Aug. 1, 1944. C. N. STOVER 2,355,019

METHOD OF AND APPARATUS FOR MAKING A KNITTED COVERING OR COVERINGS ON A STRAND

Original Filed Sept. 16, 1941 3 Sheets-Sheet 1

FIG. 1

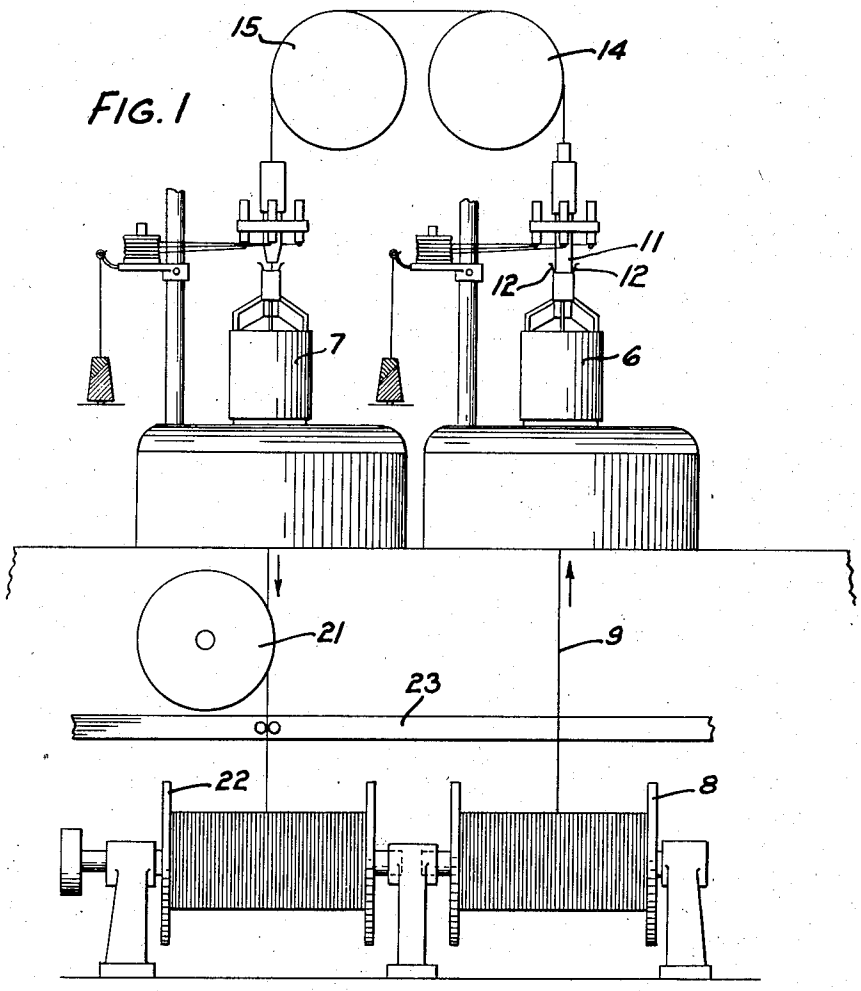


FIG. 2

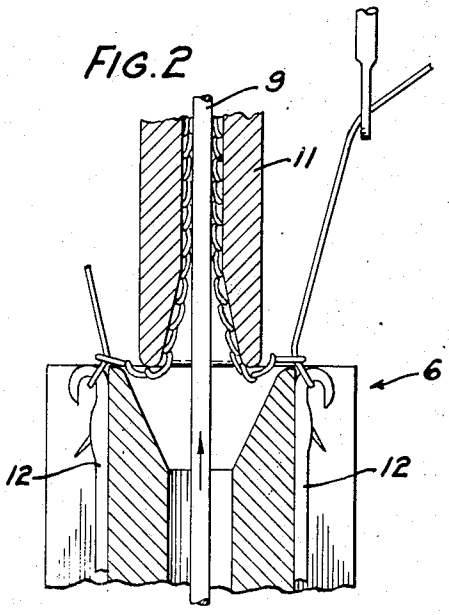
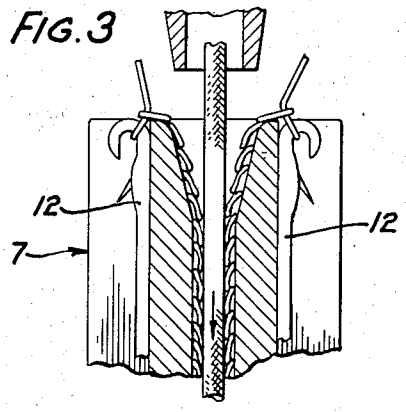


FIG. 3



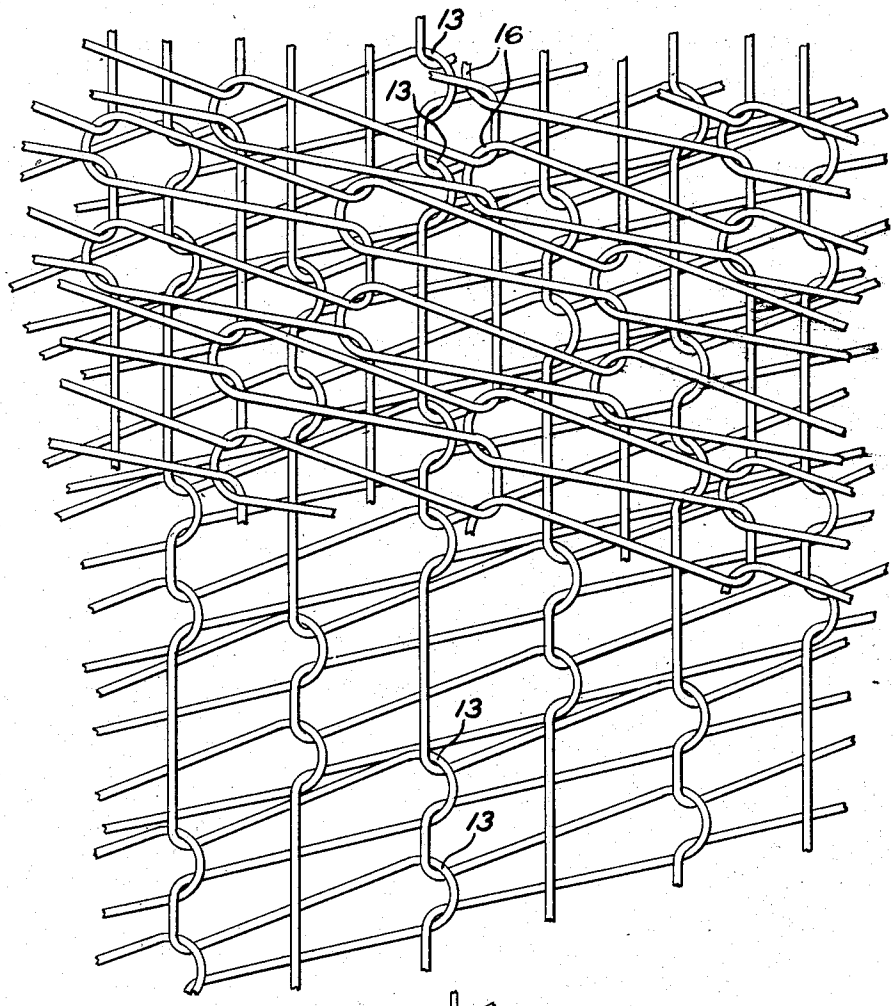
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FIG. 6



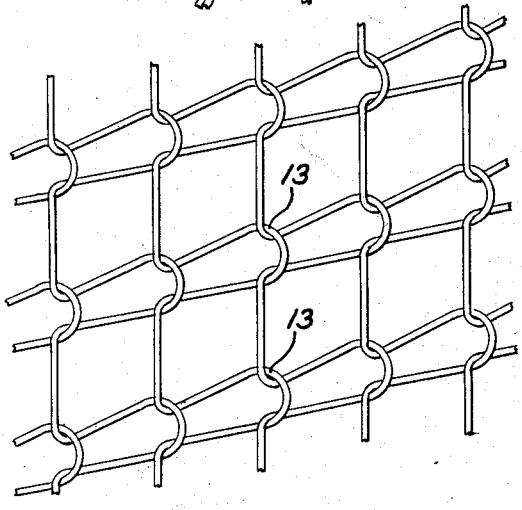


FIG. 4

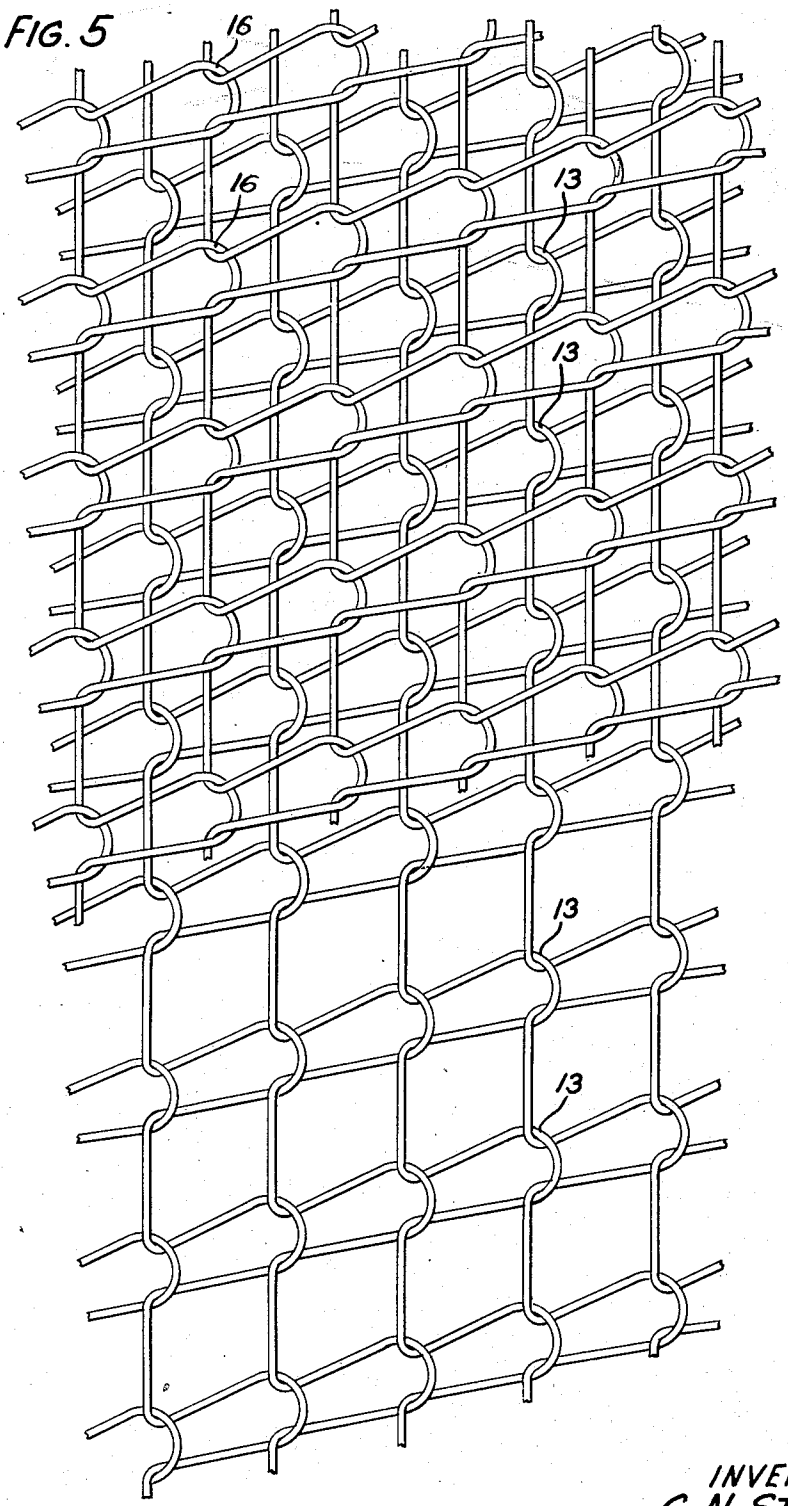
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FIG. 5



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2,355,019

METHOD OF AND APPARATUS FOR MAKING A KNITTED COVERING OR COVERINGS ON A STRAND

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Original application September 16, 1941, Serial No. 411,006. Divided and this application June 20, 1942, Serial No. 447,819

8 Claims. (Cl. 66—9)

This invention relates to a method of and apparatus for making a knitted covering or coverings on a strand and is a division of my co-pending application, Serial No. 411,006, filed September 16, 1941.

Objects of the present invention are to provide methods of and apparatus for applying a knitted covering or coverings on a strand having a high abrasive resistance.

In accordance with one embodiment of the invention, a knitted fabric covering or sheath is applied to an electrical conductor in which the ridges 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. In another embodiment of the invention, a double knitted fabric covering is applied to a conductor in which a second knitted covering is applied over a first covering, arranged as above described, and the ridges on the second covering formed by the bight ends of the loops on the inside lying between the ridges 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 embodying 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; and

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

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 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 therethrough. 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 ridges or rough portions of the fabric formed by the bight ends of the loops, indicated at 13 in Figs. 4, 5 and 6, 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 ridges formed by the bight ends, as indicated by the numeral 16 in Figs. 5 and 6, extend inwardly and lie between the ridges 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 ridges 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 ridges 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. A method of knitting a multiple fabric covering on an electrical conductor comprising passing said conductor through a knitting head in one direction to produce a first covering with its ridges outermost, and passing the covered conductor through a second knitting head in the opposite direction to apply a second covering with its ridges innermost and between the ridges of said first covering.

2. A method of knitting multiple coverings on a core comprising passing the core through a knitting head in one direction to produce a covering with alternate ridges and troughs on its outer surface, and passing the covered core through a second head in a reverse direction to produce a second covering thereover with the ridges innermost and resting in the troughs of the first covering.

3. A method of knitting multiple coverings on a conductor core comprising passing the core through a knitting head in one direction to produce a covering with floats on the exterior surface, and passing the covered core through a second knitting head in the opposite direction to produce a covering with floats on the interior surface.

4. A knitting machine for applying a multiple fabric covering to a conductor comprising a pair of knitting heads for applying coverings to a conductor, and means for passing said core through one of said heads in one direction to produce a covering with floats on its exterior surface and through a second head in the opposite direction to produce a second covering with the floats on its interior surface.

5. A knitting machine for applying a multiple fabric covering to a core comprising a pair of knitting heads for applying the coverings to a core, and means for passing said core through one of said heads in one direction to produce a first covering with the ridges thereof outermost and said core and first covering through a second head in the opposite direction to produce a second covering with the ridges thereof between the ridges of said first covering.

6. A knitting machine for applying a multiple fabric covering to a core comprising a pair of knitting heads for applying coverings to a core, and means for passing said core through one of said knitting heads in a direction to produce a covering with alternate troughs and ridges on its outer surface and through a second head in a reverse direction to produce a second covering with the ridges thereof resting in the troughs of said first covering.

7. A knitting machine for applying a multiple fabric covering to a core comprising a pair of knitting heads for applying knitted coverings to a core, means for passing said core through one knitting head in such a direction that the fabric being knitted moves away from one knitting head and through the other knitting head in such a direction that the fabric being knitted passes through the latter knitting head, whereby the ridges on the knitted coverings will face oppositely.

8. A knitting machine for applying a multiple fabric covering to a core comprising a pair of knitting heads for applying coverings to a core, means for passing said core through said heads, the core being passed through the first of said heads in such a direction that the covering being knitted thereon moves away from the head, and means associated with said first head and engaged by the knitted covering as it moves from said first head whereby the ridges on the knitted covering will be arranged on its exterior surface, the core and said covering moving through the other head in a direction reverse to the movement of said core through said first head whereby the ridges on the second knitted covering will be arranged on its interior surface and intermeshed with the ridges on said first covering.

CLYDE N. STOVER.