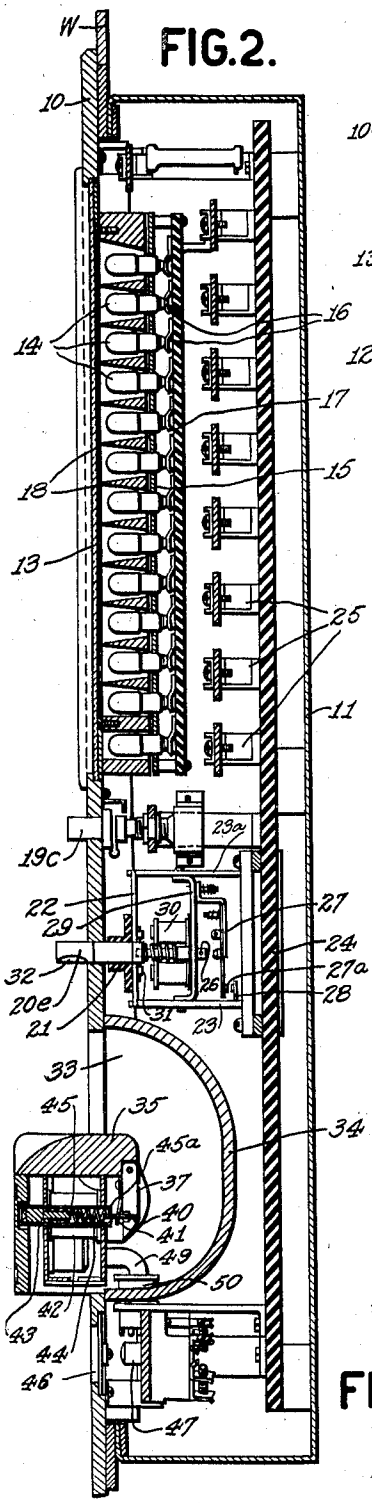
Jan. 4, 1944. H. HADSEL 2,338,582

ELEVATOR SIGNALING SYSTEM

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FIG.2.



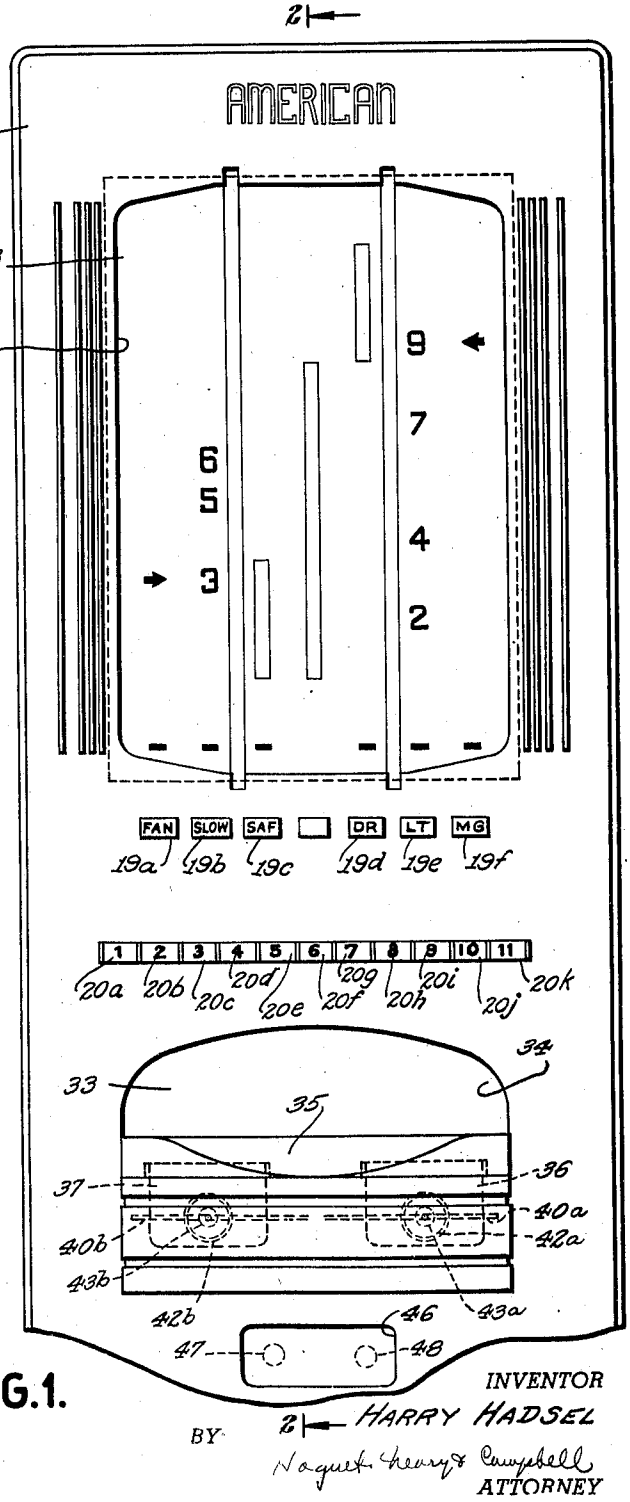


FIG.1.

INVENTOR
HARRY HADSEL
BY Z
Paquet Henry & Campbell
ATTORNEY

Jan. 4, 1944. H. HADSEL 2,338,582

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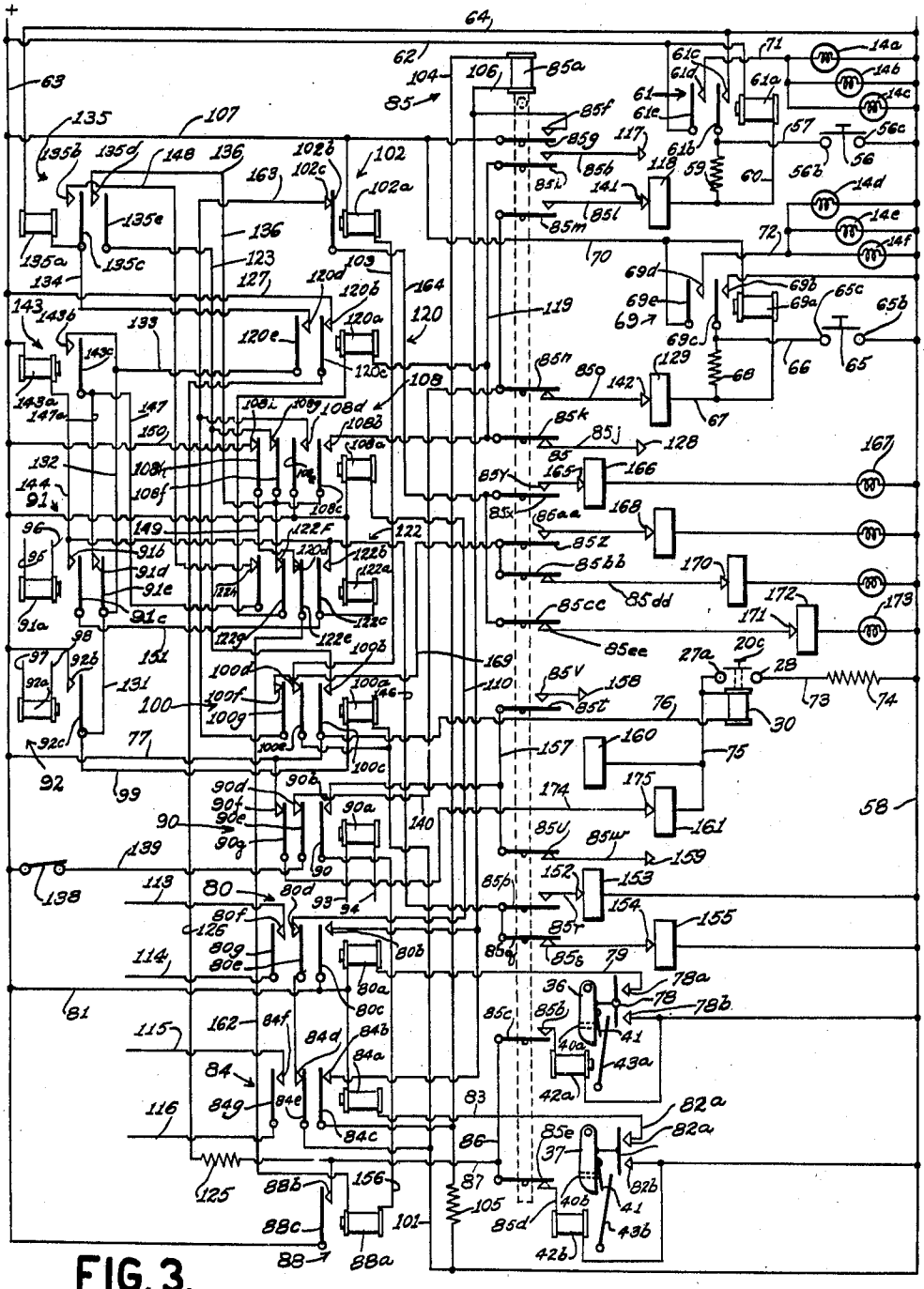


FIG. 3.

INVENTOR.
HARRY HADSEL

BY Hoguet, Fearon & Campbell
ATTORNEY.

Patented Jan. 4, 1944

2,338,582

UNITED STATES PATENT OFFICE

2,338,582

ELEVATOR SIGNALING SYSTEM

Harry Hadsel, Louisville, Ky., assignor to American Elevator & Machine Company, Inc., Louisville, Ky., a corporation of Kentucky

Application December 5, 1941, Serial No. 421,757

14 Claims. (Cl. 187—29)

This invention relates to elevator control systems and relates particularly to a semi-automatic system for controlling the operation of elevators.

The system embodying the present invention includes a control panel or means for causing the elevator car to travel up and down under the control of the operator, such system being adapted to be used with known types of automatic slow-down and car leveling mechanism and circuits to render the stoppage and leveling of the car automatic. The car control system of the present invention is constructed and arranged in such a manner that the operator may be advised both visually and tactilely as to the floors at which he should stop. The system is arranged, in the interests of the operator's efficiency, so that the signals may be disregarded to permit the car to proceed to any desired floor regardless of the signals or to be reversed without disturbing the operation of other cars in the same bank and without disturbing the signaling system. Thus, if the car is full, the operator may disregard signals from intervening floors and proceed to the ground floor to discharge the passengers without disturbing the signal system so that later-arriving cars can be stopped to pick up the passengers at the floors.

More particularly, each car may be provided with a control system which includes the hand rest in convenient relationship to the operator's arm and a pair of adjacent and preferably concealed control members which are movable to cause the car to move up or down. Each of the control members is provided with an impulse element which tactilely informs the operator of his approach to a floor at which a passenger is waiting or to which a passenger desires to be discharged. The impulse elements are actuated by means of a control circuit which is so arranged that tactile impulses are given in a zone sufficiently spaced from a floor that upon prompt release of the control member, the car may be brought to a stop at that floor. The control circuit, moreover, is so arranged that signals cannot be given in zones wherein the car cannot be brought to a stop. Each of the control systems in the cars may be provided with a plurality of floor buttons which set the control circuit in a condition to remind the car operator to stop at the desired floors although not compelling him to do so.

If desired, the control system may include a series of floor indicators controlled by the hall buttons for indicating visually the floors at which stops should be made. Moreover, indicators may be provided for indicating the position of other cars in the bank so that the operator of each car may be advised at all times as to the direction of travel of the other cars and their positions.

Systems of the type embodying the invention have many advantages that are not obtainable by means of the prior fully automatic or fully manually controlled systems. For example, inasmuch as each car is under the control of its operator, only, who is best informed as to the number of passengers in his car, the operator may disregard signals at different floors to expedite the movement of the passengers. Moreover, he may reverse the direction of travel of the car at any point if it is more efficient to do so or to use the car in shuttle service at the rush hour.

The signaling system is such that the operator can respond almost subconsciously to the signals and for that reason can duplicate the results of fully automatic systems while at the same time permitting greater freedom and flexibility of operation than is possible with such fully automatic systems.

For a better understanding of the present invention, reference may be had to the accompanying drawings in which:

Figure 1 is a plan view of a typical form of control panel for an elevator car;

Figure 2 is a view in vertical section taken on line 2—2 of Figure 1; and

Figure 3 is a diagrammatic circuit suitable for use with a car panel and system of the type embodied in the present invention.

As illustrated in Figures 1 and 2, the car control panel embodying the present invention may consist of a panel member 10 which is adapted to be supported substantially flush with the wall W of the elevator car. The panel 10 forms a front and closure for a box-like member 11 in which are mounted the various sockets, switches and the like for controlling the operation of the car.

At the upper portion of the panel is an opening 12 in which is received a transparent or translucent member 13 covering the visual signaling means of the device.

The signaling means may be of known type, such as, for example, a plurality of electric light bulbs 14 supported in a suitable socket panel 15 and making contact with spring contact members 16 on a second insulated panel 17 spaced therefrom. The various light bulbs may be used to

indicate the various floors at which passengers are waiting. As viewed in Figure 1, the up car signals "2," "4," "7" and "9" may be in the right hand column and the down car signals "3," "5" and "6" as indicated are in the left hand column. These numerals may be formed of different colors, if desired, and are illuminated by their respective light bulbs 14 so as to be visible to the elevator operator. The center panel of the device may be provided with a section to be illuminated by other light bulbs to indicate the position and direction of travel of the other cars in the same bank. In order to segregate the bulbs one from the other, they may be disposed within a grid 18 adjacent to and underlying the translucent member 13. The above-described construction is conventional, as are the circuits for controlling the lighting of these bulbs, except as will be described hereinafter.

Directly beneath the visual indicating panel may be mounted a plurality of buttons 19*a* to 19*f* which control various car functions and mechanisms, such as, for example, the fan, the door, lights, and a slow operation of the elevator, all of these being conventional in elevator control systems.

A plurality of floor signaling buttons 20*a* to 20*k* are also provided so that the operator may signal for his own information the floor at which the various passengers wish to be delivered. As best shown in Figure 2, the buttons 20*a* to 20*k* are slidably mounted in the panel and pass through an insulated bushing 21 which is supported in a plate 22. The plate 22 is mounted on standards 23 and 23*a* on a back panel 24 which also supports the binding posts 25 for the various light circuits. The control buttons 20*a* to 20*k* are provided with rod-like contacts 26, the ends of which engage with a leaf spring 27 having a contact 27*a* thereon which is movable into engagement with a second contact 28. The leaf spring 27 is mounted on an insulated cross-piece 29 between the uprights 23 and 23*a* while the contact 28 is supported on the upright 23.

Also supported on the cross-piece 29 are electromagnets 30 which cooperate with a metallic armature 31 fixed to the button 20*d* to hold the contacts 27 and 28*a* in engagement until either manually released or until released by the operation of the circuit presently to be described. In the event that the operator inadvertently pushes the wrong button 20*a* to 20*k* it may be withdrawn manually, a recess 32 being provided in the under surface of the button to permit it to be gripped.

Beneath the elevator call buttons 20*a* to 20*k* is a recess 33 formed by a concave housing member 34 joined to the back of the panel 10. Extending across the recess 33 is a hand support bar 35 on which the operator can rest his hand during the operation of the device. At the inner side and disposed principally beneath the hand rest 35 are a pair of control levers 36 and 37, the lever 36 being used to cause the car to move in an upward direction and the control member 37 being used to cause the car to move downwardly. Each of these control levers 36 and 37 controls a switch for actuating the usual motor system for moving the car in the desired direction.

In order to advise the operator of his approach to a floor at which a passenger is waiting or of his approach to a floor corresponding to one of the depressed car call buttons 20*a* to 20*k*, I have provided a tactile signaling means which pulses and informs the operator. As indicated above, this tactile signaling means may consist of similar bars 40*a* and 40*b* extending across the control members 36 and 37 which are normally urged away from the exposed surfaces of the elements 36 and 37 by means of a spring 41 affixed to the rear of each of the control elements. The rear of each of the bars 40*a*, 40*b*, disposed in front of a pair of solenoids 42*a*, 42*b* in each of which is a slidably movable plunger 43*a* or 43*b* actuated by the solenoids to strike the rear of the bars 40*a* or 40*b* and thereby cause a pulse to be delivered to the fingers of the operator on the control lever. The plungers 43*a* and 43*b* are normally retained out of engagement with the bars 40*a* and 40*b* by means of springs 44*a* and 44*b* which engage the front of the plungers 43*a* and 43*b* and an inwardly directed flange 45 on the hollow cores 45*a* or 45*b* in the solenoids.

If desired, another aperture 46 may be provided in the device within which are mounted other control buttons 47 and 48 for acting as "door bypass" and "gate bypass" controls through corresponding switches.

All of the switches, solenoids and lights may be connected by means of a cable 49 to the control system exterior of the car in the usual way. Preferably the instant device is provided with a plug 50 which permits detachment of the cable 49 from the flexible cable running from the exterior system to the car so that the entire panel can be readily installed and removed.

From the preceding description of the control panel of the car it will be clear that the operator of the car can be advised as to the position of the other cars in the bank, the floors at which the passengers are waiting and he can also register the floors at which the passengers wish to be delivered. All of the movements of the car are under the control of the operator by means of the "up" and "down" control levers 36 and 37 described above, and by means of pulsating bars 40*a* and 40*b*, the operator can be advised tactilely as to the floors at which he should stop either in response to operation of a corridor or hall button or the operation of the car call buttons 20*a* to 20*k*.

Illustrative of the manner in which the signaling system operates, reference may be had to Figure 3 which shows a circuit for controlling the various hall lanterns, car lamps, and the impulse signaling means 40 for a device of this character.

It should be understood that the system to be described is to be used in conjunction with any known type of automatic slow-down and car leveling circuit such as, for example, that disclosed in Reissue Patent No. 15,733, to Kersten and Osborne. Inasmuch as such car slow-down and leveling circuits and mechanism do not form a part of the present invention they will not be described herein.

It will be understood that the device, if desired, may be provided with automatically operating car and corridor doors or manually controlled doors for both the car and corridor. These control circuits and elements likewise are not illustrated inasmuch as they do not form a part of the present invention.

The system disclosed in Figure 3 is illustrated as applied only to one floor, for example, the third floor, and to one car control circuit but discloses the floor call-up lamps for three cars in a bank and also discloses the hall lamps for the floor.

In the illustrative circuit, Figure 3, the "up"

corridor push button 56 for a typical floor will, when pressed, engage the contacts 56b and 56c connecting conductor 57 to line 58. Conductor 57 is connected through resistor 59 to conductor 60 which, in turn, is connected to the coil 61a of relay 61. The other side of coil 61a is connected by a conductor 62 to line 63 so that when push button 56 is pressed, coil 61a is energized. Contact 61b is connected to conductor 57 and contact 61c is connected by a conductor 64 to line 58 so that once coil 61a has become energized, a holding circuit is established which will keep coil 61a energized after the "up" button has been released.

Similarly, a "down" corridor button 65 for a typical floor engages contacts 65b and 65c when pressed, connecting conductor 66 to line 58. Conductor 66 is connected to conductor 67 through resistor 68. Conductor 67 connects to the coil 69a of the relay 69. The other side of the coil 69a is connected by a conductor 70 to line 63 so that when the corridor "down" button is pressed, coil 69a is energized. Conductor 66 connects to contact 69c which, when coil 69a is energized, engages contact 69b which is connected to line 58, thus establishing a holding circuit for coil 69a so that it will remain energized after the "down" corridor button has been released.

Elevator up-call lights 14a, 14b and 14c for a bank of three elevators are connected in parallel between the line 58 and a conductor 71 which, in turn, is connected to contact 61d. Contact 61e is connected to line 63 so that when coil 61a is energized, lights 14a, 14b and 14c will be illuminated.

Similarly, elevator down-call lights 14d, 14e and 14f are connected in parallel between the line 58 and the conductor 72 which, in turn, connects to contact 69d. Contact 69e connected to line 63 so that when coil 69a is energized, the down-call lights will be illuminated.

Car-call push button 20c for a typical floor engages, when pressed, contacts 27a and 28. Contact 28 is connected to conductor 73 which, in turn, is connected to one side of resistor 74, the other side of this resistor being connected to line 58. Contact 27a connects to conductor 75, which, in turn, is connected to one side of coil 30. The other side of coil 30 is connected by means of conductors 76 and 77, to the line 63, so that when the car button 20c is pressed, coil 30 becomes energized. Coil 30 retains the contacts 27a and 28 in engagement as explained above.

Operating lever 36 for operating the elevator in an "up" direction closes, when pressed, contacts 78a and 78b of the switch 78. Contact 78b is connected to line 58 and contact 78a is connected to conductor 79 which, in turn, is connected to one side of the coil 80a of the relay 80. The other side of this coil is connected by a conductor 81 to line 63 so that when the operating lever 36 is pressed, coil 80a is energized.

Similarly, operating lever 37 for operating the elevator in a "down" direction engages, when pressed, contacts 82a and 82b. Contact 82b is connected to line 58 and contact 82a is connected to conductor 83 which, in turn, is connected to one side of coil 84a of the relay 84. The other side of coil 84a is connected to the conductor 81 so that when the operating lever 37 is pressed, coil 84a is energized.

Impulse coil 42a for the "up" direction tactile signal is connected on one side to line 58 and on the other side to the contact 85b of the master control relay 85. The contact 85c is connected to conductor 86, the conductor 87 and the contact 88b of the relay 88. The contact 88c of the relay 88 is connected to line 63. When the coil 88a and the coil 85a of the relay 85 are energized, the "up" impulse coil 42a will become energized and exert a magnetic pull on the armature 43a which, in operating, strikes bar 40a, causing it to protrude beyond the surface of lever 36, thus providing a tactile impulse for the operator.

Similarly, the "down" direction, coil 42b is connected on one side to line 58 and on the other side to the contact 85d. Contact 85e is connected to conductor 86. Thus when the coil 88a is energized and the coil 85a is deenergized, the coil 42b will exert a magnetic pull on the armature 43b which, in operating, strikes the bar 40b causing it to protrude beyond the surface of lever 37, thus producing a tactile signal to the operator.

In the illustrative diagram three relays 90, 91 and 92 having coils 90a, 91a, and 92a are shown, which are each energized by the elevator controller as follows: Coil 90a is energized through conductors 93 and 94 from the time that the elevator starts and until it stops. Relay coil 91a is energized through conductors 95 and 96 from the time the elevator starts and until the high speed relay drops out in approaching the floor for which the elevator is to stop. Coil 92a is energized through conductors 97 and 98 from the time the elevator starts and until the elevator has reached an intermediate speed during its approach to the floor for which it is to stop.

The contact 92b of the relay 92 is connected to the line 63 and the contact 92c is connected by a conductor 99 to the coil 100a of a relay 100. The other side of the coil 100a is connected by conductor 101 to the line 58 so that when the coil 92a in energized, coil 100a then becomes energized.

Coil 102a of the relay 102 is connected on one side to line 63 and on the other side to conductor 103 which, in turn, is connected to the contact 100d. The cooperating contact 100e is connected to the conductor 101 so that when cail 100a is not energized, coil 102a will be energized.

The coil 85a of master relay 85 is connected on one side to conductor 104 which, in turn, is connected to resistor 105, the other side of which is connected to line 58. The other side of coil 85a is connected to conductor 106 which, in turn, is connected to contact 84b and 80b of the relays 84 and 80. Contact 80c is connected to the conductor 81 so that when coil 80a is energized, coil 85a will be energized.

Also connected to conductor 106 is contact 85f and since contact 85g is connected by the conductor 107 to line 63, a holding circuit will thus become established for coil 85a after it has become energized. Also connected to conductor 106 is contact 84b and since contact 84c is connected to conductor 104, coil 85a will become shorted out when coil 84a is energized, thus causing coil 85a to become deenergized and thus breaking the holding circuit through contacts 85f and 85g.

The coil 108a of the relay 108 is connected by a conductor 109 to line 63 and has its other side connected to conductor 110 which, in turn, is connected to contact 80d. The cooperating contact 80e is connected by conductor 111 to contact 84d. The contact 84e is connected by the conductor 112 and conductor 101 to the line 58 and, therefore, coil 108a will become energized when neither coil 80a nor 84a is energized.

To operate the elevator in the "up" direction,

the operator presses lever 36, closing the contacts 78*a* and 78*b* completing the circuit for relay coil 80*a*. When coil 80*a* is energized, contact 80*g* engages 80*f* and completes the circuit between conductors 113 and 114, which connects to the elevator controller and causes the elevator to start and to accelerate up to full speed in the "up" direction, provided that the elevator doors are closed. Similarly, if switch contacts 82*a* and 82*b* are engaged by "down" controller 37, coil 84*a* is energized, causing contacts 84*f* and 84*g* to engage and completes the circuit between conductors 115 and 116 to cause the elevator to start down and accelerate to full speed.

If the elevator approaches a floor on which the up-call corridor button has been pressed, illustrated by push-button 56 in the diagram, moving contact 117 of the signal machine, which travels in synchronism with the elevator, engages segment 118 which is connected to the conductor 60 and resistance 59 a predetermined distance in advance of the point in the hatch at which the automatic deceleration of the elevator begins for the floor on which the up-call has been made. The contact 117 is connected to contact 85*h* which cooperates with a contact 85*i* that is connected by a conductor 119 to one side of coil 120*a* of the relay 120, the other side of the coil 120*a* is connected by conductor 121 to contact 122*g* of the relay 122. The other contact 122*f* is connected to contact 108*f* of relay 108. Cooperating contact 108*g* is connected by conductor 123 to contact 100*b* of relay 100. Cooperating contact 100*c* is connected by conductor 77 to line 63.

This engagement causes a current to flow from line 58 through contacts 61*b* and 61*c*, resistor 59, segment 118, moving contact 117, contacts 85*h* and 85*i*, conductor 119, coil 120*a*, contacts 122*g* and 122*f*, contacts 108*g* and 108*f* and contacts 100*b* and 100*c* to line 36, thus energizing coil 120*a*. Coil 120*a* being energized, contacts 120*b* and 120*c* will close and cause a current to flow from line 58 through "up" impulse coil 42*a*, contacts 85*a* and 85*b*, conductors 86 and 87, resistor 125, conductor 126 and contacts 120*c* and 120*b*, conductor 127 to line 63. Coil 42*a* being energized, causes armature 43*b* to strike bar 40*a* causing it to protrude beyond the surface of lever 36 at a point where the operator's fingers will be touching the lever 36. This provides a tactile signal to the operator for releasing the pressure on lever 36 in order for the car to make a normal automatic deceleration for the floor on which the up-call exists.

As the elevator approaches in a "down" direction a floor for which a corridor down-call has been established, illustrated by push-button 65, the moving contact 128 on the signal machine will engage stationary segment 129 at a predetermined distance in advance of the point in the hatch at which the elevator starts the automatic deceleration for the floor on which the down-call exists.

The engagement of moving contact 128 with stationary segment 129 causes a current to flow from line 58 through resistor 68, segment 129, contact 128, conductor 130, contacts 85*j* and 85*k*, conductor 119, coil 120*a*, contacts 122*g* and 122*f*, contacts 108*g* and 108*f*, conductor 123, contacts 100*b* and 100*c*, conductor 77 to line 63.

Coil 120*a* being energized, contacts 120*e* and 120*d* will close, thus causing current to flow from line 63 through high speed contacts 92*b* and 92*c*, conductors 131, 132 and 133, contacts 120*e* and 120*d*, conductor 134, coil 135*a* of relay 135 and conductor 64 to line 58, thus causing coil 135*a* to become energized and pick up relay 135.

Similarly, coil 120*a* being energized, contacts 120*b* and 120*c* will close, thus causing current to flow from line 58 through down impulse coil 42*b*, contacts 85*d* and 85*e*, conductor 87, resistor 125, contacts 120*c* and 120*d* to line 63. Coil 42*b* being energized, it causes the armature 43*b* to strike bar 40*b* causing the latter to protrude beyond the surface of lever 37 at a point when the operator's fingers press on this lever, thus a tactile signal is given the operator indicating that he should release the pressure on lever 37 in order to have the elevator slow down and stop for the floor at which the down signal exists.

As the operator releases lever 36 or 37, as the case may be, depending on the direction in which the elevator is traveling, coils 80*a* or 84*a* are de-energized causing the circuit between conductors 113 and 114, or conductors 115 and 116 to open. The opening of either one of these circuits initiates the automatic slow-down apparatus to function for the particular floor the elevator is approaching.

It can be seen in the diagram that as the operator, after being given the tactile signal, releases the pressure on either lever 36 or 37, depending on the direction in which the elevator is traveling, the current will cease to flow in relay coil 80*a* or 84*a* and, therefore, contacts 80*d* and 80*e*, 84*b* and 84*c* will cause a current to flow from line 58 through conductors 111 and 110, coil 108*a* and conductor 109 to line 63. Coil 108*a* being energized, contacts 108*c* and 108*b* connect conductor 136 to conductor 119, thus short-circuiting coil 61*a* for the "up" direction, and 69*a* for the "down" direction, from line 63 through conductor 77, contacts 100*c* and 100*b*, conductor 123, contacts 135*e* and 135*d*, conductor 136, contacts 108*c* and 108*b*, conductor 119, contacts 85*i* and 85*h* for the "up" direction, contacts 85*j* and 85*k* for the "down" direction, moving contact 117 and stationary segment 118 for the "up" direction, moving contact 128 and stationary segment 129 for the "down" direction to conductor 60 for the "up" direction and conductor 67 for the "down" direction. Coils 61*a* and 69*a*, being short-circuited, will drop out and thus the corridor signal is canceled immediately after the operator has received the tactile signal to stop and has released the pressure on the operating lever. This will prevent another car following closely behind from receiving a signal for the same call, thus avoiding having two cars stop for one call when cars are traveling closely together, which is often the case in a bank of elevators.

Should a call be established again while the elevator is slowing down for the same call, coils 61*a* and 69*a* will again become short-circuited as the elevator stops, as follows: From line 63 through the signal switch 138 in the car, conductor 139, contacts 90*e* and 90*d*, conductor 140, contacts 85*l* and 85*m* for the "up" direction, contacts 85*n* and 85*o* for the "down" direction, moving contact 141 and stationary segment 118 for the "up" direction, moving contact 142 and stationary segment 129 for the "down" direction to conductor 60 for the "up" direction and to conductor 67 for the "down" direction.

Should a push-button for the corridor call be pressed as the elevator is approaching that floor at high speed, but too close to the floor to make the proper automatic slow-down, zoning relays

122 and 143 will prevent the operator on the approaching car from receiving the tactile signal.

The coil 143*a* has one side connected to the line 63 and the other side connected through the conductor 144 to the contact 91*b* of the relay 91, the conductor 145, contact 122*b* of relay 122, conductor 146 to contacts 85*p* and 85*q* of relay 85. The contact 143*b* is connected to the conductor 133, conductor 132, contacts 120*e*, contact 91*e*, conductor 131, and contact 92*c*. The contact 143*c* of relay 143 is connected by conductor 147 to contact 122*i* of relay 122 and by the conductor 147*a* to the contact 91*d*.

The contact 122*h* of relay 122 is connected by conductor 148 to the conctact 135*b* of the relay 135. The contact 122*d* is connected by the conductor 149 to the contact 108*h* and the cooperating contact 108*i* is connected by the conductor 150 to the line 63. The contact 122*c* is connected to one side of the coil 122*a* and by conductor 151 to the contact 91*c*. The other side of the coil 122*a* is connected to one side of the coil 108*a* and to the conductor 109. The contact 122*e* is connected by the conductor 162 to the coil 88*a*.

The relays 122 and 143 are both picked up by contacts on the signal machine, contact 152 and segment 153 for the "up" direction, contact 154 and segment 155 for the "down" direction. The segments 153 and 155 are connected to the line 58 and the contacts 152 and 154 are connected, respectively, to the contacts 85*r* and 85*s* of the relay 85. The contacts 152 and 154 engage the segments 153 and 155 just prior to the point where the automatic slow-down for the respective floor is initiated. They disengage just prior to the point where the slow-down is initiated during one floor runs. The contacts 122*f* and 122*g* of relay 122 being open will prevent coil 120*a* from being energized, therefore, a corridor call will not energize either of the tactile signals if a call is established when the elevator is too close to this floor to make a normal automatic landing.

It will be noted in the circuits for the signal coils 42*a* and 42*b* that the resistor 125 is connected by the conductor 126 in series with contacts 120*b* and 120*c* of the corridor call relay 120. This resistor reduces the strength of the tactile signal over that obtained when contacts 88*b* and 88*c* are closed. Energization of the coil 88*a* is accomplished by the following connections: One side of the coil 88*a* is connected by the conductor 156 to the contact 90*c* of the relay 90, the other contact 90*b* being connected to the conductor 157 which connects the contacts 85*t* and 85*u* of the relay 85, these contacts cooperating with the relay contacts 85*v* and 85*w*, respectively. These latter contacts are connected with the signal machine contacts 158 and 159 that engage the segments 160 and 161 of the signal machine, these segments being connected to the conductor 75.

The other side of the coil 88*a* is connected by the conductor 162 to the contact 122*e* of the relay 122. Closing of switch contacts 27*a* and 28 by the call button 20*c* connects the stationary contacts 160, 161 to the line 58 so that upon engagement of the movable contacts 158 or 159 therewith a circuit is established to actuate the tactile impulse bars 40*a* or 40*b* before the car enters the slow-down zone. Due to the presence of the resistance 125, a car call produces a stronger tactile signal and a corridor call produces a normal tactile signal, thereby the operator can distinguish between corridor calls and car calls. The operator will be able to distinguish between these signals subconsciously, so if he wishes to pass up the corridor calls he may do so by responding only to the stronger tactile signals. This would be desirable when the elevator is loaded to capacity, in which case the corridor calls are passed up and thus transferred to another car.

The car-call button 20*c* may be released when a car stops at a floor corresponding to this button by shorting out the coil 30 as follows: line 63, conductor 77, contact 90*f*, contact 90*g*, conductor 174, signal machine contact 175, segment 161, conductor 75, switch contacts 27*a* and 28, conductor 73, resistance 74 to line 58.

When the elevator is traveling in the "up" direction and the operator has released the pressure on the operating key in response to a tactile signal initiated by a corridor call for the floor which he is approaching, relay 80 will drop out, and engagement of contacts 80*d* and 80*e* will cause coil 108*a* to become energized. Coil 108*a* being energized, contacts 108*e* and 108*d* will allow current to pass from line 63 through contacts 108*e* and 108*d*, conductors 162, conductor 163, contacts 102*c* and 102*b*, conductor 164, contacts 85*x* and 85*y*, moving contact 165 and stationary segment 166 on the signal machine, and hall light 167 to line 58. Light 167 illuminates at fixture above the corridor door indicating to the waiting passenger that the elevator is approaching his floor. This will allow the passenger time to walk toward the elevator door while the elevator is slowing down for this floor. Since moving contact 165 on the signal machine travels in synchronism with the elevator it would, by the time the elevator is within a few feet from the floor, have advanced sufficiently to illuminate the "up" corridor light on the floor above. To prevent this, moving contact 165 is disconnected by contacts 102*c* and 102*b* and moving contact 168, which at this time has engaged segment 166, is rendered effective by completion of a circuit through contacts 108*e*, 108*f*, conductor 162, conductor 163, contacts 100*g*, 100*f*, conductor 169, contacts 85*z*, 85*aa* to contact 168. This transfer from contacts 102*c* and 102*b* to contacts 100*g* and 100*f* takes place in such a manner that the current to light 167 is not interrupted. This is accomplished by closing contacts 100*g* and 100*f* prior to the opening of contacts 102*c* and 102*b*. The circuit for the corridor "down" light is similar inasmuch as the conductor 169 is connected, also, to contact 85*bb* and the conductor 164 is connected also to the contacts 85*cc*. The contact 85*bb* cooperates with the contact 85*dd* which is connected to the contact 170 of the signal machine. The contact 85*cc* is engageable with the contact 85*ee* which is connected with the signal machine contact 171. The signal machine contacts 170 and 171 are engageable with the segment 172 to illuminate the "down" hall lamp 173.

When the elevator is stopped at one floor and a call exists for the next floor, either above or below, the operator will receive a tactile signal immediately after the doors have been closed. Releasing the pressure on the operator's lever immediately after receiving the signal will cause the elevator to decelerate and slow down automatically for the next floor. The circuits for accomplishing this are identical with the ones described previously for the case of when the elevator, traveling at high speed, is approaching a call.

From the above disclosure of a typical form

of the system embodying the present invention, it will be apparent that elevators equipped with my system will be under the complete control of the operator who can cause the car to move upwardly or downwardly in the most efficient manner to accept or reject signals at the various floors, or to reverse the car and return if the car has passed a floor at which the passenger wished to be discharged. Thus my system is capable of manual operation and yet can function in a manner similar to fully automatic systems for the reason that the operator is advised at all times of the condition of the system and is warned both visually and tactilely so that he can respond almost subconsciously to signals received in the elevator.

It will be understood that the circuit just described above may be duplicated on any number of floors and that the terminal floors can be provided, if desired, with automatic slow-down and stopping circuits so that the operator will not overrun these floors. Through the use of the system such as that described above it will be apparent that the operator must maintain one of the controller levers depressed in order to cause the car to operate. Thus, in the case of an accident, the car will automatically come to a stop upon release of the control handles.

While I have described the invention as applied to a semi-automatic control system, it will be understood that this system may be applied to a fully manually controlled system, if desired, and therefore the system as disclosed should be considered as illustrative only and not as limiting the scope of the following claims.

I claim:

1. In an elevator control mechanism, the combination of a control panel adapted to be mounted in an elevator car, a recess in said panel, a pair of hand actuatable members in said recess, a switch associated with said members for controlling the movement of said car, movable elements associated with said members, and means for actuating said elements to give a tactile signal upon approach of said car to a floor at which a passenger is waiting or desires to be delivered.

2. In an elevator control mechanism, the combination of a control panel adapted to be mounted in an elevator car, visual signaling means associated with said panel for indicating the presence of passengers at various floors, car and floor switches for actuating said visual signaling means, up and down control means mounted on said panel, switch means actuated by said control means to control the movement of said car, a movable element associated with said control means, means for actuating said element to give a tactile signal upon approach of said car to a floor indicated by said visual signaling means when actuated by a car switch, and a signal of a different character when said visual signaling means is actuated by a floor switch.

3. In a control means for an elevator car in a multifloor building having an automatic slow-down and car stop system and floor signaling means, the combination of a panel adapted to be mounted in said elevator car, up and down control means associated with said panel, switch means actuated by said control means for controlling the movement of said car, a movable element associated with said control means, and means, responsive to actuation of a floor signaling means at one floor and actuation of said control means to start said car at a next adjacent floor for movement to said one floor, for moving said movable element to give a tactile signal in a zone at said next adjacent floor, whereby the control means may be actuated to render said slow-down and car stop system effective to stop said car at said one floor.

4. In a control means for an elevator car in a multifloor building having a slow-down system initially operable to slow down the movement of said car in zones spaced from said floors, and stop said car at said floors, and a floor signaling means, the combination of a panel adapted to be mounted in said car, manually actuated control means associated with said panel, a switch actuated by depressing said control member for controlling the movement of said car, a movable element associated with said control member, and means responsive to actuation of a floor signaling means to move said element to give a tactile signal in a zone spaced from the floor signaled to permit said slow-down system to become operative to stop said car upon release of said depressed control member.

5. In a control means for an elevator car in a multifloor building having means actuated by and for indicating passengers at various floors and a system for slowing down the car operative in zones spaced from said floors and for stopping said car at the floors indicated; the combination of separate manually actuated control members movable into positions for causing said car to move up and down and to stop selectively, an element associated with each control member for giving a tactile signal in a zone spaced from a floor at which said indicating means is actuated, said zone being in advance of the slow-down zones to permit said control members to be moved into stopping position before the car moves into the slow-down and stopping zone.

6. In a control system for an elevator car in a multifloor building having means actuated by and for indicating passengers at various floors, a system for slowing down the car operative in zones spaced from the floors and for stopping said car at the floors indicated, and means for causing said car to move at high and slow speeds; the combination of a manually actuated member electrically connected to said means movable into positions for causing said car to move up and to stop, a second manually actuated member movable into positions for causing said car to move down and stop, tactile signaling means associated with said members operatively connected to said passenger indicating means to signal the presence of passengers at said floors in zones related to said slow-down zones to permit the slow-down means to become operative upon movement of said control members to positions to stop said car.

7. In a control system for an elevator car in a multifloor building having means actuated by and for indicating passengers at various floors, a system for slowing down the car operative in zones spaced from the floors and for stopping said car at the floors indicated, and means for causing said car to move at high and slow speeds; the combination of a manually actuated member electrically connected to said means movable into positions for causing said car to move up and to stop, a second manually actuated member movable into positions for causing said car to move down and stop, tactile signalling means associated with said members operatively connected to said passenger indicating means to signal the presence of passengers at said floors in zones related to said

slow-down zones to permit the slow-down means to become operative upon movement of said control members to positions to stop said car, and means responsive to high speed movement of said car for restricting actuation of said signalling means to zones spaced in advance of said slow-down zones.

8. In an elevator control mechanism, the combination of a control panel detachably mounted in an elevator car, means forming a recess in said panel, a hand rest member at one edge of said panel, manually actuated levers pivotally supported on said hand rest, said levers being disposed within said recess, switches actuated by said levers for controlling the up and down movements of said car, movable elements mounted in said levers, and electrically actuated plungers for striking said movable elements to signal tactilely a floor at which said car should stop.

9. In an elevator control mechanism, the combination of a control panel detachably mounted in an elevator car, means forming a recess in said panel, a hand rest member at one edge of said panel, manually actuated levers pivotally supported on said hand rest, said levers being disposed within said recess, switches actuated by said levers for controlling the up and down movements of said car, movable elements mounted in said levers, plungers adjacent to said movable elements and solenoids for actuating said plungers to strike said movable elements to give a tactile signal.

10. In an elevator control mechanism for multifloor buildings the combination of a housing adapted to be removably mounted in an elevator car, a panel forming the front of said housing, signaling means supported in said housing and visible through said panel for indicating the presence of passengers at the various floors, a recess in said housing accessible through said panel, a pair of control members movable in said recess, switches actuated by said control members for controlling movement of said car, narrow bars movably mounted in said control members adapted to be projected beyond the surfaces of said control members, and electrically actuated plungers for striking said bars to project them beyond said surface to give a tactile signal.

11. In a control means for an elevator car in a multifloor building having means for signaling the presence of passengers waiting at the various floors; the combination of a pair of control members mounted in said car, switches actuated by said control members for controlling the movement and stopping of said car, movable elements mounted in said control members, and electrically actuated plungers responsive to operation of said floor signaling means for striking said movable elements to give a tactile signal upon approach of said car to a floor at which said floor signaling means has been actuated.

12. In a contral system for an elevator car in a multifloor building having means actuated by and for indicating passengers at said floors, a system for slowing down said car, operative in zones spaced from said car and for stopping said car at said floors, and means for causing said car to move at high and low speeds; the combination of a panel detachably mounted in said car, a hand rest on said panel, control members movably mounted on said hand rest, switching means actuated by said control members for controlling movement and stopping of said car, movable elements mounted on said control members, electrically actuated impact members for striking said movable elements to give a tactile signal, and an electric circuit responsive to actuation of said indicating means for actuating said impact members in zones spaced from said floors to permit said control members to be moved to a position to permit the car slow-down means to become operative.

13. In a control system for an elevator car in a multifloor building having means actuated by and for indicating passengers at said floors, a system for slowing down said car, operative in zones spaced from said car and for stopping said car at said floors, and means for causing said car to move at high and low speeds; the combination of a panel detachably mounted in said car, a hand rest on said panel, control members movably mounted on said hand rest, switching means actuated by said control members for controlling movement and stopping of said car, movable elements mounted on said control members, electrically actuated impact members for striking said movable elements to give a tactile signal, an electric circuit responsive to actuation of said indicating means for actuating said impact members in zones spaced from said floors to permit said control members to be moved to a position to permit the car slow-down means to become operative, and means in said circuit responsive to high speed movement of said car for restricting actuation of said impact means to zones in advance of said car slow-down zones.

14. In an elevator control mechanism for a multiple-floor building, the combination of a control panel adapted to be mounted in an elevator car, up and down control means mounted on said panel, switch means actuated by said control means to control the movement of said car, movable means associated with said control means for giving a tactile signal, car signaling switches in said car corresponding to the floors of said building, floor signaling switches at the floors, and means for actuating said movable means to give a tactile signal upon approach of said car to a floor at which a floor signaling switch has been actuated and to give a different tactile signal when a car signaling switch corresponding to a floor has been actuated.

HARRY HADSEL.