

Nov. 25, 1941.

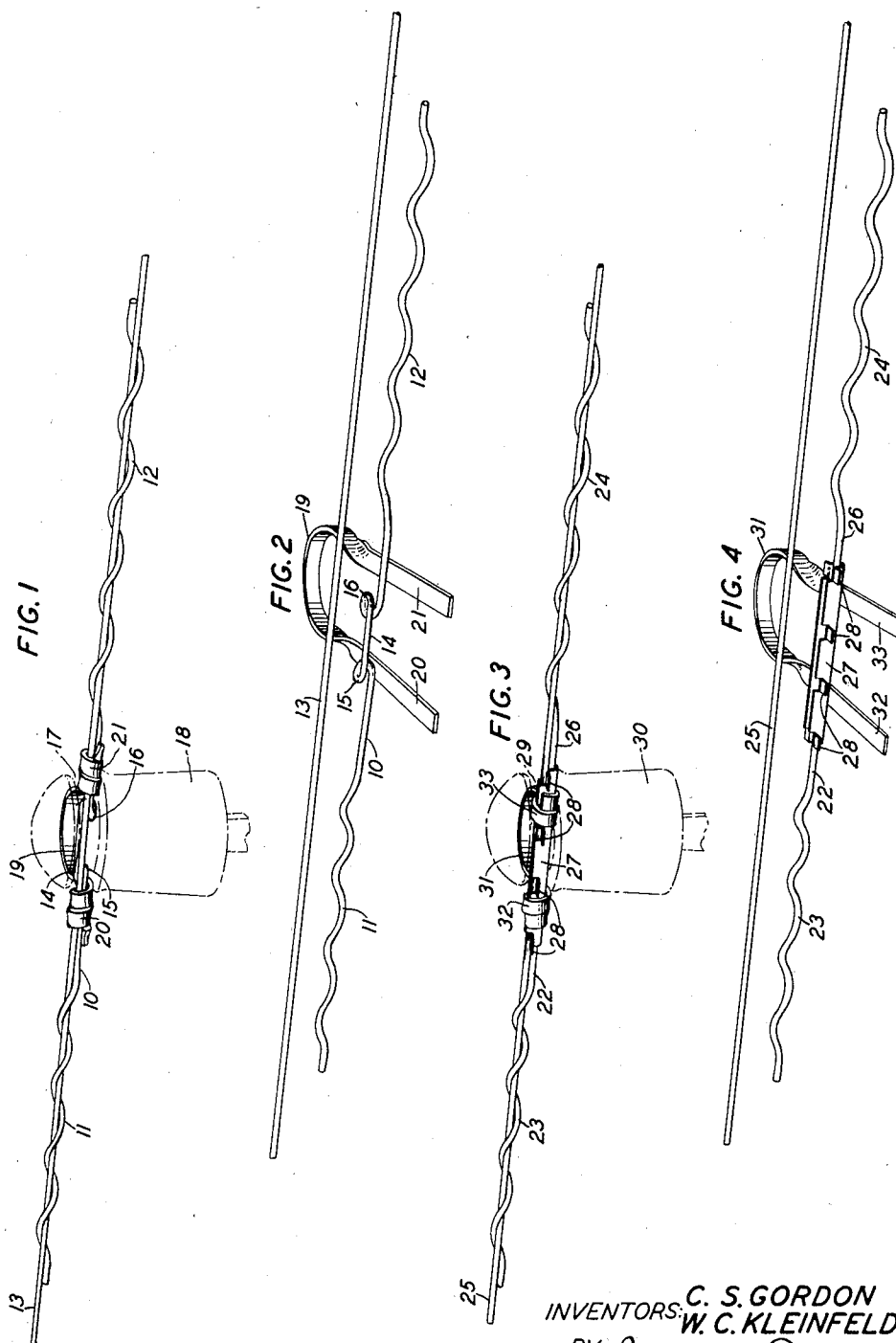
C. S. GORDON ET AL

2,263,728

COMBINED LINE WIRE TIE AND REINFORCEMENT

Filed July 8, 1939

2 Sheets-Sheet 1



INVENTORS: C. S. GORDON
W. C. KLEINFELDER
BY *J Mac Donald*
ATTORNEY

Nov. 25, 1941.

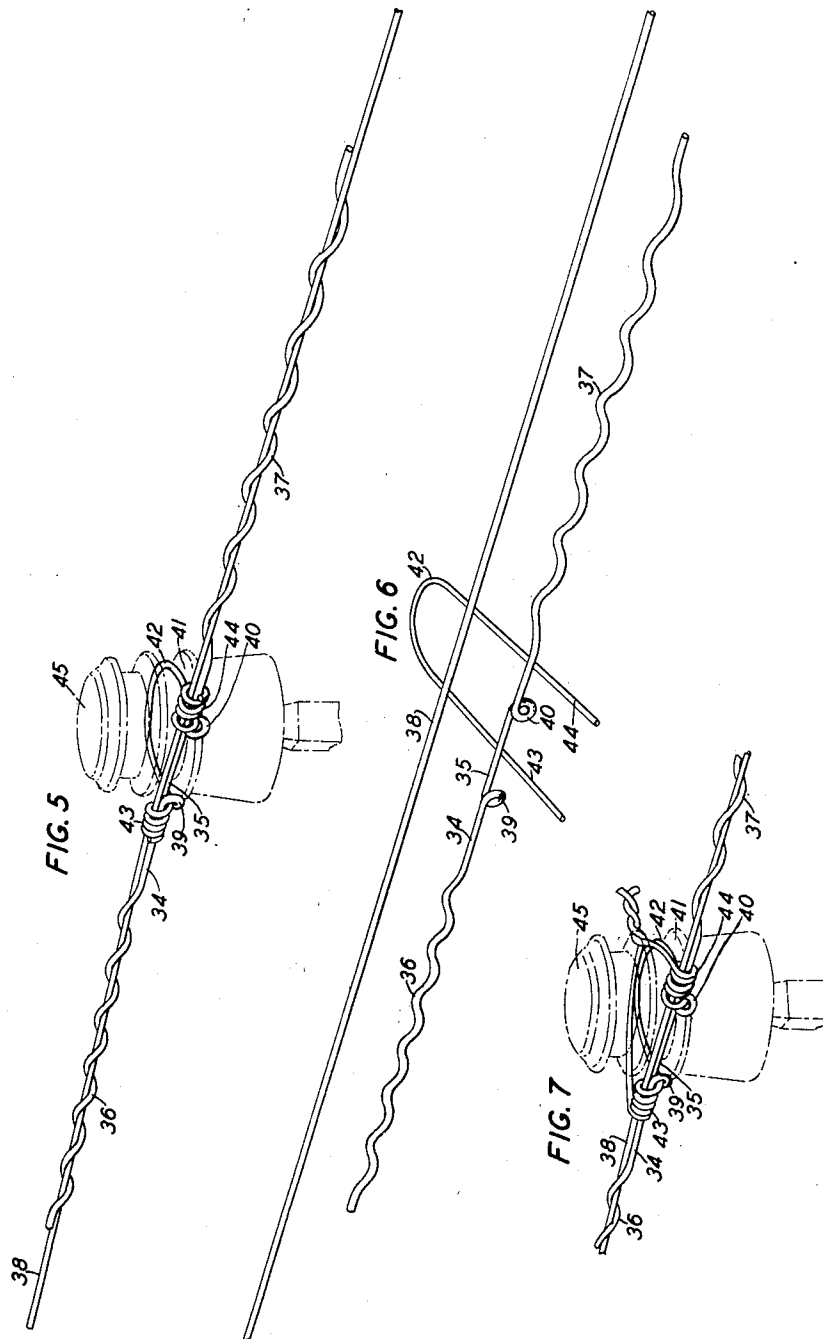
C. S. GORDON ET AL

2,263,728

COMBINED LINE WIRE TIE AND REINFORCEMENT

Filed July 8, 1939

2 Sheets-Sheet 2



INVENTORS: C. S. GORDON
W. C. KLEINFELDER
BY J. Mac Donald
ATTORNEY

UNITED STATES PATENT OFFICE

2,263,728

COMBINED LINE WIRE TIE AND REINFORCEMENT

Chester S. Gordon, Boonton, N. J., and Walter C. Kleinfelder, Rosebank, N. Y., assignors to Bell Telephone Laboratories, Incorporated, New York, N. Y., a corporation of New York

Application July 8, 1939, Serial No. 283,340

4 Claims. (Cl. 174-173)

This invention relates to a tie for a line wire and the like, and more particularly to a combined tie wire and reinforcement for use with pin-type insulators.

The object of the present invention is to provide in a single device means for securing a line wire to an insulator and to reinforce said wire in such a manner that it is held out of contact with the insulator.

Another object of the invention is the provision, in a device for securing a wire to an insulator, of means for reinforcing said line wire some distance on either side of said insulator.

A further object of the invention is the provision of a combination tie and reinforcement which may be readily applied to the insulator and line wire without damage to either one.

A still further object of the invention is the provision of a device for reinforcing and securing a line wire to an insulator which may be applied thereto without the use of special tools.

Heretofore it has been standard practice to secure line wires, which may include telephone, telegraph or other electrical conductors, to pin-type insulators by means of a short length of wire known as a tie wire. This tie wire was wrapped around the insulator and line wire to bind the wire in the groove of the insulator.

This method of tying, depending upon the friction developed by the serving of the tie wire, is known to yield relatively low holding power against endwise slippage of the line wire. In cases of line wire failure under heavy stress, such slippage of the line wire through this older type of tie is frequently observed to extend through several successive ties. Further, this old type of tie is known to provide relatively poor reinforcement for the line wire at its point of attachment to the insulator. Such points of attachment are most susceptible to vibration effects tending to result in fatigue of the line wire.

It has been found in actual practice, and particularly in long-span construction, that the line wire at the point of contact with the insulator is subjected to considerable wear, due to the continued movement of the wire which causes serious abrasion thereof. It has also been found that, due to the fact that the line wire is not tightly secured to the insulator, the insulator will have a tendency to turn on its pin, which in time will cause the insulator to become unscrewed from the pin and become what is known as a "float."

The wire tie of this invention combines in a

single device means for tightly securing the line wire to the insulator to prevent the insulator from turning and means for reinforcing the line wire at the point of contact with the insulator to prevent abrasion thereof.

The preferred form of our invention consists of a preformed helically wound short length of hard drawn wire having intermediate its ends a straight portion provided with a plurality of loops which are arranged to be positioned in the groove of the insulator and to be secured therein by means of a metal strap which passes around the insulator and is wrapped tightly around the reinforcing wire after the line wire has been positioned therein.

In a modified form of our invention a trough or channel-shaped member is secured to the intermediate portion of a preformed helix of hard drawn wire. The line wire is positioned in this member and the convolutions of the helical reinforcing member are wrapped therearound. A strap is positioned around the insulator in the groove thereof and has its ends wrapped tightly around the channel-shaped member containing the line wire.

In a further modification we have provided in the intermediate portion of the reinforcing wire a plurality of downwardly extending loops so spaced that they bear against the lip of the groove. A tie wire is arranged to pass around the insulator in the groove thereof, pass through the loops and be wrapped around the reinforcing wire and the line wire previously positioned therein.

With the hard drawn wire employed in the preformed helices which form part of our invention, a high degree of holding power is developed. The holding power is controllable by varying the diameter of eye of the helix relative to the size of line wire. Also, a slight deformation of the line wire occurs with the application of the preformed helix, thereby increasing the holding power. In this form of tie the holding power against endwise movement of the line may be readily made to exceed the stresses to which the line is designed to be subjected.

The preferred material for use in the preformed helix is a hard drawn wire showing high endurance to fatigue. The stiffness of the completed tie, in combination with the length of reinforcement afforded the line wire, mitigate the flexing of the line wire in the section adjacent to the insulator, thereby eliminating the condition making for early fatigue failure of the line wire.

Other novel features of our invention will be readily apparent from the following detailed description taken with reference to the drawings, in which:

Fig. 1 is a perspective view of the preferred form of our invention having a fragment of line wire secured therein;

Fig. 2 is an exploded view in perspective of the device shown in Fig. 1;

Fig. 3 is a modification of the device shown in Fig. 1 and discloses a channel member secured to the intermediate portion of the reinforcing wire;

Fig. 4 is an exploded view in perspective of Fig. 3;

Fig. 5 is a further modification of Fig. 1 and illustrates in particular a pair of downwardly extending loops which bear against the insulator and through which the tie wire is passed;

Fig. 6 is an exploded view in perspective of the device shown in Fig. 5; and

Fig. 7 is a fragmentary view similar to Fig. 5 in which the ends of the tie wire terminate at the back of the insulator.

In the preferred form of our invention, as shown in Figs. 1 and 2, a stiff hard drawn wire 10 is helically wound at each end to provide the open helices 11 and 12 which firmly embrace the line wire 13; see Fig. 1. The mid or intermediate portion 14 of the wire 10 is straight and is provided with two spaced apart loops or eyes 15 and 16 which point inwardly and are arranged to fit in and bear against the bottom of the groove 17 in the insulator 18. A U-shaped strap 19 is arranged to have its curved portion positioned in the groove 17 directly opposite the eyes 15 and 16 with its free ends 20 and 21 supporting said eyes against rotation and wrapped around and embracing both the reinforcing wire 10 and the line wire 13, see Fig. 1, thereby interposing between the line wire 13 and the groove 17 of the insulator 18 the loops or eyes 15 and 16 and the straight section of the hard drawn wire 14.

Inasmuch as the line wire 13 is firmly secured in the helices 11 and 12 due to the particular configuration thereof and the reinforcing member 10 which comprises these two helices is secured to the insulator 18 by means of the strap 19, there will be little or no lateral movement of the line wire 13 at the point of attachment and due to the fact that the insulator 18 is firmly gripped by the strap 19 there will be no turning of the insulator on its pin which in time would cause the insulator to become detached therefrom and "float" on the line.

In the modification shown in Figs. 3 and 4 the stiff hard wire 22 is also provided with helically wound end portions 23 and 24 which are arranged to embrace the line wire 25 as previously described with regard to the preferred form of our invention shown in Figs. 1 and 2. However, the mid or intermediate portion 26 is secured in a channel member 27 which has tabs or lugs 28 thereon and is arranged to fit into the groove 29 of the insulator 30 with the line wire 25 positioned in the channel 27 and in the convolutions of the helices 23 and 24. A U-shaped strap 31 is arranged to have its curved portions positioned around the insulator 30 in the groove 29 with its free ends 32 and 33 wrapped tightly around the channel member 27 and positioned between the tabs or lugs 28, thereby holding the line wire 25 against movement in a manner as

heretofore described with regard to the preferred form of our invention.

In the modification shown in Figs. 5 and 6 the stiff hard drawn wire 34 is also provided with a straight or flat intermediate portion 35 and two helically wound end portions 36 and 37. Like both of the devices heretofore described, these open helices are arranged to frictionally engage the line wire 38 and securely hold it as shown in Fig. 5. The straight or intermediate portion 35 is provided with two downwardly extending loops or eyes 39 and 40 which are arranged to bear against the outside edges of of the groove 41 in the insulator 45, thereby forming a bridge across the groove 41 at the point of contact. A tie wire 42 which is U-shaped in configuration is arranged to be positioned in the groove 41 with its free ends 43 and 44 passing through the loops or eyes 39 and 40 and wrapped around and embracing both the mid-portion of the reinforcing wire 34 and the line wire 38 to firmly secure the reinforcement in place and to secure the line wire and the reinforcement to the insulator 45. As shown in Fig. 7, the ends 43 and 44 of the tie wire 42 pass through the eyes 39 and 40, are served around the reinforcement 34, line wire 38, and terminate at the rear of the insulator 45 where they are twisted together.

From the foregoing it is readily apparent that the applicants have provided in a single device a means for securing and reinforcing line wires which is not only inexpensive to manufacture, but may be installed by the average lineman without the use of special tools.

While there is described herein the preferred embodiments of our invention, it is to be understood that it is not limited or confined to the precise details of construction herein described as various modifications may be made without departing from the spirit of the invention and are only limited by the scope of the appended claims.

What is claimed is:

1. A combined tie wire and reinforcement for securing a line wire to a circumferentially grooved insulator, comprising a hard drawn wire member having preformed helical end sections so dimensioned as to securely grip the line wire and a portion intermediate said helical sections, said portion having projections thereon for positioning said member with respect to said insulator, and a tie wire having its intermediate portion positioned in the groove of the insulator and having its free ends wrapped around both the line wire and reinforcement.

2. A combined tie wire and reinforcement for securing line wires to insulators having circumferential grooves therein, comprising a reinforcing member and a tie member, said reinforcing member comprising a length of stiff wire having preformed helical end sections and a portion intermediate said helical sections, said portion having spaced apart projections formed integral therewith which engage the groove of said insulator, said tie wire positioned in said groove and having its end portions wrapped around both the reinforcement and the line wire.

3. A combined tie wire and reinforcement for securing line wires to insulators having circumferential grooves therein, comprising a reinforcing member and a tie member, said reinforcing member comprising a length of stiff wire having preformed helical end sections and a portion intermediate said helical sections, said portion

having spaced apart in-turned loops which register with the groove in said insulator, said tie wire comprising a flat metallic strap positioned in said groove and having its end portions wrapped around both the reinforcement and the line wire adjacent said loops. 5

4. A combined tie wire and reinforcement for securing line wires to insulators having circumferential grooves therein, comprising a reinforcing member and a tie member, said reinforcing 10

member comprising a length of stiff wire having preformed helical end sections and a portion intermediate said helical sections, said portion having spaced apart loops with bear against the insulator adjacent the groove, said tie wire positioned in said groove, passing through said loops and having its free ends wrapped around both the reinforcement and the line wire.

CHESTER S. GORDON.

WALTER C. KLEINFELDER.