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ALUMINUM BASE ALLOY

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3 Claims. (Cl. 75—146)

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This invention relates to aluminum base alloys, and particularly to alloys of this type containing magnesium, silicon, zinc, titanium, and chromium.

An object of the invention is to provide an aluminum base alloy of greatly improved fluidity, so as to be especially suitable for the making of castings in sand, or in semi-permanent or permanent molds.

A further object of the invention is to provide an alloy as specified in the last preceding paragraph exceptionally free from surface pitting.

A further object of the invention is to provide an alloy as above defined and characterized and of greatly improved corrosion resistance.

A further object of the invention is to provide an aluminum base alloy suitable for the making of cast cooking utensils.

Before the present invention is described in detail, it should be understood that the invention is not limited to the details herein disclosed, which are exemplary in character, and not to be regarded as in any way limiting. It also should be understood that the phraseology or terminology herein employed is for the purpose of description and not of limitation.

The alloys which come within the limits herein disclosed, and defined by the appended claims, may be used for many adaptations where good casting properties, including high fluidity, are desired, and more particularly where good corrosion resistance and freedom from surface pitting are regarded as important.

As a good example of one such adaptation we may consider a cast cooking utensil. Housewives who use aluminum cooking utensils become quite dissatisfied when the surface of a utensil such as a sauce pan becomes discolored, and polishing with steel wool or similar abrasive agent or cleaning powder merely reveals the presence of innumerable pits, either in local areas or generally distributed over the surface, which no amount of scrubbing can remove. Such pits become centers for the spread of corrosive attack and discoloration. As a result the housewife may decide, next time she needs a cooking utensil, that she will choose one made from a ferrous or cuprous alloy.

As a result of considerable study and experimentation I have developed an alloy which avoids the disadvantages hereinabove enumerated. It has excellent casting characteristics and is practically completely free from surface pitting and resulting progressive discoloration and corrosion.

The alloy comprises a major portion of any conventional, commercially available grade of

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aluminum with the following alloying ingredients; from 1.75 per cent to 2.25 per cent of silicon; from 0.3 per cent to 0.75 per cent of zinc; from 2.75 per cent to 3.25 per cent of magnesium; from 0.08 per cent to 0.2 per cent of titanium; from 0.1 per cent to 0.2 per cent of chromium.

The combination of the magnesium, silicon and zinc, within the ranges above noted, greatly improves the castability while maintaining a desirable degree of corrosion resistance. An aluminum base alloy with these three constituents, in the amounts stated, is a desirable casting alloy without further alloying addition. As a matter of fact when the zinc ingredient is increased beyond the range limits disclosed, the pitting effect increases progressively.

The addition of the chromium within the disclosed range to the aluminum-silicon-zinc-magnesium alloy reduces even further any residual pitting tendency.

The addition of the titanium within the disclosed range aids in preventing any shrinkage cracking tendency.

One specific alloy which I have used with considerable success, as far as casting characteristics and freedom from shrinkage cracking and pitting are concerned, contained 2.0 per cent of silicon, 0.5 per cent of zinc, 3.0 per cent of magnesium, 0.1 per cent of titanium, and 0.15 per cent of chromium. Cooking utensils cast from this alloy exhibit an exceptionally smooth surface appearance, and are entirely free from objectionable discoloration and corrosion.

What I claim is:

1. An aluminum base alloy characterized by excellent casting characteristics, corrosion resistance, and freedom from shrinkage cracks and pitting in the cast condition, and containing from 1.75 per cent to 2.25 per cent of silicon, from 0.3 per cent to 0.75 per cent of zinc, from 2.75 per cent to 3.25 per cent of magnesium, from 0.08 per cent to 0.2 per cent of titanium, and from 0.1 per cent to 0.2 per cent of chromium, the balance being aluminum.

2. An aluminum base alloy characterized by excellent casting characteristics, corrosion resistance, and freedom from shrinkage cracks and pitting in the cast condition, containing about 2.0 per cent of silicon, about 0.5 per cent of zinc, about 3.0 per cent of magnesium, about 0.1 per cent of titanium, and about 0.15 per cent of chromium, the balance being aluminum.

3. As a novel article of manufacture a cast cooking utensil exhibiting marked resistance to shrinkage cracking, pitting, and corrosion, and

cast from an alloy containing from 1.75 per cent to 2.25 per cent of silicon, from 0.3 per cent to 0.75 per cent of zinc, from 2.75 per cent to 3.25 per cent of magnesium, from 0.08 per cent to 0.2 per cent of titanium, and from 0.1 per cent to 0.2 per cent of chromium, the balance being aluminum.

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