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METALLIC ALLOY.

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To all whom it may concern:

Be it known that I, FRANK S. HODSON, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Metallic Alloys, of which the following is a specification.

The main object of my present invention is to provide an improved metallic zinc base alloy having properties well adapted for use in making sand and die molded castings and also for hot pressed forgings in which the metallic zinc base alloy will have a higher tensile strength than heretofore produced.

While the improved metallic alloy of my present invention includes zinc, aluminum and copper as do many other metallic alloys having a zinc base nevertheless I have discovered that in the proportioning and treatment of the elements as will hereinafter be described, I am enabled to secure a zinc base alloy which has a tensile strength of upwards of 55,000 lbs. to the square inch and a Brinnell hardness of over 90.

In the production of my improved metallic alloy, I preferably make a hardening alloy of substantially equal parts of aluminum and copper.

As a specific illustration I use 51. parts aluminum, 49. parts copper, 1. part manganese, and .5 part titanium.

I then use sufficient of the above mentioned hardening alloy to keep within the range of proportionate amounts of elements specified, said elements ranging in the following proportions: zinc, 77. to 87. parts; aluminum, 10. to 20. parts; copper, 2.01 to 8.50 parts.

In carrying out the process of obtaining my improved alloy I adopt the principle and take into consideration the fact that aluminum and copper alloyed in the above ratio for the hardening alloy, when remelted has a lower melting point than aluminum itself.

The hardening alloy is preferably poured into ingots and is used when necessary by adding it into the normal aluminum content since this hardening alloy re-melts at a lower melting point than that of the aluminum itself and I thereby introduce the copper content into the alloy and thus avoid the superheating of the large aluminum content.

A specific example of the production of my metallic alloy is as follows:—To a normal molten aluminum content of 12.25 parts is added 5 parts of the above mentioned hardening alloy; the resulting co-mixture being added to 83 parts of a molten zinc content.

As above specified and owing to the affinity of both aluminum and zinc for oxygen, (particularly while molten,) I prefer to use manganese and titanium or magnesium in small quantities to remove the occluded oxygen in the molten mass since any of these three elements have a greater affinity for oxygen than either the aluminum or zinc and a small quantity of manganese and titanium or magnesium will reduce the oxides during the time the mass is in a molten state. In this zinc base alloy I have secured a tensile strength equal to the tensile strength of some grades of manganese bronze and it is an alloy that can be cast under pressure in a steel die or mold which cannot be done commercially with manganese bronze owing to the high melting point and consequent erosion of the steel die by the manganese or any other brass or bronze alloy.

In making the alloy of my present invention I prefer to use both the aluminum and zinc as free of impurities as commercially possible to do so. For example I prefer to use zinc not having more than 1.5 per cent of impurities which sometimes consist of lead, cadmium, iron, etc.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. The method of making a metallic alloy which consists in first making a hardening alloy of approximately 51 parts aluminum, 49 parts copper, one part manganese and one half part titanium; adding approximately 5 parts of the hardening alloy to approximately 12½ parts of molten aluminum, and adding this co-mixture to approximately 83 parts of molten zinc.

2. A zinc base alloy adapted for use in making castings and hot-pressed forgings having a tensile strength of 55,000 pounds

or more to the square inch and a Brinnell hardness of over 90, the alloy consisting of from 77 to 87 parts zinc, 10 to 20 parts aluminum, 2 to 8.50 parts copper, about 1 part manganese and one half part titanium, the copper, manganese and titanium having first been fused with an equal quantity of aluminum to form a hardening alloy, this mixture fused with the remaining aluminum content and the second mixture fused with the zinc content.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FRANK S. HODSON.

Witnesses:

CHAS. E. POTTS,

AUGUSTUS B. COPPES.