

# UNITED STATES PATENT OFFICE

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## SEGMENTAL CABLE

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This invention relates to electric conductors, particularly those used for alternating currents and more particularly to stranded conductors of such large cross-sectional area that, without my invention, the skin-effect would be undesirably great.

Heretofore skin effect has been overcome to a large degree by the use of segmental construction with the addition of conductively inactive copper shielding tapes. One of the objects of my invention is to eliminate the necessity of using these electrostatic shielding tapes which have been the cause of great difficulty in the manufacture of these cables because of the tendency of the tapes to wrinkle.

This invention is a particular form of the well known type of conductor commercially known as "segmental," wherein the conductor is made up of several stranded sectors, usually three or four, slightly insulated from one another but designed for operation as a unit.

The stranded sectors are built up of several layers of wires assembled with a helical lay so that each wire makes the circuit of the sector in every pitch length of the helical lay. By this means, the current, which tends to be forced outward by the skin effect, is made to flow inwardly to follow the helical path of each wire.

The helical lay referred to above is that of each sector but the several sectors of which the cable is composed are also assembled in helical lay to obtain flexibility.

My invention consists, in the addition to the above construction, of an outside overall layer of wires which serves the triple purpose of carrying current, binding the sectors together and bridging the valleys between the outer corners of the sectors.

The foregoing and other features of my invention will now be described in connection with the accompanying drawings forming part of this specification in which I have represented my segmental cable in its preferred form after which I shall point out in the claims those features which I believe to be new and of my own invention.

Referring to the figure, there is shown a single conductor cable in cross-section, composed of four sectors, 11, 12, 13 and 14. In my preferred construction, I apply a thin layer of insulation, such as a single paper tape, 15 and 16, over diametrically opposite sectors, 11 and 14. Over this group is a layer, 17, of wires applied either in a helical lay opposite in direction to the lay of assembly of the sectors, or with a shorter lay in the

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same direction, the purpose, in either case being to enable the outer wires to cross the valleys 20 between sectors.

This conductor may be part of an insulated cable, in which case there will be a layer of insulation 18 and, if desired, a protective covering or sheath 19.

I may also apply conducting or semi-conducting shielding over the assembled conductor and/or insulation.

The advantages of my construction are that it combines the well known low skin effect advantages of the so-called "segmental" construction without the addition of conductivity inactive copper shielding tapes, as hitherto used to bridge the valleys of the sectors; that it overcomes the undesirable tendency of tapes to wrinkle, especially where they cross the valleys and thereby cause high local dielectric stresses, and that it eliminates the tendency of sectors to slide upon one another laterally especially in the four sector construction. The outer layer of wires, in my construction, by bridging the valleys, makes shielding tapes unnecessary, and the solidity of the outer layer of wires effectively stops lateral sliding of the sectors. However, one or more paper binder tapes may be used to hold the sectors together before application of the outer layer. Such tape or tapes may or may not be removed, depending on the size of the conductor, as the outer layer is being applied.

A further advantage is that larger conductors may be built than hitherto because the limit has been set by the size of sector that could be used. The application of an outer layer of wires enables this limit to be considerably raised.

I regard my construction as applicable to bare or insulated cables or station busses, but believe it to be particularly adapted to high voltage insulated cables, due to its normal surface and lack of distortion in bending.

I wish it distinctly understood that my segmental cable hereinabove described and illustrated is in the form in which I desire to produce it and that changes or variations may be made as may be desirable without departing from the salient features of my invention and I therefore intend the following claims to cover such modifications as actually fall within the lines of invention.

I claim:

1. An electric cable comprising a single round conductor, the conductor comprising a plurality of sectors cabled in a helical lay, each sector comprising a number of helically laid bare wires, the