

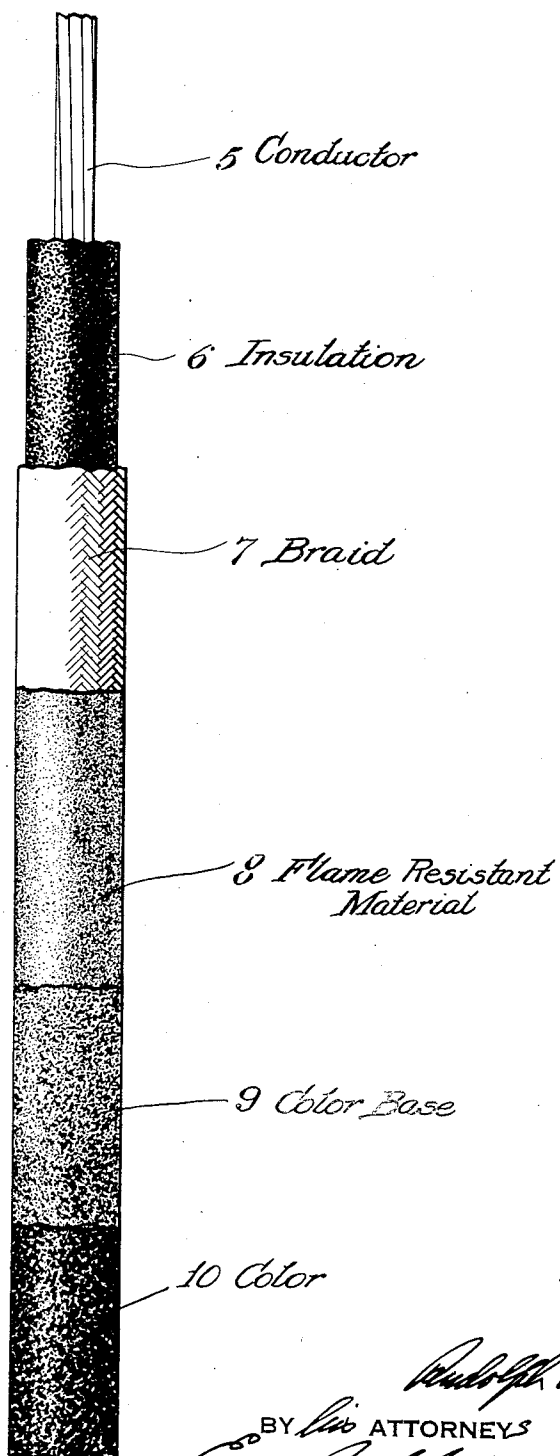
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INSULATED ELECTRIC CONDUCTOR

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INSULATED ELECTRIC CONDUCTOR

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This invention relates to insulated electric conductors and more particularly to the type commonly known as "code" wire, a term applied to rubber insulated wire which complies with the requirements of the National Electrical Code. Under such requirements, it comprises an insulating cover of rubber over the metallic conductor and a surrounding protective braid which may be in one or more layers depending upon the particular use to which the conductor is to be put. It will be readily apparent that such wire is highly inflammable, but is now usually rendered flame-resistant by saturating the protective cover or braid with a flame-proof saturant such, for example, as stearin pitch, asphalt or some similar material. Such coated wire, however, is not satisfactory as the coating is sticky and untidy, conductors so made are normally black in color, and efforts to provide distinctive colors for different conductors of this type have not been satisfactory.

For some time there has been a demand for flame-proof code wire having variously colored surfaces to permit ready identification of different conductors, but this demand has never, to my knowledge, been satisfactorily filled due to the difficulty of providing a coloring material which would properly cover the flame-proof saturant and provide the necessary color. Ordinary paint can not be applied because pitch or asphalt are readily soluble in the paint vehicle, and so produce discoloration of the paint surface. While this might be overcome by a plurality of coats, such a process is too impractical and costly from a manufacturing point of view for consideration.

An object of this invention is to provide a flame-proof, insulated conductor of the type set forth constructed and arranged to have its surface of any desired color for identification or other purposes.

A further object is to provide a flame-proof colored code wire together with a method of making the same.

These and other objects which will be apparent to those skilled in this particular art are accomplished by means of the present invention. In the accompanying drawing,

The single figure shows an insulated conductor constructed in accordance with one embodiment of this invention, the respective layers being successively removed for purposes of illustration.

In carrying out the present invention, an electrical conductor 5 is provided with the usual insulation 6 of rubber or the like, and a protective

braid 7 is formed around the rubber insulation. Preferably, the conductor is rendered flame-resistant by impregnating the braid with a flame-resistant saturant such as stearin pitch, asphalt or some similar material indicated at 8 in the figure.

In the present invention, the flame-proofing material is covered and provided with a distinctive color by applying to the surface thereof a layer of material 9 which is not only capable of completely covering the pitch or the like in a single coating so as to form an opaque layer, but which is also capable of forming a base for a distinctive color 10 which can either be applied to the coating after the coating is in place or, under certain conditions, be embodied in the coating before it is applied over the pitch. I have found that materials which can be provided in the form of finely subdivided thin metallic flakes, such as the so-called bronze powders, will completely cover the pitch surface and when applied in accordance with the present invention provide a firmly adherent opaque layer which is especially satisfactory as a base for a color coating or, if desired, the flake can be previously colored or dyed so that it will itself produce the desired color on the conductor when applied over the pitch.

A good example of a suitable material is aluminum in the form known to the trade as aluminum flake although other material such, for example, as iron oxide pigment and those materials known generally as bronze powders are equally satisfactory. Such a pigment not only completely covers the pitch saturant in a single coating, but forms a particularly advantageous base or surface to which any suitable pigment can be applied or, if desired, the metallic flake material itself can be dyed or otherwise colored prior to its application to the conductor.

The coating of covering material can be applied to the conductor in various ways. One satisfactory way is to pass the pitch coated conductor through a suspension of the flake material in a suitable vehicle such as a varnish or lacquer. If some color other than the natural color of the covering material is desired on the finished conductor, this can be easily accomplished in one or more different ways. For example, in place of the plain aluminum or similar bronze suspended in a varnish or lacquer base as above described, the bronze flake can be dyed or colored with a suitable pigment, while suspended in the varnish or lacquer. One method of obtaining a colored aluminum suspension, for ex-

ample, is by grinding aluminum flake and the desired pigment together, in which operation the aluminum flake takes up enough of the pigment to produce the required color. The colored aluminum flake is then suspended in a suitable vehicle and the pitch coated conductor drawn through it so that the colored aluminum is deposited thereon to form the desired coating over the pitch and to give the desired color. If a slippery finish is desired, a thin coat of paraffin or other wax can be wiped on the colored conductor in the manner well known in the art. If some bronze other than aluminum flake is employed as the covering material, it can be colored and applied in the same way.

Instead of coloring the aluminum or other metallic flake prior to the application thereof to the conductor, the conductor can be provided with a coating of uncolored material which will form a base over which any suitable paint or quick drying colored lacquer or varnish can be applied. In this case the coloring material can be either a pigmented lacquer or varnish or a dyed material. Ordinarily, pigments have greater covering power and require fewer coats. The metallic flake which is applied over the conductor provides an opaque cover for the flame-proof saturant on which the suitable coloring materials can be placed.

A suitable aluminum paint for carrying out the present process can be made, for example, with the following ingredients:—

	Percent by weight
China-wood oil	20.8
Cumar resin (varnish grade)	18.2
Manganese linoleate	2.1
High flash naphtha	6.8
Turpentine	6.8
Gasoline	3.6
Textile spirits	20.8
Varnish grade aluminum flake	17.3

I have also found that the metallic bronze powder can be applied to the conductor without providing a liquid vehicle therefor. In this case, the pitch covered conductor is run through a die while hot, and then directly through a container of either plain or colored metallic powder. The material adheres to the conductor and is wiped on to produce a smooth even surface and the covered wire may or may not be passed through a suitable size or lacquer to provide a smooth surface. In applying the bronze powder in the dry form, it will sometimes be found desirable to pass the pitch coated conductor through a lacquer solvent prior to passing it through the metallic powder, and then again wiping the coated wire with the solvent after the aluminum or other bronze has been applied thereto. This will materially increase the uniformity of the coating and its adherence to the pitch when the dry powder is employed. A paraffin coating may be applied at the same time by saturating the solvent with paraffin.

Instead of using metallic flake or bronze powder for covering the flame-proof saturant, the latter can be covered by a layer of size bound on with mica which also provides a surface to which any desired color can be applied, which is unaffected by such solvents as are employed in lacquers or other coloring mediums and which protects the pitch or the like against such solvents. For example, the pitch coated conductor can be passed through a sizing bath formed by a water solution of a suitable sizing material.

The water does not affect the waterproof saturant and the size, when dry and hardened, with the mica binder completely covers the saturant to form a surface which can be colored by any suitable material, and the colored cable finished with any type of wax, paraffin, or other surface desired.

A suitable size can be made, for example, from the following ingredients

Corn starch	lbs.	5
Pulverized glue	oz.	1½
Japan wax	oz.	3
Zinc chloride	oz.	1
Copper sulphate	oz.	1
Water (hot)	gallons	10

If desired, the wax can be omitted.

I claim as my invention:

1. The process of producing a colored flame-resistant insulated electric conductor which comprises covering an insulated wire with stearin pitch, providing a coating of metallic flake over said pitch and covering said metallic flake with a coloring material.

2. The process of producing a flame-resistant colored insulated electric cable which comprises passing an insulated cable impregnated with a flame-proof saturant through aluminum pigment and coloring the aluminum coating formed thereby.

3. The process of making an insulated flame-resistant electric conductor which comprises impregnating the insulation thereof with a bituminous flame-resistant compound, coating said compound with a layer of dry metallic flake and wiping the coated conductor with a lacquer solvent.

4. The process which comprises coating an insulated conductor with dry aluminum flake and wiping the coated conductor with a lacquer solvent.

5. The process which comprises providing an insulated conductor with a protective cover, impregnating said cover with a flame-resistant saturant, applying an aluminum coating to the saturated cover and wiping said conductor with lacquer solvent before and after the application of aluminum thereto.

6. An insulated electric cable having a fibrous cover impregnated with flame-resistant pitch and surrounded by a coating of aluminum flake.

7. An insulated electric cable having a fibrous cover impregnated with flame-resistant pitch and surrounded by a coating of colored aluminum flake.

8. An insulated wire having dark sticky flame resistant material impregnating the insulation thereof, a powdery material disposed directly upon the dark sticky flame resistant material, and a separate thin light colored coating layer disposed directly upon the powdery material, said thin light colored coating being of a character which tends to blend with the dark sticky flame resistant material with attendant discoloration of the thin light colored coating and the powdery material serving to prevent such blending and discoloration of the superimposed thin light colored coating.

9. An insulated wire having dark sticky flame-resistant material impregnating the insulation thereof, a metallic powdery material disposed directly upon the dark sticky flame-resistant material, and a separate colored coating layer disposed directly upon the powdery material, said colored coating being of a character which tends

to blend with the dark sticky flame-resistant material with attendant discoloration, and the powdery material serving to prevent such blending and discoloration of the superimposed colored coating.

10. An insulated wire having dark sticky flame-resistant material impregnating the insulation thereof, a layer of size disposed directly upon the dark sticky flame-resistant material, and a separate colored coating layer disposed directly upon the layer of size, said colored coating being of a character which tends to blend with the dark sticky flame-resistant material with attendant discoloration, and the size serving to prevent such blending and discoloration of the superimposed colored coating.

11. An insulated wire having dark sticky flame-resistant material impregnating the insulation thereof, a layer of size and mica disposed directly upon the dark sticky flame-resistant material, and a separate colored coating layer disposed directly upon the layer of size and mica, said colored coating being of a character which tends to blend with the dark sticky flame-resistant material with attendant discoloration, and the size and mica serving to prevent such blending and discoloration of the superimposed colored coating.

12. An insulated wire having dark sticky flame-resistant material impregnating the insulation thereof, a layer of aluminum flake disposed directly upon the dark sticky flame-resistant material, and a separate colored coating layer disposed directly upon the aluminum flake, said colored coating being of a character which tends to blend with the dark sticky flame-resistant material with attendant discoloration, and the layer of aluminum flake serving to prevent such blending and discoloration of the superimposed colored coating.

13. The process of producing a colored flame-resistant insulated electric conductor which comprises covering an insulated wire with stearin pitch, providing a coating of size and mica over said pitch, and covering said coating of size with a coloring material.

14. The process of producing a colored flame-resistant electric conductor which comprises covering an insulated wire with stearin pitch, providing a coating of metallic aluminum flake over said pitch and covering said aluminum flake with a coloring material.

15. An insulated wire having a bituminous flame-resistant material impregnating the insulation thereof, a sealing layer of flexible size surrounding said bituminous layer and joined to said layer by mica, and a coating of lacquer surrounding said mica and size and protected thereby against blending with and discoloration by the bituminous material.

16. The process of producing a colored flame-resistant insulated electric conductor which comprises covering an insulated wire with a bituminous flame-resistant material, applying over the bituminous material a coating of material insoluble in paint and lacquer solvents, and applying over said coating a layer of colored lacquer which is protected by the intervening coating against blending with and discoloration by the bituminous material.

17. An insulated electric conductor comprising a bituminous flame-resistant material impregnating the insulation thereof, a coating of material insoluble in paint and lacquer solvents surrounding said flame-resistant material, and an outer layer of colored lacquer which is protected by the intervening coating against blending with and discoloration by the bituminous material.

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