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PROCESS OF ELECTRODEPOSITION.

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To all whom it may concern:

Be it known that I, BERTRAND S. SUMMERS, a citizen of the United States, residing at Port Huron, county of St. Clair, State of Michigan, have invented certain new and useful Improvements in Processes of Electrodeposition, of which the following is a specification.

My invention has been developed in connection with the electro-deposition of lead upon iron for the purpose of forming a protective coating thereon and is exemplified hereinafter by a specific description of this process. It is to be understood, however, that the detailed disclosure is for the purpose of exemplification only and that the scope of the invention is defined in the following claims in which I have endeavored to distinguish it from the prior art so far as known to me, without relinquishing or abandoning any portion or feature thereof.

My invention is based primarily on the discovery that by the use of a solution containing the metal of the cathode or object to be plated or to receive the deposition as well as the plating metal the character of the deposit may be greatly improved in density coherence and adherence. I am not prepared to state positively the reason for the improved result though it is my present opinion that it may be due to the formation of an alloy which serves to join the plated and plating metals. I have discovered that the character of the deposition may be further improved by employing in addition to the anode of plating metal an anode of substantially the same material as the object to be plated.

In the specific form of the invention in which it has been found most useful, to wit, the plating of lead on iron the object to be plated as usual forms the cathode and I employ two anodes, one of iron and the other of lead. The electrolyte or plating solution contains both lead and iron in the form of soluble salts.

The following will serve as an example of the application of my invention to plating lead; I first form a solution of about 400 pounds of lead acetate in 2,000 gallons of water; to this solution is added iron acetate, which in the instance in question was made by mixing 400 pounds of acetate of calcium in solution with 250 pounds of sulfate of iron. After the sulfate of calcium had settled out the supernatant liquid containing iron acetate was added to the solution of acetate of lead. Obviously the iron acetate might be made in any other known manner and it is apparently immaterial whether the acetate be in the ferrous or ferric condition. Instead of separately forming the acetate of iron I may add a soluble acetate such as the acetate of ammonium, acetate of sodium or the acetate of calcium and a sulfate of iron directly to the bath, the acetate must be in sufficient quantity to prevent deposition of lead sulfate and when so present aids in cutting down porosity of the deposit, facilitates the deposition and increases the density thereof. The process in its broader aspect may be practiced with other soluble compounds of lead or iron, or both. Thus, instead of the acetate of lead the fluoro-chlorid may be used in which case I prefer to use as the soluble iron salt the chlorid. The fluoro-chlorid of lead may be formed in a known manner by dissolving freshly precipitated chlorid of lead in sodium fluoride.

As stated above the character of the deposition, its adhesion, density and coherence are greatly improved by the use of an iron anode in conjunction with the lead anode. The character of the deposition is largely governed by the relative wet areas of the respective anodes, an increase in the relative size of the iron anode reducing the speed of deposition but making the deposit denser, harder, more uniform and more adhesive.

I claim:

1. In a process of electrodeposition, passing an electric current through a bath containing in solution a compound of the metal to be plated to the object to be plated connected as the cathode from an anode of the plating metal and an anode of the metal to be plated.

2. In a process of electrodeposition, submerging the article to be plated in a bath comprising a solution of a compound of the plating metal and a compound of the metal constituting the cathode and passing a current of electricity through the bath to said cathode.

3. A process of electrodeposition of lead upon another metal which consists in submerging the article to be plated as a cathode in a bath containing a solution of lead compound and a compound of the metal constituting the cathode and passing a current of electricity through the bath to said cathode.

4. A process of electrodeposition which consists in submerging the article to be plated in a bath comprising a solution of a compound of lead and a solution of a compound of the metal of the cathode and passing a current of electricity through said bath to said cathode from anodes composed respectively of lead and the metal of the cathode.

5. A process of electrodepositing lead on iron which comprises forming a solution containing soluble compounds of lead and iron, submerging the article to be plated as a cathode in said solution, and passing a current of electricity through said solution to the cathode.

6. A process of electrodepositing lead on iron which consists in forming a solution containing soluble compounds of lead and iron, submerging the article to be plated in said solution and passing a current of electricity from anodes of lead and iron respectively to said cathode.

7. A process of electrodeposition of one metal on another which comprises forming a solution containing a salt of the metal to be plated and a corresponding salt of the plating metal, submerging the article to be plated as a cathode in said bath and passing an electric current through the bath to said cathode.

8. A process of electrodeposition which comprises forming a solution containing corresponding soluble salts of the plating and plated metal, submerging the article to be plated in the bath and passing a current of electricity from anodes composed of the plating and plated metal respectively through said bath to said anode.

9. A process of plating iron with lead comprising forming a solution containing iron and lead acetate, submerging the iron article to be plated in the bath as a cathode and passing a current of electricity through said bath to said cathode.

10. A process of plating iron with lead which comprises forming a solution containing iron acetate and lead acetate, submerging the iron article to be plated in said bath and passing a current of electricity from anodes of iron and lead respectively through said bath to said cathode.

11. A process of electrodepositing lead upon another metal which consists in forming a bath of lead acetate and passing a current through an anode of lead and an anode of the metal to be coated, the bath and the article to be coated as a cathode.

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Witnesses:
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