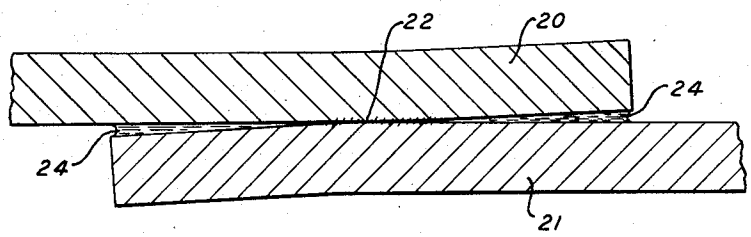
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METHOD OF TREATING JOINTED ELECTROPLATED ARTICLES

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METHOD OF TREATING JOINTED ELECTROPLATED ARTICLES

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This invention relates to a method of treating articles, and more particularly to a method of treating jointed electroplated articles to remove remnants of electrolytic salts from narrow crevices therein.

Where an article comprising metal parts secured together as by riveting or welding, is to be treated with water solutions of electrolytes such as acids, alkalies or salts, and is subsequently to be coated with an ornamental finish such as varnish or lacquer, it is found to be extremely difficult to remove the last traces of electrolyte from the narrow crevices where the parts are secured together, traces of electrolytes, particularly salts of the alkali metals left in such crevices will, in the course of time, creep out under the lacquer or varnish; and, even if they do not mechanically damage the finish, will discolor it.

An object of the present invention is to provide a method of displacing water solutions of electrolytes from crevices, particularly in metal articles, and more especially as part of a method of making a permanent ornamental finish on the articles.

With the above and other objects in view, one embodiment of the invention contemplates a method of treating creviced articles to remove water solutions of electrolytes from the crevices thereof, which method includes a step of treating the articles with trichlorethylene, tetrachlorethylene, carbon tetrachloride and the like compounds.

Other objects and features of the invention will appear from the following detailed description of one embodiment thereof taken in connection with the accompanying drawing in which the single figure represents a diagrammatic cross section of an article to be treated.

In the embodiment of the invention herein disclosed it is assumed that an article of iron, steel, copper, bronze, brass or other metallic material, comprising two parts 20 and 21, welded together at 22, is to be electroplated to produce thereon an ornamental coating of gold, silver, copper, nickel, cadmium, zinc or other suitable metal. This coating is then to be burnished, if necessary, and covered with an anti-tarnish coating of clear enamel, varnish or lacquer of any suitable kind.

The parts 20 and 21 might also be thought of as having been riveted together at 22 instead of welded, or fastened together with screws or bolts or in any other desired manner. In any event, in most instances the process of fastening the two parts together, whether it be welding or another procedure, is apt to deform or distort the parts so that practically invisible and mechanically harmless crevices are formed between the parts at either side of the weld or other securing means.

One typical and well known procedure for preparing and plating some such an article comprises the following steps:

1. The article is thoroughly washed in clean cold water,
2. Washed or dipped in a hot solution of caustic soda or other suitable caustic alkali,
3. Washed again in cold water,
4. Washed or dipped in a hot solution of hydrochloric or other preferably volatile acid,
5. Washed in cold water,
6. Dipped in a warm mixture of nitric and sulphuric acids,
7. Washed thoroughly in cold water,
8. Washed in a cold water solution of sodium cyanide,
9. Washed in cold water,
10. Rinsed again in cold water,
11. Plated in a cyanide bath,
12. Washed in cold water,
13. Washed in hot water, and
14. Dried in a compressed air jet.

The last three of these operations may even be repeated in sequence several times before the article is

15. Buffed if necessary,
16. Lacquered, enamelled or varnished, and
17. Dried.

Clearly, the 2nd, 4th, 6th, 8th and 11th steps of this process will bring electrolyte solutions into contact with the article.

It is well known that when solutions of electrolytes wet the surface of an article such as described, the solutions tend to force or draw themselves, as shown at 24, 24 in the drawing, into any narrow crevices, and obstinately to remain there. It is possible, of course, to dry these out more or less completely by heat. In such case, however, the contained salts are not driven out, but remain deposited in the crevices. Later, after the lacquer coat has been applied, these salts, being ordinarily alkali metal salts and so hygroscopic, will draw atmospheric moisture through the lacquer and creep out under the lacquer coating from the mouth of the crevice to produce stains and discolorations under and in the lacquer. These stains may be merely the physical color of the salt, or the creeping salts may produce corrosion of the underlying metal,

or the salts or the corrosion products may act upon or even destroy the lacquer. This harmful effect is particularly noticeable in the case of cadmium or zinc plated articles of iron, steel, copper or brass.

It seems, at times, as if there were some kind of adsorbent or concentrative power in the closely juxtaposed surfaces of a narrow crevice, by which the solute content of a water solution of an electrolyte tends not only to be strongly retained in such a crevice in spite of repeated washing with cold or hot water, but the solute content seems sometimes even to be somewhat concentrated therein. At any rate the time and effort and number of successive washings required to reduce the solute in the crevice to a harmless proportion may often become prohibitively expensive.

It has been found that if an article having a solution of one or more electrolytes retained in crevices, be subjected to the action of trichlorethylene, a chlorinated hydrocarbon of specific gravity about 1.46 and formula $CCl_2=CHCl$, the solution in the crevices together with the contained electrolytes will be largely bodily displaced by the trichlorethylene. The latter may then be easily removed by evaporation, leaving the crevices substantially clean and dry, and thus obviating subsequent creeping and purging.

Preferably, the article after step 13 of the above described procedure, is

13*a*. Dipped 20'' to 40'' below the surface of the trichlorethylene contained in a sufficiently deep tank at ordinary temperature while still wet with the water from step 13,

13*b*. Dipped into a tank of hot trichlorethylene,

13*c*. Subjected to trichlorethylene vapors,

13*d*. Dried in the air.

Step 14 is then omitted, and the article goes directly to be lacquered.

It is to be noted that the water solution in the crevices is not dissolved out or diluted away by the trichlorethylene, for this latter is substantially immiscible with water, neither dissolves water nor is dissolved by water to any appreciable practical extent. The water solution is apparently displaced by the trichlorethylene, driven out bodily with its electrolyte content.

The invention has here been disclosed as a new step in a specific method of plating and lacquering metal articles. The invention is not so limited, but is applicable wherever it is desired, for any reason, to remove water solutions of substances substantially insoluble in trichlorethylene from crevices of articles insoluble in trichlorethylene.

It is not always necessary to include all three steps of

13*a*. Dipping in cold trichlorethylene,

13*b*. Dipping in hot trichlorethylene, and

13*c*. Treating with trichlorethylene vapor.

In some instances, only one of these steps by itself may be sufficient for practically satisfactory results; or, in other cases, two of them may be found operative.

The action of tetrachlorethylene and carbon tetrachloride is in practice identical with that of trichlorethylene and either of these may therefor be substituted for trichlorethylene in the carrying on of the method of the invention.

The embodiment of the invention disclosed is merely illustrative and may be modified and departed from in many ways without departing from the spirit and scope of the invention as pointed out in and limited solely by the appended claims.

What is claimed is:

1. A method of removing remnants of electrolytic salts in water solution from the crevices of joined electroplated articles which comprises displacing said substances in said crevices by subjecting said articles to the action of material selected from the class consisting of trichlorethylene, tetrachlorethylene and carbon tetrachloride.

2. A method of removing remnants of electrolytic salts in water solution from the crevices of jointed electroplated articles which comprises displacing said substances in said crevices by subjecting said articles to the action of trichlorethylene.

3. A method of removing remnants of electrolytic salts in water solution from the crevices of jointed electroplated articles which comprises displacing said substances in said crevices by subjecting said articles to the action of tetrachlorethylene.

4. A method of removing remnants of electrolytic salts in water solution from the crevices of jointed electroplated articles which comprises displacing said substances in said crevices by subjecting said articles to the action of carbon tetrachloride.

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