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MANUFACTURE OF ALUMINUM SILICON ALLOYS

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My invention relates to the production of alloys containing aluminum and silicon as their chief constituents.

In the prior art three different ways have been suggested for producing aluminum silicon alloys as far as my knowledge goes, to wit:

(1) By melting down the constituents viz. aluminum and silicon.

(2) By using a silicon compound such as sodium silicon fluoride, and introducing the same into an aluminum bath with a view to obtain the desired alloy by way of exchange, and

(3) By electrolysis, that is, by producing the alloy from molten fluorides as usually prepared in the normal or customary electrolytic process of manufacturing aluminum, but in which silicic acid or any other suitable silicon compounds or substances containing silicon are to be added in a proportion corresponding to the desired percentage of silicon in the alloy to be produced.

The present invention includes and modifies the last mentioned or electrolytic process and the object of the invention is to so modify the said process that alloys of any predetermined or desired proportion of silicon can be obtained.

With this object in view, I employ silicon as such in lieu of silicon compounds and the like, in order to obtain an alloy containing a certain desired percentage of silicon. By so modifying the old electrolytic process I ensure a marked advance in the art and the new method is by far superior to the old process.

In the electrolytic process as hitherto practised it is absolutely impossible to obtain, by using silicon compounds or the like such as pure silicic acid, clay or siliciferous bauxite as additions, a desired proportion of silicon in the alloy. This is due to the fact, that in case of adding any such silicon compounds the working condition of the furnace is impaired and the reactions cannot take place in a ready smooth manner, whereas when silicon itself is added the working condition of the furnace will not be deranged and the reactions will take place in a smooth gentle way.

The addition of silicon as such ensures with certainty any previously calculated or desired proportion of silicon in the alloy obtained by the melting process. A further advantage of the invention is of economical nature. For in charging the furnace with siliciferous material such as kaolin, sand and the like the consumption of current in the furnace is much greater for the reason that current is required not only for melting the silicon but also for decomposing the silicic acid, and the current thus has to perform two actions. Considering this it is also to be noted that the melting point of silicon is at about 1404° C., whereas in my improved method an aluminum silicon alloy is to be melted the melting point of which is considerably lower than that of silicon so that a marked economy of current will be secured.

I prefer to add silicon to the bath in proportion as aluminum is separated therefrom.

It will be evident that my invention while still being adhered to in its main essentials, may be varied and adapted in many ways according to the requirements desired or most suitable under different circumstances and I would, therefore, have it understood that I do not limit myself to any specific way of carrying the same into effect, but hold myself at liberty to make such departures therefrom as fairly fall within the spirit and scope of my invention.

What I claim is:

The method of producing aluminum silicon alloys according to an uninterrupted electrolytical melting process of manufacturing aluminum in a fluoride bath without reduction of silicic acid, consisting in modifying the said process by adding to aluminum in the nascent state, uncombined silicon in an amount in accordance with the desired proportion thereof in such alloy, whereby the resulting product becomes a fine-grained alloy.

In testimony whereof I affix my signature.

HANS SCHORN.