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ELECTRICAL AND INSTRUMENT CORD

Filed Feb. 14, 1927

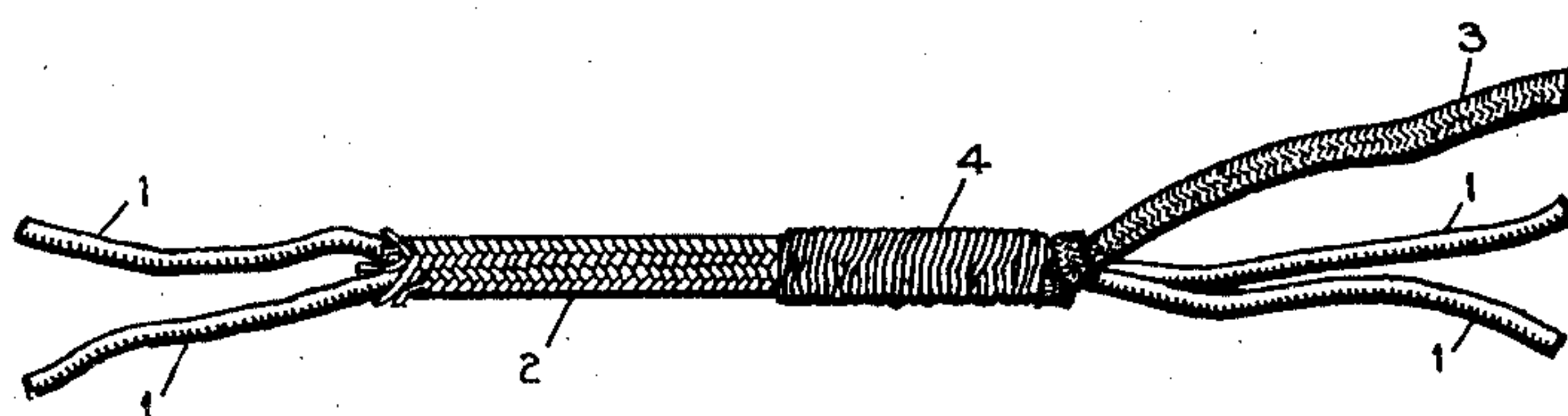


FIG. 1

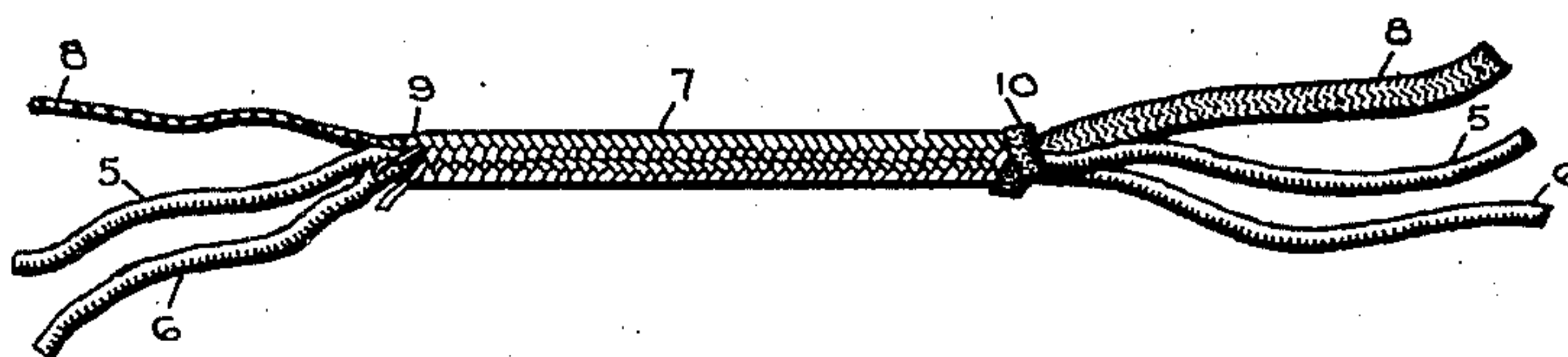


FIG. 2



FIG. 3

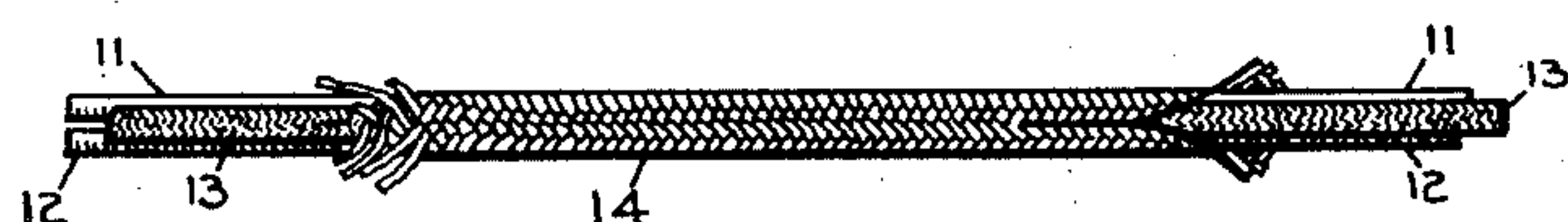


FIG. 4

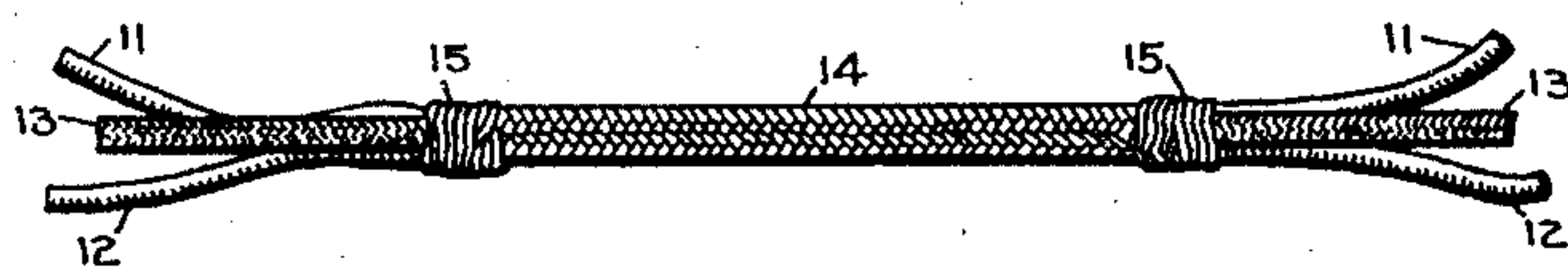


FIG. 5

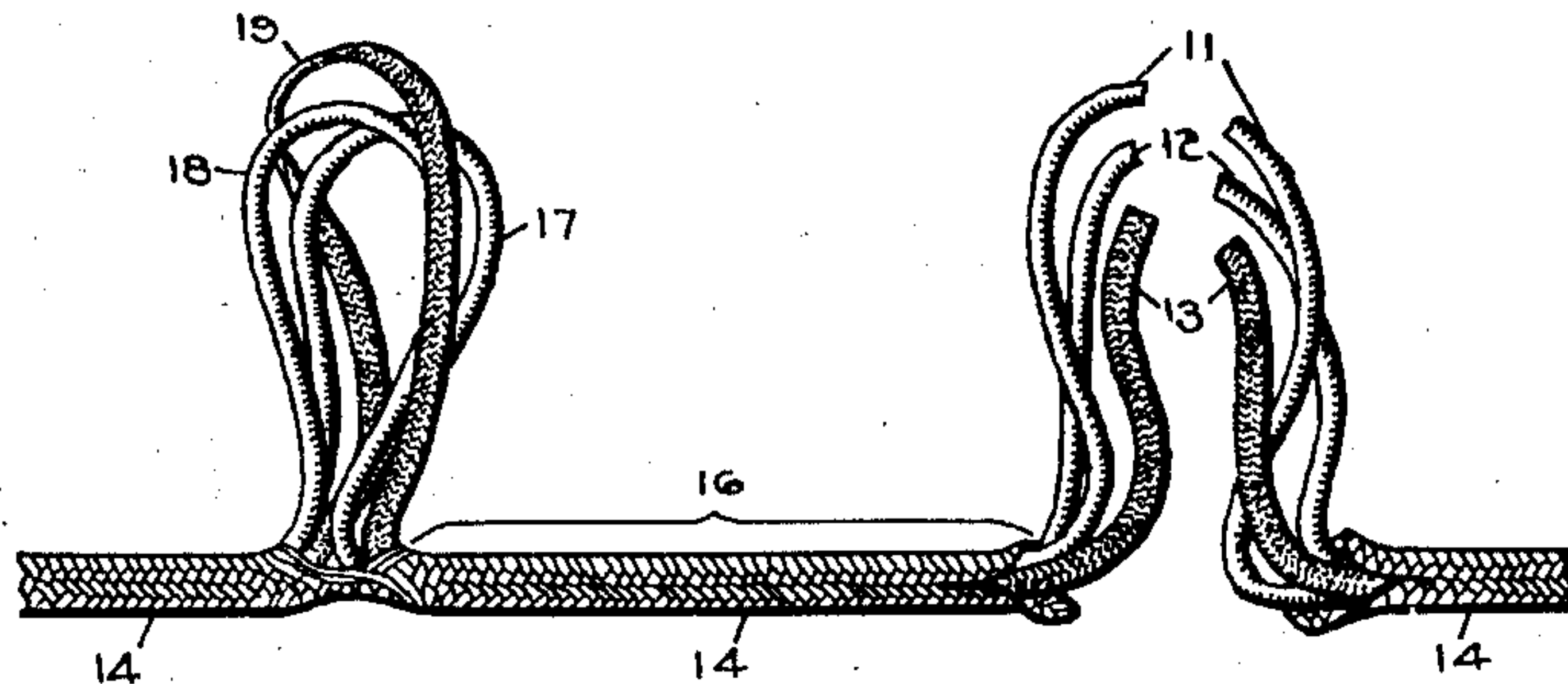


FIG. 6

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ELECTRICAL AND INSTRUMENT CORD.

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This invention relates to instrument cords and more particularly to telephone cords.

In such cords and especially in telephone cords it is the practice to provide what is known as a stay cord to remove the strain from the conductors connected to the apparatus such as the telephone receiver and the terminals in the desk stand or wall telephone. These cords, as is well known, consist of several insulated conductors brought closely together and covered with a braided covering of threads. In telephone cords now in use, the stay cord is formed by continuing this outer covering as a hollow tube of braid after the conductors have been pulled through the covering. Such a method requires that the cords be cut to length before the outer braided covering is applied, due to the fact that it is necessary to pull the conductors through the braided covering. Since a short length of cord is employed, it is necessary to apply the outer braided covering to the cords on a slow type of braiding machine such as the New England butt braider. This type of braider is so noisy and slow in operation that manufacturers have been striving for many years to devise a method of performing all of the braiding operations on a telephone cord on the relatively quiet-operating Wardwell braider so that the noisy inefficient butt braider could be dispensed with.

In accordance with the present invention it is proposed to provide a stay cord throughout the whole length of the telephone cord and to apply the braided covering to a continuous cord, that is, the braided covering is applied to a long cord of sufficient length to make many cords because the stay cord is not formed as a part of the outer braided covering.

Other features include the various steps of manufacturing a telephone or instrument cord which result in greatly reduced manufacturing time and quieter manufacturing conditions with the consequent reduction of cost and in the production of a neater and more satisfactory stay cord construction.

For a more complete understanding of the invention, reference is made to the drawings in which Fig. 1 shows an original type of telephone cord; Fig. 2 indicates the form of telephone cord now in common use. Figs. 3, 4, 5 and 6 show various steps in the manu-

facture of a telephone cord of the present invention.

Referring especially to Fig. 1 there is shown one of the original types of telephone cords consisting of two conductors 1, 1, placed either side by side or in twisted relation, with an outer covering braided thereon by a braiding machine such as a New England butt braider. Certain portions of the conductors 1, 1 were exposed for connection to the telephone apparatus and a stay cord 3 consisting of a hollow braided tube of threads overlapping an inch or so of the braided covering near the exposed ends of the conductors was bound to the telephone cord proper. In order that the stay cord 3 could not easily be pulled from the telephone cord it was knotted at a point where the exposed conductors 1, 1 left the braided covering 2. Since this type of construction was unsatisfactory due to the fact that the stay cord 3 frequently was pulled away from the wrapping 4, it has been replaced by the construction shown in cord of Fig. 2.

In this last mentioned figure there is shown a common type of telephone cord now in use having two insulated conductors, 5 and 6, placed either side by side or in twisted or rope arrangement cut to the final length of the telephone cord and when thus arranged, have an outer covering 7 braided thereon by a New England butt braider. In applying this covering a hollow stay cord 8 is first braided on the braider of desired length to a point such as 9, with the conductors 5 and 6 held outside of the threads forming the stay cord, after which the braider continues to braid the outer covering 7 around conductors 5 and 6 from point 9 to point 10, when the conductors 5 and 6 are pulled through the threads and the outer covering 7 continues as a hollow tube of braided threads to form the stay cord 8 at the other end of the cord. To give a stronger construction of the stay cord, it is knotted at the point 10 where the hollow tube of threads forming the stay cord 8 separates from the outer covering. A similar knot which has been omitted from the showing of Fig. 2 is tied at a similar point at the other end of the cord. In using such a telephone cord having a knotted stay cord it is frequently necessary to insert the cord through an opening in the

telephone instrument of approximately the same size as the cord so that the knot in the stay cord obstructs the passage of the cord through the opening. For this reason in the case of many installations it is necessary to untie these knots, insert the cord through the opening in the instrument and then retie them after the cord has been inserted. The necessity of untying and retying these knots in a stay cord increases the installation time and is a source of much annoyance to installers.

Due to the fact that it is necessary to pull the conductors 5 and 6 outside of the covering 7 while the stay cord is being braided and to place the conductor within the threads while the outer covering is being braided thereon, it is necessary that the telephone conductor be cut to final length before the braiding operation starts, and since the cord is of relatively short length it is necessary to perform this braiding operation on a New England butt braider. This necessity arises from the fact that it is necessary to stop the braider frequently and this frequent stopping and starting of the braider prevents the use of quiet, high-speed braiding machines having great momentum. The New England butt braider, as is well known, is a noisy inefficient machine and since the telephone cords are manufactured in large quantities it is necessary to have great numbers of these New England butt braiders and the great noise of each of these braiders when multiplied by the large number of braiders employed in each braiding department results in braiding departments being so noisy that it is impossible to hear conversation without shouting. This noisy condition places a nervous strain on the operators and renders it difficult to get good operators who can continuously stand the strain of such noise. In addition to this outstanding objection the New England butt braider is a slow inefficient machine. For these reasons cord manufacturers have been striving for many years to devise a method of braiding telephone cords which will permit the braiding of such cords on the quiet, fast-operating braiders now on the market such as the Wardwell braider.

Applicant has devised a telephone cord and the method of making it which accomplishes all of these desired results which is disclosed in Figs. 3, 4, 5 and 6. Referring to Fig. 3 there are represented two conductors 11 and 12 placed side by side in parallel arrangement. Each of these conductors has an insulating covering of threads braided thereon by means of a Wardwell braider. In this construction a continuous stay cord 13 consisting of a hollow tube of threads also braided on the Wardwell braider is placed in parallel arrangement with the conductors 11 and 12, in such a manner that it serves as a filler for the cord so that the cord approaches a circular

cross-section. The conductors 11 and 12 and the stay cord 13 when arranged in the manner described and of any desired length convenient for handling have applied thereto an outer braided covering 14 also by means of a Wardwell braider. After the stage of braiding a long length multi-unit telephone cord with the outer covering 14 thereon, is finished, the multi-unit cord may then be cut into pieces or units of any desired length for final use. In finishing the cord thus cut to length, the outer covering is trimmed off as shown in Fig. 4 until the desired length of conductors 11 and 12 and the stay cord 13 are uncovered. The exposed ends of threads forming the covering 14 are then wrapped with a number of turns of thread 15, as shown in Fig. 5, to which wrapping shellac or similar adhesive material is applied to hold these wrapping threads in place. For purposes of description it has been specified that a Wardwell braider should be used for all of the braiding operations but it will be understood that this invention is not limited to this type of machine but any quiet, fast-operating braider may be employed instead. Also instead of finishing the cord by wrapping the exposed ends of the covering 14 with the wrapping of threads 15, any other well-known method as a band of flexible material such as metal may be employed.

As a modification of this invention instead of applying the braided covering 14, as described above, it is also proposed that when the covering 14 has been braided over a desired portion such as 16 of the telephone cord of Fig. 6 the conductors 11 and 12 and the stay cord 13 may be pulled through the braid in the form of loops 17, 18 and 19 after which the braided covering is again applied to a second portion of the cord when the conductors and stay cord 11, 12 and 13 are again pulled through the braided covering 14 to form loops. As shown in this last figure the long length of conductor will have a series of smooth portions 16 with the outer covering 14 appearing thereon, separated by portions where the loops 17, 18 and 19 are exposed. In this modification to finish the cords the continuous length of cord is cut into pieces across the center portion of the loops 17, 18 and 19. The outer covering 14 is then trimmed off to the proper length after which the cord is finished by wrapping the exposed ends of thread of covering 14 with a wrapping such as 15 in the manner shown in Fig. 5. This second modification is the preferred one in that there is less waste of material since it is necessary to trim off much less of the outer covering 14 and also requires less time in finishing the cords since it is unnecessary to trim off so great a length of covering 14 as will be readily apparent from Figs. 4 and 6. While this description has particularly referred to telephone cords and has shown a

two-conductor, it will be understood that the invention is not so limited but is applicable to any type of instrument cord having a stay cord, whether such electrical cord has one or
5 more conductors.

What is claimed, is:

1. In an electrical cord, a conductor, a braided stay cord in close relation to said conductor extending the entire length of the conductor, and a braided covering enclosing said stay cord and conductor.
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2. In an electrical cord, a pair of conductors, a tubular stay cord in close relation to said conductors and a braided covering separate from said stay cord and enclosing said conductors and stay cord.
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3. In an electrical cord, a pair of conductors, a braided tubular stay cord extending substantially the whole length of said conductors, said stay cord serving as a filler so that the cross-section of conductors and stay cord approaches a circle, and an outer braided covering enclosing said conductors and stay cord.
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4. The method of manufacturing electrical cords which consists in assembling a plurality of conductors and a continuous stay cord of relatively great length, applying a continuous braided covering to said long length cord, cutting this long length cord into desired lengths, and removing a portion of the braided covering from each length.
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5. The method of manufacturing electrical cords which consists in assembling a plurality of conductors and a continuous stay cord of relatively great length, applying a continuous braided covering to said long cord, cutting this long cord into desired lengths, trimming off any excess portion of the braided covering from each end of each length and wrapping the exposed ends of the trimmed braided covering.
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6. A stage in the manufacture of electrical cords which consists in assembling relatively long lengths of conductors and stay cord, applying a continuous braided covering enclosing portions of said conductors and stay cord, and moving sections of said conductors and
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stay cord through the braided covering to expose desired sections thereof.
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7. A stage in the manufacture of electrical cords which consists in assembling electrical conductors and a stay cord in substantially parallel relation, applying an outer braided covering to said conductors, and pulling the conductors and stay cord through the covering at predetermined points to expose the conductors and stay cord in the form of loops.
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8. The method of manufacturing electrical cords which consists in assembling electric conductors and a stay cord in substantially parallel relation, applying an outer braided covering to said conductors, pulling the conductors and stay cord through the covering at predetermined points to expose the conductors and stay cord in the form of loops to produce a multi-unit cord, cutting the multi-unit braided cord at the points where the loops of the conductors and stay cord are exposed, and wrapping the exposed ends of the braided covering.
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9. The method of manufacturing electrical cords which consists in assembling conductors and a stay cord so that they are in close relation and extending in the same general direction, applying a braided covering over said conductors and stay cord of a length substantially equal to that of a finished cord, pulling the conductors and stay cord through the braided covering, then proceeding to braid a covering over the conductors and stay cord of substantially the desired length of a second cord, repeating these operations of applying a braided portion to the cord and pulling the conductors and stay cord through the braided covering until a multiple-unit cord is manufactured, cutting the multiple-unit cord at the points where the conductors are pulled through the braided covering, trimming off any excess braided covering and wrapping the exposed ends of the braided covering.
75 80 85 90

In witness whereof, I hereunto subscribe my name this 10th day of February, A. D. 1927.

JOHN D. WILLIAMS.