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METHOD OF BRIGHTENING NICKEL SURFACES

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1 Claim. (Cl. 204-1)

The present invention relates to a method for producing a bright surface on objects of nickel or having a nickel coating, and comparable in appearance to the surface obtained by polishing or burnishing or the like methods. In order to brighten dull surfaces on objects of nickel or having a nickel coating produced by electro-plating, squirting, rolling or the like methods, the nickel surface has hitherto been brightened by polishing or grinding or it has been subjected to rubbing or chafing by means of a hard object such as a burnisher or the like. Polishing disks have often been used for these purposes, and, especially in the treatment of large numbers of small objects, polishing drums are used. Of the above methods the treatment with a polishing disk, though rather expensive, gives a very satisfactory result, which cannot be said of the cheaper method employing a polishing drum. However, all methods hitherto known are time-wasting and rather expensive and give a poor result, especially when applied on objects of complicated form. It has also been experienced, when the above mentioned methods are used, that the nickel coating at the edges and corners of the objects becomes very thin, so that the sharpness of the edges is spoiled and, if the nickel coating is not made extra thick, the polished surface will rather soon be worn off.

The method according to the invention is cheap and of a very simple nature and is well fitted for mass production and for the treatment of objects independently of their shape and gives as a result a bright shining surface. The thickness of a nickel coating treated according to the invention is then, independently of the shape and dimensions of the objects and also when the objects have irregular and uneven surfaces, sharp edges, cuttings or the like, everywhere proportional to the thickness of the coating before the treatment.

The invention is principally characterized by this that the nickel or nickel coated objects are made the anodes in a bath containing sulphuric acid, which bath is heated to a certain temperature regulating the velocity of the unmetallization, whereupon the objects may be removed from the bath and the adhering bath liquid removed from the objects preferably by rinsing in water and/or alkaline solutions.

Through this method coatings of nickel electroplated upon any material may be treated with good results. The method may also be used with advantage upon nickel objects or objects, on which

a nickel coating has been produced by rolling, squirting or any other method.

One form of the method according to the invention is further elucidated by way of example hereinbelow in connection with objects having a nickel coating electro-plated thereon.

After having produced a nickel coating of the desired thickness on objects hung up on metal wires or the like in an electrolytic bath the objects are transferred together with the suspension wires to a receptacle containing the bath and are connected with the objects dipping into the bath by means of the wires to the positive terminal of a source of electric current, which terminal is insulated from the receptacle, the negative terminal being in conductive connection to cathodes immersed in the receptacle or with the receptacle itself or an inside coating of the receptacle, which may, for instance, comprise sheet lead if the receptacle as a whole is not made of a metal not acted upon by sulphuric acid. In order to heat the bath to a desired temperature the receptacle may be provided with an adjustable electric heating device or, if steam or hot water is available, pipes or the like made of lead or other metal may be provided in the receptacle, through which pipes a steam or hot water quantity controlled by a valve may be conducted. When the circuit is closed after or at the introduction of the objects in the bath an unmetallization of the coatings occurs causing the dull surfaces of the objects to change gradually so that, at last, the coatings show the metal colour and become bright. The brightening process is stopped by breaking the circuit at or before the removal of the objects from the bath. The objects are then transferred to a rinsing apparatus, in which the objects are carefully freed from the adhering bath liquid by rinsing preferably in running water, whereupon the objects, sometimes after further rinsing in hot water, may be directly introduced into a chrome plating bath or the like. If no chrome plating is desired to take place the objects may be rinsed in an alkaline solution in order to remove every trace of acid and after further rinsing in water the objects may be dried, for instance in a case containing saw dust. Large objects or objects of irregular shape may be treated separately in the bath, and after removal from the bath placed in a perforated cage or case, to which running water is admitted. When the cage etc. is filled it may be placed in a receptacle or the like containing hot water before the objects are thrown into the case containing saw dust.

At a proper concentration of sulphuric acid in

the bath and a proper temperature of the same and when an electric current of proper voltage and strength is supplied the time necessary for treatment of the objects in the bath may be made very short, for instance in many cases a treatment during 10-25 seconds may be quite sufficient to produce the desired result. The method according to the invention, therefore, has the important advantage that in plants for mass production of objects of the type referred to a comparatively small space may be sufficient for the brightening process.

The bath, which comprises a mixture of sulphuric acid and water, contains sulphuric acid in such a quantity that the specific gravity of the bath measured with an areometer lies between 45 and 62° Baumé. The specific gravity of the bath may preferably be kept at a medium value of 55° Baumé. It is desirable that during the treatment the composition of the bath is always maintained within the limits given hereinabove, and if possible the medium value 55° Baumé should be maintained. If, therefore, during the process the bath should accumulate water from the surrounding air or if the quantity of water due to evaporation should be reduced concentrated sulphuric acid or water should be added to the bath, so that the specific gravity of the bath is again 55° Baumé, preferably measured at a bath temperature of 65° F. During the treatment of the objects in the bath it is furthermore important that at the concentration of the bath set forth hereinabove the bath by means of the heating means is heated to a temperature between 85 and 140° F., preferably 100 to 125° F. At a temperature of the bath higher than 125° F. the process goes too fast, so that a complete unmetallization may occur, whereas the brilliancy of the surface of the objects becomes less satisfactory if the bath temperature is below 100° F. If a bath temperature is chosen within the narrow limits above mentioned the comparatively short time of treatment amounting to 10-25 seconds may be obtained, provided that the voltage of the electric current is 8 to 10 volts and the strength 280 to 560 amperes per square foot of the surface of the nickel coating. Nickel surfaces treated in the manner above

described show a brightness comparable to the brightness which may be obtained with the usual methods of polishing, i. e. with the use of rotating polishing disks and expensive polishing pastes. Since the unmetallization is furthermore independent of the shape of the objects and equally distributed over the total surface of the object, the method according to the invention is very useful in the treatment of objects of irregular shape. In the special production for instance of nickel plated metallic objects a saving in the costs of nickel plating up to 40-50% of the prior working costs may be obtained through the use of the invention, said working costs including in certain cases final polishing as well as preliminary grinding and polishing, respectively.

In such cases, where it is desired to provide the objects through electro-plating with a coating of the same or other metal, which demands a shining base surface, the method set forth hereinabove may be used with great advantage. This is, for instance, the case when the objects are to be chrome plated by placing the objects as cathodes in an electrolytic bath containing a chromium salt. Due to the uniform brightening of the nickel surface obtained by the process a very good result may then be obtained, and the spots and uneven shades or the like of the chromium coating originating from irregularities in the brightness of the base metal are totally eliminated, which has hitherto only been possible with great difficulties through carefully polishing the base metal by means of a polishing disk or drum.

What I claim is:—

The method of brightening nickel surfaces on objects having a nickel coating, which comprises making the object to be treated the anode in a bath heated to a temperature between 85 and 140° F. and containing water and such quantity of sulphuric acid that the specific gravity of the bath measured with an areometer lies between 45 and 62° Baumé, and supplying an electric current to the anode of a strength lying between 280 and 560 amperes per square foot of anode surface.

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