

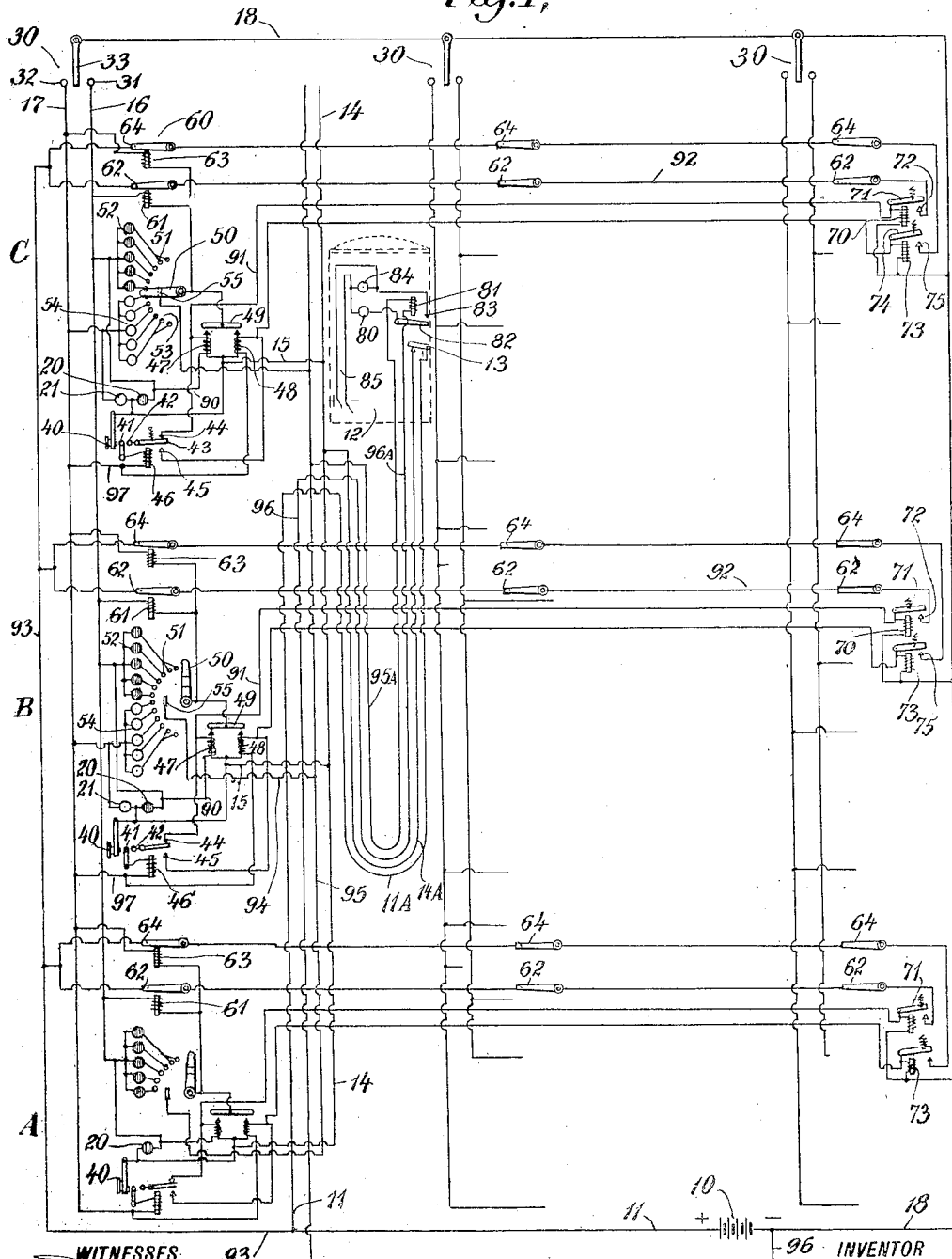
A. LE BLANC.
ELEVATOR SIGNAL SYSTEM.
APPLICATION FILED APR. 16, 1913.

Patented Jan. 22, 1918.

4 SHEETS—SHEET 1.

1,254,331.

Fig. 1.



WITNESSES
J. Carlson
J. Graves

INVENTOR
Alexis Le Blanc
BY
E. M. Marshall
ATTORNEY

A. LE BLANC.
ELEVATOR SIGNAL SYSTEM.
APPLICATION FILED APR. 16, 1913.

1,254,331.

Patented Jan. 22, 1918.

4 SHEETS—SHEET 2.

Fig. 2,

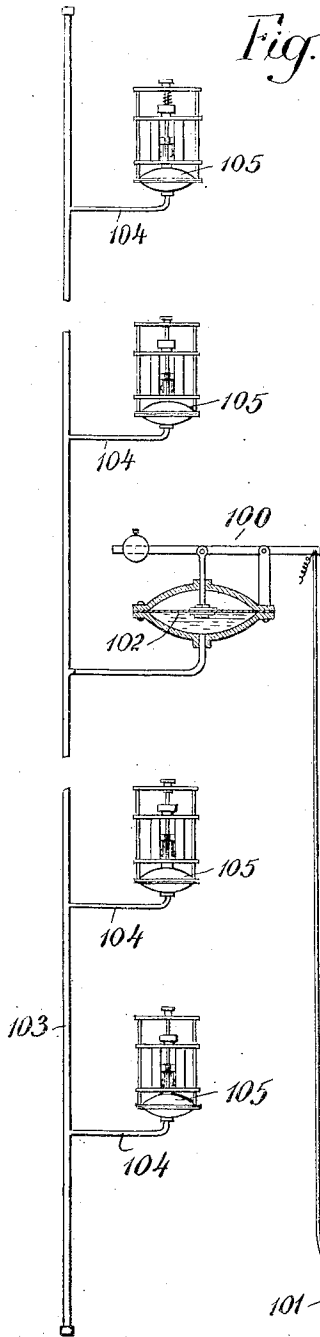


Fig. 3,

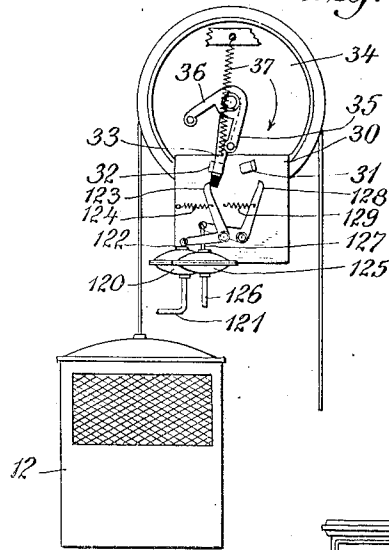


Fig. 4

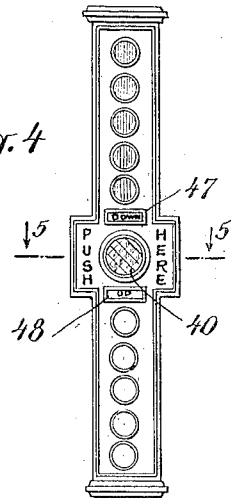
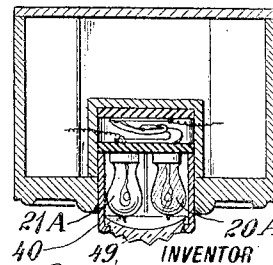


Fig. 5,



WITNESSES
J. P. Earborn
G. R. Quimby

INVENTOR
Alexis Le Blanc
BY
E. W. Marshall
ATTORNEY

1,254,331.

Patented Jan. 22, 1918.

4 SHEETS—SHEET 3.

Fig. 6,

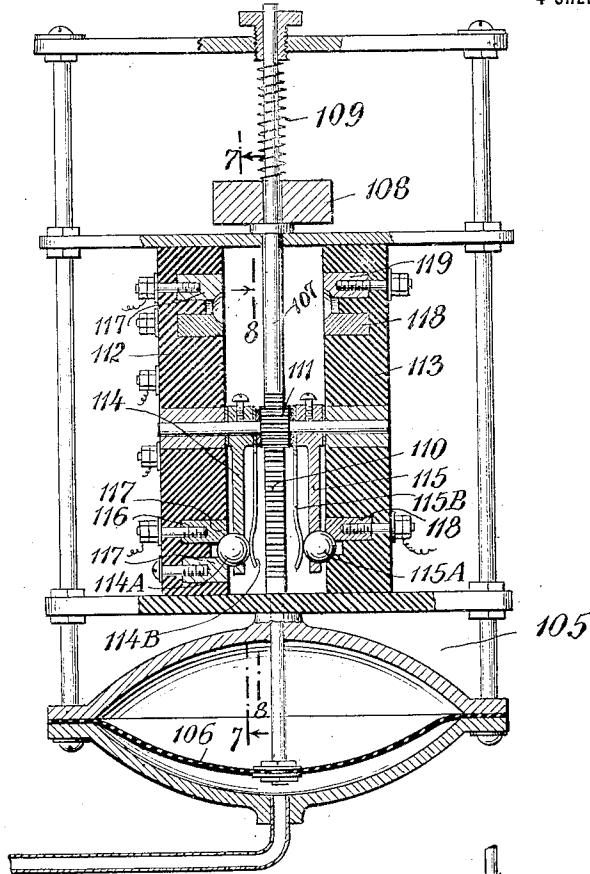


Fig. 7,

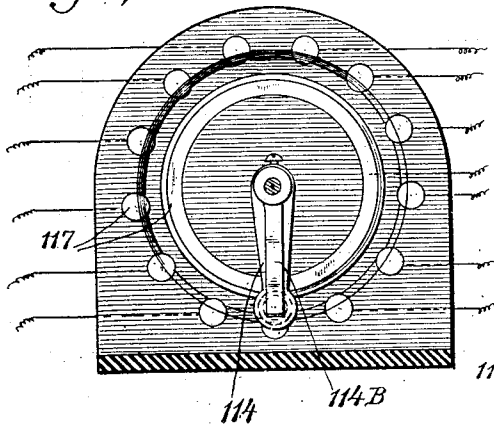
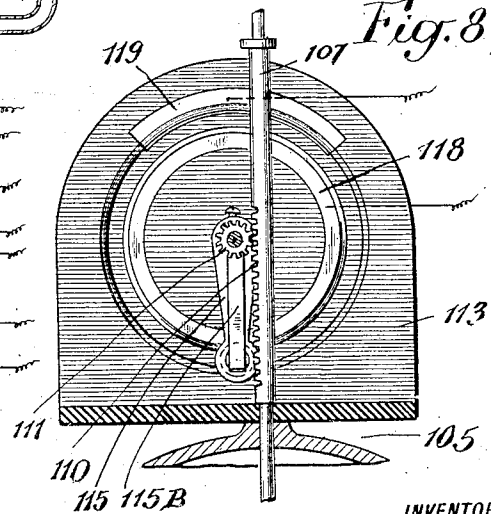


Fig. 8,



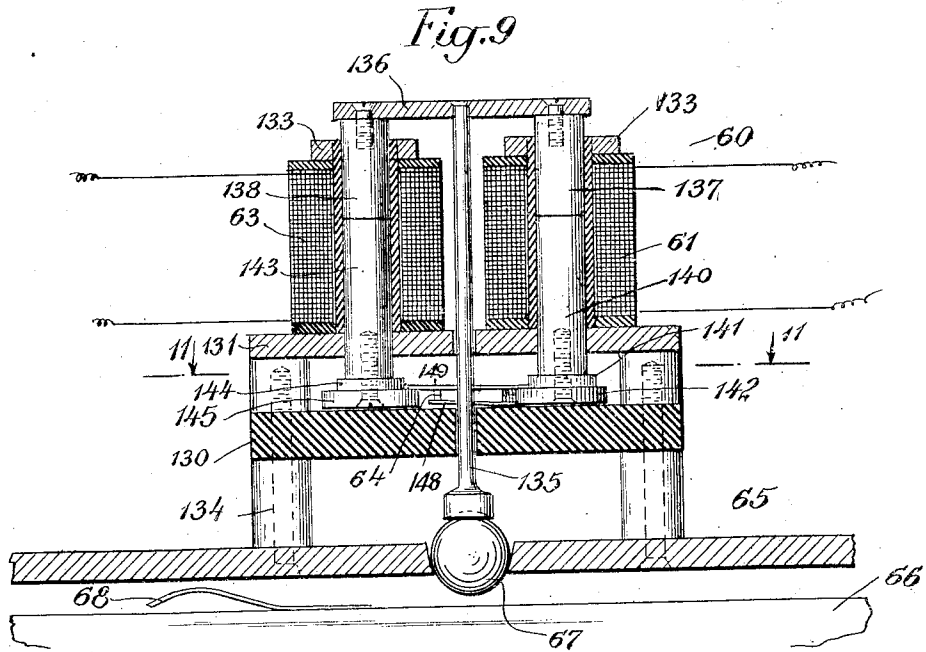
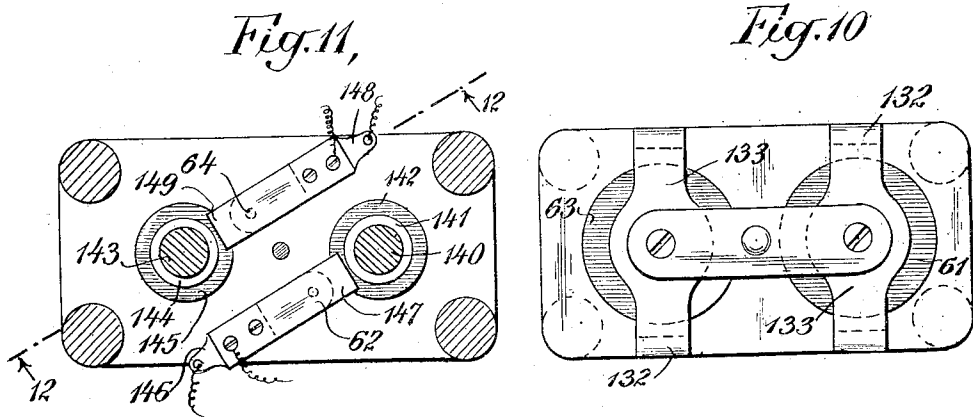
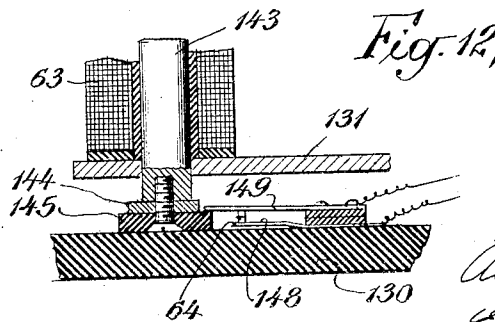
WITNESSES
J. R. Quincy
E. R. Quincy

INVENTOR
Alexis Le Blanc
BY *E. M. Marshall*
ATTORNEY

A. LE BLANC.
ELEVATOR SIGNAL SYSTEM.
APPLICATION FILED APR. 16, 1913.

1,254,331.

Patented Jan. 22, 1918.
4 SHEETS—SHEET 4.



WITNESSES
J. P. Earhart
G. R. Quimby

INVENTOR
Alexis Le Blanc
BY
E. W. Marshall
ATTORNEY

UNITED STATES PATENT OFFICE.

ALEXIS LE BLANC, OF NEW YORK, N. Y., ASSIGNOR TO GURNEY ELECTRIC ELEVATOR COMPANY, OF HONESDALE, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

ELEVATOR SIGNAL SYSTEM.

1,254,331.

Specification of Letters Patent.

Patented Jan. 22, 1918.

Application filed April 16, 1913. Serial No. 761,435.

To all whom it may concern:

Be it known that I, ALEXIS LE BLANC, a citizen of the United States, and a resident of the city, county, and State of New York, have invented certain new and useful Improvements in Elevator Signal Systems, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

My invention relates to elevator signal systems and its object is to provide a simple and efficient call and indicating system which is easy to install and reliable in action. It also includes improvements in various details of construction and in certain devices which form parts of the system.

I will describe my invention in the following specification in which the various cooperating parts of the system will be specifically described and the novel features of such parts and of the system as a whole will be pointed out in appended claims.

In the drawings,

Figure 1 is a diagram showing an elevator car and station indicators together with as many of the electrical circuits and other devices as are necessary to describe a practicable embodiment of my invention.

Fig. 2 is another diagram of a car and a pressure responsive arrangement for actuating certain parts of the station indicators.

A detail of construction is illustrated in Fig. 3 this being a switch and arrangements for actuating it, controlled either by the position of the car or by the position of the switch.

A push-button and indicator case is shown in front elevation in Fig. 4 and Fig. 5 is a sectional plan view taken through the center thereof to show a feature of construction of the push-button.

One of the station indicator actuators is shown in sectional side elevation in Fig. 6.

Figs. 7 and 8 are sectional elevations of portions of this device at right angles to the section in Fig. 6, taken on the lines 7-7 and 8-8 respectively.

A door actuated switch used in this system is illustrated in sectional elevation in Fig. 9 with the position of the door below it shown.

Fig. 10 is a top plan view of this door switch.

A sectional plan view of the door switch is shown in Fig. 11, the section being taken on the line 11-11 of Fig. 9, and Fig. 12 is a sectional elevation of a portion of this device taken on the line 12-12 of Fig. 11.

Referring first to Fig. 1, I will describe the system itself and its operation, after which I will specifically describe the various mechanisms and devices shown in the other figures of the drawings, using throughout like characters of reference to designate similar parts.

10 designates a source of electrical supply, preferably of low voltage, such for example as a storage or primary battery. From one of its terminals runs a conductor 11 which goes to the car 12 through a flexible portion 11^A. In the car it passes through an operator's switch 13 by means of which the operator in the car controls the supply of current to all the devices associated with his car and its hatchway and stations. From this switch runs a flexible conductor 14^A to a feed wire 14.

At each floor or station is a single push-button for which lamps energized by the battery 10 are provided. At each of the intermediate stations are two of these lamps 20 and 21 the first of which is preferably colored red. At the bottom station only the red lamp 20 is necessary while at the top station (not shown) only the uncolored lamp 21 is required. One terminal of all these push-button lamps is connected with feed wire 14 by a branch wire such as 15. The other terminal of all the red lamps 20 is connected through a conductor 16 with a stationary contact 31 of a direction switch 30, and the other terminal of all the uncolored lamps is connected through a conductor 17 with a stationary contact 32 of the same switch. The direction switch has a movable contact arm 33 which is arranged to rest upon contact 31 when the car approaches or is at the upper end of its path of travel or is moving downward, or to rest upon the contact 32 when the car is at the lower end of its path of travel or is moving upward. This contact arm is connected by a conductor 18 with the other terminal of battery 10.

Consequently whenever the operator's switch 13 is closed the red push-button lamps at all the floors are lighted when the car is

at the top of its run or is moving downward or else all of the uncolored push button lamps are lighted which will be the case if the car is at the bottom of its run or is moving upward.

The push buttons themselves are designated by 40 and each is connected with the + side of the battery through the branch conductors 15 with the feed wire 14. Back of each push button is a spring contact 41 with which the button first engages when actuated and after which it is moved against a stationary contact 42 which is connected with an arm 43 which is normally raised against contact 44 by a spring but which may be pulled down against contact 45 by a magnet 46 when the latter is energized. 47 and 48 are relay windings arranged to close a contact between an arm 49 and a stationary contact above the winding 47 or with a similar contact above the winding 48.

The indicators each comprise a movable member or arm 50 which is actuated by the movement of the car. This is arranged to move over a series of stationary contacts 51 as the arm moves to its central position, which are connected respectively to a series of lamps 52 which are preferably colored red. The upper two contacts are connected to the upper lamp and the other contacts are connected each to one of the lamps. The other terminals of all of these lamps 52 are connected with conductor 16.

If the arm is below these contacts and is moved upward toward its central position it moves over a series of contacts 53 which are similarly connected with a series of lamps 54 which are preferably uncolored. The other terminals of lamps 54 are connected with conductor 17. By providing two contacts for each of the end lamps as shown, it is energized twice and indicates the general position of the car a little earlier.

When near and at its central position the arm 50 also touches a stationary contact 55.

In conjunction with each door is a door actuated switch 60 each of which comprises a magnet winding 61 which controls the opening of a circuit at 62, and another magnet winding 63 which controls the opening of a circuit at 64.

At each landing is a pair of interlock relays each pair of which comprises a magnet winding 70 arranged to draw down an armature 71 against a contact 72 to close a circuit and another magnet winding 73 arranged to draw down its armature 74 against a contact 75.

In the car is a signal lamp 80 the circuit through which is controlled by a relay which comprises a magnet winding 81 which when energized draws its armature 82 against a contact 83. 84 is the usual illuminating lamp for the car which is fed from mains 85 one of which is connected with the contact

83 and the other of which is connected through the signal lamp 80 with armature 82. Consequently when the magnet winding 81 is energized, the signal lamp circuit will be closed and the signal lamp illuminated.

As reference has been made to the various devices shown in Fig. 1, I will now describe the operation of the system illustrated in this figure, reserving until later a more specific description of the construction and operation of the devices used in the installation of such a system.

It has been stated that when the elevator car approaches or is at the top of its run or is moving downward, the arm 33 of the direction switch 30 will rest upon contact 31. As feed wire 14 is connected with wire 11 from the + side of the battery 10, circuits will then be closed from this feed wire through branch wire 15, through red push button lamps 20, conductor 16, direction switch 30 and conductor 18 to the other side of the battery. Consequently all of the red push button lamps 20 will be illuminated. This will show at each floor the fact that the car has approached or is at the top of its run or that it is moving downward.

But if the car has approached or is at the lower end of its run or is moving upward, the arm 33 of the direction switch will rest upon contact 32. Under these conditions no circuits can be established through the push button lamps 20, but the uncolored lamps 21 will then be illuminated through circuits from branch wires 15, conductor 17 and direction switch 30. Thus either all of the down push button lamps 20 or else all of the up push button lamps 21 are always illuminated whenever the operator's switch 13 is closed, so that a person in any hall can see at a glance whether a given car is going up or down.

Let us assume that the car is above station B and is either at the upper end of its path of travel or is moving toward that station. A person desiring to go down then presses push button 40 at that floor. This push button is connected with the + side of battery 10 through one of the branch wires 15. The inward movement of the push button moves contact 41 against contact 42 and completes a circuit through contact 44 and relay winding 47 and through a conductor 90, through wires 16 and 18 to the other side of the battery. Thus winding 47 is energized and pulls down arm 49 onto the stationary contact above this winding. This establishes a circuit from feed wire 14 and branch 15 to the indicator arm 50 and to and through winding 61 of the door switch to wire 16 and thence to the other side of the battery, thus energizing the winding 61.

The inward movement of the push button at the same time closes a circuit from itself through a conductor 91 through winding 70

of the interlock switch at that floor to wire 18 and thus to battery. The magnet 70 will then pull down its armature 71 to which conductor 91 is also connected, against contact 72 which establishes a circuit through wire 92 and through the closed contacts of all of the door switch contacts 62 to conductor 93 which is connected with conductor 11 and with the + side of the battery. This results in the interlock magnet 70 maintaining a circuit, from the battery through relay winding 47 after the push button is released and the energized relay winding 47 maintains the circuit through door switch winding 61.

With the circuits in this condition the downward movement of the car will move indicator arm 50 toward its central position. If the latter is not already on one of contacts 51, it will continue to move until it touches the upper of this series of contacts. This will cause the upper of the red lights 52 at this station to be illuminated. It has been shown that the plus side of the battery is now connected to the indicator arm 50 and the circuit will be completed through the upper of contacts 51, upper of lamps 52, wire 16, contact 31, arm 33 and wire 18 back to the battery. Further movement of arm 50 in the same direction will move it off of the upper of contacts 51 when the upper red light will go out. After this arm 50 moves onto the next of contacts 51 when the upper red lamp 52 will again be illuminated. Still further movement of the arm 50 will bring it consecutively onto the succeeding contacts 51 so that the other red lamps 52 will be illuminated successively. The parts are so adjusted that the arm 50 will reach its central position when the car is at the landing for which the indicator is provided. The person who pushed the button will therefore be advised of the approach of the car.

Just before the car reaches the landing, the indicator arm 50 will touch the stationary contact 55. This will close a circuit through wires 94, 95 flexible conductor 95^A through car relay winding 81 flexible conductor 96^A and wire 96 to the battery. The relay winding 81 thus energized draws its armature 82 against contact 83 which closes the circuit from mains 85 through car signal lamp 80. This shows the car operator that a stop is desired at the landing he is approaching.

When a plurality of elevators are installed together, the push button, indicator and door switch devices and circuits therefor are duplicated so that there is a complete set of all of these parts at each floor for each car. Only as many of these parts as are necessary to fully disclose the operation of the system are shown in the diagram as the duplication of them on the drawing would only lead to confusion. It is to be

noted however, that there is a push button for each car at each floor, for each of which are two direction indicating lamps 20, 21, so that a person standing in a hall can see at a glance which cars are available for taking him down and which for taking him up. If he pushes the button for any down car this will energize all of the relays 47 at his floor so that the indicator lamps 52 of all down cars within a limited distance from his floor will be illuminated as the different cars approach. Consequently the passenger can see which of the cars is nearest his floor. The car signal lamp of the first car to approach the floor will be the first one to be illuminated.

Now we will assume that the car operator stops his car at the landing B at which the button had been pressed for a down car. In opening the hatchway door the electrical connection at 62 influenced by magnet winding 61, as will hereinafter be shown, is broken. This breaks the circuit through interlock magnet winding 70 which in turn allows its armature to be lifted from contact 72. This cuts off the current supply from all the relay magnets 47 on that particular floor. The effect of this is to "clear" the floor and to leave the system in the condition it was in before a button for a down car had been actuated.

If any of the cars were at the lower ends of their paths of travel or were below station B and moving upward toward it, the uncolored push button lights 54 for every such car will be illuminated. A passenger desiring to go up may press any such button. In this case the direction switch 30 has disconnected wire 16 and has connected wire 17 with the battery through wire 18.

The first effect in this case of push button 40 meeting movable contact 41 is to establish a circuit through magnet winding 46 and wire 97 to wire 17. This will draw the armature above winding 46 away from contact 44 onto contact 45. Now the winding 48 will be energized and armature 49 pulled down onto the contact above the latter winding.

The rest of the operation will be similar to that previously described, except that the magnet winding 73 of the interlock switch will be energized instead of winding 70, and magnet winding 63 of the door switch will be energized instead of winding 61. The indicator contact arm 50 will move upward toward its central position causing the lowest uncolored lamp 54 to be lighted twice and each of the other lamps to be lighted consecutively. At a predetermined distance of the car from floor B, the arm 50 will close the car relay magnet circuit at contact 55 and the operator will get his signal as before.

When the operator stops the car and opens

the door it will in this case be the contact at 64 that is broken and the relay contact 75 of the interlock switch that clears the floor.

Thus each push button serves for a down call or for an up call whenever a car is in condition to respond to such a call. Any or all push buttons on a given floor which are in condition to transmit a "down" call (which condition is clearly indicated by the illumination of the red push button) will transmit its signal to any of the cars which approach the floor from above. Any or all of the push buttons which are in condition to transmit an "up" call, will transmit its signal to any of the cars which approach the floor from below. Moreover these "down" and "up" calls are non-interfering as are also the clearing devices for the floors, that is the door switches 30 and the interlock relays.

There is one push button at each elevator shaft so that in a large installation with a long line of elevators a passenger is not required to walk to a central position but may press the nearest button which happens to be in condition to transmit the particular signal which he desires.

The switch for causing the illumination of the indicator lamps 52, 54, is preferably adjusted to move from one of its contacts to the next as the car moves from one floor to the adjacent one so that a person in a hall can see how far away the car is. But the device is so arranged that none of the indicator lamps is illuminated except when one or more of the cars are near the floor and then only if a button has been pressed. This is of decided advantage especially in a tall building with many elevators because the indicator lamps for all cars more than a predetermined distance away are "dead" so that the passenger will see only the indicator lights for the nearest cars. It has been pointed out that none of the indicator lamps is illuminated unless a button has been pressed. It is also true that only the down indicator lamps become illuminated after a button for a down signal has been pressed and only the up indicator lamps become illuminated after a button for an up signal has been pressed.

In order to show more in detail some of the mechanisms which I have devised for carrying out this system, I will describe the devices shown in the other figures of the drawings.

In Fig. 2, a pressure changing device 100 is shown which is placed about half way up the shaft. Between this and the car 12 is a flexible member 101 which may be the cable comprised of the flexible conductors 11^A, 14^A, 95^A and 96^A. This is so arranged that as the position of the car changes, a greater or less

amount of the weight of the member 101 will act upon the fluid below a diaphragm 102 in the pressure changing device. This fluid is in communication with a tube 103 in the hatchway, which tube is closed at its ends and is connected by branches 104 with pressure responsive devices 105 one of which is provided for each floor or landing.

One of these is shown more in detail in Fig. 6. This comprises a casing within which is a flexible diaphragm 106 with which is connected a vertically movable rod 107 which starts to move upward when the pressure below the diaphragm 106 reaches a predetermined value sufficient to raise a weight 108 and continues to rise in proportion to the change of position of the car, against the action of an adjustable spring 109. Its upward movement is limited so that after it has moved up as far as it can, a continued rise in the pressure will have no effect upon the rod.

When the pressure decreases, it will at a predetermined point allow the rod 107 to move downward until it reaches the lower limit of its movement after which further decrease in the pressure will have no effect upon the rod 107.

The weights 108 are different at the different floors and are so proportioned as to cause the different rods to be in the center of their path of movement when the car is at the floor for which the pressure responsive device is provided. This part of the apparatus is made the subject matter of another application for Letters Patent filed April 16th, 1913, serially numbered 761,436. In the aforesaid application is a more elaborate description of this mechanism.

These pressure responsive devices 105 are the actuators for the floor indicators. A part of rod 107 forms a rack 110 with which meshes a pinion 111 on a shaft which is rotatably supported in blocks 112 and 113 of insulating material. To the shaft are affixed two arms 114 and 115 in each of which is an opening carrying a ball 114^A and 115^A. Springs 114^B and 115^B move with the arms and are arranged to press the balls outward.

In the insulating block 112 is a continuous metallic ring 116 and concentric therewith are metallic pieces 117. A groove is formed between the ring 116 and the pieces 117 in the block 112 and the ball 114^A runs in this groove. These parts form the movable arm 50 and the series of lamp contacts 51 and 53 of Fig. 1.

In block 113 is a ring 118 similar to ring 116 and connected with the same conductor, and a segment 119. An annular groove is provided for the run of ball 115^A. The segment 119 forms the contact 55 of Fig. 1.

It may be seen that the apparatus illustrated in Figs. 6, 7 and 8 performs the func-

tions hereinbefore described for illuminating the indicator lamps 52, 54 and as the car approaches a landing and for closing the circuit for car relay magnet 81 when the car is near or at the landing.

Referring now to Fig. 3 the means for actuating the direction switches 30 will be described. The hoisting rope or the counterweight rope passes over a sheave 34 on the shaft of which is frictionally mounted an actuator comprising two arms 35 and 36. The switch arm 33 is pivoted to swing about the axis of the shaft onto the stationary contacts 31—32. A spring 37 is under tension between the switch arm 33 and a fixed point directly above its pivot.

The operation of this part of the device is that if switch arm 33 is upon contact 31 and the car ascends, it will cause the sheave 34 to rotate in a direction indicated by the arrow. The actuator will move with it and its arm 35 will engage the switch arm to push it to the left. As soon as the switch arm passes its center, the spring 37 draws it over onto contact 32. Further movement of the actuator brings its arm 35 against switch arm 33 again, after which it will slip on the shaft of sheave 34 at its point of frictional connection therewith.

Obviously a downward movement of the car will cause actuator arm 36 to move switch arm 33 onto contact 31. The space between the arms 35—36 is provided to allow a limited reverse movement of the car to take place without affecting the direction switch. This permits the car operator to return to a floor he has passed without showing change of direction at the push-button lights.

Such an arrangement shifts the direction switch when the car moves, but as it is desirable to have this switch in its "down" position when the car is at the upper end of its run even if at rest, I have provided other means for accomplishing this. In Fig. 3, 120 is a pressure responsive actuator connected with the tube 103 by branch 121. This is adjusted to raise its rod 122 when the car at the upper end of its run causes the pressure in tube 103 to reach a predetermined value. The rod 122 is connected with the lower arm of a bell crank lever 123, the upper arm of which is moved to the right against the opposition of a spring 124, and to force the switch arm 33 over past its center so that spring 37 will carry it over to the down contact 31.

125 is another pressure responsive actuator connected with tube 103 by branch 126. This one has a rod 127 connected with the lower arm of a bell crank lever 128, to the upper end of which is connected a spring 129 which pulls it over to the left when the pressure in tube 103 reaches the point it has

when the car is at the lower end of its run. This will cause switch arm 33 to be moved onto up contact 32.

A desirable form of push button and indicator is illustrated in Fig. 4. The push button itself, 40, is in the center of this casing which is adapted to contain all of the station mechanism shown in Fig. 1 except the door switch 60 and the interlock relays 70.

In this case the down push button lamp 20 is directly above the push button back of a panel 47 on the back of which is arranged to show the word "Down" when this lamp is illuminated. The up push button lamp 21 is back of a similar panel 48 below the push button which is arranged to show the word "Up" when this lamp is illuminated.

The five down indicator lamps 52 are back of the five circular openings above panel 47, and the up indicator lamps are back of the circular openings below panel 48. The circular openings are covered with curved glass disks which project beyond the outer surface of the casing and are preferably formed with facets so that the lights may be seen from the sides of the device as well as from in front of it.

I prefer also to make the push button itself with a similar glass surface as is shown at 49 in Fig. 5 and to place within it push button lamps 20^A and 21^A in circuit with the lamps 20 and 21 respectively.

One of the push button lamps will thus be always lighted and if they are made to correspond in color to the lamps 20 and 21, the push button itself will be illuminated with either a red or white light and will indicate apart from the lamps 20 and 21, the direction of car travel. Obviously, the lamps 20 and 21 and the panels 47 and 48 may be omitted if desired.

It may be seen that a person desiring to signal a car to stop at his landing can see at a glance which of the cars is in condition to receive a down call and which are in condition to receive an up call. If he pushes one of the buttons for a down call, this will cause the down indicator lamps 52 for all cars which are in condition to receive such a call, and which are within six floors of the landing for which the button has been pressed, to be illuminated. If a car is five or six floors above the landing or comes within such distance after the button has been pressed, there will be a red light show at the upper circular opening. This light will go out and be lighted again when such a car is at the fifth floor above the landing. Then when the car reaches the fourth floor above the landing a light will appear at the next to the upper opening. These lights will respectively approach the push button until the car reaches the landing.

As the indicator lamps for several cars

may show at the same time, the person who pushed the button may readily see which of such cars is nearest him. Of course a similar effect will be produced if a signal for an up car has been sent in.

I have arbitrarily called the down push button lamps and the down indicator lamps red, and the others uncolored as this is a preferred arrangement, but no limitation is intended by such description.

Referring now to Figs. 9, 10, 11 and 12, I will describe the construction of the door switch therein illustrated and will point out its operation more specifically.

This device is supported upon a metallic plate 65 which may be set into the door casing above the sliding door 66. A hole is provided in plate 65 in which is a ball 67 which projects below the plate into the path of movement of a projection 68 which is preferably a leaf-spring as shown.

130 is a plate of insulating material and 131 the base of an iron magnet frame. Two pairs of uprights 132 rise from this base and are connected by cross members 133 to complete the magnet frame. The plate 130 and magnet frame base 131 are spaced from the plate 65 and from each other by corner lugs and these parts secured together by screws 134.

Extending centrally through the parts 130 and 131 is a vertically movable rod 135, the lower end of which is enlarged, of inverted cup-shape, and is positioned directly above the ball 67. To the upper end of this rod is affixed a non-magnetic flat bar 136 near the ends of which are secured magnet core sections 137 and 138, which project through the cross members 133 of the magnet frame into the magnet windings 61—63 respectively. The structure just described is a rigid one so that when the rod 135 is raised the magnet core sections are raised with it.

Under the core section 137 is a lower magnet core section 140 which is also vertically movable within magnet winding 61. The lower end of this section is enlarged as at 141 to limit its upward movement by engagement with the base 131 of the magnet frame and below this is secured a washer 142 of insulating material of still larger diameter.

Under core section 138 is a similar lower core section 143 with a lower enlarged end 144 to which is secured an insulating washer 145.

146 is a spring contact mounted upon the insulating plate 130 and above it and insulated therefrom is another spring contact 147, the end of which projects over the annular shoulder formed by the washer 142. These spring contacts are arranged to close a circuit at the point 62.

Another pair of spring contacts 148 and 149 are similarly mounted on plate 130 with

the end of contact 149 overlapping the washer 145. These are arranged to close a circuit at the point 64.

When the door is opened by being moved to the right, the spring 68 will raise the ball 67 and this will force the rod 135 and its two connected upper magnet core sections 137—138 upward. If neither of the magnet windings 61—63 are energized, this movement of the door will have no further effect. But if a button has been pressed at the floor at which this door switch is mounted, for a down signal, this, as has been pointed out, will cause magnet winding 61 to be energized. This then will cause the upward movement of upper magnet core section to raise with it lower magnet core section 140 but will have no effect upon lower magnet core section 143. When lower magnet core section 140 raises, its connected washer 142 will raise spring contact 147 from spring contact 146 and will break the circuit which had been closed at 62. This will cut off the current supply from magnet winding 70 of the interlock relay and will clear the floor of all existing down signals. Thus the opening of any door of a given landing will clear any and all down signals which have been sent in by pressing one or all of the buttons at such landing which have been pressed for down signals.

Similarly, after an up signal has been sent in the winding 63 will be energized so that the act of opening the door will cause lower magnet core section 143 to be raised and its washer 145 will raise spring contact 149 from spring contact 148 to break at 64 the current supply to interlock relay winding 73. This will clear the floor of all up signals.

Although the various devices which I have described are capable of performing the functions required of them for an operative installation of my system it is obvious that many of the details of construction may be varied widely and that other devices than those specifically described may be utilized within the scope of this invention and within the limitations of the appended claims.

One of the advantages of this system is the ease of installation as many of the devices are self-contained and may be assembled and even adjusted in the shops. The wiring needed in the building is also extremely simple so that the cost of installation is small compared with such systems as have heretofore been used.

What I claim is:

1. In combination with an elevator car, a station signal transmitter, circuits therefor, means actuated by the movement of the car for changing said circuits whereby the same movement of the signal transmitter may be utilized for sending a down signal when the

car is at the upper end of its run or is moving downward toward said transmitter, or an up signal when the car is at the lower end of its travel or is moving upward toward the transmitter.

2. In combination with an elevator car, a down signal transmission line, an up signal transmission line, a direction switch arranged to connect one or the other of said transmission lines with a supply of energy, means for causing the downward movement of the car to actuate the direction switch to connect the down signal transmission line with the supply of energy and for causing the upward movement of the car to actuate the direction switch to connect the down signal transmission line with the supply of energy, a lost motion connection in said actuating means to permit a reversal of movement of the car through a material space without affecting the direction switch, and a station signal transmitter arranged to complete a circuit through whichever of said transmission lines is connected with the supply of energy.

3. In combination with an elevator car, a down signal transmission line, an up signal transmission line, a direction switch arranged to connect one or the other of said transmission lines with a supply of energy, means for causing the downward movement of the car to actuate the direction switch to connect the down signal transmission line with the supply of energy and for causing the upward movement of the car to actuate the direction switch to connect the up signal transmission line with the supply of energy, other means for actuating the direction switch when the car reaches the ends of its path of travel, and a station signal transmitter arranged to complete a circuit through whichever of the transmission lines is connected with the supply of energy.

4. In combination with an elevator car, a down signal transmission line, an up signal transmission line, a direction switch arranged to connect one or the other of said transmission lines with a supply of energy, means for causing the downward movement of the car to actuate the direction switch to connect the down signal transmission line with a supply of energy and for causing the upward movement of the car to actuate the direction switch to connect the up signal transmission line with the supply of energy, a lost motion connection in said actuating means to permit a reversal of movement of the car through a limited space without affecting the direction switch, other means for actuating the direction switch when the car reaches the ends of its path of travel, and a station signal transmitter arranged to complete a circuit through whichever of said transmission lines is connected with the supply of energy.

5. In combination with an elevator car, a down signal transmission line, an up signal transmission line, a supply of energy, a direction switch arranged to connect the supply of energy with one or the other of said transmission lines, a rotatable shaft connected with the car, an actuator frictionally connected with said shaft and arranged to be moved a limited distance from side to side by rotation of the shaft in opposite directions to move the direction switch to connect one or the other of said transmission lines with the supply of energy, said actuator comprising a pair of spaced arms adapted to engage the switch and arranged to provide a limited reverse movement of the actuator without affecting the direction switch, and a station signal transmitter arranged to complete a circuit through whichever of said transmission lines is connected with the supply of energy.

6. In combination with an elevator car, a down signal wire, an up signal wire, a direction switch comprising two stationary contacts with which said wires respectively are connected, and a pivotally supported contact arm arranged to swing from one to the other of said contacts, a source of electrical supply connected with the switch arm, a rotatable shaft connected with the car, an actuator frictionally connected with said shaft and arranged to be moved from side to side a limited distance by the rotation of said shaft in opposite directions, said actuator comprising two spaced arms, one on each side of said switch arm, each arranged to force the switch arm from one of said contacts to cause it to move on to the other contact, the engagement of the switch arm with the contact being arranged to limit the movement of the actuator and the spacing between the actuator arms being provided to permit a reversal of movement of the actuator through a limited space without affecting the switch arm, and a push button arranged to complete a circuit through whichever of said signal wires is connected with the source of electrical supply.

7. In combination with an elevator car, a down signal wire, an up signal wire, a direction switch comprising two stationary contacts with which said wires respectively are connected, and a pivotally supported contact arm arranged to swing from one to the other of said contacts, a tension spring connected with said arm and with a fixed point above its pivotal support, a source of electrical supply connected with the switch arm, a rotatable shaft connected with the car, an actuator frictionally connected with said shaft and arranged to be moved from side to side a limited distance by the rotation of said shaft in opposite directions, said actuator comprising two spaced arms one on each side of said switch arm, each arranged

to force the switch arm past its center from one of said contacts to cause it to be moved onto the other contact by the spring, the engagement of the switch arm with the contacts being arranged to limit the movement of the actuator and the spacing between the actuator arms being provided to permit a reversal of movement of the actuator through a limited space without affecting the switch arm, and a push button arranged to complete a circuit through whichever of said signal wires is connected with the source of electrical supply.

8. In combination with an elevator car, a plurality of station signal transmitters, circuits therefor, means actuated by the movement of the car for changing said circuits whereby the same movement of any of the signal transmitters may be utilized for sending a down signal when the car is at the upper end of its run or is moving downward toward said transmitter, or an up signal when the car is at the lower end of its travel or is moving upward toward said transmitter.

9. An elevator signal system comprising a single station signal transmitter arranged to send either down or up signals when actuated, and means at said transmitter to indicate which of said signals it will send.

10. An elevator signal system comprising a single station signal transmitter arranged to send either down or up signals when actuated, a pair of lamps at said transmitter, and means for illuminating one of said lamps when the transmitter is in condition to send a down signal and for illuminating the other lamp when the transmitter is in condition to send an up signal.

11. An elevator signal system comprising a station push button means arranged to send down and up signals when actuated, a pair of lamps within said push button means, and means for illuminating one of said lamps when the push button means is in condition to send a down signal and for illuminating the other lamp when the push button means is in condition to send an up signal.

12. An elevator signal system comprising a station push button means having a transparent face, said push button means being arranged to send down and up signals when actuated, a pair of lamps of different appearance within said push button means, and means for illuminating one of said lamps when the push button means is in condition to send a down signal and for illuminating the other lamp when the push button means is in condition to send an up signal.

13. In combination with an elevator car, a down signal circuit, an indicating lamp therefor, an up signal circuit, an indicating lamp therefor, a direction switch arranged

to be actuated by the movement of the car arranged to connect one or the other of said signal circuits with a source of electrical supply, and means for causing the downward movement of the car to actuate the direction switch to connect the down signal circuit with the source of electrical supply and to close a circuit through its indicating lamp and for causing the upward movement of the car to connect the up signal circuit with the source of electrical supply and to close a circuit through its indicating lamp, a lost motion connection in said actuating means to permit a reversal of movement of the car through a limited space without affecting the direction switch, and other means for actuating the direction switch when the car reaches the ends of its path of travel; and a station signal transmitter arranged to complete a circuit through whichever of said signal circuits is connected with the source of electrical supply.

14. An elevator system comprising a plurality of station signal transmitters each arranged to send either down or up signals when actuated, and means at each transmitter to indicate which of said signals it will send.

15. An elevator signal system comprising a plurality of station signal transmitters arranged to send down and up signals when actuated, a pair of lamps of unlike appearance at each transmitter, and means for illuminating the lamps of one appearance at each transmitter when the transmitters are in condition to send down signals and for illuminating the other lamps at the transmitters when said transmitters are in condition to send up signals.

16. In combination with an elevator car, a signal therein, a station signal transmitter, circuits between said transmitter and the car signal, means actuated by the movements of the car for changing said circuits whereby the same movement of the signal transmitter may be utilized for energizing the car signal for a down call when the car is at the upper end of its run or is moving downward toward said transmitter, or for up signal when the car is at the lower end of its travel or is moving upward toward the transmitter.

17. In combination with an elevator car, a signal therein, a circuit for said car signal, a down signal transmission line, an up signal transmission line, a direction switch arranged to connect one or the other of said transmission lines with a supply of energy, means for causing the downward movement of the car to actuate the direction switch to connect the down signal transmission line with the supply of energy, and for causing an upward movement of the car to actuate the direction switch to connect the up signal transmission line with the supply of energy

and other means for actuating the direction switch when the car reaches the ends of its path of travel, and a station signal transmitter arranged to complete a circuit through
 5 whichever of said transmission lines is connected with the supply of energy, and control said car signal circuit.

18. In combination with an elevator car, a signal therein, a circuit for said car signal, a plurality of station signal transmitters, circuits therefor, means actuated by the movement of the car for changing said circuits whereby the same movement of any
 15 of the signal transmitters may be utilized to control said car signal circuit for a down signal when the car is at the upper end of its run or is moving downward toward said transmitter, or an up signal when the car is at the lower end of its travel or is moving
 20 upward toward said transmitter.

19. In combination with an elevator car, a signal system comprising a signal in the car, a circuit for said signal, a station signal transmitter arranged to control said car
 25 signal circuit to send down and up signals when actuated, and means at each transmitter to indicate which of said signals it will send.

20. In combination with an elevator car, a signal system comprising a signal lamp in the car, a station push button arranged when actuated to control said signal circuit to cause the car signal lamp to be illuminated for down and up signals when actuated, a pair of lamps within said push button, and means for illuminating one of said
 35 push button lamps when the push button is in condition to send a down signal and for illuminating the other push button lamp when the transmitter is in condition to send
 40 an up signal.

21. In an elevator signal system, a down signal circuit, an up signal circuit, an electric station signal transmitter, including a
 45 signal push button and a selector relay for changing said signal circuits so that a signal may be sent through either of said circuits by the same push button.

22. In combination with an elevator car, a down signal transmission line, an up signal transmission line, a station signal transmitter, including a push button and a selector, said push button being arranged to send a signal through one of said lines for
 55 one direction of car movement, and to first actuate the selector and to then send a signal through the other line for the other direction of car movement.

23. In combination with an elevator car, a down signal circuit, an up signal circuit, an electric station signal transmitter, including a push button and a selector relay associated therewith and a relay circuit, said push button being arranged to send a signal through
 65 one of said signal circuits for one direction

of car movement and to first close the selector relay circuit and to then send a signal through the other signal circuit for the other direction of car movement.

24. In combination with an elevator car, a down signal transmission line, an up signal transmission line, a direction switch arranged to be actuated by the movement of the car and arranged to connect one or the other of said transmission lines with a supply of energy, a station signal transmitter arranged to complete a circuit through
 75 whichever of said transmission lines is connected with the supply of energy, and a selector relay associated with said transmitter controlled by said direction switch and arranged to cause the same movement of the transmitter to close the desired circuit.

25. In combination with an elevator car, a down signal circuit, an up signal circuit, an electric station signal transmitter, a selector relay associated therewith, a relay circuit, said transmitter being arranged to send a signal through one of said signal circuits for one direction of car movement and to
 90 first close the selector relay circuit and to then send a signal through the other signal circuit for the other direction of car movement, and a direction switch arranged to be actuated by the movement of the car and to
 95 control said signal and relay circuits.

26. In combination with an elevator car, a signal lamp therein, a circuit for said signal lamp, a car signal relay arranged to control said circuit, a relay winding therefor, a signal system comprising a source of electrical supply, a station signal transmitter, a down signal circuit and an up signal circuit between said transmitter and said car signal relay whereby the energization of the relay winding from said source of electrical supply may be controlled, another supply of electrical energy in the car, and means controlled by the energization of said relay winding for connecting said other supply of
 100 electrical energy with the signal lamp circuit.

27. In combination with an elevator car, a signal therein, a station signal transmitter, circuits between said transmitter and the car signal, means actuated by the movements of the car for changing said circuits whereby the same movement of the signal transmitter may be utilized for energizing a circuit for a down call when the car is at the upper end of its run or is moving downward toward
 115 said transmitter or another circuit for an up signal when the car is at the lower end of its travel or is moving upward toward the transmitter, and means actuated by the movement of the car in the direction for which a car signal circuit has been energized, to complete said circuit.

28. In combination with an elevator car, a signal therein, a circuit for said car signal, a
 130

plurality of station signal transmitters, circuits therefor, means actuated by the movement of the car for changing said circuits whereby the same movement of any of the
 5 signal transmitters may be utilized to control said car signal circuit for a down signal when the car is at the upper end of its run or is moving downward toward said transmitter, or an up signal when the car is at the
 10 lower end of its travel or is moving upward toward said transmitter, and means actuated by a downward movement of the car as it approaches a station from which a down signal has been sent and by an upward movement
 15 of the car as it approaches a station from which an up signal has been sent, to complete the car signal circuit.

29. In combination with an elevator car, a signal system comprising a signal lamp in
 20 the car, a circuit therefor, a station push button means arranged when actuated to control said signal circuit for down and up signals when actuated, a pair of lamps within said push button means, and means for
 25 illuminating one of said push button lamps when the push button means is in condition to send a down signal and for illuminating the other push button lamp when the transmitter is in condition to send an up signal,
 30 and means actuated by a downward movement of the car as it approaches a station from which a down signal has been sent and by an upward movement of the car as it approaches a station from which an up signal
 35 has been sent, to complete the car signal lamp circuit.

30. In combination with an elevator car, a plurality of station doors, a plurality of station signal transmitters, circuits therefor,
 40 means actuated by the movement of the car for changing said circuits whereby the same movement of any of the signal transmitters may be utilized for sending a down signal when the car is at the upper end of its run
 45 or is moving downward toward said transmitter, or an up signal when the car is at the lower end of its travel or is moving upward toward said transmitter, and means actuated by the opening of a door at the station from
 50 which a signal has been sent for deenergizing whichever of said circuits has been utilized for sending a signal.

31. In combination with an elevator car, a plurality of station doors, a signal in the
 55 car, a circuit for said car signal, a plurality of station signal transmitters, circuits therefor, door switches in said circuits, means actuated by the movement of the car for changing said circuits whereby the same
 60 movement of any of the signal transmitters may be utilized to control said signal circuit for a down signal when the car is at the upper end of its run or is moving downward toward said transmitter, or an up signal
 65 when the car is at the lower end of its travel

or is moving upward toward said transmitter, said door switches being actuated by the opening of a door at the station from which a signal has been sent for breaking whichever transmitter circuit has been utilized for
 70 sending a signal.

32. In an elevator signal system, a station door, a station signal transmitter, a down
 signal transmission line, an up signal transmission line, a selector associated with the
 75 transmitter for changing said transmission lines so that a signal may be sent through either of said lines by the same movement of the transmitter, and means actuated by the opening of the door for breaking whichever
 80 signal transmission line has been utilized for a signal.

33. In combination with an elevator car, a station door, an electric station signal transmitter, a down signal circuit, an up signal
 85 circuit, a selector relay associated with the transmitter for changing said circuits so that a signal may be sent through either of said circuits by the same movement of the transmitter, means actuated by the movement of
 90 the car for controlling said selector relay, and a door switch in said signal circuits actuated by the movement of the door and arranged to break whichever signal circuit has been utilized for a signal.
 95

34. In combination with an elevator car, a station door, a signal in the car, a station
 signal transmitter, a door switch, circuits between said transmitter and the car signal
 100 through said door switch, means actuated by the movement of the car in different directions for causing the same movement of the transmitter to energize one of said circuits for one direction of car movement and to energize another of said circuits for the opposite
 105 direction of car movement, and means actuated by the movement of the car in the direction for which a car signal circuit has been energized to complete said circuit, said door switch being arranged to be actuated
 110 by the opening of the door for breaking whichever transmitter circuit has been energized by the transmitter.

35. In combination with an elevator car, a plurality of station doors, a signal in the
 115 car, a circuit for said car signal, a switch for each door, a plurality of station signal transmitters, circuits between said transmitters and the car through said door switches, and means actuated by the movement of the
 120 car for changing said circuits whereby the same movement of any of the signal transmitters may be utilized to control said car signal circuit for a down or an up signal, means actuated by a downward movement
 125 of the car as it approaches a station from which a down signal has been sent or by an upward movement of the car as it approaches a station from which an up signal has been sent to complete the car signal circuit.
 130

cuit, said door switches being arranged to be actuated by the opening of a door at the station from which a signal has been sent for breaking whichever circuit has been utilized
5 by a transmitter for controlling the car signal circuit.

36. In combination with an elevator car, a station door, a down signal circuit, a holding magnet therein, an up signal circuit, a
10 holding magnet therein, a station signal transmitter comprising a single push button and arranged to energize either one or the other of said circuits, and means actuated by the opening of the door for deenergizing
15 the holding magnet in whichever circuit has been energized by the transmitter.

37. In combination with an elevator car, a station door, a down signal transmission line, a holding magnet therein, an up signal
20 transmission line, a holding magnet therein, a direction switch arranged to be actuated by the movement of the car and arranged to connect one or the other of said transmission lines with a supply of energy, a station signal
25 transmitter comprising a single push button and arranged to complete a circuit through whichever of said transmission lines is connected with the supply of energy, and means actuated by the opening of the door
30 for deenergizing whichever holding magnet has been completed by the transmitter.

38. In combination with an elevator car, a station door, a down signal wire, a holding magnet therein, an up signal wire, a holding
35 magnet therein, a door switch in said wires, a direction switch arranged to be actuated by the movement of the car and arranged to connect one or the other of said signal wires with a source of electrical energy, and a push
40 button arranged to complete a circuit through whichever of said signal wires is connected with the source of electrical energy, said door switch being arranged to be actuated by the opening of the door to de-
45 energize the holding magnet in whichever of said circuits has been completed by the push button to break said circuit.

39. In combination with an elevator car, a station door, a signal in the car, a circuit
50 for said car signal, a down signal wire, a holding magnet therein, an up signal wire, a holding magnet therein, a door switch in said signal wires, a direction switch arranged to be actuated by the movement of
55 the car and arranged to connect one or the other of said signal wires with a source of electrical energy, and a station signal transmitter comprising a single push button arranged to energize a circuit through which-
60 ever of said signal wires is connected with the source of electrical energy and to control said car signal circuit, said door switch being actuated by the opening of the door to deenergize the holding magnet in whichever

signal circuit has been energized by the push
button.

40. In combination with an elevator car, a station door, a down signal circuit, a holding magnet therein, an indicating lamp for
said down signal circuit, an up signal circuit, a holding magnet therein, an indicating lamp for said up signal circuit, a direc-
70 tion switch arranged to be actuated by the movement of the car and arranged to connect one or the other of the signal circuits with a source of electrical supply and to close a circuit through one or the other of
75 said indicating lamps, a station signal transmitter comprising a single push button and arranged to complete a circuit through
80 whichever of said signal circuits is connected with the source of electrical supply, and means actuated by the opening of the door for deenergizing the holding magnet in
85 whichever signal circuit has been completed by the transmitter to break said circuit.

41. In an elevator signal system, a station door, a down signal transmission line, a holding magnet therein, an up signal trans-
mission line, a holding magnet therein, a
90 station signal transmitter, comprising a push button and a selector for changing said transmission lines so that a signal may be sent through either of said lines by the same
95 movement of the transmitter, and means actuated by the opening of the door for deenergizing the holding magnet in whichever signal transmission line has been utilized for a signal to break said line.

42. In combination with an elevator car, a station door, a signal in the car, a station
100 signal transmitter, a door switch, a pair of holding magnets, circuits between said transmitter and the car signal through said
105 door switch, and holding magnets, means actuated by the movement of the car in different directions for causing the same movement of the transmitter to energize a circuit for one direction of car movement
110 and to energize another circuit for the opposite direction of car movement, and means actuated by the movement of the car in the direction for which a car signal circuit has been energized to complete said circuit, said
115 door switch being arranged to be actuated by the opening of the door for deenergizing whichever holding magnet has been energized by the transmitter to break its circuit.

43. In combination with an elevator car, a plurality of station doors, a plurality of
120 station signal transmitters, circuits therefor, holding magnets in said circuits, means actuated by the movement of the car for changing said circuits whereby the same movement of the signal transmitters may be
125 utilized for sending a down signal when the car is at the upper end of its run or is moving downward toward said transmitter, or

an up signal when the car is at the lower end of its travel or is moving upward toward said transmitter, and means actuated by the opening of a door at the station from which a signal has been sent for deenergizing the holding magnet in whichever of said circuits has been utilized for sending a signal to break said circuit.

44. In combination with an elevator car, a plurality of station doors, a signal in the car, a circuit for said car signal, a switch for each door, a plurality of station signal transmitters, a pair of holding magnets for each station, circuits between said transmitters through said door switches and holding magnets, and means actuated by the movement of the car for changing said circuits whereby the same movement of any of the signal transmitters may be utilized to control said car signal circuit for a down or an up signal, means actuated by a downward movement of the car as it approaches a station from which a down signal has been sent or by an upward movement of the car as it approaches a station from which an up signal has been sent to complete the car signal circuit, said door switches being arranged to be actuated by the opening of a door at the station from which a signal has been sent for deenergizing the holding magnet in whichever circuit has been utilized by a transmitter for controlling the car signal circuit to break said circuit.

45. In combination with an elevator car, a station indicator signal, a station signal transmitter, circuits therefor, means actuated by the car reaching the ends of its travel and by the movement of the car in different directions for causing the same movement of the transmitter to control a circuit for a downward movement of the car and to control another circuit for an upward movement of the car, and other means actuated by the movement of the car for actuating the station signal after said transmitter has been actuated.

46. In combination with an elevator car, a down station indicator signal, an up station indicator signal, a station signal transmitter, circuits therefor, means actuated by the movement of the car for changing said circuits whereby the same movement of the signal transmitter may be utilized for sending a down signal when the car is at the upper end of its run or is moving downward, or an up signal when the car is at the lower end of its run or is moving upward, and other means actuated by the downward movement of the car for actuating the down station indicator signal after the transmitter has sent a down signal or by the upward movement of the car for actuating the up station indicator signal after the transmitter has sent an up signal.

47. In combination with an elevator car,

a plurality of station indicator lamps at a station, a station signal transmitter comprising a single push button, circuits therefor, means actuated by the movement of the car in different directions for causing the same movement of the push button to control a circuit for a downward movement of the car and to control another circuit for an upward movement of the car, and other means actuated by the movement of the car as it approaches the station for successively illuminating the station indicator lamps at a station after the push button at that station has been actuated.

48. In combination with an elevator car, a plurality of down station indicator lamps at a station, a plurality of up station indicator lamps at a station, a station signal transmitter comprising a single push button, circuits therefor, means actuated by the movement of the car for changing said circuits whereby the same movement of the push button may be utilized for sending either a down signal or an up signal, and other means actuated by the downward movement of the car as it approaches the station for successively illuminating the down indicator lamps at a station after the push button at that station has sent a down signal, or by the upward movement of the car as it approaches the station for successively illuminating the up indicator lamps at the same station.

49. In combination with an elevator car, a station indicator signal, a station signal transmitter arranged to send down and up signals when actuated, means at said transmitter to show which of said signals it will send, and other means actuated by the movement of the car for actuating the station indicator signal after said transmitter has been actuated.

50. In combination with an elevator car, a down station indicator lamp, an up station indicator lamp, a station signal transmitter, a pair of lamps at said transmitter, means actuated by the movement of the car for illuminating one of said pair of lamps when the transmitter is in condition to send a down signal and for illuminating the other of said pair of lamps when the transmitter is in condition to send an up signal, and other means actuated by the movement of the car from above for illuminating the down station indicator lamp after a down signal has been sent and by the movement of the car from below for illuminating the up station indicator lamp after an up signal has been sent.

51. In combination with an elevator car, a plurality of down station indicator lamps, a plurality of up station indicator lamps, a station push button arranged to send down and up signals when actuated, a pair of lamps within said push button, means actuated by the movement of the car in different

directions for illuminating one of said push button lamps when the push button is in condition to send a down signal and for illuminating the other push button lamp when the push button is in condition to send an up signal, and other means actuated by the movement of the car as it approaches the station from above for successively illuminating the down station indicator lamps and as it approaches the station from below for successively illuminating the up station indicator lamps.

52. In an elevator signal system, a push button and associated means arranged to send down and up signals when actuated, a casing for said push button, a pair of lamps within said casing, means for illuminating one of said pair of lamps when the push button is in condition to send a down signal and for illuminating the other of said pair of lamps when the push button is in condition to send an up signal, a plurality of down station indicator lamps, a plurality of up station indicator lamps, and means for successively illuminating the down station indicator lamps after the push button has been actuated to send a down signal and the up station indicator lamps after the push button has been actuated to send an up signal.

53. In an elevator system, a casing comprising a centrally disposed push button having a transparent face, means associated with said push button whereby said button is arranged to send down and up signals when actuated, a pair of lamps of different appearance within said push button, means for illuminating one of said lamps when the push button is in condition to send a down signal and for illuminating the other of said lamps when the push button is in condition to send an up signal, a plurality of down station indicator lamps above said push button, a plurality of up station indicator lamps below the push button, and means for successively illuminating the down station indicator lamps after a down signal has been sent by the push button and for successively illuminating the up station indicator lamps after an up signal has been sent by the push button.

54. In combination with an elevator car, a signal therein, a station signal transmitter, circuits between said transmitter and the car signal, means actuated by movements of the car in different directions for causing the same movement of the transmitter to energize a circuit for one direction of car movement, and to energize another circuit for the opposite direction of car movement, a station indicator signal, and means actuated by the movement of the car in the direction for which a car signal circuit has been energized, to complete said circuit, and to actuate the station indicator signal.

55. In combination with an elevator car,

a signal therein, a station signal transmitter, circuits between said transmitter and the car signal, means actuated by the movements of the car for changing said circuits whereby the same movement of the signal transmitter may be utilized for energizing a circuit for a down signal when the car is at the upper end of its run or is moving downward toward said transmitter or another circuit for an up signal when the car is at the lower end of its travel or is moving upward toward the transmitter, a down station indicator signal, an up station indicator, and means actuated by the movement of the car in the direction for which a car signal circuit has been energized, to complete said circuit and to actuate one of said station indicator signals.

56. In combination with an elevator car, a signal therein, a station signal transmitter, circuits between said transmitter and the car signal, means actuated by movements of the car in different directions for causing the same movement of the transmitter to energize a circuit for one direction of car movement, and to energize another circuit for the opposite direction of car movement, a set of down station indicator lamps, a set of up station signal lamps, and means actuated by the movement of the car in the direction for which a car signal circuit has been energized, to complete said circuit and to successively illuminate one set of indicator lamps.

57. In combination with an elevator car, a station door, a signal in the car, a station signal transmitter, a door switch, circuits between said transmitter and the car signal through said door switch, means actuated by the movement of the car in different directions for causing the same movement of the transmitter to energize a circuit for one direction of car movement and to energize another circuit for the opposite direction of car movement, a station indicator signal, and means actuated by the movement of the car in the direction for which a car signal circuit has been energized to complete said circuit and to energize the station indicator signal, said door switch being arranged to be actuated by the opening of the door for breaking whichever transmitter circuit has been energized by the transmitter.

58. In combination with an elevator car, a station door, a signal in the car, a station signal transmitter, a door switch, a pair of holding magnets, circuits between said transmitter and the car signal through said door switch and holding magnets, means actuated by the movement of the car in different directions for causing the same movement of the transmitter to energize a circuit for one direction of car movement and to energize another circuit for the op-

posite direction of car movement, a down station indicator signal, an up station indicator signal, and means actuated by the movement of the car in the direction for which a car signal circuit has been energized to complete said circuit and to actuate the corresponding station indicator signal, said door switch being arranged to be actuated by the opening of the door for deenergizing whichever holding magnet has been energized by the transmitter to break its circuit.

59. In combination with an elevator car, a station door, a signal in the car, a station signal transmitter, a door switch, a pair of holding magnets, circuits between said transmitter and the car signal through said door switch and holding magnets, means actuated by the movement of the car in different directions for causing the same movement of the transmitter to energize a circuit for one direction of car movement and to energize another circuit for the opposite direction of car movement, a set of down station indicator lamps, a set of up station indicator lamps, and means actuated by the movement of the car in the direction for which a car signal circuit has been energized to complete said circuit and to successively illuminate the indicator lamps of the corresponding set, said door switch being arranged to be actuated by the opening of the door for deenergizing whichever holding magnet has been energized by the transmitter to break its circuit.

60. In combination with an elevator car, a down signal circuit, a holding magnet therefor, a down interlock relay in said circuit, an up signal circuit, a holding magnet therefor, an up interlock relay in said circuit, a station signal transmitter comprising a single push button and arranged to momentarily energize either of said circuits and said interlock relays being arranged to maintain the energization of whichever circuit is energized by the transmitter.

61. In combination with an elevator car, a station door, a down signal circuit, a holding magnet therefor, a down interlock relay in said circuit, an up signal circuit, a holding magnet therefor, an up interlock relay in said circuit, a station signal transmitter comprising a single push button and arranged to momentarily energize either of said circuits and said interlock relays being arranged to maintain the energization of whichever circuit is energized by the transmitter, and means actuated by the opening of the door for deenergizing the interlock relay and the holding magnet in whichever circuit has been energized by the transmitter.

62. In combination with an elevator car, a station door, a signal in the car, a circuit for said car signal, a down signal wire, a

holding magnet therefor, an up interlock relay in said circuit, an up signal wire, a holding magnet therefor, an up interlock relay in said circuit, a door switch in said signal wires, a direction switch arranged to be actuated by the movement of the car and arranged to connect one or the other of said signal wires with a source of electrical energy, and a station signal transmitter comprising a single push button arranged to energize a circuit through whichever of said signal wires is connected with the source of electrical energy and through its interlock relay to energize one of said holding magnets and to control the car signal circuit, said door switch being actuated by the opening of a door to deenergize the interlock relay to cause it to break the circuit through a holding magnet in whichever signal circuit has been energized by the push button.

63. In combination with an elevator car, a station door, a signal in the car, a station signal transmitter, a door switch, a pair of holding magnets, a pair of interlock relays, circuits between said transmitter and the car signal through said interlock relays, means actuated by the movement of the car in different directions for causing the same movement of the transmitter to energize a circuit for one direction of car movement and to energize another circuit for the opposite direction of car movement, and means actuated by the movement of the car in the direction for which a car signal circuit has been energized to complete said circuit, said door switch being arranged to be actuated by the opening of the door for deenergizing whichever interlock relay and holding magnet has been energized by the transmitter to break their circuits.

64. In combination with a plurality of elevator cars, a station signal transmitter comprising a signal push button for each car, circuits for said transmitters, means actuated by the movements of said cars for changing the circuits for their respective transmitters whereby any push button may be utilized when its car is moving downward for sending a down signal to all of the cars moving toward the transmitter from above or when its car is moving upward for sending an up signal to all of the cars moving toward said transmitter from below.

65. In combination with a plurality of elevator cars, a station signal transmitter comprising a signal push button for each car, circuits for said transmitters, means actuated by the movements of said cars for changing the circuits for their respective transmitters whereby any push button may be utilized when its car is moving downward for sending a down signal to all of the cars which are at the upper end of their runs or

are moving toward said transmitter from above, or may be utilized when its car is moving upward for sending an up signal to all of the cars which are at the lower ends of their runs or are moving toward said transmitter from below.

66. In combination with a plurality of elevator cars, a station signal transmitter for each car, circuits for said transmitters, means actuated by the movements of said cars for changing the circuits for their respective transmitters whereby any transmitter may be utilized when its car is moving downward for sending a down signal to all of the cars moving toward the transmitter from above or when its car is moving upward for sending an up signal to all of the cars moving toward said transmitter from below and means at each transmitter to indicate which of said signals it will send.

67. In combination with a plurality of elevator cars, a plurality of station signal transmitters for each car, circuits for said transmitters, means actuated by the movement of said cars for changing the circuits for their respective transmitters whereby any transmitter may be utilized when its car is moving downward for sending a down signal to all of the cars moving toward the transmitter from above or when its car is moving upward and for sending an up signal to all of the cars moving toward said transmitter from below and means at each transmitter to indicate which of said signals it will send.

68. In combination with a plurality of elevator cars, a signal in each car, a station signal transmitter comprising a single push button for each car, circuits between said transmitters and the car signals, means actuated by the movements of the cars in different directions for so changing said circuits that any push button may be utilized when its car is a down car for energizing a circuit for a down signal and means actuated by any car approaching the station from above after said circuit has been energized for closing said energized circuit to actuate its respective car signal; and that any push button may be utilized when its car is an up car for energizing a circuit for an up signal and means actuated by any car approaching the station from below after said circuit has been energized for closing a circuit to actuate its respective car signal.

69. In combination with a plurality of elevator cars, a signal in each car, a circuit for each car signal, a plurality of station signal transmitters each comprising a single push button for each car, circuits therefor, means actuated by the movement of the car for changing said circuits, whereby the same movement of any of the push buttons may be utilized to control said car signal circuits for a down signal, for the cars

which are at the upper ends of their runs or are moving downward toward said push button or an up signal for such cars as are at the lower ends of their runs or are moving upward toward said push button and means actuated by a downward movement of any car as it approaches a station from which a down signal has been sent and by an upward movement of any car as it approaches a station from which an up signal has been sent to complete its respective car signal circuit.

70. In combination with a plurality of elevator cars, a station door for each car, a down signal circuit, an up signal circuit, a station signal transmitter comprising a single push button for each car, and arranged to energize said circuits for all of the cars and means actuated by the opening of any one of the doors for deenergizing whichever circuit has been energized by a push button.

71. In combination with a plurality of elevator cars, a station door for each car, a door switch for each door, a down signal circuit running in series through the door switches at said station, an up signal circuit running in series through the door switches at said station and a station signal transmitter comprising a single push button for each car, means actuated by the movements of the cars, for so changing said circuits that any transmitter may send a signal through a down signal circuit or through an up signal circuit and means in said door switches for causing the opening of a door to break whichever signal circuit a signal has been sent through.

72. In combination with a plurality of elevator cars, a station door for each car, a down signal circuit, an up signal circuit, a station signal transmitter for each car, each transmitter comprising a single push button, a holding magnet for the down signal circuit and another holding magnet for the up signal circuit and being arranged to energize either of said circuits and means actuated by the opening of a door for deenergizing the holding magnet in whichever circuit has been energized by the transmitter.

73. In combination with a plurality of elevator cars, a station transmitter for each car, each transmitter comprising a single push button, a down holding magnet, and an up holding magnet, circuits for said holding magnets, a down signal circuit, an up signal circuit, means actuated by the movements of the cars for putting said transmitters in condition to send a signal through the down signal circuit or through the up signal circuit, a down interlock relay and an up interlock relay at each station, and means actuated by any transmitter in condition to send a down signal for momentarily closing a circuit through its down holding magnet and for the down interlock relay,

said down interlock relay being arranged to maintain said circuit and being provided with means for closing and maintaining the circuits through the down holding magnet
 5 of all other transmitters at its station which are in condition to send a down signal.

74. In combination with a plurality of elevator cars, a station transmitter for each car, signal circuits therefor, each transmitter
 10 comprising a single push button being arranged to momentarily close a circuit for a down signal or for an up signal, a down interlock relay in the down signal circuit, and an up signal interlock relay in the up
 15 signal circuit, said relays being provided with means arranged to maintain the circuit momentarily closed through it by a transmitter.

75. In combination with a plurality of
 20 elevator cars, a door for each car at each station, a station transmitter for each car, signal circuits therefor, each transmitter comprising a single push button and being arranged to momentarily close a circuit for
 25 a down signal or for an up signal through one or the other of said signal circuits, a down interlock relay in the down signal circuit, and an up interlock relay in the up signal circuit, said relays being provided
 30 with means arranged to maintain the circuit momentarily closed through them by a transmitter; and means actuated by the opening of any of said doors for releasing which ever of said interlock relays is main-
 35 taining a circuit to break said circuit.

76. In combination with a plurality of elevator cars, a station door for each car, a down signal circuit, an up signal circuit, a station transmitter for each car, each trans-
 40 mitter comprising a single push button, a holding magnet for the down signal circuit and another holding magnet for the up signal circuit and being arranged to energize either of said circuits, an interlock relay
 45 for each signal circuit, and means actuated by the opening of the door for deenergizing the interlock relay in whichever circuit has been energized by the transmitter to thereby deenergize all holding magnets which have
 50 been actuated by the transmitters for sending a like signal.

77. In combination with a plurality of elevator cars, a station door for each car, a signal in each car, circuits for said car signals,
 55 a down signal wire, an up signal wire, a door switch for each door, said signal wires passing in series through said door switch, an interlock relay in each of said signal wires, a direction switch for each car arranged to be
 60 actuated by the movement of its car, and arranged to connect one or the other of said signal wires for each car with a source of electrical energy and a push button for each car arranged to energize a circuit from
 65 whichever of said signal wires is connected

with the source of electrical energy and to control said car signal circuits, the door switch being arranged to be actuated by the opening of the door to deenergize the interlock relay in whichever signal circuit has
 70 been energized by the push button and to deenergize all holding magnets which have been energized by the push buttons for a similar signal.

78. In combination with a plurality of ele-
 75 vator cars, a station door for each car, a door switch for each door, a signal in each car, a station signal transmitter for each car, each transmitter comprising a pair of holding magnets, a pair of interlock relays and cir-
 80 cuits between each transmitter and the car signals through said holding magnets, interlock relays and door switches, means actuated by the movements of the car in different directions for causing the same movement of
 85 the respective transmitters to energize a circuit for one direction of car movement and to energize another circuit for the opposite direction of car movement, and means actuated by the movement of the car in the di-
 90 rection for which a car signal circuit has been energized to complete said circuit for its signal, said door switches being arranged to be actuated by the opening of a door to deenergize whichever interlock relay has
 95 been energized by the transmitter to break its circuit and the circuits of all the holding magnets which have been energized by the transmitters for a similar signal.

79. In combination with a plurality of ele-
 100 vator cars, a plurality of station doors for each elevator car, a door switch for each door, a plurality of station signal transmitters for each car, each of said transmitters comprising a pair of holding magnets, cir-
 105 cuits for said transmitters, means actuated by the movement of each car for changing the circuits of its transmitters whereby the same movement of the signal transmitters may be utilized when their car is moving
 110 downward for sending a down signal to all of the cars which are moving downward toward said transmitter, or may be utilized when their car is moving upward for sending an up signal to all of the cars which are
 115 moving upward toward said transmitter, a pair of interlock relays at each station, and means actuated by the opening of a door at the station from which a signal has been sent for deenergizing the interlock relay at
 120 said station in whichever of said circuits has been utilized for sending the signal to break said circuit and to deenergize each holding magnet at said station which has been energized for sending a similar signal.
 125

80. In combination with a plurality of elevator cars, a plurality of station doors for each car, a door switch for each door, a push button at each station for each car, each push button comprising a down holding magnet
 130

and an up holding magnet, a down interlock relay and an up interlock relay for each landing, a down signal circuit running in series through the door switches, the down interlock relay and the down holding magnets of the push buttons at a landing, and
5 an up signal circuit running in series through the door switches, the up interlock

relay and the up holding magnets of the push buttons at the same station.

In witness whereof, I have hereunto set my hand this 14th day of April, 1913.

ALEXIS LE BLANC.

Witnesses:

F. S. MERRITT,

SADIE C. O'CONNELL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."