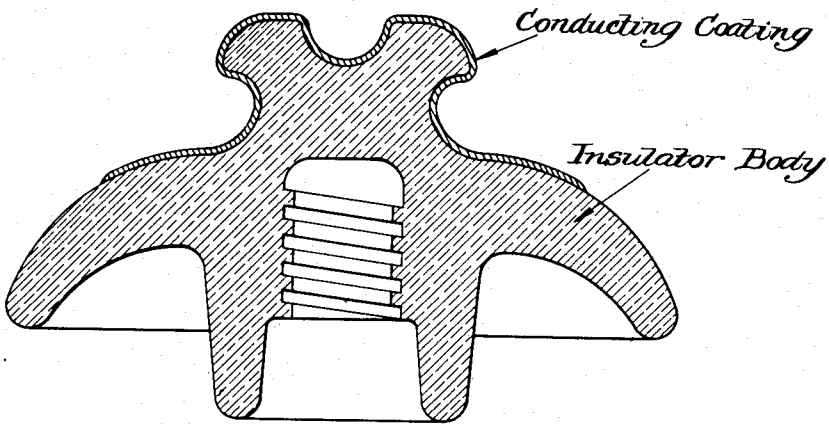
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INSULATOR AND METHOD OF PRODUCING CONDUCTING COATING THEREON

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INSULATOR AND METHOD OF PRODUCING CONDUCTING COATING THEREON

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11 Claims. (Cl. 91—72)

This invention relates to an insulator having a dielectric ceramic body and a resistant coating that is partially conducting, with more particular reference to high tension insulators, the surfaces of which are sometimes partially coated with a conducting glaze to make the insulator free from noise and radio interference by eliminating surface leakage or corona, and it has for its object to afford a coating or glaze that can easily be controlled and applied, which is economical to produce and sufficiently conductive to dampen out corona and overcome radio interference, and which is permanently bonded or attached to the body of the insulator so that it is not subject to oxidation, chipping or wear, but is as permanent and enduring as the porcelain insulator body itself.

It has heretofore been proposed to coat insulators with conducting materials, but such coatings have either been costly to apply or of such character that they quickly wear off or lose their conducting efficiency, and it is a particular purpose of the invention to afford a coating or glaze that can be manufactured and applied cheaply and which becomes an integral part of the insulator body, so as to be chemical resisting and completely unaffected by weather or by the usual wear to which an insulator is subjected.

One purpose of the invention is to utilize coating materials that are comparatively inexpensive and can be readily applied to an insulator body without increasing its cost of production over previous methods, so as to afford a glaze of stable character that is not soluble or affected by any acids and will maintain its conductive efficiency indefinitely.

Another object of the invention is to afford a coating material that is applicable to insulators formed of porcelain or other silica-containing materials, and which during the firing process becomes a permanent and integral part of the body of the insulator by a chemical action, but without in any way affecting or lessening the non-conductivity of the body of the insulator, while providing a glaze that is sufficiently conductive to prevent energy losses and radio interference.

It has heretofore been proposed to coat porcelain insulators with a metallic glaze, or with a mixture of metallic and silicate glazes, but these all have the objection that the final or resulting coating is a thin glaze metallic in form and containing free metal, since the metals that have been so proposed are resistant to kiln firing conditions, and the resulting glaze is therefore subject to abrasion and chemical action which will shorten its life, and it is a particular purpose of this invention to provide a partially conducting glaze or coating that is not of a metallic character and which contains no free metal, such metal as is introduced into the coating composition in the beginning being united chemically during the kiln firing treatment with the other materials in the coating composition and with the body of the insulator, and thus becoming an integral and permanent part of the insulator body so as to resist any action or wear to the same extent as a ceramic insulating material.

It has also been proposed to coat insulators with glazes containing metallic oxides and to apply a reducing agent after firing to make the coating conductive, but this is a slow and expensive procedure, resulting in only a surface coating in the nature of a thin metal film which will oxidize and wear away in time, before the insulator body has lost its useful life, and it is a particular purpose of the invention to provide a glaze or coating that will have the required conductive characteristic and which at the same time is so united to the ceramic body as an integral part thereof as to wear and function efficiently as long as the insulator body, so that the life of the latter is not reduced by the coating or glaze wearing, chipping, or in any way losing the efficiency it possesses in the beginning.

To these and other ends, the invention consists in the construction and procedure that will appear clearly from the following description when read in conjunction with the accompanying drawing, the novel features being pointed out in the claims following the specification.

The drawing illustrates a sectional view of a conventional type of insulator made by molding and thereafter firing a body of silica-containing material such as clay, feldspar and flint, and illustrating applied to a portion of its surface thereof a coating in accordance with the invention. This is a continuation in part of application filed January 19, 1939, Serial No. 251,777, and the invention is equally applicable to insulators made from any silica-containing ceramic material, as well known in the art.

I have ascertained that a successful and practical coating, that is sufficiently resistant and conductive for the purpose, can be obtained by using a composition including as one of its materials lime, or calcium carbonate, commercially known as "whiting," or any salt of calcium, or other of the materials in its group, that is unstable and will break down in firing, together with magnesia, and iron or steel filings, or iron

hydroxide, or other material from the group of metals including iron, that is unstable and will break down in firing, preferably mixed with a sufficient amount of water and held in suspension by aluminum silicate in the form of clay, which makes the mixture easy to apply to the surface of the ceramic body by brushing or spraying thereon, previously to the firing operation.

The coating composition may be applied to either a glazed or unglazed surface of an insulator, and various materials may be used to obtain the desired result. The magnesia may be omitted, and any material from group II of Mendeleef's Periodic Table, namely magnesium, calcium, zinc, strontium, cadmium and barium, may be used, either in the form of a carbonate, sulfate, sulfide, fluoride, or any unstable salt.

In place of iron, I have successfully used cobalt, or nickel, in unstable form, and may use an unstable compound derived from any material in the section from group VIII of Mendeleef's Periodic Table which contains iron, cobalt, and nickel.

Successful results are obtainable by combining an unstable salt of any material in group II, in the form of a carbonate, sulfate, sulfide, fluoride, or otherwise, with an unstable compound derived from any material from the section of group VIII which contains iron, cobalt, and nickel. Where the expression "unstable" is used throughout the specification and claims, I intend by this to define a material that is unstable when subjected to heat and breaks down or decomposes during the subsequent firing of the insulator body.

It has been found that a coating produced with iron, calcium carbonate, and clay, possesses a high coefficient of expansion, and in order to limit such expansion, a small amount of zirconium oxide can be added to the mixture.

As an example, one composition of materials that has been found to produce a satisfactory and efficient coating contained the following:

	Per cent
Iron hydroxide	64.4
Calcium carbonate	23.5
Clay	6.7
Zirconium oxide	5.4

Other compositions have been used successfully containing the various alternative materials hereinabove referred to, in place of iron and calcium.

After the molded ceramic body is coated with a composition such as described, it is fired in an oxidizing atmosphere, subject to temperatures of from approximately 2000° F. to 2500° F., such as are usually employed in the production of insulators of this general character.

While it can not be stated with certainty what reaction takes place during firing, it is believed that the iron, cobalt, or nickel most likely ceases to function as a metal after firing, having become along with the silicon, basic in reaction, and mating with the calcium or other material of its group. The result probably is to produce a calcium ferro-silicate, the ferro-silicate taking the place of the carbonate on firing, resulting in a conducting non-metallic glaze that is firmly and permanently bonded to the outer body portion of the insulator and becomes an integral part thereof as distinguished from a mechanically attached thin metallic film or covering.

The method and composition may be otherwise modified without departing from the essentials of the invention, and this application is intended to cover any adaptations or changes, either in the composition or the procedure in applying it, that come within the purposes of the invention or the scope of the following claims.

I claim:

1. A high tension electric porcelain insulator having a fired surface conducting coating consisting of a material derived by firing a coated composition containing an inorganic compound of an element of group II of the periodic table and an inorganic compound of an element from the section of group VIII of the periodic table which contains iron, cobalt, and nickel.

2. A high tension electric porcelain insulator having a fired surface conducting coating consisting of a material derived by firing a coated composition containing an inorganic compound of an element of group II of the periodic table, an inorganic compound of an element from the section of group VIII of the periodic table which contains iron, cobalt, and nickel; and silicon.

3. A high tension electric porcelain insulator having a fired surface conducting coating consisting of a material derived by firing a coated composition containing inorganic compounds of calcium and iron.

4. A high tension electric porcelain insulator having a fired surface conducting coating consisting of a material derived by firing a coated composition containing inorganic compounds of calcium, iron, and silicon.

5. The method of producing a high tension electric porcelain insulator with a conducting surface which consists in coating the surface of a silica-containing ceramic body with a composition containing an inorganic compound of an element of group II of the periodic table and an inorganic compound of an element from the section of group VIII of the periodic table which contains iron, cobalt, and nickel, and thereafter subjecting the insulator body and coating to a usual ceramic insulator firing temperature.

6. The method of producing a high tension electric porcelain insulator with a conducting surface which consists in coating the surface of a silica-containing ceramic body with a composition containing an inorganic compound of an element of group II of the periodic table that is unstable in the presence of heat, and an inorganic compound of an element from the section of group VIII of the periodic table which contains iron, cobalt, and nickel, said compound being unstable in the presence of heat, and thereafter subjecting the insulator body and coating to a usual ceramic insulator firing temperature.

7. The method of producing a high tension electric porcelain insulator with a conducting surface which consists in coating the surface of a silica-containing ceramic body with a composition containing an inorganic compound of an element of group II of the periodic table which is unstable in the presence of heat, and an inorganic compound of an element from the section of group VIII which contains iron, cobalt, and nickel, said compound being unstable in the presence of heat; and a clay, and thereafter subjecting the insulator body and coating to a usual ceramic insulator firing temperature.

8. The method of producing a high tension electric porcelain insulator with a conducting surface which consists in coating the surface of a silica-containing ceramic body with a composition containing an inorganic compound of an element of group II of the periodic table, and iron, and thereafter subjecting the insulator

body and coating to a usual ceramic insulator firing temperature.

9. The method of producing a high tension electric porcelain insulator with a conducting surface which consists in coating the surface of a silica-containing ceramic body with a composition containing an inorganic compound of calcium and iron hydroxide, and thereafter subjecting the insulator body and coating to a usual ceramic insulator firing temperature.

10. The method of producing a high tension electric porcelain insulator with a conducting surface which consists in coating the surface of a silica-containing ceramic body with a composition containing an inorganic compound of an element of group II of the periodic table, iron hydroxide, and a clay, and thereafter subjecting the insulator body and coating to a usual ceramic insulator firing temperature.

11. The method of producing a high tension electric porcelain insulator with a conducting surface which consists in coating the surface of a silica-containing ceramic body with a composition containing an inorganic compound of iron which is unstable in the presence of heat, and an inorganic compound of an element of group II of the periodic table which is ustable in the presence of heat, and thereafter subjecting the insulator body and coating to a usual ceramic insulator firing temperature.

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