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(71) Applicant: **Esse-Ti S.r.l.**
62019 Recanati MC (IT)

(72) Inventor: **Bracalente, Sandro**
63023 Fermo (AP) (IT)

(74) Representative: **Baldi, Claudio**
Viale Cavallotti, 13
60035 Jesi (AN) (IT)

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(54) **Elevator alarm and management system**

(57) The present invention refers to an elevator alarm system, of the type comprising a central unit for alarm management and an alarm activation device provided with handsfree unit, in which the central unit is designed to be connected by telephone with a remote control station, characterised in that the alarm management central

unit is provided with an internal modem and interfaced with the electronic board responsible for the elevator general management, in such a way that the operators of the remote station may interact with the alarm management central unit and with the electronic board for general elevator management purposes.

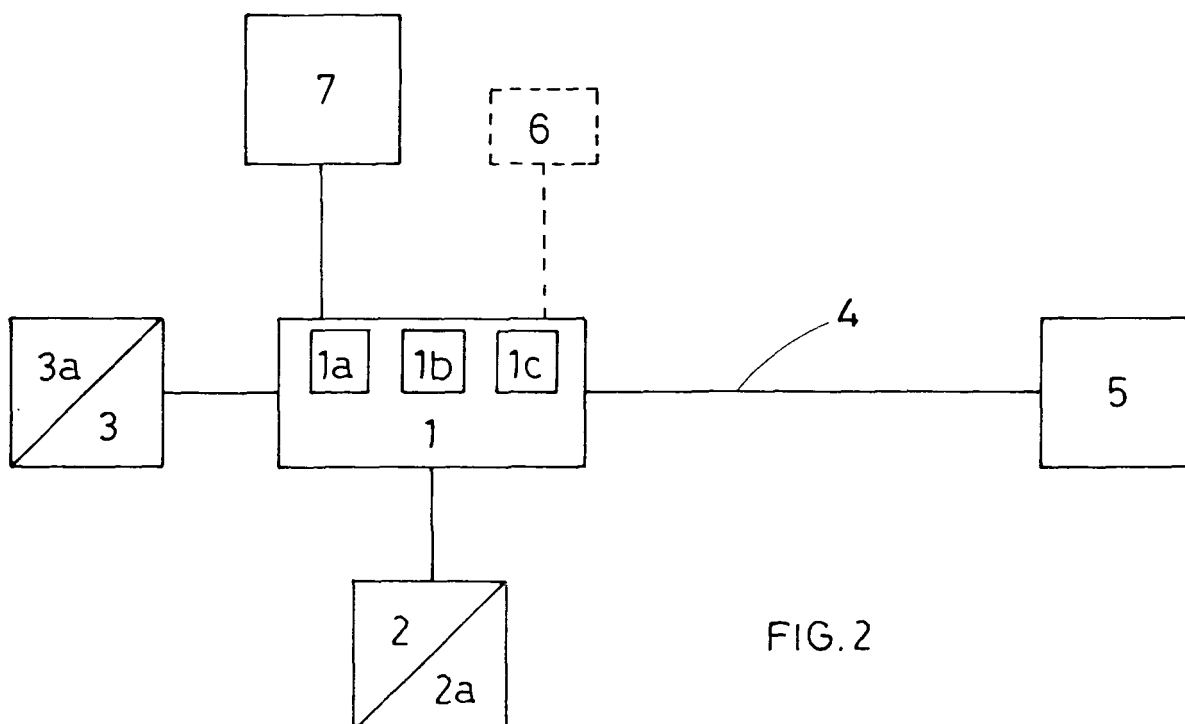


FIG. 2

Description

[0001] The present patent application for industrial invention refers to an elevator alarm and management system.

[0002] The type and specific function of the system of the invention will become evident following to a short description of the state-of-the-art of the specific reference sector.

[0003] Elevators are normally provided with alarm systems that allow a person trapped in the elevator to send an alarm signal to a remote control station and establish a conversation with the operator of the control station.

[0004] Thanks to the establishment of a telephone connection, the person trapped in the elevator may be given suitable instructions before a rescue team arrives on site and rescues the elevator trapped occupant.

[0005] In order to better understand the state-of-the-art, this description continues with reference to the enclosed drawing, in which figure 1 is the block diagram of a traditional alarm system for elevators.

[0006] Traditional systems comprise an alarm management central unit (1) housed in the traditional elevator machine room and provided with an alarm activation device (2) installed aboard the elevator, composed of a bi-directional conversation unit (2a) (normally defined as "handsfree unit"), basically consisting in a microphone and a loudspeaker.

[0007] Trapped occupants need to actuate the activation button of the alarm activation device (2) to activate the management central unit (1) that, in turns, transfers the alarm signal to the operators of a remote control station (5) by means of a suitable telephone connection over the ordinary Pstn or GSM telephone network (4).

[0008] The same telephone connection is also used to establish communication by means of the handsfree unit (2a) between the person trapped in the elevator and the operators of the remote station (5).

[0009] Generally, the same alarm management central unit (1) can activate suitable acoustic and/or luminous signals (3) located outside the elevator in order to reveal the problematic condition of the person who is calling for help.

[0010] According to the traditional technology, the alarm signalling units (3) are provided with auxiliary digital inputs or outputs (3a).

[0011] For example, the said inputs and outputs can be used to switch on an indicator light inside the elevator to indicate that a call for help was sent to the remote station.

[0012] Traditional elevator systems also comprise an electronic board (7) installed in the elevator machine room, used to programme the main operation modes of the elevators.

[0013] The electronic board (7) is normally programmed on site by a specialized technician, who needs to operate in the small, uncomfortable space of traditional elevator machine rooms.

[0014] In view of the state-of-the-art, a new elevator alarm and management system has been devised that, although based on a general traditional principle, is characterised by some technical-functional peculiarities that provide better and more advantageous performance compared to traditional systems.

[0015] The first purpose of the present invention is to devise an elevator alarm system provided with the traditional functions, which is also capable of interfacing with the electronic board responsible for the general operation of the elevator in order to permit remote programming and control of the electronic board over a telephone connection.

[0016] The second purpose of the same invention is to improve the conditions for "on site" programming of the electronic board; in particular, wireless programming is provided to save technical operators the trouble of working in the small, uncomfortable machine room where the electronic board is normally installed.

[0017] Another purpose of the invention is to enable the elevator system to periodically execute an automatic test on the efficiency of the handsfree unit installed aboard the elevator.

[0018] The possibility to periodically test the efficiency of the bi-directional conversation unit is extremely important in order to avoid that, in case of occupants trapped inside the elevator, the inefficiency of the handsfree unit prevents the voice connection with the operators of the remote control station.

[0019] In order to explain this and other purposes of the present invention, this description continues with reference to the second enclosed drawing, which is intended for purposes of illustrations only and not in a limiting sense, whereby fig. 2 is the block diagram of the new system of the invention.

[0020] With reference to figure 2, the system of the invention is based on a basically traditional principle, which comprises an alarm management central unit (2), an alarm actuation device provided with handsfree unit (2a) and a series of external devices (3) for acoustic and/or luminous signalling of the alarm status; it being also traditionally provided that the alarm management central unit (1) is connected over the public telephone network (4) with a remote control station (5).

[0021] With reference to figure 2, the first peculiarity of the system of the invention is represented by the fact that the alarm management central unit (1) is interfaced with the electronic board (7) that is normally responsible for the general management of the elevator.

[0022] Moreover, according to the system of the invention, the central unit (1) is provided with an internal modem (1a); in this way, the operators of the remote control station (5) can establish a "distance communication" not only with the alarm management central unit (1), but also with the board (7) used to manage the elevator in order to program the board (7).

[0023] Since the remote station (5) can establish a telephone connection with the management central unit (1),

the electronic board (7) can be programmed from remote without the need to connect to other dedicated telephone lines or without the use of additional modems.

[0024] In other words, the present invention makes it possible for the first time to execute "telecontrol" and "teleprogramming" of the elevator operating parameters, using the alarm system installed in the elevator.

[0025] Practically speaking, the new distance control and programming logics of bi-directional type allows to send commands to the electronic board (7) and read the information coming from the board (7).

[0026] The same electronic board (7) can also be advantageously used to manage alarm situations, in view of the higher data processing capabilities compared to the central unit (1) that is traditionally designed to manage emergency situations.

[0027] By using the higher capabilities of the electronic board (7), more complete and more sophisticated alarm signals can be generated and sent to the remote station (5) over the telephone connection (4) by means of the central unit (1).

[0028] The electronic board (7) of the elevator can also be used to send alarm or warning signals directly to the remote station (5), also in automatic mode, without the intervention of the person trapped in the elevator.

[0029] Likewise, the electronic board (7) can request the alarm central unit (1) to send predefined messages to the elevator cabin, by means of the bi-directional communication device (2a).

[0030] This avoids using the traditional equipment that is currently used for the same purpose at a higher cost.

[0031] As mentioned earlier, the system of the invention allows quick programming on site of the alarm management unit (1) and of the electronic board (7) of the elevator.

[0032] The alarm management central unit (1) is provided with a bluetooth module (1b) designed to communicate with a computerised terminal or cellular telephone provided with a bluetooth interface.

[0033] Thanks to these devices, the operator in charge of programming the system can make a wireless connection with the alarm management central station (1) and consequently with the electronic board (7) of the elevator for programming purposes.

[0034] The possibility of establishing a wireless connection saves the operator from working inside the small, uncomfortable machine rooms where the central unit (1) and the electronic board (7) are normally installed.

[0035] Moreover, the wireless connection provides additional advantages, since it permits the operator to "penetrate" the alarm management central unit (1) and execute the following operations:

1. download software update for the alarm central unit from a dedicated web site to the cellular telephone
2. update the alarm central unit software with the software downloaded via Internet (see above); this

is possible because the bluetooth module can programme the microprocessor of the alarm central unit (1).

3. create parameter programming profiles (predefined for later use) of the central unit (1) to manage the alarm and/or the electronic board (7).

4. execute guided programming of the central unit (1) and/or the electronic board (7); this eliminates the need to remember programming codes or operations and refer to the user's manual.

5. execute quick programming to guide the operator and enter only necessary data without using codes

6. display and modify the parameters of the alarm system

7. display the record of events recorded in the central unit (1) and/or the electronic board (7).

[0036] The presence of the telephone graphic display ensures better and more complete reading.

[0037] This is an important advantage, especially with reference to wireless programming of the electronic board (7) of the elevator, since traditional boards of this type are usually provided with poor interfaces for economic reasons.

[0038] The new system of the invention is also capable of automatically testing the operation of the handsfree unit installed aboard the elevator on a periodical basis.

[0039] This specific purpose has been obtained by introducing a special interaction mode between the alarm management central unit (1) and the handsfree unit (2a) associated with the alarm actuation device (2).

[0040] The handsfree unit (2a) can generate an acoustic signal ("beep" sound) at predefined time intervals designed to be transmitted by the loudspeaker.

[0041] This acoustic signal is designed to be captured by the microphone of the handsfree unit (2a) and sent to the central unit (1), where it is verified by a suitable electronic device (1c).

[0042] The central unit (1) will consider the handsfree unit (2a) to be perfectly operating if the acoustic signal coming from the loudspeaker of the unit (2) is emitted with the correct quality.

[0043] On the contrary, if the central unit (1) verifies the absence of the said acoustic signal or the lack of quality of the same signal, the central unit (1) will send a specific alarm message to the remote control station (5) to inform the operators, who will take immediate action to remedy the detected fault.

[0044] An additional advantage of the system of the invention refers to the introduction of excellent bi-directional conversation modes, with higher efficiency compared to traditional systems.

[0045] Traditional systems use intercom conversation systems, impaired by low audio quality and high risk of Larsen effect; on the contrary, the bi-directional conversation system of the invention is of typically telephone type.

[0046] This ensures high audio quality, low energy

consumption, minimum risk of Larsen effect, in addition to the fact that only two cables are needed to make all the necessary connections.

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Claims

1. Elevator alarm system, of the type comprising a central unit (1) for alarm management and an alarm activation device (2) provided with handsfree unit (2a), in which the central unit is designed to be connected by telephone with a remote control station (5), **characterised in that** the alarm management central unit (1) is provided with an internal modem (1a) and interfaced with the electronic board (7) responsible for the elevator general management, in such a way that the operators of the remote station (5) may interact with the alarm management central unit (1) and with the electronic board (7) for general elevator management purposes. 10 15 20
2. System as defined in claim 1, **characterised in that** the alarm management central unit (1) is also provided with a bluetooth module (1b) able to communicate with a computerised terminal or a cellular telephone with bluetooth interface. 25
3. System as defined in the first or both of the preceding claims, **characterised in that** the handsfree unit (2a) can generate an acoustic signal from the loudspeaker, which is captured by the microphone and sent to a suitable electronic recognition device (1c) integrated in the alarm management central unit (1). 30
4. System as defined in one or more of the preceding claims, **characterised in that** the electronic board (7) can manage alarm situations directly and send signals over the telephone to the remote station (5) by means of the central unit (1) and/or recorded messages to the handsfree unit (2a) installed in the elevator. 35 40

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