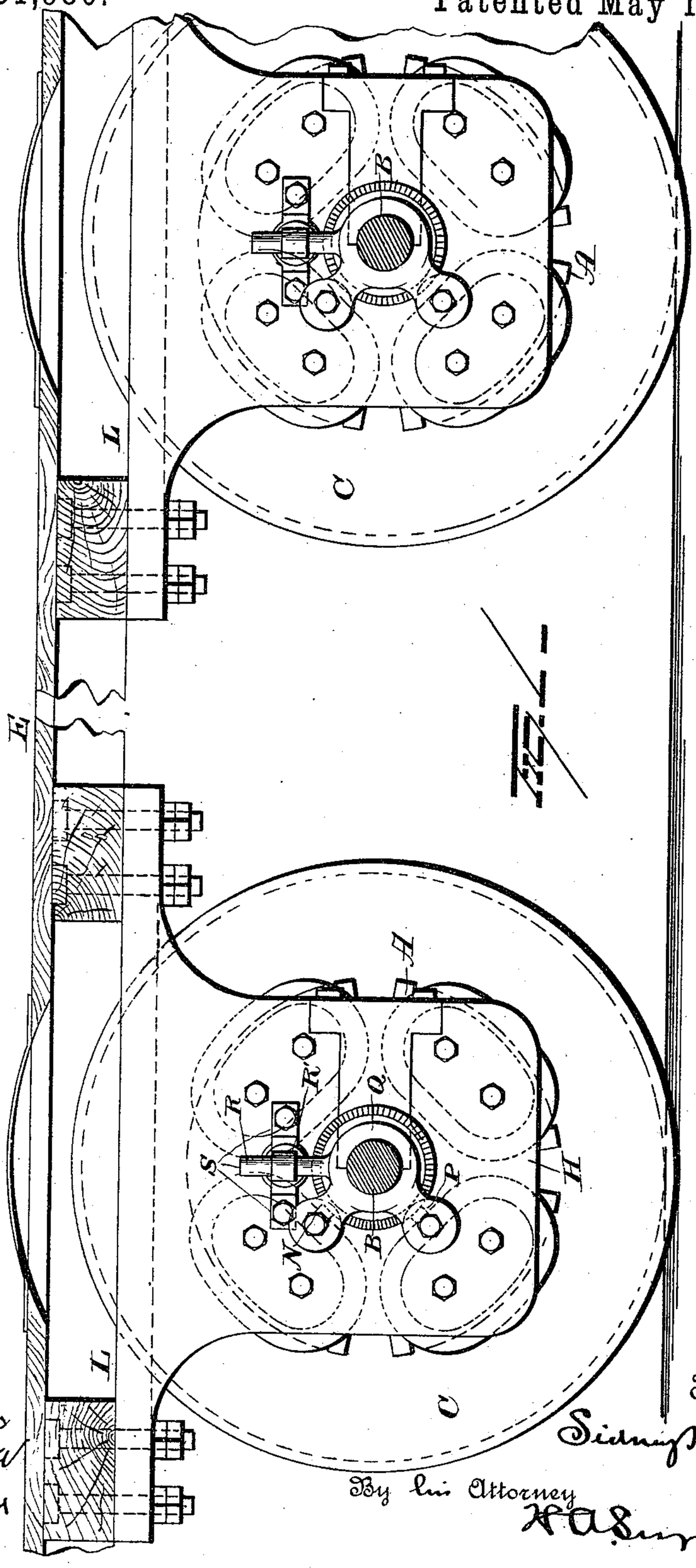
(No Model.)

2 Sheets—Sheet 1.

S. H. SHORT.

ELECTRICALLY PROPELLED CAR.

No. 451,980. Patented May 12, 1891.



Witnesses
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(No Model.) 2 Sheets—Sheet 2.

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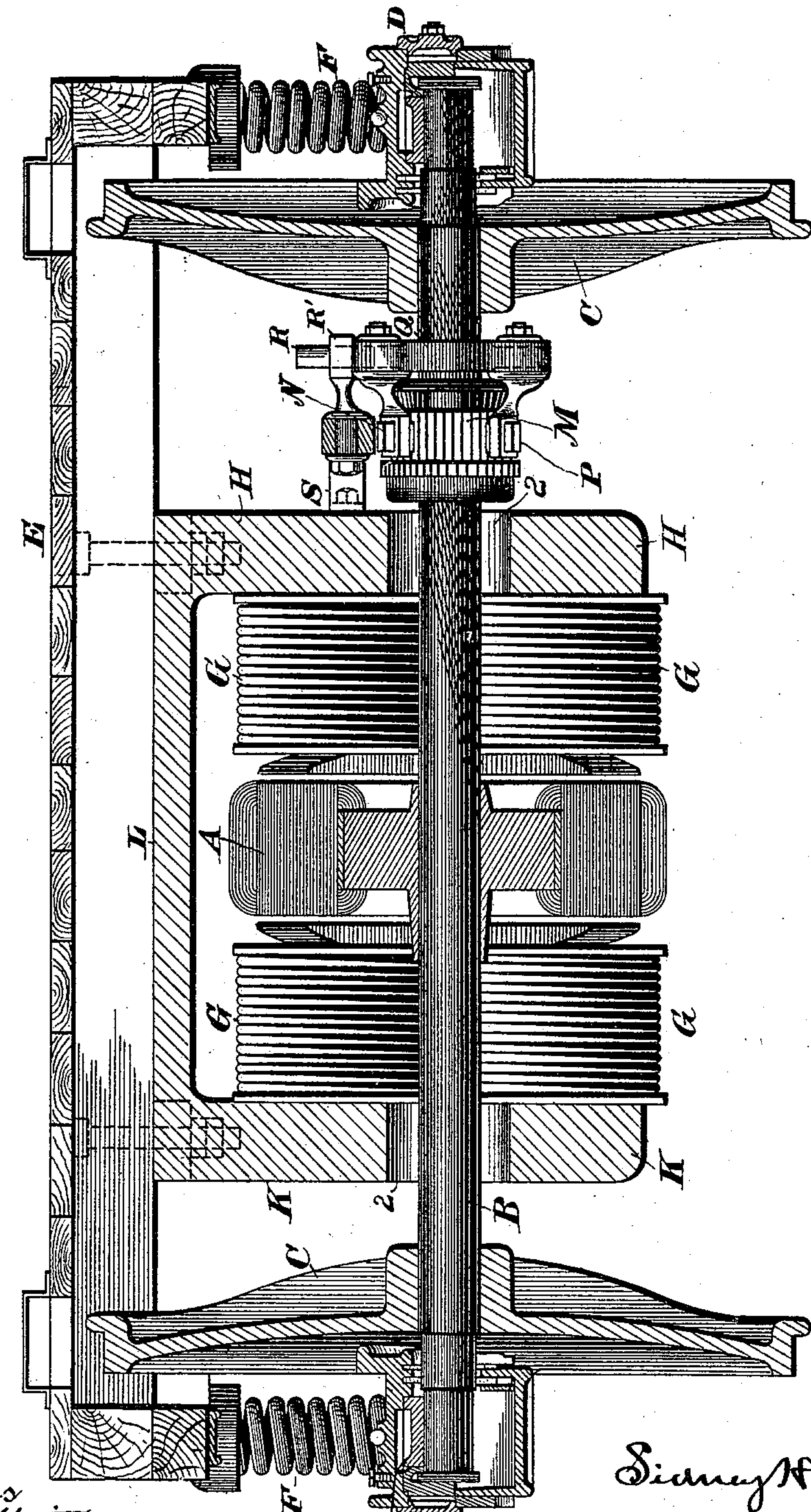

Fig. 2

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

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

ELECTRICALLY-PROPELLED CAR.

SPECIFICATION forming part of Letters Patent No. 451,980, dated May 12, 1891.

Application filed November 6, 1890. Serial No. 370,538. (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 Electrically-Propelled Cars or Vehicles; 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 cars or wheeled vehicles which are propelled by one or more electric motors and in which the armatures of said motors are axially mounted on the driving-axles and are directly secured thereto. By "axially mounted" is to be understood that the axes of the motor-armatures and of the corresponding driving-axles are coincident, or nearly so, with each other. By mounting the armatures on and directly securing the same to the driving-axles the two will at all times turn together with equal speed, thus avoiding the necessity of reducing gear.

In accordance with the present invention field-magnets mounted on springs or buffers independently of the armature are employed in connection with an axially-mounted and directly-connected armature. Preferably the field-magnets are arranged at the sides of the armature, so that their movement in vertical planes effects less variation in the interior space of the motor. It is evident that different modifications of this general arrangement may be made; but what is considered the best form involves also the following special features—that is to say: First, the field-magnet support is upheld by the ordinary journal-boxes, so that no special journals are necessary for said support; second, the field-magnet support is upheld by the same springs which uphold the car-body, so that the effect of said springs of easing the jolting is obtained for the field-magnets; third, the field-magnets are fastened under the car-floor, so that not only are the ordinary journals and springs made available for the field-magnets, but little or no special framing even is required therefor; fourth, in connection with field-magnets supported, as indicated above, in one or more of the preceding sections, an armature is employed which is mounted on the driving-axle, so that it revolves therewith and thus does not require any special journals.

By means of the present invention, therefore, it will be perceived that the connection of the motor with the car may be made of the simplest possible description, hardly any mechanism being required outside of motor and the car itself. It will also be understood, however, that the invention extends generally to constructions involving one or more of the features or combination of features indicated, notwithstanding some further mechanism may be employed in such constructions.

The invention may be employed with motors having two poles; but the multipolar machine is specially adapted to use therein on account of the greater pull upon the armature, which it is possible to obtain thereby. What is considered the best arrangement of motor comprises field-magnets projecting from yokes on opposite sides of the armature parallel with the driving-axle, the yokes having openings therein for the passage of the driving-axle with the desired clearance and being connected with each other by one or more arms.

A further part of the invention consists in employing commutator-brushes mounted on a non-rotative support on the armature-shaft in connection with the field-magnets mounted on springs or buffers independently of the armature. Such support is preferably connected with the field-magnets or the field-magnet frame in such a way that it is held in position thereby while not interfering with the movements thereof on the springs or buffers.

The term "non-rotative" as applied to the commutator-brushes will be understood as not excluding more or less turning back and forth for adjustment or other purposes.

In the accompanying drawings, which form a part of this specification, Figure 1 is a partial view in vertical longitudinal section of an electrically-propelled car constructed in accordance with the invention, and Fig. 2 is a partial view of the same in transverse section.

The armature A of the propelling-motor is

shown as mounted fast (by means of a key, for example) on the driving-axle B, whose ends outside the wheels C turn in journal-boxes D in pedestals fastened to the car-body E, which rests on springs F, all in the ordinary way. Any known or suitable arrangement may be adopted. The armature A is thus not only mounted axially with reference to the driving-axle B, but it is mounted thereon, no journal-bearings being necessary for the armature.

The field-magnets G, as shown, project from the yokes H and K at the sides of the armature parallel with the driving-axle B. These yokes are provided with openings 2 for the passage of the driving-axle B, and are connected by the arm L which is bolted to the floor-beams of the car. Thus the field-magnets are supported by the ordinary journals and the ordinary springs of the car, and are capable of moving on the said springs independently of the armature. The field-magnets shown comprise four poles; but the like arrangement of magnets projecting from the yokes which are provided with openings for the passage of the driving-axle may be used with a two-pole machine.

The commutator M is mounted on the driving-axle B, and the commutator-brushes N and P are mounted on a support Q, journaled on said axle and held from rotation by means of the connection R with the field-magnets G. The connection shown consists of an arm which plays freely through a longitudinal slot in a wrist-pin R′ on the bracket S, fastened to yoke H.

The coils of the field-magnet and armature may be connected in any desired way and may be supplied with electricity from any suitable source on or outside the car. Instead of having the field-magnets non-rotative, it is evident that these might rotate and the armature be held from rotation by a mounting on the car-body, as herein indicated for the field-magnets, these being mounted fast on the driving-axle B. In the preceding description the field-magnets have been described as upheld by the ordinary journals of the car in connection with a spring-mounting for such field-magnets. It is evident, however, that the advantage of not having to provide special journals for the field-magnets is not necessarily dependent upon the spring-mounting; and the invention extends to a car-motor in which the field-magnets are upheld by the ordinary journals irrespective of the spring-mounting of said magnets, as well as in connection with such mounting. Moreover, the brush-support on the commutator-shaft is included generally in connection with field-magnets not perfectly rigid.

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

1. The combination, with a car, of an electric propelling-motor comprising an armature mounted on and directly secured to a car-axle, and non-rotative field-magnets mounted on springs independently of the said armature, substantially as described.

2. The combination, with a car, of an electric propelling-motor comprising an armature mounted on and directly secured to a car-axle, and non-rotative field-magnets mounted on springs independently of the said armature at the sides of the same, substantially as described.

3. The combination, with a car, of an electric propelling-motor comprising an armature mounted on and directly secured to the car-axle, and non-rotative field-magnets upheld by the journals of the axle, with springs interposed between these journals and the field-magnet support, substantially as described.

4. The combination, with a car, of an electric propelling-motor comprising an armature mounted on a driving-axle to turn therewith, and non-rotative elastically-mounted field-magnets upheld by the journals of the axle, substantially as described.

5. The combination, with a car, of an electric propelling-motor comprising an armature mounted on and directly secured to a car-axle, and non-rotative field-magnets upheld by the ordinary journals of the axle and mounted on springs independently of the said armature, substantially as described.

6. The combination, with a car, of an electric propelling-motor comprising an armature mounted on a driving-axle to turn therewith, and non-rotative field-magnets mounted on springs independently of the said armature, substantially as described.

7. The combination, with a car, of an electric propelling-motor comprising an armature axially mounted on and directly connected with the driving-axle, and non-rotative field-magnets mounted on the ordinary car-springs independently of the said armature, substantially as described.

8. The combination, with a car, of an electric propelling-motor comprising an armature mounted on a driving-axle to turn therewith, and non-rotative field-magnets mounted on ordinary car-springs independently of the said armature, substantially as described.

9. The combination, with a car, of an electric propelling-motor comprising an armature axially mounted on and directly secured to a car-axle, and field-magnets fastened to the spring-supported car-body under the car-floor, substantially as described.

10. The combination, with a car, of an electric propelling-motor comprising an armature mounted on a driving-axle to turn therewith, and non-rotative field-magnets fastened to the spring-supported car-body under the car-floor, substantially as described.

11. The combination, with a car, of an electric propelling-motor comprising an armature axially mounted on and directly secured to a car-axle, and field-magnets projecting from yokes with openings therein for the passage of the driving-axle or armature-shaft with

clearance and mounted independently of the said armature, substantially as described.

12. The combination, with a car, of an electric propelling-motor comprising an armature mounted on a driving-axle to turn therewith, and non-rotative field-magnets projecting from yokes with openings therein for the passage of the said axle with clearance and upheld by the ordinary journals of the car, substantially as described.

13. The combination, with a car, of an electric propelling-motor comprising an armature mounted on a driving-axle to turn therewith, and non-rotative field-magnets projecting from yokes with openings therein for the passage of the said axle with clearance and fastened to the car-body or mounted by means of springs and journal-boxes which support said body, substantially as described.

14. The combination, with the armature and commutator and the field-magnets mounted and movable independently of the said armature, of commutator-brushes provided with a non-rotative support having a fixed relation to the said armature, substantially as described.

15. The combination, with a car, of an electric propelling-motor comprising an armature axially mounted upon and directly secured to a car-axle, non-rotative field-magnets mounted on springs independently of said armature, and non-rotative commutator-brushes having a fixed relation to the commutator, substantially as described.

16. The combination, with a car, of an armature mounted on a driving-axle to turn therewith, a commutator on said axle, a non-rotative support for the commutator-brushes on said axle, and the non-rotative field-magnets elastically mounted independently of said armature, substantially as described.

17. The combination, with a car, of an armature mounted on a driving-axle to turn therewith, a commutator on said axle, a non-rotative support for the commutator-brushes on said axle, non-rotative field-magnets fastened to the car-body, and springs and journal-boxes which support said car-body, substantially as described.

18. The combination, with a car, of an armature mounted on a driving-axle, a commutator on said axle, a brush-support journaled on said axle, non-rotative field-magnets movable independently of said armature transversely to the armature-axis, and a connection between said brush-support and said field-magnets to prevent the rotation of the brush-support, substantially as described.

19. The combination, with a car, of an electric propelling-motor comprising an armature axially mounted upon and directly secured to a car-axle, and non-rotative multipolar field-magnets mounted to have movement independently of said armature at the sides of the same, substantially as described.

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

SIDNEY H. SHORT.

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