(No Model.) 2 Sheets—Sheet 1.

C. A. MAYNARD.

CONDUIT ELECTRIC RAILWAY.

No. 518,695. Patented Apr. 24, 1894.

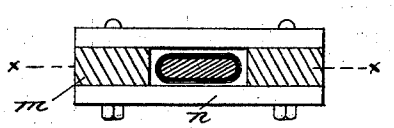

Fig II,

Fig I,

Witnesses,
Jason Perkins
Timothy Ellis Brown

Inventor
C. A. Maynard
by his Attorney
E. H. Hyde

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

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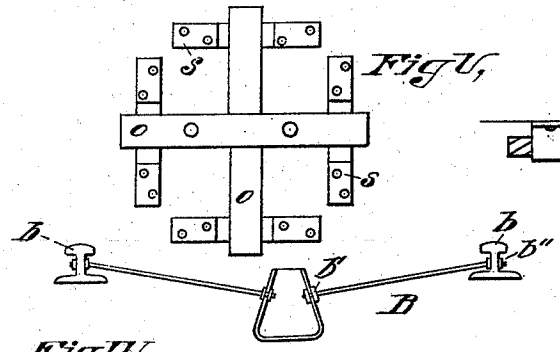

Fig IV,

Fig III,

Witnesses;
Jason Perkins
Timothy A. Browne

Inventor;
C. A. Maynard
by his Attorney
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THE NATIONAL LITHOGRAPHING COMPANY.
WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

CHARLES A. MAYNARD, OF SPRINGFIELD, MASSACHUSETTS.

CONDUIT ELECTRIC RAILWAY.

SPECIFICATION forming part of Letters Patent No. 518,695, dated April 24, 1894.

Application filed February 9, 1894. Serial No. 499,622. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. MAYNARD, a citizen of the United States, residing at Springfield, Hampden county, State of Massachusetts, have invented certain new and useful Improvements in Conduit Electric Railways, of which the following is a specification.

My improvements relate generally to the construction of the conduit and parts belonging thereto, and to the trolley and its carrier—having for their object increased strength, and simplicity facilitating the assembling and adjustment of the parts, and also providing for safety by maintaining the exposed cover of the conduit free from electricity.

The invention consists in the combination and construction as hereinafter described and more particularly pointed out in the claims, and is fully illustrated in the accompanying drawings, in which—

Figure I, is a vertical transverse section of a conduit showing the trolley in partial section in the carrier frame, and resting upon the conductor. Fig. II, is a transverse section of the carrier frame and trolley stem, on the dotted line *x*, *x*, of Fig. I. Fig. III, is a vertical longitudinal section of the conduit upon the dotted line *y*. *y*. of Fig. I, and a side elevation of the trolley, and carrier frame in partial section. Fig. IV, is a cross-section upon a reduced scale of the conduit, showing the braces centering it between the rails of the track, and Fig. V, is a top plan view of the carrier frame and of the staples suspending its arms from the car body.

Referring to the drawings, of which Figs. I, II and III are to a scale of one half the actual size—A is the conduit, the sections of which are provided with flanges *a*, or other well known means of uniting them.

B are tie rods extending from the conduit at convenient intervals to the track rails *b* upon each side to hold the conduit and said rails in proper relative position. The rods B, as shown, have their inner ends pass through the walls of the conduit to be secured thereto by check nuts *b'*, and their outer ends pass through the flanges of rails *b* where they are secured by nuts *b''*; so that the conduit may by the threaded rods and nuts, be exactly centered between the rails, or be adjusted to one or the other side of the center.

C. C. are longitudinal shelves formed upon the inner walls of the conduit and near its mouth, as shown in Figs. I and III—and D. D. are removable covers, consisting of three members, as shown in Fig. I, *i. e.*, a flange *d* coinciding with the upper outside wall of the conduit, an inner flange *d'* having its free edge resting squarely upon the shelf C within the conduit, and a web *d''* uniting the flanges *d*, *d'* and seated upon the rim of the conduit. The covers D. D. thus having three bearing surfaces in contact with the conduit, are secured thereto by bolts *c* through the flange *d*, screwing through holes *c'* in the wall of the conduit, so that while having strength to support any team passing over them they can be quickly removed and accurately readjusted.

As with the most perfect insulation of the trolley and the conductor, it is possible for the covers D D to become charged; to insure safety, I connect the covers by wires *h* to a return wire H removed from the conduit, one of which wires is shown in Fig. I, by means of which it is always safe to come in contact with the covers—and in removing one or both covers to obtain access to the interior of the conduit, the flexibility of wire *h* renders it unnecessary to detach it from its cover.

Arranged transversely in the conduit to extend horizontally from wall to wall, are screw bolts E, removed a sufficient distance from the bottom of the conduit to leave a clear water space, and secured in place so as to have no rotary or longitudinal play—by nuts *e* and washers *e'* clamping the walls of the conduit. These bolts form braces to the conduit and supply supports to the conductor F, and being in the form of bolts inserted from the outside through perforations in the wall of the conduit, permit what would be points of contact with the walls of the conduit, to be effectually packed, as shown in the drawings, in linings to the holes and on the faces of the washers *e'*—with insulating material; so that said bolts E cannot act as conductors from the conductor F, to the body of the conduit.

Between two nuts G. G. upon the bolt E, and resting upon the bolt, is a two part clamp H' of the general configuration, as shown in Fig. I, of counterpart angle irons, although it is not necessary to construct them of this ma-

terial. These counterpart sections are reversed to seat the conductor F and clamp its sides when compressed by the nuts G. G. The clamp H′ when made of a conducting material is insulated as shown from the ball seating it—and the advantage of being in two sections, besides the clamping feature—is that separate sections of angle iron, for instance, can be bent into any curve, where a receptacle and seat for the conductor of one piece could not conveniently be so bent.

Seated in the clamp H′ and insulated entirely or nearly entirely over three sides, so as only to leave the top exposed, is the conductor F, in the shape as shown, of an oblong metal bar having one of its narrow sides supply the rail surface upon which the trolley wheel I rests and travels, and being of this configuration in cross section and so insulated, it can carry a large charge of electricity without any waste.

Resting upon the conductor with its narrow edge, is a wide flat rimmed trolley wheel I. journaled in bearings and covered nearly entirely by an insulating hood *i*, which is prolonged to cover the trolley stem J also. The trolley stem J extends upward through the opening in the conduit and is flexibly connected to the car and its motor (not shown). It will be seen that the trolley wheel and stem resting by gravity upon the straight edge supplied by the conductor as a rail, has a wide latitude of movement laterally upon the rail without becoming displaced therefrom, so that any side vibration of the car, or sudden side shock due to its striking a frog of the track, can move the trolley wheel in either direction from its center without causing it to leave the conductor—and to limit the side movement which can be imparted to the trolley by the car, to keep the trolley always upon the track, I receive the stem J, in a pendent frame K from the car, said frame in addition to the members *m* forming clearers upon either front and rear of the stem, and side bars *n*, which with the clearers *m* inclose the stem and form a frame which can move vertically with the car without affecting the stem—has a cross *o* comprising four horizontal arms at right angles, and received each loosely in a staple *s* from the bottom of the car, so that the cross suspended in the four staples can with the rest of the frame K vibrate in vertical planes at right angles, as well as slide horizontally in all directions, limited both in its slide and vibration, by the staples which form stops. This limited movement of frame K in a plane transverse to the conductor prevents the trolley from being displaced from the conductor while permitting it to accommodate itself to any side vibration of the car, while by gravity the frame K restores itself to a vertical position in the staples, to center the trolley wheel upon the conductor.

To facilitate the free movement of the trolley stem by gravity, I hinge the wire *t* leading therefrom to the motor, to a disk section *v* hinged to a corresponding disk face formed upon the stem as shown in Fig. I, in dotted lines, and in Fig. III, in full lines, which hinge combined with the spring of wire *t* leaves the stem practically free.

By the use of flat staples *s* the frame K is stiffly supported when an obstruction in the opening of the conduit opposes the clearers.

By means of rods B adjustable at their screw ends, both in the conduit and rail flanges of the track, the conduit can be adjusted to one side of the center of the track, as is often advisable in curves where the car has an invariable tendency to lurch to one side upon striking the curve, and deflecting the trolley and carrier.

By means of the lateral and vertical adjustment to the conductor, afforded by the nuts, the conductor cannot only be clamped to one or the other side of a vertical line with the opening in the conduit; but can also be raised or lowered to maintain a straight line of the surface of the conductor independently of the position of the conduit, and by simply running one clamp nut away on the screw-bolt E, the conductor is released for removal or readjustment.

In the drawings the conductor is shown insulated upon its sides, to leave a portion of the sides near the top un-insulated; but in practice it is advisable to carry the insulating material flush with the top of the conductor, so that both the insulating material and the conductor will wear simultaneously under the action of the trolley wheel, as the minimum surface is thus exposed for the loss of electricity from the conductor from accidental causes.

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

1. In conduit electric railways, the combination with a metal conduit provided upon its inner wall with a longitudinal shelf C—of a metal cover D having a triple bearing upon the conduit, and comprising a brace *d′* adapted to enter the mouth of the conduit and bear upon the shelf, a flange *d* adapted to bear upon the outer wall of the conduit, a central portion *d″* integral with the brace and flange and adapted to be seated upon a top rim of the conduit; and screw bolts *c* through flange *d* and the wall of the conduit, as and for the purpose set forth.

2. The combination and arrangement substantially as shown and described of the conduit A, provided with shelves C. C. upon its inner walls, and the covers D. D, comprising brace portions *d′*, flanges *d* and central bearing portion *d″*—and screw bolts through the flanges and side walls of the conduit to hold all three parts of the covers to a bearing on the conduit.

3. In underground electric conduits, the combination with the conduit A, of transverse screw-bolts E, adapted to be combined with the conduit from the outside thereof, to

form an internal brace, and support for the conductor, and provided with insulating bushings and washers in immediate contact with the conduit walls, with nuts *e* for retaining it in position, and having clamp nuts G. G, thereon for holding the conductor and adjusting its position relative to the mouth of the conduit, as shown and described.

4. The combination of transverse screw-bolt E, clamp nuts G G thereon, two part clamp H′, and partially insulated conductor F, held between the clamp sections, all arranged and operating as shown and described to hold the conductor, and permit its adjustment vertically and horizontally.

5. The combination with a gravity trolley wheel *i*, and stem J—of a frame K provided with clearers *m* and side bars *n* inclosing the stem J, and provided with horizontal cross arms *o*, arranged loosely in corresponding staples *s* from the bottom of the car-body to suspend said frame K and permit it both a limited vibrating and sliding movement, as and for the purpose set forth.

6. In conduit electric railways, the combination with a return wire H removed from the conduit, and with removable covers D. D—of auxiliary wires *h* arranged to connect the two, as and for the purpose set forth.

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Witnesses:
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T. W. BROWN.