line 64-67; Column 7, Line 1-10; Claims 1, 6	4-7, 9-10
Y	EP3078791 B1 (WILH SCHLECHTENDAHL & SOHNE GMBH & CO KG) 21 JUNE 2017 (21.06.2017) Description, Paragraph 0038;	8



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"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

10-01-2019

Date of mailing of the international search report

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Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/IN2018/050673

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	Figures 10, 41, 42; Claim 1	
Y	US2016047142 A1 (FUZ DESIGNS LLC) 18 FEBRUARY 2016 (18.02.2016) Abstract; Description, Paragraphs 0028, 0039	6, 10
Y	DE102014015388 A1 (EUCHNER GMBH & CO. KG) 21 APRIL 2016 (21.04.2016) Description, Paragraph 0032	9

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/IN2018/050673

Citation	Pub.Date	Family	Pub.Date
EP 3078791 B1 B1	12-10-2016	PL 3078791 T3	30-11-2017
US 2016047142 A1	18-02-2016	WO 2016028697 A1	25-02-2016
		US 2018018843 A1	18-01-2018
DE 102014015388 A1	21-04-2016	WO 2016058717 A1	21-04-2016