

Aug. 1, 1944.

C. N. STOVER

2,355,018

COVERED ELECTRICAL CONDUCTOR

Filed Sept. 16, 1941

3 Sheets-Sheet 1

Fig. 1.

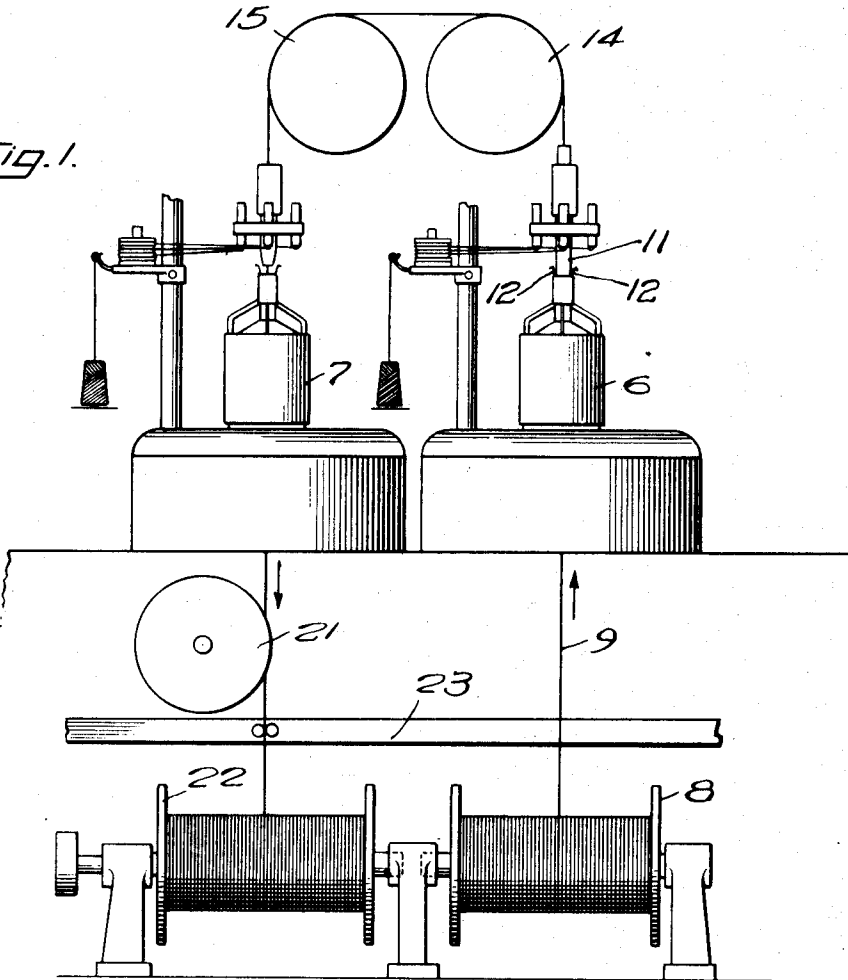


Fig. 2.

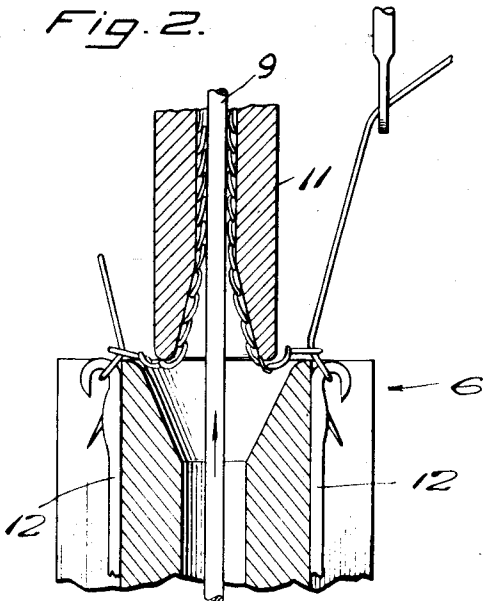
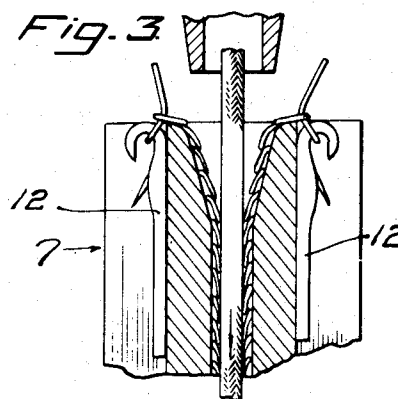


Fig. 3.



INVENTOR

C. N. STOVER

BY

Harry C. Swift
ATTORNEY

Aug. 1, 1944.

C. N. STOVER

2,355,018

COVERED ELECTRICAL CONDUCTOR

Filed Sept. 16, 1941

3 Sheets-Sheet 2

Fig. 6.

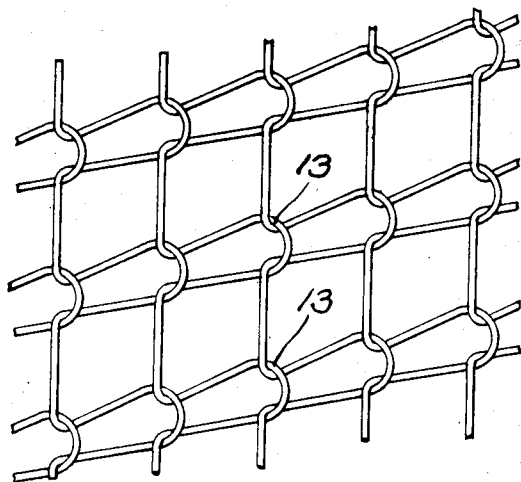
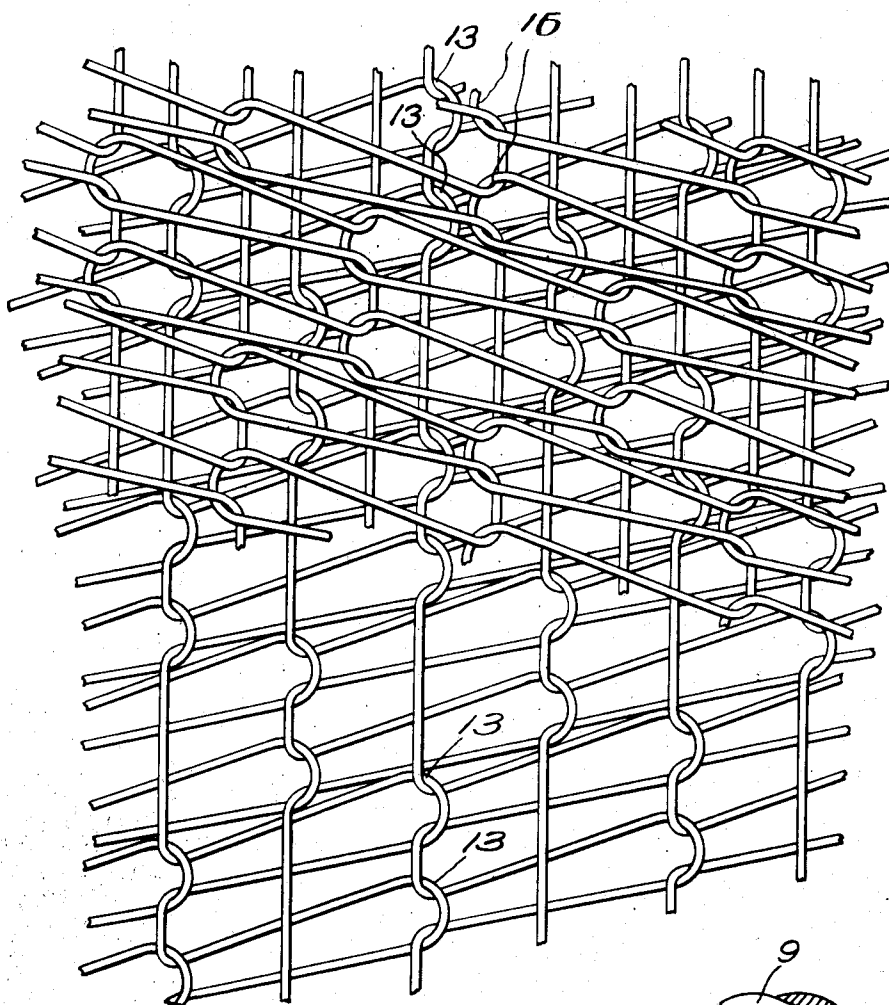
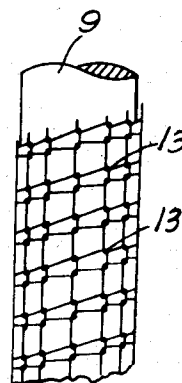


Fig. 4.

Fig. 7.



INVENTOR

C. N. STOVER

BY *Harry L. Suft*
ATTORNEY

Aug. 1, 1944.

C. N. STOVER

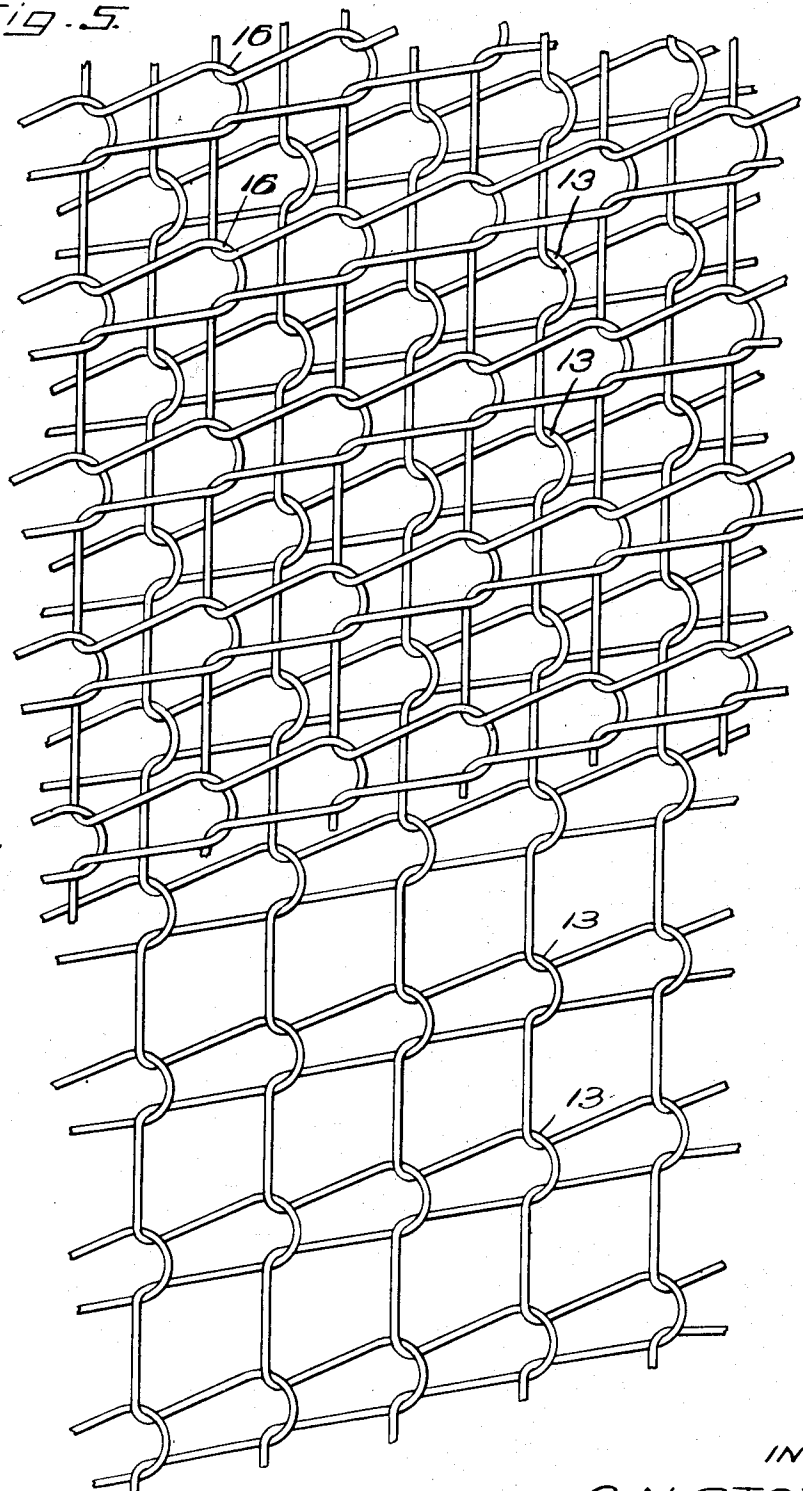
2,355,018

COVERED ELECTRICAL CONDUCTOR

Filed Sept. 16, 1941

3 Sheets-Sheet 3

Fig. 5.



INVENTOR

C. N. STOVER

BY

Harry L. Duft

ATTORNEY

UNITED STATES PATENT OFFICE

2,355,018

COVERED ELECTRICAL CONDUCTOR

Clyde N. Stover, Towson, Md., assignor to Western Electric Company, Incorporated, New York, N. Y., a corporation of New York

Application September 16, 1941, Serial No. 411,006

4 Claims. (Cl. 174-124)

This invention relates to covered electrical conductors and particularly to electrical conductors having multiple knitted coverings.

An object of the present invention is an electrical conductor having multiple knitted coverings arranged to provide a high abrasive resistance.

In accordance with one embodiment of the invention, an initial knitted fabric covering or sheath is applied to an electrical conductor in which the ribs formed by the bight ends of the loops are on the outside of the fabric and the smoother or inner surface of the fabric on the inside thereby providing a smooth closely adhering fabric surface lying against the conductor, thus materially increasing the abrasion resistance or wearing properties of the covering. Applied over the first covering is a second covering, arranged as above described, and the ribs on the second covering formed by the bight ends of the loops on the inside lie between the ribs of the first covering whereby a composite covering is formed having a high degree of compactness and high abrasive resistance.

A complete understanding of the invention may be had by reference to the following description taken in conjunction with the accompanying drawings, in which

Fig. 1 is a somewhat schematic front elevation of an apparatus used in practicing the invention;

Fig. 2 is a fragmentary sectional view of the apparatus at the upper end of the needle cylinder of the first knitting head;

Fig. 3 is a similar view of the apparatus at the upper end of the needle cylinder of the second knitting head;

Fig. 4 is an enlarged fragmentary view of a single knitted fabric made in accordance with the invention;

Fig. 5 is an enlarged fragmentary view of a composite fabric made in accordance with the invention;

Fig. 6 is a similar view of another type of composite fabric embodying the invention, and

Fig. 7 is a diagrammatic view of a conductor with the improved knitting covering thereon shown in Fig. 4.

Referring now more in detail to the drawings and particularly to Fig. 1, an apparatus is shown having two knitting heads 6 and 7 which may be of any conventional construction, the particular knitting heads shown being of the type described more in detail in U. S. Patent 2,239,378 to S. E. Brillhart of April 22, 1941. A supply reel 8 is shown for supplying an electrical conductor 9

(Fig. 7) to which a single knitted fabric covering made in accordance with the invention (Fig. 4) or the double knitted types of fabric covering (Figs. 5 and 6) may be applied.

In applying the single knitted fabric covering of Fig. 4 to the conductor 9 the knitting head 7 remains idle, the conductor merely passing there-through. The conductor 9 in this case passes through the knitting head 6 in what may be termed the reverse direction, that is, the fabric formed on the conductor is moving away from the needle cylinder after passing through the cylinder. In order to make this practicable, a web holder 11 is employed for holding the loops of the knitted fabric in position as the fabric is being formed by the needles 12. This results in forming the knitted fabric on the conductor in such a way that the ribs or rough portions of the fabric formed by the bight ends of the loops, indicated at 13 in Figs. 4, 5, 6 and 7 will lie on the outside of the fabric and not against the conductor. Thus, the smooth or inner surface of the fabric will lie against the conductor and have a tendency to produce a relatively high abrasive resistance property of the covering on the conductor.

In the forming of a double knitted fabric covering of the types shown in Figs. 5 and 6, both of the knitting heads 6 and 7 are used and the conductor 9 with the one layer of knitted fabric thereon of the type shown in Fig. 4 and previously described passes over sheaves 14 and 15 to the second knitting head 7 where a second layer of knitted fabric is applied.

As shown in Fig. 3, it will be noted that in the second knitting head the conductor passes downwardly through the knitting head and the loops of the fabric being knitted are therefore held in place by the upper end of the needle cylinder and a web holder 11, such as is shown in Fig. 2, is not required. In the second knitted composite fabric covering the ribs formed by the bight ends, as indicated by the numeral 16 in Figs. 5 and 6, extend inwardly and lie between the ribs on the first fabric covering. Thus the inside of the inner covering and the outside of the outer covering will present relatively smooth surfaces. Due to the fact that the ridged surfaces or the ribs of the coverings are staggered and directed toward each other to provide a dovetailed arrangement, a composite covering of great compactness is formed. In other words, the thickness of the combined coverings is less than if the ribs of both coverings were to extend in the same direction. Referring to Fig. 5, both the inner and outer

coverings are single loop fabrics and the loops extend spirally around the conductor in the same direction. In order to form this fabric the knitting heads 6 and 7 are rotated in opposite directions.

The composite fabric illustrated in Fig. 6 may be termed a double loop float fabric and it will be noted that the loops of the two fabrics extend spirally around the conductor in opposite directions. In order to have the loops extend spirally around the conductor in opposite directions the knitting heads 6 and 7 are rotated in the same direction.

After the conductor has passed through the second knitting head 7 it passes over a capstan 21 to a take-up reel 22 on which the conductor is laid by means of a distributor 23.

It will be understood that the nature and embodiments of the invention described and illustrated are merely illustrative and that many changes and modifications may be made therein without departing from the spirit and scope of the invention.

What is claimed is:

1. An insulated electrical conductor comprising a core having two knitted coverings with the ribs

formed by the knots along the base of the courses extending in one direction on one covering and in the opposite direction on the other covering, said ribs lying between the coverings.

2. In an electrical conductor cord, a conductor, a knitted tubular insulating covering thereon disposed with the ribbed surface on the exterior, and an additional knitted covering thereover with its ribbed surface adjoining the ribbed surface of said first covering, the ribs of said additional covering disposed between the ribs of said first covering.

3. A multiple covering for an electrical conductor comprising an initial knitted covering about said conductor with its ribs and troughs outermost, and a second knitted covering thereover with its ribs in the troughs of the first covering.

4. In an electrical conductor cord, a conductor, a knitted insulating covering thereon with its ribbed rough surface outermost, and a second knitted covering thereover with its ribbed rough surface innermost and nested in said first covering.

CLYDE N. STOVER.