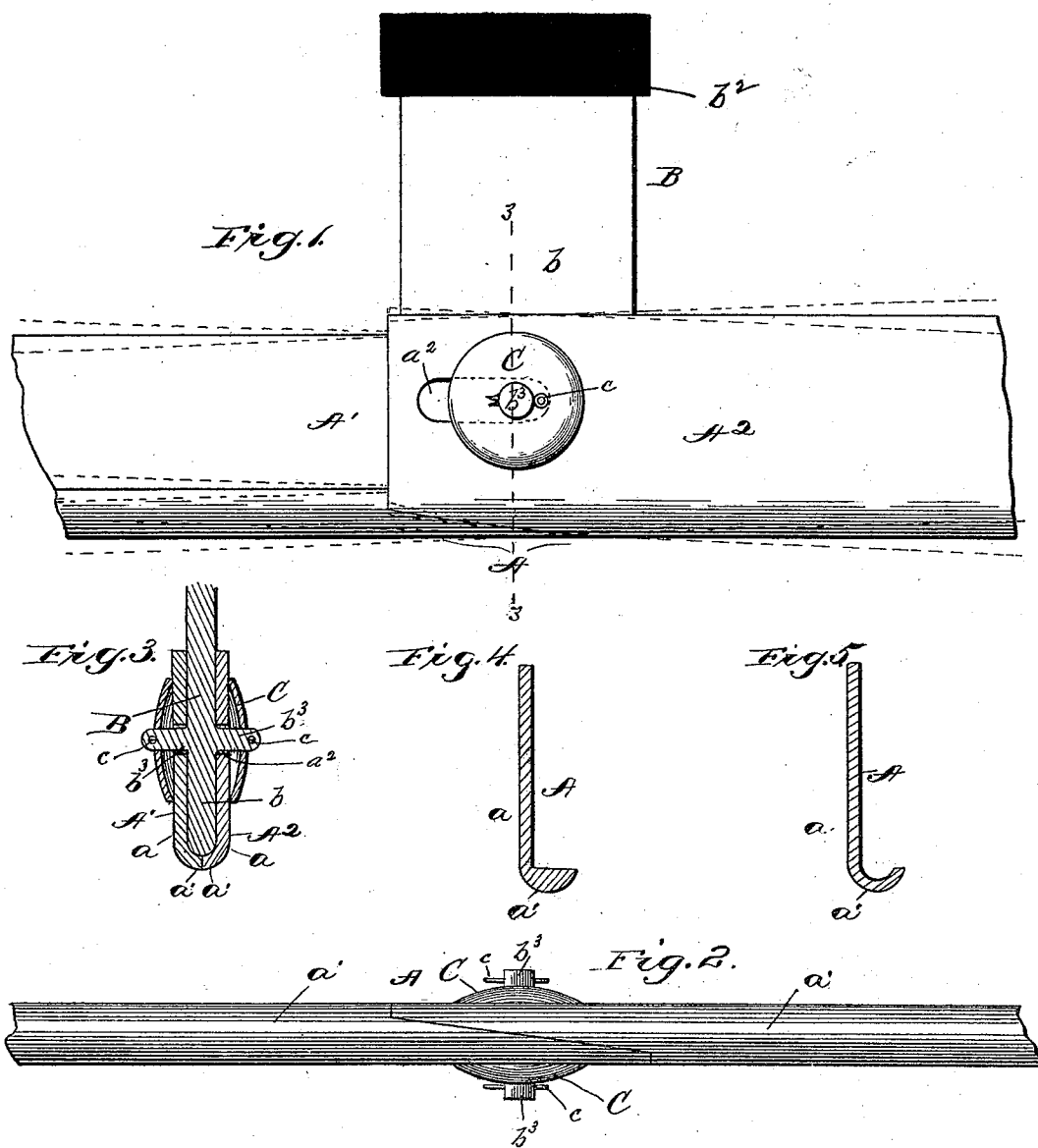


(No Model.)

M. D. LAW.
TROLLEY CONDUCTOR AND SUPPORT.

No. 515,238.

Patented Feb. 20, 1894.



Witnesses
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UNITED STATES PATENT OFFICE.

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TROLLEY-CONDUCTOR AND SUPPORT.

SPECIFICATION forming part of Letters Patent No. 515,238, dated February 20, 1894.

Application filed August 29, 1893. Serial No. 484,310. (No model.)

To all whom it may concern:

Be it known that I, MYRON D. LAW, of Washington, in the District of Columbia, have invented certain new and useful Improvements in Electric Conductors; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which
10 form a part of this specification.

This invention relates to electric conductors designed for use in electric traction systems for conducting the current to a traveling contact device which moves in contact with the
15 conductor.

A conductor embodying my invention may be employed either for overhead or underground systems, and in fact for any use where a conductor is required with which traveling
20 contact is made for supplying an electric motor or otherwise conveying an electric current to a moving object.

The invention consists in the matters hereinafter described and pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a side elevation of a conductor embodying my invention, the conductor support and insulator being also shown. Fig. 2 is a bottom
30 plan view thereof. Fig. 3 is a vertical section taken on line 3—3 of Fig. 1. Fig. 4 is a transverse section taken through the conductor. Fig. 5 is a similar section illustrating a slightly modified form of the structure.

More or less objection has been found, heretofore, in electric traction systems, and especially in underground systems, to the use of a wire conductor, because of the difficulty of maintaining the conductor under such tension as to avoid sag, which interfered somewhat with maintenance of proper contact between the conductor and the trolley or collector which traveled thereon, and also because of the difficulty of making splices where
45 repairs were needed, and the delay occasioned by such work. The present invention is designed to overcome these and other objections as to cost, insulation, &c., by the employment, as a conductor, of a rail, thereby avoiding any tendency to sag, and constructing
50 said conductor in relatively short sections

which may be prepared in the shop complete for attachment to its supports in the conduit, so that the conductor may be secured in the conduit by unskilled labor, the sectional feature doing away with the necessity of handling large spools of wire, and admitting of repairs without the necessity of making spliced joints. Moreover, by the employment of a rigid conductor the number of insulated supports may be materially reduced; an important item in the cost of construction.

My improved conductor is here illustrated as adapted for use in a system in which the trolleys or collectors make under contact
65 therewith, but it will be understood that it may be used as well in systems wherein the trolleys make lateral or top contact with the conductor, the only change required being to arrange the conductor supports to extend
70 horizontally from the sides of a conduit, or vertically from a lower point than occupied by the conductor.

The conductor proper A consists of a number of short lengths A' A², &c., L-shaped in cross section, the web *a* of which is attached to the shank *b* of a conductor support B while the flange *a'* thereof extends beneath said conductor support and forms a track or way upon which the trolley or collector travels. 80 The web *a* of the conductor is preferably of greater width than the flange *a'* thereof to afford strength for resisting tendency of the conductor to sag between supports, and also to resist the tendency to bend or give upward
85 under the pressure of the trolleys. The flange *a'* of the conductor is preferably shaped to conform to the contact outline of the trolley to be used in connection therewith, that illustrated being intended for use in connection
90 with a grooved trolley wheel, and having a semicircular cross sectional contour.

The conductor sections are preferably rolled or drawn in the mill to the form shown in Fig. 4, or they may be bent up from sheet
95 copper, in a suitable press, to the form shown in Fig. 5. These sections, about sixteen feet in length, more or less, are provided at each end with an elongated slot *a²* formed in the supporting web *a* for the reception of a securing bolt or lug *b'* passing through or projecting from the lower end of the shank *b* of
100

support B, the flange a' of said sections being cut at corresponding angles so that said flange a' at the end of one section will fit snugly against and overlap the beveled or cut away portion of the flange of the next adjacent section when said sections are reversed in position to cause said flange to project in opposite directions, as clearly illustrated in Figs. 2 and 3. I thus provide for an unbroken semi-circular way or track for the trolleys or collectors carried by the motor, and also continuous contact with said trolleys, and insure at the shop the accurate fitting of one section to another and avoid the necessity of dressing or other manipulations at the conduit as the respective ends of each section of the conduit will accurately fit the adjacent ends of the adjacent sections; and even should it be required to employ shorter lengths than the standard, the only fitting required would be to saw one end of said short length at a determined angle in a miter box. The elongated slots a^2 formed in the webs a at each end of the sections are designed to admit of the free expansion and contraction of the respective sections of the conduit under changes of temperature.

The conductor supports B comprise a shank b of brass or other good conductor, the upper end of which is embedded in or secured to a block or mass of insulating material b^2 which is in turn secured to, or supported by, any suitable devices connected to the conduit or forming a part thereof. These shanks b of the supports B are interposed between and in metallic contact with the respective ends of the conductor sections supported thereby, and transmit the current from one section to the next should the overlapping beveled ends of said sections, owing to contraction or other causes, not be in actual metallic contact with each other. To more certainly insure metallic contact between the ends of the several sections and the shanks b of the several supports B, I employ a spring washer C of any usual or preferred form, which tends to press the conductor sections closely against said shank b .

While the conductor sections may be secured to the shank b of the supports B by an ordinary bolt and nut, I prefer to make such connection by means of studs or lugs b^3 cast integral with the shanks b and projecting outward therefrom laterally, to engage the elongated slots a^2 formed in the ends of the conductor sections. These lugs should be of such length as to admit of carrying the spring washers C, hereinbefore mentioned, the whole being secured by cotter pins c passing through apertures formed in the outer ends of the lugs b^3 for that purpose.

It will be seen that the vertical web a of the conductor sections will prevent the vertical deflection of the conductor, either through sagging or under pressure of the trolleys, and that the flange a' thereof will resist lateral deflection thereof. It follows, therefore, that

the insulating supports B may be placed at greater intervals apart than is common in the use of flexible conductors, thus effecting a material saving in conduit construction. This form of conductor also affords great facility for repairs, as the conductor sections $A' A^2$, &c., can be passed through the slot of the conduit, thus admitting of the replacement of a defective conductor section without disturbing the conduit other than by lifting the covers of the manholes or traps which are usually placed at short intervals along the conduit.

Owing to the great area of surface, the conductors described possess a greater conductivity than would the same weight of copper in the form of a wire, and by increasing the conducting or current-carrying capabilities of the sections in the proper proportion throughout a line, separate feed wires may be dispensed with.

It will often happen, in constructing a conduit, that there will be variations in the distance from yoke to yoke, and the degree of variation, in some instances, may be so great as not to be compensated for by the slots in the supporting webs of the conductor sections; but by so connecting the insulated supports B with the yokes that said supports shall have longitudinal movement with respect to the conduit said variations in the distances apart of the yokes will be fully compensated for by the slotted construction of the conductor sections, and the insulated supports automatically movable longitudinally of the conduit.

Among the obvious advantages obtained by the construction described are, economy of original cost and maintenance of the conductor in use; facility of repairs; the reduction to a minimum of the amount of street work required, especially in cases where the conductor is laid in an underground conduit, and the securing of a great degree of both vertical and lateral rigidity in the conductor.

I claim as my invention—

1. A conductor comprising rails of L-shape in cross section having contact flanges and supporting webs, said flanges being arranged in alignment with each other, and the supporting webs being overlapped at the connecting ends of the rails, substantially as described.

2. A conductor comprising rails of L-shape in cross section having supporting webs and contact flanges, the supporting webs being overlapped at the meeting ends of the rails and the alternate rails being reversely arranged, substantially as described.

3. A conductor comprising rails of L-shape in cross section having supporting webs and contact flanges and supports for the conductor, having metal shanks which are interposed between the overlapping webs of the adjacent rails, substantially as described.

4. A conductor comprising rails of L-shape in cross section having supporting webs and

contact flanges and supports for the conductor, having metal shanks which are interposed between the overlapping ends of the adjacent rails, said rails being alternately reversed and having their contact flanges in alignment with each other, substantially as described.

5. A conductor comprising rails of L-shape in cross section having supporting webs and contact flanges, said webs and flanges being overlapped at the meeting ends of the rails, substantially as described.

6. A conductor comprising rails of L-shape in cross section having supporting webs and contact flanges, and supports having metal shanks which are interposed between overlapping ends of adjacent webs, said contact flanges being arranged in alignment with each other and being constructed to overlap at their meeting ends, substantially as described.

7. A conductor comprising rails of L-shape in cross section and having supporting webs and contact flanges, said webs being arranged to overlap and the contact flanges being provided with correspondingly beveled contact surfaces, substantially as described.

8. A conductor comprising rails of L-shape in cross section and supports for the conductor having metal shanks which are interposed between the overlapping adjacent ends of the rails, said rails being alternately reversed, and the contact flanges thereof being provided with correspondingly beveled contact surfaces, substantially as described.

9. A conductor comprising rails of L-shape in cross section, provided with supporting webs and contact flanges, the supporting webs of said rails being overlapped at the meeting ends of the same and being connected by slotted connections allowing longitudinal movement of the said meeting ends of the rails, substantially as described.

10. A conductor comprising rails of L-shape in cross section, having supporting webs and contact flanges and supports for the conductor having metal shanks interposed between the overlapping ends of the supporting webs and connected with the same by means embracing longitudinal slots in the said webs, substantially as described.

11. A conductor comprising rails of L-shape in cross section, and insulated supports hav-

ing metal shanks interposed between the overlapping supporting webs of the adjacent rails, said supporting webs being longitudinally slotted and the metal shank being provided with securing means which engage the slots of the supporting webs, substantially as described.

12. The combination with a conductor comprising rails of L-shape in cross section, having supporting webs and contact flanges, of insulated supports having metal shanks which are interposed between the overlapping ends of the supporting flanges and are provided with outwardly projecting lugs, said webs being provided with longitudinal slots with which the said lugs are engaged, and means for holding the webs in contact with the said shanks, substantially as described.

13. The combination with a conductor comprising rails of L-shape in cross section, having supporting webs and contact flanges and provided with longitudinal slots in the overlapping ends of the supporting webs, of insulated supports comprising metal shanks interposed between the overlapping ends of the webs and provided with lugs engaging the longitudinal slots therein, securing washers applied to the lugs outside of the rails, and means applied to the lugs for holding the washers in contact with the rails, substantially as described.

14. The combination with a conductor comprising rails of L-shape in cross section, having supporting webs and contact flanges and provided with longitudinal slots in the overlapping ends of the supporting webs, of insulated supports comprising metal shanks interposed between the overlapping ends of the webs and provided with lugs engaging the longitudinal slots therein, securing washers applied to the lugs outside of the rails and cotter pins inserted through said lugs for holding the washers in contact with the webs, substantially as described.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

MYRON D. LAW.

Witnesses:

C. CLARENCE POOLE,
TAYLOR E. BROWN.