

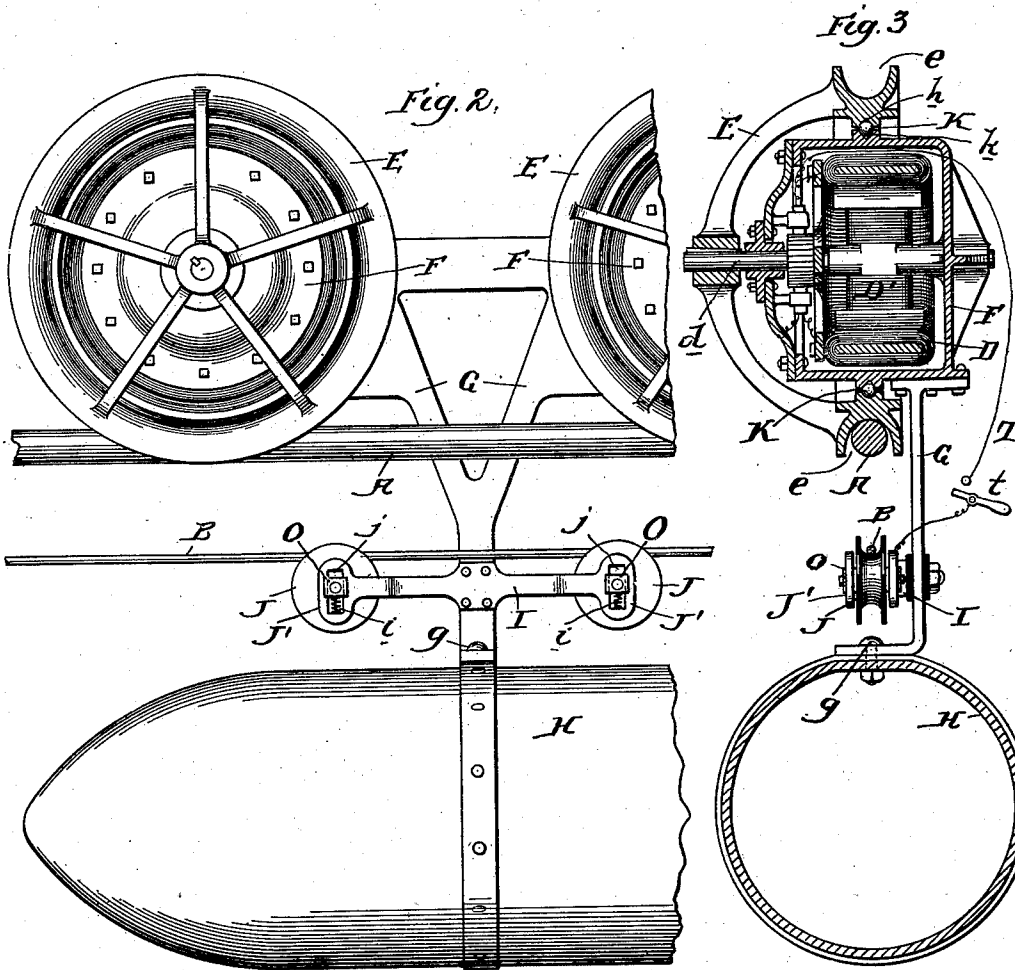
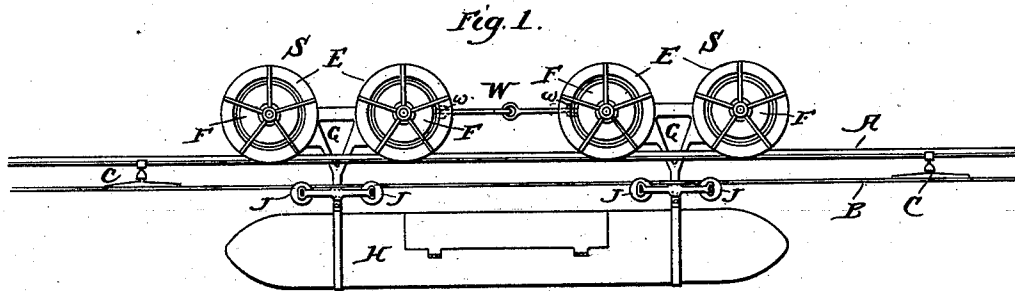
No. 657,330.

Patented Sept. 4, 1900.

T. P. CHANDLER.
ELECTRIC RAILWAY.

(Application filed July 27, 1900.)

(No Model.)



Witnesses:
H. B. Hallock.
R. M. Kelly.

Inventor:
Theophilus P. Chandler
By *[Signature]* Atty.

UNITED STATES PATENT OFFICE.

THEOPHILUS P. CHANDLER, OF PHILADELPHIA, PENNSYLVANIA.

ELECTRIC RAILWAY.

SPECIFICATION forming part of Letters Patent No. 657,330, dated September 4, 1900.

Application filed July 27, 1900. Serial No. 24,984. (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 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.

The object of my invention is to provide a suitable construction of electric railways especially adapted for high speeds and for carrying light parcels, mail-matter, &c.

In carrying out my invention I suspend two parallel conductors, the upper of which is a heavy cable and carries the weight of the car while acting as the positive or supply conductor. The other conductor is a light return-conductor connected at intervals with the heavy supporting-conductor by insulating connections. The car consists of a receptacle hung from one or more trucks having grooved wheels running upon the supporting-conductor. The trucks are each preferably formed with two electric motors, in which the armatures thereof are directly connected with the grooved supporting and drive wheels inclosing the motor. The supporting-frame from the truck depends and is connected to the package receptacle or compartment and also provided with suitably-arranged collector-wheels for making a traveling contact with the under side of the light suspended conductor. Where the car is of considerable length, two such trucks are employed, and said trucks are connected with the receptacle by joints movable about vertical axes. The two trucks may also be connected by a suitable tie or connecting bar to impart more stability to the entire structure in operation.

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

Figure 1 is a side elevation of an electric railway and car embodying my improvements. Fig. 2 is an enlarged side elevation of most of one of the trucks and its connections with the compartment or car, and Fig. 3 is a cross-section of same on line 2 2.

A is the upper or heavy supporting-cable and also acts as the positive or supply conductor of the railway. This heavy conductor may be supported in any suitable manner upon posts arranged at intervals along the railway or otherwise. It is sufficiently heavy to sustain the weight of the car and the return circuit-conductor B, which is to be hung from it.

B is the light working conductor and is arranged parallel to the cable A and suspended from it at intervals by the insulating connections C, of any suitable character.

SS are two electrically-propelled trucks and have downwardly-extending frames G, which project below the lower conductor B and are connected with the compartments H near each end by vertical joints or pivots *g*. In this manner each of the trucks may swivel about their connections *g*. The trucks comprise two motors built into the wheels, the construction of which will be more clearly understood by examining Fig. 3. Secured to the framework G are the field-magnets D' and the casing F of the motor proper. Encircling the field-magnets, so as to be of as large diameter as possible, is the armature D, which is secured to the driving-wheel E by being directly connected with its shaft *d*, which is journaled in the field-magnets D'. The wheel E has its periphery deeply grooved, as at *e*, so as to run upon the cable A. To relieve the shaft *d* of excessive strain, I prefer to form the outer periphery of the casing F with an annular groove K and the inner part of the drive-wheel J with an annular groove *h*, and between these two grooves I interpose antifriction-balls K, so that the downward strain of the field-magnets will be largely received upon the ball-bearings close to the cable A. By these means the friction will be greatly overcome and high speeds are readily secured for the driving-wheel. As shown, I prefer to form the trucks of two of these motors, each having the two field-magnets rigidly connected with the same depending frame G. It is evident, however, that the truck may only be provided with a single motor and wheel, if so desired, or the electric motor proper might only be applied to one of the wheels alone and the other wheel merely act as a trailer. I, however, prefer

to have an electric motor in each of the driving-wheels.

Secured to the lower part of the frame G is a horizontal arm I, bolted thereto by an insulating-joint. The ends of this arm N are provided with slotted yoke portions J', in which boxes O may move vertically in the slots j, and said boxes pressed upward by springs i. In these boxes are journaled the collector-wheels J, which run against the lower or under surface of the suspended negative conductor B. The collector-wheels J are arranged substantially under the drive-wheels J, so that in turning curves substantially the same relation between the wheels and conductors A and B will result. The spring-support for the collector-wheels J compensate for any slight irregularities in the suspended conductor B at points of support, and therefore the extent of this adjustment may be limited to an inch or two at most. Any slack in the conductor B between its points of support will enable the conductor to be supported upon the collector-wheel J without requiring the springs to raise said wheels, as might occur in passing under the connections C or any other connections of the railway which may be more or less rigid.

T represents the electric conductors which lead from the commutator of the motor to the arm I for connecting with the negative conductor, and this circuit may have a switch t for opening or closing it. The other terminal of the motor connects through the motor structure with the driving-wheel and receives current from the conductor A. I prefer to employ for this purpose a constant-speed motor and have therefore shown the motor as a shunt-motor; but I do not limit myself to any particular winding for the motor, as that would be changed or modified to suit the requirements.

If desired, the two trucks may be connected together by a tie-rod W, connected with the motor-trucks by suitable adjustable joints at each end. If desired, only one end of the trucks may be employed and the compartment H made shorter; but I prefer the double-truck construction and long compartment.

While I prefer the details of construction shown, they may be modified without departing from the spirit 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 two suspended insulated cables mechanically connected at intervals and supplying currents of opposite polarity, with an electrically-propelled truck having one or more grooved driving-wheels running upon the upper cable, an electric motor arranged within the rim of each driving-wheel and comprising field-magnets one of said parts being connected to and rotating with the driving-wheel, a depending frame connected with the other part

of the motor and extending to a point below both suspended conductors, an insulated current-contact device carried by the depending frame making a traveling contact with the underside of the lower suspended conductor, and a receptacle for containing merchandise, &c., carried by the depending frame and located below both the suspended conductors.

2. In an electric railway, the combination of two suspended insulated cables mechanically connected at intervals and supplying currents of opposite polarity, with an electrically-propelled truck having one or more grooved driving-wheels running upon the upper cable, an electric motor arranged within the rim of each driving-wheel and comprising field-magnets and armature one of which parts is connected to and rotates with the driving-wheel, a depending frame connected with the other part of the motor and extending to a point below both suspended conductors, an insulated current-contact device carried by the depending frame making a traveling contact with the under side of the lower suspended conductor, a receptacle for containing merchandise, &c., carried by the depending frame and located below both the suspended conductors, an inclosing case for the field-magnets and armature of the electric motor connected with the depending frame, and anti-friction-bearings between the said casing and the inner portion of the rim of the driving-wheel.

3. In an electric railway, the combination of two parallel suspended conductors connected together at intervals by insulating connections, an electrically-propelled vehicle having two driving-wheels arranged in alinement and running upon the upper of the suspended conductors, an electric motor arranged within each of the wheels and comprising field-magnets and armature one of which is directly connected with the driving-wheel, a frame connected with the other elements of the electric motors to hold them against rotation and depending to a point below both suspended conductors, a receptacle for carrying merchandise, &c., connected to the depending frame and located below the suspended conductors, and a current-collecting device making contact with the lower suspended conductor consisting of a grooved under-contact wheel and a spring-support therefor connected with the depending frame.

4. In an electric railway, the combination of two parallel suspended conductors connected together at intervals by insulating connections, an electrically-propelled vehicle having two driving-wheels arranged in alinement and running upon the upper of the suspended conductors, an electric motor arranged within each of the wheels and comprising field-magnets and armature one of which is directly connected with the driving-wheel, a frame connected with the other elements of the electric motors to hold them against rotation and depending to a point below both sus-

pendent conductors, a receptacle for carrying merchandise, &c., connected to the depending frame and located below the suspended conductors, and a current-collecting device making contact with the lower suspended conductor consisting of a longitudinal insulated arm having vertical slots in its ends, boxes arranged in said vertical slots, springs to press the boxes upward, grooved collector-wheels journaled in the boxes and making a traveling contact with the under surface of the lower suspended conductor and located respectively below each of the driving-wheels, and an insulating connection between the longitudinal arm and the depending frame.

5. In an electric railway, the combination of two suspended conductors one above the other connected at intervals by insulating connections, two independent trucks each having two grooved wheels running upon the upper of the suspended conductors and also provided with a depending frame extending to a point below the lower suspended conductor, one or more electric motors on each truck having one of its elements connected with the driving wheel or wheels and the other element connected with the truck-frame, a longitudinally-arranged compartment or receptacle for merchandise, &c., arranged below the suspended conductors, pivotal connections between the said receptacle and the depending frames of the trucks whereby they may turn independently about vertical axes, and one or more contact devices carried by the depending frames making an underrunning contact with the lower suspended conductor for supplying current to the motor or motors.

6. In an electric railway, the combination of two suspended conductors one above the other connected at intervals by insulating connections, two independent trucks each having two grooved wheels running upon the

upper of the suspended conductors and also provided with a depending frame extending to a point below the lower suspended conductor, one or more electric motors on each truck having one of its elements connected with the driving wheel or wheels and the other element connected with the truck-frame, a longitudinally-arranged compartment or receptacle for merchandise, &c., arranged below the suspended conductors, pivotal connections between the said receptacle and the depending frames of the trucks whereby they may turn independently about vertical axes, one or more contact devices carried by the depending frames making an underrunning contact with the lower suspended conductor for supplying current to the motor or motors, and an adjustable connecting tie-bar between the two trucks.

7. In an electric railway, the combination of the two suspended conductors arranged one above the other and connected at intervals by insulating connections and adapted to supply currents of opposite polarities, two trucks having supporting grooved wheels running upon the upper conductor and a pair of grooved collector-wheels running against the under surface of the lower suspended conductor, one or more electric motors carried upon each truck for propelling it, a long receptacle or compartment arranged below both of the suspended conductors, and loose connections between the trucks and the longitudinal compartment whereby the trucks may independently swivel in passing around curves.

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

THEOPHILUS P. CHANDLER.

Witnesses:

ARTHUR T. SUTCLIFFE,
HENRY C. ESLING.