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H. C. HOWARD

1,906,378

ANODE SUPPORT

Filed Nov. 4, 1929

Fig. 1.

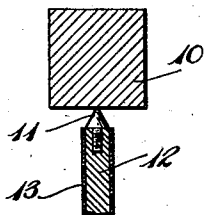


Fig. 2.

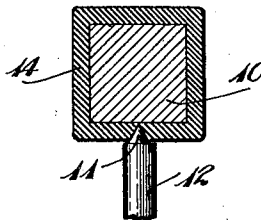


Fig. 3.

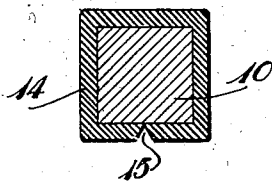


Fig. 4.

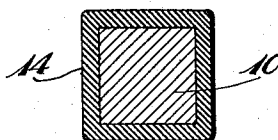
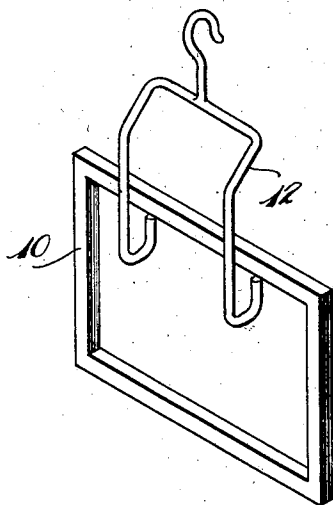


Fig. 5.



Inventor
Henry C. Howard
By Eakin & Avery
Attys.

UNITED STATES PATENT OFFICE

HENRY C. HOWARD, OF AKRON, OHIO, ASSIGNOR TO AMERICAN ANODE, INC., OF
AKRON, OHIO, A CORPORATION OF DELAWARE

ANODE SUPPORT

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This invention relates to the electrodeposition of organic substances on metallic anodes, and particularly to the electrodeposition of rubber or the like from alkaline aqueous dispersions such as natural rubber latex.

Metal articles, particularly those made of or coated with a metal which readily goes into solution under the action of the electric current without the evolution of gas, such as zinc, cadmium, iron, magnesium, etc., are readily coated with organic substances such as rubber by immersion in an aqueous dispersion of the said substances and the passage of an electric current therethrough, the article to be coated being the anode, that is, being connected with the positive terminal of the source of current. It will not be necessary to describe the electrodeposition process in detail, as it is well known in the art.

When the metal articles are to be coated with the said substances—say with rubber—in their entirety, they are ordinarily immersed completely in the aqueous dispersion, being suspended by wires or hooks which also serve to carry the depositing current to the article. However, the current which forms the deposit on the article also flows to the metallic supports, so that the deposit is continuous over the article and the support as far as the level of the surface of the dispersion. It is therefore necessary to cut away the deposit on the supports, to trim the ragged edge surrounding the point of contact of the support with the article, and patch the resulting jagged, irregular hole in the deposit.

This invention consists in supporting the article to be coated by supports consisting of or coated with a metal which is passive toward the depositing current. Such metals, for example, are tantalum and aluminum, which are substantially incapable either of emitting positive ions or discharging negative ions when in contact with weakly alkaline solutions.

The supports may have any size or shape adapted to sustain the article and conduct the depositing current thereto. Small, light objects are conveniently supported upon more or less sharply pointed spurs. The

electrodeposition then takes place smoothly and uniformly on the surface of the article, but not on the supports themselves, because of their passiveness toward electrolytes. After the withdrawal of the supports, the small holes left in the deposits may be closed by squeezing their edges together or, if they are too large for that process, by filling them with a concentrated paste of the same dispersion employed in the electrodeposition. It is thus possible to produce articles with a complete and perfect coating of rubber or other similar substance, the point at which contact with the article had been made being practically or completely indistinguishable from the remainder of the coating.

It is not well understood why certain metals are almost completely passive to the electrolyte when connected as anodes in electric circuits, but it is believed that the first current to pass to the metal surface effects the oxidation of the surface and that the film of oxide because of its high electrical resistance prevents the further passage of the current. It also seems probable that the film contains insoluble salts as well as the oxide of the metal, for the presence of the anions of such insoluble salts in the electrolyte materially increases the surface resistance of the metal.

For example, aluminum is almost completely passive to solutions containing borate, carbonate, oxalate or phosphate ions, tantalum and columbium are passive to almost any solutions, particularly those containing carbonate ions. Tantalum is preferred because of its relatively low cost, high mechanical strength, low electrical resistance, and resistance to corrosion. Other metals, including tin, bismuth, and antimony, become passive under certain conditions.

Certain illustrative embodiments of this invention are shown in the accompanying drawing. Fig. 1 is a diagrammatic sectional view of an article 10, which is to be coated with rubber by electrodeposition, supported upon a spur of tantalum. The spur is secured to a supporting member 12 of any convenient metal such as copper, steel, etc., which is preferably provided with an insulating

coating 13 of lacquer, enamel, rubber, etc. The article 10 is shown in Fig. 2 provided with an electrodeposited coating 14, the electrodeposition on the support 12 being prevented by the insulating coating, and on the spur 11 by the passive character of the tantalum. After the completion of the electrodeposition and the removal of the supports, the coating, as shown in Fig. 3 is perfect except for the small conical hole 15 left by the spur. The hole is closed by squeezing together the edges of the wet plastic deposit, or by filling the hole either before or during the drying operation with a concentrated paste of the same dispersion employed for the electrodeposition. The completed deposit is shown in Fig. 4.

The construction of the supports will of course be adapted to the size, shape, and weight of the article to be coated. As indicated in Fig. 5, in which the article 10 is represented as a square ring, the support 12 may consist of a single or compound hook. In supporting articles of other shapes spring clips or clamps may be employed, the contact points being made of tantalum or other equivalent metal which becomes passive when employed as an anode.

I claim:

1. A supporting structure adapted to support articles in an electrodeposition bath, said structure comprising contact surfaces of tantalum.
2. A supporting structure adapted to support articles in an electrodeposition bath, said structure comprising tantalum contacts secured to a support of a base metal.
3. A supporting structure adapted to support articles in an electrodeposition bath, said structure comprising a frame of a base metal provided with an insulating coating and with tantalum contact points.
4. A supporting structure adapted to support articles in an electrodeposition bath, said structure comprising contact surfaces of a material selected from the class consisting of tantalum and columbium.
5. A supporting structure adapted to support articles in an electrodeposition bath, said structure comprising contact surfaces of columbium.

In witness whereof I have hereunto set my hand this 23rd day of October, 1929.

HENRY C. HOWARD.