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(54) **Fire detectors with external power supply indication means**

Brandmelder mit Anzeigen für die Aussenspannungsversorgung

Détecteurs d'alarme d'incendie avec des moyens d'indication d'alimentation externe

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Description

[0001] This invention relates to a fire detector, a fire detector system and to a method of monitoring the functioning of a fire detector.

[0002] Existing fire detection systems typically comprise a central controller to which are attached in parallel a number of fire detection devices in a zone/loop configuration. At the end of the fire detection devices is an end of line device, which is used, in an "active" form, to send a pulse back to the central controller as confirmation that the electrical circuit through all of the fire detectors in the given loop/zone is complete. A "passive" form of end of line device simply comprises a resistor. Both types are known in the art.

[0003] If there is a break in wiring between two fire detectors, or a fault in one of the detectors, then the end of line device will not receive the electrical signal from the central controller and so no signal will be sent back from the end of line device to the central controller, thus indicating to the central controller that there is a fault in that particular loop/zone.

[0004] Disadvantages arise with this type of system because finding the location of the fault is typically time consuming, because the location of the break in the loop/zone is not known.

[0005] It is an object of the present to address the above mentioned disadvantage.

[0006] US 5,621,394 discloses a smoke detection and alarm system, wherein the fire detectors comprise visual indication means operable to indicate that the fire detector is receiving power from a separate power supply.

[0007] According to a first aspect of the present invention there is provided a fire detector comprising indication means operable to indicate that the fire detector is receiving power from a separate power supply.

[0008] The indication means are visual indication means, preferably a light, most preferably an LED.

[0009] The visual indication means are operable to indicate whether the fire detector is receiving power on receipt of a signal from a central controller. Thus, the visual indication means may be operable to illuminate on receipt of a signal from the central controller.

[0010] The visual indication means may be operable to give a visual indication when the fire detector is receiving power. The visual indication means may be operable to flash when the fire detector is receiving power. The visual indication means may be operable to give no indication when the fire detector is not receiving power and/or is malfunctioning.

[0011] The fire detector is advantageously operable to indicate when it is receiving power to facilitate visual inspection of a plurality of fire detectors in a zone arrangement. This feature assists the inspection because it indicates at what point in a zone there is a break in electrical supply or a fault in a detector.

[0012] The fire detector may be operable to detect heat, smoke and/or a specified gas. Thus the fire detector

may be a smoke detector, a heat detector and/or a gas detector operable to trigger an alarm.

[0013] The fire detector may be a plug in type fire detector, preferably arranged to be fitted in a zone of a fire detector system controlled by a central controller of the fire detector system. The fire detector preferably receives power from electrical wiring of said zone, preferably supplied by the central controller. The fire detector is preferably a conventional-type fire detector, preferably with passive fire detection means that is operable to complete an electrical circuit on detection of heat, smoke or gas.

[0014] According to a second aspect of the invention a fire alarm system comprises at least one fire detector in a zone arrangement and a central controller, wherein the at least one fire detector is arranged to receive power from the central controller and wherein the at least one fire detector includes indication means operable to indicate that the at least one fire detector is receiving power from the central controller.

[0015] The indication means are visual indication means, preferably a LED.

[0016] The indication means are adapted to operate on receipt of a signal from the central controller, where said signal may be a test signal arranged to cause the visual indication means of all functioning fire detectors in a fire detector zone to illuminate, where a fire detector zone comprises at least one fire detector electrically connected to the central controller. Preferably, a plurality of fire detectors is connected in parallel to form a zone. The fire alarm system preferably includes a plurality of zones.

[0017] Alternatively the signal may be generated by the central controller on receipt of an indication that at least one fire detectors is not receiving power and/or is malfunctioning. The indication received by the central controller may result from an end of line device not receiving a signal and/or the central controller not receiving a signal from the end of line device.

[0018] The central controller may be operable to receive a command, from input means of the central controller, to test the at least one fire detector.

[0019] The command may be a coded command, requiring entry of a code via the input means.

[0020] According to a third aspect of the invention, a method of indicating the functioning of a fire detector comprises the step of the fire detector visually indicating that the fire detector is receiving power from a separate power supply.

[0021] The indication is caused on receipt of a signal from a central controller supplying power to the fire detector.

[0022] The indication may be a pulsed illumination of visual indication means or may be a continuous illumination thereof.

[0023] If a fire detector is not receiving power from the central controller then the indication means will not function.

[0024] A specific embodiment of the present invention will now be described, by way of example and with ref-

ference to the accompanying drawings, in which:

Figure 1 is a schematic diagram of a fire detection system.

[0025] Figure 1 shows a fire detection alarm system having a central controller 10 and three fire detectors 12a,b,c located in parallel in a zone 14. An end of line device 16 is used to indicate the integrity of the zone electrical circuit through the fire detectors 12a to 12c.

[0026] Further zones 18 may also be controlled by the central controller 10, but are not shown in detail in this Figure, in order to aid simplicity.

[0027] A break 20 is shown in an electrical wire 22 between the fire detectors 12b and 12c. As a result of the break 20, a signal from the central controller to the end of line device 16 will not be received by the end of line device 16, because of the incomplete electrical circuit. However, power will be supplied to the fire detectors 12a and 12b from the central controller because those devices are connected in parallel. It would not normally be apparent which of the fire detectors 12a to 12c had failed.

[0028] In order to determine which of the series of fire detectors 12a to 12c is not functioning, or where a break in wiring has occurred, it is normally necessary to manually inspect each device to check whether current is being received from the central controller 10.

[0029] However, in Figure 1 each fire detector 12a to 12c includes an LED 24a to 24c.

[0030] The LEDs 24a to 24c are set up to flash or be turned on continuously by the central controller 10 when the central controller 10 detects a fault, for example that caused by the break 20. In the example shown in Figure 1, the LEDs 24a and 24b will illuminate, but the LED 24c will not illuminate, because of the break 20 in the wiring.

[0031] Thus, it will be easy by visual inspection to determine that either the fire detector 12c is malfunctioning or there is a break in the wiring, as is in fact the case, between the fire detector 12b and the fire detector 12c. In this way, it is not necessary to closely inspect the fire detectors 24a and 24b, because it will be clear that they are receiving power and functioning because of the illuminated LEDs 24a, 24b.

[0032] A further alternative for the illumination of the LEDs 24a to 24c (rather than by automatic action of the central controller 10 on detection of a fault,) is to include a manual feature in the central controller 10, whereby a button may be pressed to illuminate the LEDs 24a to 24c to indicate that they are receiving power correctly. Thus, in the situation shown in Figure 1 on pressing of the button on the central controller 10 only the LEDs 24a and 24b would illuminate, whereas the LED 24c would not illuminate, because of the break 20. This feature may be further developed by the use of a code which must be tapped into a keypad on the central controller 10 in order to cause illumination of the LEDs 24a to 24c in a particular zone, or at least those LEDs 24a to 24c having a fully function-

ing fire detector 12a to 12c.

[0033] The fire detection system disclosed herein can operate using fire detectors 12a to 12c, which may optionally detect heat, smoke or other undesired gases. Thus, any reference to fire detector is a reference to any of the heat, smoke or gas detectors mentioned.

[0034] The fire detection system disclosed herein has significant advantages over previous systems because the task of identifying where a failure is in a zone/loop of the fire alarm system is made considerably easier because visual inspection provides great assistance in determining which of a series of fire detectors has failed, or where there is a break in wiring.

[0035] The reader's attention is directed to all papers and documents which are filed concurrently with or previous to this specification in connection with this application and which are open to public inspection with this specification

Claims

1. A fire detector (12a, 12b, 12c) comprising indication means (24a, 24b, 24c) operable to indicate that the fire detector (12a, 12b, 12c) is receiving power from a separate power supply (10), wherein the indication means (24a, 24b, 24c) are visual indication means, **characterised in that** the visual indication means (24a, 24b, 24c) are operable to indicate whether the fire detector is receiving power on receipt of signal from a central controller (10).
2. A fire detector as claimed in claim 1, in which the visual indication means (24a, 24b, 24c) are operable to flash when the fire detector is receiving power.
3. A fire detector as claimed in any either claim 1 or claim 2, in which the visual indication means (24a, 24b, 24c) are operable to give no indication when the fire detector (12a, 12b, 12c) is not receiving power and/or is malfunctioning.
4. A fire detector as claimed in any preceding claim, which is operable to detect heat, smoke and/or a specified gas.
5. A fire alarm system comprising at least one fire detector as claimed in claim 1 in a zone arrangement (14) and a central controller (10), wherein the at least one fire detector (12a, 12b, 12c) is arranged to receive power from the central controller (10).
6. A fire alarm system as claimed in claim 5, in which the signal is generated by the central controller (10) on receipt of an indication that at least one fire detector (12a, 12b, 12c) is not receiving power and/or is malfunctioning.

7. A fire alarm system as claimed in claim 6, in which the indication received by the central controller (10) results from an end of line device (16) not receiving a signal and/or the central controller (10) not receiving a signal from the end of line device (16).
8. A method of indicating the functioning of a fire detector (12a, 12b, 12c) comprising the step of the fire detector visually indicating that the fire detector is receiving power from a separate power supply (10), **characterised in that** the indication is caused on receipt of a signal from a central controller (10) supplying power to the fire detector.

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Patentansprüche

1. Feuermelder (12a, 12b, 12c), der Anzeigeeinrichtungen (24a, 24b, 24c) aufweist, die betreibbar sind, um anzuzeigen, dass der Feuermelder (12a, 12b, 12c) Energie von einer separaten Energieversorgung (10) empfängt, wobei die Anzeigeeinrichtungen (24a, 24b, 24c) visuelle Anzeigeeinrichtungen sind, **dadurch gekennzeichnet, dass** die visuellen Anzeigeeinrichtungen (24a, 24b, 24c) auf einen Empfang eines Signals von einer zentralen Steuerung (10) hin betreibbar sind, um anzuzeigen, ob der Feuermelder Energie empfängt.
2. Feuermelder nach Anspruch 1, wobei die visuellen Anzeigeeinrichtungen (24a, 24b, 24c) betreibbar sind, um zu blinken, wenn der Feuermelder Energie empfängt.
3. Feuermelder nach Anspruch 1 oder Anspruch 2, wobei die visuellen Anzeigeeinrichtungen (24a, 24b, 24c) betreibbar sind, um keine Anzeige abzugeben, wenn der Feuermelder (12a, 12b, 12c) keine Energie empfängt und/oder nicht funktioniert.
4. Feuermelder nach einem der vorangehenden Ansprüche, der dazu betreibbar ist, Hitze, Rauch und/oder ein spezifiziertes Gas zu erfassen.
5. Feueralarmsystem mit wenigstens einem Feuermelder nach Anspruch 1 in einer Zonenanordnung (14) und mit einer zentralen Steuerung (10), wobei der wenigstens eine Feuermelder (12a, 12b, 12c) angeordnet und eingerichtet ist, um Energie von der zentralen Steuerung (10) zu empfangen.
6. Feueralarmsystem nach Anspruch 5, wobei das Signal durch die zentrale Steuerung (10) auf einen Empfang einer Anzeige hin erzeugt wird, dass wenigstens ein Feuermelder (12a, 12b, 12c) keine Energie empfängt und/oder nicht funktioniert.
7. Feueralarmsystem nach Anspruch 6, wobei die

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durch die zentrale Steuerung (10) empfangene Anzeige daraus resultiert, dass eine Leitungsende-Vorrichtung (16) kein Signal empfängt und/oder die zentrale Steuerung (10) kein Signal von der Leitungsende-Vorrichtung (16) empfängt.

8. Verfahren zum Anzeigen des Funktionierens eines Feuermelders (12a, 12b, 12c) mit dem Schritt, dass der Feuermelder visuell anzeigt, dass der Feuermelder Energie von einer separaten Energieversorgung (10) empfängt, **dadurch gekennzeichnet, dass** die Anzeige auf einen Empfang eines Signals von einer zentralen Steuerung (10) hin veranlasst wird, die Energie zum Feuermelder zuführt.

Revendications

1. Détecteur d'incendie (12a, 12b, 12c) comprenant des moyens d'indication (24a, 24b, 24c) destinés à indiquer que le détecteur d'incendie (12a, 12b, 12c) reçoit de l'énergie en provenance d'un bloc d'alimentation distinct (10), dans lequel les moyens d'indication (24a, 24b, 24c) sont des moyens d'indication visuels, **caractérisé en ce que** les moyens d'indications visuels (24a, 24b, 24c) fonctionnent de manière à indiquer si le détecteur d'incendie reçoit de l'énergie à la réception d'un signal provenant d'un dispositif de contrôle central (10).
2. Détecteur d'incendie selon la revendication 1, dans lequel les moyens d'indication visuels (24a, 24b, 24c) fonctionnent de manière à clignoter lorsque le détecteur d'incendie reçoit de l'énergie.
3. Détecteur d'incendie selon l'une quelconque des revendications 1 ou 2, dans lequel les moyens d'indication visuels (24a, 24b, 24c) fonctionnent de manière à ne fournir aucune indication lorsque le détecteur d'incendie (12a, 12b, 12c) ne reçoit pas d'énergie et/ou présente un dysfonctionnement.
4. Détecteur d'incendie selon l'une quelconque des revendications précédentes, qui fonctionne de manière à détecter la chaleur, la fumée et/ou un gaz déterminé.
5. Système d'avertisseur d'incendie, comprenant au moins un détecteur d'incendie selon la revendication 1 dans un agencement zoné (14) et un dispositif de contrôle central (10), dans lequel au moins un détecteur d'incendie (12a, 12b, 12c) est agencé de manière à recevoir de l'énergie en provenance du dispositif de contrôle central (10).
6. Système d'avertisseur d'incendie selon la revendication 5, dans lequel le signal est généré par le dispositif de contrôle central (10) suite à la réception

d'une indication informant qu'au moins un détecteur d'incendie (12a, 12b, 12c) ne reçoit pas d'énergie et/ou présente un dysfonctionnement.

7. Système d'avertisseur d'incendie selon la revendication 6, dans lequel l'indication reçue par le dispositif de contrôle central (10) résulte de ce qu'un dispositif de bout de ligne (16) ne reçoit pas un signal et/ou le dispositif de contrôle central (10) ne reçoit pas un signal provenant du dispositif de bout de ligne (16). 5 10
8. Procédé d'indication du dysfonctionnement d'un détecteur d'incendie (12a, 12b, 12c), comprenant l'étape où le détecteur d'incendie indique visuellement que le détecteur d'incendie reçoit de l'énergie en provenance d'un bloc d'alimentation distinct (10), **caractérisé en ce que** l'indication est provoquée à la réception d'un signal provenant d'un dispositif de contrôle central (10) alimentant en énergie le détecteur d'incendie. 15 20

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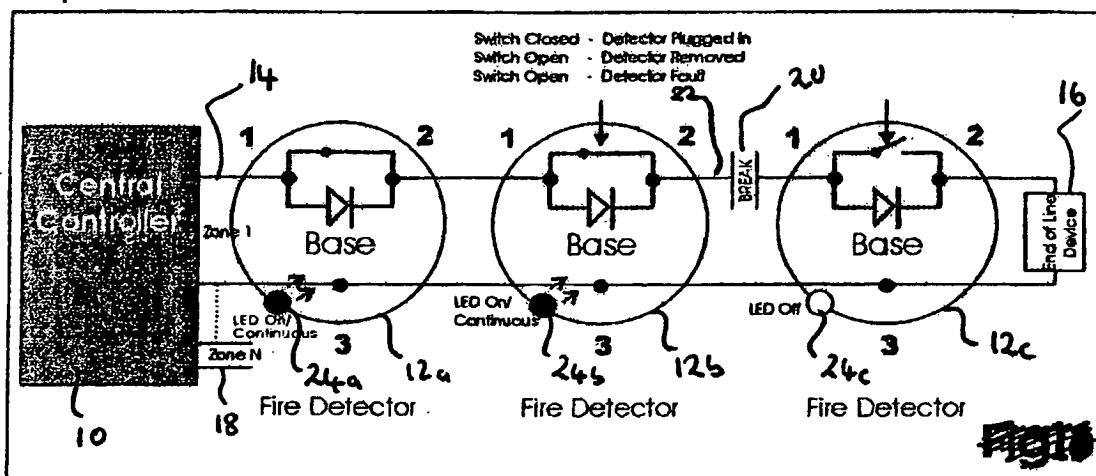


Figure 1