(No Model.) 4 Sheets—Sheet 1.

E. PECKHAM.

ELECTRIC CAR MOTOR.

No. 425,627. Patented Apr. 15, 1890.

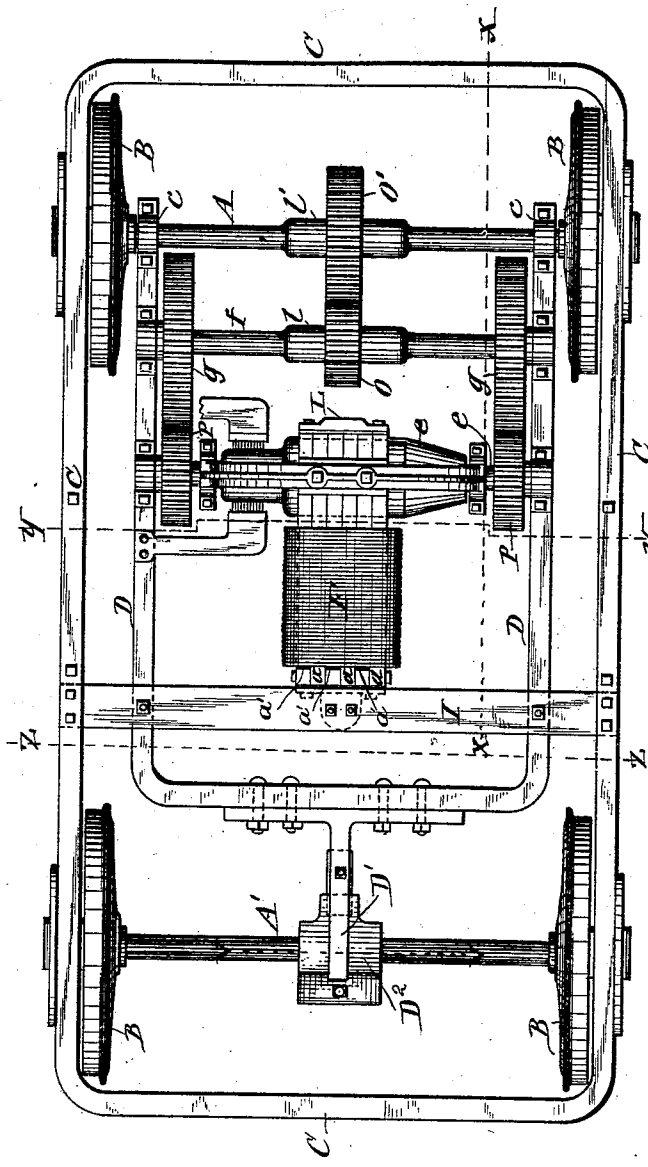

Fig. 1.

WITNESSES:

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Benj. Muller.

INVENTOR:

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BY

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ATTORNEY.

(No Model.) 4 Sheets—Sheet 2.

E. PECKHAM.

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No. 425,627. Patented Apr. 15, 1890.

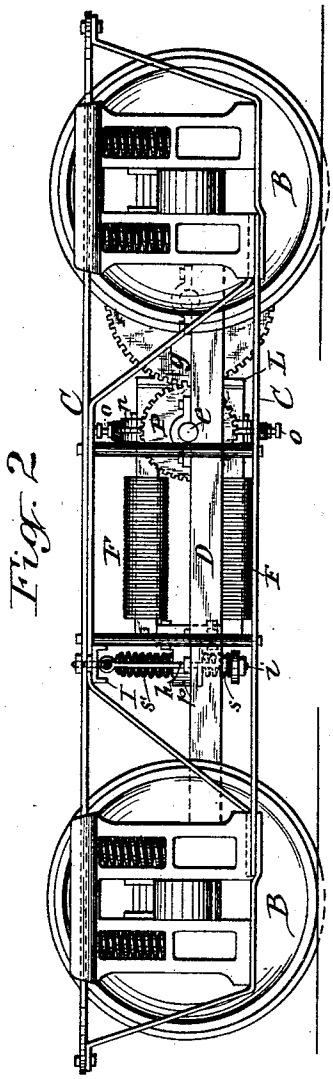

Fig. 2

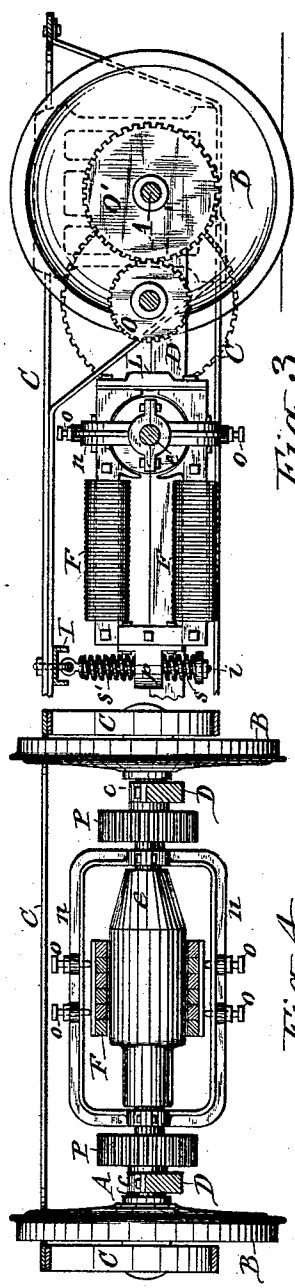

Fig. 3

Fig. 4

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4 Sheets—Sheet 3.

E. PECKHAM.

ELECTRIC CAR MOTOR.

No. 425,627. Patented Apr. 15, 1890.

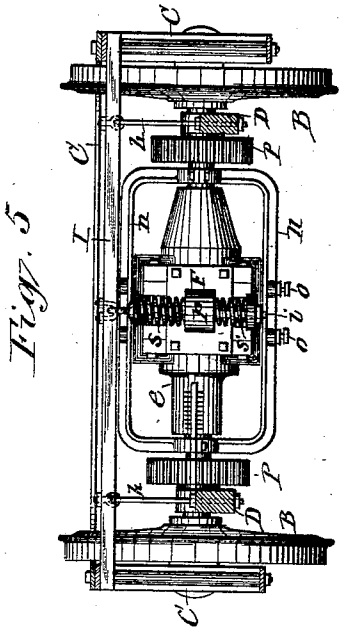

Fig. 5.

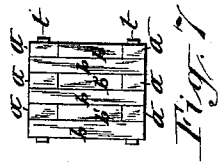

Fig. 7.

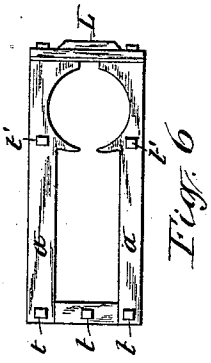

Fig. 6.

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(No Model.) 4 Sheets—Sheet 4.

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ELECTRIC CAR MOTOR.

No. 425,627. Patented Apr. 15, 1890.

Fig. 8a.

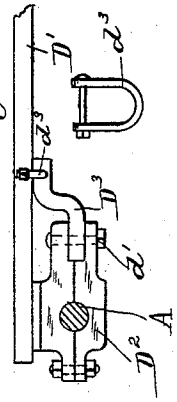


Fig. 9.

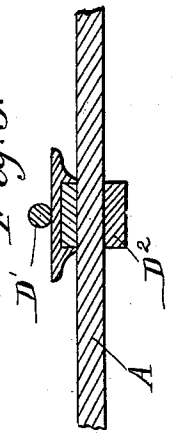


Fig. 10.

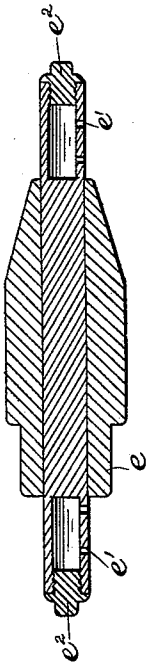


Fig. 8.

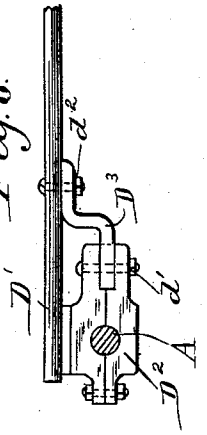
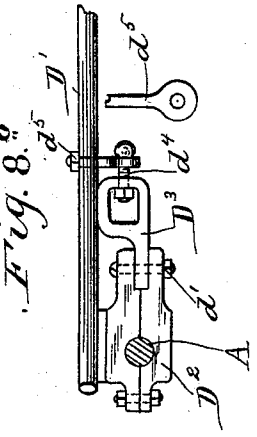


Fig. 8b.



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UNITED STATES PATENT OFFICE.

EDGAR PECKHAM, OF NEW YORK, N. Y.

ELECTRIC CAR-MOTOR.

SPECIFICATION forming part of Letters Patent No. 425,627, dated April 15, 1890.

Application filed December 2, 1889. Serial No. 332,195. (No model.)

To all whom it may concern:

Be it known that I, EDGAR PECKHAM, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Electric Car-Motors, of which the following is a specification.

My present invention relates to electric car-motors, and to the manner of supporting the same on the motor-frame mounted on the truck.

The objects of the invention are to improve the construction of the core of the electro-magnet, whereby the efficiency of said electro-magnet is increased; to render the armature-shaft self-lubricating; to so connect the motor-supporting frame to the truck-frame as to secure a flexible connection between the two structures, whereby torsional strain is prevented when the car is traveling on a curve, and the motor and its gearing consequently relieved from liability of displacement or injury; to so mount the electromotor on its supporting-frame as to bring its weight more nearly in the longitudinal center of the truck, which also avoids the crowding of the motor proper with its gearing and counter-shaft.

In my organization I depart from the usual mode of supporting the armature-shaft, which consists in connecting one end only of said shaft to the side frame of the truck and gearing its opposite unsupported end with one end of the counter-shaft, while the opposite end of the latter shaft is geared to the axle of the drive-wheels. I support both ends of the armature-shaft in bearings on the motor-frame and gear said shaft near both of its ends, at each side of the motor, to the counter-shaft, and gear said counter-shaft centrally, or midway between the side bars of the motor-supporting frame, to the axle of the drive-wheel, instead of connecting the counter-shaft to said axle at one end only. By this disposition of the parts I am enabled to produce a stable organization, not liable to derangement by the vibrations of the motor and truck, and also to insure regularity of movement of the mechanism.

My invention will now be described, and the features of novelty pointed out in the claims at the end of this description.

In the accompanying drawings, which form part of this specification, and wherein like features are indicated by like letters of reference in the several views, Figure 1 is a top plan view of a truck upon which is mounted my electromotor and its accessories. Fig. 2 is a side elevation of Fig. 1. Fig. 3 is a vertical longitudinal section on the line $x\,x$ of Fig. 1. Fig. 4 is a transverse section on the line $y\,y$ of Fig. 1. Fig. 5 is a similar view on the line $z\,z$ of Fig. 1. Fig. 6 is a side view of the core of the electro-magnet. Fig. 7 is an end view of said core. Figs. 8, 8^a, and 8^b are detail views showing modifications in the manner of flexibly connecting the rear end of the motor-supporting frame with the axle of the drive-wheel. Fig. 9 is a longitudinal sectional view through the line $v\,v$ of Fig. 1, and Fig. 10 is a longitudinal sectional view centrally through the chambered armature-shaft.

Referring to the drawings, A A′ indicate the axles of the truck; B B, the drive-wheels mounted on said axles, and C the truck-frame, supported on the axles of the truck, as shown in the drawings or in any other suitable manner.

D D indicate two longitudinal beams supported in bearings $c\,c$ on the axle A inside the drive-wheels, and connected to a transverse beam I, secured to truck-frame C at a point sufficiently removed from the axle A to permit the electromotor and its gearing to be placed in position by hangers h, as shown in Fig. 5, and having their front ends curved and joined together, as seen in Fig. 1. To the curved front of the frame thus formed there is bolted the beam D′, preferably round in cross-section, which projects forward and is supported on the enlarged surface of box D^2, which box is bolted to axle A′. The object in making the top surface of box D^2 of considerable width transversely is to afford a sufficient bearing for the swinging end of beam D′ when the motor-supporting frame D D is being subjected to torsional strain. While the box D^2 is fixed to axle A′ it is flexibly connected to beam D′, so that the motor-supporting frame is practically swung on a pivot at its rear end, and said frame is thus permitted to partake of the vibratory and oscillatory motions of the truck when the latter is being propelled. Several modes of flexibly connecting the beam D′ to the box D^2 are shown in the drawings.

In Fig. 8 the short bar D^3 has one of its ends pivoted between the forward jaws of box D^2 by bolt d', and its other end secured to the beam D′ by bolt d^2. In Figs. 8^a and 8^b the short bar D^3 is similarly connected to the box D^2. In Fig. 8^a the other end of said bar is supplied with a stirrup d^3, passing through the bar and swung on a rod fixed transversely in the beam D′. In Fig. 8^b the outer end of bar D^3 is provided with a horizontal bolt d^4, which coacts with a metal piece d^5, having an eye through which the bolt d^4 passes, and which is prevented from being withdrawn therefrom by a nut screwed onto said bolt. By any one of these forms of connection I obtain the necessary lateral flexibility for the rear end of the motor-supporting frame.

The letter *e* indicates the armature-shaft, a longitudinal section of which is shown in Fig. 10. This shaft is solid intermediate of its journals to give strength; but its journals are chambered or bored out, as shown in Fig. 10, to receive a lubricant. The hollow journals are provided with ports or perforations *e′*, through which the lubricant is conveyed to the outside surface or bearing, and the ends of the journals are fitted with screw-plugs e^2. The lubricant is supplied to the chambers of the shaft by removing the screw-plugs e^2. The shaft is thus rendered self-oiling and its efficiency in the organization much increased. The shaft *e* is journaled in boxes secured to the beams D D, and has fastened near its ends the pinions P P, as shown.

The electro-magnet is represented by F, and it is so mounted upon its supporting-frame D D as to bring it practically in the center of the truck-frame, longitudinally and transversely. The advantage of this arrangement is that the weight of the motor is more equally distributed over the truck-frame, with the effect of more nearly balancing the organization than is done in the forms of construction heretofore devised. To enable me to obtain this result, the heel of the magnet, to which tail-piece *p* is attached, instead of being sustained in front of the armature-shaft in close proximity to the counter-shaft, as is usual, is sustained at the rear of the armature-shaft or on that side thereof opposite the counter-shaft, the heel of the magnet being supported vertically and yieldingly by means of a rod *i*, suspended from the cross-beam I and passing through an eye in the tail-piece *p*, attached to the heel of the magnet, as stated. The bottom and protruding end of the rod *i* is provided with either a head or a nut, with a washer upon it to serve as a seat for a spring *s*, upon the top of which the tail-piece *p* rests. Another spring *s′* is interposed between the top of said tail-piece and the under side of the cross-beam I, and thus the heel of the magnet is supported between two springs disposed vertically, one over the other. By sustaining the heel of the magnet in the position indicated the space between the armature-shaft and driven wheel A is not unduly crowded, so that the counter-shaft and the various gear-wheels may more easily be reached when necessary to change or repair the same.

Between the armature-shaft *e* and the driven axle A, I arrange the counter-shaft *f* with its ends supported in boxes on the beams D D, and having gear-wheels *g g* fixed near its ends, which mesh with the pinions P P, as seen in the drawings. The counter-shaft *f* is centrally enlarged circumferentially, as at *l*, in order to re-enforce and stiffen the same, and upon this enlarged portion there is mounted the pinion O, which meshes with a gear-wheel O′, secured to the driven axle A, which is also circumferentially enlarged at *l′*, similar to counter-shaft *f*.

By the above-described manner of mounting the motor on its supporting-frame, by which the heel of the magnet extends away from instead of toward the counter-shaft and driven axle A, I am enabled to enlarge the several parts comprising the motor, so as to better adapt a single motor for driving the car, the motor-supporting frame in the present organization being particularly designed for cars to be equipped with but one motor.

The core of the magnet F I, form of two sets of longitudinal plates or bars *a a′*, the plates *a* being longer than plates *a′*, as indicated in Fig. 1, in which a top plan view of the magnet and its core is seen. These plates are placed side by side, first a plate *a* and then a plate *a′*, and alternate in this manner until the required number of plates have been grouped together to form a core of the required thickness. These longitudinal plates are united at their heel ends by two sets of cross-bars *b b′*. The bars *b′* are not so long as bars *b*, and the latter are placed between the longitudinal bars *a*, or so as to abut with their edges against the ends of the intermediate shorter longitudinal bar *a′*, while the shorter bars *b′* are so placed that their ends abut against the inner surfaces of longitudinal bars *a*, as seen in Fig. 7. The cross-bars *b b′* are thus interlocked with the longitudinal bars *a a′*, and transversely through the interlocking portions of the several bars pass tie-bolts *t t*, which, in connection with other tie-bolts *t′ t′*, passing transversely through the several longitudinal bars, firmly unite the entire structure together. To the pole ends of the said longitudinal bars there is rigidly secured a non-magnetic tie-plate L. The core is thus built up in sections, which mode of construction has its advantages in the facility with which the quality of metal is selected and the metal prepared for the structure.

The magnet is sustained in proper position with reference to the armature-shaft by means of yoke *n*, mounted in bearings on said shaft near its ends and encompassing the magnet transversely. The set-screws *o o* pass vertically through the top and bottom rails of said yoke and bear against the magnet, as

shown in Fig. 4, thus holding the yoke firmly in place.

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

1. The core of an electro-magnet, consisting of two sets of longitudinal bars, one set of greater length than the other, a series of connecting cross-plates of two lengths uniting the heel ends of said longitudinal bars together, and a non-magnetic plate rigidly securing together the pole ends of the longitudinal bars, substantially as set forth.

2. The core of an electro-magnet, consisting of two sets of longitudinal bars, as *a a'*, arranged side by side, the bars *a* being of greater length than the bars *a'*, whereby the ends of the former extend beyond the ends of bars *a'*, and two sets of cross-bars, as *b b'*, of different lengths, the bars of greater length *b* located between the projecting ends of longitudinal bars *a*, and the intervening shorter bars *b'* having their ends abutting against the inner surfaces of the longer longitudinal bars *a*, the whole united together substantially as set forth.

3. In an electric-motor truck, the combination, with a supporting-frame, of an armature-shaft solid intermediate of its journals, which latter are chambered or bored out and perforated, as at *e'*, substantially as set forth.

4. An armature-shaft constructed with a solid center and with lubricating-chambers at its ends, which are provided with ports or openings for conveying the lubricant to the bearings, and screw-threaded plugs for closing the ends of the chambers, substantially as set forth.

5. In an electric-motor truck, the combination, with a motor-supporting frame, of an electromotor having the heel end of its magnet suspended on a cross-beam in rear of or on that side of the armature-shaft opposite the counter-shaft of the motor-gear, substantially as and for the purpose set forth.

6. In an electric-motor truck, the combination, with the motor-supporting frame and cross-beam I, of an electromotor supported on said frame and having its heel end suspended by a flexible joint from beam I, which beam is arranged in rear of or that side of the armature-shaft opposite the counter-shaft, substantially as set forth.

7. In an electric-motor truck, a motor-supporting frame sustained at one end on one of the driving-axles and flexibly connected at its opposite end to the other driving-axle, in combination with a transverse beam bolted to the truck-frame proper intermediate of the driving-axles and sustaining one end of the motor independent of the motor-supporting frame, substantially as set forth.

8. In an electric-motor truck, a motor-supporting frame journaled at one end on one of the driving-axles and sustained at its opposite end on the other driving-axle by a flexible connection, in combination with a transverse bar intermediate of the driving-axles and bolted to the truck-frame and connected to the motor-supporting frame by hangers, substantially as set forth.

9. In an electric-motor truck, the combination, with a motor-supporting frame journaled at one end on one of the driving-axles and provided centrally at its opposite unbroken end with a beam, as D', of a box bolted to the opposite driving-axle and co-operating with the unconfined extremity of said beam D', substantially as set forth.

10. In an electric-motor truck, a motor-supporting frame journaled at one end on the driving-axle and provided at its opposite end with a horizontally-projecting beam, and a box, as D^2, having a flat top surface and bolted to the opposite driving-axle and sustaining the end of said projecting beam, which is also flexibly connected thereto, substantially as set forth.

Signed at New York, in the county of New York and State of New York, this 22d day of November, A. D. 1889.

EDGAR PECKHAM.

Witnesses:
J. E. M. BOWEN,
W. E. BOWEN.