

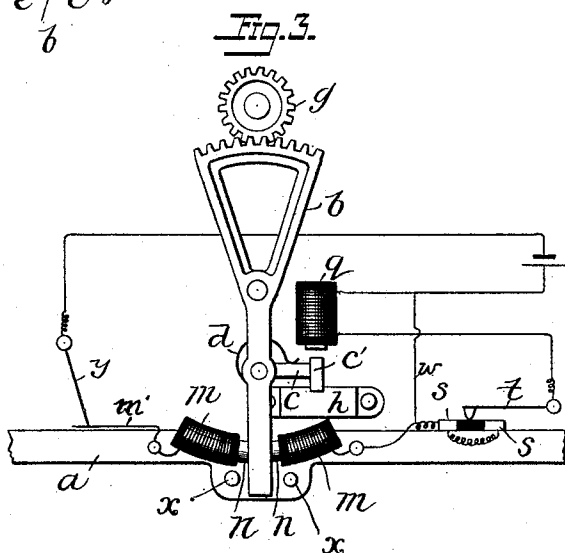
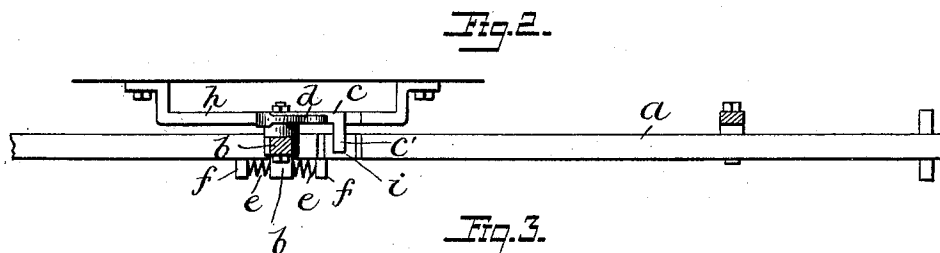
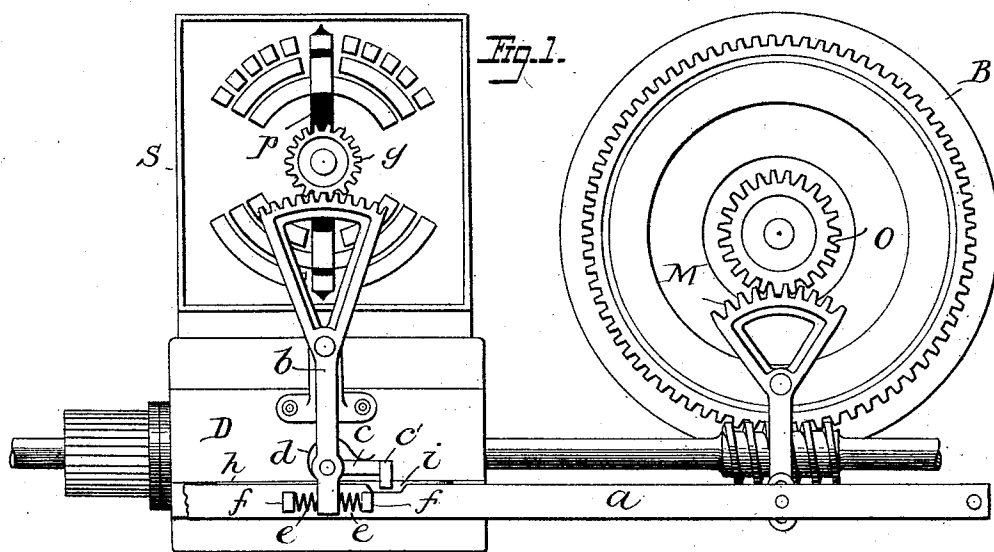
(No Model.)

2 Sheets—Sheet 1.

R. C. SMITH.
DEVICE FOR ELECTRIC ELEVATORS.

No. 466,447.

Patented Jan. 5, 1892.



WITNESSES
Geo. G. Hinkel
W. S. McArthur

INVENTOR
Rudolph C. Smith
By *Forster & Freeman*
Attorneys.

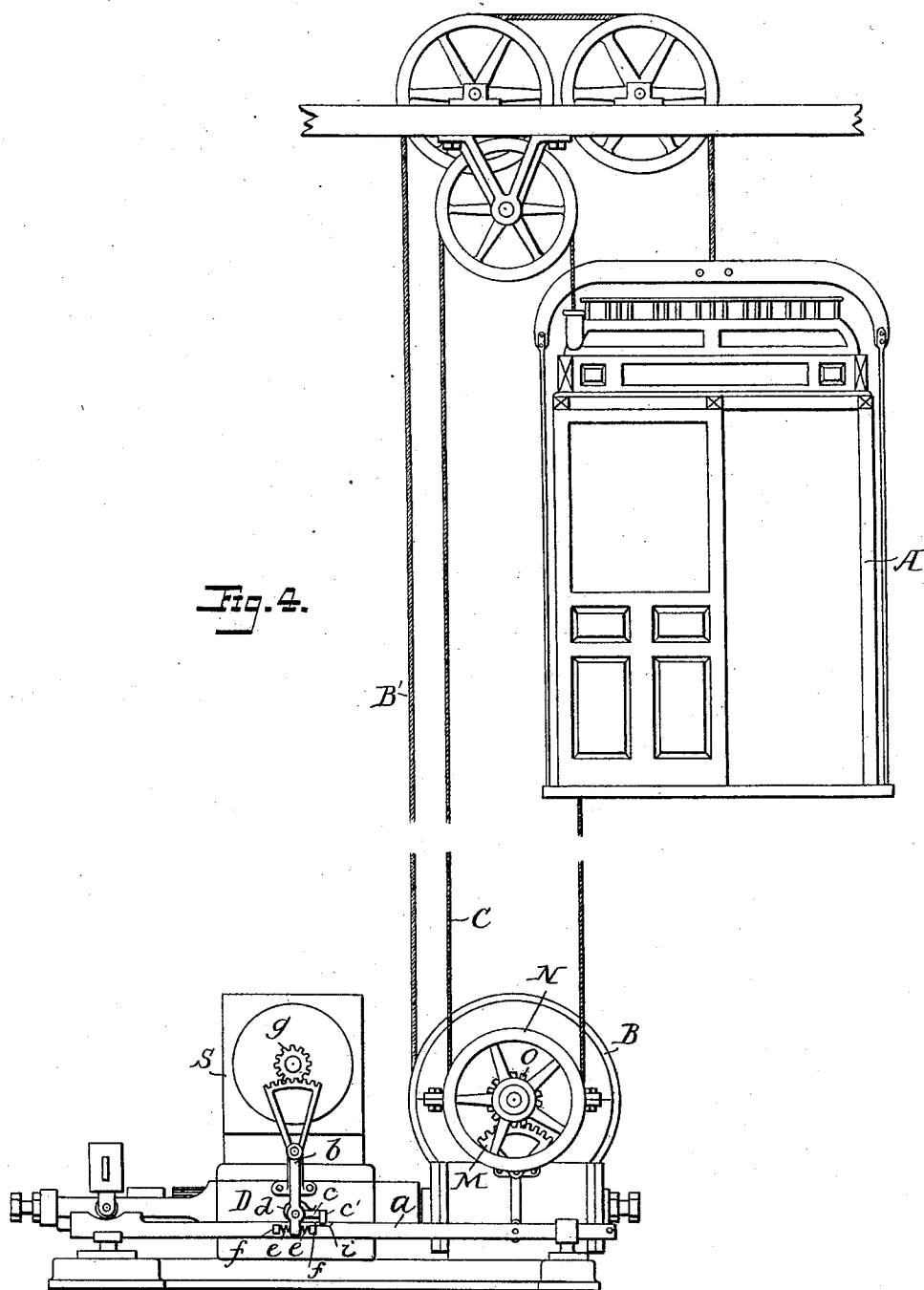
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UNITED STATES PATENT OFFICE.

RUDOLPH C. SMITH, OF YONKERS, ASSIGNOR TO OTIS BROTHERS & COMPANY,
OF NEW YORK, N. Y.

DEVICE FOR ELECTRIC ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 466,447, dated January 5, 1892.

Application filed March 17, 1891. Serial No. 385,397. (No model.)

To all whom it may concern:

Be it known that I, RUDOLPH C. SMITH, a citizen of the United States, residing at Yonkers, Westchester county, State of New York, have invented certain new and useful Improvements in Devices for Electric Elevators, of which the following is a specification.

My invention relates to switch devices for electric elevators, and has for its object to provide means whereby, when the switch is turned to disconnect or break the circuit and render the apparatus inoperative, it may be locked in position against accidental displacement and the operator in the cage may be sure that the switch is in the proper position, so that the apparatus can be left with safety; and to these ends my invention consists in a construction and arrangement of parts, substantially as more particularly pointed out hereinafter.

Referring to the accompanying drawings, Figure 1 is an enlarged side view of portions of an electric elevator-operating device sufficient to disclose my invention. Fig. 2 is a plan view, partly in section, showing the means of locking the switch. Fig. 3 is a diagrammatic view showing a modification; and Fig. 4 is a general view of a well-known type of electric elevators, showing my invention applied thereto.

In the large and growing use of elevators which are operated by electricity, and especially of that class wherein the electric motor receives its current from a distribution-line and in which this line is connected or disconnected to the motor by means of a switch device under the control of the operator in the car or carriage of the elevator, it is desirable that every precaution should be taken to prevent accidents and to insure the correct and safe running of the elevator apparatus. My present invention relates more particularly to this class of elevators in which a switch device controlling the current energizing the electric motor for operating the elevator is under the control of the operator in the carriage through the medium of the ordinary hand-rope, and while I have described and illustrated the preferred embodiment of my invention in this connection it will be understood that the details of construction and

arrangement may be varied by those skilled in the art to suit the exigencies of any particular case without departing materially from the principles of my invention.

In the drawings, A represents the cage of the elevator, and B the hoisting-drum around which the rope B', connected to the elevator, passes, while C is the hand-rope or other equivalent device passing through the car in the ordinary manner, and around the shipper-wheel N, which carries a pinion O, engaging the segment M, which is connected to the shipper-bar *a*. In this instance the electric motor D is mounted on the base sustaining the drum, and is connected in the ordinary way to operate the same, and a switch device S, which may be of any desired construction, and it is indicated herein in a conventional manner to show a starting, stopping, and reversing switch, is also mounted on the base and connected with the electric circuit E. This switch device shows an arm or brush *p*, arranged to close the circuits through the switch in a manner well understood, and when it is moved to the position indicated in the drawings in a switch of the kind stated the circuit is absolutely broken, so that no current can pass through the switch and thence to the motor, and while this is a preferred arrangement of switch it is evident that any other well-known and equivalent form of switch may be used in which it is desired to maintain the brush or switch-arm normally in any stated or fixed position. In the present instance this switch-arm *p* is mounted on a shaft or bearing which is provided with a pinion *g*, meshing into a segment on the segmental lever *b*, and by means of which the switch-arm is moved to the desired position to regulate the passage of the current through the motor. This segmental lever is connected to be operated by the shipper-bar, which is moved in the manner before stated, by means of the hand-rope, to start, stop, and reverse the motor, and thereby raise or lower or hold stationary the elevator-car. In my present arrangement I connect this segmental lever to the shipper-bar through the medium of springs. Thus I interpose the spring *ee* between the free end of the segmental lever and the shipper-bar, the latter being provided with lugs

or supports *f*, against which the springs bear. These springs are preferably of such a strength and resiliency that under ordinary conditions the segmental lever will be moved in accordance with the movements of the shipper-bar, but if any obstruction or hinderance to the movements of the segmental lever occurs will become compressed to a greater or less extent before the lever is operated.

In order to secure the switch-arm or brush *p* in its normal position, which in the present instance is with the dead-break of the circuit, I provide some suitable locking device, and while this may be variously constructed I have shown herein a simple pawl *c*, normally under the stress of a spring *d*, which engages a notch in a stationary piece or bar *h*, secured to the frame-work of the device, and which thus maintains the brush in this position until the locking device is released. Various ways of releasing this locking device may be adopted; but I have illustrated the shipper-bar *a* as provided with a recess *i*, having inclined sides which engage the extension *c'* of the pawl and lift it out of the notch in the bar *h*.

With this construction the operation of the parts will be readily understood. The parts being in the position shown in the drawings, the operator pulling the hand-rope *p* to start the engine in the desired direction will move the shipper-bar *a*, and as the segmental lever *b* is locked the spring *e* will be compressed and require more than ordinary force or pull upon the hand-rope to move the shipper-bar; but as soon as the bar has moved sufficiently to cause the incline of the notch *i* therein to raise the pawl and unlock the segmental lever the lever will be operated freely to control the circuit, and, as before stated, the springs *e* will maintain the lever in its normal relation to the shipper-bar throughout its movement, and it will move freely in harmony with the movements of the bar. When, however, the elevator is stopped, or for any other reason it is desired to move the switch-arm into any particular position and leave it there, the locking device being properly arranged, the lever will become locked and require extra force to move it from this locked position, and the operator in the carriage will readily understand from the "feel" of the rope or the extra force required that the switch-arm is in the proper position and can leave the elevator with the assurance that everything is correctly arranged and in position to leave with safety.

The same general construction and arrangement of parts may be carried out by electrical means instead of mechanical. Thus in Fig. 3 I have illustrated one embodiment of the invention, wherein the shipper-bar *a* supports the coils of the solenoid *m* on either side of the switch-lever *b*, and mounted on the switch-lever *b* is the core *n*, extending on either side thereof and into the coils of the solenoid. The coils of the solenoid may be connected in the main circuit of the motor or

in a separate circuit, the latter being indicated for convenience, and the terminals are connected by a flexible conductor, as *w*, or by a brush *y*, bearing on an extended contact *m'*, so that the coils of the solenoid are in circuit whatever may be the position of the shipper-bar. The shipper-bar is also preferably provided with studs *x* on either side of the switch-lever *b*, which while allowing a certain freedom of movement or backlash, so to speak, between the shipper-bar and the lever will insure the lever being moved when the shipper-bar has moved a certain extent. The pawl *c*, attached to the segmental lever, is in this instance made of magnetic material, or has a portion, as *c'*, thereof so made, and takes into the notch in the stationary bar *h*, and above the pawl I arrange a magnet *g*, the coils of which are in a branch of the electric circuit, one end being connected to the contact which normally rests on an insulated portion of the shipper-bar, but which is adapted to make contact with the contacts *s* at either side of the insulated portion. From this arrangement it will be seen that, the parts being normally locked and the operator moving the shipper-bar, the core of the solenoid will pass into the coils thereof against the tendency of these coils to maintain the core in equilibrium between them; but as soon as the contact *t* bears upon either of the contacts *s* the branch circuit is completed, and a portion of the current flowing through the magnet *g* energizes the same, and this raises the pawl *c'* out of the notch in the stationary piece or bar *h*, and the attraction of the coils of the solenoid causes the segmental lever to assume its normal position between the coils of the solenoid, and the switch is moved then in accordance with the movements of the shipper-bar. It will be understood that the operator on the car has not only to move the shipper-bar, but to overcome the tendency of the core of the solenoid to maintain its normal position, and this will require an extra force, which the operator will understand from the feel of the rope to indicate that the segmental lever, with its connecting switch controlling the motor, is in its normal position. It will thus be seen that the principles of my invention may be embodied in various forms and arrangement of devices which will suggest themselves to those skilled in the art.

What I claim is—

1. In an electric elevator, the combination, with an electric motor, a switch controlling the motor, and the hand-rope for controlling the switch, of a locking device for the switch and means connected to the hand-rope for releasing the locking device, substantially as described.

2. In an electric elevator, the combination, with the electric motor, the switch controlling the motor, and a hand-rope for operating the switch, of a locking device for temporarily holding the switch against the movement of

the hand-rope, a spring connection between the switch and the hand-rope, and devices for releasing the lock of the switch when the hand-rope has moved a sufficient distance, substantially as described.

5 3. In an electric elevator, the combination of the electric motor, the switch controlling the motor, a lever controlling the switch, a locking device on said lever, a hand-rope for
10 operating the switch, a shipping-bar connected to the hand-rope, spring connections between the shipping-bar and lever, and means connected with the shipping-bar for releasing the locking device of the lever, substantially as
15 described.

4. In an electric elevator, the combination of the electric motor, the switch, the lever, the spring-actuated pawl connected to the lever and forming a locking device therefor, the
20 shipper-bar, springs interposed between the shipper-bar and lever, and a notch having inclined sides on the shipping-bar to release the locking-pawl, substantially as described.

5. The combination, with the electric motor,

of an electric elevator, the switch controlling
25 the motor, and a locking device therefor, of a shipper-bar, and connections between the shipper-bar whereby the bar may be moved without moving the switch, and releasing devices operated by the shipper-bar for releasing
30 the locking devices, substantially as described.

6. In an electric elevator, the combination of the switch, springs for moving the switch, means connected with the cage for compressing the springs without moving the switch,
35 a locking device for temporarily holding the switch against the pressure of the springs, and means for releasing the locking device when the springs are compressed, substantially as
40 described.

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

RUDOLPH C. SMITH.

Witnesses:

EDWD. K. ANDERTON,
HARRY W. BARKLEY.