No. 716,311. Patented Dec. 16, 1902.

E. THOMSON.

ELECTRICAL CONDUCTOR.

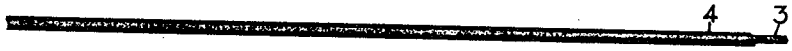
(Application filed May 23, 1902.)

(No Model.)

Fig. 1.



Fig. 2.



Witnesses.
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UNITED STATES PATENT OFFICE.

ELIHU THOMSON, OF SWAMPSCOTT, MASSACHUSETTS, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

ELECTRICAL CONDUCTOR.

SPECIFICATION forming part of Letters Patent No. 716,311, dated December 16, 1902.

Application filed May 23, 1902. Serial No. 108,660. (No model.)

To all whom it may concern:

Be it known that I, ELIHU THOMSON, a citizen of the United States, residing at Swampscott, county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Electrical Conductors, (Case No. 2,598,) of which the following is a specification.

My present invention comprises a compound electrical conductor the component elements of which consist of materials having temperature coefficients of opposite signs. These elements are proportioned relatively to each other, so that the increase of resistance of one of the elements produced by variation of temperature balances the decrease of resistance of the other element, thereby maintaining the resistance of the conductor as a whole at a constant value.

In the drawings, Figure 1 represents one embodiment of my invention, and Fig. 2 a modification.

In carrying my invention into practice I may form the conductor in the shape of a wire, having a core of one material and a concentric coating or skin of another material, these materials being chosen so that the temperature coefficient of one is positive and that of the other negative. Moreover, the relative proportion of the materials used is such that the variation of resistance with a given change of temperature of one of the elements of the conductor is compensated for by the opposite variation of resistance of the other element.

In Fig. 1 the core 1 of the conductor, which in this figure is represented in cross-section, is formed of a material—such as copper, German silver, iron, platinum, or the like—having a positive temperature coefficient. Over this core is applied a coating of a material having a negative coefficient—such, for example, as certain alloys or carbon. This coating is indicated at 2, and if it be of carbon may be applied by heating the core in an atmosphere composed of a hydrocarbon. The resulting decomposition of the carbon deposits the carbon on the wire constituting the core, and this deposition is continued until the desired thickness is obtained. The exact proportion of the core and the outer covering of the conductor depends upon the particular materials selected.

In Fig. 2 the conductor is shown as having the material possessing a negative temperature coefficient—in this case carbon—constituting the core of the conductor, the outer shell or coating of which is formed of material having a positive temperature coefficient. The core, which is indicated at 3, may be constructed like an ordinary incandescent-lamp filament, but of any desired length, and may be coated with the selected metal by means of electrical deposition, the coating being indicated at 4. This coating is made of sufficient depth so that its variation of resistance with temperature balances or compensates for the opposite variation of resistance of the carbon core.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. A compound electrical conductor composed of elements having temperature coefficients of opposite signs and proportioned in amount, relatively to each other, so that the variation of resistance of one element with temperature compensates for the opposite variation of resistance of the other element.

2. An electrical conductor formed with a core and a coating or shell superposed upon said core, the core and the shell being of such materials and proportioned relatively to each other so that their joint resistance is unaffected by temperature.

In witness whereof I have hereunto set my hand this 21st day of May, 1902.

ELIHU THOMSON.

Witnesses:
DUGALD MCK. MCKILLOP,
JOHN A. MCMANUS.