

UNITED STATES PATENT OFFICE

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CLEANING OF METALLIC PARTS

No Drawing.

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This invention relates to the cleaning of metallic parts, and more particularly to an electrolytic method of cleaning metallic parts preparatory to electro-plating.

5 An object of the invention is to clean metallic parts in a thorough, rapid, and economical manner.

In accordance with one embodiment of the invention, any grease adhering to the metallic parts is first removed by immersing the parts in an alkali electrolyte while passing an electrical current from the part through the electrolyte; scale and oxides are then removed by immersing the parts in an electrolyte consisting of hydrochloric acid and an inhibitor, such as formaldehyde while passing alternating current through the parts and the electrolyte; and traces of copper or other foreign substances are then removed by immersing the parts in a cyanide solution. The parts are passed immediately from the cleaning process to a plating bath.

The invention will be more fully understood from the following example, which illustrates one embodiment thereof. The parts to be cleaned are immersed in a solution of an alkali, such as sodium hydroxide or potassium hydroxide, which is maintained at a temperature of about 200° F., the preferred concentration being approximately one pound of caustic soda per gallon of solution, and direct current at approximately 50 amperes per square foot of anode surface is passed from the parts to a submerged cathode during such immersion. When the grease is removed from the surfaces of the parts, the parts are then rinsed in water and immersed in an electrolyte containing hydrochloric acid in the concentration of approximately 200 grams of hydrochloric acid gas per liter of solution, the bath also containing about 1% of formaldehyde to prevent attack on the surfaces after the scale and rust have been removed by the acid. In this bath alternating current at a concentration of about 75 amperes per square foot of surface to be cleaned is passed between the parts and a submerged electrode, and the electrolyte is maintained at a temperature of from 85° to 115° F. This acid bath removes scale and

oxides from the parts in about two minutes, and the parts are then again rinsed and immersed in a cyanide solution containing approximately one pound of sodium or potassium cyanide and one-fourth pound of sodium or potassium hydroxide per gallon of solution, the bath being maintained at about 160° F.

This process is especially adapted to be carried out by the use of automatic machinery whereby the parts are successively passed from bath to bath in timed sequence. In practicing the invention with such machinery it will usually be found advantageous to suspend the parts by means of copper wires, since copper is but little affected by the various electrolytes used with the process. The copper will, however, be dissolved to some slight extent by the hydrochloric acid bath, and traces of copper may appear on the surfaces of the parts being cleaned. These traces, as well as any other loosely adhering material which may have adhered to the parts in their passage through the acid bath, are removed by the cyanide bath.

The concentrations, temperatures, and other conditions outlined above may be considerably varied without departing from the spirit of the invention as defined by the following claims.

What is claimed is:

1. The process of cleaning metal parts, which consists in immersing them in a bath containing hydrochloric acid and a small amount of formaldehyde.

2. The process of cleaning metal parts, which consists in immersing them in a bath containing hydrochloric acid and formaldehyde, and passing alternating current through the parts and the bath.

3. The process of cleaning metal parts, which consists in immersing them successively in a sodium hydroxide solution and a solution of hydrochloric acid and formaldehyde.

4. The process of cleaning metal parts, which consists in immersing them in a sodium hydroxide solution at a temperature slightly below its boiling point and then immersing them in a solution of hydrochloric acid and formaldehyde.

5. The process of cleaning metal parts, which consists in immersing them successively in a sodium hydroxide solution and a solution of hydrochloric acid and formaldehyde while passing electrical current between the parts and another electrode.

6. The process of cleaning metal parts, which consists in immersing them in a sodium hydroxide solution while passing direct current from the parts through the solution, and then immersing the parts in a solution of hydrochloric acid and formaldehyde while passing alternating current through the solution to the parts.

7. The process of cleaning metal parts, which consists in immersing them in a hot sodium hydroxide solution while passing direct current from the parts through the solution, and then immersing the parts in a solution of hydrochloric acid and formaldehyde while passing alternating current through the solution to the parts.

8. The process of cleaning metal parts, which consists in immersing them successively in an alkali bath, a hydrochloric acid bath containing formaldehyde, and a cyanide bath.

9. The process of cleaning metal parts, which consists in immersing them in a sodium hydroxide solution at about 200° F. while passing direct current from the parts through the solution, then immersing them in a solution of hydrochloric acid and formaldehyde while passing alternating current through the hydrochloric acid solution to the parts, and then immersing them in a cyanide solution at about 160° F.

In witness whereof, I hereunto subscribe my name this 13th day of April, A. D. 1929.

SUMNER REDWAY MASON.