United States Patent

[11] 3,598,202

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[21] Appl. No. **787,979**
[22] Filed **Dec. 30, 1968**
[45] Patented **Aug. 10, 1971**
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[54] **ELEVATOR DOOR CONTROL**
18 Claims, 5 Drawing Figs.

[52] **U.S. Cl.** **187/48,** 187/51, 187/57, 187/61, 49/1
[51] **Int. Cl.** **B66b 1/00**
[50] **Field of Search** ..... 187/51, 52, 57, 58—61, 48; 49/1, 3, 7, 8, 116, 118, 379

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ABSTRACT: In response to excessive heat on the corridor side of an elevator hatch door, a spring-loaded plunger is released which repositions the hatch door driving block associated with the master door operator so that the hatch door is not automatically unlocked and opened by the vane carried on the car door when the car door is opened adjacent the associated landing. The hatch door can still be opened manually by an occupant of the car who releases the locking mechanism by rotating the driving block against the force exerted by the plunger.

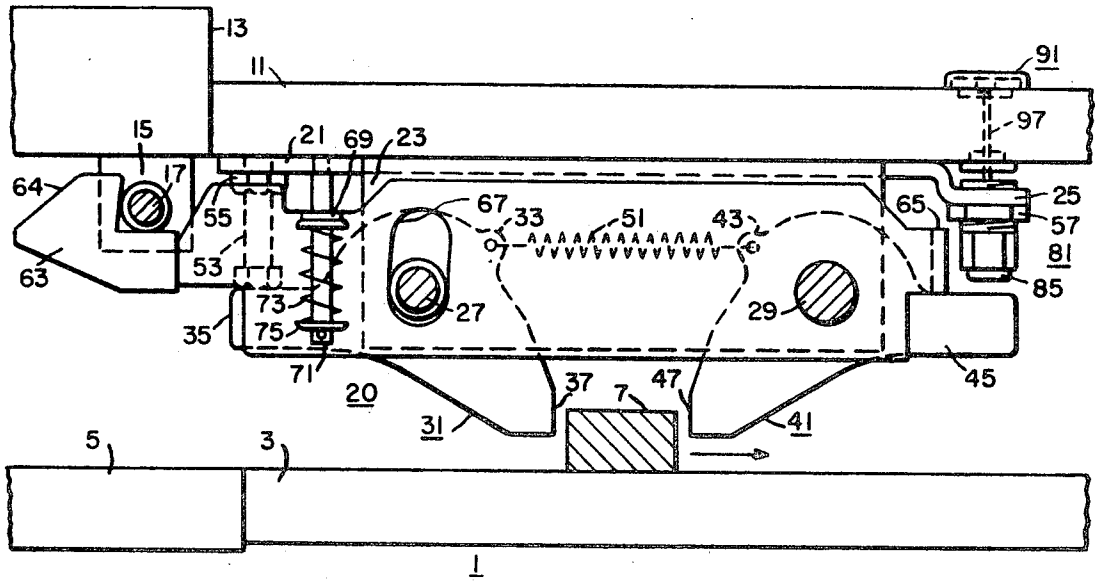


FIG. 2

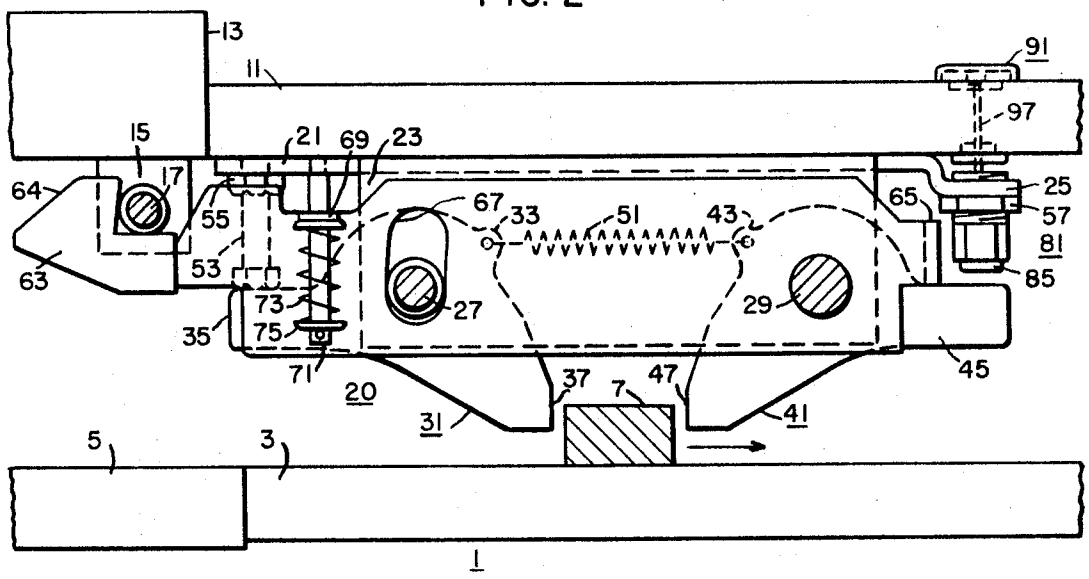


FIG. 1

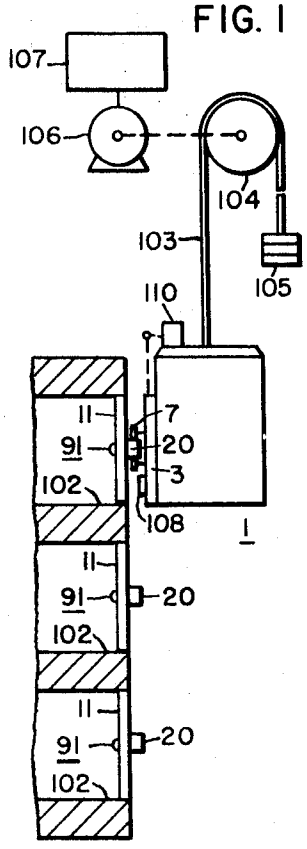


FIG. 3

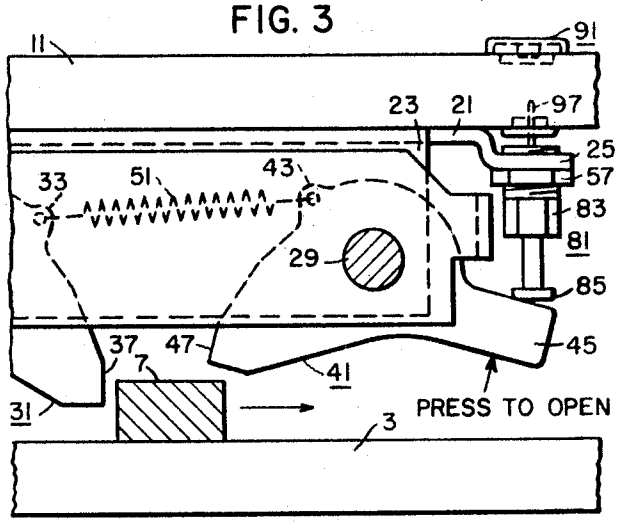


FIG. 4

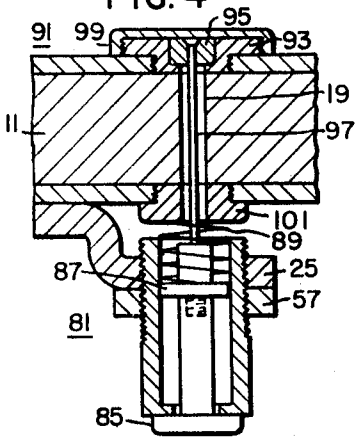
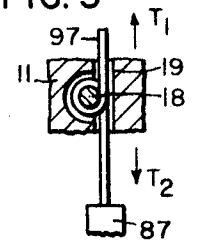


FIG. 5



WITNESSES

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ELEVATOR DOOR CONTROL

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to transportation systems wherein a vehicle moves in a predetermined path relative to a number of fixed stations or landings and is particularly applicable to an elevator system utilizing a master door operator to control operation of the hatch doors at each landing.

2. Description of the Prior Art

In most elevator systems today the operation of the car doors and hatch doors is controlled by the supervisory system. This is generally true whether the car is attendant operated or self-operated by the passengers. In general the modern day supervisory system is responsive to inputs such as the registration of car calls and corridor calls, perhaps to the loading of the cars and in some instances to the time of day. Although some of the systems are also responsive to other inputs such as a command to bypass certain calls, none of the present day systems are responsive to the environmental conditions existing at the various landings.

One very critical environmental condition which may be present is the existence of a fire at one or more of the landings. It can be appreciated that occupants of an elevator car could be severely injured by the blast of hot gases and flames to which they would be exposed if the doors to the car were to be opened at a floor at which a fire was raging. If the fire were severe enough, the passengers could be overcome before the doors could be closed again. In any event it would be a very unpleasant experience.

It is common practice today to utilize a master door operator to control movement of the car door and the hatch doors. By utilizing the car door operator to also operate the hatch door adjacent the position of the car, the need for separate door drives at each landing is eliminated. A vertical vane carried on the car door slides into coupling relationship with drive blocks mounted on the hatch door as the car approaches the associated landing. As the car door is opened, the vane acting on the driving block on the associated hatch door simultaneously opens the hatch door.

SUMMARY OF THE INVENTION

In its broadest sense the subject matter of this invention relates to the modification of the elevator control system in response to the presence of predetermined environmental conditions at landings served by the elevator car. Such environmental conditions can include the presence of toxic fumes, fire, radiation, darkness etc. The modifications to the control system can include the sounding of an alarm, the cancellation of car calls for that landing and even cancellation of corridor calls if the conditions were serious enough to greatly reduce the possibility of the survival of a prospective passenger under the existing conditions, the dispatching of cars to the afflicted landing or the termination of door operation at the afflicted landing, etc. In addition, the modification to the control system can include the disabling of the photoelectric detectors commonly used to delay closing of the doors when there is an obstruction in the entranceway. Heavy smoke associated witH building fires can become dense enough to prevent the doors from closing thereby effectively stalling the car with the doors open. A microswitch operated by the sensor could be utilized to disable the photoelectric detector when the temperature approaches that which would be associated with a fire. Such modifications could be utilized singly or in combination of course.

The invention therefore basically calls for a sensor to sense the predetermined environmental condition and an actuator responsive to the sensor to affect modification of the control system.

In the preferred embodiment of the invention a heat responsive detector located at each landing is effective to trip an actuating mechanism when the temperature on the corridor side of the hatch door reaches a predetermined value which would normally be associated with a fire. The actuating mechanism is effective in turn to decouple the associated hatch door from the master door operator to prevent the automatic opening of the hatch door at that landing. A plug formed of an alloy with a low melting point is placed in a receptacle on the corridor side of of each hatch door. A cable imbedded in the alloy holds the plunger of an actuating mechanism in the seated position against the biasing force of a spring tending to extend the plunger. If the heat on the corridor side of the hatch door exceeds the temperature which would normally be associated witH a fire (in any event a temperature far in excess of the normal ambient air temperature for the landing), the plug melts or softens thereby releasing the cable. Under the influence of the spring the plunger is extended. The plunger is so oriented with respect to the driving block against which the vane on the car door operates to open the associated hatch door, that this driving block is rotated to a position in which it is not engaged by the vane when the car door is opened.

The hatch door coupling device disclosed incorporates a hatch door lock to ensure that the door cannot be opened from the corridor side when the car is not present at that floor. Initial horizontal movement of the vane against the opening drive block on the hatch door serves to rotate the coupling mechanism so that the door is unlocked. It is apparent that with the car door open the hatch door coupling and locking mechanism is exposed to passengers within the car. By rotating the opening drive block against the force exerted by the spring-loaded plunger a passenger in the car, such as a fireman, can unlock the hatch door and open the door manually if so desired. Appropriate warnings of the impending danger and instructions for manually opening the hatch door can be displayed on the hatchway side of the hatch door and/or on the appropriate point at which the force should be applied to manually unlock the doors.

With these considerations in mind it is therefore a first object of the invention to provide an improved elevator control system which is responsive to environmental conditions at the various floors.

It is a second object of the invention to provide an improved elevator system such as that described in the first object which is effective to prevent the opening of the hatch door at a landing at which a fire exists.

A third object of the invention is to provide an improved elevator system such as that described in the previous objects wherein the modification to the system can be overridden manually by a passenger within the car.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a diagrammatic side view with parts broken away of an elevator system embodying the subject invention;

FIG. 2 is a plan view of an elevator hatch door coupling mechanism incorporating the subject invention with parts shown in the unoperated position;

FIG. 3 is a plan view of a portion of the mechanism of FIG. 1 with parts shown in the operated position;

FIG. 4 is a detailed view in section of a portion of the mechanism shown in FIGS. 2 and 3; and

FIG. 5 is a view in section of a modification of a portion of the mechanism shown in FIG. 4.

DESCRIPTION OF THE PREFERRED EMBODIMENT

According to the preferred embodiment of the invention, an elevator car 1 is mounted for movement relative to a plurality of landings 102 through a cable 103 reeved over a sheave 104. Connected to the other end of the cable 103 is a counterweight 105. The sheave 104 is driven by suitable motive means 106 responsive to control means 107 familiar in the art.

The elevation car 1 has a door 3 which is operated by master drive means 110 mounted on top of the car. In addition, hatch doors 11 are provided at each landing. The hatch doors adjacent the position of the car are operated by the

master drive means on the car through a coupling comprising a vane 7 carried on the car door which cooperates with an interlock 20 connected to the appropriate hatch door. According to this invention a sensor 91 mounted on each hatch door is effective to modify operation of the associated interlock under conditions and in a manner to be described below in detail. In one embodiment of the invention, the sensor is effective to modify operation of the widely utilized light beam detector 108 which detects the presence of passengers in the entranceway through interruption of a beam of light projected across the entranceway to a photoelectric cell on the opposite side. The door-operating means and the control means 107 form parts of a control system for controlling the operation of the vehicle.

Turning to FIG. 2 for a more detailed description, the elevator car door 3 closes against a jamb 5. Mounted on the car door 3 and movable therewith is the vane 7. This vane acts as a portion of the coupling device through which the hatch doors are operated by the car door operator. Although most vanes utilized today are of the expanding type and it is contemplated that such a vane would be utilized with the invention, a rigid vane is shown for simplicity.

At each landing the hatch door 11 closes against a jamb 13. Mounted on the hatchway side of each hatch door is an interlock 20 which forms the hatch door portion of the coupling mechanism. Although the invention is adaptable to other types of interlocks, it will be described as incorporating the type of interlock disclosed in the application of Harry Berkovitz, Ser. No. 739,933, filed May 31, 1968, which is a continuation of application Ser. No. 596,929, filed on Nov. 25, 1966, and now issued as U.S. Pat. No. 3,447,637.

The hatch door coupler is mounted on a mounting plate having a vertical portion 21 which is fastened to the hatchway side of the hatch door and a horizontal portion 23 somewhat shorter in length to which are fixed two vertically oriented pins 27 and 29. These pins extend both above and below the horizontal portion of the mounting plate. Drive blocks 31 and 41 are pivotally connected below the mounting plate 23 to the pins 27 and 29 respectively. A spring 51 is connected to projections 33 and 43 on the drive blocks 31 and 41 respectively to maintain the drive blocks in balanced relationship. The drive block 31 has a tail 35 which acts against a stop composed of a bolt 53 affixed to the mounting plate 21 by a locknut 55. A spring 51 tends to rotate the block 31 in a clockwise direction about the pin 27 to maintain the drive block 31 in contact with the stop. The drive block 41 also has a tail 45. The spring 51 tends to rotate the drive block 41 in a counterclockwise direction around the pin 29. With the hatch door in the closed and locked position this rotation is resisted by a vertical tail 65 on the latch 61 which forms a stop for the tail 45 on the driving block.

A latch 61 is pivotally connected to the pin 29 above the mounting plate 23. The latch has a slot 67 which permits it to be moved relative to the pin 27 about the pin 29. A latch hook 63 engages a locking pin 17 connected to the hatch jamb 13 through the mounting bracket 15 when the hatch door is in the closed position. The latch hook 63 is maintained in locking engagement with the locking pin 17 when the hatch door is closed through the operation of a spring 73 acting on a boss 69 of the latch. The other end of the spring 73 is restrained by a retainer 75 on a pin 71 which is connected to the mounting plate 21.

Affixed to a projection 25 on the vertical portion of the mounting plate 21 is an actuator 81. A locknut 57 permits adjustment of the actuator with respect to the mounting plate. Under normal conditions with the hatch door closed the position of the actuator is adjusted so that there is clearance between the head of the plunger 85 of the actuator and the tail 45 of the drive block 41. The extent of the clearance will become evident from the discussion below.

Referring to FIG. 4, the plunger 85 of the actuator 81 is inserted in an aperture in the housing 83. Affixed to the bottom of the plunger is a guide 87 with a shoulder which maintains the alignment of the plunger as it moves from the seated position illustrated in FIGS. 2 and 4 to the extended position illustrated in FIG. 3. The shoulder on the guide also serves as a seat for a spring 89 which tends to urge the plunger 85 toward the extended position, and as a stOp which acts against the lips of the housing 83 to prevent the plunger from overextending.

A sensor 91 is mounted in the hatch door 11. In the preferred embodiment of the invention the sensor is a heat responsive device which is composed of a housing 93 mounted in the face of the corridor side of the hatch door. A receptacle in the face of the housing is filled with a low melting alloy composition which possesses structural strength at normal ambient air temperatures but which melts or softens at temperatures which would be associated with a building fire. A composition of either lead, tin, cadmium or bismuth could be used to give the desired temperature and strength characteristics. Alloys of this sort are used in automatic sprinkler systems. A suitable alloy is Cerrolow 140 which melts at 140° F.

A connector 97 is embedded in the plug 95 and passes through an aperture in the bottom of the housing 93, through a hole 19 in the hatch door, through a guide 101 mounted in the face of the inner side of the hatch door into the opening in the housing 83 where it is connected to the guide 87 attached to the bottom of the plunger 85. The connector is of such a length that it retains the plunger in the seated position when held by the plug. In the preferred embodiment of the invention a cable is used as the connector although a rod would also be suitable. The strength of the plug 95 should be such at normal ambient air temperatures that it can retain the plunger in a seated position against the force exerted by the spring. The operating forces are such that the connector can be retained by swaging it to the plug. The plug 95 may be protected from tempering by a facial plate 99 connected to the housing 93. A metal facial plate will transmit the heat directly to the plug 95.

When the temperature on the corridor side of the hatch door reaches a temperature which would be associated with a fire, the heat is transmitted through the facial plate 99 to the plug 95. As the temperature of the plug 95 rises it begins to lose structural strength and eventually the spring 89 will overcome the retaining force of the plug to drive the plunger 85 to the extended position. It can be seen from FIG. 3 that with the plunger extended it acts against the tail 45 of the drive block 41 to rotate the block around the pin 29 against the force of the spring 51. The length of the plunger is such that in the fully extended position shown in FIG. 3, the drive block 41 is rotated sufficiently so that it is not engaged by the vane 7 carried on the car door when the car door is opened. The hatch door therefore remains closed and locked even through the car door is opened.

Although the sensor described in the preferred embodiment is heat responsive, sensors responsive to other environmental conditions such as toxic fumes, radiation or darkness could be utilized. The requirements are that the sensor be capable of retaining the plunger 85 in the seated position against the force of the spring under normal conditions and be operable to release the plunger so that it may be operated to the extended position by the spring when the abnormal condition occurs.

OPERATIONS

A detailed description of the operating sequence should be helpful in gaining an understanding of the invention. With the hatch door closed and locked the apparatus appears as in FIG. 2 with the latch hook 63 held in locking engagement with the locking pin 17 by the spring 73 acting against the boss 69 of the latch 61. The drive block 31 is held in the position shown by the spring 51 and the stop 53 acting against the tail 35 of that drive block. Similarly the driving block 41 is held in the position shown by the spring 51 and the tail 65 of the latch 61 acting against the tail 45 of that drive block. Assuming that the ambient air temperature at the landing is within the normal range, the plunger 85 of the actuator 81 is held in the seated

position against the force of the spring 89 by the connector 97 embedded in the plug of the sensor 95.

As the elevator car 1 approaches the landing illustrated, the vane 7 connected to the hatch door 3 comes into coupling relationship with the hatch door coupler by sliding between the drive blocks 31 and 41. Sufficient running clearance is maintained between the vane 7 and the drive blocks to permit the vane to move into coupling relationship without binding. When the car door motor (not shown) is energized the car door 3, with the vane 7 attached, begins to move in the direction of the arrow. Initial movement of the door brings the vane 7 in contact with the surface 47 of the drive block 41. Continued movement of the car door in the direction of the arrow causes the drive block 41 to rotate in the counterclockwise direction about the pin 29. The tail 45 of the drive block 41 acts against the tail 65 of the latch 61 to cause the latch to rotate about the pin 29. A slot 67 in the latch permits it to move relative to the pin 27. This rotation of the latch 61 causes the spring 73 to be compressed. The latch 61 continues to rotate in the counterclockwise direction until the latch hook 63 clears the locking pin 17. The latch will rotate until the tail 45 of the drive block 41 comes in contact with the plunger 85 of the actuator. This prevents further rotation of the drive block 41 and consequently the latch 61. The continued movement of the car door and its attached vane in the direction of the arrow therefore causes the hatch door 11 to be moved to the right in FIG. 2 in synchronism with the car door.

When the door close signal is generated the car door operator closes the car door and thence the vane 7 is moved in the direction opposite to the arrow shown in FIG. 2. The vane 7 therefore comes in contact with the drive surface 37 of the drive block 31. This drive block is prevented from rotating in the clockwise direction by the stop 53 and therefore the hatch door moves in synchronism with the car door in the closed direction. With the force in the direction of the arrow removed from the drive block 41, the spring 73 acting against the boss 69 causes the latch to rotate in the clockwise direction to the position shown in FIG. 2. As the hatch door reaches the closed position the angular guide surface 64 of the latch hook 63 comes in contact with the locking pin 17. Continued movement in the closed direction forces the latch 61 to rotate in a counterclockwise position against the force exerted by the spring 73. When the hatch door has been driven to the fully closed position the latch hook 63 snaps around the locking pin 17 under the force exerted by the spring 73 and the coupling mechanism is returned to the condition shown in FIG. 2. As the car leaves the floor the vane 7 moves from its position between the drive blocks 31 and 41 to disengage the coupling mechanism.

Assume now that a serious fire develops in the corridor adjacent the hatch door shown in FIG. 2. As the temperature in the corridor adjacent the door rises, the heat is transmitted to the facial plate 99 at the plug 95 of the sensor 91. As the temperature rises well above the normal ambient air temperature the plug softens and when the temperature reaches on the order of 140° F. the plug softens sufficiently so that it can no longer restrain the connector 97 to hold the plunger 85 in the seated position against the force of the spring 89. The spring 89 therefore pulls the cable 97 out of the plug 95 and forces the plunger out of the housing until the shoulder of the guide 87 is stopped by the lips of the housing 83. The plunger 85 acting on the tail 45 rotates the drive block 41 about the pin 29 to the position shown in FIG. 3. Now when the car comes into position adjacent the floor and the car door begins to open the vane 7 again moves in the direction of the arrow but now does not come into contact with the drive block 41. Therefore, even though the car door opens the hatch door remains closed and locked thereby protecting the occupants of the car from the heat and flames of the fire. It should be noticed however that if the car is standing idle at the floor when the fire occurs so that the vane is already in coupling relationship with the drive blocks 31 and 41 when the sensor is tripped and the plunger of the actuator 85 is extended, the drive block 41 cannot be rotated out of coupling relationship with the vane. Therefore if the door open signal should be generated by a person trapped on that landing the hatch door will be unlocked and opened simultaneously with the car door so that the passenger may enter the car to escape the flames.

Although the hatch door will not be opened automatically with the car door when the sensor at a particular floor has been tripped, the door may still be unlocked and opened manually if the passenger such as a fireman so desires. With the car door opened the hatch door coupler will be fully exposed to occupants of the car. Referring to FIG. 3, if the passenger exerts a force on the tail 45 of the driving block 41 in the direction of the arrow labeled "Press To Open" the plunger 85 will be moved toward the seated position as the spring 89 is compressed until the tail 45 comes in contact with the tail 65 of the latch 61. Continued application of force by the passenger on the tail 45 will cause the latch 61 to rotate in a counterclockwise direction until the door is unlocked. The door may then be pushed to the right in FIGS. 2 and 3 manually to open the door. A suitable placard can be placed on the tail 45 of the driving block 41 to indicate how the door may be manually opened.

If a plug with the desired temperature characteristics does not have the strength necessary to hold the plunger in the seated position against the necessary operating force of the spring 89, a simple mechanical amplifier such as that shown in FIG. 4 can be utilized by wrapping the cable 97 around a pin 18. The force T_1 required to restrain the cable against a force T_2 exerted by the spring can be calculated according to the following well known formula:

$T_1=T_2/_{e^{fb}}$ where f equals the coefficient of friction and b equals the wrap in radians.

When the actuator 81 is utilized in an installation having a radiant energy detector 108 for detecting the passage of passengers through the entranceway of the car, the detection of a fire by the sensor can be adapted to render the radiant energy detector ineffective to delay the closing of the doors. Radiant energy detectors are well known in the elevator field and it is common practice for such systems to have a relay which is energized as long as the beam of radiant energy remains uninterrupted but which drops out when an object interrupts the beam. In such systems, the detector is rendered inoperative by providing means such as a mechanical switch for maintaining the relay energized independently of the radiant energy beam. In order to provide this operation, a microswitch 62*a* in the circuit of the radiant energy detector 108 in FIG. 1 can be mounted so that it is operated by the plunger 85 of the actuator 81 as shown in FIGS. 2 and 3.

The radiant energy detector 108 may be similar to the radiant energy detector of U.S. Pat. No. 2,785,771 and may be controlled by the switch 62*a* in the same manner that the radiant energy detector of U.S. Pat. No. 2,785,771 is controlled by the switch 62.

We claim:

1. A transportation system including a structure having a hatchway with a plurality of landings, a vehicle having door means and mounted for movement in the hatchway relative to the structure to serve the landings, a control system for controlling the operation of the vehicle including the vehicle door means, sensor means for one of said landings operative from a first to a second condition in response to predetermined environmental conditions at the associated landing and modifying means operative in response to the operation of said sensor means to the second condition to modify the operation of the control system.

2. The system of claim 1 wherein the predetermined environmental conditions include the condition that the ambient air temperature at the associated landing is above a predetermined value.

3. The system of claim 1 including hatch door means for each of a plurality of landings to be served by the vehicle, wherein sensor means are provided for each of a plurality of

said landings, wherein said control system includes master door operator means for applying an operating force to the hatch doors to open and close said hatch doors, and wherein said modifying means renders the master door operator means ineffective to apply an operating force to the hatch door means when one of the sensor means is in the second condition.

4. The system of claim 1 wherein the vehicle has an entranceway and wherein the control system includes means for establishing a beam of radiant energy across the entranceway and delay means responsive to interruptions in the transmission of the beam across the entranceway for delaying operation of the control system, said modifying means being operative to disable the delay means when one of the sensors is operated to the second condition.

5. The system of claim 3 wherein the master door operator includes master door drive means mounted on the vehicle and coupling means coupling the master door drive means to the hatch door means at the landing substantially adjacent the position of the vehicle, said modifying means being operative to render the coupling means ineffective to couple the master door drive means to the hatch door means at the landing substantially adjacent the position of the vehicle when the associated sensor means is in said second condition.

6. The system of claim 5 wherein the predetermined environmental conditions under which a sensor means is operated to the second condition include the condition that the temperature on the landing side of the associated hatch door means exceeds a predetermined value.

7. The system of claim 5 wherein the coupling means includes a vehicle-mounted master-coupling member connected to the master drive means and hatch door coupling means associated with a plurality of said hatch door means, said master coupling member assuming a coupling relationship with the hatch door means at a landing as the vehicle approaches that landing, said modifying means being operative to prevent the hatch door coupling means at a landing from assuming said coupling relationship with the master coupling member when the associated sensor means is in the second condition.

8. The system of claim 7 wherein the modifying means associated with each hatch door means comprises an actuator and biasing means operative to bias said actuator to an actuated condition, said actuator being restrained by the associated sensor means to an unactuated condition when said sensor is in its first condition, said restraint being removed when the sensor is operated to its second condition, whereby the actuator will be operated to the actuated condition by the biasing means to prevent the hatch door-coupling means from assuming a coupling relationship with the master-coupling member when said sensor is operated to the second condition.

9. The system of claim 8 including locking means for each of a plurality of said hatch door means for locking the associated door means in the closed position when engaged, said locking means being disengaged upon initial movement of the hatch door-coupling means by the master-coupling means whereby the hatch door at the landing adjacent the position of the vehicle is unlocked by the initial movement of the master drive means when the sensor means at the associated landing is in the first condition and remains locked when the sensor means at the associated landing is in the second condition.

10. The system of claim 9 including means by which a passenger in the vehicle can initiate movement of the hatch door coupling means to disengage the locking means associated with the hatch door means adjacent the position of the vehicle when the associated detector means is in the second condition.

11. The system of claim 7 wherein the vehicle has an entrance way and including vehicle door means for closing and exposing said entrance way, said vehicle door means on which said master-coupling member is mounted being connected to and operated by the master door drive means, whereby the hatch door means at the landing adjacent the position of the vehicle will be opened simultaneously with the vehicle door when the associated sensor means is in the first condition and whereby the hatch door means at the landing adjacent the position of the vehicle remains closed while the vehicle doors open when the associated sensor means is in the second condition.

12. A transportation system including a structure having a hatchway with doorways at a plurality of landings, a vehicle mounted for movement in the hatchway relative to the structure to serve the landings, hatch door means at a plurality of said landings for closing and exposing the associated doorway, master drive means mounted on said vehicle for operating the hatch door means, coupler means for coupling the master drive means on the vehicle to the hatch door means at the landing adjacent the position of the vehicle and detector means operative under predetermined conditions to render the coupler means ineffective to couple the hatch door means at the landing adjacent to the position of the vehicle to the master drive means whereby the associated hatch doors remain closed when the master drive means is operated.

13. The system of claim 12 wherein separate detector means at each of a plurality of said landings are responsive to the temperature on the landing side of the associated hatch door means, and wherein the individual detector means are operative to render the coupler means ineffective to couple the associated hatch door means to the master drive means when the temperature on the landing side of the associated hatch door means exceeds a predetermined value.

14. The system of claim 13 wherein each detector is comprised of an operating mechanism biased to an operated condition and a temperature responsive sensor connected to said operating means, said sensor being effective to retain the operating mechanism in an unoperated condition so long as the temperature at the associated landing remains below said predetermined value, said sensor being ineffective to hold the operating mechanism in the unoperated condition when the temperature exceeds the predetermined value, whereby said operating mechanism will be operated to said operated condition when the temperature at the associated landing exceeds said predetermined value.

15. The system of claim 14 wherein said operating mechanism comprises a housing having an aperture therethrough, a plunger inserted in said aperture and movable relative to the housing between a seated position and an extended position, and biasing means operative to bias said plunger toward the extended position, said operating mechanism being in the operated condition when the plunger is extended.

16. The system of claim 15 wherein said sensor comprises a heat deformable retainer connected to the plunger of the operating mechanism, said retainer being effective to retain the plunger in the seated position against the force exerted by the biasing means at normal ambient temperatures and being ineffective to prevent the biasing means from operating the plunger to the extended position when the ambient temperature reaches the predetermined value.

17. The system of claim 16 wherein the sensor comprises a housing having a receptacle therein rigidly attached to the associated hatch door means, a plug inserted in said receptacle and a connector fixedly attached to the plunger of the operating mechanism, said plug being composed of a material having structural rigidity at normal ambient air temperatures and being deformable when the ambient air temperature rises above a predetermined value, whereby the plunger is held in the seated position through the rigid retention of the connector by the plug at normal ambient air temperatures and whereby the plunger is operated to the extended position through movement of the connector relative to the housing as the plug is deformed under the force exerted by the biasing means when the temperature rises above said predetermined value.

18. The system of claim 17 wherein said housing is mounted with the receptacle in the face of the landing side of the associated hatch door means so that the plug is responsive to the ambient temperature on the landing side of the associated hatch door means.