(No Model.)

J. H. ROBERTS.

ELECTRICAL APPLIANCE FOR ELEVATORS.

No. 537,856. Patented Apr. 23, 1895.

Fig. 2.

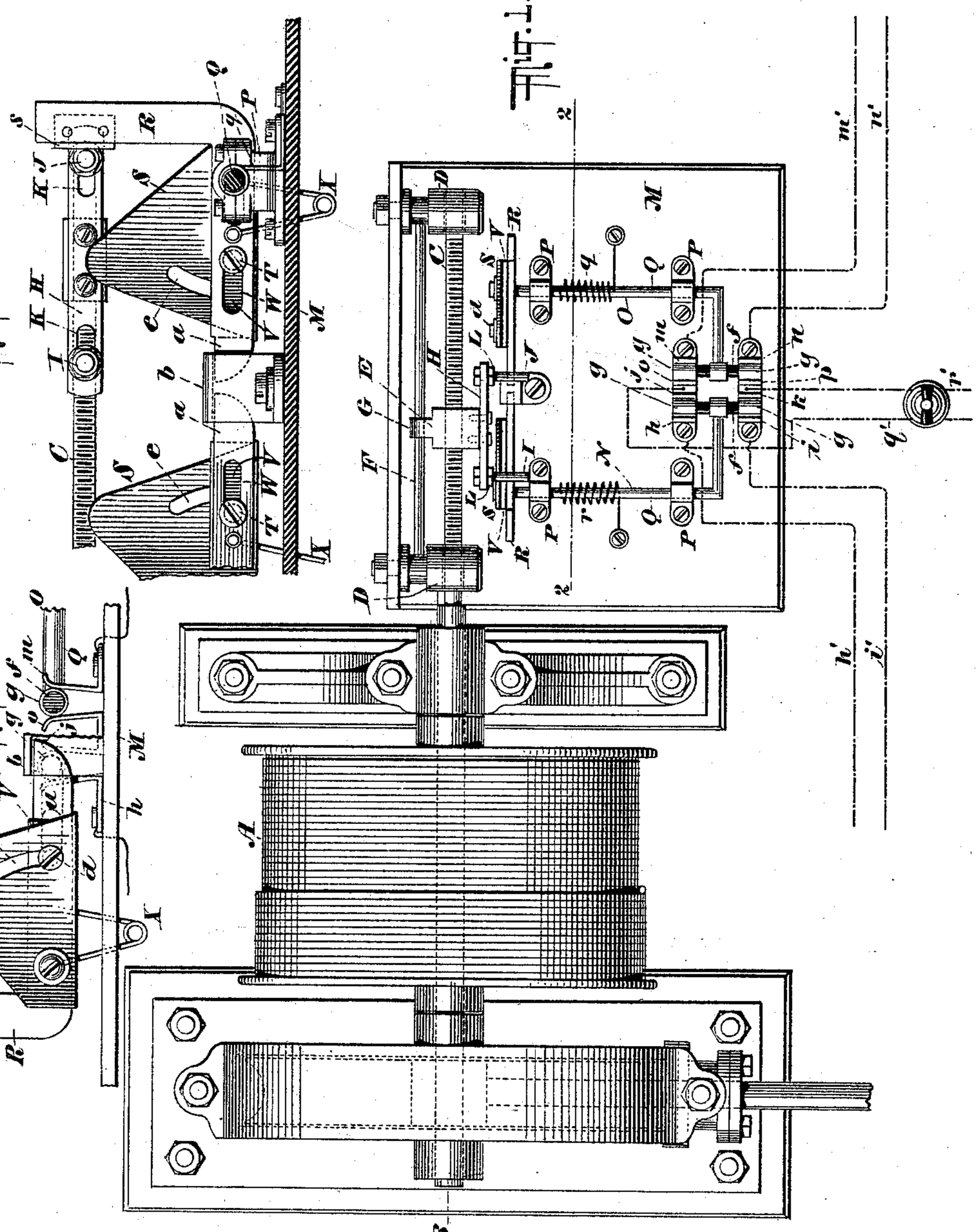

Fig. 3.

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ELECTRICAL APPLIANCE FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 537,856, dated April 23, 1895.

Application filed February 23, 1895. Serial No. 539,335. (No model.)

To all whom it may concern:

Be it known that I, JAMES H. ROBERTS, a citizen of the United States, and a resident of Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Electrical Appliances for Elevators, of which the following is a specification.

The invention relates to improvements in electric appliances for elevators or other forms of hoisting or elevating apparatus, and consists in the novel switches and contacts hereinafter described, with mechanism timed with the winding drum or other movable part of the apparatus and operable from said part to actuate the said switches to break the electric circuit at each end of the line of travel of the elevator, and thus automatically arrest the movement of the elevator at the terminus of its proper travel either on its ascent or descent.

The invention will be more fully understood from the detailed description hereinafter presented, reference being had to the accompanying drawings, in which—

Figure 1 is a top view of the hoisting drum, switches and operative connections constructed in accordance with and embodying the invention. Fig. 2 is an enlarged sectional view, partly broken away, of same on the dotted line 2—2 of Fig. 1; and Fig. 3 is an enlarged front view, partly broken away, of a portion of same.

In the drawings A designates the usual hoisting drum mounted upon the shaft B, to which is connected the revoluble screw shaft C supported in bearings D and receiving its motion with said main shaft B. Upon the threaded shaft C is mounted the traveler E which is prevented from rotating by means of the rod F passing through the lug G thereof, and which traveler carries upon its front face the plate H having at its opposite ends the arms I, J, which are adjustable in the elongated slots K of said plate H and are adapted to be locked in any desired adjustment by means of the nuts L. The traveler E during the motion of the shaft B and threaded shaft C has imparted to it a traveling movement between the bearings D, D, the said traveler moving to the right or to the left in accordance with the direction of motion in the shafts B, C. When the elevator is ascending the traveler E will move in one direction and when the elevator is descending it will move in an opposite direction. The shaft C is externally threaded and engages an internal thread formed within the traveler E, and hence the traveler is compelled to move along said shaft during the rotation of the latter.

Adjacent to the threaded shaft C is provided the switch board M supporting the switches N, O, which are wholly independent of each other and are mounted in bearings P, as indicated more clearly in Fig. 1. The switches N, O, correspond with each other in construction, and each is composed of the right angular rod Q having upon one end the angular lever R whose upper end is within the path of the arms I, J, and whose lower end is supported by means of a screw T upon the plate V, rigidly mounted upon the end of the rod Q and carrying the adjustable plate S. The angular lever R is not rigidly fastened to the rod Q but is supported upon the end of said rod against the face of the rigid plate V. By reason of the fact that the end of the said rod Q passes through an elongated slot formed in the lower part of said angular lever R, as shown by dotted lines in Fig. 2, and the further fact that the screw T passes through the elongated slot W in said angular lever R and enters the rigid plate V, the angular lever R is adapted to have a sliding or reciprocating movement against the face of the rigid plate V, at such time being supported by the screw T and the end of the rod Q of the switch. The angular lever R has a spring tension by reason of the spring X toward the center of the switch board M, and at the inner end of its lower portion is provided with the toe *a* adapted to pass below the catch-plate *b*, as indicated by the dotted lines in Fig. 2, which illustrates the angular levers R in their normal position. The plate S is somewhat segmental in form and at its outer end is swiveled upon the end of the rod Q, while at its inner end it is held in position by the screw *d* passing through the elongated slot *e* thereof and entering the rigid plate V secured upon the switch rod Q, as shown more clearly in Fig. 3. The screw *d* and slot *e* permit of the adjustment of the plate S, for the purpose hereinafter described.

Upon the outer ends of the rods Q of the switches N, O, are provided the insulated arms *f*, each having upon its opposite ends the sleeves *g* of conducting material and adapted to pass between the plate contacts secured to the switch board M. The contacts for the sleeves *g* of the switch N are lettered *h*, *i*, *j*, *k*, and as may be seen in Figs. 1 and 3, the said sleeves *g* pass downward between the contacts *h*, *j*, and *i*, *k*, respectively, the contacts being separated from each other and the sleeves being insulated from each other. The contacts for the sleeves *g* of the switch O are lettered *m*, *n*, *o*, *p*, and, as shown, the sleeves *g* of the switch O pass downward between the contacts *m*, *o* and *n*, *p*, respectively, and are insulated from each other. The contacts for the sleeves *g* are, as illustrated in Fig. 3, formed of sheet metal secured to the switch board M and extend upward in pairs to snugly receive between them the sleeves *g* of the switches. The contacts *j*, *o*, are formed of one piece of sheet metal, and the contacts *k*, *p*, are also formed of one piece of sheet metal and to these pieces of sheet metal are connected the main line conducting wires *q'*, *r'*, respectively. The auxiliary wires lettered *h'*, *i'*, pass from the contacts *h*, *i*, and the auxiliary wires or conductors *m'*, *n'*, pass from the contacts *m*, *n*, respectively, as illustrated in Fig. 1.

The switches N, O, are illustrated in their normal position in Fig. 1 and in this position they are held by reason of the inner ends or toes *a* of the angular levers R being beneath the plate or catch *b*, as illustrated in Fig. 2, and the said switches will remain in this normal position during the travel of the elevator either on its ascent or descent and are not moved therefrom except by the contact of the arms I, J, with the upper portion of the angular levers R at the ends of the travel of the elevator carriage.

During the ascent and descent of the elevator the traveler E will in a well known manner move along the screw shaft C and bring either its arm I in contact with the angular lever R of the switch N or its arm J in contact with the angular lever R of the switch O, and if we assume that the traveler E in Fig. 1 is moving to the right it will be understood that upon the elevator reaching the end of its travel the arm J will strike the upper portion of the angular lever R of the switch O for the purpose of breaking the circuit and arresting the elevator. The contact of the arm J with the angular lever R of the switch O will first cause the said angular lever to have a sliding movement outward until its toe *a* is free of the catch *b*; at which time the spring *q* will suddenly turn the switch O outward and thereby the upper portion of the angular lever R will be thrown outward from the arm J and the plate S will come into contact with the inner side of said arm, whereby the spring *q* is prevented from unduly turning the switch O and the plate S is in a position to enable the arm J upon its return movement to the left to depress the said angular lever R until its toe *a* again passes beneath the catch *b* and re-locks the switch O in its normal position.

The outward reciprocating movement of the angular lever R under the contact of the arm J does not of itself affect the electric circuit, but after the lever R has moved outward sufficiently for its toe to escape from the catch *b*, the spring *q* in turning the switch O outward, elevates the insulating arm *f* and conducting sleeves *g* free of the contacts *m*, *j*, and *n*, *p*, thereby breaking the circuit and stopping the motor. During the opposite movement of the elevator the traveler E will move to the left, and its arm J pressing against the plate S will first restore the switch O to its normal position and the arm I will at the end of the travel of the elevator come into contact with the angular lever R of the switch N and cause the said lever to have a reciprocating movement outward until its toe *a* is free of the catch *b*, at which time the spring *r* will turn the said switch N outward to the left and elevate the sleeves *g*, *g*, thereof free of the contacts *h*, *j*, and *i*, *k*, and thereby break the circuit. Upon each of the angular levers R is provided the plate *s* which is adjustable by means of the screws *t* passing through the elongated slots in said plate and the purpose of the plate is to regulate the point at which the arms I, J, shall commence to act upon the switches in order that the exact moment for breaking the electric circuit at each end of the line of travel of the elevator may be regulated at will. The arms I, J, are also adjustable in the ends of the plate H in order that additional means for regulating the exact point at which the electric circuits shall be broken may be afforded.

The plates S have inclined upper surfaces and in their normal position the upper ends of said plates project above the horizontal line of the arms I, J, and the purpose of the said plates S is, as above indicated, to prevent the springs *q*, *r*, from turning the switches N, O, respectively, unduly outward and to afford a means for restoring the said switches to their normal position. If the upper portions of the plates S were not above the line of travel of the arms I, J, the return movement of said arms would not depress the said plates sufficiently for the outer lower ends of the angular levers R to reach below the plate or catch *b*, but since said plates are of the elevation described and are provided with inclined upper surfaces the arms I, J, when returning from their contact with the upper portions of the angular levers R may depress the said plate sufficiently to press the lower portions of the angular levers R downward below the upper portion of the plate or catch *b*. The lower edges of the outer ends of the angular levers R are rounded, as indicated by dotted lines in Fig. 2, in order that upon the depression of the plates S, the said ends may ride downward

against and pass below the upper portions of the catch *b*, the said levers while passing or contacting with the catch *b* moving outward against the force of the springs X, which upon the lower ends of said levers R having passed below the upper edge of the catch *b* will move the said levers R inward to the extent permitted by the slots W in order that the ends *a* of said levers may be securely held by the catch *b*. When for instance, the arm J is passing toward the right from a point at the left of the plate S, the said arm J riding against the upper inclined end of said plate will depress the same and the lower portion of the angular levers R, in order that the said arm may succeed in passing to the right of said plate S and in position to contact with the upper portion of the angular lever R, but the depression of the plate S at this time has no effect upon the circuits other than to depress the sleeves *g* of the switches more firmly between the metal contact plates.

The invention is not limited to the use of the plates S since they simply afford one means for preventing the angular levers R from turning outward too far and for enabling the arms I, J, to restore the said levers and the switches N, O, to their normal position.

The operation of the switches N, O, with their contacts above described has been sufficiently pointed out in the foregoing description. It is my purpose to employ the said switches in connection with the rheostat and switch board illustrated in Letters Patent of the United States No. 517,169, granted to James H. Roberts March 27, 1894, for improvements in electric appliances for dumb waiters and other forms of hoisting or elevating apparatus, although it is to be understood that I do not limit the present invention to its employment in connection with the features of the said patent.

The purpose of the slots *e* and screws *d* for the plates S is to enable the adjustment of said plates to suit the positions and condition of the arms I, J, and contacts on the switch board.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The switches N, O, mounted in bearings and having at one end the sleeves insulated from each other to engage the contacts in pairs and at the other end provided with the angular levers adapted to turn with the switches and to have a reciprocating movement independent of said switches, combined with the hoisting mechanism, the threaded shaft connected therewith, and the traveler on said shaft adapted at the ends of the line of travel of the elevator to move said switches and break the circuit; substantially as set forth.

2. In electric appliances for elevators or other form of hoisting apparatus, the switches N, O, mounted in bearings and having at one end the conductors for engagement with the contacts in pairs, and at the other end provided with the angular levers R, rigid plates V and plates S, combined with the threaded shaft connected with the hoisting apparatus, the traveler on said shaft, and the arms carried by said traveler for contact with the said angular levers R and plates S; substantially as and for the purposes set forth.

3. In electrical appliances for elevators or other form of hoisting apparatus, the switches mounted in bearings and having at one end the insulated arms *f* supporting the conductors *g* for engagement with the contacts in pairs and having at the other end the angular levers R, rigid plates V and adjustable plates S, combined with the springs connected with the said switches, the springs connected with the said angular levers R, the traveler E on said screw shaft, and arms carried by said traveler and adapted for engagement with the said angular levers; substantially as set forth.

4. In electrical appliances for elevators or other form of hoisting apparatus, the switches N, O, mounted in bearings and having at one end the conductors for engagement with the contacts in pairs and having at the other end vertical arms, combined with the threaded shaft connected with the hoisting mechanism, and the traveler thereon adapted for engagement with the said vertical arms at the ends of the travel of the elevator; substantially as set forth.

5. In electrical appliances for elevators or other form of hoisting apparatus, the switches N, O, having the outwardly acting springs and provided at one end with the arms of insulating material carrying upon their opposite ends the conductors for engagement with the contacts in pairs, combined with the threaded shaft connected with the hoisting mechanism, and the follower thereon adapted for engagement with the said switches to break the circuit at the ends of the travel of the elevator; substantially as set forth.

6. In electrical appliances for elevators or other form of hoisting mechanism, the switches N, O, having at one end the conductors for engagement with the contacts in pairs and provided at their other end with the angular levers adapted to have a limited reciprocating movement, combined with the catch for receiving the ends of the lower portion of the said angular levers, the threaded shaft connected with the hoisting mechanism, and the follower on said shaft adapted to contact with the said angular levers at the ends of the travel of the elevator; substantially as set forth.

7. In electrical appliances for elevators or other form of hoisting mechanism the switches N, O, mounted in bearings and having at one end the conductors *g*, the plate contacts extending from the switch board in position to receive between them the said conductors and themselves being in electrical connec-

tion with the main and auxiliary conducting wires, combined with the threaded shaft connected with the hoisting mechanism, and the follower on said shaft adapted for contact with said switches at the ends of the line of travel of the elevator; substantially as set forth.

Signed at New York, in the county of New York and State of New York, this 20th day of February, A. D. 1895.

JAMES H. ROBERTS.

Witnesses:
CHAS. C. GILL,
EDWARD D. MILLER.