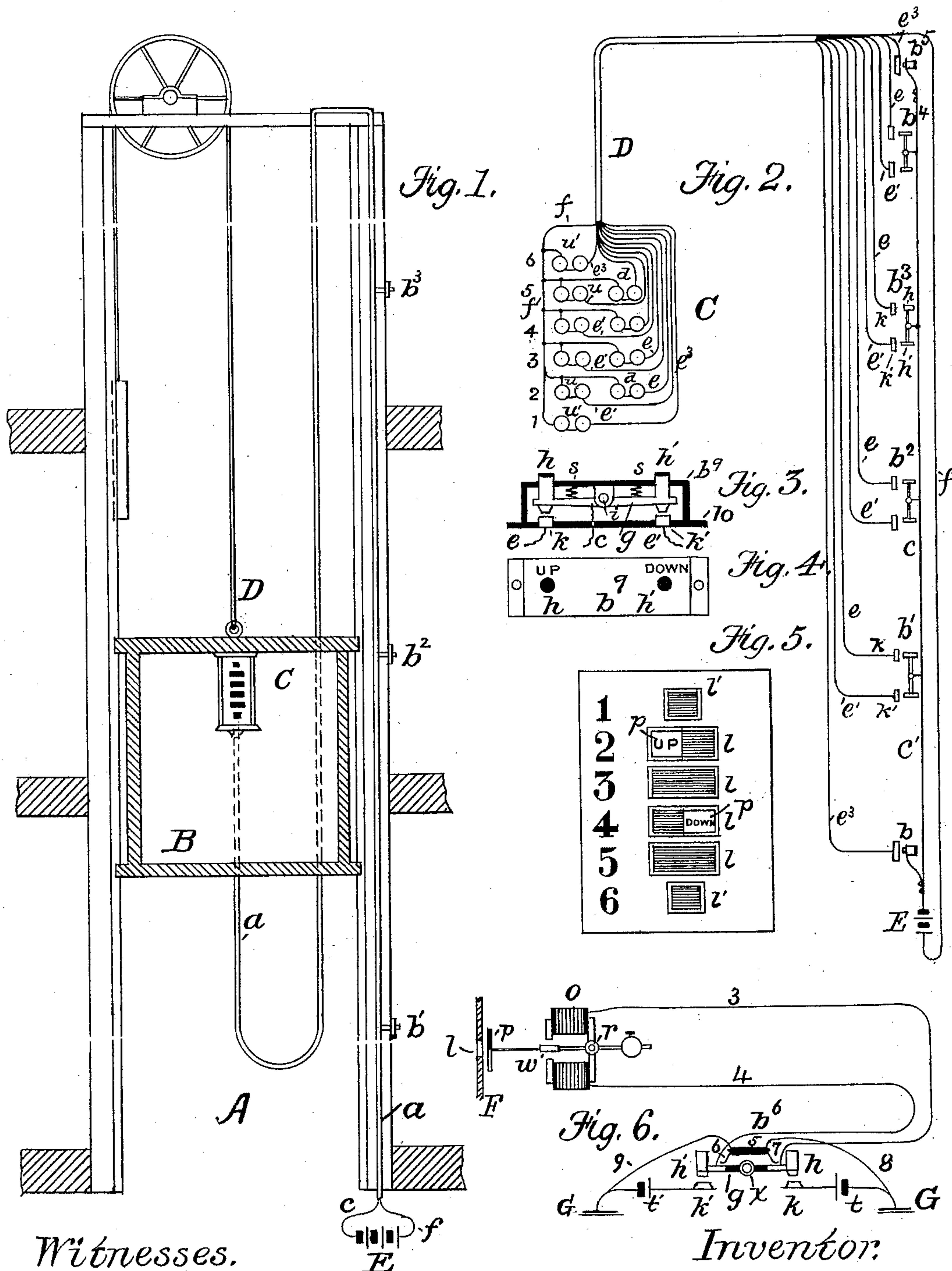


(No Model.)

G. F. MILLIKEN.  
SIGNALING APPARATUS.

No. 407,101.

Patented July 16, 1889.



Witnesses.  
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# UNITED STATES PATENT OFFICE.

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## SIGNALING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 407,101, dated July 16, 1889.

Application filed April 1, 1889. Serial No. 305,550. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE F. MILLIKEN, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented  
5 certain Improvements in Variable Signaling Apparatus, of which the following is a specification.

My invention relates to electrical communication between the several floors of a building and a movable elevator located therein.  
10

It is well known that there are electrical means of communication or signaling between the floors of a building and the elevator, consisting, usually, of an annunciator in  
15 the elevator-car having as many indicators as there are floors or stories reached by the elevator, each drop or shutter of the indicators being operated by an electro-magnet in electrical connection with a push-button or  
20 key near the elevator-door on each story passed or reached by the elevator-car. Each drop so connected is numbered to correspond with the number of the floor or story of the building, so that when the button is pressed  
25 and a drop in the annunciator falls down the elevator boy or attendant knows from which floor the call is made and that some person there desires his service. This system operates very well in a small building, or where  
30 there is not much use for an elevator, or where the elevator runs very slow; but I have found by experience that in large buildings, where the travel by elevator is very great and continuous, and where the elevator-car travels  
35 very swiftly, there are many and serious disadvantages connected with it. For example, a person on any of the intervening floors or stories wishes to go up another story of the building while the elevator-car is moving.  
40 The attendant has no idea from the drop falling in the annunciator as to the desire of the person as to whether he wants to go up or down, and may stop the car at the designated floor, whether it is at that time ascending or descending; or if the car is going up  
45 he, thinking the passenger wants to go down, does not stop until the return-trip, or vice versa; or if the car is stopped and the passenger taken in he may be carried the wrong  
50 way, unnecessarily loading the elevator-car

and annoying the passenger. It is a custom in large buildings, or where there is much passenger traffic, to run the car to the top of the building before descending, especially when there are passengers aboard who are to  
55 be distributed to the several floors. In other words, in all the elevator systems I am aware of there are no means to announce to the elevator-attendant the direction the passenger wishes to go, whether up or down. The an-  
60 nunciator-drop simply gives knowledge to him that there is a person on a certain floor who desires his service. This deficiency creates much annoyance and disturbance. For  
65 example, a person, seeing a swiftly ascending or descending elevator-car, shouts "up" or "down," as he wishes to go, and if he has not been quick enough has to wait until the elevator-car makes another trip.

My invention has for its object to obviate  
70 the above-described deficiency, difficulty, and annoyance, and to convey, display, or indicate to the elevator-attendant certain and absolute information as to the desire of any person on any floor of the building.  
75

In carrying out my invention I provide a system whereby the passenger may indicate  
80 to the elevator-attendant, by means of the annunciator located in the car, whether he wishes to go up or down, and to do this at the same time he signals the number of the floor he is on, so that such information is indicated to the attendant in time to stop at the designated floor if the car is going in the direction  
85 the person has indicated that he wishes to go, or, if not, the attendant stops on the return-trip and takes the passenger in, all being perfectly understood without confusion, annoyance, or trouble of any kind.

My invention consists in the provision on  
90 each floor of a building, (excepting the first and the upper ones, for reasons to be stated,) near the elevator-door, of two stationary circuit-closing or circuit-breaking push-buttons, (according to the character of the circuits and  
95 generators employed,) one button being marked "Up" and the other "Down." Upon the first and the upper floors the common single key or button is used. The application of  
100 my invention is especially to the intervening



floors between the first and the last, as it will be readily seen that passengers can go but one way from the first and last floors, and consequently at those floors but one key or button is required. The double buttons are electrically connected with electro-magnets, each having an indicator-drop, in the annunciator. These electro-magnets are arranged in pairs, and are marked to correspond with the double buttons, so that there are two indications, constituting a variable display, in the annunciator for each floor of the building excepting the first and last, and when a button on any of the intervening floors is pressed an indication is made in the annunciator of the wish of the person pressing the button. If the person wishes to go up another story, he presses the button marked "Up," and if he wishes to go down he presses the button marked "Down." In both cases the annunciator in the elevator-car indicates the floor from which the signal was sent, and also whether the person sending the signal wishes to go up or down in the elevator.

My invention also consists in the combination, in a system of signaling from the floors of a building to a movable elevator-car, of single buttons or keys on the first and last floors of a building, with variable signaling-keys on the intervening floors of the same building, with their circuit-connections and electrical generator, and an annunciator in the elevator-car, provided with single indicators corresponding with the single keys and with variable indicators corresponding with the variable keys.

My invention also consists in the signaling-key employed, preferably consisting of a double key with buttons and contacts at each end of a lever, by which it is impossible to send more than one signal or indication at the same time to the movable elevator-annunciator, while it is possible to send a signal of opposite import, after the first has been indicated in the annunciator, for if both buttons should be pressed at the same time double the current would be used.

My invention also consists in an annunciator and the circuits and keys connected therewith, all of which I will now proceed to describe and set forth in detail.

Figure 1 of the drawings is a representation in section of an elevator-well and an elevator-car suspended therein, three floors of a building being shown in connection therewith. Fig. 2 is a diagram of the electrical circuits between an annunciator located in an elevator-car and the several points on different floors of a building from which signals are sent. Fig. 3 is a sectional view of the key preferably employed for signaling variable indications, and Fig. 4 is a top view of the same. Fig. 5 is a front view of the annunciator-face, showing the sights or spaces through which the drops are seen when down; and Fig. 6 is a diagram of a key and an indicator-drop operated by a polarized electro-magnet

which is influenced by the reverse currents of an electrical generator.

In Fig. 1, A is the elevator-well; B, the elevator-car arranged to travel upon slides in a manner well understood. C is an annunciator in the car, and *a* is the flexible cable carrying the wires, which extend from the electro-magnets in the annunciator to the several signaling-keys on the respective floors of a building and to the electric generator E.

Although I have shown the electrical conductors between the annunciator and the signaling-keys to be contained in a cable, I reserve to myself the right to employ any suitable means for arriving at the same result.

Figs. 3 and 4 show the form of variable signaling-key I prefer to use in my system for all the floors of a building excepting the first and upper, which when in position is secured near the elevator-door on each floor of the building. It consists of a base-piece 10, upon which is secured a box or housing *b*<sup>9</sup>. The latter has a lug *i* projecting inwardly, to which is pivoted the lever *g*, having at each end press-buttons *h* and *h'*, arranged over anvils *k* and *k'*, secured to the base-piece 10. Springs *s s*, placed between the lever *g* and the under side of the cover *b*<sup>9</sup>, one on each side of the lug *i*, serve to maintain and return the lever to a balanced position. Upon the face of the box *b*<sup>9</sup> one button *h* is marked "Up" and the other button *h'* is marked "Down."

Fig. 5 shows the face of the annunciator for indicating or displaying ordinary and variable signals from the several floors. In this form of annunciator I employ as variable indicators two electro-magnets and their drops for each floor indication, by means of which I am enabled to indicate variable electric signals. I make the sight or space in which the drop is displayed long enough to show two drops down at the same time, one from each electro-magnet. The drop to the right is marked "Down;" that to the left is marked "Up." As the drops and electro-magnets employed in this form of indicator are of any ordinary construction, no description of them is necessary. The sight for the bottom and top floor indicators is of the ordinary width for the common indicators operated by one push-button.

Fig. 2 is a diagram of the circuits employed in this form of my invention. *b*<sup>1</sup> *b*<sup>2</sup> *b*<sup>3</sup> *b*<sup>4</sup> represent the double variable signal-transmitting keys, one on each floor, respectively. *b* and *b*<sup>5</sup> are single keys or push-buttons for the first and last floors. D is the flexible cable carrying the wires, and C is the annunciator in the movable elevator-car. *c* is a wire extending from each key to one pole of the electric generator E, and *f* is a wire extending from its other pole to the annunciator C, where it branches to one side of each electro-magnet therein. The drops *p* for the two sets of pairs of electro-magnets *u* and *d* for displaying variable indications from each floor are marked "Up" and "Down" to correspond with the buttons *h* and *h'* of the variable signaling-



keys, as shown in Fig. 5. Wires  $e$  from each anvil  $k$  of the several keys connect to one side of the right-hand electro-magnets  $d$ , and wires  $e'$  from the other anvils connect with the left-hand electro-magnets  $u$ . Wires  $e^3$  extend from the anvils of the single keys or push-buttons  $b$  and  $b^5$  to one side of the single electro-magnets  $u'$ .

The operation of the hereinbefore-described system of variable signaling is as follows: Suppose a person on the second floor wishes to be carried to the third floor in the elevator-car, he presses the button  $h$  of the key  $b'$ , marked "Up," which closes the circuit through the battery or generator E, causing the drop in the annunciator marked 2 "Up" to fall into sight, thus notifying the elevator-attendant that a person on floor 2 desires to be carried up, the circuit being as follows: by wire  $c$  from one pole of battery E, key  $b'$ , button  $h$ , anvil  $k$ , wire  $e$ , to annunciator-magnet 2  $d$ , wire  $f$ , to opposite pole of the battery. If the passenger had purposed to descend in the elevator, he would have pressed the button  $h'$ , marked "Down," and the opposite drop of the annunciator electro-magnet 2  $d$ , marked "Down," would have fallen, the circuit being traced by wire  $c$  from battery E, button  $h'$  of key  $b'$ , anvil  $k'$ , wire  $e'$ , electro-magnet 2  $u$ , and by wire  $f$  to battery E. The same result will be obtained by operating the button  $h$  or  $h'$  from each floor of the building.

My object in making the sight  $l$  of the annunciator-face twice the ordinary length is to prevent the opposite drops from falling upon each other and also to allow both drops to be down at the same time; for if there should be two persons on the same floor, one wishing to go down and the other to go up, by the arrangement shown both indications could be made, one after the other, without interference.

Fig. 6 is a modification, the electro-magnet being of the well-known polarized form, with its coils wound in opposite directions, having its armature balanced between its poles and

bearing at its extremity a drop  $p$ , and  $b^6$  is a double key arranged to send electric currents of opposite polarity to the electro-magnet. The key is pivoted at  $x$ . The opposite ends or buttons  $h$  and  $h'$  are insulated from each other, as shown. Under the buttons  $h$  and  $h'$  are anvils  $k$  and  $k'$ , connecting through batteries  $t$  and  $t'$  to ground. The batteries are arranged with the same poles to ground. Above the key is a block of insulating material, having secured to each end springs 6 and 7, connected to ground, as shown. When desired to cause the drop  $p$  to go in one direction to make an indication, the button  $h$  is depressed to the anvil  $k$ , causing a current to traverse from ground and battery  $t$ , button  $h$ , wire 3, to and through the polarized electro-magnet  $o$ , returning by wire 4, spring 6, wire 9, to ground, the electro-magnet attracting the armature and causing the drop to display through the sight  $l$ , as desired. The drop in this case is shown as black and white, making a variable display or indication. If the button  $h'$  is depressed to its anvil  $k'$ , the armature is attracted in the opposite direction and the drop displays the opposite or other indication.

I claim as my invention—

The combination of an electrical annunciator for an elevator-car, having indicators for announcing the different floors and words or symbols indicating direction, with transmitting-keys attached to different floors and electrically connected with said annunciator, each floor-indicator and direction-indicator of the annunciator being each electrically connected with its corresponding keys, all substantially as shown and operating as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 29th day of March, 1889.

GEORGE F. MILLIKEN.

Witnesses:

ALBERT P. SAWYER,  
GEO. W. PIERCE.