(No Model.) 2 Sheets—Sheet 1.

W. H. KNIGHT.

ELECTRIC RAILWAY.

No. 455,342. Patented July 7, 1891.

Fig. II.

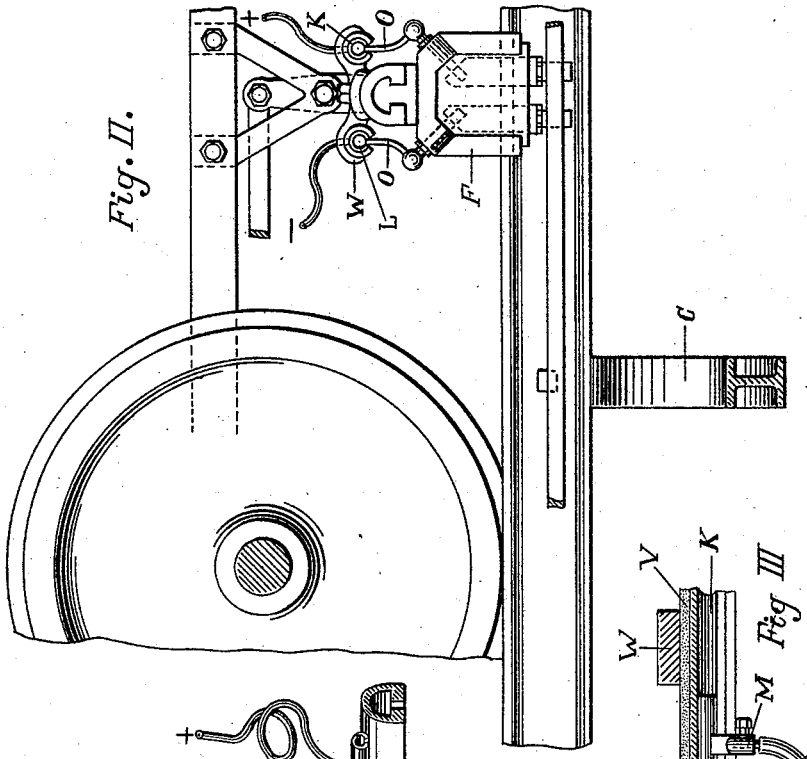
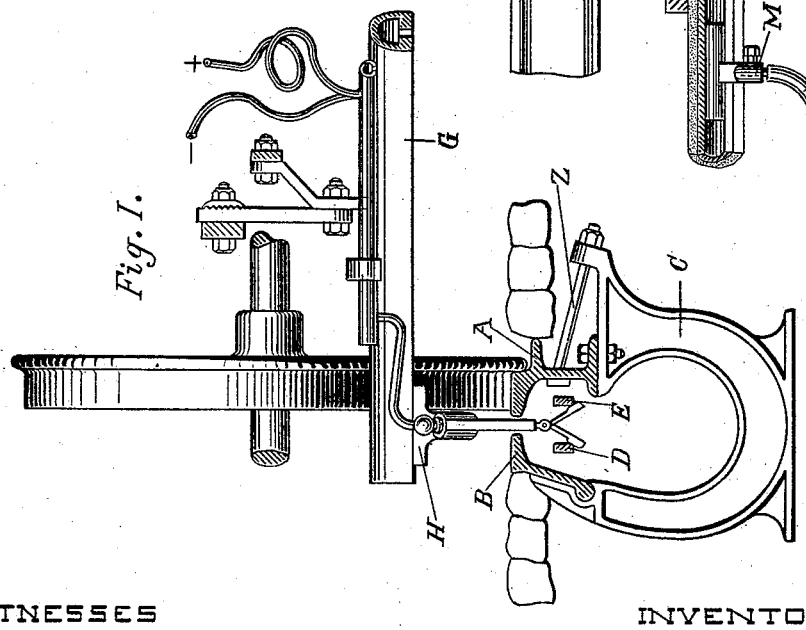


Fig. III

Fig. I.



WITNESSES

Joseph E. Dee.

Edward L. McKinney.

INVENTOR

Walter H. Knight

by Bentley & Knight

Attys.

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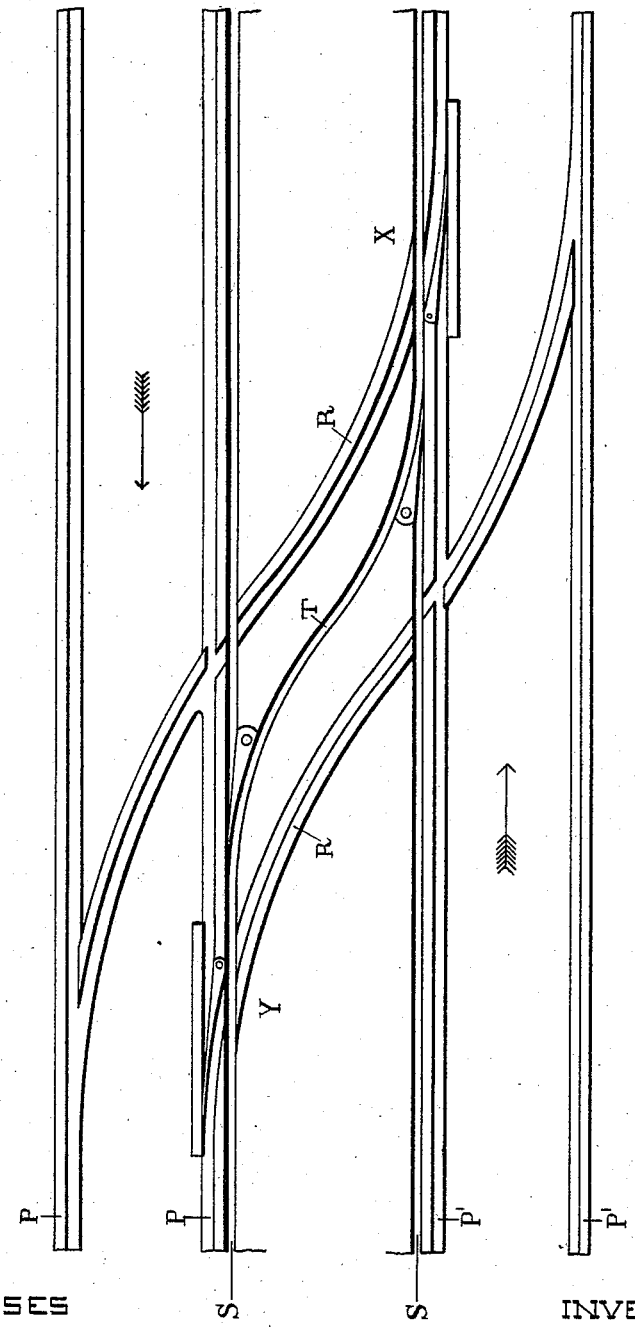

Fig. IV.

WITNESSES

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UNITED STATES PATENT OFFICE.

WALTER H. KNIGHT, OF NEW YORK, N. Y.

ELECTRIC RAILWAY.

SPECIFICATION forming part of Letters Patent No. 455,342, dated July 7, 1891.

Application filed October 16, 1888. Serial No. 288,244. (No model.)

To all whom it may concern:

Be it known that I, WALTER H. KNIGHT, 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 Railways, of which the following is a specification.

My invention relates to electric railways in which the supply-conductor is inclosed in a slotted conduit outside the track; and it consists in a conduit of this nature in which an ordinary girder track-rail is also used for one of the slot-rails; and it further consists in a contact device or plow attached to a vehicle and capable of a transverse movement, whereby at switch-points the plow may pass clear across from one side of a car to the other and permit on a double-track road the placing of both conduits between the two tracks while the car can pass from one track to the other, the plow automatically changing sides with the car.

It further consists in a device for maintaining electrical connection with the plow as it travels from one side of the vehicle to the other.

My invention is illustrated in the accompanying drawings, in which—

Figure I is a transverse section of the conduit with an end elevation of the plow. Fig. II is a side elevation of the plow and a longitudinal section of the conduit. Fig. III is a detail, and Fig. IV is a plan, of a double-track cross-over.

In the drawings, A and B are respectively the two slot-rails of a conduit, which are supported by a substructure, consisting in this instance of transverse yokes C, placed at intervals below the paving, the yokes extending to a point beneath the upright web of the bearing-rail A, whereby the strain upon the rail is supported directly by and in the line of its web. The rail also affords a bearing for the tread of the wheel, which is in line with the web for the same general purpose.

The rail A is of the ordinary form employed for a track-rail of the girder type, consisting of a contracted upright web, with a broadened bearing-surface at the top and also preferably at the bottom. It has, however, an especial function in this combination, for the web of the rail extends down through the paving, forming the upper part of the conduit, and affords also a substantially vertical bearing for the wheel, so that the tendency of the weight of the car to close the slot is lessened. Moreover, any practical form of conduit in which the slot and bearing rail are combined in one requires its rail to be of great strength and to have the stiffness afforded by the vertical web of the girder type of rail. Especially is this true when the slot-rail is supported only at intervals, as by the transverse yokes.

The rail is set with the outer edge of its bottom flange substantially flush with the inner surface of the yoke, so that there is no projection into the line of the conduit to interfere with the contact device, and the top flange projecting in from the web forms one edge of the slot, the opposite edge being formed by an angular slot-rail of ordinary shape. The combined bearing and slot rail A is preferably placed on the inside of the conduit, whereby the slot comes on the outside of the wheels and the wheel-flange does not travel in the slot.

D and E are the two conductors in the conduit, which may be supported by any suitable means; but it is desirable that they be above the bottom flange of the girder-rail A, in order that there may be a larger clearance below the conductors for drainage, and that the contact device may not have to extend past the bottom flange of the rail.

F represents a contact device or plow of any well-known type extending into the conduit and making electrical connection with the conductors D and E therein. This plow is provided with a transverse guide G, extending clear across the car to a point outside and beyond the wheel on each side. A traveler H on plow F slides in this guide.

In order to maintain the electrical connection between the plow and the propelling-motor of the vehicle over the entire range of movement of the plow, I have provided two transverse conductor slides or guides K and L, formed of split metallic tubes extending along parallel with guide G and attached thereto. In each of these guides is a traveler

M, Fig. III, which takes the current from the guide and has a flexible wire O leading to one terminal of the plow. The two guides K and L are connected, respectively, to the two terminals of the propelling-motor by conductors *g g'*, which lead off from points intermediate between the ends of the guides some considerable distance from the wheels, so that they are protected from mud and dirt. These conductors must permit of the movement of the guides into and out of their normal positions, and hence are preferably made flexible, though the same function might be gained in different ways. In practice, therefore, as the plow moves from side to side it is constantly in electrical connection with the motor. The guide G is movable up and down around its transverse pivot, and the conductor-slides are connected to the guide G, so as to move with it. As will be seen from an inspection of the plan in Fig. 4, a car moving along one track will have its plow attached thereto and extending into the conduit between the tracks. When the car passes by the cross-over track to the opposite conduit coming back in the other direction, it will be necessary for the plow to pass completely across the car and have its point of attachment on the opposite side of the car. In this sketch P P are the rails of one track and P' P' rails of the opposite track. R R are the rails of the cross-over track, S S are the two conduits between the two tracks, and T the cross-over conduit between the rails of the cross-over track. A car passing along the rails P in the direction of the arrow will have its plow traveling in the corresponding slot S. When the car comes to the cross-over and returns by the cross-over rails onto the return rails P' P', the plow will first pass inward under the vehicle at the point X, where the rail R crosses the slot S. It will then turn from the slot S into the slot T, moving transversely with the car all the while. At the point Y it will pass out beyond the car-wheel, where the other slot S crosses the other rail R. It will therefore be plain that a sliding plow in connection with the conduits between the two tracks and the cross-over has a new and important function never before considered in connection with a transversely-moving vehicle.

As shown in the detail, Fig. III, the conductor-guide K is covered throughout with insulation V and is supported at intervals by brackets W, extending from the plow-guide G. By this arrangement the conductor-guide is held firmly in alignment with the plow-guide and is always protected against accidental short circuit by any metallic piece coming in contact with the two conductor-guides.

It will be seen in Fig. I that the slot-rail A, forming also the track-rail, is supported upon yoke C, and is provided with a brace Z on the inside, extending to the offset on the yoke. This brace has a special function in this connection, because the spreading action of the wheels has to be resisted as well as the strains ordinarily coming upon the slot-rails.

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

1. In an electric railway, a conduit comprising a rail of the girder type, constituting both a track-rail and the inner slot-rail, and consisting of an upright contracted web having a transverse flange at its upper end affording a bearing for the car-wheel substantially in line with the web and extending beyond the web to form one edge of the slot, in combination with an insulated supply-conductor in the conduit to one side of the slot, where it is shielded by the overhanging transverse flange, as described.

2. The combination, in a conduit system of electric railway, of a series of transverse yokes with a rail of the girder type forming a track-rail and also one of the slot-rails, and an angular rail having an upright web forming the opposite slot-rail, the said slot-rails resting on and supported by the yokes, and an insulated supply-conductor in the conduit to one side of the slot where it is shielded by said rails, as described.

3. The combination of a conduit for an electric railway made up of transverse yokes and slot-rails supported directly thereon, one of said rails consisting of a rail of the girder type, forming both a slot-rail and one of the track-rails and having an upright contracted web and a transverse overhanging flange at its upper end extending in to form one edge of the slot, and an insulated supply-conductor in the conduit beneath and shielded by the said flange, as described.

4. The combination, in a conduit for an electric railway, of a series of transverse yokes, and a girder-rail forming one of the track-rails and also one of the slot-rails, having its bottom flange resting upon said yokes substantially flush with their inner surfaces, whereby there is no projection into the conduit, and an insulated supply-conductor in the conduit to one side of the slot where it is shielded by said rail, as described.

5. In an electric railway, the combination, with the two tracks having two conduits between them, of a vehicle adapted to travel along either track and provided with a contact device having a transverse movement relatively to the vehicle from one side to the other.

6. The combination, in an electric railway, of a track-rail forming also one of the slot-rails and having a transverse supporting-flange at its lower end, with a supply-conductor supported above the said flange and a contact device for engagement with the said conductor.

7. The combination, in an electric railway-conduit, of a track-rail forming also one of the slot-rails and having a transverse supporting-flange at its lower end, with a supply-conductor above the said flange and a con-

tact device bearing upwardly against the said conductor.

8. The combination of the two tracks, the two conduits between them and a cross-over section of conduit, with the contact device having a transversely-moving connection with the vehicle.

9. The combination of the two tracks and the conduits inclosing supply-conductors between the same and outside the bearing-rail with a cross-over section of track, a transverse guide extending beyond the wheels on both sides of the car, and a contact device having a traveling connection with the said guide.

10. The combination, in an electrically-propelled vehicle with a movable transverse guide and a contact device engaging therewith, of an independent conductor-slide connected to the guide and movable therewith, and a traveler for the conductor-slide in circuit with the contact device.

11. The combination of the tracks having two conduits between them and outside of the track-rails, with the cross-over track having a cross-over conduit between the rails, and a contact device having a traveling connection with the vehicle.

12. The combination, with an electrically-propelled vehicle, of a contact device extending into a slotted conduit and movable relative to the vehicle, a transverse conductor-guide insulated throughout, and a traveler therefor in electrical connection with the said contact device.

13. In an electrically-propelled vehicle, the combination of a movable conductor-slide and a contact device in traveling electrical connection with said slide, with a conductor between said slide and the vehicle, permitting movement of the slide, for the purpose set forth.

14. In an electrically-propelled vehicle, the combination, with a transverse conductor-slide and means for moving the same into and out of its normal position, of a transversely-moving contact device in traveling electrical connection with said slide, and a flexible conductor between the slide and vehicle, permitting movement of the slide, as set forth.

15. In an outside conduit for an electric railway, the combination, with a girder-rail common to the track and to the slot, of a supporting-yoke for said rail and an inside brace from said rail to the yoke.

16. The combination, in an electric railway, of a conduit inclosing a supply-conductor, with a rail of the girder type forming one of the track-rails and also the inner slot-rail, whereby the slot comes on the outside of the track, and a brace for the said girder-rail, resisting the spreading action of the car-wheels.

WALTER H. KNIGHT.

Witnesses:
C. C. CAPES,
ROBT. W. BLACKWELL.