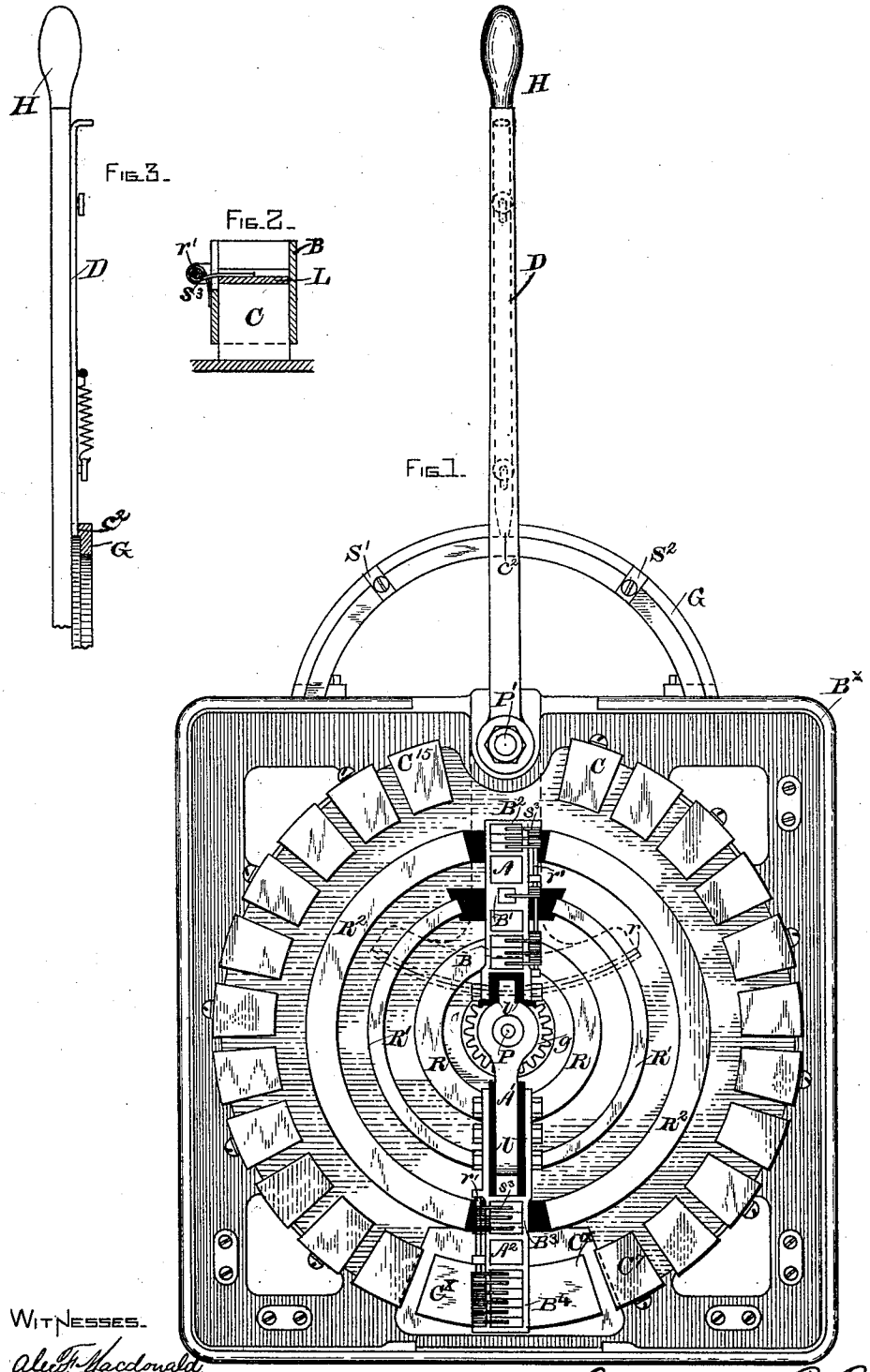
(No Model.) 2 Sheets—Sheet 1.

J. P. B. FISKE.

ELECTRIC ELEVATOR CONTROLLER.

No. 508,691. Patented Nov. 14, 1893.



WITNESSES.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 4.

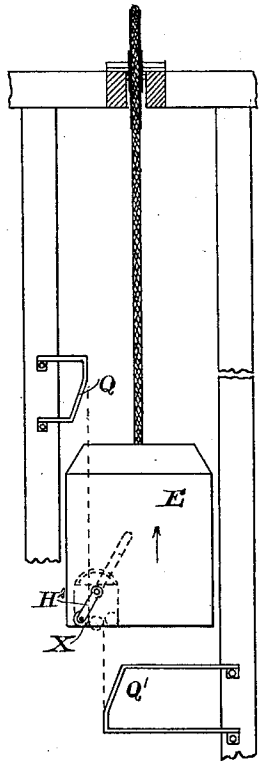


Fig. 6.

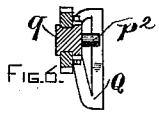


Fig. 5.

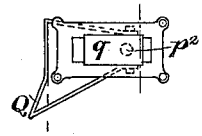


Fig. 7.

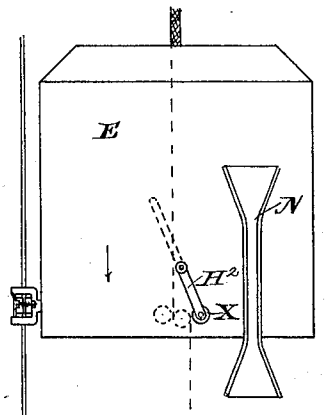
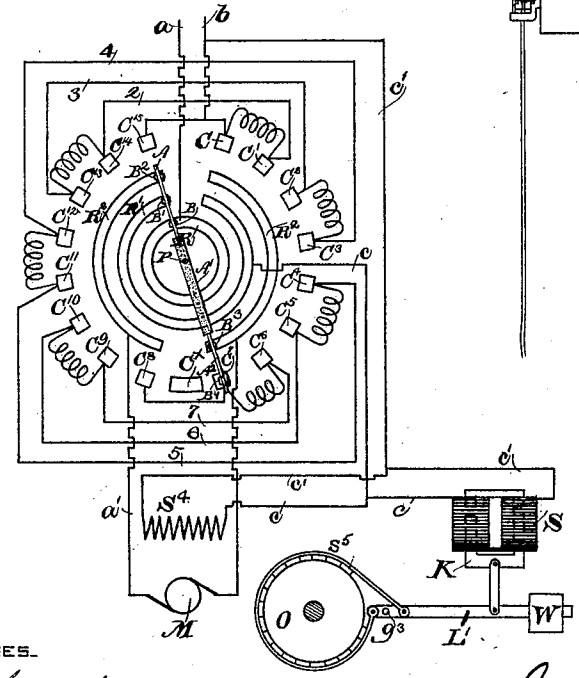
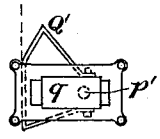


Fig. 8.





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UNITED STATES PATENT OFFICE.

JONATHAN P. B. FISKE, OF LYNN, MASSACHUSETTS, ASSIGNOR TO THE THOMSON-HOUSTON ELECTRIC COMPANY, OF CONNECTICUT.

ELECTRIC-ELEVATOR CONTROLLER.

SPECIFICATION forming part of Letters Patent No. 508,691, dated November 14, 1893.

Application filed July 18, 1891. Serial No. 399,906. (No model.)

To all whom it may concern:

Be it known that I, JONATHAN P. B. FISKE, a citizen of the United States, residing at Lynn, in the county of Essex and State of Massachusetts, have invented a certain new and useful Improvement in Electric-Elevator Controllers, of which the following is a specification.

This invention relates to improvements in electric elevator controllers, and its object is to provide a compact and efficient controller, and to enable the same to be operated automatically by the car itself as the same approaches the top or bottom of the elevator shaft.

My invention further relates to an improved form of brake to operate simultaneously with the controller to control the movement of the car.

In the accompanying drawings, Figure 1, is an elevation of my circuit controller for electrically operated elevators. Figs. 2 and 3 show details thereof. Figs. 4 and 5 are diagrams of an elevator car and shaft showing my invention applied thereto. Figs. 6 and 7 show details of the controller operating and sliding contact devices of Fig. 5, and Fig. 8 is a diagram of the circuit connections with the circuit controller and the automatic brake.

In Fig. 1, $B^{\times}$ is a base plate which may be made of wood, but which is preferably constructed of cast iron. Upon it is secured a metal ring R and concentric therewith an insulated split ring R′, two insulated half rings R^2, R^2, and a series or ring of insulated copper contact plates C′ C^2 C^3 C^4 to C^{15} from which connections by copper wires are made, to a rheostat or resistance as indicated in Fig. 8. An arm made in three portions A, A′, A^2, insulated from one another by insulation 1, is pivoted at P and is capable of being rotated over the aforesaid rings and contact plates, and the collecting portion or portions carrying the contact brushes are preferably made in the form of receptacles or boxes within which are contained the contact making blocks of carbon or other conductor, three such receptacles or boxes being provided in the arm A, the contact blocks in each resting, respectively, on the rings R R′ R^2, and two of which are provided in the arm A^2, one of the contact blocks in which bears upon the ring R^2 and the other of which traverses the series of contact plates C C′ C^2 C^3 to $C^{\times}$, or $C^{\times}$ to C^{15}, in accordance with the direction of rotation given to the arm when it is operated. The pin P upon which the arm is pivoted or centers is provided with a gear *g* into which meshes a segment rack *r* which is operated by the handle H, fulcrumed at the point P′.

By the above construction the full circumference of the controller is utilized and traversed by the contacts which are placed at different radial distances so that the contacts of one series will not interfere with those of another, while by means of the multiplying action obtained by the pinion and segment rack, a comparatively slight angular movement of the handle is required, such slight angular movement being desirable on account of the rapidity and certainty with which it may be effected. It will also be seen that the resistances are connected alternately to the opposite contact plates of the controller and that the corresponding contact plates on each side are connected together by cross wires 2, 3, 4, 5, 6, and 7, so that the whole of the resistance is utilized whether the contacts be moved in one direction or the other. Secured to the base $B^{\times}$ is a curved guide G, as shown, provided with two stops S′ S^2 which limit the play or extent of motion of the handle H in operating the controller, in both directions of its two ways of motion, and the guide has also a recess at the point c^2 into which a locking detent D, Figs. 1 and 3, may engage to retain the handle H in its intermediate or middle position, or position where the contact devices of the controller are out of connection. As shown in Fig. 3 this locking detent is made so that it can be released by the finger of the operator in manipulating the handle H. The boxes B B′, &c., of the arm A A′ A^2 contain suitable contact devices that bear upon the rings R R′, &c. It is preferred to make these contacting portions or brushes of blocks of carbon as at C, Fig. 2. On the carbon block is placed a piece of insulation L and upon this insulation bears a spring s^3. A series of these

springs are provided bearing upon the different carbon blocks and they are carried upon a small shaft r' which runs along the outside of the arm. The purpose of inserting the insulation between the blocks C and the springs s^3 is to prevent the conveyance of electric currents by the latter which would heat them and destroy their temper. In addition to the handle H for the operation of the controller there is also provided an accessory operating lever H^2, which is intended to be an automatically operated lever, or safety device, controlled by suitable devices at the top and bottom of the well or passageway whereby the car or carriage is automatically stopped at each end of its route should the attendant forget to manipulate the controller, or should the controller be left in such position that the car would be set in operation when the current was thrown on with no attendant present in the car.

The lever H^2, may be rigidly connected to handle H and has a small friction wheel X at its end, and at the top and bottom of the well there are provided cams or angle guides Q Q'. See Figs. 4 and 5. When the car nears the top or bottom of the shaft, the wheel X of the lever H^2 upon reaching the cam Q or Q' would be moved to the middle position and the controller brought to a position to cut off the current and stop the car. It may sometimes be the case that there is some lateral movement of the car, especially after the elevator has been in use for a considerable time, and in such cases the cams Q Q' may not have such a position with relation to the lever H^2 as to cause its proper action. There is therefore provided some such arrangement as is illustrated in Fig. 5. Here the cams Q Q' are made movable laterally and this movement is effected by suitable arrangements on the car itself, which accurately adjust the relative position of the cam with reference to the lever H^2 to that which is necessary for its successful and proper operation. For this purpose there is attached to the car E a guide N with its ends flared, as shown, so that it will with the maximum lateral displacement of the car in its travel engage pins p' p^2 projecting from blocks q q which blocks carry the cams Q Q'. The distance between the guide N and the lever H^2 is made that which will bring the cams Q Q' into position for the correct operation of the controller.

The connections of the controller and its mode of operation are indicated in Fig. 8. Assuming the arm A A' A^2 to be thrown into contact with the plate C^7 the circuit connections are as follows: The current enters by the line a and passes to the ring R and the brush or carbon block B resting thereon and then to the blocks B' and B^2. The current from the block B' goes by the ring R' and wire c to the brake magnet S and also to the shunt field coil S^4 of the motor and to the opposite line b by the wire c'. The current from the brush B^2 goes to one of the half rings R^2, then by the line a' to the armature of the motor M, then by line a' to the other half ring R^2, by brushes B^3 and B^4 to contact plate C^7, through part of the resistance, to plate C^6, line 7, plate C^9, resistance, plate C^{10}, line 6, plate C^5, resistance, plate C^4, line 5, plate C^{11}, resistance, plate C^{12}, line 4, plate C^3, resistance, plate C^2, line 3, plate C^{13}, resistance, plate C^{14}, line 2, plate C', resistance, plate C, and out by the line b. It will be seen that immediately upon the arm contacting with the plate C^7 the shunt field coil S^4 of the motor M and the solenoid magnet S of the brake are energized and that current to the armature must first traverse all of the resistance. Upon a continued motion being imparted to the arm, the resistance is gradually cut out of the circuit and the motor M starts up with safety. A reversed motion imparted to the handle H energizes the shunt field coil S^4 and the solenoid, as before, but the current now passes through the armature of the motor M in the opposite way changing the direction of its rotation and the direction of motion of the elevator car. There is employed an improved safety brake with the elevator, and it is shown in this figure. The wheel O is placed upon the armature shaft of the motor M or it is geared or belted thereto. It is provided with a friction clutch s^5. This friction clutch is operated by a weight W, or a spring, which is carried upon or engages with a lever L' pivoted at g^3, the strap of the clutch s^5 being secured at equidistant points each side of the point g^3. When the solenoid S becomes energized it attracts its core K lifting the weight W and releasing the brake permitting the motor M to rotate and move the elevator car. Upon cessation of current the weight W tightens the clutch s^5 and stops the car. It will be seen therefore that the car is always in a locked position when no current is flowing in through the motor M.

By the arrangement of the invention there is secured an efficient and compact form of controller whereby but little space is needed for it upon the elevator, and whereby also, there is obtained in improved connection and manner of operation of the controller so that its manipulation to start, stop and reverse the motion of the car requires only the movement of a single operating handle by the attendant.

Electrical connection between the apparatus carried upon the elevator car, the mains, and the motor may be made in any suitable manner, as by a flexible connection, but it is preferred to support copper rods or strips along the line of way of the car and establish connection by traveling contacts, as indicated in Figs. 5 and 7. Heavy copper rods or wires are extended between the top and bottom of the well, which are embraced by carbon blocks, on one side of the rod, spring-pressed against the rods as shown. These carbon blocks by wear adjust themselves to a close fit so that the entire outer surface of the rod is used to conduct current, thus giving a cur-

rent collecting device having the maximum area for conveyance of current with a minimum amount of copper required in the rods, while the carbon blocks may be readily and cheaply replaced.

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

1. An elevator operating system comprising an electric motor geared to the car, a switch on the car controlling the motor circuit, an arm adapted to operate said switch, movable cams in the shaft arranged to engage with said arm to open circuit the motor, and means for automatically adjusting said cams substantially as set forth.

2. An elevator operating system, comprising an electric motor geared to the car, a switch on the car controlling the motor circuit, movable cams arranged to operate said switch and thereby open circuit the motor, and a guide on the car to automatically adjust said cams to the proper position relative to the car, substantially as described.

3. An elevator operating system comprising a motor geared to the elevator car, a rheostatic circuit breaking and reversing circuit controller on said car and controlling the circuit of the motor to break, reverse, or vary the resistance of the motor circuit, an arm on said circuit controller, and cams in the shaft and engaging with said arm to open circuit the controller, and a guide on the car engaging with the cams, for the purpose set forth.

4. In an electric hoisting apparatus, an operating motor, a brake engaging with the armature shaft, an electro-magnet for releasing said brake, and a switch arranged to control both a rheostatic armature circuit, and a constant potential shunt circuit through said brake magnet, substantially as set forth.

Signed at Lynn, Massachusetts, July 16, 1891.

JONATHAN P. B. FISKE.

Witnesses:
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JOHN E. RANDALL.