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(54) ENTRANCE GUARD CONTROL METHOD AND SYSTEM THEREOF

(57) An entrance guard control method, comprising: entrance guard switch device (102) acquiring door opening request and user account which are input by user, and sending door opening request and user account to entrance guard management system (100) in remote end, wherein entrance guard management system (100) stores corresponding relationship between user account and mobile terminal identifier of the user; entrance guard management system (100) responding to door opening request, generating password and check code corresponding to user account, and according to corresponding relationship between user account and mobile terminal identifier of user (104), sending password to mobile terminal (104) corresponding to user account and sending check code to entrance guard switch device (102); entrance guard switch device (102) acquiring password input by the user, checking password by using check code, and executing operation of opening door if check is passed.

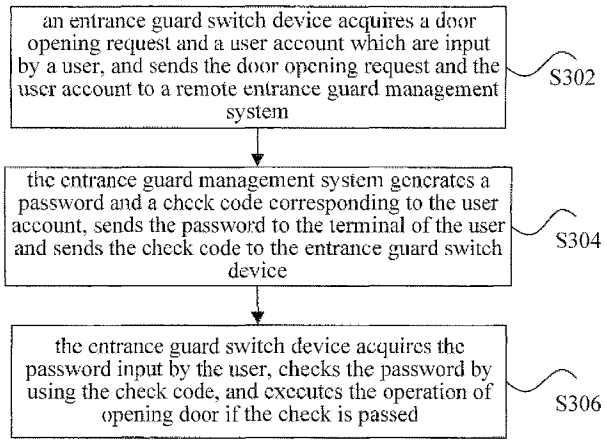

Fig. 3

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Description

Field of the Invention

[0001] The disclosure relates to the field of communication, and in particular to an entrance guard control method and an entrance guard control system.

Background of the Invention

[0002] The conventional entrance guard systems mainly include the entrance guard systems of keyboard password mode, contact IC card mode, Radio Frequency Identification Devices (RFID) card mode and Bluetooth mode.

[0003] The entrance guard system adopting the IC card mode, the RFID card mode or the Bluetooth mode requires a user to carry a key substitute. If the radio key is lost, a person who picks up the key substitute can open the entrance guard directly. And, the entrance guard system adopting the common keyboard password mode or similar mode requires the user to remember the password of the entrance guard, and it is easy to occur that the user forgets the password.

[0004] With the rapid development of mobile communication services, all common users have a cell phone terminal. The security level of the mobile communication network is very high. Every mobile communication technology has its own encryption mode, the networking is complex and the network is difficult to be attacked. The mobile communication network has all-around functions and it is easy to extend new functions of the mobile communication network. At present, there is no entrance guard technology based on the mobile communication network.

Summary of the Invention

[0005] The disclosure provides an entrance guard control method and an entrance guard control system, to solve the above problems.

[0006] According to one aspect of the disclosure, an entrance guard control method is provided and comprises: an entrance guard switch device acquiring a door opening request and a user account which are input by a user, and sending the door opening request and the user account to a remote entrance guard management system, wherein the entrance guard management system stores a corresponding relationship between the user account and a mobile terminal identifier of the user; the entrance guard management system responding to the door opening request, generating a password and a check code corresponding to the user account, and according to the corresponding relationship between the user account and the mobile terminal identifier of the user, sending the password to a mobile terminal corresponding to the user account and sending the check code to the entrance guard switch device; and the entrance guard switch device acquiring the password input by the user, checking the password by using the check code, and executing the operation of opening door if the check is passed.

[0007] Preferably, the entrance guard switch device sending the user account and the door opening request to the remote entrance guard management system comprises: sending, by the entrance guard switch device, the user account, the door opening request and an identifier of the entrance guard switch device to an entrance guard controller corresponding to the entrance guard switch device; and sending, by the entrance guard controller corresponding to the entrance guard switch device, the received user account, door opening request and the identifier of the entrance guard switch device, and an identifier of the entrance guard controller to the entrance guard management system through a mobile communication network; wherein the entrance guard management system manages a plurality of the entrance guard controllers, each of the plurality of the entrance guard controllers controls one or more entrance guard switch devices.

[0008] Preferably, before the entrance guard management system generates the password and the check code corresponding to the user account, the method further comprises: the entrance guard management system verifying the validity of the identifier of the entrance guard controller; verifying a corresponding relationship between the identifier of the entrance guard controller and the identifier of the entrance guard switch device; and determining that the user corresponding to the user account has an authority of operating the entrance guard switch device.

[0009] Preferably, the entrance guard management system sending the check code to the entrance guard switch device comprises: sending the check code and the identifier of the entrance guard switch device to the entrance guard controller corresponding to the identifier of the entrance guard controller through the mobile communication network; and sending, by the entrance guard controller, the check code to the entrance guard switch device according to the identifier of the entrance guard switch device.

[0010] Preferably, the entrance guard management system generating the password and the check code corresponding to the user account comprises: generating randomly, by the entrance guard management system, a password corresponding to the user account; finding, by the entrance guard management system, a key corresponding to the identifier of the entrance guard switch device locally, wherein the entrance guard management system locally stores a corresponding relationship between the entrance guard switch device and the key; adopting, by the entrance guard management system, a preset encryption algorithm to generate the check code according to the password and the key; and setting a valid time of the check code to be a threshold time.

[0011] Preferably, the entrance guard switch device checking the password by using the check code com-

prises: verifying whether a time difference between a time the password is input and a time the check code is received is beyond the threshold time, so as to verify time validity of the password; and adopting the key stored locally to decrypt the check code to obtain a decipher, and comparing the decipher and the password to verify the password.

[0012] Preferably, acquiring, by the entrance guard switch device, a door closing request and the password which are input by the user; the entrance guard switch device comparing the password and the decipher, executing an operation of closing door if the password and the decipher are consistent, prompting the user to input the user account if the password and the decipher are inconsistent, and sending the user account, the password, the identifier of the entrance guard switch device and the door closing request through the entrance guard controller; and the entrance guard management system comparing the received password with the password generated for the door opening request from the user, notifying the entrance guard switch device to execute the operation of closing door if the password received and the password generated are consistent, and notifying the entrance guard switch device not to execute the operation of closing door if the password received and the password generated are inconsistent.

[0013] Preferably, the entrance guard management system stores entrance guard configuration information, user information and entrance guard switching history information, wherein the entrance guard configuration information comprises: the identifiers of the plurality of the entrance guard controllers managed by the entrance guard system, the identifier of the entrance guard switch device bound with the each of the plurality of the entrance guard controllers, and the key corresponding to the each of the plurality of the entrance guard controllers; and the user information comprises: the user account, the mobile terminal identifier bound with the user account, and the authority of the user account operating the entrance guard switch device.

[0014] Preferably, in a condition that the user is a temporary user, the method further comprises: the entrance guard switch device acquiring the mobile terminal identifier and the door opening request which are input by the user, and sending the mobile terminal identifier and the door opening request to the remote entrance guard management system; the entrance guard management system sending the mobile terminal identifier and the door opening request to an administrator for authentication, generating, for the user passing the authentication, a temporary user account, and a temporary password and a temporary check code corresponding to the temporary user account, sending the temporary user account and the temporary password to a mobile terminal corresponding to the mobile terminal identifier, and sending the temporary check code to the entrance guard switch device; and the entrance guard switch device acquiring the temporary user account and the temporary password which are input by the user, checking the temporary password by using the temporary check code and executing the operation of opening door if the check is passed.

[0015] According to another aspect of the disclosure, an entrance guard control system is provided, comprising: a plurality of entrance guard switch devices and a remote entrance guard management system, wherein each of the plurality of entrance guard switch devices is configured to acquire a door opening request and a user account which are input by a user, to send the door opening request and the user account to the remote entrance guard management system, to receive a check code from the entrance guard management system, to check a password input by the user using the check code, and to execute an operation of opening door if the check is passed; and the entrance guard management system stores a corresponding relationship between the user account and a mobile terminal identifier of the user, and is configured to receive the door opening request and the user account from the entrance guard switch device, to generate the password and the check code corresponding to the user account, and according to the corresponding relationship between the user account and the mobile terminal identifier of the user, to send the password to a mobile terminal corresponding to the user account and to send the check code to the entrance guard switch device.

[0016] Preferably, a plurality of entrance guard controllers, wherein each of the plurality of entrance guard controllers manages one or more of the plurality of entrance guard switch devices, and the each of the plurality of entrance guard controllers is configured to receive from an entrance guard switch device managed by the entrance guard controller the user account, the door opening request and an identifier of the entrance guard switch device, to send the user account, the door opening request, the identifier of the entrance guard switch device and an identifier of the entrance guard controller to the entrance guard management system through a mobile communication network, to receive the check code and the identifier of the entrance guard switch device from the entrance guard management system, and to send the check code to the entrance guard switch device corresponding to the identifier of the entrance guard switch device.

[0017] Preferably, each of the plurality of entrance guard switch devices is further configured to acquire a door closing request and the password which are input by the user, to compare the password with a decipher, to execute an operation of closing door if the password and the decipher are consistent, to prompt the user to input the user account if the password and the decipher are inconsistent, and to send the user account, the password, the identifier of the entrance guard switch device and the door closing request to the entrance guard management system through an entrance guard controller; and the entrance guard management system is further configured to compare the received password with the

password generated for the door opening request from the user, to notify the entrance guard switch device to execute the operation of closing door if the password received and the password generated are consistent, and to notify the entrance guard switch device not to execute the operation of closing door if the password received and the password generated are inconsistent.

[0018] Preferably, the entrance guard management system stores entrance guard configuration information, user information and entrance guard switching history information, wherein the entrance guard configuration information comprises: the identifiers of the plurality of entrance guard controllers managed by the entrance guard system, the identifier of the entrance guard switch device bound with the each of the plurality of entrance guard controllers, and a key corresponding to the each of the plurality of entrance guard controllers; and the user information comprises: the user account, the mobile terminal identifier bound with the user account, and an authority of the user account operating the entrance guard switch device.

[0019] Preferably, in a condition that the user is a temporary user, the each of the plurality of entrance guard switch devices is further configured to acquire the mobile terminal identifier and the door opening request which are input by the user, to send the mobile terminal identifier and the door opening request to the remote entrance guard management system, to acquire a temporary user account and a temporary password which are input by the user, to check the temporary password by using a temporary check code and to execute the operation of opening door if the check is passed; and the entrance guard management system is further configured to send the mobile terminal identifier and the door opening request to an administrator for authentication, to generate, for the user passing the authentication, the temporary user account, and the temporary password and the temporary check code corresponding to the temporary user account, to send the temporary user account and the temporary password to a mobile terminal corresponding to the mobile terminal identifier, and to send the temporary check code to the entrance guard switch device.

[0020] With the technical solution provided by the disclosure, the remote entrance guard management system assigns a password to a user dynamically, sends the password to the mobile terminal of the user, and encrypts the password with a key to form a check code and sends the check code to the entrance guard switch device. Then, the entrance guard switch device decrypts the received check code and checks the password input by the user. With the technical solution provided by the disclosure, an entrant does not need to carry a key substitute, nor to memory a tedious password. Thus, it is convenient for the user to use. In addition, there will be no such problem as loss of password, the password is difficult to crack and this solution has high level of security.

Brief Description of the Drawings

[0021] For a better understanding of the disclosure, the drawings described hereinafter are provided to constitute one part of the application. The schematic embodiments of the disclosure and the description thereof are used to illustrate the disclosure but not to limit the disclosure improperly. In the drawings:

Fig. 1 shows a structure diagram of an entrance guard control system according to Embodiment 1 of the disclosure;

Fig. 2 shows a structure diagram of a preferred entrance guard control system according to Embodiment 1 of the disclosure;

Fig. 3 shows a flowchart of an entrance guard control method according to Embodiment 3 of the disclosure;

Fig. 4 shows a flowchart of a temporary user opening a door according to Embodiment 3 of the disclosure;

Fig. 5 shows a flowchart of an entrance guard switch device sending a user account and a door opening request to an entrance guard management system according to Embodiment 3 of the disclosure;

Fig. 6 shows a flowchart of an entrance guard management system verifying authority according to Embodiment 3 of the disclosure;

Fig. 7 shows a flowchart of an entrance guard management system generating a password and a check code corresponding to a user account according to Embodiment 3 of the disclosure;

Fig. 8 shows a flowchart of an entrance guard management system sending a check code to an entrance guard switch device according to Embodiment 3 of the disclosure;

Fig. 9 shows a flowchart of an entrance guard switch device checking a password input by a user using a check code according to Embodiment 3 of the disclosure;

Fig. 10 shows a flowchart of an operation of closing door according to Embodiment 3 of the disclosure;

Fig. 11 shows a flowchart of a radio entrance guard system opening a door based on a mobile communication network according to Embodiment 4 of the disclosure; and

Fig. 12 shows a flowchart of a radio entrance guard system closing a door based on a mobile communication network according to Embodiment 5 of the disclosure.

Detailed Description of the Embodiments

[0022] The disclosure is described hereinafter in detail by reference to the drawings and in conjunction with the embodiments. It should be noted that the embodiments in the application and the features of the embodiments can be combined with each other if no conflict is caused.

Embodiment 1

[0023] In this embodiment, an entrance guard control system is provided. Fig. 1 shows a structure diagram of an entrance guard control system according to Embodiment 1 of the disclosure. As shown in Fig. 1, the system comprises a remote entrance guard management system 100 and a plurality of entrance guard switch devices 102.

[0024] In the above, each entrance guard switch device 102 is configured to acquire a door opening request and a user account which are input by a user who uses a mobile terminal 104, to send the door opening request and the user account to the remote entrance guard management system 100, to receive a check code from the entrance guard management system 100, to check a password input by the user by using the check code, and to execute the operation of opening door if the check is passed; and

the entrance guard management system 100 stores a corresponding relationship between the user account and the mobile terminal identifier of the user, and is configured to receive the door opening request and the user account from the entrance guard switch device 102, to generate a password and a check code corresponding to the user account, and according to the corresponding relationship between the user account and the mobile terminal identifier of the user, to send the password to the mobile terminal 104 corresponding to the user account and to send the check code to the entrance guard switch device 102.

[0025] The related entrance guard system requires a user to carry a key substitute or memory a door opening/closing password and input the password through the keyboard on the entrance guard switch device, so as to implement the operation of opening/closing door. Once the key is lost or the user forgets the password, not only inconvenience is brought to the user, but security hazard is caused too. The above entrance guard control system provided by the embodiment makes full use of the universality of mobile terminals. Hence, during each operation of opening/closing door, the entrance guard management system generates a random password for the user and sends the password to the mobile terminal of the user. Then, the user inputs the received random password on the entrance guard switch device and the entrance guard switch device checks the password. In this way, the user does not need to memory different passwords for different entrance guard switch devices, or to carry a key substitute, but only needs to use the carried mobile terminal to receive the door opening/closing password. Thus great convenience is brought to the user. Moreover, the password or the check code is not stored in the entrance guard switch device, but is generated by the remote entrance guard management system. If the same user operates the same entrance guard switch device at different time, the entrance guard management device generates a random password for the user each time. The password generated each time is different too. Therefore, even if the user loses the password or leaks the password, no security hazard is caused. Thus, the security of the entrance guard control system is greatly improved.

[0026] During the implementation process, the entrance guard management system 100 and the entrance guard switch device 102 can be connected through a wired network, and also can be connected through a mobile communication network. For example, they can be connected by adopting, but not limited to, the Unstructured Supplementary Service Data (USSD) mode.

[0027] Fig. 2 shows a structure diagram of a preferred entrance guard control system according to Embodiment 1 of the disclosure. Preferably, as shown in Fig. 2, the entrance guard control system provided by the disclosure further comprises: a plurality of entrance guard controllers 106, wherein each entrance guard controller 106 manages one or more entrance guard switch devices 102. And each entrance guard controller 106 is configured to receive the user account, the door opening request and the identifier of the entrance guard switch device 102 managed by the entrance guard controller 106, to send the user account, the door opening request, the identifier of the entrance guard switch device 102 and the identifier of the entrance guard controller 106 itself to the entrance guard management system 100 through a mobile communication network, to receive the check code and the identifier of the entrance guard switch device from the entrance guard management system 100, and to send the check code to the entrance guard switch device 102 corresponding to the identifier of the entrance guard switch device 102.

[0028] Preferably, each entrance guard switch device 102 is further configured to acquire a door closing request and a password which are input by the user, to compare the password with a decipher, to execute the operation of closing door if the password and the decipher are consistent, to prompt the user to input the user account if the password and the decipher are inconsistent, and to send the user account, the password, the identifier of the entrance guard switch device and the door closing request to the entrance guard management system 100 through the entrance guard controller 106; and

[0029] the entrance guard management system 100 is further configured to compare the received password with the password previously generated for the door opening request from the user, to notify the entrance guard switch device 102 to execute the operation of closing door if the password received and the password generated are consistent, and to notify the entrance guard switch device 102 not to execute the operation of closing door if the password received and the password generated are inconsistent.

[0030] Preferably, the entrance guard management system 100 stores entrance guard configuration information, user information and entrance guard switching history information locally. The entrance guard configuration

information comprises: the identifier of the entrance guard controller 106 managed by the entrance guard system 100, the identifier of the entrance guard switch device bound with each entrance guard controller, and the key corresponding to each entrance guard controller 106. The user information comprises: the user account, the mobile terminal identifier bound with the user account, and the authority of the user account operating the entrance guard switch device 102.

[0031] Preferably, in the condition that the user is a temporary user, each entrance guard switch device 102 is further configured to acquire the mobile terminal identifier and the door opening request which are input by the user, to send the mobile terminal identifier and the door opening request to the remote entrance guard management system 100, to acquire a temporary user account and a temporary password which are input by the user, to check the temporary password by using a temporary check code and to execute the operation of opening door if the check is passed; and the entrance guard management system 100 is further configured to send the mobile terminal identifier and the door opening request to an administrator for authentication, to generate, for the user passing the authentication, the temporary user account, and the temporary password and the temporary check code which are corresponding to the temporary user account, to send the temporary user account and the temporary password to the user terminal 104, and to send the temporary check code to the entrance guard switch device 102.

[0032] During the implementation process, the entrance guard management system 100 and the entrance guard controller 106 can be connected through a wired network, and also can be connected through a mobile communication network. For example, they can communicate by adopting, but not limited to, the USSD mode. The entrance guard management system 100 and the mobile terminal 104 can communicate by adopting, but not limited to, the short message mode. The entrance guard controller 106 and the entrance guard switch device 102 can be connected by adopting, but not limited to, a cable line. If the entrance guard controller 106 and the entrance guard switch device 102 are of the one-to-one corresponding relationship, that is, one entrance guard controller 106 manages one entrance guard switch device 102, these two can be integrated to implement.

Embodiment 2

[0033] During the implementation process, a system administrator, an entrance guard administrator and a user (entrant) need to interact through the entrance guard control system provided by the Embodiment 1, so as to implement the operation of opening/closing door of each entrance guard switch device. This embodiment is to illustrate in detail the preferred entrance guard control system provided by Embodiment 1. In the entrance guard control system shown in Fig. 2, the entrance guard management system 100 also provides a WAP portal page to provide registration or setting services for the system administrator, the entrance guard administrator and the entrant, wherein these three roles can have the following authorities respectively.

[0034] First, the system administrator has the following authorities:

(1) All authorities of operating the entrance guard control system, comprising setting system parameters and portal authorities;
(2) Authorities of managing the entrance guard administrator and the entrant, mainly comprising: regulating the entrance guard administrator manages which entrance guard controller, regulating the entrance guard controller manages which entrance guard switch device, and regulating the entrant is allowed to enter which entrance guard and the enter time limit;
(3) Examining and approving applications submitted by relevant entrance guard administrators, and the application contains the basic information of the entrance guard controller (entrance guard controller number, cell phone number of controller, entrance guard administrator to which the controller belongs, detailed location, unit to which the controller belongs, the entrance guard controlled by entrance guard controller), the basic information of the entrance guard switch device (entrance guard number, the entrance guard controller to which the device belongs, detailed location), the basic information of the entrance guard administrator (administrator user name, administrator password, the bound cell phone number, name and address of the administrator) and the basic information of the entrant (entrant's user account, cell phone number, name, address and valid enter period, dynamic password generated by the system, information of the authorizer); and
(4) Querying all entrance guard switch information and history alarms.

[0035] Second, the entrance guard administrator mainly has the following functions:

(1) Setting the cell phone number of each entrance guard controller (for communicating with the entrance guard management system), and the cell phone number, user name for login and password of the entrance guard administrator;
(2) Setting the relationship between each entrance guard switch device and the entrance guard controller, and the key of the entrance guard switch device;
(3) Setting the relationship between the entrant and the entrance guard, and the user account and bound cell phone number of the entrant;
(4) Examining and approving applications submitted by relevant entrants, including temporary entrants;
(5) Creating a new entrant and a temporary entrant,

and setting the corresponding entrance guard authority; and

(6) Querying relevant entrance guard switching information and history alarms.

[0036] Third, the entrant mainly has the following functions:

(1) When the cell phone of the entrant is lost, the entrant modifies the bound cell phone number through the WAP portal or by sending a USSD instruction, which needs to be examined and approved by the entrance guard administrator; and

(2) When in an emergency, the entrant is not at the entrance guard and it is needed to authorize another user to open the door, the entrant can authorize another user to accept partial entrance guard authorities of the entrant himself through the WAP portal or by sending a USSD instruction, which needs to be examined and approved by the entrance guard administrator.

Embodiment 3

[0037] In this embodiment, an entrance guard control method is provided. Fig. 3 shows a flowchart of an entrance guard control method according to Embodiment 3 of the disclosure. As shown in Fig. 3, the method comprises:

Step 302: an entrance guard switch device acquires a door opening request and a user account which are input by a user, and sends the door opening request and the user account to a remote entrance guard management system, wherein the entrance guard management system stores a corresponding relationship between the user account and the mobile terminal identifier of the user;

Step 304: the entrance guard management system responds to the door opening request, generates a password and a check code corresponding to the user account, and according to the corresponding relationship between the user account and the mobile terminal identifier of the user, sends the password to the mobile terminal corresponding to the user account and sends the check code to the entrance guard switch device; and

Step 306: the entrance guard switch device acquires the password input by the user, checks the password by using the check code, and executes the operation of opening door if the check is passed.

[0038] The above entrance guard control method provided by the embodiment makes full use of the universality of mobile terminals. During each operation of opening/closing door, the entrance guard management system generates a random password for the user and sends the password to the mobile terminal of the user. Then the user inputs the received random password on the entrance guard switch device and the entrance guard switch device checks the password. Compared with the conventional art, with the method provided by the embodiment, the user does not need to memory different passwords for different entrance guard switch devices, or to carry a key substitute, but only needs to use the carried mobile terminal to receive the door opening/closing password. Thus great convenience is brought to the user. Moreover, the password or the check code is not stored in the entrance guard switch device, but is generated by the remote entrance guard management system. If the same user operates the same entrance guard switch device at different times, the entrance guard management device generates a random password for the user each time. The password generated each time is different too. Therefore, even if the user loses the password or leaks the password, no security hazard is caused. Thus, the security of the entrance guard control system is greatly improved.

[0039] During the implementation process, the entrance guard management system and the entrance guard switch device can be connected through a wired network, and also can be connected through a mobile communication network. For example, they can be connected by adopting, but not limited to, the USSD mode.

[0040] Preferably, in the condition that the user currently requesting door opening is a temporary user, that is, the information of the temporary user is not registered in the entrance guard management system, Fig. 4 shows a flowchart of a temporary user opening a door according to Embodiment 3 of the disclosure. As shown in Fig. 4, the method further comprises the following steps.

Step 402: the entrance guard switch device acquires the mobile terminal identifier and the door opening request which are input by the user, and sends the mobile terminal identifier and the door opening request to the remote entrance guard management system.

Step 404: the entrance guard management system sends the mobile terminal identifier and the door opening request to an administrator for authentication, generates, for the user passing the authentication, a temporary user account, and a temporary password and a temporary check code which are corresponding to the temporary user account, sends the temporary user account and the temporary password to the terminal of the user, and sends the temporary check code to the entrance guard switch device.

[0041] During the implementation process, after the entrance guard management system receives the mobile terminal identifier and the door opening request sent from an entrance guard switch device, the entrance guard management system can send the mobile terminal identifier and the door opening request to a mobile terminal of the administrator, for the administrator to authenticate and approve. Alternatively, it can be that an examination prompt props up on the portal page of the entrance guard control system for the administrator to authenticate and

approve. Preferably, the administrator can be the entrance guard administrator provided by the above embodiment, and also can be the system administrator.

Step 406: the entrance guard switch device acquires the temporary user account and the temporary password which are input by the user, checks the temporary password by using the temporary check code and executes the operation of opening door if the check is passed.

[0042] Preferably, the entrance guard management system can manage a plurality of entrance guard controllers, each of which can control one or more entrance guard switch devices.

[0043] Fig. 5 shows a flowchart of an entrance guard switch device sending a user account and a door opening request to an entrance guard management system according to Embodiment 3 of the disclosure. As shown in Fig. 5, preferably, the entrance guard switch device sending the user account and the door opening request to the remote entrance guard management system comprises the following steps.

[0044] Step 502: the entrance guard switch device sends the user account, the door opening request and the identifier of the entrance guard switch device to an entrance guard controller corresponding to the entrance guard switch device.

[0045] During the implementation process, the managed entrance guard switch devices are numbered uniformly, so that identifiers corresponding to each entrance guard switch device are formed. The entrance guard control system records which entrance guard switch devices are managed by each entrance guard controller specifically, that is, the corresponding relationship between the entrance guard controller and the entrance guard switch device. After the entrance guard switch device receives the account number and the door opening request which are input by the user, the entrance guard switch device carries the identifier of itself in the request message to send to the corresponding entrance guard controller.

[0046] Step 504: the entrance guard controller corresponding to the entrance guard switch device sends the received user account, door opening request and identifier of the entrance guard switch device, and the identifier of the entrance guard controller to the entrance guard management system through a mobile communication network.

[0047] During the implementation process, the entrance guard controller is connected with the mobile communication network and can communicate by adopting, but not limited to, the USSD mode. In order to implement the communication of the USSD mode, the entrance guard controller and the entrance guard management system both need to be provided with an internal mobile communication device, and correspondingly have a Subscriber Identity Module (SIM) card for mobile communication. The identifier of the entrance guard controller can adopt, but not limit to, the SIM card number of the entrance guard controller. After the entrance guard controller receives the user account, the door opening request and the identifier of the entrance guard switch device, the entrance guard controller carries the user account, the door opening request, the identifier of the entrance guard switch device and the card number of the entrance guard controller itself in a password request message to send to the entrance guard management system.

[0048] Preferably, the entrance guard management system stores entrance guard configuration information, user information and entrance guard switching history information locally. The entrance guard configuration information comprises: the identifiers of the entrance guard controllers managed by the entrance guard system, the identifier of the entrance guard switch device bound with each entrance guard controller, and the key corresponding to each entrance guard controller; and the user information comprises: the user account, the mobile terminal identifier bound with the user account, and the authority of the user account operating the entrance guard switch device.

[0049] During the implementation process, both the entrance guard configuration information and the user information mentioned above can be recorded through the WAP portal by the entrance guard administrator, and then be examined and approved by the system administrator.

[0050] Preferably, Fig. 6 shows a flowchart of an entrance guard management system verifying authority according to Embodiment 3 of the disclosure. As shown in Fig. 6, before the entrance guard management system generates the password and check code corresponding to the user account, the method can further comprise the following steps.

[0051] Step 602: the entrance guard management system verifies the validity of the identifier of the entrance guard controller.

[0052] During the implementation process, the entrance guard system resolves a password application message and resolves out the user account, the door opening request, the identifier of the entrance guard switch device and the identifier (card number) of the entrance guard controller respectively. First, the entrance guard system needs to verify whether the identifier (card number) of the entrance guard controller is valid. That is, whether the entrance guard controller has been authorized with a function of applying for a password.

[0053] Step 604: verify the corresponding relationship between the identifier of the entrance guard controller and the identifier of the entrance guard switch device.

[0054] During the implementation process, after the validity of the identifier of the entrance guard controller is verified, the corresponding relationship between the identifier of the entrance guard controller and the identifier of the entrance guard switch device also can be verified. That is, whether the entrance guard switch device is managed by the entrance guard controller.

[0055] Step 606: determine that the user corresponding to the user account has an authority of operating the entrance guard switch device.

[0056] During the implementation process, before the password and the check code are generated for the user, it is needed to perform binding verification on the user account and the identifier of the entrance guard switch device, to verify whether the user has the authority of operating the entrance guard switch device.

[0057] With the above preferred method, before password check is performed, a process of identifier and authority check initiated by the entrance guard management system can be added to further improve the security of the entrance guard control system.

[0058] Preferably, Fig. 7 shows a flowchart of an entrance guard management system generating a password and a check code corresponding to a user account according to Embodiment 3 of the disclosure. As shown in Fig. 7, the entrance guard management system generating the password and check code corresponding to the user account comprises the following steps.

[0059] Step 702: the entrance guard management system randomly generates a password corresponding to the user account.

[0060] Step 704: the entrance guard management system finds a key corresponding to the identifier of the entrance guard switch device locally, wherein the entrance guard management system stores a corresponding relationship between the entrance guard switch device and the key locally.

[0061] Step 706: the entrance guard management system adopts a preset encryption algorithm to generate the check code according to the password and the key.

[0062] Step 708: setting the valid time of the check code to be a threshold time. During the implementation process, the system administrator and the entrance guard administrator determine the threshold time by negotiation. For example, the valid time can be set to be, but not limited to, 1 minute. The entrance guard administrator sets this valid time on the entrance guard switch device.

[0063] With the above preferred method, the entrance guard management system can generate a dynamic password for each user account. Since the password is randomly generated, the password generated for the door opening requests of the same user account at different times is different. Therefore, the user and the password have no regular corresponding relationship, and the security of the entrance guard control system is further improved.

[0064] Preferably, Fig. 8 shows a flowchart of an entrance guard management system sending a check code to an entrance guard switch device according to Embodiment 3 of the disclosure. As shown in Fig. 8, the entrance guard management system sending the check code to the entrance guard switch device comprises the following steps.

[0065] Step 802: the entrance guard management system sends the check code and the identifier of the entrance guard switch device to the entrance guard controller corresponding to the identifier of the entrance guard controller through a mobile communication network.

[0066] Step 804: the entrance guard controller sends the check code to the corresponding entrance guard switch device according to the identifier of the entrance guard switch device.

[0067] Preferably, Fig. 9 shows a flowchart of an entrance guard switch device checking a password input by a user using a check code according to Embodiment 3 of the disclosure. As shown in Fig. 9, after receiving the check code, the entrance guard switch device checking the password input by the user by using the check code comprises the following steps.

[0068] Step 902: verify whether the time difference between the time the password is input and the time the check code is received is beyond the threshold time, so as to verify the time validity of the password.

[0069] During the implementation process, the entrance guard switch device is provided with a timer locally. The entrance guard switch device begins timing when receiving the check code, stops timing when the user completes the input of password, and judges whether the time difference is beyond a preset valid time so as to verify the time validity of the password. If the time difference is not beyond the valid time, the entrance guard switch device performs the following password correctness check. If the time difference is beyond the valid time, the entrance guard switch device prompts to the user that the password is expired and reapplication is required.

[0070] Step 904: adopting a key stored locally to decrypt the check code to obtain a decipher, and comparing the decipher with the password to verify the password.

[0071] During the implementation process, each entrance guard switch device locally stores a unique key which is used for decrypting the received check code, wherein the decryption algorithm is an inverse operation of the encryption algorithm implemented in the entrance guard management system.

[0072] Preferably, the method provided by this embodiment further comprises that the user inputs a door closing request to trigger the entrance guard control system to perform the operation of closing door. Fig. 10 shows a flowchart of an operation of closing door according to Embodiment 3 of the disclosure. As shown in Fig. 10, the process comprises the following steps.

[0073] Step 1002: the entrance guard switch device acquires a door closing request and a password which are input by the user.

[0074] Step 1004: the entrance guard switch device compares the password with the decipher, executes the operation of closing door if the password and the decipher are consistent, prompts the user to input the user account if the password and the decipher are inconsistent, and sends the user account, the password, the identifier of the entrance guard switch device and the door closing request through the entrance guard controller.

[0075] Step 1006: the entrance guard management

system compares the received password with the password generated for the door opening request from the user, notifies the entrance guard switch device to execute the operation of closing door if the password received and the password generated are consistent, and notifies the entrance guard switch device not to execute the operation of closing door if the password received and the password generated are inconsistent.

Embodiment 4

[0076] In this embodiment, the process of a radio entrance guard system opening a door based on a mobile communication network is illustrated in detail. Fig. 11 shows a flowchart of a radio entrance guard system opening a door based on a mobile communication network according to Embodiment 4 of the disclosure. As shown in Fig. 11, the process of opening a door is as follows.

[0077] Step 1101: an entrance guard administrator logs in the entrance guard management system to input the basic information of the entrance guard controller, the entrance guard switch device and the entrant; and the system administrator examines and approves them.

[0078] Step 1102: a temporary entrant presses an "Apply for Entrance" key on the entrance guard; and the entrance guard device prompts to input a cell phone number of the temporary entrant.

[0079] Step 1103: after a temporary entrant inputs the cell phone number, the entrance guard switch device sends to the entrance guard controller an entrance application request, which comprises: an entrance application instruction, an entrance guard number and the cell phone number of the temporary entrant; and the entrance guard controller resolves the request into a USSD message to send to the entrance guard management system, wherein the content of the message is *125#77#1#13966662223#, and the cell phone number of the temporary entrant is 13966662223.

[0080] Step 1104: after receiving the entrance application request, the entrance guard management system finds an administrator of the entrance guard controller and forwards the entrance application request to a bound cell phone in the USSD mode. The administrator of the entrance guard controller confirms whether this application is valid through a phone call, and replies an examination result to the entrance guard management system. The reply comprises the result of whether entrance is allowed and the valid time period of the examination result.

[0081] Step 1105: the entrance guard management system performs processing according to the examination result. If the examination result is approval, the entrance guard management system generates a temporary user account and a dynamic password 123456 for the temporary entrant, and sends the temporary user account and the dynamic password to the cell phone number 13966662223 bound with the temporary user account. And the entrance guard management system generates an entrance guard password 654321 according to the key of the entrance guard switch device and the dynamic password, and sends the entrance guard password to the entrance guard switch device through the entrance guard controller. If the examination result is rejection, the system prompts to the user that the application is rejected through the entrance guard switch device.

[0082] Step 1106: the temporary entrant inputs the temporary user account according to the prompt on the entrance guard switch device; go to Step 1116.

[0083] Step 1107: a common entrant presses an "Open Door" instruction on the entrance guard switch device and inputs a user account according to the prompt on the entrance guard switch device.

[0084] Step 1108: the entrance guard switch device sends to the entrance guard controller the door opening request, which comprises the door opening instruction, the entrance guard number and the user account.

[0085] Step 1109: the entrance guard controller sends a USSD entrance guard door opening request message to the entrance guard management system using an inbuilt cell phone module through the mobile communication network, wherein the content of the message is *125#88#1#1001# and the calling number is the cell phone number (13966661111) of the entrance guard controller.

[0086] Step 1110: the entrance guard management system verifies the validity of the cell phone number (13966661111) of the entrance guard controller. If the cell phone number is valid, the entrance guard management system continues to verify whether the entrance guard number 1 is under the management of the entrance guard controller, and whether the user account 1001 has the authority of opening the entrance guard 1.

[0087] Step 1111: if the verification fails, a door opening failure message is returned to the entrance guard controller. The entrance guard controller forwards the message to the corresponding entrance guard switch device, and the entrance guard switch device prompts to the entrant that the input is wrong.

[0088] Step 1112: after the verification is passed, a dynamic password 123456 is generated for the user account randomly and is recorded in the system. Then the key of the entrance guard switch device is extracted and is encrypted to generate an entrance guard check code 654321, and the valid time period is 1 minute.

[0089] Step 1113: the entrance guard management system sends the entrance guard password 654321 of the entrance guard switch device 1 to the entrance guard controller 13966661111 through a USSD response. Meanwhile, the entrance guard management system sends a short message containing the dynamic password 123456 to the cell phone number (13966662222) bound with the user account of the entrant in the mode of short message. The system records a sending log.

[0090] Step 1114: after receiving the USSD response, the entrance guard controller sends the entrance guard check code to the entrance guard switch device 1 ac-

cording to the entrance guard number.

[0091] Step 1115: the entrant inputs the dynamic password 123456 contained in the received short message on the entrance guard switch device according to the prompt.

[0092] Step 1116: the entrance guard switch device 1 decrypts the received entrance guard check code by using the preset key, records the reception time, judges whether the time difference between the reception time and the time of the entrant inputting the dynamic password exceeds 1 minute, and compares the decipher with the dynamic password input by the entrant. If the time difference exceeds 1 minute or the password is inconsistent, the entrance guard switch device prompts door opening failure and sends an alarm message to the entrance guard administrator 13966661112. If the time difference is within 1 minute and the password is correct, the entrance guard switch device prompts door opening success and executes the operation of opening door.

[0093] Step 1117: the entrance guard switch device 1 reports a door opening failure or success message to the entrance guard management system through the entrance guard controller, wherein the USSD message is *125#88#1#1001#0#.

[0094] Step 1118: the entrance guard management system records a door opening log and records the state of the entrance guard switch device.

Embodiment 5

[0095] In this embodiment, the process of a radio entrance guard system closing a door based on a mobile communication network is illustrated in detail. Fig. 12 shows a flowchart of a radio entrance guard system closing a door based on a mobile communication network according to Embodiment 5 of the disclosure. As shown in Fig. 12, the process of closing a door is as follows.

[0096] Step 1201: the entrant inputs and sends a door closing instruction at the entrance guard switch device, and inputs the dynamic password 123456 received when opening the door according to the prompt.

[0097] Step 1202: after receiving the dynamic password and the door closing instruction which are input by the entrant, the entrance guard switch device extracts the password decrypted out when opening the door last time to perform comparison.

[0098] Step 1203: if the passwords are consistent, the entrance guard switch device executes the operation of closing door, and reports a door closing success message *125#99#1#1001#0# to the entrance guard management system through the entrance guard controller. The entrance guard controller forwards this operation to the entrance guard management system which then performs log recording.

[0099] Step 1204: if the entrance guard switch device finds that the passwords are inconsistent, the entrance guard switch device prompts the entrant to input the user account, and sends again the entrance guard number 1, the user account 1001, the dynamic password 123456 and the door closing instruction 99 to the entrance guard management system through the entrance guard controller.

[0100] Step 1205: after decrypting the received entrance guard number, user account, dynamic password and door closing instruction, the entrance guard management system first verifies whether the authority of the user account is correct, and then extracts the door opening dynamic password transmitted to the user last time to perform comparison.

[0101] Step 1206: if the passwords are consistent, door opening success is returned to the entrance guard switch device.

[0102] Step 1207: if the authority of the user account of the entrant is incorrect or the passwords are inconsistent, door closing failure is returned to the entrance guard switch device.

[0103] Step 1208: the entrance guard management system records relevant door closing logs.

[0104] Step 1209: if the entrance guard switch device receives door closing success, the operation of closing door is executed.

[0105] Step 1210: if door closing failure is received, the entrance guard switch device prompts to the entrant that the input is wrong.

[0106] The solution of the disclosure can be widely applied to the entrance guard management of machine rooms, buildings, personal houses, residential areas etc., and is not limited to the applications listed in the description and the embodiments. For those skilled in the art, various modifications and variations can be made according to the disclosure. These corresponding modifications and variations all belong to the protection scope of the claims of the disclosure. For instance, the interactive communication mode between each network element in the system is changed, two network elements are integrated simply, and the function of one network element is moved to another network element for implementation.

[0107] From the description above, it can be seen that in the technical solution provided by the disclosure, the entrant does not need to carry a key substitute, nor to memory a tedious password. Thus, great convenience is brought to the user. Moreover, the password is generated randomly each time, and no such problem as loss of password exists. The password is difficult to crack and adopts a mechanism of multiple verifications. Therefore, the security of the entrance guard control system is high.

[0108] Obviously, those skilled in the art should understand that the modules and steps of the disclosure described above can be implemented by a common computer device; the modules or steps can be integrated on a single computing device or distributed on a network composed of a plurality of computing devices; optionally, the modules or steps can be implemented by a programming code executable by a computing device, thus they can be stored in a storage device to be executed by a

computing device and executed in a different order in some cases, or manufactured into individual integrated circuit module respectively, or several of them can be manufactured into a single integrated circuit module to implement; in this way, the disclosure is not limited to any combination of specific hardware and software.

[0109] The above are only the preferred embodiments of the disclosure and are not intended to limit the disclosure. For those skilled in the art, various modifications and changes can be made to the disclosure. Any modification, equivalent substitute and improvement made within the spirit and principle of the disclosure are deemed to be included within the scope of protection of the disclosure.

Claims

1. An entrance guard control method, **characterized by** comprising the steps of:

   an entrance guard switch device acquiring a door opening request and a user account which are input by a user, and sending the door opening request and the user account to a remote entrance guard management system, wherein the entrance guard management system stores a corresponding relationship between the user account and a mobile terminal identifier of the user;
   the entrance guard management system responding to the door opening request, generating a password and a check code corresponding to the user account, and according to the corresponding relationship between the user account and the mobile terminal identifier of the user, sending the password to a mobile terminal corresponding to the user account and sending the check code to the entrance guard switch device; and
   the entrance guard switch device acquiring the password input by the user, checking the password by using the check code, and executing the operation of opening door if the check is passed.

2. The method according to claim 1, **characterized in that** the step of the entrance guard switch device sending the user account and the door opening request to the remote entrance guard management system comprises:

   sending, by the entrance guard switch device, the user account, the door opening request and an identifier of the entrance guard switch device to an entrance guard controller corresponding to the entrance guard switch device; and
   sending, by the entrance guard controller corresponding to the entrance guard switch device, the received user account, door opening request and the identifier of the entrance guard switch device, and an identifier of the entrance guard controller to the entrance guard management system through a mobile communication network;
   wherein the entrance guard management system manages a plurality of the entrance guard controllers, each of the plurality of the entrance guard controllers controls one or more entrance guard switch devices.

3. The method according to claim 2, **characterized in that** before the entrance guard management system generates the password and the check code corresponding to the user account, the method further comprises the steps of:

   the entrance guard management system verifying the validity of the identifier of the entrance guard controller;
   verifying a corresponding relationship between the identifier of the entrance guard controller and the identifier of the entrance guard switch device; and
   determining that the user corresponding to the user account has an authority of operating the entrance guard switch device.

4. The method according to claim 2, **characterized in that** the step of the entrance guard management system sending the check code to the entrance guard switch device comprises:

   sending the check code and the identifier of the entrance guard switch device to the entrance guard controller corresponding to the identifier of the entrance guard controller through the mobile communication network; and
   sending, by the entrance guard controller, the check code to the entrance guard switch device according to the identifier of the entrance guard switch device.

5. The method according to claim 2, **characterized in that** the step of the entrance guard management system generating the password and the check code corresponding to the user account comprises:

   generating randomly, by the entrance guard management system, a password corresponding to the user account;
   finding, by the entrance guard management system, a key corresponding to the identifier of the entrance guard switch device locally, wherein the entrance guard management system locally stores a corresponding relationship between the

entrance guard switch device and the key;
adopting, by the entrance guard management system, a preset encryption algorithm to generate the check code according to the password and the key; and
setting a valid time of the check code to be a threshold time.

6. The method according to claim 5, **characterized in that** the step of the entrance guard switch device checking the password by using the check code comprises:

verifying whether a time difference between a time the password is input and a time the check code is received is beyond the threshold time, so as to verify time validity of the password; and adopting the key stored locally to decrypt the check code to obtain a decipher, and comparing the decipher and the password to verify the password.

7. The method according to claim 6, **characterized by** further comprising:

acquiring, by the entrance guard switch device, a door closing request and the password which are input by the user;
the entrance guard switch device comparing the password and the decipher, executing an operation of closing door if the password and the decipher are consistent, prompting the user to input the user account if the password and the decipher are inconsistent, and sending the user account, the password, the identifier of the entrance guard switch device and the door closing request through the entrance guard controller; and
the entrance guard management system comparing the received password with the password generated for the door opening request from the user, notifying the entrance guard switch device to execute the operation of closing door if the password received and the password generated are consistent, and notifying the entrance guard switch device not to execute the operation of closing door if the password received and the password generated are inconsistent.

8. The method according to any one of claims 2 to 7, **characterized in that** the entrance guard management system stores entrance guard configuration information, user information and entrance guard switching history information, wherein
the entrance guard configuration information comprises: the identifiers of the plurality of the entrance guard controllers managed by the entrance guard system, the identifier of the entrance guard switch device bound with the each of the plurality of the entrance guard controllers, and the key corresponding to the each of the plurality of the entrance guard controllers; and
the user information comprises: the user account, the mobile terminal identifier bound with the user account, and the authority of the user account operating the entrance guard switch device.

9. The method according to any one of claims 1 to 7, **characterized in that** in a condition that the user is a temporary user, the method further comprises:

the entrance guard switch device acquiring the mobile terminal identifier and the door opening request which are input by the user, and sending the mobile terminal identifier and the door opening request to the remote entrance guard management system;
the entrance guard management system sending the mobile terminal identifier and the door opening request to an administrator for authentication, generating, for the user passing the authentication, a temporary user account, and a temporary password and a temporary check code corresponding to the temporary user account, sending the temporary user account and the temporary password to a mobile terminal corresponding to the mobile terminal identifier, and sending the temporary check code to the entrance guard switch device; and
the entrance guard switch device acquiring the temporary user account and the temporary password which are input by the user, checking the temporary password by using the temporary check code and executing the operation of opening door if the check is passed.

10. An entrance guard control system, **characterized by** comprising: a plurality of entrance guard switch devices and a remote entrance guard management system, wherein
each of the plurality of entrance guard switch devices is configured to acquire a door opening request and a user account which are input by a user, to send the door opening request and the user account to the remote entrance guard management system, to receive a check code from the entrance guard management system, to check a password input by the user using the check code, and to execute an operation of opening door if the check is passed; and
the entrance guard management system stores a corresponding relationship between the user account and a mobile terminal identifier of the user, and is configured to receive the door opening request and the user account from the entrance guard switch device, to generate the password and the check code corresponding to the user account, and accord-

ing to the corresponding relationship between the user account and the mobile terminal identifier of the user, to send the password to a mobile terminal corresponding to the user account and to send the check code to the entrance guard switch device.

11. The entrance guard control system according to claim 10, **characterized by** further comprising: a plurality of entrance guard controllers, wherein each of the plurality of entrance guard controllers manages one or more of the plurality of entrance guard switch devices, and the each of the plurality of entrance guard controllers is configured to receive from an entrance guard switch device managed by the entrance guard controller, the user account, the door opening request and an identifier of the entrance guard switch device, to send the user account, the door opening request, the identifier of the entrance guard switch device and an identifier of the entrance guard controller to the entrance guard management system through a mobile communication network, to receive the check code and the identifier of the entrance guard switch device from the entrance guard management system, and to send the check code to the entrance guard switch device corresponding to the identifier of the entrance guard switch device.

12. The entrance guard control system according to claim 11, **characterized in that**
each of the plurality of entrance guard switch devices is further configured to acquire a door closing request and the password which are input by the user, to compare the password with a decipher, to execute an operation of closing door if the password and the decipher are consistent, to prompt the user to input the user account if the password and the decipher are inconsistent, and to send the user account, the password, the identifier of the entrance guard switch device and the door closing request to the entrance guard management system through an entrance guard controller; and
the entrance guard management system is further configured to compare the received password with the password generated for the door opening request from the user, to notify the entrance guard switch device to execute the operation of closing door if the password received and the password generated are consistent, and to notify the entrance guard switch device not to execute the operation of closing door if the password received and the password generated are inconsistent.

13. The entrance guard control system according to any one of claims 10 to 12, **characterized in that** the entrance guard management system stores entrance guard configuration information, user information and entrance guard switching history information, wherein
the entrance guard configuration information comprises: the identifiers of the plurality of entrance guard controllers managed by the entrance guard system, the identifier of the entrance guard switch device bound with the each of the plurality of entrance guard controllers, and a key corresponding to the each of the plurality of entrance guard controllers; and
the user information comprises: the user account, the mobile terminal identifier bound with the user account, and an authority of the user account operating the entrance guard switch device.

14. The entrance guard control system according to any one of claims 10 to 12, **characterized in that** in a condition that the user is a temporary user,
the each of the plurality of entrance guard switch devices is further configured to acquire the mobile terminal identifier and the door opening request which are input by the user, to send the mobile terminal identifier and the door opening request to the remote entrance guard management system, to acquire a temporary user account and a temporary password which are input by the user, to check the temporary password by using a temporary check code and to execute the operation of opening door if the check is passed; and
the entrance guard management system is further configured to send the mobile terminal identifier and the door opening request to an administrator for authentication, to generate, for the user passing the authentication, the temporary user account, and the temporary password and the temporary check code corresponding to the temporary user account, to send the temporary user account and the temporary password to a mobile terminal corresponding to the mobile terminal identifier, and to send the temporary check code to the entrance guard switch device.

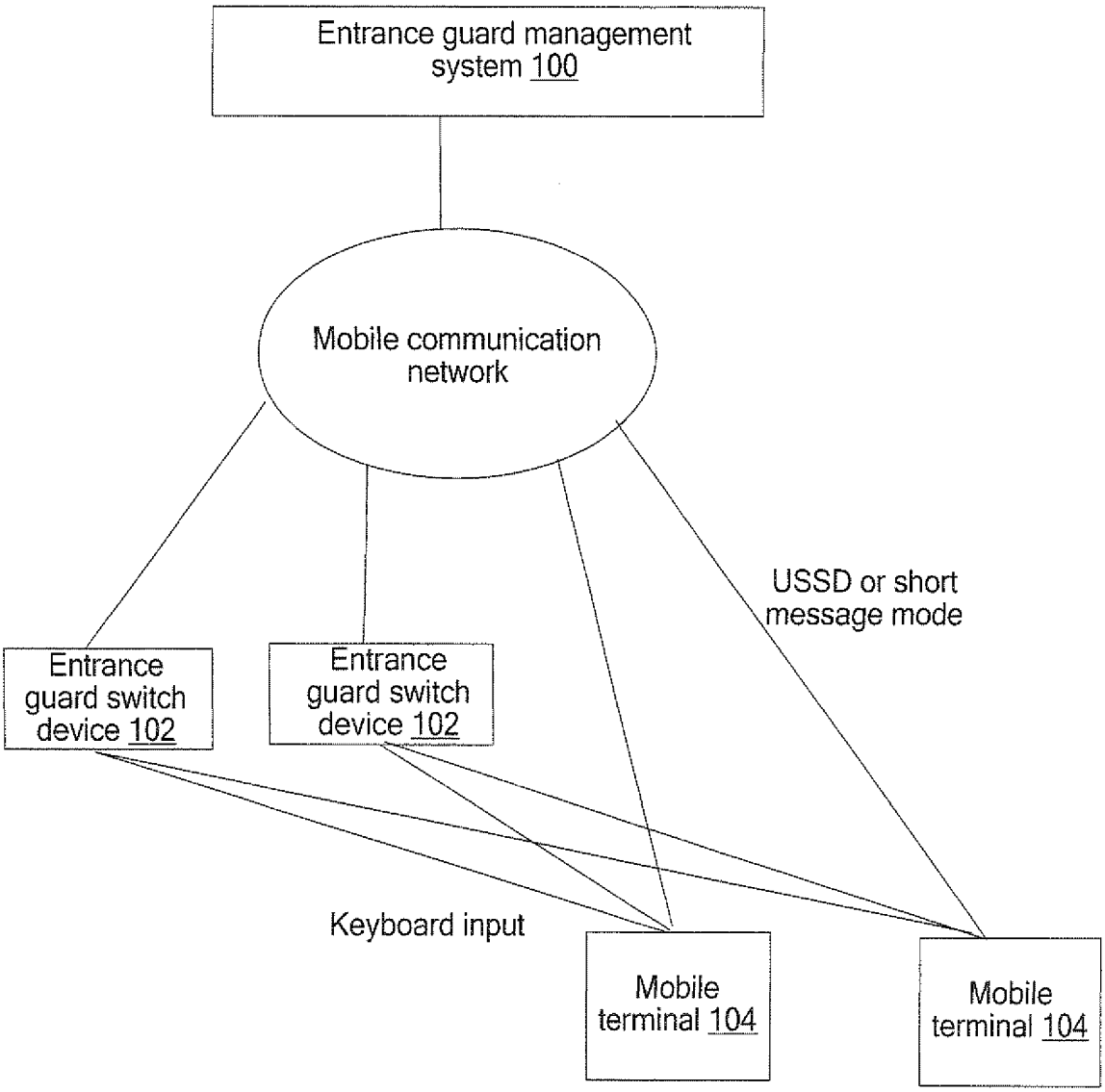
Entrance guard management system 100
Mobile communication network
USSD or short message mode
Entrance guard switch device 102
Entrance guard switch device 102
Keyboard input
Mobile terminal 104
Mobile terminal 104

Fig. 1

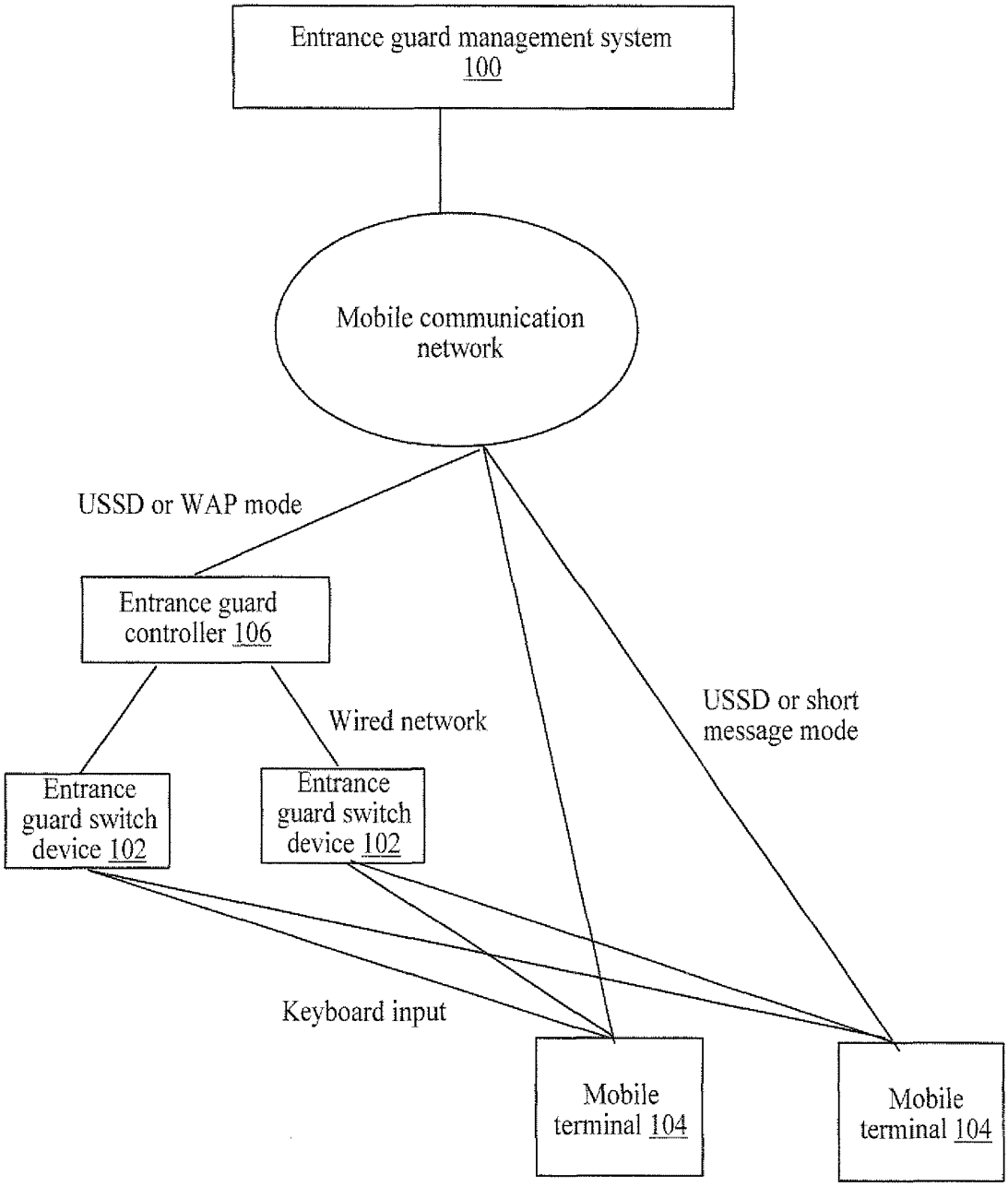
Entrance guard management system
100
Mobile communication network
USSD or WAP mode
Entrance guard controller 106
Wired network
USSD or short message mode
Entrance guard switch device 102
Entrance guard switch device 102
Keyboard input
Mobile terminal 104
Mobile terminal 104

Fig. 2

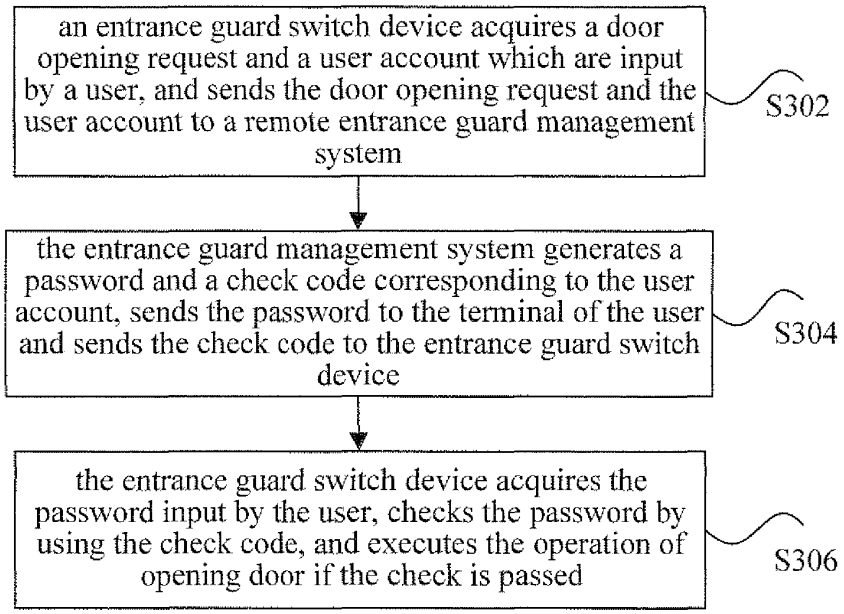
an entrance guard switch device acquires a door opening request and a user account which are input by a user, and sends the door opening request and the user account to a remote entrance guard management system
S302
the entrance guard management system generates a password and a check code corresponding to the user account, sends the password to the terminal of the user and sends the check code to the entrance guard switch device
S304
the entrance guard switch device acquires the password input by the user, checks the password by using the check code, and executes the operation of opening door if the check is passed
S306

Fig. 3

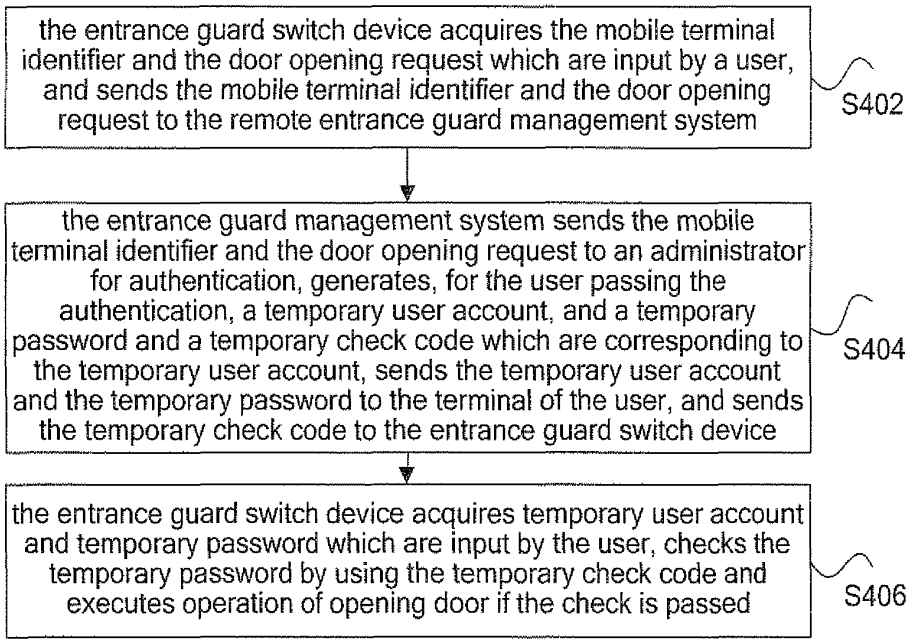
the entrance guard switch device acquires the mobile terminal identifier and the door opening request which are input by a user, and sends the mobile terminal identifier and the door opening request to the remote entrance guard management system
S402
the entrance guard management system sends the mobile terminal identifier and the door opening request to an administrator for authentication, generates, for the user passing the authentication, a temporary user account, and a temporary password and a temporary check code which are corresponding to the temporary user account, sends the temporary user account and the temporary password to the terminal of the user, and sends the temporary check code to the entrance guard switch device
S404
the entrance guard switch device acquires temporary user account and temporary password which are input by the user, checks the temporary password by using the temporary check code and executes operation of opening door if the check is passed
S406

Fig. 4

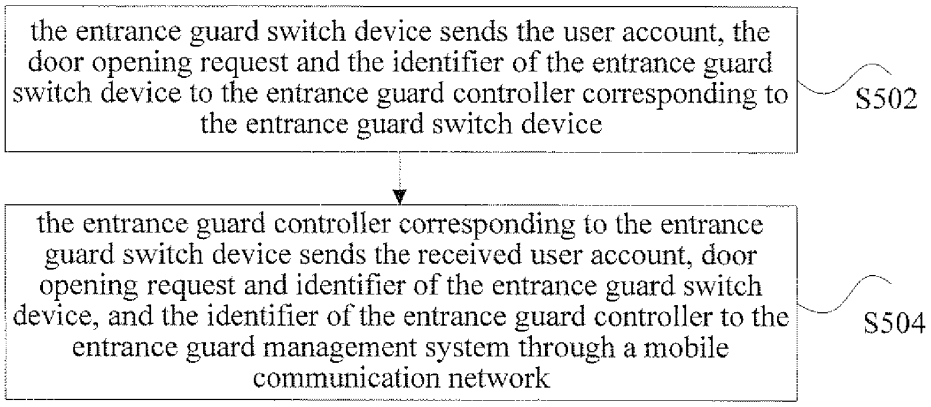
the entrance guard switch device sends the user account, the door opening request and the identifier of the entrance guard switch device to the entrance guard controller corresponding to the entrance guard switch device
S502
the entrance guard controller corresponding to the entrance guard switch device sends the received user account, door opening request and identifier of the entrance guard switch device, and the identifier of the entrance guard controller to the entrance guard management system through a mobile communication network
S504

Fig. 5

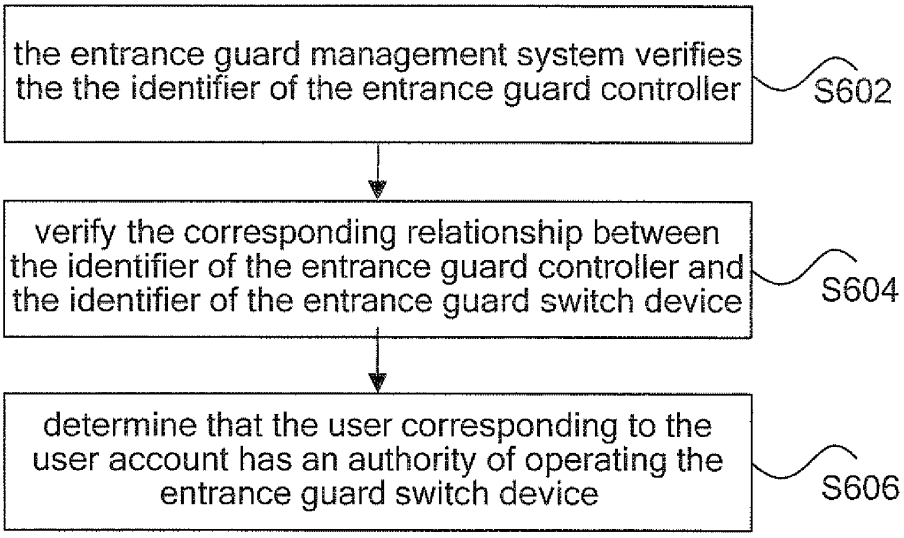
the entrance guard management system verifies the the identifier of the entrance guard controller
S602
verify the corresponding relationship between the identifier of the entrance guard controller and the identifier of the entrance guard switch device
S604
determine that the user corresponding to the user account has an authority of operating the entrance guard switch device
S606

Fig. 6

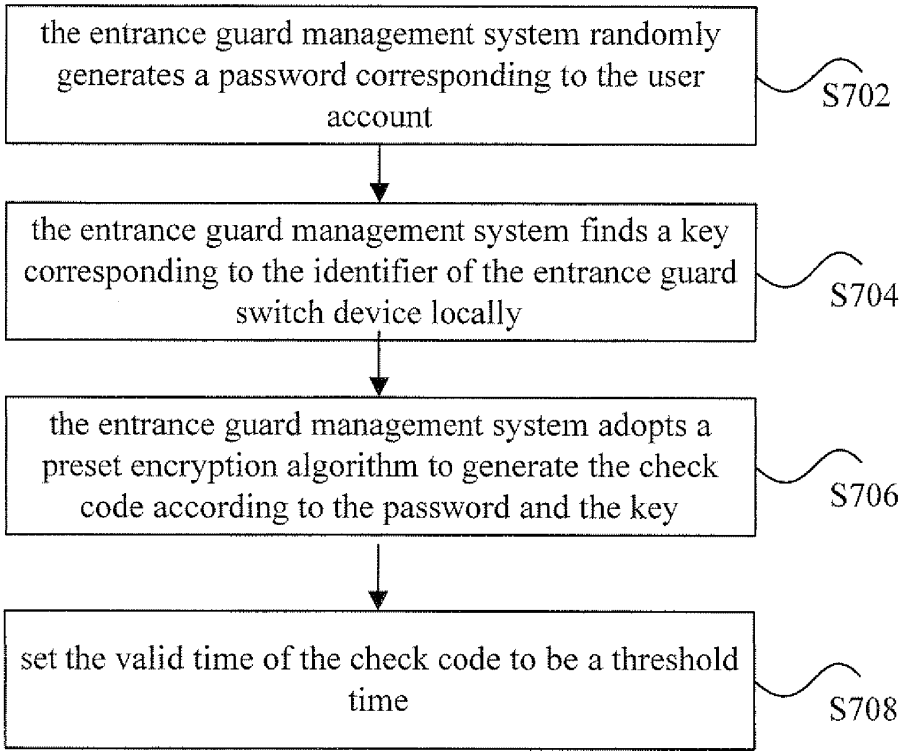
the entrance guard management system randomly generates a password corresponding to the user account
S702
the entrance guard management system finds a key corresponding to the identifier of the entrance guard switch device locally
S704
the entrance guard management system adopts a preset encryption algorithm to generate the check code according to the password and the key
S706
set the valid time of the check code to be a threshold time
S708

Fig. 7

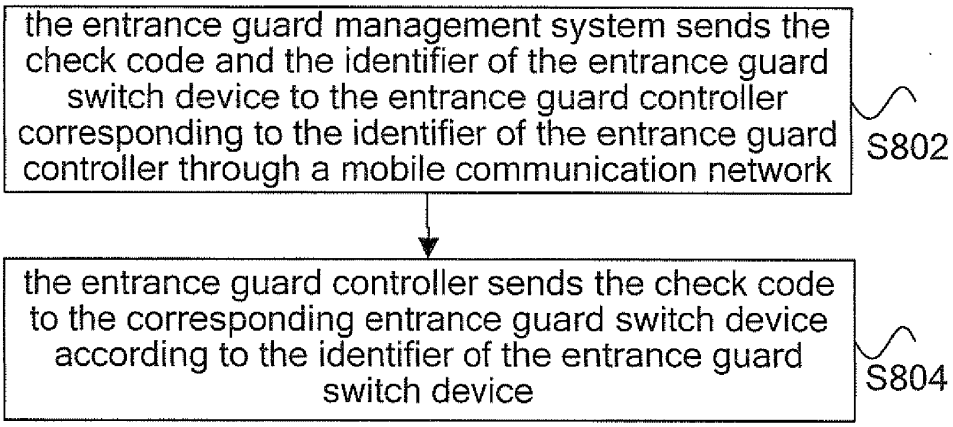
the entrance guard management system sends the check code and the identifier of the entrance guard switch device to the entrance guard controller corresponding to the identifier of the entrance guard controller through a mobile communication network
S802
the entrance guard controller sends the check code to the corresponding entrance guard switch device according to the identifier of the entrance guard switch device
S804

Fig. 8

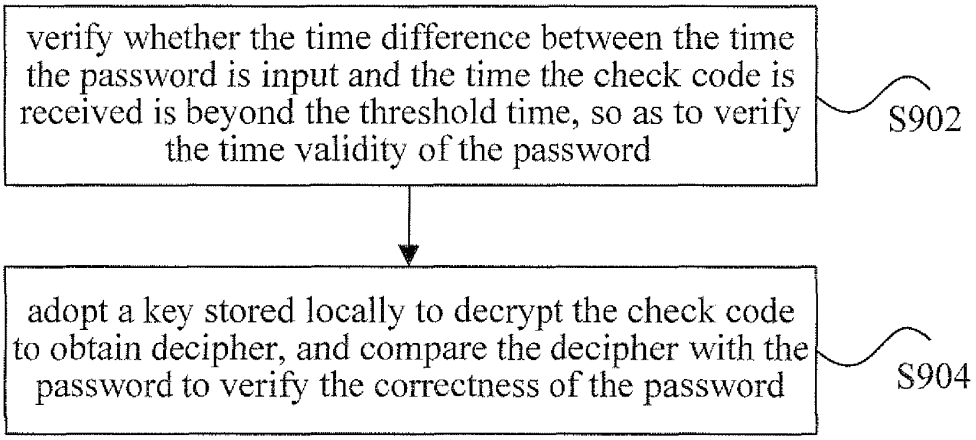
verify whether the time difference between the time the password is input and the time the check code is received is beyond the threshold time, so as to verify the time validity of the password
S902
adopt a key stored locally to decrypt the check code to obtain decipher, and compare the decipher with the password to verify the correctness of the password
S904

Fig. 9

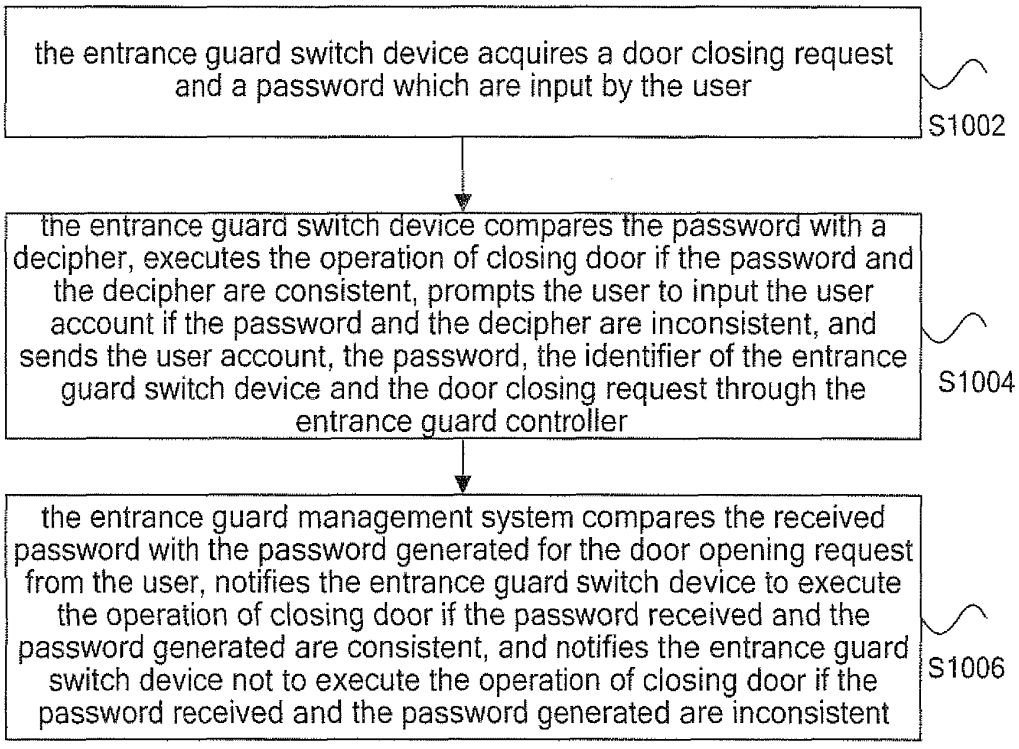
the entrance guard switch device acquires a door closing request and a password which are input by the user
S1002
the entrance guard switch device compares the password with a decipher, executes the operation of closing door if the password and the decipher are consistent, prompts the user to input the user account if the password and the decipher are inconsistent, and sends the user account, the password, the identifier of the entrance guard switch device and the door closing request through the entrance guard controller
S1004
the entrance guard management system compares the received password with the password generated for the door opening request from the user, notifies the entrance guard switch device to execute the operation of closing door if the password received and the password generated are consistent, and notifies the entrance guard switch device not to execute the operation of closing door if the password received and the password generated are inconsistent
S1006

Fig. 10

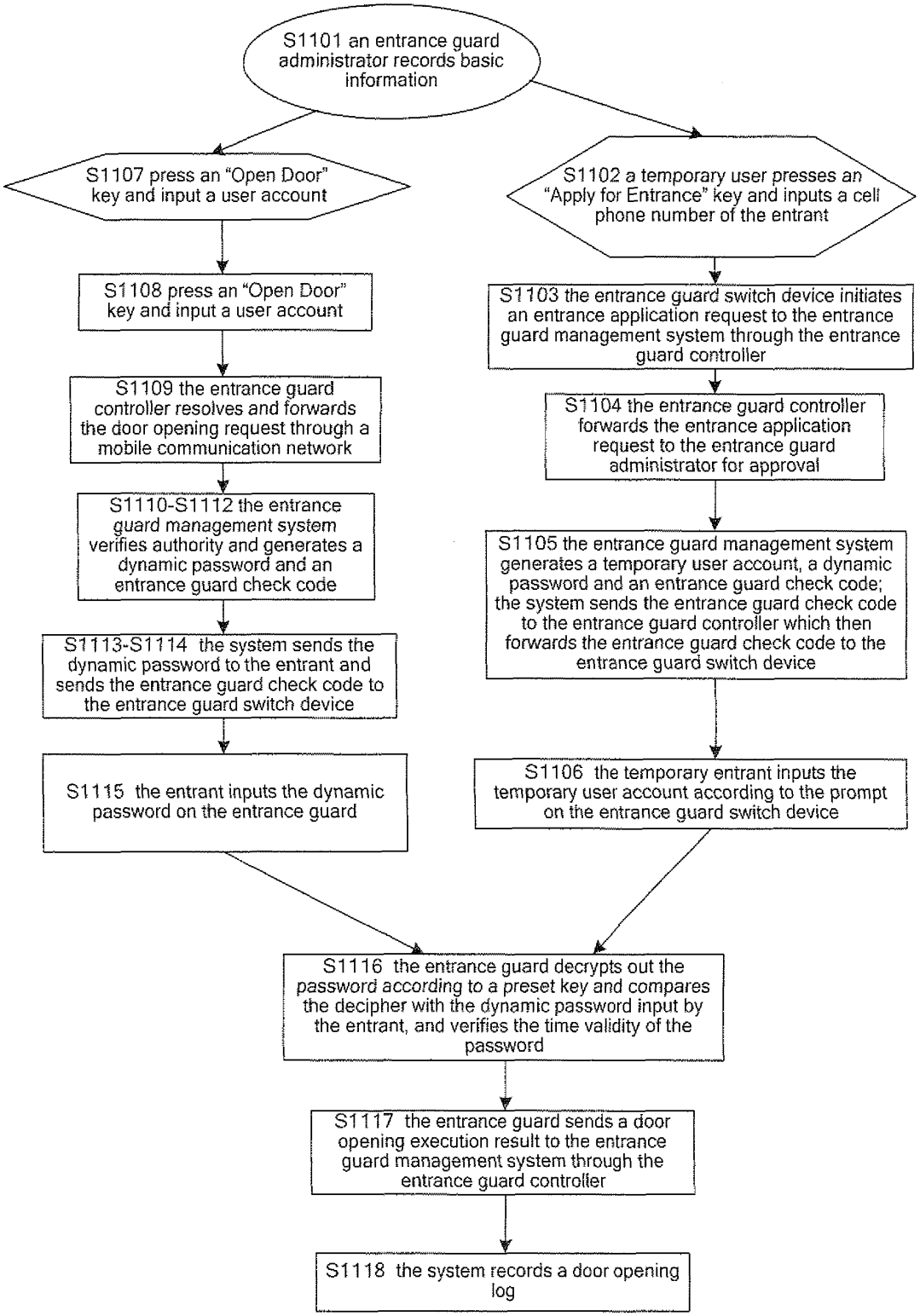
S1101 an entrance guard administrator records basic information
S1107 press an "Open Door" key and input a user account
S1102 a temporary user presses an "Apply for Entrance" key and inputs a cell phone number of the entrant
S1108 press an "Open Door" key and input a user account
S1103 the entrance guard switch device initiates an entrance application request to the entrance guard management system through the entrance guard controller
S1109 the entrance guard controller resolves and forwards the door opening request through a mobile communication network
S1104 the entrance guard controller forwards the entrance application request to the entrance guard administrator for approval
S1110-S1112 the entrance guard management system verifies authority and generates a dynamic password and an entrance guard check code
S1105 the entrance guard management system generates a temporary user account, a dynamic password and an entrance guard check code; the system sends the entrance guard check code to the entrance guard controller which then forwards the entrance guard check code to the entrance guard switch device
S1113-S1114 the system sends the dynamic password to the entrant and sends the entrance guard check code to the entrance guard switch device
S1115 the entrant inputs the dynamic password on the entrance guard
S1106 the temporary entrant inputs the temporary user account according to the prompt on the entrance guard switch device
S1116 the entrance guard decrypts out the password according to a preset key and compares the decipher with the dynamic password input by the entrant, and verifies the time validity of the password
S1117 the entrance guard sends a door opening execution result to the entrance guard management system through the entrance guard controller
S1118 the system records a door opening log

Fig. 11

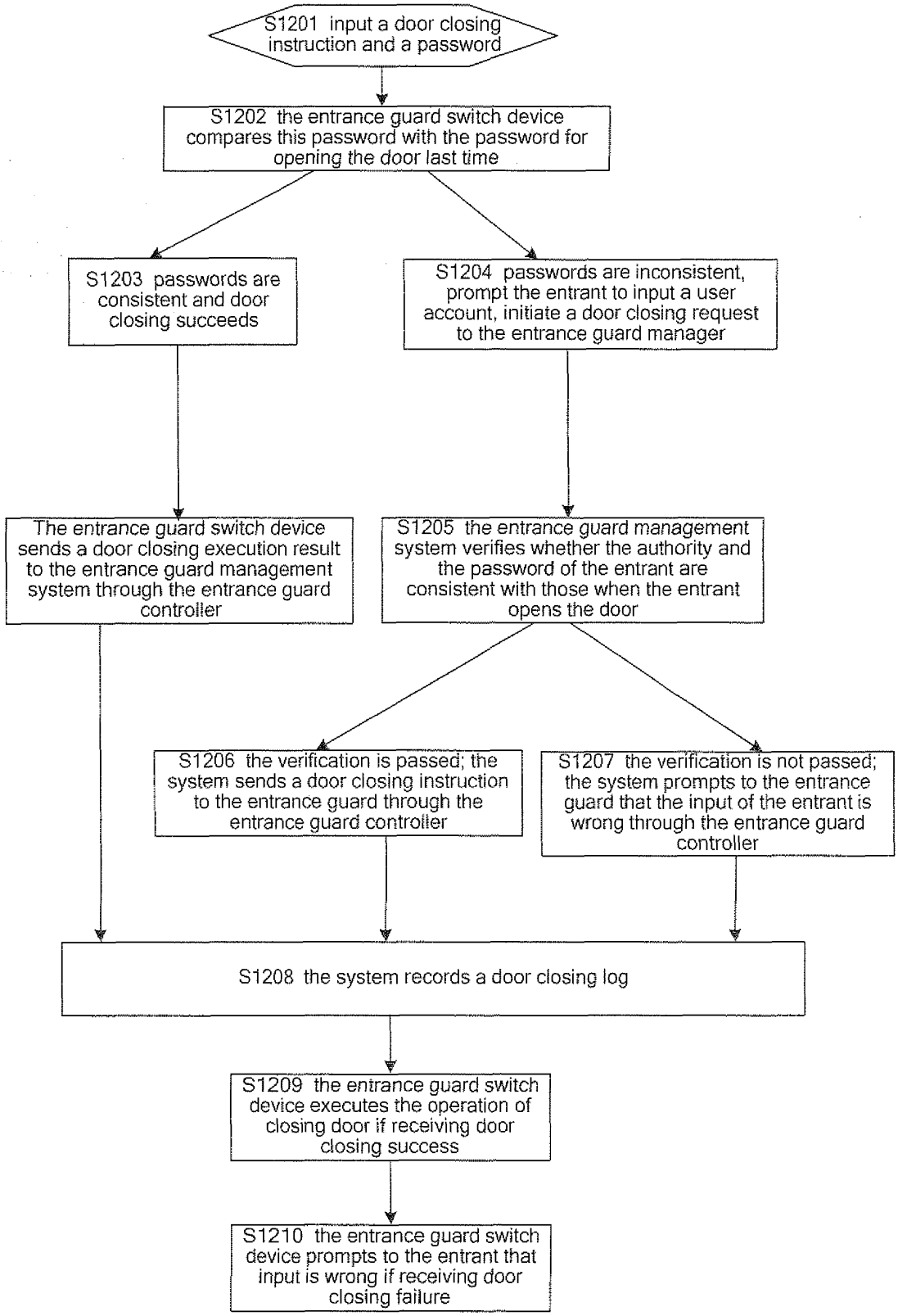
S1201 input a door closing instruction and a password
S1202 the entrance guard switch device compares this password with the password for opening the door last time
S1203 passwords are consistent and door closing succeeds
S1204 passwords are inconsistent, prompt the entrant to input a user account, initiate a door closing request to the entrance guard manager
The entrance guard switch device sends a door closing execution result to the entrance guard management system through the entrance guard controller
S1205 the entrance guard management system verifies whether the authority and the password of the entrant are consistent with those when the entrant opens the door
S1206 the verification is passed; the system sends a door closing instruction to the entrance guard through the entrance guard controller
S1207 the verification is not passed; the system prompts to the entrance guard that the input of the entrant is wrong through the entrance guard controller
S1208 the system records a door closing log
S1209 the entrance guard switch device executes the operation of closing door if receiving door closing success
S1210 the entrance guard switch device prompts to the entrant that input is wrong if receiving door closing failure

Fig. 12

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2011/070371

A. CLASSIFICATION OF SUBJECT MATTER

SEE EXTRA SHEET

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)

IPC: G07C9, E05B49,H04M1,H04M9

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)

CAPAT;WPI;EPODOC;CNKI: GATE, INHIBIT???, ENTRANCE, GUARD, ACCOUNT, PHONE, PORTABLE, MOBILE, TERMINAL, PASSWORD, CODE, CHECK

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CN101174338A (FUJIAN LTD CHINA MOBILE COMMUNICATION GROUP) 07 May 2008 (07.05.2008) line 20, page 1-line 12, page 2 in the description, figure 1	1,9,10,14
Y	CN1921390A (NETEASE INFORMATION TECHNOLOGY BEIJING CO., LTD.) 28 Feb.2007(28.02.2007)line 15, page 1, line 5-17, page 4 in the description	1,9,10,14
A	CN101106796A (LIU Xun) 16 Jan.2008 (16.01.2008) the whole document	1-14
A	TW200641689A(WU Xinyi et al.)01 Dec.2006(01.12.2006)the whole document	1-14
A	JP10037551A (MATSUSHITA DENKI SANGYO KK) 10 Feb.1998(10.02.1998) the whole document	1-14

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:

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"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim (S) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"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	Date of mailing of the international search report
28 Mar.2011 (28.03.2011)	**21 Apr. 2011 (21.04.2011)**
Name and mailing address of the ISA/CN The State Intellectual Property Office, the P.R.China 6 Xitucheng Rd., Jimen Bridge, Haidian District, Beijing, China 100088 Facsimile No. 86-10-62019451	Authorized officer XU Yan Telephone No. (86-10)62085794

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2011/070371

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
CN101174338A	07.05.2008	NONE	
CN1921390A	28.02.2007	NONE	
CN101106796A	16.01.2008	NONE	
TW200641689A	01.12.2006	NONE	
JP10037551A	10.02.1998	NONE	

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2011/070371

Continuation of second sheet A. CLASSIFICATION OF SUBJECT MATTER

G07C9/00（2006.01）i

E05B49/00（2006.01）i

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