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ALUMINUM ALLOY

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2 Claims. (Cl. 75—138)

This invention relates to aluminum alloys and, more particularly, to alloys that are especially adapted for making castings. It is one of the objects of the invention to provide an improved aluminum casting alloy that will be satisfactory for foundry purposes, give reliable results, and produce castings that will have a higher tensile strength and higher elongation, without the necessity for heat treatment, than aluminum alloys that are now commonly used.

A further object of the invention is to provide an alloy having better physical properties than alloys now used and which, at the same time, will produce sound castings and have sufficient fluidity, when melted, to make satisfactory castings which vary widely in cross section and in configuration.

It is known that the addition of manganese to aluminum improves the tensile strength but an aluminum-manganese alloy is objectionable for casting purposes, because of cracking and porosity in the castings. I have discovered that the addition of a relatively small amount of titanium to an aluminum-manganese alloy, will overcome the porosity and tendency to crack.

In the practice of my invention, I have found that very satisfactory alloys may be made from commercially pure aluminum, titanium, and manganese, in which the content of titanium varies from 1/20 to ½ of 1% and the content of manganese varies from ½ of 1% to 5%, the balance of the alloy being aluminum with the usual traces of other elements that are present in commercially pure aluminum.

As an example of an alloy made in accordance with my invention, I would suggest an alloy containing 98.1% of aluminum with the attendant impurities that are present in commercially pure aluminum, 1.75% of manganese, and 0.15% of titanium. This alloy may be made up as follows to produce 100 lbs. of metal:

62½ lbs. of aluminum (commercially pure) is melted with 35 lbs. of aluminum-manganese "rich" containing 95% aluminum and 5% manganese, and then 2½ lbs. of an aluminum-titanium "rich" is added, which contains 94% aluminum and 6% of titanium. The mixture is manipulated in the usual way to disperse the manganese and titanium throughout the mixture and produce a uniform alloy.

Instead of using an aluminum-manganese "rich", pure manganese may be added to the aluminum and, instead of using aluminum-titanium "rich", an aluminum is commercially available which contains .2% of titanium, and this metal may be used in place of the commercially pure aluminum.

While I prefer to limit the manganese content of the alloy to 5%, it is possible to use higher percentages of manganese and, for some purposes, nickel, copper, and/or magnesium may be added at the expense of the aluminum. The amount of copper in the alloy may vary from a trace to 8% and the amount of nickel and magnesium that is used may be in accordance with the usual practice in aluminum alloys containing these metals. The effect of the copper and nickel is to give an immediate increase in the tensile strength of the metal but at the expense of elongation, whereas magnesium produces age-hardening by slowly increasing the tensile strength of the castings, at the expense of the elongation.

While I have described and given an example of a typical alloy made in accordance with my invention, it will be understood that various changes in the proportions of the metal in the alloy, may be made within the limits specified, without departing from the spirit of the invention as defined in the appended claims.

Having thus described my invention, I claim:

1. A casting alloy consisting of one-half to five per cent of manganese, from one-twentieth to one-half per cent of titanium and the balance aluminum.

2. A casting alloy consisting principally of aluminum and containing approximately two per cent of manganese and from one-twentieth to one-half of one per cent of titanium and the balance aluminum.

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