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(54) **Remotely controlled module for a cylinder lock**

(57) There is disclosed a module (1) and a method wherein a controllable module, which is mounted on the inner side of a door over a cylinder lock (2) provided with a latch bolt and/or a dead bolt, comprises a hand knob (3) connected to the cylinder lock (2), by means of which the door can be opened at all times, and wherein at least one control unit communicates wirelessly with control means of the module (1), which are connected to the cylinder lock (2), by means of which the position of the latch bolt and/or the dead bolt is controlled.

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Description

[0001] The present invention relates to a method for remotely controlling a cylinder lock by means of a module.

[0002] The present invention further relates to a module which is suitable for implementing the method.

[0003] Such a method and module are generally known.

[0004] A drawback of the known modules and method is that they are not suitable for being used with common cylinder lock systems without all kinds of complicating operations being required.

[0005] The object of the present invention is to provide a universally usable method and a compact module suitable for use with cylinder locks, which is easy to mount.

[0006] In order to accomplish that object, the method according to the invention provides a controllable module, which is mounted on the inner side of a door over a cylinder lock provided with a latch bolt and/or a dead bolt, and which comprises a hand knob connected to the cylinder lock, by means of which the door can be opened at all times, wherein at least one control unit communicates wirelessly with control means of the module, which are connected to the cylinder lock, by means of which the position of the latch bolt and/or the dead bolt is controlled.

[0007] The corresponding module according to the invention is **characterised in that** it comprises: a hand knob for opening the cylinder lock, which is to be provided on the inner side of a door, which hand knob can be connected to a cylinder lock provided with a latch bolt and/or a dead bolt, being in line with the lock pin thereof for opening the cylinder lock; at least one control unit; and control means connected to the cylinder lock, which are arranged for wireless communication with said at least one control unit for controlling the latch bolt and/or the dead bolt.

[0008] The advantage of the method and module according to the invention is that all the necessary basic functions to be carried out from the inner side of the door are integrated in the module in a compact manner and are easy to carry out by means of one hand knob. The hand knob can be used to operate the latch bolt, for opening the door, as well as the dead bolt, for unlocking the lock module, which is double-locked at that point. Since operation by means of the hand knob of the aforesaid bolts has priority over remote control thereof, which in itself can be used advantageously, the door can be unlocked as well as opened by means of said one hand knob under all circumstances, so that a guaranteed escape route is available at all times.

[0009] The module according to the invention is moreover easy to mount to existing door fittings and is sufficiently fixed around the insertion opening and the cylinder lock of a new or possibly existing lock housing.

[0010] Further detailed possible embodiments, which are defined in the other claims, are discussed in conjunction with the associated advantages in the description below.

[0011] The method and the module according to the present invention will now be explained in more detail with reference to the figures below, in which like parts are indicated by the same numerals. In the drawing:

Figure 1 shows a functional block diagram of the module according to the invention, by means of which also the method according to the invention will be explained in more detail; and

Figure 2 shows an exploded schematic view in particular of the mechanical part of the module of figure 1.

[0012] Figure 1 shows a block diagram of a module 1, the various mechanical parts of which (yet to be explained) are shown in figure 2. The module 1 is an electronic control module, which can be mounted on the inner side of the door, such as an outside door, of a house or a building, for example, but also on a door that opens into a hall or a corridor of a block of buildings or an office building, for example. The module 1 can be placed over an existing lock of the type comprising a separate insertion cylinder lock, in place of the inner shield, from which the original cylinder was previously removed. The cylinder lock 2 that forms part of the module 1 is provided with a combined latch bolt and/or dead bolt D/N. The cylinder lock 2 can be fully released, in a manner yet to be explained, by moving or turning a latch, or in particular a hand knob 3 hereinafter, provided on the module 1 in the releasing direction. That is, when the dead bolt N is out, in which situation the door is - on the night latch and - locked, the dead bolt N is unlocked by the aforesaid turning, and when the dead bolt N is unlocked but the latch bolt D is out, the latch bolt D is retracted, after which the door can be opened, if desired, by swinging it away from its frame when the hand knob 3 is turned further in the releasing direction. In this way a free passage and a guaranteed escape route are ensured, because the door can be manually opened by means of the latch or the hand knob 3 at all times, irrespective of the current position of the latch bolt or the dead bolt D/N. When the hand knob 3 is turned in the opposite direction of the releasing direction, the dead bolt is manually locked.

[0013] The hand knob 3 may be provided with a one-way coupling K1, which is known per se and which is schematically indicated, therefore, which is adjustable by means of a pawl (not shown), which is for example mounted to the front of the hand knob 3. The pawl has two positions, in a first position the hand knob 3 can move freely in both directions of rotation and the cylinder lock 2 is not operated, whilst in the second position it performs the previously explained function of completely releasing the cylinder lock 2 upon rotation of the hand knob 3 in the releasing direction.

[0014] In all cases a handle for operating the latch bolt is no longer needed, since both the latch bolt and the dead bolt are now operated by means of one and the

same hand knob 3 via a switch that is normally present in the lock housing, which is operated by the cylinder lock 2.

[0015] A control unit 5 may be connected to the module 1, in particular to control means 4 (generally indicated) incorporated therein. Said means 4 and one or more units 5 are capable of wireless communication by means of respective RF units 6 for remotely controlling the position of the latch bolt and/or the dead bolt D/N of the cylinder lock 2. To enhance the level of safety and reliability of the commands to be given to the module 1 by means of the control units 5, the units 5 are configured as transponders, in which case they comprise transceivers which, embedded in suitable control protocols, can make use of mutually confirming encoded messages in an interference free and safe manner.

[0016] Besides a central, usually programmable control unit provided with a memory #, the control means 4 incorporated in the module 1 comprise a controllable motor 7 connected thereto and a reduction unit 8 connected to the motor. The reduction unit 8 is connected to the cylinder lock 2 via a freewheel clutch 9. The module 1 further comprises a power supply unit 10 for the control means 4, which comprises (possibly rechargeable) batteries. This reduces the mounting costs and the costs of installing the wiring, as well as the dependence on the mains power supply and the required mains voltage thereon.

[0017] By giving the appropriate commands via one or more control units 5, which commands are to be transmitted to the control means 4 over the air, the processor delivers control signals derived therefrom to the motor 7 that rotates at high speed. The reduction unit 8 converts said movement into a slow movement, by means of which a higher torque can be transmitted, so that a sufficiently large force can be exerted on the lock pin 11 of the cylinder lock 2 and on the two bolts D/N via the freewheel clutch, and said bolts can each move in the releasing or the locking direction in a reliable manner in response to a command that is given.

[0018] The freewheel clutch 9 fitted with a suitable gears that is schematically shown in figure 2 is configured so that the turning forces exerted via the hand knob 3 will have priority, whatever the circumstances, over the rotating forces exerted on the lock pin 11 via the motor and the reduction unit 8. As a result, the aforesaid escape route can at all times be manually cleared by turning the knob 3.

[0019] As is shown in the embodiment of figure 2, the hand knob 3 connects to and is positioned in line with the lock pin 11, which leads to a compact construction of the module 1 that comprises relatively few parts. The shaft of the hand knob 3 is provided with a cam, which falls into a longitudinally extending slot G of the lock pin 11, via which the knob 3 is slidably connected to the pin 11. The module 1 further comprises an internal cavity 12 between the hand knob 3 and the cylinder lock 2 for receiving within the knob any excess length of the lock pin 11, which is preferably in one piece, but which may also be extensible, in which case it is to be made up of interconnecting parts. In combination with the aforesaid slideability, the presence of the cavity 12 makes the module 12 universally usable on doors of varying thickness and on door fittings of varying depth. By supplying a cylinder lock 12 having a relatively long pin 11, any excess projecting length of said lock pin can be accommodated in said cavity 12, without there being a need to cut the lock pin 11 to length or possibly extend it upon installation of the module 1 on an existing lock. Thus, mounting the module 1 will be easier and can be done in a shorter period of time.

[0020] The housing 14, which is provided with command buttons 13, advantageously houses a key 15, which can for example be slid out of the housing, be integrated therein or be detachable therefrom. The mechanical key 15, which is thus available at all times, can be inserted into the keyhole of the cylinder lock 2, which is located on the outer side of the door, so as to be able to open, lock or unlock the door from outside under all circumstances.

[0021] Besides one or more control units 5, a main control unit 16 is supplied with the module 1, by means of which main control unit the module 1 can go through a learning cycle after installation thereof. During said learning cycle, the various positions that locally occur in the lock, in particular the extreme positions of the latch bolt and the dead bolt D/N, are stored in the processor's memory # for later use. Also, the door can be set for left-hand swinging or right hand swinging, by means of a micro switch. Furthermore, the approved control units 16 are defined and the rotational speeds and opening, waiting and closing times are stored.

[0022] The module 1 is provided with a sensor 17 comprising a magnetic contact 18, which sensor is connected - preferably wirelessly - to the processor unit, and by means of which opening and closing of the door is detected, whereupon an adjusted closing cycle is activated in the processor unit, which will result in the cylinder lock 2 being locked automatically at a predetermined, adjustable point in time or after an adjustable period of time.

[0023] An acoustic or optical signal may be delivered by a device 19 to indicate that the door is being released by the motor 7 and/or that the door is not locked and/or that the door is open. It is also possible to indicate in this way that the batteries are low. Furthermore, a door operator may be connected to the module 1 for automatically opening the door after the door has been unlocked by unfastening the latch bolt. Furthermore, a wireless command to unlock the door or to have the door operator open the door may be given to the module 1, via a communication unit to be connected to the module 1, by a selected telephone or by any telephone which provides a code passed thereto. Moreover, one or more smoke detectors connected to the module 1 may be provided, which deliver - generally wirelessly - an alarm signal to the module, so that appropriate action can be taken in

dependence on the alarm signal, such as releasing, closing or opening the door.

[0024] When the lock module 1 is mounted to the inner side of a door, a steel mounting place (not shown in figure 2) is first fixed to the door, which mounting plate is provided with slotted holes, so that all the SKG-approved security shields that are available in the Netherlands can be mounted in a universal manner without any drilling, cutting or breaking being required. On said mounting plate, the lock module 1 shown in figure 2 is mounted.

Claims

1. A method wherein a controllable module, which is mounted on the inner side of a door over a cylinder lock provided with a latch bolt and/or a dead bolt, comprises a hand knob connected to the cylinder lock, by means of which the door can be opened at all times, and wherein at least one control unit communicates wirelessly with control means of the module, which are connected to the cylinder lock, by means of which the position of the latch bolt and/or the dead bolt is controlled.

2. A method according to claim 1, **characterised in that** the hand knob is connected to the cylinder lock via an - adjustable, if desired - one-way coupling that can be operated only in the releasing direction of the bolts.

3. A method according to claim 1 or 2, **characterised in that** the control means comprise a controllable motor and a reduction unit connected thereto, which reduction unit is connected to the cylinder lock and which can make the two bolts move in the releasing direction of in the closing direction in response to a command that is given.

4. A method according to any one of claims 1-3, **characterised in that** said module comprises an RF unit and said at least one control unit comprises a corresponding RF unit for mutual communication.

5. A method according to any one of claims 1-4, **characterised in that** said at least one control unit is configured as a transponder, being capable of transmitting as well as receiving.

6. A method according to any one of claims 1-5, **characterised in that** said at least one control unit is accommodated in a housing, which holds a key that is removable therefrom or integrated therein, by means of which key the cylinder lock can be operated.

7. A method according to any one of claims 1-6, **characterised in that** the module is battery-fed.

8. A module, comprising:

   - a hand knob for opening the cylinder lock, which is to be provided on the inner side of a door, which hand knob can be connected to a cylinder lock provided with a latch bolt and/or a dead bolt, being in line with the lock pin thereof;
   - at least one control unit; and
   - control means connected to the cylinder lock, which are arranged for wireless communication with said at least one control unit for controlling the latch bolt and/or the dead bolt.

9. A module according to claim 8, **characterised in that** the module comprises a cavity located between the hand knob and the cylinder lock for accommodating any excess length of the - possibly extended - lock pin.

10. A module according to any one of claims 8-9, **characterised in that** said control unit and said RF unit are arranged for wireless communication by means of an adjustable code.

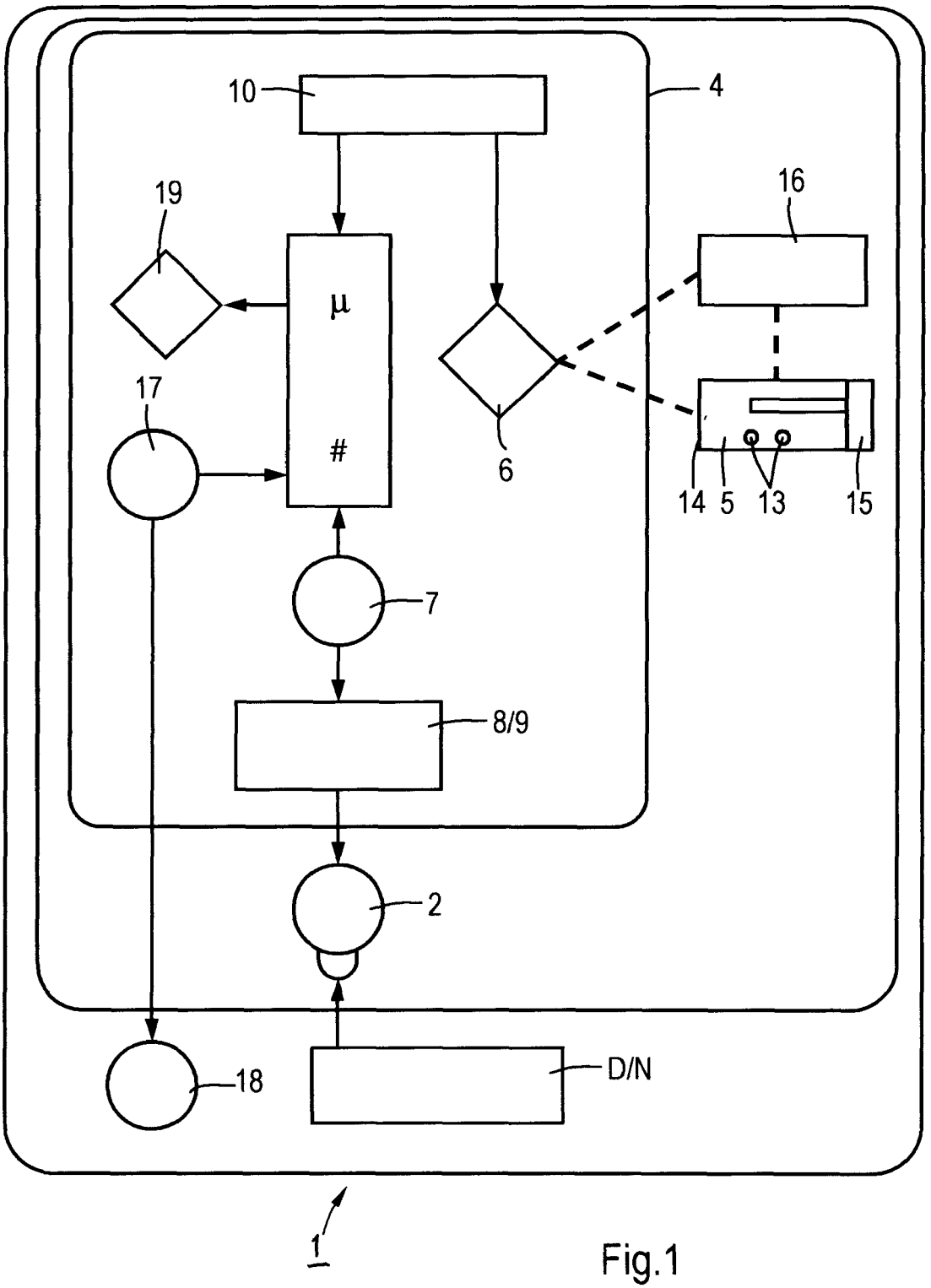

Fig.1

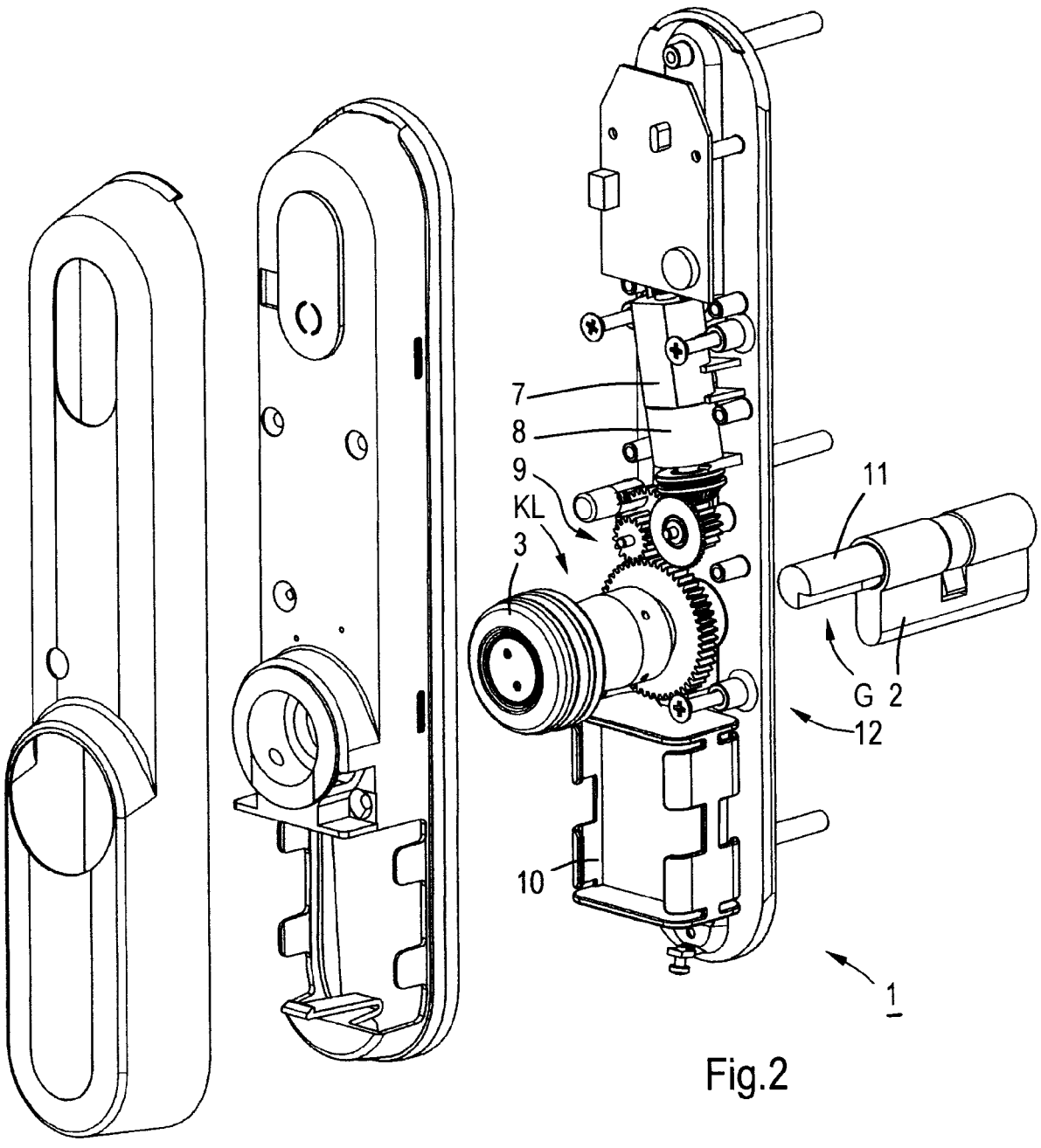

Fig.2

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EUROPEAN SEARCH REPORT

Application Number
EP 09 15 2915

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	DE 10 2004 021704 B3 (ELV ELEKTRONIK AG) 22 December 2005 (2005-12-22)	1,3-10	INV. E05B47/00
A	* the whole document *	2	
X	DE 200 03 715 U1 (LANGBEIN PETER [DE]) 10 August 2000 (2000-08-10)	1,3-10	
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X	FR 2 903 444 A (EL ABBOUTI) 11 January 2008 (2008-01-11)	1,3-10	
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A	DE 198 00 304 A1 (FLIETHER KARL GMBH & CO) 8 July 1999 (1999-07-08) * the whole document *	1,8	

TECHNICAL FIELDS SEARCHED (IPC)

E05B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	10 March 2009	Van Beurden, Jason

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 09 15 2915

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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10-03-2009

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82