T. A. DISSEL.

SUSPENSION RING FOR ELECTRIC WIRES AND THE LIKE.

APPLICATION FILED JAN. 5, 1916.

1,331,248. Patented Feb. 17, 1920.

Fig. 3

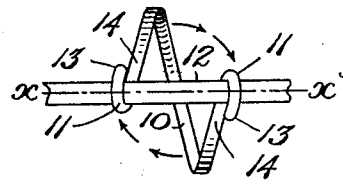


Fig. 6

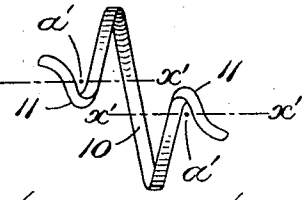


Fig. 5

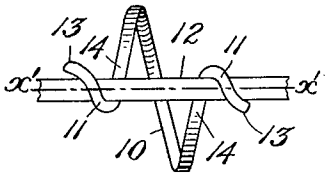


Fig. 1

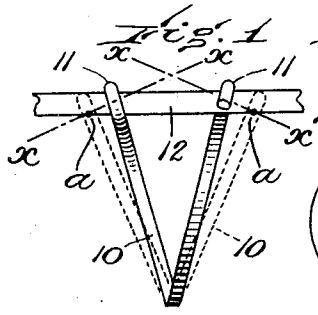


Fig. 2

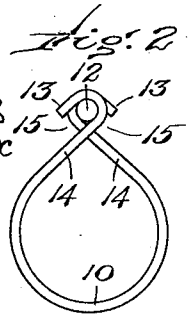


Fig. 7

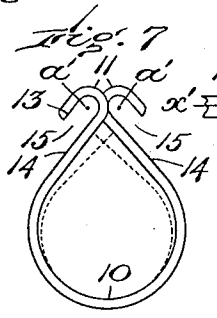


Fig. 4

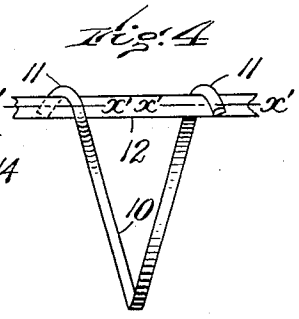


Fig. 8

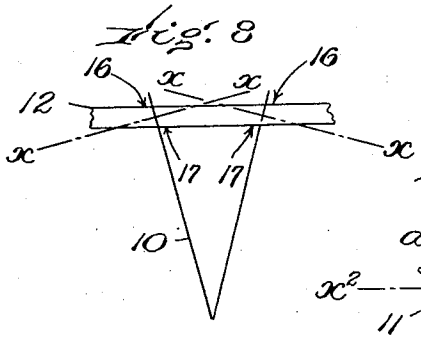


Fig. 9

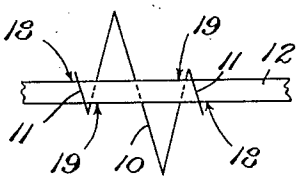


Fig. 11

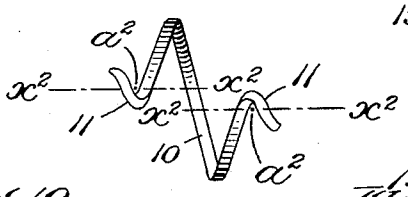


Fig. 10

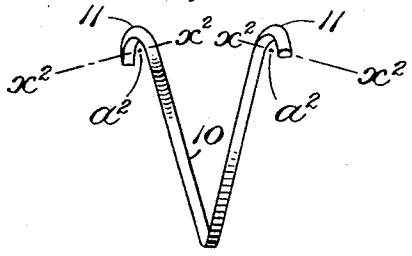
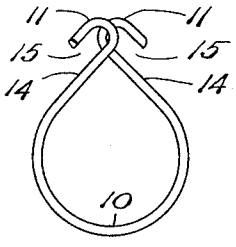


Fig. 12



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Attorneys

UNITED STATES PATENT OFFICE.

THEODORE A. DISSEL, OF MEDFORD, MASSACHUSETTS, ASSIGNOR TO CAMERON APPLIANCE COMPANY, OF EVERETT, MASSACHUSETTS, A CORPORATION OF MAINE.

SUSPENSION-RING FOR ELECTRIC WIRES AND THE LIKE.

1,331,248. Specification of Letters Patent. **Patented Feb. 17, 1920.**

Application filed January 5, 1916. Serial No. 70,525.

To all whom it may concern:

Be it known that I, THEODORE A. DISSEL, a citizen of the United States, and resident of Medford, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Suspension-Rings for Electric Wires and the like, of which the following is a specification.

This invention relates to suspension rings which are used by telephone companies and electric light companies to support wires or cables. For such purpose suspension rings are attached in a series to a supporting wire or messenger strand, and the cable is supported by them between the poles, trees, cross-arms, or other main supporting elements to which the supporting wire is fastened.

Suspension rings for this purpose are made of strips of metal, of any suitable cross section, and each ring is formed with a loop or substantially circular portion to receive the cable and with one or more hooks adapted to hook over the supporting wire. Such rings are usually made of steel but are galvanized to render them rust proof. The majority of suspension rings now in use are fastened to the supporting wire by crimping their hook portions around the latter, such crimping being necessary to prevent accidental detachment from the supporting wire and to prevent movement along the wire as the cable is drawn through the rings. A ring capable of being readily crimped as hereinbefore stated must be made of stock not too stiff to yield readily to the action of the crimping tool, and rings capable of undergoing such crimping are not always as stiff and strong as they should be in order to withstand the stresses due to drawing a cable through them. The crimping operation is also undesirable for the reason that it cracks the zinc coating and causes the hook portions to rust through and break in a comparatively short time. In addition to the destructive effect of the crimping operation there is the inconvenience of having to carry a special tool for the purpose. Furthermore, if a ring which has once been crimped is removed from the supporting wire it is not suitable for further use.

The present invention provides a suspension ring adapted to be applied to a supporting wire without being crimped, said ring embodying formations which will permit intentional detachment and reattachment but which will prevent accidental detachment and slipping along the supporting wire. In consequence of the formations which characterize this invention, the ring may be made of stronger and stiffer stock than would be permissible if crimping were necessary.

Of the accompanying drawings, which illustrate the invention embodied in three forms:

Figure 1 represents an elevation of a supporting ring applied to a supporting wire, the normal condition of the ring being indicated by dotted lines, and its condition when attached to the supporting wire being indicated by solid lines. In this form the axes of the hook portions are normally at an angle to each other but intersecting.

Fig. 2 represents an elevation of the asemblage shown by Fig. 1, looking in the direction of the axis of the supporting wire.

Fig. 3 represents a top plan view of the asemblage shown by Fig. 1, arrows indicating the rotary motion by which the ring is attached to the wire.

Fig. 4 represents an elevation of a supporting ring embodying the invention in another form, the ring being attached to a supporting wire. The hook portions of this ring are helical in form.

Fig. 5 represents a top plan view of the assemblage shown by Fig. 4.

Fig. 6 represents a top plan view of the ring shown by Figs. 4 and 5, but in Fig. 6 the ring is shown in its normal condition and is not attached to the supporting wire. As shown by Fig. 6 the axes of the hook portions are out of register with each other but are substantially parallel.

Fig. 7 represents an elevation of the ring shown by Figs. 4, 5 and 6, looking in the direction of the axes of the hook portions. In this figure the ring is shown in its normal condition, and dotted lines are included to indicate the shape to which the ring is sprung when it is attached to a supporting wire.

Fig. 8 is a diagrammatic view of the ring shown by Figs. 1 to 3, the view correspond-

ing to Fig. 1 and representing the condition of the ring when attached to a supporting wire.

Fig. 9 represents a diagrammatic plan view of the ring shown by Figs. 4 to 7, and represents the ring as attached to a supporting wire as shown by Fig. 5.

Fig. 10 is a view similar to Figs. 1 and 4, showing a ring, in its normal condition, embodying the invention in a third form which is a combination of the two forms shown respectively by Figs. 1 to 3 and 4 to 7.

Fig. 11 represents a top plan view of the ring shown by Fig. 10.

Fig. 12 represents an elevation of the ring shown by Figs. 10 and 11, the direction of view being at right angles to that of Fig. 10.

The same reference characters indicate the same parts wherever they occur.

In all the forms the ring is made of a strip of metal, preferably steel coated with zinc after forming, the term "strip" being used in its broad sense as including flat ribbon metal or wire of any suitable cross section. In each of the forms the ring comprises a body portion 10 and two hook portions 11, 11. The stock of which the ring is made is preferably so stiff that the hook portions will not spring to any appreciable extent, but the loop or body portion 10 in each case is capable of springing owing to the comparatively great length of stock connecting the hook portions.

A supporting wire, sometimes called a "messenger strand", is indicated at 12. This wire is represented conventionally, but it is usually made of a plurality of small strands twisted together to give it flexibility. For the purpose of the present invention it is not necessary to represent the several twisted strands of which the wire 12 is made. The hook portions 11 are substantially semi-circular and their diameter is preferably no greater than what is required to receive the supporting wire. The free end portions 13 of the hooks are extended a short distance from the curved portions of the hooks, as shown by Figs. 2, 7 and 12, and they are substantially parallel to the portions 14, 14 which cross each other as shown by Fig. 2. The throats 15, 15 of the hooks, as formed by the portions 13 and 14, are in every instance as wide as the diameter of the supporting wire 12, and the latter is therefore enabled to enter the hooks without spreading or opening the latter.

One characteristic feature of all the forms is that the axes of the hook portions are normally out of register in one way or another, and as said axes must be brought more nearly into register with each other in order to attach the hooks to the supporting wire, the loop or body portion of the ring must be sprung from its normal condition. The reactive tendency of the ring, when attached to a supporting wire, to spring back to its normal condition causes the hook portions to grip the supporting wire in such manner as to prevent the hooks from becoming unhooked accidentally from the supporting wire and to prevent the ring from sliding lengthwise of the supporting wire when a cable is drawn through the ring. In the form shown by Figs. 1 to 3 the non-registering relation of the axes of the hooks is due to the fact that said axes are normally at an angle relatively to each other, although said axes may intersect each other. This condition is illustrated by Figs. 1 and 8, in which the axes of the hook portions are indicated by broken lines x—x, x—x. In Fig. 1 the said axis lines occupy their normal angular relation corresponding to the normal condition of the ring as indicated by dotted lines, but in Fig. 8 the axis lines occupy the angular relation corresponding to the condition of the ring when the latter is attached to the supporting wire as represented by solid lines in Fig. 1. For this reason the angle of the axis lines as shown by Fig. 8 is more obtuse than that shown by Fig. 1. As shown by Fig. 3 the axis lines coincide with the longitudinal median plane of the supporting wire.

Inasmuch as the loop or body portion of the ring must be sprung from its normal condition, as indicated by Fig. 1, in order to attach the ring to a supporting wire, the hook portions tend to spring back to the dotted-line positions but are prevented from doing so by the supporting wire. The hook portions therefore grip the supporting wire at four points, indicated diagrammatically in Fig. 8 at 16, 16, and 17, 17. The gripping action thus maintained prevents the hooks from unhooking and prevents the ring from sliding along the supporting wire. Still referring to Fig. 8, if a cable were drawn from left to right through the loop or body portion of the ring, it would tend to swing the bottom of the ring in the same direction. This would increase the force of the gripping action of the left-hand hook and would tend to lift the right-hand hook from the supporting wire, but the right-hand hook would not in fact leave the supporting wire, because its portion 14 underlies the supporting wire, as shown by Figs. 2 and 3, and for the additional reason that the left-hand hook would resist the detaching tendency of the right-hand hook. On the other hand, if the cable were drawn from right to left through the ring the force of the gripping action of the right hand hook would be increased and the left-hand hook would be held on the supporting wire by its portion 14 and by the gripping action of the right-hand hook. In each case one of the portions 14 acts as a strut to brace the ring against

the stress incidental to drawing the cable through the ring, and such strut effect is of great assistance owing to the distance separating the two hook portions.

The ring may be attached in a second by turning it as indicated by arrows in Fig. 3. Before turning the ring the two hook portions would be moved upwardly on opposite sides of the supporting wire, to a plane slightly above such wire, then by turning the ring as indicated the two portions 14 would be brought into contact with the wire and would guide the latter into the throats 15 of the hooks, and the hooks would hook over the wire from opposite sides of the latter. The fact that the free ends of the hooks are a considerable distance from the axes of the hooks, and the fact that such axes are out of register, cause the free ends to abut against the wire and to oppose the rotary attaching motion indicated by Fig. 3. In order, therefore, to get the supporting wire into the hooks it is necessary to spring the loop or body portion of the ring so as to move the hooks toward each other as indicated by Fig. 1. Such springing may be caused automatically by the deflecting action of the free ends as the latter are brought to bear with pressure against the supporting wire by the rotary attaching motion, in which case no other act on the part of the user is required to cause such springing. However, if the ring be grasped by the loop or body portion and squeezed so as to spring the hook portions toward each other as the ring is turned, the application of the hook portions to the strand is facilitated. As soon as the hook portions have been sprung toward each other sufficiently to enable the supporting wire to enter the hooks, the hooks snap onto the wire and the attaching operation is completed.

The form shown by Figs. 4 to 7 differs from the form just described, in five respects, viz.: First, the axes x'—x', x'—x' of the hook portions are normally parallel. Second, they are not in the same vertical plane when the ring is in its normal condition. Third, the hook portions must be sprung transversely with relation to their axes in order to attach the ring to the supporting wire. Fourth, the hooks do not have to be sprung toward each other, as indicated by Fig. 1, in order to attach the ring to the supporting wire. Fifth, the form of the hooks is helical. The new features common to both forms thus far described are, first, that the axes of the hook portions are normally out of register with each other; second, said axes are normally at angles relatively to a line intersecting the centers of the hook portions; and, third, the hook portions have a gripping action on the supporting wire in consequence of being sprung from their normal relation when attached to a supporting wire. In order to explain the significance of the phrase "said axes are normally at angles relatively to a line intersecting the centers of the hook portions", said centers are indicated by dots a', a' in Figs. 6 and 7. It will be clear that a line intersecting these dots would not be parallel to either of the axes x'—x'. The centers of the hook portions of the first form are indicated by dots a, a in Fig. 1, and it is clear that the axes as shown by the latter figure are not parallel to a line intersecting said dots.

The helical form of the hooks is clearly shown by Figs. 4, 5 and 6. The reason for such form will be stated in due course. As shown by Figs. 4 and 5, the axes x'—x', x'—x' are coaxial, and such coaxial relation would appear to exist when the ring is detached from the supporting wire provided the ring in such case is viewed according to Fig. 4; but when viewed according to Fig. 6 or Fig. 7 it would be apparent that said axes are offset laterally from each other. The mode of attaching this ring to a supporting wire is the same as that described and indicated by Fig. 3, but the effect of attaching it causes the ring to be sprung as indicated by dotted lines in Fig. 7, the solid lines in the latter figure representing the normal condition of the ring. This distortion from normal condition, although different from that indicated by Fig. 1, is substantially the equivalent so far as results are concerned, but it is to be explained that if the hooks were substantially semi-circular instead of helical in form the tendency of the ring to spring back to its normal condition would result in skewing the ring relatively to the supporting wire and would enable the hooks to be too easily unhooked from the supporting wire. Furthermore, the ring would not have any substantial gripping action on the supporting wire. The purpose, then, of providing hooks of helical form in a ring whose hook axes are normally out of register as shown by Figs. 6 and 7, is to prevent the skewing tendency above mentioned. The hooks are therefore caused to grip the supporting wire at the points indicated conventionally in Fig. 9 at 18, 18, and 19, 19.

The ring shown by Figs. 10, 11 and 12 embodies the essential features of both the forms previously described. For example, the axes x^2—x^2, x^2—x^2 are at an angle relatively to each other when the ring is viewed as in Fig. 10, and when this ring is attached to a supporting wire the hook portions are sprung toward each other as indicated by Fig. 1 and are thereby caused to exert a gripping action on the supporting wire. These axes are otherwise normally out of register with each other, as shown by Fig. 11, and in this respect the normal rela-

tion of the hooks is like that shown by Fig. 6, although the degree of lateral offset, as shown, is less than that shown by Fig. 6. The centers of these hooks are indicated by dots a^2, a^2 in Figs. 10 and 11. As shown by Fig. 10 the axes x^2—x^2, x^2—x^2 are at angles relatively to a horizontal plane intersecting the centers a^2, a^2, and as shown by Fig. 11 the said axes are at angles relatively to a vertical plane intersecting such centers. This form of ring is otherwise similar to the ring shown by Figs. 4 to 7 in that the form of the hooks is helical. This ring therefore utilizes both the gripping characteristics hereinbefore described, and the total grip on the supporting wire is the sum of the two said characteristics.

To detach any of the rings shown, it is only necessary to turn the ring in the opposite direction from that indicated by the arrows in Fig. 3, at the same time forcing the ring upwardly. But the ring would not be accidentally detached when in use, because considerable force is required to turn it and considerable force is required to move it upwardly. When a cable is in the ring and is supported thereby, its weight would be sufficient to prevent any upward movement of the ring relatively to the supporting wire.

I claim:

1. A suspension ring consisting of a strip of metal and having a springy U-shape loop or body portion, two oppositely arranged open hook portions adapted to hook over a supporting wire from opposite sides of the latter, said hook portions being widely separated longitudinal of the axis of the helix, and oppositely inclined portions connecting said hook portions respectively with said U-shape body portion, said inclined portions being arranged to cross below and to underlie the supporting wire, said hook portions being normally separated from each other in lines corresponding to the length of the supporting wire, with their axes normally out of register, and being similar so that either may be first hooked over the supporting wire.

2. A suspension ring consisting of a resilient loop or body terminating in portions crossing each other below and arranged to underlie the supporting wire, and oppositely disposed widely spaced hooks at the ends of said portions, said helical loop being capable of expansion and contraction longitudinally of its axis, said hooks being similar open and so arranged that either may be first hooked upon the wire and the other then hooked upon said wire after forcing it lengthwise of said wire toward the first mentioned hook, the axes of said hooks being relatively angular, said hooks when so engaged with the wire being locked thereon when forced apart lengthwise of the wire by the resiliency of the loop or body.

In testimony whereof I have affixed my signature.

THEODORE A. DISSEL.