

T. P. CHANDLER.
ELECTRIC RAILWAY.

(Application filed Oct. 22, 1900.)

(No Model.)

2 Sheets—Sheet 1.

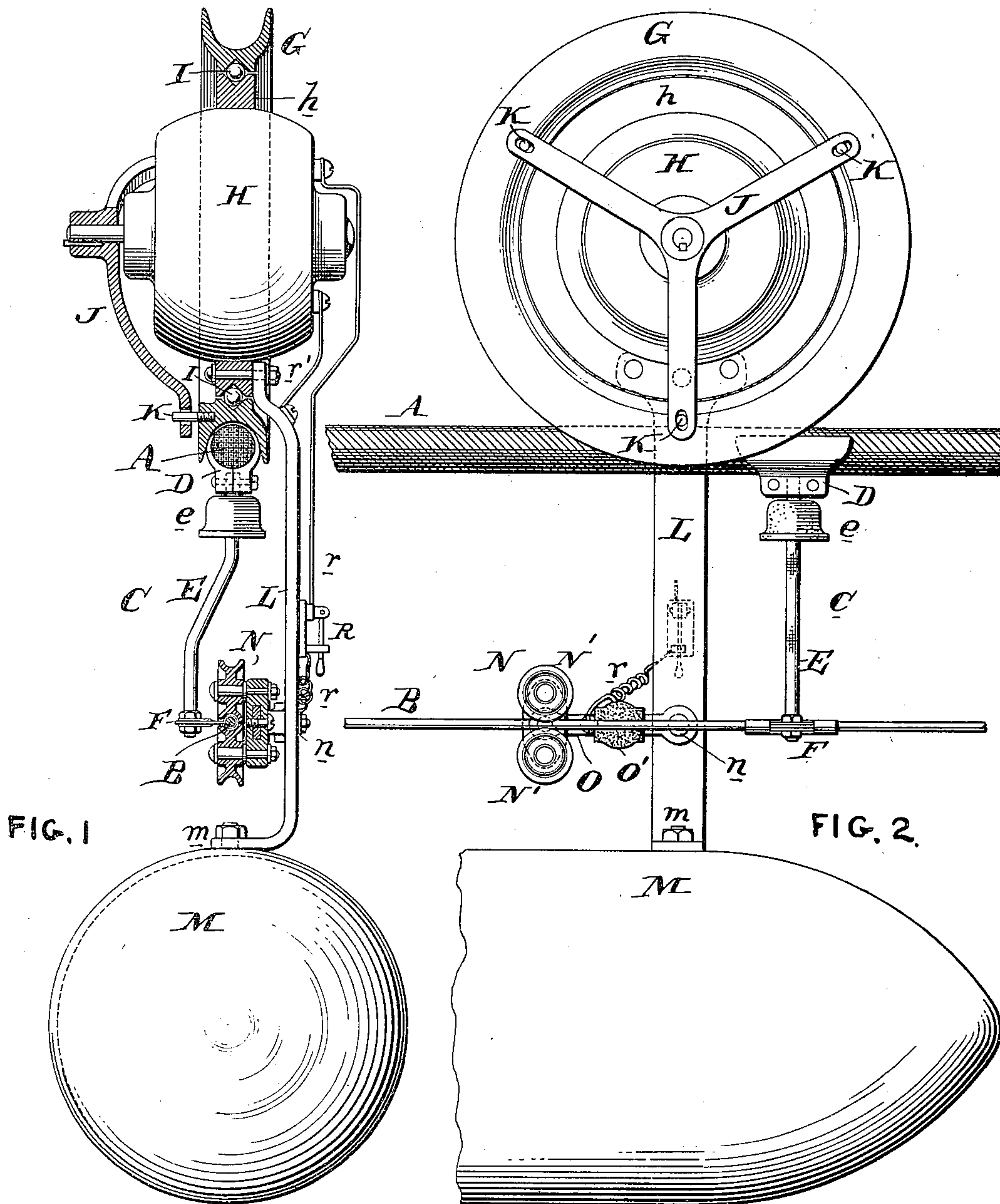


FIG. 1

FIG. 2.

WITNESSES.

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A. M. Kelly

INVENTOR.

Theophilus P. Chandler
By *W. H. Kelly*
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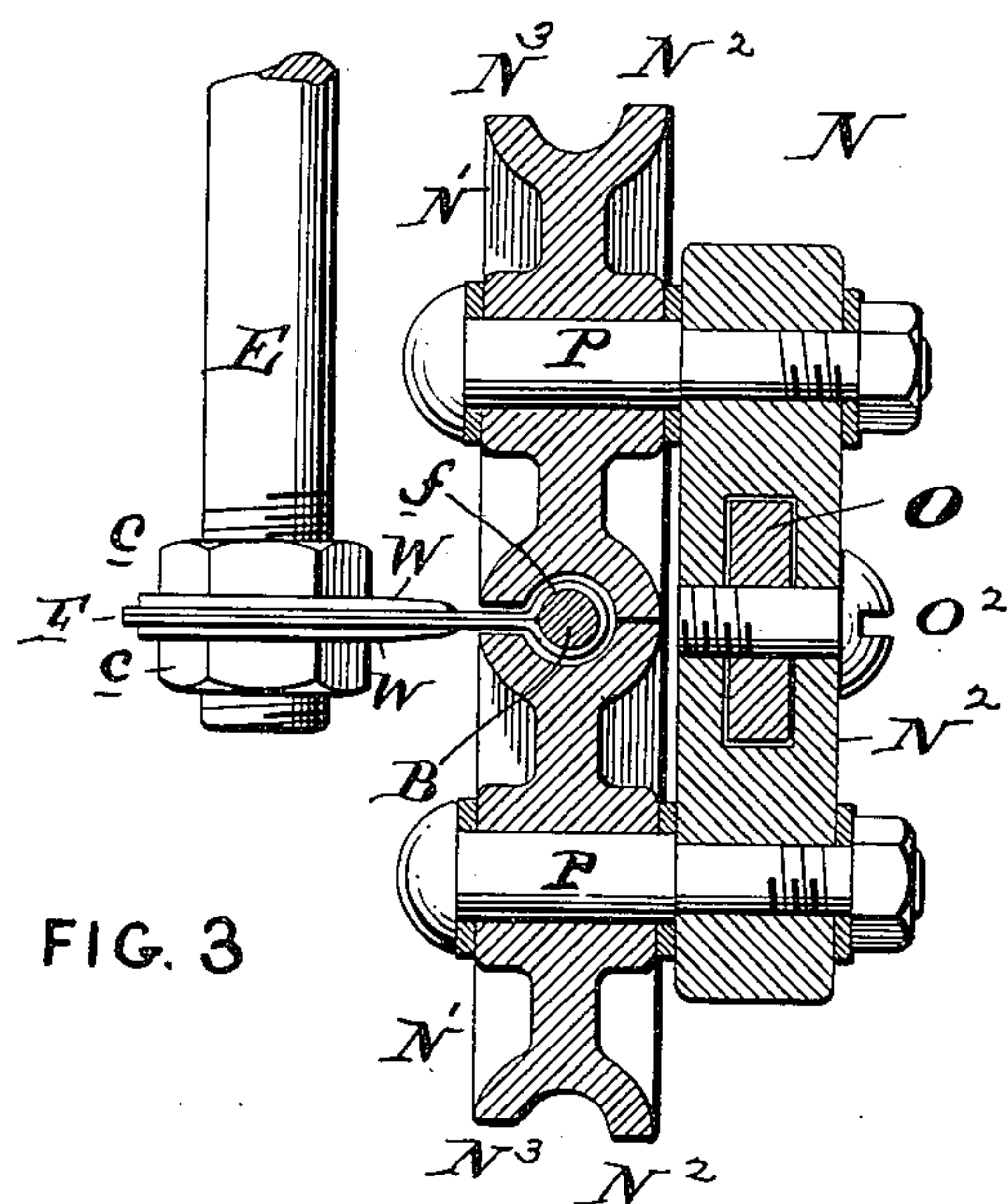


FIG. 3

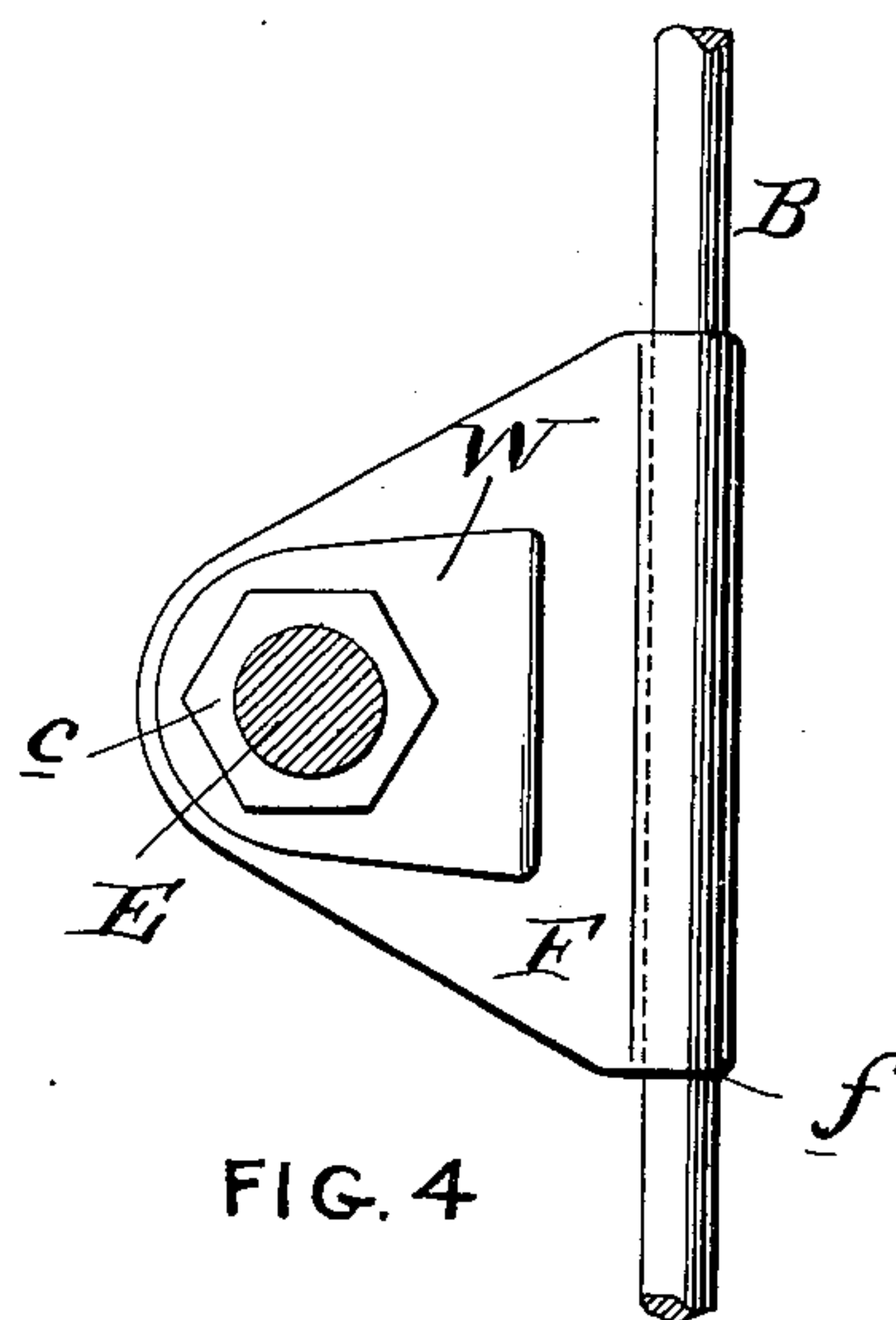


FIG. 4

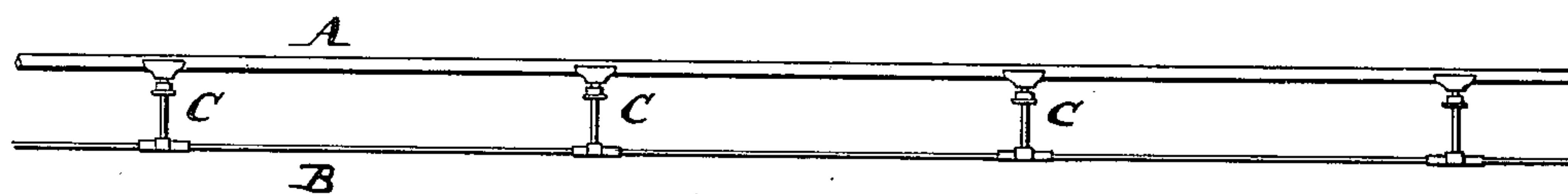


FIG. 5

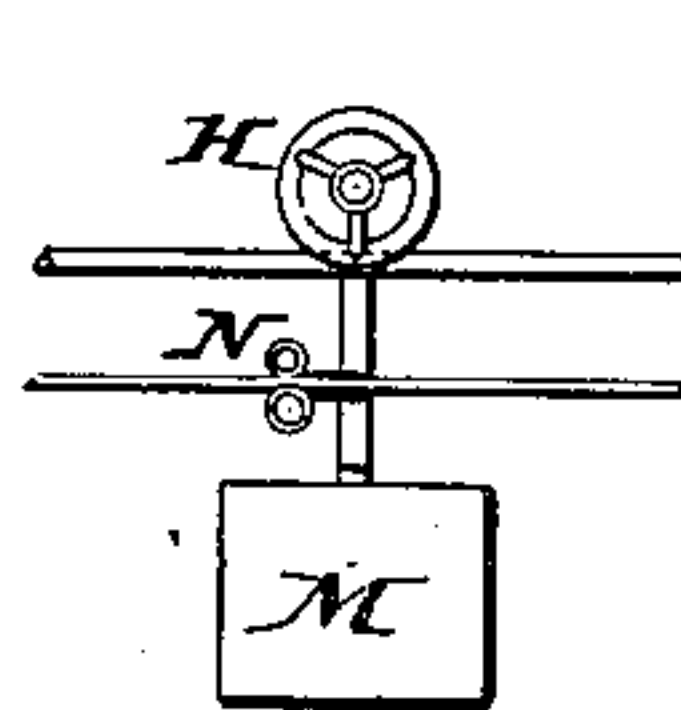


FIG. 6

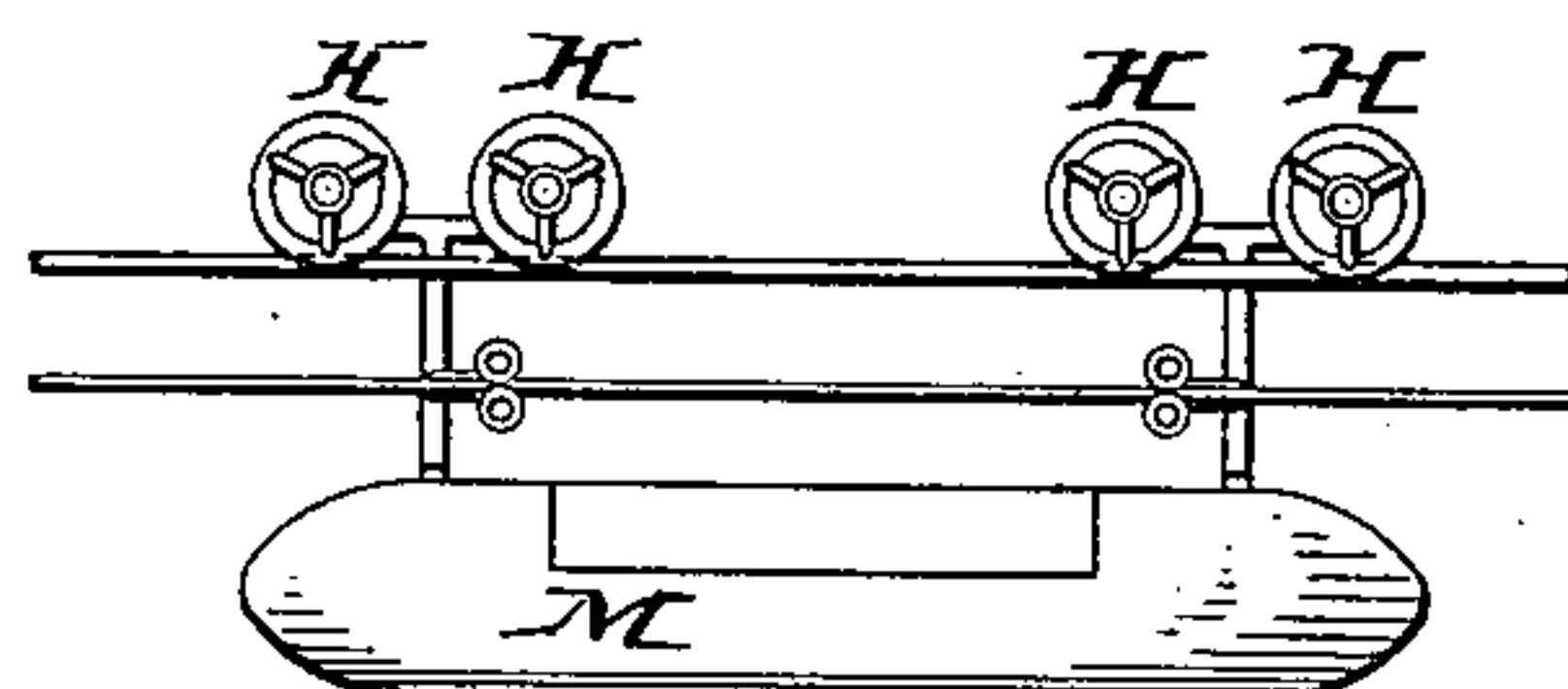


FIG. 7

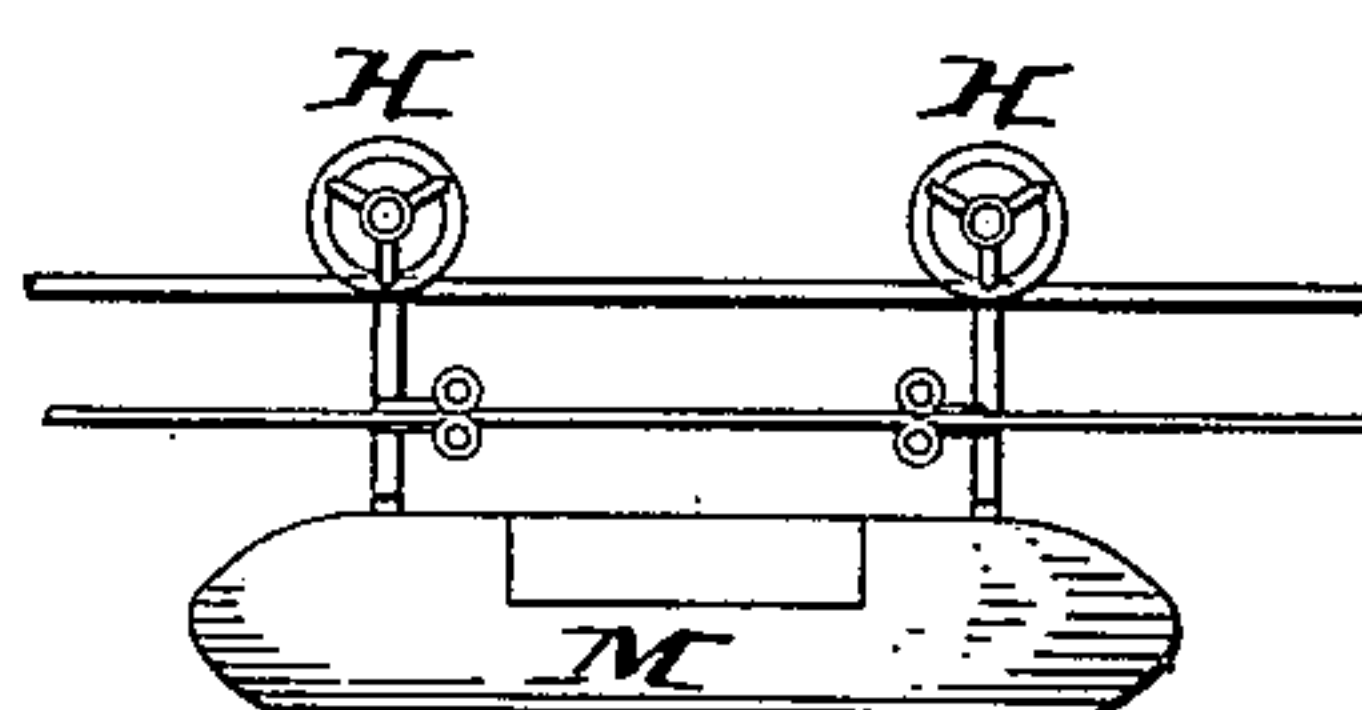


FIG. 8

WITNESSES.

Henry D. Dwyer
A. M. Kelly

INVENTOR.

Theophilus P. Chandler
By his atty
[Signature]

UNITED STATES PATENT OFFICE.

THEOPHILUS P. CHANDLER, OF PHILADELPHIA, PENNSYLVANIA.

ELECTRIC RAILWAY.

SPECIFICATION forming part of Letters Patent No. 663,600, dated December 11, 1900.

Application filed October 22, 1900. Serial No. 33,814. (No model.)

To all whom it may concern:

Be it known that I, THEOPHILUS P. CHANDLER, of the city and county of Philadelphia, in the State of Pennsylvania, have invented an
5 Improvement in Electric Railways, of which the following is a specification.

My invention has reference to electric railways; and it consists of certain improvements, which are fully set forth in the following specification and shown in the accompanying drawings, which form a part thereof.
10

My improvements relate to that class of railways set out in Letters Patent granted to me June 12, 1900, No. 651,343, and September
15 4, 1900, No. 657,330, and more particularly embody certain improvements in the means of sustaining the suspended secondary conductor, the details of the motor-truck, and the construction of the current-collector or
20 trolley.

The object of my invention is to reduce the amount of friction in the motor-truck to a minimum and also to provide a trolley or collector device which shall readily adapt itself
25 to all conditions of the suspended conductor without liability to be disengaged therefrom.

In carrying out my invention I arrange the motor proper within the grooved sustaining-wheel and supported in position by means of
30 ball-bearings, which perform the function of properly locating the motor laterally and vertically and at the same time centralizing the strains, so as to hold the grooved wheel in a vertical position and permit it to run with a
35 minimum friction. I further provide the secondary suspended conductor with suitable supports, which permit the free passage of a pair of grooved collector-wheels respectively arranged above and below the said conductor,
40 said collector-wheels being carried upon a substantially horizontal arm pivoted to the electric vehicle, so that its free end may swing vertically to suit all irregularities of the conductor.

My invention also comprehends details of construction, all of which will be better understood by reference to the drawings, in which—
45

Figure 1 is a front sectional elevation
50 through an electric railway embodying my improvements. Fig. 2 is a side elevation of a portion of same. Fig. 3 is an enlarged sec-

tional elevation corresponding to a portion of Fig. 1, illustrating the secondary conductor and the collector or trolley. Fig. 4 is a sectional plan view of the support for the secondary conductor. Fig. 5 is a side elevation of the conductor-cables and their connecting-supports; and Figs. 6, 7, and 8 are side elevations of different types of cars or vehicles
55 to which my improvements are adapted. 60

A is the main suspended cable, adapted to carry the weight of the electrically-propelled vehicle and acts as an electric conductor of one polarity. B is the suspended conductor
65 of the other polarity and may be made, if desired, very much lighter in weight than the cable A, and C represents the insulating suspension devices, whereby the conductor B may be sustained at intervals from the cable
70 A. In practice the cables A and B may be connected by the insulating suspension devices C at reasonable distances apart—for instance, about one hundred feet—whereas the
75 cables A and B may be sustained from the earth at extremely great intervals—as, for example, in one-thousand-foot spans—as is fully described in Letters Patent No. 651,343 afore-

said.
D is a clamp or jaw adapted to grasp the
80 cable A, preferably with freedom of rotation thereon, and to it is connected the insulating-bell *e*, which carries the downwardly-projecting rod E, bolted to the horizontal plates F, preferably of thin steel. These plates may be
85 reinforced above and below by specially-constructed washers W, which are clamped upon the plates F by means of the nuts *c c*. The steel-plate structure F is looped, as at *f*, through which the suspended conductor wire or cable
90 B passes, and, if desired, firmly soldered or otherwise secured therein. The plate F flares or widens as it approaches the conductor B, so as to make a better and more firm connection therewith. The general construction of this
95 support for the conductor B gives sufficient elasticity to compensate for swinging and vibration of the conductor B relative to the cable A and at the same time connects the
100 said conductor B in such a manner that only a very thin lateral suspending device is necessary to hold it in position. As shown, the rod E is bent or curved for the purpose of enabling the conductor B to hang immedi-

ately below the suspended cable A, as shown in Fig. 1.

G is a grooved truck-wheel adapted to run upon the cable A and is made annular, with an internal groove in which the antifriction-balls I are placed.

H is an electric motor and has about its circumference a grooved annular part or ring h, also working in connection with the balls I. By this construction the grooved wheel G may be revolved freely about the motor H. The motor H is rigidly connected with a downwardly-extending frame L, to the lower end of which is connected the vehicle-body or carrying-receptacle M, which is attached to said downwardly-extending frame by a suitable connection f, which is rigid in the case of a vehicle having a single truck, as indicated in Fig. 6, and which is adjustable in cases where two trucks are employed, as in Figs. 7 and 8, to enable said trucks to swivel in passing around curves. The motor-shaft is provided with spider J, which is furnished at the outer ends of its arms with apertures through which studs extend, said studs being secured to the annular grooved wheel G. It will now be seen that the rotation of the armature of the motor-shaft will cause the grooved wheel G to revolve, and the loose connection between K and J will permit reasonable wear without in any wise binding upon the bearings of the motor-shaft.

N is a current-collecting device or trolley and is pivoted to the downwardly-extending frame L at n. The arm O is divided and insulated at O', and at the free end of said arm is pivoted at O² the cross-bar N², carrying above and below the pivot O² the studs P P, upon which are respectively journaled the collector-wheels N' N'. These collector-wheels N' are grooved in their peripheries, so as to form two sets of radial flanges N² and N³ of different diameters, the flanges N² being such as to permit the wheels to normally roll in contact without binding upon the suspended conductor and the flanges N³ being of sufficiently small diameter to enable a space to be formed between the two wheels sufficient for the flattened parts of the steel supports F to freely pass, as clearly indicated in Fig. 3. By examining Fig. 3 it will be observed that under no conditions can the trolley device become disengaged from the suspended conductor, as the wheels N' cannot be separated. This is important, because in electric railways of this class, especially those designed for transmission of merchandise and mail, there is no one present with the vehicle to replace the trolley in case it should jump the track. The bar N² is free to oscillate on its pivot-pin O², so that the wheels N' N' may trail upon the cable, either one in advance of the other, as the friction may require. When they are in a vertical position, as indicated in the various figures, they run very freely on the conductor B; but if they take a slight oblique position they will

both have a tendency to run in firm contact with the conductor and at the same time adjust themselves freely on passing over any of the supporting devices F f.

r is a conductor leading from the trolley N to one terminal of the motor and may be provided with a circuit-controlling switch R. The other terminal of the motor is connected by a conductor r' with the frame L of the motor. In this manner the electric current may pass by the conductor B through the motor and returns by cable A, or vice versa, as desired.

While I prefer the construction shown, the minor details thereof may be modified without departing from the principles of the invention.

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

1. In an electric railway, the combination of the conductors A and B, with a series of depending insulating-supports C attached to the cable A, and horizontal plate-supports secured at the bottom of the supports C and looped about the conductor B.

2. In an electric railway, the combination of the conductors A and B, with a series of depending insulating-supports C attached to the cable A, horizontal plate-supports secured at the bottom of the supports C and looped about the conductor B, an electrically-propelled truck running upon the conductor A and having a depending frame, and a trolley-arm pivoted to the said depending frame and having its free end provided with two grooved wheels arranged upon opposite sides of the conductor B and in which the diameters of the flanges of said wheels on one side are greater than the diameters of the flanges on the opposite side.

3. In an electric railway, the combination of the conductors A and B, with a series of depending insulating-supports C attached to the cable A, horizontal plate-supports secured at the bottom of the supports C and looped about the conductor B, an electrically-propelled truck running upon the conductor A and having a depending frame, a trolley-arm pivoted to the said depending frame and having its free end provided with two grooved wheels arranged upon opposite sides of the conductor B and in which the diameters of the flanges of said wheels on one side are greater than the diameter of the flanges on the opposite side, and a cross-bar pivoted to the end of the trolley-arm in line with the conductor B and carrying studs upon which the trolley-wheels are journaled.

4. In an electric railway, the combination of a suspended conductor, a supporting horizontally-extending bracket structure consisting of a flat plate looped about the conductor, a pivoted trolley-arm adapted to move vertically at its free end, and two grooved collector-wheels arranged one above and the other below the conductor and having their

corresponding flanges on one side of the conductor closer together than on the other side.

5 In an electric railway, the combination of a suspended conductor, a supporting horizontally-extending bracket structure consisting of a flat plate looped about the conductor, a pivoted trolley-arm adapted to move vertically at its free end, two grooved collector-wheels arranged one above and the other below the conductor and having their corresponding flanges on one side of the conductor closer together than on the other side, and an intermediate support between the said trolley-wheels and the free end of the pivoted arm whereby said trolley-wheels may assume different positions so that either wheel may be in advance of the other or assume a position in which one is vertically over the other.

6. In an electric railway, a suspended conductor B, a flat plate support or bracket arranged horizontally and looped about the conductor B, retaining-washers W for holding the plate in position, a vertical support extending through the washers and plate, and clamping-nuts c for clamping the plate and washers firmly upon the rod.

7. In an electric railway, the combination of a suspended conductor sustained at intervals by laterally-projecting thin brackets or plates of less thickness than the diameter of

the conductor, with a trolley device consisting of a vertically-movable frame and two grooved collector-wheels pivoted to said frame, one being arranged above and the other below the conductor and in which the flanges of said two wheels on the side of the conductor most distant from the bracket or supporting-plate are normally closer together than are the corresponding flanges of said wheels on the side of the conductor adjacent to said supporting bracket or plate.

8. In an electrically-propelled vehicle, the combination of a suspended conductor, a large grooved annular truck-wheel, a motor arranged within the grooved truck-wheel, antifriction-bearings interposed between the grooved truck-wheel and the motor, a radial spider-frame secured to the motor-shaft, loose power-transmitting connections between the said spider and the annular grooved truck-wheel, and a vehicle-body or compartment for conveyance of merchandise, &c., secured to the motor and depending below the suspended conductor.

In testimony of which invention I have hereunto set my hand.

THEOPHILUS P. CHANDLER.

Witnesses:

E. DONALD ROBB,
HENRY C. ESLING.