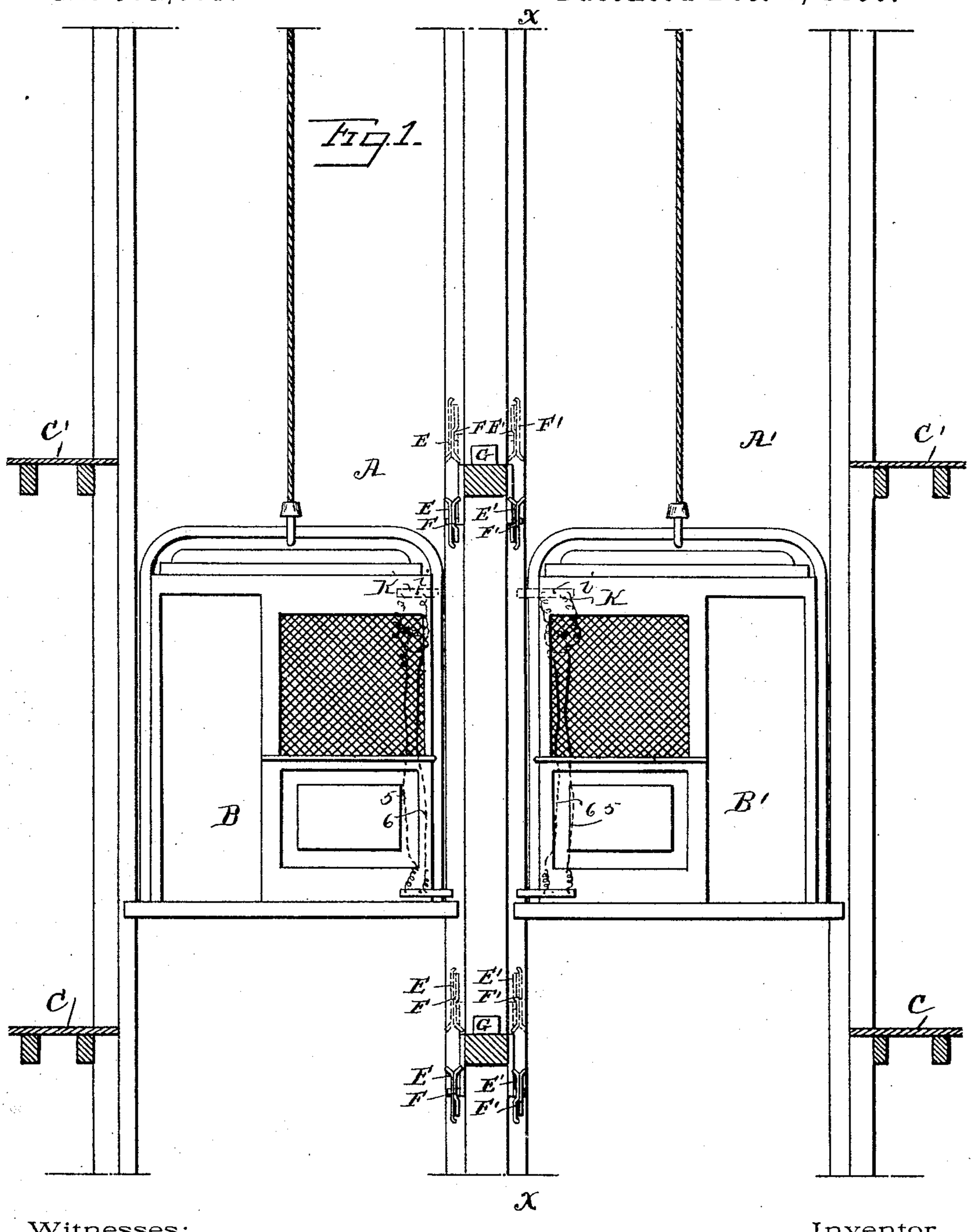
(No Model.) 3 Sheets—Sheet 1.

S. B. OPDYKE, Jr.

ELEVATOR SIGNAL APPARATUS.

No. 572,561. Patented Dec. 8, 1896.

Fig. 1.



Witnesses:
Jesse B. Heller.
Frank S. Bussen

Inventor.
Stacy B. Opdyke, Jr.
by G. H. Harding
Attorney.

(No Model.)

3 Sheets—Sheet 2.

S. B. OPDYKE, Jr.

ELEVATOR SIGNAL APPARATUS.

No. 572,561. Patented Dec. 8, 1896.

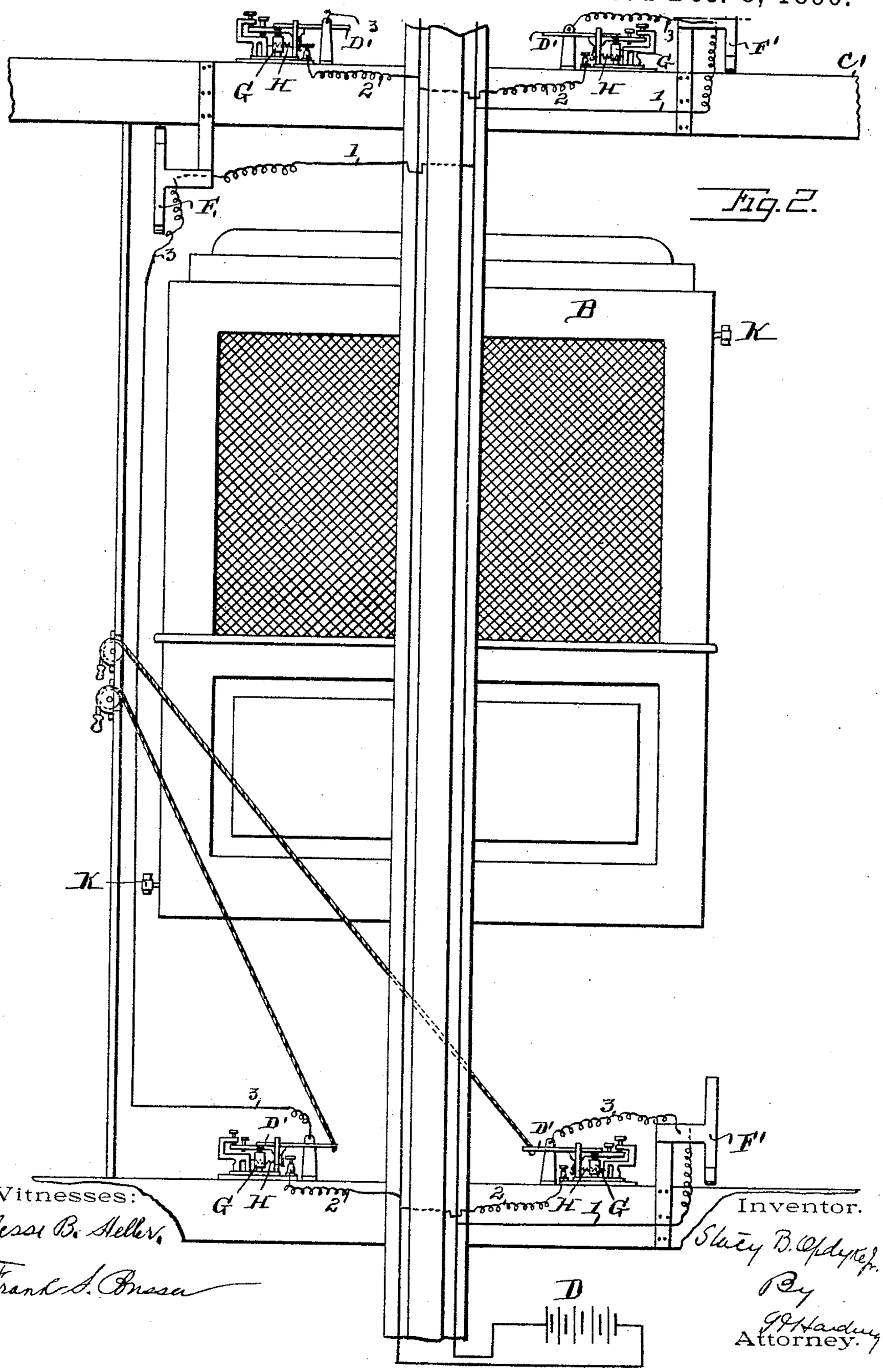


Fig. 2.

Witnesses:
Jesse B. Heller.
Frank L. Brasa

Inventor.
Slater B. Opdyke Jr.
By
G. H. Harding
Attorney.

(No Model.)

3 Sheets—Sheet 3.

S. B. OPDYKE, Jr.

ELEVATOR SIGNAL APPARATUS.

No. 572,561. Patented Dec. 8, 1896.

Fig. 3.

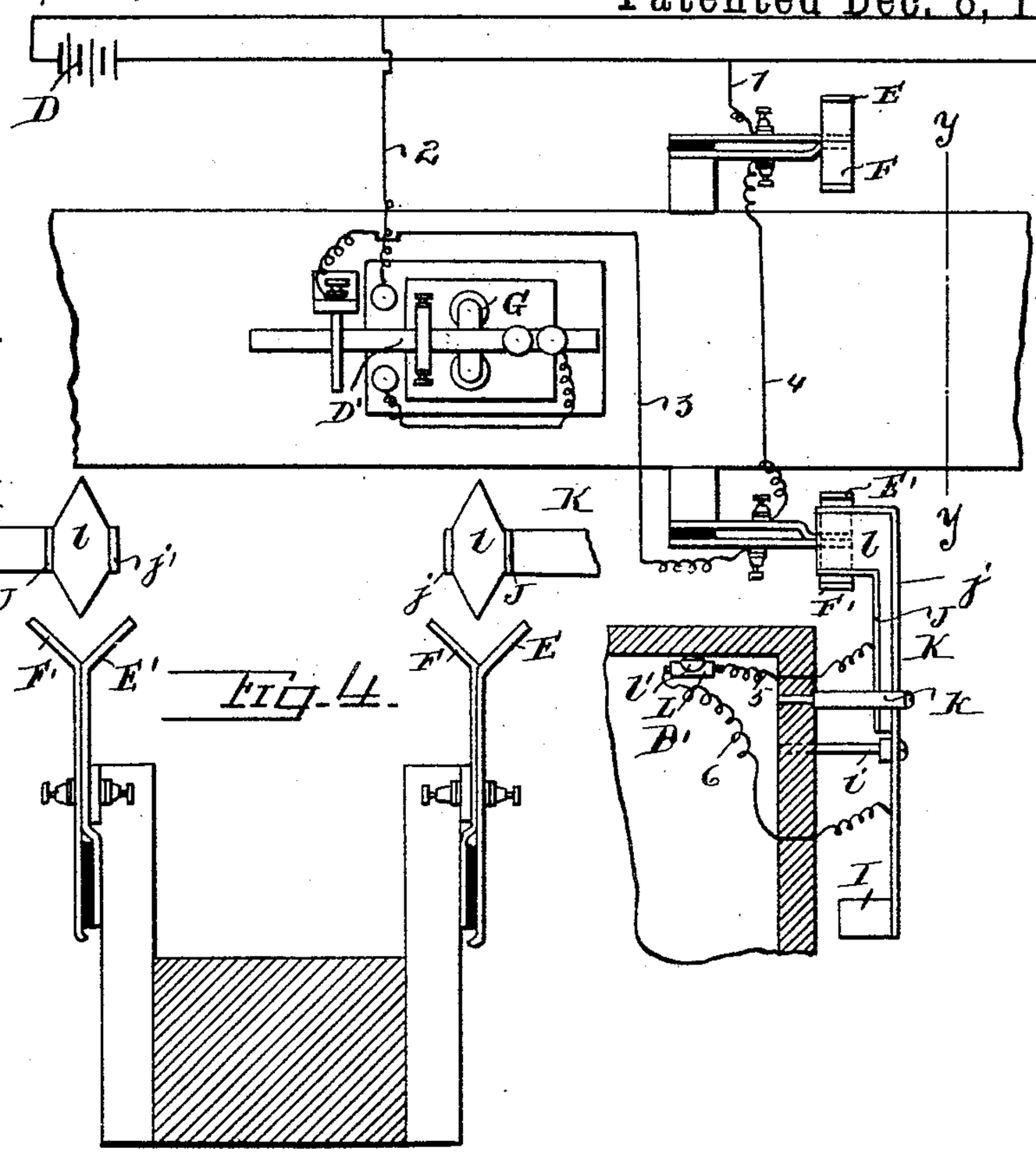
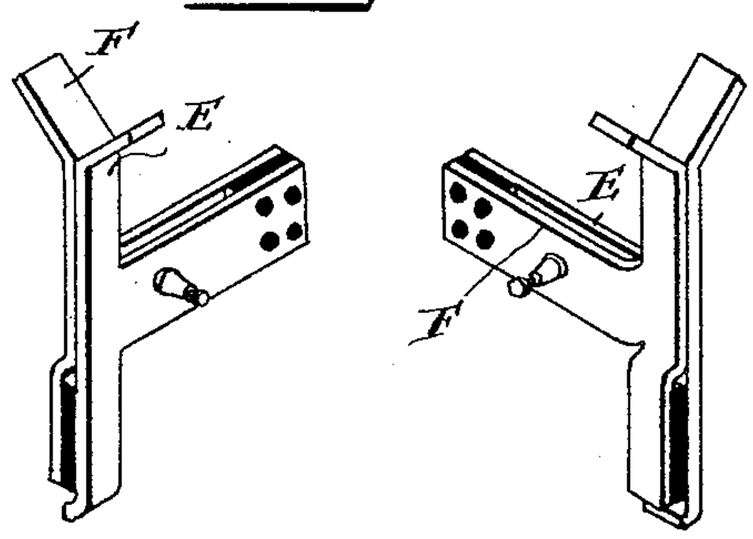


Fig. 5.



Witnesses:
Jesse B. Heller,
Frank A. Burns

Inventor.
Stacy B. Opdyke Jr.
by G. P. Harding
Attorney.

UNITED STATES PATENT OFFICE.

STACY B. OPDYKE, JR., OF PHILADELPHIA, PENNSYLVANIA.

ELEVATOR SIGNAL APPARATUS.

SPECIFICATION forming part of Letters Patent No. 572,561, dated December 8, 1896.

Application filed April 24, 1894. Serial No. 508,756. (No model.)

To all whom it may concern:

Be it known that I, STACY B. OPDYKE, Jr., a citizen of the United States, residing at Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented a new and useful Improvement in Elevator Signal Apparatus, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

I will first describe an embodiment of my invention illustrated in the drawings, and then specifically point out the invention in the claims.

In the drawings, Figure 1 is a front view, partially in section, of two elevator-shafts, elevator-cars, and signal mechanism. Fig. 2 is a section on the line *x x*, Fig. 1. Fig. 3 is a plan view showing electric connections. Fig. 4 is a section on line *y y*, Fig. 3; Fig. 5, perspective views of arms E and F.

A A′ are elevator-shafts, two being shown, although there may be any number.

B B′ are the elevator-cars traveling in the shafts A A′, respectively.

C C′ represent two floors or landings of a building.

G is an electromagnet provided with an armature D′, which is in position to be moved at the floor or landing by the passenger directly or through connections. Secured to the framework and at points somewhat above the landing or floor (preferably at a point slightly below the next landing above) and adjacent to each of the elevators in their travel are the spring contact-arms E F E′ F′, the spring being such that the arms are normally in contact. The electrical connections are as shown in Fig. 3. The current from one pole of current supply passes by wire 1 to the contact-arm E of contact-arms E F. The current from the other pole passes by wire 2 to a contact in electrical connection with the core of electromagnet G, and electrical connection is also made by wire 3 between armature D′ and contact-arm F′ of the contact-arms E′ F′. A wire 4 connects contact-arm E′ and contact-arm F, so that when armature D′ is brought in contact with the magnet G a closed circuit is formed, and the magnet energized, which holds the armature in contact with the magnet. A spring H normally holds the armature out of contact with the magnet.

Upon each car, adjacent to the lower end, is an arm K, pivotally attached to a pin *i*, secured to the car, and weighted at one end by weight I. The pivoted arm is provided with two metallic strips J *j*, between which at the outer end is secured the wedge *l*, of wood or other non-electric conductive material, the point of the wedge projecting beyond the strips J *j*. *k* is a pin secured to the car to limit the movement of the arm in one direction. From strip J *j* wires 5 and 6, respectively, lead to an electromagnet L, which controls the clapper of a bell attached to the car.

Each of the arms E F and E′ F′, respectively, at the top are flared outward, and their lower inner surfaces are insulated one from the other of the respective pairs of contact-arms. The positions of the arms E F or E′ F′ are such that in the travel downward of the elevator-car corresponding thereto the wedge *l* will enter between the flared-out end of the arms, and a further movement of the car will cause the wedge to force apart the arms until the strips J and *j* rest, respectively, against the metallic arms E and F or E′ and F′, dependent upon the car. At this time, if there was current passing through the arms prior to their being separated, said current will now pass from one arm, through the strip J, to the magnet L, and from the magnet L, through strip *j*, to the other arm, thus energizing the magnet L, ringing the bell, or operating any signal which may be used in place of the bell. The further movement of the car brings the strips J and *j* in contact with the insulated portion of the arms E and F and the circuit through both the magnet L and magnet G is broken. When the wedge passes beyond the arms, the arms return to their normal contact with each other. Upon the upward travel of the car the wedge strikes the spring contact-arms, causing the arm K to swing upon its pivot against the action of weight I, so that it moves out of the way of the arms E F and does not affect them. When the arm K passes above the arms E and F, the weight I returns the arm K to its normal position.

The passenger at any floor, desiring to descend, moves the armature D′ in contact with magnet G, which closes the circuit through the magnet G and the arms E F E′ F′, &c., so that the armature is held against the magnet. When the first descending elevator passes below the floor above, its arm K, through the wedge *l*, will force apart the arms E F or E′ F′ and the current will pass through the strips J *j* and magnet L, giving a signal in the car. When the wedge passes to the insulated portion of the arms, the circuit to both magnet L and G will be broken and the armature D′, by means of spring H, will be drawn away from contact with the magnet G. When the wedge has passed below the arms, they return into contact with each other, and the device is prepared for use again whenever a passenger moves the armature in contact with the magnet.

I have described signaling for a descending car, but my device can be used both for descending and ascending cars.

For signaling an ascending car I use an electromagnet and armature similar to those hereinbefore described, and also spring-arms E and F similar to those described, except that they are reversed, that is, the flaring ends point downward, and they are at a point slightly above the floor or story and out of alinement with the signal for descending. The arm K corresponding to the arm of ascending signals is placed at a point near the top of the car in alinement with its corresponding contact-arms; otherwise the construction and electrical connections are substantially the same as far as the descending signal is concerned. By this construction the passenger at any floor, desiring to ascend, can move the armature corresponding to the ascending-signal mechanism in contact with its magnet, and the first car ascending will receive a signal with sufficient time to stop the car at the floor; and if the passenger desires to descend he has only to move the armature corresponding to the descending signals, and the first descending car will receive a signal in sufficient time to stop the car at the floor.

The position of the magnets G and their armatures is immaterial, provided there be a connection in such position that the passenger can move the armature in contact with the magnet.

Having now fully described my invention, what I claim, and desire to protect by Letters Patent, is—

1. In an elevating apparatus, the combination with a source of electric-current supply, a normally open circuit, contacts in said circuit normally in contact, of an elevator-car, a signal carried by said car, a device carried by said car and adapted in the movement of said car to separate said contacts and include the signal carried by said car in said circuit, and means independent of the car to close said circuit.

2. In an elevating apparatus, the combination with a source of electric-current supply, a normally open circuit, spring-contacts in said circuit normally in contact, of an elevator-car, a signal carried by said car, a device carried by said car and adapted in the movement of said car to separate said contacts and include the signal carried by said car in said circuit, and means independent of the car to close said circuit.

3. In an elevating apparatus, the combination with a source of electric-current supply, a normally open circuit, contacts in said circuit normally in contact, of an elevator-car, a signal carried by said car, a device carried by said car and adapted in the movement of said car in one direction to separate said contacts and include the signal carried by said car in said circuit, and in the movement of the car in the other direction, to move out of line with said contacts, and means independent of the car to close said circuit.

4. In an elevating apparatus, the combination with a source of current supply, a normally open circuit, contact-arms in said circuit normally in contact, an electromagnet in said circuit, the armature of said magnet controlling said circuit and being normally out of contact with the magnet, of an elevator-car, a signal carried by said car, a device carried by said car and adapted in the movement of said car to separate said contacts and include the signal carried by said car in said circuit.

5. In an elevating apparatus, the combination with a source of current supply, a normally open circuit, spring contact-arms in said circuit normally in contact, an electromagnet in said circuit, the armature of said magnet controlling said circuit and normally out of contact with the magnet, of an elevator-car, a signal carried by said car, a device carried by said car, and adapted in the movement of said car to separate said contacts and include the signal carried by said car in said contact.

6. In an elevating apparatus, the combination with a source of current supply, a normally open circuit, contact-arms in said circuit held in contact, an electromagnet in said circuit, the armature of said magnet controlling said circuit and held out of contact with the magnet when the circuit is open, of an elevator-car, a signal carried by said car, a device carried by said car and adapted in the movement of said car to separate said contacts and include the signal carried by said car in said circuit.

7. In an elevating apparatus, the combination with a source of current supply, a normally open circuit, spring contact-arms in said circuit held in contact, an electromagnet in said circuit, the armature of said magnet controlling said circuit and held out of contact with the magnet when the circuit is open, of an elevator-car, a signal carried by said car, a device carried by said car and adapted

in the movement of said car to separate said contacts and include the signal carried by said car in said circuit.

8. In an elevating apparatus, the combination with a source of current supply, a normally open circuit, contact-arms in said circuit held in contact, an electromagnet in said circuit, the armature of said magnet controlling said circuit and held out of contact with the magnet when the circuit is open, of an elevator-car, a signal carried by said car, a device carried by said car and adapted in the movement of said car to separate said contacts and include the signal carried by said car in said circuit, and in its further movement to break the circuit between said contacts.

9. In an elevating apparatus, the combination with a source of current supply, a normally open circuit, contact-arms in said circuit normally in contact, an electromagnet in said circuit, the armature of said magnet controlling said circuit and normally out of contact with the magnet, of an elevator-car, an arm secured to said car, a signal and electrical connection between said signal and the arm, the arm in the travel of the car being adapted to separate said contacts and form electrical connection between the arm and contacts.

10. In an elevating apparatus, the combination with a source of current supply, a normally open circuit, contact-arms in said circuit normally in contact, the lower end of said arms being insulated from each other, an electromagnet in said circuit, the armature of said magnet controlling said circuit and normally out of contact with the magnet, of an elevator-car, an arm secured to said car, a signal, and electrical connection between said signal and the arm, the arm in the travel of the car being adapted to separate said contacts and form electrical connection between the arm and contacts, and in the further travel to strike the insulated portion of contact-arms and break the circuit at the contacts.

11. In an elevating apparatus, the combination with a source of current supply, a normally open circuit, spring contact-arms in said circuit normally in contact, an electromagnet in said circuit, the armature of said magnet controlling said circuit, and normally out of contact with the magnet, of an elevator-car, an arm secured to said car, a signal and electrical connection between said signal and the arm, the arm in the travel of the car being adapted to separate said contacts and form electrical connection between the arm and contacts.

12. In an elevating apparatus, the combination with a source of current supply, a normally open circuit, spring contact-arms in said circuit normally in contact, the lower end of said arms being insulated from each other, an electromagnet in said circuit, the armature of said magnet controlling said circuit and normally out of contact with the magnet, of an elevator-car, an arm secured to said car, a signal and electrical connection between said signal and the arm, the arm in the travel of the car being adapted to separate said contacts and form electrical connection between the arm and contacts, and in the further travel to strike the insulated portion of spring contact-arms and break the circuit at the contacts, and the further movement to first strike the insulated portion of contacts and break the circuit at contact, and then pass beyond the contact-arms when said contact-arms return to contact restoring the circuit at that point.

13. In an elevating apparatus, the combination with a source of current supply, a normally open circuit, contact-arms in said circuit normally in contact, an electromagnet in said circuit, the armature of said magnet controlling said circuit and normally out of contact with the magnet, of an elevator-car, an arm secured to said car and adapted to swing in one direction and provided with a counterbalance, a signal and electrical connection between said signal and the arm, and the arm in the travel of the car being adapted to separate said contacts and form electrical connection between the arm and the contacts.

14. In an elevating apparatus, the combination with a source of current supply, a normally open circuit, contact-arms in said circuit normally in contact, the lower end of said arms being insulated from each other, an electromagnet in said circuit, the armature of said magnet controlling said circuit and normally out of contact with the magnet, of an elevator-car, an arm secured to said car, and adapted to swing in one direction and provided with a counterbalance, a signal and electrical connection between said signal and the arm, the arm in the travel of the car being adapted to separate said contacts and form electrical connection between the arm and contacts, and in the further travel to strike the insulated portion of contact-arms and break the circuit at the contacts.

15. In an elevating apparatus, the combination with a source of current supply, a normally open circuit, spring contact-arms in said circuit normally in contact, an electromagnet in said circuit, the armature of said magnet controlling said circuit, and normally out of contact with the magnet, of an elevator-car, an arm secured to said car, and adapted to swing in one direction and provided with a counterbalance, a signal and electrical connection between said signal and the arm, the arm in the travel of the car being adapted to separate said contacts and form electrical connection between the arm and contacts.

16. In an elevating apparatus, the combination with a source of current supply, a normally open circuit, spring contact-arms in said circuit normally in contact, the lower end of said arms being insulated from each other, an electromagnet in said circuit, the armature of said magnet controlling said cir-

cuit and normally out of contact with the magnet, of an elevator-car, an arm secured to said car and adapted to swing in one direction and provided with a counterbalance, a signal and electrical connection between said signal and the arm, the arm in the travel of the car being adapted to separate said contacts and form electrical connection between the arm and contacts, and in the further travel to strike the insulated portion of spring contact-arms and break the circuit at the contacts, and the further movement to first strike the insulated portion of contacts and break the circuit at contact and then pass beyond the contact-arms when said contact-arms return to contact restoring the circuit at that point.

17. In an elevating apparatus, the combination with a plurality of elevator-cars, of a source of electric-current supply, a normally open circuit, a plurality of contacts in said circuit equal in number and adjacent to the travel of the cars, and means to close said circuit, a signal carried by each car, a device carried by each of said cars, each device being adapted in the movement of its car to separate the contacts corresponding to said car and to include the signal carried by said car in the circuit.

18. In an elevating apparatus, the combination with a plurality of elevator-cars, of a source of electric-current supply, a normally open circuit, an electromagnet in said circuit, the circuit being controlled by the armature, said armature being normally out of contact with the magnet, a plurality of contacts in electrical connection with the magnet, and said contacts being equal in number and adjacent to the travel of the cars, a signal carried by each car, a device carried by each of said cars, each device being adapted in the movement of its car to separate the contacts corresponding to said car and to include the signal carried by said car in the circuit.

19. In combination with an elevator-car provided with a signal and mechanism for operating the car, of a series of contacts corresponding to the floors, a device having a movement corresponding to the movement of the car, normally open circuits including said device, the signal, and the contacts, and a circuit-closing device at each floor, whereby, when the circuit-closing device at any floor is operated and the first-named device makes connection with the corresponding contact, the circuit is completed to the signal.

20. The combination with an elevator-car provided with a signal and mechanism for operating the car, of two series of contacts, the contacts of each series corresponding to the floors, devices having a movement corresponding to the movement of the car, one device being adapted to make contact with one series of contacts in the movement of the car in one direction, and the other device with the other series, in the movement of the car in the other direction, normally open circuits including said devices, the signal and the contacts, and circuit-closing devices, two at each floor, corresponding with said two series of contacts, whereby, when either of said circuit-closing devices at any floor is operated and the corresponding device of said first-named devices makes connection with the corresponding contact, the circuit is completed to the signal.

21. In combination with a series of elevator-cars, each provided with a signal, and mechanism for operating the car, of a series of contacts corresponding to the floors for each elevator, devices corresponding in number to the car and each having a movement corresponding to the movement of its corresponding car, normally open circuits including said devices, the signals and the contacts, and a circuit-closing device at each floor, whereby, when the circuit-closing device at any floor is operated and any of the first-named devices makes connection with the contact corresponding to that floor, the circuit is completed to the signal of the car corresponding to the device making contact.

22. In combination with an elevator-car provided with a signal and mechanism for operating the car, of a series of contacts corresponding to the floors, a device having a movement corresponding to the movement of the car, normally open circuits including the signal and the contacts and a circuit-closing device at each floor, whereby when the circuit-closing device at any floor is operated and the first-named device makes connection with the corresponding contact, the circuit is completed to the signal.

23. The combination with an elevator-car provided with a signal and mechanism for operating the car, of two series of contacts, the contacts of each series corresponding to the floors, devices having a movement corresponding to the movement of the car, one device adapted to make connection with one series of contacts in the movement of the car in one direction, and the other device with the other series, in the movement of the car in the other direction, normally open circuits including the signal, and the contacts and circuit-closing devices, two at each floor, corresponding with said two series of contacts, whereby, when either of said circuit-closing devices at any floor is operated and the corresponding device of said first-named devices makes connection with the corresponding contact, the circuit is completed to the signal.

24. In combination with a series of elevator-cars, each provided with a signal, and mechanism for operating the car, of a series of contacts corresponding to the floors for each elevator, devices corresponding in number to the car and each having a movement corresponding to the movement of its corresponding car, normally open circuits including signals and the contacts, and a circuit-closing device at each floor, whereby, when the circuit-closing device at any floor is op-

erated and any of the first-named devices makes connection with the contact corresponding to that floor, the circuit is completed to the signal of the car corresponding to the device making contact.

25. In combination with an elevator-car provided with a signal and mechanism for operating the car, of a series of contacts corresponding to the floors, a brush common to all the contacts, and means to give a relative movement between the contacts and brush corresponding to the movement of the elevator-car, normally open circuits including the brush the signal and each of the contacts, and a circuit-closing device at each floor whereby when the circuit is connected at any floor and the brush makes connection with the corresponding contact the circuit is completed to the signal.

26. In combination with an elevator-car provided with a signal and mechanism for operating the car, of a series of contacts corresponding to the floors, a brush common to all the contacts, and means to give a relative movement between the contacts and brush corresponding to the movement of the elevator-car, normally open circuits each including the signal the brush and one of the contacts, a switch at each floor in the circuit to its corresponding contact, whereby upon the closing of the switch at any floor the circuit is connected to its corresponding contact and is completed to the signal when the brush makes contact with the contact corresponding to said switch.

27. In combination with an elevator-car provided with a signal and mechanism for operating the car, of two series of contacts, the contacts of each series corresponding to the floors, a brush for each series of contacts, and means to give a relative movement between the contacts and their corresponding brushes corresponding to the movement of the car, the brush of one series being adapted to make contact with its series of contacts in the movement of the car in one direction, and the other brush with its contacts in the movement of the car in the other direction, normally open circuits each including the signal in the car and one of the contacts and the brushes, two switches at each floor, one switch in the circuit to its corresponding contact in one series of contacts, the other in the circuit to its corresponding contact of the other series of contacts, whereby, dependent upon which switch is closed, the circuit to the signal in the car is closed when the brush is in contact with the contact corresponding to that of the switch.

28. In combination with a series of elevator-cars, each provided with a signal and mechanism for operating the car, of a series of contacts corresponding to the floors for each elevator, a brush for each series of contacts, and means to give a relative movement between the contacts and brush of each elevator corresponding to the movement of said elevator, normally open circuits, each including a signal and the corresponding contact of the series of contacts corresponding to said signal and its corresponding brush, a switch at each floor in the circuit to the corresponding contacts of all the series of contacts, whereby, when the switch is closed, the first brush of the series which makes contact with the contact corresponding to the switch will close the circuit to the signal.

29. In combination with a series of elevator-cars, each provided with a signal and mechanism for operating the car, of two series of contacts for each elevator, the contacts of each series corresponding to the floors, a brush for each series of contacts, and means to give a relative movement between the contacts and their corresponding brushes corresponding to the movement of the car, the brush of one series of each pair of series of contacts being adapted to make contact with its series of contacts in the movement of the car in one direction, and the brush of the other series of each pair of series of contacts in the movement of the car in the other direction, normally open circuits, each including the signal in the car and one of the contacts and its brush, two switches at each floor, one in the circuit to the corresponding contacts of all of one of the pairs of series of contacts, the other in the circuit to corresponding contacts of all of the other of the pairs of series of contacts.

30. In combination with an elevator-car provided with a signal, and mechanism for operating the car, of a series of contacts corresponding to the floors, a brush corresponding to the movement of the car common to all the contacts, and means to give a relative movement between the contacts and brush, normally open circuits including the contact, the brush and the signal in the car, and a switch device at each floor, the arrangement being such that when the switch is operated and the brush makes contact with contacts corresponding to the switch operated, the corresponding car-signal is operated.

In testimony of which invention I have hereunto set my hand.

STACY B. OPDYKE, JR.

Witnesses:
FRANK S. BUSSER,
FRANCES ELLIS.