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G. T. JONES

ELECTRICAL CONDUCTOR AND METHOD OF MAKING THE SAME

Filed June 11, 1927

Fig. 1.

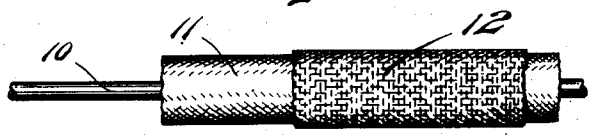
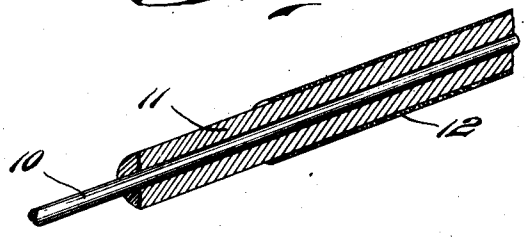


Fig. 2.



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UNITED STATES PATENT OFFICE.

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ELECTRICAL CONDUCTOR AND METHOD OF MAKING THE SAME.

Application filed June 11, 1927. Serial No. 198,091.

This invention relates to an improved electrical conductor and method of making the same, and has to do more specifically with the production of a form of insulated wire particularly adapted for use in connection with radio circuits and other electrical devices wherein a plurality of electric circuits are employed and the wires therefor are marked in some distinguishing manner so that the wires forming the various circuits can be readily identified in making the necessary connections.

One object of the invention is to provide a coated insulated wire, having an outer protective coating which is impervious to moisture, acids, and the like, thus insuring that no part of the wire covering be liable to deterioration or destruction by contact with moisture, acids, or the like.

Another object of the invention is the provision of a wire adapted for use as an electric conductor having a layer of insulating material applied thereto and a protective coating overlying the insulation and serving both to protect the insulation against injury and to designate by a particular color the circuit to which it belongs.

A further object of the invention relates to the novel method of forming the improved conductor, and more particularly, the character of the coating employed for protecting the insulation and the preferred method of applying the same.

Other objects and advantages of the invention relate to various improved details of construction and methods of operation, as well as certain novel steps preferably employed in the manufacture of the improved structure, as will be more fully set forth in the detailed description to follow.

Referring to the accompanying drawings forming a part of the present application:—

Fig. 1 is a fragmentary elevational view of a portion of the improved wire illustrating the relative position of the insulation and protective coating, and,

Fig. 2 is a sectional perspective view of the structure.

In the drawings, wherein like reference characters refer to corresponding parts throughout the several views, 10 designates the wire, which is preferably of copper or other metal possessing high conductivity, 11 is the insulation of rubber or other suitable insulating material, while 12 designates a protective coating applied to the outer surface of the insulation as a protection therefor and providing a means for identifying the wires of the several circuits. The coating 12 is prepared in various different colors whereby different colored coating may be applied to the insulation of the wires forming different circuits.

In the production of insulated wire for use in electric devices wherein a plurality of circuits are employed and it is desirable to have the wires for each circuit possess distinguishing markings to insure their connection to the proper terminals, it has been the practice heretofore to cover the insulation with a sheath of braided cotton thread, the threads forming the sheaths for the different circuits being of different colors, thus making it possible for the user to readily distinguish the wires of the different circuits and connect the same to their proper terminals. This form of wire is open to certain objections in that it is relatively expensive to manufacture, the sheath of cotton thread is readily attacked by acids and absorbs moisture which tends to extend to and cause corrosion of the terminals, and the cotton sheath itself is subject to rapid deterioration in an atmosphere containing moisture or acid fumes. Moreover, such sheath affords no protection to the insulation which tends to deteriorate with long use.

In the manufacture of the improved conductor wire shown herewith, the insulation 11, which in the preferred embodiment of the invention is rubber, may be applied to the wire 10 in the usual manner as is well known in the art. The surface of the rubber insulation is then prepared to receive the protective coating 12 by subjecting it to the action of a liquid compound containing constituents which produce a softening or solvent effect both upon the insulating material and the protective coating material, whereby upon the application of the protective coating an intimate union is effected between the protective coating and the insulating material to such an extent that contiguous particles of the insulation and protective coating are substantially held against separation at all times. The protective coating employed in the present embodiment of the invention is a pyroxylin lacquer formed by dis-

solving pyroxylin in amyl acetate or other solvent with addition of diethyl phthalate and rendered properly plastic by inclusion of castor oil or equivalent material, and containing a quantity of coloring matter sufficient to impart a distinguishing color thereto. The pyroxylin lacquer being of a type which is in common use, the exact proportions of the constituent materials and method of compounding the same are believed to be unnecessary for a complete description of the present invention. it being necessary only for the purpose of the present invention that the protective coating be formed of a pyroxylin lacquer which possesses a sufficient degree of plasticity so that where placed upon the insulation, it will permit bending of the wire without cracking the protective coating.

The manner of applying the lacquer to the rubber insulation is important, however, since a substantially complete union of the protective coating with the insulation is necessary in order to prevent peeling or scaling of the protective coating from the insulation, as well as to prevent cracking of the coating in bending the wire. In order to secure the protective coating to the rubber insulation, the insulated wire is first passed through a bath for treating the same with a compound formed of approximately thirty (30%) per cent ethyl acetate, forty (40%) per cent benzol, and thirty (30%) per cent ethyl alcohol.

The above liquid contains constituents which are solvents or partial solvents both for the rubber of the insulation and the pyroxylin which is the basis of the protective coating, the benzol serving as a softening agent or partial solvent for the rubber of the insulation, and the ethyl acetate and ethyl alcohol both exerting a solvent action on the pyroxylin content of the protective coating. The treatment of the insulation with the above liquid serves to thoroughly clean and soften the surface of the rubber insulation and at the same time the excess of liquid remaining on the outer surface of the insulation acts as a solvent for the pyroxylin lacquer which is immediately applied to the outer surface of the insulation thus promoting most intimate union between the outer surface of the insulation and the protective coating to insure that contiguous particles of the insulation and protective coating are firmly united whereby any scaling or peeling of the protective coating from the rubber insulation is prevented and these materials so closely united that, by reason of the plastic nature of the protective coating above referred to, the wire may be bent as desired, without producing cracks in the protective coating.

From the above description, it will be seen that the protective coating forms a complete outer coating for the insulation, which continues to extend completely thereover notwithstanding any bends which may be made in the wire, and this protective coating serves to protect the rubber from the action of acids or acid fumes and at the same time itself acts as an insulation since it is highly dielectric. It will be seen also that the improved conductor described herein is greatly superior to those heretofore employed by reason of its cheapness of manufacture, the varieties and brilliancy of the distinguishing colors which may be imparted to the protective coating, the protection afforded the insulation itself by the protective coating, not only by reason of the protection afforded thereby against moisture or acids but also by reason of the dielectric properties of the protective coating. In addition to the above advantages, the method of uniting the rubber insulation with the protective coating produces a structure wherein the rubber insulation and protective coating are so perfectly united as to prevent any peeling of the protective coating from the insulation and even overcoming the danger of cracks being formed in the protective coating by the bending of the wire.

What I claim is:

1. An electrical conductor comprising a wire, a rubber insulation coating covering the wire throughout its lateral extent, and a thin flexible protective pyroxylin coating overlying the rubber insulation and intimately united therewith whereby the contiguous particles of insulation and protective material are substantially held against separation when the wire is bent.

2. The method of making an electrical conductor which comprises coating a conductor wire with a layer of rubber insulation material, subjecting the exterior surface of the insulation material to contact with a liquid containing a pyroxylin solvent and a rubber softening element, and then applying a thin protective coating of pyroxylin lacquer to the outer surface of said insulation material whereby an intimate union is effected between the insulation material and the protective coating.

3. The method of applying a moisture and acid proof protective coating to the rubber insulation of an electrical conductor in such a manner as to prevent cracking or peeling of the protective coating, which comprises, treating the exterior surface of the rubber insulation with a liquid compound containing benzol, castor oil and a pyroxylin solvent, and then applying a relatively thin coating of a pyroxylin lacquer to the rubber insulation whereby an intimate union is effected between the rubber insulation and the protective pyroxylin coating.

In testimony whereof I have affixed my signature.

GEORGE T. JONES.