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ALUMINUM BASE ALLOYS

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5 Claims. (Cl. 75—138)

This invention relates to materials which when anodized and sealed yield products having utility as architectural materials.

This invention relates to a family of aluminum base alloys which are particularly useful as base materials to which, after anodizing, a design, photographic image or other material may be applied, for example by the procedures taught in U.S. Patents 2,115,339; 2,126,017; 2,766,119 or 3,108,932 or others of a similar nature.

The alloys of this invention consist essentially of aluminum as the principal constituent; between about 1% and about 4% by weight of at least one refractory metal selected from the group consisting of Ti, Zr, Nb, Ta, Th and mixtures thereof; and between about .01% and about 0.1% by weight of at least one precious metal selected from the group consisting of Ag, Au, Pd and Pt.

Preferred alloys of this invention contain about 2% of the refractory metal constituent and about 0.1% of the precious metal constituent.

Such alloys are produced by induction melting in an argon atmosphere utilizing a zircon holding crucible. The batch mix consists of 60 parts of pure ingot aluminum, 40 parts of a 5 percent master alloy in lump form of the binary between aluminum and the refractory metal such as niobium, tantalum, titanium, zirconium, and thorium and 0.1 part of the noble metal such as silver, gold, platinum or palladium in minus 100 mesh powder form. The argon melting is carried out at 1600° F. and the molten alloy maintained at this temperature for about 15 minutes, after which it is maintained at room temperature. Preferably the melting is accompanied by vigorous stirring to ensure perfect alloying. The recovery of both aluminum and the binary aluminum master alloy is generally in excess of 99 percent and the recovery of the noble metal is invariably close to 100 percent. This yields an ingot having an average analysis of 97.9 percent aluminum, 2.0 percent of niobium, tantalum, titanium, zirconium, or thorium and 0.1 percent of silver, gold, platinum or palladium.

The ingot is first pickled in a mixture of ferric chloride and hydrochloric acid and the concentration of the ferric chloride being 5 percent by weight and the hydrochloric acid being 10 percent by weight of concentrated (32 percent) HCl. Pickling is carried out at between 50 to 60° C. for about 10 minutes, after which the ingot is washed in running water. The ingot is then rolled at 600° F. in stages down to the desired foil thickness, pickled for 30 seconds again in the ferric chloride/hydrochloric acid mixture, washed and finished rolled between polishing rolls.

The resulting foil may be used without further treatment or it may be lacquered, oiled, colored or otherwise

treated, e.g., by anodizing as described in my above mentioned copending patent application.

Instead of reducing the alloys to foil they may be used in the form of sheets or other structural shapes.

Examples of specific alloys are as follows all in percent by weight:

A	97.9 Al	2 Zr		0.1 Ag
B	97.9 Al	2 Ti		0.1 Ag
C	97.9 Al	2 Th		0.1 Ag
D	97.9 Al	2 Nb		0.1 Ag
E	97.9 Al	2 Ta		0.1 Ag
F	97.9 Al	1 Ta, 1 Zr		0.1 Au

Having now described my invention I claim:

1. An aluminum base alloy consisting essentially of between about 1% and about 4% of at least one refractory metal selected from the group consisting of Nb, Ta, Ti, Th and Zr and between about 0.01% and about 0.1% of at least one precious metal selected from the group consisting of Ag, Au, Pd and Pt, balance substantially all Al except for incidental impurities.

2. An aluminum plate consisting essentially of between about 1% and about 4% of at least one refractory metal selected from the group consisting of Nb, Ta, Ti, Th and Zr and between about 0.01% and about 0.1% of at least one precious metal selected from the group consisting of Ag, Au, Pd and Pt, balance substantially all Al except for incidental impurities.

3. An aluminum foil consisting essentially of between about 1% and about 4% of at least one refractory metal selected from the group consisting of Nb, Ta, Ti, Th and Zr and between about 0.01% and about 0.1% of at least one precious metal selected from the group consisting of Ag, Au, Pd and Pt, balance substantially all Al except for incidental impurities.

4. An aluminum article consisting essentially of between about 1% and about 4% of at least one refractory metal selected from the group consisting of Nb, Ta, Ti, Th and Zr and between about 0.01% and about 0.1% of at least one precious metal selected from the group consisting of Ag, Au, Pd and Pt, balance substantially all Al except for incidental impurities.

5. An aluminum alloy consisting essentially of about 2% by weight of at least one refractory metal selected from the group consisting of Nb, Ta, Ti, Th and Zr and about 0.1% by weight of at least one precious metal selected from the group consisting of Ag, Au, Pd and Pt, and the balance substantially all aluminum except for incidental impurities.

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