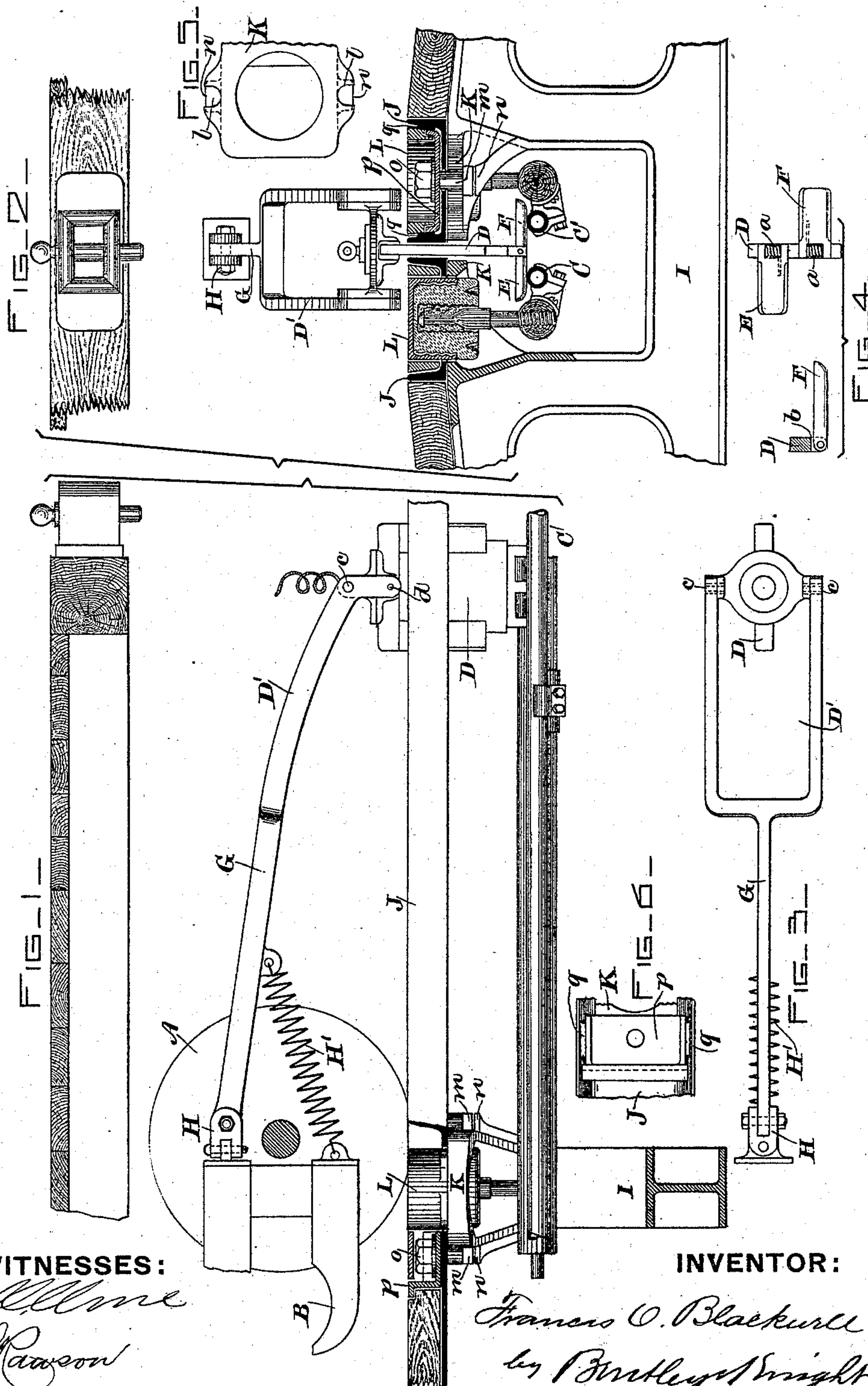


(No Model.)

F. O. BLACKWELL.  
CONTACT DEVICE FOR ELECTRIC RAILWAYS.

No. 470,657.

Patented Mar. 15, 1892.



WITNESSES:

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INVENTOR:

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ATTYS.



# UNITED STATES PATENT OFFICE.

FRANCIS O. BLACKWELL, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE THOMSON-HOUSTON ELECTRIC COMPANY, OF CONNECTICUT.

## CONTACT DEVICE FOR ELECTRIC RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 470,657, dated March 15, 1892.

Application filed January 26, 1891. Serial No. 379,092. (No model.)

*To all whom it may concern:*

Be it known that I, FRANCIS O. BLACKWELL, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented a certain new and useful Improvement in Contact Devices for Electric Railways, of which the following is a specification.

My invention relates, chiefly, to an improvement in contact devices for electric railways; and it belongs to that general type of devices which travel and are supported on a supply conductor or conductors inclosed in a slotted conduit, as contradistinguished from such as are supported upon the traveling vehicle itself or are carried by a separate truck or skid traveling along the outside of the conduit and towed by the car.

My contact device consists of a plow having a shank of less width than the slot and spring-held contact maker or makers attached to the lower end of the shank, which rest on the conductor. As these contact-makers are limited in their upward movement, they furnish means for supporting the contact device directly on the conductor. The upper end of the contact device is connected with the electrically-driven vehicle by a swinging arm of somewhat peculiar construction, and if gravity is not sufficient to hold the contact device down a spring or other retractor will be connected with the arm to assist in this action.

Reference will now be made to the accompanying drawings, wherein—

Figure 1 is a longitudinal section through a portion of a car-truck and conduit. Fig. 2 is a cross-section of a conduit, showing the contact device in end elevation. Fig. 3 is a plan view of the contact device and swinging arm. Fig. 4 shows detail views of the contact-makers, and Figs. 5 and 6 are details of features of the conduit construction.

In the figures, A represents one of the wheels of a vehicle driven by an electric motor, which is indicated conventionally at B. Supply-conductors C C', of which there may be one or more, though preferably two, are inclosed in a slotted conduit and supported in such a way that their upper surfaces are left clear and unobstructed for engagement with the contact device.

The problem with which my invention deals is the maintenance of a traveling electrical connection between the supply-conductors and vehicle. On comparatively small trucks—such as are used in warehouse or factory railways—the available space beneath the car-platform is so completely occupied by the motor or motor and brakes that it is difficult to attach the contact device thereto in any of the ways heretofore employed and permit its necessary play without interference with the motor. Moreover, in railways of this character changes in grade are often very sharp, so that the contact device needs a comparatively long range of movement relatively to the truck in order to preserve the circuit constant. With these difficulties in mind I have adopted a contact device, constructed as described, which rests on the supply-conductors and is connected to the truck by a swinging arm, allowing free play in vertical and horizontal directions.

The contact device consists of a shank D, extending through the slot, to which are hinged contact-makers E F, extending out transversely from the shank and held normally in a substantially horizontal position by coiled springs *a a*. This contact device may be placed in position by folding down the contact-makers into line with the shank and inserting the plow through the slot, when the springs throw the contact-makers up to the horizontal position and they rest on the supply-conductors, as in Fig. 2. The contact device can be removed at any time by simply pulling it up through the slot. The upward movement of the contact-makers is limited by their engagement with a shoulder *b* on the shank, as in Fig. 4, so that they are themselves able to support the weight of the contact device. To the upper end of the plow, outside the conduit, there is pivoted on a transverse axis *c* a connecting-arm G, which is at its inner end attached to the motor frame or truck by a universal joint H, permitting movement in both horizontal and vertical planes. An easily-broken shear-pin *d*, or other device performing the function of a yielding stop, holds the contact device normally in an upright position; but should an obstruction be met in the conduit its attach-



ment to the arm at this point is freed and the plow swings up around axis *c* into the fork *D'*. The arm will push or pull the contact device equally well, so that the vehicle may travel in either direction. If the weight of the plow is not sufficient to keep the contact-makers in continuous engagement with the conductors, a spring *H'* or other retractor will be connected to the arm and truck, pressing the former downward.

The conduit inclosing the supply-conductor is made up of transverse yokes *I* and channel slot-rails *J*, which are supported and free to slide on bracket-seats *K* upon the upper ends of the yokes. The conductors are supported by insulator-hangers *L*, arranged in the manner described and claimed in other applications of mine. I have introduced into this form of conduit certain specific features of construction aiming to facilitate the adjustment of the slot-rails and their attachment to the yokes.

The bracket-seats are grooved or recessed on their opposite edges, as seen at *l l*, and when putting the parts together the bolts *m* are slid into the recesses, their heads resting on shoulders *n* and their screw-tapped ends passing through the lower web of the slot-rail to receive nut *o*. To afford means for adjusting the slot-rails, I place a plate or washer *p* under nut *o*, which is thereby fixed relatively to the yokes. Then by driving in fillers *q* on one side or the other of this plate *p* I am enabled to slide the slot-rail in or out to the desired extent. The rest of the conduit construction has been already claimed by me, and forms no part of the invention covered by this specification.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination, in an electric railway, of one or more supply-conductors inclosed in a slotted conduit, with a contact device comprising a shank going through the slot and a folding contact maker or makers traveling on the conductors, and thereby furnishing means for supporting the contact device, and means for connecting the contact device with an electrically-driven vehicle.

2. The combination, in an electric railway, of a supply-conductor inclosed in a slotted conduit, with a contact device connected with an electrically-driven vehicle, and comprising a shank extending through the slot and a pivoted spring-actuated contact-maker furnishing means for supporting the contact device on the conductor, as set forth.

3. The combination, in an electric railway, of a supply-conductor inclosed in a slotted conduit, with a contact device consisting of a shank extending through the slot, a folding contact-maker limited in its upward movement by a stop and furnishing means for supporting the contact device on the conductor, and a swinging arm connecting the contact device with an electrically-driven vehicle.

4. The combination, in an electric railway, of a supply-conductor inclosed in a slotted conduit, with a contact device resting on said conductor, comprising an upright shank and a contact-maker at its lower end, and a swinging arm connected with an electrically-driven vehicle, to which the contact device is pivoted on a transverse axis at its upper end.

5. The combination, in an electric railway, of a supply-conductor inclosed in a slotted conduit, with a contact device resting on said conductor, and an arm jointed to the vehicle on a vertical axis and to which the contact device is pivoted on a transverse axis, as set forth.

6. The combination, in an electric railway, of a contact device resting and supported on a supply-conductor inclosed in a slotted conduit and pivoted on a transverse axis, with a readily-frangible stop or catch holding it normally in an upright position.

7. The combination of a supply-conductor inclosed in a slotted conduit, with a contact device resting on the conductor, and the forked arm connecting the contact device with the vehicle and so arranged that the contact device when thrown out of the conduit may swing up into the fork, as described.

8. The combination, in a contact device for making contact with an inclosed supply-conductor, of the upright shank and hinged spring-actuated contact maker or makers limited by a stop in their upward movement, as set forth.

9. The combination, with transverse yokes and channel slot-rails forming a conduit inclosing the supply-conductor of an electric railway, of means for adjusting the slot-rails, consisting of filling-blocks inserted between the slot-rail and a part of the conduit fixed relatively to the yokes.

10. The combination of the transverse yokes and channel slot-rails resting upon the yokes, the whole forming a conduit inclosing the supply-conductor of an electric railway, with a plate *p*, bolted fast to the yoke, and fillers adapted to be inserted between the plate and slot-rail, whereby the latter may be adjusted, as described.

11. The combination, in an electric railway, of the swinging arm connected to the vehicle, and a contact device pivoted to its outer end on a transverse axis, with a readily-frangible stop or catch holding the contact device normally in a position to engage the supply-conductor.

12. The combination of a swinging arm connected to a vehicle and forked at its outer end, with a contact device for making contact with an inclosed supply-conductor connected to said forked end and adapted to swing up within it when thrown out of the conduit, as set forth.

13. The combination of the swinging arm jointed to a vehicle and free to swing both laterally and vertically, with a contact device



pivoted eccentrically to the outer end of the arm on a transverse axis, so that movement around such axis moves the contact device toward or away from the supply-conductor.

- 5 14. A conduit inclosing the contact device of an electric railway, comprising the channel slot-rail, and transverse yokes having inwardly-extending seats at their upper ends provided with grooves or recesses receiving

bolts fastening the rail to the yokes, as described.

In testimony whereof I have hereunto set my hand this 20th day of January, 1891.

FRANCIS O. BLACKWELL.

Witnesses:

E. L. RAWSON,

A. O. ORNE.