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Fried

[11] **3,788,428**

[45] **Jan. 29, 1974**

[54] **ELEVATOR SAFETY CONTROL CIRCUIT FOR PREVENTING ELEVATOR DOOR FROM OPENING AT FLOOR WITH FIRE**

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[73] Assignee: **Millar Elevator Industries, Inc.,** New York, N.Y.

[22] Filed: **Dec. 22, 1972**

[21] Appl. No.: **317,602**

[52] **U.S. Cl.** ..... **187/29 R**

[51] **Int. Cl.** **B66b 13/24**

[58] **Field of Search** 187/29

[56] **References Cited**

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3,726,364 4/1973 Citrin et al. 187/29

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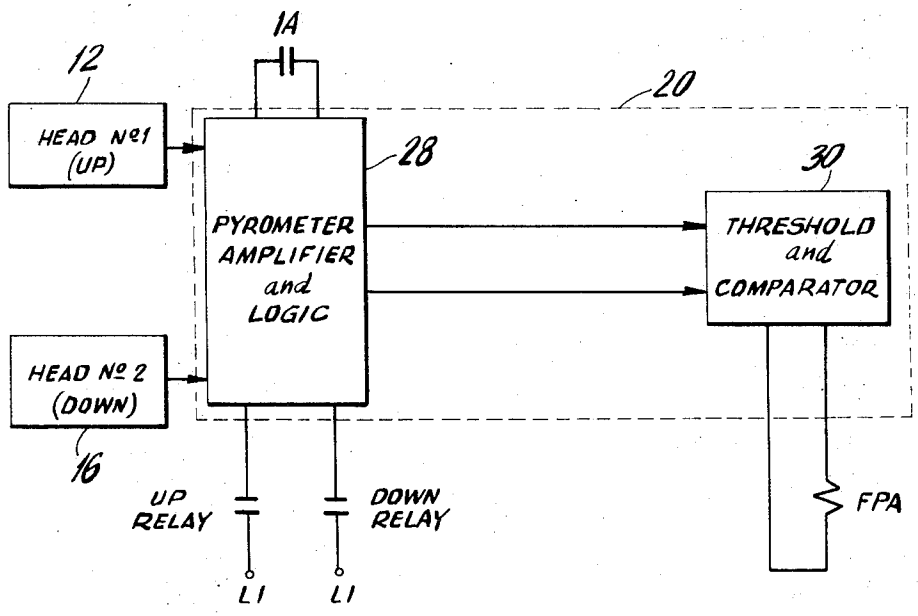
A.N.S.I., "Safety Code for Elevators" pp. 296–297.

Primary Examiner—Bernard A. Gilheany
Assistant Examiner—W. E. Duncanson, Jr.
Attorney, Agent, or Firm—Nichol M. Sandoe et al.

[57] **ABSTRACT**

A sensor mounted on an elevator car senses the heat developed in the adjacent hallway as the car moves between the floors of a building. The heat sensor is connected to a relay circuit to operate a relay which prevents the car door from opening at any floor whenever excessive heat is sensed as a result of a fire in the hallway. That relay may also be employed to operate, when it is actuated in response to the detection of excessive heat, a fireman's return circuit to recall the elevator car to the lobby floor, and to provide an indication at the lobby floor of the existence and location of the fire.

15 Claims, 15 Drawing Figures



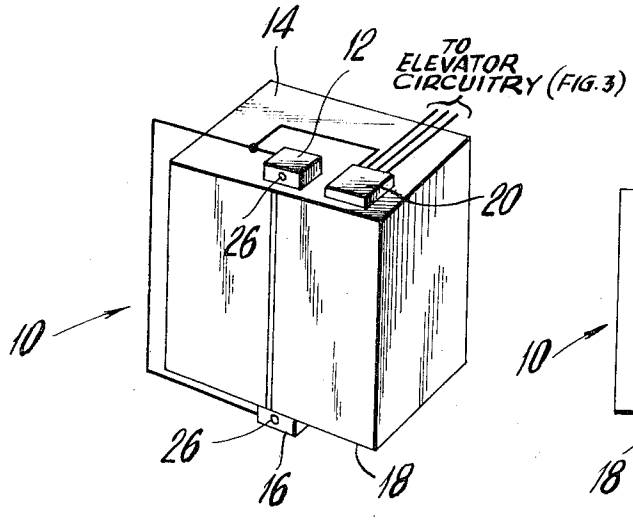


FIG. 1

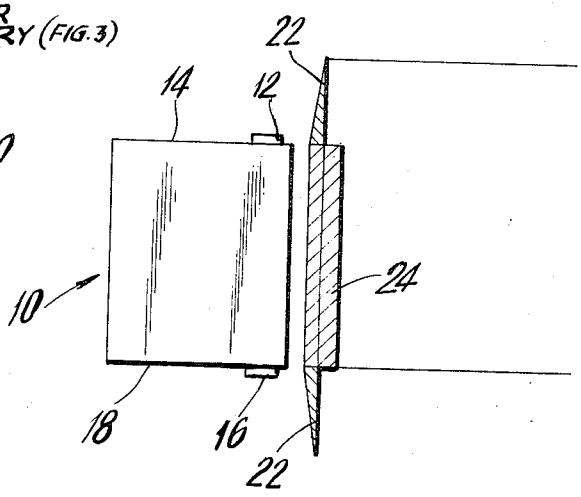


FIG. 2

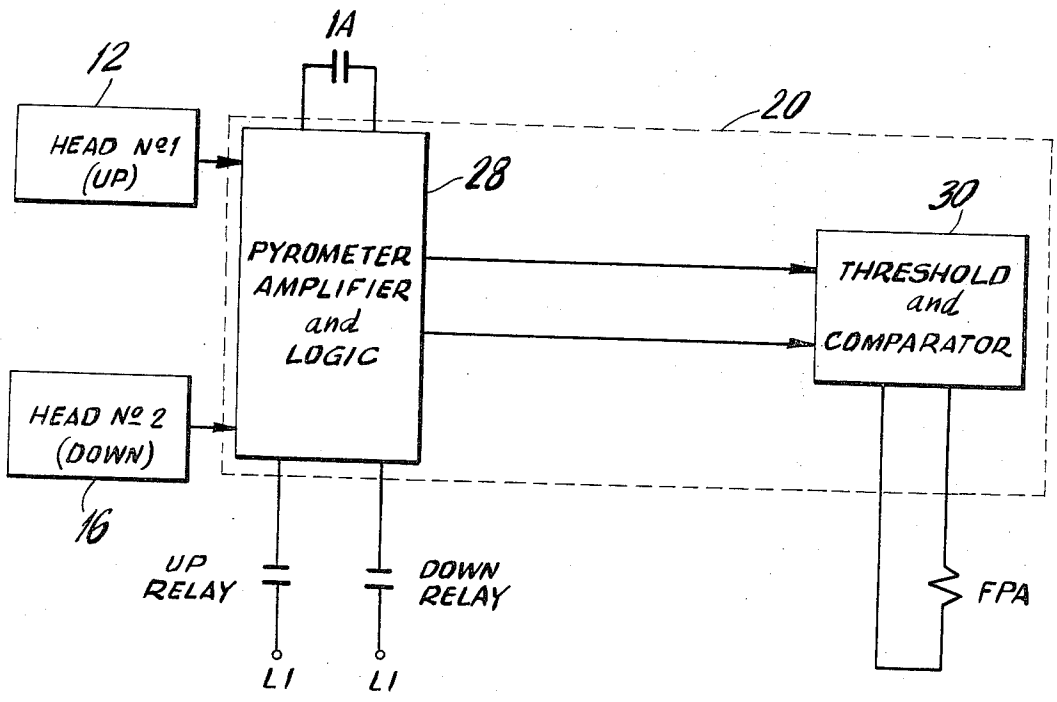


FIG. 3

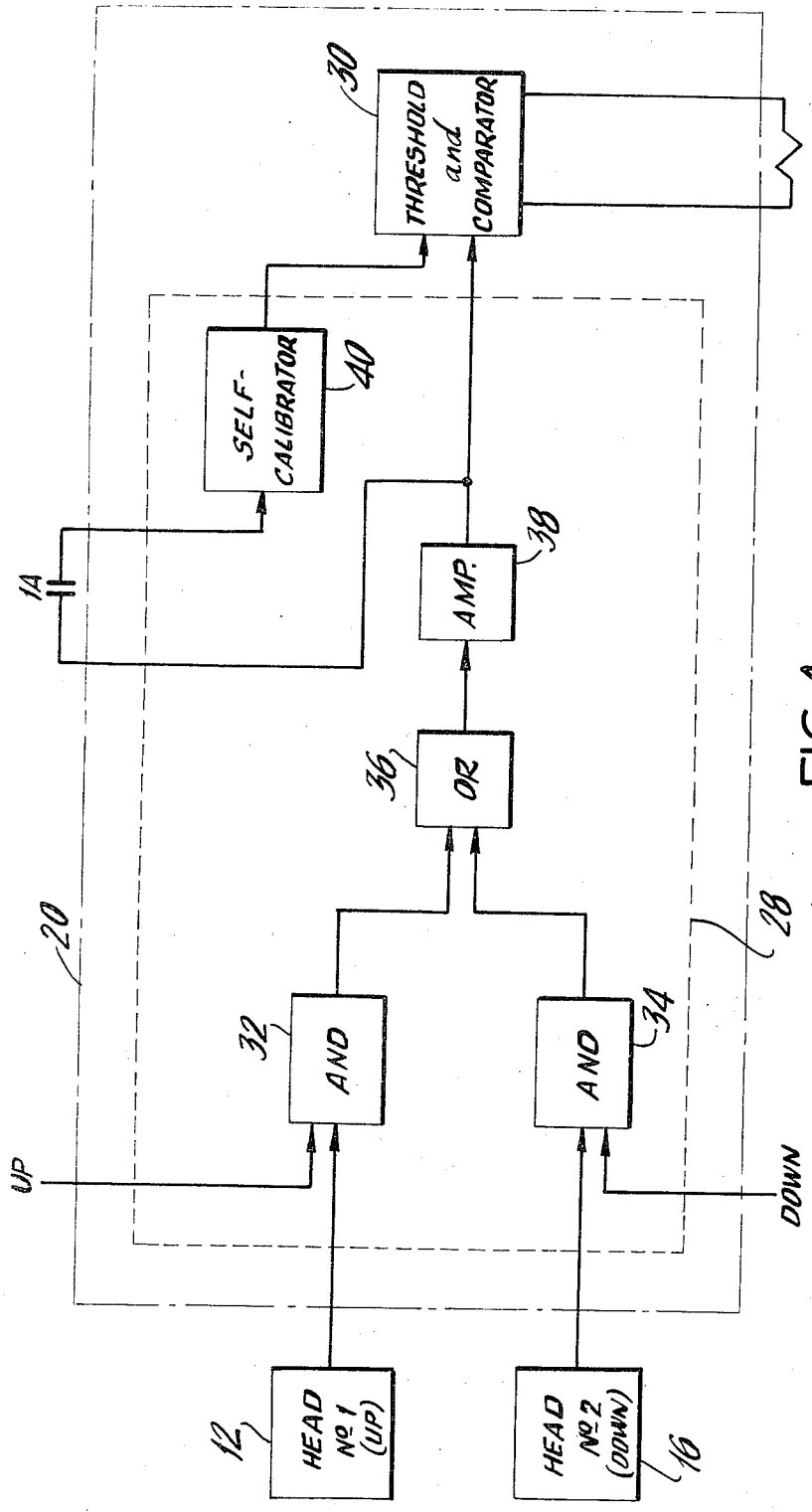


FIG.4

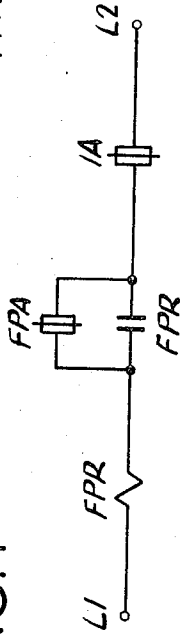


FIG.6

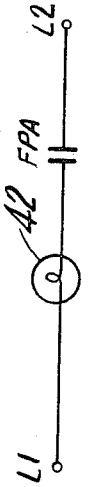


FIG.5

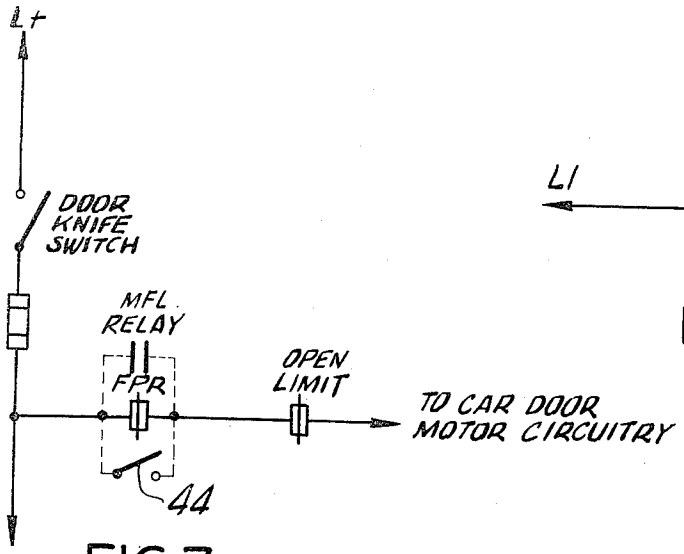


FIG. 7

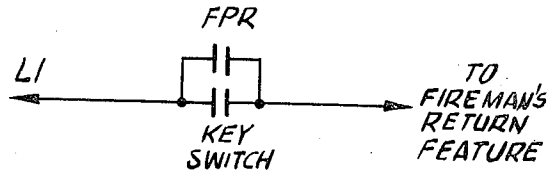


FIG. 8

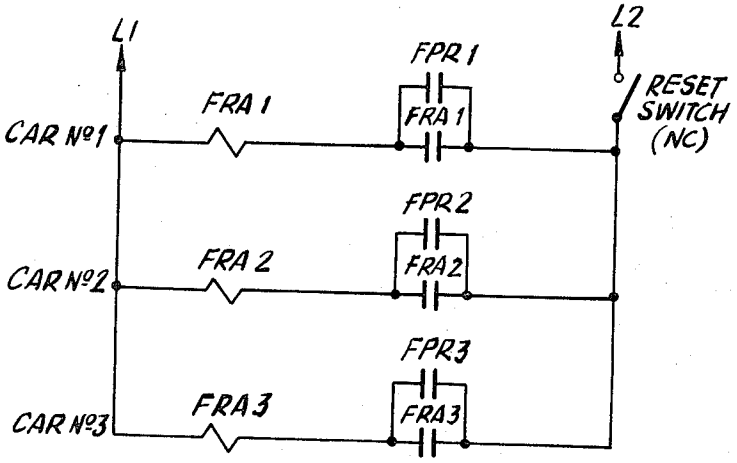


FIG. 9

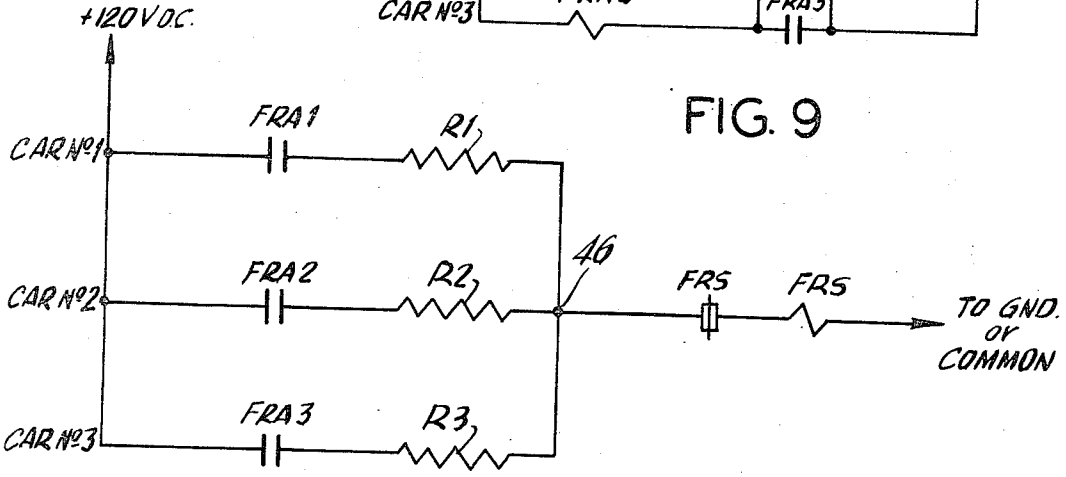


FIG. 10

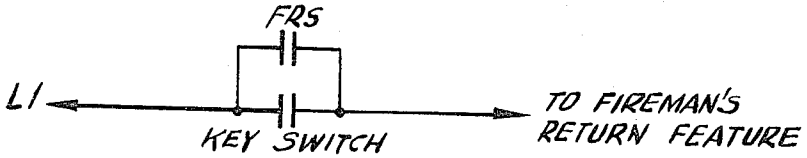


FIG. 11

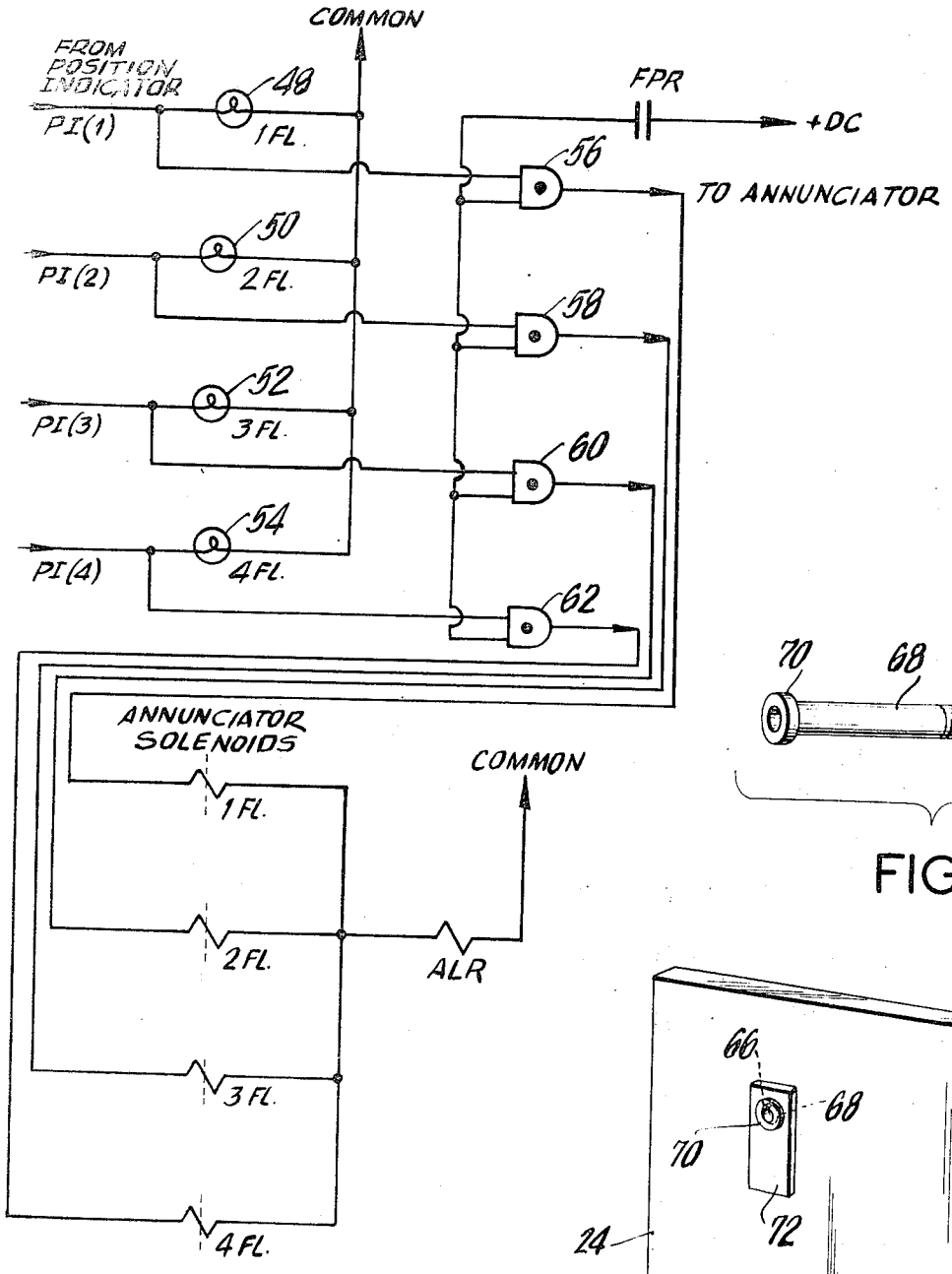


FIG.12

FIG.15

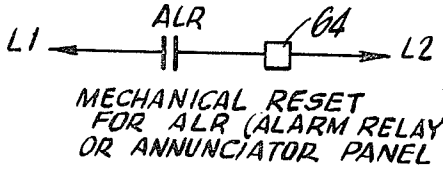


FIG.13

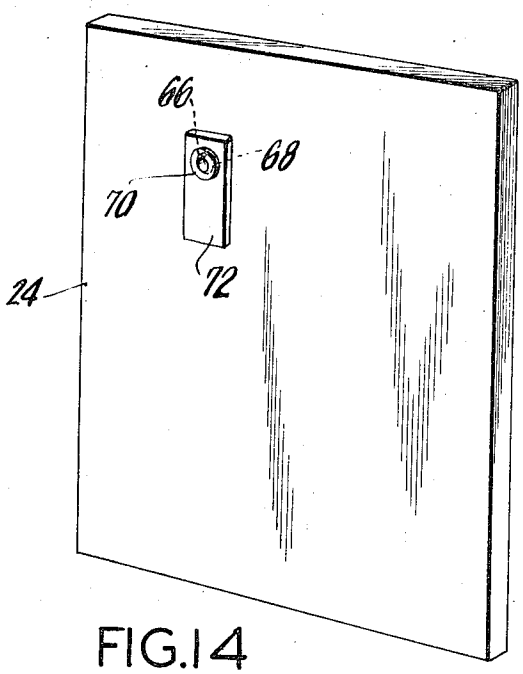


FIG.14

ELEVATOR SAFETY CONTROL CIRCUIT FOR PREVENTING ELEVATOR DOOR FROM OPENING AT FLOOR WITH FIRE

The present invention relates generally to protective devices for elevator systems, and more particularly to a fire detection and elevator control circuit which prevents the opening of the elevator car door at any landing or floor at which a fire has been detected.

Recent tragic events in office buildings in New York City and other large cities, in which riders in an elevator car were trapped in the car during a fire, have dramatically demonstrated the need for improved safety controls for automatic elevators in the event of a fire in the building.

In the operation of a conventional automatic elevator system, the elevator car is sent to a floor in response to either a floor selection made by pressing an up or down call button at any floor (hall call), or by pressing the appropriate button on a floor-select panel located within the elevator car (car call). In the event that a fire breaks out at a floor in the building and a car call is made for that floor, the elevator car will be sent to that floor, and the car door (and hall door as well) will open. If the doors are not seriously affected by the heat, the doors will close after a predetermined period, typically 15 seconds, and the car and its passangers will be moved away from the floor to safety.

However, in the event of a sufficiently high temperature at the floor caused by a fire, the car door once having opened may expand and buckle, and may thereafter, along with hall door, be prevented from closing. If this should occur, the elevator car will be unable to move away from the floor and any individuals in the car will be trapped therein with possible tragic results.

In application Ser. No. 117,561, now U.S. Pat. No. 3,726,364, there is disclosed a system for preventing an elevator from responding to a car call to any landing at which there is a fire. In the system therein disclosed, a heat sensor-switch is located at each landing near the hall call buttons. When excessive heat is sensed, the floor and car call relays for that particular landing are disabled to prevent the elevator car from stopping at the floor.

That system has proven to be highly adequate for achieving its intended purposes, but is most effective in the design and installation of a new automatic elevator control system. That is, it is difficult and relatively expensive to modify an existing elevator control system to incorporate the safety system of said application, particularly because the sensors and the accompanying relay control circuitry and components must be installed at the hall call buttons at each floor in the building.

It is, therefore, an object of the invention to provide an improved, less complex, and highly reliable elevator safety control system.

It is another object of the invention to provide an elevator safety control circuit which can be readily incorporated into an existing elevator control system.

It is a further object of the invention to provide an elevator safety control system in which a failure in the heat sensor circuit is immediately noticed such that reliable operation is ensured when needed in the event of a fire.

It is yet a further object of the invention to provide an elevator safety control system of the type described

which can be readily adapted to return the elevator car directly to the lobby floor when a fire is detected at any floor, and to provide an immediate indication of the occurrence and location of the fire.

It is yet another object of the present invention to provide an elevator safety control system of the type described which is highly reliable in use over long periods of time and unlikely to experience failure.

In the elevator safety control system of the invention, a heat sensor is placed on the elevator car and senses heat in the adjacent hallways as the car moves between floors. When the car approaches a floor at which there is a fire, the signal produced by the sensor exceeds a preset threshold level and operates a relay, herein designated as a fire protection relay, to thereafter prevent the car door from opening at the floor at which the fire is detected.

In the embodiment of the invention herein specifically disclosed, the heat sensor is in the form of an optical pyrometer which produces an electrical signal in response to the ambient temperature. For improved performance, one pyrometer sensor is mounted on the roof of the elevator car and a second pyrometer is mounted under the car such that quick detection of the fire can be achieved irrespective of the direction of movement of the car between floors. If desired, the fire protection relay may also be connected with additional relay circuitry to return the car to the lobby floor upon the detection of a fire at any floor, and to also indicate the occurrence and location of the fire.

To the accomplishment of the above and to such further objects as may hereinafter appear, the present invention relates to an elevator safety control circuit, substantially as defined in the appended claims and as described in the following specification taken together with the accompanying drawings, in which:

FIG. 1 is a schematic perspective view of an elevator car having heat sensors mounted thereon in accordance with one embodiment of the invention;

FIG. 2 is a schematic elevation partly in cross-section of the elevator car of FIG. 1 in proximity to a hall or shaftway door;

FIG. 3 is a schematic diagram, partially in block form, of the sensor and relay energizing circuitry of the invention;

FIG. 4 is a schematic block diagram of the sensor and relay logic of the circuit of FIG. 3;

FIG. 5 is a schematic diagram of the indicator circuit of the system;

FIG. 6 is a schematic diagram of the relay energizing circuit of the system;

FIG. 7 is a schematic relay diagram of the car door control circuit of the system;

FIG. 8 is a schematic diagram of a fireman's return circuit that may be incorporated into the system;

FIGS. 9–11 are schematic relay diagrams of alternate fireman's return control circuits that may be employed in a multi-car system according to the invention;

FIGS. 12 and 13 are schematic diagrams of a multi-floor indicator and alarm circuit that may be incorporated in the system of the invention;

FIG. 14 is a perspective view of a shaftway door as it may be modified for use with the system of the invention; and

FIG. 15 is a cross-section of the shaftway door taken across line 15—15 in FIG. 14.

The present invention is directed toward an improved fire safety system for use in an automatic elevator system, in which one or more elevator cars move vertically within a shaftway between the floors or landings of a building. Movement of the car between the first or lobby floor and the top floor is controlled either by floor select buttons arranged in a panel within the car (car calls), or by up and down call buttons located at each landing (hall calls). The hall call buttons are commonly located adjacent the hall doors which open upon the opening of the car door when the car has responded to a call to that floor.

In the system of the invention, when excessive heat is sensed at any floor by means of a heat sensor carried on the car, the elevator car door is prevented from opening at the floor, thereby preventing unwary passengers in the car from being trapped at a floor at which there is a fire.

As shown in FIGS. **1** and **2**, an elevator car carries a heat sensor **12** above its upper wall or roof. To increase the reliability of the system, and as shown in FIGS. **1** and **2**, a second heat sensor **16** is mounted under the floor **18** of the elevator car. The output signals from heat sensors **12** and **16**, which are here shown in the form of optical pyrometers, are connected to amplification and threshold circuitry **20**, the outputs of which are connected to car door control relay circuitry in a manner more completely described in a later part of this specification.

As shown in FIGS. **1** and **2**, sensors **12** and **16** are located at the forward end of the car and are in alignment with the facias **22** (which extend from each end of the elevator hall door **24**) when the elevator car comes to rest at a floor.

As shown in FIG. **1**, the optical heads **26** of the heat sensors are directed along an axis that is substantially normal to the direction of movement of the elevator car, and may, if desired, be placed at a slight angle to increase the sensing area of the head with respect to the walls of the shaftway door.

As shown in FIG. **3**, the output signals of sensors **12** and **16**, which are in the form of electrical voltages having amplitudes substantially proportional to the heat sensed by the individual sensing heads, are applied to a pyrometer amplifier and logic circuit **28**, the outputs of which are in turn connected to the two inputs of a threshold and comparator circuit **30**.

The coil of a fire protection actuator (FPA) relay is connected across the output of threshold and comparator circuit **30**.

The amplifier and logic circuit **28**, as shown in greater detail in FIG. **4**, includes AND gates **32** and **34** each of which has one input respectively receiving the output from sensors **12** and **16**. The other input to AND gate **32** is an UP enabling signal applied through the normally open UP relay contacts (FIG. **3**) when the elevator car is moving in the up direction to higher floors. Similarly, the other input to gate **34** is a DOWN enabling signal received through the normally open DOWN relay contacts whenever the elevator car is moving in the down direction to the lower floors.

The outputs of gates **32** and **34** are applied to the inputs of an OR gate **36**, the output of which is applied to the input of an amplifier **38**. The output of the amplifier is connected to one input of threshold and comparator circuit **30** and also through the normally closed contacts of the **1A** (first step of acceleration) relay to the input of a self-calibrator circuit **40**. The output of self-calibrator circuit **40** is connected to the second input of threshold and comparator circuit **30**.

In the operation of the system illustrated in FIGS. **1–4**, sensors **12** and **16** ride along the elevator shaft with the car and sense the heat in the shaftway. During normal operation, that is, when there is no abnormal heat such as produced by a fire, the output of sensors **12** and **16** and thus the inputs to threshold and comparator circuit **30** are at a normal level, and the output of circuit **30** is at a first or go condition in which sufficient current is caused to flow through the FPA relay coil to thereby energize the FPA relay.

When the car is moving upwards, AND gate **32** is enabled by the presence of the UP signal at one of its inputs, and gate **34** is disabled. The output of sensor **12** is applied through AND gate **32** and OR gate **38** to the input of amplifier **38**. When the elevator car is moving in the down direction, gate **34** is enabled by the presence of the DOWN signal at its input and gate **32** is disabled, so that the output of sensor **16** is applied through gates **34** and **36** to the amplifier.

To make the system insensitive to changes in the ambient temperature in the shaftway, a self-calibration circuit **40** is incorporated into the system to ensure that the system responds only to excessive temperatures such as caused by a fire rather than to normal temperature variations. The output of amplifier **38** is applied to the input of self-calibration circuit **40** during the approximately **3**-second period during which the contacts of the **1A** relay are closed, that is the period in which the elevator car goes from a rest condition at a floor to the next adjacent floor. During this period, the output of the amplifier, which is proportional to the ambient temperature sensed by the sensor, is applied to the self-calibration circuit which stores that signal, such as by charging up a capacitor to the level of the amplified signal, such that an ambient reference voltage is stored in circuit **40** and applied to one input of threshold and comparator circuit **30**. The ambient reference voltage is reestablished at circuit **40** each time the acceleration **1A** relay is energized, that is, each time the elevator car leaves a floor at which it had previously come to rest.

When the voltage produced by sensors **12** or **16** and amplified in amplifier **38** is essentially at the same level as the reference ambient voltage, circuit **30** produces a signal at one level corresponding to a go condition. In this state, the FPA relay is energized as described above and the neon light **42** (FIG. **5**) is energized through the normally open FPA contacts.

When the temperature sensed by one of the sensors exceeds the ambient temperature, the output of the sensors increases and the output of amplifier **38** exceeds the ambient reference voltage. When the difference between the amplified output voltage and reference voltage exceeds a preset amount, threshold and comparator circuit **30** is caused to operate in an opposite or no-go condition, and produces a signal at a second level at which the FPA relay coil is deenergized and neon light **42** is extinguished.

As shown in FIG. **6**, the energizing coil of the FPR (fire protection) relay is connected in series with a parallel combination of the normally closed FPA contact and a normally open FPR contact, and the normally closed **1A** (acceleration) contact. Accordingly, when the FPA relay is deenergized upon the sensing of an excessive or abnormal temperature, the FPR coil is ener-

gized through the normally closed FPA contacts, and is maintained in the energized state through its own contacts so long as the elevator remains at the floor; that is, until the 1A relay is energized to open the series-connected 1A normally closed contacts.

As shown in FIG. 7, normally closed FPR contacts are placed in series between the supply voltage line L+ and the car door motor control circuitry, which may take any one of several conventional forms and is therefore not shown in the drawing nor further described herein. In parallel with the FPR contact are the normally open MFL (main floor) contacts, and an override switch 44. Conventional, normally closed open limit contacts are in series between the FPR contacts and the car door motor circuitry.

It will be appreciated that in order for the car door to open when the elevator car arrives at a landing, the FPR relay must be deenergized. That is, when the FPR relay is energized, in response to the deenergization of the FPA relay when excessive heat or temperature is sensed in the manner described above, the application of the L+ supply voltage to the car door motor is prevented and the car door, and hall door as well, thus cannot open at any floor at which a fire has been detected.

Under a fire condition, the elevator car, with its door maintained closed to protect the passengers from the fire, will remain at the floor for approximately 15 seconds, after which the car will leave the floor in response to car or hall call made for service to another floor. At this time, the 1A relay is energized which in turn deenergizes the FPR relay. As the car leaves the hot fire zone, the outputs from the heat sensors return to their normal, ambient levels, and the FPA relay is once again energized. At the same time, the self-calibrating circuit 40 is reset through the closed 1A contacts, as described above.

In the unlikely event that any component in the fire control system, such as the amplifier, threshold and comparator circuit, or the FPA coil should fail, a condition will result that is similar to that which occurs upon the detection of a fire. That is, upon a failure in the control system, the FPR relay is energized so that the elevator door will not open at any floor. When the car returns to the main floor, the MFL relay (FIG. 7) is energized to bypass the FPR relay and allow the car door to open to release passengers. This failure condition will be quickly brought to the attention of the building maintenance man who will quickly notice that neon light is extinguished and that the safety unit is defective. The maintenance man then operates the override switch 44 (FIG. 7) to bypass the safety circuit to restore normal elevator operation and permit the faulty safety circuit to be repaired or replaced.

A feature of automatic elevator system that is required by law in some states is the fireman's return control, by means of which all elevator cars are caused to return to the main or lobby floor whenever a fire is sensed in the building. In conventional elevator systems, the fireman's return circuit is operated by the operation of a key switch located in the lobby panel. As shown in FIG. 8, in the safety system of the invention, an additional set of FPR contacts is connected in parallel with the key switch contacts between the voltage supply line and the fireman's return circuit. The latter may be of any conventional design and is thus not shown in the drawing or further described herein.

When the FPR relay is energized in response to a fire in the manner described above, the supply line is applied through the closed FPR contact to the fireman's return control to thereby automatically and quickly return the elevator car to the lobby where the car door can be opened to release the passengers.

In a multi-car installation, it may be desired to actuate the fireman's return control to return all cars to the lobby floor only when a fire has been detected by a selected number of the cars. For example, the fireman's return control circuit illustrated in FIGS. 9–11 is operated when at least two of the three elevator cars sense a fire, thus preventing a false alarm should one unit fail (see page 12, line 17). As shown in FIG. 9, an FRA (fire return activate) relay is assigned to each of the cars. The coils of those relays are connected between the L1 and L2 voltage supply lines in series with the parallel-connected, normally open FRA and FPR contacts and a normally closed reset switch. As shown in FIG. 10, the normally open FRA1, FRA2, and FRA3 contacts are respectively connected in series with resistors R1, R2, and R3 between a 120-volt line and a junction point 46. An FRS (fire return sensitive) relay coil is connected in series with a normally closed FRS contact between point 46 and ground or common. As shown in FIG. 11, a normally open FRS contact is arranged in parallel with the conventional key switch contact between the L1 line and the fireman's return circuit. It will be noted that the circuit of FIG. 11 is similar to tahat of FIG. 8 with the FPR relay contacts of that FIG. 8 circuit being replaced by the FRS contact in the FIG. 11 circuit. Thus, in the circuit of FIG. 11, the fireman's return control circuit is operated upon the closing of the FRS contact, and thus upon the energization of the FRS relay, which occurs, as will be described, whenever any two of the three FRA relays are energized.

If the FPR relay is energized for any of the three cars, it will energize the corresponding one of the FRA relays by closing the series path containing the FRA coil between the L1 and L2 lines as can be seen in FIG. 9. When a single FRA relay is thus energized, the current flowing through its closed contact and through the series-connected resistor will be insufficient to energize the FRS relay coil. However, when a second FPR relay is energized to in turn energize a second FRA relay, the current flowing through the second resistor is added to that flowing through the first resistor such that the current in the FRS relay coil is effectively doubled. That increased current is sufficient to energize the FRS relay and with it the fireman's return control circuit. Should all three FRA relays become energized, the current through the FRS coil will be even greater, and, of course, sufficient to energize the FRS relay. The provision of the normally open FRS contact in series with the FRS coil prevents excessive current from damaging the FRS coil.

It may also be desired to include at the building lobby an indicator of the location of the fire detected by the heat sensors, and to provide an alarm to bring the existence of the fire to the attention of the building personnel as quickly as possible. To this end, the system of the invention may additionally include the indicator-alarm circuit shown in FIGS. 12 and 13, which for the sake of simplicity of description, illustrate the circuit for use with a single car operating in a four-story building. It will be apparent that the circuit can be augmented to

operate with additional cars in a building having more than four floors.

The position-indiicator (PI) signals are received from conventional floor-position indicators (not shown) which provide a signal indicating the floor at which the elevator car is located. For example, if the elevator car is located at the second floor, a position signal will be present only at the PI(2) line in FIG. 12.

The PI(1) – PI(4) lines are respectively connected to a common line through indicator lamps 48–54 and to one input of AND gates 56–62. The other input to gates 56–62 is a DC signal applied through the normally closed FPR contacts only when the FPR relay is energized upon the detection of a fire.

The outputs of gates 56–62 are respectively coupled to one terminal of the 1FL – 4FL floor indicator or annunciator solenoids, the other terminals of which are coupled to a common line through the ALR (alarm) relay coil. The ALR relay is preferably of the mechanically self-latching type. As shown in FIG. 13, the normally open ALR contacts are connected in series with an alarm actuator 64 which, when actuated, causes an alarm located at the annunciator panel to sound.

In operation, the sensing of a fire at any floor will cause the FPR relay to be energized to thereby apply an enabling DC signal to one input of each of gates 56–62 through the FPR contact. Depending upon the location of the elevator car, one of the PI lines will have a signal present thereon which signal is applied to the other input of the corresponding AND gate which in turn will produce an output signal.

That output signal is applied to and energizes the corresponding annunciator solenoid to in turn cause an appropriate floor indicator or flag to pop up at the annunciator panel. That signal also causes the operation of an alarm which continues to sound until the ALR relay is mechanically reset.

For optimum operation of the system, the optical heat sensors 12 and 16, which are mounted on the elevator car and move vertically within the shaftway, must be responsive to increased temperatures in the floor lobbies which are separated from the shaftway by the shaftway or hall doors such as 24 in FIG. 2. In many elevator installations, that door may be an excellent heat insulator and would thus effectively reduce the responsiveness of the heat sensors to temperature changes at the floor.

To resolve this possible difficulty, the shaftway door may be modified such as in the manner illustrated in FIGS. 14 and 15 to significantly increase the transfer of heat from the floor through the shaftway to the heat sensors. As therein shown, an opening 66 is formed in the shaftway door and a tube or pipe 68 is snugly fitted within opening 66. The opening may be, for example 9/16 inch in diameter, and tube 68 may be made of aluminum and have an outer diameter of 9/16 inch and an inner diameter of 7/16 inch. Tube 68 has a circular flange 70 at its innner end which seats against the inner wall of the shaftway door.

To increase the transmission of heat from the lobby to the shaftway, a metal plate 72 may be fastened to inner flange 70. To increase the radiation of heat from the shaftway door to the sensors, plate 72 is preferably painted black. Heat access tubes 68 are preferably located at each floor and in vertical alignment with one another along the shaftway. The central axis of the access tubes are preferably in registration with the central axes of the heat sensors whenever the heat sensors pass the fixed heat access plates.

It will be apparent from the foregoing that a highly reliable system has been disclosed for detecting a fire at any floor in a multi-floor building, and to prevent the elevator car door from opening at any floor at which abnormal heat produced by a fire is sensed. In preventing the car door as well as the hall door from opening at a floor at which a fire has been detected, the lives of the passengers in the elevator car, who are unaware of the fire, will be saved in many cases.

To increase the utility of the system, the heat sensor and fire detection circuitry may be combined with a fireman's return operation, and with an alarm and annunciator circuit to provide a practically instantaneous indication of the existence and location of the fire.

Although the heat sensors used in the system of the invention have been herein shown in the form of optical pyrometers, other heat or temperature-responsive devices such as thermistors or infra-red detectors may also be employed to comparable advantage. The system of the invention may be installed at relatively low expanse and with minimum disturbance to any of the presently existing automatic elevator control systems. The safety system of the invention can be employed to equal advantage with either a single-car system or in larger systems employing a plurality of elevator banks.

Thus, while the system of the invention has been herein specifically described with respect to several presently preferred embodiments, modifications to the system that will be apparent to those skilled in the art may be made therein without necessarily departing fro the spirit and scope of the invention.

What is claimed is:

1. In an elevator system for use in a multi-level building including at least one elevator car vertically movable in a shaftway between the levels, said car having a door, and means for opening said door when said car comes to rest at the levels, temperature sensing means mounted on said car door, means for producing an electrical signal that varies in accordance with the temperature sensed by said sensing means, and control means including means coupled to said sensing means for disabling said car door opening means when the temperature sensed by said sensing means exceeds a predetermined value, said control means further comprising threshold means for producing a first signal when said electric signal is below a reference level, and a second signal when said electric signal is greater than said reference level, and switch means coupled to said door opening means, said switch means being placed into a first condition in response to said first signal to enable said door opening means and into a second condition in response to said second signal to disable said door opening means.

2. The system of claim 1, in which said sensing means comprises first and second sensors respectively mounted on the upper and lower walls of the car walls, and means interposed between said sensors and said threshold means for coupling the output of one of said sensors to said threshold means depending on the direction of travel of said car.

3. The system of claim 2, further comprising means for periodically establishing said reference level each time said car is moved away from rest at one of said landings.

4. The system of claim 3, in which said reference signal establishing means comprises signal storing means having an output coupled to said threshold means, and means interposed between said sensing means and said signal storing means and responsive to the acceleration of the car away from a landing to temporarily couple the output of said sensing means to said storing means.

5. The system of claim 4, in which said switch means comprises a first relay energized only when said threshold means produces one of said first and second signals, and a second relay energized in response to the change of state of energization of said first relay, the contacts of said second relay being normally closed and connected in series with a voltage source and said car door opening means.

6. The system of claim 5, further including a fireman's return circuit, said improvement further comprising means for enabling the fireman's return circuit upon the operation of said disabling means.

7. The system of claim 6, including a plurality of elevator cars each comprising temperature sensing means, door opening means, and means for disabling said door opening means upon the detection at the corresponding one of said sensing means of a temperature exceeding a predetermined value, said fireman's return enabling means being operated in response to the detection of a temperature exceeding said predetermined value at at least two of said cars.

8. The system of claim 6, further comprising means coupled to said disabling means for indicating at which level a temperature exceeding said predetermined value is detected.

9. The system of claim 2, in which said sensing means comprises an optical pyrometer mounted one one of the upper and lower walls of said elevator car and having a sensing axis extending substantially normal to the direction of movement of said elevator car.

10. The system of claim 1, further comprising means for periodically establishing said reference level each time said car is moved away from rest at one of said landings.

11. The system of claim 1, in which said switch means comprises a first relay energized only when said threshold means produces one of said first and second signals, and a second relay energized in response to the change of state of energization of said first relay, the contacts of said second relay being normally closed and connected in series with a voltage source and said car door opening means.

12. The system of claim 1, further including a fireman's return circuit, said improvement further comprising means for enabling the fireman's return circuit upon the operation of said disabling means.

13. The system of claim 12, including a plurality of elevator cars each comprising temperature sensing means, door opening means, and means for disabling said door opening means upon the detection at the corresponding one of said sensing means of a temperature exceeding a predetermined value, said fireman's return enabling means being operated in response to the detection of a temperature exceeding said predetermined value at at least two of said cars.

14. The system of claim 1, further comprising means coupled to said disabling means for indicating at which level a temperature exceeding said predetermined value is detected.

15. The system of claim 1, in which said sensing means comprises an optical pyrometer mounted on one of the upper and lower walls of said elevator car and having a sensing axis extending substantially normal to the direction of movement of said elevator car.

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