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E. J. SCHNEIDER

1,908,062

ELECTRIC CONDUCTOR

Filed Nov. 6, 1931

Fig. 1.

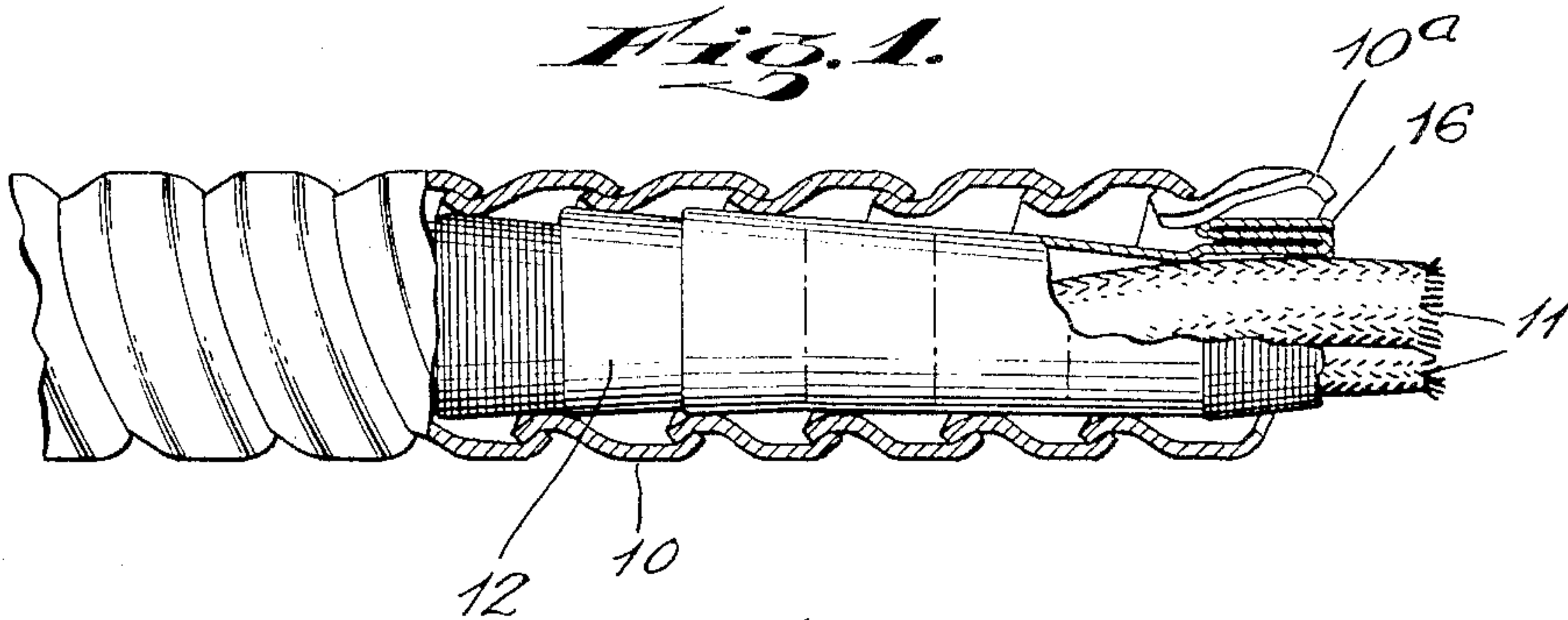


Fig. 2.

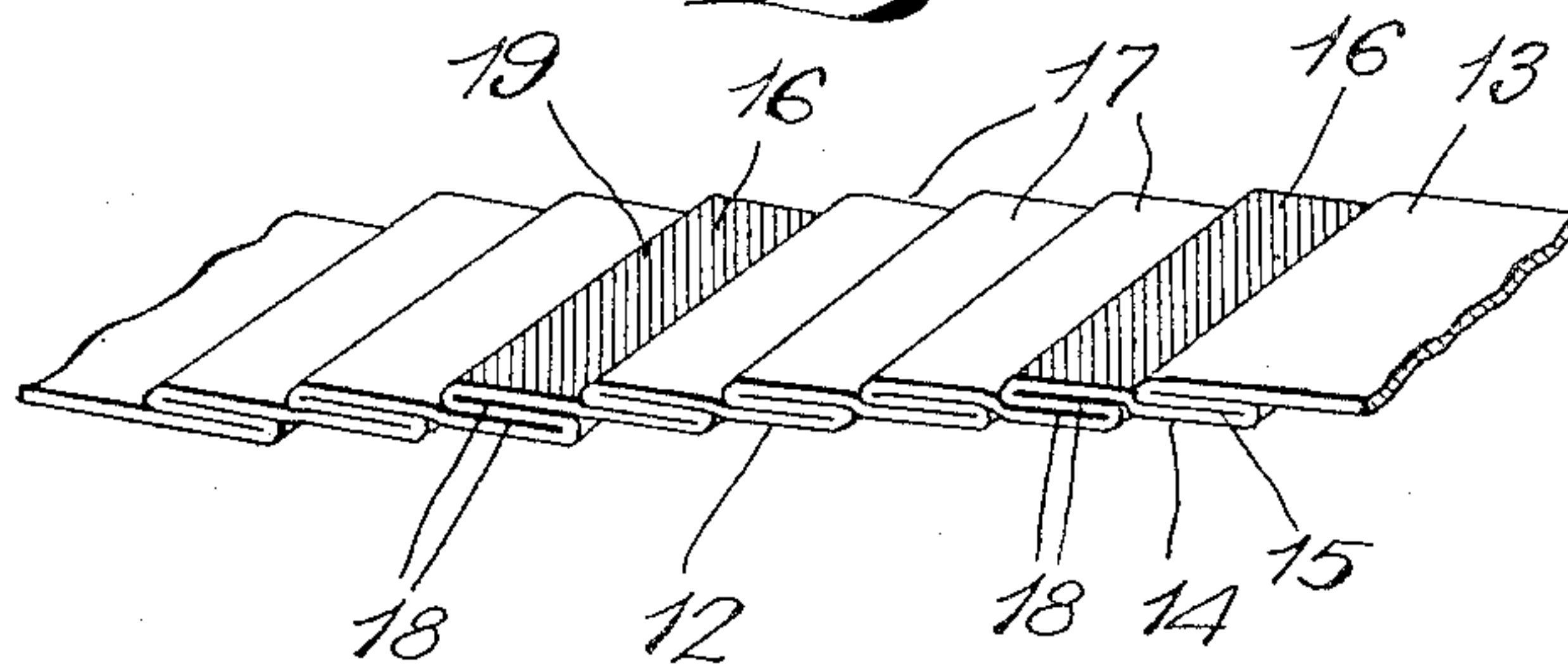


Fig. 3.

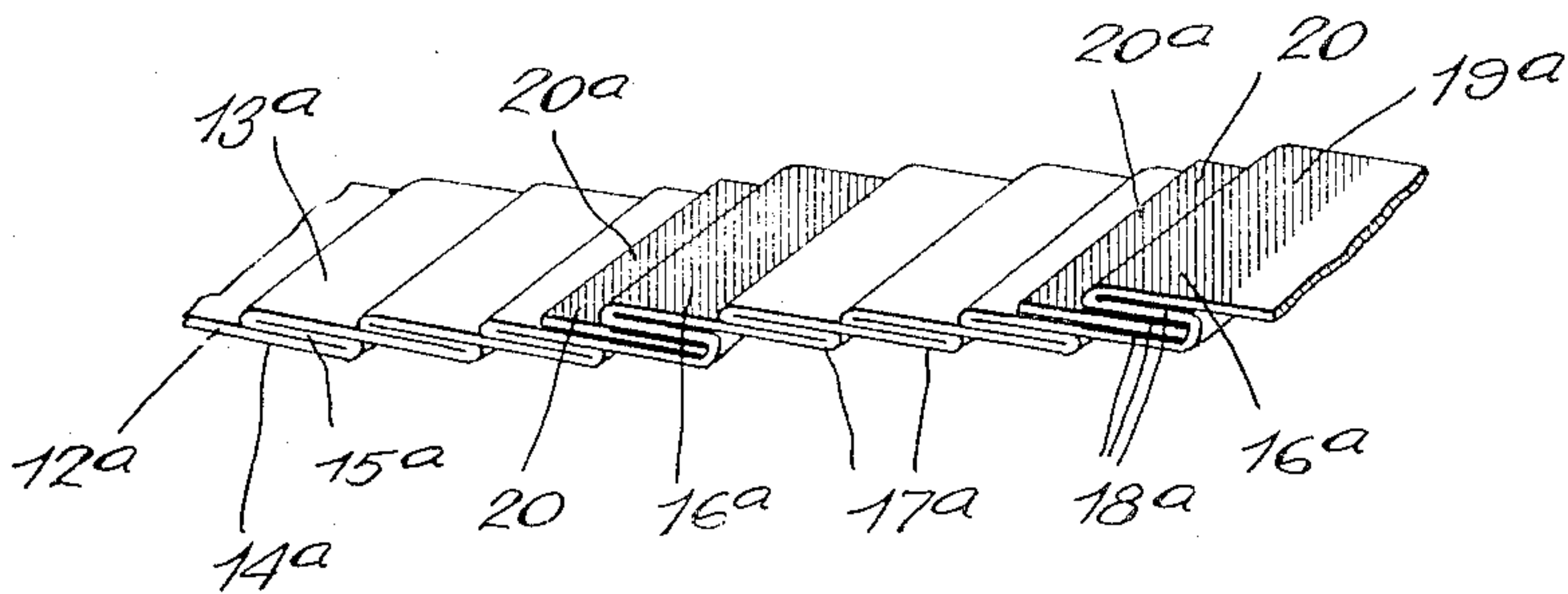


Fig. 4.

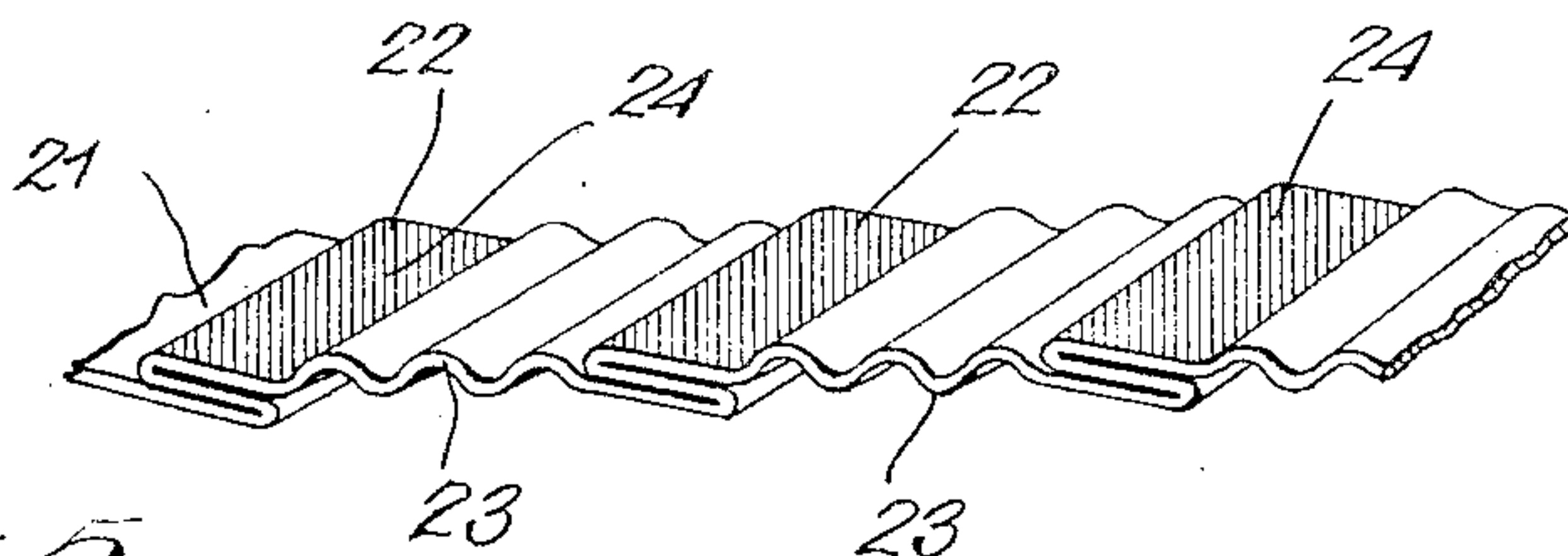
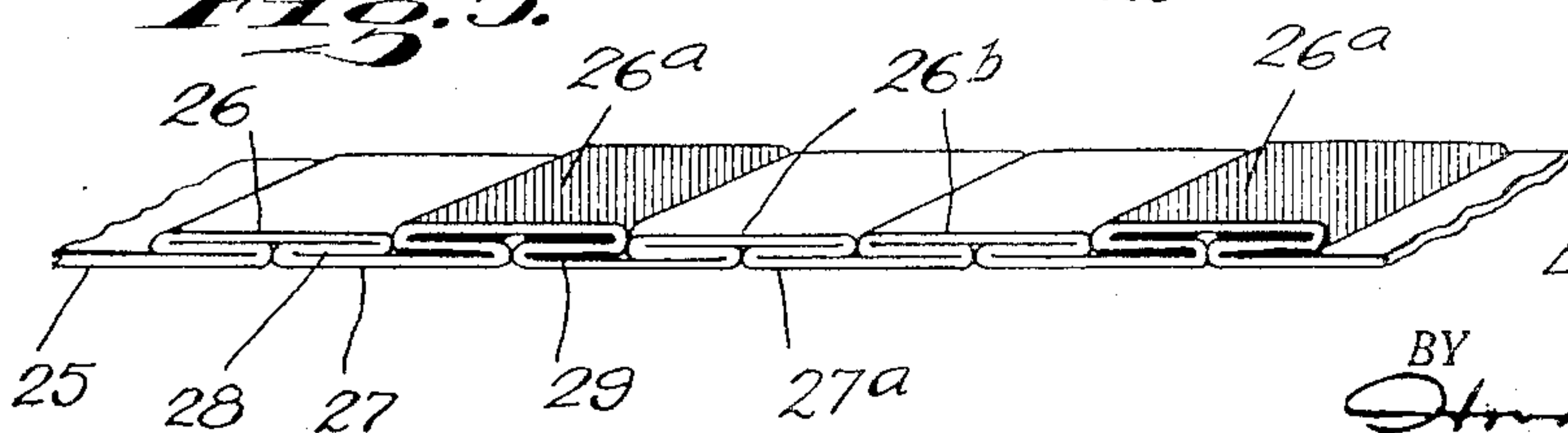


Fig. 5.



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ELECTRIC CONDUCTOR

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This invention relates to electric conductors of various kinds and classes, and particularly to the provision of an insulated sheath or wrap for insulating the conductor strands within an outer casing or jacket of any kind or class; and the object of the invention is to provide a sheath or wrapper adapted to be folded or wrapped around the conductor strand or strands, and so formed as to permit the longitudinal extension thereof so as to bring reinforced shield or bushing sections constituting an integral part of said sheath or wrap in position to guard, protect and insulate the conductor or conductors adjacent the cut or severed end of the outer casing or jacket; a further object of the invention being to provide a sheath or wrapper of the class described, wherein the shield or bushing sections are provided at predetermined spaced intervals throughout the entire length of the sheath with intermediate folded, crinkled, or otherwise gathered sections or areas, facilitating the withdrawal of the sheath to permit the positioning of a bushing or shield section at the end of the outer casing of the conductor; a further object being to provide a protector sheath or wrap for conductors of the class specified which will obviate the necessity of using independently formed bushings or shields between the conductor strand or strands and the severed end of the outer casing or jacket; a still further object being to characterize the bushing or shield sections of the sheath to distinguish them from the remainder of the sheath, facilitating the location hereof at the end of the outer casing of the conductor; and with these and other objects in view, the invention consists in a protector sheath or wrap for conductors of the class specified, which is simple in construction, efficient in use, and which is constructed as hereinafter described and claimed.

The invention is fully disclosed in the following specification, of which the accompanying drawing forms a part, in which the separate parts of my improvement are designated by suitable reference characters in each of the views, and in which:

Fig. 1 is a side and sectional view through

one form of cable illustrating one use of my improved protector sheath.

Fig. 2 is a perspective view of the sheath shown in Fig. 1, detached.

Fig. 3 is a view similar to Fig. 2 showing a modification.

Fig. 4 is a view similar to Fig. 2 showing another modification; and,

Fig. 5 is a view similar to Fig. 2 showing another form of sheath.

In conductors of various kinds and classes, it has been customary to provide protector sheaths of various kinds and classes between the conductor strands and an outer casing or jacket in what are known as armored conductors, lead covered cables, as well as non-metallic sheathed conductors. My invention consists in the provision of a protector sheath or wrap so formed as to permit longitudinal extension thereof so as to bring bushing or shielding sections arranged longitudinally of and as an integral part of the sheath into positions at the end portion of the cable so as to insulate the conductors adjacent the free end of the outer casing.

For the purpose of illustrating one use of my invention, I have illustrated in Fig. 1 of the drawing, what is known as an armored conductor consisting of an outer, flexible, metallic casing 10 in which is arranged the conductor strand or strands 11. At 12, I have shown one form of my improved protector sheath or wrap arranged on the conductor or conductors 11 within the casing 10. The sheath 12, in the construction shown in Figs. 1 and 2, is formed from a comparatively wide strip of fibrous material such for example as paper, preferably treated with a compound to render the same fire and moisture-proof. The strip 12 is folded transversely upon itself a number of times so as to form a plurality of transverse or circumferential sections, each consisting of an upper layer 13, a lower layer 14 and an intermediate layer 15. Longitudinally spaced sections 16 are so formed and treated as to provide what I term bushing or shielding sections which are spaced apart by a plurality of plain, extensible sections 17, it being understood that the separate layers of the sections 16 are secured

together in such manner as to prevent extension thereof, which result may be accomplished by adhering the respective layers together as indicated at 18. It is also preferred that the sections 16 be characterized by a color, printed or otherwise applied thereto as indicated by the shading 19, or these sections may contain other printed matter or markings to designate them and distinguish them from the sections 17 so as to facilitate the positioning of said sections beneath the outer cut end 10a of the casing 10. One of the sections 16 is shown beneath said cut end 10a in Fig. 1 of the drawing.

By securing the separate layers of the sections 16 together, these sections become relatively hard, rigid and strong and durable as will be apparent, and will serve to properly shield, protect and insulate the conductor or conductors at the cut end of the outer casing. In dealing with metallic casing, it is common to employ a saw to sever the end of the casing in the operation of coupling the protruding end or ends of the conductors with an electric fixture of any kind or class.

With the use of my improved protector sheath or wrap, after the outer casing has been cut in the manner referred to, the end of the wrap is pulled from beneath the casing 10 so as to bring the next section 16 thereof to a position beneath the cut end 10a of the casing as seen in Fig. 1. This result is accomplished by the extensibility of the sections 17, and it will be noted in Fig. 1 of the drawing, that one of the sections 17 between two of the sections 16, has been fully extended to properly position a section 16 beneath the cut end 10a of the casing. In some instances, more or less of the sheath will be extended or withdrawn, depending entirely upon the location of the inner section 16 within the cable inwardly of its cut end. In some instances, it may be desirable to provide wider bushing or shielding sections than the sections 16. This may be accomplished by increasing the width of the folds in making up the layers 13, 14 and 15, or as will be apparent, two adjacent, transverse, folded sections may be secured together to make the bushing or shielding section twice the width of that shown in Fig. 2. This would also apply to the structure shown in Fig. 3 of the drawing, which is later described.

In this connection, it will also be apparent that the width of the folds in the respective sections of the sheath may be varied without departing from the spirit of my invention.

In Fig. 3 of the drawing, I have shown a slight modification in the form of the protector sheath, and in said figure, 12a represents a sheath similar to the sheath 12; 13a, 14a, 15a, the upper, lower and intermediate

layers provided in the respective sections 16a and 17a; and the sections 16a are characterized or marked as indicated at 19a and adhered or secured together as indicated at 18a. The structural difference between the two sections resides in the provision of supplemental strips or sheets 20 which are disposed between two of the layers 13a, 14a, 15a, the strip 20 being positioned between the layers 14a and 15a in the construction shown.

It will be understood that the strips 20 will reinforce and strengthen the bushing or shield sections 16, especially if the strip material from which the sheath 12a is formed should be comparatively thin. I also prefer to have one side edge of the strips 20 project as seen at 20a and be free or unattached with respect to the layer of the adjacent sections 17a so as to permit the outward folding of said edge 20a if desired to aid in securing the sections 16a in position at the free end of the outer casing 10.

In this connection, it will be understood that the sections 16—16a are of greater thickness than the intermediate sections 17—17a, and thus fit very snugly in the casing 10. It will therefore be apparent that these sections extending longitudinally throughout the entire length of the cable, will serve to properly position the conductors within the outer casing 10, and yet permit the free flexure of the outer casing and the protector sheath 12—12a, by virtue of the flexibility of the sections 17 and the fact that the same are free to extend longitudinally of the casing 10.

In Fig. 4 of the drawing, I have shown at 21 another form of protector sheath, which differs from the sheaths 12, 12a, in that the bushing or shield sections 22 are spaced apart by crinkled, corrugated or otherwise folded or formed intermediate sections 23, which permit longitudinal extension of the sheath 21 to facilitate the positioning of one of the sections 22 beneath the cut end 10a of the casing 10. The sections 22 are formed by folding the strip from which the sheath 21 is formed in the same manner as the fold of the sections 16. It will be understood that the sections 22 may be folded in the manner of equivalent sections shown in Fig. 5 of the drawing, later described. The sections 22 will be marked or characterized as indicated at 24 so as to distinguish the same from the intermediate sections 23.

In Fig. 5 of the drawing, I have shown a protector sheath or wrap 25 which is formed from a strip of fibrous material folded in a manner different from the fold of the strip forming the sheath 12, so as to form comparatively wide top layers 26 as well as wide bottom layers 27, with narrower intermediate layers 28 joining adjacent ends of the layers 26 and 27, the layers 27 overlapping the intersection of the layers 26. In like man-

ner, the layers 26 overlap the intersections of the layers 27, thus forming three ply thickness throughout the entire length of the sheath 25. With this construction, longitudinally spaced sections 26a formed by the layers 26 are secured to the folded side portions of two adjacent lower layers 27 and to the intermediate layers 28 therebetween by a suitable adhesive as indicated at 29, or in any other desired manner so as to form of the sections 26a, bushing or shield sections similar to the sections 16—16a, and the sections 22, whereas the intermediate sections 26b and 27a are free to be extended to facilitate the positioning of the sections 26a beneath the cut end 10a of the casing 10.

As hereinbefore stated, it will be understood that my improved protector sheath or wrap may be employed in connection with electric conductors of any kind or class including the various types of metallic cable or conductors as well as the non-metallic sheathed cable and conductors.

It will also be understood that any suitable means may be employed for coupling or connecting the bushing or shield sections so as to permit relative movement of said sections with respect to each other to facilitate the withdrawal of a section from within the outer casing to a position adjacent and beneath the severed or cut end thereof. While I have shown certain forms of protector sheaths and specific methods of folding the same and securing the separate folds together, it will be apparent that I am not necessarily limited in these respects nor to the structural details herein shown and described, and various changes therein and modifications thereof may be made within the scope of the appended claims without departing from the spirit of my invention or sacrificing its advantages.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a conductor of the class described, a sheath comprising an elongated strip of insulating material folded transversely upon itself to form a plurality of longitudinal sections, each section containing two or more plies of said strip, means for securing the plies of predetermined, longitudinally spaced sections together to form thereof spaced bushing sections, and the sections between the bushing sections permitting the movement of one bushing section with respect to the other.

2. In a conductor of the class described, a sheath comprising an elongated strip of insulating material folded transversely upon itself to form a plurality of longitudinal sections, each section containing two or more plies of said strip, means for securing the plies of predetermined, longitudinally spaced sections together to form thereof spaced bushing sections, the sections between the

bushing sections permitting the movement of one bushing section with respect to the other, and a reinforcing strip arranged between and secured to the ply of the bushing sections to strengthen the same.

3. In a conductor of the class described, a sheath comprising an elongated strip of insulating material folded transversely upon itself to form a plurality of longitudinal sections, each section containing two or more plies of said strip, means for securing the plies of predetermined, longitudinally spaced sections together to form thereof spaced bushing sections, the sections between the bushing sections permitting the movement of one bushing section with respect to the other, a reinforcing strip arranged between and secured to the ply of the bushing sections to strengthen the same, and said strips having free edge portions.

4. The combination with a conductor of the class described comprising an outer casing or jacket and a conductor strand disposed within said jacket, of means arranged on the strand within said casing and movable longitudinally thereof for providing an insulator and protector bushing around the strand at and beneath the end of said casing, said means comprising a plurality of substantially rigid bushings arranged longitudinally of the strand and bushing connecting portions accessible beyond one end of the casing for drawing one of said bushings from within the casing to a point beneath the end thereof and around the conductor strand at said end.

5. In conductors of the class described employing a conductor strand, a casing or jacket enclosing said strand, and a protector sheath wrapped around the conductor within said casing, said sheath being treated at longitudinally spaced intervals to form substantially rigid bushing sections, the sheath including means intermediate the bushing sections whereby the sheath may be extended with respect to the casing to position one of said bushing sections beneath one end portion of said casing to shield and insulate the conductor strand at said end of the casing.

6. In conductors of the class described employing a conductor strand, a casing or jacket enclosing said strand, and a protector sheath wrapped around the conductor within said casing, said sheath being treated at longitudinally spaced intervals to form substantially rigid bushing sections, the sheath including means intermediate the bushing sections whereby the sheath may be extended with respect to the casing to position one of said bushing sections beneath one end portion of said casing to shield and insulate the conductor strand at said end of the casing, said means comprising extensible portions on the sheath intermediate the bushing sections.

7. In conductors of the class described em-

ploying a conductor strand, a casing or jacket enclosing said strand, a protector sheath wrapped around the conductor within said casing, said sheath being treated at longitudinally spaced intervals to form substantially rigid bushing sections, the sheath including means intermediate the bushing sections whereby the sheath may be extended with respect to the casing to position one of said bushing sections beneath one end portion of said casing to shield and insulate the conductor strand at said end of the casing, and means for distinguishing the bushing sections from the remainder of the sheath.

8. The combination with a conductor of the class described employing an outer casing or jacket and a conductor strand disposed within said jacket, of a plurality of insulator bushings arranged and spaced longitudinally of the strand within said casing and means including said bushings movable longitudinally of the strand and within the casing and through one open end of the casing for forming and positioning an insulator and protector bushing around the strand at and beneath the open end of said casing.

9. In electric conductors of the class described comprising a flexible, metallic casing and insulated conductor strands within said casing, a sheath of insulating material in the form of an elongated fibrous strip laid longitudinally of the strands and folded circumferentially therearound to envelop the strands within said casing, said sheath being treated at longitudinally spaced intervals to form substantially rigid bushing sections enveloping said strands and the sheath intermediate the bushing sections including means whereby an end of said sheath may be withdrawn through one cut end of the casing to position one of said bushing sections around the conductor strands beneath the cut end of said casing.

10. In electric conductors of the class described comprising a flexible, metallic casing and insulated conductor strands within said casing, a sheath of insulating material in the form of an elongated fibrous strip laid longitudinally of the strands and folded circumferentially therearound to envelop the strands within said casing, said sheath being treated at longitudinally spaced intervals to form substantially rigid bushing sections enveloping said strands and the sheath intermediate the bushing sections including means whereby an end of said sheath may be withdrawn through one cut end of the casing to position one of said bushing sections around the conductor strands beneath the cut end of said casing, and means for reinforcing the bushing sections of said sheath.

11. In electric conductors of the class described comprising a flexible, metallic casing and insulated conductor strands within said casing, a sheath of insulating material in

the form of an elongated fibrous strip laid longitudinally of the strands and folded circumferentially therearound to envelop the strands within said casing, said sheath being treated at longitudinally spaced intervals to form substantially rigid bushing sections enveloping said strands and the sheath intermediate the bushing sections including means whereby an end of said sheath may be withdrawn through one cut end of the casing to position one of said bushing sections around the conductor strands beneath the cut end of said casing, and means for distinguishing the bushing sections from the remainder of the sheath.

12. In electric conductors of the class described comprising a flexible, metallic casing and insulated conductor strands within said casing, a sheath of insulating material in the form of an elongated fibrous strip laid longitudinally of the strands and folded circumferentially therearound to envelop the strands within said casing, said sheath being treated at longitudinally spaced intervals to form substantially rigid bushing sections enveloping said strands and the sheath intermediate the bushing sections including means whereby an end of said sheath may be withdrawn through one cut end of the casing to position one of said bushing sections around the conductor strands beneath the cut end of said casing, and said last named means comprising gathered portions on the sheath intermediate said bushing sections facilitating longitudinal extension of the sheath with respect to the strands and casing.

13. In electric conductors of the class described a sheath of insulating material wrapped around a conductor strand, said sheath comprising an elongated strip of fibrous material folded transversely to form a plurality of multiple ply sections, the ply of predetermined sections of said sheath being secured together to form thereof spaced bushing sections between the conductor strand and an outer body.

14. In electric conductors of the class described a sheath of insulating material wrapped around a conductor strand, said sheath comprising an elongated strip of fibrous material folded transversely to form a plurality of multiple ply sections, the ply of predetermined sections of said sheath being secured together to form thereof spaced bushing sections between the conductor strand and an outer body, and the ply of the sections intermediate the bushing sections being unsecured so that said sections are capable of extension when subjected to longitudinal pull to move one bushing section with respect to an adjacent bushing section.

15. In electric conductors of the class described a sheath of insulating material wrapped around a conductor strand, said sheath comprising an elongated strip of

fibrous material folded transversely to form a plurality of multiple ply sections, the ply of predetermined sections of said sheath being secured together to form thereof spaced
5 bushing sections between the conductor strand and an outer body, and means for characterizing the bushing sections to distinguish the same from the other sections of said sheath.

10 16. The combination with a conductor of the class described employing an outer casing or jacket and a conductor strand disposed within said jacket, of a plurality of insulator bushings arranged and spaced lon-
15 gitudinally of the strand within said casing, means including said bushings movable longitudinally of the strand and within the casing and through one open end of the casing for forming and positioning an insulator and
20 protector bushing around the strand at and beneath the open end of the casing, and said bushings fitting snugly within said casing and around said strand to support the strand against longitudinal movement with respect
25 to the casing.

In testimony that I claim the foregoing as my invention I have signed my name this 2nd day of November, 1931.

EDWIN J. SCHNEIDER.

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