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METHOD OF PREPARING ALLOYS

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2 Claims. (Cl. 75-1)

The previous patents of Messrs. Berthélemy and de Montby (as will be seen especially from French Patents Nos. 610,464, of May 11, 1925, 634,751, of May 20, 1927, and 650,240, of December 13, 1927) have shown that it is possible to incorporate homogeneously a rather considerable quantity of cadmium into aluminium and aluminium alloys, by using magnesium as a vehicle for cadmium. Whereas previously it was never possible to incorporate cadmium homogeneously into aluminium and aluminium alloys, experience has shown that such incorporation can be obtained with absolute certainty by the abovementioned procedure.

Continuing their researches, Messrs. Berthélemy, de Montby and Pouvreau have now found that this procedure can also be extended and would make it possible to incorporate homogeneously into aluminium and aluminium alloys other metals than cadmium that so far could only be heterogeneously incorporated. They have also found that the application of this general method would make it possible to obtain alloys possessing special physical or chemical characteristics.

An object of the invention is the general method of incorporating other metals homogeneously into aluminium and aluminium alloys, by using magnesium as a vehicle for the metal to be thus incorporated, such metals having been only heterogeneously incorporated in the past.

Another object of the invention is the new industrial product formed by an aluminium alloy containing a metal (lead) capable of conferring special properties upon the alloy thus produced, said additional metal being incorporated homogeneously into the alloy by the use of magnesium as a vehicle.

Generally speaking, the alloys thus obtained will stand the usual mechanical treatment (rolling, forging, stretching, upsetting, drawing etc.) or can be molded.

As an example of how the invention may be carried out procedure for preparing a lead-containing aluminium alloy is here described as follows:

The aluminium is melted in a plumbago crucible with magnesium. The molten bath is cleaned in the usual way and a magnesium-lead alloy is then incorporated.

The quantity of magnesium thus added should be from 0.80 to 1% of the total amount of aluminium; the quantity of pure lead to be added should be from 1.50 to 2% of the total amount of aluminium.

When the magnesium-lead alloy is completely

melted, the mass is stirred energetically and the bath is cleaned again. Tapping is then effected in the usual way.

The incorporation of magnesium and lead can be made by simultaneous or consecutive introduction of magnesium and lead. If the magnesium and lead are consecutively added to the aluminium, the lead should be added immediately after the magnesium, so that the magnesium can act as an agent to uniformly distribute the lead in the alloy, in the form of a solid solution.

The alloy thus prepared is of a perfect homogeneity. The homogeneous distribution of lead may be explained by the fact that the magnesium-lead diagram of equilibrium shows a limited solid solution of lead in magnesium.

Such an alloy behaves very well when subjected to the various agents of natural corrosion (dampness, salt water, salt spray etc.).

Alternate corrosion trials made with sea water with an addition of 10% of hydrogen peroxide of 20 volumes strength have given the following results:

	Loss of weight per square meter
Lead alloy	1
99% commercial aluminium	2
Al-Si at 13% Si alloy	5.5

The rolling of this alloy is carried out in the same manner as that usually applied in the case of aluminium alloys.

The rolled products after the usual thermal treatment, show the following characteristics:

Resistance	24-26 kgs. per mm ²
Apparent elasticity limit	20-22 kgs. per mm ²
Contraction	25%
Elongation	14-16%
Brinell hardness	65

The preceding example is given only as an indication which is by no means exhaustive; the general method of this invention is susceptible of being applied also to aluminium alloys containing other ingredients than lead.

An alloy of the following composition may be prepared:

Copper	3.5C
Manganese	0.30
Magnesium	0.90
Silicon	0.40
Iron	0.30
Lead	1.95
Aluminium	92.65

100.00

This alloy shows the following characteristics when rolled after thermal treatment: resistance 40; elasticity 23; elongation 12-13%.

5 Losses in weight per square meter on comparative trials of this alloy and of a high resistance Al-Cu-Mg-Si alloy were as follows:

Lead alloy-----	1
Al-Cu-Mg-Si alloy-----	2

10 In the claims that follow, the term "solutions" is used generically to cover solid solutions, solid compounds and mixtures of the former and the latter.

What we claim is:

15 1. A method of forming a homogeneous alloy of aluminum and lead, in which the major portion of the alloy is composed of aluminum and the lead is homogeneously distributed in the

alloy, which consists in forming an alloy of lead and magnesium, and adding this alloy to melted aluminum so that the magnesium acts to distribute the lead homogeneously throughout the alloy.

2. A method of forming a homogeneous alloy of aluminum, magnesium, and lead, in which the major portion of the alloy is composed of aluminum and the lead is homogeneously distributed in the alloy, which consists in simultaneously incorporating the magnesium and lead in said alloy, so that the magnesium serves as an agent to homogeneously distribute the lead throughout the alloy.

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