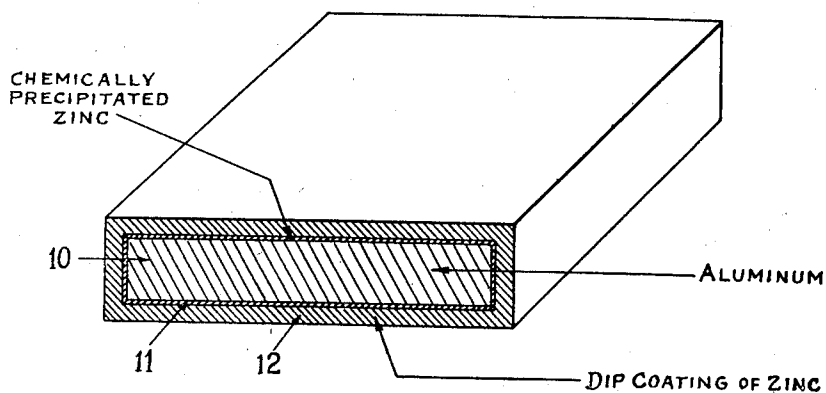


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PROCESS FOR PROVIDING ALUMINUM AND ALUMINUM
ALLOYS WITH METAL COATINGS
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WITNESS

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PROCESS FOR PROVIDING ALUMINUM AND ALUMINUM ALLOYS WITH METAL COATINGS

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2 Claims. (Cl. 117-51)

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This invention relates to a process for providing aluminum and aluminum alloys with metal coatings, and more particularly to a process whereby the coating is produced by dipping the aluminum and the like into molten metal.

It is already known to coat by rolling or by electro-plating aluminum and aluminum alloys with metallic layers, which have a different composition from the base metal. But these processes cannot be used in all cases. The rolling process, for example, is only suitable for the production of thin aluminum plates, while electro-plating requires rather long time of treatment in order to produce a rather thick metallic layer. With certain metals, such as for instance, tin and zinc, it is quite difficult to produce a strongly adhering layer on aluminum without the use of special metallic intermediate layers.

Hence, quite often the attempt has been made to coat aluminum with suitable metals by dipping the same into the molten metal. Thus, some preparations for hard-soldering exist, which by using higher temperatures and especially suitable fluxes, make it possible to coat aluminum with other metals. Because generally very high temperatures are required for the above mentioned process only small areas can be coated with sufficient uniformity. The same applies to the metallizing processes according to the principle of soldering by reaction or to other processes, in which the surface of aluminum is mechanically worked in molten metal in order to produce a firm connection between the aluminum and the molten metal.

In spite of the lack of success of the already known experiments for coating aluminum and aluminum alloys with other metals in the molten state, we have found, that aluminum and aluminum alloys can be readily prepared for fire-plating, when they are dipped into solutions from which the aluminum can precipitate metals having a higher potential in a well covering and strongly adhering form. Surfaces of aluminum prepared in this manner are coated without any difficulty, for instance, with tin or zinc on dipping into the molten metals.

For carrying out the process according to this invention aluminum is advantageously subjected to a preliminary treatment in solutions of zincates, which may or may not contain heavy metals.

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The following example illustrates the invention without, however, limiting the same to it:

Example

Degreased and deoxidized aluminum is treated in a solution consisting of

	Grms.
Sodium hydroxide.....	400
Zinc oxide.....	70
Potassium copper cyanide.....	30

until a well covering and strongly adhering metal layer is obtained. This treatment requires about 1/2 to 4 minutes. Subsequently, the metal is rinsed and then dipped into a molten zinc aluminum alloy for producing the desired layer.

The preliminary treatment may be carried out at a high temperature. By experiment the most suitable composition of the bath for preliminary treatment can be found out in any particular case. However, it is of essential importance to use only solutions, which yield a most compact and uniform precipitate, which adheres strongly to aluminum. Thus, it is possible to produce in this way firmly adhering layers on aluminum not only from molten zinc and zinc-aluminum alloys, as described in the examples, but also from molten tin, zinc-tin, tin-lead or similar alloys.

Coatings, obtained as described, possess a considerable thickness. Hence, in contrast to aluminum which has been electro-plated, aluminum coated as described and claimed obtains in a very short time a metallic layer which yields a good protection against corrosion. Of course, the process of this invention may be used also in order to solder the aluminum plates by dipping parts, subjected to the described preliminary treatment, into the molten metal, pressing the parts together, whereafter they are removed from the molten mass and allowed to cool. It is also possible to proceed in a manner, whereby the aluminum parts, subjected to a preliminary treatment according to this invention, are first metallized separately in the molten metal and are subsequently heated above the melting point of the used metal, while pressing the parts together. Another way is the following: From two aluminum parts to be soldered, which were subjected to the claimed preliminary treatment, first the one is coated with a metallic layer in the

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manner described. Then this coated part is heated above the melting point of the metal forming the coating layer, while pressing it together with the second part, which also had been subjected to a preliminary treatment according to this invention. Also by this way of proceeding a firm and uniform connection of the aluminum parts is achieved.

A coated article obtained in accordance with the invention is shown diagrammatically, by way of example on the accompanying drawing, wherein 10 indicates the base or core of aluminum or aluminum alloy. This base may, of course, itself have a core of a metal other than aluminum, but the essential characteristic of the base metal is that it has a surface of aluminum or an aluminum alloy. The chemically precipitated layer of metal, such as zinc, is shown at 11; while the surface metal coating, such as zinc obtained by dipping and thus fused-on to the chemically precipitated layer, is shown at 12.

Of course, many changes and variations in the composition of the solutions used for preliminary treatment and the metals employed for coating, in the reaction conditions, duration of treatment, temperatures and the like may be made by those skilled in the art in accordance with the principles set forth herein and in the claims annexed hereto.

What I claim is:

1. Process for coating aluminum and aluminum alloys by dipping the same into molten metal, comprising subjecting aluminum or its alloys to a preliminary treatment with a solution

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of an alkali metal zincate containing potassium copper cyanide until a chemically precipitated metal deposit in a well covering and firmly adhering form is obtained, and dipping the so coated aluminum into a molten bath of a member of the group consisting of zinc, tin, lead and their alloys.

2. Process according to claim 1 wherein the alkali metal zincate solution is a sodium zincate solution.

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