

1,200,319.

Patented Oct. 3, 1916.

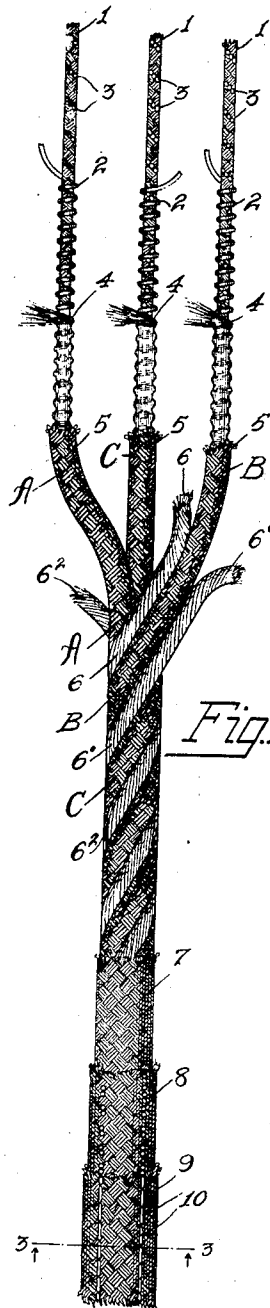


Fig. 1.

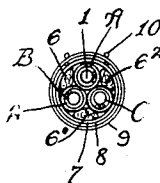


Fig. 3.

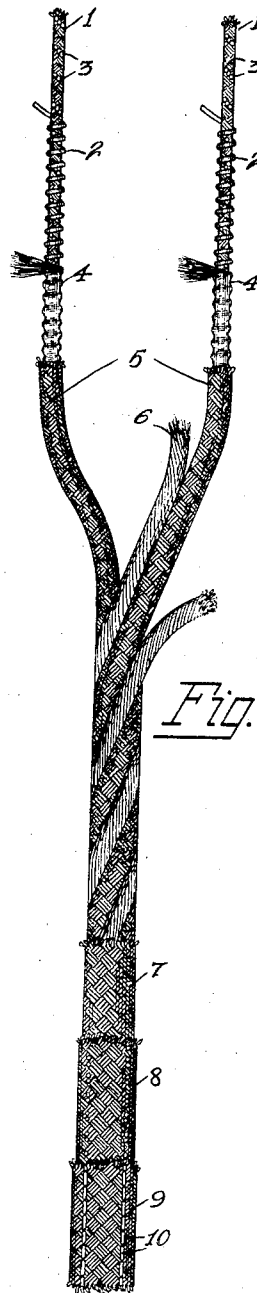


Fig. 2.

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UNITED STATES PATENT OFFICE.

HIRAM D. CURRIER, OF CHICAGO, ILLINOIS, ASSIGNOR TO KELLOGG SWITCHBOARD AND SUPPLY COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

SWITCHBOARD-CORD.

1,200,319.

Specification of Letters Patent.

Patented Oct. 3, 1916.

Application filed September 10, 1914. Serial No. 861,077.

To all whom it may concern:

Be it known that I, HIRAM D. CURRIER, residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Switchboard-Cords, of which the following is a specification.

My invention relates to conducting cords such as are ordinarily used in telephone switchboards for conductively uniting the cord or link circuit plugs, my invention having to do more particularly with an improved cord construction, the features thereof being more particularly pointed out in the ensuing specification and claims. In constructing cords of the above character, it is essential that they be of the maximum flexibility, well insulated and of such construction that the least amount of breakage of the conducting elements may occur. In the use of these conductors upon telephone switchboards their ends are secured to short switchboard plugs which are inserted horizontally into the jack so that the cord depends from the plug and practically a right angle bend occurs in the conductor where joined to the plug. These cords are in constant use and it will be apparent that they may be more readily and easily handled when very flexible. It is also necessary that the cords be well insulated so as to prevent contact between the conductors and the hands of the operator but at the same time this insulation must not be so stiff as to render the cord inflexible or flexible only to a small degree. In some of the early forms of these cords tinsel was used as a conducting element but due to the fact that it would readily break a noisy cord would result. Therefore in later forms helical steel conducting elements were used being arranged concentrically with interposed insulation in cords of more than one conductor. Cords of this latter character still have certain objections and to avoid these I have produced a conducting cord wherein insulated helical steel conducting elements are provided, being circularly disposed with filler cords of insulating material positioned between the different conducting cords so that substantially a smooth round outer surface is provided for the external insulating braid.

For a better understanding of my inven-

tion reference is to be had to the accompanying drawing in which—

Figure 1 illustrates a three-conductor cord; Fig. 2 illustrates a two-conductor cord; and Fig. 3 is a transverse section through the three-conductor cord.

Referring now more particularly to the preferred form of construction of my invention, I provide a core 1 preferably of fabric material of high tensile strength and carrying a sinistrorsal helical tinsel conductor 3 having concentric thereto a dextrorsal helix preferably of a steel conducting element such as piano wire so that the two helixes are in electrical contact at each convolution. By having right and left helixes 2 and 3, more contacting surfaces are secured and it is to be understood that the direction of the two helixes 2, 3, may be reversed. A layer of tussah silk 4 is then placed over the steel conductor and over this silk covering a braid 5 is provided which may be, and is preferably, water proofed with an insulating material. The conductor strands A, B and C thus formed are angularly disposed with alternate filler cords 6, 6¹, 6², all twisted so as to present interposed helical formations as will be clear from Figs. 1 and 2. That is, in following the twisted conductors such as in Fig. 1, longitudinally on the outer surface, it will be seen that strands A, B and C follow in regular order with interposed filler cords 6 thus producing what I call interposed helix. By twisting the elements A, B, and C and filler cords 6, 6¹, 6² as above described, a substantially circular construction is provided over which a first braid 7 is applied followed by a heavier braid 8 and a heavy linen braid 9. I also preferably provide tangential stitching through the outer braids thereby preventing these braids from folding back over the cord when worn. Although I preferably use a tinsel conducting element 3 in each conductor of the cord this may be eliminated if desired although I find that a 6 foot strand such as A is reduced from 6 ohms for the steel alone to 1½ ohms where the tinsel is used. Although in the use of tinsel alone as a conductor objection is made to the fact that it is so easily broken, when used in connection with the spiral steel spring one or more breaks of the tinsel does not mate-

rially affect the conductivity of this strand because each break is connected by a single convolution of the steel helix. Furthermore due to the comparatively small circumference of the helical conductors in the different strands of the cord less chance of breakage is present and a greater flexibility occurs on account of the bend in the cord being oblique to the axis of the conductor. That is when the cord is bent at an angle there is more of a torsional strain upon the conductor and less transverse strain which results in more flexibility and longer life. I also find that due to the co-action between elements 1, 2 and 4 when it is desired to cut back the cord on account of wear near its plug end, it is impossible to readily pull out more than a short piece of the spring conductor 2. This prevents having a long straight end of the conductor 2 at a point near the plug so that the helical formation remains up close to the end of the plug and more flexibility and longer life results.

In the foregoing description I have referred more particularly to the three strand cord of Fig. 1 and in Fig. 2 I have illustrated a two strand cord each strand of which is of the same construction as are the strands of Fig. 1. It will be apparent that different numbers of strands may be used and furthermore it will be apparent that variations in construction and form of my invention will readily suggest themselves and therefore I do not desire to be limited to the exact structure as shown and described but aim to cover all that which comes within the spirit and scope of the appended claims.

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

1. A flexible conducting cord comprising a core of fabric material, a sinistrorsal helix of tinsel wound thereon, a concentrically disposed dextrorsal helix of steel wound thereover, said helixes being in electrical contact throughout their length, and an insulating cover thereover.

2. A flexible conducting cord comprising a plurality of radially disposed strands each including a core of fabric material and a sinistrorsal helical conductor wound thereon with a covering of insulating material, filler cords interposed between said strands so as to present a substantially circular outer surface, and a layer of insulating fabric for covering said strands and filler cords.

3. A flexible conducting cord comprising a plurality of insulating cores each having concentrically disposed tinsel and steel dextrorsal and sinistrorsal helixes in electrical contact throughout their length and an insulating fabric thereover so as to form independent strands, said strands being formed into interposed helixes and having interposed filler cords whereby a substantially circular outer surface is presented and a layer of insulating fabric for covering said strands and filler cords whereby a substantially circular conducting cord is produced.

4. An electrical conducting cord comprising a core of insulating material, a sinistrorsal helix of tinsel wound thereon, a dextrorsal helix of steel wound thereover and in electrical contact with said helix of tinsel throughout its length, and a cover of insulating material.

5. A flexible conducting cord comprising a plurality of insulating cores each having a concentrically disposed sinistrorsal helix of tinsel and a concentrically disposed dextrorsal helix of steel, the helixes of each core being in electrical contact throughout their length and having insulating fabric thereover so as to form independent strands, said strands being twisted together and having filler cords laid in the recesses between the insulating cores whereby a substantially circular outer surface is secured.

Signed by me at Chicago, county of Cook and State of Illinois, in the presence of two witnesses.

HIRAM D. CURRIER.

Witnesses:

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