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## (54) Residential fire alarm system.

(57) This invention relates to a fire alarm system in which sensitivities of detectors can be adjusted to the ambient conditions under which they are used, and which thus has a high sensitivity but less possibility of producing false alarm.

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Residential Fire Alarm System

This invention relates to a fire alarm system for residential use.

Up to now, sensitivities of fire detectors have been set to comparatively low levels to avoid that they will produce false alarms with cigarette smoke or heat from heating appliances and to permit their wide application. By the use of the fire detectors with low sensitivities it is possible to build a reliable fire alarm system which does not produce an alarm with such a rise in ambient temperature as caused by room heating or with cigarette smoke. Conversely, in case of actual fire, an alarm is given only at an advanced stage of the fire. Therefore, for protection of general houses built with wood, it is preferable that the fire detectors have the highest possible sensitivity setting.

In view of the above, this invention is to offer a fire alarm system having a high sensitivity but less possibility of producing a false alarm, which is achieved by adjusting the sensitivities of the fire detectors to the ambient condition each time a fire is handled in lieu of the conventional thought of permanently fixing the sensitivities of the fire detectors.

The following describes an embodiment according to this invention with reference to a circuit diagram. Shown in the figure are an ionization

type smoke detector 1 which is installed, for example, on the ceiling of the kitchen, and a control panel 2 installed on the wall nearby. The ionization type smoke detector 1 consists of outer ionization chamber 3; inner ionization chamber 4; FET 5 with its gate connected to the junction of the ionization chambers 3, 4, and its source equipped with bleeder resistors 6, 7 to determine a point at which the FET 5 becomes conductive, in other words the sensitivity of the detector; and a switching circuit 12 comprising resistors 8, 9, capacitor 10 and transistor 11. The control panel 2 consists of power supply 13 for the detector 1 and control panel 2; push button switch 14 which is pressed when adjusting the sensitivity; timer 15 which is connected in series with the push button switch 14 and is capable of adjusting the set time; alarm relay 16 actuated as the switching circuit of the detector 1 switches on; self-holding contact 16-1 of the relay 16 connected in series with break contact 15 - 1 of the timer 15; alarm bell 17 connected in series with make contact 16 - 2 of the relay 16; and variable resistor 18 for sensitivity adjustment connected in series with make contact 15 - 2 of the timer 15 as sensitivity setting circuit, and between the source of the field effect transistor 5 of the detector 1 and plus terminal of the power supply 13.

Operation of this fire alarm system is described below. When fire is used in the kitchen such as use of a gas range, the timer 15 on the control panel 2 is set to the time corresponding to the length of time that the gas range is in actual use with pans on, and the push button switch 14 is pressed. Then, the timer 15 is actuated to open its break contact 15 - 1, and the make contact 15 - 2 in the sensitivity setting circuit is closed. By adjusting the variable resistor 18, the sensitivity of the detector, i.e. the source potential of the FET 5 is raised until the FET 5 becomes conductive to operate the bell 17 through the relay 16. Now, the variable resistor 18 is reset until the bell 17 is silenced, i.e. the FET 5 becomes non-conductive, thus the sensitivity of the detector 1 is set to a highest possible level at which the detector 1 can remain unoperated under the condition that the range is being used. In this state, if oil in the pan ignites, even small amount of smoke entering the ionization chamber 3 causes the gate potential of the FET 5 to fall below the source potential. Thus, the FET 5 immediately becomes conductive, causing the realy 16 to operate through

the switching circuit 12 and the bell 17 to sound for alarm. After lapse of a predetermined time without such an accident, the make contact 15 - 2 opens due to action of the timer 15, and the sensitivity of the detector 1 returns to the fixed value determined by resistors 6, 7. The detector is now set to a low sensitivity and continue surveillance of comparatively safe kitchen where no fire is being used after kitchen work.

In the case of the fire alarm system installed in a living room, surveillance is normally made by the detector with low sensitivity which is determined by resistors 6, 7 and at which the detector is not actuated by cigarette smoke or heat from the heating appliance. When a housewife goes to kitchen, leaving her baby alone in the living room without putting off the heating appliance, the detector should be set to a high sensitivity under the condition that the heating appliance is in use as described for the case that the range is used in the kitchen. Thus, even if the heating appliance is accidentally thrown down by baby and a fire occurs, the detector 1 immediately operates in the incipient stage of the fire and notifies her mother in the next room of the danger.

While the above has described the embodiment using an ionization type smoke detector, it is possible to provide photoelectric type smoke detectors, thermal detectors or gas sensors with similar sensitivity setting circuits, too.

With the above described composition and function this invention offers a fire alarm system which does not produce an alarm even if soiling of the detector has changed the sensitivity because the sensitivity adjustment is made each time fire is used, and which is capable of giving an alarm in the incipient stage of fire.

4. Brief Description of Drawing

The drawing is a circuit diagram of an embodiment of the fire alarm system according to this invention.

| | | |
|---|---|---|
| 1 | ..... | Ionization smoke detector |
| 2 | ..... | Control panel |
| 3 | ..... | Outer ionization chamber |
| 4 | ..... | Inner ionization chamber |

| | | |
|---|---|---|
| 5 | ..... | FET |
| 6 | 7, 8, 9 ..... | Resistors |
| 10 | ..... | Capacitor |
| 11 | ..... | Transistor |
| 12 | ..... | Switching circuit |
| 13 | ..... | Power supply |
| 14 | ..... | Push button switch |
| 15 | ..... | Timer |
| 16 | ..... | Relay |
| 17 | ..... | Bell |
| 18 | ..... | Variable resistor |

Claim

1. A residential fire alarm system which is installed in the ordinary house or apartment house and which is characterized in that a sensitivity setting circuit is provided in the fire detector or the contro panel to adjust the sensitivity of the detector to the highest possib value at which the detector will not operate when a fire is used.

2. A residential fire alarm system as set forth in Claim 1 wherin the sensitivity setting circuit is provided with a timer to reset the fire detector to the fixed sensitivity in a predetermined time.

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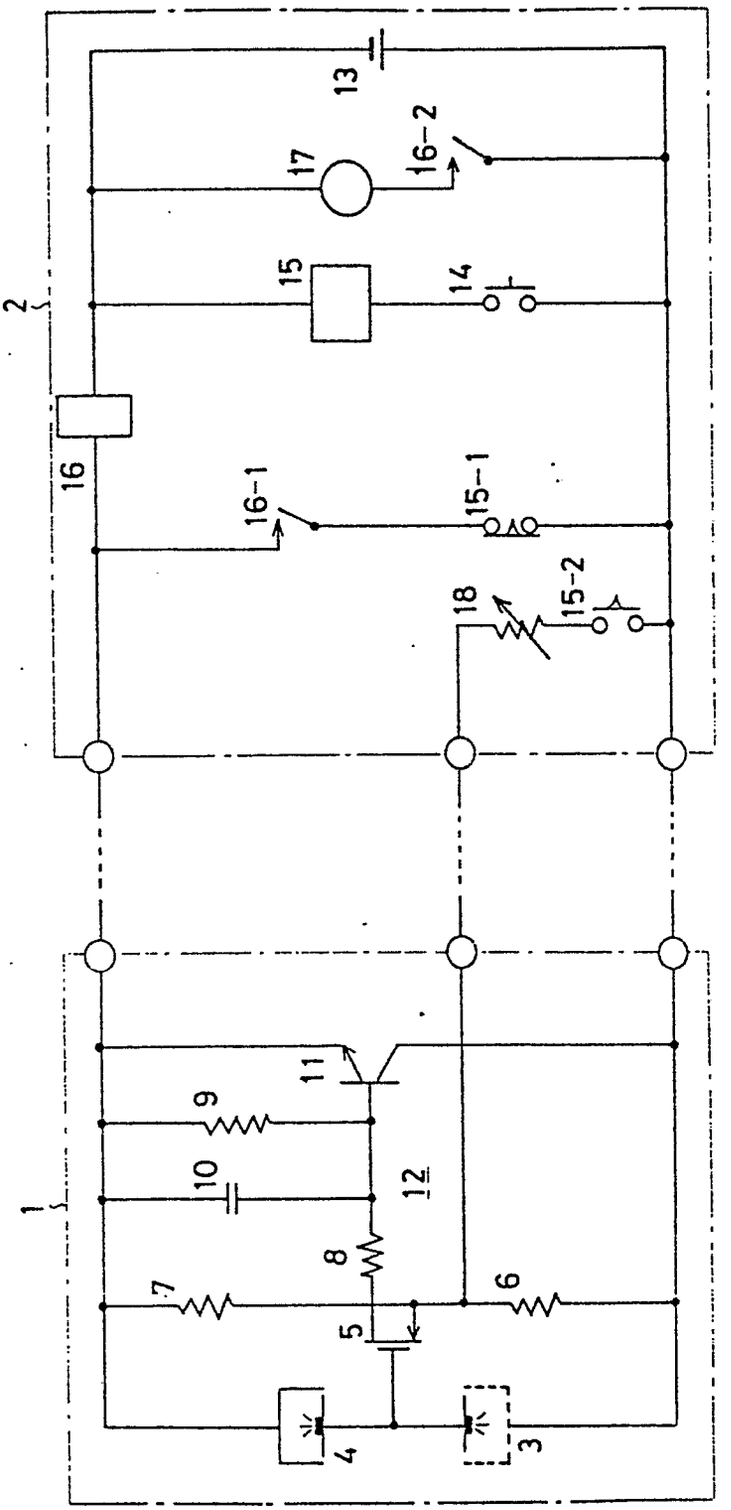

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# EUROPEAN SEARCH REPORT

Application number

EP 84102466.4

## DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (Int. Cl. ³) |
|---|---|---|---|
| X | DE - A1 - 2 530 848 (NOHMI BOSAI KOGYO CO.)<br>* Claim 1; fig. 6 * | 1 | G 08 B 17/10 |
| Y | * Claim 1; fig. 6 * | 2 | |
| Y | US - A - 4 313 110 (SUBULAK)<br>* Abstract; fig. 2 * | 1,2 | |
| X | DE - B2 - 2 454 196 (CERBERUS AG.)<br>* Claim 1; fig. 1 * | 1 | |

TECHNICAL FIELDS SEARCHED (Int. Cl. ³)

G 08 B

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| VIENNA | 05-07-1984 | FRANZ |

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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