

(No Model.)

R. M. HUNTER.  
ELECTRIC RAILWAY

No. 413,604.

Patented Oct. 22, 1889.

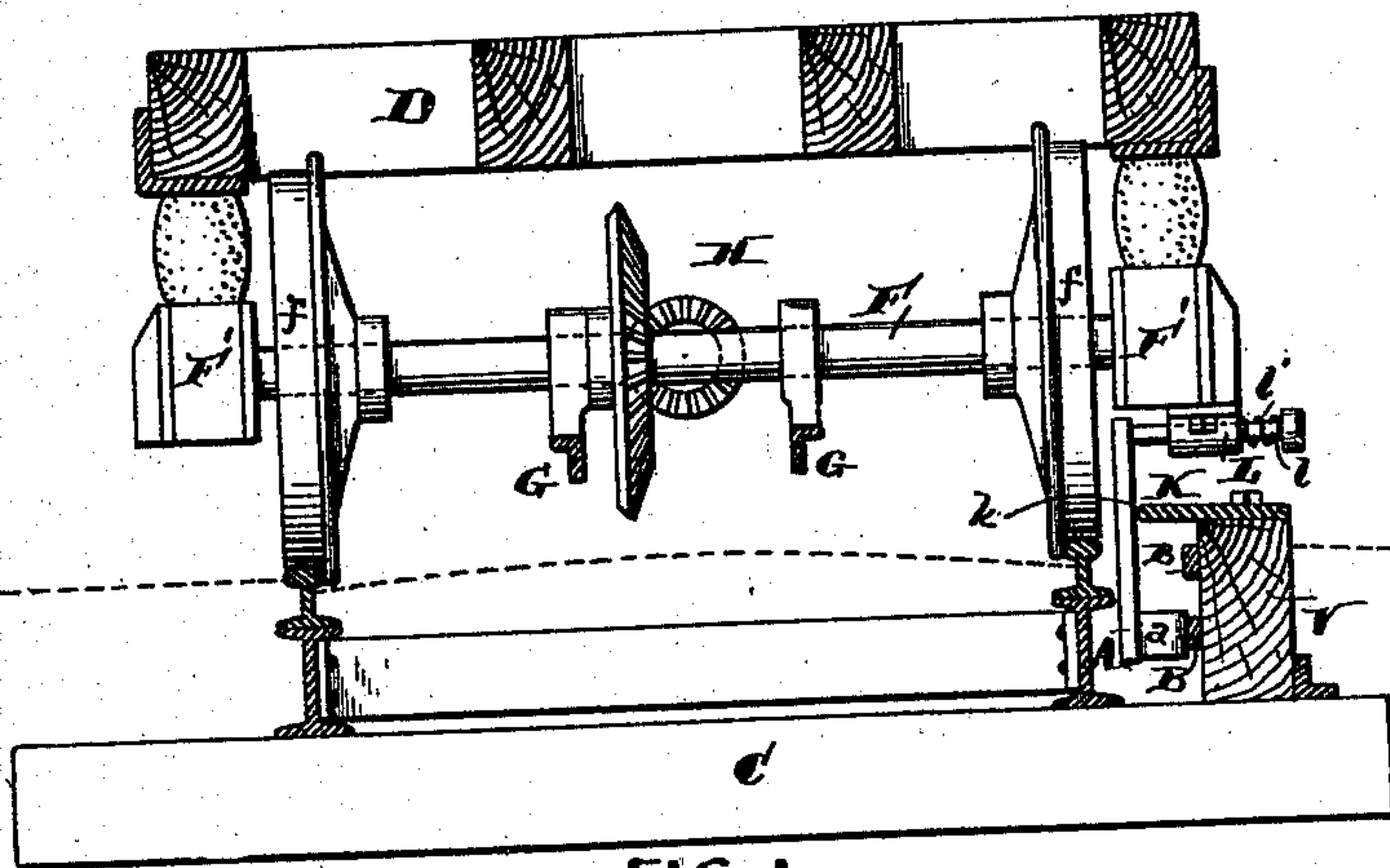


FIG. 1

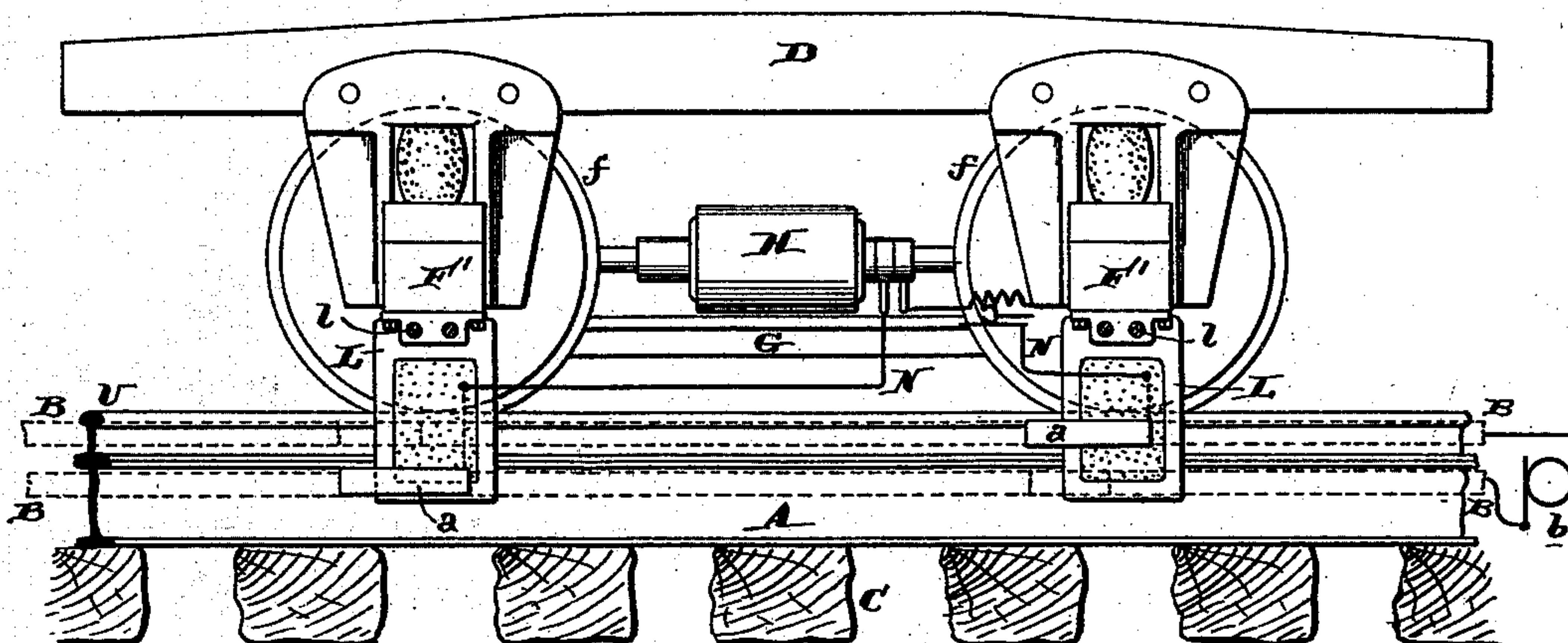


FIG. 2.

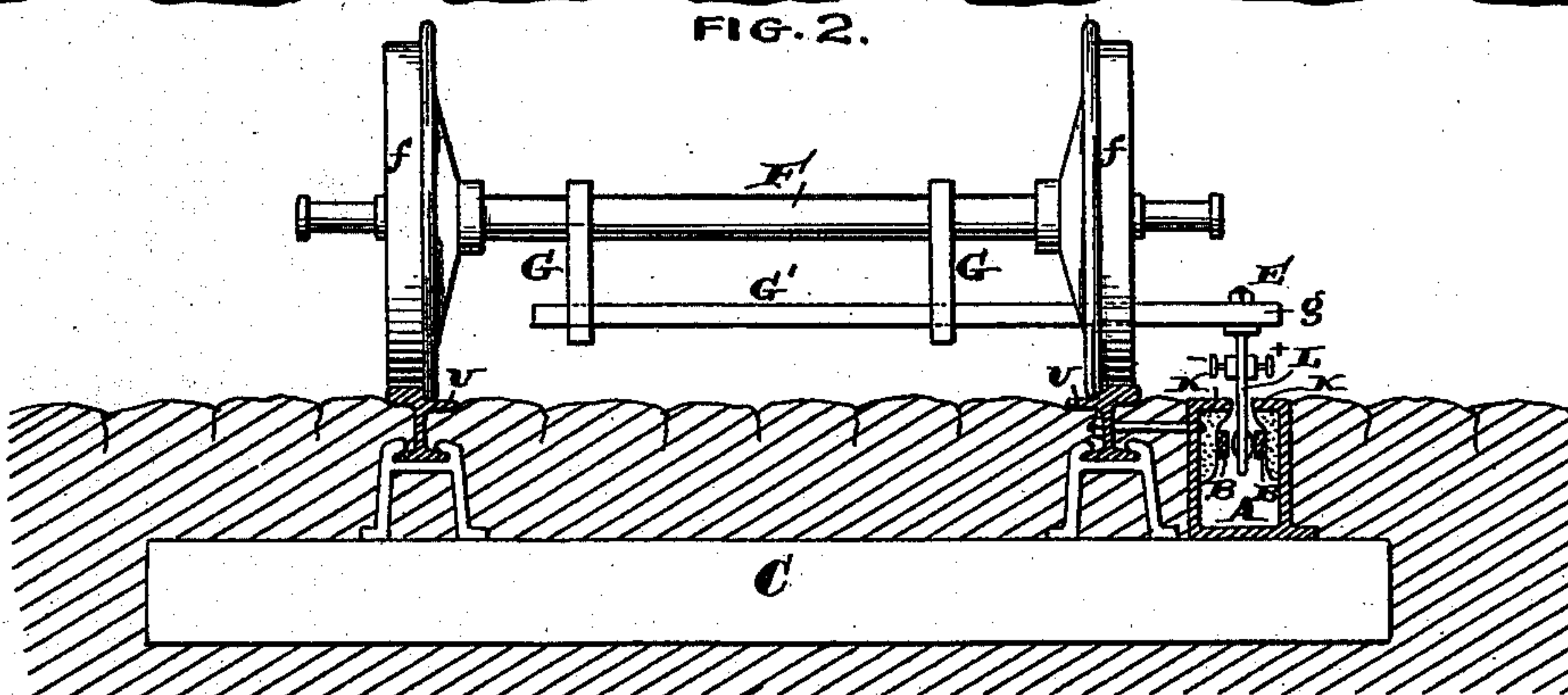


FIG. 3.

WITNESSES:

*Henry D. Dwyer*  
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INVENTOR:

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# UNITED STATES PATENT OFFICE.

RUDOLPH M. HUNTER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR, BY  
MESNE ASSIGNMENTS, TO THE THOMSON-HOUSTON ELECTRIC COMPANY,  
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## ELECTRIC RAILWAY.

SPECIFICATION forming part of Letters Patent No. 413,604, dated October 22, 1889.

Original application filed January 14, 1889, Serial No. 296,292. Divided and this application filed July 13, 1889. Serial No. 317,393. (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 part thereof.

This application (Case 104) is a division of my application filed January 14, 1889, and Serial No. 296,292, and shows matter set out in my application, Serial No. 204,583, filed June 9, 1886.

My invention relates particularly to the road-bed structure and the collectors on the car, which work in connection with the conduit and conductors.

Considered generally, my invention consists in locating the conduit, in which is housed one or more electric conductors, outside of the track and preferably close to one of the rails. The current-collector is carried by the car upon the outside of the wheel-base, so as to depend into the conduit and make connection with the conductor. The collector is preferably supported from the axle box or boxes directly or indirectly, or may be supported by a frame supported from the axles independently of the car-body, which latter rests upon springs. In practice the conduit could be located at the highest part of the street or in the space between the tracks, and thus avoid the excessive quantities of surface water, which usually run in the road between the rails of the track. The conduit may be formed in any suitable manner, either as part of the road-bed structure or as a separate conduit secured in fixed relation with the rail to which it is adjacent.

In the drawings, Figure 1 is a cross-section of a railway and car embodying my improvements. Fig. 2 is a side elevation of same, with the conduit cut away; and Fig. 3 is a cross-section of a road-bed and truck of a modified form of my invention.

D is the car or vehicle or truck, and has the axles F provided with wheels *f*, which axles are received in axle-boxes F' in the usual way. The car-frame D rests upon said boxes F' through the mediation of springs.

H is the electric motor, and is supported upon a frame G, carried by the axles, in any suitable manner.

U are the rails of the road-bed, and are supported upon cross ties or frames C.

A is a conduit arranged upon the outside of the track-rails, and preferably close to the outer edge of the rail. In Fig. 1 this conduit is formed in conjunction with the rail by arranging a longitudinal stringer V upon the cross-ties C outside of the rails and placing a plate or slot-iron K upon its upper edge, so as to form a slot *k* between said plate and rail U. Within the conduit are the two conductors B B, one of which is for positive current and the other for negative current received from the generator *b*.

L L are two collectors, depending from the axle-boxes F' and adapted to have lateral movement by being loosely guided by pins *l* in the bottom of the axle-boxes. Springs *l'* are employed to cause the collector to run close to the edge of the plate or slot-iron K; but such springs may be dispensed with, if desired. It is evident that by making the guides of loose fit the collector would have provision for slight rotary motion on a vertical axis. These collectors are provided with contacts *a*, which run in contact with the conductors B and supply current to the motor H by the motor-circuit N, which is provided with a suitable regulator M. The motor may be mechanically connected with the axles in any suitable and well-known manner.

As shown in Fig. 2, there are two collectors—one under each axle-box—and while one is designed to collect current of one polarity and the other to collect current of the other polarity, yet it is evident that each collector may collect current from both conductors B by the addition of the second contacts indicated in dotted lines. The collectors are arranged in a vertical line through the axle



and wheel, and thus are not shifted when the vehicle is turning corners. The provision for lateral movement is to compensate for irregularities in the line of the slot.

5 In the modified form of my invention shown in Fig. 3 I have the usual road-bed structure of a street-railway with the conduit A formed separate and secured to the cross-ties C. B B are the conductors, as before,  
10 and are insulated from the sides of the conduit, which is shown as of metal. K K are the top plates or overhanging ledges of the conduit and form the slot. This conduit may be constructed in any desirable manner, and  
15 for rigidity should be secured to the rail U by ties T, arranged at intervals. In this figure the collector L is shown as pivoted on a vertical axis at *g* to a laterally-movable frame G', supported by the frame G on the axles.  
20 By this means the collector may be arranged between the axles. The provision for self-adjustment in this case is practically no greater than that shown in Figs. 1 and 2.

I do not limit myself to the details of construction, as the various parts or devices may be modified in various ways without departing from the spirit of my invention.

Any matters set out in this application but not claimed are not dedicated to the public, but form subject-matter of my applications  
30 hereinbefore referred to and my application, Serial No. 293,665, of December 15, 1888.

Having now described my invention, what I claim as new, and desire to secure by Letters  
35 Patent, is—

1. In an electric railway, the combination of a traveling vehicle, a stationary source of electric supply, a bared working-conductor extending along the path of the vehicle, and  
40 a current-collector device of less width than the diameter of the wheel and supported immediately outside of the wheel of the vehicle and upon the axle-box.

2. In an electric railway, the combination  
45 of a stationary source of electric supply, bared working-conductors extending along the path of the vehicle, an electrically-propelled vehicle, and depending collectors to receive electricity from said bared conductors supported by the axle-box of the vehicle, and  
50 suitable guides for said collectors to admit of lateral motion, substantially as and for the purpose specified.

3. In an electric railway, the combination  
55 of a stationary source of electric supply, bared working-conductors extending along the path of the vehicle running upon said railway, an electrically-propelled vehicle, and two independent depending collectors to receive electricity from said bared conductors supported  
60 in line of travel of the vehicle, and each carried by a different axle-box and arranged substantially in a vertical plane through the respective axles.

65 4. In an electric railway, the combination of a stationary source of electric supply, bared working-conductors extending along the path

of the vehicle running upon said railway, an electrically-propelled vehicle, two independent depending and laterally-movable collectors to receive electricity from said bared conductors supported in line of travel of the vehicle, and each carried by a different axle-box and arranged substantially in a vertical plane through the respective axles. 75

5. The combination of the track-rails of a railway with an electric slotted conduit arranged upon the outside of the track and close to or adjacent to one rail thereof, and positive and negative bared conductors contained  
80 within said conduit and consisting of longitudinal bars, having vertical or substantially vertical faces exposed to a vertical plane extending through the slot, a traveling vehicle, and laterally-movable current-collecting device arranged outside of the wheel-base of  
85 the vehicle and depending into the conduit for making connection with the conductors.

6. The combination of the track-rails of a railway with an electric conduit arranged  
90 upon the outside of the track and close to or adjacent to one rail thereof, an insulated working-conductor contained within said conduit, a traveling vehicle, and a laterally-movable current-collecting device arranged  
95 outside of the wheel-base of said vehicle and depending into the conduit for making connection with the working-conductors.

7. The combination of the track-rails of a railway with an electric conduit arranged  
100 upon the outside of the track and close to or adjacent to one rail thereof, an insulated working-conductor contained within said conduit, a traveling vehicle, and a current-collecting device arranged outside of the  
105 wheel-base of said vehicle in line with the wheel-axle and depending into the conduit for making connections with the working-conductor.

8. The combination of the track-rails of a railway with an electric conduit arranged  
110 upon the outside of the track and close to or adjacent to one rail thereof, and positive and negative insulated working-conductor contained within said conduit, a traveling  
115 vehicle, and two narrow independent current-collectors carried thereby and arranged upon the outside of the wheel-base one in advance of the other and depending into the conduit for making connection with the working-con-  
120 ductors.

9. The combination of the track-rails of a railway with an electric conduit arranged upon the outside of the track and close to or adjacent to one rail thereof, and positive  
125 and negative insulated working-conductors contained within said conduit, a traveling vehicle, and two independently adjustable or movable current-collectors carried thereby and arranged upon the outside of the wheel-  
130 base one in advance of the other and depending into the conduit for making connection with the working-conductors.

10. The combination of the track-rails of



5 a railway with an electric conduit arranged upon the outside of the track and close to or adjacent to one rail thereof, and positive and negative insulated working-conductors contained within said conduit, a traveling vehicle having a car-body supported on springs, and two current-collectors carried thereby independently of the car-body and arranged upon the outside of the wheel-base one in advance of the other and depending into the conduit for making connection with the working-conductors.

10 11. The combination of a railway-track with a slotted conduit arranged upon the outside thereof and a bared conductor contained within said conduit and exposing its contact-surface from the side, a traveling

vehicle, and a depending current-collecting device adapted to make contact with the conductor and carried by the vehicle with provision for lateral movement. 20

12. The combination of a railway, a slotted conduit arranged outside of the track, a bared working-conductor supported within said conductor and insulated therefrom, and tie-rods 25 connecting the upper part of the conduit to the track, whereby it is maintained in relative fixed position with respect to the rail.

In testimony of which invention I have hereunto set my hand.

RUDOLPH M. HUNTER.

Witnesses:

ERNEST HOWARD HUNTER,  
S. T. YERKES.