No. 748,409. PATENTED DEC. 29, 1903.

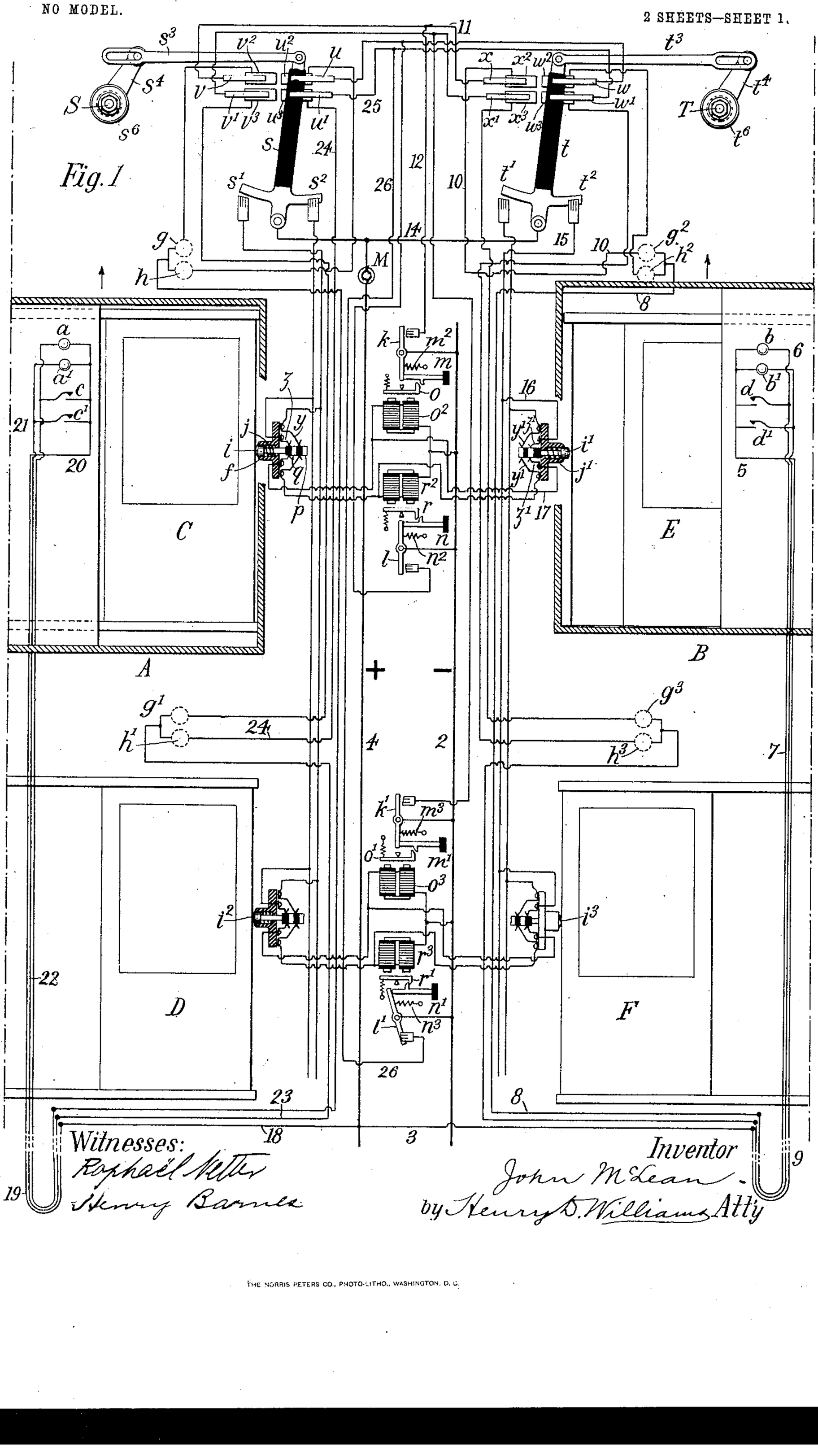
J. McLEAN.

ELEVATOR SIGNALING APPARATUS.

APPLICATION FILED DEC. 8, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1



Witnesses:
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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 2

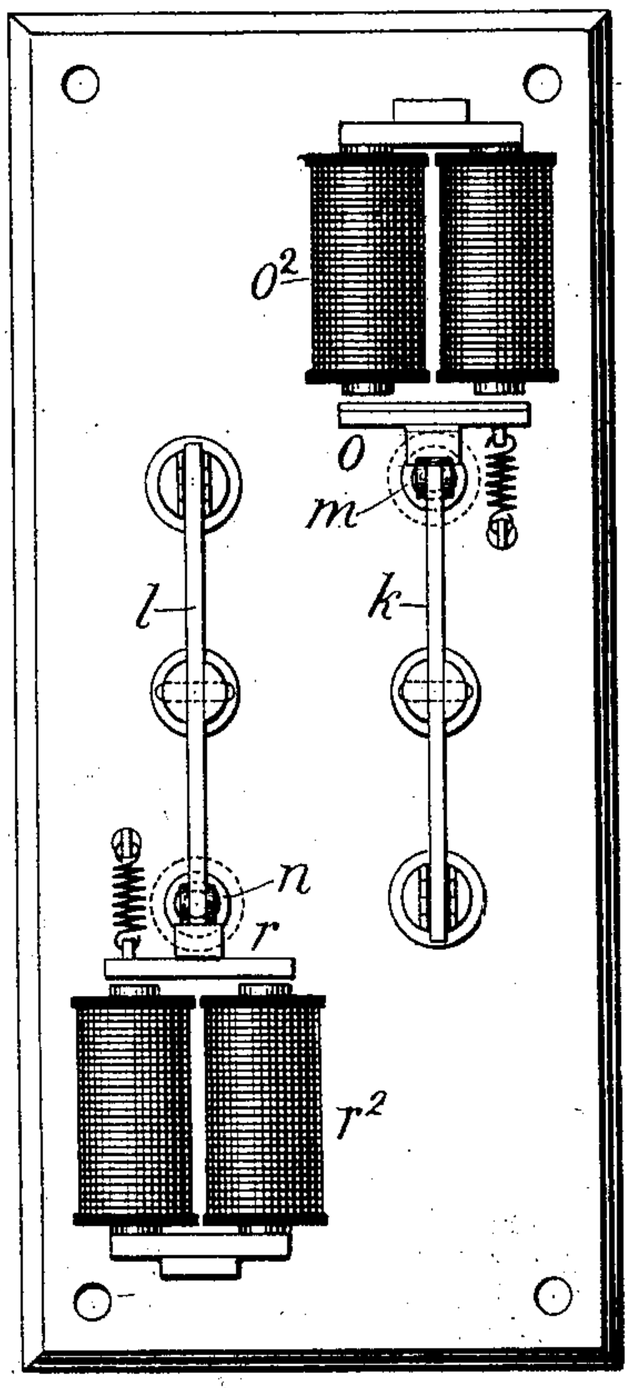


Fig. 3

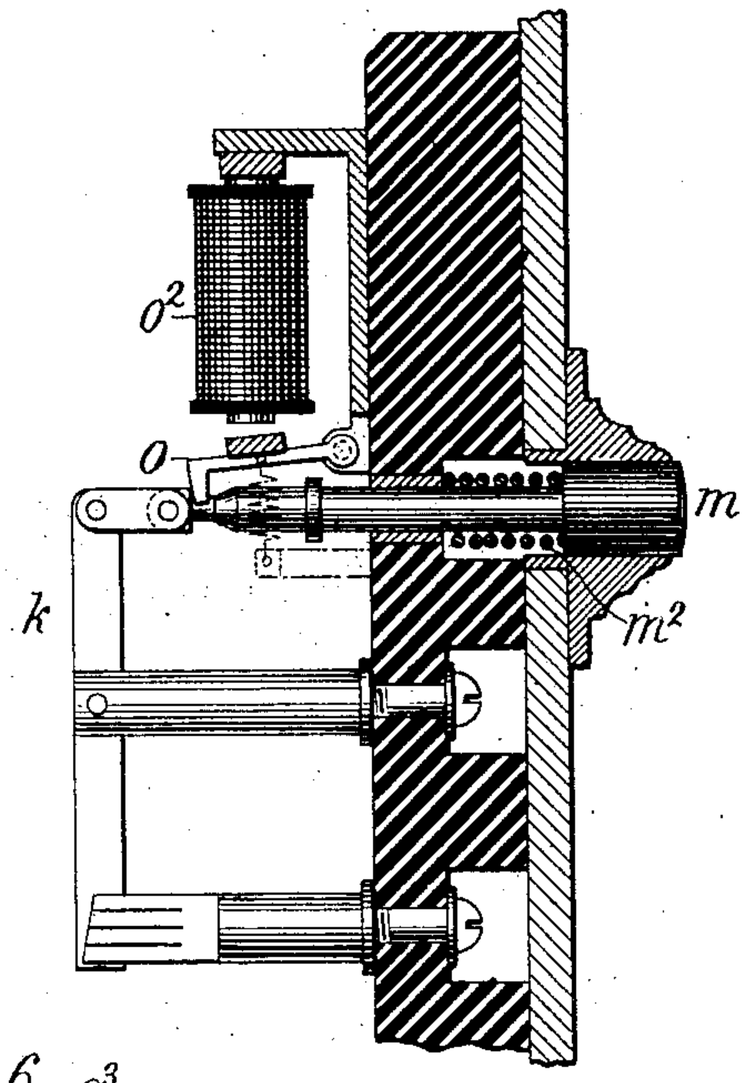


Fig. 6

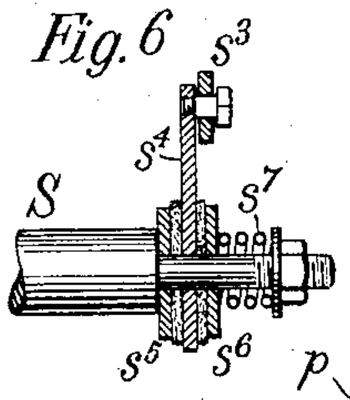


Fig. 7

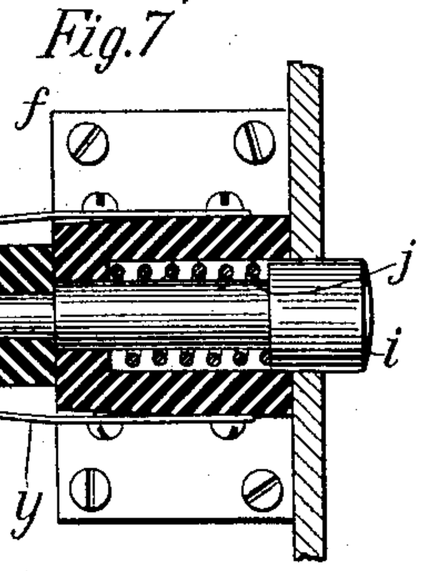


Fig. 4

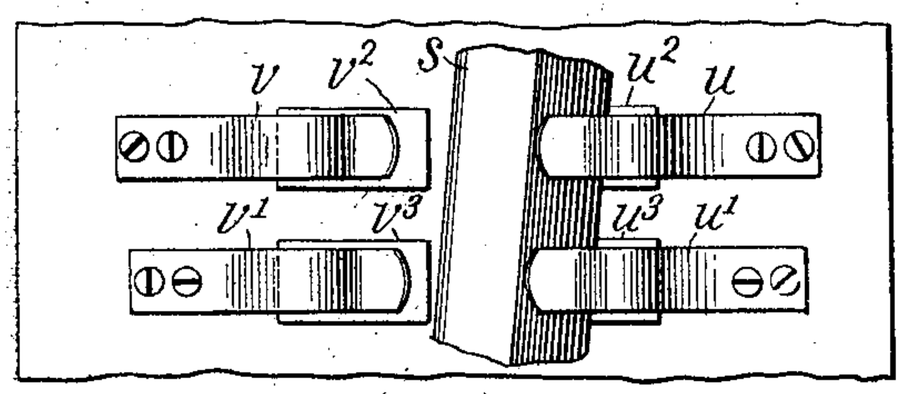


Fig. 8

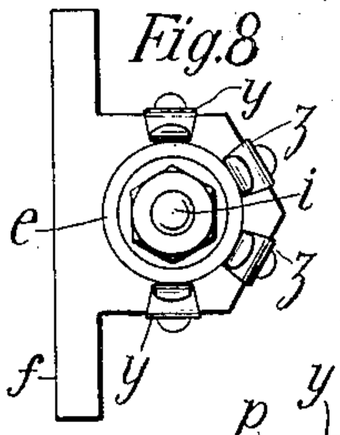


Fig. 5

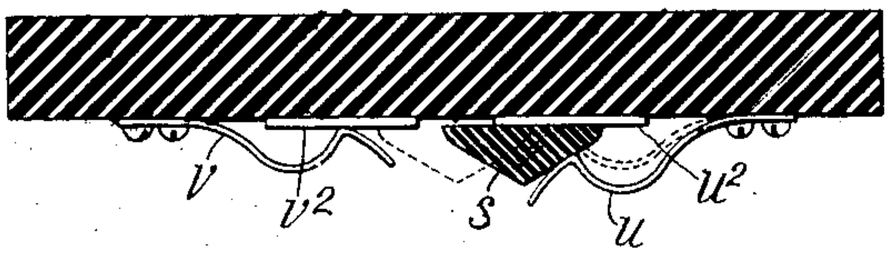
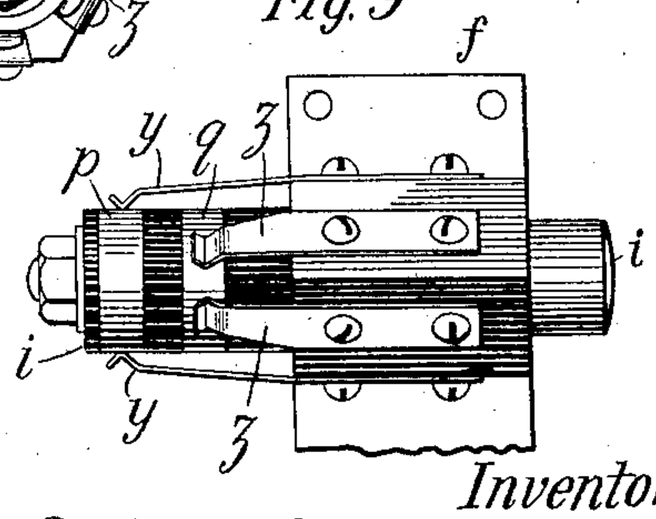


Fig. 9



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Inventor
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No. 748,409. Patented December 29, 1903.

UNITED STATES PATENT OFFICE.

JOHN McLEAN, OF NEW YORK, N. Y.

ELEVATOR SIGNALING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 748,409, dated December 29, 1903.

Application filed December 8, 1902. Serial No. 134,331. (No model.)

To all whom it may concern:

Be it known that I, JOHN McLEAN, a citizen of the United States, residing in the borough of Manhattan, city of New York, county of New York, and State of New York, have invented certain new and useful Improvements in Elevator Signaling Apparatus, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to elevator signaling apparatus, and has for its objects simplicity of construction, reliability of action, durability, and the realization of the advantageous features hereinafter set forth.

According to my invention the indicators for a car are directionally controlled through a friction-clutch mounted upon a rotating part of the elevator-actuating mechanism and not requiring reducing-gearing, and a change in the direction of movement of the car, continued for a sufficiently long period, whether occurring at the top or bottom of the shaft or at some intermediate point, will make the indicators receptive only of signals corresponding to the new direction of movement of the car.

According to my invention means are provided whereby an elevator attendant may immediately send a return-signal to the floor from which a call-signal was sent to indicate to an intending passenger which car will first arrive at the floor traveling in the direction in which the passenger intends to travel.

According to my invention electrically-controlled indicators are provided for the car and at the floor, these indicators being connected in series when a call-signal is sent and the car-indicator being responsive and the floor-indicator unresponsive under such conditions and the operation of the return-signal means by the elevator attendant closes a branch circuit excluding the car-indicator and including the floor-indicator, and the floor-indicator is then responsive.

According to my invention I provide for restoring the indicators to non-indicating condition by the movement of the gate to admit a passenger, as in my application for Letters Patent, filed November 16, 1901, Serial No. 82,511; but my present invention provides for effecting this operation through an electric switch directly controlled by the gate, and according to my invention the switch has a normal bent to circuit-closing position and is held in circuit-opening position by the elevator-gate.

My invention includes various improvements in the construction and arrangement of the circuits and apparatus, hereinafter fully set forth.

I will now particularly describe the construction of elevator signaling apparatus embodying my invention illustrated in the accompanying drawings and will thereafter point out my invention in claims.

Figure 1 is a diagrammatic vertical section of a portion of an elevator-shaft and elevator-cars therein, showing the signaling circuits and apparatus. Fig. 2 is a detail rear elevation of the floor directional signaling device or calling instrument. Fig. 3 is a vertical section of the up-signaling portion of the same. Fig. 4 is a detail elevation of a portion of the directional switch at the upper part of the elevator-shaft. Fig. 5 is a horizontal section of the same. Fig. 6 is a detail section of the frictional clutch and arm controlling such directional switch. Fig. 7 is a longitudinal vertical section. Fig. 8 is a rear end view, and Fig. 9 is an elevation of the switch of the restoring means.

I have shown in the diagrammatic view, Fig. 1, the circuits and apparatus for two intermediate floors in a shaft containing two elevator-cars A and B. Signaling devices are provided at each of the floors and are constructed so as to send directional signals to the elevator-cars. These signaling devices are diagrammatically shown in Fig. 1, and a single signaling device is completely and accurately illustrated in Figs. 2 and 3. As shown, each of these signaling devices is provided with two switches, one for the up-signal and the other for the down-signal. The signaling device for the upper floor has a switch k for the up-signal and a switch l for the down-signal, and the signaling device for the lower floor has a switch k' for the up-signal and a switch l' for the down-signal. Each of these switches is actuated by a corresponding push-button to close its circuit, the push-button m for the switch k, the push-button n for the switch l, the push-button m' for the switch k', and the push-button n' for

the switch l'. The retracting-spring m^2 for the push-button m is shown in proper position in Fig. 3 and diagrammatically in Fig. 1, and the retracting-springs n^2 m^3 n^3 for the other push-buttons are illustrated only diagrammatically. A retaining device carrying an armature is provided for each switch and a fixed electromagnet is provided for the armature of each retaining device, the retaining device o and electromagnet o^2 for the switch k, the retaining device r and the electromagnet r^2 for the switch l, the retaining device o' and the electromagnet o^3 for the switch k', and the retaining device r' and the electromagnet r^3 for the switch l'. Each retaining device or latch is constructed to engage with its push-button when the button is pushed rearwardly to close the switch and to hold the switch closed until the energization of the corresponding electromagnet causes the armature thereof, carried by the retaining device, to be attracted, thereby releasing the switch. A retracting-spring is shown for each retaining device, operating to retract the armature and latch.

Signal-indicators are provided located at the respective floors and shown as comprising, for the elevator-car A, electric lamps g at the upper floor and g' at the lower floor for up-signals and h at the upper floor and h' at the lower floor for down-signals, and for the elevator-car B g^2 at the upper floor and g^3 at the lower floor for up-signals and h^2 at the upper floor and h^3 at the lower floor for down-signals. These indicators are, as usual, located at the outside of the shaft, preferably above the corresponding entrance-gates. Their function is to indicate to the intending passenger who sends a signal which one of the elevator-cars will first arrive at his floor moving in the direction in which he wishes to travel; but this result is accomplished not by automatic action, but by a return-signal from the elevator attendant.

The indicators for the elevator attendant are shown as electric lamps carried by the respective elevator-cars. In the elevator-car A the indicator a is for the upper floor and the indicator a' for the lower floor, and in the elevator-car B the indicator b is for the upper floor and the indicator b' for the lower floor. Each of these indicators gives both the up-signal and the down-signal, but is under directional control of the elevator mechanism, so that the indications will be limited to those corresponding to the direction of movement of the car, and when the car is going up the signal will necessarily be an up-signal and when the car is going down the signal will necessarily be a down-signal.

Each of the elevator-cars is provided with signaling devices, one for each floor, whereby the elevator attendant may send a signal to the floor from which a call or signal was sent by the intending passenger, these signaling devices being under the control of the elevator attendant, so that he may immediately return the signal at whatever distance he may be from such floor if his car will be the first to arrive at the floor. This signaling device is shown as comprising a switch or circuit-closer and is shown only diagrammatically, the car A having the circuit-closer c for the upper floor and the circuit-closer c' for the lower floor and the car B having the circuit-closer d for the upper floor and the circuit-closer d' for the lower floor.

The means for limiting the signal indications in any car to those corresponding to the direction of movement of the car are located in the elevator-shaft and are controlled by the elevator mechanism and comprise a switch device for each elevator-car, such switch device controlling by a single movement all of the indicators in the corresponding car for the different floors. As shown, this switch device comprises a pivoted bar s for the elevator A and a pivoted bar t for the elevator B. The switch-bar s and the contacts controlled thereby for the two floors shown are partly shown in Figs. 4 and 5, and both switch devices are of identical construction. Each switch-bar is composed of or faced with insulating material and has two inclined faces. When the switch-bar s is to the right, as shown, the spring-contact fingers u and u' are held away from and out of contact with their respective contact-plates u^2 and u^3, and the spring-contact fingers v and v' are permitted to press against and make contact with their corresponding plates v^2 and v^3. The switch-bar s also has conductive arms s' and s^2, which exercise a directional control upon the circuits of the restoring means, closing only the restoring-circuits corresponding to the direction of movement of the car. The switch-bar s is actuated through a connecting-rod s^3, having a slotted connection with an actuating-arm s^4, this actuating-arm s^4 being loosely mounted on the elevator-sheave S without reducing gearing and having a frictional connection therewith, shown as provided by a frictional clutch comprising clamping-plates s^5 and s^6, between which the actuating-arm s^4 is located, such clamping-plates being pressed against the actuating-arm s^4 by the helical spring s^7. (See Fig. 6.) The switch-bar t is also shown in right position and in such position opens the contacts w w^2 and w' w^3 and permits the contacts x x^2 and x' x^3 to close, and the switch-bar t also has conductive arms t' and t^2, constituting the directional switch for the restoring-circuits, and is actuated by an arm t^4, having a slotted connection with a connecting-rod t^3, the actuating-arm t^4 having a frictional clutch connection such as above described with the sheave T of its elevator-actuating mechanism. The frictional connection causes the exertion in one direction or the other, depending upon the direction of movement of the corresponding elevator-car, of a predetermined force sufficient to shift the switch and firmly hold it in shifted position. The loose

or slotted connection between the connecting-rod and actuating-arm permits a limited freedom in the initial movement in either direction, so that a small retrograde movement of a car will not shift the switch. It is to be noted, however, that should an elevator-car ascend for only a portion of its full travel and then descend its switch will be shifted, it being unnecessary for the car to reach the extremity of its movement in either direction to shift the switch.

The means for restoring the signal-indicators to non-indicating condition comprise electric-circuit-controlling means actuated by the gates for admission to the elevator-cars, such circuit-controlling means being shown as spring-actuated circuit-closers, adapted to be set into the frames or jambs of the elevator-gates, so as to be actuated by direct contact with the elevator-gates. The four circuit-closers required for the two floors and two cars shown are diagrammatically illustrated in Fig. 1 and are of identical construction, and the upper-floor left-gate circuit-closer is fully and accurately illustrated in Figs. 7, 8, and 9. The movable part of this circuit-closer comprises a pin i, fitted to slide in a housing-plate f and pressed forward by a spring j and carrying at its rear end a sleeve e, of insulating material, with contact-rings p and q, which make contact with spring-fingers $y\ y$ and $z\ z$, respectively, when the pin i is in forward position, as shown in Figs. 7 and 9. The pin i is in forward position only when the elevator-gate is open. With the gate closed the direct contact with the end of the pin i causes the pin to be moved rearwardly into such position that the spring-contacts $y\ y$ and $z\ z$ press upon the insulated sleeve e, and their circuits are therefore open. The circuits of these spring-contacts are the restoring-circuits for restoring the indicators to non-indicating condition, the springs $y\ y$ for the down-signals and the springs $z\ z$ for the up-signals. When the elevator-gate is opened to admit a passenger, these restoring-circuits are closed. When the elevator-gate is closed after the passenger has been admitted, these restoring-circuits are opened and are not again closed until the gate is again opened to admit a passenger. The other restoring device of the upper floor has a spring-pin i', which is directly actuated by contact with the elevator-gate E against the resilient action of the spring j' and is shown in forward position, the elevator-gate E being open. The contact-springs $y'\ y'$ and $z'\ z'$ are in contact with the conductive rings p' and q', respectively, and the restoring-circuit corresponding to the direction of movement of the elevator-car is closed.

The elevator-gates D and F for the lower floor are combined with restoring means such as above described, the spring-pin i^2 for the gate D and the spring-pin i^3 for the gate F.

I will now describe the circuits with which the apparatus above described are combined and the operations thereof. A main positive conductor 4 and a main negative conductor 2 are connected to some suitable source of electricity, generating a current adapted for illuminating the indicating-lamps. Assume that a passenger at the upper floor has operated the up-signal push-button m to signal to a car that he wishes to travel upward. The circuits closed by such operation are as follows: from the positive conductor 4, through the wire 3, extending from the lower part thereof, and by wire 9 of the usual flexible cable to the elevator-car and through wire 5, upper-floor inside or car lamp b, wire 6, flexible wire 7, wire 8, upper-floor outside or floor up-signal lamp g^2, wire 10, contact-plate x^2 and spring x of directional switch, wires 11 and 12, and up-signal switch k to the negative conductor 2. It will be noted that the car-lamp b and the floor-lamp g^2 are now connected in series in the same circuit. The amount of current required by the floor-lamp is such that it will not under these conditions be illuminated, but the car-lamp will be illuminated and will thus give an indication apprising the elevator conductor that an intending passenger at the upper floor desires to go up. If the car B will be the first car to arrive at such floor going up, the elevator conductor will operate the upper-floor circuit-closer d, and will thereby close a shunt or short circuit between the conductors 5 and 6, in multiple with the car-lamp b, this short circuit being of slight resistance, so that the greater part of the current will pass therethrough and the car-lamp b will be shunted, and the diminished resistance of the circuit will cause an increased current to flow therethrough, and under these conditions the floor-lamp g^2 will be illuminated and the intending passenger will be apprised thereby of the fact that the car B will be the first car to arrive at his floor going up. Upon the arrival of the car at the floor the gate E will be opened to admit the passenger to the car, and thereby the restoring-circuit for up-signals will be closed through the forward movement of the spring-pin i'. This restoring-circuit is as follows: from the main positive conductor 4, through the motor-generator M shown at the upper portion thereof, whereby a current of low potential will be caused to flow through the conductor 14, the conductive arm t^2 of the directional switch, through wires 15 and 16 to the upper spring z' of the restoring device, and from the upper spring z', through the conductive ring q', to the lower spring z', and by wire 17 and electromagnet o^2 back to the negative conductor 2. This circuit will energize the electromagnet o^2 and cause the retaining device o to be released, permitting the switch k and push-button m to be retracted to forward position, and thereby opening the signaling-circuit, which was closed by the switch k, and restoring the indicators to non-indicating condition.

The signaling-circuit and restoring-circuit above described were those for the right elevator B in Fig. 1. The left elevator A is also shown as moving upward, and a corresponding signaling-circuit would be closed for the upper-floor indicating-lamp a in this elevator-car, as well as for the upper floor up-signal outside lamp g. Should, however, the elevator-car A or either elevator-car be descending, it would not receive the up-signal, and, conversely, should either elevator-car be ascending it would not receive a down-signal. This can be illustrated by assuming that an intending passenger on the lower floor has pushed the down-button n' to indicate that he desires to go down. This will close the down-switch l', as shown, and the switch will be held closed by the retaining device r' until one of the doors of the lower floor has been opened to admit the passenger to an elevator-car going down. Although the down-switch l' is closed, it cannot send a signal to either of the upwardly-moving elevator-cars, because all down-signaling circuits are open at the directional switches, as will be evident from a description of the down-signaling circuit to the elevator-car A'. This partly-closed circuit is as follows: from the positive conductor 4 by wire 18, flexible wire 19, wire 20, car-lamp a', wire 21, flexible wire 22, wire 23, down-signal floor-lamp h', wire 24 to the contact-plate u^3. At this point the circuit is opened by reason of the position of the switch-bar s, which results from the upward movement of the elevator-car A, and the circuit will remain open until the elevator-car A changes its direction of movement, and thereby shifts the switch-bar s. When the switch-bar s is thus shifted, the spring u' will be permitted to make contact with the plate u^3, and the current will flow from the spring u' by wires 25 and 26 and down-switch l' to the negative conductor 2. Although the open condition of this circuit will be maintained by the switch-bar s so long as the elevator-car is moving upward, nevertheless the down-signal switch l' will be retained in closed condition, and as soon as the elevator-car changes its direction of movement and shifts the switch-bar s, whether at the top of the shaft or at some intermediate point, this down-signaling circuit will be closed. As before described, the presence of both the car-lamp a' and the floor-lamp h' in series in the same circuit will cause the car-lamp a' only to be illuminated; but when the elevator conductor operates the contact device c' he will shunt the circuit of the car-lamp a' between the wires 20 and 21 and will cause the floor-lamp h' to be illuminated, as above described relative to the lamps g^2 and b.

When an elevator-gate is opened to admit a passenger to an elevator-car going in one direction, the restoring-circuit of the corresponding direction is alone closed, and signals for the other direction from the same floor are unaffected by reason of the control of the directional switch s' s^2 or t' t^2 of the restoring-circuit. For example, should the left elevator-gate D of the lower floor be opened to admit a passenger to the left elevator-car A while the elevator-car A is ascending the down-signal of that floor will be unaffected, since the down restoring-circuits controlled by the elevator-car A are open at the switch s'. It will be noted that the restoring-circuits are individual to each car and are therefore unaffected by the conditions of the restoring-circuits of other cars.

For simplicity of illustration the drawings show only the circuits and apparatus for two intermediate floors of a shaft containing two elevators. The repetitions for other elevators and other floors are obvious.

It is obvious that various modifications may be made in the construction shown and above particularly described within the spirit and scope of my invention.

What I claim, and desire to secure by Letters Patent, is—

1. An elevator signaling apparatus comprising a signal-indicator for an elevator-car, a directional signaling device located at a floor of the building and connected to such indicator, a directional shifting device controlling such connection, an actuating-arm connected to the shifting device by a loose connection so as to permit the initial movement of the actuating-arm in either direction to be independent of the shifting device, a rotating part moving with the elevator-car, and a frictional connection between such rotating part and the actuating-arm.

2. An elevator signaling apparatus comprising a signal-indicator for an elevator-car, a directional signaling device located at a floor of the building and connected to such indicator, a directional shifting device controlling such connection, an actuating-arm connected to the shifting device by a loose connection so as to permit the initial movement of the actuating-arm in either direction to be independent of the shifting device, and a sheave of the elevator-actuating mechanism on which such arm is rotatively mounted and with which such arm has a frictional connection.

3. An elevator signaling apparatus comprising a plurality of signal-indicators for an elevator-car, directional signaling devices located at floors of the building and connected to the corresponding indicators, a directional shifting device controlling all of such connections, a rotating part moving with the elevator-car, and an arm rotatively mounted on such rotating part and having a frictional connection therewith, such arm being connected to the directional shifting device and actuating the same by its frictionally-controlled movement.

4. An elevator signaling apparatus comprising a plurality of signal-indicators for an elevator-car, directional signaling devices located at floors of the building and connected

to the corresponding indicators, a directional shifting device controlling all of such connections, a rotating part moving with the elevator-car, an actuating-arm connected to the shifting device by a loose connection so as to permit the initial movement of the actuating-arm in either direction to be independent of the shifting device, and a frictional connection between the rotating part and actuating-arm.

5. An elevator signaling apparatus comprising a plurality of signal-indicators for an elevator-car, directional signaling devices located at floors of the building and connected to the corresponding indicators, a directional shifting device controlling all of such connections, a sheave of the elevator-actuating mechanism, an actuating-arm rotatively mounted on such sheave and having a frictional connection therewith, and a slotted link connecting the actuating-arm and directional shifting device.

6. An elevator signaling apparatus comprising an electrically-controlled signal-indicator for an elevator-car, a plurality of circuit-controlling directional signaling devices located at floors of the building and connected to such indicator, a directional switch interposed in such connections and comprising a plurality of pairs of contacts for up-signals and a plurality of pairs of contacts for down-signals, each pair of contacts having a normal bent to closed position, such directional switch also comprising a circuit-opening device adapted in one position to open the up-contacts only and in another position to open the down-contacts only, a sheave of the elevator-actuating mechanism and actuating means for such directional switch comprising an arm rotatively fitted on such sheave and having a frictional connection therewith.

7. An elevator signaling apparatus comprising an electrically-controlled signal-indicator for an elevator-car, a circuit-controlling directional signaling device located at a floor of the building and connected to such indicator, a directional switch interposed in such connection, an actuating-arm connected to such directional switch by a loose connection so as to permit the initial movement of the actuating-arm in either direction to be independent of the directional switch, and a sheave of the elevator-actuating mechanism on which such arm is rotatively mounted and with which it has a frictional connection.

8. An elevator signaling apparatus comprising a plurality of electrically-controlled indicators in an elevator-car, circuit-controlling directional signaling devices located at floors of the building and connected to the corresponding indicators, a directional switch interposed in all of such connections, a rotating part moving with the elevator-car, and a frictional connection between such rotating part and the directional switch and actuating the switch by its frictionally-controlled movement.

9. An elevator signaling apparatus comprising a plurality of indicators in an elevator-car, one indicator for each floor, a directional signaling device for each floor connected to the corresponding indicator, and a directional shifting device controlled by the direction of movement of the elevator-car and controlling such connections to limit the signal indications to those corresponding to the direction of movement of the car.

10. An elevator signaling apparatus comprising a plurality of electrically-controlled indicators in an elevator-car, one indicator for each floor, a circuit-controlling directional signaling device for each floor connected to the corresponding indicator, and a directional switch interposed in all of such connections and controlled by the direction of movement of the elevator-car.

11. An elevator signaling apparatus comprising a directional signaling device located at a floor of the building, a directionally-controlled signal-indicator for the elevator-car connected to such signaling device, another signaling device in the elevator-car and another signal-indicator at such floor unresponsive to the signaling device at such floor and connected to the signaling device in the elevator-car.

12. An elevator signaling apparatus comprising a circuit-controlling signaling device located at a floor of the building, an electrically-controlled signal-indicator for the elevator-car, another electrically-controlled signal-indicator at such floor, conductors connecting the signaling device and car-indicator and floor-indicator in series, the floor-indicator being unresponsive when in series with the car-indicator, and a circuit-controlling signaling device in the elevator-car arranged to close a branch of such circuit excluding the car-indicator, such branch circuit including the floor-indicator and the floor-indicator being responsive when such branch circuit is closed.

13. An elevator signaling apparatus comprising a circuit-controlling signaling device located at a floor of the building, an electrically-controlled signal-indicator for the elevator-car, another electrically-controlled signal-indicator located at such floor, conductors connecting the signaling device and car-indicator and floor-indicator in series, and a circuit-closer in the elevator-car arranged to shunt the circuit of the car-indicator, the floor-indicator being unresponsive when in series with the car-indicator and responsive when the car-indicator is shunted.

14. An elevator signaling apparatus comprising a signal-indicator for an elevator-car, a signaling device located at a floor of the building and connected to such indicator, a gate at such floor for admission to the car, and electrical restoring means controlling such indicator and including a switch directly and automatically actuated by the movement of the gate and automatically con-

trolled in its restoring operation by the opening movement of the gate.

15. An elevator signaling apparatus comprising an electrically-controlled signal-indicator for an elevator-car, a circuit-controlling signaling device located at a floor of the building and connected to such indicator, a gate at such floor for admission to the car, a restoring-circuit for the indicator, and a switch controlling such restoring-circuit having a normal bent to circuit-closing position and located so as to be held in circuit-opening position by the elevator-gate when the elevator-gate is closed.

16. An elevator signaling apparatus comprising a signal-indicator for an elevator-car, a directional signaling device located at a floor of the building and connected to such indicator, a gate at such floor for admission to the car, directional restoring-circuits for the indicator, a switch controlling such restoring-circuits and having a normal bent to circuit-closing position and located so as to be held in circuit-opening position by the elevator-gate when the elevator-gate is closed, and a directional shifting device controlled by the direction of movement of the car and controlling the connections of the signaling device and indicator and controlling the restoring-circuits.

17. An elevator signaling apparatus comprising a plurality of electrically-controlled signal-indicators for an elevator-car, circuit-controlling directional signaling devices located at floors of the building and connected to corresponding indicators, a directional shifting device controlled by the direction of movement of the car and controlling all of such connections, gates at such floors for admission to the car, and circuit-controlling directional restoring means for each floor, actuated by the movement of the gate of such floor and connected to the corresponding indicator, the directional shifting device also controlling the connections of all the restoring means.

18. An elevator signaling apparatus comprising a plurality of electrically-controlled signal-indicators for an elevator-car, circuit-controlling directional signaling devices located at floors of the building and connected to corresponding indicators, gates at such floors for admission to the car, circuit-controlling directional restoring means for the several floors actuated by the movement of the gates of corresponding floors and connected to the corresponding indicators, and directional shifting means controlled by the direction of movement of the car and controlling the connections of all of the signaling devices and indicators and also controlling the connections of all of the restoring means.

19. An elevator signaling apparatus comprising a plurality of electrically-controlled signal-indicators for an elevator-car, circuit-controlling directional signaling devices located at floors of the building and connected to corresponding indicators, a directional shifting device controlling all of such connections, a rotating part of the elevator-actuating mechanism, an actuating-arm connected to the shifting device and mounted upon and having a frictional connection with such rotating part, gates at the floors for admission to the car, and circuit-controlling directional restoring means for the several floors actuated by the movements of the gates of corresponding floors and connected to the corresponding indicators, the directional shifting device also controlling the connections of all of the restoring means.

20. An elevator signaling apparatus comprising a plurality of electrically-controlled signal-indicators for an elevator-car, circuit-controlling directional signaling devices located at floors of the building and connected to corresponding indicators, a directional switch device interposed in all of such connections, an actuating-arm connected to such directional switch device, a sheave of the elevator-actuating mechanism on which such arm is rotatively mounted and with which it has a frictional connection, gates at the floors for admission to the cars, directional restoring-circuits for the indicators, and a directional restoring-switch at each floor controlling such restoring-circuits and having a normal bent to circuit-closing position and located so as to be held in circuit-opening position by the corresponding elevator-gate when such elevator-gate is closed, the directional shifting-switch also controlling all of such restoring-circuits.

In testimony whereof I have affixed my signature in presence of two witnesses.

JOHN McLEAN.

Witnesses:

HENRY D. WILLIAMS,

HERBERT H. GIBBS.