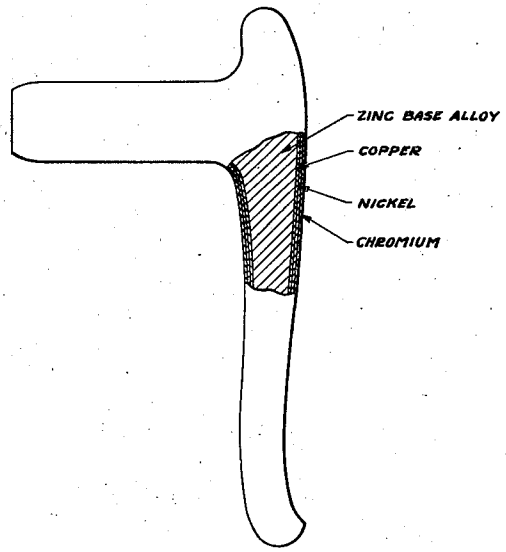
Aug. 30, 1938. J. T. FORD 2,128,550

ANTICORROSION PROCESS FOR ZINC BASE CASTINGS

Filed Feb. 6, 1933



Inventor
Jay T. Ford

By Blackmore, Spencer & Flint
Attorneys

Patented Aug. 30, 1938 2,128,550

UNITED STATES PATENT OFFICE

2,128,550

ANTICORROSION PROCESS FOR ZINC BASE CASTINGS

Jay T. Ford, Flint, Mich., assignor, by mesne assignments, to General Motors Corporation, Detroit, Mich., a corporation of Delaware

Application February 6, 1933, Serial No. 655,453

5 Claims. (Cl. 204—13)

The invention relates to the treatment of metal surfaces to inhibit or prevent corrosion and is particularly concerned with the treatment of articles composed of alloys having a material content of zinc.

Alloys of this type, generally termed "zinc-base" alloys, are of especial importance in the manufacture of articles by the method known as "die-casting." Zinc-base alloys for this purpose may contain in the neighborhood of four percent of aluminum and generally magnesium to an amount not over one tenth of one percent, with or without a small content of copper, for example three percent, the remainder being substantially zinc. Such alloys are highly desirable from the standpoint of fluidity, strength and durability for the casting of many small but relatively complicated parts, such as parts of automobile fittings, coach hardware, etc.

One material defect that has been encountered in castings from zinc-base alloys is their tendency to corrode when exposed to atmospheric or other corrosive agencies. Even the usual metal coatings, such as the copper-nickel-chromium coatings now in general use, are ineffective to prevent attack on the zinc unless great care is taken and unusually heavy coatings applied. Electro-deposited coatings are normally somewhat porous and corrosive agencies apparently obtain access to the base metal through the pores of the coating. At any rate, the products of corrosion exude through the electro-plated coating and appear as unsightly spots of white deposit on the surface.

I have found that the corrosion of zinc and zinc-base alloys upon exposure to weathering agencies, salt-spray tests, and the like, may be substantially prevented by a chemical treatment of the surfaces which may be applied either before or after the application of electrolytic deposits. This chemical treatment comprises subjecting the surfaces to the action of an acid bath containing a dichromate, preferably of sodium or potassium.

The concentrations of the salts employed and of the acid may be varied within wide limits. A bath which has been found satisfactory comprises about 100 grams of sodium or potassium dichromate in a liter of water acidified with about 5–10 cc. of concentrated sulphuric acid (66 Bé.). The articles to be treated are first cleaned and then immersed in the solution for about five minutes. The solution may be maintained at room temperature. Following the treatment, the articles should be rinsed thoroughly and then dried in air. The rinsing may be in ordinary tap water at room temperature.

The treatment described produces on the surface a very thin film which has high corrosion-resisting properties and serves to protect the base metal from attack by atmospheric or like agencies. It also acts to inhibit or prevent intercrystalline corrosion. If the treatment has been applied directly to the base metal, the articles thus treated may be employed without further coatings for uses where decoration or other additional surface finishes are not required. If, however, electrodeposited or like finishes are desired they may be applied after the treatment described, or the articles may be subjected to the anti-corrosion treatment after the other coatings have been applied.

In the accompanying drawing is shown as an example of the articles to which the invention may be applied, a door handle which is cast of a zinc-base alloy of the general character above referred to. As illustrated, the handle is coated with successive layers of copper, nickel and chromium, all of which may be applied in the usual manner from electrolytic baths of standard composition.

The electro-deposited metal coatings such as copper-nickel-chromium coatings referred to above, chromium being preferable for the outer portion at least of such metal coating, may be applied by the methods commonly used for electro-plating.

I claim:

1. The method of treating articles composed largely of zinc to prevent corrosion of the surface comprising applying to the surface of the article a combination of coatings, one produced by immersion in an acidified dichromate solution and one consisting of electro-deposited metal.

2. The method as set forth in claim 1, the treatment with dichromate solution being applied to the surface subsequent to the deposition of metal thereon.

3. The method as set forth in claim 1, the metal coating consisting of successively deposited layers, the outer one of which is chromium.

4. An article having a relatively large content of zinc and coated with a thin film of the reaction product of an acidified solution of dichromate acting upon the zinc, the surface being also coated with electro-deposited metal.

5. An article as set forth in claim 4, the outer portion at least of said metal coating being of chromium.

JAY T. FORD.