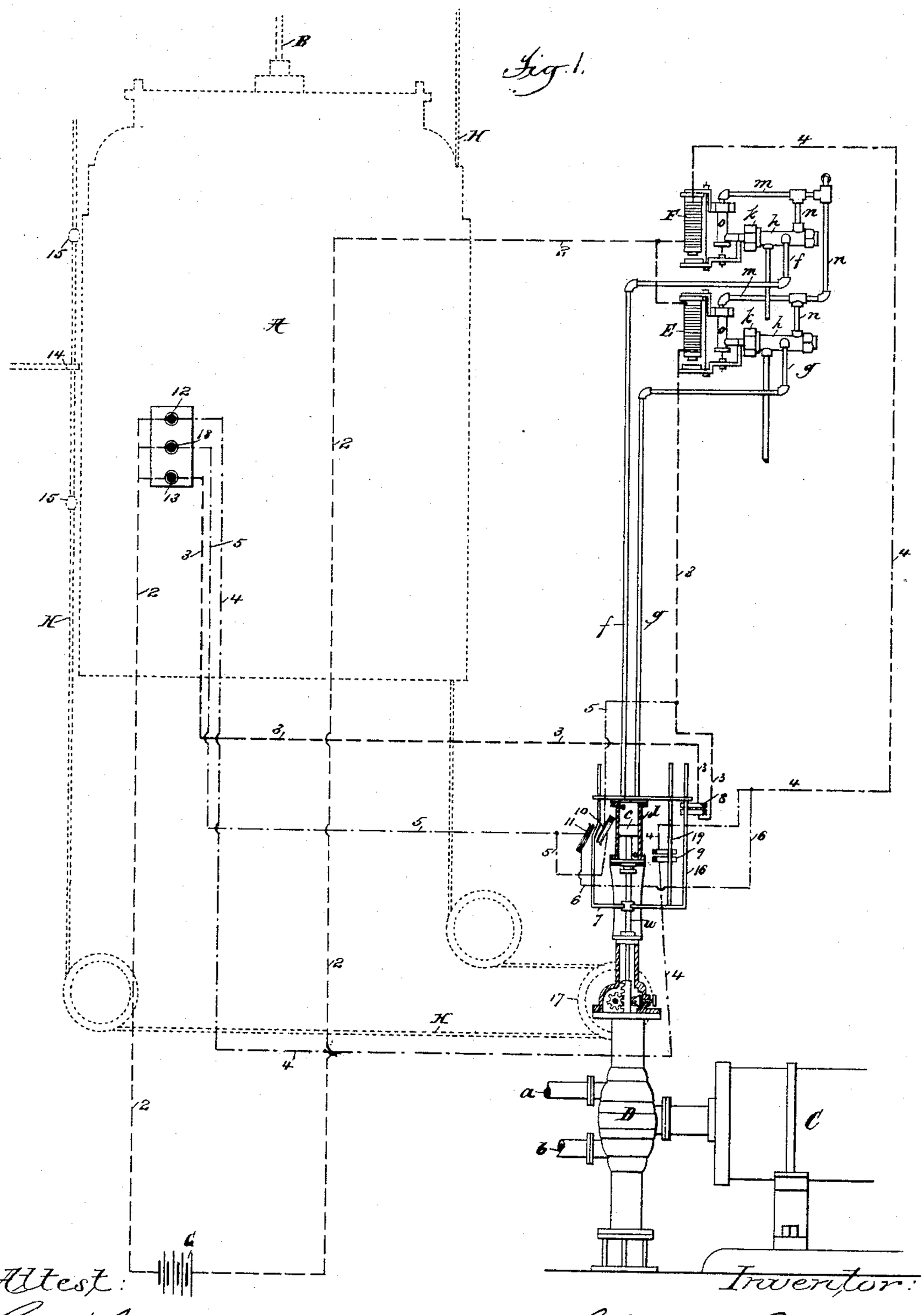
(No Model.) 2 Sheets—Sheet 1.

C. E. ONGLEY.

ELECTRICALLY CONTROLLED ELEVATOR.

No. 410,183. Patented Sept. 3, 1889.

Fig. 1.



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Inventor:
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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

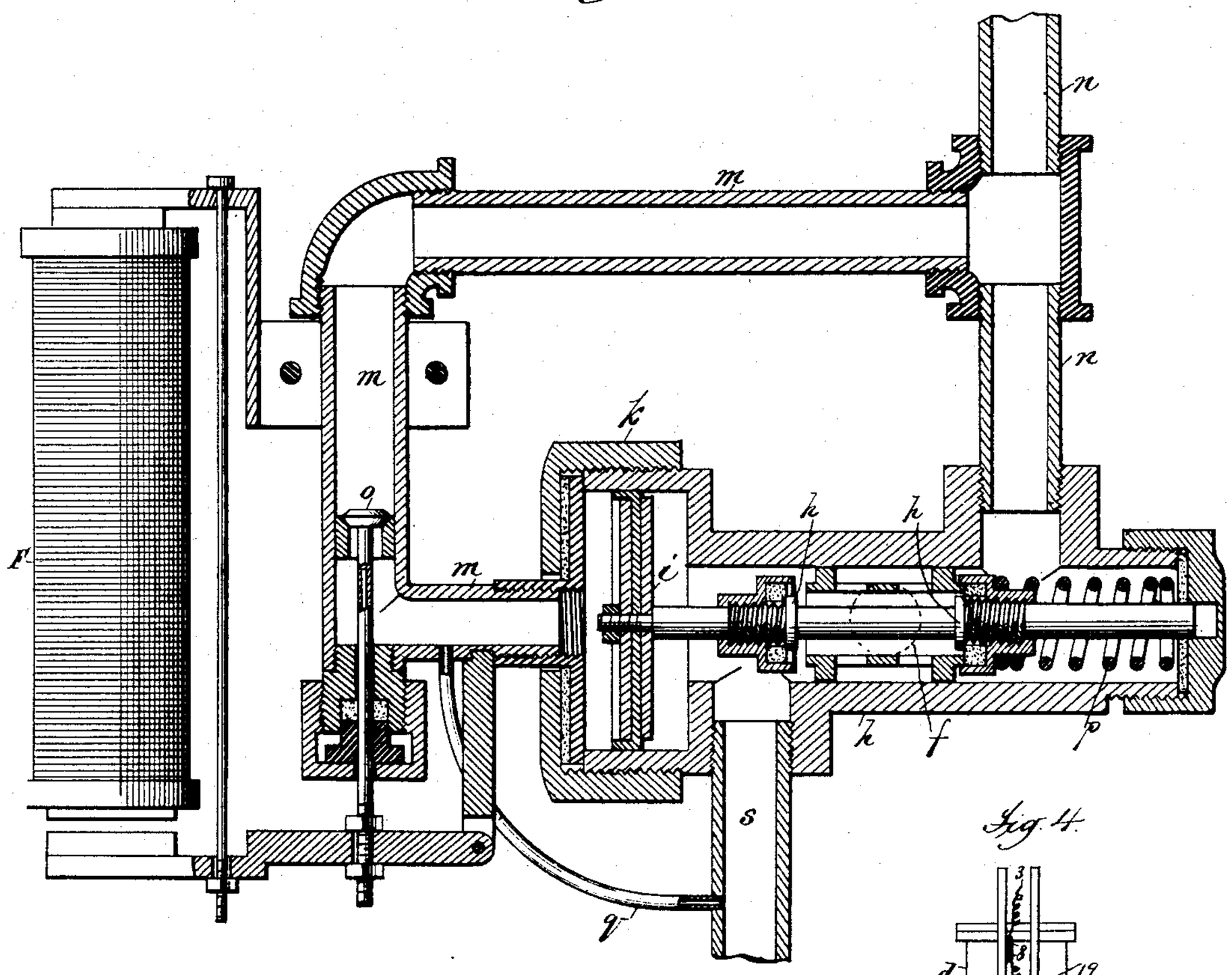


Fig. 4.

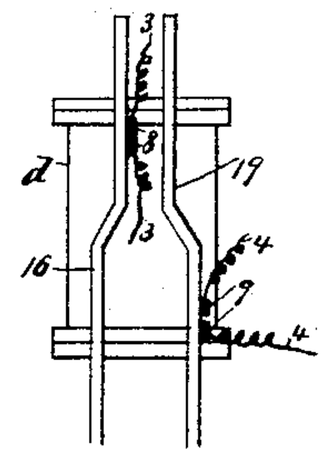
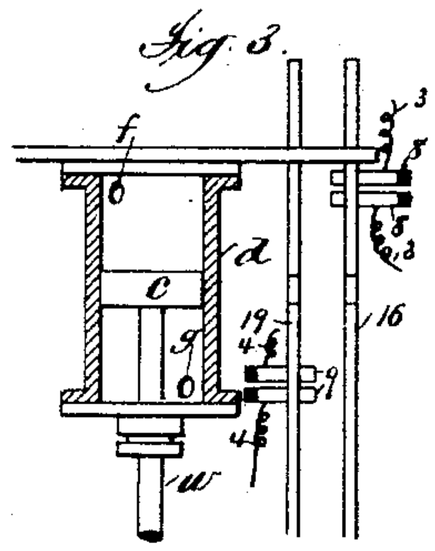


Fig. 3.



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UNITED STATES PATENT OFFICE.

CHARLES E. ONGLEY, OF NEW YORK, N. Y., ASSIGNOR TO THE HYDRAULIC ELEVATOR COMPANY, OF ILLINOIS.

ELECTRICALLY-CONTROLLED ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 410,183, dated September 3, 1889.

Application filed July 6, 1888. Serial No. 279,206. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. ONGLEY, a citizen of the United States, residing at New York, county of New York, and State of New York, have invented certain new and useful Improvements in Electrically-Controlled Elevators, fully described and represented in the following specification, and the accompanying drawings, forming a part of the same.

This invention relates to an organized apparatus for controlling electrically the movements of an elevator-car, and particularly to a system of electrical connections by which the circuit through which the valve or other controlling apparatus is operated is automatically broken at the proper time to prevent the slamming and violent action of said apparatus.

In the accompanying drawings, Figure 1 is a diagrammatic view illustrating the organization of the apparatus embodying the invention. Fig. 2 is an enlarged sectional elevation of one of the auxiliary and primary valves through which the main valve or other controlling mechanism is operated, showing, also, the electromotor for actuating the primary valve. Figs. 3 and 4 are enlarged details.

The elevator-motor and the mechanism for controlling its movements, the electromotors and connections for operating the same, and the system of electrical connections through which these motors are energized from the car to control its movements are substantially the same as shown and described in my prior applications for Letters Patent filed November 22, 1887, and March 9, 1888, Serial Nos. 255,857 and 266,653. A very brief description of these parts will therefore be sufficient in the present case.

Referring to said drawings, it is to be understood that A represents the elevator-car, the hoisting-cable B of which is connected in the usual manner to the piston-rod of a hydraulic cylinder C, which constitutes the elevator-motor. The mechanism for controlling the movements of the motor is in the case shown the main valve D, which is of the ordinary construction and operates to allow the water to enter the cylinder from the induction-pipe *a* and act upon the piston to cause the car to ascend, and to allow the water to escape from the cylinder through the exhaust-pipe *b*, to permit the car to descend by gravity. As herein illustrated, the cylinder C is arranged in a horizontal position; but it may be arranged in a vertical position, if preferred, and it is also to be understood that it may be provided with the well-known circulating-pipe where that is more desirable. It is also to be understood that the invention is not limited to the particular form of motor shown, and that the controlling mechanism may be varied to conform to the style of the motor employed without departing from the invention. The term "main valve" is therefore to be understood as including any suitable form of mechanism for controlling the motor employed.

The main valve D or other controlling mechanism is controlled by means of electromotors, which are arranged to act upon the valve through suitable connections, consisting in the case shown of an auxiliary piston *c*, which is connected to the rod *w* of the valve and works in a cylinder *d*, into which water is admitted under suitable pressure through the pipes *f g* to drive the piston in opposite directions. The pipes *f g* are controlled by auxiliary valves *h*, which are operated by means of primary pistons *i*, located in small primary cylinders *k*, into which water is admitted under suitable pressure to drive the pistons through pipes *m*, which communicate with pipes *n*, through which the water is admitted to the chambers containing the auxiliary valves, and thence to the pipes *f g*. The pipes *m* are controlled by primary valves *o*, which are operated by means of electro-motors E F, which are energized at the proper times from the car.

The motors E F are herein shown as ordinary electro-magnets, and will be herein termed "magnets;" but it is to be understood that the term "magnet" as herein used includes any form of electromotor which is capable of being energized by the passage through it of an electric current. The magnets E F are included in electric circuits 2 3 and 2 4, which include push-buttons 12 13, carried upon the car, and also suitable battery-power, as indicated at G. The term "push-button" as

herein used is to be understood as including any suitable form of circuit making and breaking device by which the circuits through the respective magnets can be readily broken and closed.

As herein illustrated, the elevator is also provided, in addition to the apparatus for operating its controlling mechanism electrically, with an ordinary hand-rope H, which is arranged in the usual manner for operating the main valve D. In the ordinary working of the elevator the hand-rope will simply be moved idly through its connections with the main valve; but in case the electrical connections or the auxiliary or primary valves should become disordered, or for any reason should fail to operate properly, the hand-rope will be available to control the movements of the car in the ordinary way heretofore practiced.

The operation of the system as thus far described is as follows: To cause the car to ascend, the button 12 will be operated to close the circuit 2 4 through the magnet F. This will operate the corresponding primary valve *o* and admit water to the cylinder *k*, thereby operating the piston *i* and auxiliary valve *h*, to allow water to pass through the pipe *f* and enter the auxiliary cylinder *d* to move the piston *c* downward, and thus operate the main valve D to admit water to the cylinder C. When the valve D has been opened to the proper extent, depending upon the speed at which it is desired to move the car, the conductor will break the circuit through the magnet F and allow the primary valve *o* to close. The spring *p* will then at once restore the auxiliary valve *h* to its normal position, (the water in the cylinder *k* escaping through the permanent exhaust *q*,) so as to cut off communication between the pipes *n f* and open communication between the pipe *f* and the exhaust *s*. This will remove the pressure from the auxiliary piston *c* and arrest the movement of the main valve. To stop the car or cause it to descend, the conductor will operate the push-button 13 to close the circuit through the magnet E and operate the other primary and auxiliary valves to admit water through the pipe *g* to move the main valve upward. If the car is to be stopped, the circuit through the magnet E will be broken as soon as the main valve has arrived at its mid-position; but if the car is to descend the circuit through the magnet will be maintained until the main valve has been reversed, so as to allow the water to escape from the cylinder C. To stop the car in its descent, the operation is reversed.

From the foregoing it will be seen that so long as the circuit through either one of the magnets E F remains closed the corresponding primary valve *o* will remain open and the pressure upon the primary piston will maintain the auxiliary valve *h* in position to allow water to continue to enter the cylinder *d* and move the piston *c* and the main valve until these parts reach the limit of their movement by being brought in contact with some stationary part, and if the water enters the auxiliary cylinder under a considerable pressure, as is frequently the case, the shock occasioned by thus arresting the main valve and the auxiliary piston is damaging and disagreeable. To prevent the shock caused by moving the main valve abruptly to the limit of its movement, it has been found desirable, even when the valve is operated by a hand-rope, to cause the rope to pass through a stationary guide, as 14, and to provide the rope with stops 15, arranged upon opposite sides of the guide and so positioned as to limit the movement of the rope in either direction and arrest the main valve before it arrives at the extreme limit of its movement.

Where the main valve is operated through the medium of electrical connections, such as are herein shown, it can, as already explained, be arrested at any point by simply breaking the circuit through the magnet E or F, as the case may be, at the proper time, and by this means, if the conductor is skillful and attentive, all liability of shock to the valve and its connections can be avoided; but it is found that in many cases the skill and attention of conductors cannot be relied upon for this purpose. In order, therefore, to avoid all liability of a shock to the machinery occasioned by failure of the conductor to break the circuit before the main valve reaches the extreme limit of its movement, or in those cases where the ordinary hand-rope is used as an adjunct to the electrical connections, before the valve has been moved so far as to bring one of the stops 15 violently against the guide 14, thus causing a shock and strain upon the rope, I provide the circuits 2 3 2 4 with circuit-closers 8 9 of any suitable form, but preferably composed of brushes or contact-springs, as shown, which are acted on by rods 16 19, connected to the valve-rod *w*, or by any other part of the apparatus—as, for example, the pulley 17, around which the hand-rope H passes, which moves in unison with the main valve in such manner as to automatically break the respective circuits just before the main valve reaches the limit of its downward and upward movements, but to maintain the circuits closed at all other times. The rods 16 19, or other parts which form the circuit-closers, are suitably insulated from each other and from the other parts of the apparatus to prevent the current from being diverted from the circuits.

With the system thus organized the operation is as follows: So long as the main valve is at any point between the upward and downward limits of its working movements the rods 16 19 will be in position to maintain both of the circuits 2 3 and 2 4 closed, so that by operating the respective push-buttons 12 13 the valve can be moved in either direction. As soon, however, as the valve reaches the upward limit of its work-

ing movement—that is to say, the point beyond which it is desired it should not move—the rod 16 will disconnect the brushes of the circuit-closer 8 to automatically break the circuit through the magnet E, and thus, as before explained, arrest the valve before any shock can be occasioned and before the stop 15 is brought violently against the guide 14 so as to put undue strain upon the hand-rope. The circuit-closer 9 will then, however, be in position to close the circuit through the magnet F, so that the main valve can be moved in the opposite direction to stop or reduce the speed of the car or reverse its movement. As the main valve moves downward the circuit-closer 8 will again close the circuit through the magnet E, and as it reaches the downward limit of its working movement the circuit-closer 9 will break the circuit through the magnet F and arrest the valve the same as before.

The system, as herein illustrated, is also provided with circuits 2 3 5 and 2 4 6 5, which include the battery G and a push-button 18 upon the car, and respectively include the magnets E F and circuit-closers 10 11, which are operated by a moving rod 7 to close the respective circuits as the main valve is moved downward and upward from its mid-position, and to break both the circuits when the valve is at its mid-position. By this means the main valve can be automatically arrested in its mid-position, so as to stop the car at any point by operating the push-button 18. This feature forms no part of the present invention, however, it being fully described in my prior application, hereinbefore referred to.

What I claim is—

1. The combination, with an elevator-car, its motor, and the main valve for controlling the movements of the motor, of an electro-magnet for controlling the movement of the main valve, an electric circuit for energizing said magnet, and a circuit-closer operated by a moving part of the mechanism to break the circuit through the magnet as the main valve reaches the limit of its working movement, substantially as described.

2. The combination, with an elevator-car, its motor, and the main valve for controlling the movements of the motor, of electro-magnets for controlling the movements of the main valve in opposite directions, electric circuits for energizing said magnets, and circuit-closers operated by a moving part of the mechanism to break the circuits through the respective magnets as the main valve reaches the limit of its working movement in opposite directions, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

CHARLES E. ONGLEY.

Witnesses:
J. J. KENNEDY,
T. H. PALMER.