METHOD OF MAKING MULTICORE ELECTRICAL CONDUCTORS

FIG. 1

FIG. 2

FIG. 3

FIG. 4

FIG. 5

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METHOD OF MAKING MULTICORE ELECTRICAL CONDUCTORS

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This invention relates to electric cables and more particularly to multi-core electric power cables.

Paper, whether unimpregnated or impregnated with an insulating compound is a normal form of insulation in electric cables. The usual method of applying this form of insulation is to lap the required numbers of papers in the form of narrow strips around the conductors to form separate cores. Additional layers of paper may then be applied around the cores after they have been laid up in cable form. For high voltage cables, say 11,000 volts and over, the papers must be applied with precision to avoid the formation of spaces within the dielectric, but for lower voltages the thickness of insulation is designed for mechanical rather than electrical considerations.

The application of the paper insulation represents an appreciable proportion of the total cost of making the cable. In a four core cable, for example, there are five distinct lapping operations necessitating five different passes through the lapping machine. Furthermore, the process is comparatively slow owing to the narrow widths of the paper tapes.

An object of the present invention is to change the process of making a power cable by eliminating the lapping operations on the individual cores.

According to one feature of the present invention we provide a multi-core electric power cable in which the several cores are insulated from one another by means of a member extending along the length of the cable the cross section of which comprises a plurality of arms radiating from a centre, the separate conductor cores being laid between the arms.

Preferably also the flexible arms are made of sufficient length to enable them to be folded around the separate conductors.

The invention will be better understood from the following description of one embodiment, as applied to a four core cable, taken in conjunction with the accompanying drawings, of which:

Fig. 1 shows a cross section of an electric power cable in accordance with the invention.

Figs. 2, 3 and 4 show successive steps in the construction of the insulation of the cable of Fig. 1. Fig. 2 shows the form in which the insulating member of Figs. 2 to 4 may be stored.

Referring to the drawings, an electric power cable is formed with a member 1 having four arms 2 radiating from the centre, so as, in the case of four core cable illustrated, to have a cruciform cross section. This central member is formed from a plurality of superposed paper strips in the manner shown in Figs. 2 to 4. Fig. 2 shows in cross section a plurality of paper strips laid one above the other. The width 3 of the strips is sufficient to enable the formation of the arms 2 of Fig. 1. The length at right angles to the plane of the paper may be sufficient to produce a manufacturing length of cable without jointing although there is no objection to making a joint by over-lapping the papers. The papers are folded lengthwise as shown in Fig. 3 and then again lengthwise to form the structure shown in cross section in Fig. 4, the folding being done by means of passing the pile of strips through suitable guides. This process may be included in the laying up of the conductors 4 to form the cable in which the guides and supply rolls for the paper strips would be attached to the cable making machine. The paper member shown in Fig. 4 is then fed along the centre line of the machine and the copper conductors 4 guided between the limbs. The portions of the arms 2 extending beyond the conductors are then folded around the conductors, as shown in Fig. 1 by passage through a die. Fillers 5, in the form of extended folded strips of paper or jute string, folded into the cross section shown in Fig. 1 are guided into position and the assembly passed through a second die to form an approximately circular section. The effect of the fillers is to complete the turnover of the extremities of the arms 2 and to fill up the gaps at the extremities of the radial portions of these arms. Finally, on leaving the second die, the outer or belt papers 6 are applied by the usual rotating head.

During the laying up operation the conductors 4 are twisted according to normal practice and preferably are pretwisted during the stranding.
of the individual wires, again according to normal practice.

If desired a central filler \( I \) may be inserted during the manufacture of the cable.

After the application of the belt insulation \( J \) and a lead sheath (not shown) is applied by extrusion in the normal manner.

If desired the central member \( I \) after being formed into the shape shown in Fig. 4 may be stored, before being used in the manufacture of the cable, by being flattened into the shape shown in Fig. 5 and coiled on a drum, which drum is then mounted when required on the laying up machine.

It is clear that the invention can readily be applied to the manufacture of a cable of any number of cores.

What is claimed is:

A process for producing a multi-core electric power cable comprising the steps of superimposing a plurality of insulating paper strips in stacked relation, folding said stacked strips as a continuous unit into cruciform shape, laying a plurality of conductors between the arms of said cruciform, folding each arm to completely encircle a conductor core, inserting a filler at the center from which the arms radiate and inserting peripheral fillers in the openings between the end of each arm and the next adjacent arm.

EDWIN CHARLES LEE.

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