Jan. 27, 1959 C. H. KLEIN 2,871,045

WIRE CONNECTING DEVICE

Filed Feb. 3, 1958 2 Sheets-Sheet 1

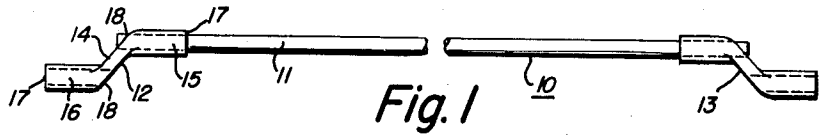


Fig. 1

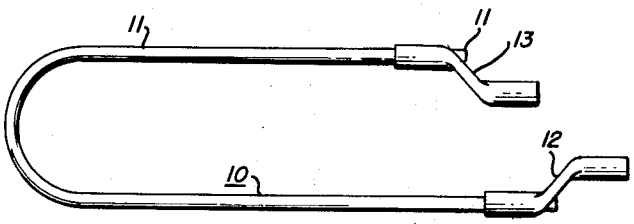


Fig. 2

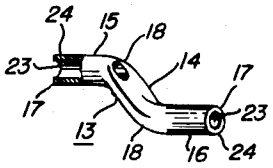


Fig. 3

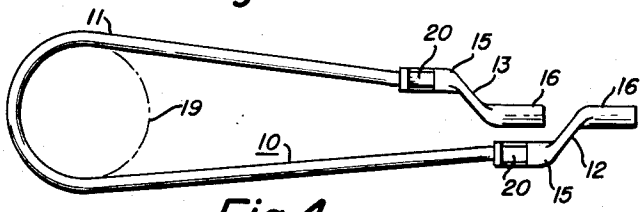


Fig. 4

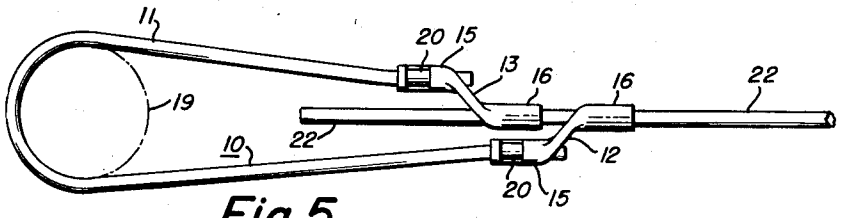


Fig. 5

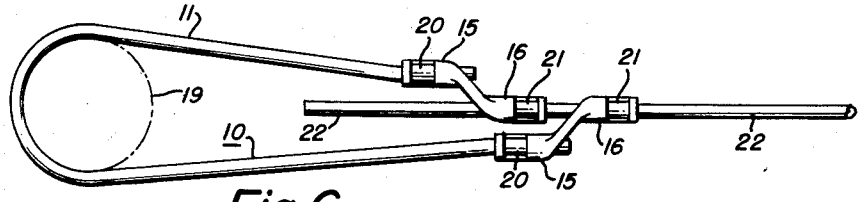


Fig. 6

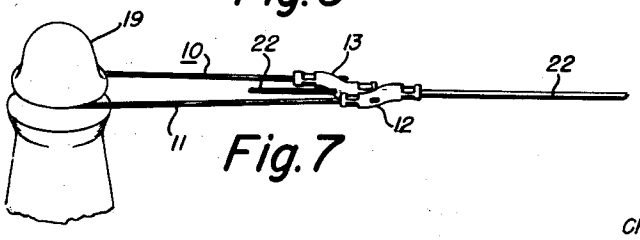


Fig. 7

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WIRE CONNECTING DEVICE

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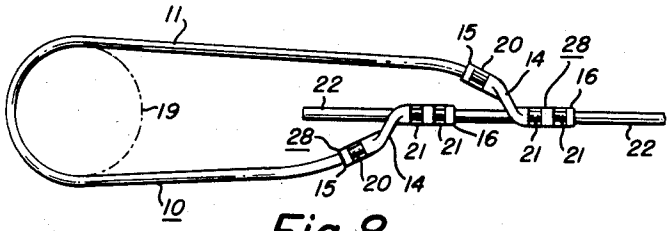


Fig. 8

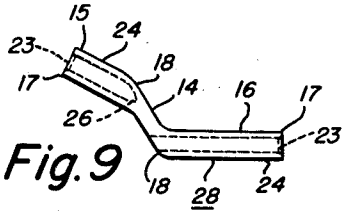


Fig. 9

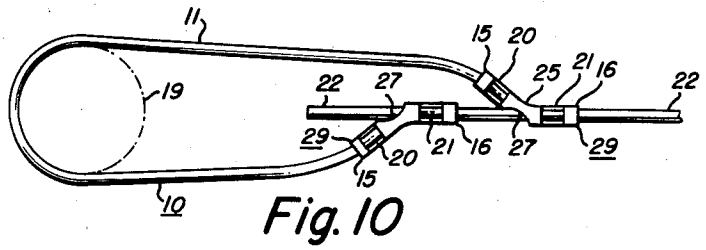


Fig. 10

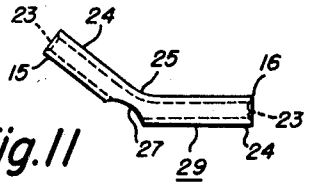


Fig. 11

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United States Patent Office

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WIRE CONNECTING DEVICE

Charles H. Klein, Cleveland, Ohio, assignor to The National Telephone Supply Co.

Application February 3, 1958, Serial No. 712,933

9 Claims. (Cl. 287—75)

This invention relates in general to wire connecting devices and more particularly to a method and means for connecting a straight line wire to a dead-end support.

In dead-ending wires used for telephone, telegraph, or other purposes, it has been the established practice to loop the end of a straight line wire around a dead-end support or electric insulator and insert the end of the wire into a sleeve at the point where the loop begins, thus securing the loop. Over the years the wire manufacturers have strengthened the wires and the communications especially have gone after thinner wires because of the lower cost. Many of these wires are now so stiff that they cannot easily be bent into a loop for dead-ending. Or else the wires are damaged and weakened when bent with the aid of tools. And experience has shown that these stiff wires when held in loop form and then subject to line loads cannot endure vibration as well as a softer or more ductile wire.

It is an object of my invention then to provide a wire connecting device comprising a length of soft, ductile loop wire and two connecting sleeves attached to the ends of the wire.

Another object of my invention is the method of bending the loop wire around a dead-end or an electrical insulator and aligning the two sleeves in a straight line to receive a straight line wire.

Another object of my invention is the method of positioning the straight line wire and crimping the sleeves about the wire enclosed therein.

Other objects and a fuller understanding of this invention may be had by referring to the following description and claims, taken in conjunction with the accompanying drawings, in which:

Figure 1 is a plan view of my invention showing a piece of wire and two offset sleeves attached thereon;

Figure 2 is a plan view showing the wire in a loop or bent position;

Figure 3 is a cross-section view of the type of sleeve embodied in my invention;

Figure 4 is a plan view showing the two sleeves in alignment with one another to receive a straight line wire;

Figure 5 is a plan view showing the straight line wire inserted in the sleeves;

Figure 6 is a plan view showing that the sleeves are compressed about the wire to securely fasten the wire enclosed therein;

Figure 7 shows the relationship of my invention to an electrical insulator or dead-end;

Figure 8 is a plan view showing a modification of my wire connecting device;

Figure 9 is a modification of the type of sleeve embodied in my invention shown in Figure 8;

Figure 10 is a plan view showing a further modification of my wire connecting device; and

Figure 11 shows a further modification of the type of sleeve that may be embodied in my invention.

With reference to Figures 1 and 2 of the drawings, the wire connecting device for connecting a line wire **22** to a dead-end support or electrical insulator **19** is designated by the numeral **10**. The wire connecting device **10** comprises a loop wire **11** and two offset connecting sleeves **12** and **13** connected to the ends of the loop. The wire **11** is soft and ductile so it can easily be looped around a dead-end or electrical insulator **19**.

With specific reference to Figure 3, the sleeves **12** and **13** are formed from a single piece of copper or steel or other suitable material, and are constructed to make a good joint. Since the line load is divided, the offset connecting sleeves **12** and **13** need not be as strong as previously used. The sleeves **12** and **13** have a middle portion **14** and two tubular portions **15** and **16**. The tubular portions **15** and **16** each have an outer end **17** and an inner end **18**. The sleeves **12** and **13** are so formed that the tubular portions **15** and **16** extend at an angle from the ends of the middle portion **14** and are substantially parallel and laterally offset with respect to each other. The middle portion **14** extends between the tubular portions **15** and **16** and at an angle thereto. The tubular portions **15** and **16** each have an opening **23** forming a passage wall **24** extending from the outer end **17** to the inner end **18** of the tubular portions **15** and **16**. The passage walls **24** of the tubular portions **15** and **16** of the sleeves **12** and **13** are of a correct diameter to receive the loop wire **11** and the line wire **22**. The sleeves **12** and **13** are preferably identical and may be the same as the sleeve shown and described in Figure 16 of Patent No. 2,106,007.

With specific reference to Figure 4 of the drawings, the loop wire **11** of the wire connecting device **10** is shown looped around the dead-end or electric insulator **19**. The loop wire **11** is bent in such a way that the two offset sleeves **12** and **13** are aligned to receive the line wire **22**. Prior to looping the loop wire **11** around the dead-end, the tubular portions **15** of the sleeves **12** and **13** are forcibly crimped or compressed as shown by numeral **20** upon the loop wire **11** with a crimping tool to effectively anchor the loop wire **11** to the tubular portions **15** of the sleeves **12** and **13**. The crimping tool may be of the type shown in Patent No. 2,086,400.

After the wire connecting device **10** is positioned, the straight line wire **22** is inserted in the passage walls **24** of the tubular portions **16** of the sleeves **12** and **13** as shown in Figure 5. At this time, the tubular portions **16** of sleeves **12** and **13** are forcibly compressed or crimped, as shown by numeral **21** in Figure 6, upon the line wire **22** enclosed therein with a crimping tool to effectively anchor the line wire **22** to the tubular portions **16** of the sleeves **12** and **13**. This crimping operation anchors the line wire **22** to the sleeves **12** and **13** of the wire connecting device **10**. The Figure 7 is a perspective view of the wire connecting device **10** looped around the insulator or dead-end **19**.

The loop wire **11** of the wire connecting device **10** is made of a length of wire, usually the same diameter as the line wire **22** to be terminated, but of a softer or more ductile metal. While these softer wires are not so strong as the stiff line wires, the design of the device is such that the load is evenly divided between two sides, so that only one-half the strength is needed. Since the line load is divided, the offset connecting on the loop wire need not be as strong as when used as a looped dead-end shown in Patent 2,106,007.

With specific reference to Figures 8 and 9, I show a modification of my wire connecting device as shown in Figures 1 to 7 of the drawings. The corresponding parts are identified with corresponding reference characters. The angularly related offset sleeve **28** used in this particular wire connecting device is modified in two particulars. The tubular portion **15** of sleeve **28** is not substantially parallel to the tubular portion **16** of the sleeve **28**.

The tubular portion 15 is angularly related to the tubular portion 16 so that the line wire 22 can be inserted into the opening 23 of the tubular portion 16 with a minimum of bending. The second modification is that the passage wall 24 of the tubular portion 15 of the sleeve 28 is terminated at a terminating end 26 instead of extending completely through the tubular portion 15 as shown in Figure 3 of the drawings. The ends of the loop wire are inserted into the opening 23 of the tubular portion 15 of the sleeve 28 and the terminating end 26 acts as a stop for the ends of the loop wire 11 from extending beyond the inner ends 18 of the tubular portions 15. The tubular portions 15 and 16 of the sleeve 28 are compressed upon the loop wire 11 and the line wire 22 as shown by the numerals 20 and 21, respectively.

With specific reference to Figures 10 and 11, I show a further modification of my wire connecting device as shown in Figures 1 to 7 of the drawings. The corresponding parts are also identified with corresponding reference characters. The elbow sleeve 29 is a further modification of the sleeve 28. The elbow sleeve 29 has two angularly related portions 15 and 16 connected together by an intermediate portion 25. The tubular portion 15 is not parallel to tubular portion 16 as are the tubular portions 15 and 16 of sleeve 13 as shown in Figure 3. The elbow sleeve 29 has an intermediate opening 27 which allows the passage of the line wire 22 through the tubular portion 16. The ends of the loop wire 11 terminate at a point or place spaced from the terminating end 27 and are compressed wherein by a crimping tool.

Although this invention has been described in its preferred form with a certain degree of particularity, it is understood that the present disclosure of the preferred form has been made only by way of example and that numerous changes in the details of construction and the combination and arrangement of parts may be resorted to without departing from the spirit and the scope of the invention as hereinafter claimed.

What is claimed is:

1. A wire connecting device for connecting a line wire to a dead-end support, said wire connecting device comprising a loop wire having ends and first and second sleeve members, said loop wire extending around said dead-end support, said sleeve members having a middle portion and first and second tubular portions, said first and second tubular portions having outer and inner ends, said first tubular portions of said sleeve members extending at an angle from an end of said middle portion, said second tubular portions of said sleeve members extending at an angle from the other end of said middle portions, said first and second tubular portions being substantially parallel and laterally off-set with respect to each other with said middle portion extending therebetween and at an angle thereto, said first and second tubular portions each having an opening forming a passage wall extending from said outer end to said inner end, said passage walls of said first tubular portions of said first and second sleeve members being of a diameter to receive said ends of said loop wire, said passage walls of said second tubular portions of said first and second sleeve members being of a diameter to receive said line wire, and said tubular portions of said sleeve members being compressed about said wires enclosed therein and securely connecting said line wire to said loop wire.

2. A wire connecting device for connecting a line wire to a dead-end support, said wire connecting device comprising a loop wire having ends and first and second sleeve members, said loop wire extending around said dead-end support, said sleeve members having a middle portion and first and second tubular portions, said first and second tubular portions having outer and inner ends, said first tubular portions of said sleeve members extending at an angle from an end of said middle portion, said second tubular portions of said sleeve members extending at an angle from the other end of said middle portions, said first and second tubular portions extending in the same general direction and laterally off-set with respect to each other with said middle portion extending therebetween and at an angle thereto, said first and second tubular portions each having an opening forming a passage wall, said passage walls of said first tubular portions of said first and second sleeve members being of a diameter to receive said ends of said loop wire, said passage walls of said second tubular portions of said first and second sleeve members being of a diameter to receive said line wire, and said tubular portions of said sleeve members being compressed about said wires enclosed therein and securely connecting said line wire to said loop wire.

3. A wire connecting device for connecting a line wire to a dead-end support, said wire connecting device comprising a loop wire having ends and first and second sleeve members, said loop wire extending around said dead-end support, said sleeve members having a middle portion and first and second engagement portions, said first and second engagement portions having outer and inner ends, said first engagement portions of said sleeve members extending at an angle from an end of said middle portion, said second engagement portions of said sleeve members extending at an angle from the other end of said middle portions, said first and second engagement portions extending in the same general direction and laterally off-set with respect to each other with said middle portion extending therebetween and at an angle thereto, said first and second engagement portions each having an engagement wall, said engagement walls of said first portions of said first and second sleeve members receiving said ends of said loop wire, said engagement walls of said second tubular portions of said first and second sleeve members receiving said line wire, and said engagement portions of said sleeve members being compressed about said wires enclosed therein and securely connecting said line wire to said loop wire.

4. The method for connecting a line wire to a dead-end support which comprises the steps of providing a loop wire and first and second sleeve members each having first and second tubular portions with passage walls extending therethrough, passing the ends of the loop wire respectively through the passage walls of the first tubular portions of said sleeve members, compressing said first tubular portions upon the ends of the loop wire to anchor the sleeves to the said ends of the loop wire, bending said loop wire around said dead-end support, aligning said second tubular portions of said sleeve members substantially in a straight line to receive said line wire, passing said line wire through said passage walls of said second tubular portions of said sleeve members, and compressing said second tubular portions of said sleeve members about said line wire enclosed therein to connect said line wire to said loop wire.

5. A wire connecting device for connecting a line wire to a dead-end support, said wire connecting device comprising a loop wire having ends and first and second sleeve members, said loop wire extending around said dead-end support, said sleeve members having related first and second engagement portions connected together, said first and second engagement portions each having an engagement wall, said engagement walls of said first portions of said first and second sleeve members receiving said ends of said loop wire, said engagement walls of said second tubular portions of said first and second sleeve members receiving said line wire, and said engagement portions of said sleeve members being compressed about said wires enclosed therein and securely connecting said line wire to said loop wire.

6. A wire connecting device for connecting a line wire to a dead-end support, said wire connecting device comprising a loop wire having ends and first and second

sleeve members, said loop wire extending around said dead-end support, said sleeve members having angularly related first and second engagement portions connected together, said first and second engagement portions each having an engagement wall, said engagement walls of said first portions of said first and second sleeve members receiving said ends of said loop wire, said engagement walls of said second tubular portions of said first and second sleeve members receiving said line wire, and said engagement portions of said sleeve members being compressed about said wires enclosed therein and securely connecting said line wire to said loop wire.

7. A wire connecting device for connecting a line wire to a dead-end support, said wire connecting device comprising a loop wire having ends and first and second sleeve members, said loop wire extending around said dead-end support, said sleeve members having angularly related first and second engagement portions and an intermediate portion, said intermediate portion connecting said first and second engagement portions together, said first and second engagement portions each having an engagement wall, said engagement walls of said first portions of said first and second sleeve members receiving said ends of said loop wire, said engagement walls of said second tubular portions of said first and second sleeve members receiving said line wire, and said engagement portions of said sleeve members being compressed about said wires enclosed therein and securely connecting said line wire to said loop wire.

8. A wire connecting device for connecting a line wire to a dead-end support, said wire connecting device comprising a loop wire having ends and first and second sleeve members, said loop wire extending around said dead-end support, said sleeve members having angularly related first and second tubular portions and an intermediate portion, said intermediate portion connecting said first and second tubular portions together, said first and second tubular portions having outer and inner ends, said first tubular portion having an opening forming a passage wall extending from said outer end and terminating at a distance intermediate said outer and inner ends, said second tubular portion having an opening forming a passage wall extending from said outer end to said inner end, said passage walls of said first portions of said first and second sleeve members receiving said ends of said loop wire, said passage walls of said second tubular portions of said first and second sleeve members receiving said line wire, and said tubular portions of said sleeve members being compressed about said wires enclosed therein and securely connecting said line wire to said loop wire.

9. The method for connecting a line wire to a dead-end support which comprises the steps of providing a loop wire and first and second sleeve members each having first and second engagement portions with engagement walls, placing the ends of said loop wire respectively within the engagement walls of said first engagement portions of said sleeve members, compressing said first engagement portions upon the ends of said loop wire to anchor the sleeves to said ends of said loop wire, bending said loop wire around said dead-end support, aligning said second engagement portions of said sleeve members substantially in a straight line to receive said line wire, placing said line wire within said engagement walls of said second engagement portions of said sleeve members, and compressing said second engagement portions of said sleeve members about said line wire enclosed therein to connect said line wire to said loop wire.

No references cited.