

(No Model.)

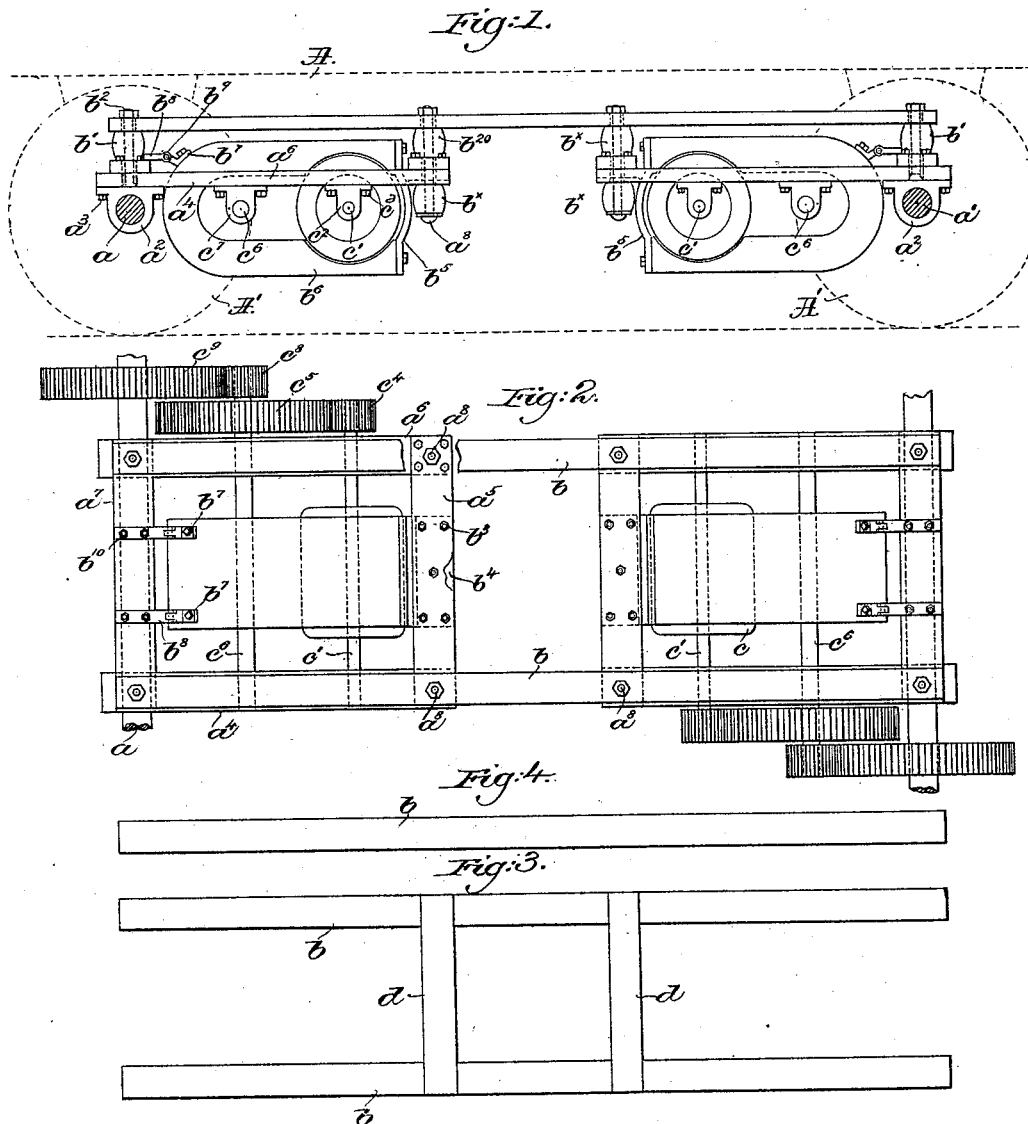
2 Sheets—Sheet 1.

E. D. PRIEST.

SUPPORTING FRAME FOR ELECTRIC RAILWAY MOTORS.

No. 422,445.

Patented Mar. 4, 1890.



Witnesses.

Fred. S. Church  
Frank L. Emery

Inventor.

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(No Model.)

2 Sheets—Sheet 2.

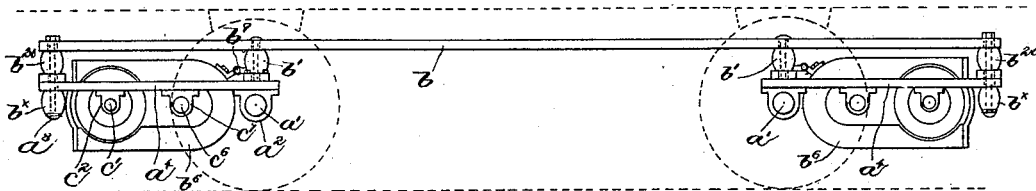
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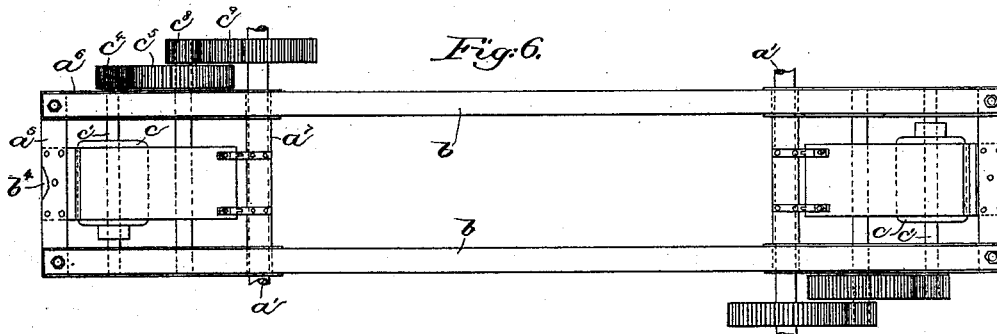
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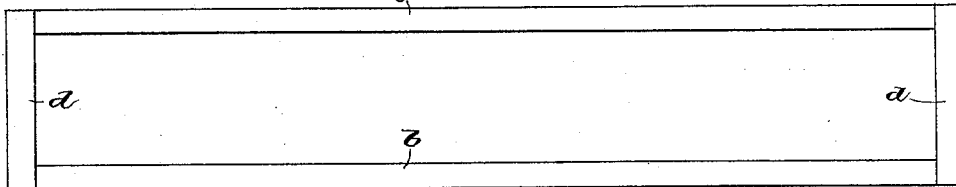
*Fig: 5.*



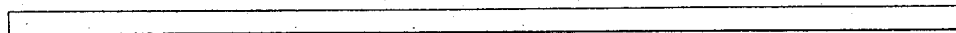
*Fig: 6.*



*Fig: 7.*



*Fig: 8.*



*Witnesses.*

*Howard F. Eaton.*

*James M. Emery.*

*Inventor.*

*Edward D. Priest.*

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# UNITED STATES PATENT OFFICE.

EDWARD D. PRIEST, OF LYNN, MASSACHUSETTS.

## SUPPORTING-FRAME FOR ELECTRIC-RAILWAY MOTORS.

SPECIFICATION forming part of Letters Patent No. 422,445, dated March 4, 1890.

Application filed January 24, 1889. Serial No. 297,373. (No model.)

### *To all whom it may concern:*

Be it known that I, EDWARD D. PRIEST, of Lynn, county of Essex, State of Massachusetts, have invented an Improvement in Supporting-Frames for Electric-Railway Motors, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to electromotors employed in the propulsion of cars or vehicles, and has for its object to provide an efficient, simple, and cheap support for the motor below the body of the said car or vehicle and independent thereof and of the truck-frame upon which the body is mounted, my improved support for the motor being capable of being readily applied to housings on the axles of a car or vehicle body of any usual design or form.

In accordance with my invention, the electromotor, which may be of any desired or usual type, is sustained or suspended below the car-body by a supporting-frame, preferably made of bars of rolled steel or iron of any desired shape, the said bars being bolted or otherwise secured together to form a strong frame, herein shown as substantially rectangular in shape. One end of the supporting-frame will rest upon and be secured to suitable housings or boxes mounted on the axle of the truck, which may be of any usual or desired construction. One end of the supporting-frame, as represented in the embodiment of my invention herein contained, is shown as sustained by or through one or more auxiliary supports, preferably made as a bar or bars extended in the direction of the length of the car or vehicle, and preferably the end of the said supporting-frame will rest upon usual buffers or springs or like yielding support, although the buffers or springs may be omitted. The armature-shaft of the motor is journaled in suitable boxes or bearings secured to the supporting-frame. I have herein shown a counter-shaft as also journaled in suitable or like boxes secured to the said frame.

The particular features in which my invention consists will be pointed out in the claims at the end of this specification.

Figure 1 in side elevation shows two electromotors supported, in accordance with my invention, below the body of the car or vehicle, the bottom of which is represented by dotted lines; Fig. 2, a top or plan view to more clearly show the supporting-frame shown in Fig. 1, the body being omitted; Figs. 3 and 4, modified forms of auxiliary supporting-frame; Fig. 5, a side elevation of a modified arrangement to be referred to; Fig. 6, a top or plan view to more clearly show the supporting-frame shown in Fig. 5; and Figs. 7 and 8, modifications to be referred to.

The car-body A, as well as the truck-frame upon which it is supported, are and may be of any usual construction, the axles *a a'* having usual wheels A', (indicated by dotted lines in Fig. 1.)

In accordance with my invention, one or both axles *a a'* of the truck has mounted upon it between its wheels housings or boxes *a<sup>2</sup>*. To the housings or boxes of one or both of these axles is secured, as by bolts *a<sup>3</sup>*, one end of a motor-supporting frame, consisting, as herein shown, of four bars, (marked *a<sup>4</sup> a<sup>5</sup> a<sup>6</sup> a<sup>7</sup>*), the said bars being preferably of rolled steel or iron.

The end of the supporting-frame farthest from the axle is secured, as by bolts *a<sup>8</sup>*, to an auxiliary supporting-frame of suitable shape located above the motor-supporting frame and between it and the car-body A, the auxiliary supporting-frame being herein shown as composed of two bars *b*, extended in the direction of the length of the body, and having its opposite ends resting upon preferably yielding supports *b'*, which may be rubber buffers or springs, the said bars, as herein shown, being secured to the bars *a<sup>4</sup> a<sup>5</sup>* by bolts *b<sup>2</sup>*.

The end of the motor-supporting frame which does not rest upon the housings or boxes *a<sup>2</sup>* of the axle of the truck is herein shown as supported from the auxiliary supporting-bars by a buffer *b<sup>x</sup>* on the bolt *a<sup>8</sup>*.

The cross-bar *a<sup>5</sup>* of the motor-supporting frame has secured to its under side, as by bolts *b<sup>3</sup>*, a flange *b<sup>4</sup>* of the field-cap or end piece *b<sup>5</sup>* of the motor, the said field-cap or end piece being shown as bolted to the field-magnets *b<sup>6</sup>*.

The armature  $c$  of the motor has its shaft  $c'$  supported in hangers or boxes  $c^2$ , herein shown secured by bolts  $c^3$  to the under side of the bars  $a^4 a^5$  of the motor-supporting frame, the said shaft being provided with the pinion  $c^4$ , in mesh with a gear  $c^5$  on a counter-shaft  $c^6$ , having journals in hangers or boxes  $c^7$ , represented as detachably secured to the side bars of the motor-supporting frame, the said counter-shaft having a pinion  $c^8$  in mesh with the gear  $c^9$  on the axle  $a$ , by which gearing the rotation of the armature is transmitted to the axle of the truck.

One of the chief advantages of my invention is to enable the armature of the motor to be readily removed for purpose of repair—as, for instance, the field-cap  $b^5$  may be disconnected from the bar  $a^5$  and the hangers or boxes  $c^2$  unscrewed from the supporting-frame, thus permitting the motor to be turned down on the counter-shaft  $c^6$  as a center, or nearly so, to prevent the wire on the field from coming in contact with the counter-shaft, a suitable joint or connection at the rear portion of the motor permitting the motor to be so turned.

To enable the motor to be turned, as described, the rear end thereof is represented as supported by the bars  $b^7 b^8$ , jointed together, as at  $b^9$ , the bar  $b^7$  being bolted or otherwise secured to the field-magnet  $b^6$  and the bar  $b^8$  secured, as by bolts  $b^{10}$ , to the cross-bar  $a^7$  of the motor-supporting frame; but I do not desire to limit my invention to the exact form of connection shown.

If desired, the motor may be readily removed without disturbing the supporting-frame by disconnecting the arm  $b^7$  from the field-magnets at its rear end and the field-cap or end piece  $b^5$  at the front end of the motor and removing the hangers  $c^2 c^7$ , the motor being then free to be dropped below its frame.

It will be noticed that the car-axles are not rigidly connected together, but that they have substantially the same freedom of motion as they would have with the motor and supporting-frames omitted.

By making the motor-supporting frame of rolled steel or iron lightness coupled with great strength is obtained, while the elasticity of the metal largely prevents sudden shocks and jarring of the motor.

If desired, the motor and its supporting-frame and auxiliary frame may be protected by a covering.

The supporting-frames are entirely independent of the car-body, so that movement of the same does not affect the motor. The motor may be located at either side of the axle.

Fig. 5 shows the motor-supporting frame as located outside the axles rather than between them, as in Fig. 1.

I may use one or two motors, and, if de-

sired, one motor may be supported between the axles and the other beyond one axle below the end or what may be the platform of the car; or four motors may be used—as, for instance, by combining the arrangements shown in Figs. 1 and 5—so that two motors are located between the axles and one at each end outside of the said axle.

I do not desire to limit myself to the particular form of auxiliary supporting-frame shown in Figs. 1 and 2, as other forms may be used, such, for instance, as shown in Fig. 3, where two bars  $b$  are united by cross-bars  $d$ , substantially in line with the axles of the car-truck; or a single bar  $b$ , as shown in Fig. 4, may be employed, it being supported at its ends by buffers  $b'$  and secured to the supporting-frames.

In Fig. 1 I have shown the ends of the auxiliary frame resting upon buffers supported above the axles, but it is evident that they may be supported by the side bars of the motor-supporting frame.

Referring to Fig. 1, a buffer  $b^{20}$  or other yielding cushion is placed upon the bolt  $a^8$ , between the motor-supporting frame and the auxiliary supporting-frame, so that on the reversal of the motor the upward thrust, caused by the tendency of the motor-supporting frame to turn about the car-axle as a center, is checked or taken up by the said buffer, thus relieving the motor from jar.

When a single bar  $b$ , as shown in Figs. 4 and 8, is employed as the auxiliary supporting-frame, it will preferably extend over the motors from about the center of the axle, it resting upon suitable buffers  $b'$ .

When the auxiliary supporting-frame shown in Figs. 3 and 7 is used, the buffer  $b^{20}$  on the bolt  $a^8$  will preferably be located in the longitudinal center of the bar  $d$ .

I have herein described the motor-supporting frame which surrounds the motor as composed of bars bolted together, but it is evident that the said frame may be cast in one piece.

The bolts securing the motor-supporting frame to the auxiliary supporting-frame are permitted to have a freedom of motion, as herein shown, by enlarging the holes through which they are extended.

I claim—

1. The combination, with a car or vehicle mounted upon axles having wheels and an electromotor for propelling the same, of a supporting-frame to which the motor is secured having one end sustained by the axle, and an auxiliary supporting-frame located above the motor-supporting frame and independent of the car-body, and to which the said motor-supporting frame is secured, substantially as described.

2. The combination, with a car or vehicle mounted upon axles having wheels and an electromotor for propelling the same, of a

supporting-frame for said motor surrounding the motor and having one end sustained by the axle, a support for its other end, and detachable bearings or boxes secured to the motor-supporting frame independent of the axle, substantially as described.

3. The combination, with a car or vehicle mounted upon axles having wheels and an electromotor for propelling the same, of a supporting-frame for said motor having one end sustained by the axle, a support for the other end of the said frame, and detachable bearings or boxes secured to the motor-supporting frame independent of the car-axle, substantially as described.

4. The combination, with a car or vehicle mounted upon axles having wheels and an electromotor for propelling the same, of a supporting-frame for said motor having one end sustained by the axle, an auxiliary supporting-frame located above the motor supporting frame and independent of the car-body and connected to both ends of the said motor-supporting frame, and a cushion interposed between the said supporting-frames, substantially as described.

5. The combination, with a car or vehicle mounted upon axles having wheels and an electromotor for propelling the same, of a supporting-frame for said motor having one end sustained by the axle, an auxiliary supporting-frame located above the motor-supporting frame, a cushion interposed between the said supporting-frames, and a second cushion located below the end of the motor-supporting frame remote from the axle and sustained by the auxiliary supporting-frame, substantially as described.

6. The combination, with a car mounted upon axles having wheels, of an electromotor for propelling the same, a counter-shaft, a gearing, substantially as described, to transmit motion from the armature-shaft of the motor to the said axle, a motor-supporting frame for said motor having one end sustained by the axle, and detachable boxes or bearings secured to the motor-supporting frame independent of the axle for the said armature-shaft and counter-shaft, substantially as described.

7. The combination, with a car mounted upon axles having wheels and an electromotor for propelling the same, of a supporting-frame to which the said motor is secured, an independent auxiliary supporting-frame located above the motor-supporting frame, and bolts to connect said frames having a freedom of motion, substantially as described.

8. The combination, with a car or vehicle mounted upon axles having wheels and an electromotor for propelling the same, of a supporting-frame for said motor surrounding the motor and having one end sustained by the axle, a support for its other end, and a hinged connection joining the field or pole

piece of the motor to the said motor-supporting frame, substantially as described.

9. The combination, with a car mounted upon axles having wheels, of a motor-supporting frame surrounding the motor and having one end sustained by the axle, and a support for the other end of the said frame, of the motor for propelling the said car, carried by said frame and having its pole-piece or field secured to the under side of the motor-supporting frame, substantially as described.

10. The combination, with a car or vehicle mounted upon axles having wheels and an electromotor for propelling the same, of a supporting-frame to which is connected the said motor, having one end sustained by the axle, and an independent auxiliary supporting-frame located above the motor-supporting frame and resting on cushions, substantially as described.

11. The combination, with a car or vehicle mounted upon axles having wheels, of an electromotor for propelling the same, a counter-shaft, and gearing, substantially as described, to transmit motion from the armature-shaft of the motor to the said axles, a motor-supporting frame for said motor, having one end sustained by the axle, and detachable boxes or bearings for the said armature and counter shafts secured to said motor-supporting frame, whereby when in operative position the said detachable bearings will be substantially in line with the bearing of the axle, substantially as described.

12. The combination, with a car or vehicle mounted upon axles having wheels and an electromotor for propelling the same, of a supporting-frame to which the said motor is secured, having one end sustained by the axle, and an independent auxiliary supporting-frame located above the motor-supporting frame and to which the said motor-supporting frame is secured, substantially as described.

13. The combination, with a car or vehicle mounted upon axles having wheels and an electromotor for propelling the same, of a supporting-frame to which the said motor is secured, having one end sustained by the axle, and an independent auxiliary supporting-frame located above the motor-supporting frame and to which the said motor-supporting frame is secured, and a cushion interposed between the said supporting-frames, substantially as described.

14. The combination, with a car or vehicle mounted upon axles having wheels and an electromotor for propelling the same, of a supporting-frame for said motor, having one end sustained by the axle and a support for its other end; and a hinged connection joining the field or pole-piece of the motor to the said motor-supporting frame, substantially as described.

15. The combination, with a car or vehicle

mounted upon axles having wheels and an  
electromotor for propelling the same, of a mo-  
tor-supporting frame having one end sus-  
tained by the axle and to which the motor is  
5 secured, and an auxiliary support consisting  
of a frame located above the motor and inde-  
pendent of the car-body, substantially as de-  
scribed.

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

EDWARD D. PRIEST.

Witnesses:

JAS. H. CHURCHILL,  
FREDERICK L. EMERY.