

UNITED STATES PATENT OFFICE.

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METHOD OF CASTING ALUMINIUM ALLOYS.

SPECIFICATION forming part of Letters Patent No. 648,214, dated April 24, 1900.

Application filed October 16, 1899. Serial No. 733,758. (No specimens.)

To all whom it may concern:

Be it known that I, WILLIAM A. McADAMS, a citizen of the United States, and a resident of New York, in the borough of Brooklyn and State of New York, have invented a new and useful Improvement in the Method of Casting Aluminium Alloys, of which the following is a specification.

My invention relates to an improvement in the method of casting aluminium alloys, and more particularly to aluminium alloys containing magnesium and in which the metal aluminium predominates.

Aluminium when melted cools slowly, so slowly that other metals which are present in molten state in the molten aluminium are permitted to segregate and form large crystals before the slowly-cooling aluminium checks to any considerable degree their segregation and crystallization, thereby materially reducing the strength of the casting.

The object of the present invention is to prevent such segregation, crystallization, and lack of homogeneity in alloys of the above-named character, and thereby add material strength to the castings.

In an alloy composed of one hundred parts aluminium and from five to thirty-five parts magnesium the hereinabove-described segregation and crystallization of the commingled metals will be liable to take place unless the molten mass is cooled so rapidly after pouring as to check the segregation and crystallization before it can have proceeded to any great extent. By means of numerous experiments I have found that the cooling should take place rapidly within certain well-defined practical limits and that the heat should be taken from the molten mass at as nearly a uniform rate as possible. This may be accomplished where the casting is thin or small by using a metal mold of sufficient thickness to quickly remove the heat from the casting,

and when the casting is to be thick or large, the mold may be surrounded by a cooling medium to assist in removing the heat with the required speed and uniformity.

To carry the method successfully into effect, the following will serve as a guide: Assuming the casting to be a solid sphere one and one-half inches in diameter, the heat should be removed from the casting as rapidly as at the rate of one-fifth of a calory per second. The best results are obtained by removing the heat at the rate of from one to one and one-tenth calories per second, a rate much more rapid than is common in the ordinary use of metallic molds. In castings of different weights and forms a corresponding rate of cooling should be observed. I have found that this treatment of aluminium alloys, in which the aluminium forms the greater part of the alloy, will materially increase the strength of the casting.

What I claim is—

The method of casting alloys containing aluminium and magnesium and in which the aluminium predominates consisting in rapidly removing the heat from the molten mass at a rate corresponding to not less than one-fifth of a calory per second, from a solid spherical casting one and one-half inches in diameter, viz; more rapidly than has hitherto been common in the ordinary use of molds, thereby preventing the segregation of the metals and the formation of large crystals substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 14th day of October, 1899.

WILLIAM A. McADAMS.

Witnesses:

FREDK. HAYNES,
C. S. SUNDGREN.