(No Model.) 3 Sheets—Sheet 1.

W. F. RICHARDS.

ELECTRIC LIGHTING APPARATUS FOR RAILWAY CARS.

No. 604,084. Patented May 17, 1898.

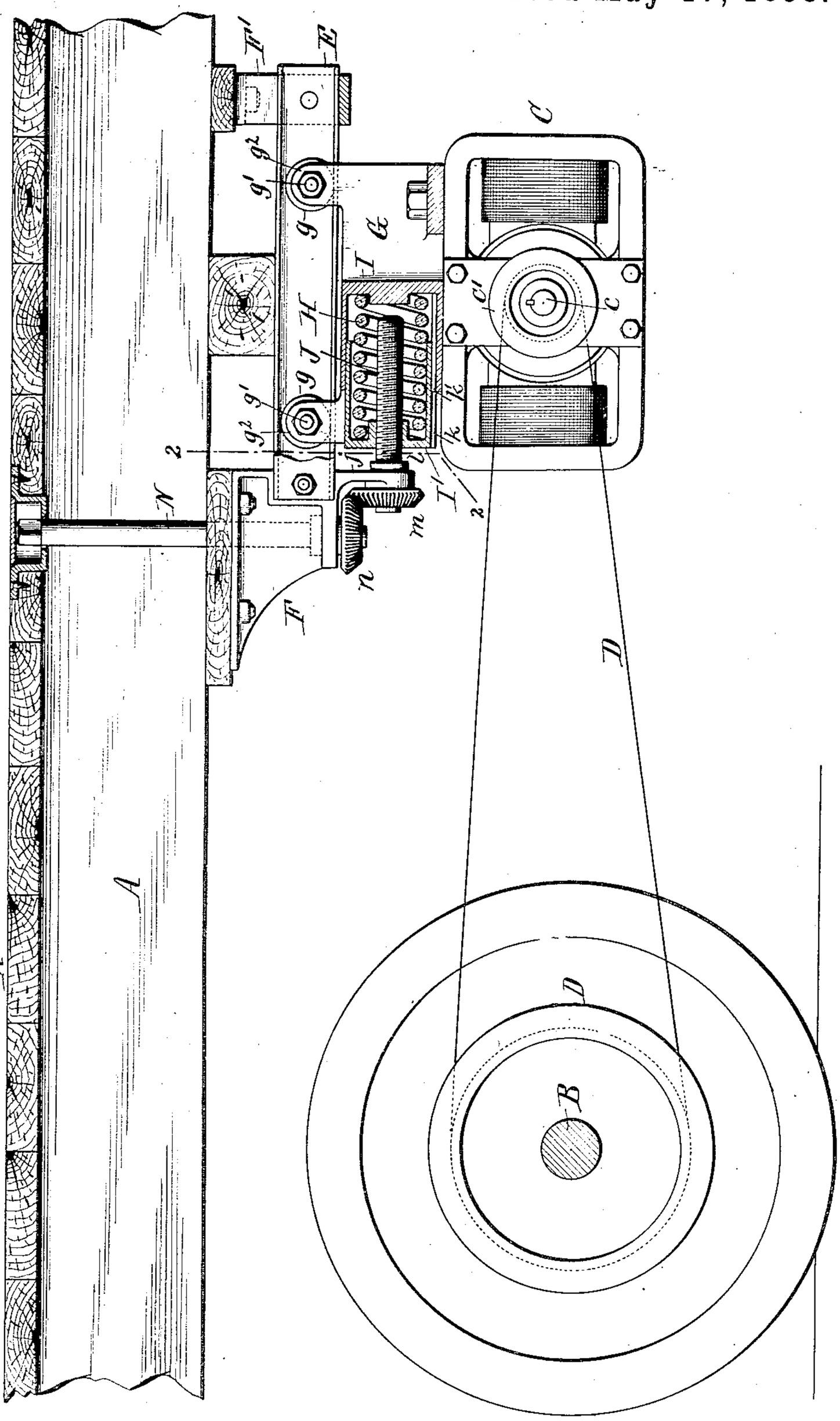


Fig. 1.

WITNESSES:

Chas. F. Burkhardt

Henry L. Deck

Willard F. Richards, INVENTOR.

By Wilkens & Bonner

ATTORNEYS.

(No Model.) 3 Sheets—Sheet 2.

W. F. RICHARDS.

ELECTRIC LIGHTING APPARATUS FOR RAILWAY CARS.

No. 604,084. Patented May 17, 1898.

Fig. 2.

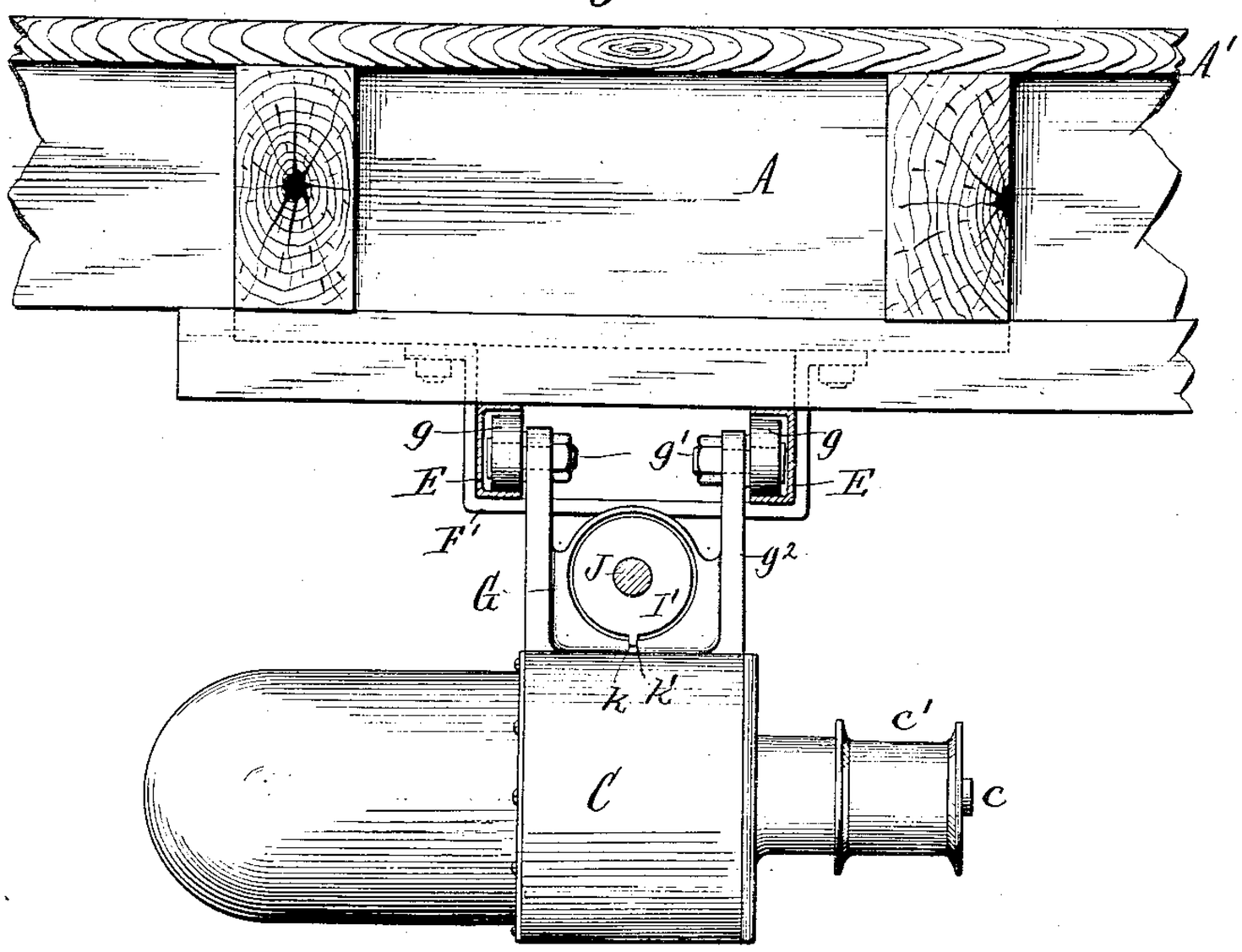
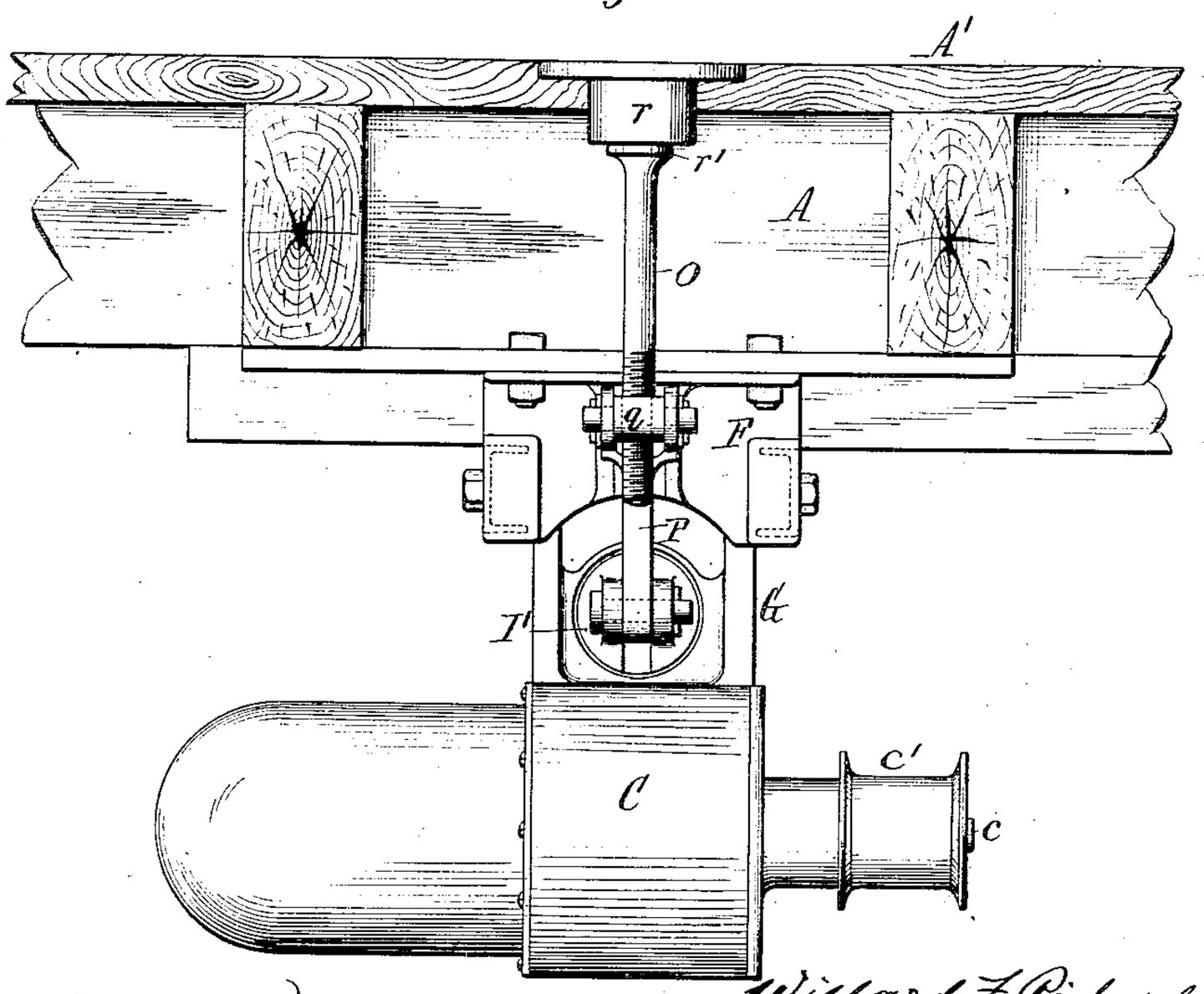


Fig. 4.



Chas. F. Burkhardt
Henry L. Decker. } WITNESSES:

Willard F. Richards INVENTOR.
By Wilhelm & Bonner
ATTORNEYS.

(No Model.)

3 Sheets—Sheet 3.

W. F. RICHARDS.

ELECTRIC LIGHTING APPARATUS FOR RAILWAY CARS.

No. 604,084. Patented May 17, 1898.

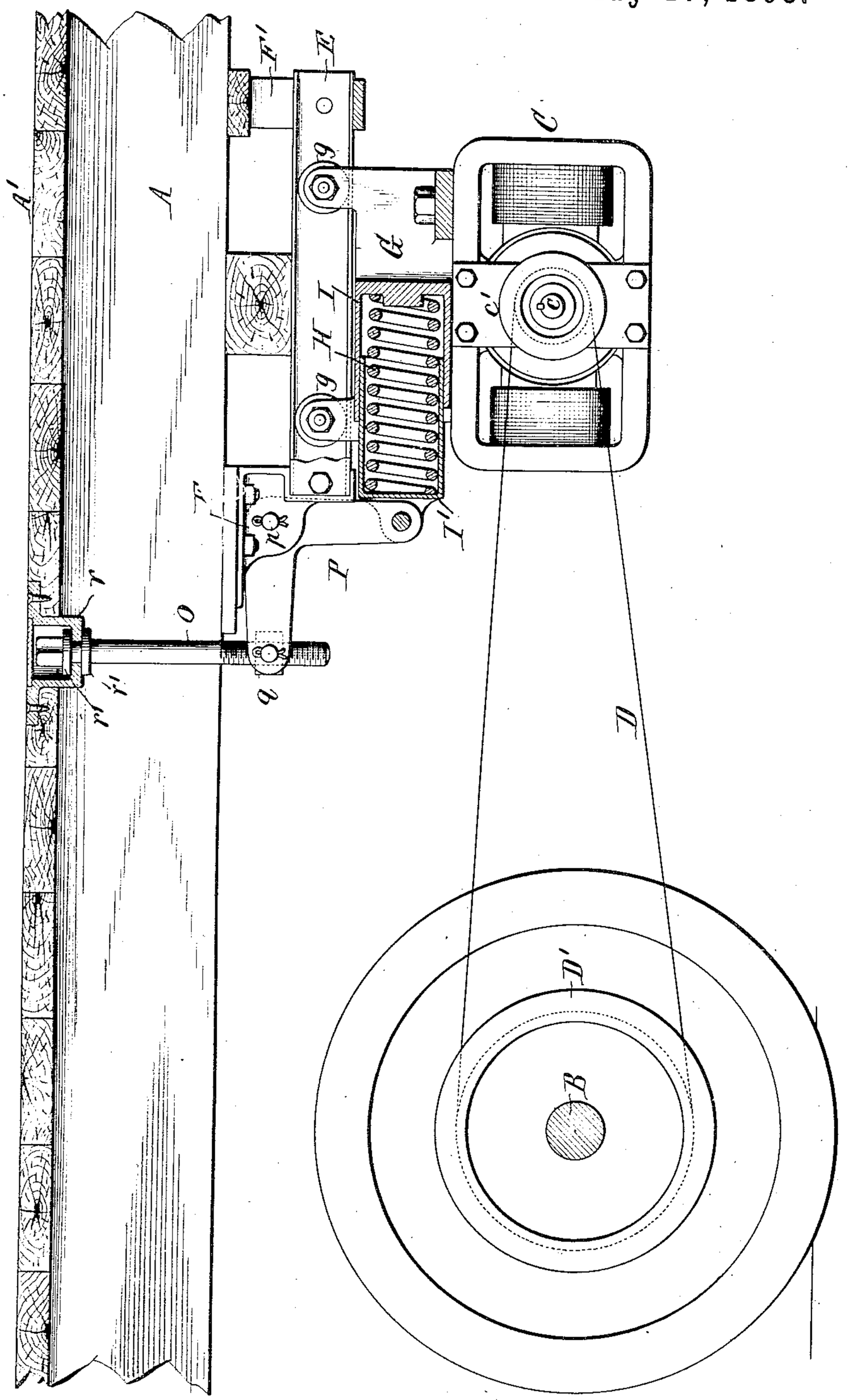


Fig. 3.

WITNESSES:

Chas. F. Burkhardt.
Henry L. Deck.

Willard F. Richards INVENTOR.
By Williams & Bonner
ATTORNEYS.

UNITED STATES PATENT OFFICE.

WILLARD F. RICHARDS, OF BUFFALO, NEW YORK, ASSIGNOR TO CHARLES M. GOULD, OF SAME PLACE.

ELECTRIC-LIGHTING APPARATUS FOR RAILWAY-CARS.

SPECIFICATION forming part of Letters Patent No. 604,084, dated May 17, 1898.

Application filed October 11, 1897. Serial No. 654,807. (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 which is driven from one of the car-axles by a belt and movably mounted in such manner that a spring-pressure device applied to the dynamo tightens the belt and produces the necessary adhesion for driving the dynamo with the speed required for the desired normal output, while an increase of the speed of the driving-axle, and consequently of the belt, draws the dynamo toward the axle and causes a slippage of the belt, which neutralizes such increase of speed, thereby maintaining the dynamo at the predetermined normal speed. An apparatus of this kind is described and shown in my application for patent, Serial No. 651,840, filed September 16, 1897.

The objects of this invention are to support the movable dynamo by simple means which allow the dynamo to move toward and from the driving-axle with little friction and to provide simple and convenient means for changing the pressure exerted by the spring against the dynamo for tightening the belt.

In the accompanying drawings, consisting of three sheets, Figure 1 is a sectional side elevation of my improved apparatus applied to a railway-car. Fig. 2 is a transverse vertical section thereof in line 2 2, Fig. 1. Fig. 3 is a sectional side elevation showing a modified construction of the tension device. Fig. 4 is a front view of said modified apparatus.

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

A is the car-frame, A' the floor of the car, and B one of the car-axles.

C is the dynamo, *c* the armature-shaft having the driving-pulley *c'*, and D a driving-belt running around the pulley of the armature-shaft and a pulley D', secured to the car-axle.

E represents parallel horizontal tracks or ways arranged lengthwise on the under side of the car-body in rear of the car-axle and firmly connected with the body. In the construction shown in the drawings the front ends of the tracks are secured to a bracket F and their rear ends to a strap or bracket F', which brackets are bolted to cross-pieces fastened to the car-sills. The tracks preferably consist of channel-bars which are so arranged that their flanges face each other.

G is a carriage running upon the tracks E and carrying the dynamo, which latter is preferably rigidly secured to base-flanges of the carriage.

g represents the wheels or rollers of the carriage, which run upon the lower flanges of the channel-bar tracks E and are journaled upon transverse pivot-bolts *g'*, secured to lugs g^2, arranged at the upper front and rear portions of the carriage. The carriage is preferably provided with four rollers, as shown. The dynamo is capable of rolling upon its supporting-tracks toward and from the car-axle and is pressed away from the latter for keeping the belt tight by a suitable tension device. Either of the tension devices shown in the drawings may be employed for this purpose. That shown in Figs. 1 and 2 is constructed as follows:

H is a tension-spring which is seated in a longitudinal socket or cylinder I, rigidly mounted on the carriage G above the dynamo and bearing with its rear end against the bottom of said socket.

I' is a tubular follower or cylinder arranged to slide in the socket I and bearing with its closed head against the front end of the tension-spring. This follower is adjusted in its socket for increasing or diminishing the tension of the spring by means of a horizontal screw J, journaled in a bearing *j*, depending from the bracket F and engaging with a screw-threaded opening formed in the head of the follower. The follower is free to slide in its socket, but held against turning therein by a groove and feather *k k'*, arranged on the respective parts, while the screw J is free to turn in its bearing, but held against lengthwise movement therein by a collar *l*, arranged on the same on the inner side of the bearing, and a bevel-gear *m*, secured to the screw on the outer side of said bearing, by which con-

struction the follower is caused to slide lengthwise in its socket, upon turning the screw, in an obvious manner.

N is an upright operating-shaft journaled in the bracket F and provided at its lower end with a bevel-gear *n*, meshing with the gear-wheel *m* of the adjusting-screw, while the upper portion of the shaft extends into or through an opening formed in the car-floor, as shown in Fig. 1, so that the shaft can be turned from the inside of the car. The upper end of the shaft is formed to receive a suitable detachable wrench, and the opening in the car-floor is preferably closed by a removable cap or cover, as shown. By this construction the follower I' in the normal operation of the dynamo forms a fixed abutment for the tension-spring, which latter tends constantly to force the suspended carriage and the dynamo away from the car-axle by bearing against the bottom of the socket I, mounted on the carriage, thus keeping the driving-belt taut. The motion of the car-axle is transmitted to the armature-shaft of the dynamo so long as the speed of the latter remains at or below the normal; but as soon as the speed rises above the normal by the increased speed of the train the increased pull of the belt resulting therefrom overcomes the weight of the dynamo and the resistance of the tension device and draws the dynamo toward the car-axle, thereby slackening the driving-belt, allowing it to slip on the driving-pulley of the dynamo and permitting the speed to fall to the normal, when the dynamo will again move away from the car-axle under the force of the tension-spring and tighten the belt and so maintain the normal speed and output of the dynamo. By means of the operating-shaft and adjusting-screw the tension of the driving-belt can be regulated for obtaining any predetermined output of the dynamo.

In the modified construction of the belt-tensioning device shown in Figs. 3 and 4 the tension-spring and the socket and follower coöperating therewith are arranged as in the first-described construction; but a vertical adjusting-screw O and an elbow-lever P are substituted for the operating-shaft N, the horizontal adjusting-screw J, and the connecting-gearing *m n*. This elbow-lever is pivoted to the bracket F by a horizontal pin *p*, and its lower arm is pivoted to the head of the follower I'. The upper arm of the lever carries a swiveling-nut *q*, with which the lower portion of the adjusting-screw O engages. The upper portion of this screw is journaled in a bearing *r*, arranged in an opening of the car-floor, and is held against vertical or endwise movement in said bearing by collars *r'*. Upon turning the screw in one or the other direction the swivel-nut *q* is caused to traverse the same, thus swinging the elbow-lever on its pivot and moving the follower I' toward or from the relatively stationary socket I, whereby the tension of the spring is changed accordingly.

By supporting the dynamo in the manner herein shown and described the same remains at all times in the same position relatively to its carriage or support and does not affect or modify the action of the driving-belt when the latter becomes stretched more or less, so that the tension of the belt is affected only by the tension device. As the dynamo rolls on a level track or support, the friction is reduced to a minimum, rendering the apparatus sensitive in action. The apparatus is, moreover, simple and inexpensive in construction.

I claim as my invention—

1. The combination with the car-body and the driving-axle provided with a pulley, of a longitudinal track arrangod on the underside of the car-body, a carriage mounted on said track and carrying a dynamo provided with a pulley, a horizontal socket mounted on said carriage, a follower applied to said socket, a pressure-spring arranged between said socket and follower, an adjusting device connected with said follower, and a belt applied to said pulleys and extending in a substantially horizontal direction from the driving to the driven pulley, substantially as set forth.

2. The combination with the car-body and a car-axle, of a longitudinal track or way arranged on the under side of the car-body, a carriage mounted on said track and carrying a dynamo, a horizontal socket mounted on said carriage, a tubular follower applied to said socket, a tension-spring arranged in said socket and follower, an adjusting-screw engaging with said follower, and an upright operating-shaft geared with said adjusting-screw, substantially as set forth.

Witness my hand this 5th day of October, 1897.

WILLARD F. RICHARDS.

Witnesses:
CARL F. GEYER,
KATHRYN ELMORE.