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ELECTRIC CABLE

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Fig. 1.

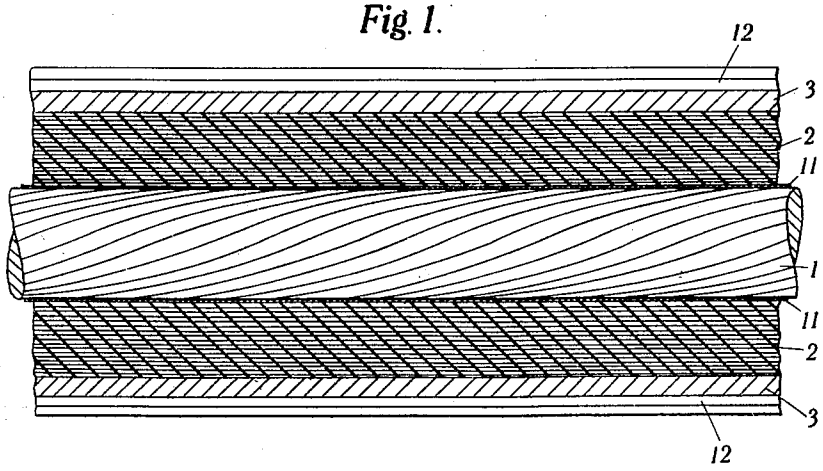


Fig. 2.

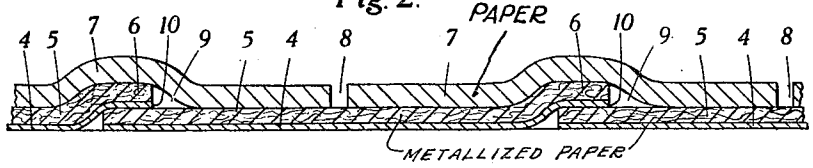
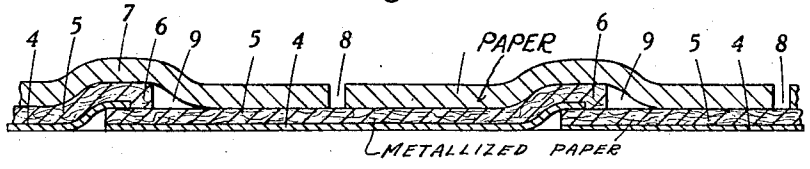


Fig. 3.



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ELECTRIC CABLE

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1 Claim. (Cl. 174—109)

In high voltage electric cables for the purpose of reducing the local stress in the dielectric adjacent to the surface of the conductor, due to the variation of the radius of curvature of the surface of a stranded conductor, a wrapping of metallised paper has been applied to the conductor with the metallised surface in contact therewith. The invention is concerned with an improved arrangement of this kind.

It is known that there is a much greater probability that breakdown of a non-homogeneous dielectric will be initiated by a discharge in a space bounded on one side by a conductive surface than in a space bounded on all sides by a non-conductive surface. If metallised paper be wrapped helically round a conductor, with the metallic surface in contact with the conductor and with a small overlap of adjacent turns, there is not complete prevention of the existence of spaces having conducting material on one side only. The spaces between the conductor and the metallic layer have conducting surfaces on both sides, but the edge of the metallic layer, where it overlaps the side of the adjacent turn of metallised paper, lies in a space, the outer surface of which is formed by the innermost layer of insulating material, usually impregnated paper. There is, accordingly, in this space the possibility of the initiation of breakdown.

In the improved arrangement, in accordance with the present invention, this possibility is avoided by terminating the metallisation of the paper at a short distance from the edge of the paper which overlaps the adjacent turns. By this means the edge of the metallic layer is shut in by the narrow width of paper lying between it and the edge of the strip. Accordingly, there is no exposed conducting material in the space where the layer of insulating material passes over this overlapping edge of metallised paper.

The invention is further described hereinafter, by way of example, with reference to the accompanying drawing wherein:

Figure 1 represents a longitudinal section of a single-core high voltage cable incorporating the improved construction;

Figure 2 represents diagrammatically upon an increased scale a section of a portion of such a cable representing the relative disposition of the component parts adjacent the conductor surface and illustrating the form of metallisation which has heretofore been generally adopted; and

Figure 3 is a view similar to Figure 2 indicating the improved arrangement of the metallisation.

The cable represented in Figure 1 comprises a stranded conductor 1 enclosed in a body of insulation 2 comprising layers of helically applied paper strip, a lead sheath 3, and an outer protective or reinforcing covering 12. Directly adjacent the conductor is the metallised layer 11, the metallic surface of which is in contact with the conductor surface.

As is shown diagrammatically in Figure 2 the metallised layer comprises a metallic surface 4 formed on one side of a strip 5 of insulating paper which is helically applied to the conductor so that the metallic surface 4 is in contact with the conductor. The metallised strip 5 is applied with a slight overlap so that one edge of the strip always overlaps by a small amount 6 the other edge of the strip. The first layer of insulating paper 7 is helically applied over the metallised layer with a slight gap 8 between adjacent turns in such a manner that these gaps 8 and the overlapping parts 6 of the metallised layer are not coincident. Consequently, where the first layer of insulation covers those overlapping portions there is formed a space 9 bounded by surfaces of insulating material with the exception of the metallic surface formed by the edge 10 of the metallic layer 4. In operation of the cable an electric discharge will occur at the exposed edge 10 of the metallic surface, as has been shown by practical experiment, and thereby is initiated the possibility of breakdown of the cable.

In the improved construction according to the invention, as represented diagrammatically in Figure 2, the condition which gives rise to undesirable discharge is eliminated. The metallic surface 4 terminates at a short distance, e. g., 0.15–0.3 mm., from the edge of the overlapping portion 6 of the metallised paper, thus the under-surface of the overlapping portion 6 immediately adjacent to its edge is devoid of metallisation, and the actual boundary of the metallic surface is set back and isolated from the space 9. Thus there is no exposed conducting material in this space 9 and the undesirable electric discharge does not occur.

It will be understood that to obtain the benefit of the invention the metallised paper must not be perforated, since the edges of the metallic layer would be exposed in the cavities thus formed and the undesirable electric discharge would occur thereat.

Where the metallisation of the paper is effected by spraying, the provision of an unmetallised

part along the edge of the strip can be conveniently effected by the use of a shield.

What we claim as our invention is:

A high voltage electric cable in which a helical wrapping of paper strip metallised on one side encloses the conductor with the metallic surface of the metallised paper in contact therewith, the adjacent turns of the helix of metallised paper overlapping and the metallic surface terminating short of the overlapping edge of the paper, leaving a non-metallised border between the said overlapping edge and the termination of the metallic surface.

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