(No Model.) 3 Sheets—Sheet 1.

E. R. ESMOND.

ELECTRIC ELEVATOR.

No. 506,169. Patented Oct. 3, 1893.

Fig. 1.

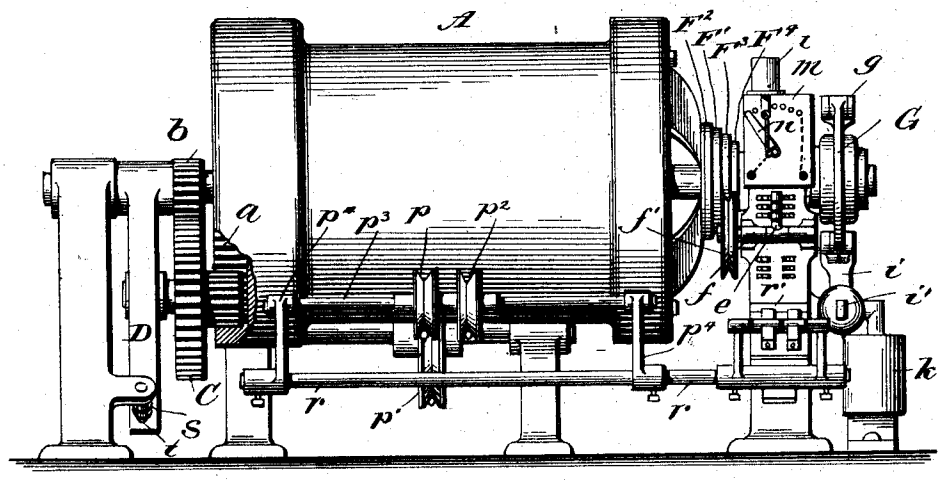
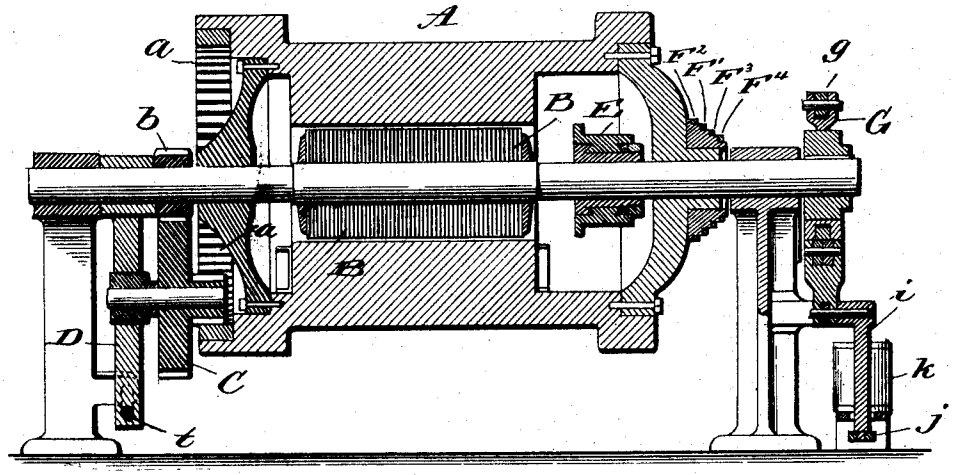


Fig. 2.



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(No Model.) 3 Sheets—Sheet 2.

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Fig. 3.

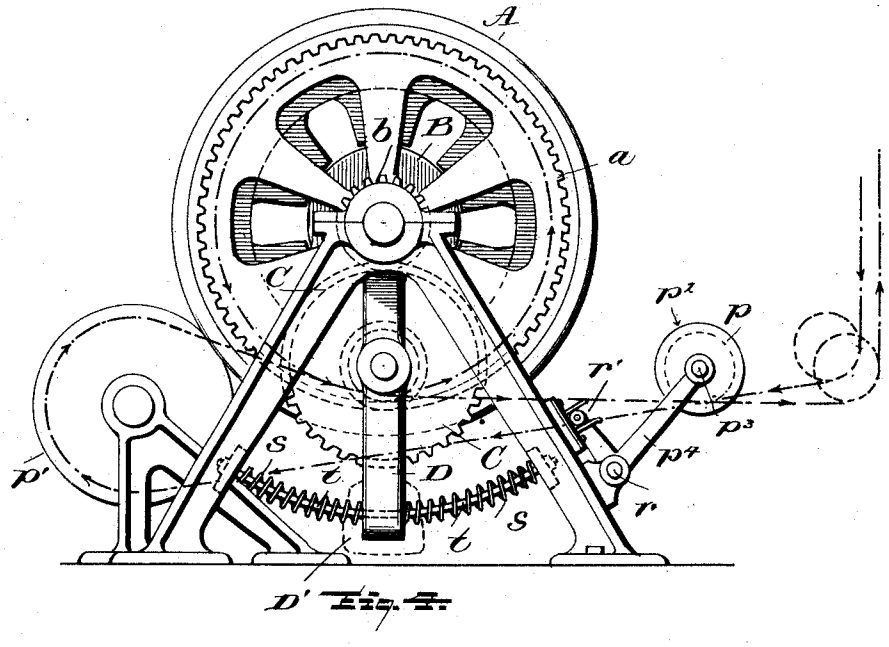
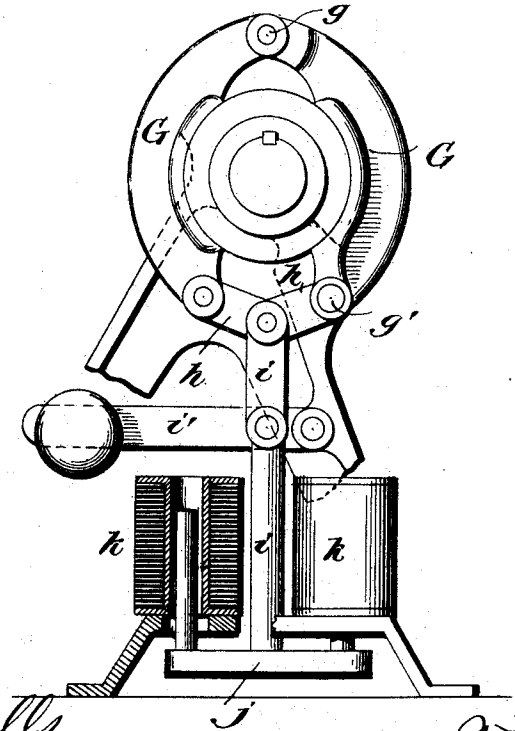


Fig. 4.



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(No Model.) 3 Sheets—Sheet 3.

E. R. ESMOND.

ELECTRIC ELEVATOR.

No. 506,169. Patented Oct. 3, 1893.

Fig. 5.

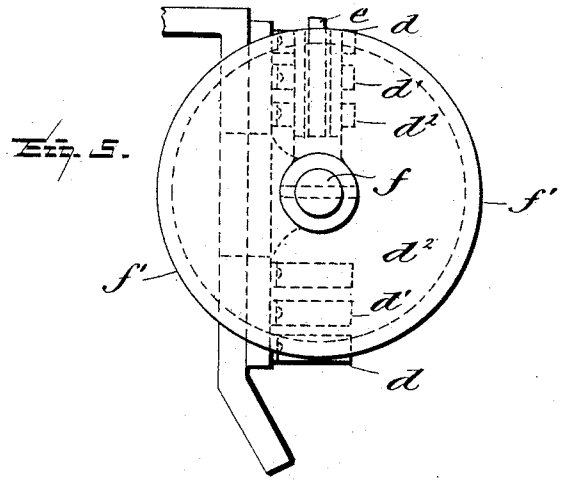
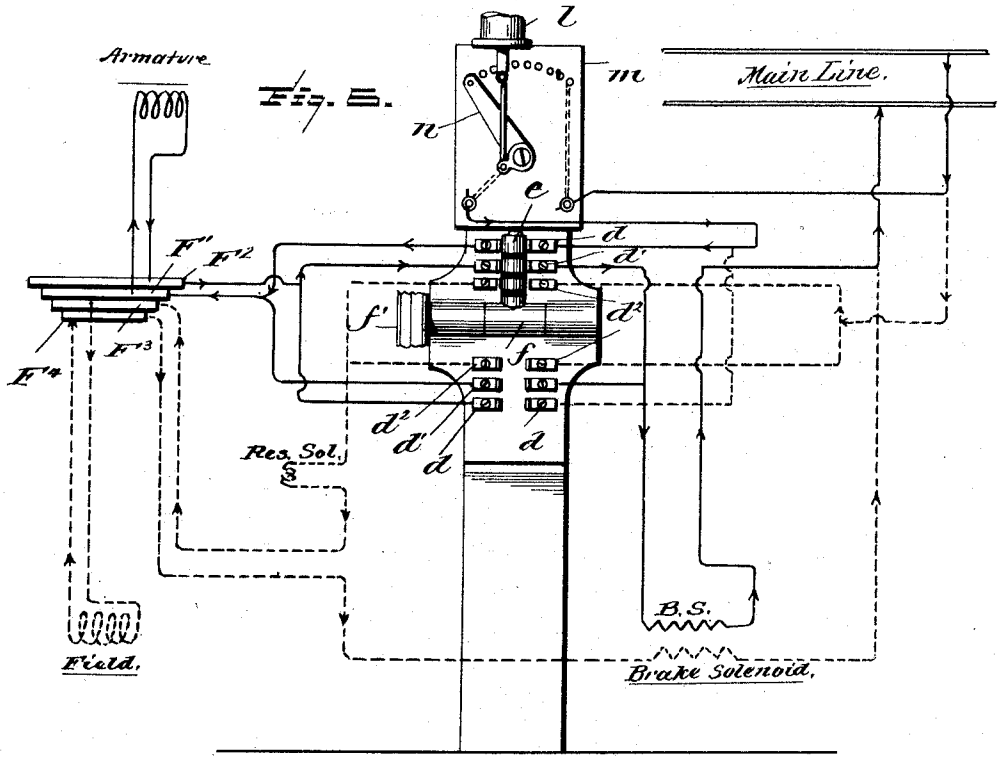


Fig. 6.



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UNITED STATES PATENT OFFICE.

ERNEST R. ESMOND, OF NEW YORK, N. Y.

ELECTRIC ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 506,169, dated October 3, 1893.

Application filed February 21, 1893. Serial No. 463,239. (No model.)

To all whom it may concern:

Be it known that I, ERNEST R. ESMOND, of the city, county, and State of New York, have invented certain new and useful Improvements in Electric Elevators and Hoisting Apparatus, of which the following is a specification.

The hoisting apparatus which I have devised comprises essentially an electric motor whose field constitutes the hoisting drum—that is to say the hoisting drum is mounted on and carried by the field of the motor, said field being rotatable and geared to the armature by an intermediate pinion. The intermediate itself is preferably pendulous, being hung so that it may move bodily in the arc of a circle struck from the axis of the armature shaft as a center; and a weight or springs or other elastic medium may be used to offer a yielding resistance to its motion in this direction, and to bring it back to its normal position. The object of this arrangement is to avoid abrupt starting and stopping of the hoisting drum, and further to preserve a uniform rate of speed whether the load be light or heavy—variations in the weight of the load being taken care of by the automatic adjustment of the intermediate to the varying condition.

To enable others skilled in the art to understand and use my invention I will now proceed to describe more particularly the manner in which it is or may be carried into effect by reference to the accompanying drawings in which—

Figure 1 is a side elevation, and Fig. 2 is a longitudinal vertical central section of a hoisting apparatus embodying my improvements. Fig. 3 is an elevation of the end at which the intermediate is located. Fig. 4 is a sectional elevation of the brake mechanism. Fig. 5 is a side elevation of the switch. Fig. 6 is a diagram of the circuits.

A is the rotating field of the electric motor which constitutes also the hoisting drum.

B is the rotating armature; on its shaft is hung an arm D in which is journaled the intermediate C which meshes on the one hand with pinion *b* on the armature shaft, and on the other hand with internal spur gearing *a* at one end of the field A. In the present instance the intermediate is a compound one its larger part gearing with the armature shaft, and its smaller part with the field as shown more clearly in Fig. 1 where a part of the field is broken away.

The arm D can vibrate on the armature shaft as an axis. In some instances it will be sufficient to weight its lower end as indicated at D′ to prevent it from being carried around by the intermediate, and to bring it back to the normal position shown in the drawings. I prefer, however, to use a yielding resistance such as furnished for example by the springs *s*, *s*, placed on opposite sides of the arm D and encircling a curved guide rod *t* which passes through a guide eye or slot in the arm. In this way I avoid jar and shock in either starting or stopping the hoisting drum. The hoisting rope comes down and passes under pulley *p*, thence across under the machine to the wheel *p′* passing under this wheel, thence up over it, down under and three or four times around the hoisting drum, and thence out under pulley p^2. The pulleys *p*, p^2 are mounted on a connected shaft p^3, carried by crank arms p^4 attached to a rock shaft *r*, which carries the movable member of the main cut out or switch *r′*. When the hoisting rope is in order it will by passing under the pulleys *p*, p^2, hold them up in a position in which the switch *r′* will be closed. Should the rope break, or become unduly slack, the pulleys will at once drop by gravity, and in so doing will rock shaft *r* in a direction to open the switch *r′*—the effect of which as hereinafter described will be to at once apply the brake to the motor.

On the armature shaft is the commutator E and on the field are the four annular contact strips F′, F^2, F^3, F^4,—each insulated from the other; two of these strips are electrically connected to the commutator brushes, and two of them to the field. There is an insulated contact brush for each strip F′, &c., but these brushes as well as the commutator brushes are omitted, as their construction is well known to electricians.

The brake consists of two brake shoes G encircling a hub on the armature shaft and jointed together at *g*. One of the brake shoes is pivoted to the frame of the machine at *g′*;

and h, h are two toggle arms to which is jointed at their meeting point a vertical rod i fast at its base to a plate j carried by the cores of the brake solenoids or suction magnets k. Whenever the current is on, the brake solenoids draw up their cores, and thus raise the rod i. Consequently the toggle arms h are operated to release the brake. When the current is off, the rod i by its weight and that of the parts attached to it will drop thus at once setting the brake. Its downward movement can be assisted by the weighted lever i' pinned to it as seen in Fig. 4.

The switch for stopping, starting and reversing, comprises two sets of contacts, each consisting of three pairs d, d', d^2. The movable contact which operates in connection with them is shown at e; it is mounted on a rock shaft f, provided with a pulley f', for receiving the operating cord which extends to and is connected with it in the same way as is the operating cord in ordinary elevators. When the part e is engaged with one set of contacts the drum will move in one direction; when it is engaged with the other set the drum will revolve in the opposite direction; and when in its intermediate position the drum will be at rest. A resistance box m is provided which is included in the armature circuit, and a resistance solenoid l is provided for operating the contact arm n, this solenoid being in the field circuit. The resistance contact arm is connected to the core of the solenoid. When the solenoid is inactive the core drops and the arm n is moved in a direction to throw in all the resistance. As soon as the solenoid is active, it draws up its core, and consequently the contact arm n is moved to gradually cut out all resistance, and to allow the full measure of current to pass to the armature. The contacts d, d' are in the armature circuit, the contacts d^2 in the field circuit.

The circuit connections are represented in Fig. 6 and are as follows: The armature circuit, is from main line, through resistance box, through contacts d, and contact strip F', to and through the armature, thence out through strip F^2, and contacts d' through the brake solenoid and thence back to line. The field circuit is from main line through resistance solenoid, contacts d^2, strip F^3, to and through field, thence out through strip F^4 to and through brake solenoid and back to line.

Having described my improvements, what I claim, and desire to secure by Letters Patent, is—

1. In an electric elevator or hoisting apparatus, an electric motor comprising a field and an armature, both of them rotatable, an intermediate pinion geared on the one hand to the armature and on the other hand to the field, a carrier for said intermediate vibratory upon an axis coincident with that of the armature, and a hoisting drum mounted on or formed with the field, substantially as hereinbefore set forth.

2. In an electric elevator or hoisting apparatus, the intermediate and its pendulous spring or weight-controlled carrier, in combination with the rotatable field and rotatable armature and a hoisting drum mounted on or formed with the field, substantially as hereinbefore set forth.

In testimony whereof I affix my signature in presence of two witnesses.

ERNEST R. ESMOND.

Witnesses:
GEO. W. DELANO,
P. Q. ECKERSON.