Design of mechanical arm based on piston fire rescue and emergency lock system in public places

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Abstract. In recent years, emergency have occurred in public place, especially fire, such as the Xinyi City Yi yuan Song and Dance Hall in Liaoning, and the Karamay Friendship Hall in Xinjiang, Henan Jiaozuo City Paradise Audio and Video Club. The common lesson is that the security channel is blocked by the security door and the security net, and the security exit is closed, causing people to escape without a door when the fire occurs, causing heavy casualties. Again and again, firefighting and rescue, all must first remove the security door, iron fence window to rescue the trapped people, missed the best time to extinguish the fire. In order to solve the problem of unimpeded safety exits, it is necessary to solve the problem of consistency between normal use management and fire safety. It is difficult to be effective only by administrative means, and technical measures must be taken to solve the problem of safety dredging. Small-scale hotels, Internet cafes, etc. without fire or security systems must be able to push open the emergency exit door, but an alarm will be generated locally when the door is opened during normal working hours. The emergency exit door of an emergency gathering place such as a large-scale hotel, an Internet cafe, a dance hall, a hotel, a department store, etc., which is connected by a fire-fighting linkage system or an anti-theft alarm linkage system, must be pushed open, but will open when the door is opened during normal working hours. Local alarms are generated, so it is especially important to design a security door that can automatically unlock when an emergency occurs in a public place.
1. Introduction to the work Design a safety door that can automatically open a password lock through experiment

1.1. Development background and significance
There are many security gates that are entered by mechanical passwords. Each time you unlock, you will waste a lot of time. If you encounter an emergency, you may miss the opportunity to escape because of the waste of unlocking time. Therefore, we design this password-safe door that can be unlocked automatically. If there is an emergency, you can open the control center through the administrator, so that the program can automatically complete the password input and gain more time for the escape.

1.2. Design plan

1.2.1. Mechanical structure design. The password lock structure we use is shown in Figure 1. The unlocking principle is to rotate the password disk clockwise to the specified position, then rotate the password disk counterclockwise to the specified position, and finally rotate the password disk clockwise to match the slots of the three disks. It can be unlocked.

1.2.2. Program Control Principle. Referring to the principle of unlocking the password disk, we complete the above steps by controlling the motor through the program: the motor is controlled to rotate forward by the single-chip microcomputer, and when the infrared receiving module 1 receives the signal from the infrared module, it stops rotating, and the first slot is proofreader, Instead of manually completing the password input.

2. working principle and performance analysis
Using a single-chip microcomputer to integrate a microprocessor (CPU), a memory (including a program memory ROM and a data memory RAM), and an input and output interface circuit (I/O interface) having data processing capability on the same chip by using a very large-scale technology, thereby It constitutes a small and complete hardware system, and the task specified in advance by the program is accurately, quickly and efficiently under the control of the single-chip computer program - the automatic unlocking system is used to realize the unlocking function in the event of an emergency.

The three-dimensional figure of the work is shown in Figure 2, Figure 3 and Figure 4.
3. Innovations and applications

1) When the escape occurs after an emergency, the automatic unlocking system is used to open the safety door, which reduces the time required for escape and increases the chance of survival;

2) Using the control principle of the single-chip microcomputer, the intelligent control function required by modern industrial control is realized;

3) After the initial program is compiled, any staff member can control it. Without technical requirements, it is safe, simple, fast and efficient.

4) It can replace the traditional safety door, and realize the intelligentization of the safety door switch by using the single-chip control system;

5) The automatic unlocking system safety door can be applied in some crowded places such as public places to ensure that people can escape in time when an emergency occurs.

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