

UNITED STATES PATENT OFFICE

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ALUMINUM CONNECTION PARTS TREATED
WITH CONCENTRATED NITRIC ACIDWilhelm Friedrich Bonwitt, Mount Vernon, N. Y.,
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Inc., a corporation of New YorkNo Drawing. Application June 26, 1943,
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3 Claims. (Cl. 174-126)

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My invention relates to a treatment for aluminum conductor surfaces to decrease electrical contact resistance.

It is commonly known that special care has to be taken when making an electrical connection between parts made from aluminum. The surface of aluminum is seldom clean but mostly covered with a film of oxide, which forms rapidly even at normal temperatures and atmospheres. This oxide film is an extremely poor conductor and therefore the cause of contact troubles. An additional cause for contact difficulties is the fact that it is hard to maintain a sufficiently high contact pressure because of the softness and ductility of pure aluminum.

The primary object of my invention therefore is to provide a treatment for aluminum conductors employed in electrical connections which will increase the electrical joint efficiency as compared with untreated conductors.

Another object is to provide a treatment which will reduce the contact resistance especially on crimped or indented joints.

Other objects are to provide a treatment of the foregoing character in which the results will be stable over long periods of time, and to provide means for protecting the surfaces so produced.

I accomplish these and other objects and obtain my novel results as will be apparent from the procedure described hereinafter, and particularly pointed out in the attached claims.

My invention consists in treating the contact surfaces of the aluminum parts with concentrated nitric acid for a short period of time, five minutes at room temperature being satisfactory. The part is then removed from the acid and dried. It is important that the drying be done without mechanically rubbing, wiping or rinsing. Blowing the excess acid off with air and letting the part dry slowly (about one hour) was found effective. When the part is dry, care should be taken not to wipe or scratch the surface.

The application of a zinc-petrolatum compound to the treated surfaces has a two-way preserving effect. First, it protects the surface after the treatment whenever the connection cannot be made immediately. Second, it has a protective function after the joint is made, by acting as a seal. I have found it desirable to dry the treated surface thoroughly before applying the zinc-petrolatum. Zinc-petrolatum is a mixture of metallic zinc dust suspended in heavy petrolatum jelly. The zinc dust acts as a cathodic means to inhibit corrosion on the contact surfaces.

The treatment of only one member of a pair

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in contact, has been found to establish a satisfactory lowering of the contact resistance.

Extended tests have consistently shown that the resistance of joints to which the treatment was applied, is not only practically unaffected by severe aging tests but also was considerably lower than the resistance of indented joints made with aluminum which had not been prepared before making the joints.

By the foregoing treatment I have accomplished the objects of my invention. Contact resistance of treated connections has been reduced; the treated surface may be made stable over long periods of time, and means have been found to protect the surfaces so treated.

I claim:

1. The method of preparing electrical connections having metal contacting parts, at least one of which is aluminum, which comprises treating the aluminum contacting part with concentrated nitric acid and immediately thereafter air drying only the treated surface.

2. A connection for transmitting electric current therethrough said connector being made of metal contacting parts at least one of which is aluminum, said aluminum part having a good conducting surface thereon obtained by treating it with concentrated nitric acid which is immediately air dried only.

3. A metal conductor made of aluminum having a contacting face for direct engagement with another contacting face for transmitting current therethrough, said aluminum contacting face having a good conducting surface thereon obtained by treating it with concentrated nitric acid which is immediately air dried only.

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