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(54) **Electric code lock set for telecommunication cabinet.**

(57) An electric code lock set mounted in a telecommunication cabinet includes a code-storing device (22) for storing therein a preset code, an electric lock (37) energized by an electric lock power source selected from one of a portable locking device power source (34) and an electric power source from a monitoring center if to be unlocked, a code-identifying control device (6) electrically connected to the code-storing device (22) for identifying whether there is an input code identical to the preset code and for generating an unlocking signal if said codes are identical, and an electric lock circuit (23) electrically connected to the code-identifying control device (6) for unlocking the electric lock (37) after the electric lock circuit (23) receives the unlocking signal. Such electric code lock set can be provided with a non-fixed/portable power supply/unlocking device in order to be well-monitored/well-protected/conveniently managed/highly securable.

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The present invention relates generally to an electric code lock set, and more particularly to one used for cross connect cabinets or wiring cabinets.

Most of telecommunication cabinets are without a locking device so that the wire tapping, illegal connecting or illegal disconnecting can happen easily. This situation is harmful to both the telephone subscriber and the Post Telephone and Telegraph (PTT).

Some conventional cabinets are to be unlocked by keys of the same size and shape. Thus, with only one key, a key holder can unlock all cabinets with the same keyhole type. Although with locks, this kind of cabinets still suffer easily from wire tapping, illegal connecting or illegal disconnecting. If the cabinets are locked by electric code locks of the same code, there still is the similar problem.

There still are conventional cabinets locked by keys of different sizes and shapes. Because the cabinets are of a large quantity and because the different key holders to a specific cabinet are not always from the same place, the management of keys is difficult and inconvenient. Conventional electric code card locks of different codes still have the similar problem.

There further are conventional cabinets with electric code locks electrically connected to a fixed power supply and a keyboard for inputting therefrom an input code. Because the power supply for the electric code locks cannot always be desiredly obtained, there is a power-supply problem. Because the keyboard is mounted on the surface of the cabinets and prone to be damaged by a curious person, there is a repairing and maintaining problem. Because the code for the electric code lock is fixed and can not be changed, there is a security problem.

It is therefore attempted by the Applicants to deal with the above situation encountered by the prior art.

The primary object of the present invention is to provide an electric code lock set capable of being energized by a non-fixed power supply.

Another object of the present invention is to provide an electric lock set obtaining an input code from a portable unlocking device, which thus, frees from being damaged by a curious fellow or kid.

A further object of the present invention is to provide a well-monitored and well-protected electric code lock set connected to a monitoring center which monitors whether the electric code lock set is locked or unlocked and gives a warning signal when the electric code lock set is undesiredly unlocked.

A yet object of the present invention is to provide an electric code lock set having portable unlocking devices capable of being conveniently managed and distributed.

Still an object of the present invention is to provide an electric code lock set with a code changeable to be highly securable.

One more object of the present invention is to provide an electric code lock set capable of being energized by an electric power from the monitoring center.

In accordance with the present invention, an electric code lock set includes a code-storing device, e.g. a RAM, ROM or EEPROM, for storing therein a preset code, an electric lock energized by an electric lock power source by a portable unlocking device power source or an electric power source from a monitoring center if to be unlocked, a code-identifying control device for identifying whether there is an input code identical to the preset code and for generating an unlocking signal if said codes are identical, and an electric lock circuit for unlocking the electric lock after the electric lock circuit receives the unlocking signal.

Certainly, the present electric code lock set can further include a portable unlocking device having the portable unlocking device power source and a code-inputting device for inputting thereby the input code. The preset code can be preset by the monitoring center, and the electric lock circuit can be an electronic switch.

Certainly, the electric code lock set can further include a receiving device for receiving the electric lock power source and the input code. The monitoring center can include an automatically answering device and a computer. The portable unlocking power source can be a battery. The portable unlocking device power source can also supply the portable unlocking device. The monitoring center can allow the preset code in the code-storing device to be altered.

Certainly, the electric lock can further include a coil for generating a magnetic field when the electric lock circuit receives the unlocking signal; a blocking board being in a translated condition when the coil generates the magnetic field; and a latch normally latching the lock and for freeing from latching the lock when the blocking board is in the translated condition.

Certainly, the electric code lock set can further include an electronic sensor to detect whether a door of the cabinet is open. The code-identifying device can generate an open signal when the door is open. The monitoring center can further include an automatically dialing and receiving device for transmitting a warning signal to the computer when the electric lock is undesiredly unlocked. The undesiredly unlocked condition of the electric lock can mean that the input code is not identical to the preset code but the electric lock is unlocked. The electric code lock set can further include a warning device for warning when the warning device re-

ceives the warning signal. The warning device can be an amplifier. The code-identifying control device can further include an enabling device permitting the electric code lock set in a enabling mode allowing the portable unlocking device to receive the input code, and a disabling device permitting the electric code lock set in a disabling mode not allowing the portable unlocking device to receive the input code.

Certainly, the electric code lock set can further include a selecting switch for selecting the electric lock power source from one of the portable unlocking device power source and the electric lock power source from the monitoring center. The portable unlocking device can further include a buzzer for warning that the lock is not locked rightly after being unlocked. The portable unlocking device can further include several indicators for showing different working conditions. The portable unlocking device can further include an outputting device connected for outputting an electric lock power from the electric lock power source and the input code to the receiving device.

The present invention can be more fully understood by reference to the following description and accompanying drawings, which form an integral part of this application:

Fig. 1 is a schematical block diagram showing a monitoring center according to the present invention;

Fig. 2 is a block diagram of an electric code lock set in combination with a portable unlocking device according to the present invention;

Fig. 3 is a schematical view showing a wiring cabinet containing the present electric lock set with a latch normally latching the electric lock; and

Fig. 4 is a schematical view showing a wiring cabinet containing the present electric lock set with the latch not latching the electric lock when the blocking board is in a translated condition.

Referring now to Fig. 1, the monitoring center according to the present invention includes an automatically answering device 5 and a computer 4, and the automatically-answering device 5 is connected to the electric code lock set by a communication circuit 19, as shown in Fig. 2, which shows the electric code lock set according to the present invention includes a code-identifying control device 6, a code-storing device 22, an automatically dialing and receiving circuit 21, an electronic connector 20, an electronic sensor 8, a power-supplying device 10, a first rechargeable battery 11, a warning device 9 being an amplifier, an electric lock circuit 23 being an electronic switch, an electric lock 37 which has a relay 32 having a coil 33, a blocking board 25 and a latch 31 normally blocked by board 25, and a receiving device 26.

Power-supplying device 10 gets a DC power from a telephone exchange through communication circuit 19 to energize code-storing device 22, code-identifying control device 6, and automatically dialing and answering device 21.

First rechargeable battery 11 is recharged by power-supplying device 10 on normally-working occasion, but when communication circuit 19 is broken up, battery 11 will assume the function of power-supplying device 10.

Referring to Fig. 2, the present electric code lock set further includes a portable unlocking device 2 having a controller 13, a code-inputting device 15 being a keyboard, a buzzer 14, a portable unlocking device power source 34 being a second rechargeable battery, a light fixture 12, a starting switch 18, a confirming switch 16, an outputting device 30, a power indicator 27, a normally-working indicator 28, and a lock-requiring indicator 29. Portable unlocking device 2 is connected to code-identifying control device 6 by connecting together outputting device 30 and receiving device 26.

The monitoring center connects thereto code-identifying control device 6 through automatically dialing and receiving circuit 21, electronic connector 20, and communication circuit 19 so that monitoring center can preset a code in code-storing device 22, can alter the preset code in code-storing device 22 and selectively allows the electric code lock set in an enabling mode or in a disabling mode.

After receiving device 26 and outputting device 30 are connected, the input code, inputted through keyboard 15 and processed by an encoding device in controller 13, is transmitted to code-identifying control device 6 through a wire a. And then, after comparing the preset code in code-storing device 22 with the input code, code-identifying control device 6 generates an unlocking signal to allow electronic switch 23 to turn on if the two codes are identical. Because electronic switch 23 is turned on, second rechargeable battery 34 energizes electric lock 37 through a wire b so that there will be a current flowing through coil 33, thus generating a magnetic field (according to Ampere's right-hand law and Faraday law of induction) in order that blocking board 25 is translated by a magnetic force resulted by the magnetic field. Since latch 31 is no more blocked by blocking board 25 (as shown in Figs. 3 & 4), latch 31 can be moved to an "unlocking position" to execute the unlocking procedure. Then, code-identifying control device 6 communicates with the monitoring center to inform that electric lock 37 is unlocked. Besides, the electric unlocking device holder can use the light fixture 12 by turning on starting switch 18 for lightening. Electronic sensor 8 is installed on the door of the

cabinet. When the door is closed, electronic sensor 8 provides a shorted switch function and when the door is opened, electronic sensor 8 provides an opened switch function. When keyboard 15 does not input an input code the same as the preset code to code-identifying control device 6 and electronic sensor 8 senses that the door of the cabinet is opened, the door of the cabinet apparently is damaged which is an undesired unlocked condition. At this time, code-identifying control device 6 initiates the automatically dialing and receiving circuit 21 to communicate with computer 4 of the monitoring center in order that computer 4 will show a warning information and code-identifying control device 6 can generate a warning signal to amplifier 9 for frightening a possible intruder.

When the portable unlocking device holder closes the door of the cabinet, electronic sensor 8 provides the shorted switch function, and the information that the door of the cabinet is closed is transmitted to code-identifying device 6 allowing locking-requiring indicator 29 to turn on to show that the electric code lock set should be locked. Meanwhile, buzzer 14 begins buzzing. After locking the electric lock and translating latch 31 to the "locking position", the portable unlocking device holder must turn on confirming switch 16 to confirm that the electric lock is locked exactly. That is to say, controller 13 in portable unlocking device 2 transmits a signal to code-identifying control device 6 thus generating a control signal to allow electronic switch 23 to turn off so that there will be no current flowing to coil 33 and no magnetic force generated, and latch 31 will be returned to the "locking position" and latches the lock. At this moment, code-identifying control device 6 generates a signal to controller 13 to allow locking-requiring indicator 29 to turn off and buzzer 14 to stop buzzing. Then the portable unlocking device holder disconnects outputting device 30 from receiving device 26. Code-identifying control device 6 generates a signal to communicate the automatically-dialing and answering circuit 21 with the monitoring center through communication circuit 19. The informations about whether the electric code lock set is locked and when the electric code lock set is locked are transmitted to computer 4.

According to the present invention, the electric code lock set further includes a selecting switch connected to second rechargeable battery 34 and the monitoring center. If the switch is selected to be connected to second rechargeable battery 34, as mentioned above, it is a normally-working condition. If the switch is selected to be connected to the monitoring center, the monitoring center can directly send the unlocking signal to unlock electric lock 37 without using portable unlocking device 2.

Finally, as mentioned above, the monitoring center can alter the preset code in code-identifying control device 6 so that the circuit in code-identifying control device 6 will return to the initial state after the preset code is altered.

Claims

1. An electric code lock set adapted to be mounted in a telecommunication cabinet comprising a code-storing device (22) for storing therein a preset code, an electric lock (37) energized by an electric lock power source if to be unlocked, a code-identifying control device (6) electrically connected to the code-storing device (22) for identifying whether there is an input code identical to the preset code and for generating an unlocking signal if the codes are identical, and an electric lock circuit (23) electrically connected to the code-identifying control device (6) for unlocking the electric lock (37) after the electric lock circuit (23) receives the unlocking signal, characterized in that the electric lock power source is selected from one of a portable unlocking device power source (34) and an electric power source from a monitoring center.
2. An electric code lock set according to Claim 1 characterized in that the preset code is preset by the monitoring center.
3. An electric code lock set according to Claim 1 or 2 characterized in that the electric lock circuit (23) is an electronic switch.
4. An electric code lock set according to Claim 1, 2 or 3 characterized in that the portable unlocking device power source (34) is a battery.
5. An electric code lock set according to anyone of Claims 1 - 4 characterized in that the monitoring center further allows the preset code in the code-storing device (22) to be altered.
6. An electric code lock set according to anyone of Claims 1 - 5 characterized in that the electric lock (37) further includes:
 - a coil (33) electrically connected to the electric lock circuit (23) for generating a magnetic field when the electric lock circuit (23) receives the unlocking signal; a blocking board (25) being in a translated condition when the coil (33) generates the magnetic field; and
 - a latch (31) normally latching the electric lock (37) and electrically connected to the blocking board (25) for freeing from latching the electric lock (37) when the blocking board (25) is in the

translated condition.

7. An electric code lock set according to anyone of Claims 1 - 6 characterized in that code lock set further includes an electronic sensor (8) electrically connected to the code-identifying control device (6) to detect whether a door of the cabinet is open. 5
8. An electric code lock set according to anyone of Claims 8 characterized in that the code-identifying control device (6) generates an open signal when the door of the cabinet is open. 10
9. An electric code lock set according to anyone of Claims 1 - 8 characterized in that the code lock set further comprises a portable unlocking device (2) including a code-inputting device (15) for inputting thereby the input code and the portable unlocking device power source (34) . 15
10. An electric code lock set according to Claim 9 characterized in that the portable unlocking device power source (34) also supplies the portable unlocking device (2). 20
11. An electric code lock set according to Claim 9 or 10 characterized in that the portable unlocking device (2) further includes a buzzer (14) electrically connected to the code-identifying control device (6) for warning that the electric lock (37) is not locked rightly after unlocked. 25
12. An electric code lock set according to anyone of Claims 9 - 11 characterized in that the portable unlocking device (2) further includes several indicators (27, 28, 29) for showing different working conditions. 30
13. An electric code lock set according to anyone of Claims 9 - 12 characterized in that code lock set further includes an receiving device (26) for receiving the portable unlocking device power source and the input code. 35
14. An electric code lock set according to Claim 13 characterized in that the portable unlocking device (2) further includes an outputting device (30) electrically connected to the receiving device (26). 40
15. An electric code lock set according to anyone of Claims 1 - 14 characterized in that the monitoring center includes an automatically answering device (5) and a computer (4) . 45
16. An electric code lock set according to Claim 15 characterized in that the code lock set further comprises an automatically dialing and receiving device (21) electrically connected to the automatically answering device (5) and the code-identifying control device (6) for transmitting a warning signal to the computer (4) when the electric lock (37) is undesiredly unlocked. 50
17. An electric code lock set according to Claim 16 characterized in that an undesiredly unlocked condition of the electric lock (37) means that the input code inputted by the code-inputting device (15) is not identical to the preset code but that the electric lock (37) is unlocked. 55
18. An electric code lock set according to Claim 16 or 17 characterized in that the code lock set further includes a warning device (9) for warning when the warning device (9) receives the warning signal.
19. An electric code lock set according to Claim 18 characterized in that the warning device (9) is an amplifier.
20. An electric code lock set according to anyone of Claims 9 - 19 characterized in that the code-identifying control device (6) further includes an enabling device and a disabling device.
21. An electric code lock set according to Claim 20 characterized in that the enabling device permits the electric code lock set in an enabling mode allowing the portable unlocking device (2) to receive the input code.
22. An electric code lock set according to Claim 20 characterized in that the disabling device permits said electric code lock set in a disabling mode which does not allow the portable unlocking device (2) to receive the input code.

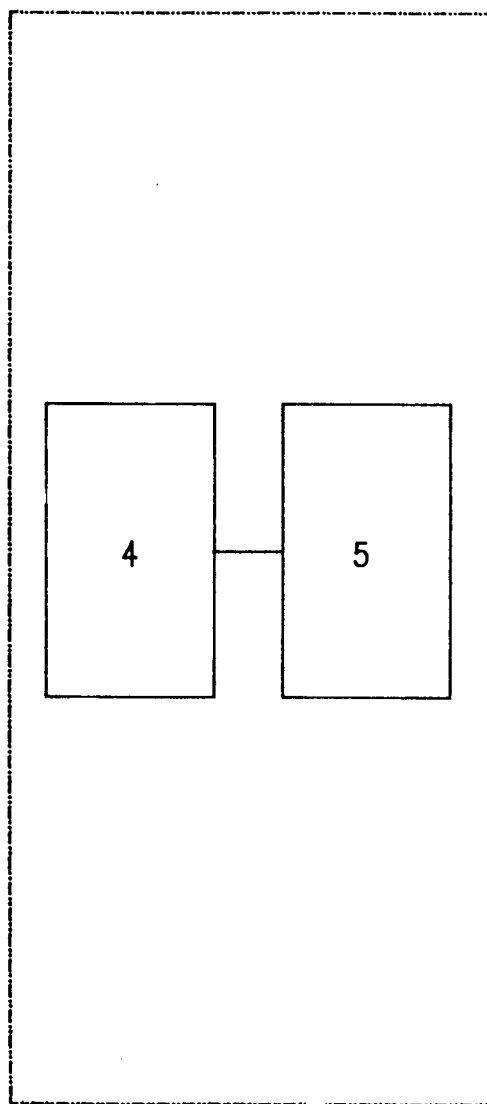


FIG. 1

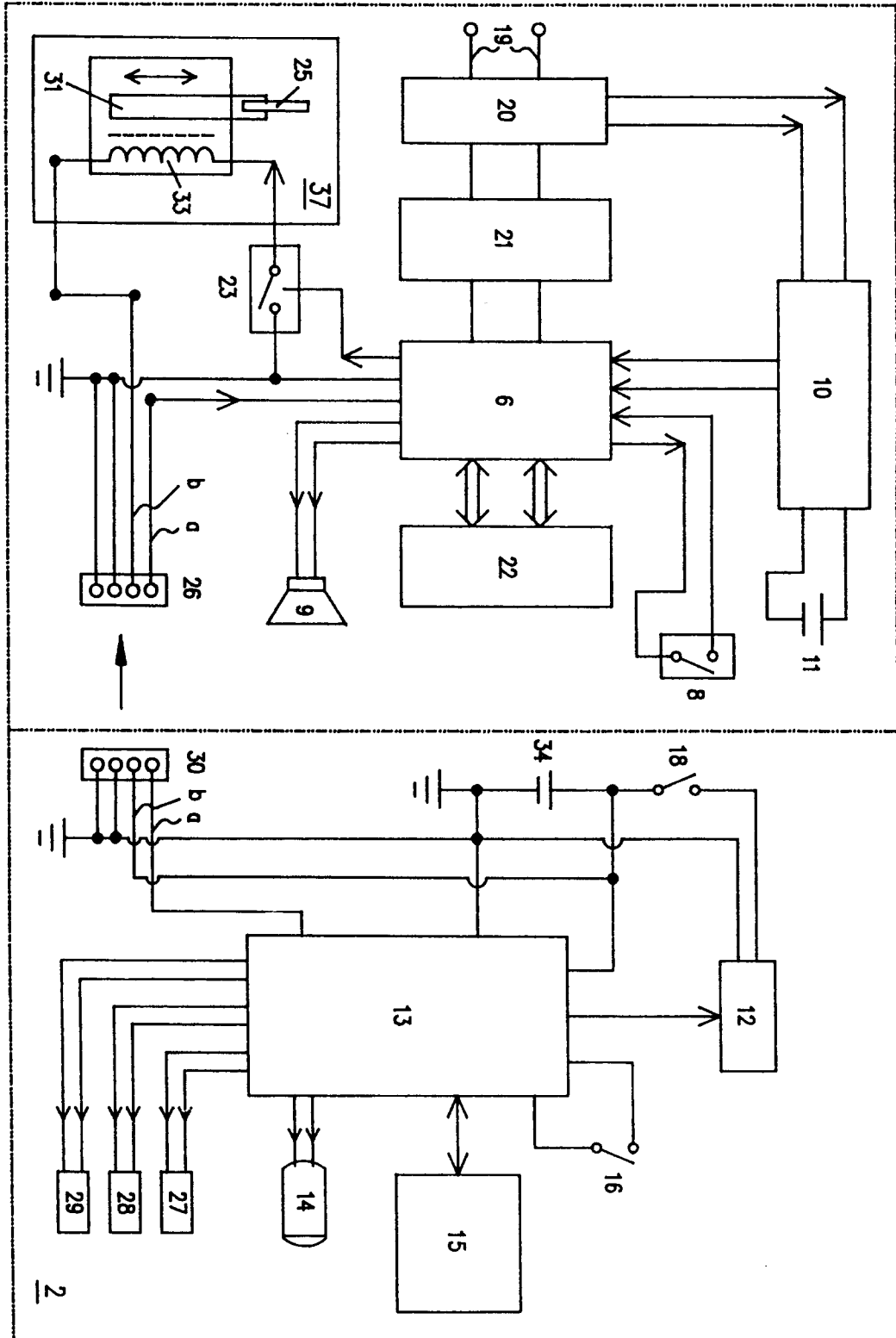


FIG. 2

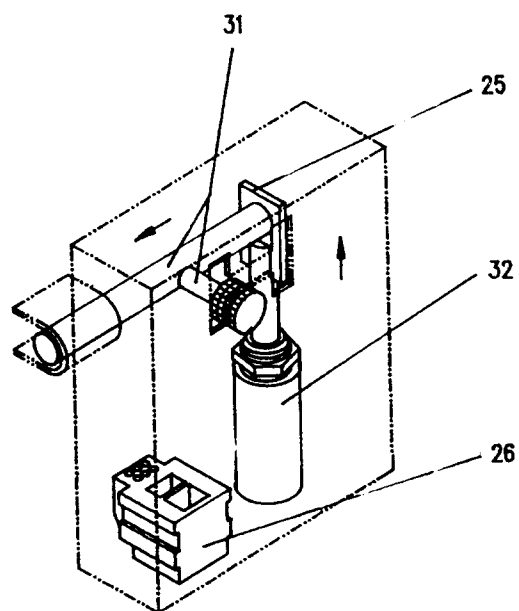


FIG. 3

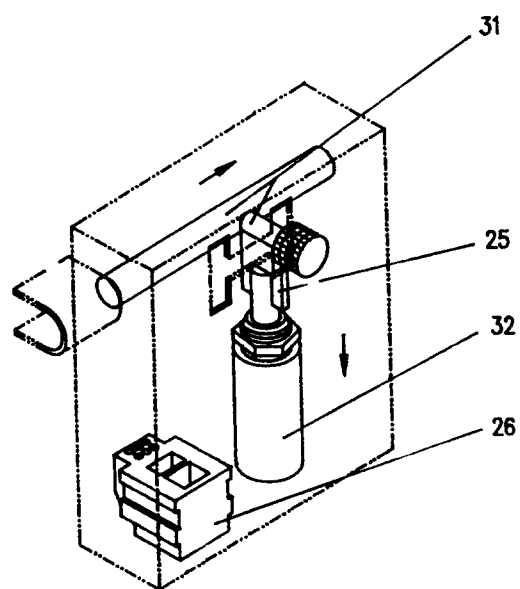


FIG. 4



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 93 30 5621

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
Y	US-A-4 829 296 (CLARK, WINCH) * column 2, line 23 - column 4, line 52; figures 1,2 *	1	E05B49/00
A	---	3,4,9, 10,13,14	
Y	US-A-4 083 424 (VON DEN STEMMEN, SWARTZ) * column 2, line 56 - column 7, line 22; figures 1-5 *	1	
A	---	4,9,10, 12-14	
A	1980 CARNAHAN CONFERENCE ON CRIME COUNTERMEASURES 14 May 1980 , KENTUCKY US pages 67 - 71 MOORE 'computerized site security monitor and response system'	1,2,4,5, 8,13-15, 18	
A	---		
A	GB-A-2 200 016 (MING HWANG WANG) * page 6, line 1 - line 20 *	8,15,16	
A	---		
A	DE-A-23 37 490 (WILMSMANN) -----		
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 24 November 1993	Examiner Herbelet, J
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