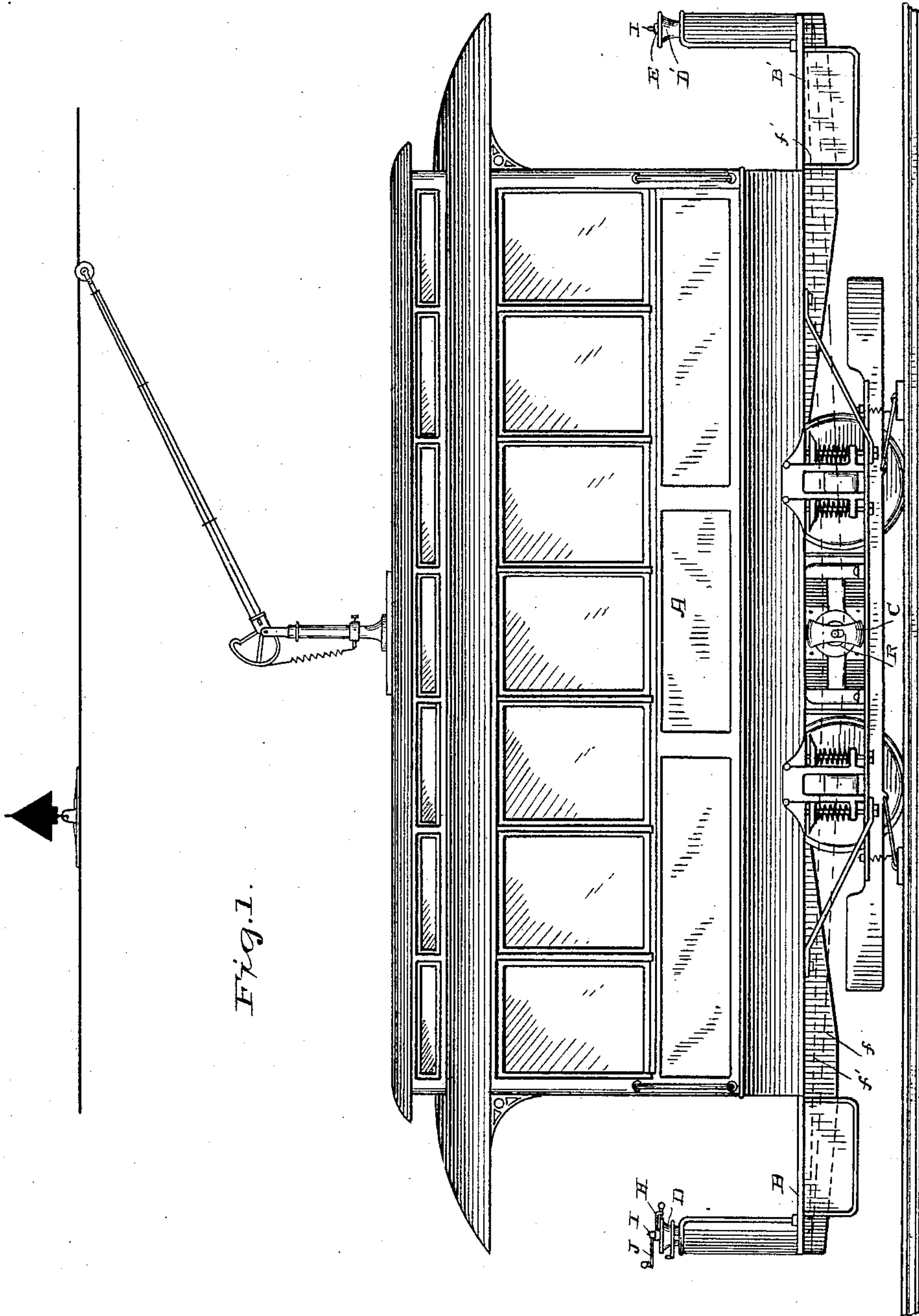


2 Sheets—Sheet 1.

MECHANISM FOR CONTROLLING ELECTRIC RAILWAY MOTORS.

Patented July 9, 1889.



Inventor

Charles J. VanDepoele

By his Attorney

Frankland Jarvis.

(No Model.)

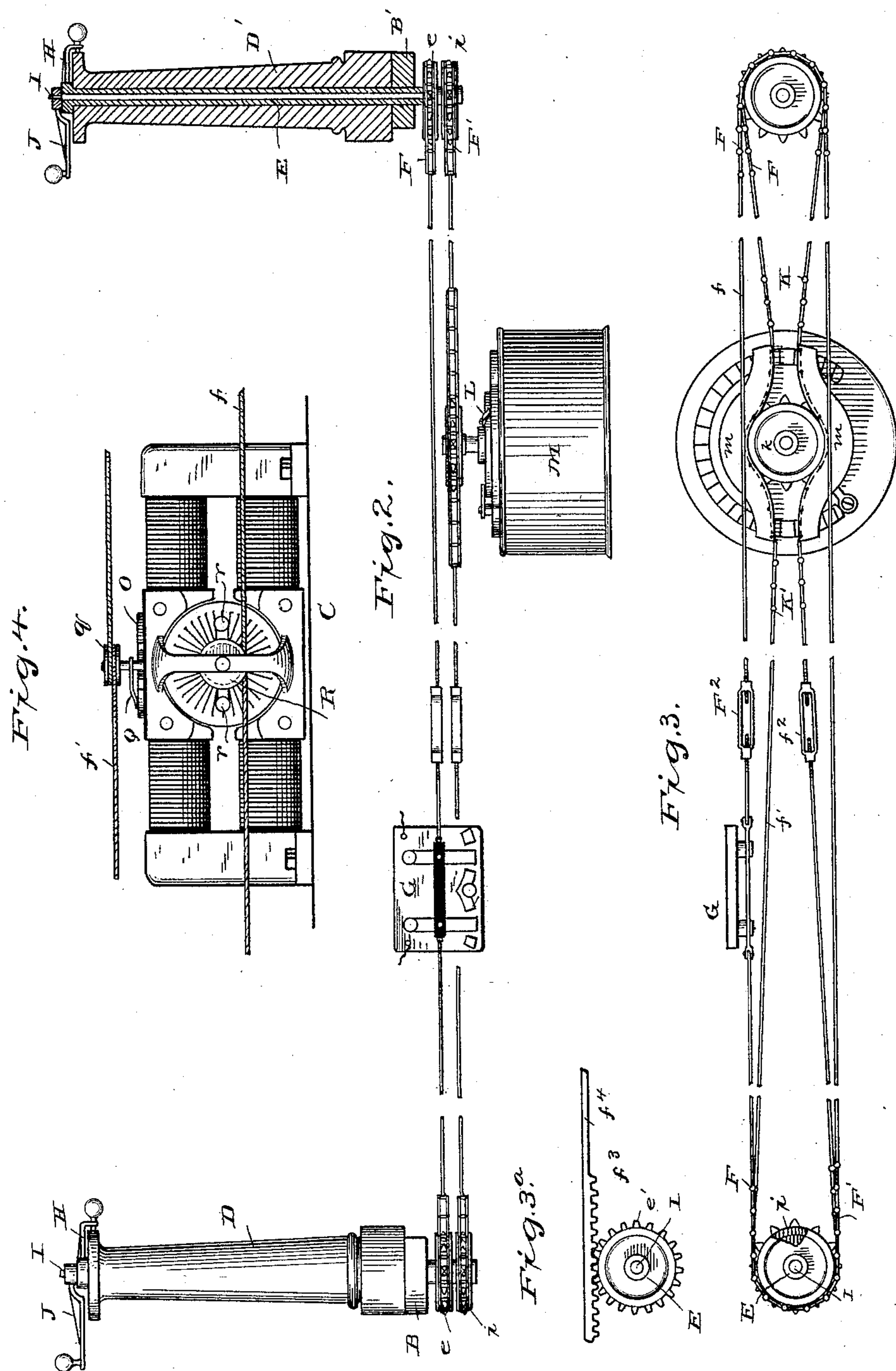
2 Sheets—Sheet 2.

C. J. VAN DEPOELE.

MECHANISM FOR CONTROLLING ELECTRIC RAILWAY MOTORS.

No. 406,798.

Patented July 9, 1889.



Witnesses

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UNITED STATES PATENT OFFICE.

CHARLES J. VAN DEPOELE, OF LYNN, MASSACHUSETTS.

MECHANISM FOR CONTROLLING ELECTRIC-RAILWAY MOTORS.

SPECIFICATION forming part of Letters Patent No. 406,798, dated July 9, 1889.

Original application filed October 29, 1888. Serial No. 289,488. Divided and this application filed April 13, 1889, Serial No. 307,133. (No model.)

To all whom it may concern:

Be it known that I, CHARLES J. VAN DEPOELE, a citizen of the United States, residing at Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Mechanism for Controlling Electric-Railway Motors, of which the following is a description, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon.

This application is a division of case filed October 29, 1888, Serial No. 289,488.

The invention relates generally to mechanism for operating electric motors, and more particularly to means for starting, stopping, regulating, and reversing an electric motor or motors when applied to the propulsion of vehicles, as on electric-railway cars.

As herein shown by way of illustration, the invention is applied to the manipulation of a motor mounted upon a platform suspended below the car-body; and it consists in providing at each end of the car, or other point from which it is desired to operate the propelling-power, a suitable support in which are sustained a pair of levers connected to moving parts below the car, by which the electro-dynamic mechanism for propelling the same can be started, stopped, reversed, and otherwise controlled. The mechanism by which this is effected may be varied in a number of ways and the results may be attained in different modes electrically, as will appear.

The construction, arrangement, and operation of the parts will be hereinafter fully described, and referred to in the appended claims.

In the accompanying drawings, Figure 1 is a view in elevation showing an electric-railway car embodying my invention. Fig. 2 is a diagrammatic view showing the connections between the operating-levers, the motor-reversing switch, and the adjustable resistance. Fig. 3 is a plan view of the parts shown in Fig. 2. Fig. 3^a is a detail showing a different form of connection. Fig. 4 is an elevation of a motor showing a different mode of applying my said invention.

Similar letters denote like parts throughout.

As indicated in the drawings, A is an electric-railway car provided with the usual end platforms B B'. A motor or motors C is or are suitably sustained upon a platform attached to and depending from the car-body, though it will be apparent that for the purposes of this invention it is immaterial whether the motor be depending from the car-body or located within the casing inside the car or under one of the seats thereof.

D D' are posts located at convenient points near each end of the car or upon each of the platforms B B', desirably to the right of the front of each of said platforms, so that the motor-man standing in the center of the platform will have the operating devices convenient to his right hand, and also have an unobstructed view of the track ahead. The posts D D' at each end of the car (or at one end only if the car is of the species known as "bob-tail") are securely mounted, and each provided with two rotatable shafts passing entirely therethrough, one within the other. Each hollow shaft E is provided with a sprocket-wheel *e*, upon each of which is placed a chain F F², said chains being connected by rods or cables *f*. A turn-buckle F' is also provided for adjusting the tension of the parts.

In referring to posts upon each platform of a car, and also to sprocket-wheels and chains as the medium of connection between rotatable shafts in the posts and the propelling portions of the motor or motors, I desire to be understood as stating that so far as the principal features of my invention are concerned it is entirely immaterial whether one or more posts are used, or what be the nature of the connections between the actuating hand-levers and the reversing or commutator-brush-shifting parts of the motor, the invention consisting in means for controlling the direction of motion of the motor and the rate thereof, and any organization of devices for producing these results at a distance from the motor is within the spirit of my invention.

In the case of a bob-tail car one post need only be provided, the other extremity of the loops connected to the reversing-switch and

rheostat being carried upon idle-pulleys suitably attached to the bottom of the car. It will also be apparent that I am not confined to the use of flexible devices for thus controlling the speed and direction of the motor, as an obvious modification of the foregoing would consist in the substitution for the sprocket wheel or wheels of a small pinion or pinions engaging a rack or racks attached to connecting-rods extending below the vehicle and attached to the parts to be moved. An arrangement such as just referred to is seen in Fig. 3^a, e' being the pinion, and f^3 the rack in mesh with pinion e' . Rod f^1 extends from the rack to the device to be operated, and is suitably sustained and guided, a part only of said rod being shown for convenience.

As seen in Fig. 2, G indicates a reversing-switch, to which the terminals of the propelling motor or motors are connected. This switch may be constructed in a variety of ways, the essential feature being that when in one position the current will enter the motors and drive them in one direction, and when in its other position the conditions will be reversed. The cable f is connected to the moving parts of the switch G. An operating-lever II is provided at each post D D, and there removably secured to the tubular shafts E E. By means of lever II the said shaft or shafts can be rotated and motion imparted to the sprocket-wheels e , chains F, and cable f to throw the switch G in the desired direction. In practice only one set of levers II J are provided.

I I represent shafts passing through the interiors of the tubular shafts E E. The shafts I I are provided at their lower extremities with sprocket-wheels $i i$ and at their upper extremities with operating-handles J J. Chains F' F' pass around sprocket-wheels $i i$, and, as shown in Figs. 2 and 3, are connected to other chains K K' by sections of metallic rods or cables f' , in which latter is included a turn-buckle f^2 for adjusting the tension of the parts as desired.

As indicated in Figs. 2 and 3, the additional chains K K' engage and actuate a sprocket-wheel k , to which is attached the moving terminal L of an adjustable resistance M. Where desired, guideways $m m$ are provided to hold the chains K' in engagement with the teeth of the sprocket-wheel k . With this construction it will be apparent that movement of the handles J, or either of them, will impart rotary motion to the sprocket-wheel i , which will move the chains and rods connected thereto and the sprocket-wheel k , thus moving the terminal of the adjustable resistance M, which may thus be placed as desired to effect the necessary regulation.

While for better illustration I have in Fig. 2 shown two sets of operating-handles II J, it will be understood that in practice only one set is provided. Said handles, being readily removable, are placed upon the forward part,

thus enabling the motor-man to see ahead and at the same time preventing interference from the other part with his sole control of the apparatus.

From the foregoing it will be understood that the mechanism there described is applicable to and designed for the control and regulation of a motor or motors operating with stationary commutator-brushes and a set field of force, through which the flow of current is controlled and regulated by a variable resistance external to the motor. This, however, is not the only manner in which my invention can be utilized.

As indicated generally in Fig. 1 and shown more in detail in Fig. 4, the invention is specially adapted to the operation of what I have called my "rheostatic motor," the said motor being the subject of Letters Patent No. 347,902, granted to me August 24, 1886. As seen in Fig. 4, the auxiliary field-magnet coils referred to in said patent are represented by terminals O, upon which moves a contact arm or finger O', arranged to be actuated by a sprocket or grooved wheel q . With this construction the auxiliary chains K K' may be dispensed with, and the cable f' , connecting the main sprocket-chains F F', should be connected to the pulley q for imparting the desired rotary movement thereto.

A reversing-switch G may be employed with the construction just referred to; but in certain instances I desire to make use of adjustable and reversible commutator-brushes in lieu thereof. When this is the case, the reversing-switch will be dispensed with and the cable f secured directly to the hub R of the commutator-brush holder, so that a forward or backward movement of the cable f , produced by rotary movement of either of the tubular shafts E and sprocket-wheels e , will turn said hub R upon its axis, thereby moving the brush-holders and brushes to any desired position upon the commutator.

In Fig. 1 the cables $f f'$, connecting, respectively, the field-magnet-controlling switch Q and the movable commutator-brush, are for purposes of illustration indicated in dotted lines. Parts of said cable are, moreover, shown in full in Fig. 4, the remaining portions thereof and their operative connections being similar to that shown in Fig. 2 and heretofore described.

I have heretofore particularly described my said invention; but it will be understood that said specific description is for the purpose of illustration only, not with any intention of limiting the said invention to any precise details set out, since the same may be varied in many ways without departing from the spirit thereof.

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

1. A controlling mechanism for electric motors, comprising a pair of movable hand-levers supported at either end of the vehicle

to be propelled and at a distance from the motor or motors, two sets of movable mechanical connections, one attached to and operated by each hand-lever, current-controlling devices mechanically connected to one of the movable connections for regulating the speed and power of the motor, and circuit-reversing mechanism connected to and operated by the other of said hand-levers and connections, substantially as described.

2. The combination of an electrically-propelled vehicle, an electric motor or motors connected to the running-gear thereof, a support or standard upon the forward part of said vehicle, a tubular shaft within said standard, a shaft within the tubular shaft, operating-levers attached, respectively, to said shafts for imparting rotary movement thereto independently, sprocket wheels and chains upon each shaft, and connections extending from said independent set of sprocket-chains to devices for controlling, respectively, the direction of movement and the rate thereof of the motor or motors, substantially as described.

3. The combination of an electrically-propelled vehicle, a post or support upon the forward part thereof, a tubular shaft sustained in said support and provided with an operating-handle at its upper end and with a sprocket-wheel or equivalent at its lower extremity, said shafts, operating-handles, and sprocket-wheels operating independently,

means for controlling the direction of rotation of the armature of the motor propelling the vehicle and for varying the speed thereof, and separate sets of connections between the sprocket-wheels and the said speed and direction controlling devices, substantially as described.

4. The combination of an electrically-propelled vehicle, posts D D', located one on each platform thereof, a reversing-switch included in the circuits of the motor, a rheostat also included in the external circuit of the motor, a tubular shaft E in each post and an operating-handle adapted to engage the upper extremities thereof, sprocket-wheels on the lower extremities of each of said tubular shafts, an endless flexible connection extending between said sprocket-wheels and the reversing-switch, separate shafts extending through the tubular shafts and provided with an operating handle or handles at their outer extremities and with sprocket-wheels on their lower extremities, and flexible connections extending from said sprocket-wheels to the circuit-controlling devices for regulating the speed and power of the motor, substantially as described.

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

CHARLES J. VAN DEPOELE.

Witnesses:

J. W. GIBBONEY,
FRANKLAND JANNUS.