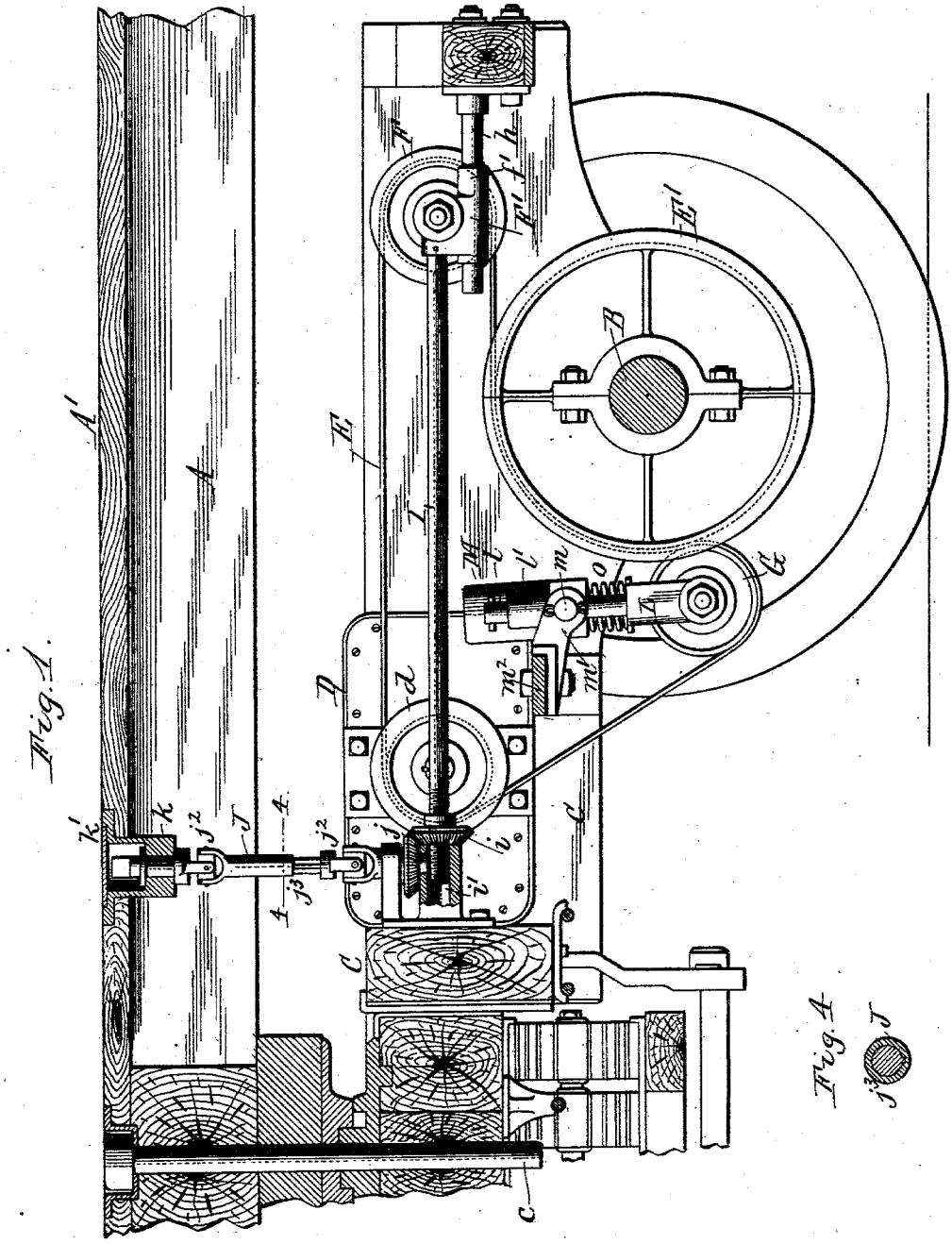
No. 634,542. Patented Oct. 10, 1899.

W. F. RICHARDS.

ELECTRIC LIGHTING APPARATUS FOR RAILWAY CARS.

(Application filed Aug. 13, 1898.)

(No Model.) 2 Sheets—Sheet 1.



Witnesses:
Chas. F. Burkhart.
Henry L. Deck.

W. F. Richards Inventor.
By Wilhelm & Bonner
Attorneys.

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

No. 634,542. Patented Oct. 10, 1899.

W. F. RICHARDS.

ELECTRIC LIGHTING APPARATUS FOR RAILWAY CARS.

(Application filed Aug. 13, 1898.)

(No Model.) 2 Sheets—Sheet 2.

Fig. 2.

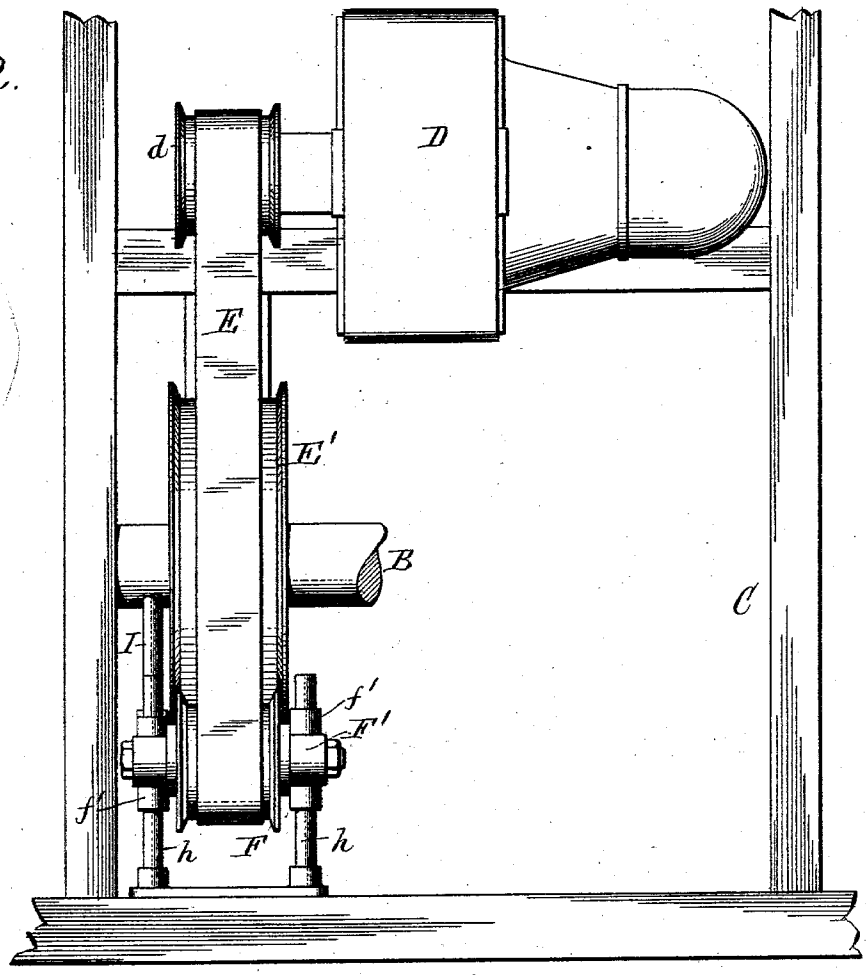
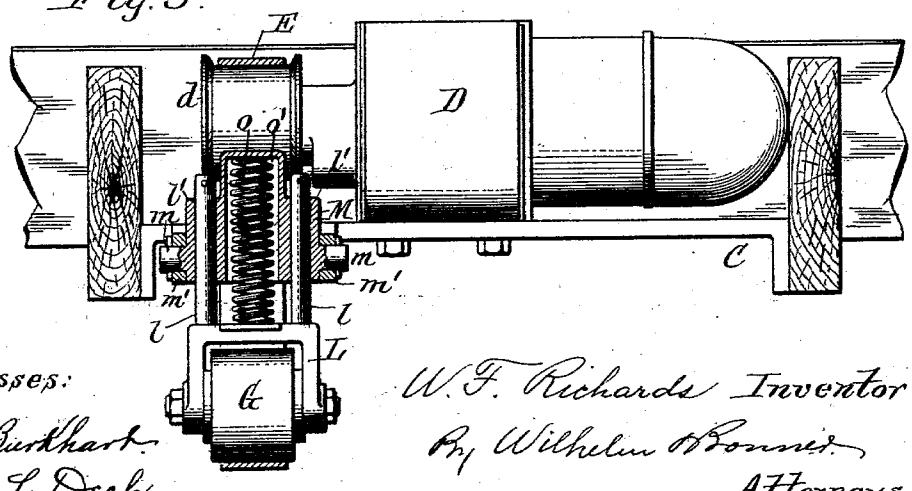


Fig. 3.



Witnesses:
Chas. F. Burkhart.
Henry L. Decke.

W. F. Richards Inventor
By Wilhelm Bonnet
Attorneys.

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

UNITED STATES PATENT OFFICE.

WILLARD F. RICHARDS, OF BUFFALO, NEW YORK, ASSIGNOR TO CHARLES M. GOULD, OF NEW YORK, N. Y.

ELECTRIC-LIGHTING APPARATUS FOR RAILWAY-CARS.

SPECIFICATION forming part of Letters Patent No. 634,542, dated October 10, 1899.

Application filed August 13, 1898. Serial No. 688,511. (No model.)

To all whom it may concern:

Be it known that I, WILLARD F. RICHARDS, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Electric-Lighting Apparatus for Railway-Cars, of which the following is a specification.

This invention relates to an electric-lighting apparatus for railway-cars in which the current is generated by a dynamo driven from one of the car-axles by a frictional driving mechanism, such as a belt, which slips when the speed of the driving-axle exceeds that which is necessary to properly drive the dynamo, thereby neutralizing such excess of speed and maintaining a practically uniform normal speed of the dynamo. My invention has more especial reference to an apparatus of this kind in which the dynamo is stationary and mounted on the car-truck and in which an adjustable tightener is applied to the driving-belt of the dynamo, whereby the adhesion of the belt can be properly regulated for obtaining the desired normal output of the dynamo.

The objects of my invention are to provide an efficient driving mechanism of this charter which can be conveniently adjusted and which absorbs the vibrations of the truck, so as to prevent the same from interfering with the proper action of the dynamo.

In the accompanying drawings, consisting of two sheets, Figure 1 is a fragmentary longitudinal section of a railway-car provided with my improved apparatus, the plane of the section being on the outer side of the pulleys of the dynamo and the car-axle. Fig. 2 is a top plan view thereof. Fig. 3 is a transverse section taken through the swiveling tightener-pulley. Fig. 4 is a cross-section in line 4 4, Fig. 1, on an enlarged scale.

Like letters of reference refer to like parts in the several figures.

A is the car-frame; A', the car-floor; B, one of the axles; C, the truck-frame, and *c* the king-bolt of the same.

D is the dynamo, which is preferably mounted rigidly on the truck-frame as near the king-bolt as practicable and arranged between the side beams of said frame.

d is the pulley, mounted on the armature-shaft of the dynamo.

E is the driving-belt, which runs around the dynamo-pulley *d*, over one side of a driving-pulley E', secured to the car-axle B, and around upper and lower guide and tightener pulleys F and G. The upper tightener-pulley F is preferably arranged about on a level with the dynamo-pulley and on the opposite side of the driving-axle or near the end of the truck, while the lower tightener-pulley is arranged between the axle and the dynamo and below the plane of the axle, so that the driving-belt passes from the dynamo-pulley *d* horizontally, or thereabout, to the upper tightener-pulley F, thence toward the dynamo and downwardly over about one-fourth of the periphery of the axle-pulley, thence around the lower tightener-pulley G, and thence upwardly to the dynamo-pulley.

The upper tightener-pulley F is adjustable toward and from the dynamo-pulley and journaled in a carriage F', which slides upon parallel longitudinal guide-rods *h*, projecting inwardly from the end cross-piece of the truck-frame, the carriage having horizontal sleeves *f'*, which encircle said guide-rods. This carriage is shifted by any suitable means for regulating the tension of the driving-belt. The preferred mechanism for adjusting the carriage is shown in the drawings and consists of a longitudinal shifting-rod I, rigidly secured at one end to the carriage and provided at its opposite end with an external screw-thread which engages with the internally-screw-threaded bore of a bevel gear-wheel *i*. The latter bears against a longitudinal socket *i'*, which is secured to the inner cross-piece of the truck-frame and which receives the adjacent end of the shifting-rod, so that upon turning said gear-wheel the pulley-carriage F' is shifted on its guides. The gear-wheel *i* is held against endwise movement in one direction by the socket *i'* and in the opposite direction by the tension of the driving-belt and is turned by an upright shaft J, having a bevel gear-wheel *j*, which meshes with the wheel *i*. This shaft is journaled at its lower end in bearings arranged on the socket *i'* and the base-plate thereof and near its upper end in a casing *k*,

which incloses the upper end of the shaft and is seated in an opening formed in the car-floor, the casing having a removable cap or plate k', which is flush with the car-floor. The upper end of the operating-shaft J is square or flat-sided to receive a corresponding detachable wrench for turning it. To enable the operating-shaft to assume an angular position for following the swiveling movements of the truck upon curves, the same is composed of sections which are connected by universal joints j^2, and to permit it to follow the vertical vibration of the truck and the car-body the central section j^3 of said shaft is composed of two telescopic parts, which are free to slide on each other, as shown in Fig. 1. The parts of the telescopic shaft-section are compelled to turn together by a key and keyway formed on the respective parts, as shown in Fig. 4.

The lower tightener-pulley G is journaled in a vertically-movable yoke L, having upwardly-extending rods l, which are guided in upright sockets or sleeves l', formed in a block or carrier M, said rods being retained in said sleeves by transverse pins or keys passing through their upper ends or other means. The block or carrier is preferably capable of swiveling or swinging toward and from the pulley on the driving-axle and for this purpose is provided on opposite sides with trunnions m, which are journaled in stationary brackets m', which latter are secured to a cross-bar m^2. This cross-bar is secured at its ends to the side beams of the truck-frame and serves to support the rear portion of the dynamo as well as the tightener-pulley G.

o is a spring which is interposed between the upper side of the yoke L and the closed upper end of a socket o', arranged on the swiveling carrier M between the guide-sleeves l' thereof. This spring holds the pulley G in yielding contact with the driving-belt and forms a cushion between the pulley and its support, which absorbs the vertical vibrations of the truck-frame and the driving-axle, thereby preventing the tension of the belt from being affected by such vibrations and insuring a uniform output of the dynamo and a steady illumination of the car. The belt is properly tensioned for obtaining the desired degree of adhesion of the same by shifting the upper tightener-pulley F in the proper direction by means of the operating-shaft J. When the shaft is turned to tighten the belt, the lower yielding tightener-pulley G is drawn upwardly more or less and the tension of its spring o is increased correspondingly, while when the belt is slackened the tension of the spring and the adhesion of the belt are diminished.

In the use of the apparatus when the train is running at its ordinary speed the speed of the car-axle is much higher than that which is required for driving the dynamo. The tension of the belt is so regulated that the full adhesion of the same and the full speed of the dynamo are reached at a comparatively low speed of the car-axle. As the speed of the axle increases beyond this point by the increase in the speed of the train as the latter gathers headway the pull of the belt increases accordingly and draws the yielding tightener-pulley G upwardly. This slackens the belt, reduces its adhesion correspondingly, and so prevents it from imparting a correspondingly-increased speed to the armature-shaft of the dynamo. When the speed of the axle decreases, the tension-spring o forces the lower tightener-pulley G downwardly and again tightens the belt. In this manner the desired uniform speed of the armature-shaft is maintained, although the driving-axle rotates at a much higher speed than that which is required for driving the dynamo and although this high speed of the axle may vary considerably.

In order to stop the dynamo, the carriage of the upper tightener-pulley F is shifted toward the dynamo by means of the operating-shaft J sufficiently to slacken the belt. The pivots of the lower pulley-yoke L are arranged at such a distance from the driving-axle that the yoke is slightly inclined toward the axle-pulley by the pull of the belt, as shown in Fig. 1. By this arrangement the belt is pressed against the axle-pulley by said tightener-pulley, when the belt is tightened and a more effective contact is obtained between the belt and the driving-pulley, and as soon as the belt is slackened for stopping the dynamo the lower tightener-pulley swings by gravity to a vertical position, relieving that portion of the belt between the axle-pulley and said tightener-pulley from pressure and allowing the same to move out of contact with the axle-pulley, thereby effectually stopping the dynamo. By extending the driving-belt only over the upper side of the axle-pulley, as shown, the axle can be removed from the truck without requiring the belt to be cut or parted.

I claim as my invention—

1. The combination with a railway-car having an axle provided with a driving-pulley, of a dynamo secured to said car above said driving-pulley and on one side thereof, said dynamo having a pulley, a tightener-pulley arranged on the opposite side of said driving-pulley and above the same, means whereby said tightener-pulley can be adjusted toward and from the dynamo-pulley, a spring-pressed tightener-pulley arranged underneath the dynamo-pulley and facing the lower portion of the driving-pulley, and a driving-belt wrapped around the driving-pulley between said tightener-pulleys and running around said tightener-pulleys and the dynamo-pulley, substantially as set forth.

2. The combination with the swiveled truck of a railway-car having an axle provided with a driving-pulley, of a dynamo secured to said truck on the inner side of the driving-pulley

and above the same, said dynamo having a pulley, a tightener-pulley arranged above the driving-pulley and on the outer side thereof, means whereby said tightener-pulley can be adjusted toward and from the dynamo-pulley, a spring-pressed tightener-pulley facing the lower inner portion of the driving-pulley, and a driving-belt wrapped around the upper inner portion of the driving-pulley and running around said tightener-pulleys and the dynamo-pulley, substantially as set forth.

3. The combination with the truck-frame and the axle mounted therein and provided with a driving-pulley, of a dynamo secured to said frame above said driving-pulley and on one side thereof, said dynamo having a pulley, a tightener-pulley arranged on the opposite side of said driving-pulley and above the same, a sliding carriage on which said pulley is mounted, a horizontal guide for said carriage secured to the truck-frame, means whereby said carriage can be adjusted on said guide, a tightener-pulley arranged underneath the dynamo and facing the lower portion of the driving-pulley, a vertically-movable carrier for said pulley, a spring which presses said carrier downwardly, and a driving-belt wrapped around the driving-pulley between said tightener-pulleys and running around said tightener-pulleys and the dynamo-pulley, substantially as set forth.

4. The combination with the car-body, the swiveled truck and the axle provided with a driving-pulley, of a dynamo secured to said truck on the inner side of the driving-pulley and above the same, said dynamo having a pulley, a spring-pressed tightener-pulley facing the lower inner portion of the driving-pulley, a tightener-pulley arranged above the driving-pulley and on the outer side thereof, a sliding carriage on which said pulley is mounted, a horizontal guide for said carriage secured to the outer portion of the truck-frame, a screw-threaded adjusting-rod secured at its outer end to said carriage, an actuating-screw which engages with the inner threaded end of said rod, an upright operating-shaft engaging at its lower end with said screw-wheel and composed of telescopic, universally-jointed sections extending to the car-body, and a driving-belt, substantially as set forth.

5. The combination with a railway-car and an axle thereof having a pulley, of a dynamo having a driving-pulley, an upper tightener-pulley arranged above the car-axle, a swiveling carrier arranged adjacent to said axle-pulley, a lower guide-pulley having a yoke capable of sliding vertically on said carrier, a driving-belt running around the dynamo-pulley and said upper and lower pulleys and over the axle-pulley, and a spring interposed between said carrier and said yoke and tending to press said lower pulley against the belt, substantially as set forth.

Witness my hand this 4th day of August, 1898.

WILLARD F. RICHARDS.

Witnesses:
JNO. J. BONNER,
ELLA R. DEAN.