

No. 751,581.

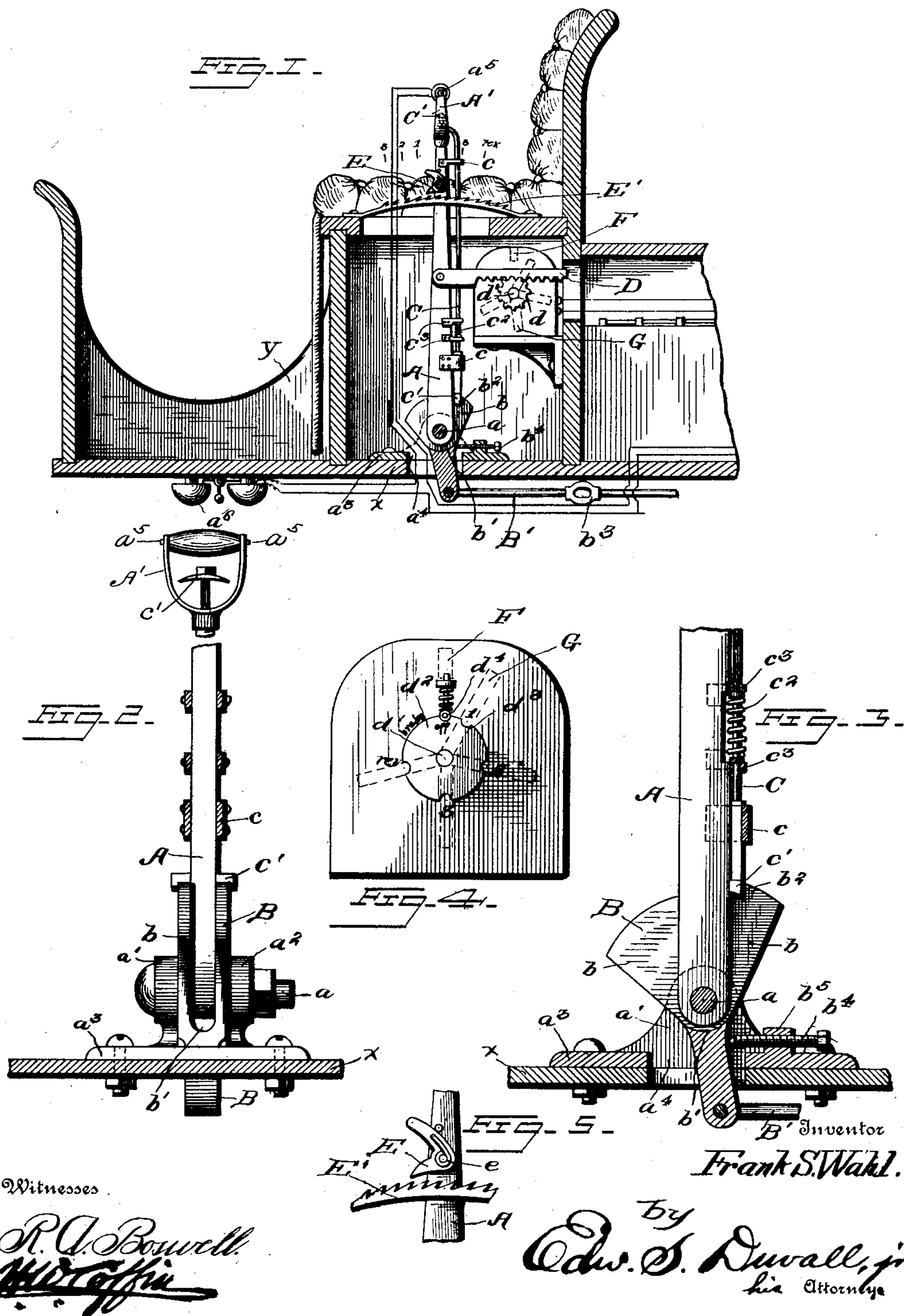
PATENTED FEB. 9, 1904.

F. S. WAHL.  
CONTROLLING MECHANISM FOR ELECTRIC VEHICLES.

APPLICATION FILED DEC. 21, 1901.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses

R. A. Bowell  
*[Signature]*

by  
Edw. S. Duwall, jr.  
his Attorney

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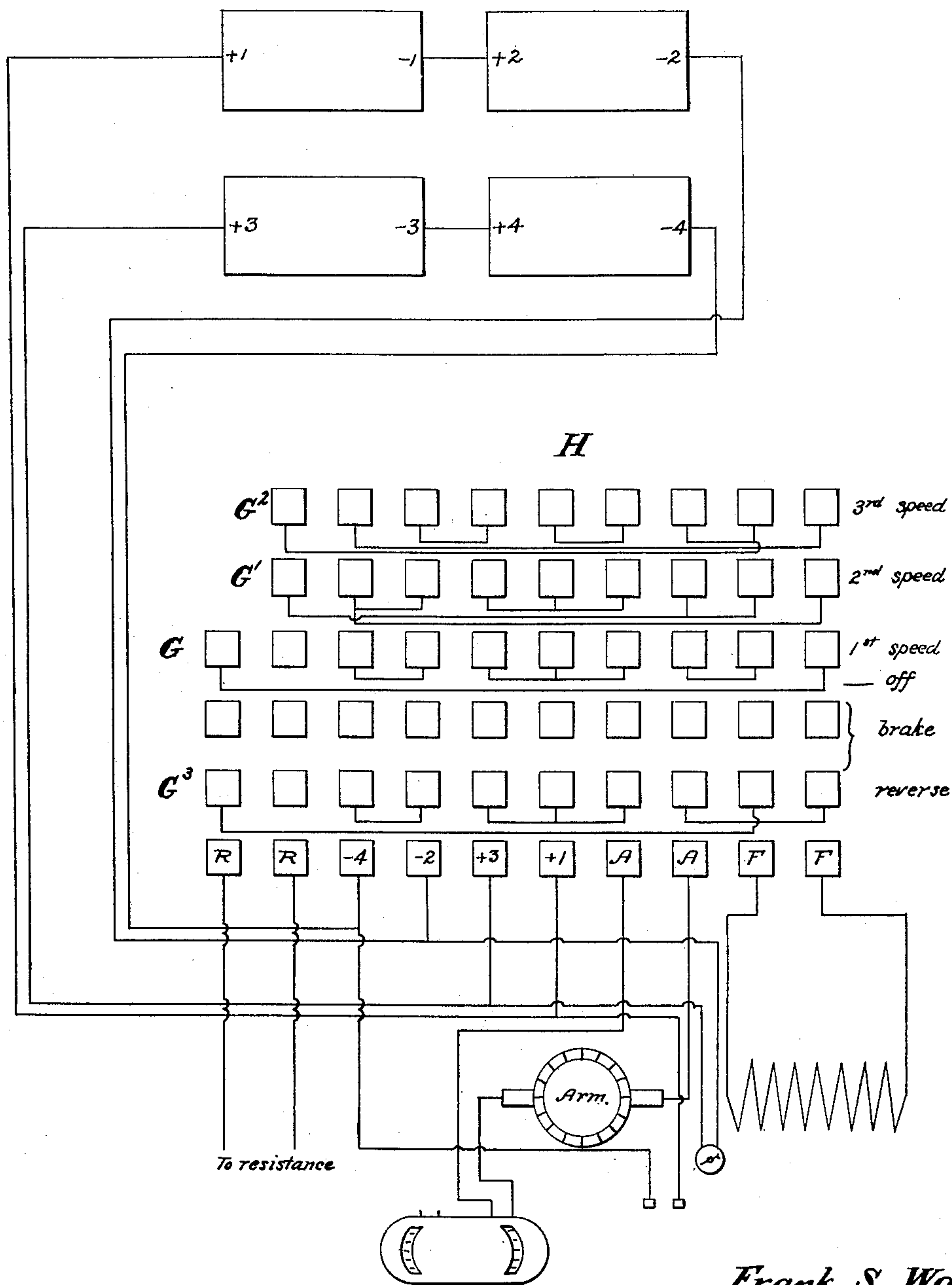
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2 SHEETS—SHEET 2.

*Fig. 6.*



Witnesses  
*W. C. [Signature]*  
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# UNITED STATES PATENT OFFICE.

FRANK S. WAHL, OF BUFFALO, NEW YORK.

## CONTROLLING MECHANISM FOR ELECTRIC VEHICLES.

SPECIFICATION forming part of Letters Patent No. 751,581, dated February 9, 1904.

Application filed December 21, 1901. Serial No. 86,819. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK S. WAHL, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Controlling Mechanism for Electric Vehicles, of which the following is a specification.

My invention relates to improvements in 10 controlling-levers for electric vehicles; and the objects of the invention are, first, to combine a controller and brake-lever in one located with due regard for comfort in traveling and ease of manipulation; second, to secure a 15 long brake leverage; third, to secure a foot-platform free from push-buttons and levers; fourth, to reduce the movement or swing of the controlling-lever to a small arc; fifth, to prevent a setting of brake with current on, and, 20 lastly, to provide a reverse always at hand and bell push-buttons at thumb's end.

With the foregoing and other objects and advantages in view the invention consists in certain novel and useful features of construction clearly set forth in the following description of parts and distinctly pointed out in the 25 claims concluding this specification.

In the drawings forming part hereof and illustrating my invention, Figure 1 is a partial longitudinal sectional view of an electric carriage, showing my improved controlling and brake lever installed. Fig. 2 is an enlarged front elevation of the lower part of the lever and base. Fig. 3 is a detail sectional 35 view of the brake-lever and base. Fig. 4 is a detail in plan of the controller-disk. Fig. 5 is a detail view. Fig. 6 is a diagrammatic view of the controller and its wiring.

Like letters of reference designate identical 40 parts throughout the figures of the drawings.

The lever A is pivoted upon a transverse bolt  $a$ , journaled in the upright ears  $a'$  and  $a''$ , of a casting  $a^3$ , secured to the floor X of the vehicle Y in approximately the center thereof, so 45 that the lever will project through the center of the seat, permitting the operator to sit upon either side. Pivoted upon the same bolt, thereby providing a common axis, is a brake-lever B, which projects downwardly through an opening  $a^4$  in the base of the casting and through 50

the floor of the vehicle. This lever is formed with a sector-shaped part  $b$ , which projects above the bolt  $a$  and is concentric therewith. The part  $b$  is bifurcated, as at  $b'$ , and upon the periphery of each sector at the rear thereof 55 is a shoulder  $b^2$ . The lever A is mounted upon the transverse bolt  $a$  in the bifurcation of the sector-shaped part  $b$ . A rod C is mounted in guides  $c$ , attached to the upper and lower parts of the lever A, and is provided at 60 the lower end with a wide catch  $c'$ , adapted to engage with the shoulders  $b^2$  of the sector-shaped part of the brake-lever B. A coil-spring  $c^2$  upon the rod and confined between guides  $c^3$  65 presses the catch into contact with the periphery of the sector-shaped parts of the brake-lever. The upper end of this rod extends into the detachable spade-shaped handle A' of the lever A and is provided at its tip 70 with a transverse grip  $c'$ .

The length of the depending brake-lever B is proportioned to the length of the lever A, so as to give a leverage of approximately one to eight. At its end the brake-lever is provided with an eye for the attachment of the 75 sectional brake-rod B', and adjustment of the brake action is obtained by means of a turnbuckle  $b^3$ , connecting the sections of the brake-rod, and a set-screw  $b^4$ , mounted in a lug  $b^5$  upon the base of the casting  $a^3$  at the rear of 80 the lever. This set-screw is designed to reduce the arc of movement of the said lever when braking.

Below the seat-line a rearwardly-extending rack-bar D is attached to the lever A, and this 85 rack-bar, the teeth of which are on the under side, engages with a toothed pinion  $d$ , secured to the controller-shaft  $d'$  of a controller. On the same shaft is secured a notched disk  $d''$ , the several notches in which register with the 90 movable contacts of the controller, which may be of any design.

The lever is provided with a pawl E, which may be set in engagement with a toothed bar or ratchet E', secured to the seat adjacent to 95 the side of the lever to hold the brake in a set or locked position when the vehicle may be standing on a grade or whenever desirable. A spring  $e$ , pressing against the arm of the pawl, serves to hold the same normally free 100



from engagement with the ratchet. The spade-handle is provided at each end of the grip with push-buttons  $a^5$   $a^5$  in the battery-circuit and connected to actuate an alarm-bell  $a^6$ .

5 I employ, preferably, a five-point controller H, provided with the usual stationary contacts F and with movable contacts G,  $G'$ , and  $G^2$  for three speeds forward, first, second, and third forward, and a reverse  $G^3$  on the first  
10 speed, together with an off position. The disk  $d^2$ , which is provided with notches  $d^3$  for the three speeds forward and for the reverse and "off" positions, has a contiguous spring-pressed detent  $d^4$ , which engages with the  
15 notches. There is no notch on the disk for the brake position, thereby giving a smooth pull, and the brake action takes place one-half notch back of the off position, giving one-half of off notch plus the space allotted for braking for  
20 the setting of same.

When the lever A is in a vertical position, it is at the off or coasting notch, also to be used when charging the batteries. Three positions of the lever forward give the three  
25 speeds ahead, requiring not more than nine inches of swing for the handle of the lever. The operator wishing to stop pulls lever A back until the catch  $c'$  engages with the shoulders  $b^2$  on the sector-shaped part  $b$  of the brake-  
30 lever. Further movement of the lever turns the brake-lever on the common axis  $a$  and actuates the brake-rod B'. To reverse, the catch  $c'$  is lifted, which releases the brake, and the lever A is moved back to last position, turning  
35 the disk  $d^2$  on the controller-shaft over to the reverse notch. To set the brake from this position of the controller, it is pushed forward until the catch  $c'$  drops back over the shoulders on the sector-shaped parts  $b$ , which brings  
40 the lever to the off position. From there the lever is pulled back and the brake set, as heretofore described. It will be noted that the reverse cannot be applied while braking, as the brake is adjusted for application within  
45 the limits of the off and reverse. It will also be noted that in controlling the current must be cut off from any running-notch before applying the brake, which fact prevents overloading of the motor and batteries and also prevents  
50 accidents which might occur to nervous operators and amateurs.

The vehicle may be supplied with a reversible steering apparatus, the construction of which is too well known to need illustration  
55 here. For the same reason the motors need no illustration.

From the foregoing description of parts it will be seen that I have provided a very simple controlling and brake lever of few parts,  
60 and the situation and construction are such as to greatly relieve the mind of the operator and add to his ease and comfort in mobiling. Simplicity of operation is secured through the employment of but one lever for running,  
65 braking, reversing, and sounding the warn-

ing-bell, and this lever requires merely a forward and backward movement to secure the above results. The long leverage gives an enormous brake-pull, insuring a substantial grip of the brake-shoes. The reverse is al- 70 ways at hand in case of the necessity for an exceptionally quick stop or in getting the vehicle out of danger.

The absence of floor-pushes, treads, &c., gives the operator the privilege of shifting his 75 feet at will and does not necessitate a search for an important piece of controlling mechanism if he has for any reason moved his foot therefrom and prevents cramping of the body through a stiff or strained position held for 80 any length of time.

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

1. In an automobile vehicle, the combina- 85 tion of driving means, a controller for said driving means, means for reversing said driving means, and a mechanical brake; a lever common to the controller and the reversing means and adapted to operate each separately 90 from the other by movement in opposite directions from a given, neutral or deenergizing point in the arc of movement of the lever, and means for engaging the lever with the brake mechanism and operating the latter, 95 without actuating either the controller or the reverse, upon movement of the lever in a given direction from the said neutral or deenergizing point.

2. The combination with a motor-vehicle, of 100 a motor-controller comprising a reversing-switch and a controller-shaft, revoluble in one direction from the neutral or open-circuit position, to supply energy, and in the other direction to operate the reverse-switch, of means 105 connected with the controller-shaft and adapted to operate same in either direction, a mechanical brake, and mechanism connecting said means with said brake and adapted to be operated by the movement of the controller- 110 operating means from the neutral position in the direction for actuating the reversing-switch.

3. The combination with a motor-driven vehicle, a motor-controller provided with a re- 115 verse, operated by the controller-shaft, and brake mechanism, of a single lever and connections between said lever and the controller-shaft and brake mechanism, whereby the lever may operate the controller, the reverse and the 120 brake mechanism separately.

4. The combination with an electric vehicle, a motor-controller provided with a reverse, operated by the controller-shaft, and brake mechanism, of a lever pivotally secured to the said 125 vehicle, means connecting the said lever with the controller-shaft so that the current is "off" when the lever is in its normal position, and the shaft is rotated so that the circuit is "made" when the lever is moved in one di- 130



rection from its normal, while the "reverse" is actuated when the lever is moved in an opposite direction from its normal; and means connecting said lever with the brake mechanism, whereby the latter may be operated by the lever from its normal position only, without closing the circuit.

5. The combination with an electric vehicle and the motor-controller, of rotating mechanism attached to the shaft of the controller, a controller-lever pivotally mounted in said vehicle, connections between the rotating mechanism and said lever, a brake-lever journaled on the controller-lever pivot, brake mechanism attached to said brake-lever, and mechanism for engaging the controller-lever with the brake-lever when the brake mechanism is to be actuated.

6. The combination with an electric vehicle and a motor-controller, constructed with a reverse operated by the controller-shaft, a disk attached to the controller-shaft and provided with notches for each forward speed, the "off" and the reverse, a spring-pressed detent engaging with said notches, a toothed pinion mounted on said controller-shaft, a controller-lever pivotally mounted on the floor of the vehicle, a rack-bar attached to said controller-lever and engaging with said pinion, brake mechanism, and a brake-lever with means for engagement with the controller-lever, when the brakes are to be applied, substantially as described.

7. The combination with an electric vehicle and a motor-controller, of rotating mechanism attached to the shaft of the controller, a piv-

otal lever connected with the said shaft-rotating mechanism, brake mechanism, a brake-lever, connected with said mechanism, and journaled upon the pivot of the controller-lever, sector-shaped bifurcated parts projecting from said brake-lever on each side of the controller-lever and above the pivotal point, shoulders on the periphery of said sector-shaped bifurcated parts, a spring-pressed catch mounted on the controller-lever for engagement with said shoulders.

8. The combination with an electric vehicle and a motor-controller, of rotating mechanism attached to the shaft of the controller, a pivot lever connected with said shaft-rotating mechanism, brake mechanism, a brake-lever, connected with said mechanism, and journaled upon the pivot of the controller-lever, sector-shaped bifurcated parts projecting from said brake-lever on each side of the controller-lever and above the pivotal point, shoulders on the periphery of said sector-shaped bifurcated parts, a spring-pressed catch mounted on the controller-lever for engagement with said shoulders, adjusting means for the brake mechanism whereby to regulate the arc of movement of the brake-lever, and means for locking the controller-lever when the brakes are applied, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

FRANK S. WAHL.

Witnesses:

ALBERT A. BEUTTER,  
ELLSWORTH J. RICHARD.