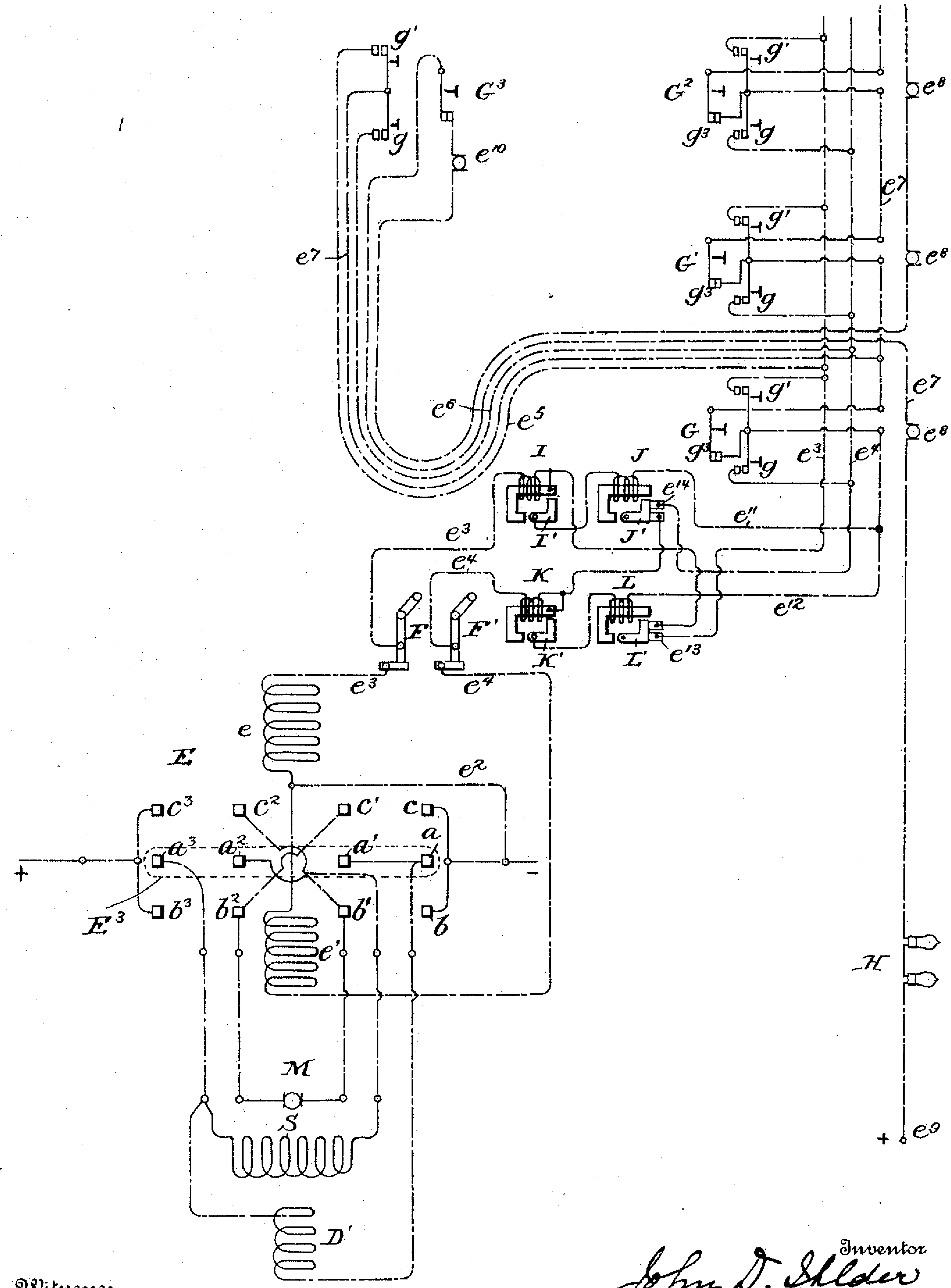
No. 616,190. Patented Dec. 20, 1898.

J. D. IHLDER.

ELECTRIC OPERATION OF ELEVATORS BY THREE BUTTON PUSH SYSTEMS.

(Application filed Dec. 16, 1897.)

(No Model.)



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ELECTRIC OPERATION OF ELEVATORS BY THREE-BUTTON PUSH SYSTEMS.

SPECIFICATION forming part of Letters Patent No. 616,190, dated December 20, 1898.

Application filed December 16, 1897. Serial No. 662,173. (No model.)

To all whom it may concern:

Be it known that I, JOHN D. IHLDER, a citizen of the United States, residing at Yonkers, in the county of Westchester and State of New York, have invented certain new and useful Improvements in the Electric Operation of Elevators by Three-Button Push Systems, of which the following is a specification.

My invention relates to the electrical operation of elevators by a three-button push system; and it has for its object to provide a simple, cheap, and effective apparatus adapted for use with elevators of all kinds, and especially to provide such apparatus that it is unnecessary to hold the button compressed in order to keep the car running and to prevent interference with the movements of the car when it is operating under the control from one floor by pressure or operation of the other push-buttons; and to these ends my invention consists in the various features of construction and arrangement of parts, substantially as hereinafter more particularly set forth.

In the accompanying drawing the figure is a diagrammatic representation of an apparatus embodying my invention, sufficient to enable those skilled in the art to understand the same.

I have designated my invention as a "three-button system," it being understood that in place of a push-button any other form of switch or means for opening and closing or controlling the circuit may be used, and while I am aware that it is not broadly new to operate elevators by means of a three-button system my invention embodies a very simple, cheap, and effective apparatus to prevent interference and to relieve the operator from holding the button or switch closed until the car reaches its destination, the apparatus being so arranged that the desired button being once operated the motor is set in motion and the car is moved until it reaches its destination, while the button or switch can be released almost instantly after being once operated.

In my application, Serial No. 661,867, filed December 14, 1897, I have shown and described more particularly what I have designated as a "two-button system" for the electrical operation of elevators, and in the present instance I have shown, diagrammatically, an arrangement of motor and reversing-switch and some other devices substantially as shown in said application.

In the drawing, M represents the armature of the motor, S the series field-magnet coils thereof, and D′ the coils of an electromagnet controlling the brake, and this is given simply as a typical form of motor, it being understood that any other winding of the motor may be used, depending upon the character of the work to be done, the form shown being one of the simplest in use in connection with electric elevators.

Connected with the motor is an electric reversing-switch E, (represented diagrammatically,) which in its normal condition leaves the circuit of the motor broken, but when a push-button at one of the floors or on the car is operated through the medium of the electric connections the reversing-switch is operated to close the circuit through the motor in the required manner to cause the elevator to move up or down, as the case may be, and when the circuit is broken the reversing-switch assumes its normal position, breaking the circuit of the motor, applying the brake to the engine, and stopping the movements of the car. In the diagram the armature of the reversing-switch is represented by the dotted lines E^3, and this armature carries a series of contact-pieces $a\ a'\ a^2\ a^3$, adapted to coöperate with contacts $b\ b'\ b^2\ b^3$ on one side and the contacts $c\ c'\ c^2\ c^3$ on the other side, there being four sets of contacts in the present instance, though of course there may be more, according to the nature of the circuits to be controlled. The armature E^3 is arranged to be moved by magnets represented by the coils $e\ e'$, it being understood that when, for instance, the coil e is energized the armature E^3 will be moved to bring the contacts $a\ a^3$ into engagement with the contacts $c\ c^3$, and when the magnet e' is energized the armature is moved to bring the contacts $a\ a^3$ into engagement with the contacts $b\ b^3$.

Arranged in the circuit controlling the magnets $e\ e'$, which in the present instance is shown as a branch of the main line, although it may be an independent line receiving its current from an independent source, are arranged the automatic stop-motion switches F F′, they being shown in the present instance diagrammatically, and they may be of any known or desired construction, they being arranged so that one or the other will be operated as the car reaches the extremes of its movement in the well in the usual manner.

The circuits are arranged as follows: Plus and minus indicate the leading-in wires or circuit, and this is normally open, and each terminal has two contacts, as b c and b^3 c^3, coöperating, respectively, with the contacts a a^3 on the moving armature E^3 of the reversing-switch. The series field-magnet coil S is shown as connected to the contacts a^2 a^3 of the armature of the reversing-switch, while the brake-magnet circuit is connected between contacts a a^3 thereof. The armature M is shown with its terminals respectively connected with the contacts b' c^2 and c' b^2 on opposite sides of the moving armature, so that the current through the armature of the motor will be reversed according as the armature of the reversing-switch is moved to one side or the other, while the circuit through the field-magnet coil and brake-magnet coil will remain unchanged in direction. The coils e e' of the reversing-switch are connected by the conductor e^2 to the minus terminal of the circuit, and from these coils, respectively, lead the conductors e^3 e^4, extending to the respective contacts g g' of the switches G G′ G^2, and when there is a switch upon the car branch circuits, as e^5 e^6, lead to the contacts of the push-botton or switch G^3 on the car. The push-buttons or switches, while they may be of any desired construction, are shown as having their movable contact-pieces g g' connected together and to the conductor e^7, and in this conductor e^7 are shown contacts e^8, adapted to be operated by the doors of the well, it being understood that when the doors are closed the circuit through the conductor e^7 is closed, and when any one of the doors is opened the circuit is broken. Also arranged in the conductor e^7 is a resistance device H, and the terminal e^9 of this conductor, while shown detached, is supposed to be joined to the plus terminal of the leading-in conductor or one of the terminals of any other source of power, as a battery or the like. This conductor e^7 includes a switch or button g^3 on each floor and on the car, and also includes the contacts e^{10}, controlled by the door or gate on the car, and these push-buttons g^3 are normally closed; but when any one of them is operated the circuit is broken through the magnets e e' of the reversing-switch, and the circuit of the motor is consequently broken, and the car can be brought to rest by manipulating either one of these push-buttons g^3.

Arranged in the circuits e^3 e^4 are the magnets I and K, respectively, and connected to the normally open and movable armatures I′ K′ thereof are branch conductors e^{11} e^{12}, connected to the conductor e^7 and including, respectively, the coils of the magnets J L.

The conductor e^3 includes a pair of terminals e^{13}, which are normally closed by the armature L′ of the magnet L, and the conductor e^4 includes a pair of terminals e^{14}, normally closed by the armature J′ of the magnet J. These various magnets are represented in a conventional form and may of course be of any desired or usual construction which can operate to control the circuits in the manner hereinafter described.

With this arrangement of circuits the operation will be largely understood by those skilled in the art, and we will suppose, for instance, that the elevator-cage is at the bottom of the shaft or at any other position below the upper floor and it is desired to bring the elevator to the upper floor. Any one of the push-buttons g' is pressed—as, for instance, the push-button g' at the upper floor—and the circuit is then traced as follows: from the plus terminal through the resistance H, conductor e^7, it being understood that the contacts e^8 are closed, through the normally-closed contacts g^3 at the top floor, through the now closed contacts g', through conductor e^3, through the closed contacts e^{13}, through the coil of the magnet I, to the coil e of the reversing-switch, and thence to the minus terminal. This is assuming that the reversing-coil is operated by the current from the main line, and it will be readily understood that if a separate source of current is used for this purpose the circuit would be that just traced, the terminal of the coil e being connected through the source to the conductor e^7. This current moves the armature E^3 of the reversing-switch, we will say, to close the circuit through the electric motor in a direction to cause the car to move upward, so that the current for the motor would be traced from the plus terminal, through the contacts c^3 a^3, through a branch including the coils of the brake-magnet D′, through the terminals a c, to the minus line, while the main current from the contacts c^3 a^3 passes through the series field-magnet coil S to the contacts a^2 c^2, thence to the contact b', through the armature M, to contact b^2, thence through the contacts c' a' and out, and the motor would be operated to move the car. As soon as the magnet I was energized it would attract its armature I′ and establish a parallel circuit, including the armature I′, through the energizing-coils of the magnet J, by conductor e^{11}, connecting to the conductor e^7, so that the push-button g' would be short-circuited and can be released, and still the current would be maintained through the magnet e of the reversing-switch, and from this it will be seen that it is only necessary to press the push-botton g' to close the contacts thereof an instant, sufficient to establish the circuits just described, when it can be released, and the car will proceed until it reaches the proper destination, when it is stopped by operating one of the push-buttons g^3, breaking the contacts thereof, which would break the energizing-circuit, including the magnet e, releasing the armature E^3, and breaking the circuit of the motor and allowing the brake to be applied to stop the car. This parallel circuit through the magnet J not only provides means whereby the push-button can be instantly released, but also breaks the circuit including the push-buttons g, which control the movement of the car in the opposite direction, for as soon as the magnet J is energized its armature J' is attracted, breaking the circuit at the contacts e^{14}, and if any of the push-buttons g which are connected to the conductor e^4 are operated no current can flow through them while the armature J' is held under the influence of the energized magnet J; but as soon as the circuit is broken by operating any one of the stop push-buttons g^3 the armature J' falls and closes the contacts e^{14}, so that any of the push-buttons g can be operated to cause the car to move in the opposite direction as soon as the contacts of the brake push-buttons g^3 are again closed. If perchance after the push-button g' at one floor has been operated another one of the push-buttons g' on another floor or on the car is operated, it would not interfere with or change the motion of the car at all, as it would simply momentarily establish a circuit parallel to the circuit e^{11}, including the magnet J, without deënergizing it, and it will thus be seen that under no conditions after one of the push-buttons has been operated to cause the car to go in the desired direction can its movement be interfered with by any person on any floor or on the car attempting to start the car in either direction, and it can only be interfered with by operating one of the stop push-buttons g^3.

It will thus be seen that by the interposition of the magnets I J K L in the circuits of the push-buttons, as described, a practical non-interfering system is provided which not only prevents interference with the movement of the elevator, but enables the push-button to be momentarily pressed and then released by the operator to cause the car to go in any desired direction, and when it reaches the position it can be stopped by opening any one of the stop push-buttons g^3. Of course it will be understood that opening the doors of the well will also break the circuit; but these doors can be provided with well-known means which will prevent their being opened except when the elevator is opposite the floor adjacent the door. It will further be seen that the system includes a conductor, as e^7, including the door-contacts and the stop push-buttons, and two conductors, as e^3 e^4, connected, respectively, to all of the up and all of the down push-buttons and to the magnet-coils e e' of the reversing-switch, and included in these conductors are the magnets I K, which may be termed "circuit-maintaining" magnets, while in parallel circuits therewith are the non-interfering magnets J L.

What I claim is—

1. In a system for the electrical operation of elevators, the combination with a motor and a reversing-switch controlling the motor, of a circuit including two sets of push-buttons, circuit-maintaining magnets, and non-interfering magnets controlling said circuit, substantially as described.

2. In a system for the electrical operation of elevators, the combination with a motor and a reversing-switch controlling the motor, of a circuit connected to the switch and containing two sets of push-buttons, circuit-maintaining magnets included in said circuit, and non-interfering magnets included in branches of said circuit, substantially as described.

3. In a system for the electrical operation of elevators, the combination with a motor and a reversing-switch controlling the motor, of a circuit connected to the switch and containing two sets of push-buttons, circuit-maintaining magnets included in said circuit, and non-interfering magnets in branches of said circuit controlled by the circuit-maintaining magnets, substantially as described.

4. In a system for the electrical operation of elevators, the combination with a motor and a reversing-switch controlling the motor, of a circuit connected to the switch and containing two sets of push-buttons, a branch of the circuit leading from each set of push-buttons, a circuit-maintaining magnet in each branch, and a non-interfering magnet controlled by the circuit-maintaining magnet of each branch and controlling the other branch, substantially as described.

5. In a system for the electrical operation of elevators, the combination with a motor and a reversing-switch controlling the motor, of a circuit connected to the switch and containing two sets of push-buttons, a branch of the circuit leading from each set of push-buttons, a circuit-maintaining magnet in each branch, a parallel circuit to each branch of said circuit including a non-interfering magnet, and contacts of each branch controlled by the non-interfering magnet of the other branch, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN D. IHLDER.

Witnesses:
F. E. HUBBELL,
E. RICHENS.