(No Model.) 2 Sheets—Sheet 1.

F. O. BLACKWELL.

ELECTRIC RAILWAY PLOW.

No. 410,264. Patented Sept. 3, 1889.

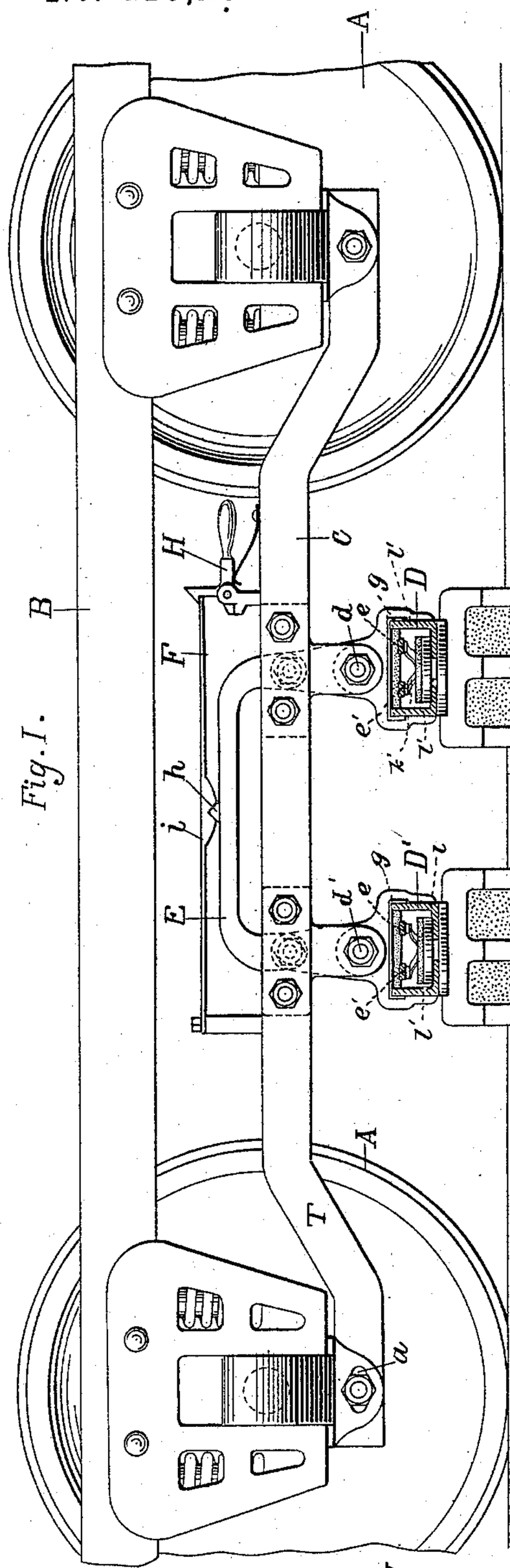


Fig. I.

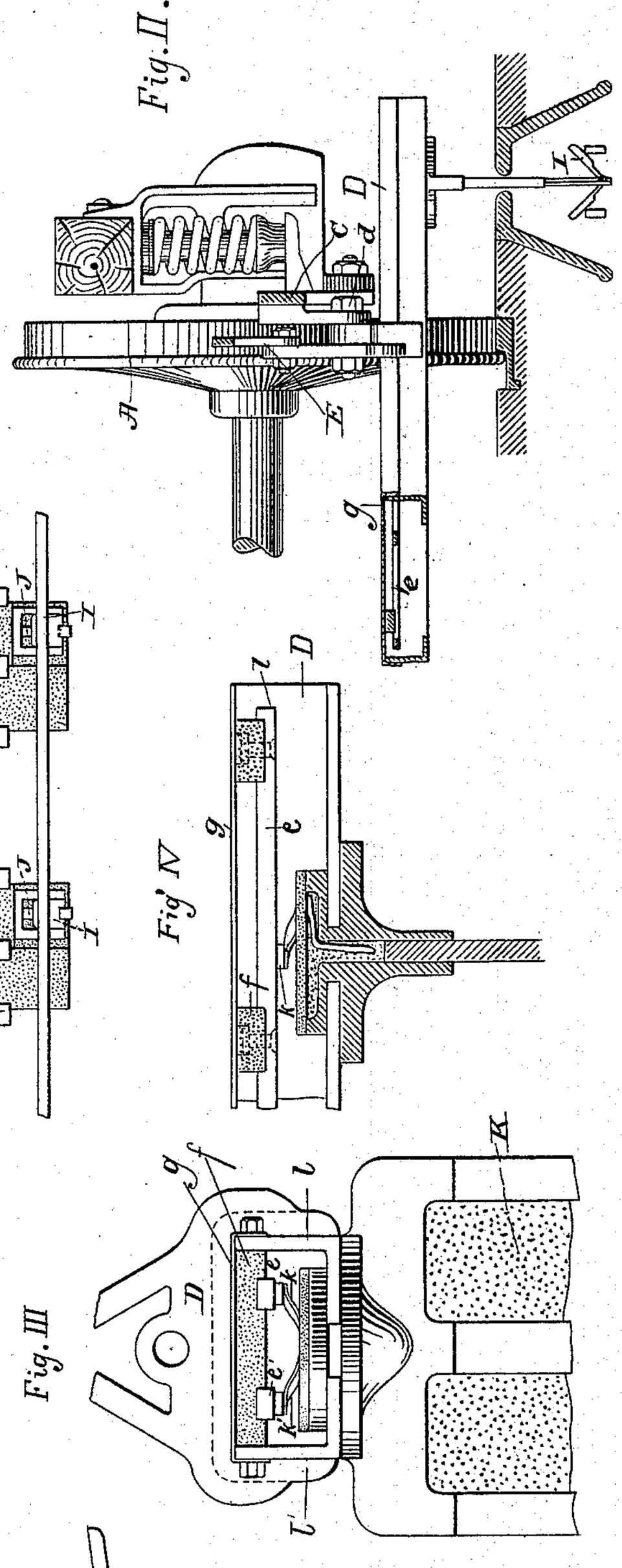
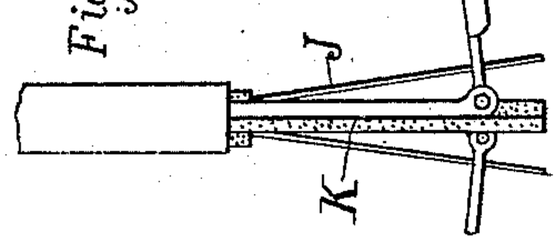


Fig. II.

Fig' IV

Fig. III



WITNESSES

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(No Model.) 2 Sheets—Sheet 2.

F. O. BLACKWELL.

ELECTRIC RAILWAY PLOW.

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Fig. VI.

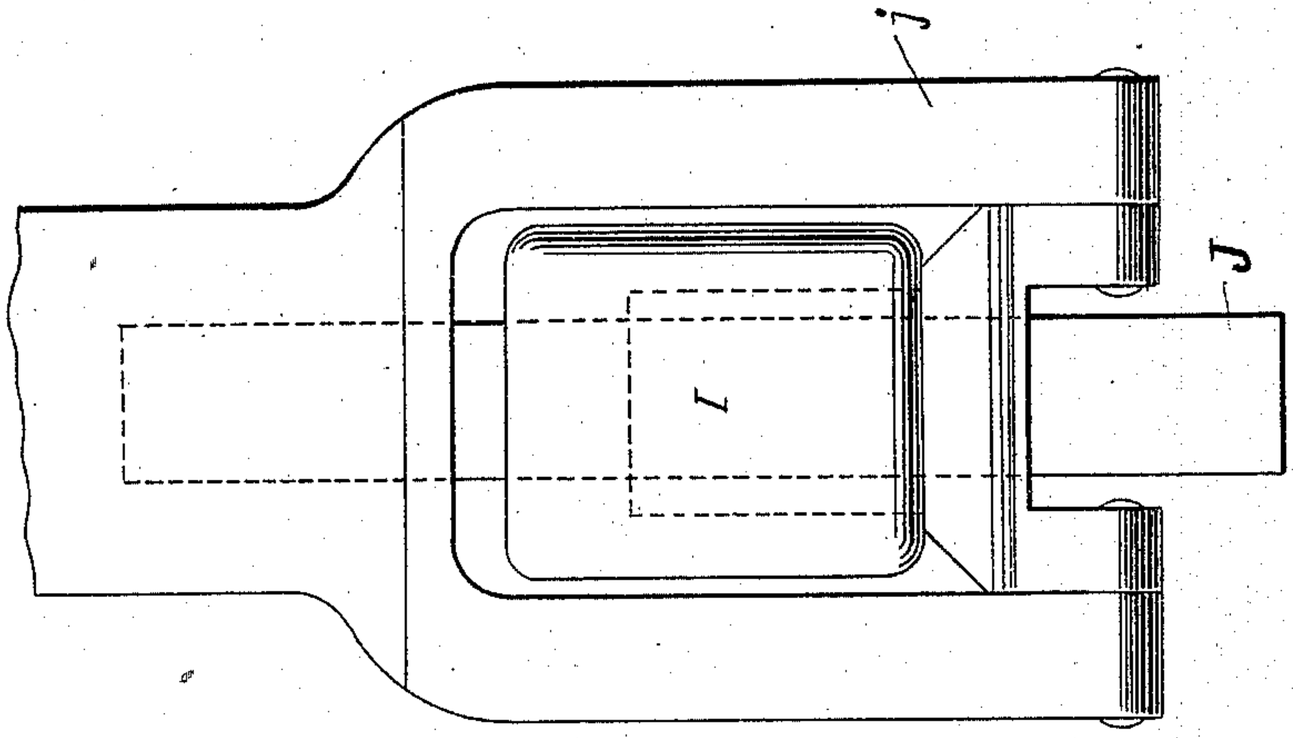


Fig. VII.

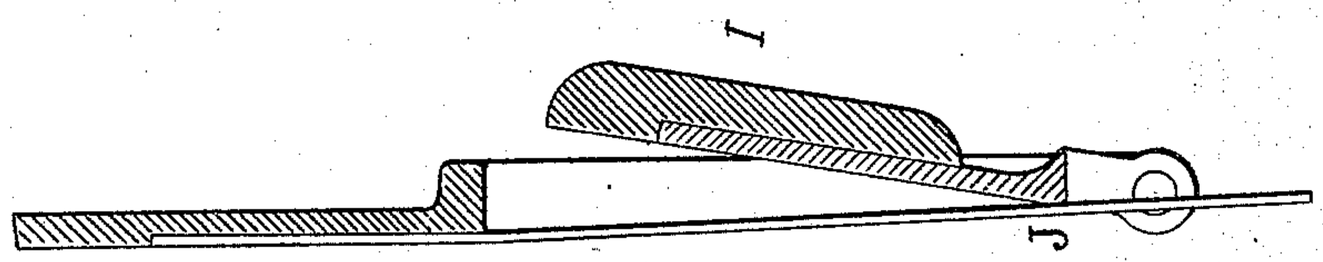
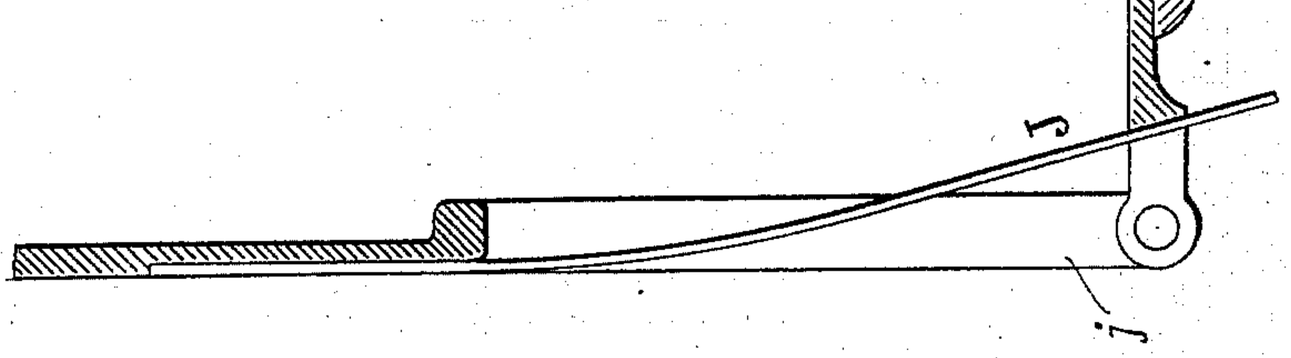


Fig. VIII.



WITNESSES.

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UNITED STATES PATENT OFFICE.

FRANCIS O. BLACKWELL, OF NEW YORK, N. Y.

ELECTRIC-RAILWAY PLOW.

SPECIFICATION forming part of Letters Patent No. 410,264, dated September 3, 1889.

Application filed March 5, 1889. Serial No. 301,850. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS O. BLACKWELL, a citizen of the United States, residing at New York, in the county of New York, State of New York, have invented certain new and useful Improvements in Electric-Railway Plows, of which the following is a specification.

My invention relates to electric railways, and particularly to features of novelty in the construction of the contact device, together with the means for supporting the same and for maintaining the electrical connection between the moving contact device and that part of the motor-circuit which is fixed upon the car.

My invention is illustrated in the accompanying drawings, wherein—

Figure I is a side view of a motor-truck, showing the plow-guides in cross-section. Fig. II is a cross-section taken between the wheels, showing part of the truck. Fig. III is a detail end view of the guide and plow. Fig. IV is a central vertical section of the same; and Figs. V, VI, VII, and VIII are side, front, and sectional views of the contact-shoe and spring-plate.

A A′ represent the wheels of a car-truck, and B is the car-body spring supported upon the axles in the ordinary manner.

C is a longitudinal frame-bar attached rigidly at one end to one axle, and connected loosely, through slot *a*, at its other end to the opposite axle, thereby making provision for the "come and go" of the bar when rounding curves upon the road. This bar is attached to the under side of the journal-boxes upon the two axles, and is curved upward, as at T, between the wheels, so that the bar is brought up over the contact-plow, allowing the latter an unimpeded transverse traveling movement. A similar bar is provided on the other side of the truck, thereby forming a framing, which is carried directly by the axles and is independent of the car-body. From this truck-frame there are suspended two transverse guides D D′, journaled on transverse mechanical pivots *d d′* and connected together by a link E. Each of these guides consists of two L-shaped angle-irons *l l′*, placed with their bottom flanges facing each other, and a covering-plate *g*, while inside of the box-shaped inclosure thus formed there are placed two conductor-slides *e e′*, extending along the guide and secured thereto by suitable insulating-blocks *f*.

The contact device or plow has a traveler extending through the opening in the guide, and passing up through this traveler there are a couple of exposed spring-contacts *k k′*, which are in circuit, respectively, with the contact-shoes and conducting-cores forming part of the contact-device, and which, when the plow is in place, contact with the conductor-slides *e e′*. As the traveler and spring-contact occupy the same relative positions upon the plow which the guide and conductor-slide do upon the car, the insertion of the plow into the guide automatically completes the motor-circuit, and the traveling electrical connections are not only out of the way and out of sight, but they are also protected by the guide from any dirt or moisture which might interfere with the contact.

The plows have free independent lateral movement along the guides, but their longitudinal movement into and out of the conduit is shared by both together, and in order to guard against breakage of the plows, should any accidental obstacle be encountered, a yielding spring-catch is provided which normally hold the plows in their operative positions, but which is adapted to give way before injury to the contact device ensues. This catch consists of a lug or tooth *h* upon link E, which engages a corresponding notch *i* in a keeper F, consisting of a stiff spring-plate, fastened at one end and held in place at the other by a spring-latch H. This latch is of importance, because in practice it is necessary to make the catch of such stiffness that the attendant cannot readily move the contact device when desiring to throw it up out of the conduit. However, by tripping the latch H, the tooth *h* will easily be sprung out of the notch *i*, and when the contact device is lifted the keeper will fly back to its original position under latch H in readiness to automatically engage the contact device when again lowered into the conduit.

In Figs. V to VIII the contact piece or shoe I is shown hinged to the insulated conducting-core *j*, forming part of the shank of the plow, which is incased in the customary protecting-

sheath K; and J is a spring-plate secured at one end to the core and bearing upon the shoe at a point to one side of its pivot. The contact-shoe stands normally at substantially a right angle to the core, and if moved either way the spring J will be compressed, as may be seen in Fig. II, where the shoe bears downwardly upon the upper side of the inclosed supply-conductor. It has been found that this spring-plate is much more durable and efficient than a spiral coiled around the hinge, and it also forms an auxiliary conducting-connection between the shoe and core, insuring no break in the circuit owing to imperfect contact in the hinges.

In Fig. II the supply-conductors, which will ordinarily be at opposite polarity, are shown inclosed in slotted conduit placed outside of the track-rail; but neither the construction nor the location of this conduit forms part of the present invention.

I claim as my invention—

1. The combination, in an electric railway, of a guide upon a vehicle and a conductor-slide extending along the guide, with a contact device comprising a traveler, and an exposed contact in circuit with the conductor of the contact device, said traveler and contact occupying the same positions relatively to each other upon the contact device as do the guide and slide upon the vehicle, whereby, when the contact device is placed in position on the guide, the conductor-slide will be engaged by the contact, substantially as described.

2. The combination, in an electric railway, of a transverse mechanical guide and an insulated conducting-slide extending along the guide, with a contact device for maintaining the electrical connection, with a supply-conductor inclosed in a slotted conduit comprising a traveler and a contact in circuit with the conductor of the contact device, the traveler and contact being so located as to engage the guide and slide, respectively, and maintain traveling electrical connection therewith

3. The combination, in an electric railway, of a transverse guide upon a vehicle and a conducting-slide extending along the guide, with a contact device carrying a traveler and an exposed contact which engage the guide and slide, respectively, when the contact device is placed in operative position.

4. The combination, in an electric railway, of a transverse guide and a plow movable along the same, having contact-shoes for maintaining the electrical connection, with line-conductors of opposite polarity inclosed in a slotted conduit, with two exposed contacts, insulated from each other, carried by the plow and in circuit with said shoes, respectively, and two conducting-slides engaged by said contacts when the plow is placed in operative position.

5. The combination, in an electric railway, of a transverse guide and a contact device having a traveler movable along said guide, with a conductor-slide and a contact carried by the traveler and engaging the slide when the plow is in place.

6. The combination, in an electric railway, of a traveler connected to a contact device and a guide embracing the same, with an independent conductor within the guide and a traveling electrical connection between the said conductor and the contact device.

7. The combination, in an electric railway, of a transverse guide with an insulated conductor extending along the guide and protected thereby, and a contact device movable along said guide and maintaining a traveling electrical connection with said conductor.

8. The combination, in an electric railway, of an electrically-propelled vehicle and a bared conductor thereupon, with the contact device for taking current from the supply-conductor, and a traveling spring electrical connection between the contact device and conductor upon the vehicle.

9. A plow adapted to extend into a slotted conduit for engagement with a supply-conductor therein, having a spring-contact at its upper end in circuit with the conductor of the plow and adapted to engage a fixed conductor upon the car.

10. A contact device adapted to complete the circuit between a line-supply conductor and an electrically-propelled vehicle, comprising an insulated conductor, and an exposed spring-contact for engagement with a conductor upon the car when the contact device is connected to the vehicle.

11. A contact device for an electric railway, consisting of a traveler forming a mechanical connection with an electrically-propelled vehicle, permitting movement of the contact device relatively to the vehicle, and a spring-contact maintaining a constant electrical connection between a conductor carried upon the vehicle and the contact device, respectively.

12. A contact-plow adapted to extend into a slotted conduit for engagement with a supply-conductor, comprising the conducting-core, the protecting-sheath therefor, and the traveler and spring contact, the last two being adapted to maintain a traveling mechanical and electrical connection with the car, substantially as described.

13. The combination, in an electric railway, with a transverse guide and a contact device movable along said guide, of an independent conductor extending along the guide, and a spring-contact carried by the contact device and engaging said conductor.

14. The combination, with an electrically-propelled vehicle, of a hollow transverse guide for the traveler of a contact device, having on its inside an insulated conductor-slide, and having an opening for the connection leading to the contact device.

15. In an electric railway, the transverse guide consisting of the two angle-irons secured together, in combination with a contact device free to travel along said guide.

16. The transverse guide consisting of the two L-shaped angle-irons placed with their lower flanges facing each other, and a cover for the upper end of said guide, in combination with a contact device free to travel along said guide.

17. In an electric railway, the combination of a transverse guide and a contact device having a traveler engaging said guide, with an insulated conductor extending up through the said head for establishing the electrical connection with the car-circuit.

18. The combination of the plow-shank, and a contact-shoe pivoted thereto, with a spring-plate between the shoe and shank normally holding the shoe in engagement with the line-conductor.

19. The combination, in a plow for maintaining traveling electrical connection with a supply-conductor inclosed in a slotted conduit, of a shank and a contact-shoe pivoted thereto at a point within the conduit, with a spring-plate connected to the shoe and shank, respectively, and holding the shoe in engagement with the supply-conductor.

20. The combination, with the plow-shank extending into a slotted conduit, and a contact-piece pivoted to the shank and movable relatively thereto, of an independent spring-plate between the shank and contact-piece, holding the latter in engagement with the supply-conductor.

21. The combination, in an electric railway, of the plow-shank, and the contact-shoe I with the spring-plate J, substantially as described.

22. The combination, in a contact device for electric railways, of an insulated conducting-core and a contact-shoe connected thereto and in circuit therewith, with a spring-plate holding the contact-shoe in engagement with the supply-conductor and forming an auxiliary conducting-connection between the shoe and the core.

23. The combination, in an electric railway, of a plow-shank and contact-piece having a movable connection therewith, with a spring-plate connected to the plow and bearing at its free end upon the moving contact-piece, whereby the latter is held in engagement with the supply-conductor.

24. The combination, in a contact device for use upon electric railways, of a plow-shank extending through a slotted conduit, and a hinged contact-piece, with a spring-plate holding the contact-piece normally at an angle to the shank.

25. The combination, in an electric railway, of a plow-shank extending into a slotted conduit and a hinged contact-shoe standing normally at an angle to the shank, but free to move in either direction, with a spring-plate between the plow-shank and shoe, tending to hold the shoe in its normal position.

26. The combination of a conduit and a contact device extending into the conduit, with a yielding catch normally holding the contact device in operative position, but adapted to give way automatically on meeting an obstruction, with means for disengaging the members of said catch at will, whereby the contact device may be operated without having to overcome the tension of said catch.

27. The combination of a conduit, a contact device extending into the conduit, and a spring-catch therefor normally holding the contact device in operative position, with means for maintaining the said catch under tension and for releasing it from tension at will, whereby the contact device when desired may be operated without having to overcome the tension of said catch.

28. The combination, in an electric railway, of a contact device and a spring-catch normally holding the contact device in its operative position, with a latch for the spring-catch.

29. The combination, in an electric railway, with a contact device, of a spring-catch therefor located so as to engage the contact device automatically when the latter is in operative position, and a latch for the spring-catch.

30. The combination, in an electric railway, of a movable contact device and a keeper normally holding the same in operative position, said keeper consisting of a spring-plate engaging the contact device and a latch engaging the free end of said plate.

31. The combination, in an electric railway, of two contact-plows extending into a slotted conduit and having free independent lateral movement to conform to irregularities in the slot, with a common catch normally holding both plows in operative position, but adapted to give way when either plow strikes an obstacle.

32. The combination, in an electric railway, of the two transverse guides connected together so as to have a common movement, with a contact device free to travel along each guide, and a yielding catch normally holding the contact devices in their operative positions, but adapted to give way on striking an obstacle.

33. The combination, in an electric railway, of the contact devices, the movable transverse guides, and a link joining the guides, with a spring-catch connection between said link and the vehicle, whereby the contact devices are normally held in operative position.

34. The combination, in an electric railway, of a truck-frame independent of the spring-supported car-body, an inclosed supply-conductor, and a contact device for engagement therewith, with a spring-catch connection between the contact device and truck-framing, normally holding the contact device in operative position, but adapted to give way on meeting an obstruction.

35. The combination, with a truck-framing joining the opposite axles of the car and outside the wheels, with a transverse guide sup-

ported by said framing, and a contact device free to travel along said guide.

36. The combination, with a truck-framing joining the axles of a railway-truck and having a loose connection therewith, of the contact devices carried by the framing.

37. The combination, in an electrically-propelled vehicle, of the spring-supported car-body, and a truck-framing independent of the car-body, joining the opposite axles of the truck and having a yielding connection therewith permitting the come and go of the framing, with electrical apparatus supported on the said truck-framing.

38. The combination, with a framing joining the axles of a railway-truck and having a slotted connection therewith permitting the come and go of the framing, of a transverse guide connected to said framing and a contact device free to travel along said guide.

39. The combination of a bar attached to the journal-boxes below the axles of an electrically-propelled vehicle, with a transverse guide below and supported by said bar and a contact device free to travel along said guide.

40. The combination of a conduit, and a supply-conductor therein, with an electrically-propelled vehicle, a frame-bar above the axles but extending downward and attached to the under sides of the journal-boxes, a transverse guide attached to said bar, and a contact device free to travel along said guide.

41. In an electric-motor truck, the combination, with a curved side bar attached to a journal-box of the truck below the journal, of a contact device for engagement with a supply-conductor in a conduit below the said side bar, whereby the side bar does not interfere with the free movement of the contact device.

FRANCIS O. BLACKWELL.

Witnesses:

ROBT. W. BLACKWELL,

H. D. HOTCHKISS.