

(No Model.)

R. M. HUNTER.
ELECTRICALLY PROPELLED VEHICLE.

No. 424,207.

Patented Mar. 25, 1890.

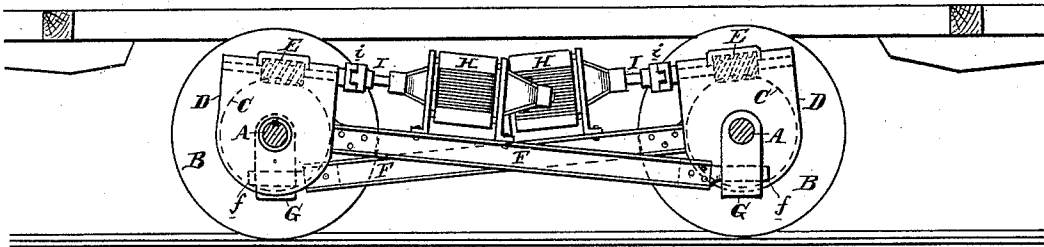


FIG. 1

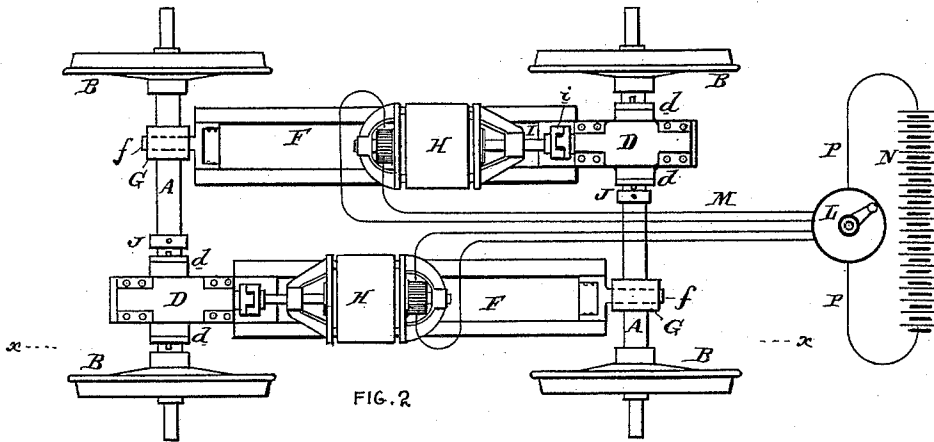


FIG. 2

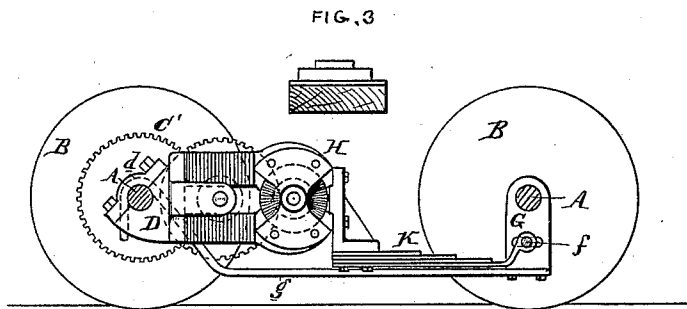


FIG. 3

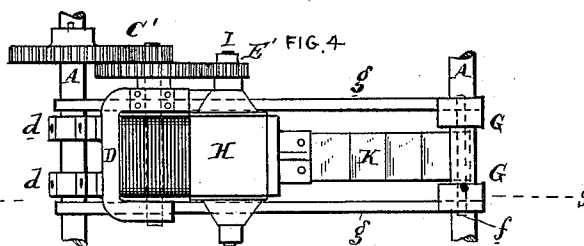


FIG. 4

Attest

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RUDOLPH M. HUNTER, OF PHILADELPHIA, PENNSYLVANIA.

ELECTRICALLY-PROPELLED VEHICLE.

SPECIFICATION forming part of Letters Patent No. 424,207, dated March 25, 1890.

Application filed June 5, 1889. Serial No. 313,217. (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 Electrically-Propelled Vehicles, of which the following is a specification.

My invention has reference to electrically-propelled vehicles; 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.

This application (Case 103) relates generally to electric cars or other vehicles, and may be used in conjunction with batteries carried by the car or vehicle or with line-conductors extending along the railway, from which the motors derive their current.

Specifically the invention relates to the means employed for connecting the motors on the axles, preferably so that each is independent in its motions with respect to the other. Both motors are supported by frames from both axles, but each is connected so as to rotate different axles. In detail each motor is supported by frame-work, which enables the motor to be journaled on one axle with a flexible connection with the other axle, whereby there shall be no binding, and yet the motor shall be positively coupled with the axle which it drives.

In the drawings, Figure 1 is a sectional elevation on line *x x* of Fig. 2, showing my improved manner of supporting the motor on the axles. Fig. 2 is a plan view of the same. Fig. 3 is a sectional elevation of a modification of the same, taken on line *y y* of Fig. 4; and Fig. 4 is a plan view of the devices shown in Fig. 3 with the wheels and parts of the axles cut away.

A are the axles. B are the wheels thereof.

C are the worm-wheels, secured to the axles by keys so as to rotate the axles with them.

D is a dust-box inclosing the worm and worm-wheel, and is journaled on the hub of the worm-wheel or the axle.

E is the worm, which meshes with the worm-wheel and is journaled in the frame or box D.

F are frames, which are secured at one end to the boxes D, and thereby journaled to the axles at *d*, and have their other ends provided

with pins *f*, which extend through links G, supported upon the axles with provision for lateral movement. In practice there may be one or two of these frames and motors. I have shown two, and they are journaled and hung from opposite axles. It will thus be seen that each motor H, secured upon the frames F, is, in effect, journaled to the axles which it rotates, and is pivoted by a flexible or universal joint on the other axle and with provision to allow the axles to have any relative movement desired, as in jumping switches, frogs, cross-tracks, &c., without binding on the journals or displacing the motor-connection with the axle.

I is the motor-shaft, and may be connected directly with the worm E or through a flexible coupling *i*, which permits of a limited amount of spring to the parts without binding. I prefer to hang the pivoted end *f* of the frame F to the link below the axle. These two motors are thus free to have all kinds of relative movements, and are carried by the axles independent of the car-body, which is supported on springs in the usual way.

L is the regulator, and may be carried on the car-body, if desired, and is connected by flexible conductors M with the motors H, the flexibility thereof permitting the free independent movements of the motors without rupture of the conductors.

N is a source of electric supply, and P is a circuit for supplying current from N to the regulator L, and thence by conductors M to the motors. This source of power N may be batteries carried by the car, or current may be supplied by the usual line-conductors extending along the railway, and current-collectors carried by the car—as, for instance, is set out in Letters Patent No. 400,916, dated April 9, 1889, or No. 403,192, dated May 15, 1889, granted to me.

It is not essential that worm and worm-wheel gearing shall be used between the axles and motor-shaft, nor that the motor shall be supported without elasticity.

In Figs. 3 and 4 I have the motor H journaled to one axle A by journals *d* and frame D, and connected at the other or free end to spring K, which terminates in a pin *f*, jour-

naled in a link or frame G, loosely journaled on the other axle A. This frame or link G, in this case, may be double and have extensions *g* loosely supported on the other axle, forming a light frame. As shown, the motor-shaft I is geared to the axle A by gears E' C', and the gearing and motor are free to move about the axle, since the spring K and link G permit such movement. It is also evident the axles may move independently and relatively to each other without binding of the motor on the axle.

It is apparent that the frame D, the motor-frame, and springs K of Figs. 3 and 4 correspond to the frames D F and motor of Figs. 1 and 2, and hence, broadly considered, the construction shown in the various figures are equivalents.

In Figs. 3 and 4 I have only shown one motor connected to drive one axle; but it is evident that the apparatus may be duplicated, as in Fig. 2, to drive both axles from separate motors. In this construction the rear extension from the motor is connected by a cross-pin working in slots in the frame G, which permits movement in a horizontal plane about a vertical axis, as well as longitudinal motion, and performs the same function as the loose play between the pin *f* and frame G of Figs. 1 and 2.

I do not limit myself to any special form of gearing, nor to the minor details of construction, as they may be modified in various ways without departing from the spirit of my invention.

Many matters herein shown are not claimed herein, but form subject-matter of other applications; hence such matters are not dedicated to the public, but form subject-matter of my applications, No. 215,199, of September 23, 1886; No. 217,346, of October 27, 1886; No. 224,150, of January 12, 1887; No. 264,456, of February 18, 1888; No. 268,360, of March 24, 1888; No. 271,141, of April 19, 1888, and No. 324,076, of September 16, 1889.

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

1. In an electrically-propelled vehicle, the combination of the axles, a frame journaled upon one axle and loosely or flexibly connected with the other axle, a motor supported on the frame, and connecting-gearing between the motor and axle on which the frame is journaled.

2. In a car, the combination of a motor journaled to one axle, gearing connecting the motor-shaft with the axle, a frame supported by the axles between the wheels, and an extension to the rear of the motor, connecting with said frame to support the motor.

3. In a car, the combination of a motor journaled to one axle, gearing connecting the motor-shaft with the axle, a frame supported by the axles between the wheels, and an extension to the rear of the motor, connecting with

said frame by an elastic joint to support the motor, with provision of movement about the axle to which it is journaled.

4. The combination of two axles with two independent electric motors supported partly by each axle and respectively connected by power-transmitting gear with different axles.

5. The combination of two independent longitudinal frames supported partly on each axle and arranged side by side between the wheels, an electric motor for each frame, and connecting-gearing between the motor-axles, whereby one motor drives one axle and the other motor drives the other axle.

6. The combination of two axles of a car with two independent electric motors coupled to drive different axles, and flexible electrical connections between the motors.

7. The combination of two axles of a car with two independent electric motors coupled to drive different axles, mechanical means for supporting said motors to the respective axles, and flexible electrical connections between the motors.

8. In an electrically-propelled vehicle, the axles, in combination with a frame journaled upon one axle and loosely and flexibly connected with the other axle between the wheels and independently of the axle-boxes, an electric motor supported upon said frame between the axles, and connecting-gearing between the motor-shaft and axle to which the frame is journaled.

9. In an electrically-propelled vehicle, the axles, in combination with a frame journaled upon one axle and loosely and flexibly connected with the other axle between the wheels and independently of the axle-boxes by means of a connection permitting both longitudinal and lateral motion, an electric motor supported upon said frame between the axles, and connecting-gearing between the motor-shaft and axle to which the frame is journaled.

10. In an electrically-propelled vehicle, the combination of the axles, a frame journaled upon one axle and supported by the other by a loose connection permitting longitudinal and lateral motion, an electric motor supported upon said frame, and gearing between the motor and axle to which the frame is journaled.

11. In a car, the combination of a motor arranged between the axles, journaled to one axle and extending toward the other axle, gearing connecting the motor-shaft with the said axle to which it is journaled, a frame supported by the two axles between the wheels, and a rear extension from the motor, connecting with said frame.

12. In a car, the combination of a motor arranged between the axles, journaled to one axle and extending toward the other axle, gearing connecting the motor-shaft with the said axle to which it is journaled, a frame supported by the two axles between the

wheels, and a rear extension forming a flexible connection between the motor and said frame.

13. In a car, the combination of two axles, an electric motor journaled upon one axle and arranged between both axles, a frame journaled upon the other axle, and a rear extension from the motor, connected with said

frame by a joint permitting motion in a horizontal plane about a vertical axis.

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

R. M. HUNTER.

Witnesses:

ERNEST HOWARD HUNTER,
S. T. YERKES.