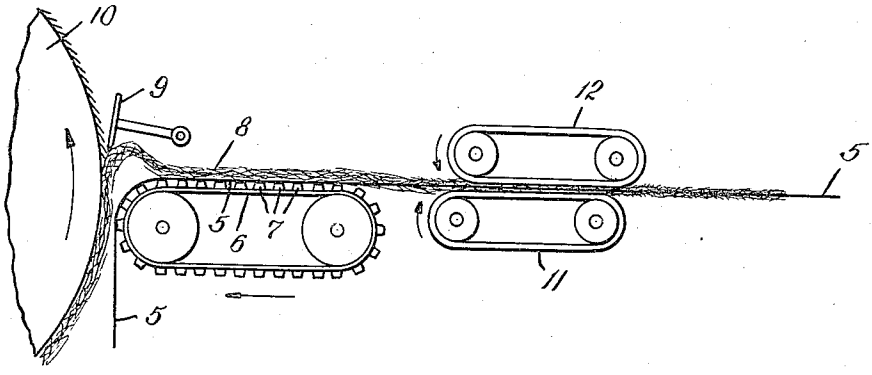
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REINFORCED ASBESTOS SLIVER

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REINFORCED ASBESTOS SLIVER

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1 Claim. (Cl. 28—1)

This invention relates to an asbestos sliver, particularly for use in the manufacture of insulated electrical conductors. The invention aims to provide, as a new article of manufacture, a continuous sliver of asbestos fibers containing no combustible material and possessing adequate strength and coherence to permit its application around an electrical conductor by the winding operation customarily employed in applying insulating coverings of asbestos to such conductors.

It has heretofore been necessary to combine other types of fibers with asbestos fibers in order to fabricate them into slivers, roving or yarn for use in applying insulating coverings to wires and cables. This has been due to the inherent characteristics of the asbestos, such as straightness (lack of curl), smoothness (lack of hooks or lumps), and slipperiness (due to presence of dust on surface of fibres), which make it impossible for the asbestos fibers to hang together during the various manipulations involved in the production of asbestos yarn and its subsequent handling and application to electrical conductors.

Cotton has heretofore been principally used as the other type of fiber in the production of asbestos slivers, yarn or roving. Cotton fibers possess the necessary characteristics to enable them to cling to each other and to the asbestos fibers and thus to act as a carrying agent in the steps of carding and spinning and as a strengthening agent in the finished product. Other organic fibres have also been used with some success, but the cheapness and ready availability of cotton has made its use for the purpose almost universal. The precentage of cotton added will vary with the quality of the asbestos, but usually runs from 5 to 20%.

There is a distinct disadvantage, from the electrical insulation standpoint, in the use of cotton (or any other organic fiber), either in the form of loose fibers mixed with the asbestos fibers or in the form of a carrier and reinforcing thread, due to its inability to withstand high temperatures without carbonizing and forming a conducting instead of an insulating material. Cotton (or other organic fiber) also produces undesirable smoke and odor during its initial subjection to high temperature, which is a cause for complaint on household appliances (ranges, waffle irons, toasters, etc.) equipped with wire insulated with asbestos containing organic fibers.

I have discovered that asbestos fibers such as carded asbestos fibers, may be formed into a sliver about a reinforcing glass thread, and the fibers of asbestos intertwined and condensed to form a self-supporting structure without twisting the sliver, and yet be sufficiently fluffy and fibrous so that a plurality of the slivers may be placed together and worked into a continuous felted layer. Glass filaments or fibers are spun or drawn from molten glass in much the same manner that cellulose-containing solutions are spun in the manufacture of artificial silk. The glass filament or fiber is comparable in size (diameter) to the artificial silk filament. It is strong and flexible, but is incapable of withstanding sharp or acute bends without breaking. A group of the spun glass filaments or fibers are twisted into a thread by well-known means, which is about as flexible as cotton thread of the same size and about twice as strong.

The asbestos sliver of the invention, based on the foregoing discovery, comprises a fluffy mass of self-adhering and indiscriminately arranged asbestos fibers disposed about and slidable on to a flexible reinforcing thread of twisted filaments or fibers of glass or equivalent non-combustible vitreous material.

The single figure of the accompanying drawing diagrammatically illustrates one way of producing the asbestos sliver of the invention.

Referring to the drawing, a thread **5** of twisted glass filaments or fibers (supplied from any suitable source, such as a spool or the like, not shown) is drawn longitudinally and centrally over the upper surface of a belt or conveyor **6** having transversely disposed ribs **7**. A sliver **8** of carded asbestos fibers is deposited on top of the glass thread **5**. The sliver **8** is stripped by a comb **9** from the doffer roll **10** of a carding machine. The sliver **8** is many times wider than the diameter of the thread **5**, and overhangs the thread at the sides as the sliver and thread leave the belt **6**. From the belt **6**, the sliver and thread pass together at the same speed between rub motion belts **11** and **12** in close proximity to the discharge end of the belt **6**. The rub motion belts have a longitudinally progressing and laterally reciprocating motion. The reciprocating motion produces a rolling of the asbestos sliver about the glass thread. Thus, the action of the rub motion belts apply the sliver entirely around the thread and a substantial number of the asbestos fibers of the sliver cling to one another and some asbestos fibers cling to the filaments of the thread. The product leaves the rub-motion belts as the reenforced sliver of the invention with the glass thread enclosed centrally within a substantially circular body of intertwined and more or less condensed asbestos fibers, which cling to

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the thread and to one another with adequate tenacity to permit winding, subsequent handling and use of the sliver substantially as herefore practiced with asbestos slivers containing organic carrier fibers. The asbestos sliver of the invention is condensed to a point where the asbestos fibers cling to each other sufficiently to form a self-supporting or self-adhering structure, i. e., it will support itself in short sections when the glass thread is removed, but it is also sufficiently fluffy that the slivers may be pressed together into a contiguous felted layer. The sliver of the invention is not a yarn or thread which is twisted to orient the fibers in a more or less distinct direction of lay causing them to be bound or grouped together, thereby preventing mutual intermingling of the fibers when two strands are pressed together. The production of yarn from this sliver may be accomplished by twisting in accordance with established textile practice.

The glass thread may be made of continuous filaments or of shorter filaments or fibers, and in the appended claims I use the word filament generally to include both long continuous filaments and shorter filaments or fibers. In making the glass thread of short filaments or fibers, say 12 to 18 inches long, a plurality of the fibers are collected on a conveyor and condensed into a sliver by drawing through a guide in the form of an eyelet. This sliver is then twisted into a thread or yarn on the usual form of ring-twisting machine, and the resulting thread or yarn has projecting whiskers which are really the ends of individual filaments throughout its length. The glass thread is made of continuous filaments by drawing the molten glass into a continuous filament, and assembling a group of these filaments, sufficient in number to produce the size of thread desired, and twisting them together with a long-lay twist to prevent the spread of the filaments and to produce a finished thread of approximately circular cross section.

The asbestos sliver of the invention contains no organic or combustible material and possesses adequate strength for all requirements during application as an insulating medium to wires or cables. When subjected to high temperatures, wires and cables insulated with the asbestos sliver of the invention give off no smoke, fume or odor, and even when subjected to such elevated temperatures as would carbonize cotton there is no deleterious effect on either the glass or asbestos. Under extremely high temperatures the glass may fuse or melt, but as there is no carbonizable material present there is no carbon formed with resulting short circuit due to the conversion of the cotton or the like into conducting carbon.

The asbestos sliver of the invention may advantageously be used, when suitably twisted into a yarn or thread, in the fabrication of woven, knitted, felted or braided products in which asbestos is required on account of its resistance to heat or chemical deterioration and where the association of cotton or other organic material with the asbestos is detrimental or where the necessity of eliminating such organic material requires the use of very expensive grades of asbestos fiber and special processes which render the cost of production almost prohibitive. Use of the twisted asbestos sliver of the invention in such cases permits the fabrication of the aforementioned products by ordinary and efficient processes and without recourse to specially high grades of asbestos or special fabricating means.

I claim:

A continuous non-combustible reinforced asbestos sliver which comprises a glass thread and a surrounding fluffy mass of asbestos fibers slidable thereon, said mass of asbestos fibers being so intertwined and condensed that the fibers cling together with sufficient tenacity to be a self-adhering structure permitting winding and ordinary handling of the sliver, but also sufficiently fluffy that when two or more of the slivers are pressed together, contacting fibers thereof intermingle and can be formed into a felted layer.

JOHN W. GREENLEAF.