

(No Model.)

R. M. HUNTER. OVERHEAD ELECTRIC RAILWAY.

No. 497,025.

Patented May 9, 1893.

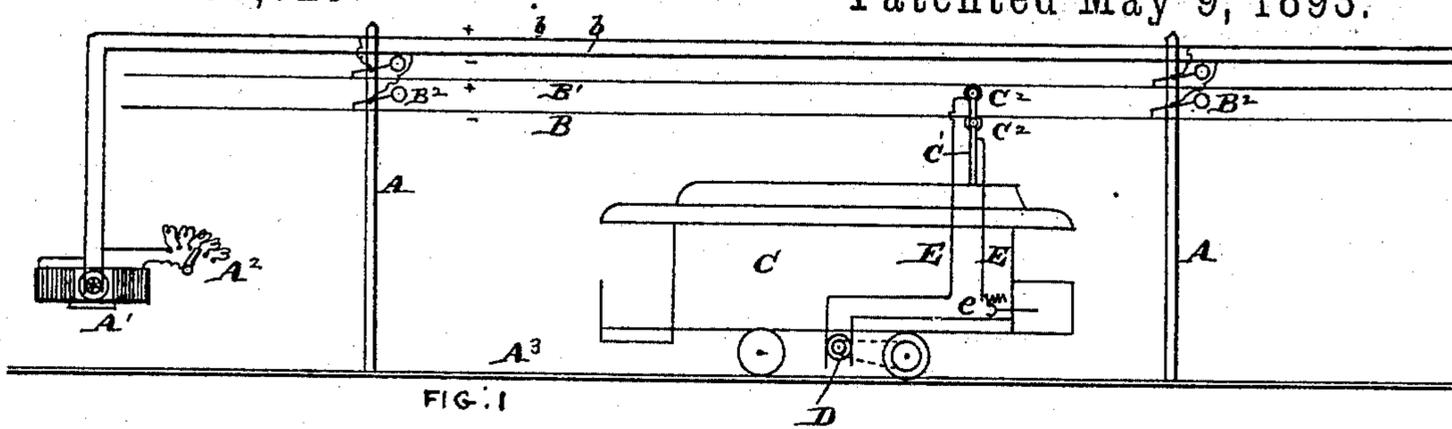


FIG. 1

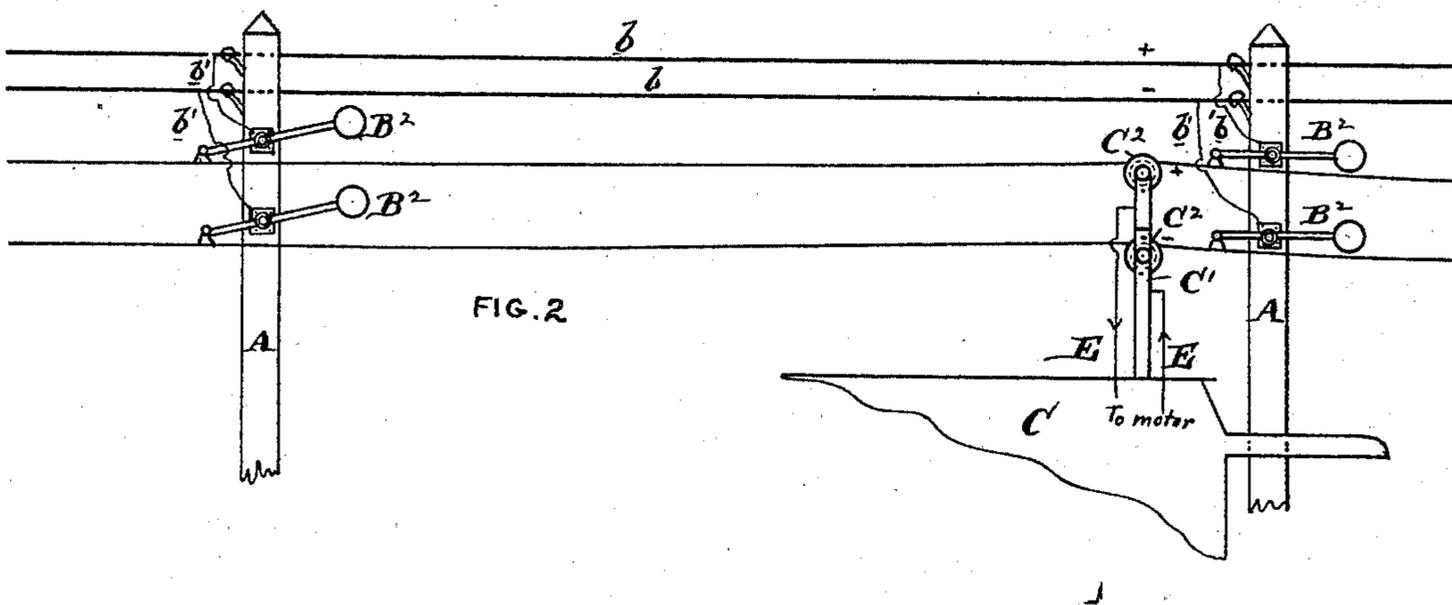


FIG. 2

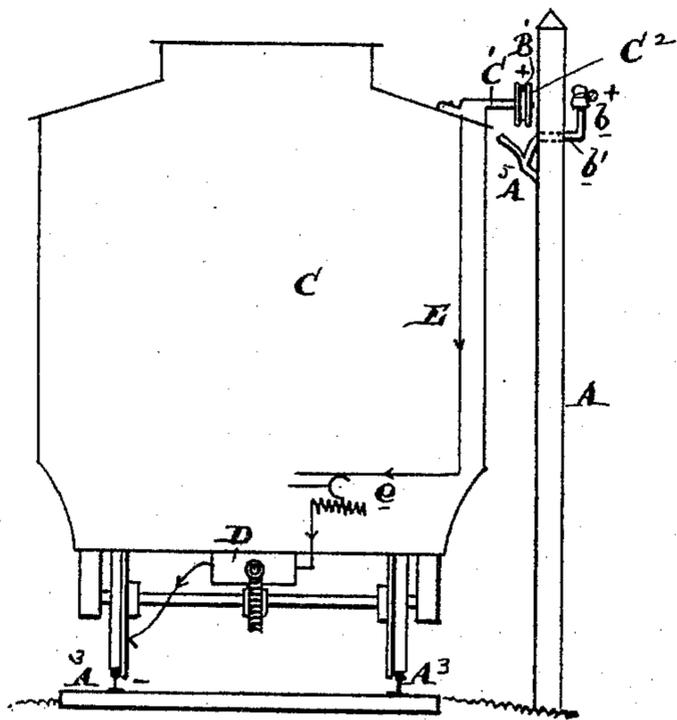


FIG. 4

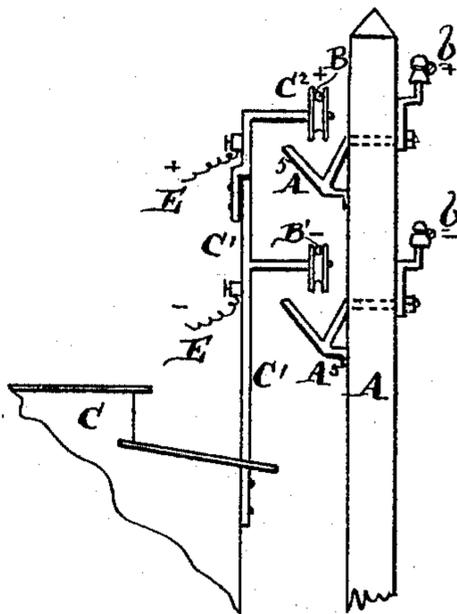


FIG. 3

Attest
S. J. Verkes.
F. B. Meyer.

Inventor

UNITED STATES PATENT OFFICE.

RUDOLPH M. HUNTER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO
THE THOMSON-HOUSTON ELECTRIC COMPANY, OF CONNECTICUT.

OVERHEAD ELECTRIC RAILWAY.

SPECIFICATION forming part of Letters Patent No. 497,025, dated May 9, 1893.

Original application filed September 23, 1886, Serial No. 214,309. Divided and application filed June 1, 1887, Serial No. 239,930.
Again divided and this application filed September 18, 1890. Serial No. 365,361. (No model.)

To all whom it may concern:

Be it known that I, RUDOLPH M. HUNTER, of the city and county of Philadelphia and 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 consists of certain improvements which are fully set forth in the following specification and shown in the accompanying drawings which form a part thereof.

This application, Case No. 172, is a division of my application, Serial No. 239,930, filed June 1, 1887, which in turn is a division of my application, Serial No. 214,309, filed September 23, 1886.

The essential features of my system lie in the use of one or more suspended working conductors arranged along the track, combined with one or more supply conductors for supplying electricity thereto, and an electrically propelled vehicle provided with a traveling collector making contact with the working conductor and having its weight sustained and moved by the vehicle. There may be two suspended working conductors and two supply conductors, if so desired, or there may be employed one suspended conductor, and the rails and the earth may be used as a return circuit. The suspended working conductor or conductors are bared, and may be made in the form of flexible cables, wires, or rods.

The invention herein set out is specially adapted to railways operating a number of cars on the same circuit. These suspended conductors may be directly connected with the source of electric energy, or they may be connected indirectly thereto by means of fixed supply conductors (preferably insulated) either supported above or below the ground, which supply and working conductors are connected at intervals by branch conductors. If two suspended conductors are employed there will be two collectors to each car, but if desired the rails may be used as the return conductor, and only one upwardly extending current collecting device employed.

Another portion of my invention comprehends the employment in an electric railway

having a suspended line conductor with which the vehicle makes a traveling connection of a source of electric energy, and a regulator for controlling the current passing through the line.

In the drawings:—Figure 1 is an elevation of an electric railway embodying my improvements. Fig. 2 is an enlarged view of the upper portion of Fig. 1 showing the suspended conductors and collectors. Fig. 3 is a cross section showing a modified arrangement of suspended working conductors, and Fig. 4 is a cross section of an electric railway and car showing the rails used as the return conductors.

A are the vertical posts of wood or metal and support the working suspended conductors B B', which may be supported by suitable pivoted counterbalancing lever or supports B², by which they are suspended from the said posts. The generator of electricity A' may be connected directly with these working conductors, or may be connected to supply conductors b b which are preferably insulated and permanently secured to the posts, or otherwise supported, the said conductors being electrically connected with the working conductors at intervals by branch conductors b'. The generator may be provided with a resistance changer or regulator A² to regulate the line current passing to the suspended conductor or conductors. It will be observed that this regulator or resistance changer is preferably arranged in a shunt circuit around the armature of the generator and is adapted to regulate the field of the generating machine. A regulator of this character enables the output of the generator to be changed at will to comply with the requirements of the number of cars in circuit, and the machine being shunt wound is a constant potential generator, and automatically delivers the current in accordance with the demand due to hand regulation of the motors on the various cars.

A³ are the rails of the railway upon which the electrically propelled vehicle C runs, and are arranged parallel to the working conductors.

The car or vehicle C is provided with a suit-

55

60

65

70

75

80

85

90

95

100

able collector, preferably upwardly extending above the roof of the car, and provided with contact wheels or collectors $C^2 C^2$ secured thereto and insulated from each other; and the said wheels are adapted to run under the conductors $B B'$ receiving the current therefrom.

The car is provided with an electric motor D mechanically connected with the axle for the purpose of propelling the car or vehicle, and a motor circuit E includes the motor and connects with the contact wheels or collectors C^2 . A regulator or resistance changer e is arranged upon the car in the motor circuit for controlling the speed and power of the motor. There may be any number of cars employed in circuit, and they would all be coupled in parallel with the line conductors. Each would have the collector or collectors, motor, and hand regulator e for stopping or starting or changing the speed of the car independently of other cars. The generator supplies current to suit the requirement of the various cars. The potential always remains the same though the current may vary.

In place of supporting the conductors by levers or projecting arms as above described, the working conductors may be supported normally in the metal bracket A^5 as shown in Figs. 3 and 4, to which brackets the supply conductors b are secured. In this construction the rollers or collecting wheels C^2 on the arm projecting from the car lift the cables or conductors clear of the brackets while passing under them and over the said brackets as indicated in the drawings.

The conductors or cables may be simply light wires, rods, or cables of twisted wires, as desired, and may be suspended in any suitable manner so long as they expose an unobstructed under surface to the collector of the car. There may be simply one suspended working conductor, the rails being used as the other conductor, and preferably the return circuit for the current. This construction is shown in Fig. 4.

I do not limit myself to the details of construction as they may be modified in various ways without departing from the principles of my invention, which comprehends broadly the constructions herein set out.

In this application I do not claim the specific construction contemplating the use of two suspended working conductors with or without independent supply conductors, and with two electrically independent contact devices arranged above the car, as that forms subject matter of my divisional application Serial No. 363,900, filed September 4, 1890.

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 a suspended electric working conductor, a stationary source of electric energy to supply electricity thereto, a traveling vehicle, tracks for said vehicle parallel to said working con-

ductor, an electric motor on the vehicle to propel it, a motor circuit and hand regulator on the vehicle, and a traveling collector having its weight sustained and moved by said vehicle and consisting of a support having a grooved contact wheel making contact with the under side of said suspended conductor and supplying current to the motor circuit.

2. In an electric railway, the combination of a suspended working conductor, a fixed source of electric energy to supply electricity thereto, a traveling vehicle, tracks for said vehicle parallel to said working conductor, an electric motor on the vehicle to propel it, a motor circuit on the vehicle, a hand regulator on the vehicle to control the current in the motor circuit, and a traveling collector having its weight sustained and moved by said vehicle and making contact with said suspended conductor, said collector consisting of an upwardly extending arm arranged above the roof of the car, and provided with a grooved contact moving against the under surface of the working conductor and supplying current to the motor circuit.

3. In an electric railway, a suspended bared working conductor extending along the railway, traveling electrically propelled vehicles having upwardly extending current collecting devices for collecting current from said suspended conductor, a fixed generator of electricity, a supply conductor extending from the generator to the suspended conductor, and a resistance changer arranged adjacent to the generator for varying the current delivered by the generator to the supply circuit.

4. In an electric railway, a suspended working conductor, a generator of electricity electrically connected with said suspended working conductor, a traveling vehicle provided with an electric motor connected with its axle, a current collecting device moving in contact with the suspended conductor and a current regulator to control the current supplied by the generator to the suspended working conductor.

5. In an electric railway, a suspended working conductor arranged along the railway, a supply conductor connected at intervals with the working conductor, a generator of electricity for supplying electricity to the supply conductor, means to control the current supplied by the generator to the supply conductor, a traveling electrically propelled vehicle, and a current collecting device carried by the vehicle and making a traveling connection with the suspended working conductor.

6. In an electric railway, a suspended working conductor arranged along the railway having its under surface exposed, a supply conductor connected at intervals with the working conductor, a generator of electricity for supplying electricity to the supply conductor, means to control the current supplied by the generator to the supply conductor a traveling electrically propelled vehicle, and an up-

wardly extending current collecting device carried by the vehicle above its roof and making a traveling connection with the underside of the suspended working conductor.

5 7. In an electric railway, the combination of a suspended electric working conductor, a stationary source of electric energy to supply electricity thereto, a traveling vehicle, tracks for said vehicle parallel to said working conductor constituting the return circuit or conductors, an electric motor on the vehicle to propel it, a motor circuit and hand regulator on the vehicle, and a traveling collector having its weight sustained and moved by said
10 vehicle and consisting of a support having a grooved contact wheel making contact with the under side of said suspended conductor and supplying current to the motor circuit.

8. In an electric railway, the combination of
20 a suspended working conductor, a fixed source of electric energy to supply electricity thereto, a traveling vehicle, tracks for said vehicle parallel to said working conductor constituting the return circuit or conductors, an electric motor on the vehicle to propel it, a motor circuit on the vehicle, a hand regulator on the vehicle to control the current in the motor circuit, and a traveling collector having its weight sustained and moved by said vehicle
25 and making contact with said suspended conductor said collector consisting of an upwardly extending arm arranged above the roof of the car, and provided with a grooved contact moving against the under surface of the working conductor and supplying current
30 to the motor circuit.

9. In an electric railway, the combination of the rails, a conductor extending along the railway, an electrically propelled vehicle having a current collecting device making contact with the conductor, a hand regulator on the vehicle for varying the current taken from the conductor, a stationary source of electric supply, and a regulator to control the current
35 delivered by the source of supply to the conductor extending along the railway.

10. In an electric railway, the combination of the rails acting as one conductor, a second conductor extending along the railway, an electrically propelled vehicle having current collecting devices making contact with the conductors, a hand regulator on the vehicle for varying the current taken from the conductors, a generator of electric current connected with the conductors, and a regulator to control the current delivered by the generator to the conductors arranged in a shunt around the said conductors and adjacent to the generator.

60 11. In an electric railway, the combination of the rails acting as one conductor, a second conductor extending along the railway, an electrically propelled vehicle having current collecting devices making contact with the
65 conductors, a hand regulator on the vehicle for varying the current taken from the conductors, a generator of electric current con-

nected with the conductors, and a regulator consisting of a resistance changer in series with the field coils of the generator to control
70 the current delivered by the generator to the conductors and arranged in a shunt around the said conductors and adjacent to the generator.

12. In an electric railway a suspended work-
75 ing conductor extending along the railway, a generator of electricity connecting with the line conductor, a traveling electrically propelled vehicle receiving current from the line conductor, a hand regulator on the vehicle for
80 varying the current taken from the conductor and a current controlling device arranged adjacent to the generator of electricity for controlling the current supplied to the suspended conductor.

13. The combination in an electric railway, of rails acting as the return conductor, a suspended overhead working conductor, a dynamo electric machine for supplying current to the suspended working conductor and the rail
85 return and having means to regulate its field, a traveling car, an electric motor on the car, connected to rotate the axle thereof, an upward pressure contact device carried by the car making a traveling connection with the
90 under side of the suspended conductor, a motor circuit on the car, and means to control the current flowing through the motor circuit to vary the speed of the motor.

14. The combination in an electric railway,
100 of rails acting as the return conductor, a suspended overhead working conductor, a supply or feeding conductor connected with the suspended working conductor, a dynamo electric machine for supplying current to the sus-
105 pended working conductor through the supply or feeding conductor and to the rail return and having means to regulate its field, a traveling car, an electric motor on the car connected to rotate the axle thereof, an up-
110 ward pressure contact device carried by the car making a traveling connection with the under side of the suspended working conductor, a motor circuit on the car, and means to control the current flowing through the mo-
115 tor circuit to vary the speed of the motor.

15. The combination in an electric railway, of rails acting as the return conductor, a suspended overhead working conductor, an overhead supply or feeding conductor connecting
120 with the suspended working conductor, a dynamo electric machine for supplying current to the suspended working conductor through the supply or feeding conductor and to the rail return, and having means to regulate its
125 field, a traveling car, an electric motor on the car connected to rotate the axle thereof, an upward pressure contact device carried by the car above its roof making a traveling connection with the under side of the suspended
130 working conductor, a motor circuit on the car, means to control the current flowing through the motor circuit to vary the speed of the motor, and common supports for the overhead

supply or feeding conductor and the overhead working conductor.

16. In an electric railway, a suspended working conductor arranged above the track, a series of poles extending along the railway, brackets or supports upon said poles to normally support the said suspended conductor from below, a source of electrical energy electrically connected with the suspended working conductor, a traveling electrically propelled vehicle, a current collecting device having its weight wholly supported by the vehicle and making a traveling under contact with

the suspended conductor, a regulator on the car for controlling the speed of the motor, and means to control the generation of the current delivered to the working conductor to compensate for the varying currents supplied to the motor on the vehicle.

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

R. M. HUNTER.

Witnesses:

ERNEST HOWARD HUNTER,
S. T. YERKES.