

(No Model.)

R. M. HUNTER.  
ELECTRIC RAILWAY.

No. 429,093.

Patented May 27, 1890.

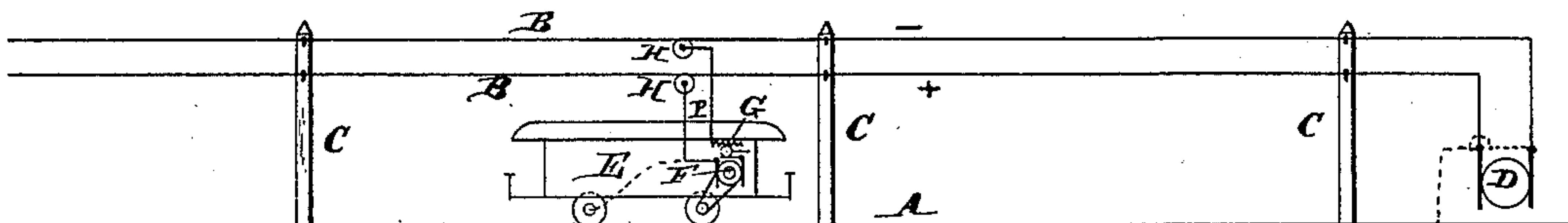


FIG. 1.

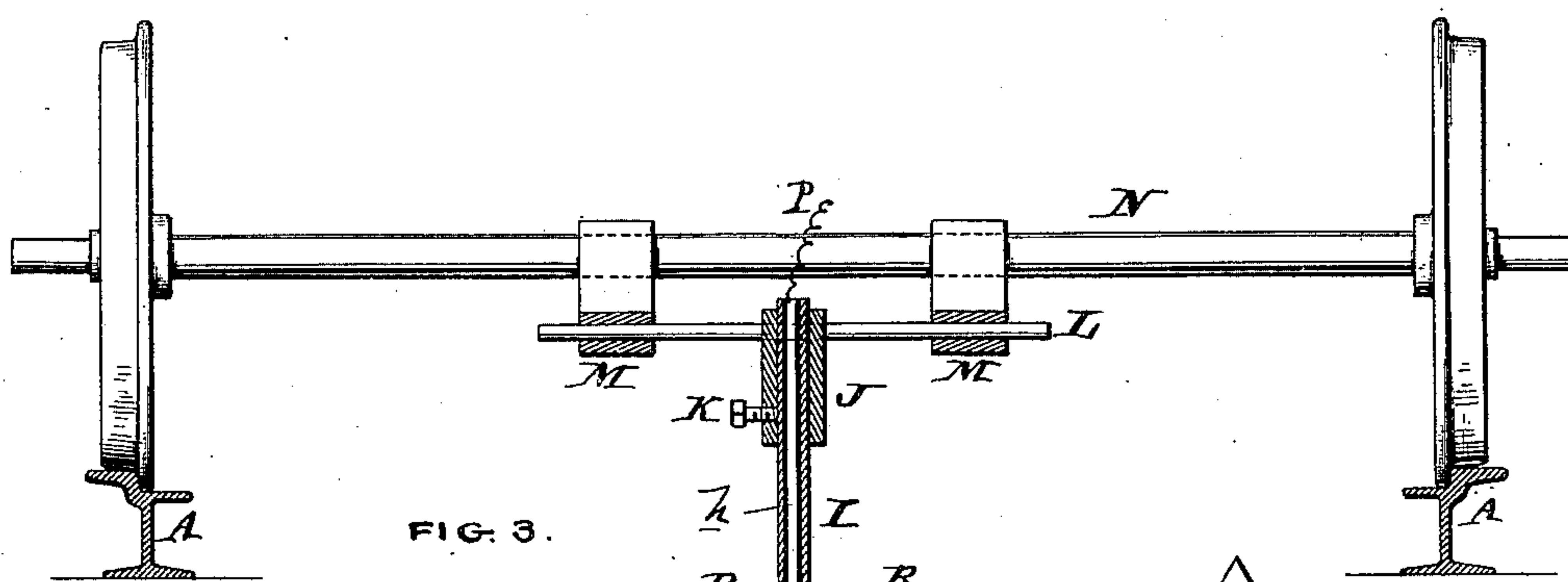


FIG. 3.

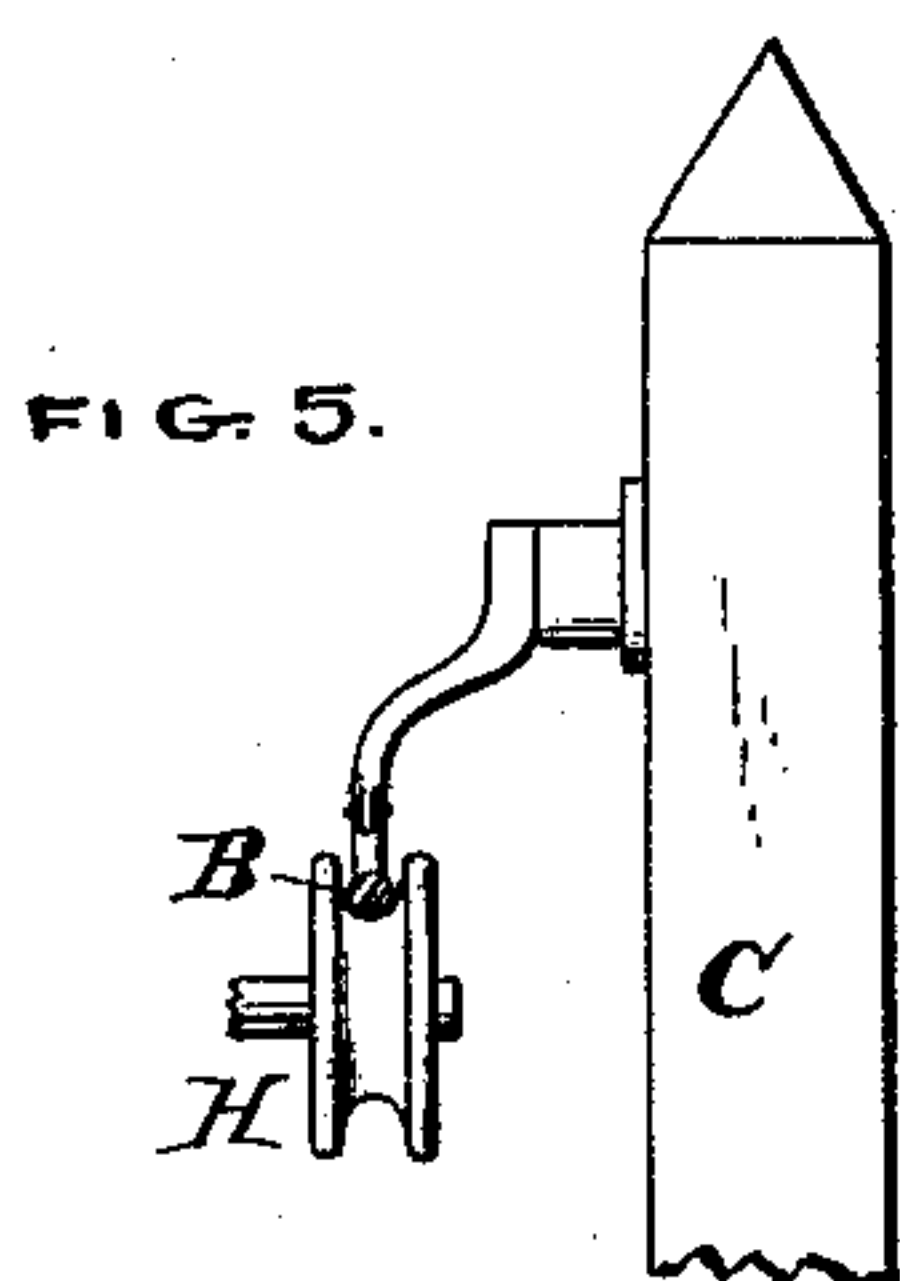


FIG. 5.

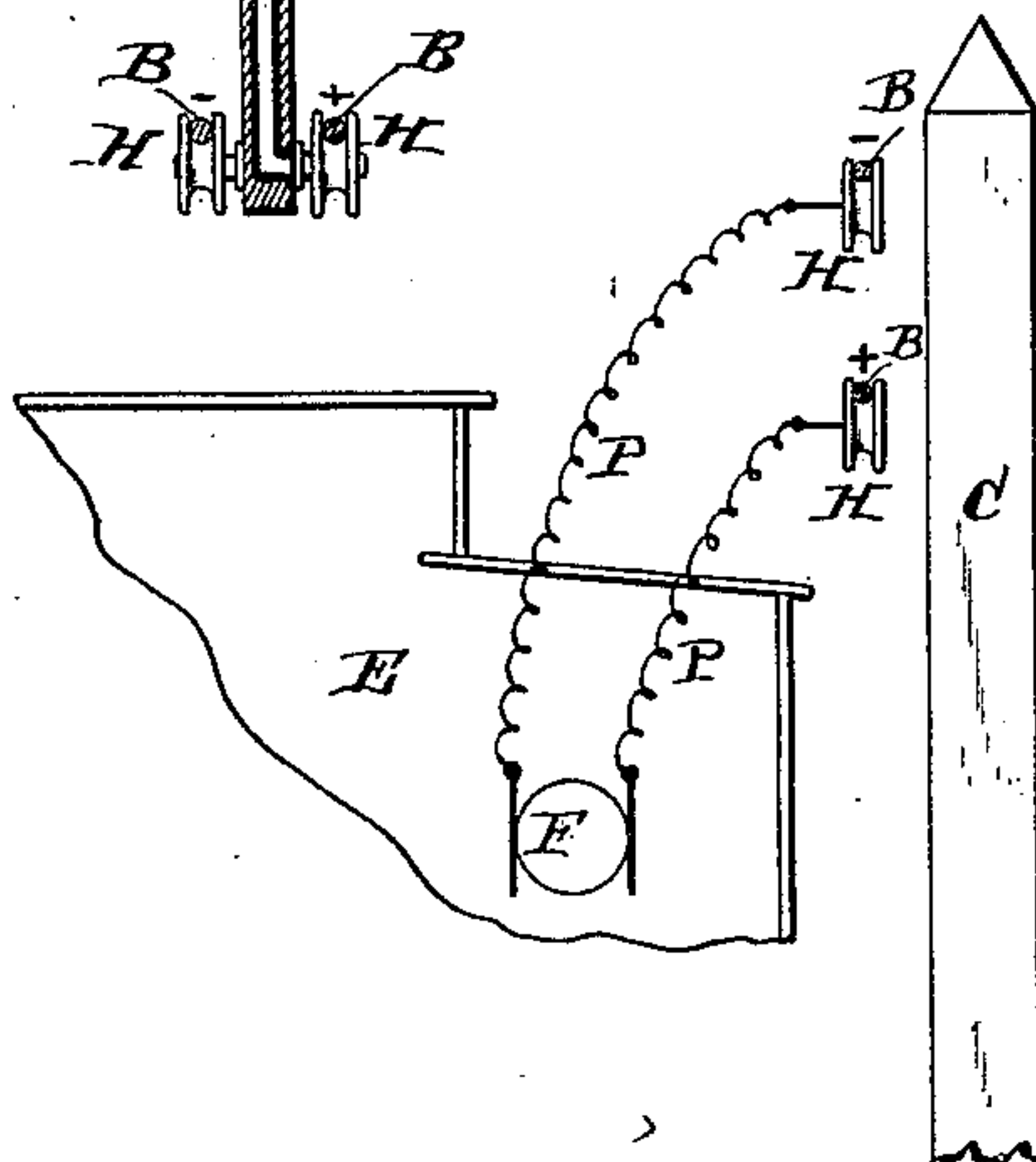


FIG. 2.

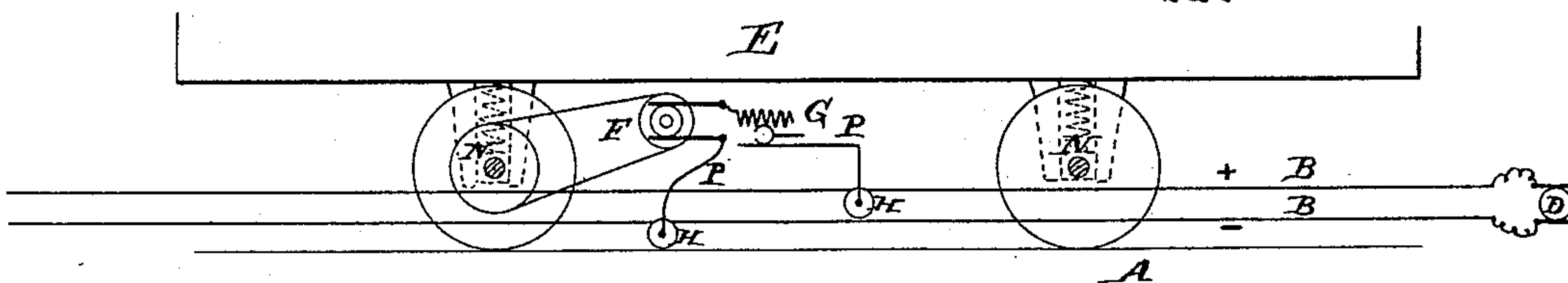


FIG. 4.

WITNESSES:

*Henry D. Dury*  
*E. H. Hunter*

INVENTOR:

*R. M. Hunter*

# UNITED STATES PATENT OFFICE.

RUDOLPH M. HUNTER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO  
THE THOMSON-HOUSTON ELECTRIC COMPANY, OF CONNECTICUT.

## ELECTRIC RAILWAY.

**SPECIFICATION** forming part of Letters Patent No. 429,093, dated May 27, 1890.

Original application filed September 23, 1886, Serial No. 214,309. Divided and this application filed September 11, 1889. Serial No. 323,597. (No model.)

*To all whom it may concern:*

Be it known that I, RUDOLPH M. HUNTER, of the city and county of Philadelphia and State of Pennsylvania, have invented an Improvement in Electric Railways, of which the following is a specification.

My invention has reference to electric railways; and it consists of certain improvements, all of which are fully set forth in the following specification, and shown in the accompanying drawings, which form a part thereof.

This application (Case 107) is a division of my application, Serial No. 214,309, filed September 23, 1886.

The object of my invention is to supply current to electrically-propelled vehicles from one or more suspended conductors extending along a railway, be they elevated above the vehicle, on a level with the roof of the vehicle, or under the vehicle.

In carrying out my invention I provide one or more suspended conductors, extending along the railway, each having its under side unobstructed for the free passage of a current-collecting device; and upon the electrically-propelled vehicle I mount a current-collecting device making an under contact with the conductors and having provision for lateral movement at its free end or that which is adjacent to the conductor or conductors. The contact portion for making direct connection with the conductor is preferably a deeply-grooved wheel which receives the conductor within its groove, and thereby insures the conductor remaining in contact with the said wheel. Any form of contact device may be used. The conductor guides the collector, and vice versa, so as to keep both in working connection. The collector may be carried upon the axles independent of the car-body, if so desired.

The foregoing are the essential features of my invention; but various details of my invention are set out hereinafter.

In the drawings, Figure 1 is a diagrammatic view illustrating my invention with the suspended conductors arranged above the vehicle. Fig. 2 is a cross-sectional view illustrating the location of the conductors on a

level with the roof of the vehicle. Fig. 3 is a cross-section showing the wheels and axle, collector device, and conductors, the latter being arranged under the vehicle. Fig. 4 is a diagrammatic side elevation corresponding to Fig. 3; and Fig. 5 is a cross-section showing the support of the conductor from above, and also illustrating the under-contact roller.

A are the rails.

B B are the two parallel suspended line-conductors, which may supply positive and negative current. These conductors extend along the railway and may be formed of wires, rods, bars, or cables, and are supported in any suitable manner, so as to expose a smooth or practically smooth and unobstructed under surface. They are preferably flexible. As shown in Fig. 5, these conductors are held from above by arms extending from the posts C. The particular method of support is immaterial to my invention, beyond the fact that it must permit a continuous or substantially continuous contact by the collector with the under surface of the conductor.

D is the generator for supplying current to the conductors B. If desired, one suspended conductor B may be employed as the supply-conductor and the return-conductor may be the rails, as indicated in Fig. 1 by the dotted connection between the generator and the rail.

E is the vehicle or car, and is supported upon axles N by springs, in the usual manner. It is supplied with an electric motor F, geared in any suitable way to the axles to enable its propulsion.

H H are the grooved contact-wheels for making a running under contact with the conductors B. These wheels are deeply grooved, so as to receive the conductors and enable the one to be guided by the other, and thereby insure intimate and constant contact. These contact-wheels are insulated from each other and supported by a frame or arm I, carried by the vehicle and capable of lateral movement relatively to the said vehicle, so as to compensate for the varying locations of the conductors. This arm or frame I is vertically adjustable in a frame or primary part J and held by a



set-screw K, so as to move the contact-wheels vertically with respect to the conductors. The frame J is secured to a transverse cross-bar or slide L, which is guided in the bearings or journals M, carried by the vehicle and, if desired, upon the axles N. By this construction the collector as a whole may move laterally to compensate for any variations of the conductors. The arm or frame I is provided with insulated conductors h, leading from the motor-circuit P to the contact-wheels II.

I do not limit myself to the mere details herein set out, as they may be varied in many ways without departing from my invention.

The under-contact collector has many advantages in practice over upper-contact collectors, since it simplifies the construction of the road equipment and cheapens the cost of construction.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination of a railway, a suspended electrical conductor extending along said railway, a traveling vehicle for said railway, and a laterally-adjustable current-collecting device carried by the vehicle and making an under contact with the conductor.

2. The combination of a railway, a suspended electrical conductor extending along said railway, a traveling vehicle for said railway, and a laterally-adjustable current-collecting device carried by the vehicle and provided with a grooved roller making an under contact with the conductor.

3. The combination of a railway, a suspended conductor extending along said railway, a traveling vehicle, and a contact-arm extending between the vehicle and conductor and carrying on its end a contact device making an under contact with the conductor and having provision for lateral movement.

4. The combination of a railway, a suspended conductor extending along said railway, a traveling vehicle, and a contact-arm extending between the vehicle and conductor and carrying on its end a contact device making an under contact with the conductor and having provision for lateral movement and vertical adjustment.

5. The combination of a railway, a conductor extending along said railway, a traveling vehicle, guides or journals carried by the vehicle, a frame transversely adjustable in said guides or journals, and a current-collecting device supported by said frame and having on its free end a contact part making an under contact with the conductor.

6. The combination of a railway, a conductor extending along said railway, a traveling vehicle, guides or journals carried by the vehicle, a frame transversely adjustable in said guides or journals, and a current-collecting device supported by said frame and having on its free end a contact part consisting

of a grooved roller making an under contact with the conductor and supporting the conductor in its groove.

7. The combination of a railway, a suspended conductor extending along said railway, a traveling vehicle, and a contact-arm extending between the vehicle and conductor and carrying on its free end a contact device consisting of a grooved roller adapted for making an under contact with the conductor and having provision for lateral movement with respect to the vehicle.

8. The combination of a railway, a conductor extending along said railway, a traveling vehicle, and a contact device carried by the axles independent of the vehicle-body, making an under contact with the conductor.

9. The combination of a railway, a conductor extending along said railway, a traveling vehicle, and an adjustable contact device carried by the axles independent of the vehicle-body and having a grooved wheel making an under contact with the conductor.

10. The combination of a railway, a suspended conductor arranged along the railway, an electrically-propelled vehicle, and a current-collecting device carried by the vehicle, consisting of a vertical arm carrying at its end adjacent to the conductor a grooved contact-wheel, which runs against the under side of the conductor and supports it in the groove.

11. The combination of a railway, a suspended conductor arranged along the railway, an electrically-propelled vehicle, and a current-collecting device carried by the vehicle consisting of a vertical arm carrying at its end adjacent to the conductor a grooved contact-wheel, which runs against the under side of the conductor and supports it in the groove and is connected to the vehicle, with provision for lateral movement of the end and wheel.

12. The combination of a suspended conductor, an electrically-propelled vehicle, a current-collector consisting of an arm carried by the vehicle and provided with an under-contact device making a traveling connection with the under side of the conductor, an electric motor on the vehicle, and an insulated conductor extending from the contact device to the motor.

13. The combination of a suspended conductor, an electrically-propelled vehicle, a current-collector consisting of an arm carried by the vehicle, capable of lateral movement and provided with an under-contact grooved wheel making a traveling connection with the under side of the conductor, an electric motor on the vehicle, and an insulated flexible conductor extending from the contact device to the motor.

14. The combination of a railway, a suspended conductor extending along the railway, an electrically-propelled vehicle, and a current-collecting device consisting of an arm or frame supported at one end by the vehicle and having the other end free and pro-



vided with a contact making a moving electrical connection with the under side of the conductor.

5 15. The combination of a railway, a suspended conductor extending along the railway, an electrically-propelled vehicle, and a current-collecting device consisting of an arm or frame supported at one end by the vehicle and having the other end free and provided with a grooved contact-wheel making a moving electrical connection with the under side of the conductor and guiding the conductor in its groove.

10 16. The combination of a railway, a suspended conductor extending along the rail-

way in a vertical plane between the rails, an electrically-propelled vehicle, and a current-collecting device consisting of an arm or frame supported at one end by the vehicle at its middle and having the other end free and provided with a contact making a moving electrical connection with the under side of the conductor. 20

In testimony of which invention I hereunto set my hand.

RUDOLPH M. HUNTER.

Witnesses:

ERNEST HOWARD HUNTER,  
A. J. DUNN.