(No Model.) 3 Sheets—Sheet 1.

R. F. McFEELY & H. V. POTTER.

ELECTRICAL APPLIANCE FOR STOPPING AND STARTING ELEVATORS.

No. 399,341. Patented Mar. 12, 1889.

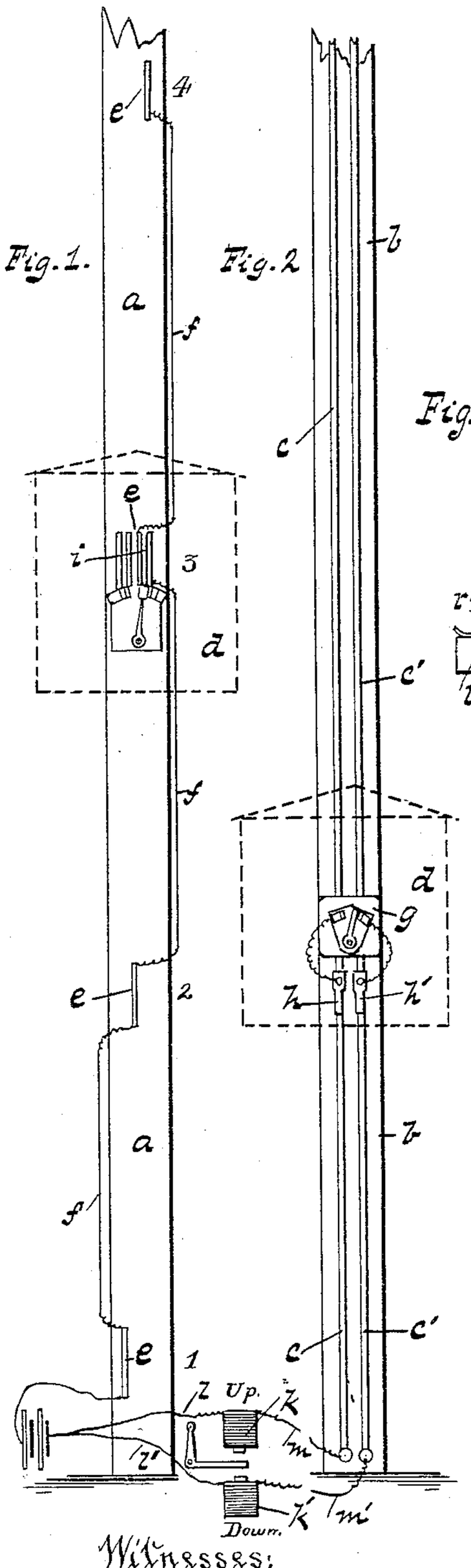

Fig. 1.

Fig. 2.

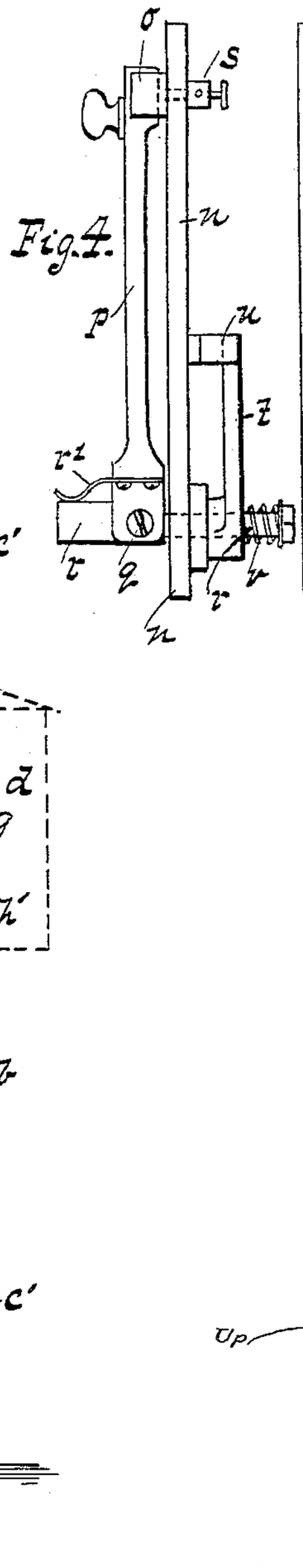

Fig. 4.

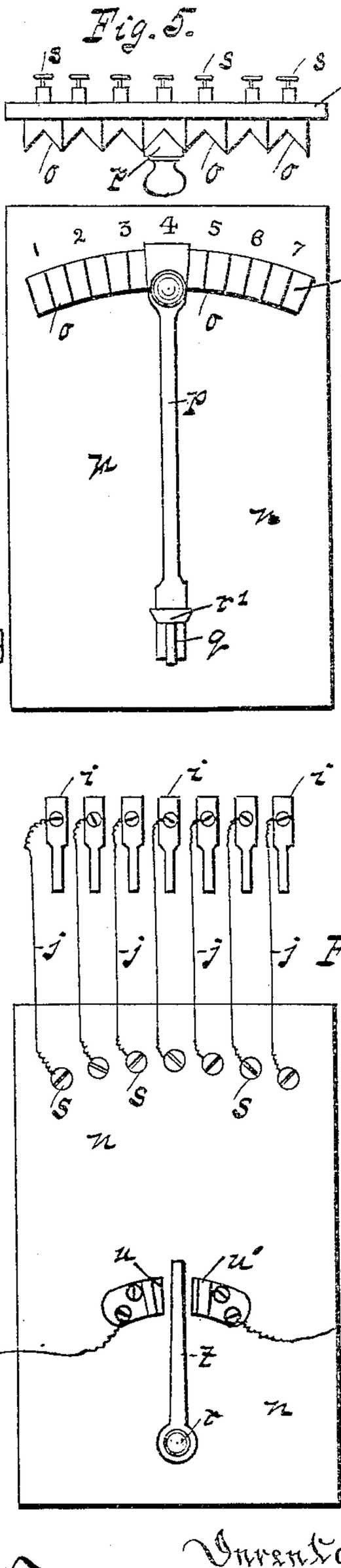

Fig. 3.

Fig. 6.

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ELECTRICAL APPLIANCE FOR STOPPING AND STARTING ELEVATORS.

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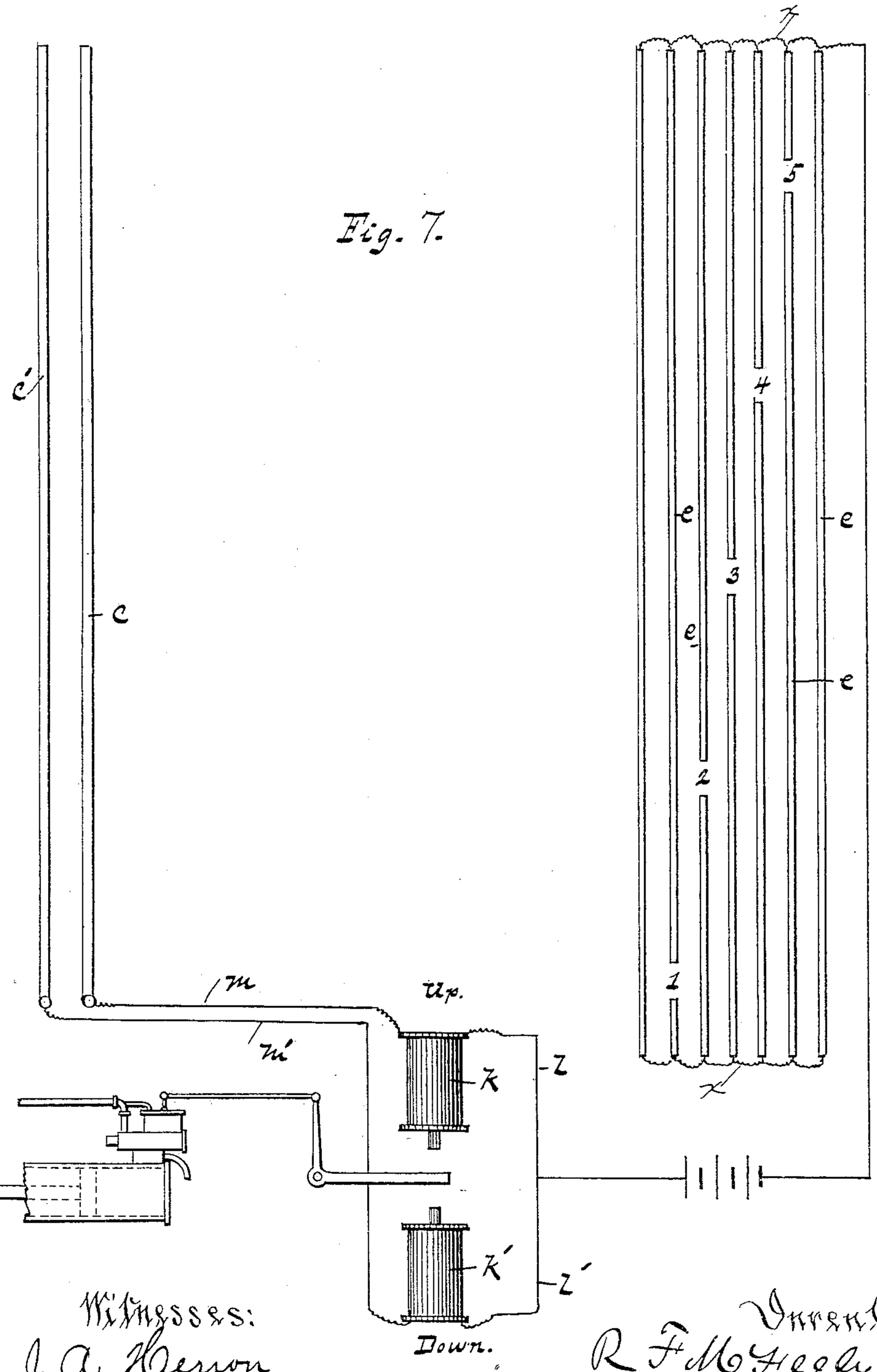
Fig. 7.



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(No Model.) 3 Sheets—Sheet 3.

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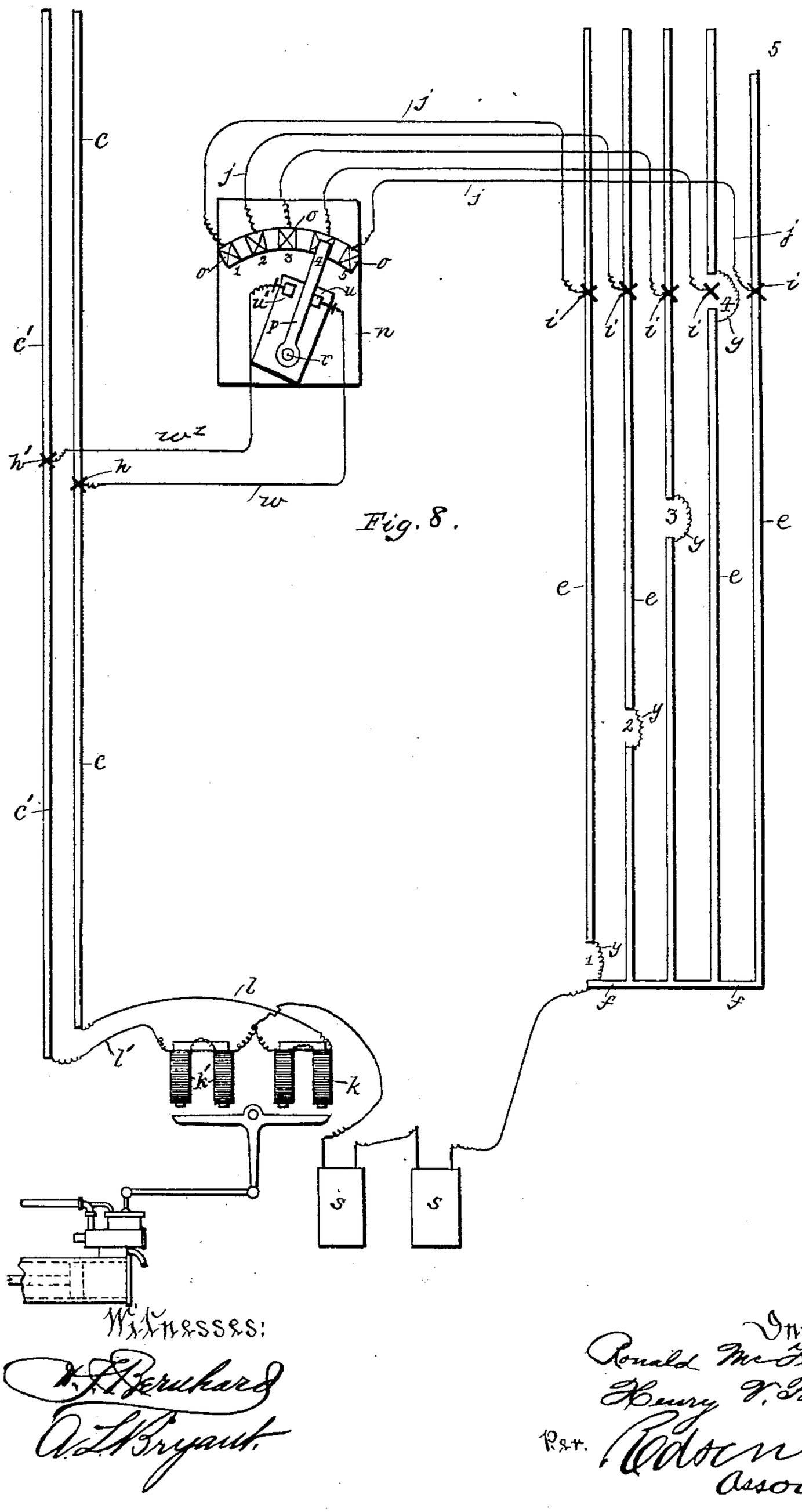

Fig. 8.

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ELECTRICAL APPLIANCE FOR STOPPING AND STARTING ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 399,341, dated March 12, 1889.

Application filed December 12, 1887. Serial No. 257,711. (No model.)

To all whom it may concern:

Be it known that we, RONALD F. McFEELY and HENRY V. POTTER, citizens of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Electrical Appliances for Stopping and Starting Elevators; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

Our invention relates to a device for controlling the starting and stopping of elevators by means of electricity applied to the valves governing the motive power; and with this end in view our invention consists in certain details of construction and combination of parts, as will be fully set forth hereinafter.

In the accompanying drawings, Figure 1 is a side elevation of one of the vertical guides such as are in common use in all elevators, having attached thereto several metallic contact-strips arranged at a suitable position at each of the several landings. Fig. 2 is a side elevation of the opposite vertical guide of the elevator, having secured thereto on its inner side two continuous parallel strips extending the full length of the movement of the elevator-carriage. Fig. 3 is a front elevation of the switch and switch-board used in connection with our invention. Fig. 4 is a side view of the same. Fig. 5 is a plan view of the switch-board, showing the manner in which a sure contact is made with any one of the several switches. Fig. 6 is a rear elevation of the same, showing the several attachments made with the brushes secured to one side of the elevator-car. Fig. 7 is a diagram of a modification of our invention, in which are shown a separate metallic strip for each landing, having a break opposite the same, in place of the short metallic strips indicated in a previous figure. The breaks or spaces in these strips are to break the circuit at each landing instead of closing the same. Two continuous strips are placed on either side of the landing-strips and the whole series connected by short wires at the top and base. The remaining parts shown on the drawings are substantially the same as those previously referred to. Fig. 8 is a diagrammatic view illustrating the arrangement of the several contact-strips, the switch-board, and the circuits.

To put our invention into practice with an elevator, we attach to the inner side of one of the vertical guides, *b*, two parallel metallic strips, *c* and *c'*, extending the entire length of the movement of the elevator-car *d*. To the inner side of the opposite guide, *a*, we attach a series of short metallic strips, *e*, arranged the one above the other, representing the several landings of the elevator. These contact-strips *e* are so placed as to be out of line with each other, and connected the one with the next above by a suitable insulated wire, *f*.

Attached to the side of the elevator-car *d*, next the continuous strips, is a switch-board, *g*, and two spring-brushes, *h* and *h'*, which are in constant contact with the two continuous strips *c* and *c'*. To the opposite side of the elevator-car *d* are secured several spring-brushes *i*, each so arranged as to insure a contact with but one of the contact-strips *e* secured to the guide *a* when the aforesaid brushes *i* are directly opposite to the same. Attached to these brushes *i*, by short wires *j*, is a switch-board which carries a movable switch, which will be fully described hereinafter. The short contact-strip *e* at the foot of the vertical guide *a* we connect with two suitable magnets, *k* and *k'*, properly adjusted and set to operate the valve for controlling the motive power, the connection being made with insulated wires *l* and *l'*. The lower extremities of the two continuous strips *c* and *c'* are connected by insulated wires *m* and *m'* to the same magnets *k*, and *k'*, thus completing the circuit.

Occupying a proper position in the elevator-car *d* is a switch-board consisting of a plate of hard rubber, *n*, having secured to the upper part of its front face a series of metallic blocks, *o*, arranged in an arc of a circle, each having a V-shaped groove formed in the face of the same. Secured to this hard-rubber plate *n* is a hinged switch-lever, *p*, capable of moving backward, forward, and sidewise by means of a hinged joint, *q*, and a loose shaft

r, to which the switch-lever *p* is secured. A short flat spring, *r'*, properly arranged at the base of the switch-lever *p*, serves to retain the same in close contact with the metallic blocks *o* unless otherwise disturbed. The top portion of this switch-lever *p* is triangular in shape, corresponding in form and size to the V-shaped grooves in the blocks *o*. Each of these blocks *o* are separately connected by a binding-post, *s*, and short insulated wires *j* to one of the several metallic brushes *i*, attached to the side of the elevator-car *d*, which insures a separate connection with each and every landing-strip *e* when the car *d* is opposite the same. At the base, on the reverse side of this hard-rubber plate *n*, is attached to the projecting end of the shaft *r* a contact-arm, *t*, of the switch which, when in a vertical position, stands between two metallic contact-pieces, *u* and *u'*, secured to the plate *n* on either side of the contact-arm *t*. These two contact-pieces *u* and *u'* are connected to the two continuous strips *c* and *c'*, representing the up-and-down movement of the car *d*. Between the plate *n* and the base of the lever *t* is a short spiral spring, *v*, which pressing against the lever *t* will cause the same to revolve at the same time and in a like direction as the lever *p* on the opposite side of the plate *n*.

In Figs. 7 and 8 of the drawings, we have illustrated a series of broken contact-strips *e*, which, if desired, can be used in lieu of the corresponding contact-plates *e*, spaced at suitable intervals on the guide *a* opposite the several landings or floors. These contact-strips *e* are arranged parallel with each other at suitable intervals apart, to adapt one of the series of brushes to ride against each strip; and the strips have breaks therein opposite the several landings or floors to interrupt the contact of the brushes *i* with the strips, and thus break the circuit, the appliance working under a normally-closed circuit when the strips *e* with the breaks therein are used as in Figs. 7 and 8, and under a normally-open circuit when the spaced plates *e* shown in Fig. 1 are employed. Only one of the breaks is made in each strip *e*, and the breaks of the series of strips are located at different elevations, opposite the several landings or floors—as, for instance, the break 1 in the first of the series of strips *e* designates the first landing, the break 2 in the second strip the second landing, &c.

In Figs. 7 and 8 of the drawings we have illustrated the several interrupted contact-strips *e* connected in circuit with each other and the battery at their upper and lower extremities by wires or conductors, *x;* but in Fig. 8 the lower extremities only of said strips *e* are connected by a short horizontal strip, *f*, and the ends of each strip opposite the break therein are connected by short intermediate wires, *y*. The object of these wires *y* is to connect the two parts of the strip and energize each strip (the two parts thereof) throughout its entire length when it is included in circuit with the battery and strips *c c'* through the switch-board, as is obvious.

For convenience we will first describe the operation of our invention in connection with Fig. 8 of the drawings, which is a complete diagrammatic view of the system, including the switch, the switch-board, and the several contacts and brushes therefor. When the elevator-car is at rest at the bottom of the shaft or the first landing, designated at 1, the switch *p* should contact with the contact-block No. 1 of the switch-board, and the contact between brush 1 and the first of the series of strips *e* will be interrupted or broken by the break 1, which thus breaks the circuit. If it is desired to ascend to the fourth landing, designated by the numeral 4, the switch *p* is turned by hand on its pivot to contact with the block No. 4 on the switch-board, which movement of the switch brings the arm *t* of the latter in contact with the contact-post *u* on the switch-board and thereby completes a circuit from the battery *s* through the connecting-strip *f* at the base of the fourth contact-strip *e* through the fourth of the series of brushes *i* to the block *o*, numbered 4, against which the switch *p* presses through said switch and the shaft *r* thereof to the contact-post *u*, the wire *w*, the brush *h*, one of the continuous strips *c* or *c'*, the magnet *k*, and thence back to the battery *s*, as is obvious. When these magnets are energized by the current from the battery, the valve is opened, which causes the car to ascend until it reaches the fourth or desired landing, at which time the contact between the fourth brush *i* and the corresponding strip *e* is broken or interrupted by the break 4, thus breaking the circuit and demagnetizing the magnet *k* to release the valve, which automatically closes and stops the car. If it is desired to descend from this landing (No. 4) to the adjoining floor below or other point, the switch *p* is reversed to bring it into contact with the desired block *o*, which causes the arm *t* of said switch to come into contact with the post *u'* and establishes another circuit through the second or other strip *e*, through the brush *i*, pressing against said second strip *e*, the wire *j*, to the second contact-block, *o*, numbered 2, the lever *p*, and the post *u'*, the wire *w'*, the strip *c'*, the magnet *k'*, and thence back to the battery. The magnets again open the valve and the car descends to the desired landing, where it is arrested by reason of the breaking of the contact between the second brush *i* with the second contact-strip.

In the arrangement shown in Fig. 1 of the drawings the desired one of the series of brushes is arranged to come into contact with the proper contact-plate *e* to close the circuit between the battery and the brush, the devices operated in the same manner as heretofore described. It will of course be understood that the contact of the brush with one

of the plates *e* serves to close the circuit and to stop the elevator-car at the desired landing.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In an electric elevator, the combination of the continuous contact-strips connected in circuit with valve-controlling magnets, the spaced broken contact-strips, a switch-board carried by the elevator-car and having brushes normally bearing against said continuous strips, a series of brushes adapted to contact with the spaced broken strips, and a switch movably mounted on the switch-board, substantially as and for the purpose described.

2. The combination of the continuous metallic contact-strips connected in circuit with valve-controlling magnets, a switch-board carried by an elevator-car and normally in contact with said continuous strips, the interrupted contact-strips also connected in circuit with said magnets, and a switch for reversing the current through either of the continuous strips and magnets, substantially as described.

3. The combination of the continuous contact-strips, valve-controlling magnets connected in circuit with said strips, a switch-board having two contact-posts, *u u'*, brushes normally bearing on said continuous strips and connected with said posts, and a switch adapted to be moved into contact with either post, substantially as and for the purpose described.

4. The combination of the continuous contact-strips, a switch-board having brushes normally pressing against the continuous strips, the interrupted spaced contact-strips, a series of brushes each adapted to contact with one of the series of interrupted strips, and a switch, substantially as and for the purpose described.

5. The combination of the series of interrupted spaced contact-strips *e*, connected in circuit with one another and having the breaks therein, a switch-board having a series of contacts, *o*, a series of brushes, *i*, each adapted to contact with one of the series of interrupted strips and connected with the contacts *o*, and a switch, substantially as described.

6. The combination of a switch-board having a series of contacts, *o*, and the contact-posts *u u'*, a switch pivotally mounted on said board and capable of lateral movement thereon to adjust its free end against either of the contacts *o* and the posts *u* or *u'*, a series of brushes, *h*, connected with the posts, the continuous and interrupted strips *c*, *c'*, and *e*, and the valve-controlling magnets, substantially as described.

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