Patented June 7, 1927. 1,631,930

UNITED STATES PATENT OFFICE.

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METHOD OF IMPROVING ALUMINUM ALLOYS.

No Drawing. Application filed May 31, 1924, Serial No. 717,170, and in Germany August 16, 1923.

My invention relates to the art of improving or perfecting aluminum alloys, that is to say, to bring the alloy into a state of greater perfection especially as regards the physical properties thereof.

In the methods hitherto applied for the purpose, a lengthy and complicated operation is necessary which is objectionable and detrimental mainly for the reason that the stretching out of the ingots is to be interrupted by treating the same with heat and that the final stage of the operation is a repeated treatment with heat.

Furthermore, the hitherto known perfecting methods are applicable to the treatment of aluminum alloys only, which contain magnesium.

In consequence thereof irregularities in the operation occur which prevent the final products to be obtained in accordance with the hitherto practised methods from being uniform, so that the same fail to answer the desired purpose as regards both the obtainable properties and the final composition of the alloy.

The object of my invention is to remedy these defects.

With this aim in view I stretch out the alloys or ingots, without interruption by treatments with heat or by cooling, to the desired final dimensions by way of a continuous or uninterrupted reducing process, then I heat the stretched alloy to a temperature of about 500° C. and thereafter I cool the same as much as necessary and harden the same at a low temperature.

In practice my method may be carried out as follows:

The ingot which preferably contains about 4% Cu and 1–2% Si, is heated to a temperature of about 500° C. and reduced out in a single operation to the final sectional dimensions by pressing, rolling or the like, so that the reduction as regards the crosssectional area of the work will preferably amount to at least 90 p. c.

The reduced bar is then heated for about three hours to about 500° C. or a little higher just as required by the solidus-point of the alloy, whereupon it is cooled either by chilling the same in oil, water or the like or by allowing it to cool down slowly.

I am aware that the operation of chilling an aluminum alloy for the purpose of improving the properties thereof is known in the art.

The cooled alloy then is hardened without subjecting the same to any further stretching operation and the hardening operation may be carried out at a temperature, which is far below the temperatures that are usually employed hitherto for the purpose.

Example.—An ingot of an aluminum alloy containing in hundred parts about 4 parts of copper and 1 to 2 parts of silicon is heated to a temperature of about 500° C. and rolled by a rolling mill in a continuous operation down to the final cross-section, which is about $\frac{1}{10}$ of the original cross-sectional area. The thus rolled alloy is then subjected to an annealing process for three hours and at a temperature of 500° C. or still more, just as required by the solidus-point of the alloy under treatment whereupon it is cooled by chilling the same in oil or water or by allowing it to cool down slowly. The metal-sheets obtained this way are subjected for 48 hours to a temperature of 90 to 100° C.

As already intimated my method is particularly adapted and suitable for use in perfecting or improving aluminum alloys, which do not contain magnesium and it is possible to produce thereby, notwithstanding the simplified mode of operation, an equivalent or substitute for the known magnesium aluminum alloys like "duraluminum" which have the great disadvantage, that the composition desirable in the final product scarcely or only with difficulty can be obtained, since an incalculable portion or percentage of the magnesium employed is consumed for the deoxydation of the alloy and a further percentage thereof is lost by burning during the mixing and stirring operation.

From the foregoing it is believed that the advantages and novel features of my invention will be readily understood and therefore further detail description is deemed unnecessary.

It will be evident that my invention,

whilst still being adhered to in its main essentials may be varied and adapted in many ways, according to the particular requirements desired or most suitable under different circumstances.

What I claim is:—

The process of treating aluminum alloys consisting in producing an ingot of aluminum alloys with substantially four percent of copper and two percent of silicon, subjecting the same to pressure to reduce it to the desired thickness, heating the same to the temperature of substantially 500 degrees C. for the period of about three hours, cooling the same, and then maintaining the same at a temperature of about 90 to 100 degrees C. for the period of about 48 hours.

In witness whereof I affix my signature.

DR. ING. VINCENZ FUSS.