No. 606,825. Patented July 5, 1898.

C. A. TERRY & H. P. DAVIS.

CONTACT DEVICE FOR ELECTRIC RAILWAYS.

(Application filed Mar. 2, 1896.)

(No Model.) 2 Sheets—Sheet I.

Fig. 1.

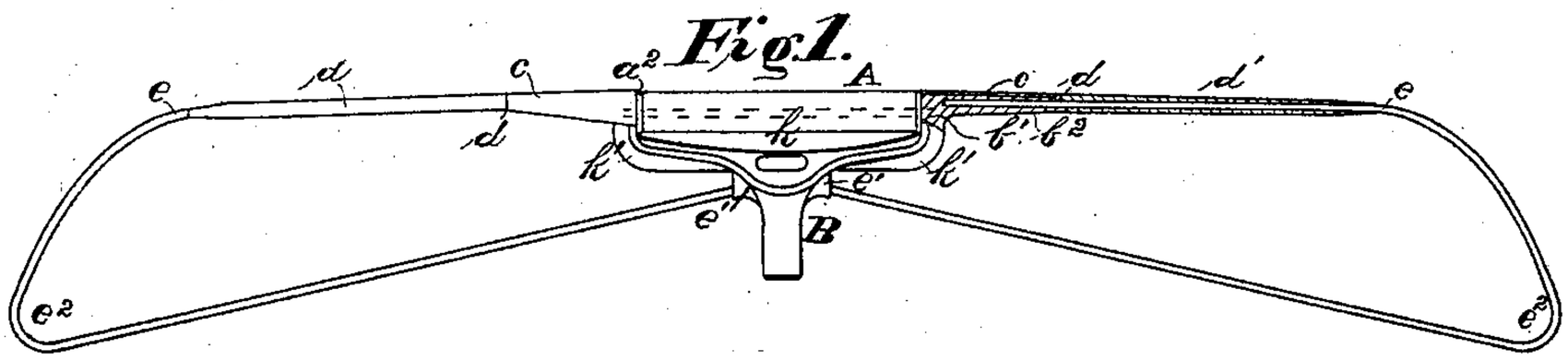

Fig. 2.

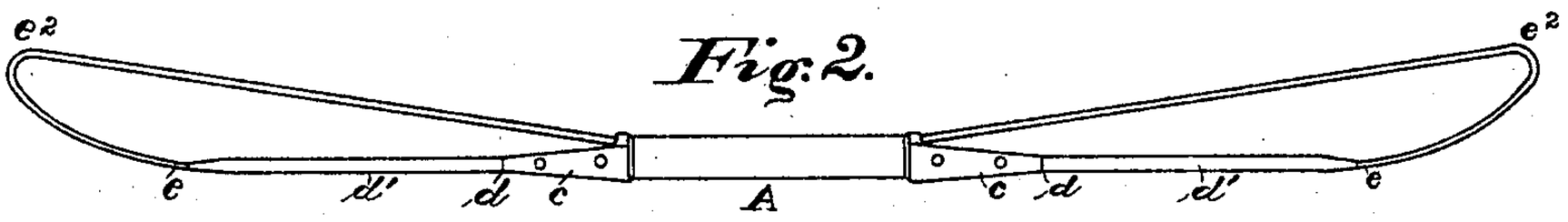

Fig. 3.

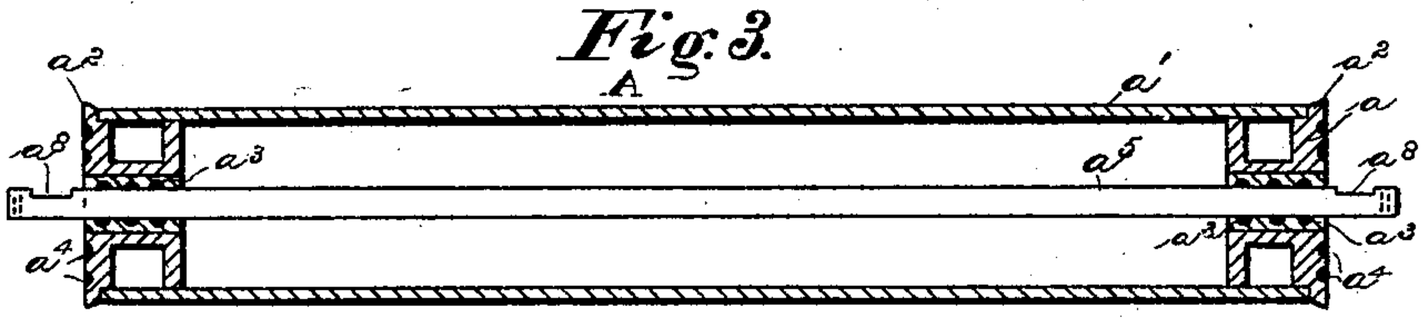

Fig. 4.

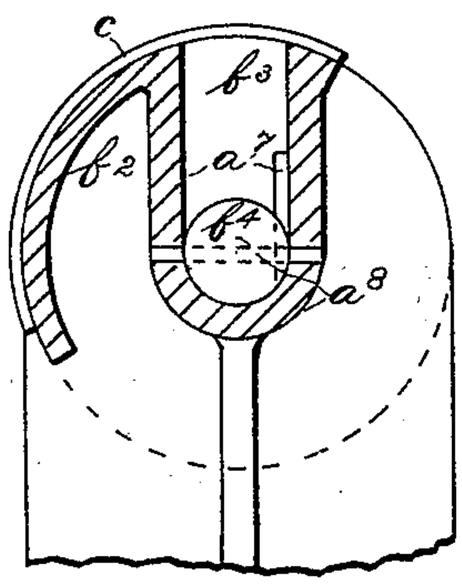

Fig. 5.

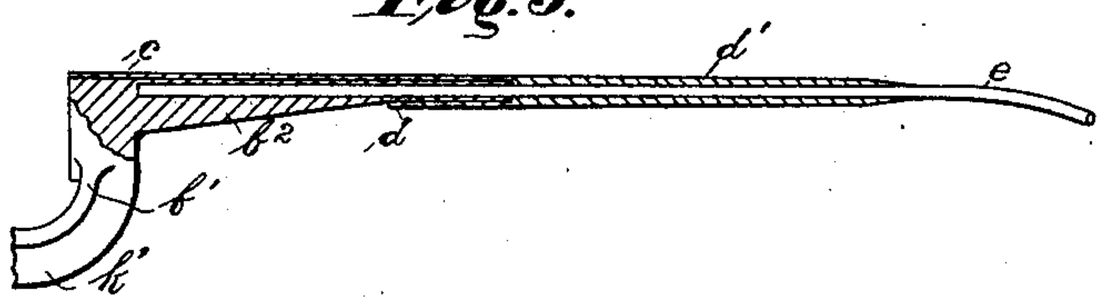

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Fig. 6.

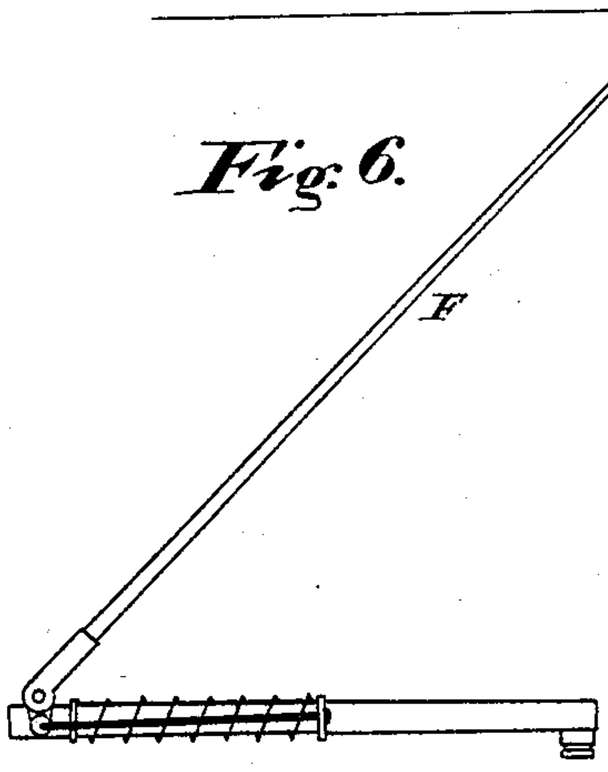


Fig. 7.

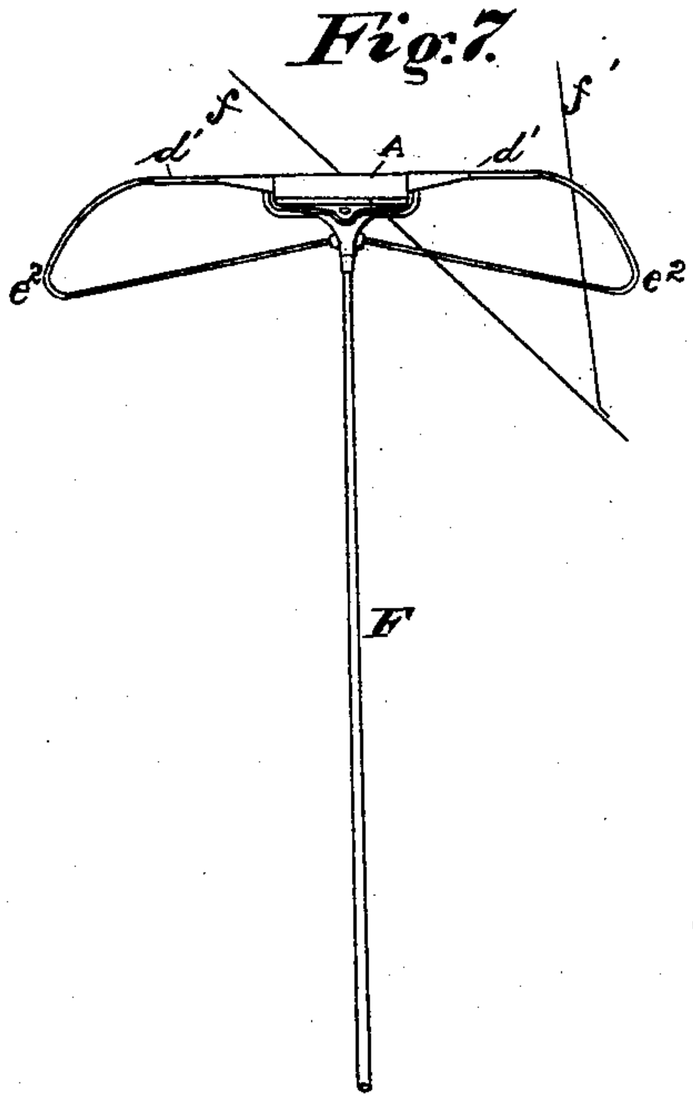
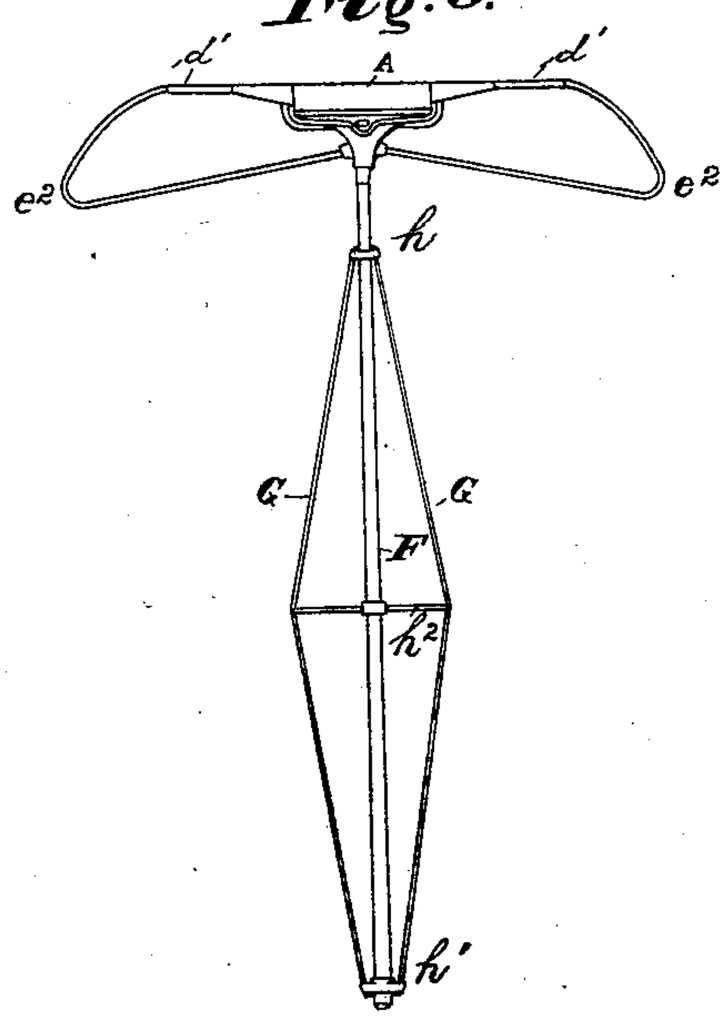


Fig. 8.



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UNITED STATES PATENT OFFICE.

CHARLES A. TERRY, OF NEW YORK, N. Y., AND HARRY P. DAVIS, OF PITTSBURG, PENNSYLVANIA, ASSIGNORS TO THE WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY, OF PITTSBURG, PENNSYLVANIA.

CONTACT DEVICE FOR ELECTRIC RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 606,825, dated July 5, 1898.

Application filed March 2, 1896. Serial No. 581,493. (No model.)

To all whom it may concern:

Be it known that we, CHARLES A. TERRY, residing in New York, in the county and State of New York, and HARRY P. DAVIS, residing at Pittsburg, county of Allegheny, and State of Pennsylvania, citizens of the United States, have invented certain new and useful Improvements in Contact Devices for Electric Railways, of which the following is a specification.

The invention relates to the class of devices employed for making traveling contact with electric conductors through which current is supplied to moving electrically-propelled vehicles, and particularly to that class of contact devices employing laterally-extending contact-surfaces as distinguished from grooved contact-wheels.

The object of the invention is to provide a light and durable form of contact device which will be cheap to manufacture and the parts of which may be easily replaced.

The contact device proper, or contact-head, consists of a central revolving section carried by a fork provided with non-revolving lateral extensions which constitute prolongations of the contact-surface presented by the revolving section. These extensions are continued outwardly and downwardly in such a manner as to guard against the danger of the device becoming entangled in converging overhead wires and to aid in supporting the entire contact device.

The invention also involves certain novel features in the construction of the supporting parts of the contact device.

The invention will be described in detail in connection with the accompanying drawings.

In the drawings, Figure 1 is a front elevation of the contact device, partly in section. Fig. 2 is a plan view of the same. Fig. 3 is an enlarged view, in longitudinal section, of the revolving portion of the contact device. Figs. 4 and 5 are enlarged detail sectional views. Fig. 6 is a side elevation of the contact device. Fig. 7 is a perspective view of the contact device in engagement with a main and a branch conductor, and Fig. 8 is a front elevation of the contact device and a supporting-arm therefor of modified construction.

Referring to the figures, A represents a cylindrical roller provided at its respective ends with heads or bearing-supports a a. These heads fit within the ends of the tube a' forming the cylinder and may be so constructed as to overlap the ends, forming slight fillets or beads a^2 at the end of the cylinder. The fillets at the ends of the roller serve to prevent the wire from wearing grooves between the ends of the roller and the confronting arms b' of the fork B. Graphite bearings a^3 are placed in the respective ends of the cylinder, and, if desired, the ends of the heads may be provided with grooves a^4, filled with graphite to lessen the friction between the ends of the roller and the arms b'. The shaft or spindle a^5, which may be either a solid rod or a tube, extends through the roller and is received by the two arms b' b' of the fork B. The fork B may be of cast metal, and the two arms b' are preferably extended outwardly, as shown at b^2, the extensions being skeleton-like, as indicated in cross-section in Fig. 4. The shaft a^5 of the roller is dropped into openings b^3 in the respective arms b', and recesses a^8 therein fit over corresponding lugs a^7, so as to firmly bind the two arms of the fork and prevent the fork from spreading. Lock-pins, as indicated by dotted lines b^4 in Fig. 4, may also be used to fasten the spindle a^5 in place. The openings b^3 and the locking recesses and lugs may be omitted and the shaft inserted through proper cylindrical openings formed in the arms b', if desired. The fork may be conveniently made of a single casting, and to make it as strong as possible without increasing its weight beyond a satisfactory limit it is provided with a central web k and with strengthening-ribs k'.

The projecting arms b^2 of the casting forming the fork B are provided with curved wearing pieces or plates c which are fastened thereto by means of screws or otherwise in such position as to cover the slots b^3, when such slots are employed. These wearing-pieces may be of sheet-brass or other suitable material.

In practical use in those cases where contact is liable to be made with the overhead conductor in any position of the contact-arm from a horizontal to a vertical position the portions of the wearing-pieces c which are liable to come in contact with the conductor will cover only an arc of ninety degrees.

Hence it is necessary to extend the contact-piece c over an arc of only ninety degrees or thereabout.

The extensions b^2 are preferably tapered, so as to meet the ends d of small tubes d'. These tubes, which may be of brass or other suitable conducting material, constitute prolongations of the respective extensions and of the wearing-plates, against which they abut at their inner ends. It will be understood that the wearing-pieces c and the tubes d' may be made as one piece, if desired, in practice.

Through each of the tubes there is passed a rod or tube e, which may be of spring-steel or other suitable material. These rods or tubes may extend entirely through the tubes d' and through suitable openings in the ends of the extensions b^2, if desired, or they may terminate in the extensions near to the ends of the shaft a^5, as shown. In either case they constitute firm supports for the tubes. The portions of the rods e projecting from the ends of the tubes d' extend outwardly and downwardly to the points e^2 and then turn backward toward the fork B, the ends of the rods being received by suitable sockets e' in the fork. The sections of the rods e between the outer ends of the tubes d' and the points e^2 are curved slightly both downwardly and outwardly with reference to the supporting arm or pole, as shown in Fig. 6, the purpose of this curve or bend being to present a proper bearing and guiding surface for engagement with cross and branch wires when the contact device is in use.

On account of the different heights at which supply-conductors are located it is necessary to provide for contact with the proper conductor and to avoid entanglement with crossing and branching conductors, whatever may be the angular position of the supporting-arm F. In order that the contact device shall invariably pass beneath every overhead wire with which it may come into contact, the points or bends e^2 should be located outside of and below the plane which includes the contact-roller and the axis on which the supporting-arm turns in every position, from horizontal to vertical, which the latter may assume in practice. When the supporting-arm is vertical, the points or bends e^2 are at the rear of rather than below the plane which includes the roller and the axis on which the supporting-arm turns. In the form shown in the drawings the desired result is secured, and by reason of the curvature between the ends of the tubes d' and the bends e^2 the contact device will readily pass under every overhead wire with which it may come into contact without materially straining or deflecting either the wire or the contact-supporting arm. It has been demonstrated in practice that a guard having an approximately helical curvature between the ends of the tubes d' and the bends e^2, as indicated in the drawings, affords the most satisfactory results; but we do not desire to limit our invention to this exact form.

The relation of the contact device to overhead wires is illustrated in Fig. 7, in which f is the conductor, extending along the line of travel of the car, and f' is a branch conductor.

In the operation of this device it is desirable that there should be the least possible lateral movement of the arm F, and for this reason it may be necessary or desirable in some cases to brace the arm by means of tension-rods G, as shown in Fig. 8. These tension-rods may extend from lugs h, formed on the fork along the rod F to a collar h' at the bottom of the rod F, being spread apart at some intermediate point by a cross-piece h^2. This construction renders the arm firm and not subject to lateral swing, and hence better adapted to hold the contact device in its proper relation to the conductor. The method of supporting the arm F or the entire contact device and affording it an upward pressure against the under side of the conductor is illustrated diagrammatically in Fig. 6, it being intended that the entire contact device shall be reversible, if desired, to permit the car carrying it to run in either direction.

We desire it to be understood that modifications other than those shown and described may be made without departing from the spirit and scope of our invention.

We claim as our invention—

1. A contact device for electric railways consisting of a revolving cylinder or roller, a fork carrying the same, stationary pieces at the end of said roller constituting continuations thereof and tapering outwardly, and a supporting-arm rigidly joined at its upper end directly to said fork, substantially as described.

2. A contact device for electric railways consisting of a cylindrical roller, a fork carrying the same, extensions of said fork constituting prolongations of the roller and tapering outwardly, cylindrical prolongations of said extensions, and a supporting-arm the upper end of which is rigidly joined directly to said fork.

3. A contact device for electric railways consisting of a rotating cylindrical contact, a skeleton casting or fork receiving the same, wearing-pieces constituting continuations of said cylindrical contact secured to said casting, a supporting-arm rigidly joined at its upper end directly to said fork and braces extending from the ends of the casting to its supporting-arm.

4. A contact device for electric railways consisting of a rotating contact-cylinder, a fork carrying the same and having lateral extensions in the general line of the surface of the cylinder tapering toward their outer ends, removable shields or wearing-pieces covering the same, and a supporting-arm rigidly joined at its upper end directly to said fork.

5. A contact device for electric railways consisting of a rotating contact-cylinder, a fork for carrying the same having lateral extensions in the general line of the surface of the cylinder and tapering toward their outer ends, and braces extending from the stem of the fork to the respective ends of the lateral extensions.

6. A contact device for overhead conductors for electric railways consisting of a contact-roller; a fork receiving the same, tapering lateral extensions of the arms of said fork; tubular extensions of the ends of the tapersections, and downwardly and outwardly projecting guards or braces constituting extensions of said tubular sections.

7. The combination with an arm hinged to move in a substantially vertical plane, of a contact device supported by the outer end of said arm and comprising a hollow cylindrical roller, heads fitting within the respective ends of said roller and projecting to form fillets or beads of slightly larger diameter than the diameter of the roller, extensions at the respective ends of the roller, the adjacent bearing portions of which are flush with said fillets or beads, and guards projecting outwardly and downwardly from said extensions to points outside of the plane which includes the contact-roller and the axis on which the supporting-arm turns.

8. In a contact device for electric railways, a cylindrical roller, bearings therefor, a shaft carrying the roller, a fork receiving the respective ends of the shaft, slots formed in the arms of the fork through which said shaft is inserted and wearing-pieces covering said slots, substantially as described.

9. In a contact device for electric railways, a cylindrical roller, a shaft carrying the same, a fork receiving the roller between its arms, lateral extensions formed upon said fork, tubular prolongations of the lateral extensions, and rods passing through said tubular extensions into said fork.

10. In a contact device for electric railways, the combination of a fork having lateral projections, tubular extensions of said projections, rods passing through said tubular extensions, said rods extending outwardly and downwardly from the respective ends of said tubular extensions and bent backward and extending into said fork.

11. The combination with a fork or frame having lateral extensions, and a cylindrical roller journaled in said fork or frame in alinement with said extensions, of a supporting arm or stem for said fork or frame hinged to move in a substantially vertical plane and curved guards projecting from the ends of said extensions to points outside the plane which includes the roller and the axis on which the supporting-arm turns.

12. A fork for supporting the contact-roller of a contact device for electric conductors consisting of a stem having the arms b' with lateral extensions b^2, and provided with the inner web k and the outer strengthening-webs k', substantially as described.

13. A guard for laterally-extending contact devices, consisting of a helically-curved arm projecting outwardly and downwardly from the end of the main contact portion and constituting a longitudinal extension thereof.

14. The combination of a hinged supporting-arm, with means tending to raise said arm to a vertical position and a horizontally and laterally extending head comprising a main contact portion, and guides projecting outwardly and downwardly from said contact portion to points outside the plane which includes it and the axis on which said supporting-arm turns, and constituting longitudinal extensions of said main contact portion.

15. A contact device consisting of a support mounted upon a horizontal axis and yieldingly pressed upward, a horizontally and laterally extending contact portion and curved guide portions projecting outwardly and downwardly from said contact portion to points outside the plane which includes it and the axis of the support and constituting longitudinal extensions to prevent entanglement with intersecting and supporting wires.

16. A device for making contact with overhead supply-conductors comprising a spring-actuated supporting-arm hinged to move in a vertical plane and a laterally-extending head carried by the free end of said arm, said head being provided with guards which constitute longitudinal extensions of the contact portion of said head and are curved outwardly and downwardly to points outside the plane which includes the contact portion of the head and the axis on which the supporting-arm turns and thence extend inwardly to the supporting-arm.

17. A spring-actuated arm hinged at its lower end to a suitable base and provided at its upper end with a contact-head comprising a laterally-extending horizontal roller, nonrotatable extensions in alinement therewith, and guard-pieces projecting from the ends of the extensions in approximately helical curves to points outside the plane which includes the contact-roller and the axis on which the supporting-arm turns, and thence extending inwardly to the supporting-arm.

In testimony whereof I, the said CHARLES A. TERRY, have subscribed my name this 26th day of February, 1896.

CHARLES A. TERRY.

Witnesses:
EDWIN S. CARPENTER,
GEO. H. LEWARS.

In testimony whereof I, the said HARRY P. DAVIS, have hereunto subscribed my name this 29th day of February, 1896.

HARRY P. DAVIS.

Witnesses:
WESLEY G. CARR,
HUBERT C. TENER.