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COPPER WIRE TREATMENT FOR ENAMELLING

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This invention relates to a process for electrolytically and otherwise preparing copper wire for subsequent enamelling so that it shall be suitable for electrical use. It has been found that copper wire intended for enamelling frequently has a faulty surface owing to the presence of scale, flaws, ridges and the like, which project above the normal surface of the wire and which it is impossible to cover or obliterate sufficiently by means of the applied coating of enamel to ensure complete insulation. These irregularities or projections produce a great amount of fusing sometimes accompanied by short circuits.

A length of enamelled wire of some 100 metres will, when ordinarily finished present a very considerable number of such irregularities, and the presence of the latter may thus defeat the purpose of the enamelling of the wire.

The main object of the present invention is to practically eliminate the projections, roughness, irregularities and similarly defective conditions of the wire to be enamelled by removing or at least to a satisfactory degree reducing the extent to which such projections and irregularities project in order that a coating of enamelling will completely and smoothly cover the same.

In ordinary practice, when a copper wire is being drawn, upon close inspection, it will be found that the surface is not absolutely smooth and uniform, but has many irregularities thereon, such as ridges, projections and rough protuberances, as well as scale, etc., and this is true even after several operations. This is due to the fact that the wire is, of course, originally drawn from a slab or bar of massive copper and in either case there may be surface scale of oxide present and the metal may also exhibit a grain or other peculiarity but it is also quite usual for drawing dies to leave marks upon drawn wire by virtue of worn spots in said dies which make the wire streaky and otherwise irregular. Other causes may include dirt upon the original copper bars from careless handling, etc. The main reason for the irregularities occurring upon the wire is, however, due to the condition of the copper bar iteself before drawing the same as it often contains wrinkles and blisters, as well as seams, etc., for the most part due to rolling operations and other pre-treatment which is necessary to shape the bar for the drawing operations. It is not surprising then if the dies become worn and if wire drawn through the same is not perfectly uniform but presents rough spots and many other inequalities upon the surface. It is quite obvious that if enamel is applied to a wire in such condition, it will, of course coat even the ridges and irregularities, but any contact with other bodies or with adjacent turns or strands of wire in actual practice, will tend to abrade or mutilate the enamel on such exposed points, with the result that the insulation of the wire is penetrated and thus broken down.

In view of these disadvantages, it is now proposed to smoothen the wire by means of the present invention in order to offer a wire surface as a foundation for an enamel coating which is as uniform and free from irregularities as can be produced on a commercial scale.

Hence, in the practice of my invention, after a copper wire which is being drawn has already passed through one or more drawing operations, a step is interposed before the final drawing operation in order to make said final drawing as effective as possible in smoothing and polishing the wire preparatory to enamelling the same. Thus, before the wire is finally drawn, it is passed through an electrolytic bath and caused to form a soluble anode, with the result that the ridges, projections and like irregularities which the wire may display on its surface are principally attacked by the action of the electric current used and entirely dissolved in the electrolyte or at least greatly reduced. The wire thus electrolytically treated presents a very considerably improved surface condition, for the irregularities have been for the most part removed or so reduced in size and sharpness that the wire only needs to be drawn again to completely remove the last vestiges of said irregularities.

The electrolytic bath is preferably of copper sulphate and the cathode may consist of a plate of platinum, if desired.

The wire is then passed through the last drawing step and issues from this operation smooth, uniform and practically free from flaws and irregularities, and is finally enamelled.

During the course of such electrolytic treatment the defects are acted on more energetically than the rest of the wire, and disappear or are greatly reduced.

The wire is given its ultimate form by a final drawing process, and is thereafter enamelled.

The invention also comprises as a new industrial product copper wire after having been subjected before enamelling to an electrolytic treatment.

What I claim and desire to protect by Letters Patent is:

1. The process for producing uniform enamelled wire for electrical purposes, which, in com-

bination, consists in first passing the wire, intermediate drawing steps, as a soluble anode through an electrolytic solution of copper sulphate capable of directly attacking the substance of the wire itself under the action of an electric current, in order to initially remove and electrolytically strip off the surface inequalities and protuberances of copper upon said wire, thereafter completing the removal of said inequalities and protuberances by drawing the electrolytically treated wire, and finally enamelling the drawn wire.

2. In a process for treating copper wire for electrical purposes in order to smoothen the same preparatory to producing a uniform enamelling thereof, which, intermediate a preliminary drawing step and a final finishing drawing step, consists in passing the wire as a soluble anode through an electrolytic solution capable of directly attacking the substance of the wire itself under the action of an electric current and thereby electrolytically removing and stripping off the superficial projections and roughness of the metallic copper of said wire.

3. In a process for treating copper wire for electrical purposes in order to smoothen the same preparatory to producing a uniform enamelling thereof, which, intermediate a preliminary drawing step and a final finishing drawing step, consists in passing the wire as a soluble anode through an electrolytic solution of copper sulphate capable of directly attacking the substance of the wire itself under the action of an electric current and thereby electrolytically removing and stripping off the superficial projections and roughness of the metallic copper of said wire.

4. In a process for treating copper wire for electrical purposes in order to smoothen the same preparatory to producing a uniform enamelling thereof, which, intermediate a preliminary drawing step and a final finishing drawing step, consists in passing the wire as a soluble anode through an electrolytic solution of copper sulphate capable of directly attacking the substance of the wire itself under the action of an electric current and thereby electrolytically removing and stripping off the superficial projections and roughness of the metallic copper of said wire, and simultaneously using a platinum cathode in said solution.

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