PROCESS FOR ELECTROLYTICALLY REMOVING TARNISH FROM SILVER ARTICLES

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3 Claims. (Cl. 204—144)

1 The present invention relates to a machine, method and solution for removing tarnish from silver articles by galvanic action.

It is one of the objects of this invention to provide an apparatus and method for cleaning and polishing silver articles or articles having a silvered surface which electrolytically removes all of the tarnish from the articles and simultaneously polishes and purifies so that the surfaces are rendered electrolytically clean and sanitary.

A further objective of this Invention is to provide a machine which functions both as an outer casing of a voltaic cell battery and a bursnishing device which by rotation burnsishes the silver articles and concurrently maintains its inner surface in a clean and reactive condition.

Another object of the invention is to provide a method for removing tarnish from the surface of silver articles which removes the tarnish without detrimentally affecting the silver surface.

Other objects and advantages of the invention will be specifically pointed out or will become apparent as the description proceeds.

In accordance with this invention, tarnished silver articles may be efficiently cleaned and polished by immersing the same in an aqueous solution containing suitable quantities of salt and soap when positioned within a rotatable zinc container or drum. It has been found that the tarnish on silver is removed by galvanic action upon merely immersing the silver articles in the solution when the silver article is in direct contact with the zinc surface. It has also been found, however, that a more highly polished surface results from rotating the zinc drum due to the polishing action of soft globules or pellets of soap which are present in the brine solution. Furthermore, the abrasive action between the silver article and the zinc surface is sufficient to continuously maintain the interior zinc surface free from extraneous materials including oxides which enables the drum to be used at high efficiency over a long period of time before cleaning is necessary.

A solution which is found to be particularly satisfactory for accomplishing the foregoing objects is a salt solution in which soap is insoluble, and in which the soap forms globules or pellets upon being added to the salt solution. A solution of this type which has been successfully used is comprised of 4 tablespoons of salt and 4 tablespoons of granulated or chip soap to one gallon of water. The salt may be ordinary table salt, that is sodium chloride. This solution in the zinc drum acts as an electrolyte when tarnished silver articles are placed in the solution in contact with the zinc surface. While it is not desired to be bound by theory, it is believed that the tarnish removal is effected through the principle of operation of a voltaic cell. It is thought that the zinc provides the outer casing of a voltaic primary cell of which the silver becomes the positive pole and the zinc the negative pole and the water-salt-soap solution serving as electrolyte. Hydrogen is formed at the surface of the silver-reducing the sulfide on the surface of the silver, in accordance with the equation: AgS—I—H2—2AgI—H2S. Zinc goes into the solution at the negative pole in the form of zinc ions. The liberated hydrogen sulfide is then thought to combine with the water of the bath to form weak sulfuric acid.

In the drawings:

Figure 1 is a perspective view of the apparatus of this invention having the cover in the open position;

Figure 2 is a side view of the apparatus of Figure 1;

Figure 3 is a cross section taken along line 1—3 of Figure 1; and,

Figure 4 is an end view of the apparatus of this invention.

There is provided at 1 a drum tumbler or container which consists of a cylindrical section ia and end portions ib and ic. The cylindrical portion ia is provided with a longitudinally disposed opening on the periphery thereof for the purpose of allowing the drum to be loaded and unloaded. A cover or closure section 2 is provided and hinged at 3 and adapted to provide an air and gas-tight seal for the opening. Cover 2 may be provided with a rubber gasket 4, the compression of which, on closing provides the desired seal.

A peripheral bead 5 is integrally attached to the inner edges of the opening and projects inward therefrom to provide a surface against which cover 2 and its gasket 4 is compressed upon closing. Bead 5 is supported by a turnplate 11 to insure a rigid connection with cylindrical portion ia.

Camin fasteners 6 are integrally attached to cover 2 and are adapted to engage lugs or strikes 7 which are mounted on cylindrical portion ia. Closure of cover 2 is accomplished by engaging lug 7 with fasteners 6 and depressing the handle portion 8a to depress cover 2 and rubber gasket 4 into contact with bead 5 to effect a seal, thereby preventing the escape of gas or liquid from the drum 1 during rotation.

Drum 1 is provided with centrally located threaded flanges 8 oppositely disposed on end por-
tions 1b and 1c for receiving threaded studs 9 and 10. Stud 9 is bent to form a hand crank which when threaded into flange 8 renders drum 1 and stud 9 an integral unit so that rotation of stud 9 causes the rotation of drum 1. Studs 9 and 10 are suitably journeled for rotation in bearings 14 to enable the smooth rotation of the drum 1 within frame end support members 12 and 13.

Frame ends 12 and 13 are triangular in shape and have their edges bent to increase their strength. To insure against wobbling, there is provided at 15 a suitable bracing member positioned between end members 12 and 13 and rigidly attached thereto.

To enable drum 1 to be held in a stationary position during the loading and unloading operation, there is provided at 17 an eyeslot integrally attached to crank 9 and a suitable latch member 17A the base portion of which is attached to end member 12.

Silver articles of various shapes may be cleaned and simultaneously burnished by placing the same in the heretofore described apparatus containing the electrolyte of this invention by securing the cover and rotating the handle a few times.

The beneficial effects are obtained from the use of a solution containing ordinary laundry soaps. Most detergents or dishwashing combinations, however, have been found to be soluble in a brine solution and for this reason are not recommended. On rotation, the soft globules or pellets of soap act as a polisher of the silverware during the rotation of the drum, thereby increasing the shine and luster of the cleaned article.

For practical reasons the exterior surface of drum 1 has been plated with nickel or nickel and copper to protect the same against corrosion and to increase the attractiveness of the apparatus. Furthermore it is believed that the presence of the nickel coating reduces the rate of zinc deterioration both internally and externally and for that reason greatly prolongs the life of the apparatus.

To summarize, this invention provides a rotatable voltaic cell battery and a method and solution for using the same to remove tarnish from silver articles in a simple, inexpensive and positive manner; the voltaic cell battery consists of a hollow cylindrical shaped zinc drum having therein an aqueous brine solution containing soap globules or pellets and silver positioned in the solution.

What is claimed is:

1. A process for cleaning silver articles by galvanic action which comprises agitating silver articles in contact with the interior of a rotating zinc drum, said drum containing a solution consisting of water, salt and soap, the said soap being insoluble and present in the form of globules, whereby tarnish is removed from the said silver by galvanic action and burnedish by contact with the said soap globules.

2. A process for cleaning silver articles by galvanic action which comprises agitating silver articles in contact with the interior of a rotating zinc drum, said drum containing an aqueous solution having the proportions of 4 tablespoons of sodium chloride and 4 tablespoons of soap to each gallon of water whereby tarnish is removed from the said silver by galvanic action.

3. A process for electrolytically removing tarnish from silver articles which comprises immersing silver articles in an aqueous solution in a zinc drum, the essential constituents of said solution being sodium chloride and soap in the proportions of 4 tablespoons of sodium chloride and 4 tablespoons of soap to each gallon of water, and agitating said articles in said solution in contact with said zinc drum.

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