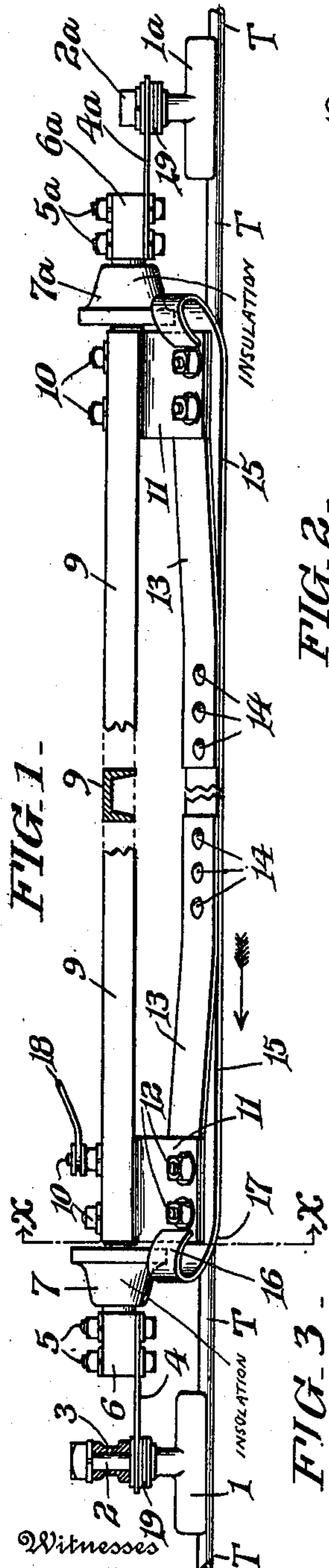


C. P. NACHOD.  
TROLLEY SWITCH.  
APPLICATION FILED MAY 21, 1910.

992,035.

Patented May 9, 1911.



Witnesses  
Daniel Webster Jr.  
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FIG. 2.

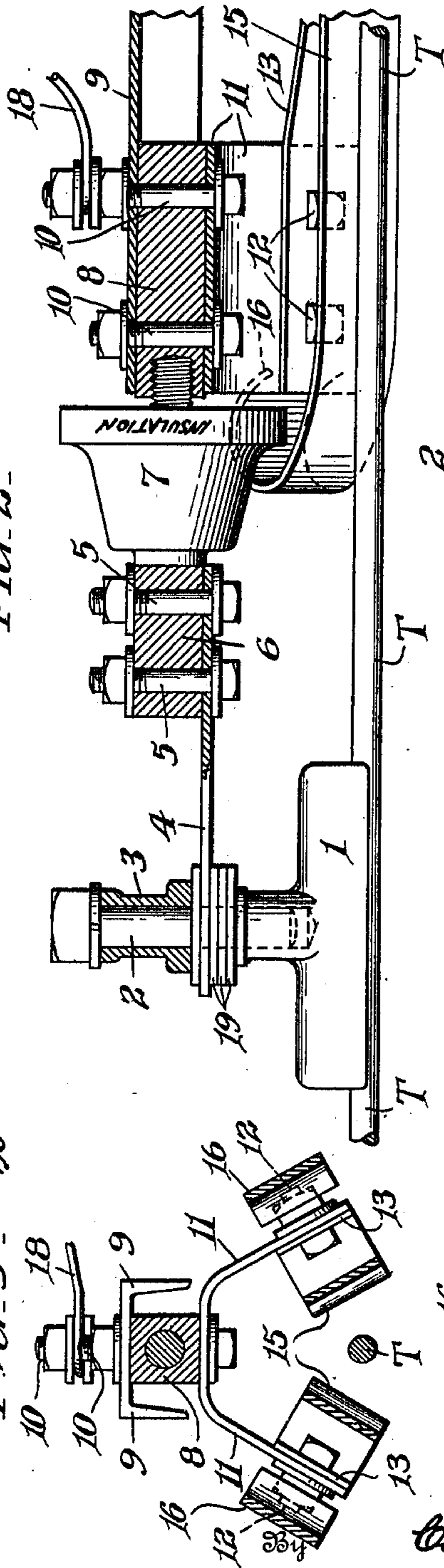
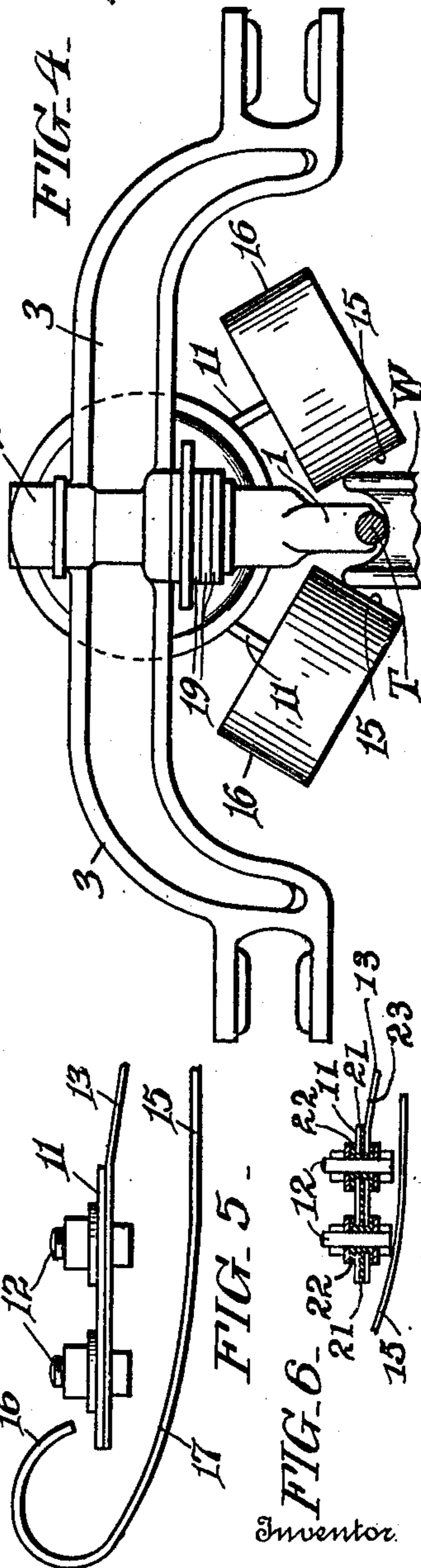


FIG. 3.



# UNITED STATES PATENT OFFICE.

CARL P. NACHOD, OF PHILADELPHIA, PENNSYLVANIA.

## TROLLEY-SWITCH.

992,035.

Specification of Letters Patent.

Patented May 9, 1911.

Application filed May 21, 1910. Serial No. 562,590.

*To all whom it may concern:*

Be it known that I, CARL P. NACHOD, a citizen of the United States, residing in the city of Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented a new and useful Trolley-Switch, of which the following is a specification.

My invention relates to a switch or contact device for controlling or operating a signal or other translating device, as by energy passed through said switch or contact device from the trolley wire or other contact conductor of an electric or other railway system.

My invention may be termed a "trolley switch" for use in connection with the trolley wire or other contact conductor of an electric railway system, the traveling contact or trolley wheel serving to bring a conductor or conductors into electrical communication with the trolley wire or other contact conductor. Such trolley switch may be located at any desired point along the railway, and, as the trolley wheel or contact passes the switch, a signal or other circuit is closed or a conductor of the signaling or other system is brought into communication with the trolley wire or other contact conductor or feeder.

The trolley switch of my present invention is of the type disclosed in Letters Patent of the United States No. 922,024 granted me on May 18, 1909.

It is a feature of my present invention that a supporting or base frame or bar extending lengthwise of the trolley wire or other contact conductor, carries longitudinal inclined contact strips, and so placed with respect to the trolley wire or other contact conductor, from which they are normally insulated, that the trolley wheel or other moving contact while continuously touching the trolley wire or other contact conductor, and without leaving such wire or contact conductor, makes connection with one or the other or both longitudinally extending contact strips while the trolley wheel or contact device is passing under the switch. The contact strips are flexible in themselves and flexibly supported, and are provided with positive stops to limit deflection. The con-

tact strips are disposed in an inclined position with respect to each other and flared at their ends to freely receive the trolley wheel or other contact device. They are slightly wedged apart by the wheel or contact device which, therefore, exerts a rubbing action in addition to a rolling one, and which secures a continuous electrical engagement or contact.

In the case of an overhead trolley wire system, the switch is preferably supported at one end approximate a span wire, the end of the switch nearest the span wire being that end at which the trolley wheel or moving contact leaves the switch.

My invention resides in other features hereinafter described and claimed.

For an illustration of one of the forms my invention may take, reference is to be had to the accompanying drawing, in which:

Figure 1 is a longitudinal or side elevation of a trolley switch. Fig. 2 is a vertical sectional view, on larger scale, some parts in side elevation, of one end of the trolley switch. Fig. 3 is a cross sectional view, some parts in elevation, taken on the line X—X of Fig. 1. Fig. 4 is an end view looking from the left toward the right. Fig. 5 is a fragmentary edge view of the contact strip and its support. Fig. 6 is a modification of Fig. 5, parts in section, showing insulation.

In the drawing, T represents a trolley wire or other contact conductor to which is secured a trolley ear or clamp 1 supported by a bolt 2 upon the bracket or suspension member 3 to each end of which may be fastened a span wire extending between posts or other suitable supports on either side of the trackway of the railway system, such bracket or double curve suspension, bolt 2 and ear or clamp 1 forming a standard and common means of supporting a trolley wire. Supported by and extending along the trolley wire T from the trolley wire suspension 1, 2, 3, is a metal plate 4 secured by bolts 5 to a metal block 6, the latter in turn supporting the bell or member 7 of insulating material, the bell or member 7 in turn supporting the metal block 8, to which is secured

the longitudinally extending member 9 by bolts 10, 10.

The bar or member 9 may be of any suitable material or shape and is here shown, by way of example, as a channel iron. If desired, the member 9 may be of insulating material, its function being that of a support. At its other end remote from the suspension 1, 2, 3, it is supported by means similar to those hereinbefore described by the insulating member or bell 7<sup>a</sup> which, in turn, is supported by the block 6<sup>a</sup> to which is secured the plate or bar 4<sup>a</sup> by bolts 5<sup>a</sup>, the plate or bar 4<sup>a</sup> being held by bolt 2<sup>a</sup> to the clamp or trolley ear 1<sup>a</sup> secured to and upon the trolley wire T. In consequence, the bar or base member 9 and attached parts are supported in definite relation with respect to the trolley wire T and insulated therefrom. By employing fewer or more washers 19, the contact strips 15 may be located nearer or farther from the trolley wire T. At each end of the bar or channel 9 there is secured by the bolts 10 a metallic bracket 11. By bolts 12 there is secured at each side of each bracket 11 a flexible contact strip supporter 13 extending longitudinally of the trolley wire. At a considerable distance from its bracket 11 each contact strip supporter 13 is connected, both mechanically and electrically, as by rivets 14, to a contact strip 15, which is thus flexibly supported by the brackets 11 and in electrical communication therewith through the supporting members 13, such contact strips being laterally yielding, and having their contact faces disposed at an angle with respect to each other, as seen in Figs. 3 and 4. Each of the contact strips 15 approximate a bracket 11 stands away from such bracket 11 and the supporter 13, and at its end is curved backwardly upon itself, as at 16. The end 16 is adapted to engage the rear of bracket 11 to limit the movement of the contact strip 15 in a direction toward the trolley wire T. And the portion of the contact strip 15 in the vicinity of the point 17 is adapted to engage the other side of the bracket 11 or attached parts to limit the movement of the strip 15 away from the trolley wire. The contact strips 15 are, as shown, connected to the flexible strip supports 13 at points between the brackets 11. Between the points at which the contact strips 15 are affixed to the strips 13 there is a considerable space, whereby the contact strip 15 is flexible and laterally yielding between these points.

The trolley wheel W is adapted to pass along on the under side of and in contact with the trolley wire T, as seen in Fig. 4, and to maintain contact with said trolley wire T and to simultaneously engage one or the other or both of the contact strips 15. Due to the convergence of the contact surfaces of

the strips 15 the trolley wire wedges to a greater or less extent between them, causing them to yield laterally, there being a rubbing as well as rolling contact. And it will be seen that the contact strips are in themselves laterally yielding, and are in turn supported by relatively long laterally yielding supports 13.

As thus far described, the contact strips 15 are in electrical communication with each other through the metallic supporting brackets 11; and one of the bolts 10 may be supplied with washers and an extra nut to form a binding post to receive a conductor 18 which, during the passage of the trolley wire under the switch, is brought into electrical communication with the trolley wire T for signaling or any other purposes. In case, however, it is desired that the trolley wheel or traveling contact W shall bring two independent conductors into communication with the trolley wire T, the contact strips 15 may be suitably insulated from each other, and a conductor for signaling or other purposes electrically connected with each contact strip 15. This may be accomplished in a variety of ways. By way of example merely reference is to be had to Fig. 6. Here the member 13 is secured to the bracket 11 by bolts 12, a strip 21 of insulation intervening between the member 13 and the bracket 11, and the insulation 22 preventing the bolts 12 from electrically connecting members 13 and 11. A conductor 23 electrically connected to the member 13 affords means of electrical communication with the contact strip 15.

As seen in Fig. 1, the switch extends to the right from the trolley wire suspension 1, 2, 3 at a span wire. The direction of passage of the trolley wheel under the switch is then preferably from right toward the left as indicated by the arrow, for it is found in practice that at high speeds, the trolley wheel will enter the switch without shock, pass along the same, bringing the conductor 18 into communication with the trolley wire T, as explained, and pass beyond the switch again without shock.

The reason for having the trolley wheel or other traveling contact device enter the switch at the end remote from the span wire support is that, with ordinarily supported trolley wire conductors cusps are formed at each span wire support, and though these cusps may be shallow, due to the speed of travel of the trolley wheel, a shock is invariably experienced at such span wire connection accompanied by sparking. Therefore, if the trolley wheel enters the switch from the end remote from the span wire support, it is entering the switch where there is no cusp and where the trolley wire conductor is substantially straight, the entry being then

without shock and without sparking. However, it is to be understood that my switch is not limited in its use to such location of the trolley switch with respect to the span wire support and direction of travel.

What I claim is:

1. In a device of the character described, the combination with a contact conductor, of a base member extending longitudinally of said contact conductor, means for supporting said base member in proximity to said contact conductor, and longitudinally extending contact strips in electrical communication with each other and supported in proximity to said contact conductor by said base member, said contact strips being themselves resilient and laterally yielding for substantial portions of their lengths independently of any yielding by their supports.

2. In a device of the character described, the combination with a longitudinally extending base member, of a contact conductor, a clamp or ear engaging said contact conductor, an insulator supported by said clamp or ear, said insulator supporting said longitudinally extending base member, a bracket secured to said base member independently of said insulator, a flexible laterally yielding and longitudinally unyielding contact strip, and a flexible member supporting said contact strip upon said bracket.

3. In a device of the character described, the combination with a contact conductor, of separated clamps or ears engaging said conductor, insulators supported by said clamps or ears, and a longitudinally extending base member supported by and between said insulators, separated brackets supported by said base member, a flexible laterally yielding contact strip, and means supporting said contact strip at a plurality of points between said brackets.

4. In a device of the character described, the combination with a contact conductor, of a longitudinally extending base member supported thereby, longitudinally extending resilient and laterally yielding contact strips in electrical communication with each other, and means supporting each contact strip upon said base member at a plurality of points separated a substantial part of the length of said contact strip, each contact strip yielding laterally between said points of support.

5. In a device of the character described, the combination with a contact conductor, of a longitudinally extending base member supported thereby, separated brackets supported by said base member, flexible laterally yielding longitudinally extending contact strips supported by said brackets, a bracket serving also as electrical connection between said contact strips.

6. In a device of the character described, the combination with a contact conductor, of a span wire connection supporting the same, a clamp or ear supported only by said contact conductor at a distance from said span wire connection, a base member supported by and between said span wire connection and said clamp or ear, a longitudinally extending contact strip supported by said base member, and a traveling contact adapted to simultaneously engage said contact conductor and said contact strip, said clamp or ear disposed near the end of said contact strip at which said traveling contact first engages said contact strip.

7. In a device of the character described, the combination with a longitudinally extending base member, of a plurality of separated supporting members carried thereby and yielding laterally with respect thereto, and a longitudinally extending resilient laterally yielding contact strip supported at a plurality of separated points by said supporting members.

8. In a device of the character described, the combination with a longitudinally extending base member, of separated flexible supporting members carried thereby and extending longitudinally toward each other, and a flexible laterally yielding contact strip secured to said supporting members.

9. In a device of the character described, the combination with a contact conductor, of a longitudinally extending base member, separated flexible supporting members secured to said base approximate the ends thereof and extending longitudinally toward each other, and a contact strip secured to said supporting members at points remote from the points of support of said supporting members.

10. In a device of the character described, the combination with a contact conductor, of a longitudinally extending base member, separated brackets carried thereby, flexible longitudinally extending yielding supporting members secured to said brackets, and a longitudinally extending contact strip secured to said supporting members at a distance from said brackets.

11. In a device of the character described, the combination with a contact conductor, of a longitudinally extending base member, separated brackets carried thereby, flexible longitudinally extending yielding supporting members secured to said brackets, and a longitudinally extending flexible laterally yielding contact strip secured to said supporting members at a distance from said brackets.

12. In a device of the character described, the combination with a contact conductor, of a longitudinally extending base member, a longitudinally extending flexible and lat-

erally yielding contact strip supported by said base member, and means limiting the lateral movement of said contact strip in both directions.

5 13. In a device of the character described, the combination with a contact conductor, of a longitudinally extending base member, a longitudinally extending flexible and laterally yielding contact strip supported by  
10 said base member, and a stop limiting the movement of said contact strip toward said contact conductor.

14. In a device of the character described, the combination with a contact conductor, of  
15 a longitudinally extending base member, a longitudinally extending supporting member secured at its one end to said base member, a longitudinally extending contact strip secured at the other end of said supporting  
20 member and extending backward in the direction of said supporting member.

15. In a device of the character described, the combination with a contact conductor, of a longitudinally extending base member, a  
25 flexible supporting member secured at its one end to said base member, a flexible and laterally yielding contact strip secured at the other end of said flexible supporting member and extending backward in the di-  
30 rection of said flexible supporting member.

16. In a device of the character described, the combination with a contact conductor, of a longitudinally extending base member, a  
35 bracket upon said base member, a supporting member supported at its one end by said bracket, a longitudinally extending contact strip secured at the other end of said supporting member and extending backward to said bracket.

40 17. In a device of the character described, the combination with a contact conductor, of a longitudinally extending base member, a bracket upon said base member, a flexible supporting member supported at its one end  
45 by said bracket, a flexible and laterally yielding contact strip secured at the other end of said flexible supporting member and extending backward to said bracket.

18. In a device of the character described, the combination with a contact conductor, of  
50 a longitudinally extending base member, a bracket thereon, a supporting member secured at its one end to said bracket, a longitudinally extending contact strip secured to said supporting member at a point remote  
55 from said bracket and extending back to said bracket, and a bend in said contact strip adapted to engage said bracket to limit the movement of said contact strip.

60 19. In a device of the character described, the combination with a contact conductor, of a longitudinally extending base member, a bracket thereon, a flexible supporting member secured at its one end to said bracket, a

flexible and laterally yielding contact strip 65 secured to said flexible supporting member at a point remote from said bracket and extending back to said bracket, and a bend in said contact strip adapted to engage said bracket to limit the movement of said con- 70 tact strip.

20. In a device of the character described, the combination with a contact conductor, of a longitudinally extending base member, a  
75 bracket thereon, a flexible supporting member secured at its one end to said bracket, a flexible and laterally yielding contact strip secured to said flexible supporting member at a point remote from said bracket and ex-  
80 tending back to said bracket, and a bend at the end of said contact strip embracing said bracket and adapted to limit the movement of said contact strip toward said contact conductor.

21. In a device of the character described, 85 the combination with a contact conductor, of a longitudinally extending base member, a bracket thereon, a supporting member secured at its one end to said bracket, a con-  
90 tact strip secured to said supporting member at a point remote from said bracket and extending back to said bracket, and a bend at the end of said contact strip embracing said bracket and adapted to limit the movement  
95 of said contact strip toward said contact conductor.

22. In a device of the character described, the combination with a contact conductor and a traveling contact, of a longitudinally  
100 extending base member, flexible laterally yielding contact strips supported at separated points by said base member in proximity to said contact conductor, said contact strips having their contact surfaces up-  
105 wardly convergent, said traveling contact adapted to wedge between said upwardly convergent surfaces to electrically connect said strips with said contact conductor.

23. In a device of the character described, the combination with a contact conductor 110 and a traveling contact, of a resilient laterally yielding contact strip extending longitudinally of said contact conductor, and a base member extending longitudinally of said contact conductor and supporting said con-  
115 tact strip in proximity to said contact conductor, said traveling contact adapted to simultaneously engage said contact conductor and said contact strip, said contact strip when engaged by said traveling contact yielding  
120 laterally with respect to said contact conductor throughout a substantial part of the length of said contact strip independently of any yielding by said supporting means.

24. In a device of the character described, 125 the combination with a contact conductor and a traveling contact, of a resilient laterally yielding contact strip extending longi-

5 tudinally of said contact conductor, and  
means yielding laterally of said contact con-  
ductor supporting said contact strip in prox-  
imity to said contact conductor, said trav-  
eling contact adapted to simultaneously  
engage said contact conductor and said con-  
tact strip, said contact strip when engaged  
by said traveling contact yielding laterally  
with respect to said contact conductor  
10 throughout a substantial part of the length

of said contact strip independently of any  
yielding by said supporting means.

In testimony whereof I have hereunto  
affixed my signature in the presence of the  
two subscribing witnesses.

CARL P. NACHOD.

Witnesses:

ANNA E. STEINBOCK,  
ELEANOR T. McCALL.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,  
Washington, D. C."

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