(No Model.) 3 Sheets—Sheet 1.

C. G. ARMSTRONG.

SIGNALING DEVICE FOR ELEVATORS.

No. 462,834. Patented Nov. 10, 1891.

Fig. 1.

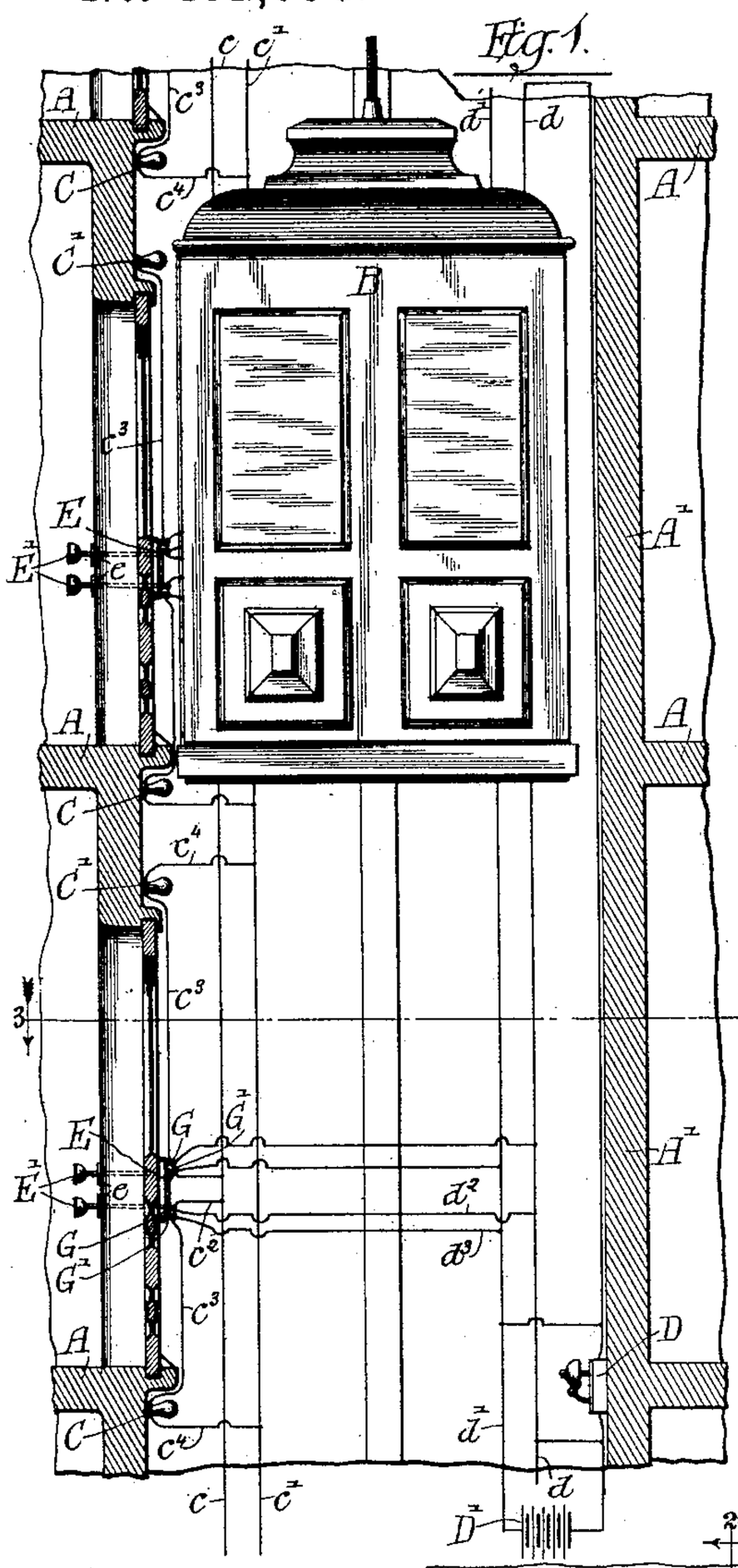


Fig. 2.

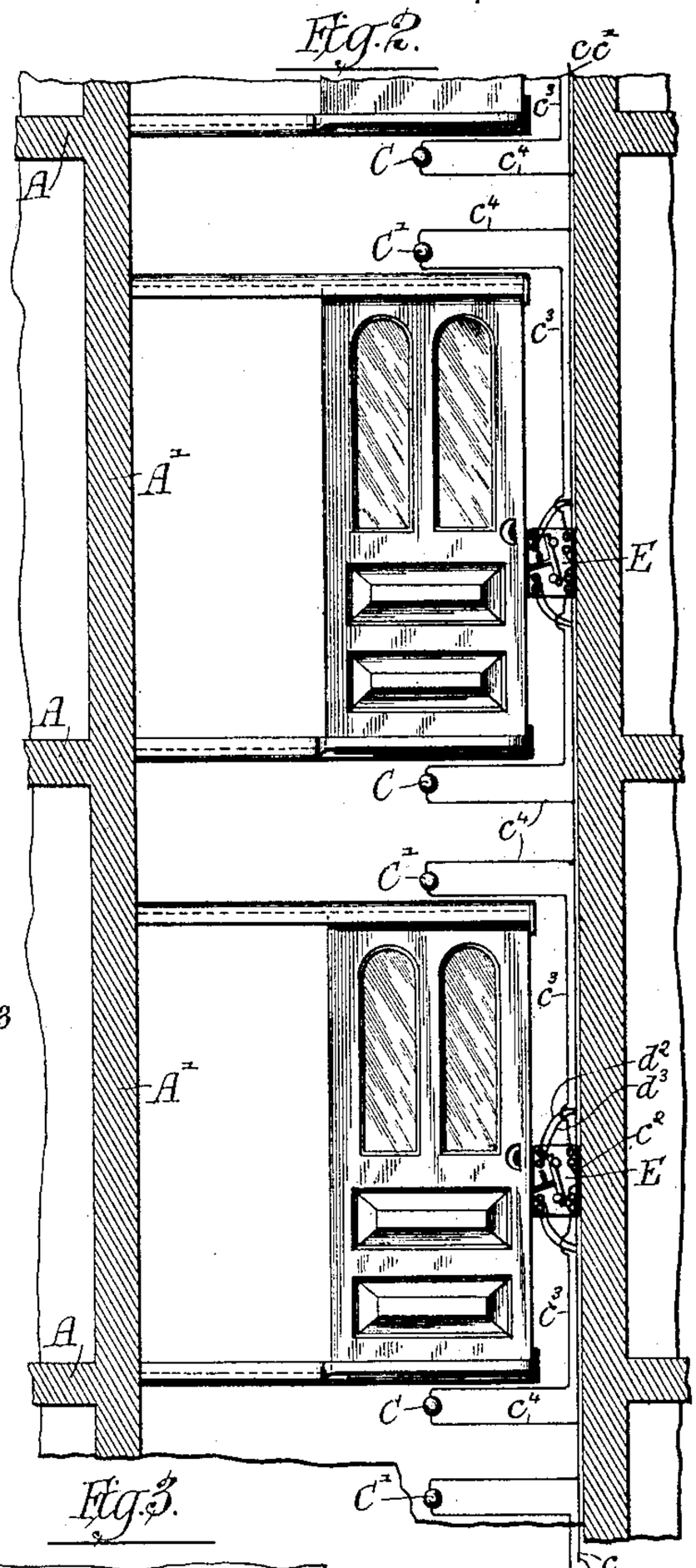
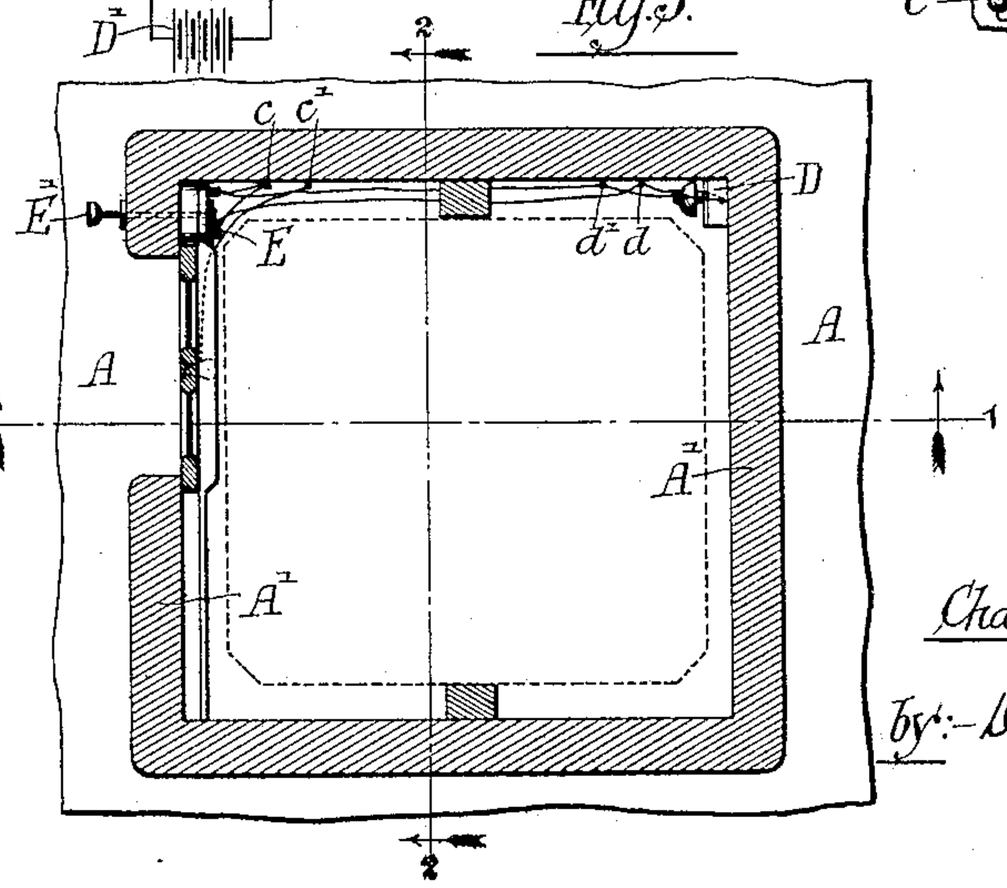


Fig. 3.



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(No Model.) 3 Sheets—Sheet 2.

C. G. ARMSTRONG.

SIGNALING DEVICE FOR ELEVATORS.

No. 462,834. Patented Nov. 10, 1891.

Fig. 5.

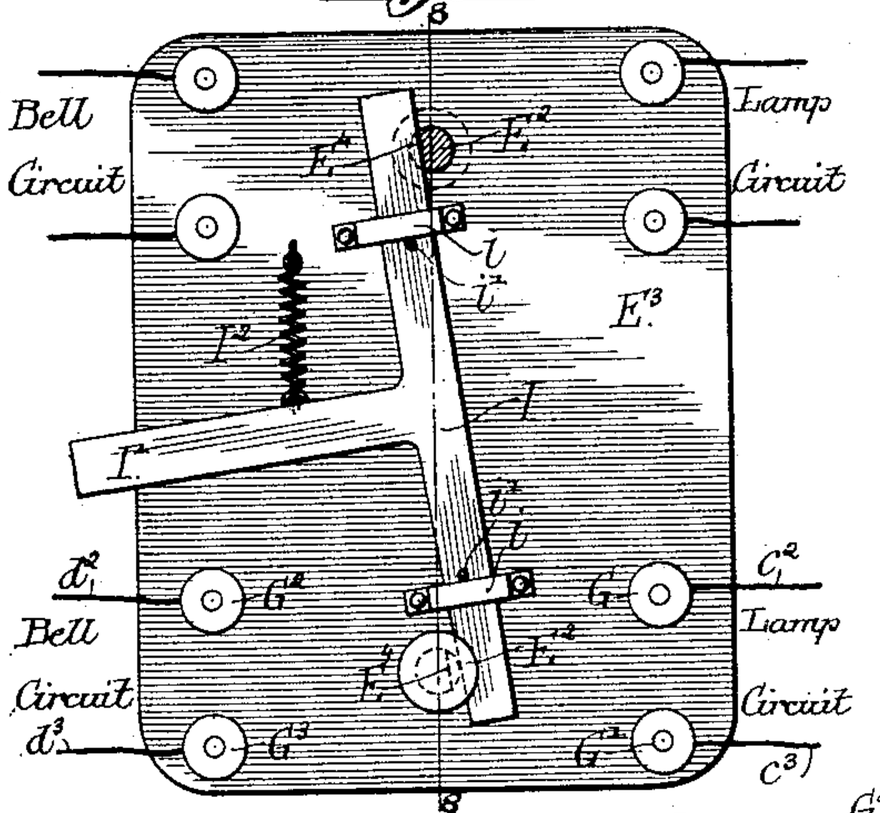


Fig. 6.

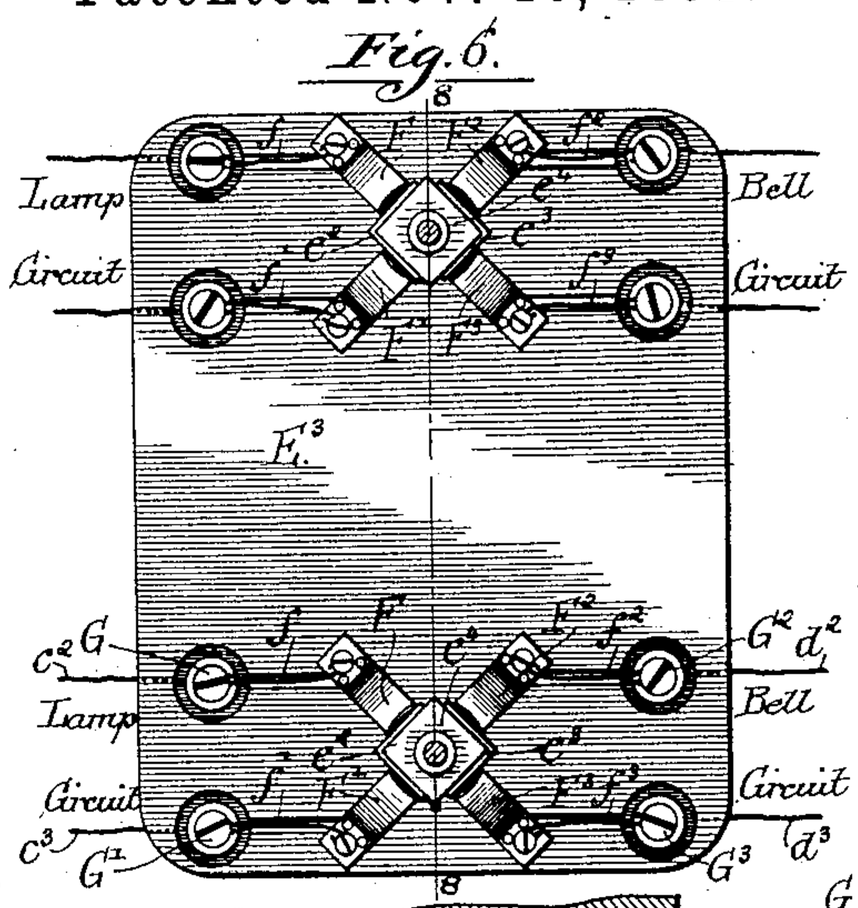


Fig. 4.

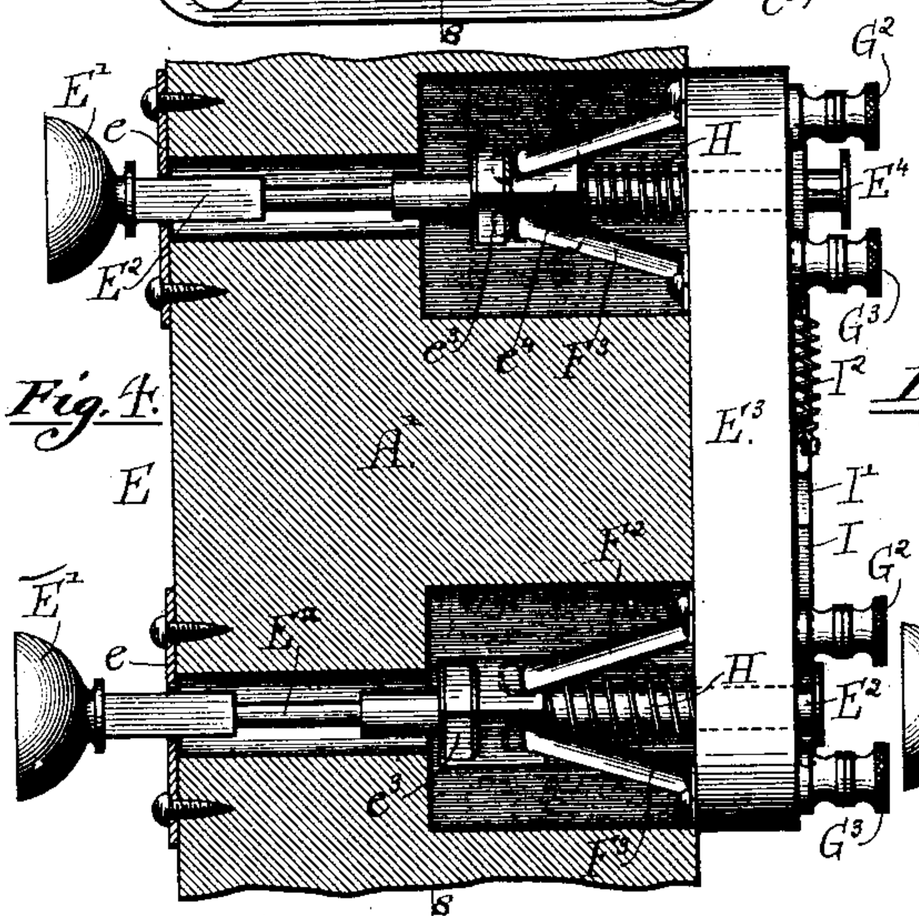


Fig. 8.

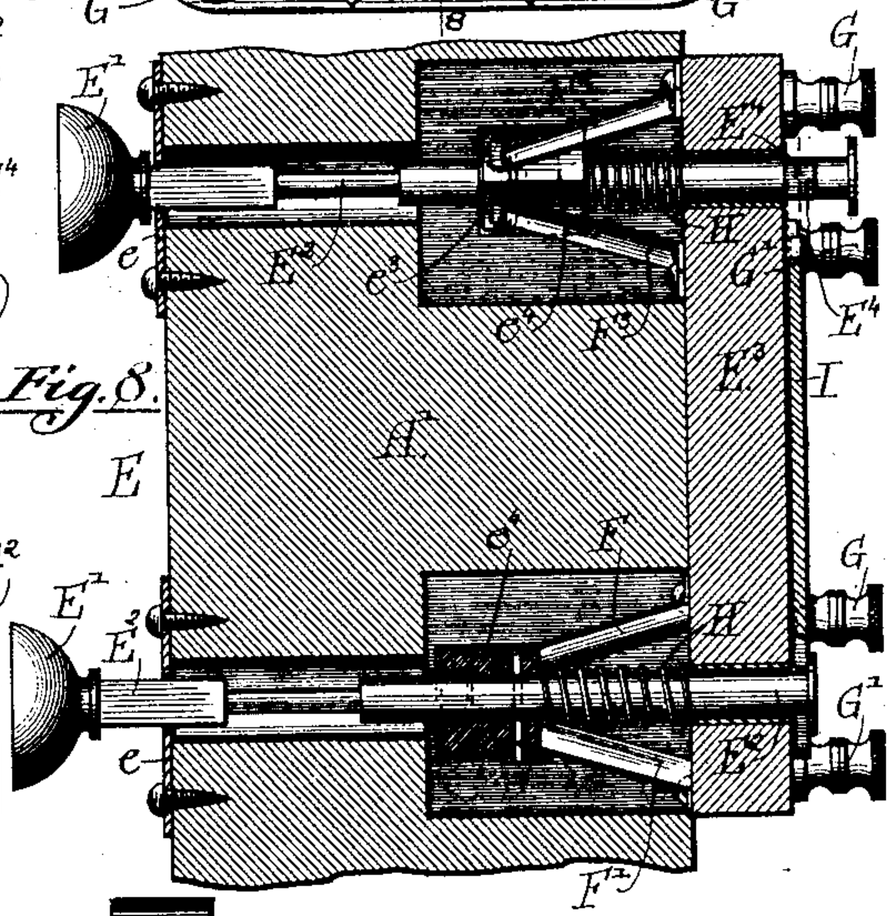


Fig. 7.

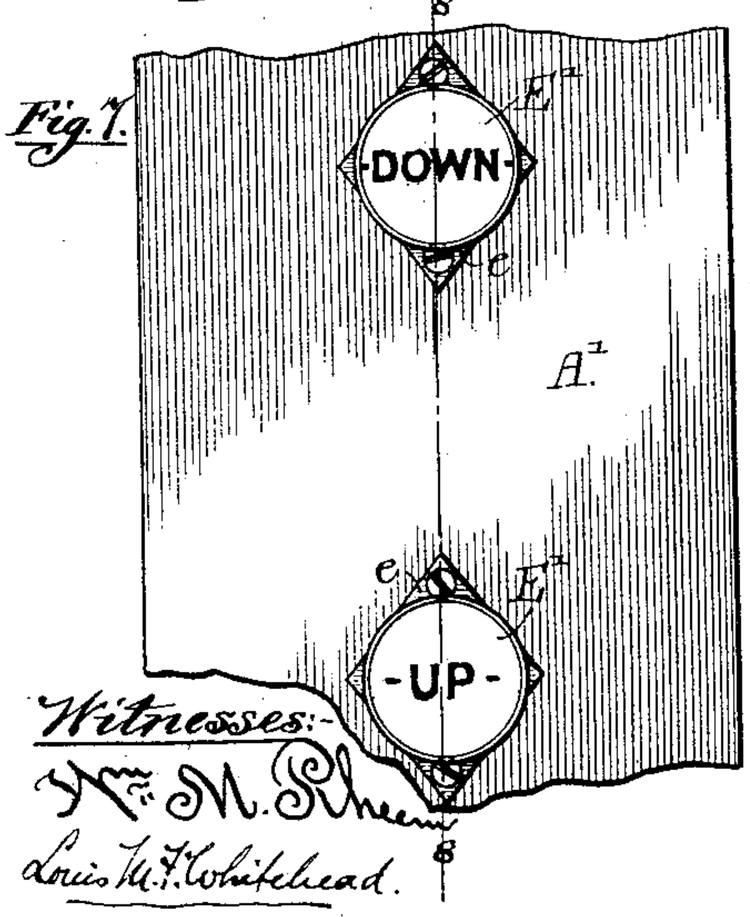


Fig. 9.

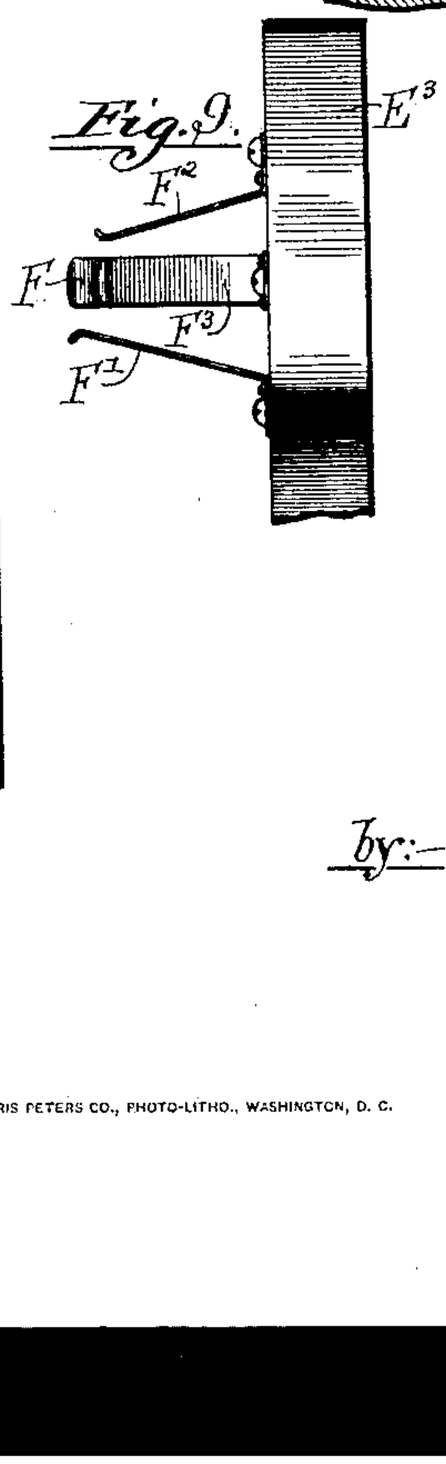
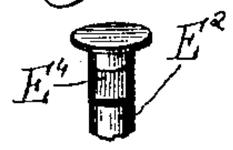


Fig. 10.



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(No Model.) 3 Sheets—Sheet 3.

C. G. ARMSTRONG.

SIGNALING DEVICE FOR ELEVATORS.

No. 462,834. Patented Nov. 10, 1891.

Fig. 11.

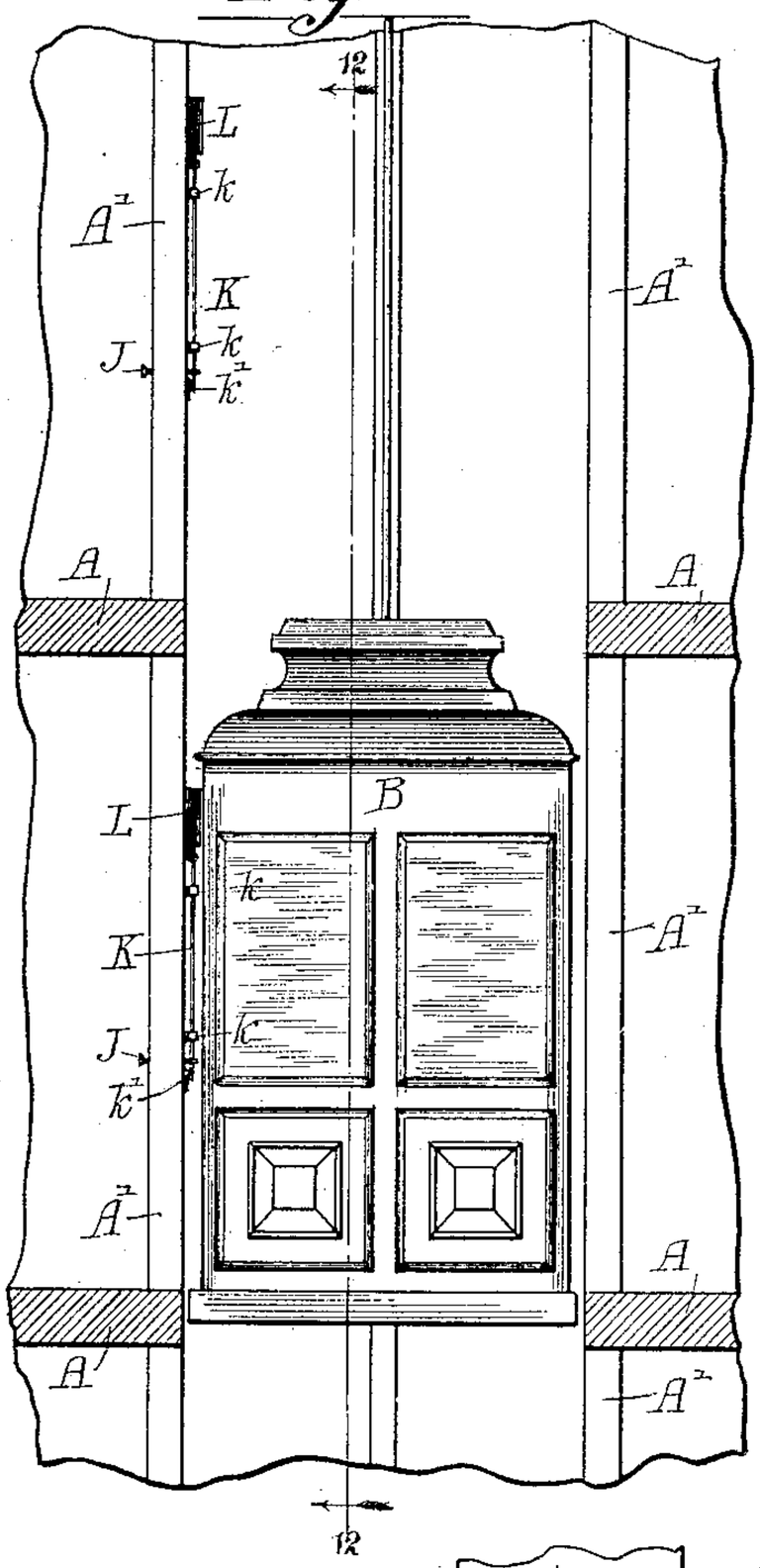


Fig. 12.

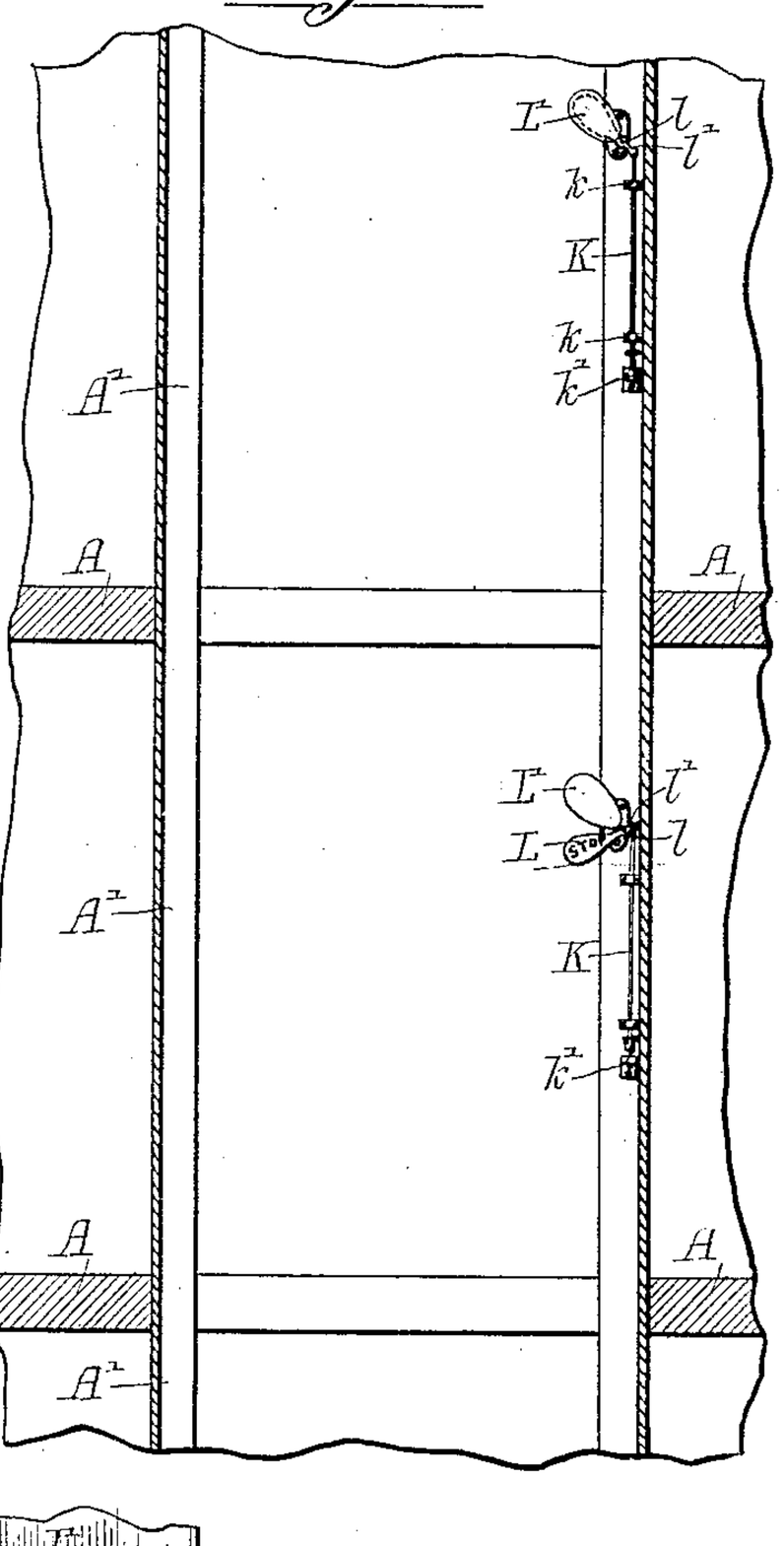


Fig. 13.

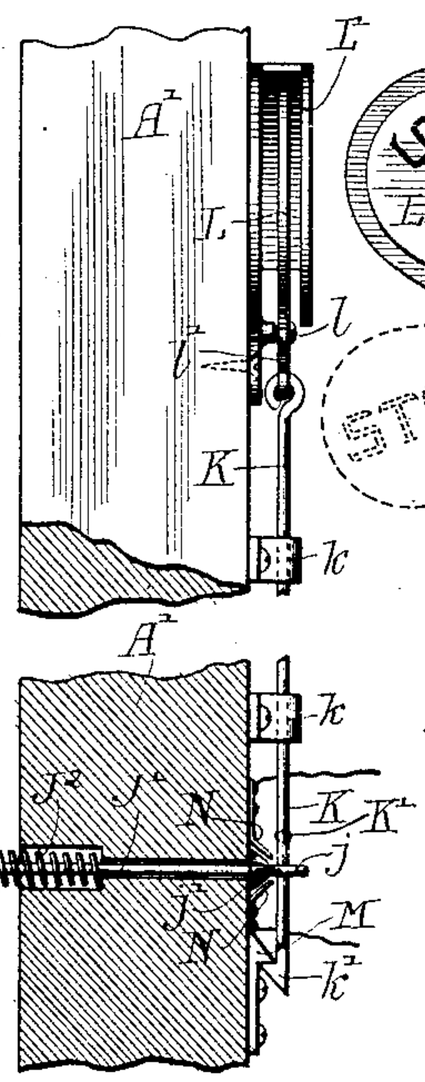
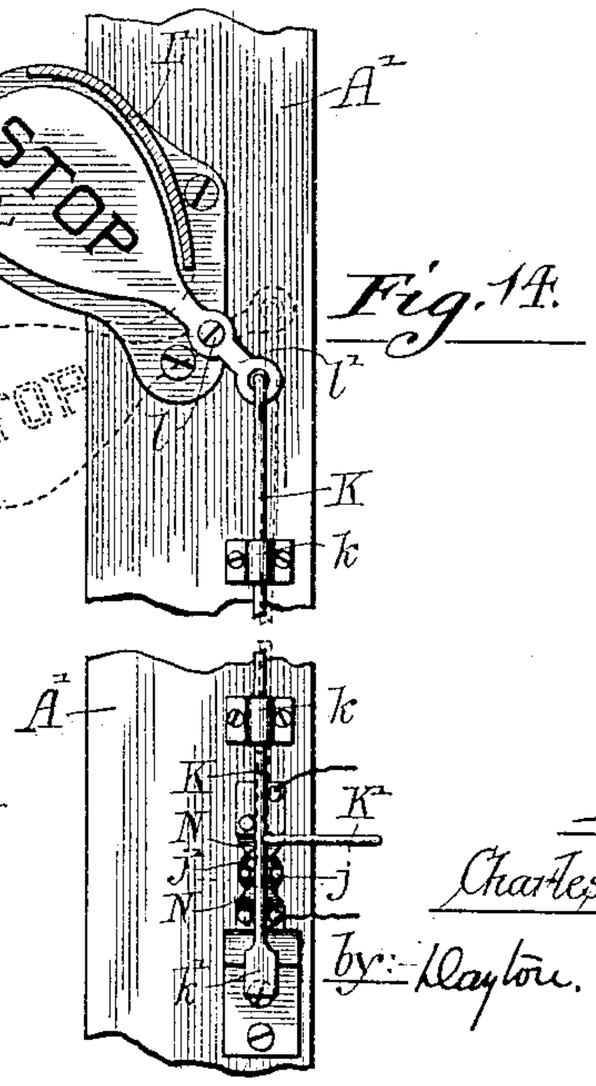


Fig. 14.



Witnesses:—

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Louis M. T. Whitehead

Inventor:—

Charles G. Armstrong.

by:— Clayton, Poole & Brown

Atty's

UNITED STATES PATENT OFFICE.

CHARLES G. ARMSTRONG, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO DANKMAR ADLER, OF SAME PLACE.

SIGNALING DEVICE FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 462,834, dated November 10, 1891.

Application filed January 17, 1891. Serial No. 378,110. (No model.)

To all whom it may concern:

Be it known that I, CHARLES G. ARMSTRONG, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Signaling Devices for Elevators; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in signaling devices for elevators; and it consists in the matters hereinafter described, and pointed out in the appended claims.

In the accompanying drawings, illustrating my invention, Figure 1 is a vertical sectional view, taken on line 1 1 of Fig. 3, of an elevator-shaft provided with my improved signaling device and showing the elevator-carriage in side elevation. Fig. 2 is a vertical section of the elevator-shaft on line 2 2 of Fig. 3. Fig. 3 is a horizontal section of the elevator-shaft. Fig. 4 is an elevation, on an enlarged scale, of the main operative part of the signaling device, the wall of the elevator-shaft being shown in section. Fig. 5 is a view in elevation of the inner side or face of said device. Fig. 6 is a view in elevation of the inner face of the device shown in Figs. 4 and 5 removed from the wall of the shaft with the actuating-rods in section. Fig. 7 is a face view of the exterior of the wall of the elevator-shaft, showing the two push-buttons for actuating the signaling device. Fig. 8 is a vertical section of the device shown in Figs. 4, 5, 6, and 7, taken upon line 8 8 of Figs. 5, 6, and 7. Fig. 9 is a detail view illustrating the construction of contact-pieces forming part of the signaling device. Fig. 10 is a detail view of one of the parts hereinafter described. Fig. 11 is a sectional view of the elevator-shaft provided with another form of signaling apparatus embodying the main feature of my invention. Fig. 12 is a sectional view taken upon line 12 12 of Fig. 11. Figs. 13 and 14 are enlarged views illustrating more fully the construction of the signaling apparatus shown in Figs. 11 and 12.

In said drawings, A A indicate several floors of a building; A′, the walls of an elevator-shaft, and B the elevator carriage or car.

As shown in Figs. 1, 2, and 3, C C C′ C′ indicate electric lamps, of the kind known as "incandescent" or "glow" lamps, located inside of the elevator-shaft adjacent to the several doors thereof, the lamps C′ C′ being located above and the lamps C C below the doors. The lamps above and below the doors will preferably be constructed to give differently-colored lights, so that they may be easily distinguished by the operator in the car—as, for instance, the lamps C C may be of ordinary or white glass and the lamps C′ C′ of colored glass. Electric conductors *c c′* for supplying the lamps are shown as extending from bottom to top of the shaft, said conductors being connected with the lamps by means of branch conductors, as hereinafter more particularly described. Said lamps C C C′ C′, in connection with the devices herein described, by which they may be lighted and extinguished at will from points adjacent to the doorways of the shaft, constitute visual signals, by which the operator may be notified to stop the car.

D indicates an electric bell in circuit with electric conductors *d d′* and a battery D′ and serving to give audible signals in case the same are needed in addition to the visual signals to indicate that a passenger is awaiting the elevator on one of the floors of the building.

E E indicate, as a whole, circuit making and breaking devices for controlling the lamp and bell circuits described. One of such circuit closing and breaking devices E is located adjacent to each doorway of the shaft and each controls the electric circuit of the signaling-lamp above and below the doorway at which it is located and also the circuit which operates the electric bell, so that the latter can be operated at will from either doorway. The said circuit closing and breaking devices are shown more clearly in Figs. 4 to 10. Each of said devices embraces two similar push-buttons E′ E′, which are located outside of the shaft and one of which controls the signal-lamp above the doorway and the other that below the doorway, while both operate

the signal-bell. Said push-buttons are attached to the outer ends of sliding push-rods E^2 E^2, which extend inwardly through the wall of the shaft where the contact-making devices of the circuit-closing mechanism are preferably located. The said push-rods are preferably arranged to slide at their inner ends in a base-board E^3, which is attached to the inner surface of the wall of the shaft and upon which all of the principal parts of the circuit-closing mechanism are mounted, the push-rods being conveniently arranged to slide at their outer ends in face-plates *e*, secured to the outer face of the shaft-wall, as shown. The push-button which controls the signal-lamp above the doorway may, for convenience, be marked "Down" and the other push-button "Up," as seen in Fig. 7 of the drawings.

Mounted upon each of the push-rods E^2 E^2 are contact-plates e^2 e^3, which are insulated from said rod and from each other by means of a block e^4, of insulating material, rigidly secured upon the said rod between the push-button and the base-board and to which said contact-plates are attached. F F′ are contact-springs attached to the inner surface of the base-board and adapted to engage at their free ends with one of the contact-plates e^2, and F^2 F^3 are other similar contact-springs also attached to the base-board and adapted to engage the contact-plate e^3. For convenience of construction the contact-plates e^2 e^3 are each bent at right-angles and are secured to two adjacent sides of the insulating-block e^4, which is in this instance of square form, and the contact-springs are arranged radially around the rod so as to bear upon the four faces of the insulating-block, as clearly shown in Fig. 6. These details of construction are, however, immaterial as far as the main features of the invention are concerned.

The two contact-springs F F′ are connected by wires *f f′* with binding-posts G G′, secured in the outer surface of the base-board. The two contact-springs F^2 F^3 are similarly connected by means of wires f^2 f^3 with binding-posts G^2 G^3. The contact-springs F F′ and contact-plate e^2 serve as a circuit breaking and closing device for one of the signal-lamps, while the contact-springs F^2 F^3 and the contact-plate e^3 similarly serve to open and close the signal-bell circuit. The main conductors *c c′* are connected with opposite terminals of the generator, and branch conductors c^2 lead from the one main conductor *c* to the binding-post G. A conductor c^3 leads from the binding-post G′ to the lamp, and a conductor c^4 leads from the lamp back to the other main conductor *c′*. The several signal-lamps are thus placed in multiple arc with each other in the usual manner, while each lamp-circuit is provided with a separate controlling device. Similarly the two conductors *d d′* of the signal-bell circuit are connected with opposite terminals of the battery, and branch conductors d^2 d^3 severally lead from said conductors *d d′* to the binding-posts G^2 G^3 belonging to each push-rod, so that when either push-rod is thrust inwardly a circuit is closed through the conductors *d d′* and the bell is caused to ring.

The several contact-springs are so arranged that they will bear upon the contact-plates when the push-rod is at one limit of its movement and will rest against the insulating-block e^4 and will be free from the contact-plates when the push-rod is at the opposite limit of its movement. It follows that by moving the said push-rod endwise the several arms may be brought into contact with or disengaged from the contact-plates and the lamp and bell circuits broken and closed, as desired—as, for instance, if the person at one of the doorways desires to signal the operator in the car he moves the push-button so as to shift the push-rod into a position to bring the contact-springs against the contact-plates when the bell-circuit will be closed to give an audible signal, while the lamp-circuit will be closed and the lamp thereby lighted, so as to indicate to the operator that a passenger desires the car to stop at that particular floor.

It will of course be understood that the signal-bell will be operated equally from all of the floors of the building, but that the lamp only will be lighted which is adjacent to the doorway at which the signal is given.

For the purpose of holding the push-rod normally in position to maintain the circuits broken a spring H is applied to act upon said push-rod, such spring, as herein shown, being of coiled form and placed around the rod between the base-board and the insulating-block e^4. Inasmuch as a spring thus applied will tend to hold the push-rod constantly outward and to maintain the circuits broken it is obviously desirable that means should be provided for temporarily holding the push-rod at the inward limit of its movement when pushed inward by the person signaling, so that the lamp will remain burning until the elevator reaches the floor at which the signal is made, in order to avoid the necessity of the passenger holding the push-rod at the inward limit of its movement for an inconveniently long time.

It will of course be understood that in some instances—as, for instance, where there are only a few floors in the building—the lighting of the lamp for a brief period only will afford a sufficient indication to the operator as to the floor at which it is desired that he should stop. Where there are many floors in the building, however, and the elevator has a great distance to move, it will commonly be necessary that the lamp should remain burning until the elevator-car reaches the floor at which the signal is made. In such case a device of the character above described for automatically holding the push-rod in position to maintain the circuits closed will be of great utility.

One simple form of device for the purpose

last above referred to is clearly shown in the drawings and is constructed as follows: I is a movable plate or latch-bar arranged upon the outer face of the base-board E^3 and adapted to slide or move freely thereon, being for this purpose held by means of loops *i i*, made wider than the said bar and arranged to engage the ends of the bar adjacent to the two push-rods which pass through the base-board. Pins or stops *i'* in the said latch-bar hold the latter from endwise movement by bearing against the loops *i i*, while at the same time permitting free lateral movement of each end of said bar. Attached to the central part of the latch-bar is a rigid arm I', to which is connected a spring I^2, which acts upon the arm in a direction to press and hold the opposite ends of the latch-bar against opposite sides of the two push-rods. Said push-rods, furthermore, are provided with recesses or notches forming shoulders E^4, which are adapted to engage the latch-bar I when the rods are thrust inwardly. The latch-bar, arranged as described, serves to hold either or both of the push-rods at the inward limit of their movement, while at the same time said latch-bar may be easily moved or shifted to release the push rod or rods when desired—as, for instance, in the drawings, Figs. 4, 5, and 8, the lowermost push-rod is shown in its outward position, while the uppermost push-rod is shown as thrust inwardly and held by the latch-bar I. In this instance the lower end of the latch-bar simply bears against the cylindric inner end of the lower push-rod, while the upper end of the latch-bar engages the shoulder E^4 of the upper push-rod, the spring I^2 holding the upper and lower ends of the latch-bar in the positions described. If it is desired to release the upper push-rod, downward pressure upon the arm I' of the latch-bar will obviously accomplish this result. Furthermore, if the lower push-rod is thrust inwardly the spring I^2 will throw the lower end of the latch-bar into engagement with the shoulder E^4, and said lower push-rod will be held near the inward limit of its movement, and when so held it may be released by similarly pressing downwardly upon the said arm I', so as to throw the lower end of the latch-bar away from the said lower push-rod. The latch-bar I is intended usually for operation by the person controlling the elevator-car, and for this purpose the arm I' of said latch-bar is located in position convenient to be reached from the inside of the car at the time of closing the doorway of the shaft. In the drawings the said arm I' is shown as extending past the side or jamb of the door, so that it may be touched by the hand of the operator as the door is being closed. If preferred, however, the latch-bar may be actuated automatically by closing the door or by the movement of the elevator past the doorway.

The contact-springs F^2 F^3 belonging to the bell-circuit are shown as made somewhat shorter than the contact-springs F F' belonging to the lamp-circuit, and the push-rods are given a movement greater than that necessary for engaging and disengaging the longer contact-springs with and from the contact-plate e^2, so that the push-rod may be thrust inwardly far enough to bring the shorter contact-springs in contact with the contact-plate e^3, (this being the position shown in the upper portion of Fig. 8,) and then allowed to spring outwardly, so as to carry the said contact-plate e^3 away from the contact-springs F^2 F^3, while still leaving the longer contact-springs F F' upon the contact-plate e^2, the shoulder E^4, which engages the latch-bar I, being arranged to hold the push-rod when in the position last described and as seen at the top of Fig. 4. It follows from this construction that the bell-circuit will only be closed and the bell will only ring when the push-rod is pushed to the extreme inward limit of its movement, so that the bell will be rung for a short time only and will cease ringing as soon as the push-rod is released, while the signal-lamp will continue to burn until the push-rod is released by a movement of the latch-bar in the manner hereinbefore described.

The operation of my improved signaling device is as follows: A person upon the outside of the elevator shaft or well desiring to signal the operator in the elevator-car presses upon the one of the push-buttons which is marked "Up" or "Down," according to the direction in which he desires to go, pressing said push-button and push-rod inward to the limit of its movement. In this condition the parts will occupy the positions shown in the upper part of Fig. 8, the contact-springs F F' and the contact-springs F^2 F^3 bearing upon the contact-plates e^2 and e^3, respectively, thus closing the lamp-circuit connected with said springs F F' and causing the lamp to burn and also closing the bell-circuit connected with the contact-springs F^2 F^3 and causing the bell D^2 to ring. Upon the push-button being released the spring H throws the push-button and rod outwardly until the outward movement of the rod is stopped by the engagement of the latch I with the shoulder E^4. By this slight outward movement of the rod the plate e^3 is carried out from under the springs F^2 F^3 and the bell-circuit is thereby broken, springs F F', however, remaining in contact with the contact-plate e^2, and the lamp continues to burn. The ringing of the bell notifies the operator of the elevator that a passenger is waiting at one of the doors, and as he ascends or descends he is enabled to determine at which door to stop the car by the presence of the lighted lamp. If the light is a colored one, he knows that the passenger desires to go in one direction, while if it is white he knows that the passenger desires to go in the opposite direction. After receiving the passenger the operator moves the lever so as to release the latch-bar I from its engagement with the shoulder E^4 upon the push-rod, when the spring H immediately pushes

the rod outwardly to its initial position, thereby cutting the lamp out of circuit.

By arranging the lamps above and below the doors and adjacent thereto, as described, the operator is notified of the presence of the passenger in ample time to stop the car in the proper position to receive the passenger; but this particular arrangement of the lamps is not essential, and they may be located at other points adjacent to the doorway to which they belong.

It is obvious, as far as the main feature of my invention is concerned, that one lamp only may be employed, if desired, adjacent to each of the doors; but in this instance the operator will be unable to determine by the location or the color of the light the direction in which the passenger desires to go.

A main feature of my invention is embraced in a construction in which a visual signal is displayed in the elevator-shaft for the guidance of the operator in the car, which signal is operated by a push-button or equivalent device located at each floor, and as far as this main feature of the invention is concerned forms of signaling device other than a lamp may be employed and the signaling device may be operated otherwise than by electricity.

An illustration of a mechanically-operated signal is contained in Figs. 11 to 14 of the accompanying drawings. As shown in said figures, J indicates a push-button which is attached to a push-rod J′, passing through the wall of the elevator-shaft in the same manner as the push-button hereinbefore described. A spring J^2, placed between a shoulder on the wall and the push-button, serves to hold the push-rod normally at the outward limit of its movement. K is a vertically-arranged endwise movable rod mounted in guides *k k* on the inner surface of the shaft-wall and connected at its upper end with a pivoted target or semaphore L. At its lower end the rod K is provided with a hooked end *k′*, adapted to engage with a stationary stop M on the wall of the shaft. The lower part of the said rod below the lowermost guide *k* is sufficiently flexible to enable its hooked lower end to be thrust inwardly free from the stop M, and the push-rod J′ is engaged with said rod K in such manner that it may act upon the rod K to push the latter inwardly, while at the same time the rod is free to slide endwise, the form of connection for this purpose being shown as consisting of an eye *j* on the inner end of the push-rod, adapted to encircle the said rod K. The target L is mounted on a pivot *l* and provided with an arm *l′*, extending past its pivotal point, to which arm the rod K is connected, the target being so arranged that it tends to drop by gravity and lift the rod K. When in its elevated position, the target L is covered by a shield L′, so that the target is concealed; but when allowed to drop by gravity it passes outside of the shield and becomes visible. The target is held in its elevated position by the engagement of the hooked lower end of the rod K with the stop M, and when said rod is disengaged from the stop by thrusting inwardly the push-rod J′ the target falls by gravity and lifts the rod K. For restoring the target to its elevated position the rod K is shown as provided with a horizontal arm K′, located within reach of the operator in the elevator-car, it being obvious that by pressing downwardly upon said arm K′ the rod K may be thrust downwardly until its hooked lower end engages the stop M, when the parts will be in position for subsequent operation through the medium of the push-button. The target L is herein shown as provided with the word "Stop" upon its surface; but it may be without such lettering, and the shield L′ is not necessary, inasmuch as the change of position in the target itself may afford a sufficient indication to the operator.

Any suitable means may be employed in connection with this form of signaling apparatus for operating a bell or other audible signaling device.

As shown in Figs. 13 and 14, the push-rod J′ is provided with a collar *j′*, adapted when the rod is pressed inwardly to close a circuit from the two terminals N N of an electric-bell circuit. It is obvious that two of the mechanical signals may be employed at each doorway, as described, in connection with the signal-lamps.

Instead of employing a mechanical connection between a push-button at the shaft-doorway and a semaphore in the shaft, the latter may obviously be operated by electric means, as in the case of electric signaling devices or annunciators heretofore commonly used.

I claim as my invention—

1. The combination, with an elevator shaft and car, of a visual signaling device located within the shaft, an audible signaling device also located in the shaft, and means for actuating said signaling device, embracing a push-button or equivalent device located at a doorway of the shaft outside of the latter, and operative connections extending from the said push-button through the wall of the shaft to said signaling devices, substantially as described.

2. The combination, with an elevator shaft and car, of two visual signaling devices located inside of the shaft, one above and the other below a doorway thereof, and means for actuating said signaling devices, embracing two push-buttons or equivalent devices located at the doorway of the shaft outside of the latter, and operative connections extending from the said push-buttons to the signaling devices, substantially as described.

3. The combination, with an elevator shaft and car, of two visual signals located inside of the shaft, one above and the other below the doorway, two push-buttons or equivalent devices located at the doorway of the shaft outside of the latter, and operative connections extending from the said push-buttons

through the wall of the shaft to the said signaling devices, an audible signaling device also located within the shaft, and operative connections between said audible signaling device and both of said push-buttons, substantially as described.

4. The combination, with an elevator shaft and car, of signaling devices consisting of electric lamps located within the shaft adjacent to the several doorways thereof, and controlling devices for the lamp-circuits located outside of the shaft at the said several doorways, substantially as described.

5. The combination, with an elevator shaft and car, of a visual signaling device consisting of an electric lamp located at a doorway of the shaft within the latter and a push-button or equivalent device located at said doorway of the shaft outside of the latter and controlling the lamp-circuit, substantially as described.

6. The combination, with an elevator shaft and car, of a visual signaling device within the shaft, consisting of an electric lamp, a push-button or equivalent device located at the doorway of the shaft outside of the latter and controlling the lamp-circuit, an electric bell, and an electric circuit for actuating the bell, also controlled by said push-button, substantially as described.

7. The combination, with an elevator shaft and car, of a visual signal consisting of an electric lamp at a doorway of the shaft within the latter, a sliding rod located at said doorway of the shaft and extending through the wall of the latter, an insulated contact-plate carried by said rod, contact-springs adapted to engage the rod in electric connection with the lamp, and a conductor supplying electricity to the lamp, substantially as described.

8. The combination, with an elevator shaft and car, of a visual signal consisting of an electric lamp and means for controlling the lamp, comprising a sliding rod, an insulated contact-plate carried by the rod, contact-springs in circuit with the lamp, a spring applied to move the said rod in one direction, and a movable latch-bar constructed to engage the rod and hold the same from movement against the action of the spring, substantially as described.

9. The combination, with an elevator shaft and car, of a visual signal within the shaft, consisting of an electric lamp located within the shaft, an electric bell, and means for controlling the electric circuit belonging to the said lamp and bell, consisting of a sliding rod located adjacent to the doorway of the shaft and extending through the wall of the latter, two insulated contact-plates attached to the rod, and contact-springs in circuit with the lamp and with the electric bell, substantially as described.

10. The combination, with an elevator shaft and car, of a visual signal within the shaft, consisting of an electric lamp, an electric bell, and means for controlling the electric circuits belonging to the said lamp and bell, consisting of a sliding rod located adjacent to the doorway of the shaft, two insulated contact-plates attached to the rod and contact-springs in circuit with the lamp and with the electric bell, the said contact-springs belonging to the lamp-circuit being located in position to engage one contact-plate when those belonging to the bell-circuit are free from the other contact-plate, substantially as described.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

CHARLES G. ARMSTRONG.

Witnesses:

C. CLARENCE POOLE,

GEORGE W. HIGGINS, Jr.