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CORROSION RESISTING METAL

Filed June 19, 1922

Fig. 1.

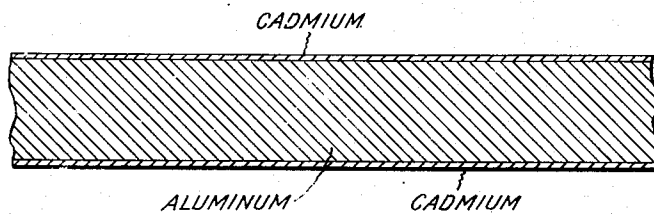
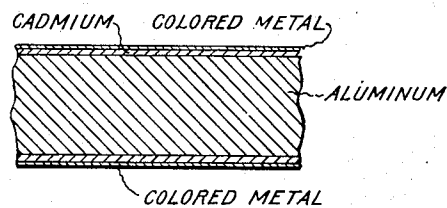


Fig. 2.



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UNITED STATES PATENT OFFICE.

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CORROSION-RESISTING METAL.

Application filed June 19, 1922. Serial No. 589,435.

The present invention relates to the production of a protective coating on non-ferrous metals, subject to corrosion and in particular aluminum and magnesium and their various alloys.

The light non-ferrous metals aluminum and magnesium, either pure or alloyed with each other, or with copper, zinc, silicon or other metals, although relatively permanent in dry air, under some conditions are subject to corrosion, particularly when exposed to moist salt air. The protection of these metals by painting, enameling or varnishing, is not adequate because these coatings are apt to crack and peel off, and will in time expose the foundation metal. Attempts heretofore made to plate these metals by electrolytic deposition of metals which resist corrosion, as for example, copper, nickel, zinc, tin, brass, etc., have failed, and in fact, these platings through their electrolytic potential difference to aluminum or magnesium have accelerated the corrosion. The galvanic action between the plate and the underlying metal, which occurs when the corrosive electrolyte goes through the pores of the plate metals, undermines the platings, causing them to peel and the corrosion of the foundation metal becomes more rapid by the presence of the plating metal.

I have discovered that a coating of cadmium on aluminum, or magnesium, is permanent and stable, and is not liable to be undermined and forced off by corrosion or galvanic action between the aluminum or magnesium and the cadmium coating, and also that these metals when coated with cadmium are highly resistant to corrosion in a salt atmosphere.

The accompanying drawing shows in Fig. 1 a magnified cross-section of a sheet of aluminum coated with cadmium, and Fig. 2 is a cross-section of a similar article with the additional provision of an exterior film of coloring metal.

In carrying out my invention, the article to be coated is first cleaned by cleaning methods so well understood that they require no description here on my part. The cleaned article is coated with cadmium in any suitable way, preferably by electrolysis. For example, it is made the cathode in an electrolytic bath containing a cadmium

compound, such as the chloride, the sulphate or the hydroxide, and containing also potassium or sodium cyanide. The anode may consist of cadmium or carbon. I may use from 1 to 4 ounces of cadmium compound, and 2 to 5 ounces of cyanide in a gallon of solution, and proceed otherwise by approved methods of electrolysis. I may also use an acid bath containing, for example, cadmium sulphate and sulphuric acid. I may use for each gallon of water about 3 to 5 ounces of cadmium sulphate and $\frac{1}{4}$ to $\frac{1}{2}$ ounce of concentrated sulphuric acid. Although the thickness of the coating will vary with the conditions and service required, ordinarily the plating of cadmium should be about $\frac{1}{4}$ mil to 1 mil in thickness. The coating of cadmium has been indicated conventionally in Fig. 1.

If any other finish than white cadmium color is desired, the various shades may be obtained by superimposed coats of suitable metal. For example, copper may be superimposed on the cadmium coating, as indicated conventionally in Fig. 2. The cadmium coating may be oxidized by well known methods, as for example, by treatment with an alkaline solution of white arsenic.

In my opinion the success of an unalloyed cadmium coating for the prevention of corrosion of aluminum and closely related metals is to be ascribed to the fact that in a salt atmosphere or solution substantially no difference of potential exists between the aluminum and the cadmium. The high resistance to atmospheric corrosion of cadmium keeps the cadmium coating intact and protects the surface of the foundation metal.

I mean by the appended claims to cover not only my invention as applied to articles containing aluminum, but also other metals subject to corrosion in the same electrolytic series, as for example, metallic articles containing or consisting of magnesium.

What I claim as new and desire to secure by Letters Patent of the United States, is:—

1. An article of manufacture comprising a non-ferrous metal, which in a salt solution is adjacent to cadmium in electrolytic potential and a corrosion resisting coating thereon comprising metallic cadmium.

2. An article of manufacture consisting largely of aluminum and an electrodeposited coating of cadmium thereon whereby said 10 article is rendered resistant to the corrosive influence of a salt atmosphere.

3. An article of manufacture comprising 5 an alloy of aluminum and an unalloyed coating thereon of cadmium of the order of about one mil in thickness. In witness whereof, I have hereunto set my hand this 16th day of June, 1922.

4. An article of manufacture consisting

CHARLES E. JONES.