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E. J. SCHNEIDER

1,908,063

ELECTRIC CABLE

Filed Nov. 6, 1931

Fig. 1.

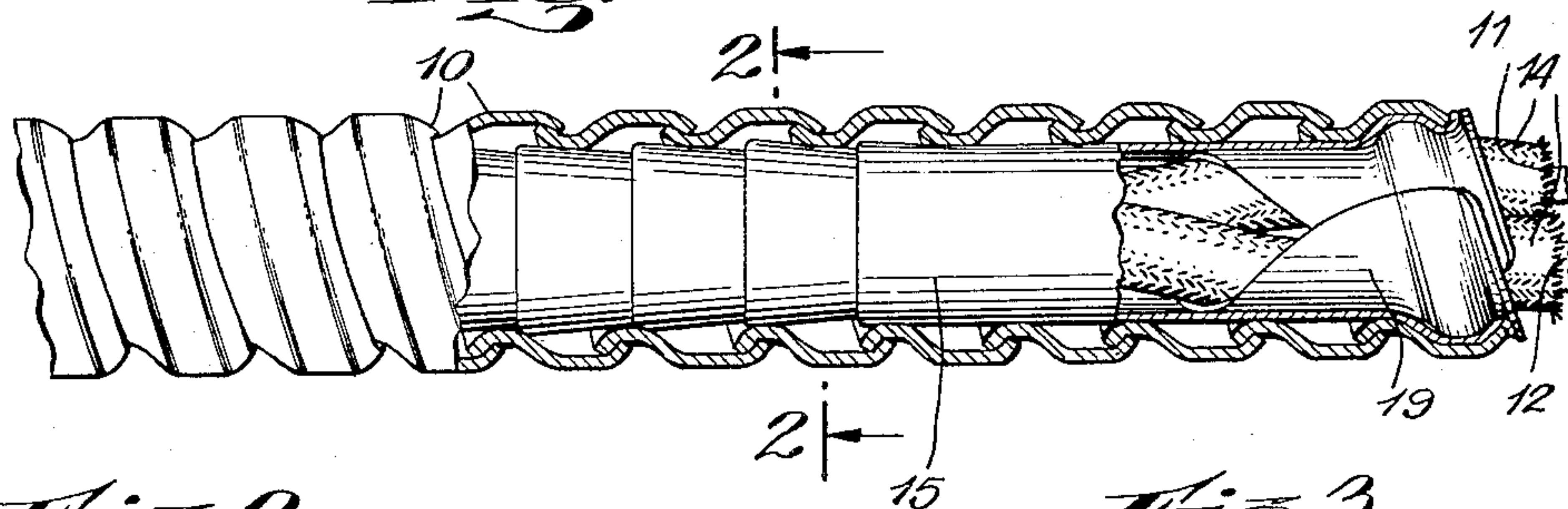


Fig. 2.

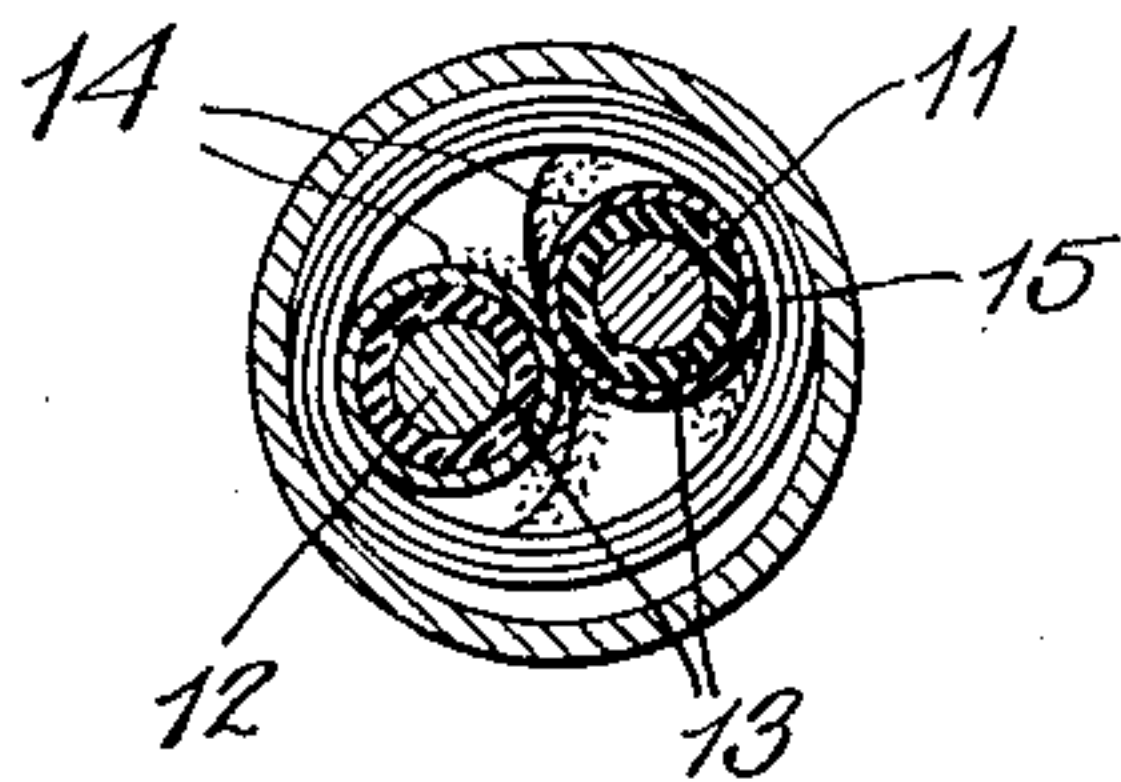


Fig. 3.

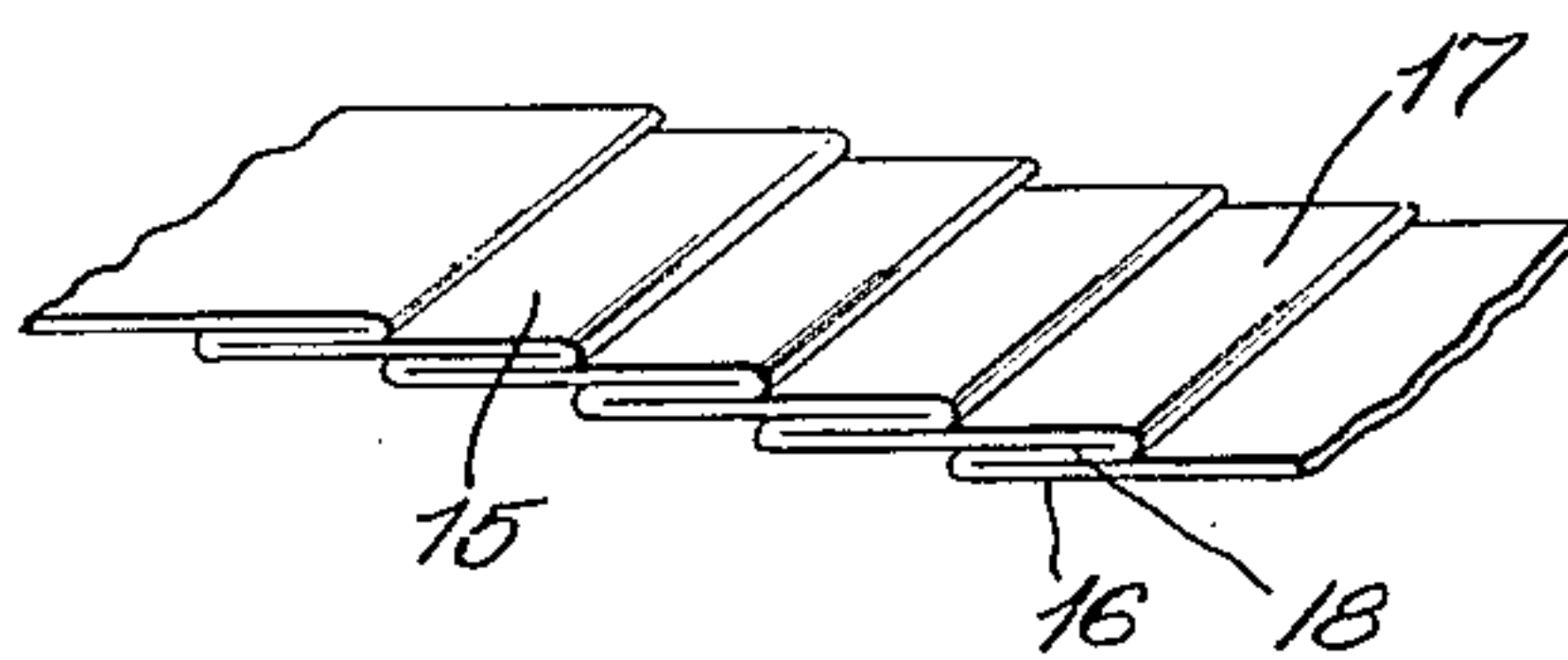


Fig. 5.

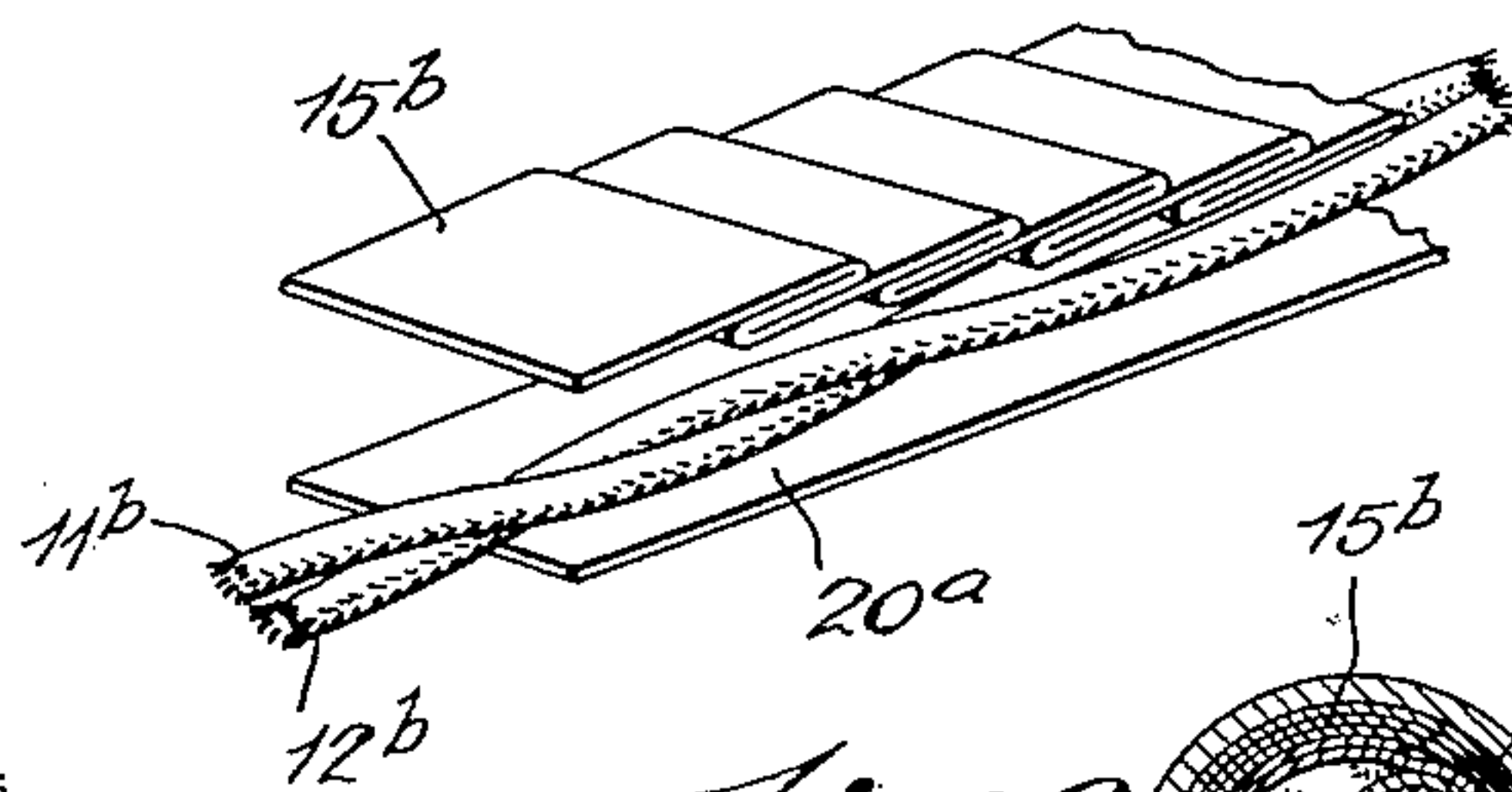


Fig. 4.

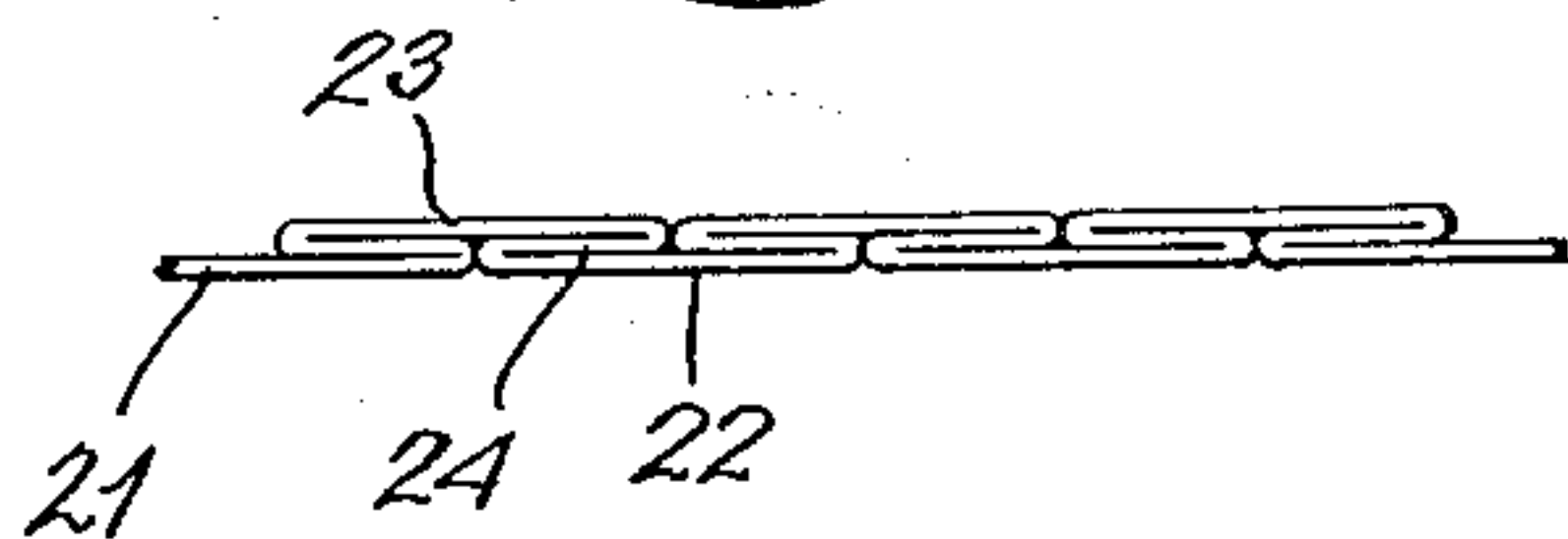


Fig. 6.

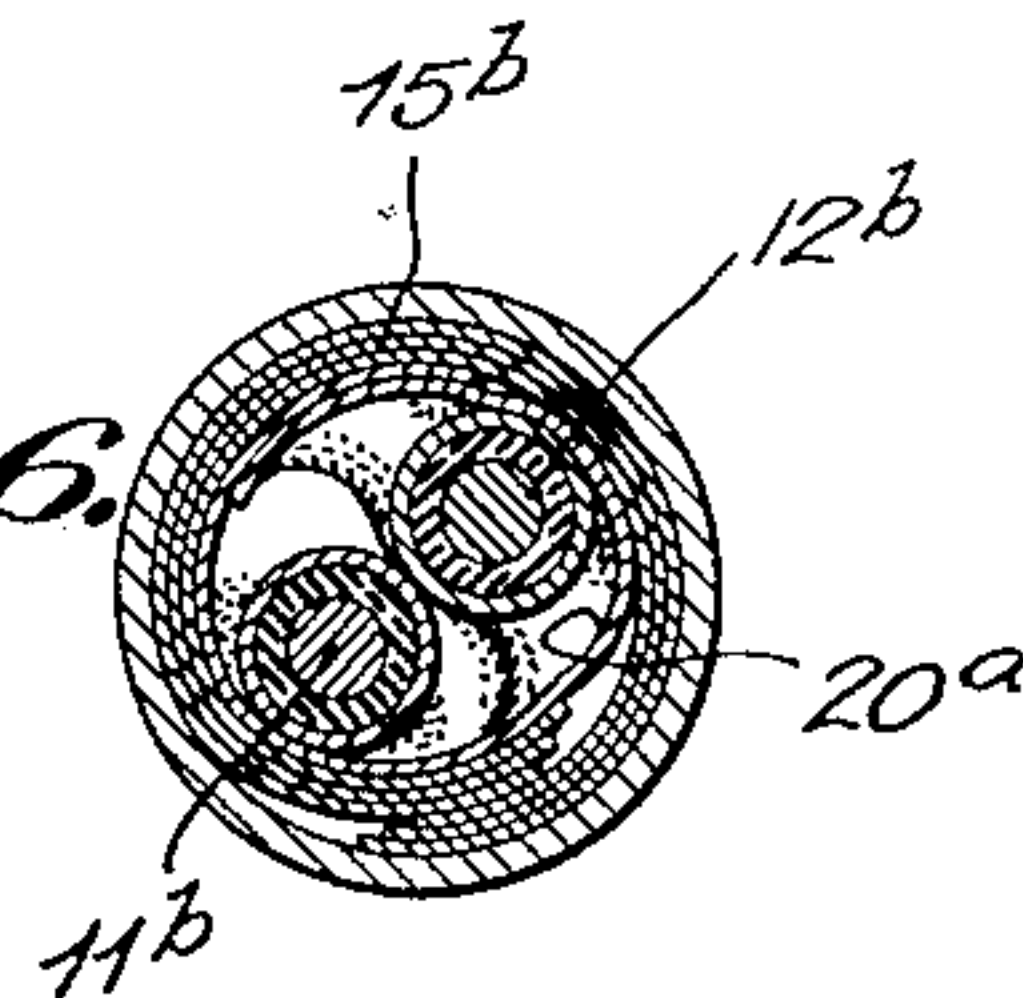


Fig. 7.

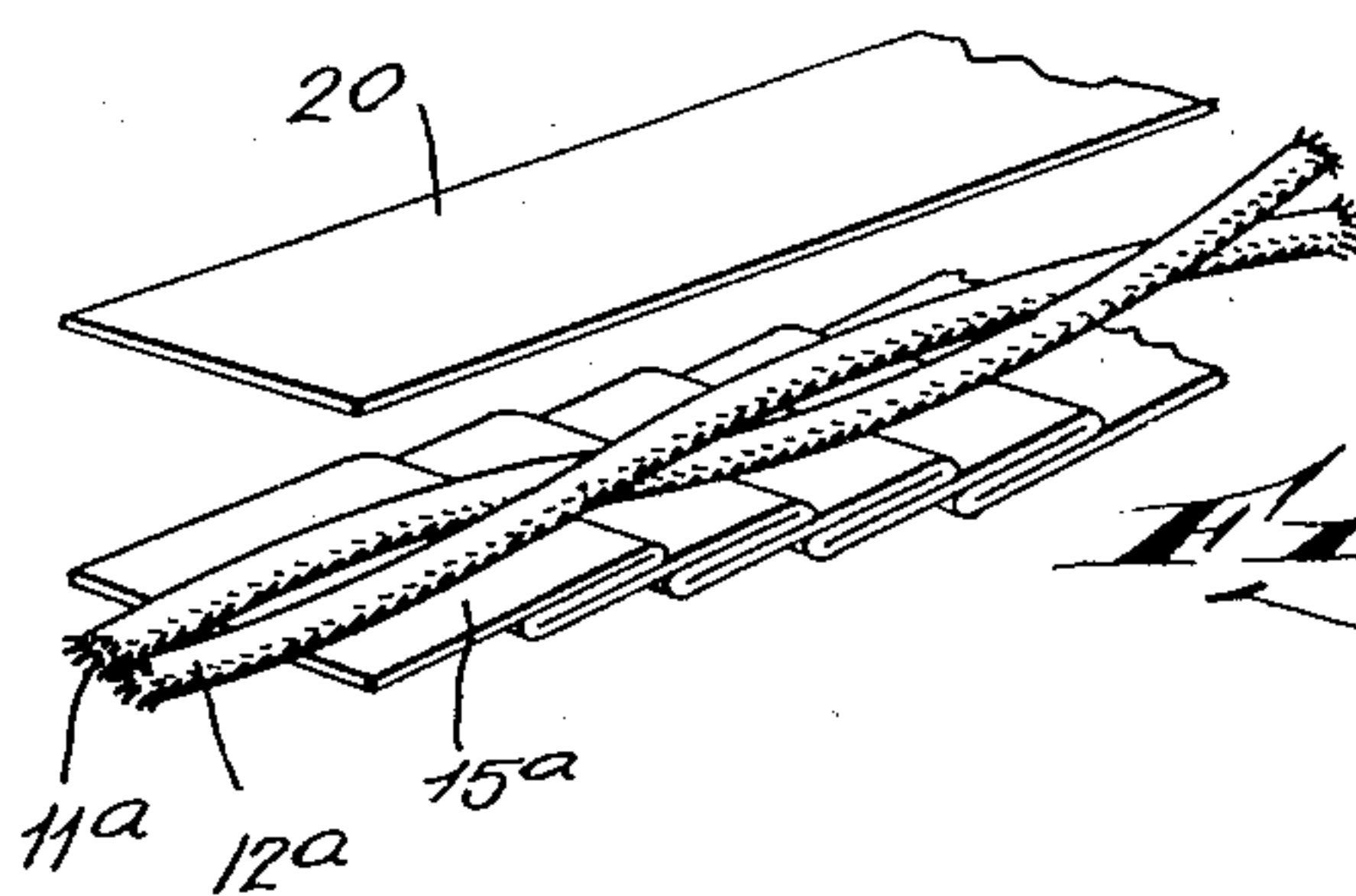


Fig. 9.

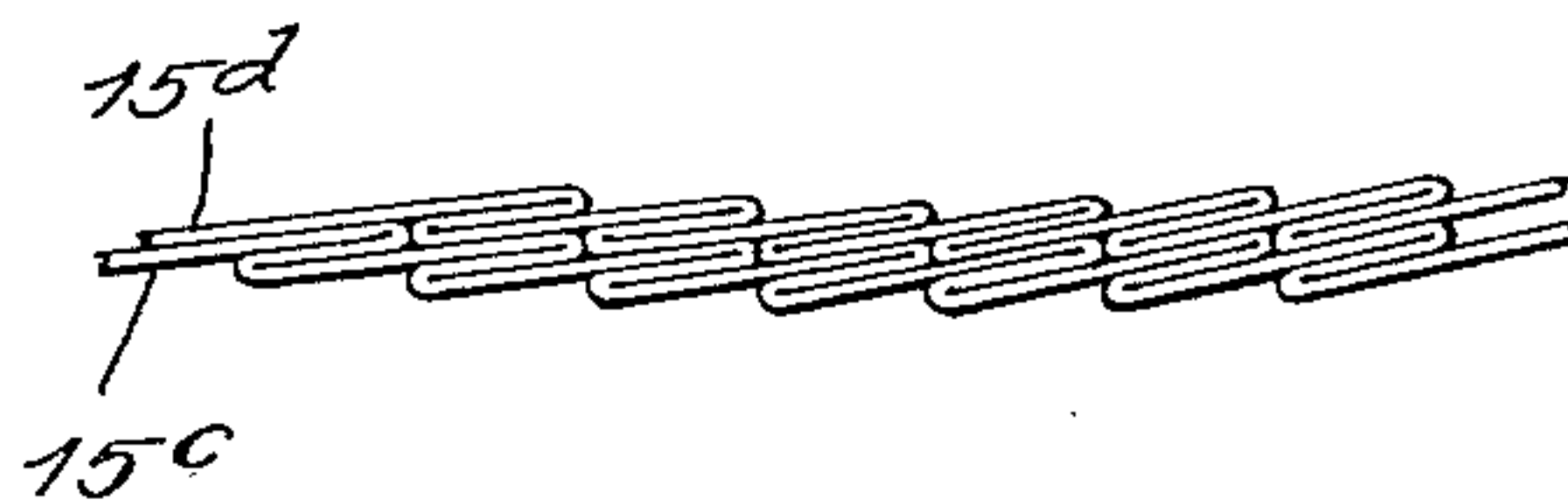
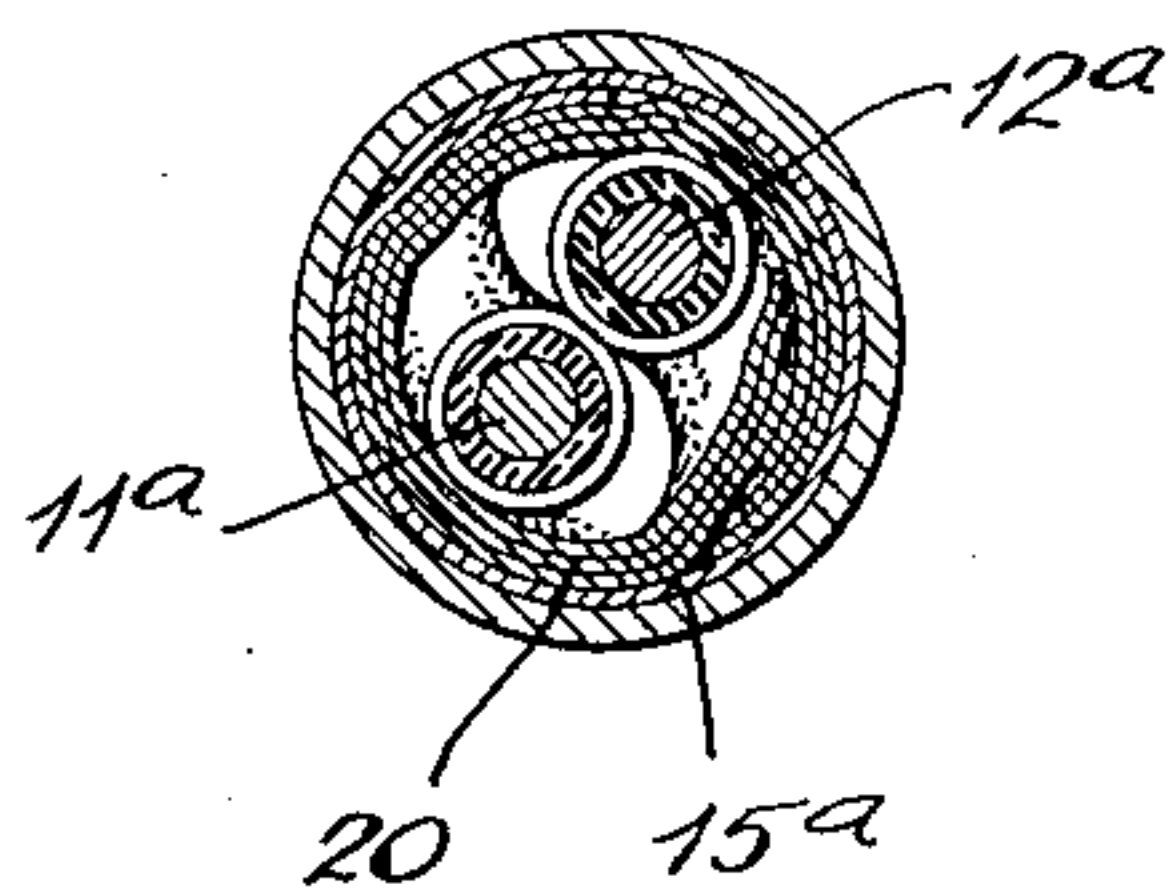


Fig. 8.



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ELECTRIC CABLE

Application filed November 6, 1931. Serial No. 573,385.

This invention relates to electric cable and particularly to the provision of a wrap or protector sheath for insulating the conductors thereof within an outer casing or jacket; and the object of the invention is to provide a wrap or sheath consisting of a comparatively wide strip of fibrous material folded transversely upon itself at longitudinally spaced intervals to form a series of multiple layers of said strip extending throughout the entire length of the sheath and facilitating the withdrawal of the strip through one severed end of an outer casing or armor to reduce the thickness of said sheath adjacent said end of the armor and to facilitate the insertion of an insulating bushing into the armored casing around said conductors; a further object being to provide a protecting sheath or wrap of the class described including in conjunction therewith a plain or unfolded strip preferably wrapped around the conductors in such manner as to dispose the last named strip centrally of the intersection of the transversely folded strip; and with these and other objects in view, the invention consists in electric cable of the class described, 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 of the cable made according to my invention, indicating the use of my improved wrap or sheath.

Fig. 2 is a section on the line 2—2 of Fig. 1.

Fig. 3 is a perspective view of the sheath or wrap shown in Figs. 1 and 2, detached.

Fig. 4 is a transverse, sectional view through a sheath or wrap showing a modification.

Fig. 5 is a perspective view illustrating another method of wrapping the conductors.

Fig. 6 is a cross section of the cable showing the wrapper illustrated in Fig. 5.

Fig. 7 is a view similar to Fig. 5 showing another method of wrapping the conductors.

Fig. 8 is a cross section through the cable illustrating the wrapper shown in Fig. 7; and,

Fig. 9 is a side edge view of a modified form of wrapper which I employ.

In Figs. 1, 2 and 3 of the drawing, I have shown one method of carrying my invention into effect; and in Fig. 1, I have shown at 10 an outer, flexible, metallic sheath or casing of conventional form, within which is arranged two insulated conductors 11 and 12, which are preferably twisted one upon the other, the insulations on the conductors consisting of a body of rubber 13 and a woven or braided fabric sheath 14 as is commonly employed.

Arranged upon the conductors 11 and 12 within the casing 10 is an insulating sheath or wrapper 15 of fibrous material in the form of a comparatively wide strip of paper or similar material, preferably treated to render the same moisture and fire-proof, the strip being folded transversely upon itself to form sections of three ply thickness. Each section consists of a bottom layer 16, a top layer 17 and an intermediate layer 18. The strip is also preferably folded so that the three ply sections consisting of the layers 16, 17 and 18 are disposed one adjacent the other longitudinally of the strip so that the completed sheath or wrapper 15 has three plies or layers between the conductors 11—12 and the casing 10 throughout the entire length of the cable, it being understood that the sheath 15 is wrapped around the conductors 11 and 12, and the side edges thereof are overlapped to a slight extent so as to completely envelop the conductors within the outer or armored casing. It will appear that the insulated sheath is formed by folding the strip alternately in opposite directions, thus forming what might be termed telescoping folds or sections, permitting longitudinal extension of the sheath as later described, and the use of the term "telescoping" will be descriptive of the extension of the sheath referred to.

In the use of a sheath or wrapper similar to the wrapper 15, it will be understood that after one end of the armored casing 10 has

been cut off to leave the ends of the conductors projecting therebeyond in the manner indicated in Fig. 1 of the drawing, a part of the sheath 15 may be pulled out from 5 beneath the casing 10 to form a single ply thickness of said sheath beneath the outer cut end portion of the armored casing, thus permitting the free insertion of a fibrous, tubular, split shield or bushing 19, either di- 10 rectly upon the conductors or within the sheath 15 as shown in Fig. 1, it being also understood that the bushing may be inserted between the sheath 15 and the casing 10.

In either use of the bushing, it will be 15 understood that the reduced single ply sheath 15 will facilitate the insertion of the bushing. After the bushing is securely placed in position at the cut end of the casing 10, the projecting portion of the sheath 15 may 20 be torn off outwardly of and adjacent the bushing. It will be understood that in pulling out the sheath as above stated, the bottom layer 16 as well as the intermediate layer 18 are pulled out from beneath the 25 top layer 17 so as to arrange all of said layers in one plane forming the single ply thickness, and two or three of the folded sections may be so unravelled or extended. An advantageous feature of this method of 30 construction resides in the fact that an uncut or unruptured layer of the sheathing 15 will be arranged beneath the cut end of the casing 10, it being understood that the sheathing beneath the cut portion of the 35 armored casing is oftentimes cut or ruptured, and this must be removed.

In Fig. 7 of the drawing, I have shown a slight modification which consists in applying a straight strip of paper or other fibrous 40 material 20 upon a strip 15a similar in all respects to the strip 15 after the strip 15a has been wrapped around the conductors 11a—12a. The strip 20 is so applied as to dispose the central portion thereof in alinea- 45 ment with the intersection or overlapping of the side edges of the strip 15a so that this intersection is covered and shielded by the strip 20 as indicated in Fig. 8 of the drawing. This strip 20 also serves to sup- 50 port the folds of the strip 15a against accidental displacement on the conductors, as will be apparent.

In Fig. 5 of the drawing, I have shown a slight modification of the structure shown in 55 Fig. 7, which consists in first applying a straight strip 20a to the conductors 11b and 12b, and then wrapping the folded strip 15b similar to the strips 15 and 15a around the conductors and the strip 20a thereon, the 60 central portion of the strip 15b being arranged at the intersection of the adjacent and overlapping side edges of the strip 20a, as seen in Fig. 6 of the drawing.

In Fig. 9, I have shown another modifica- 65 tion wherein two strips 15c and 15d, each

similar in construction to the strip 15, are arranged one upon the other so as to form six ply thickness between the conductors and the outer metallic casing throughout the entire length of the cable. With this construc- 70 tion, the strip material from which the folded sheaths 15c and 15d are made will be considerably thinner than the thickness of the material employed in the strip 15.

With this construction, it will be under- 75 stood that one or both of the sheaths 15c, 15d may be withdrawn from the cut end of the casing 10 to facilitate the insertion of a bushing similar to the bushing 19. In this connection, it will also be apparent that 80 in the structures shown in Figs. 5 and 7, the strips 15a and 15b alone are extended.

Instead of folding the strips 15, 15a, 15b, 15c and 15d in the manner illustrated, said 85 strips may be folded in accordance with the fold of the strip 21 shown in Fig. 4 of the drawing, forming comparatively wide inner layers 22, the corresponding wide outer 90 layers 23 with narrower intermediate layers 24 joining adjacent side edges of the alternate inner and outer layers 20 and 23 thus forming throughout the entire length of the 95 folded strip, three ply thickness, similar to the three ply of the strips shown in the other figures.

With the structure shown in Fig. 4, it will be noted that the wide layer 22 overlaps the intersection of the other wide layers 23, the latter correspondingly overlapping the inter- 100 section of the layers 22. With a sheath or wrapper such as that shown in Fig. 4 of the drawing, it will be understood that the end portion thereof may be pulled out to form a single ply thickness in the same manner as 105 the extension of the strip 15 as illustrated in Fig. 1 of the drawing, to facilitate the insertion of a bushing within the outer casing and around the conductors, either inwardly or outwardly of the sheath.

From the foregoing, it will be apparent 110 that the distinctive feature of my invention resides in the provision of at least one transversely folded strip forming a sheath or wrap enveloping the conductors of the cable, the 115 folds being so made as to permit the extension or withdrawal of the sheath from beneath the cut end of the armored casing to provide clearance for the insertion of an insulated bushing. In addition to this struc- 120 tural feature of the sheath or wrap, it will also be apparent that by virtue of the folds provided in the wrap, the same may be readily flexed without any danger of rupturing the 125 insulated sheath or wrap, thus assuring proper insulation between the armored casing 10 and the insulated conductors contained therein. It will be understood that various changes in and modifications of the construc- 130 tion herein shown and described may be made within the scope of the appended claims with-

out 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

5 Patent is:—

1. A conductor of the class described comprising an insulated conductor strand, an outer casing for said strand and an elongated insulated sheath arranged longitudinally of
10 and wrapped circumferentially around the conductor within said casing, said sheath consisting of an elongated single ply strip transversely folded upon itself alternately in opposite directions to form a multiple ply thick-
15 ness throughout the entire length of the sheath, and the folds of said sheath forming telescoping portions permitting one end portion of the sheath to be withdrawn from within the end portion of the casing to re-
20 duce the sheath to a single ply thickness at the end of said casing.

2. A conductor of the class described comprising an insulated conductor strand, an outer casing for said strand and an elongated
25 insulated sheath arranged longitudinally of and wrapped circumferentially around the conductor within said casing, said sheath consisting of an elongated single ply strip transversely folded upon itself alternately in op-
30 posite directions to form a multiple ply thickness throughout the entire length of the sheath, and the folds of said sheath forming telescoping portions permitting one end portion of the sheath to be withdrawn from with-
35 in the end portion of the casing to reduce the sheath to a single ply thickness at the end of said casing and to form a clearance space permitting the insertion of an insulating bushing within the casing:

3. A conductor of the class described comprising an insulated conductor strand, an outer casing for said strand and an elongated insulated sheath arranged longitudinally of
40 and wrapped circumferentially around the conductor within said casing, said sheath consisting of an elongated single ply strip transversely folded upon itself alternately in opposite directions to form a multiple ply
45 thickness throughout the entire length of the sheath, the folds of said sheath forming telescoping portions permitting one end portion of the sheath to be withdrawn from within the end portion of the casing to reduce the
50 sheath to a single ply thickness at the end of said casing, and another straight strip of insulating material arranged longitudinally of and wrapped circumferentially around said conductor strand in conjunction with said
55 sheath.

4. A conductor of the class described comprising an insulated conductor strand, an outer casing for said strand and an elongated insulated sheath arranged longitudinally of
60 and wrapped circumferentially around the conductor within said casing, said sheath con-

sisting of an elongated single ply strip transversely folded upon itself alternately in opposite directions to form a multiple ply thickness throughout the entire length of the sheath, the folds of said sheath forming tele-
70 scoping portions permitting one end portion of the sheath to be withdrawn from within the end portion of the casing to reduce the sheath to a single ply thickness at the end of said casing, another straight strip of insulat-
75 ing material arranged longitudinally of and wrapped circumferentially around said conductor strand in conjunction with said sheath, and the central portion of the last named strip being disposed at the intersection of the side
80 edges of said protector sheath.

5. In conductors of the class described comprising an outer casing in which are insulated conductor strands, a protector sheath of insulating material, said sheath consisting of an
85 elongated strip transversely folded alternately in opposite directions to form a strip of multiple flat, parallel and telescoping layers throughout the length of said sheath, and said sheath being arranged longitudinally of
90 the conductor strands and folded circumferentially therearound to bring the side edges of the strip in engagement with each other to envelop the strands within said
95 casing.

6. In conductors of the class described comprising an outer casing in which are insulated conductor strands, a protector sheath of insulating material, said sheath consisting
100 of an elongated strip transversely folded alternately in opposite directions to form a strip of multiple flat, parallel and telescoping layers throughout the length of said sheath, said sheath being arranged longitudinally of
105 the conductor strands and folded circumferentially therearound to bring the side edges of the strip in engagement with each other to envelop the strands within said casing, and the telescoping folds of the sheath permitting
110 longitudinal withdrawal of the sheath from within the open ends of the casing to reduce the layers of the sheath at said end of the casing.

7. In an armored conductor of the class described comprising an outer flexible metallic casing in which are arranged insulated
115 conductors, a protector sheath of insulating material enveloping the strands within said casing, said sheath comprising an elongated, single ply strip folded transversely at longi-
120 tudinally spaced intervals to form a strip of flat multiple and telescoping plies throughout the length of the sheath, and the sheath being arranged longitudinally of the strands and folded circumferentially therearound with
125 adjacent side edge portions of the sheath in engagement with each other.

8. In an armored conductor of the class described comprising an outer flexible metallic casing in which are arranged insulated con-
130

ductors, a protector sheath of insulating material enveloping the strands within said casing, said sheath comprising an elongated, single ply strip folded transversely at longitudinally spaced intervals to form a strip of flat, multiple and telescoping plies throughout the length of the sheath, the sheath being arranged longitudinally of the strands and folded circumferentially therearound with adjacent side edge portions of the sheath in engagement with each other, and the telescoping plies of the sheath being folded to facilitate flexure of the conductor without danger of rupturing the sheath and permitting the longitudinal extension of the sheath within said casing.

9. In an armored conductor of the class described comprising an outer flexible metallic casing in which are arranged insulated conductors, a protector sheath of insulating material enveloping the strands within said casing, said sheath comprising an elongated, single ply strip folded transversely at longitudinally spaced intervals to form a strip of flat, multiple and telescoping plies throughout the length of the sheath, the sheath being arranged longitudinally of the side edge portions of the sheath in engagement with each other, the telescoping plies of the sheath being folded to facilitate flexure of the conductor without danger of rupturing the sheath and permitting the longitudinal extension of the sheath within said casing to form within the cut end of said casing a clearance space, and an insulator bushing inserted into the clearance space to shield the conductors at the cut end of the casing.

10. In an armored conductor of the class described comprising an outer flexible metallic casing in which are arranged insulated conductors, a protector sheath of insulating material enveloping the strands within said casing, said sheath comprising an elongated, single ply strip folded transversely at longitudinally spaced intervals to form a strip of flat, multiple and telescoping plies throughout the length of the sheath, the sheath being arranged longitudinally of the strands and folded circumferentially therearound with adjacent side edge portions of the sheath in engagement with each other, and another protector sheath in the form of a strip arranged longitudinally of said conductors and folded circumferentially therearound in conjunction with said first named sheath.

11. In an armored conductor of the class described comprising an outer flexible metallic casing in which are arranged insulated conductors, a protector sheath of insulating material enveloping the strands within said casing, said sheath comprising an elongated, single ply strip folded transversely at longitudinally spaced intervals to form a strip of flat, multiple and telescoping plies throughout the length of the sheath, the sheath being

arranged longitudinally of the strands and folded circumferentially therearound with adjacent side edge portions of the sheath in engagement with each other, another protector sheath in the form of a strip arranged longitudinally of said conductors and folded circumferentially therearound in conjunction with said first named sheath, and the central portion of one of said sheaths being arranged in alinement with the intersection of the side edges of the other sheath.

12. In conductors of the class described comprising an outer casing in which are insulated conductor strands, a protector sheath of insulating material, said sheath being treated to render the same moisture and fire proof, said sheath consisting of an elongated strip transversely folded alternately in opposite directions to form a strip of multiple, flat, parallel and telescoping layers throughout the length of said sheath, and said sheath being arranged longitudinally of the conductor strands and enveloping the strands within said casing.

13. In conductors of the class described comprising an outer casing in which are insulated conductor strands, a protector sheath of insulating material, said sheath consisting of an elongated strip transversely folded at longitudinally spaced intervals to form a strip of multiple, telescoping layers throughout the length of said sheath, said sheath being arranged longitudinally of the conductor strands, and another strip of insulating material extending longitudinally of and fitting snugly on said sheath.

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

EDWIN J. SCHNEIDER.