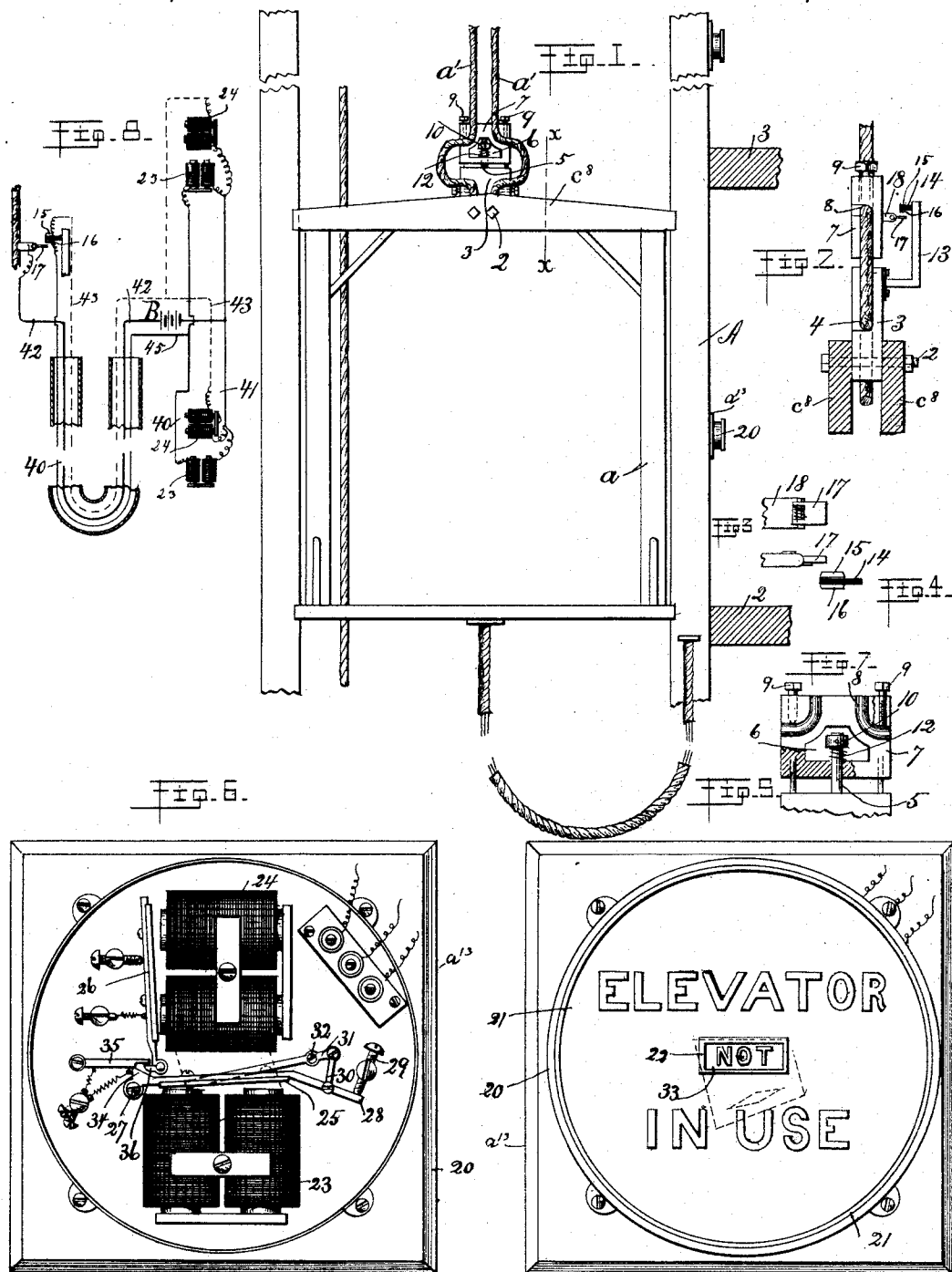
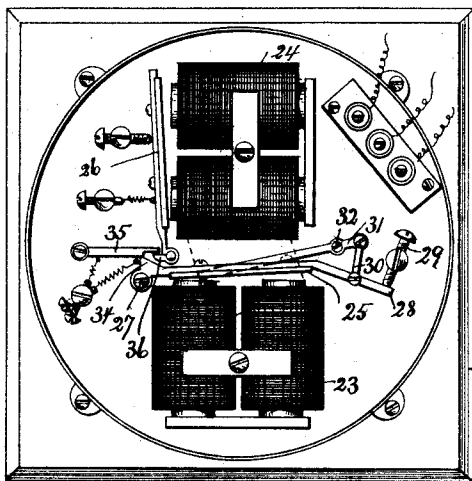
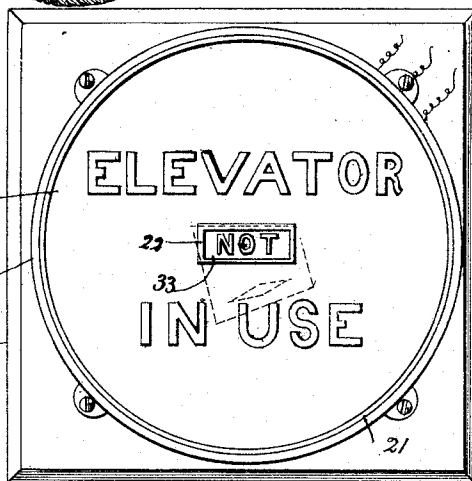


J. P. CUSHING.
INDICATOR FOR ELEVATORS.

No. 429,189.

Patented June 3, 1890.



Witnesses,

Arthur O. Davis
Frank L. Emery

Inventor,

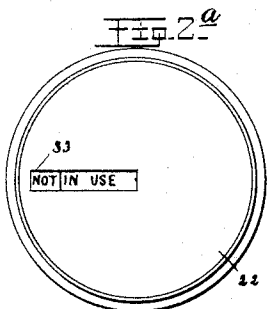
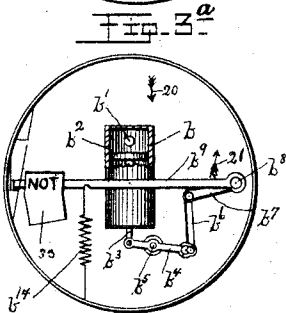
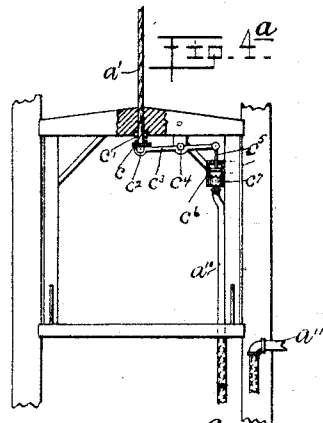
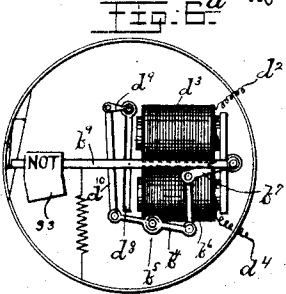
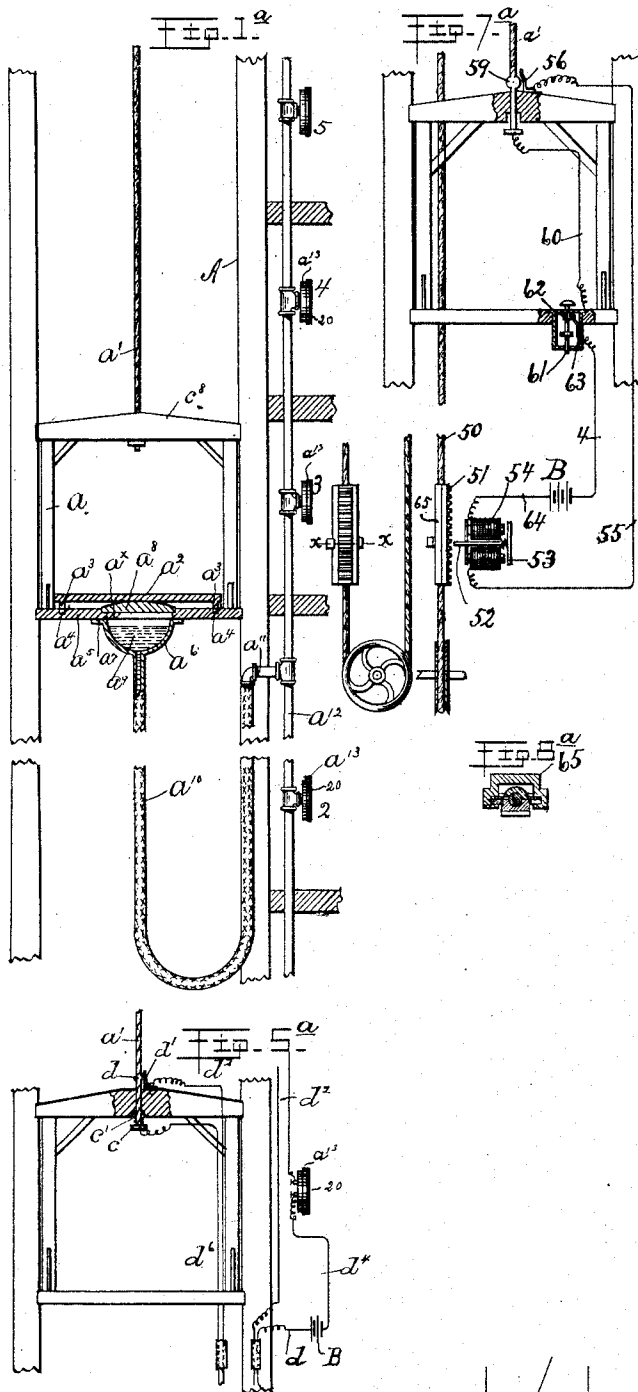
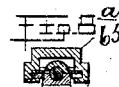
John P. Cushing,
By *Brody & Gregory*

Attys

J. P. CUSHING.
INDICATOR FOR ELEVATORS.

No. 429,189.

Patented June 3, 1890.



Witnesses,

Arthur J. Davis
Frederick L. Evans

Inventor,

John P. Cushing,
By *Lowry & Gregory*
Attys

UNITED STATES PATENT OFFICE.

JOHN P. CUSHING, OF BOSTON, MASSACHUSETTS.

INDICATOR FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 429,189, dated June 3, 1890.

Application filed February 18, 1890. Serial No. 340,904. (No model.)

To all whom it may concern:

Be it known that I, JOHN P. CUSHING, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Indicators for Elevators, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention has for its object to provide elevators with a safety device operated by weight or pressure upon the elevator car or platform to indicate at given points or stations—as, for instance, the different floors or landings of a building or structure—that the elevator is in use.

In accordance with my invention the elevator car or platform, or a portion thereof, is made movable, so that when weight is placed upon the car or platform the movable portion is brought into position to render operative a device at a given point—as a landing or floor of a building—to indicate that the elevator is in use.

My invention therefore consists, essentially, in the combination, with an elevator-car or a movable portion thereon, of an indicating device connected to the elevator-car to be operated by a weight or pressure placed upon the car, substantially as will be described.

Other features of my invention will be pointed out in the claims at the end of this specification.

Figure 1 represents a sufficient portion of a building provided with an elevator and devices located at the different floors and operated by the elevator to enable my invention to be understood; Fig. 2, a sectional detail on an enlarged scale of the upper portion of the elevator on line *xx*, Fig. 1; Fig. 3, a detail showing one member of one form of circuit-controlling device; Fig. 4, a detail of the co-operating member of the circuit-controlling device; Fig. 5, a front elevation of one form of indicating device; Fig. 6, a view of the indicating device shown in Fig. 5, with the cover or face-plate removed; Fig. 7, a detail to be referred to; Fig. 8, a diagram of circuits to illustrate the mode of operation of the apparatus. Fig. 1^a represents a portion of a building provided with an elevator and modified form of devices located at the different

floors and operated by the elevator. Fig. 2^a represents a face view of a modified form of indicator; Fig. 3^a, a view of the indicator shown in Fig. 1^a, with the outer cover or face removed and the cylinder partially broken out; Fig. 4^a, a modification to be referred to; Fig. 5^a, another modification showing the indicator as operated by electricity; Fig. 6^a, a detail of a modified form of electrical indicating device; Fig. 7^a, still another modification to be referred to; and Fig. 8^a, a detail to be referred to.

Referring to Figs. 1 and 1^a, A represents an elevator-shaft or hoistway of a building provided, as shown in Fig. 1, with two floors marked 2 3, and in Fig. 1^a, with four floors marked 2, 3, 4, and 5. The elevator-shaft has suspended in it an elevator *a*, which may be of any usual or well-known construction, it being represented in the present instance as a platform-elevator suspended by two cables *a'*, as shown in Fig. 1, and by a single cable, as shown in Fig. 1^a.

Referring to Fig. 1, the elevator *a* has secured to its cross-beam *c*⁸, as by bolts 2, a block or piece 3, provided, as shown, with grooves or channels 4, the said block having, as herein shown, a rod or pin 5 extended into a chamber 6 in a block or cap 7, preferably provided with grooves or channels 8 to receive the cables *a'*, which are secured therein by screws or bolts 9. The block or cap 7 is independent of the block 3, and the said cap is normally forced out of contact with the nut or head 10, as herein shown, by a spiral spring 12, encircling said rod. The block 3 is provided with one member of a circuit-controller, preferably a normally-open circuit-closer, the said member consisting, as shown, of an arm 13, provided with a finger 14 of insulating material, to the opposite sides of which are secured contact plates or strips 15 16, which co-operate with the spring-actuated plate 17, pivoted to an arm 18, secured to the block 7. The circuit-controller referred to is connected in circuit with an electrically-actuated device *a*¹³, located preferably at each floor of the building.

The electrically-actuated indicating device *a*¹³ preferred by me is shown separately in Figs. 5 and 6, and consists, as herein shown,

of an inclosing-case 20, provided with a dial or face 21, having, as herein shown, the inscription "Elevator in use," with a hole or opening 22 in the dial intervening between the words "elevator" and "in use." The inclosing-case 20 has secured to it, as herein shown, two electro-magnets 23 24, provided with armatures 25 26. The armature 25 is pivoted, as at 27, and extended beyond the magnets 23, and its extended end 28 co-operates with a back-stop 29, herein shown as a screw. The extended end of the armature has secured to it one end of a link 30, joined to a lever 31, pivoted as at 32, and having its long arm provided with a sign or placard 33, bearing the word "Not," so that when the armature 25 is attracted by its magnet the said sign will be removed from opposite the hole or opening 22, and the inscription on the face of the indicator will then read as follows, viz: "Elevator in use."

The armature 25 is provided with a heel or projection 34, adapted to be engaged by a locking device (shown as a lever 35) when the electro-magnet 23 is energized, as will be described. The lever 35 has co-operating with it a toe or projection 36 on the armature 26 of the electro-magnet 24, the said toe or projection constituting a releasing device for the armature 25. The armatures 25 26 and lever 35 are operated upon by the usual retracting-springs.

The electro-magnet 23 has one end of its coil, as 40, connected to the contact-plate 16 and the other end to a return-wire 41, joined to one pole of a battery B, the other pole of which is connected by wire 42 to the contact member 17, and the magnet 24 has one end, as 43, of its coil connected to the contact member 15, the other end of the coil being joined to the return-wire 41. In the normal or unweighted condition of the elevator the contact-plate 16 is above and out of contact with the member 17, as shown in Figs. 4 and 8. As soon as a predetermined weight is placed upon the elevator the elevator is moved down until the head 10 of the bolt 5 compresses the spring 12. As the elevator is moved down by the weight placed thereon, the contact member 16 is brought in contact with the member 17, and the circuit of the magnet 23 is closed for substantially an instant, thus energizing the magnet 23 and causing it to attract its armature and moving the lever 31 to remove the sign 33 from line with the opening 22, so that the inscription will read "Elevator in use."

The circuit of the magnet 23 may be traced as follows, viz: From positive pole of the battery B by wire 42 to contact member 17, thence by contact member 16, wire 40 to magnet 23, thence by return-wire 41 to negative pole of battery B. The armature 25 is locked in its attracted position to hold the sign 33 in its proper place after the circuit of the magnet is open at the circuit-controller by

the lever 35 engaging the heel 34 of the armature. The indicator thus denotes that the elevator is in use, and will continue to do so until the weight has been removed from the elevator.

When the elevator is not in use and the weight is removed therefrom, the spring 12 lifts the rod 5, and thereby moves the contact member 15 into contact with the member 17, thus closing the circuit of the magnet 24, which circuit may be traced as follows, viz: From positive pole of battery B by wire 42 to contact member 17, thence by member 15 and wire 43 to magnet 24, thence by return-wire 41 to negative pole of the battery. As soon as the magnet 24 is energized it attracts its armature 26 and the toe 36 lifts the lever 35 and releases the armature 25, permitting the latter to be restored to its normal position by its retractile spring, thereby moving the sign 33 down into the position shown in Fig. 5, it being opposite the opening 22, so that the inscription reads "Elevator not in use."

I prefer to employ the mechanism shown in Fig. 1, and above described, as the electro-magnets are in a normally-open circuit, so that a small battery may be used; but I do not desire to limit my invention in this respect, as other forms of devices may be used. For instance, as shown in Fig. 1^a, the elevator *a* is provided with a false bottom *a*², having secured to its under side guide posts or rods *a*³, fitted into holes or sockets *a*⁴ in the bottom or floor *a*⁵ of the elevator. The bottom or floor *a*⁵, as represented in Fig. 1^a, is provided with an opening or hole *a*^x, preferably located near the center thereof, and has secured to its under side a hollow vessel *a*⁶, provided, as herein shown, with a flange *a*⁷, by which the said vessel may be bolted or otherwise secured to the bottom *a*⁵. The opening or hole *a*^x is covered on its upper side with a flexible diaphragm *a*⁸, preferably a rubber disk, upon which the false bottom *a*² rests, the said flexible diaphragm and vessel *a*⁶ forming a chamber *a*⁹. The vessel *a*⁶ is connected by a flexible pipe *a*¹⁰ to a branch pipe *a*¹¹ of a stand-pipe *a*¹², extended substantially the height of the building, and provided, preferably, at each floor with an indicating device *a*¹³.

The indicating device *a*¹³ (shown separately in Figs. 2^a and 3^a) consists of a case 20, containing within it a cylinder *b*, provided with an inlet-port *b*¹, communicating with the stand-pipe *a*¹², and with a piston *b*², having its piston-rod *b*³ joined to a lever *b*⁴, pivoted, as at *b*⁵, to one wall of the case, the said lever being connected by a link *b*⁶ to a crank or arm *b*⁷, fast on a shaft *b*⁸, on which is also mounted a lever *b*⁹, provided, as herein shown, with a plate 33. The plate 33 registers with a slot or opening 22 in the front face or dial 21 of the case and is provided, as herein shown, with the word "Not," which, when the elevator is not in use, registers with the opening or slot 22, and with the words "In use" inscribed on the dial 21.

The lever b^9 is brought to its normal position (shown in Fig. 3^a) by a spring b^{14} , or in other usual manner, as by a weight.

In the operation of the apparatus constructed as shown in Fig. 1^a the piston b^2 of each indicating device is moved downward or in the direction of arrow 20, Fig. 3^a, when a predetermined weight or pressure is placed upon the false bottom a^2 of the elevator-car by means of water or other fluid, or it may be air or gas contained in the chamber a^9 , flexible pipe a^{10} , and stand-pipe a^{12} . When the piston b^2 is moved in the direction of arrow 20, the crank or arm b^7 and the lever b^9 are moved upward or in the direction of arrow 21, and the plate 33 is thus moved to withdraw the word "Not" from the slot or opening 22, leaving a blank or plain portion of the plate opposite the said slot, so that the indicating device reads "In use," thus indicating at each landing that the elevator is in use.

Instead of operating the piston b^2 by a movable portion of the elevator—as, for instance, the false bottom a^2 —I may employ the entire elevator-car to effect this result—as, for instance, as shown in Fig. 4^a, wherein the elevator-car when not in use is normally raised up away from a collar c on the hoist-rope a' by means of a spring c' , herein shown as encircling the said hoist-rope. The collar c is provided, as herein shown, with an ear c^2 , to which is pivoted one end of a lever c^3 , also pivoted, as at c^4 , to the elevator-car and having connected to its other end the piston-rod c^5 of a piston c^6 , located in a cylinder c^7 , having connected to it the flexible pipe a^{10} , which is connected at its other end to the branch pipe a^{11} of the stand-pipe a^{12} .

With the apparatus constructed as shown in Fig. 4^a the lever b^9 of the indicating device occupies its normal position (shown in Figs. 2^a and 3^a) when the elevator-car is not in use; but as soon as a weight is placed upon the said car the latter is moved bodily down until the cross-beam c^8 of the car has compressed the spring c' . As the elevator-car is thus moved downward, the piston c^6 is moved downward in its cylinder c^7 , thus forcing the liquid, air, or gas in the flexible pipe a^{10} into the cylinder b of each indicating device and moving the piston b^2 of each indicating device in the direction of arrow 20, as above described.

I have thus far described the indicating device at each landing (shown in Fig. 1^a) as operated by pressure upon a piston; but I do not desire to limit myself in this respect, as the lever b^9 of the indicating device may be operated by an electro-magnet connected in circuit with the elevator-car, so that when a weight is placed upon a car the said circuit will be closed and the electro-magnet energized to actuate the lever b^9 and move the plate 33 into position to indicate that the elevator is in use.

Referring to Figs. 5^a and 6^a, I have shown

the hoisting-cable a' as provided with a metallic collar d , forming one member of a circuit-controlling device, the other member of which is shown as a spring-arm d' , secured to the cross-beam of the elevator-car, the said member d' being connected by wire d^2 to the electro-magnet d^3 of the indicating device, the other wire d^4 of the said magnet being connected to one pole of a battery or other source of electricity B, the other pole of the said battery being connected by wire d^6 , as herein represented, to the metallic collar c on the cable a' , which in this instance may be supposed to be a wire cable.

The elevator-car when not in use is normally separated from the collar c by the spring c' , and the circuit of the electro-magnet d^3 is broken by the withdrawal of the spring d' from engagement with the button d . The electro-magnet d^3 of each indicating device is provided with an armature d^8 , having connected to it an arm d^9 , joined by a link d^{10} to the lever b^4 , connected by the link d^6 to the crank b^7 .

I have herein shown a visual indicating device; but I do not desire to limit myself in this respect, as it is evident other well-known forms of indicating devices may be substituted therefor—as, for instance, an audible signal may be used to indicate the operative condition of the elevator; or, if desired, the indicating device may be a portion of the operating mechanism—as, for instance, the starting mechanism—which may be so arranged as to be locked when the elevator is in use.

Referring to Fig. 7^a, the shipper-rope has secured to it, as shown, a rack-bar 51, adapted to be engaged by a rod or bar 52, secured to or forming part of the armature 53 of an electro-magnet 54, having one end, as 55, of its coil or wire joined to one member of a normally-open circuit-controller (shown as a spring 56, secured to the cross-beam c^8) and adapted to be brought in contact with a collar 59 on the cable a' , forming the other member of the circuit-controller.

The collar 59 is electrically connected by wire 60, as herein shown, to a normally-closed circuit-controller preferably located in the floor of the elevator, the said circuit-controller consisting, as herein shown, of a rod 61, provided with a collar 62, with which co-operates a spring 63, connected by wire 64 to one pole of the battery B, the other pole of the battery having joined to it the other end 64 of the electro-magnet coil. The rack-bar 51 is shown as movable in a guide 65.

In the operation of the device shown in Fig. 7^a the spring 56 is brought in contact with the collar 59 when a predetermined weight is placed upon the elevator, thereby closing the circuit of the electro-magnet 54, and causing the same to attract its armature and move the rod 52 into engagement with the rack-bar 51, thereby preventing the shipper-rope from being moved to start the elevator until the op-

erator in the car opens the circuit by pressing upon the rod 61, which removes the collar 62 from engagement with the spring 63. When the shipper-rope is locked, the elevator cannot be started from a different floor or station, thereby notifying a person on a different floor that the elevator is in use.

I have herein shown the shipper-rope as adapted to be locked; but I do not desire to limit myself in this respect, as any other form of starting mechanism may be automatically locked by a weight placed upon the elevator, and in this case the locking of the mechanism is a tangible indication that the elevator is in use, and therefore by the terms "indicating device" used in the claims I desire to be understood as including locking of the shipper-rope or like mechanism.

By the term "electro-magnet" I desire to include a solenoid or equivalent electromotor. I claim—

1. In an elevator mechanism, the combination, with the elevator-car, of an indicating device connected to the elevator-car and means for actuating the indicating device adapted to be operated by a weight or pressure placed upon the car, substantially as described.

2. In an elevator mechanism, the combina-

tion, with the elevator-car, of indicating devices located at the different floors or stations, and including an electro-magnet in an electric circuit, a circuit-controller operatively connected to the car, and means for actuating the controller adapted to be operated by weight upon the car, and thus to actuate said electro-magnet and operate said indicating device, substantially as described.

3. In an elevator mechanism, the combination, with the elevator-car, of indicating devices located at the different floors or stations, and including an electro-magnet having its armature connected to a visual indicator, a locking device for said armature, a second electro-magnet to release the locking device, and a normally-open circuit-controller carried by the car, consisting of one member, as 17, and co-operating member, as 16, connected to the said electro-magnets, substantially as described.

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

JOHN P. CUSHING.

Witnesses:

JAS. H. CHURCHILL,
FREDERICK L. EMERY.