No. 891,049. PATENTED JUNE 16, 1908.

J. F. DOSTAL.

CROSSING PROTECTOR FOR HIGH TENSION LINES.

APPLICATION FILED FEB. 27, 1906.

2 SHEETS—SHEET 1.

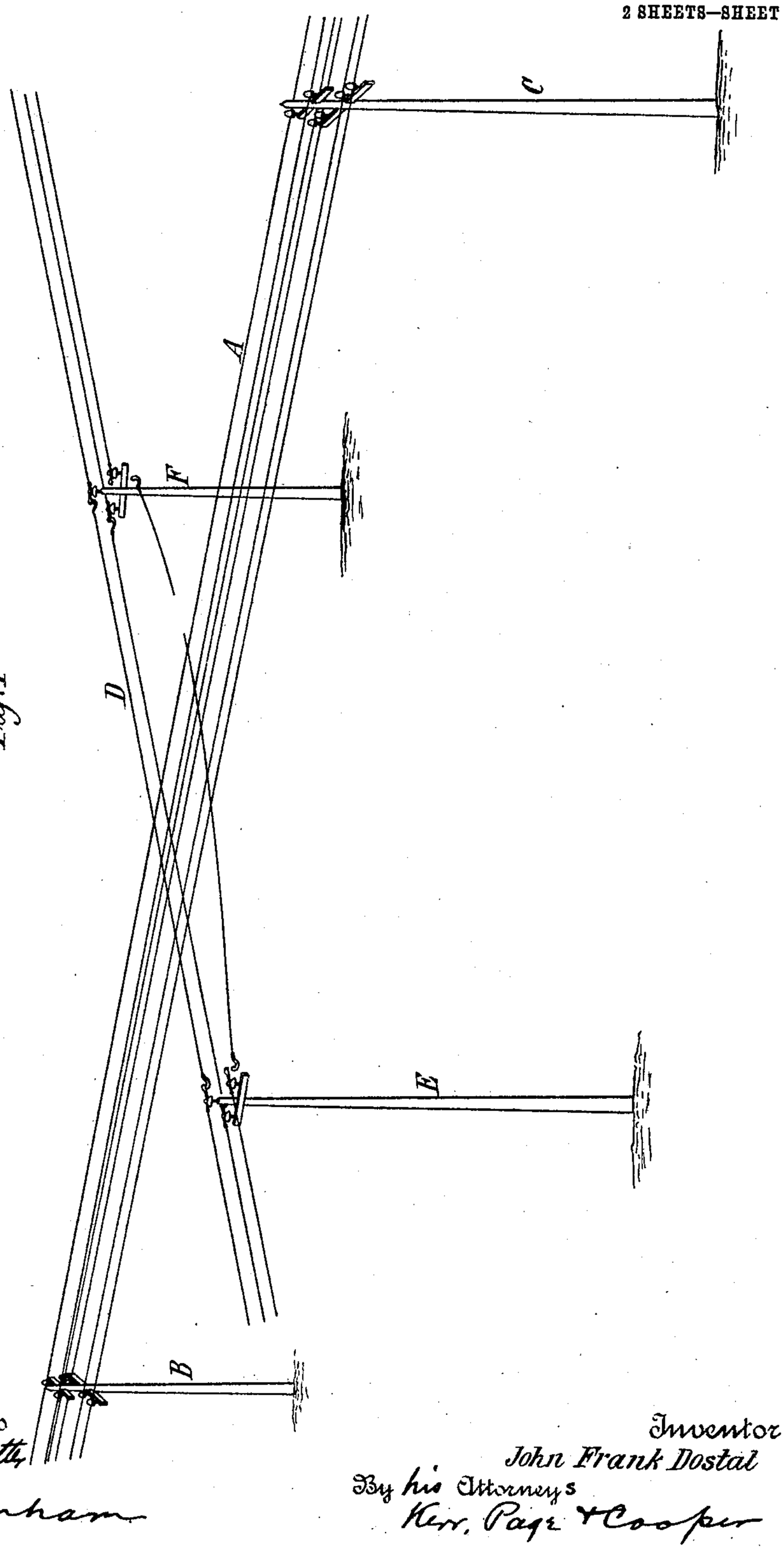

Fig. 1

Witnesses
Raphael Kette
A. S. Dunham

Inventor
John Frank Dostal
By his Attorneys
Kerr, Page & Cooper

No. 891,049. PATENTED JUNE 16, 1908.

J. F. DOSTAL.

CROSSING PROTECTOR FOR HIGH TENSION LINES.

APPLICATION FILED FEB. 27, 1906.

2 SHEETS—SHEET 2.

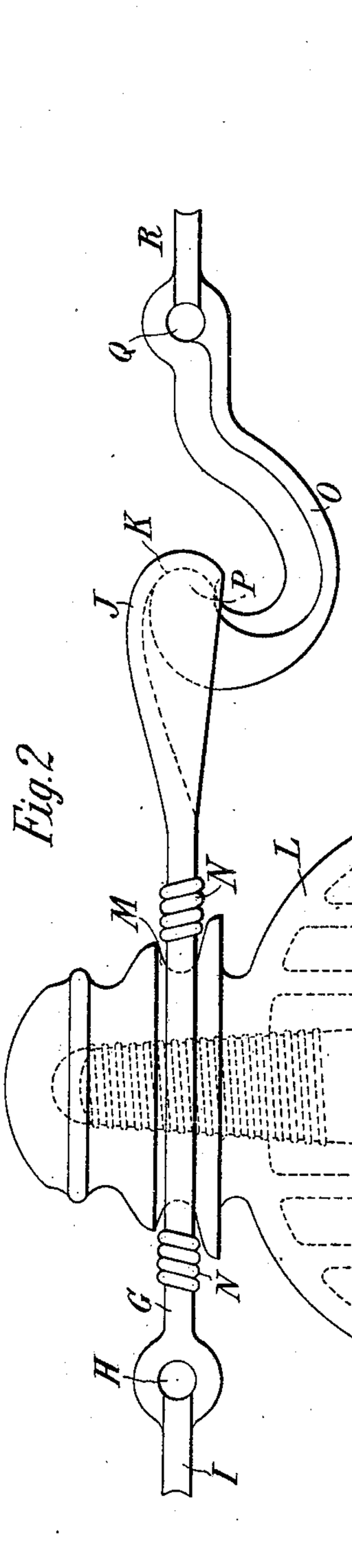

Fig. 2

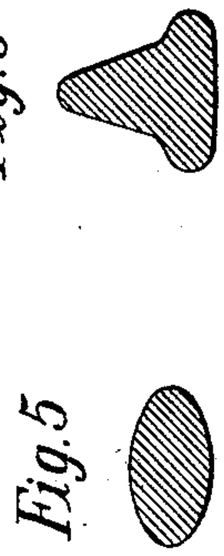

Fig. 5

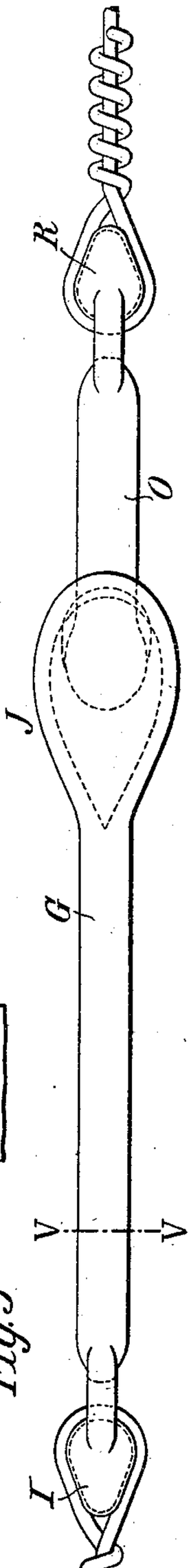

Fig. 3

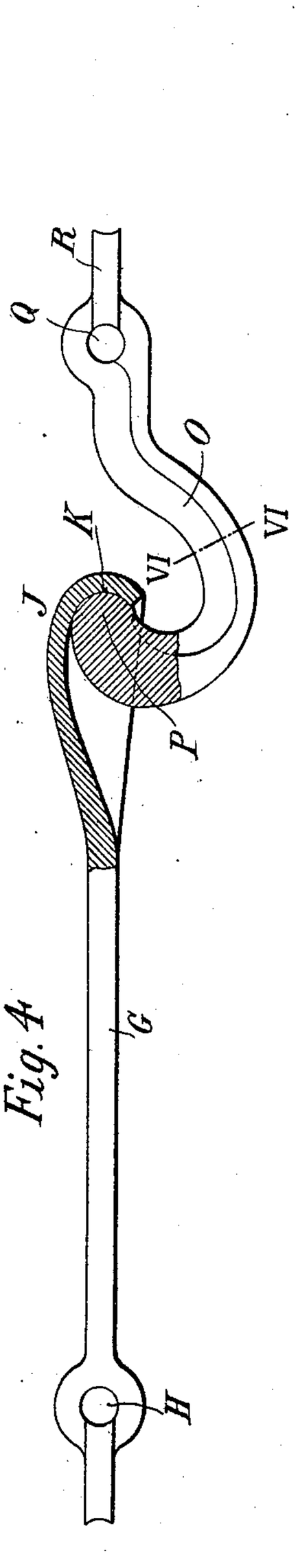

Fig. 4

Witnesses
Raphael Netter
L. L. Denham

Inventor
John Frank Dostal
By his Attorneys
Kerr, Page & Cooper

UNITED STATES PATENT OFFICE.

JOHN FRANK DOSTAL, OF DENVER, COLORADO, ASSIGNOR OF ONE-THIRD TO WILLIAM J. BARKER AND ONE-THIRD TO CLIFFORD W. HUMPHREYS, OF DENVER, COLORADO.

CROSSING-PROTECTOR FOR HIGH-TENSION LINES.

No. 891,049. Specification of Letters Patent. Patented June 16, 1908.

Application filed February 27, 1906. Serial No. 303,162.

To all whom it may concern:

Be it known that I, JOHN FRANK DOSTAL, a citizen of the United States, and a resident of the city and county of Denver, State of Colorado, have invented certain new and useful Improvements in Crossing-Protectors for High-Tension Lines, of which the following is a specification, reference being had to the drawings accompanying and forming part of the same.

Where lines of aerial electrical conductors cross, as for example where a high tension power transmission line crosses a telegraph or telephone line, it is of course necessary to carry one line above the other. If an upper conductor of the crossing section or reach should break at any point one or the other loose ends thereof may fall upon a conductor of the lower line, thereby connecting the two electrical systems. The high tension currents are thus diverted into the telegraph or telephone system, resulting in burning out some, if not all, of the instruments connected therewith and causing danger of serious injury or even loss of life to persons using the instruments or engaged about the same. However infrequent such accidents may be, the possible damage therefrom is a grave menace to life and property, and precautions must therefore be taken to obviate such occurrences. The expedient commonly employed for this purpose is to carry the upper conductors a considerable distance above the lower lines, on poles or other supports set close together at that point, so that if a break should occur in one of the upper conductors, even close to one of the supports, the broken end, or ends, will not be long enough to reach the lower lines, but will swing clear of the same without coming in contact therewith. This plan, however, possesses a number of disadvantages. In the first place it involves considerable additional expense, due to extra poles and greater length of the same. The upper lines are also less readily accessible at that point for inspection, repair of insulators, etc. Furthermore, in some locations it is impracticable to locate the poles close together, as for example at street crossings, where the poles must be at least as far apart as the width of the roadway. Hence the poles at such places must be very high and therefore very costly. In any case tall poles are more liable than short ones to be blown down, or damaged by lightning, etc.

I have therefore been led to devise my present invention, which has for its object to provide, at comparatively small expense, effective protection against injurious results from accidents of the kind mentioned.

In carrying out my invention I provide each upper conductor with a detachable section where it crosses the lower line, and connect such section in its particular line by means of connecting devices so constructed and arranged that if the section should break the two parts thereof will instantly detach themselves from the rest of the line. The result is that before either part can come in contact with the lower conductors they will both have been disconnected from their own line and hence no further injury to either electrical system can follow. It is clear that with such a construction the poles for the crossing section of the upper line need be no taller than sufficient to carry the conductors thereof well above the other line, and that the poles need be practically no closer than the regular distance apart.

It is evident that if the crossing section should sag into contact with the lower line injurious results would follow, and my invention therefore provides that whenever the section sags to a dangerous point it will disconnect itself, as though a break had occurred.

The precise nature of the invention will be more readily comprehended when explained in connection with the annexed drawings, which illustrate the preferred form. Therein,

Figure 1 is a perspective view showing two lines crossing, the lower being, for example, a telephone or telegraph line, and the upper a power transmission line equipped with my invention. This figure also shows the way in which the invention operates. Fig. 2 is a detail elevation showing the preferred form of connector, secured in position on the insulator. Fig. 3 is a plan view of the connector without the insulator, but with the line wire attached. Fig. 4 is a side elevation of the connector, partly in longitudinal section. Figs. 5 and 6 are cross sections on lines V—V, and VI—VI respectively.

Referring more particularly to Fig. 1, A indicats a telephone or telegraph line, which may include any number of wires, supported

on poles B and C. Crossing above this reach of the telephone or telegraph line is a high tension line, D, for example three-phase, supported on poles E and F. The conductors of the upper line between the latter poles are detachably supported, as previously stated, in such manner that when a wire breaks it will instantly disconnect itself from the rest of the line, as shown. Hence no damage or danger can result from either broken end falling on the line below. The devices which I prefer to employ for thus detachably connecting the conductor sections with their respective wires are illustrated in Figs. 2 to 6 inclusive.

The wire beyond the pole is connected to a socket member G, having one end conveniently formed for that purpose, with an eye H provided with a grooved loop-engaging device of oval form, I. The wire may be firmly secured by passing the end through the eye, forming a loop around the device I, and then twisting the end tightly around the main part of the wire, as clearly shown in Fig. 3. At the other end of the member G is a downwardly open hood J of elongated form and having a substantially spherical engaging surface K on the inside of its outer end. The socket member G is secured to the insulator L, in the groove M, by a tie-wire of the usual form, N, passing around the other side of the insulator and having its ends wrapped around the socket member, as shown in Fig. 2. The socket member is arranged with the hood J horizontal, and to insure that such position will be maintained, as for example against the tendency of the tie-wire to turn the device, the body of the socket member is made of elliptical cross section, as shown in Fig. 5, with its longer axis horizontal. Consequently when the device is placed in the insulator groove it is unable to rotate therein, at least to an objectionable extent. This precaution effectively protects the inside, or socket, of the hood from dirt and the weather.

Engaging the hood G is a hook member O, having an upwardly and inwardly extending hook P with a substantially spherical end bearing on the inner spherical surface K, of the hood. The other end of the hook member is formed with an eye Q and loop device R, like those on the socket member, for like connection with the crossing reach or section between the poles E and F. The body of the hook member is of the knife-edge or triangular cross section shown in Fig. 6, so as to shed water readily and prevent accumulation of ice or dirt thereon. Connecting devices of this kind are provided for each line conductor at the poles E, F, which support the crossing section, the wires coming to the poles being secured to the eyes of the socket members and the sections of the line between the poles being secured at their ends to the eyes of the hook members. This arrangement is clearly shown in Fig. 1. The section of each conductor between the poles is thus detachably connected in circuit, the stretch or mechanical tension of the wire serving to hold the hooks firmly in their sockets. When, however, a break occurs in the reach between the poles the hooks at each end of the broken section are by gravity instantly caused to drop out of the sockets, thus entirely disconnecting the broken parts from the rest of the line, whereupon they can fall harmlessly to the ground. The quick separation of the connecting devices is aided by the resiliency of the wire, which, when the mechanical tension is suddenly released by the breaking of the wire, acts to throw the hooks positively out of their sockets. By reason of the curvature of the engaging faces on the hook and socket members, a normal amount of sagging will not disengage the parts. But should the section sag below a predetermined point, into dangerous proximity to the lower line the downward turning of the hook members will draw them out of their sockets and allow the entire section to fall. The degree of sag which can occur without such disengagement depends of course on the design of the connectors, particularly in respect to the degree of curvature of the engaging faces, and the devices can readily be designed so as to disengage themselves at any desired amount of sag.

It will be observed that the hook-member and socket member are out of contact or engagement with each other except on their spherical engaging faces. This arrangement permits the crossing reach of the conductor to sway freely in the wind, while the substantially spherical form of the engaging surfaces permits the swaying to turn the hook-members in any direction without impairing the electrical connection with the socket members. At the same time this motion of the hook-members causes their engaging surfaces to rub or grind on the corresponding surfaces of the socket-members, thereby keeping the contact or engaging surfaces clean and bright and insuring good electrical connection.

From the foregoing it will be seen that my invention provides very effectively against injurious consequences following contact of the upper and lower lines due to sagging or breaking of the former.

The connecting devices can be manufactured and applied at small cost, and the plan is free from the expense and inconvenience of the methods heretofore in vogue. The particular form herein described is merely the preferred embodiment and may be modified in various ways without departure from the proper scope of the invention as defined by the following claims.

What I claim is:

1. In a crossing protector for high tension

lines, the combination of a socket-member consisting of an elongated body portion adapted for rigid securement on an insulator and terminating in a downwardly open hood provided with a spherical concave engaging surface on the inside of its outer end; and a hook-member curved downwardly and rearwardly out of contact with the socket member and terminating in a spherical convex face engaging the correspondingly concave surface in the hood of the socket-member, whereby the hook-member is permitted to turn freely in all directions on the said concave surface as a bearing.

2. A socket member for a crossing protector for high tension lines, comprising an elongated body portion adapted for rigid securement on an insulator, terminating in an oval upwardly convex and downwardly open hood provided with a spherical concave surface on the inside of its outer end.

3. A hook-member for a crossing protector for high tension lines, comprising a body portion having at one end means for connection with a conductor, and having its other end curved rearwardly and terminating in a rearwardly disposed spherical convex face.

4. In a crossing protector for high tension lines, the combination of a socket-member consisting of an elongated body portion adapted for rigid securement on an insulator, having one end formed for electrical connection to a main conductor and having at its other end a downwardly open hood provided with a spherical concave engaging surface on the inside of its outer end; and a hook-member curved downwardly and rearwardly out of contact with the socket-member and having a spherical convex face engaging the correspondingly concave surface in the hood of the socket-member, whereby the hook-member is permitted to turn freely in all directions on the concave surface of the hood as a bearing, said hook-member having at its other end means for electrical connection to the crossing section of the conductor, as set forth.

5. In a crossing protector for high tension lines, the combination of a conductor comprising main sections and an intermediate cross section; a pair of socket-members each consisting of a body portion having at one end means for electrical connection to the main section of the conductor and having at its other end a downwardly open hood provided with a rearwardly facing spherical concave surface, the said socket-members being arranged with their hoods toward the crossing section of the conductor; insulating supports to which the socket-members are secured; and hook-members electrically connected with the said crossing section at the ends of the latter, each hook-member curving downwardly out of contact with the adjacent socket-member and terminating in a spherical convex surface engaging the correspondingly concave surface in the hood of the adjacent socket-member; as set forth.

JOHN FRANK DOSTAL.

Witnesses:
JOSEPH F. FUGAZZI,
RUFE GENTRY.