April 18, 1939. H. V. WODTKE 2,154,551

FLEXIBLE STRANDED CONDUCTOR

Filed March 28, 1936

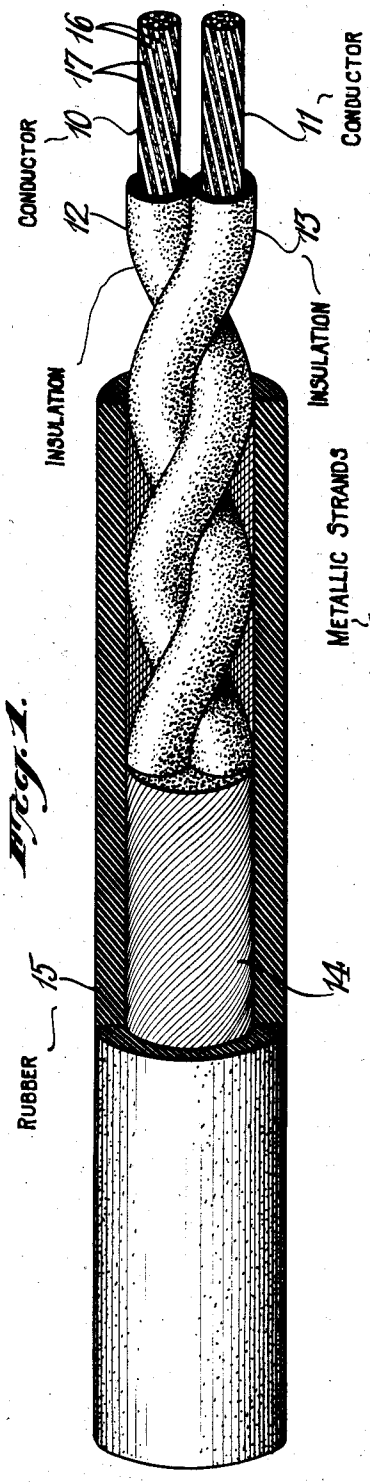


Fig. 1.

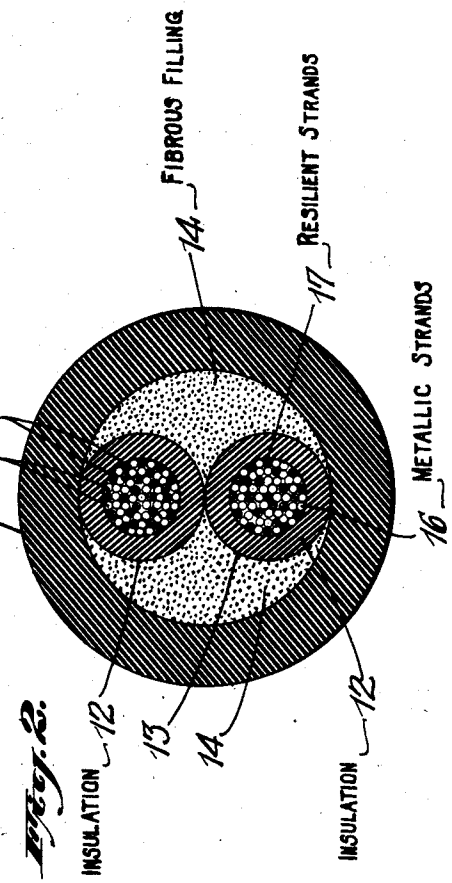


Fig. 2.

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FLEXIBLE STRANDED CONDUCTOR

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6 Claims. (Cl. 174—128)

My invention relates to stranded metallic conductors of electricity having a high degree of flexibility and more particularly to a stranded conductor in which all of the strands are twisted in a group in the same direction to form the finished conductor.

Conductors of the above type are commonly used with portable electric tools such as drills and grinders and lamps and are subject to frequent bending or flexing. In these cables, as heretofore constructed, each bending or flexure tends to cause certain strands to bind against others. Moreover, the sliding incident to the flexing of the conductor causes a friction and abrasion of one strand on an adjacent one.

My present invention provides a stranded conductor in which the binding of one strand on another and friction between the strands is avoided or largely eliminated.

The various features of the invention are illustrated in connection with the accompanying drawing, in which—

Fig. 1 is a longitudinal view of a length of conductor cable embodying my invention, parts of the insulation being progressively cut away to show the construction; and Fig. 2 is a cross section of the cable shown in Fig. 1.

In my invention, I provide cushioning strands intermingled with the metallic strands of which the conductor is composed. These cushioning strands may be made of cotton or other textile fibres, or other material having sufficient impressibility and resilience so that any tendency to binding between the metallic strands will be relieved by a compression or distortion of the intermingled resilient strands. In manufacturing the conductor, a number of cotton or other resilient strands preferably of non-conducting material are twisted with the metallic strands while being intermingled therewith, being handled and treated in this manner just as though they were metallic strands. As a result, these strands are intermingled among the twisted metallic strands in a hit or miss arrangement. The resilient strands may be treated or saturated with lubricant or preservative materials, such as graphite or oil prior to or after being twisted with the strands.

In the specific embodiment of the invention shown in the accompanying drawing, the conductors 10 and 11 covered by individual sheaths 12 and 13 of insulating material, such as rubber, are twisted together in helical turns. The spaces or valleys between the twisted conductors are then filled to an approximately circular cross section by means of a filling 14 of suitable material, such as a fibrous or textile mass. The entire assembly is then enclosed in a sheath 15 of non-metallic material, such as rubber. It will be understood, however, that the conductors may be employed in various other cable constructions than that specifically shown in the drawing.

Each of the conductors 10 and 11 is made up of a number of metallic strands, such as fine copper wires 16 and a number of strands 17, of resilient or fibrous material such as cotton thread. The threads 17 may be of very low tensile strength, as they form merely a buffer or number of buffers between the individual metallic strands 16. They may be incorporated most conveniently by intermingling them with the metallic threads or wires, as the latter are being assembled and twisted so that in the twisting operation the threads will become and remain scattered throughout the strand. It will be understood that the position of any particular thread may vary at different intervals in the length of the conductor and may at successive intervals occupy any position from the center to the outer periphery of the conductor.

The several threads or strands of resilient material act as buffers, so that when any two or more strands tend to crowd together when on the inside or outside of a turn the necessary space to prevent binding is made by a compression of the fibrous material. The sharpness of the bending for any particular wire of the strand is generally lessened by relieving the binding of the wires.

During the bending or flexing of the conductor, displacement of the individual metallic wires is liable to take place. Such displacement either longitudinal or crosswise tends to rub the surface of one wire against the surface of an adjacent wire. The interposition of the resilient strands, however, tends to lessen the direct contact of one wire on another and the consequent direct rubbing of the wires. The relative movement of the strands may take place on opposite sides of a resilient thread and the friction largely avoided. This friction may be still further lessened by impregnating the resilient strands with lubricating oils or solid such as graphite. These materials also tend to form a preservative coating on the wires protecting them against corrosion, particularly in those cases in which an impervious protective outer jacket is not used.

What I claim is:

1. A stranded electrical conductor for flexible

cords comprising a plurality of metallic conducting strands twisted into a common assembly with strands of said assembly in conductive contact with other strands and strands of resilient material irregularly interspersed and twisted with said metallic strands in said conductor to vary in cross sectional position in the conductor and in relation to other strands at successive longitudinal distances.

2. The conductor of claim 1, in which said strands of resilient material are of fibrous textile material.

3. The conductor of claim 1, in which said resilient strands are of cotton.

4. The conductor of claim 1, in which said resilient strands are of relatively low tensile strength.

5. The conductor of claim 1, in which said resilient strands carry a lubricant.

6. The conductor of claim 1, in which said strands are impregnated with an oil.

HANS V. WODTKE.