

(No Model.)

R. M. HUNTER.
ELECTRIC RAILWAY.

No. 450,074.

Patented Apr. 7, 1891.

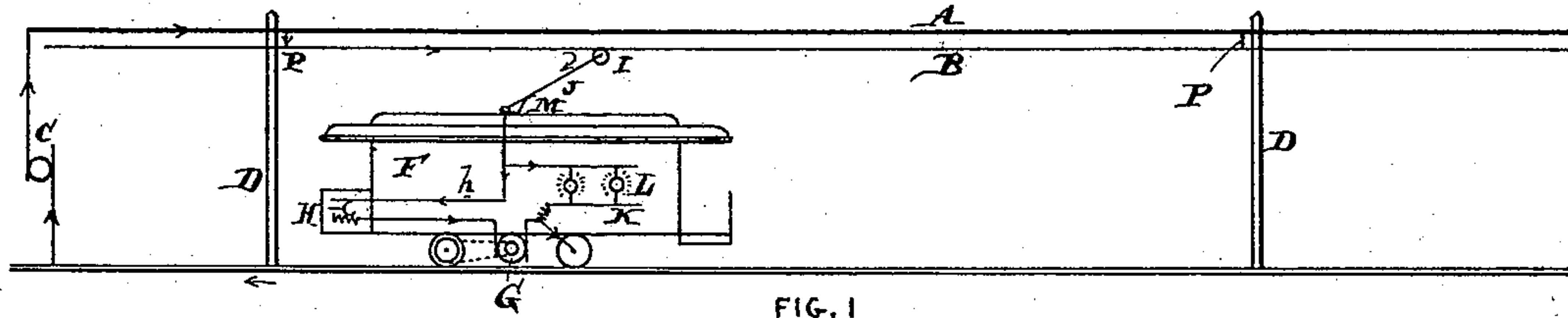


FIG. 1

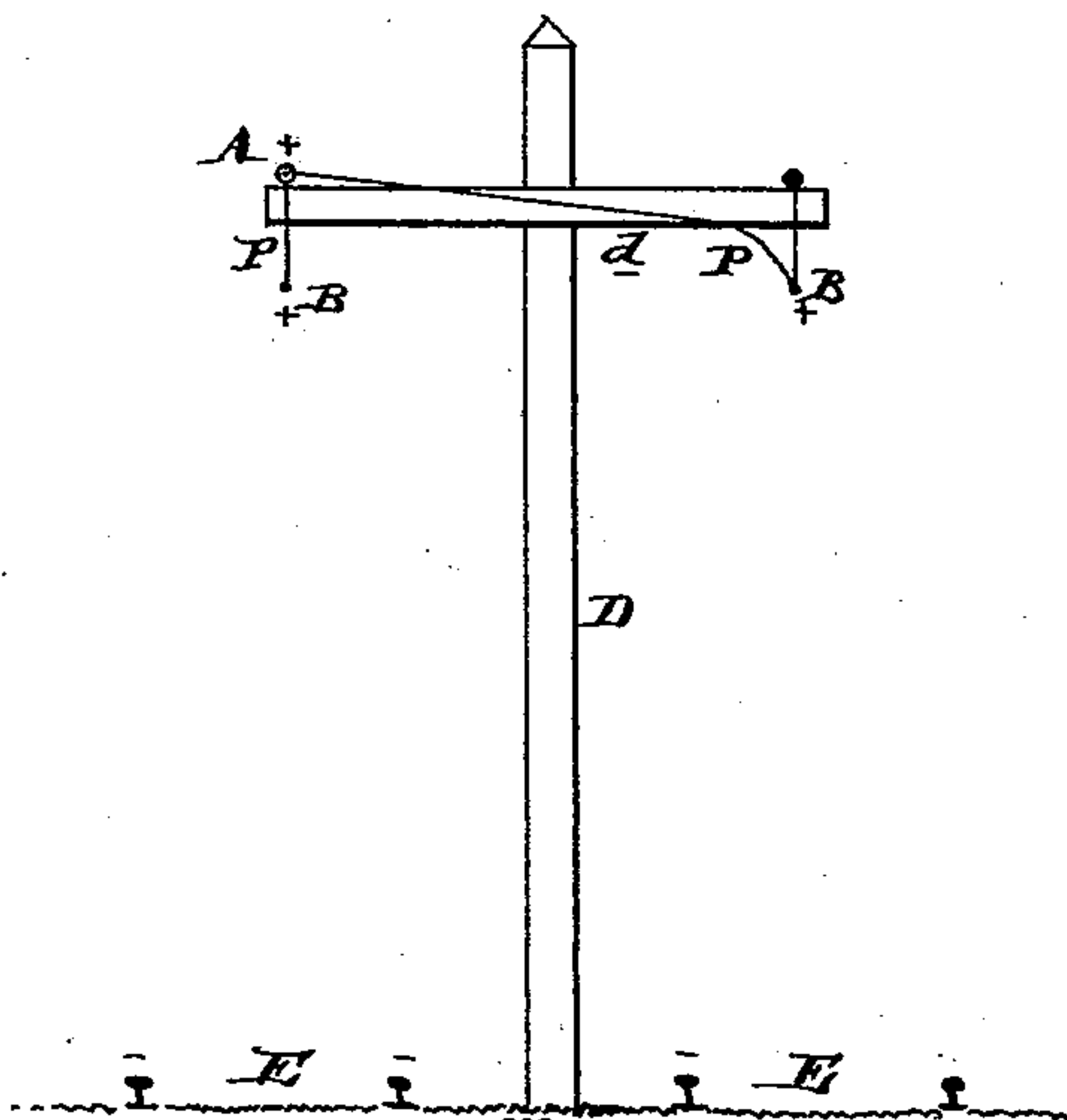


FIG. 3

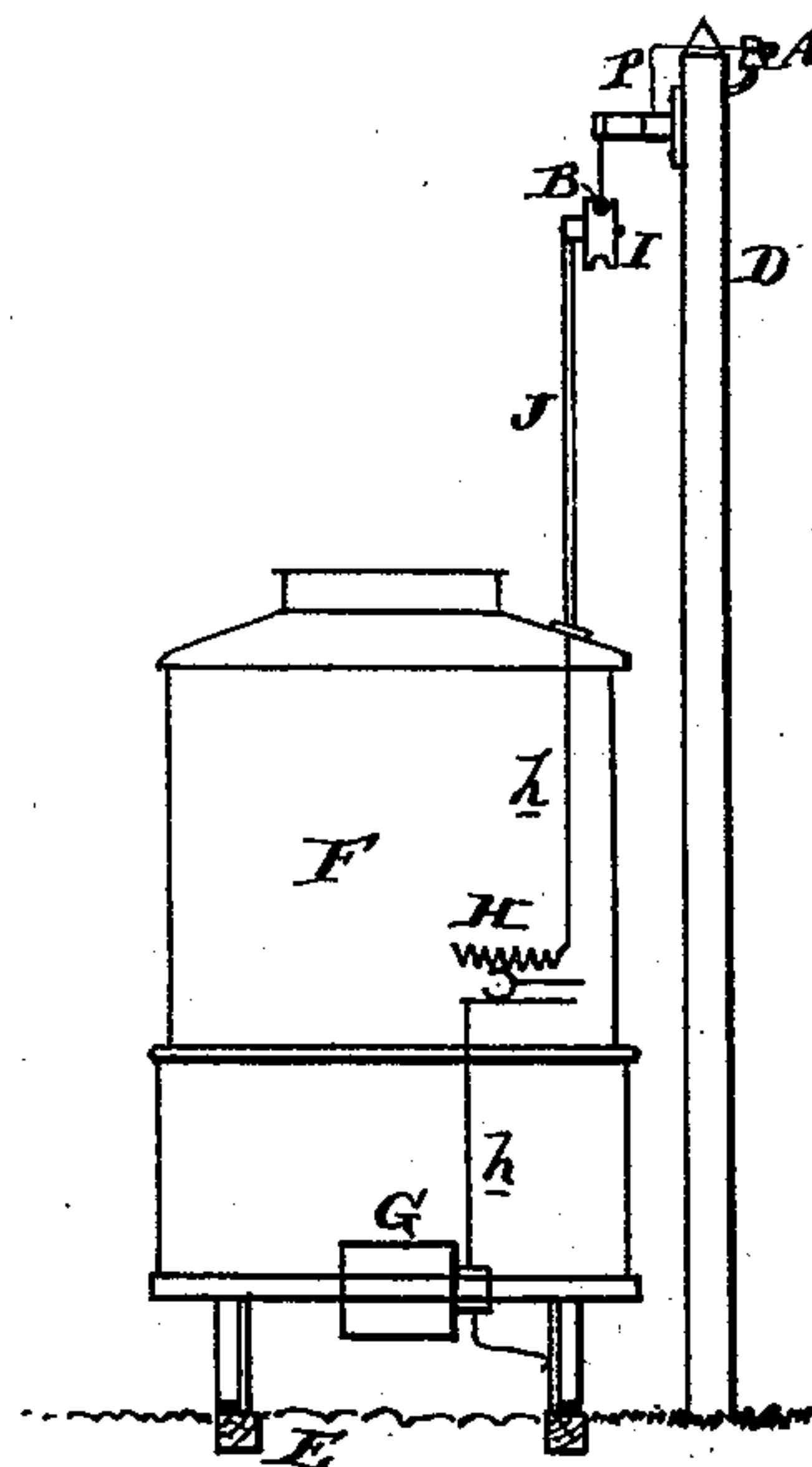


FIG. 2

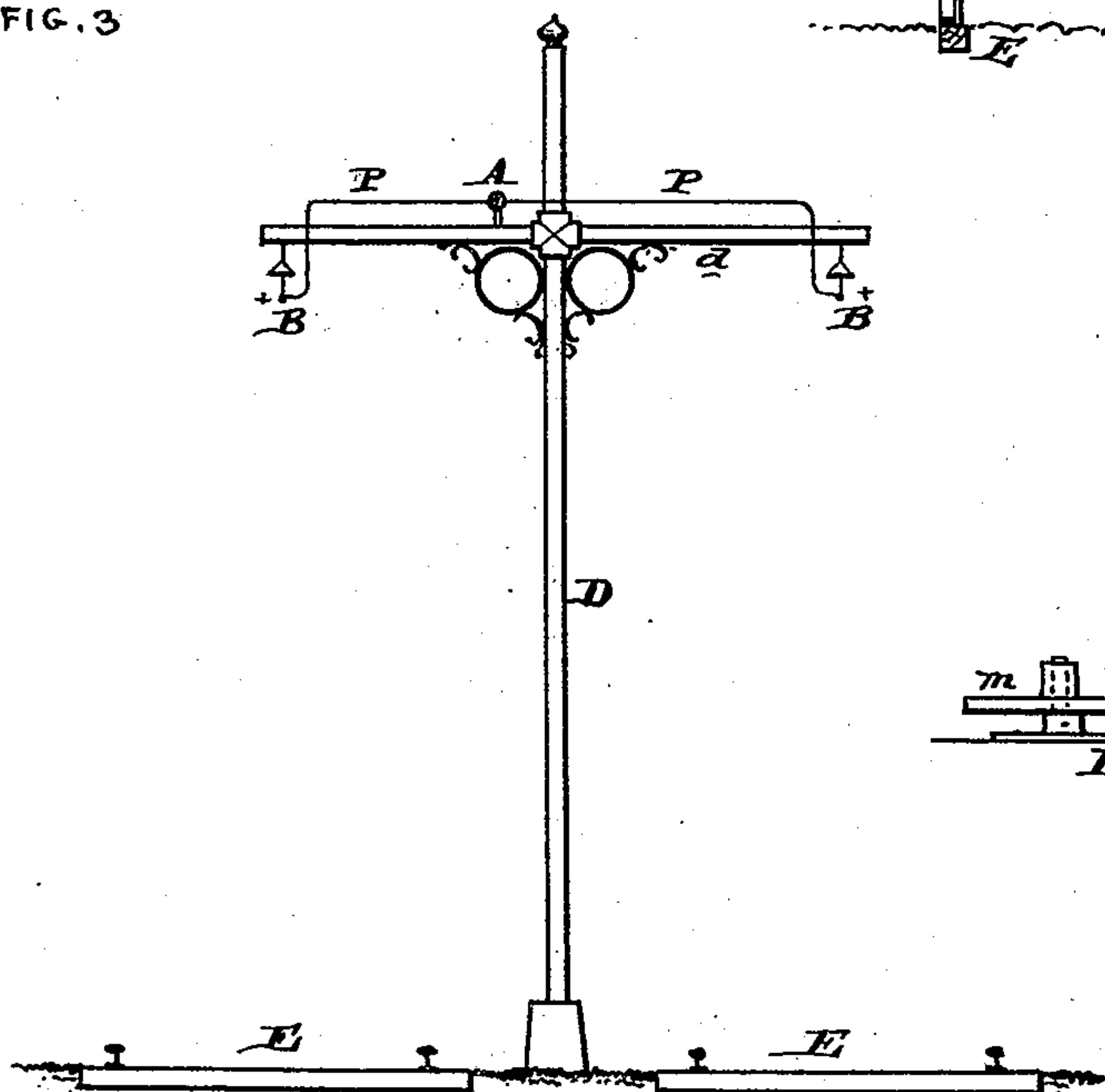


FIG. 4

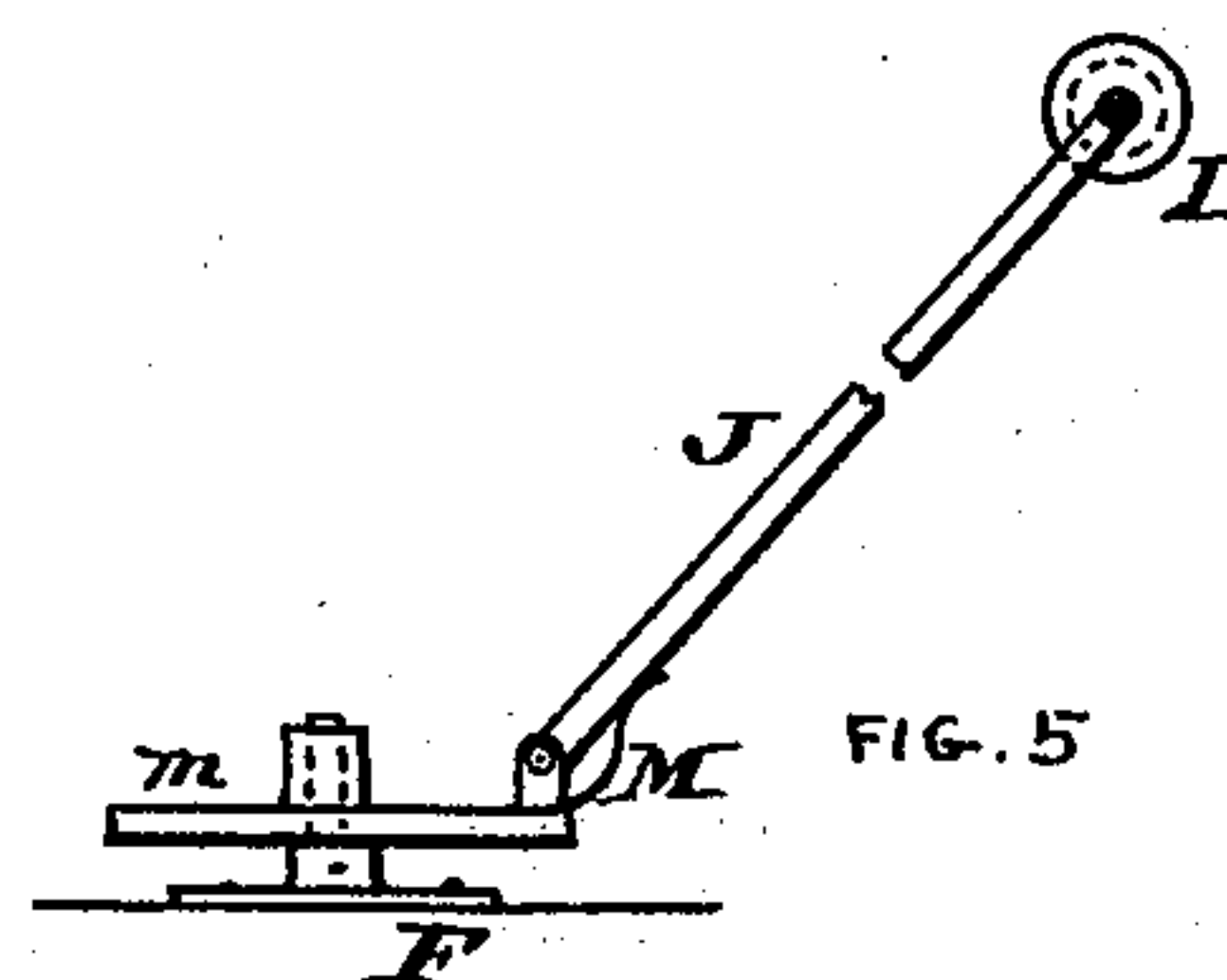


FIG. 5

Attest
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ELECTRIC RAILWAY.

SPECIFICATION forming part of Letters Patent No. 450,074, dated April 7, 1891.

Original application filed May 29, 1889, Serial No. 312,578. Divided and this application filed September 18, 1890. Serial No. 365,362. (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, which are fully set forth in the following specification and shown in the accompanying drawings, which form a part thereof.

This application (Case 173) is a division of my application, Serial No. 312,578, filed May 29, 1889.

In carrying out my invention I provide a series of poles or supports extending along a railway to one side of the track or between two tracks, and upon these supports I arrange in a suitable manner the conductor or conductors which supply current to the electrically-propelled vehicle or car running on the track or tracks below. I also arrange upon these poles the supply conductor or conductors, which are connected at intervals with the other or working conductors. The supply conductor or conductors may be insulated. Both the outgoing and return conductors may be supported on the poles, or the rails and earth may be used as the return-conductor; or, if desired, separate return-conductors may be used in place of rails. The suspended conductors are preferably supported at a higher elevation than the car-roof, so as to be out of reach of persons on the railway, and the current is collected by an upwardly-extending collector-arm carried by the car and provided with an underrunning contact-wheel or other contact device. Any other form of collector may be used. With double tracks the poles are erected between the tracks and have cross-arms at the top, from which are suspended the working-conductors, so as to be within reach of a collector of the car. In this case the working-conductors of like polarity of the two tracks are preferably connected in parallel. By this construction the supply-conductor may be supported along the railway in any convenient manner and normally out of reach of the current-collecting device, while the work-

ing-conductor, receiving its current from the supply-conductor, is in position to maintain at all times an electrical contact with the collector on the electrically-propelled vehicle. Furthermore, it enables the light working-conductor to be supported in any suitable manner within reach of the contact device on the vehicle, while the heavy supply-conductor is supported in the most desirable way without regard to being within reach of the current-collecting device on the car.

In the drawings, Figure 1 is an elevation of an electric railway embodying my invention. Fig. 2 is a cross-section of a railway embodying my invention. Figs. 3 and 4 are cross-sections of double-track railways embodying my invention, and Fig. 5 is a side elevation of the current-collecting device.

A is the supply-conductor. B is the working-conductor. C is the electric generator for furnishing electricity to the supply-conductor. D are the poles, and E are the rails, which may act as the return-conductors.

The current from the generator C goes out the supply-conductor and passes by branch conductors P to the working-conductors B, from which it is taken by the collector I J on the car, and after energizing the motor and lamps passed to the return-conductor E.

F is the car, which may be of any suitable construction and furnished with one or more electric motors G, by which it may be propelled. The collector may be of any suitable construction—such, for instance, as set out in my patent, No. 398,402, dated February 26, 1889.

In Fig. 2 the working-conductor B is hung from a transverse arm extending laterally from post D, and is electrically connected by a branch conductor P with the supply-conductor A, the conductors A and B being upon opposite sides of the supports. F is the car, and is provided with the upwardly-extending collector J, having a grooved contact-roller I at the top, making an underrunning contact with the conductor B.

As shown in the present drawings, an under-contact grooved wheel I runs upon the under side of the working-conductor and is

supported by the car on an arm J, preferably obliquely and rearwardly extending, and which may be flexibly supported, as shown in Fig. 4, where it is hinged to a plate *m*, pivoted on a vertical axis to the car and pressed upward by a spring M, so as to keep the wheel L against the conductor. The current is supplied to the motor G from the collector by a motor-circuit N, having a suitable regulator H to control the speed of the motor.

L in Fig. 1 represents electric lamps on the car in multiple with the motor or motor-circuit and are included in the lighting-circuit K on the car.

Referring now to Figs. 3 and 4 I have double tracks, and the conductors A B are supported on posts D between the tracks having cross-arms *d* at the top. I do not confine myself to any type of post, as it may be plain or ornamented and of wood or of metal. The cross-arms *d* extend out transversely from each side of the post to a point preferably above the middle of the railways E E, and the conductors B are supported from the outer ends of the cross-arms, while the supply-conductor A may be supported at any place desired and connected by the branch conductors P. In Fig. 3 the supply-conductor A is arranged upon the upper part of the cross-arm and to the outer edge thereof, and the conductor B is suspended therefrom over one track, and the conductor B over the other track is suspended from the end of the other arm *d* and electrically connected by wire P with the conductor A. It is also quite evident that the supply-conductor may be divided or formed of two longitudinal conductors A A' and both connected in parallel with the positive conductors B. In Fig. 3 the supply-conductor is supported by the cross-arm *d* near the vertical post D, and the working-conductors B are suspended from the ends of the arms and connected electrically with the conductor A by the branch conductors P. In this case the weight of the large supply-conductor is near the vertical post and less strain comes upon the cross-arm.

The supply-conductor may be a wire or a cable and bare or insulated, while the working-conductor would in all cases be bare and preferably smaller.

In all cases the supply and working conductors are supported by the same means of support and are held out of reach of persons on the cars or railway, and also provide sufficient height to enable vehicles of all kinds to readily pass beneath them.

The working-conductors B B are preferably suspended from the under and outer sides of the cross-arms and expose their under surfaces, and the current-collector makes a traveling contact with said unobstructed under surface of the conductors. The collector and car may move over either track and will work in conjunction with the conductor of either track equally well.

I do not limit myself to the details of con-

struction, as they may be modified in various ways without departing from the principles of my invention.

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

1. The combination of a railway-track, a series of posts or poles arranged along said track, a supply-conductor and a working-conductor connected in parallel and suspended upon the opposite sides or portions of said posts or poles at an elevation above the track and so that the working-conductor is adjacent to the track, a traveling car, an electric motor to propel the said car, a laterally-movable collector moving with the car and making a traveling contact with the suspended working-conductor upon its under side, and a motor-circuit on the car for supplying current from the collector to the motor.

2. The combination of a railway-track, a series of posts arranged along the side of said track, supply and working conductors connected in parallel and supported by said posts at a distance above the track, a traveling car, an electric motor to propel the car, and an upwardly-extending and laterally-movable current-collector for making contact with the working-conductor for supplying current to the motor on the car from the supply-conductor.

3. A railway-track combined with a series of vertical posts arranged along the track and having lateral or transverse arms at their upper parts extending over the track, a suspended working-conductor supported by said arms at their free ends and presenting an unobstructed under surface, a supply-conductor supported by the posts and connected in parallel with the working-conductor, a traveling car, an electric motor mechanically connected to rotate the axle of the car, an upwardly-extending current-collector making a traveling contact with the under side of the working-conductor, and a motor-circuit carried by the car to supply current from the collector to the motor.

4. A railway-track combined with a series of posts arranged along said railway-track, having lateral or transverse arms extending over the track, a working-conductor suspended below the said arms, a supply-conductor suspended above said arms, electrical connections between the said conductors, whereby they are connected in parallel, an electrically-propelled vehicle on the track below said arms and working-conductor, and an upwardly-extending collector moving with the vehicle and making a continuous contact with the working-conductor.

5. A railway-track combined with a series of posts arranged along said railway-track, having lateral or transverse arms extending above the track, a working-conductor suspended below said arms, a supply-conductor suspended above said arms, electrical connections between said conductors, whereby

they are connected in parallel, a source of electric supply connecting with the supply-conductor and rails of the track, an electrically-propelled vehicle on the track below said arms and working-conductor, and a collector carried with the vehicle, making a moving contact with the working-conductor.

6. The combination of two railway-tracks, a series of posts or poles arranged between them and provided with transverse or cross arms at their upper parts extending out over each track, a working-conductor suspended from each of said arms substantially over the middle of the corresponding tracks, connecting-circuits for coupling the said conductors in parallel, a supply-conductor supported by said posts or their cross-arms and electrically connected with said connecting-conductors so as to be connected in parallel with the working-conductors, an electrically-propelled car, and a current-collecting device carried with the car for making a traveling contact with the working-conductor and supplying current to the motor on the car.

7. The combination of two parallel tracks, a series of posts or poles arranged between the tracks and having cross-arms extending transversely over each track, a working-conductor suspended from each of the cross-arms and over the respective tracks and having the under surface unobstructed, a supply-conductor, also suspended upon said poles and connected to the working-conductors in parallel, a traveling car, and an upwardly-extending current-collector making a traveling contact with the under surface of the working-conductors and having its free end laterally movable.

8. The combination of two parallel tracks, a series of posts or poles arranged between the tracks and having cross-arms extending transversely over each track, a working-conductor suspended from each of the cross-arms and over the respective tracks and having the under surface unobstructed, a supply-conductor, also suspended upon said poles and connected to the two working-conductors in parallel, a traveling car, an upwardly-extending current-collector making a traveling contact with the under surface of the working-conductors and having its free end laterally movable, and also vertically movable, and provided with means to sustain the weight of the upwardly-extending collector-arm and press it with a spring action against the conductor.

9. A railway-track combined with a series of posts arranged along said railway-track, having lateral or transverse arms extending over the track, a working-conductor suspended below the said arms, a supply-conductor suspended above said arms, electrical connections between the said conductors, whereby they are connected in parallel, a traveling car adapted to move over either track, and an upwardly and rearwardly extending current-collector supported upon the roof of

the car and adapted to make a running contact with the under side of either working-conductor, according as to which track the car is upon, whereby the current may be collected from the supply-conductor through the mediation of either of the working-conductors.

10. In an electric railway, the combination of a series of posts arranged along the railway and provided at their upper parts with laterally-projecting arms extending over each railway-track, a supply-conductor supported upon said laterally-projecting arms out of reach of a current-collector carried by the car, a working-conductor suspended from the under side of the laterally-projecting arms and electrically connected at intervals with the supply-conductor, a traveling car, an electric motor to propel said car, and an upwardly-extending current-collecting arm connected to the car, with provision for lateral movement, making a traveling connection with the working-conductor, and a motor-circuit provided with a current-regulator connecting the collector with the motor.

11. In an electric railway, the combination of a series of posts arranged along the railway and provided at their upper parts with laterally-projecting arms extending over the railway-track, a supply-conductor supported upon said laterally-projecting arms out of reach of a current-collector carried by the car, a working-conductor suspended from the under side of the laterally-projecting arms and connected at intervals with the supply-conductor, a traveling car, an electric motor to propel said car, an upwardly-extending current-collecting arm connected to the car, with provision for vertical movement, making a traveling connection with the working-conductor, and a motor-circuit provided with a current-regulator connecting the collector with the motor.

12. In an electric railway, the combination of a series of posts arranged along the railway and provided at their upper parts with laterally-projecting arms extending over the railway-track, a supply-conductor supported upon said laterally-projecting arms out of reach of a current-collector carried by the car, a working-conductor suspended from the under side of the laterally-projecting arms and connected at intervals with the supply-conductor, a traveling car, an electric motor to propel said car, an upwardly-extending current-collecting arm connected to the car, with provision for vertical and lateral movement, making a traveling connection with the working-conductor, and a motor-circuit provided with a current-regulator connecting the collector with the motor.

13. In an electric railway, the combination of a series of posts arranged along the railway and provided at their upper parts with laterally-projecting arms extending over the railway-track, a supply-conductor supported upon said laterally-projecting arms out of reach of a current-collector carried by the car,

a working-conductor suspended from the under side of the laterally-projecting arms and connected at intervals with the supply-conductor, a traveling car, an electric motor to propel said car, an upwardly-extending current-collecting arm connected to the car on a transverse axis and spring-pressed upward against the under surface of the working-conductor, and a motor-circuit carried on the car, arranged between the collector and motor and including a current-regulator.

14. In an electric railway, the combination of a series of posts arranged along the railway and provided at their upper parts with laterally-projecting arms extending over the railway-track, a supply-conductor supported upon said laterally-projecting arms out of reach of a current-collector carried by the car, a working-conductor suspended from the under side of the laterally-projecting arms and connected at intervals with the supply-conductor, a traveling car, an electric motor to propel said car, an upwardly-extending current-collector arm connected to the car on a vertical axis and spring-pressed against the under side of the working-conductor, and a motor-circuit connecting the current-collector with the motor.

15. The combination of two railway-tracks arranged parallel to each other, a series of posts arranged between the tracks and provided at the top with cross-arms extending over each track, a working-conductor suspended from the under side of the cross-arms at their ends and over each track, a supply-conductor supported upon the cross-arms near the vertical part of the posts, and branch conductors connecting the supply and working conductors in parallel.

16. The combination of two railway-tracks arranged parallel to each other, a series of posts arranged between the tracks and provided at the top with cross-arms extending over each track, a working-conductor suspended from the under side of the cross-arms at their ends and over each track, a supply-conductor supported upon the cross-arms near the vertical part of the posts, branch conductors connecting the supply and working conductors in parallel, a traveling car adapted to run upon either track, an electric motor to propel said car, an upwardly and rearwardly extending current-collecting arm having its free end adapted to move vertically and laterally and making a running contact with the under side of either of the working-conductors but out of reach of the supply-conductor, and a motor-circuit connecting the current-collector with the motor.

17. A railway-track in combination with a series of posts arranged along said railway-track, having lateral or transverse arms extending over the track, a working-conductor suspended below the said arms, a supply-con-

ductor suspended above said arms, electrical connections between the said conductors, whereby they are connected in parallel, a traveling car, an upwardly-extending current-collecting device carried upon the roof of the car, with provision for lateral and vertical movement and making an underrunning contact with the working-conductor, a lighting-circuit carried upon the car, including electric lamps, and a connection between the lighting-circuit and the current-collector, whereby the lamps receive current from the supply-conductor through the mediation of the working-conductor and current-collector.

18. A railway-track combined with a series of posts arranged along said railway-track, having lateral or transverse arms extending over the track, a working-conductor suspended below said arms, a supply-conductor suspended above said arms, electrical connections between the said conductors, whereby they are connected in parallel, a traveling car, an upwardly-extending current-collecting device carried upon the roof of the car, with provision for lateral and vertical movement and making an underrunning contact with the working-conductor, a lighting-circuit carried upon the car, including electric lamps, a connection between the lighting-circuit and the current-collector, whereby the lamps receive current from the supply-conductor through the mediation of the working-conductor and current-collector, a motor to propel the car, and a motor-circuit connecting with the current-collector and coupling the motor in parallel with the lighting-circuit.

19. The combination of two railway-tracks, a series of posts or poles arranged between them and provided with transverse cross-arms at their upper parts extending out over either track, a working-conductor suspended from each of said arms substantially over the corresponding tracks, connecting-circuits for coupling the said conductors in parallel, a supply-conductor supported by said posts or their cross-arms and electrically connected with said connecting-conductors so as to be connected in parallel with the working-conductors, an electrically-propelled car, a current-collecting device carried with the car for making a traveling contact for supplying current to the motor on the car, an electric motor to propel the car, a lighting-circuit on the car, including lamps coupled in parallel with the motor, and a regulator independent of the lamp-circuit for controlling the current passing to the motor.

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

R. M. HUNTER.

Witnesses:

ERNEST HOWARD HUNTER,
S. T. YERKES.