

(No Model.)

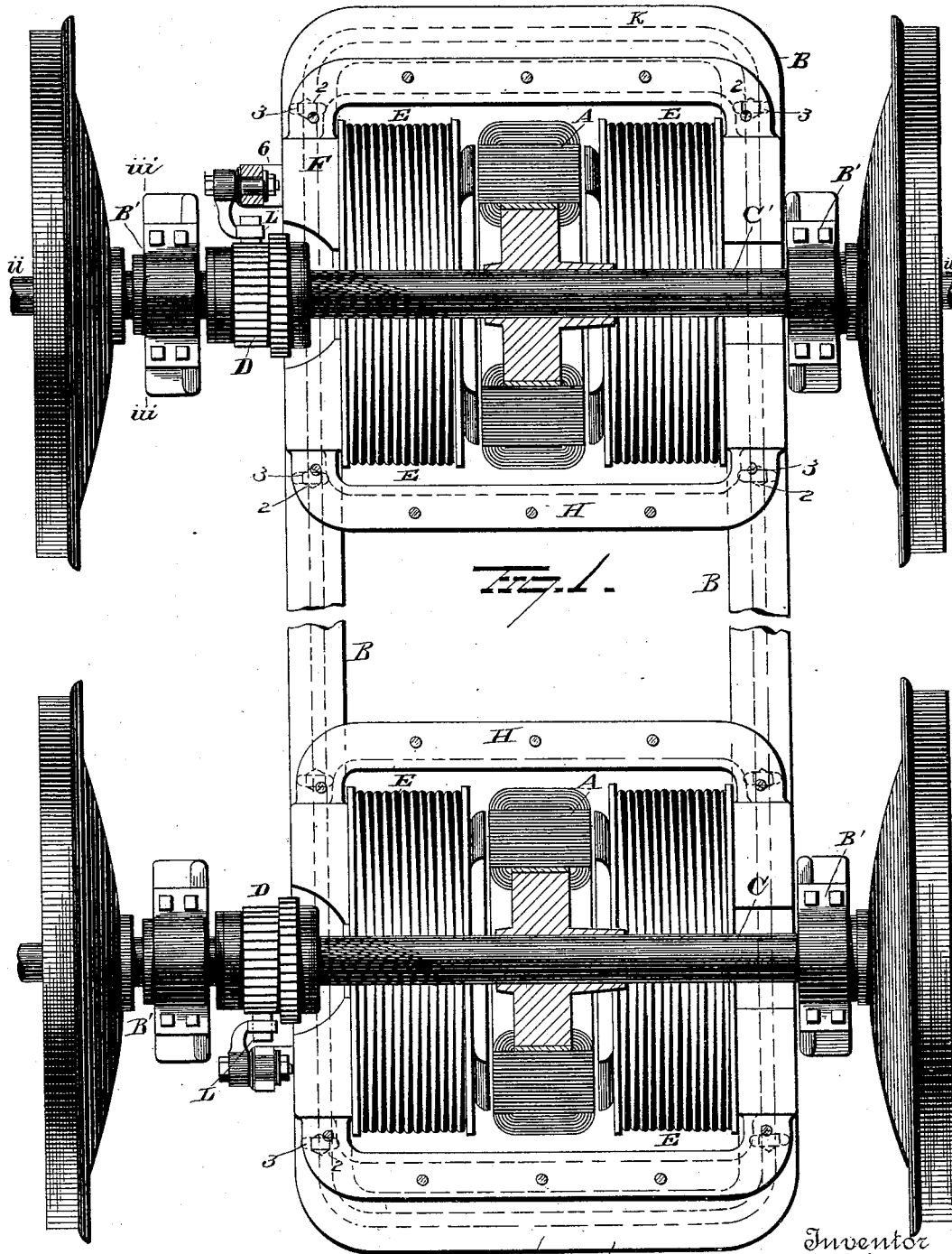
3 Sheets—Sheet 1.

S. H. SHORT.

SUPPORTING AND CONNECTING THE DRIVING MOTORS OF ELECTRIC CARS.

No. 454,008.

Patented June 9, 1891.



Witnesses
E. J. Matthews
G. J. Downing

Inventor
Sidney H. Short
By his Attorney
H. A. Seymour

(No Model.)

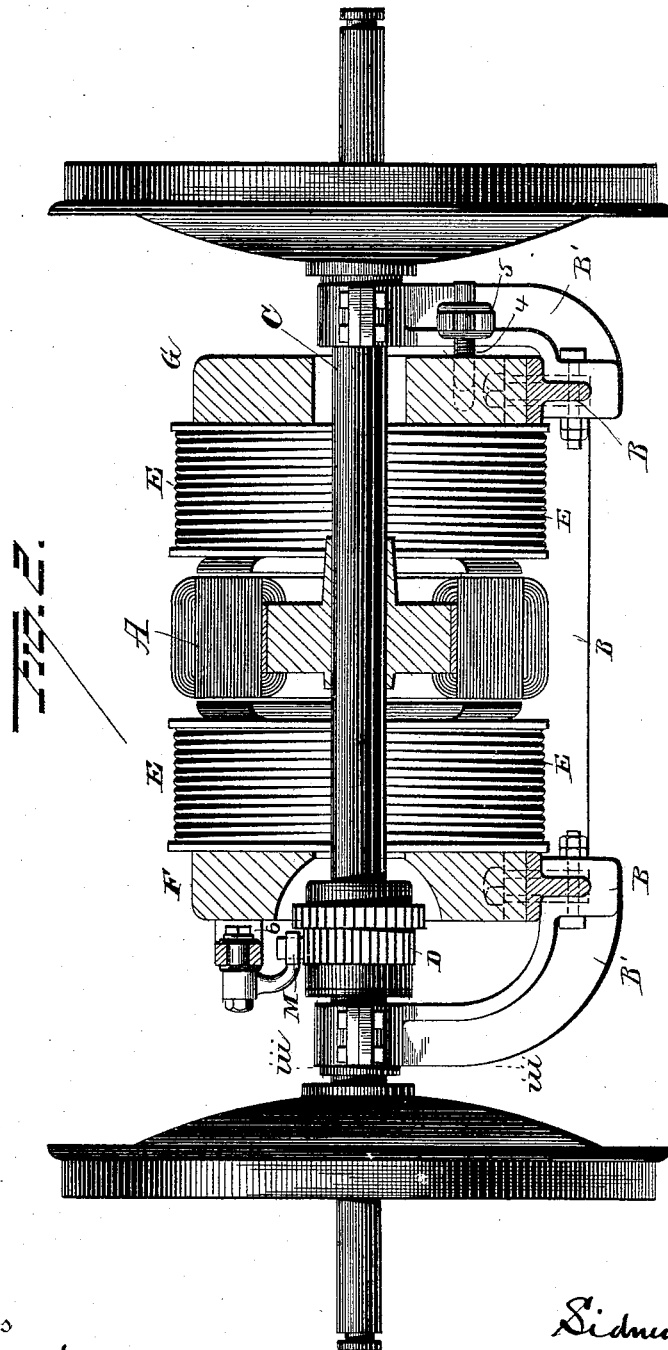
3 Sheets—Sheet 2.

S. H. SHORT.

SUPPORTING AND CONNECTING THE DRIVING MOTORS OF ELECTRIC CARS.

No. 454,008.

Patented June 9, 1891.



Witnesses
E. M. Hougham
G. F. Downing

Inventor
Sidney H. Short
By his Attorney
H. A. Seymour

(No Model.)

3 Sheets—Sheet 3.

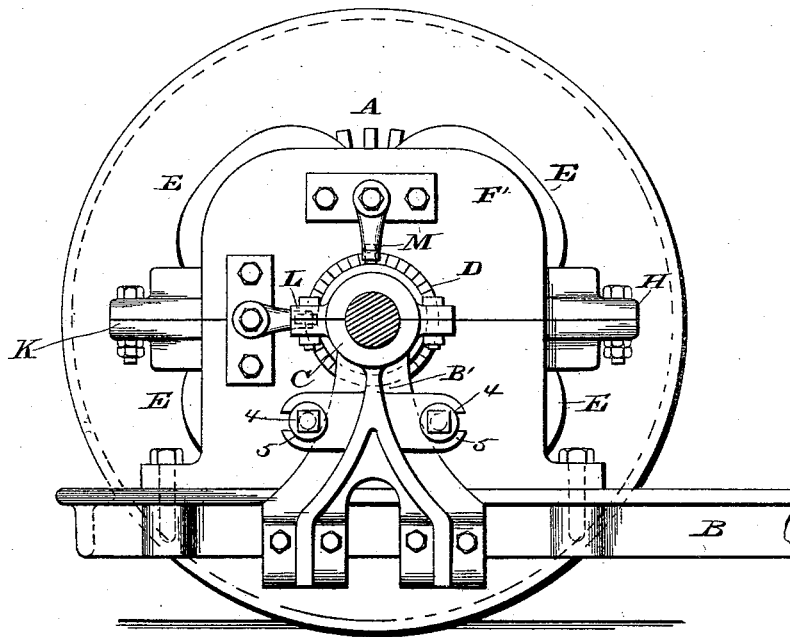
S. H. SHORT.

SUPPORTING AND CONNECTING THE DRIVING MOTORS OF ELECTRIC CARS.

No. 454,008.

Patented June 9, 1891.

~~Fig. 3.~~



Witnesses
G. F. Downing
S. G. Nottingham

Inventor
Sidney H. Short
By his Attorney
H. A. Seymour

UNITED STATES PATENT OFFICE.

SIDNEY H. SHORT, OF CLEVELAND, OHIO, ASSIGNOR TO THE SHORT ELECTRIC RAILWAY COMPANY, OF SAME PLACE.

SUPPORTING AND CONNECTING THE DRIVING-MOTORS OF ELECTRIC CARS.

SPECIFICATION forming part of Letters Patent No. 454,008, dated June 9, 1891.

Application filed November 22, 1890. Serial No. 372,333. (No model.)

To all whom it may concern:

Be it known that I, SIDNEY H. SHORT, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Supporting and Connecting the Driving-Motors of Electric Cars; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to an electrically-propelled car or wheeled vehicle in which the armature of a propelling-motor is mounted axially with reference to one of the car-axes, which serves as a driving-axle for the car, and the said motor is directly connected with the said axle. By "axially mounted" is to be understood that the axes of the armature and of the driving-axle are coincident, or nearly so, with each other, and by "directly connected" is to be understood that the armature makes one revolution to each revolution of the driving-axle.

In accordance with the present invention the armature is mounted on the driving-axle so as to turn therewith, and the field-magnets are supported by a frame between the two axes of the car below the car-body. The frame may be of oblong form with bowed ends, and is preferably hung below the axles by suitable hangers journaled on the axles. It may be connected rigidly to the car-axes, except, of course, that the axle must be permitted to rotate. It is designed to employ the frame in connection with propelling-motors which have the field-magnets projecting from yokes at the sides of the armatures, the yokes being provided with openings for the passage of the driving-axle. With such a propelling-motor the sides of the frame are or may be placed under the said yokes to which they are secured. In a motor thus mounted upon a frame pendulously supported from a car-axle the center of gravity of the structure is below the car-axle, and the motor thus accommodates itself automatically to the unequal rise and fall of the front of the car with respect to the rear of the same. A motor with a two-pole field (the usual kind of

field) may be used; but multipolar field-magnets have special advantages in connection with the axially-mounted and directly-connected armature on account of the multiplied attraction which they may exert, and their use in connection with a frame such as above indicated is specially included in the invention. The armature would of course be adapted to operate with a multipolar field—as, for example, by being cross connected at the commutator.

In the accompanying drawings, which form part of this specification, Figure I is a plan view of the wheel-base and motor mechanism supported and connected in accordance with the present invention. Fig. II is a transverse section on line *ii*, and Fig. III is a partial longitudinal section on line *iii*.

The armature A is composed of a soft-iron strip wound upon itself and provided with bobbins in notches in the edges. The bobbins are connected together in series and are provided with conductors leading to the strips of the commutator D. An armature A and commutator D are mounted fast on each of the car-axes C. Below the axes C is hung the endless frame B of oblong form with bowed ends. Hangers B', provided with journal-bearings at their upper ends and securely fastened at their lower ends to the frame B, support the latter. The field-magnets E project from yokes F and G at the sides of the armatures parallel to the car-axes. As shown, they make four poles for each armature. The yokes F and G rest upon the sides of the frame B, which directly underlie the same. The yokes of each motor are connected with each other by arms H and K.

To facilitate application to the car-axes, the yokes F G and their connected arms H K may be made in two pieces, as shown, or other convenient arrangement for that purpose may be adopted. As shown, the yokes are secured to the frame by bolts 2, passing through slots 3 in the feet with which the yokes are provided, and screws 4, tapped into the yoke G and journaled in lugs 5 on one of the hangers B' and held from endwise motion, serve to adjust the field-magnets E to the proper position relatively to the armature A. At L and

M are the commutator-brushes supported by small brackets 6 on the yokes F.

Instead of having the armatures to rotate with the driving-axes, the field-magnets may be made to turn therewith, the armatures being held stationary and mounted on a frame which is mounted on the car-axes, and it will be understood that this reversed arrangement is included in the invention as a substitute for that described without further specification herein.

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

1. The combination, with a car and one or more propelling-motors comprising each an armature mounted on and connected directly with a driving-axle, and non-rotative field-magnets, of a frame pendulously hung from the car-axes and having the said field-magnets mounted thereon, substantially as described.

2. The combination, with a car and one or more propelling-motors comprising each an armature mounted on and connected directly with a driving-axle, and non-rotative field-magnets, of an oblong frame pendulously depending from the car-axes and having the field-magnets mounted thereon, substantially as described.

3. The combination, with a car and one or more propelling-motors comprising each an armature mounted on and directly connected with a driving-axle, and non-rotative field-magnets projecting from yokes at the sides of the armature, of a frame depending from the axles and forming the support for the said field-magnets, substantially as described.

4. The combination, with a car and one or more propelling-motors comprising each an armature mounted on and directly connected with a driving-axle, and non-rotative field-

magnets projecting from yokes at the sides of the armature, of the oblong frame having its sides under said yokes to support the same, and the hangers connecting the said frame with the car-axes, substantially as described.

5. The combination, with a car, of one or more propelling-motors with axially-mounted and directly-connected armatures, and the field-magnet-supporting frame journaled on and depending from the car-axes, substantially as described.

6. The combination, with a car, of one or more propelling-motors with axially-mounted and directly-connected armatures, and a hollow oblong field-magnet-supporting frame journaled on and depending from the car-axes, substantially as described.

7. The combination, with a car, of one or more propelling-motors with axially-mounted and directly-connected armatures, and field-magnets projecting from yokes at the sides of the armatures, of the supporting-frame for the field-magnets journaled on and depending from the car-axes, substantially as described.

8. The combination, with a car, of one or more propelling-motors with axially-mounted and directly-connected armatures, multipolar field-magnets projecting from yokes at the sides of the armatures, and the field-magnet-supporting frame journaled on and depending from the car-axes, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

S. H. SHORT.

Witnesses:

A. B. CALHOUN,
C. J. LEEPHART.