(No Model.)

R. M. HUNTER.

ELECTRIC RAILWAY.

No. 431,720. Patented July 8, 1890.

FIG. 1

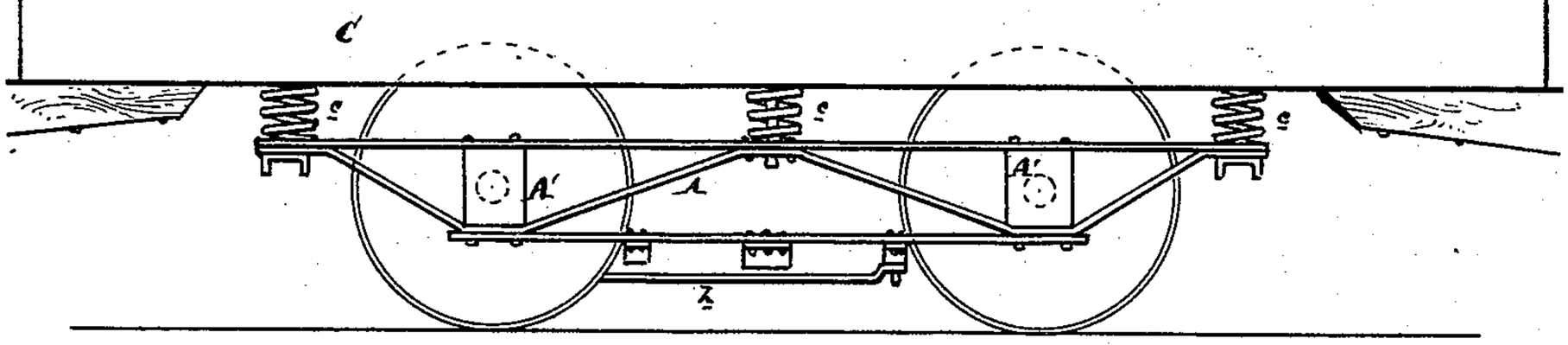


FIG. 2

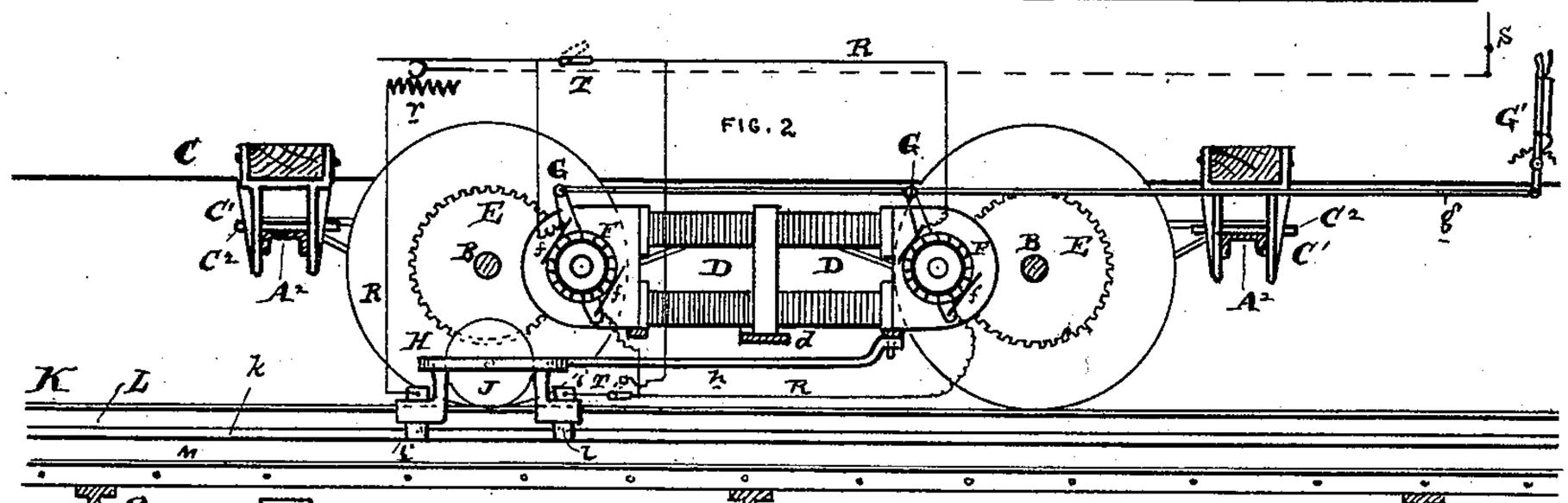
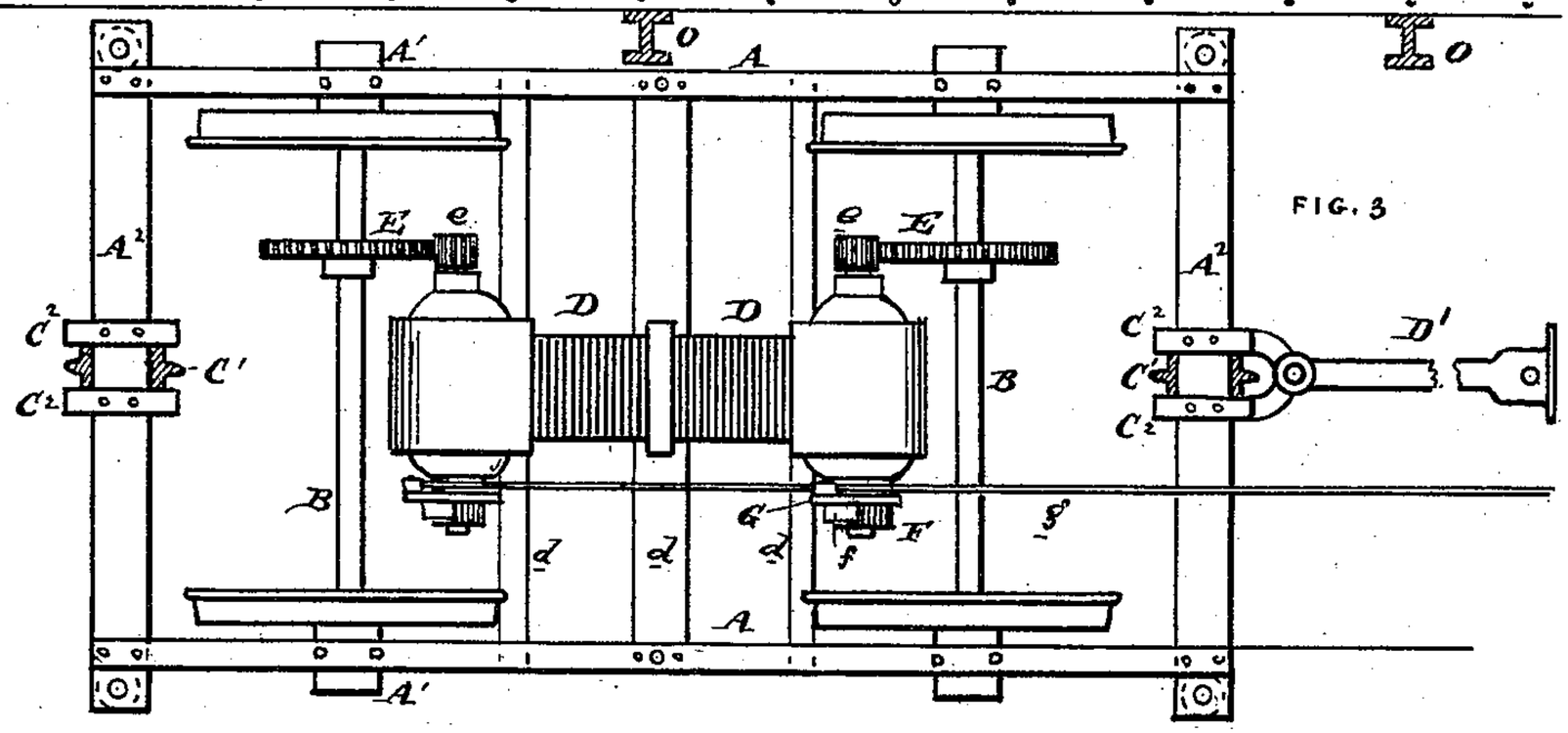


FIG. 3



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UNITED STATES PATENT OFFICE.

RUDOLPH M. HUNTER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE ELECTRIC CAR COMPANY OF AMERICA, OF SAME PLACE.

ELECTRIC RAILWAY.

SPECIFICATION forming part of Letters Patent No. 431,720, dated July 8, 1890.

Application filed January 26, 1887. Serial No. 225,498. (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 it consists in certain improvements, all of which are fully set forth in the following specification and shown in the accompanying drawings, which form part thereof.

In carrying out this invention the car or vehicle is formed with a motor truck-frame supported upon the axles without elasticity, and the car-body is supported upon this frame by means of springs. By this means the motors and connections are rigidly connected with respect to each other and are not affected by the movements of the vehicle-body. By connecting the two axles by the truck-frame the trucks, with motors, &c., may be completed, ready to receive the body. The draw-bar would connect with the truck-frame and not with the body, as has heretofore been the case. The operator's levers, &c., are located on the front of the car-body and are connected with the motor by flexible connections. The body portion is prevented from having lateral movement independently of the truck by means of suitable guides. The motors are two in number and are connected with the truck-frame and independently of the car-body, and are geared with the respective axles, which axles being fixtures in the truck, the connection is perfect. The motors, as shown, are arranged end to end, being united at their neutral parts. The commutator-brushes are capable of being shifted for changing the angular advance in regulation or reversing, and both sets of brushes are connected together and to the same operating-lever, whereby they may both be simultaneously moved. The motors are connected together by a circuit, and may be coupled in multiple or series connection, and provision is made for varying the resistance of the motor-circuit.

The foregoing give the general features of my improvements; but it is to be understood that I do not limit myself to the specific details thus enumerated.

In the drawings, Figure 1 is a side elevation of my improved electrically-propelled vehicle with the upper and end portions of the car-body not shown. Fig. 2 is a sectional elevation of same on line x x of Fig. 3 and showing the conduit; and Fig. 3 is a plan view of the truck and its appendages, the car-body and its springs having been removed.

A is the truck-frame, and may be made in any manner desired, and is provided with axle-boxes A′, in which the two axles B are journaled, preferably without elastic play. The side frames or trusses are connected by cross-bars A^2 and d.

C is the car-body, which may be of any suitable construction, and is supported upon the truck-frame by the springs c of any well-known make.

To prevent lateral movement of the car-body on the truck-frame, I provide guide-frames C′, secured to the car-body and projecting down and spanning the cross-bars A^2, which is formed with guide-bars C^2, between which the guide-frames C′ move vertically. It is evident that the same effect might be produced by bolts passing down through the springs, as shown in Fig. 1. The draw-bar D′ is hinged to the truck-frame, and is therefore independent of the car-body and pulls directly from the axles. This draw-bar is shown in Fig. 3.

D D are the two motors, which are secured end to end, being united at their neutral parts, as shown. These motors are supported upon the cross-bars d of the truck-frame, or may be otherwise secured to it, so as to be independent of the car-body. The motors are respectively connected with the axles B by a spur-gear E and pinion e. The brushes f are secured to the brush-levers G, and are movable over the commutator F for varying the lead for regulation or reversing. These two brush-levers G are connected by a rod g, connecting with a lever G′ on the front of the car-body, the connecting-rod g being flexible to allow of the movements to the car-body without affecting the connection. By this lever G′ both sets of brushes may be shifted

simultaneously, and thus both motors may be regulated at the same time and with the same movement.

I do not limit myself to any particular means for shifting the brushes, as it may be accomplished electrically, as set out in my application, Serial No. 216,321, or in any other way. The essential feature is to regulate both motors at the same time and with the same movement of parts. The motors may be of any desired construction, and may be connected with the axles in any desired manner, that shown being simply one form of connection to illustrate the general features of the invention.

In this application I do not claim the construction of the collector for supplying the current to the motor, but have shown sufficient of such a construction to make the invention clearly understood. The collector here shown consists of a frame H, running upon a wheel J and connected to the motor frame or truck by bar *h*. The frame H supports the contact-shoes, which extend down into the conduit K, in which the conductors *k* are supported at some distance above the bottom M. O are supports for the conduit. It is evident that the motors may receive their current from storage-batteries or overhead conductors or in any other way, as this invention has no particular reference to the source of supply.

R is the motor-circuit and connects both motors in circuit with the contact-shoes *i i*. The current may be regulated by the resistance-changer *r*, which may be operated by a lever or handle *s* on the front of the car-body, as in the case of the brush-shifting devices. As shown in Fig. 2, the motors are in parallel or multiple circuit, but may be put in series connection by switches T T when necessary—as, for instance, in starting, or when the potential of the current has greatly increased and volume of current decreased from any cause.

The foregoing is a general description of the details of construction illustrated; but, as I have before stated, these details are given simply as one method of carrying the invention into effect, and I do not in any wise limit myself to the details herein set out.

I do not here claim the simultaneous shifting of the brushes of the two motors to reverse both motors simultaneously.

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

1. In an electric railway, a truck-frame in which the axles are journaled outside the wheel-base, an electric motor carried by said truck-frame within the wheel-base, and a car-body supported by said truck-frame through the mediation of springs.

2. In an electric railway, a truck-frame in which the axles are journaled, an electric motor carried by said truck-frame, a car-body supported directly by said truck-frame through the mediation of springs, and vertical guides to prevent said car-body moving laterally independently of the truck-frame.

3. In an electric railway, a truck-frame in which the axles are journaled, an electric motor carried by said truck-frame, a car-body supported by said truck-frame through the mediation of springs, and a draw-bar connected to the truck-frame, whereby the pull may come directly upon the axles.

4. In an electric railway, a truck-frame in which the axles are journaled, an electric motor carried by said truck-frame, a current-collecting device connected to said truck-frame, and a car-body supported by said truck-frame through the mediation of springs.

5. In an electric railway, a truck-frame in which the axles are journaled, an electric motor carried by said truck-frame, a current-collecting device connected to said truck-frame, a car-body supported by said truck-frame through the mediation of springs, and means to control the operation of the motor carried by the car-body.

6. In an electric railway, a truck-frame in which the axles are journaled, an electric motor carried by said truck-frame, a car-body supported by said truck-frame through the mediation of springs, and an electric-current regulator to control the operation of the motor, carried by the car-body independent of the truck and provided with an operating part at the forward portion of the car-body.

7. In an electric railway, a truck-frame formed with axle-boxes rigidly connected thereto, in which the axles are journaled, an electric motor carried by said truck-frame and mechanically connected with the axle, a car-body independent of said truck-frame and supported thereon through the mediation of springs, vertical guides secured to the car-body, and suitable guideways formed on the truck to admit of vertical but not lateral movement.

8. In an electric railway, a truck-frame formed with axle-boxes rigidly connected thereto, in which the axles are journaled, two electric motors carried by said truck-frame and mechanically connected, respectively, with the axles, a source of electric energy and a motor-circuit common to both motors, a car-body independent of said truck-frame and supported thereon through the mediation of springs, vertical guides secured to the car-body, and suitable guideways formed on the truck to admit of vertical but not lateral movement.

9. In an electric railway, the combination of a vehicle having two axles, two electric motors, one of which is mechanically connected with each axle, whereby each motor and its axle may move independently of the other motor and its axle, a circuit, and a single regulator for both motors, having its operative part on the front of the car common to both of said motors.

10. In an electric railway, the combination

of a vehicle having two axles, two electric motors, one of which is mechanically connected with each axle, whereby each motor and its axle may move independently of the other motor and its axle, a circuit common to both of said motors, reversing devices for each motor, and a mechanical operating device extending to each motor to operate both reversing devices simultaneously.

11. In an electric railway, the combination of a vehicle having two axles, two electric motors, one of which is mechanically connected with each axle, whereby each motor and its axle may move independently of the other motor and its axle, a circuit common to both of said motors, brush-shifting device for each motor, a single hand-lever to shift both brushes, and mechanical connections between the hand-lever and brush-shifting devices of each motor to simultaneously reverse both motors.

12. In an electric railway, a truck-frame to which the axles are journaled without elasticity, two electric motors supported upon said frame and mechanically connected with the axles, brush-shifting devices for each of said motors, a positive mechanical connection between said brush-shifting devices, a car-body supported upon said truck-frame by means of springs, hand operating devices carried by the car-body and in reach of the operator, and a flexible connection between the hand operating devices and brush-shifting devices.

13. In an electric railway, two motors connected with the axles of a common vehicle, brush-shifting devices for each of said motors, a positive mechanical connection between said brush-shifting devices, a car-body supported upon said truck-frame by means of springs, hand operating devices carried by the car-body and in reach of the operator, and a flexible connection between the hand operating devices and brush-shifting devices.

14. In an electric car, the combination of a car-body supported on axles by means of springs, a motor arranged beneath the car-body and mechanically connected with the axles, a movable brush-shifter to reverse the motor, a reversing-lever device at the front of the car and extending above the platform of the car, and a loose flexible but positive mechanical connection between the brush-shifter and lever device and arranged below the car-body.

15. In an electrically-propelled vehicle, the combination of the axles, two electric motors made integral at their neutral parts, and mechanical gearing between the respective motors and the axles.

16. In an electrically-propelled vehicle, the combination of the axles and wheels, a truck-frame extending around the outside of the wheels and including the axle-boxes, which are journaled upon the axles outside of said wheels, an electric motor supported by the truck-frame independent of the car-body and mechanically connected to drive the axle, and a car-body supported upon springs arranged between the said car-body and truck-frame.

17. In an electrically-propelled vehicle, the combination of the axles and wheels, a truck-frame extending around the outside of the wheels and including the axle-boxes, which are journaled upon the axles outside of said wheels, an electric motor supported by the truck-frame independent of the car-body and mechanically connected to drive the axle, a car-body supported upon springs arranged between the said car-body and truck-frame, and inverted-**V**-shaped guides carried by the car-body at a distance from each other and fitting down upon the truck-frame to permit the car-body to move vertically but not transversely.

18. In an electrically-propelled vehicle, the combination of the axles and wheels, a truck-frame extending around the outside of the wheels and including the axle-boxes, which are journaled upon the axles outside of said wheels, an electric motor supported by the truck-frame independent of the car-body and mechanically connected to drive the axle, and a car-body supported upon springs arranged between the said car-body and truck-frame and located at distances over the truck-frame greater than the wheel-base to prevent the vertical rocking or swinging of the car-body.

19. In an electrically-propelled vehicle, the combination of the wheels and axles, a trussed truck-frame extending around the wheels and secured to the axle-boxes journaled on the axles outside the wheels, a transverse bar or frame arranged across the truck-frame between the wheels at a lower level than the axles, and an electric motor supported thereby and mechanically connected to drive the axle.

20. In a four-wheeled electrically-propelled vehicle, the combination of the wheels and axles with a truck-frame extending around the outside of the wheels and secured to axle-boxes, in which are journaled the axles, a transverse or cross bar carried by said truck-frame between the wheels of the two axles, an electric motor supported by said cross or transverse bar, and mechanical power-transmitting connections between the motor and axle.

21. In a four-wheeled electrically-propelled vehicle, the combination of the wheels and axles with a truck-frame extending around the outside of the wheels and secured to axle-boxes, in which are journaled the axles, a separate transverse or cross bar carried by said truck-frame between the wheels of the two axles and respectively close to the wheels of the respective axles, an electric motor supported by each of said cross or transverse bars, and mechanical power-transmitting connections between the motors and axles.

22. In an electrically-propelled vehicle, the combination of the wheels and axles, a truck-frame supported on said axles through boxes,

a car-body, springs for supporting the car-body, arranged between the car-body and truck-frame and spread over an area greater than the wheel-base, and guides between the car-body and truck-frame to prevent transverse motion to said car-body on the truck-frame, but permit vertical motion.

In testimony of which invention I hereunto set my hand.

RUDOLPH M. HUNTER.

Witnesses:
RICHD. S. CHILD, Jr.,
E. M. BRECKINREED.