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CASTINGS OF ALUMINUM ALLOYS

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1 Claim. (Cl. 75—147)

The present invention relates to castings made of aluminum alloys, which castings have a compact texture and a high mechanical strength at elevated temperatures.

This application is a division of my application Serial No. 17,971 filed April 24, 1935, and entitled "Castings of aluminium alloys".

It has been found that aluminum castings of a compact texture and a high mechanical strength at elevated temperatures are obtained by using an aluminum alloy containing of from about 3% to about 16% of magnesium and from about 0.8 to about 3% of silicon and which may furthermore contain manganese to about 2.5%. The amount of added silicon depends on and varies directly with the magnesium content of the alloy, the higher the magnesium content, the larger being the amount of silicon needed to produce the desired effect. On the other hand, however, higher percentages of silicon result in a considerable lowering of the strength and elongation of the alloys, so that, in order to obtain castings which will meet the usual commercial requirements in this respect, the addition of silicon to alloys high in magnesium must remain below the optimum amounts for the attainment of compact texture. Bearing these conditions in mind, alloys that have been found suitable are those containing between about 5 and about 7% of magnesium and between about 0.8 and 1.5% of silicon (the latter increasing within the specified limits, with the magnesium content of the alloy). A very suitable alloy is one containing 5% of magnesium and 1 to 1.2% of silicon. Manganese, in amounts up to 2.5% (preferably about 1%) may also be incorporated with the alloy.

It has also been observed that the alloys containing silicon in the amounts above specified are notably superior, in respect also of their strength at high temperatures, to the corresponding alloys containing either no silicon at all, or such amounts of silicon, i. e. not more than about 0.3%, as are normally present as impurity, inasmuch as, at higher temperatures, the tensile strength of the alloys diminishes to a less extent than that of the corresponding alloys free from silicon. For example, when an alloy containing 5% of magnesium, 1.1% of silicon and 0.1% of manganese, is heated to about 300° C., its tensile strength is only about 25% lower than at room temperature, whereas, in the case of the same alloy, containing only 0.2% of silicon, the strength at 300° C. is already more than 35% lower.

This observation probably affords at least a partial explanation of the more compact texture of the castings made from the siliceous alloys, since, owing to the greater strength of these alloys at the higher temperatures through which they pass after solidification, the loosening of their structure is correspondingly slighter.

Castings made of the following aluminum alloys show the described qualities:

	Percent		Percent
(1) Mg	5.0	(2) Mg	7.0
Mn	0.2	Si	2.0
Si	1.0		
(3) Mg	5.0	(4) Mg	5.0
Mn	0.3	Mn	0.3
Si	1.5	Si	3.0

Even castings with comparatively thin walls (for example about 5 mm.) made from alloys in accordance with the invention, are practically quite impervious under a positive pressure of at least 8 atmospheres.

As the result of their greater compactness of texture, in conjunction with their known property of resisting corrosion, the alloys of the present invention are suitable for the production of a great variety of mould castings, such as fittings for pipes conveying liquids, carburetter parts, hydraulic control members, compressor casings, vessels for containing liquids and gases, and the like.

I claim:

Castings of aluminum alloys consisting of about 5 to 7% of magnesium, about 0.8 to 1.5% of silicon, the balance being aluminum, and the quantity of silicon increasing as the quantity of magnesium increases within the respective ranges specified, such castings having a compact texture and a high mechanical strength at elevated temperatures.

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