No. 668,438. Patented Feb. 19, 1901.

M. H. COLLOM.

ELEVATOR SIGNAL SYSTEM.

(No Model.) (Application filed Apr. 9, 1900.)

3 Sheets—Sheet 1.

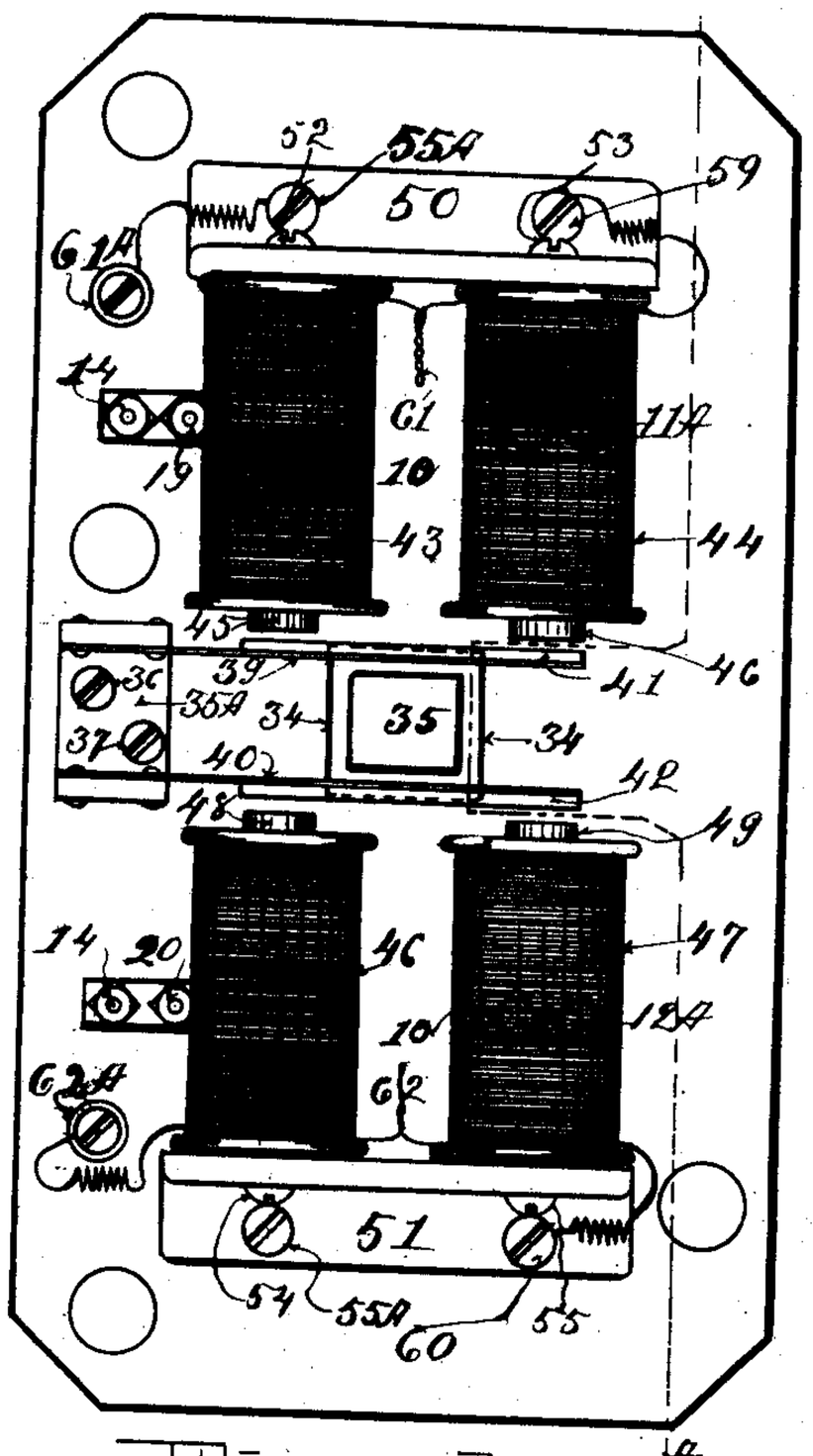

Fig. 1.

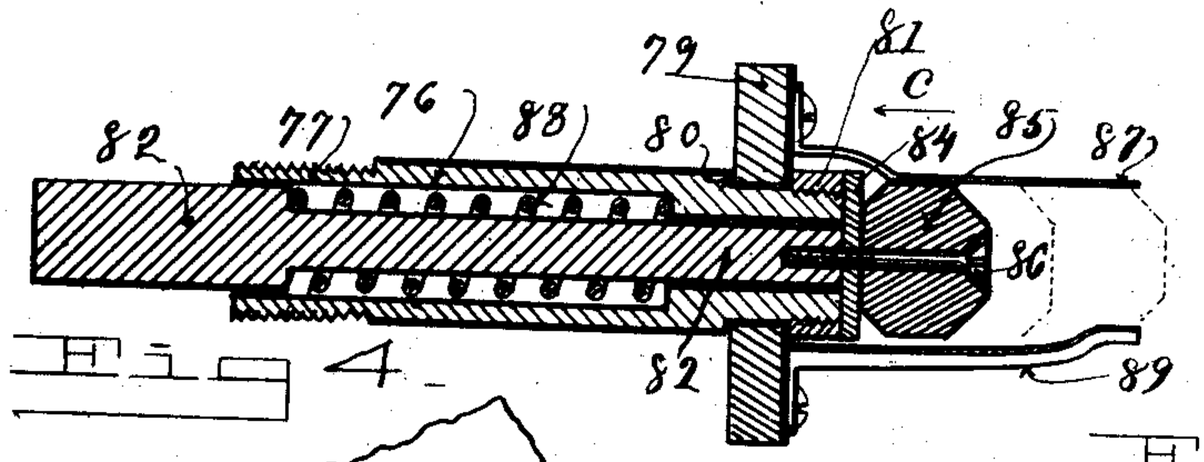

Fig. 4.

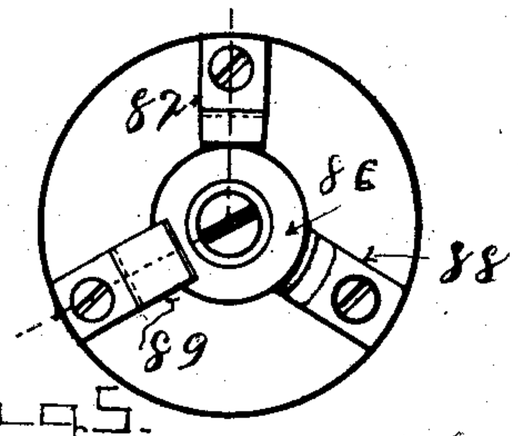

Fig. 5.

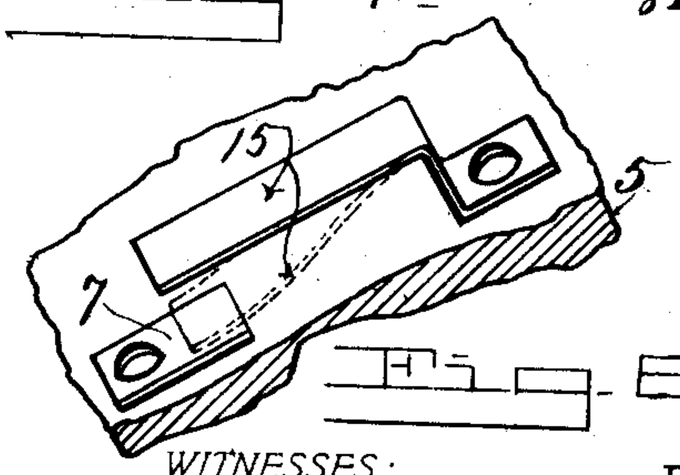

Fig. 6.

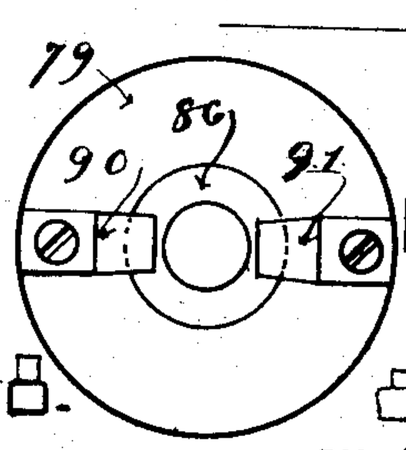

Fig. 8.

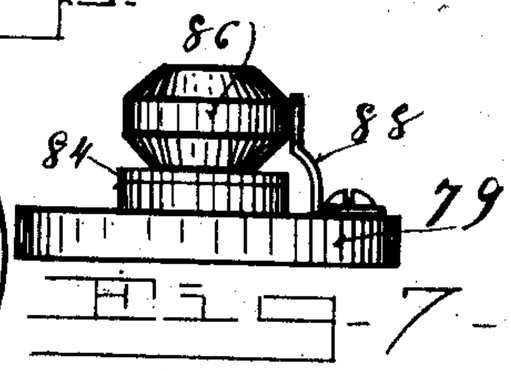

Fig. 7.

WITNESSES:

Claude A. Dunn.

Bessie Thompson.

INVENTOR.

BY Martin H. Collom.

H. S. Bailey ATTORNEY.

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M. H. COLLOM.

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(Application filed Apr. 9, 1900.)

(No Model.) 3 Sheets—Sheet 2.

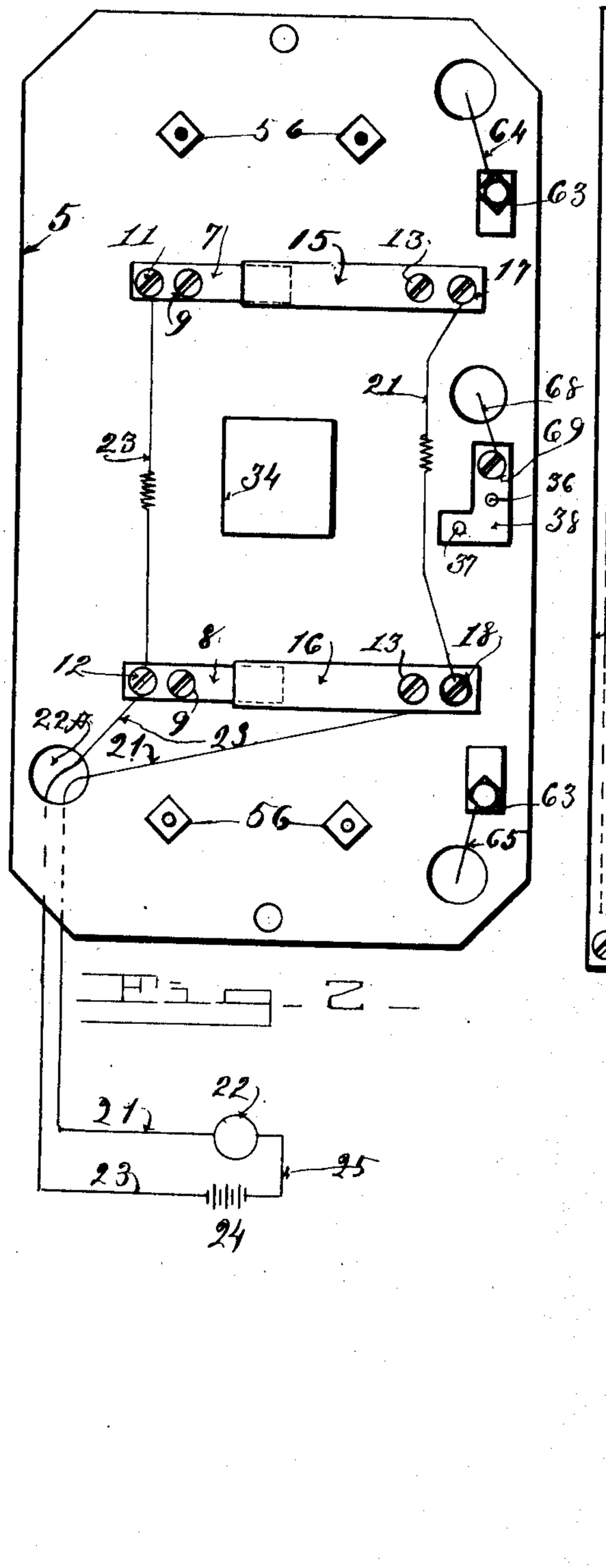

Fig. 2.

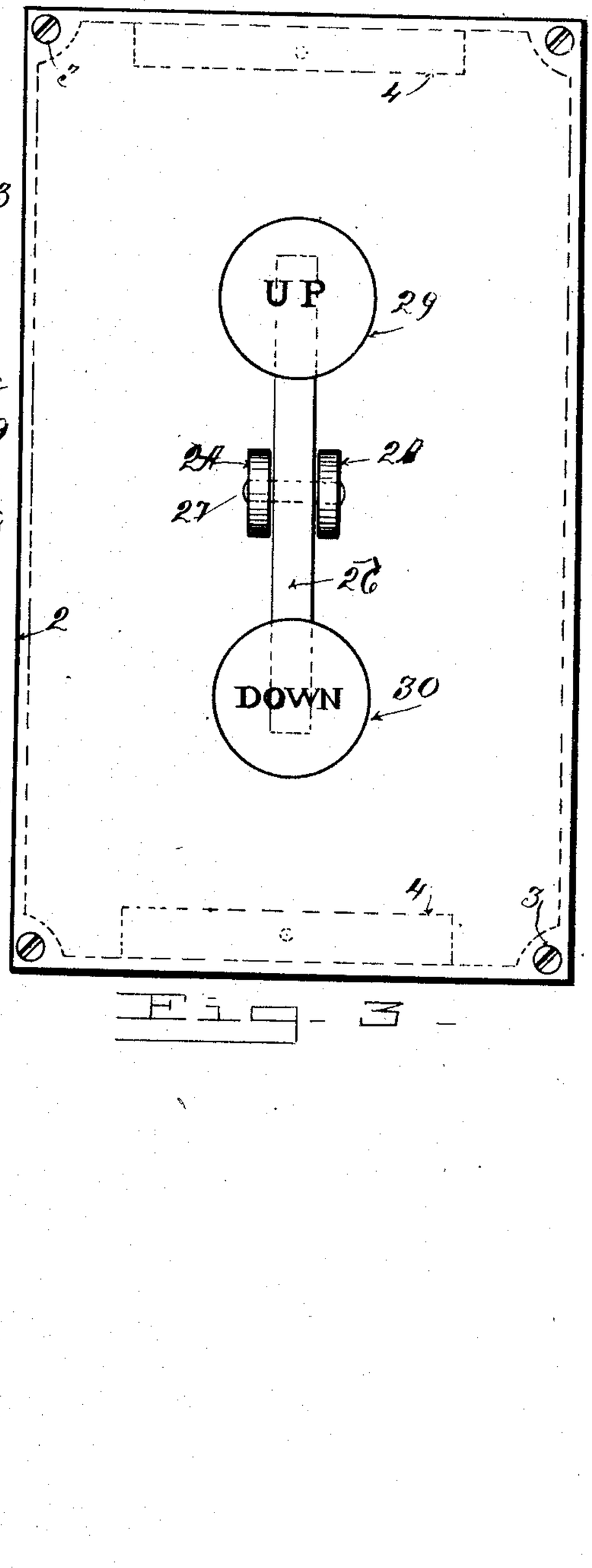

Fig. 3.

WITNESSES:

Claude A. Dunn.

Bessie Thompson

INVENTOR.

BY Martin H Collom

H. S. Bailey. ATTORNEY.

No. 668,438.

Patented Feb. 19, 1901.

M. H. COLLOM.

ELEVATOR SIGNAL SYSTEM.

(Application filed Apr. 9, 1900.)

(No Model.)

3 Sheets—Sheet 3.

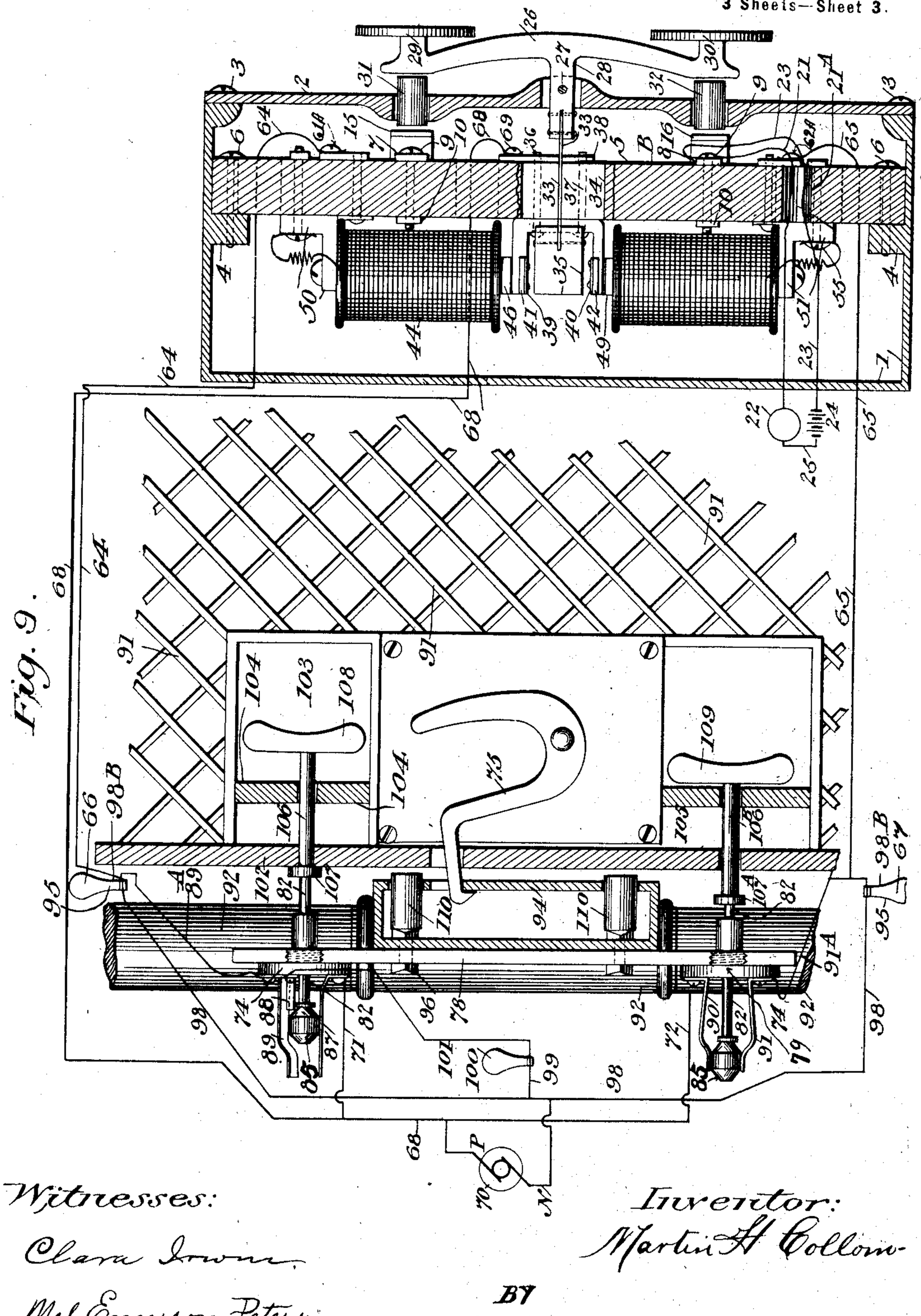

Fig. 9.

Witnesses:

Clara Brown.

Mel Emerson Peters

Inventor:

Martin H Collom-

BY

H. S. Bailey. Attorney

UNITED STATES PATENT OFFICE.

MARTIN H. COLLOM, OF DENVER, COLORADO.

ELEVATOR SIGNAL SYSTEM.

SPECIFICATION forming part of Letters Patent No. 668,438, dated February 19, 1901.

Application filed April 9, 1900. Serial No. 12,179. (No model.)

To all whom it may concern:

Be it known that I, MARTIN H. COLLOM, a citizen of the United States of America, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Elevator Signal Systems; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in elevator-car signal systems; and the object of my invention is to provide a simple and reliable signal system by which a number of elevators can be signaled from one call-station on each floor. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is an elevation of the electrical apparatus of one of the call boxes or stations of my system. Fig. 2 is an elevation of the opposite side of the supporting-block of Fig. 1 and of the side B of the block of Fig. 9, showing a plan view of the bell-contacts and of the other parts of the mechanism as are placed on this side of the supporting-block. Fig. 3 is an elevation of the cover of the box, showing the "Up" and "Down" bell-signal call-buttons. Fig. 4 is a central longitudinal sectional view of the cut-out switch. Fig. 5 is an elevation of Fig. 4 in the direction of the arrow C. Fig. 6 is a fragment of the supporting-block, showing the bell make-and-break contacts. Fig. 7 is a fragment of the switch, showing one of the make-and-break contacts in side elevation. Fig. 8 is an elevation of the switch, showing but two contact-pieces; and Fig. 9 is a fragmentary elevation of an elevator entrance-door and door-jamb and also a side side elevation of Fig. 1 showing a section through the supporting-block on the irregular line A and also showing a section through a surrounding casing and its cover, showing a side elevation of the bell and signal mechanism, showing the application of my call and signal system.

Similar figures of reference refer to similar parts throughout the several views.

Referring to the drawings, the numeral 1 designates a box. A cover 2 is secured to the box by screws 3. Cleats 4 project inward from the ends of the box, upon which a supporting-block 5 is removably secured by screws 6. This block is made of any suitable non-conductive material, preferably slate. Upon the top side of the block I place two conductive terminal-strips 7 and 8, securing them by screw-bolts 9, which pass freely through the slate and have a nut 10 threaded to their ends. Wire binding-bolts 11 and 12, which are provided with nuts 12^A and 11^A are bolted through each strip and the slate. I also secure by bolts 13 and nuts 14 one end of conductive resilient contact terminal-strips 15 and 16 to the slate block in line with the strips 7 and 8 and bend one end in a Z form, so that their free ends will stand normally over and at a slight distance above the contacts 7 and 8. Wire binding-bolts 17 and 18, which are secured in place by nuts 19 and 20, are also passed through the fixed end of each of these strips and the slate block. A conductive wire 21 extends from the bolts 17 to the bolt 18 and from it through a hole 21^A in the slate to an electric bell 22, which is conveniently located in an elevator-way. A wire 23 also extends from the binding-bolt 11 to the binding-bolt 12 and from it through the hole 21^A to a battery 24, to which it is electrically connected, and from the battery a wire 25 extends to the bell 22, thus forming a current-circuit from the battery through the wires and bell to each set of terminal-contacts, which are normally out of contact with each other, and consequently the bell-circuit is normally open.

In the center of the cover 2 of the box 1 are two projecting lugs 2^A, between which I pivot a lever 26 by a pin 27, which passes through a depending portion 28, that extends through the cover. This lever has at each end a push-button disk 29 and 30. The upper disk is marked with the word "Up" and the lower disk with the word "Down." Below each disk and the ends of the lever there are non-conductive pins 31 and 32, which fit loosely

in holes in the cover. These pins are long enough to extend from the ends of the lever to the contact-terminals 15 and 16, so that the lever and its push-button disks will stand at substantially equal distances from the contact-terminals and in a vertical plane.

When it is desired to call an elevator to go up, the "Up" push-button is pressed, which forces the pin 31 against the terminal 15 and forces it down against the terminal 7, as shown in Fig. 7, and closes the bell-circuit and rings the bell 22. When the push-button is released, the resilient tension of the terminal causes it to spring back again to its normal position, which breaks the circuit and moves the pin and push-button back to its normal position. The "Down" push-button closes the bell-circuit through the terminals 16 and 8 in a similar manner and rings the bell.

To the lower end of the depending portion 28 a spring-blade 33 is secured at one end. This blade passes through a hole 34 in the slate block, and at its opposite end a non-conductive block 35 is secured. At one side of the slate block a yoke-shaped clip 35^{A} is secured by screws 36 and 37, which pass through the slate block and screw into a strip 38 on its opposite side. To each of the upward-extending ends of this clip I secure conductive springs 39 and 40. The springs extend one on each side of the block 35 and each spring supports opposite the block an armature 41 and 42. Opposite the spring 41 two magnetic coils 43 and 44 are placed. The cores 45 and 46 of the magnets extend beyond the coils and close to the armature. Two magnets 46 and 47 are also placed opposite the armature 42. The cones 48 and 49 of these magnets also project close to the armature 42. The magnet-sets are supported and secured to the slate block by the conductive angled bars 50 and 51, which are attached to their cores by screws 52, 53, 54, and 55 and to the slate by the bolts 55^{A} and nuts 56. The angled bars are placed at the opposite ends of the magnets from the armature. The ends of the magnet-coils are connected to the binding-screws 59 and 60, which screw into the conductive angle-bars 50 and 51. The wire is then coiled around the cores 44 and 47 and continues across through the portion 61 and 62 to the core 45 and 48, from which they extend to the binding-screws 61^{A} and 62^{A}, which extend through the slate block. A nut 63 is secured to each of the binding-screws.

In Fig. 9 I illustrate a fragment of an elevator-shaft-inclosure door 91 and door-jamb 92, latch 75, and lock 94, showing the application of my signal system to it. The door-switches are screwed into a flat bar 78, which is secured by bolts 96 to the back of the door-lock, which is generally cast with the door-jamb. These switches comprise a tube 76, (see Fig. 4,) having a threaded portion 77, adapted to secure it to the plate 78 or other suitable support. A non-conductive disk 79 is fitted on one end against a shoulder 80, and a nut 81 is threaded to the end and secures the disk to the end of the tube. The bore of the tube contains two diameters, the smaller one being at the disk end in the tube. A non-conductive push-pin 82 is slidably fitted and is made in two diameters to fit the diameters of the tube. The smaller diameter is extended throughout the greater portion of the length of the tube to allow a space around it and between it and the tube for a coiled expansion-spring 83, the ends of which bear against the shoulder formed by the two diameters of the tube and pin. The push-pin projects beyond the threaded portion of the tube and has secured to its opposite end a non-conducting washer 84 and a conducting round knob 85 by a screw 86, which threads into the end of the stem. The spring normally holds the washer and knob against the end and nut of the tube. Upon the top of the disk I secure contact-terminals, placing three terminals on each switch, where only one elevator is to be used, and two switches, as shown in Fig. 9, where a group of elevators is under the control of one system.

Where two switches are placed in a system at each elevator-door, the lower one is provided with only two contact-terminals, as shown in Figs. 8 and 9, and the upper one has three contact-terminals, as shown in Figs. 5 and 9. The three contact-terminals are composed of resilient conductive material. They are spaced at equidistances apart around the disk and stand vertically alongside the knob. The terminal 87 is positioned to bear against the knob throughout the length of the reciprocative push-stroke of the pin in the tube. The terminal 88 is a short terminal and is only long enough to extend to and bear on the knob when it is in its normal position against the end of the tube. The terminal 89 is of the same length of terminal 87, but stands away from the knob, except at its free end, which is bent to bear against it when it is pushed out to the limit of its push-stroke. Consequently when the knob is in its normal position a current would flow through the terminal 87, the knob, and its short terminal 88, and when it is pushed out one-half of its stroke, as indicated by the dotted lines, the circuit through the knob would be open, and when it is pushed out its whole stroke a closed circuit would be formed through 87, the knob, and 89. For the switch below the latch only two terminals 90 and 91 are used. These are positioned on opposite sides of the knob and extend up beside it, but are placed a short distance from it to near their free ends, which are bent inward to be engaged by the knob at the end of its push-stroke, and at this point a circuit would be made through the terminals and knob, but with the knob in its normal position—that is, when the door is closed—

it would be out of contact with the terminals and the circuit between the terminals would be open.

The wires 68, 71, and 72 extend from one pole of the dynamo 70 to the binding-screws 69, which are electrically connected by the conductive strip 38 and screws 36 to the armatures and to the straight terminal 87 of the upper switch and to the terminal 90 of the lower switch. The opposite pole-wire 98 extends to the same side 95 of the white and blue lamps 66 and 67 and to the red light 100 from the terminal 89 of the upper switch, and from the terminal 91 of the lower switch wires 89^A and 91^A run to the opposite side 98^B of the white and blue electric signal-lights 66 and 67 and connect with the wires 64 and 65, that run to the binding-screw 61^A and 62^A, that connects with the magnet-coils. A wire 101 also extends from the short contact 88 of the upper switch to the opposite side of the red light 100.

102 designates the edge of the door, which strikes the buffer 110 just above and below the latch 75. A space 103 is made in the door, across which bars 104 and 105 extend. Through these bars and the edge of the door I extend push-rods 106 and 106^B, to the outer end of which disks 107 and 107^A are secured, and at the opposite end handles 108 and 109 are formed, which enables the elevator-pilot to press the rods against their stops 104 and 105. These push-rods engage the ends of the push-pins of the switch. The disk of the push-rod is held back against the edge of the door by the pressure of the spring of the switch push-pins. When the door is opened, however, the push-pin of the switch moves back into position, with its knob in contact with the terminal 88, which closes the circuit to the red light, which burns until the door is shut. In Fig. 9, however, the door push-rod is shown pushed up against its stop-bar and the switch-push-pin knob is in contact with the two terminals, which closes the circuit to the blue light.

The operation of the system is as follows: When the buttons are pressed, a circuit to the signal-lamps is closed by the magnet-armatures being forced to the cores of said magnets. Said armatures are held in this position by magnetic attraction until the circuit through the door-switches is closed. The magnets will then be weakened and the armatures released, as a greater part of the current will flow to the lamps through the path of less resistance. When the "Up" button is pressed, the bell-circuit is closed through the contact-strips, the bell rings, and the blue lamp or lamps are lighted. The elevator-pilot to put out this lamp places his fingers on the push-rod in the door to close the door. This pin passes through the edge of the door and forces the knob of the "Up" switch between its contact-springs, thus closing the circuit through the switch to the blue lamp or lamps. When the pilot takes his fingers off the door push-rod, the spring of the switch forces the knob back to its normal position and the circuit to the blue lamp is broken. When the "Down" button is pressed, the bell rings and the white lamp or lamps are lighted, and if the pilot wishes to put this signal-lamp out he closes the door with the "Down" push-rod, which closes the circuit to the white light, and when he takes his fingers off the push-rod this circuit is broken, as described. If the pilot closes the door and does not use the push-rods, he does not put out the white and blue lamps that may be lighted. This is often the case when he may have opened the door to let out a passenger and he does not wish to put out the lamps that are lighted in the other elevator-shafts.

My invention is simple both as to the mechanism and as to the wiring.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination in an elevator signal system for elevator-doors and elevator-ways, of two pairs of magnets, two independent armatures in operative relation to said magnets conductively connected together at one end, a conductive wire connected to said armatures, and a source of electric-current supply, conductive wires connected to each pair of said magnets and to said source of current-supply, one or more electric lights in each conductive wire and push-pin switches comprising a push-pin, spring-controlled in one direction of its movement, terminals in operative relation to said push-pin to make or break a circuit, conductive wires operatively connected to said terminals and to said lights and to said current-supply, push-rods connected with said doors and arranged to be normally operated to engage said push-pin of said switches and close the circuit through them, whereby the current from said source of current-supply is shunted from said magnets to said switches and through said lamps back to said source of current-supply and said closed circuit between said magnets and said armatures is broken, substantially as described.

2. The combination of an elevator signal system with an elevator-door and door-jambs on each floor of the system, push-rods in said doors, push-pin switches secured to said door-jamb in line with said push-rods, and arranged to stand normally in open circuit, a source of current-supply, conductive wires connecting said current-supply with the terminals of said switches, and a light or lights of some predetermined color in circuit with one of said switches, lights of two colors in circuit with the other switch, one of said lights adapted to indicate when said door is open, substantially as described.

3. The combination in an elevator signal system for elevator-doors and elevator-ways, of a signal-box, a rocking "Up" and "Down"

signal push-button lever on said box, a bell signal system operatively connected to said push-button lever, two pairs of magnets arranged in said signal-box with their cores opposite each other, two independent armatures in operative relation to said magnets conductively connected together at one end, a resilient extension on said rocking push-button lever projecting between said magnet-cores and arranged to move said armatures against its respective set of magnets as the push-buttons of said rocking levers are operated, a conductive wire connecting to said armatures, a source of electric-current supply, a conductive wire connected to each independent set of said magnets and to said source of current-supply, and one or more electric lights in each of said circuits, substantially as described.

4. The combination in an elevator signal system for elevator-doors and elevator-ways, of a signal-box, a rocking, "Up" and "Down" signal push-button lever on said box, a bell signal system operatively connected to said push-button lever, two pairs of magnets arranged in said signal-box with poles opposite each other, two independent armatures in operative relation to said magnets conductively connected together at one end, a resilient extension on said rocking push-button lever projecting between said magnet-armatures and arranged to move said armatures against its respective set of magnets as the push-buttons of said rocking levers are operated, a conductive wire connected to said armatures, and a source of electric-current supply, conductive wires connected to each pair of said magnets and to said source of current-supply, one or more electric lights in each conductive wire, and push-pin switches comprising a push-pin spring-controlled in one direction of its movement, terminals in operative relation to said push-pin to make or break a circuit, conductive wires operatively connected to said terminals and to said lights and to said current-supply, push-rods connected with said doors and arranged to be normally operated to engage said push-pin of said switches and close the circuit through them, whereby the current from said source of current-supply is shunted from said magnets to said switches and back to said source of current-supply and said closed circuit between said magnets and said armatures is broken, substantially as described.

5. The combination in an elevator signal system of an elevator-door and jambs on each floor of the system, a latch and keeper on each door, a push-rod both above and below said latch, push-pin switches secured to said jamb in line with said push-rods and arranged to stand normally with an open circuit, a signal-box for each floor of said system, a push-button signal mechanism in said box comprising a rocking lever, a signal-bell system arranged to be operated by pushing said button to tilt said lever, and an "Up" and "Down" floor-signal comprising two pairs of magnets oppositely-arranged armatures arranged in operative relation to said magnets to normally maintain an open circuit between them, means connected to said rocking push-button lever for forcibly moving said armatures against said magnets in alternate order, a source of current-supply, conductive wires connecting said current-supply with said armatures and said magnets, an electric light of some predetermined color in one of said magnet-circuits, a second electric light of another color in the circuit of said opposite set of magnets, a conductive wire leading from said current-supply to said push-pin switch and from said switch to each of said electric lights, substantially as described.

6. The combination in an elevator signal system, of the signal-box, the rocking lever, a push-button at each end of said rocking lever, the bell-terminals having one contact member of each terminal of resilient material and arranged above the other and adapted to be sprung in contact with it by pushing one of said push-buttons, the battery and the bell-circuit wires connected to said terminals, the magnets, the magnet-armatures arranged in operative relation to said magnets and the resilient member on said rocking lever arranged and adapted to move said magnet-armatures in contact with said magnets, with the push-button switches, the dynamo, positive wires leading from said dynamo to said switches and from said switches to said magnet-armatures, a conductive wire leading from each set of magnets to the negative pole of said dynamo; the electric lights in each of the wires leading from each set of magnets to said negative pole of said dynamo, the shunt-wires leading from said negative pole of said dynamo to one of the terminals of said switches, and the wire leading from said pin-switches to the electric lights in the negative wire of said magnets and dynamo, substantially as described.

7. In an elevator signal system, the combination with the elevator-doors and door-jambs of the signal-box, the push-button lever, the two independent sets of magnets, the magnet-armatures and the bell signal terminal therein arranged to be operated by said push-button lever, with the push-pin switches comprising the tube, the pin within said tube, the spring between said pin and tube, the non-conductive disk secured to said tube, the conductive knob in the end of said pin, the two conductive terminals on said disk arranged in operative relation to said conductive knob to make a closed or open circuit, the dynamo, positive wires leading from said dynamo to said switches and to said magnet-armatures, a conductive wire leading from each set of magnets in said signal-box to the negative pole of said dynamo, an electric light of some predetermined color in each of

the wires leading from each set of magnets to said negative pole of said dynamo, and the shunt-wires leading from said positive pole of said dynamo to one of the terminals of said switches and the wires leading from another terminal of said switches to said electric lights in the negative wire of said dynamo and magnets, the third terminal on one of said switches, the wire leading from said terminal to said negative wire and an electric light in said wire adapted to indicate when said elevator-door is open, substantially as described.

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

MARTIN H. COLLOM.

Witnesses:

CLAUDE A. DUNN,

BESSIE THOMPSON.