No. 629,079. Patented July 18, 1899.

R. M. HUNTER.

ELECTRICALLY PROPELLED VEHICLE.

(Application filed Mar. 4, 1899.)

(No Model.) 4 Sheets—Sheet 1.

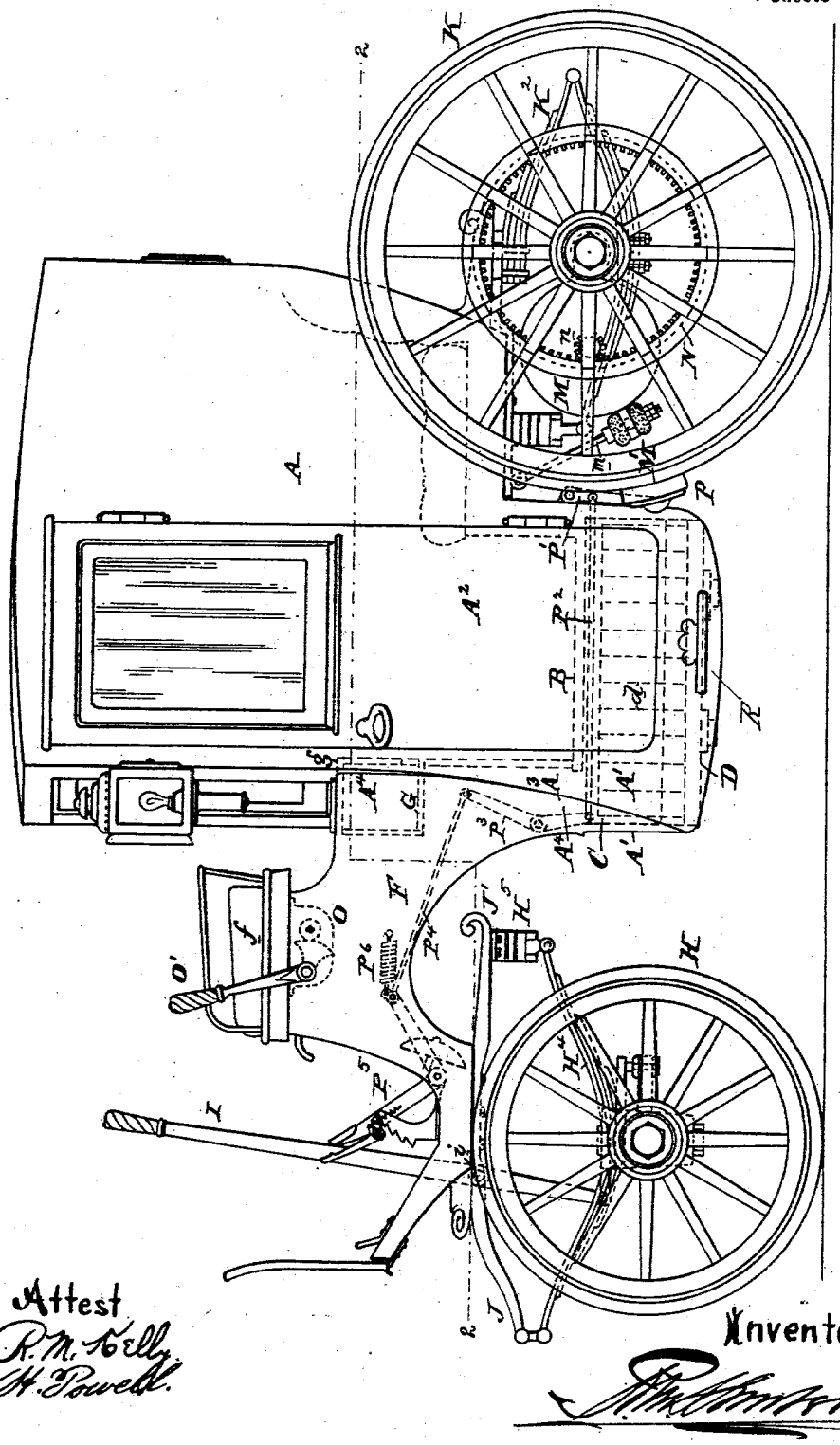


FIG. 1

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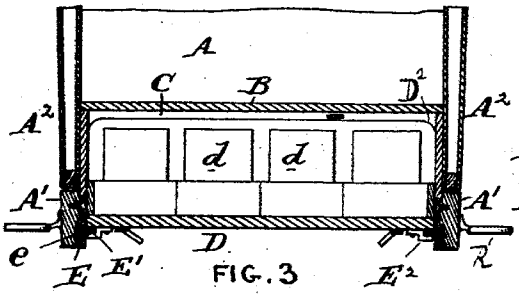


FIG. 3

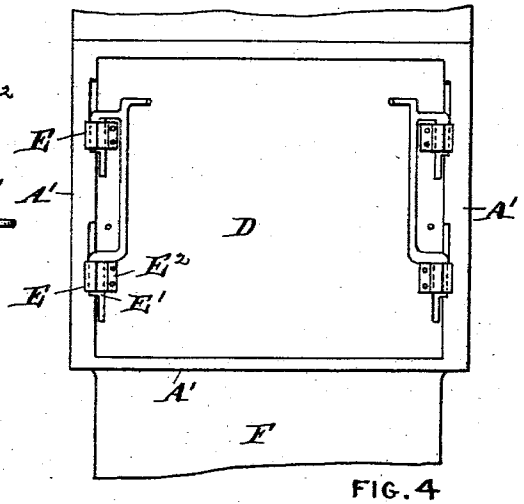


FIG. 4

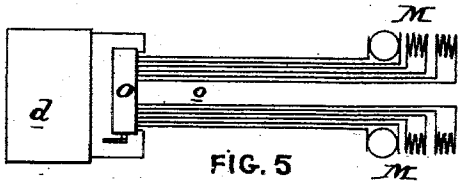


FIG. 5

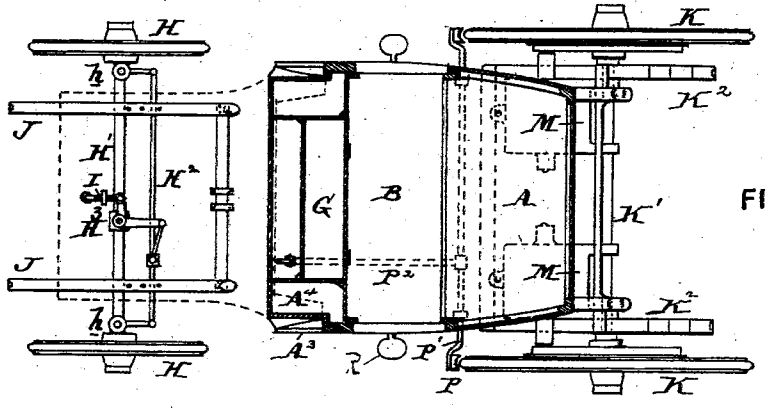


FIG. 2

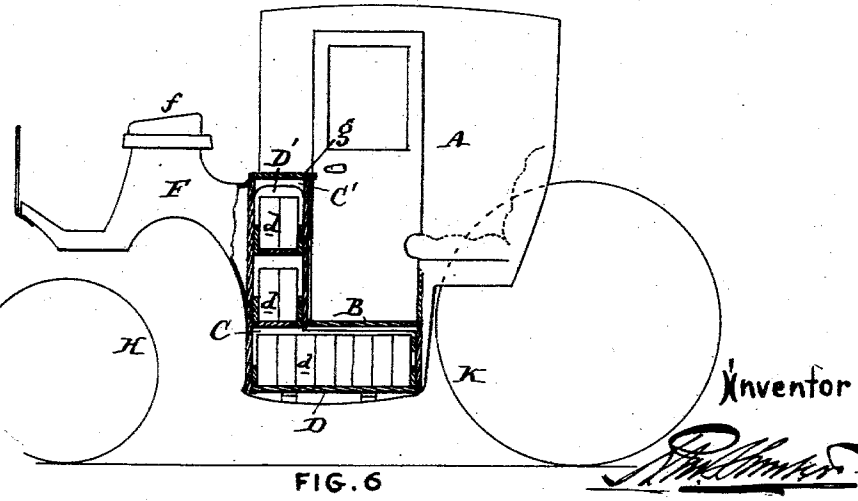


FIG. 6

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(No Model.)

4 Sheets—Sheet 3.

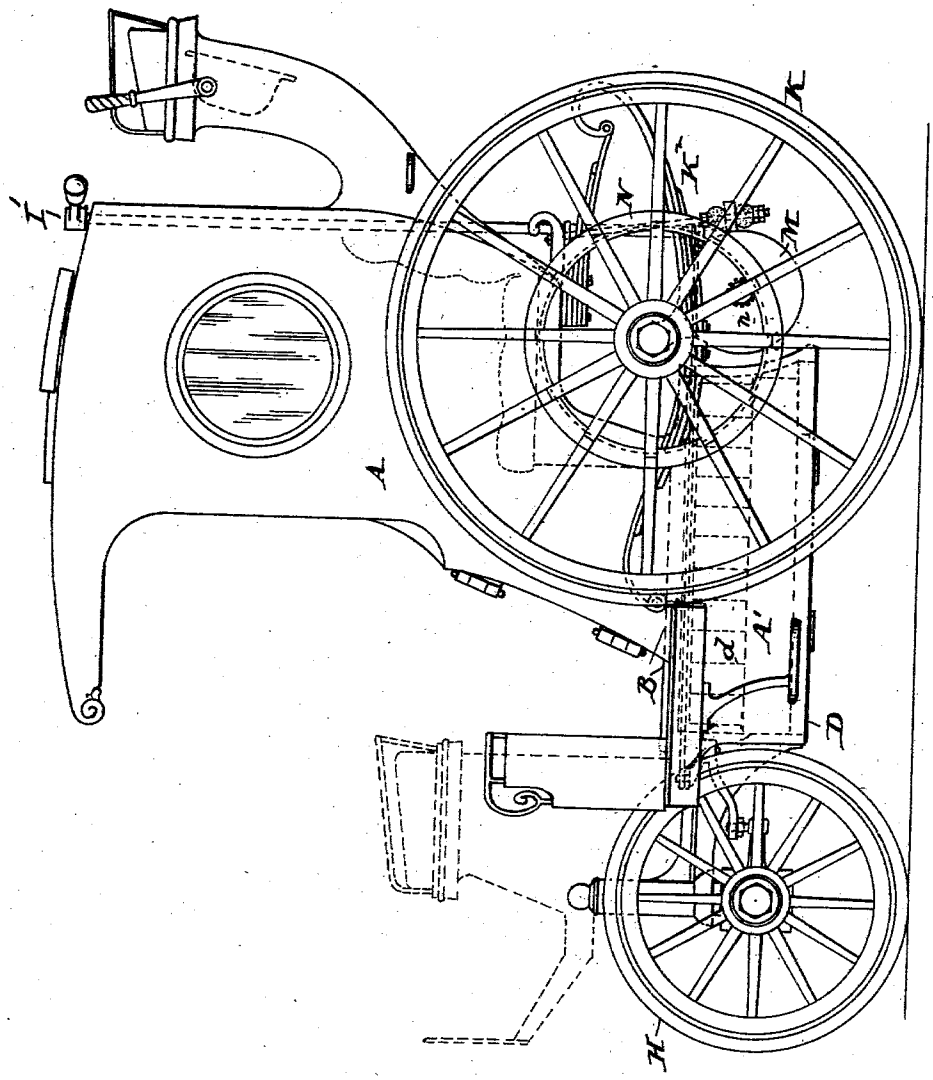


FIG. 8

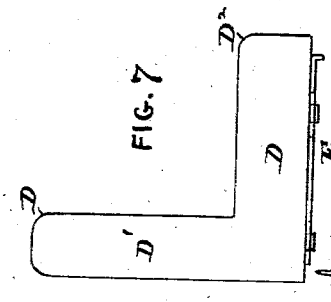


FIG. 7

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(Application filed Mar. 4, 1899.)

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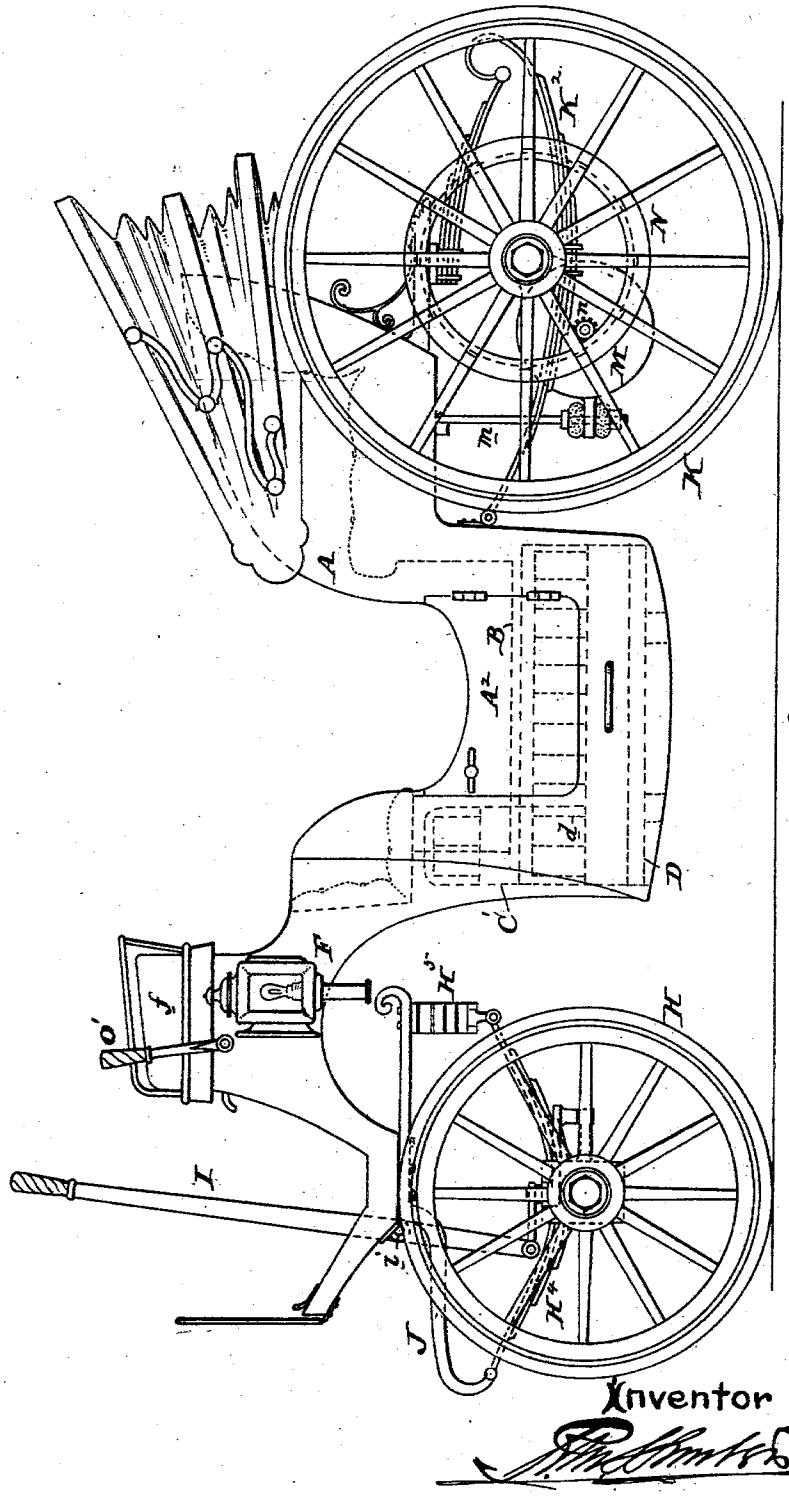


Fig. 9.

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UNITED STATES PATENT OFFICE.

RUDOLPH M. HUNTER, OF PHILADELPHIA, PENNSYLVANIA.

ELECTRICALLY-PROPELLED VEHICLE.

SPECIFICATION forming part of Letters Patent No. 629,079, dated July 18, 1899.

Application filed March 4, 1899. Serial No. 707,738. (No model.)

To all whom it may concern:

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

This application (Case No. 307) has special reference to pleasure vehicles, such as carriages, and comprises certain features of construction of the body and running-gear.

In the construction of electric carriages much difficulty has been experienced in suitably arranging the batteries so as to be conveniently placed and at the same time so shielded as not to destroy the general beauty of design. In my improvements the body portion of the carriage is formed with a compartment immediately below the floor and shielded from view by the extensions of the walls of the body portion. The batteries are supported upon a suitable removable floor or bottom and inserted or removed as a unit. The general configuration of the sides and ends may be extended downward, so as to prevent the appearance to the eye of any existing compartment. The general proportions of the body are maintained, so that the additional space occupied by the batteries is not noticeable. The general character of the body above may be that of a brougham, hansom-cam, victoria, or open carriage. The compartment for the batteries may extend upward at the forward end and the battery-support made L-shaped, so as to fit therein and increase the capacity where greater distance is to be run with one charge. The rear axle is provided with large wheels electrically driven by separate electric motors, and the forward and small wheels are the steering-wheels, being preferably operated by knuckle-joints and levers. The friction-brake operates upon the rear wheels and is actuated by a rod or bar extending through battery-compartment immediately below the floor of the vehicle.

My improvements will be better understood by reference to the drawings, in which—

Figure 1 is a side elevation of an electric brougham embodying my improvements. Fig. 2 is a sectional plan view of same on line 2 2. Fig. 3 is a cross-sectional elevation through the lower portion of the body and battery-support. Fig. 4 is an inverted plan view of the battery compartment, support, and carriage. Fig. 5 is a diagram showing the electric circuits for the motors. Fig. 6 is a sectional elevation of a modification of my improved brougham. Fig. 7 is an elevation of the battery-support for the brougham of Fig. 6. Fig. 8 is a side elevation showing my improvements applied to a hansom-cab, and Fig. 9 is a similar view showing my invention adapted to a victoria or open carriage.

In all of the types of carriages here shown the general construction may be the same so far as my improvements are concerned, the only variations being in the shape of the upper part of the body. Thus in the victoria or open carriage the upper part of the body of the brougham is cut away and the falling top is substituted, and in the case of the hansom-cab the operator's seat may, if desired, be placed in the rear of the body. It may be placed in the front, if desired, as indicated in dotted lines.

Referring now to the drawings, Figs. 1 to 7, A is the body part and is shaped so as to closely resemble a brougham and is provided with a floor B at a considerable distance above the bottom of the side walls A'. The space bounded by these side walls forms a compartment C, open on the bottom, into which the batteries *d* are placed. The batteries are supported upon a frame D, fitting to the bottom of the side walls A' of the body, and said frame is locked in position in any suitable manner preferably capable of ready removal. In the construction shown the side walls A' immediately below the doors A^2 are provided with metal plates E, notched at *e*, and the bottom of the frame D is furnished with sliding bolts E', carried in guides E^2. When these bolts are in the position shown in Figs. 3 and 4, the battery-support is locked in position; but when drawn backward they are liberated from the notches *e*, and then the batteries may be lowered and removed. The weight of the batteries being large, hydraulic lifting devices may be employed for this purpose. Any other suitable manner of fastening the remov-

able battery-support in place within the compartment C may be employed in lieu of that shown, if so desired.

It will be observed that the doors A^2 are brought down below the floor B and received in recesses *b*, so that they give the appearance of there being no compartment below the floor. Furthermore, the sides A' below the door are brought down below the support or frame D and curved to destroy the appearance of a box-compartment and also to provide guides E for insuring the battery properly entering.

Another feature of construction is that the outside appearance is what is termed a three-quarter brougham, while the interior is a coupé, said construction being to secure the large forward curve to the post A^3 and building of the body forward at A^4, so as to enable the neck F extending down to meet the body, and thereby secure a great deal more space within the compartment C below the floor. Now it will be observed that by this construction I am enabled to secure a greatly-increased capacity of battery-compartment, and consequently room to carry the necessary battery without destroying the beauty of design. It will also be noticed that the battery-compartment C extends forward of the actual floor B of the passenger-compartment, and as this gives ample storage-battery capacity for most cases the interior of the body may be provided with a three-quarter seat, if so desired, or may have a closet G, if preferred. In cases where long runs are necessary the space above the forward part of the compartment C may be made to receive an upward extension of the battery-support provided with cells. This construction is shown in Fig. 6 and the battery-support is shown in Fig. 7. In this case the compartment within the carriage is made L-shaped, since the lower horizontal compartment C has an upward extension C', and the battery-support is also made L-shaped by an extension D' upon the forward end of the main part D. The upper edges of the battery-support are rounded, as at D^2, to more readily guide the support into the compartment C C'. The upright compartment C' is immediately in front of the passenger-compartment and may be said to be built partly therein, since the forward windows and walls are extended forward. In this manner the top of the compartment C' is within the passenger-compartment and acts as a table *g*. If the upright part D' of the battery-support is reduced in height, this top of the compartment may be sufficiently lowered to make it perform the function of a seat instead of a table. This is evident from an examination of Fig. 9. The neck F is brought forward and is hollow, as is customary. It supports the operator's seat *f*, as usual.

The forward or small wheels H are mounted on stub-axles hinged to the axle H' by knuckle-joints *h*, which are provided with levers connected by a link H^2. This link is moved by bell-crank H^3, operated by a hand steering-lever I, pivoted to the operator's platform at *i*. By throwing the lever forward or backward the wheels H are turned for steering. The axle H' is secured to two springs H^4 of the elliptic type. The forward ends of these springs are hinged to rigid arms J, extending forward from the platform, and the rear ends of the springs are connected to a transverse spring H^5, or, if desired, to the rear ends of the arms J'.

The rear axle K' is connected to the body by springs K^2 in the usual way and carries the large driving-wheels K. M are electric motors, sleeved or otherwise connected with the axle K' and supported from the body A by rods *m*, connecting therewith under the seat portion thereof. Rubber springs M' may be employed for supporting the motor, so as not to transmit unpleasant jarring to the occupants. It also secures more flexibility for the motor-support. The motor-shafts are provided on the outside with pinions *n*, which mesh with the internal gears N, bolted to the spokes of the wheels K. In this manner the motors are respectively arranged to drive separate wheels. The motors are arranged between the axle and the lower part of the body A and under the seat portion, so that they are greatly shielded or hidden from view, and thereby enhancing the beauty of design.

The controller O may be of the series-multiple type and is placed under the operator's seat and manipulated by a handle O.' The circuits *o*, Fig. 5, extend from the battery to controller through the neck portion F and thence back through the body to the motors. Any additional controlling devices, such as reversing-switch and cut-out switch, may be employed. The electric braking-switch is usually embodied in the controller.

P are brake-shoes carried by a lever-frame P' and adapted to act upon the rear wheels K. This frame P' is moved by a bar P^2, extending through the battery-compartment below the floor B, and is operated by a bell-crank P^3, rod P^4, and foot-lever P^5. A spring P^6 removes the brake when the foot-lever is released.

All that has been said with regard to Figs. 1 to 7 equally applies to Fig. 9, and hence that figure requires no further explanation.

Referring to Fig. 8, the operator's seat may be at the rear, as shown at *f'* in full lines, or in front, as indicated in dotted lines, according to preference. In this case the battery-compartment C is under the floor both on the interior of the body and exterior thereof, and on account of the short length of the floor the compartment may, if desired, be extended a short distance backward as well, as clearly shown. I' is the steering-lever and is shown as a rocking shaft on account of the small space available when the seat is at the rear. When, however, it is at the front, then the steering-lever may be as described in connection with Fig. 1. In all of these cases the step R is se-

cured to the outside walls of the battery-compartment immediately below the entrance to the floor of the vehicle.

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

1. In an electrical vehicle the combination of a body provided with a seat and floor in front of and at a lower level than the seat, and a battery-compartment built into and as a part of the body portion immediately below the floor and forward of the seat of the full width of the body, and a removable battery-support adapted to said compartment.

2. In an electric vehicle the combination of a body provided on the interior with a seat and floor and a battery-compartment built into the body portion immediately below the floor and of the full width of the body and open at the bottom, in combination with a removable battery-support adapted to fit into the open bottom of the battery-compartment, and means for holding the said battery-support in position.

3. In an electric vehicle, the combination of a body provided on the interior with a seat and floor and a battery-compartment built into the body portion immediately below the floor and of the full width of the body and open at the bottom and also having entrances on each side of the body directly to the floor and immediately in front of the seat, in combination with a removable battery-support adapted to fit into the open bottom of the battery-compartment, and means for holding the said battery-support in position.

4. In an electric vehicle, the combination of a body provided on the interior with a seat and floor and a battery-compartment built into the body portion immediately below the floor and of the full width of the body and open at the bottom and also having entrances or passage-ways on each side of the body directly to the floor immediately in front of the seat, in combination with a removable battery-support adapted to fit into the open bottom of the battery-compartment, means for holding the said battery-support in position, and doors hinged to the body part to close the passage-ways to the interior thereof arranged forward of the seat and extending to a point below the floor-line.

5. A body for an electric vehicle consisting of an inclosed upper body portion having therein a seat and a floor at a lower level and in which the sides of the body are extended below the floor-level to constitute a rectangular battery-compartment of the full width of the upper portion of the body.

6. A body for an electric vehicle consisting of an inclosed upper body portion having therein a seat and a floor immediately in front of the seat and at a lower level and in which the sides of the body are extended below the floor-level to constitute a rectangular battery-compartment below the floor and forward of the seat and of the full width of the upper portion of the body, in combination with a battery-support below the floor removably connected with said compartment for sustaining the batteries within the same.

7. A body for an electric vehicle consisting of an inclosed upper body portion having therein a seat and a floor and in which the sides of the body below the floor-line are extended downward to constitute a rectangular battery-compartment, a removable bottom or battery-support for sustaining the batteries within the said compartment, and locking devices for locking the bottom of the support in position.

8. In an electric vehicle, a body portion having an inclosed upper part and provided with a seat and a floor at a considerable distance above the bottom of the body and in which the lower portion of the body below the floor-line is extended downward and forward beyond the floor to form a rectangular battery-compartment of greater area than the area of the floor, in combination with a removable battery-support of greater area than the floor to sustain the batteries within the compartment below the floor.

9. In an electric vehicle, a body portion having an inclosed upper part and provided with a seat and a floor at a considerable distance above the bottom of the body and in which the lower portion of the body below the floor-line is extended downward and forward beyond the floor to form a rectangular battery-compartment of greater area than the area of the floor, in combination with a removable battery, and hinged doors on each side of the body and in line with the side edges of the floor and battery-compartment.

10. In an electric vehicle, a body part having a seat at the rear, a floor in front of the seat, and an L-shaped battery-compartment arranged below the floor and extending upward at the forward part of the floor, in combination with a battery-support having a forward upward extension or frame adapted to sustain the batteries in both the compartment below the floor and the upper forward compartment.

11. In an electric vehicle, a body part having a seat at the rear, a floor in front of the seat, and an L-shaped battery-compartment arranged below the floor and extending upward at the forward part of the floor, in combination with a battery-support having a forward upward extension or frame adapted to sustain the batteries in both the compartment below the floor and the upper forward compartment, and locking devices for holding said battery-support in place.

12. In an electric vehicle, a body portion having a transversely-arranged floor at a considerable distance above its lower edge, a seat arranged to the rear of said floor, a compartment arranged in front of said floor and opposite the seat, a lower compartment arranged

below the floor and extending beyond the same so as to communicate with the hollow compartment in front of the floor, and a removable means for supporting the batteries within the said lower and forward compartment.

13. In an electric vehicle, a body part having an offset under the seat at its rear, a battery-compartment below the floor forward of the seat, a hollow curved-neck portion extending forward of the main body and provided with the operator's seat and platform, in combination with driving-wheels and axles spring-connected at the rear of the body, electric-motor devices carried by the axle and adapted to rotate the wheels, steering-wheels of small diameter connected immediately below the curved neck and operator's platform, steering mechanism arranged on said platform immediately above the steering-wheels and connecting with said wheels to change their angle, and controlling mechanism for the electric-motor devices arranged also upon the curved-neck portion and adapted to be operated from the operator's seat.

14. In an electric vehicle, a body part having an offset under the seat at its rear, a battery-compartment below the floor forward of the seat, a hollow curved-neck portion extending forward of the main body and provided with the operator's seat and platform, in combination with driving-wheels and axles spring-connected at the rear of the body, electric-motor devices carried by the axle and adapted to rotate the wheels, steering-wheels of small diameter connected immediately below the curved neck and operator's platform, steering mechanism arranged on said platform immediately above the steering-wheels and connecting with said wheels to change their angle, controlling mechanism for the electric-motor devices arranged also upon the curved-neck portion and adapted to be operated from the operator's seat, a friction-brake adapted to control the rotation of the driving-wheels and connected to the rear part of the body, a foot-lever for operating the brake arranged on the operator's platform forward of the body, and mechanical connections between said foot-lever extending through the curved neck and body below the floor-level thereof for operating the brake.

15. In an electrically-propelled vehicle, a body part supported upon the axles by springs and provided with a battery-compartment arranged below the floor thereof, an operator's seat arranged forward of the main body portion, a pair of large driving-wheels arranged at the rear portion of the vehicle, electromotor devices for rotating the said large driving-wheels partly carried by the axle and partly by the vehicle-body, a pair of steering-wheels of small diameter arranged immediately below the operator's seat and in front of the main body portion, steering devices extending from said steering-wheels to a position in front of the operator's seat, controlling devices for the electromotor devices arranged adjacent to the operator's seat, and electric circuits including the motor, battery and controlling devices extending from the forward part of the vehicle-body to the rear thereof.

16. An electric brougham consisting of a closed body portion containing a passenger-seat and having its sides extended down below the floor to form a battery-compartment and also having a forward curved or goose neck portion of light construction upon which is arranged the operator's seat and platform, in combination with electrically-propelled driving-wheels at the rear of the body portion, steering-wheels arranged in front of the body portion and immediately below the operator's platform, a controller arranged within the space inclosed by the curved or goose neck portion and having a handle extending within reach of the operator's seat, and a battery arranged within the compartment under the floor of the vehicle, whereby the general construction of the vehicle closely resembles the modern type of brougham and the operating devices largely shielded from view.

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

R. M. HUNTER.

Witnesses:
J. W. KENWORTHY,
R. M. KELLY.