

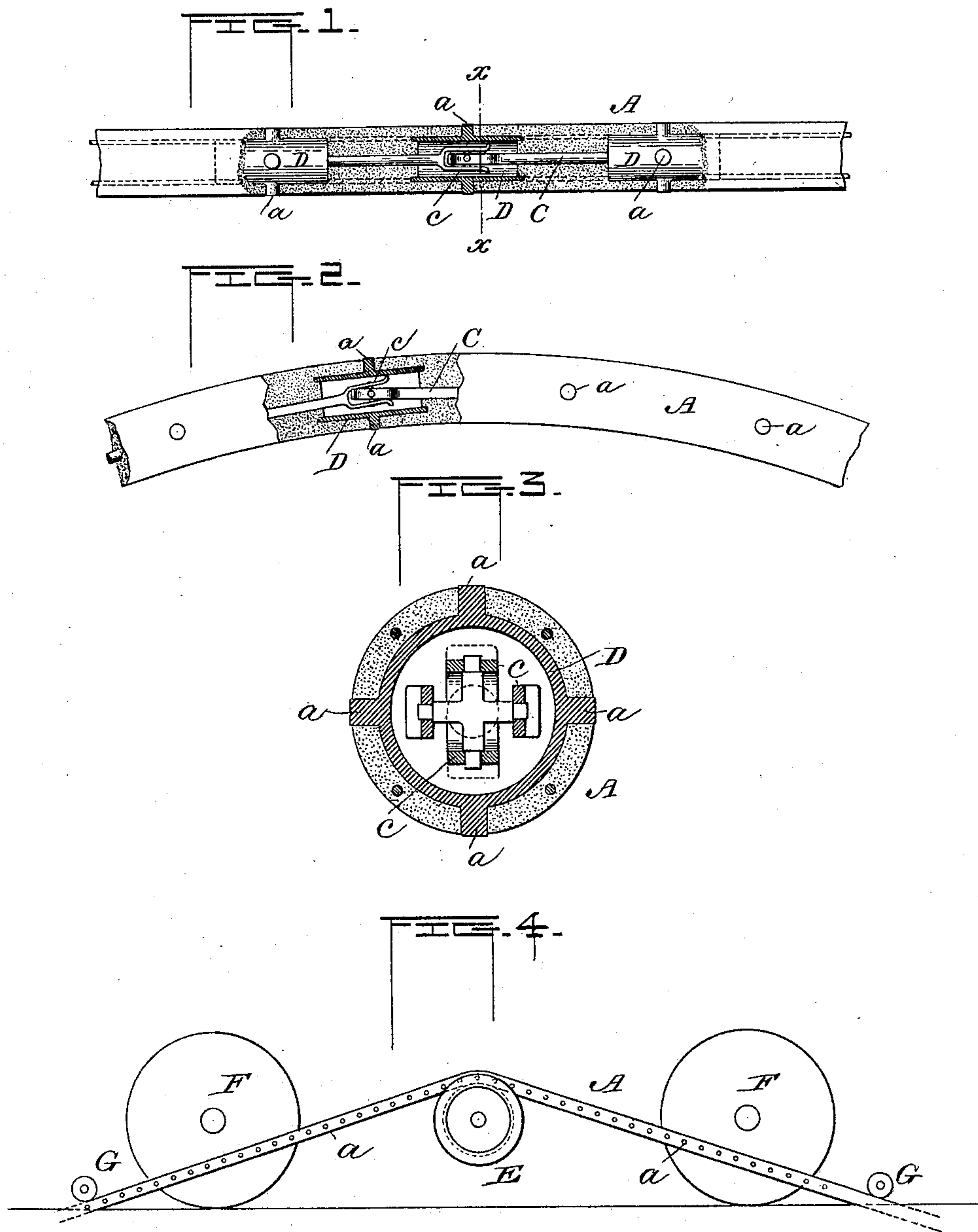
(No Model.)

2 Sheets—Sheet 1.

E. W. MITCHELL.
CONDUCTOR FOR ELECTRIC RAILWAYS.

No. 452,611.

Patented May 19, 1891.



Witnesses
S. L. Johnson
J. R. King

Inventor
Edward W. Mitchell
By Butterworth Hall & Brown
his Attorneys

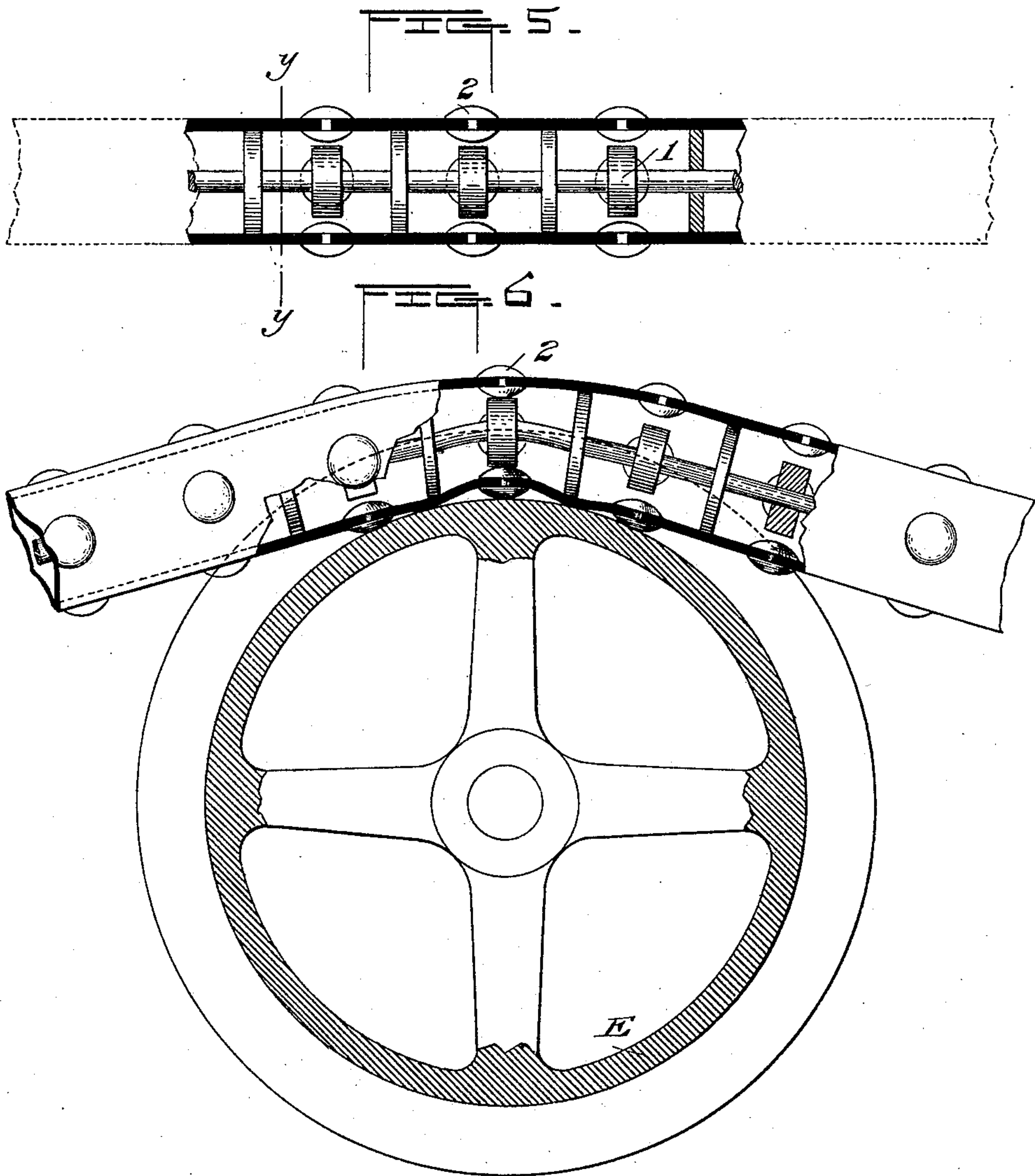
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J. C. Strong

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his Attorneys

UNITED STATES PATENT OFFICE.

EDWARD W. MITCHELL, OF SPOKANE FALLS, WASHINGTON, ASSIGNOR, BY
DIRECT AND MESNE ASSIGNMENTS, OF ONE-FOURTH TO RUSSEL PARKER,
JAMES H. STEARNS, AND BENJAMIN F. SUTTON, OF BROOKLYN, NEW
YORK.

CONDUCTOR FOR ELECTRIC RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 452,611, dated May 19, 1891.

Application filed February 5, 1891. Serial No. 380,398. (No model.)

To all whom it may concern:

Be it known that I, EDWARD W. MITCHELL, a citizen of the United States, residing at Spokane Falls, in the county of Spokane and State of Washington, have invented certain new and useful Improvements in Conductors for Electric Railways; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in conductors for electric railways; and the object is to provide means whereby an electric current taken from any suitable source of supply may be conveyed to the motor on the car through electric connections which will permit the passage of the current from the conductor to the motor through the usual trolley and connections only at the points of contact between the trolley and the conductor and in certain positions of the latter, the conductor being normally inactive or "dead" and incapable of conveying current at any point in its length, except the immediate point of contact between the same and the trolley and at a time when the conductor is elevated or thrown out of its normal position.

To this end the invention consists in an improved electric conductor constructed and arranged to operate substantially as herein-after described, and in certain improved features of construction, all as herein set forth, and particularly pointed out in the claims at the end of this description.

In the accompanying drawings, in which like letters of reference are used to designate like parts, Figure 1 represents a sectional view of a portion of an electric cable embodying my invention. Fig. 2 is a side view of the same, partly in section, showing one of the sections of the conductor elevated so as to impinge against one of the contact-pieces. Fig. 3 is a transverse section of the cable on line *x x* of Fig. 1. Fig. 4 is a diagram illustrating the wheels of a car and a trolley with the cable resting on the latter in an elevated position above the slot in an underground conduit. Fig. 5, Sheet 2, represents a sec-

tional view of a modification of the invention. Fig. 6 shows a similar sectional view with the cable resting upon a trolley shown in section. Fig. 7 is a transverse section taken on the line *y y* of Fig. 5.

In the preferred construction shown in Sheet 1 of the drawings, A represents an electric cable composed of a tubular covering, which preferably consists of vulcanized rubber or other suitable insulating material, within which is placed a sectional metallic conductor C, the sections of which have forked ends which are hinged together or connected at right angles to each other by pivot-joints *c c*, which permit the several sections of the conductor to flex or rock upon their pivots, for a purpose to be described.

This conductor is supported centrally within the cylindrical non-conducting covering or sheath B, so as to insulate the same from the metallic plates or contact-pieces attached to the insulator B, and in such manner as to yield sufficiently to permit the conductor-sections to break joint or rock upon their pivots when a trolley-wheel is passing beneath the cable.

D are metallic thimbles secured within the covering A and having pintles or contact-points *a a*, which protrude through the insulation B in position to engage the peripheral surface of the trolley-wheel E, so that when the cable is raised by the trolley, as indicated in Figs. 2, 4, and 6, the conductor-sections will break joint or rock upon their pivots, and their ends, as at *d*, Fig. 2, coming in contact with the spaced metallic thimbles, will establish electric connection between the conductor and the trolley, which connection, however, will be broken as soon as the trolley has passed the point of contact and allowed the conductor to resume its normal position. Thus current may be taken from the conductor, which may be supplied from any suitable source of electric energy, and conveyed through said contact-pieces and the trolley to the motor on the car as the trolley travels to and fro with the cable or conductor resting thereon or in electrical contact therewith; but in its normal position the cable is adapted to

lie in the conduit or on suitable supports with the contact-pieces out of contact with the conductor, whereby the surrounding insulation will prevent electrical contact between the conductor and the earth or other surface, so that the conductor in such position will be "dead" or incapable of conveying current through the contact-pieces, whereby the loss of electric energy due to the conductor coming in contact with moist or metallic conducting-surfaces, as is the case with conductors now in general use, will be avoided, and thus a source of great practical difficulty which has been experienced in electric rail-
 15 roading as heretofore conducted with ordinary electric cables will be overcome.

In the construction shown in Figs. 5, 6, and 7 the conductor consists, preferably, of a continuous metallic wire or rod of the desired
 20 size, having suitably-spaced projecting buttons or enlargements I, which are adapted to make contact with similarly-spaced contact-pieces 2, attached to the tubular insulating-shield or inclosing tube A, the operation of
 25 this device being substantially the same as the operation of the parts shown in Sheet 1 of the drawings, the conductor being adapted to spring sufficiently to allow the parts 1 and 2 to make contact, as shown in Fig. 6.

30 It will be understood, of course, that various modifications of my invention may be made without departing from the spirit thereof, and hence I do not desire to be limited to the specific construction shown and described; but
 35 What I claim, and desire to secure by Letters Patent, is--

1. An electric cable comprising a conductor extending within an insulating tube or covering, which latter is provided with contact-
 40 pieces at suitable distances apart throughout its length, normally out of contact with said conductor, the latter being adapted to engage said contact-pieces when the cable is com-

pressed or thrown out of its normal position, substantially as described. 45

2. An electric cable comprising a conductor extending within an insulating tube or covering, which latter is provided with contact-pieces at suitable distances apart throughout
 50 its length, normally out of contact with said conductor, the latter having contact-points adapted to engage said contact-pieces when the cable is compressed or thrown out of its normal position, substantially as described.

3. An electric conductor composed of sections hinged together and inclosed within an
 55 insulating tube or covering, substantially as described.

4. An electric conductor comprising a sectional metallic rod arranged within a suitable
 60 insulating tube or covering, which latter has contact-pieces arranged at suitable distances apart throughout its length, said conductor being adapted to lie normally within the covering, out of engagement with said contact-
 65 pieces, substantially as described.

5. In combination with the sectional conductor, the insulating tube or covering, having contact-pieces thereon adapted to make
 70 contact with the conductor-sections when the conductor is thrown out of its normal position, substantially as described.

6. In combination with the car, the trolley and the electric cable, comprising a sectional
 75 conductor arranged within an insulating tube or covering having spaced contact-pieces, said conductor being adapted to make contact with said contact-pieces by the action of the trolley, substantially as described.

In testimony whereof I affix my signature
 80 in presence of two witnesses.

EDWARD W. MITCHELL.

Witnesses:

CHAS. RHODES,
 ANSON S. TAYLOR.