

March 11, 1941.

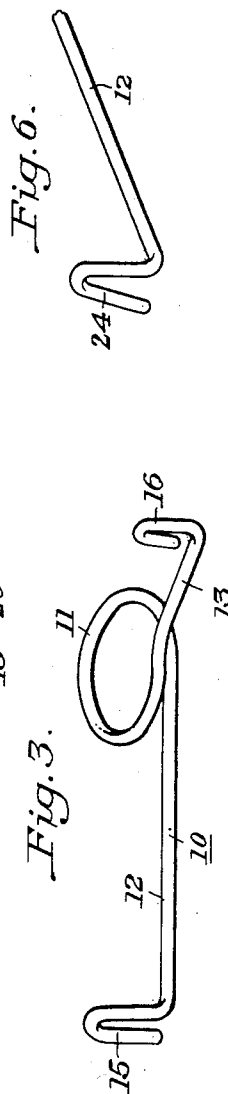
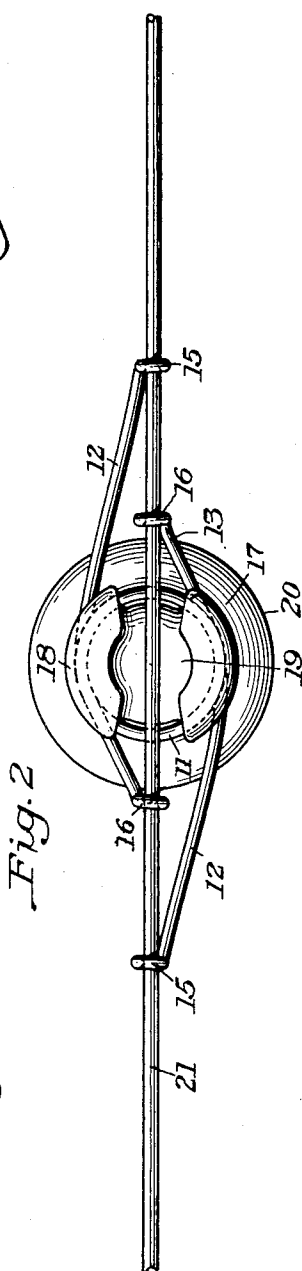
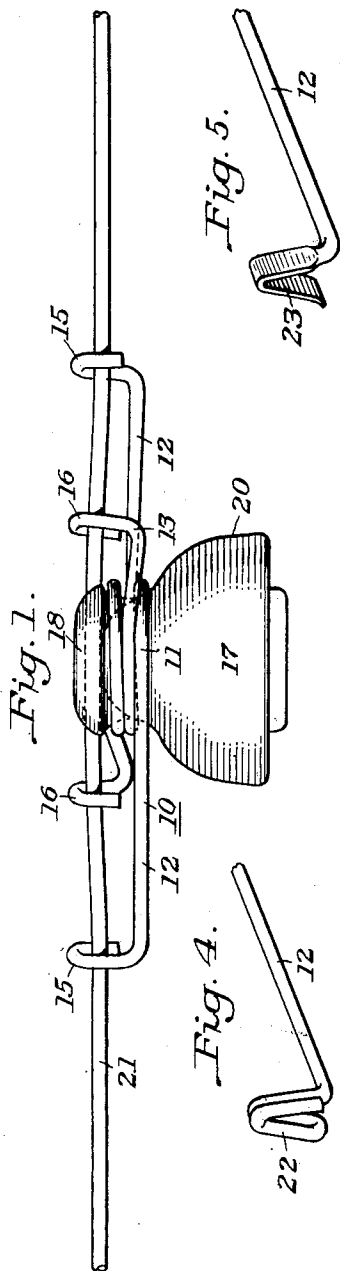
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2,234,656

INSULATOR TIE FOR ELECTRIC CONDUCTORS

Filed Dec. 31, 1938

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 8.

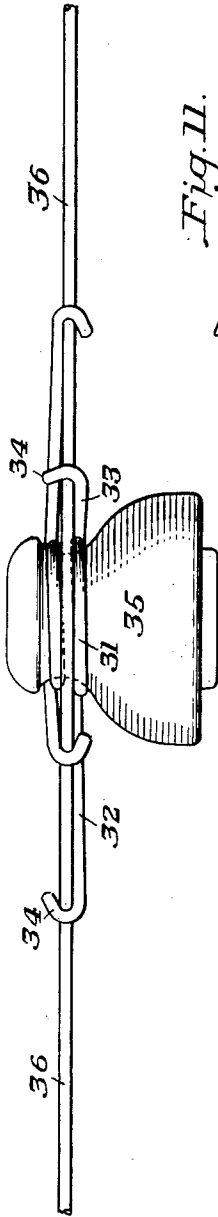


Fig. 11.

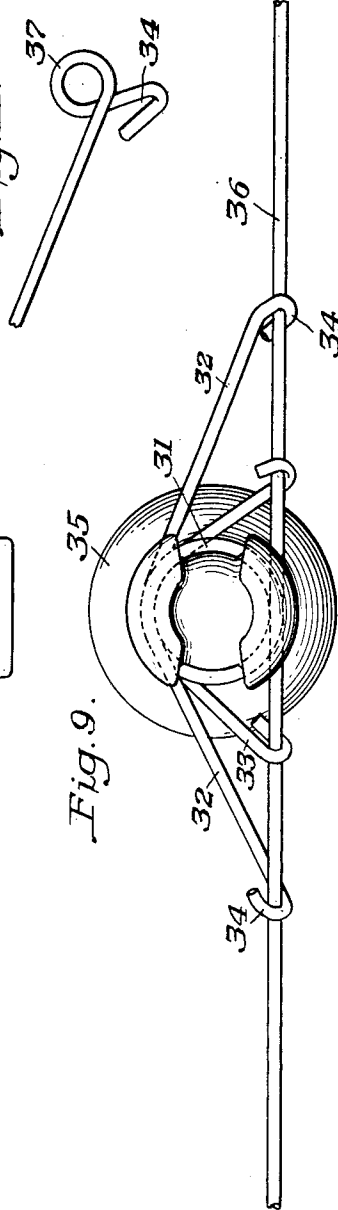


Fig. 7.

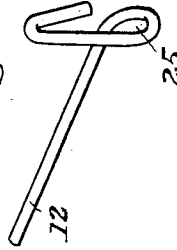


Fig. 9.

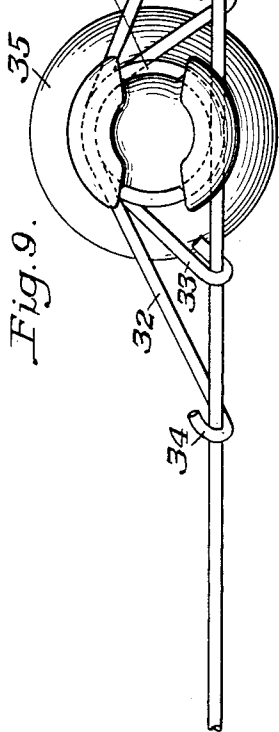
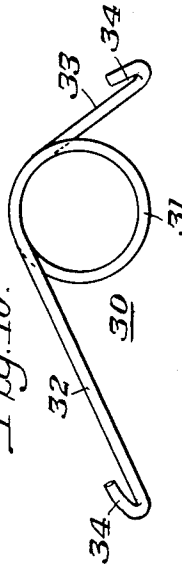


Fig. 10.



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UNITED STATES PATENT OFFICE

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INSULATOR TIE FOR ELECTRIC
CONDUCTORS

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Application December 31, 1938, Serial No. 248,805

1 Claim. (Cl. 24-73)

This invention relates to an insulator tie and, in particular, to a preformed tie especially adapted for easy and rapid installation in the field.

It has been customary heretofore to secure electric conductors such as distribution lines to supporting insulators by bending a short length of annealed wire around the insulator and wrapping the ends around the conductor to be secured thereto. Although this practice is open to certain objections, it provides a fairly satisfactory tie for general use. It has also been customary to de-energize the conductors of a transmission or distribution line while workmen are engaged thereon in repair or maintenance operations. It has become the practice more recently, however, to make minor replacements and repairs while the conductors are "hot" or connected to their source of energy. This practice is desirable because it prevents interruption of service which was necessary under the former practice and is especially important in distribution circuits where there is no alternate supply and a large number of individual customers are inconvenienced.

Repairing or maintenance work on "hot" lines must be carried out by workmen wearing insulated gloves or by the aid of so-called "hot sticks" which are merely wire manipulating tools of wood or other insulating material. It is practically impossible under such circumstances to make a neat, tight tie by bending a length of annealed wire around the insulator and twisting the ends around the conductor in accordance with the former practice. It is the object of this invention, therefore, to provide an insulator tie which can be readily secured by workmen using gloves or "hot sticks", which will securely bind the conductor to the insulator.

In a preferred form, the invention comprises a length of wire having the characteristics of hard-drawn wire, preformed into a loop with the ends extending therefrom in opposite directions and bent into substantially hook shape. The tie is applied by enlarging the loop by manual deformation until it will pass over the head of the insulator, and then bending the ends of the tie until the hook-shaped end portions are engageable with the conductor. After the tie has been applied, the resilience of the wire of which it is composed, by reason of the configuration of the tie, is sufficient to cause it to grip the insulator tightly and to hold it firmly thereon.

A better understanding of the invention may be obtained from the following detailed description which refers to the accompanying drawings

illustrating a preferred embodiment and several modifications thereof. In the drawings:

Fig. 1 is a side elevation showing an insulator with the tie applied thereto for holding a conductor thereon;

Fig. 2 is a plan view;

Fig. 3 is a perspective view of the tie apart from the insulator;

Figs. 4 through 7 are partial perspective views showing modifications of the hook-shaped end portions of the tie;

Fig. 8 is a side elevation of an insulator having a conductor secured thereto by a modified form of tie designated a side tie;

Fig. 9 is a plan view thereof;

Fig. 10 is a plan view of the tie alone; and

Fig. 11 is a partial perspective view illustrating a modified form of the hook-shaped end portion for the side tie.

Referring now in detail to the drawings and, for the present, to Figs. 1 through 3, the tie of my invention is indicated generally at 10 and is composed of wire having characteristics similar to those of spring wire, hard-drawn wire, or similar material. The tie 10 is made by bending a short length of wire into the shape illustrated in Fig. 3 which includes a loop or eye 11 from which the ends of the length of wire extend in opposite directions as shown at 12 and 13. The ends 12 and 13 are of different lengths and the end 13 is bent downwardly from the general plane of the eye 11. The extreme ends of the portions 12 and 13 are bent upwardly and then downwardly, forming hooks 15 and 16.

The type of tie just described is particularly adapted for securing conductors to top-tie insulators as shown at 17. Insulators of this type comprise a head or top 18 having a conductor groove 19 formed therein and a skirt 20. It will be understood, of course, that the insulator 17 is screwed onto or otherwise attached to a supporting pin or fixture secured to a pole or cross-arm or other supporting structure.

To apply the tie to the insulator, the line conductor indicated at 21 is raised slightly therefrom. One of the ties is then manually deformed to the extent necessary to permit the eye 11 to pass over the head of the insulator. I prefer to employ the ties in pairs as shown in the drawings and for this reason the hooks of the tie first applied are not engaged until the second tie has been similarly disposed on the insulator. Such application of the ties to the insulator can frequently be done before attaching the insulator to its supporting structure, thus decreasing and

minimizing the work required of the workmen at the top of the pole or supporting structure. As shown in the drawings, the two ties are arranged on the insulator with their longer ends extending in opposite directions and when both ties have been applied, the line conductor is lowered into the insulator groove 19. Thereafter, the end portions 12 and 13 of both ties are bent upwardly to the extent necessary to permit the hooks 15 and 16 to engage the conductor 21 as shown in the drawings.

The deformation of the tie in its application is resilient and does not substantially change the shape or characteristics of the wire of which it is composed. The loop or eye 11 thus contracts around the neck of the insulator after being dilated sufficiently to pass over the head. Similarly, the end portions 12 and 13, after being sprung upwardly so that their hooks engage the line conductor, resume their downward inclination to a certain extent and effect a gripping on the conductor with possibly a slight bending of the wire 21 as best shown in Fig. 1. The tie is so formed, furthermore, that the ends 12 and 13 extend from substantially the same point of tangency to the loop 11 when the tie is viewed in plan. Thus in order to engage the hooks 15 and 16, a slight contraction of the eye or loop 11 is necessary, which increases the tightness of the grip of the tie on the insulator.

It will be recognized that the tie is so shaped that it may easily be applied to the insulator and secured to the line conductor even though the workman is wearing gloves or using a "hot stick." No complicated manipulations are necessary since the ties are merely "snapped" over the insulator heads and sprung slightly to permit their hooks to engage the conductor.

Fig. 4 illustrates a modified form of hook 22 formed by bending the extreme ends of the portions 12 and 13 back on themselves before bending them to form a hook. This provides an increased bearing surface for engagement with the line conductor.

A similar result may be achieved by flattening the extreme ends of the length of wire used to form the tie as illustrated at 23 in Fig. 5.

Fig. 6 illustrates a hook 24 which is of substantially V-shape as opposed to the substantially U-shape of hook shown at 15 and 16 of Figs. 1 to 3. The V-shape permits the same tie to be employed with several different sizes of wire.

Fig. 7 illustrates a further modification in which the end portions 12 and 13 of the tie are provided with an eye or loop 25 for convenience in handling and particularly adapted to receive a "hot stick," further facilitating the application of the tie to the insulator and conductor by the lineman.

Referring now to Figs. 8 through 11, a modified form of tie indicated at 30 comprises a loop or eye 31 with end portions 32 and 33 extending therefrom at adjacent points of tangency toward the opposite side of the eye. The portions 32

and 33 lie substantially in the same plane as the eye 31 and terminate in hooks 34 disposed in a plane substantially perpendicular to that of the eye 31.

It will be apparent that the tie 30 may be applied to a side tie insulator such as that shown at 35 in the same manner as the tie 10. The eye 31 is dilated slightly by bending the portions 32 and 33 outwardly. After disposing a pair of the ties on the insulator as illustrated in Fig. 9, the hooks 34 are caused to engage the line conductor indicated at 36. It will be noted from the drawings that one tie is preferably disposed with its hooks extending downwardly and the other with its hooks extending upwardly, thus forming a very tight anchorage for the conductor.

The tie 30 is composed of wire similar to that of which the tie 10 is formed, viz., wire having characteristics similar to those of spring wire, 20 hard-drawn wire, or similar material. Both ties may conveniently be formed of the hard-drawn copper-covered steel wire, various bronze wires, steel or such materials as will provide a performance as described herein.

Fig. 11 illustrates a slight modification of the tie 30 which includes a loop or eye 37 formed between the portions 32 and 33 and hooks 34. This eye, like the eye 25 in the tie 10, is for convenience in handling and is particularly adapted to receive the end of a tool such as a "hot stick."

It will be apparent from the foregoing description that the invention contributes greatly to the safety of linemen working on "hot" lines by providing a tie which can be readily and quickly applied by insulated tools and which does not require such elaborate and complicated manipulation that safety gloves are any handicap to the workman using the tie.

Although I have illustrated and described but two preferred embodiments with certain modifications, it will be understood that changes in the shape of the tie and the arrangement of its parts may be made without departing from the spirit of the invention or the scope of the appended claim.

I claim:

A tie wire comprising a closed eye adapted to be dilated to fit over a support such as an insulator, and spring arms extending laterally from said eye, said arms being of different lengths and one of said arms being bent downwardly from the general plane of said eye, and the ends of the arms being bent upwardly and then downwardly forming hooks adapted to engage a wire to be anchored, when said arms are sprung upwardly, the length of the arms being such that two tie wires may be mounted on each insulator without the hooks interfering with each other on the wire to be anchored and thus equalize and distribute the stress on the wire and insulator on both sides of the insulator.

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