BEST AVAILABLE COPY

Patented Sept. 28, 1926. 1,601,511

# UNITED STATES PATENT OFFICE.

FREDERICK C. SCHMUTZ, OF MATAWAN, NEW JERSEY, ASSIGNOR TO A. P. MUNNING & CO. OF NEW YORK, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

## PROCESS OF CLEANING ARTICLES.

No Drawing. Application filed April 3, 1923. Serial No. 629,706.

The invention relates to the art of cleaning from metallic articles compounds which have been deposited thereon during manufacturing processes or otherwise, particularly in the case of articles consisting of non-ferrous metals or alloys which are liable to become discolored or tarnished if subjected to the action of a cleaning agent which is too highly alkaline.

For example, in buffing or polishing articles made of brass or die-cast metals, buffing compounds are commonly employed containing calcium hydroxide or similar compounds such as magnesium hydroxide, in combination with some animal grease or mineral grease such as stearic acid or paraffin, and after the buffing operation has been carried out sufficiently to produce the desired highly polished surface, it is necessary to remove the buffing composition which adheres thereto without discoloring or otherwise injuring the finished surface.

I have discovered that articles of the above nature may be satisfactorily cleaned without injury to their surfaces by subjecting the articles to be cleaned to the action of a soap solution which is not so highly alkaline as to injure the surfaces, which solution also should contain a current conducting salt or resistance lowering agent in order that the article to be cleaned may be employed as one electrode in the solution and an electrolytic action set up which will cause the compounds to be loosened from the surfaces of the article and reacted upon by the soap.

The process may be carried out with current conducting salts in general so long as they do not have electroplating radicals, salts such as nickel sulphate and zinc sulphate, for example, being unsuitable, since if the article to be cleaned were connected at the cathode, the process would tend to deposit nickel or zinc upon such articles. However, other classes of current conducting salts may be used, since the electrolytic action in each instance will tend to mechanically loosen the compounds to be removed, from the surfaces of the articles, and enable the soap to act effectively thereon.

Although the process may be employed with the articles to be cleaned connected at either the anode or the cathode, I prefer to connect them at the cathode and to use a salt having a soap making radical to lower the specific resistance of the solution, whereby the radical which is liberated at the cathode may combine with grease or similar substances (if the latter are present in the compounds to be removed) and build up more soap to enter into the saponification or emulsification process.

I prefer also to use a conducting salt which in the presence of an electric current will liberate a deodorizing agent, since many soaps which are suitable for use in the process are more or less offensive in their odor. It should be understood, however, that any animal or vegetable soap, or soap having a detergent action, may be employed, the main requisite being, as above stated, that the soap shall not be so highly alkaline as to tarnish the articles to be cleaned when immersed therein for the period necessary to complete the cleaning process. I prefer to use a soap made from a fish oil base which will possess the qualities above mentioned as being desirable.

Sodium chloride constitutes a very satisfactory conducting salt for use in the process, since the sodium radical thereof will be liberated at the cathode to combine with the grease (if any) contained in the compounds to be removed, while the chlorine which passes to the anode will tend to deodorize the soap solution.

The conducting salt or resistance decreasing reagent is necessary in the process, since soaps which are not too alkaline in their nature are also relatively poor conductors, whereby it is necessary to increase the conductivity of the solution to enable the electrolytic action to be carried on within the necessary voltage limits. The electrolytic action, furthermore, tends to produce an undue amount of foam from the soap and sodium chloride is a satisfactory salt to use for the additional reason that it acts as a foam reducing agent during the process.

Where the article to be cleaned is employed as a cathode, an insoluble anode may be used, since its function will be merely to act as a conductor without going into solution itself.

For cleaning articles of brass, nickel plate, die-cast metals, copper, etc., a solution should be employed containing less than about 16% by weight of soap, otherwise the solution may lose its efficient detergent action, and the amount of the conducting salt should be less than about 4% by

weight to avoid tarnishing. A solution of the following proportions will be found satisfactory for ordinary purposes: sodium chloride (NaCl) one ounce, fish oil soap six ounces, water one gallon.

While a preferred embodiment of the invention has been disclosed, such embodiment is to be considered merely as illustrative of the principle of the invention, and it will be understood that changes may be made therein without departing from its principle as defined in the following claims.

I claim:

1. The process of cleaning articles containing non-ferrous alloys or metals and carrying compounds to be removed, which comprises subjecting such articles to electrolytic action in a solution containing a soap and a reagent of a non-plating character which lowers the specific electrical resistance of water.

2. The process of cleaning articles containing non-ferrous alloys or metals and carrying grease containing compounds to be removed, which comprises subjecting such articles to electrolytic action in a solution containing a soap and a reagent which lowers the specific electrical resistance of water.

3. The process set forth in claim 1, wherein the articles to be cleaned are electrically connected to form a cathode during the electrolytic action.

4. The process set forth in claim 2, wherein the articles to be cleaned are electrically connected to form a cathode during the electrolytic action.

5. The process set forth in claim 1, wherein said reagent comprises an electrolyte containing an alkali radical.

6. The process set forth in claim 1, wherein said reagent comprises sodium chloride.

7. The process set forth in claim 1, wherein the soap comprises less than 16% and the reagent less than 4% by weight of such solution.

8. The process set forth in claim 1, wherein a reagent is employed which liberates a soap making agent in the presence of an electric current.

9. The process set forth in claim 1, wherein a reagent is employed which liberates a deodorizing agent in the presence of an electric current.

10. The process set forth in claim 1, wherein a reagent is employed which reduces the volume of foaming.

In testimony that I claim the foregoing, I have hereunto set my hand this 31st day of March, 1923.

FREDERICK C. SCHMUTZ.