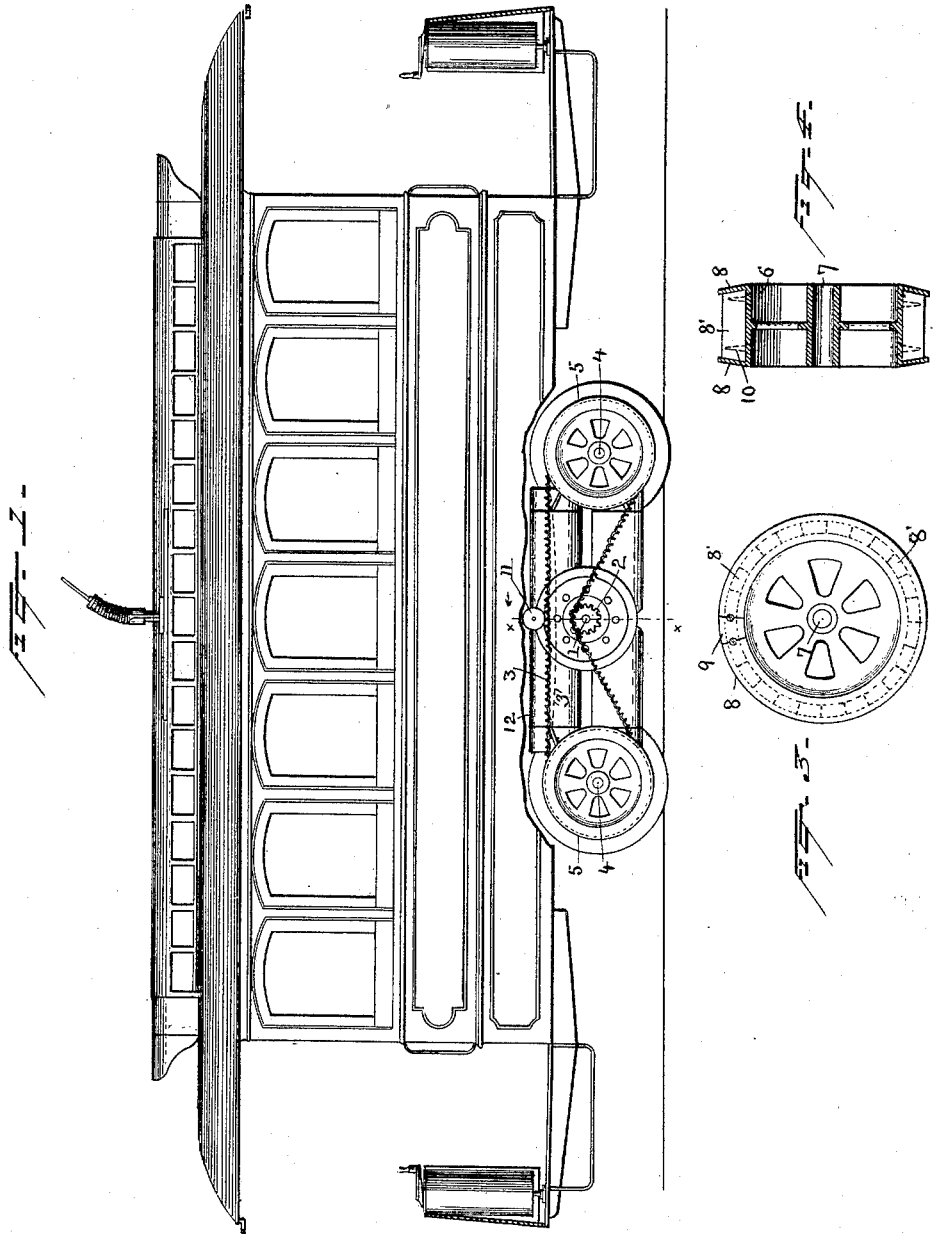
(No Model.) 2 Sheets—Sheet 1.

T. A. EDISON.

MEANS FOR PROPELLING ELECTRIC CARS.

No. 476,986. Patented June 14, 1892.



Witnesses.
Norris A. Clarke,
N. F. Oberlé.

Inventor
T. A. Edison,
By his Attorneys
Dyer & Seely.

(No Model.) 2 Sheets—Sheet 2.

T. A. EDISON.

MEANS FOR PROPELLING ELECTRIC CARS.

No. 476,986. Patented June 14, 1892.

Fig. 2.

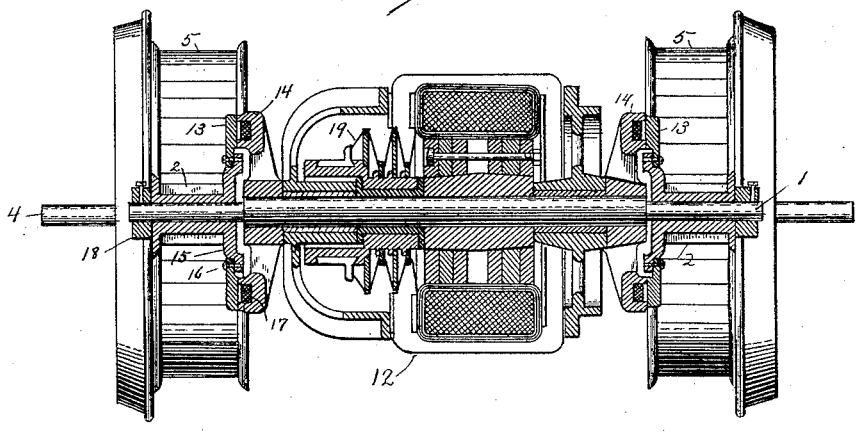
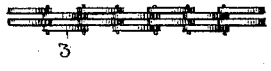


Fig. 5.

Fig. 6.



Witnesses
Norris A. Clark.
W. F. Oberlé

Inventor
T. A. Edison
By his Attorneys
Dyer & Seely.

UNITED STATES PATENT OFFICE.

THOMAS A. EDISON, OF LLEWELLYN PARK, NEW JERSEY.

MEANS FOR PROPELLING ELECTRIC CARS.

SPECIFICATION forming part of Letters Patent No. 476,986, dated June 14, 1892.

Application filed March 2, 1891. Serial No. 383,374. (No model.)

To all whom it may concern:

Be it known that I, THOMAS A. EDISON, a citizen of the United States, residing at Llewellyn Park, in the county of Essex and State of New Jersey, have invented a certain new and useful Improvement in Means for Propelling Electric Cars, (Case No. 909,) of which the following is a specification.

The present invention relates to means for propelling electric cars and other machinery; and the object is to provide means which will operate in an efficient manner under all conditions arising in ordinary use of the apparatus; and the invention consists in the devices and combinations hereinafter specifically set forth and clained.

In the accompanying drawings, Figure 1 is a view of a car having the present improvements attached thereto. Fig. 2 is a section on the line *x x* of Fig. 1, looking in the direction of the arrow. Fig. 3 is a side view of one of the pulleys such as are mounted on the car-axles. Fig. 4 is a central section through said pulley; and Figs. 5 and 6 are side and top views, respectively, of a short section of the belt chain, which is of special design.

It has been found impracticable to use a simple sprocket-chain and sprocket-wheels for connecting the motor with the car-axles, because the chain lengthens with use and does not fit properly over the teeth of the several wheels. When a sprocket chain thus fails to work properly, it rides over the teeth of the sprocket-wheel and gives severe jerks or strains to the chain.

The arrangement described in this application is not open to the above objection. It also allows a slight independent movement of the axles relatively to the motor-shaft while the car or truck is turning a curve and the axles have a tendency to move differently.

The motor-shaft 1 is provided with a cog-wheel or drum 2, the teeth of which are adapted to engage with the belt 3. Said belt is preferably a chain belt and is constructed as shown in Figs. 5 and 6. The links are curved or U-shaped and are pivoted together end to end, there being several links side by side to produce a chain of considerable width. On the two axles 4 of the car are pulleys 5, rigidly secured to the car-wheels. These pulleys are constructed as shown in Figs. 3 and 4.

6 is a single continuous metal ring having a hub 7, through which the car-axle passes. The rim is provided with two flanges 8, preferably inclining inward to form a groove around the rim, having a cross-section of dovetail shape.

A section of one or both flanges is removable, as indicated at 9.

To form a bearing-surface for the pulley, several blocks 8′ of wood or of iron, coated with lead or other comparatively-soft material, are inserted through the opening in flange 8 one after the other, and are slipped along in the groove until the entire circle is complete. The section 9 is then secured in place. To prevent the blocks sliding or turning in the groove, they may be secured by screws 10, inserted from the inner side of the rim.

The chain heretofore referred to is placed around the pulleys and the cog-wheel or drum on the motor-shaft, as shown in Fig. 1, in such manner that the concave side of the links comes next to the cogs of the wheel and the reverse or convex side of the curved links bears on the smooth surface of the pulleys 5. It will be seen that the chain is freely suspended between the top of the pulley on the front axle and the top of the pulley on the rear axle, and since the chain used in an electric car will weigh approximately twelve pounds per foot the weight is sufficient to produce a decided catenary curve in the chain, provided said chain is sufficiently loose, as indicated by the dotted line 3′ in Fig. 1, whereby increased friction and leverage are obtained between the chain and the smooth pulleys. In some cases it may be found desirable also to place a belt-tightener in position to bear down on the chain, as indicated at 11. The electric motor 12 is supported from the axles 4 4 by means of yielding blocks, as described and claimed by me in an application of even date herewith, Serial No. 383,375.

As shown in Fig. 2, the shaft 1 of the motor 12 is provided with a cog-wheel or drum at each end in line with pulleys 5 on the car-axles. On each end of the motor-shaft is a magnetic clutch composed of two members 13 14. The members 13 consist of flanges rigidly secured to the cog-wheels or drums 2, the flanges being of larger diameter than the wheels or drums. Said cog-wheels are pref-

erably of chilled cast-iron, and on the inner side of the wheels are cast flanges 15, to which the outer mass of iron, which forms the bearing-face of this member of the magnetic clutch and which is preferably in the form of a ring, is secured by bolts 16. This clutch member and the cog-wheel are free to turn on the motor-shaft. The second member of the magnetic clutch is provided with a groove in which is a magnetizing-coil 17. The clutch member 13 is held between 14 and the collar 18 on the end of the shaft. As the faces of the clutch members wear away, this collar may be moved inward to compensate for such wear.

19 are German-silver resistance-wires connecting the armature-coils with the commutator-plates, as described and claimed by me in my application, Serial No. 382,338, filed February 24, 1891.

By the use of the chain belts constructed and arranged as described for conveying motion from the motor to the car-axles I get the necessary leverage and friction on the axle-pulleys and there is no torsion or twisting of the motor-shaft, the pull being in the same direction on both ends.

Having thus described the invention, what I claim is—

1. The combination, in a car, of a motor, a sprocket-wheel driven thereby, pulleys with smooth peripheries on the car-axles, a chain belt co-operating with the wheel and both pulleys, one side of the belt being unsupported between the pulleys, whereby said side is allowed to assume a catenary curve, thereby increasing the friction of the chain on the pulleys, substantially as described.

2. The combination, in a car, of a motor, a sprocket-wheel on each end of the motor-shaft and driven thereby, pulleys with smooth peripheries on the car-axles in line with the sprocket-wheels, and chain belts co-operating with both the wheels and the pulleys, one side of each belt being unsupported between the pulleys, whereby the said side is allowed to assume a catenary curve, thereby increasing the friction of the chain on the pulleys, substantially as described.

3. A chain belt consisting of several series of bent links pivoted together end to end, each series consisting of several bent links side by side, so that the bends are in line and are adapted to fit simultaneously over suitable cogs, in combination with a sprocket-wheel engaging therewith on the concave side of the links, and a pulley over which the chain passes and on which the convex sides of the links bear, substantially as described.

4. The combination of a sprocket-wheel or drum, a smooth pulley, and a chain belt having bent links connecting the wheel and pulley, the concave side of the links facing the sprocket-wheel and the convex sides of the links facing the smooth pulley, substantially as described.

5. As a new article of manufacture, a chilled-iron cog-wheel having a flange and a mass of softer iron around said flange connected thereto and adapted to constitute one member of a magnetic clutch, substantially as described.

6. As a new article of manufacture, a chilled-iron cog-wheel having a flange and a ring of softer iron secured to the flange and adapted to constitute one member of a magnetic clutch, substantially as described.

This specification signed and witnessed this 24th day of February, 1891.

THOS. A. EDISON.

Witnesses:
CHARLES M. CATLIN,
JOHN F. RANDOLPH.