(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 512 575 A2**

(12) # EUROPEAN PATENT APPLICATION

(21) Application number: **92107904.2**

(51) Int. Cl.5: **B66B 1/46**

(22) Date of filing: **11.05.92**

(30) Priority: **10.05.91 FI 912308**

(43) Date of publication of application:
11.11.92 Bulletin 92/46

(84) Designated Contracting States:
DE FR GB IT NL

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(54) **Electronic code key.**

(57) The invention relates to an apparatus for changing the operational mode of an elevator or elevator bank, said apparatus comprising interfaces (4,9) placed in the elevator cars, on the landings and/or other user access points and connected to an elevator controller (1), to which interfaces an element (7) designed to change the operational mode can be connected. According to the invention, said element changing the operational mode is a code key (7) provided with a memory for the storage of the data corresponding to the operational mode and with elements (8) designed to set up a communication link with the interface (4,9), and the operational mode data stored in the code key (7) is transmitted to the elevator controller (1) via serial communication.

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The present invention relates to an apparatus for changing the operational mode of an elevator, as defined in the introductory part of claim 1.

In elevators, it is often necessary to use various key switches to change the operational mode of the elevator. Depending on the case, it must be possible to change the mode from the elevator car or from a landing, or from an external control connection outside these. The operational modes referred to include e.g. goods transport, cleaning, priority calls, disabling the elevator with doors open/closed.

Previously known are systems that use key switches to change the operational mode of an elevator. When key switches are used, it is necessary to know which switch corresponds to the input/output connection of which function. Also, the additional definitions relating to the switch data must be taken into account at the production stage when the programs are being written. Therefore, the definitions relating to key switches must be made at an early stage and mistakes made in production are difficult to correct in the field in connection with installation.

Key switches mounted in the signal devices require more installation depth than pushbuttons and direction arrows. This causes difficulties especially in the case of surface-mounted devices, i.e. devices mounted directly on a wall surface without making a cut-out in the wall. The installation of key switches involves extra work because they require separate mounting boxes.

When key switches are used, provision must be made for different alternative ways of application, and this requires several I/O lines for the signal devices in the elevator controller, though not all of these lines are used during normal operation. During system configuration, the components have to be informed as to which key switch is connected to which input. All this results in a considerable amount of special design work and risks of error in each project.

The object of the present invention is to eliminate the drawbacks mentioned above and to achieve a simple and reliable apparatus for changing the operational mode of an elevator. This is accomplished by means of the characteristic features defined in the characterization part of claim 1. Other preferred embodiments of the invention are presented in the subclaims.

With the apparatus of the invention, it is possible to use keys that are physically identical and fit the same "keyholes". The keyhole does not require any physical depth, permitting the use of surface-mounted devices requiring no mounting boxes embedded in the wall. The keys can be coded either during production or in connection with installation in the field, and the coding can be renewed when necessary. In the panels on the landing walls and elevator cars, only one key interface is needed, thus reducing the need for physical equipment.

The key tells the operational mode itself, thus eliminating the need for configuration work on the signal devices and car panels with regard to the key switches. The use of key switches can also be easily extended to cover e.g. landing calls and equivalent. The code key can also be applied in time/access control, in which case it is possible to record the time of usage of each key. When a reprogrammable memory is used, the code data of the key can be changed. This can also be done from the user interface of the elevator controller. If a key is lost, the right to use it can be eliminated separately for each key. In this way, the rest of the code keys associated with the system remain valid without safety risks.

In the following, the invention is described with reference to the figure in the attached drawing, which presents an embodiment of the apparatus of the invention.

According to the landing and car calls it has received, the elevator controller 1 gives control signals to the elevator drive system (not shown), which comprises a motor which moves the elevator car and counterweight by means of a traction sheave and a hoisting rope. The elevator controller 1 is connected by means of connecting cables to the shaft wiring 3, over which the data needed by the elevator system is transmitted in serial form. Connected to the elevator controller 1 is also a specific user interface 2, by means of which the operation of the elevator can be controlled and tested e.g. during maintenance.

The shaft wiring 3 is connected to the control interfaces on each floor and in the car. The figure shows one of these interfaces in the form of a call button box 4. The box is located on a landing wall and is provided with push buttons 5 for up and down calls, the corresponding signals being transmitted by serial communication along the shaft wiring 3 to the elevator controller 1.

Fitted in the surface-mounted box 4 are three short-circuit protected contact surfaces 6 connected to the serial communication bus. The boxes on the other landings and in the elevator car are provided with corresponding contact surfaces. Similarly, the user interface 2 connected to the elevator controller 1 is also provided with contact surfaces like this. Using the programming keys 10 on the user interface 2, it is also possible to reprogram a code key 7 connected to its programming interface 9.

The code key 7 is provided with elements 8 corresponding to the contact surfaces 6, onto which they can be fitted. The code key has an

electrically programmable memory in which the data corresponding to the operational modes of the elevator is stored. The memory can be implemented using different memory elements, such as EEPROM or NVRAM circuits. When the code key is pressed against the contact surfaces of the interface, the mode data stored in its memory is transmitted along the serial bus to the elevator controller. Using a suitable logic arrangement, it is possible to store the data corresponding to several operational modes in one key, so that those who need to use several modes only have to carry one key with them. Similarly, the restoration of normal operation can be effected by means of the same key.

In another embodiment, the communication between the key and the user interface can also be implemented using wireless techniques, as is well known from similar control devices. For example, by storing calls to certain floors in the key, the range of its application can be further extended.

In the foregoing, the invention was described referring to one of its embodiments, but the invention can be implemented in various ways in the scope of the following claims.

Claims

1. Apparatus for changing the operational mode of an elevator or elevator bank, said apparatus comprising interfaces (4,9) placed in the elevator cars, on the landings and/or other user access points and connected to an elevator controller (1), to which interfaces an element (7) designed to change the operational mode can be connected, **characterized** in that said element changing the operational mode is a code key (7) provided with a memory for the storage of the data corresponding to the operational mode and with elements (8) designed to set up a communication link with the interface (4,9), and that the operational mode data stored in the code key (7) is transmitted to the elevator controller (1) via serial communication.

2. Apparatus according to claim 1, **characterized** in that the code key (7) and the interface (4,9) are provided with contact surfaces (6,8) corresponding to each other.

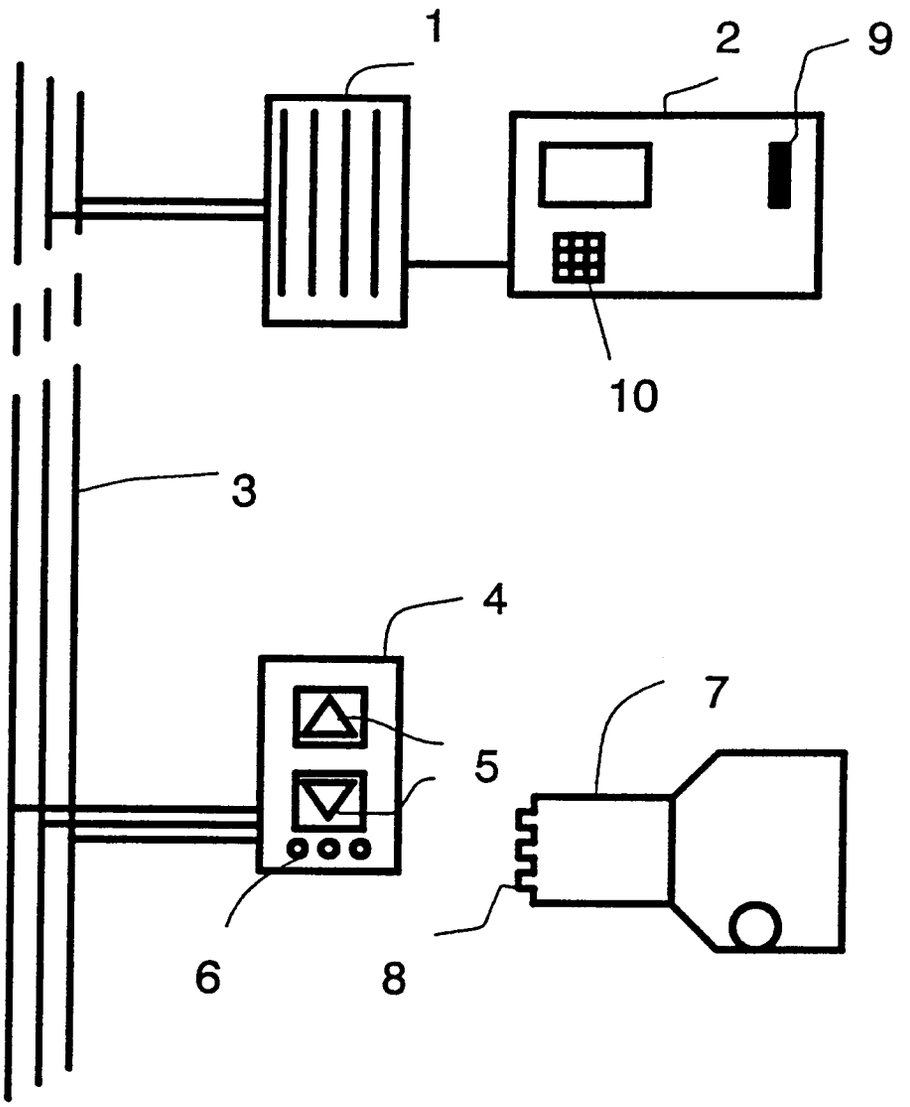
3. Apparatus according to claim 1, **characterized** in that, to permit wireless transmission of the operational mode data, the code key (7) and the interface (4) are provided with elements for the transmission and reception of a code signal and that the code key (7) is provided with a power source.

4. Apparatus according to any one claims 1 - 3, **characterized** in that the memory is reprogrammable.

5. Apparatus according to claim 4, **characterized** in that a user interface (2) connected to the elevator controller (1) is provided with means (9,10) for the programming of the code key (7).

6. Apparatus according to any one of the preceding claims, **characterized** in that the interface is fitted into a surface-mounted push-button controller (4).

7. Apparatus according to any one of the preceding claims, **characterized** in that the code key 7 contains stored data designed to restore the normal operational mode.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