

UNITED STATES PATENT OFFICE

1,940,922

ALUMINIUM SILICON ALLOY WITH A PHOSPHORUS CONTENT OF 0.001 TO 0.1%

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No Drawing. Application August 2, 1933, Serial No. 683,407, and in Germany August 8, 1932

3 Claims. (Cl. 75—1)

This invention relates to aluminium-silicon-alloys with a phosphorus content of 0.001 to 0.1%. The invention relates further to a special method for the introduction of the phosphorus and also the production of pistons, bearings and other machine parts which are exposed to frictional stressing when in use.

The invention is based on the circumstance that the addition of phosphorus within the limits specified to aluminium-silicon-alloys with 5 to 40% of silicon has an extremely favorable influence on the sliding properties and resistance to wear of such alloys.

The addition of the phosphorus to aluminium alloys having as low a silicon content as from 5 to 15% improves their sliding properties to a substantial degree, but this addition of phosphorus has a particularly favorable effect in the case of the hyper-eutectic alloys containing between 15 and 25% of silicon. Even alloys containing up to 40% of silicon, which were considered unusable by reason of their brittleness, can be rendered suitable for constructional purposes by the addition of phosphorus within the limits hereinbefore set forth.

In addition to the specified quantities of silicon and phosphorus, the alloy may also contain additions known for aluminium alloys, of one or more of the metals magnesium, nickel, chromium, manganese, cobalt or copper, in the usual quantities, in order to influence special properties of said alloys, such as hardness, mechanical strength or ductility.

On account of the good sliding properties of such alloys it is possible to make pistons, bearings and engine cylinders and other analogous machine parts, such as mould tools and ram guides for briquette presses and cylinder liners, which are exposed to frictional stresses, especially in the warm, out of these alloys. In addition to good sliding properties, the capability of said al-

loys of being pressed, is improved, by the phosphorus addition, to such an extent as to enable it to be worked by means of presses.

In producing the machine parts, it is preferable to make an alloy of aluminium and silicon of the desired proportions of composition, in the first place, and thereupon to add the requisite phosphorus, taking the loss by burning into consideration.

It is particularly advantageous and a further part of the invention, to introduce the phosphorus in the form of phosphorus pentachloride, and not in the elemental form, the result being that, in consequence of the decomposition of the phosphorus pentachloride, the phosphorus is introduced into the melt in a gradual manner and almost without any loss. Moreover, a refining action is obtained, at the same time, through the liberated chlorine. For example, excellent results have been obtained with an amount of phosphorus pentachloride corresponding to about 0.2% of the weight of metal to be refined.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. Aluminium-silicon alloys containing 0.001 to 0.1% of phosphorus, 5 to 40% of silicon and the balance principally-aluminium.

2. Aluminium-silicon alloys containing 0.001 to 0.1% of phosphorus, 15 to 25% of silicon and the balance principally aluminium.

3. Articles that are exposed to frictional stress especially at elevated temperatures, such as pistons, bearings, engine cylinders, machine parts and parts of briquetting presses, made of aluminium-silicon alloys containing 0.001 to 0.1% of phosphorus, 5 to 40% of silicon and the balance principally aluminium.

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