

No. 615,904.

Patented Dec. 13, 1898.

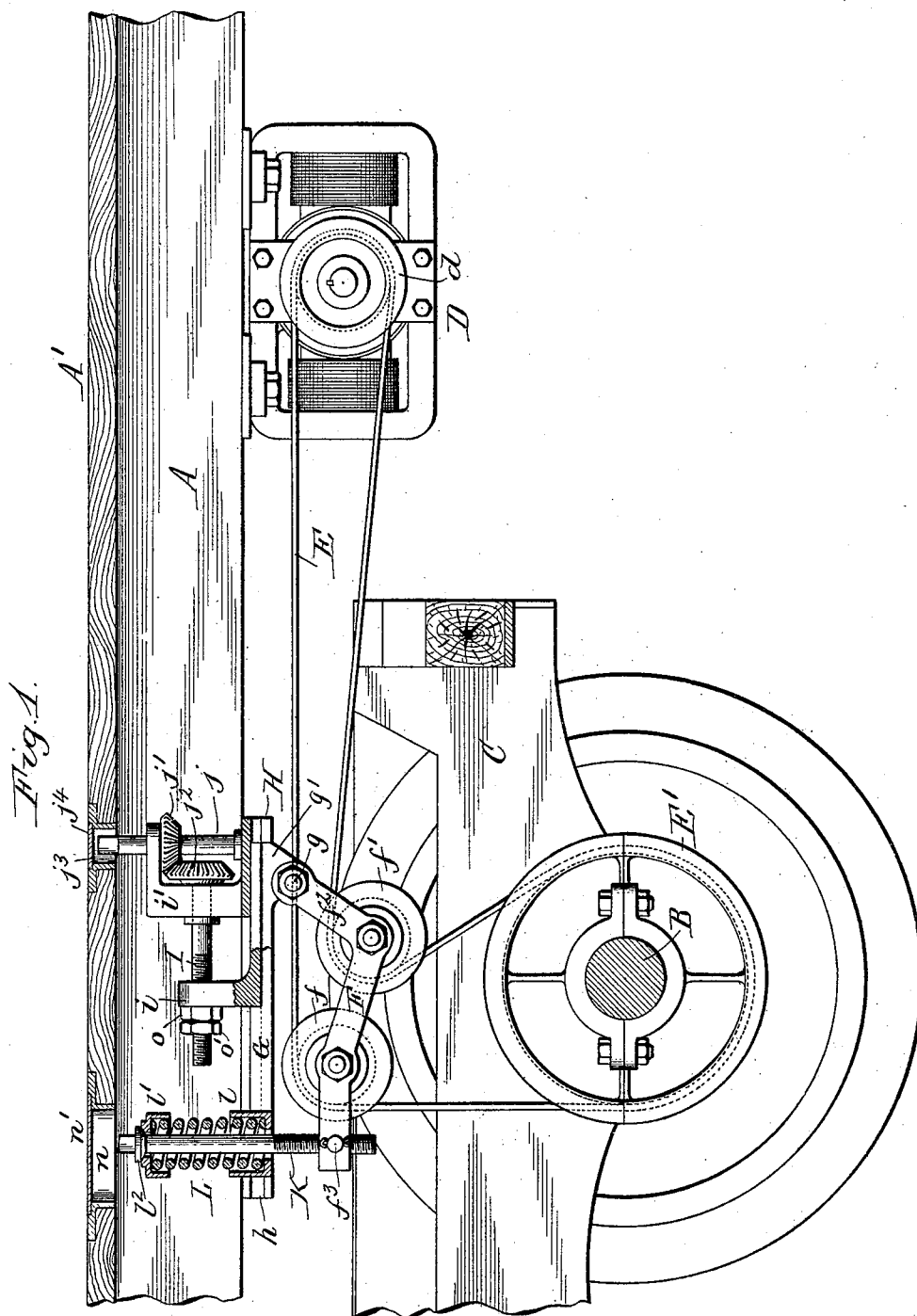
W. F. RICHARDS.

ELECTRIC LIGHTING APPARATUS FOR RAILWAY CARS.

(Application filed July 7, 1898.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses:

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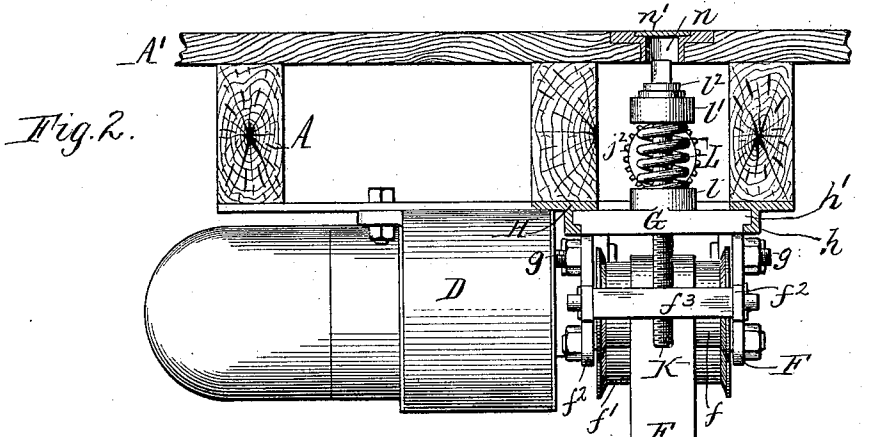


Fig. 2.

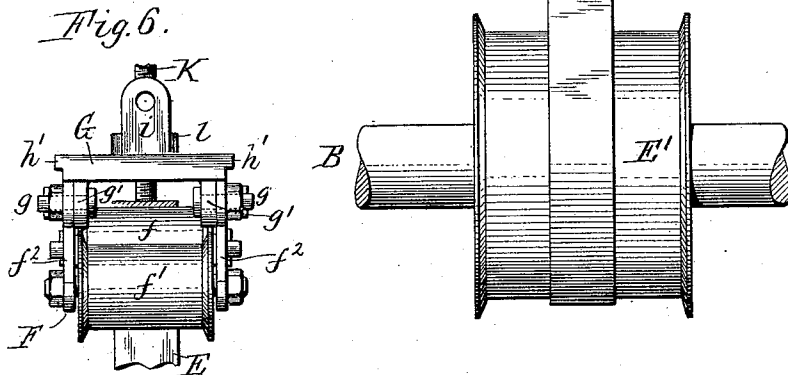


Fig. 6.

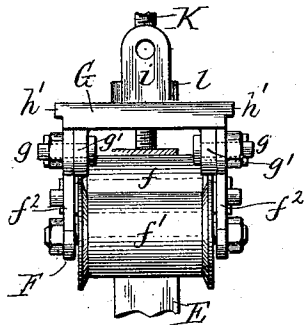


Fig. 3.

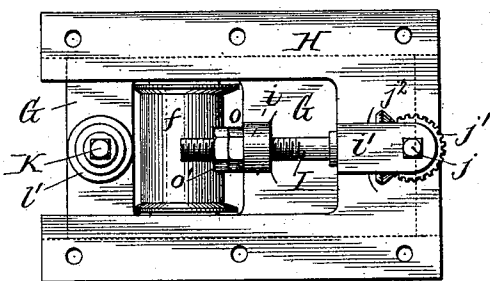


Fig. 4.

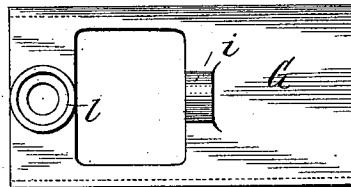
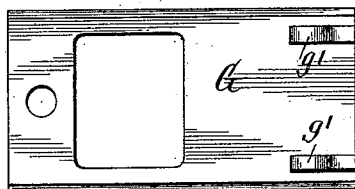


Fig. 5.



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UNITED STATES PATENT OFFICE.

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ELECTRIC-LIGHTING APPARATUS FOR RAILWAY-CARS.

SPECIFICATION forming part of Letters Patent No. 615,904, dated December 13, 1898.

Application filed July 7, 1898. Serial No. 685,316. (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 a new and useful Improvement 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 belt or frictional driving mechanism 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 particular reference to an apparatus of this kind in which the dynamo is stationary and carried by the car-body and in which an adjustable tension or spring-pressure device is applied to the driving-belt of the dynamo, whereby the tension or adhesion of the belt can be properly regulated for obtaining the desired normal output of the dynamo. To enable the dynamo to be effectually stopped, it is necessary to arrange the belt so that the same extends upwardly from the driving-axle in order to allow the belt to move out of contact with the under side of the pulley on the driving-axle when the belt is loosened. When the belt is arranged in this manner, the vertical vibrations of the car produce variations in the tension of the belt, and this causes the dynamo to be driven at an irregular speed and renders the light unsteady.

The objects of my invention are to so construct this driving mechanism that the dynamo is not materially affected by the vibrations of the car-axle from which it is driven and so that the dynamo can be stopped and started without disturbing the adjustment of the pressure or tension device applied to the belt.

In the accompanying drawings, consisting of two sheets, Figure 1 is a fragmentary longitudinal section of a railway-car provided with my improved apparatus. Fig. 2 is an end elevation, partly in section, looking to-

ward the dynamo. Fig. 3 is a detached top plan view of the slide, the tightener-pulleys, and the supporting-plate on which the slide is guided. Fig. 4 is a detached top plan view of the slide. Fig. 5 is a detached bottom plan view thereof. Fig. 6 is an end elevation of the tightener-frame and slide viewed from the dynamo.

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, and C the truck-frame.

D is the dynamo, which is preferably secured to the under side of the car-frame, near the inner side of the truck, and *d* is the pulley on the armature-shaft.

E is the driving-belt, which runs around the dynamo-pulley *d*, a driving-pulley E' on the car-axle B, and a pair of intermediate guide and tightener pulleys *f f'*, arranged above the axle-pulley, so that the belt extends substantially upwardly from the driving-pulley to the tightener-pulleys and thence lengthwise of the car to the dynamo-pulley. The tightener-pulleys *f f'* are mounted on a vertically-adjustable tightener-frame F, which is pivoted at one end to the under side of a slide G. The tightener-frame is preferably composed of two parallel bent arms or levers *f²*, between which the guide-pulleys are journaled, and a swiveled cross-piece *f³*, connecting the free ends of these arms, as shown in Figs. 1 and 2. This frame is pivoted to the slides G by bolts *g* engaging with lugs *g'* on the under side of the slide, Figs. 1 and 6. The slide G is capable of adjustment lengthwise of the car and is supported on the under side of the plate H by longitudinal ways *h*, which are formed on said plate and receive corresponding flanges *h'*, formed on the slide. The supporting-plate H is secured to the car-frame above the driving-axle B. The slide is adjusted by any suitable means, preferably, as shown, by a longitudinal screw I, which engages in a screw-threaded lug *i*, projecting upwardly from the slide. The screw I is journaled in a standard *i'*, arranged on the supporting-plate, the screw being held against endwise movement in the standard, so that upon turning the screw in one or the other direction the lug *i* is caused

to traverse the screw, thereby moving the slide and the tightener-pulleys $f' f'$ toward or from the dynamo. The screw I is operated by an upright shaft j , having a bevel gear-wheel j' , which meshes with a similar gear-wheel j^2 on the screw. The actuating-shaft j is journaled in the supporting-plate H and in an overhanging bracket of the standard i' , and its upper end is made square or flat-sided to receive a suitable wrench for turning it. The upper end of this shaft projects into or through an opening j^3 in the car-floor, which opening is preferably covered by a cap or removable plate j^4 , as shown in Fig. 1.

The free end of the tightener-frame F is supported by or connected with a suitable tension device, whereby said frame can be adjusted toward or from the driving-axle for regulating the tension of the belt. This tension device preferably consists of a vertical adjusting-screw K, connected with the free end of the tightener-frame F, and a spring L, applied to said screw and resting upon and carried by the slide G, so that the frame is yieldingly suspended from the slide by said screw and spring. The lower end of this spring is seated in a cup or socket l , arranged on the slide, and its upper end is inclosed by a cap l' , bearing with its upper side against a collar l^2 of the adjusting-screw K. The lower portion of this screw engages in a screw-threaded opening formed in the swiveling cross-piece f^3 , which is pivoted transversely between the free ends of the arms of the tightener-frame F, by which connection the screw is permitted to work freely in all positions of said frame. The screw is squared or flattened at its upper end to receive a corresponding wrench and terminates under or within an opening n , formed in the car-floor, which opening is covered by a cap or movable plate n' .

When it is desired to tighten the driving-belt, the greater portion of the slack of the belt is first taken up by shifting the slide G away from the dynamo by turning the actuating-shaft j in the proper direction, whereby the tightener-pulleys carried by the slide are brought into substantially the position shown in Fig. 1. As the tension-screw K and spring L are also carried by the slide, they take part in this movement. After shifting the tightener-pulleys in this manner the tension of the belt is regulated for obtaining the desired degree of adhesion by means of the adjusting-screw K, so as to move the free end of the tightener-frame F toward or from the driving-axle, as may be necessary.

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 lat-

ter gathers headway, the pull of the belt increases accordingly and draws the tightener-pulleys $f f'$ slightly toward the driving-axle. 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 K draws the tightener-pulleys $f f'$ away from the axle and again tightens the belt. In this manner the increased pull of the belt resulting from an increased speed of the axle causes the tightener-pulleys to approach the axle, and this causes a slackening of the belt and a corresponding slipping of the same on its pulleys, so that 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 is maintained practically uniform, although this high speed of the axle may vary considerably.

When it is desired to stop the dynamo, the slide G is shifted toward the dynamo by means of its actuating-shaft j , so as to move the tightener-pulleys $f f'$ in the same direction and slacken the belt, the pulleys being shifted sufficiently to allow the belt to leave the under side of the pulley for effectually stopping the dynamo. When it is desired to again start the dynamo, the slide and tightener-pulleys are returned to their former position. The dynamo is stopped and started in this manner without disturbing the adjustment of the tension device of the belt, as this device moves with the slide and the tightener-frame F and remains in the same relative position to said frame. By providing separate means for tensioning the belt and for throwing the same into and out of gear with the driving-axle it is unnecessary to readjust the tension device after tightening the belt, rendering the apparatus more convenient in use.

In order to enable the tightener-pulleys to be readily returned to their proper position for tightening the belt, an adjustable stop is provided, which arrests the movement of the slide G when the same is shifted to the desired position. In the construction shown in the drawings this stop consists of a screw-nut o , which is applied to the adjusting-screw I and against which the lug i of the slide strikes when the latter reaches its proper position. This stop-nut is locked by a jam-nut o' . It will be observed that the driving-belt is thrown into and out of gear by shifting the tightener-pulleys $f f'$ toward and from the dynamo and that the tension of the belt is varied by shifting said pulleys toward and from the driving-axle.

The tension-spring L, while permitting the requisite slippage of the belt when the speed rises above that which is required to properly drive the dynamo, also acts as a cushion which absorbs the vertical vibrations of the car and prevents the tension of the belt from being affected by such vibrations, thus insur-

ing a uniform output of the dynamo and a steady illumination of the car.

By leading the belt upwardly from the driving-axle and arranging the tightener-pulleys as shown the upright portion of the belt is brought near the pivot on which the truck oscillates or swivels, and the variations in the tension of the belt, caused by the swiveling of the car-truck when the car passes around a curve, are thereby reduced to a minimum. This arrangement also permits the belt to clear the truck and the belt to run with great ease and freedom.

I claim as my invention—

1. The combination with a railway-car and its axle, of a dynamo mounted on the car, a frictional driving mechanism for driving the dynamo from said axle, an adjusting device for regulating the tension of said driving mechanism, and means independent of said adjusting device for throwing said driving mechanism out of gear for stopping the dynamo, substantially as set forth.

2. The combination with a railway-car and its axle, of a dynamo mounted on the car, a belt whereby the dynamo is driven from said axle, a tightener-pulley bearing against the belt, a movable support carrying said pulley, a shifting device for said support, and an adjusting device whereby the tightener-pulley can be moved independently of its support, for regulating the tension of the belt, substantially as set forth.

3. The combination with a railway-car and its axle, of a dynamo mounted on the car on one side of said axle, a pulley-support arranged on the car and capable of moving toward and from said dynamo, a tightener pulley or pulleys arranged substantially above the driving-axle, carried by said support and capable of moving on the latter toward and from the driving-axle, and a driving-belt extending upwardly from the driving-axle around said tightener pulley or pulleys and thence lengthwise of the car and around the dynamo-pulley, substantially as set forth.

4. The combination with a railway-car and its axle, of a dynamo mounted on the car, a

belt whereby the dynamo is driven from said axle, a slide movable toward and from the dynamo, a vertically-swinging arm or frame pivoted at one end to said slide and carrying a pulley which bears against the belt, and a yielding support which carries the opposite end of said frame, substantially as set forth.

5. The combination with a railway-car and its axle, of a dynamo mounted on the car, a belt whereby the dynamo is driven from said axle, a slide movable toward and from the dynamo, a vertically-swinging tightener frame or arm pivoted at one end to said slide and carrying a pulley which bears against said belt, and a yielding adjusting device mounted on said slide and connected with the opposite free end of said tightener-frame, substantially as set forth.

6. The combination with a railway-car and its axle, of a dynamo mounted on the car, a belt whereby the dynamo is driven from said axle, a slide movable toward and from the dynamo, a vertically-swinging tightener frame or arm pivoted at one end to said slide and carrying a pulley which bears against the belt, a spring mounted on said slide, and an adjusting-screw carried by said spring and engaging with the opposite free end of said tightener-frame, substantially as set forth.

7. The combination with a railway-car and its axle, of a dynamo mounted on the car, a belt whereby the dynamo is driven from said axle, a slide movable toward and from the dynamo, a vertically-swinging arm or frame pivoted at one end to said slide and provided at its opposite end with a swiveling nut, a pulley carried by said frame and bearing against the belt, a spring mounted on said slide, and an adjusting-screw carried by said spring and engaging with said swiveling nut, substantially as set forth.

Witness my hand this 28th day of June, 1898.

WILLARD F. RICHARDS.

Witnesses:

JNO. J. BONNER,
KATHRYN ELMORE.