



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**19.10.2022 Bulletin 2022/42**

(51) International Patent Classification (IPC):  
**G08B 17/10 (2006.01) G08B 25/14 (2006.01)**  
**G08B 27/00 (2006.01)**

(21) Application number: **22168250.3**

(52) Cooperative Patent Classification (CPC):  
**G08B 17/10; G08B 25/14; G08B 27/005;**  
**G08B 27/006**

(22) Date of filing: **13.04.2022**

(84) Designated Contracting States:  
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB**  
**GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO**  
**PL PT RO RS SE SI SK SM TR**  
Designated Extension States:  
**BA ME**  
Designated Validation States:  
**KH MA MD TN**

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(30) Priority: **15.04.2021 GB 202105395**

(54) **METHODS AND SYSTEM FOR FIRE ALARM SYSTEM**

(57) A method of upgrading a fire alarm system comprising a conventional fire alarm panel, the method comprises installing a remote-control unit 10 for controlling functions of a conventional fire alarm panel in a fire alarm system using a remote computing device external to the fire alarm system, the remote-control unit comprising: a control unit 12 including wireless communication module 16 for receiving a command from a remote computing device external to the fire alarm system; and a plurality of relays 18 for remotely controlling functions of the conventional fire alarm panel, the plurality of relays being connected to the control unit 12, each relay being electrically connectable across a switch 20, 22 in the fire alarm panel, wherein the control unit operates the or each relay based on the command received from the remote computing device. A system for remotely controlling a conventional fire alarm panel is also provided (Figure 2).

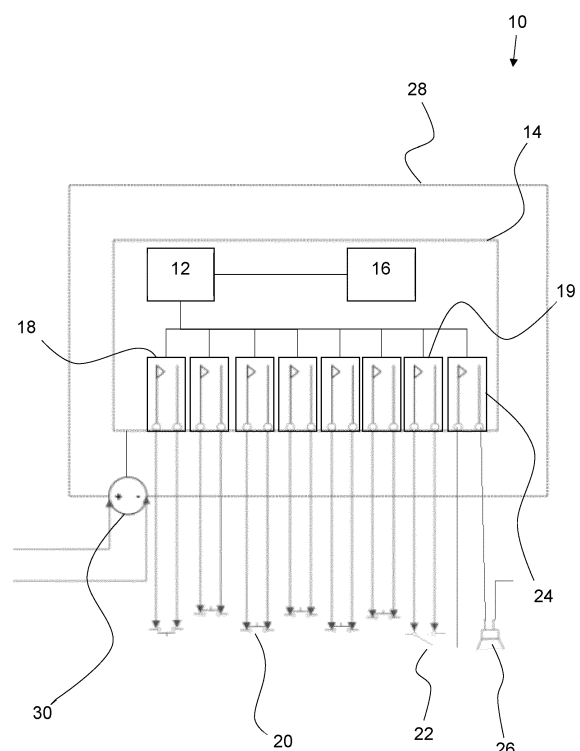


FIG. 1

## Description

**[0001]** The present invention relates to a method of upgrading a fire alarm system, a system for remotely controlling functions of a conventional fire alarm panel in a fire alarm system and a method for controlling functions of a conventional fire alarm panel in a fire alarm system. The present invention also relates to a computer program for remotely controlling functions of a conventional fire alarm panel in a fire alarm system and a remote-control unit.

## BACKGROUND TO THE INVENTION

**[0002]** A fire alarm system will include a fire alarm panel which controls operation of the fire alarm system and indicates when there is an alarm state. The fire alarm panel operates notifiers, such as sounders, beacons etc, based on initiators, such as detectors, call-points etc, indicating an alarm state. The initiators and possibly the notifiers are typically set up zonally, for example each floor in a building may be a different zone having its own initiators, and possibly its own notifiers. The initiators are in zones so that in an alarm state, the fire alarm panel can indicate in which zone, i.e. area of the building, an initiator has been activated. This speeds up the process of searching for the cause of the alarm condition. In some systems, notifiers may sound only in the zone in which the initiator has been activated and notifiers in the other zones will either remain silent or sound a different pattern to announce a "standby to evacuate" rather than "evacuate" condition, at least initially. However, more commonly at least in small to medium systems, activating an initiator in any zone will activate all notifiers in the system and in these systems the notifiers do not need to be connected zonally - i.e. all notifiers may be on one circuit.

**[0003]** The fire alarm panel will include a display, such as a series of lights and/or an LCD display, to indicate the state of the fire alarm system.

**[0004]** Fire alarm panels also include inputs, such as buttons, used to control the function of the fire alarm panel, such as resetting alarm states, silencing sounders etc.

**[0005]** There are various fire alarm panels available. The fire alarm panels tend to be selected based on the requirements for the fire alarm system. These panels typically fall into what are known as conventional fire alarm panels, conventional two-wire (or sav-wire) fire alarm panels or addressable fire alarm panels.

**[0006]** In conventional fire alarm panels, the initiators are on separate circuits to the notifiers. Each panel includes a number of initiator circuits and one or more notifier circuits allowing each circuit to correspond to the zonal plan of the fire alarm system.

**[0007]** Conventional two-wire fire alarm panels are similar to the conventional fire alarm panels in that they may include separate initiator circuits and notifier circuits. However, they also allow for the initiators and notifiers to be on the same circuit. However, there will have to be

at least as many circuits as there are zones.

**[0008]** In addressable fire alarm panels each initiator, notifier and other system devices is individually electronically addressable and can be on a single physical circuit which acts as a databus. Zones can be set up on the panel. Therefore many zones can be defined, even to the extent of one initiator per "zone", and the amount of cable required, especially in a large building, is reduced.

**[0009]** The fire alarm panel will typically be located at the main entrance to allow emergency services to be able to identify which zone is currently in an alarm state and the location of that zone. However, the distance to the zone may be significant, for example, the zone may be a number of floors away from the main entrance. This distance can be problematic, especially when there are false or relatively minor incidents, for example someone burning toast, because prior to deactivating the alarm state on the fire alarm panel a person needs to check the zone thoroughly which increases time and annoyance while the alarm is sounding. Depending on the fire alarm system, this added time may initiate a wider alarm state in all the zones of the fire alarm system.

**[0010]** To discourage idle tampering with fire alarm systems, and given that the fire alarm panel is usually located by an entrance, the controls are usually disabled until enabled by means of a keyswitch or code input. In many conventional panels, a keyswitch is turned to enable the controls. As long as the keyswitch is closed, all the pushbutton controls are enabled. When the keyswitch is open, pressing the pushbuttons will have no effect on the state of the fire alarm panel.

**[0011]** In some fire alarm systems, typically in large buildings, one or more repeater panels may be provided. Repeater panels can be either active or passive. A passive repeater panel will typically only indicate the same outputs as the main fire alarm panel while an active repeater panel will also provide some control functions, such as silencing or resetting. These repeater panels are located in a few key locations with the building, for example a security office, and are part of the fire alarm system, typically networked with the main fire alarm panel. Repeater panels can increase the cost and complexity of a fire alarm system. Retrofitting the repeater panels into an existing system can be difficult and time consuming because they have the correctly wired into the system using the appropriate fire safety wiring.

**[0012]** It is an object of the present invention to reduce or substantially obviate the aforementioned problems.

## STATEMENT OF INVENTION

**[0013]** According to a first aspect of the present invention there is provided a method of upgrading a fire alarm system comprising a conventional fire alarm panel, the method comprising installing a remote-control unit for controlling functions of the conventional fire alarm panel in the fire alarm system using a remote computing device external to the fire alarm system, the remote-control unit

comprising a control unit including a wireless communication module for receiving a command from the remote computing device, and a plurality of relays for remotely controlling functions of the conventional fire alarm panel, the plurality of relays being connected to the control unit, each relay being electrically connected across a switch in the fire alarm panel, wherein the control unit operates the or each relay based on the command received from the remote computing device.

**[0014]** The remote-control unit provides a simple and effective way to upgrade a fire alarm system as it allows the functions of a conventional fire alarm panel to be remotely controlled. Connecting the relays across, i.e. in parallel with, the function controlling switches in the fire alarm panel provides two forms of input for the same function - the switch on the fire alarm panel and the relay which is remotely controllable.

**[0015]** The remote-control unit allows a person remote to the conventional fire alarm panel to operate its functions, i.e. alarm states can be reset or sounders silenced while away from the panel. This is particularly advantageous as a single person can check the zone and operate the functions of the fire alarm panel without having to return to the panel thus saving time and limiting annoyance. Moreover, it allows a person remote to the building in which the fire alarm panel is located to operate its functions which is useful if the person inside the building does not know how to operate the panel.

**[0016]** At least some of the plurality of relays may be normally open relays. The plurality of relays may be considered function controlling relays. Normally open relays allow the function control relays to operate as a second switch for controlling a function remotely while still allowing the switches within the conventional fire alarm panel to function correctly.

**[0017]** The control unit may operate the relays based on the command transmitted from a remote computing device. The command may provide an instruction to the control unit. The command may instruct which relay to operate. The command may instruct the length of time to operate the relay. The command may provide a series of instructions to the control unit. The command may instruct a sequential operation of the relays. The command may provide the necessary instructions to perform a function of the conventional fire alarm panel.

**[0018]** The command may be considered a relay control command.

**[0019]** The control unit may operate a relay based on the command for a desired function of the conventional fire alarm panel. The control unit may operate a relay for a predetermined time period based on the command, the time period being based on the desired input at the panel. For example, the control unit may operate the relay for a first time period or a second time period. The first time period may be based on the time period required for the conventional fire alarm panel to recognise a press input. The second time period may be based on the time period required to recognise a press and hold input.

**[0020]** A sounder relay for remotely disconnecting a sounder may be provided. The sounder may be proximate the conventional fire alarm panel. The sounder may be a sounder internal to the conventional fire alarm panel. The sounder relay may be connectable in series between the fire alarm panel and the sounder.

**[0021]** The sounder relay may be a normally closed relay.

**[0022]** The control unit may latch the sounder relay into an open state based on a command. The sounder relay may be latched in the open state until an unlatching command is received. Alternatively or in combination the sounder relay may be latched in the open state for a predetermined time period.

**[0023]** A dedicated sounder relay allows for sounders within or in close proximity to the fire alarm panel to be silenced. This is particularly advantageous as it allows a remote person to converse (for example on the telephone) with a person proximate the conventional fire alarm panel without altering the state of the fire alarm panel, and without silencing the fire alarm generally.

**[0024]** The remote-control unit may receive power from a dedicated power supply. Alternatively or in combination, the remote-control unit may receive power from an auxiliary output of the fire alarm panel. The auxiliary output may be an auxiliary power output.

**[0025]** A keyswitch relay for remotely operating the function of a keyswitch in the conventional fire alarm panel may be provided.

**[0026]** In some conventional fire alarm panels certain functions are restricted by authorisation levels. The authorisation level may be set by a keyswitch or a keycode. A dedicated keyswitch relay allows a remote user to set an authorisation level to access the restricted functions.

**[0027]** The control unit may latch the keyswitch relay into a closed state. The keyswitch relay may be latched into a closed state for a predetermined time period according to a selected function. Alternatively or in combination the keyswitch relay may be latched in the closed state until an unlatching command from the remote computing device is received.

**[0028]** The control unit may operate the keyswitch relay and at least one of the plurality of relays in a sequence for a desired function of the conventional fire alarm panel. For example, the control unit may latch the keyswitch relay prior to operating one of the plurality of relays and then subsequently unlatching the keyswitch relay.

**[0029]** The control unit may operate at least some of the function control relays in a sequence. The sequence may be based on a keycode required to set an authorisation level.

**[0030]** A housing may be provided for enclosing the components of the remote-control unit. The housing may enclose the control unit, wireless communication module, plurality of relays, and/or the sounder relay.

**[0031]** The remote-control unit may be retrofitted to an existing fire alarm system. This allows older systems to be upgraded with new remote functionality.

**[0032]** According to a second aspect of the present invention there is provided a system for remotely controlling functions of a conventional fire alarm panel in a fire alarm system, the system comprising: a remote-control unit comprising a control unit including a wireless communication module for receiving a command from a remote computing device external to the fire alarm system, and a plurality of relays for remotely controlling functions of the conventional fire alarm panel, the plurality of relays being connected to the control unit; and a conventional fire alarm panel comprising a plurality of switches for controlling functions of the fire alarm panel, wherein each relay of the remote-control unit is electrically connected across one of the switches and the control unit is adapted to operate the or each relay based on the command received from the remote computing device.

**[0033]** The second aspect of the invention has at least all the same advantages as the first aspect of the invention. The second aspect of the invention may include any feature or combination of features presented with respect to the first aspect of the invention.

**[0034]** The plurality of switches may be operated by push buttons. At least one of the plurality of switches may be a keyswitch.

**[0035]** A remote computing device may be provided. The remote computing device may be external to the fire alarm system.

**[0036]** The remote computing device may include a user interface for generating a command that is transmitted to the remote-control unit through a wireless network.

**[0037]** The user interface may comprise a plurality of icons. The icons may correspond to functions of the conventional fire alarm panel. Each icon may generate a command to control a function of the conventional fire alarm panel.

**[0038]** An icon may generate a command which controls more than one relay in a sequential manner. For example, an icon may generate a command which causes the control unit to latch a keyswitch relay before operating at least one of the plurality of relays and subsequently unlatch the key switch relay.

**[0039]** The user interface may include a simulated fire alarm panel. The user interface may comprise a plurality of icons which correspond to the inputs on the conventional fire alarm panel. For example, the icons may include labelled buttons and/or a keyswitch which correspond to those on a conventional fire alarm panel.

**[0040]** The user interface may be displayed on a display of the remote computing device.

**[0041]** A user interface presents the remote user with a display which is understandable to a user of the remote computing device. The icons, and control logic for generating the commands behind the icons, can simplify remote operation of the functions of the conventional fire alarm panel.

**[0042]** A simulated fire alarm panel may be particularly advantageous as it has substantially the same appear-

ance and/or layout as a conventional fire alarm panel, i. e. it is recognisable to a typical user of a conventional fire alarm panel.

**[0043]** The remote computing device may be a mobile computing device. The mobile computing device may be a smart device, such as a smart phone or tablet.

**[0044]** According to a third aspect of the present invention there is provided a method of remotely controlling the functions of a conventional fire alarm panel in a fire alarm system, the method comprising the steps of: generating a command based on a user input in a user interface of a remote computing device external to the fire alarm system, the user interface comprising a plurality of icons for user input, the icons correspond to functions of the conventional fire alarm panel; transmitting the command to a remote-control unit through a wireless network; and operating a relay of the remote-control unit connected across a switch in the fire alarm panel to control the function of the fire alarm panel.

**[0045]** The method of remotely controlling the functions of a conventional fire alarm panel may comprise steps which enable any feature or combination of features presented with respect to the other aspects of the present invention.

**[0046]** According to a fourth aspect of the present invention there is provided a computer program comprising instructions which, when executed by a computer, causes the computer to carry out the steps of: generating a user interface, the user interface including a plurality of icons for user input which correspond to functions of a conventional fire alarm panel; generating a relay control command based on a user input in the user interface, the command being readable by a remote-control unit comprising a plurality of relays electrically connected across switches in a conventional fire alarm panel of a fire alarm system and a wireless communication module, the command being adapted to cause the remote-control unit to operate at least one of the relays in the remote-control unit based on the relay control command; and wirelessly transmitting the command to the remote-control unit through the wireless communication module.

**[0047]** The computer program may comprise instruction which enable any feature or combination of features presented with respect to the other aspects of the present invention.

**[0048]** According to another aspect of the present invention there is provided a fire alarm panel remote-control unit for controlling functions of a conventional fire alarm panel in a fire alarm system using a remote computing device external to the fire alarm system, the remote-control unit comprising: a control unit including a wireless communication module for receiving a command from a remote computing device external to the fire alarm system; and a plurality of relays for remotely controlling functions of the conventional fire alarm panel, the plurality of relays being connected to the control unit, each relay being electrically connectable across a switch in the fire alarm panel, wherein the control unit operates

the or each relay based on the command received from the remote computing device.

[0049] The fire alarm panel remote-control unit may comprise include any feature or combination of features presented with respect to the other aspects of the present invention. The fire alarm panel remote-control unit may be the remote-control unit in the other aspects of the present invention.

[0050] For the purposes of the invention, conventional fire alarm panels may be considered to include fire alarm panels which operate a notifier by monitoring for a change in quiescent voltage and/or quiescent current in an electrical circuit as a result of an initiator, such as detector, closing the circuit, this includes conventional two-wire (also known as sav-wire) fire alarm panels. That is to say that conventional fire alarm panels may be considered fire alarm panels which monitor a circuit for at least one of a drop in voltage compared to the quiescent voltage and/or an increase in current over the quiescent current. This does not cover addressable fire alarm panels because the notifiers are operated based on a data message rather than quiescent voltage and/or quiescent current.

[0051] Conventional fire alarm panels may comprise an electrical circuit with at least one initiator, a control unit adapted to monitor for a change in current or voltage on the electrical circuit as a result of the initiator and adapted to activate a notifier in response to the change in current or voltage, and a plurality of switches for controlling functions of the control unit. The switches may control the control unit function such as resetting the alarm or similar.

[0052] The conventional fire alarm panel may include separate electrical circuits for initiators and notifiers. The initiator circuit may include an end-of-line device. The notifier circuit may include an end-of-line device. The end-of-line device may be an end-of-line resistor. The end-of-line device may be an end-of-line capacitor. The end-of-line device may be an end-of-line relay also known as an end-of-line power relay or an end-of-line power supervision relay.

[0053] The electrical circuit may include both initiators and notifiers. Initiators and notifiers may be provided on separate electrical circuits.

[0054] In some embodiments the remote-control unit is not a repeater panel. The remote-control unit may not include indication means for indicating the status of the fire alarm system. The conventional fire alarm system may not communicate the status of the fire alarm system to the remote computing device.

## BRIEF DESCRIPTION OF THE DRAWINGS

[0055] For a better understanding of the present invention, and to show more clearly how it may be carried into effect, reference will now be made by way of example only to the accompanying drawings, in which:

Figure 1 shows a schematic representation of a remote-control unit; and

Figure 2 shows a schematic representation of a system for remotely controlling a function of a fire alarm panel in a fire alarm system.

## DESCRIPTION OF PREFERRED EMBODIMENTS

[0056] Referring firstly to Figure 1, a remote-control unit according to the present invention is generally indicated at 10.

[0057] A control unit 12 for controlling operation of the remote-control unit is provided on a printed circuit board (PCB) 14.

[0058] A wireless communication module 16 is provided on the PCB 14 and connected to the control unit 12. An antenna is connected to the wireless communication module 16. The wireless communication module 16 is preferably a two-way communication module. The wireless communication module may connect to a wireless area network, preferably a WiFi network, within the building in which the fire alarm system is installed. The wireless communication module allows a remote computing device to send commands to the remote-control unit 10, preferably over the internet.

[0059] A plurality of relays 18 for controlling functions of a conventional fire alarm panel are provided on the PCB 14. Each of the function controlling relays 18 is connected to the control unit 12 and the corresponding relay coils can be energized or deenergized according to a signal from the control unit.

[0060] In the current embodiment, six function controlling relays 18 are provided. Each function controlling relay 18 is a normally open relay. The function controlling relays are connectable across momentary switches 20 disposed in the conventional fire alarm panel. Connecting the function controlling relays 18 across the switches provides an additional input for controlling the functions of the fire alarm panel because the relay and switch are in a parallel arrangement.

[0061] A keyswitch relay 19 is provided on the PCB 14. The keyswitch relay 19 is connected to the control unit 12 and the corresponding relay coils can be energized or deenergized according to a signal from the control unit. The keyswitch relay 19 is connectable across a keyswitch 22 disposed in the conventional fire alarm panel.

[0062] Connecting the keyswitch relay 19 across the keyswitch in the conventional fire alarm panel provides an additional input for controlling the functions restricted by the keyswitch because the relay and switch are in a parallel arrangement.

[0063] A sounder relay 24 for connecting or disconnecting a sounder 26, or a plurality of sounders, is provided on the PCB 14. The sounder relay 24 is connected to the control unit 12. In the current embodiment, the sounder relay is a normally closed relay. The sounder

relay 24 is connectable in series with the sounder 26. Sounder 26 may be disposed proximate the conventional fire alarm panel or within the conventional fire alarm panel.

**[0064]** The sounder relay 24 may disconnect only one, or only a subset, of sounders which are connected to the fire alarm panel - it will be understood that further sounders may be connected to the fire alarm panel, in parallel with each other, and cannot be disabled by the sounder relay 24. The purpose of the sounder relay 24 is to disable only a sounder, or sounders, proximate to the fire alarm panel, for example to allow a conversation between a remote support person at a fire protection company and a person on site, near the fire alarm panel. If it is established that all the sounders on the system need to be silenced, this can be achieved via the functions of the fire alarm panel, remotely if required using the function control relays.

**[0065]** A housing 28 is provided to enclose the PCB 14. The PCB 14 is securely connected to the housing 28. A plurality of ports, either pre-formed or formable through knock-out portions, are provided in the housing. The ports provide a means to allow wire to be routed through the housing 28 to the PCB 14.

**[0066]** Power circuitry is provided on the PCB 14 and connected to an electrical connector 30 disposed in the housing 28. The electrical connector 30 can be connected to a dedicated power supply connectable to a mains circuit within a building. Alternatively or in combination, the power circuitry may be connectable to an auxiliary output circuit in the conventional fire alarm panel.

**[0067]** Referring to Figure 2, a system for remotely controlling a function of a fire alarm system is generally indicated at 40. The system includes a remote-control unit which is substantially the same or similar to the remote-control unit 10 discussed above. Reference numerals related to the same features will be maintained.

**[0068]** A conventional fire alarm panel 42 is provided in the fire alarm system. The conventional fire alarm panel 42 includes a housing 43 enclosing the fire alarm control unit 44. The fire alarm control unit has the necessary electrical and/or electronics to control the operation of the fire alarm system and the functions of the fire alarm panel.

**[0069]** A plurality of momentary switches 20 are provided. Preferably, the momentary switches are operated by push buttons disposed on the housing 43 of the fire alarm panel 42. Each momentary switch 20 may provide a control input to control a function of the fire alarm panel 42 and the fire alarm system. For example, one of the momentary switches 20 may be used to input the command to reset an alarm state in the fire alarm system.

**[0070]** In the current embodiment, a keyswitch 22 is provided in the fire alarm control unit 44. The keyswitch 22 is used to set an authorisation level. Certain functions of the fire alarm panel are restricted until an authorisation level has been set. In use, the keyswitch 22 is engaged to close a circuit before the control unit 44 accepts an

input from one of the momentary switches 20. For example, to reset the alarm state, a user inserts a key into the keyswitch 22 before engaging by turning, the control unit 44 determines that the circuit is closed and sets an authorisation level, a user operates the momentary switch associated with the function of resetting the alarm state and the control unit 44 resets the alarm as the authorisation level has been set. Then the key is removed the circuit is open and the authorisation level reset.

**[0071]** At least one initiator 46 is electrically connected to the fire alarm control unit 44 through an electrical circuit. The electrical circuit defines a zone within the building. Each zone in the building has a separate electrical circuit.

**[0072]** A sounder 26 is electrically connected to the fire alarm control unit and is disposed in proximity to the fire alarm control panel 42. The sounder 26 may be on its own notifier circuit or share the same notifier circuit with other notifiers in a zone. In a "two-wire" system, a sounder or other notifier may be on the same circuit as one or more initiators in a zone.

**[0073]** Further notifier circuits and initiator circuits may be provided as needed based on the desired zonal plan of the building.

**[0074]** In the current embodiment, the remote-control unit 10 is disposed proximate to the conventional fire alarm panel. In some embodiments the remote-control unit 10 may be disposed within the housing of the fire alarm panel.

**[0075]** Each function controlling relay 18 is connected across one of the momentary switches 20, preferably by conductive paths such as wires. The keyswitch relay is connected across the keyswitch 22, preferably by conductive paths such as wires. This arrangement provides two inputs for controlling one function of the fire alarm panel 42 because of the parallel arrangement of the relay and physical switch.

**[0076]** The sounder relay 24 is connected in series with the sounder 26 proximate the fire alarm panel 42.

**[0077]** Sounder 26 may be provided on a sounder or notifier circuit with additional sounders which are not proximate the conventional fire alarm panel. In such embodiments it may be desirable that the sounder relay 24 is used to silence only the sounder 26 proximate the conventional fire alarm panel. This could be achieved by providing sounder 26 and the sounder relay 24 in parallel with the sounder circuit.

**[0078]** A remote computing device 48 for remotely controlling the functions of the fire alarm panel 42 is provided. The remote computing device is external to the fire alarm system in that it is not directly connected to or communicates with the fire alarm panel 42. In the current embodiment, the remote computing device 48 is a mobile smart device, such as a tablet, which is connectable to a wireless network and includes a touch screen.

**[0079]** An application is provided on the remote computing device 48 for generating commands to control the operation of the relays 18, 19, 24 in the remote-control

unit 10. A user interface provided by the application allows a user of the remote computing device 48 to generate the commands.

**[0080]** A plurality of icons are provided in the user interface. Each icon provides a user input means for the application. The application generates a command based on the user interacting with the icons.

**[0081]** Each icon may generate a command which corresponds to a function of the conventional fire alarm panel. The command may be adapted to cause the control unit 12 to operate one relay 18, 19, 24 or a plurality of relays 18, 19, 24 in a sequential manner.

**[0082]** For example, a user may press one icon which generates a command to cause the conventional fire alarm panel to reset the alarm state. A user presses the icon which causes the application to generate a command. The command includes instructions readable by the control unit 12. The command is transmitted to the remote-control unit 10 through a wireless network 50. The wireless communication module 16 receives the command and transfers it to the control unit 12. The control unit 12 interprets the instruction in the command and sends a control signal to the required relays. In the current example, the command instructs the control unit 12 to latch the keyswitch relay 19 before operating one of the functional control relays 18.

**[0083]** A simulated fire alarm panel may be provided in the user interface. The simulated fire alarm panel may substantially correspond with the physical fire alarm panel. For example, icons in the simulated fire alarm panel may be provided which correspond to the push buttons and/or the keyswitch provided on the physical fire alarm panel.

**[0084]** The generated commands are transmitted through a wireless network 50 to the remote-control unit 10. The commands are received by the wireless communication module 16 and transferred to the control unit 12. The or each relay 18, 19, 24 is controlled by the control unit 12 based on the received command.

**[0085]** In the case of the function control relays 18, the control unit 12 closes the normally open relay in parallel with the switch 20. The fire alarm control unit recognises this as an input because the circuit on which the momentary switch is disposed is completed. In the case of the sounder relay 24, the control unit 12 opens the normally closed relay in series with the sounder 26. This breaks the circuit which silences the sounder 26.

**[0086]** In the case of the keyswitch relay 19, the control unit 12 closes the normally open relay in parallel with the switch 22. The fire alarm control unit recognises this as an input because the circuit on which the momentary switch is disposed is completed.

**[0087]** The embodiments described above are provided by way of example only, and various changes and modifications will be apparent to persons skilled in the art without departing from the scope of the present invention as defined by the appended claims.

## Claims

1. A method of upgrading a fire alarm system comprising a conventional fire alarm panel, the conventional fire alarm panel comprising an electrical circuit with at least one initiator, a control unit adapted to monitor for a change in current or voltage on the electric circuit as a result of the initiator and adapted to activate a notifier in response to the change in current or voltage, and a plurality of switches for controlling functions of the control unit, the method comprising: installing a remote-control unit for controlling functions of the conventional fire alarm panel in the fire alarm system using a remote computing device external to the fire alarm system, the remote-control unit comprising

a control unit including a wireless communication module for receiving a command from the remote computing device external to the fire alarm system, and

a plurality of relays for remotely controlling functions of the conventional fire alarm panel, the plurality of relays being connected to the control unit of the remote-control unit, each relay being electrically connected in parallel across a switch of the conventional fire alarm panel, wherein the control unit operates the or each relay based on the command received from the remote computing device.

2. A method as claimed in claim 1, in which the remote-control unit comprises a sounder relay connected to the control unit for remotely operating a sounder proximate the conventional fire alarm panel based on a command received from the remote computing device, the sounder relay being connected in series with the sounder and the conventional fire alarm panel.
3. A method as claimed in claim 2, in which the sounder relay is a normally closed relay and/or the control unit of the remote-control unit latches the sounder relay based on the command.
4. A method as claimed in any preceding claim, in which the remote-control unit further comprises a keyswitch relay connected to the control unit of the remote-control unit for remotely operating the function of a keyswitch in the conventional fire alarm panel, the keyswitch relay being connected in parallel across the keyswitch in the conventional fire alarm panel.
5. A method as claimed in claim 4, in which the keyswitch relay is a normally open relay and/or the control unit of the remote-control unit latches the keyswitch relay based on the command.

6. A method as claimed in any preceding claim, in which the control unit of the remote-control unit operates the or each relay for a predetermined time period, the predetermined time period being adapted to emulate a push or a push and hold input of the conventional fire alarm panel.
7. A method as claimed in any preceding claim, in which the control unit of the remote-control unit operates the relays in a sequence based on the received command.
8. A method as claimed in any preceding claim, in which the remote-control unit further comprises a housing enclosing the communication module and plurality of relays.
9. A method as claimed in any preceding claim, in which the remote-control unit receives power from a dedicated power supply and/or an auxiliary power supply in the conventional fire alarm panel.
10. A system for remotely controlling a function of a conventional fire alarm panel in a fire alarm system, the system comprising:
- a remote-control unit comprising,
    - a control unit including a wireless communication module for receiving a command from a remote computing device external to the fire alarm system, and
    - a plurality of relays for remotely controlling functions of the conventional fire alarm panel, the plurality of relays being connected to the control unit of the remote-control unit; and
    - a conventional fire alarm panel comprising an electrical circuit with at least one initiator, a control unit adapted to monitor for a change in current or voltage on the electric circuit as a result of the initiator and adapted to active a notifier in response to the change in current or voltage, and a plurality of switches for controlling functions of the control unit of the fire alarm panel, wherein each relay of the remote-control unit is electrically connected in parallel across one of the switches and the control unit of the remote-control unit is adapted to operate the or each relay based on the command received from the remote computing device.
11. A system as claimed in claim 10, further comprising a remote computing device external to the fire alarm system, the remote computing device including a user interface for generating a command that is transmitted to the remote-control unit through a wireless network.
12. A system as claimed in claim 11, in which the remote computing device is a mobile computing device and/or the user interface includes a simulated fire alarm panel displayed on a display of the remote computing device.
13. A method of remotely controlling the functions of a conventional fire alarm panel in a fire alarm system, the conventional fire alarm panel comprising an electrical circuit with at least one initiator, a control unit adapted to monitor for a change in current or voltage on the electric circuit as a result of the initiator and adapted to active a notifier in response to the change in current or voltage, and a plurality of switches for controlling functions of the control unit, the method comprising the steps of:
- generating a command based on a user input in a user interface of a remote computing device external to the fire alarm system, the user interface comprising a plurality of icons for user input, the icons corresponding to the functions of the conventional fire alarm panel;
  - transmitting the command through a wireless network to a remote-control unit; and
  - operating a relay of the remote-control unit to control the function of the fire alarm panel based on the transmitted command, the relay being connected in parallel across a switch of the fire alarm panel.
14. A computer program comprising instructions which, when the program is executed by a computer, causes the computer to carry out the steps of:
- generating a user interface, the user interface including a plurality of icons for user input which correspond to the functions of a conventional fire alarm panel, the conventional fire alarm panel comprising an electrical circuit with at least one initiator, a control unit adapted to monitor for a change in current or voltage on the electric circuit as a result of the initiator and adapted to active a notifier in response to the change in current or voltage, and a plurality of switches for controlling functions of the control unit;
  - generating a command based on a user input in the user interface, the command being readable by a remote-control unit comprising a plurality of relays electrically connected in parallel across the switches in the conventional fire alarm panel and wireless communication module, the command being adapted to cause the remote-control unit to operate at least one of the plurality of relays; and
  - wirelessly transmitting the command to the re-



mote-control unit through the wireless communication module.

15. A computer program as claimed in claim 14, in which the user interface comprising a simulated fire alarm panel. 5

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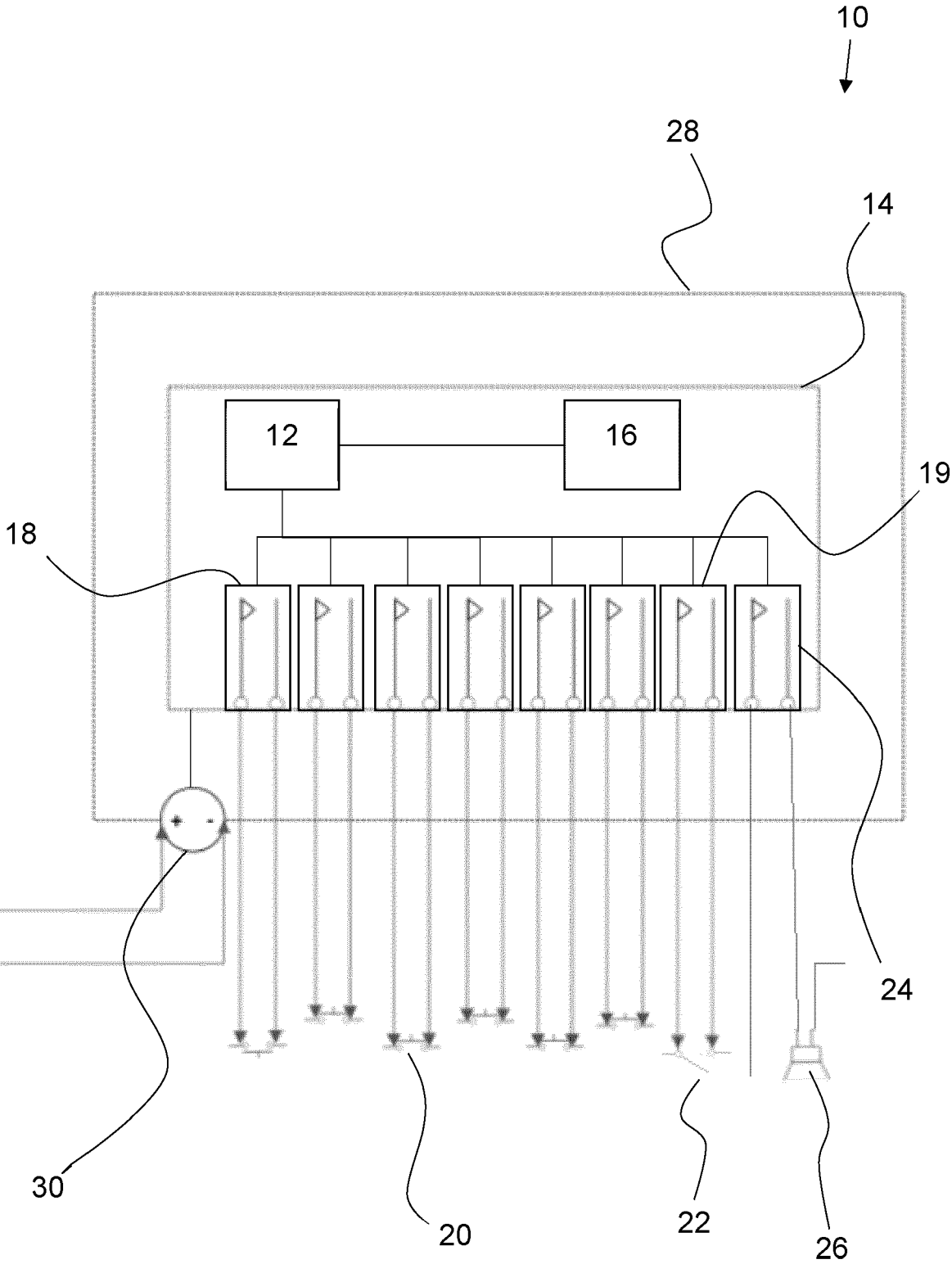


FIG. 1

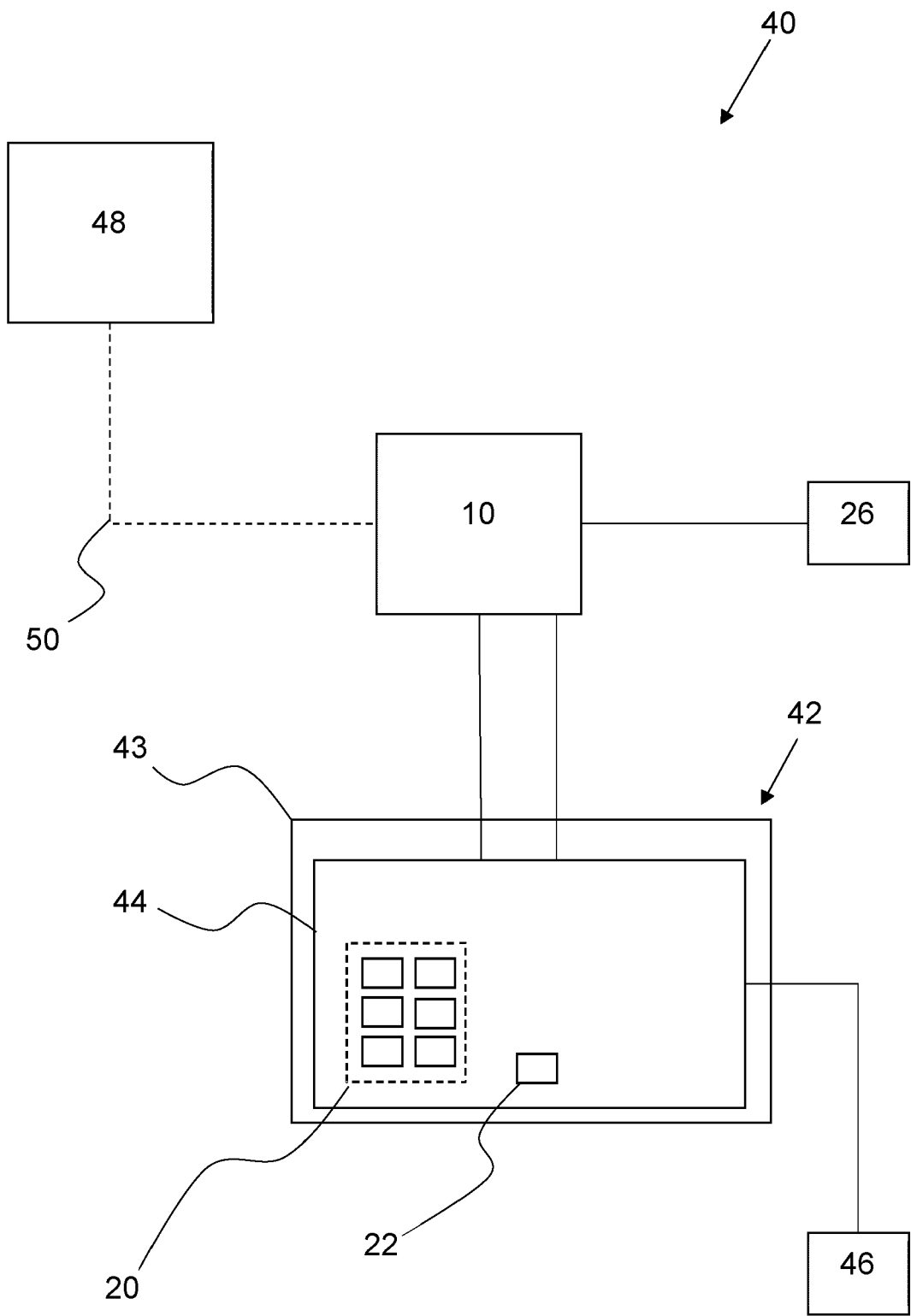


FIG. 2



## EUROPEAN SEARCH REPORT

Application Number

EP 22 16 8250

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EPO FORM 1503 03:82 (P04C01)

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			G08B
The present search report has been drawn up for all claims			
Place of search <b>Munich</b>		Date of completion of the search <b>3 August 2022</b>	Examiner <b>Coffa, Andrew</b>
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document	

**ANNEX TO THE EUROPEAN SEARCH REPORT  
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EP 22 16 8250

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
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03-08-2022

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