ALUMINIUM RESEARCH ALUMINIUM TECHNOLOGY ALUMINIUM APPLICATION ALUMINIUM

Alloys based on Aluminium Magnesium and Titanium

Patent Study

Aluminium-Verlag

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Alloys based on Aluminium Magnesium and Titanium

Patent Study

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Commission of the European Communities

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P R E F A C E

The present report covers abstracts of about 1200 different patents and patent applications published since 1.1.1980.

The patents and patent applications have been located by appropriate searches in the systematically classified files of the European Patent Office at The Hague. Considered have been the European (Munich), International (PCT), British, French, West German, United States and Japanese patent literature present under the following I.P.C.-units (International Patent Classification):

C 22 C 14/00	Alloys based on titanium
C 22 C 21/00 - 21/18	Alloys based on aluminium
C 22 C 23/00 - 23/06	Alloys based on magnesium
C 22 C 1/09	Alloys containing fibers or filaments.

When comparing the international patent activity in the technology of alloys based on titanium,aluminium and magnesium, we see the extraordinary high activity of Japan, holding more than eighty percent of the world's published patent applications. The rest is rather equally devided between the other countries.

The English abstracts of the Japanese patent applications presented in this report, have been made and published by the Japanese Patent Office. The other abstracts have either been taken from the original patent specification or made by the author of this report.

When abstracts of corresponding patents or patent applications were available, only one of them has been taken into account. Generally an abstract is present in one chapter only. In about ten percent of the cases, however, the abstract has been classified into more than one chapter. In the list of applicants at the end of the report, each abstract is referred only once.

The patent documents cited throughout the report are characterized by using the following abbreviations for indicating the countries, i.e.:

DE	= Federal Republic of Germany
EP or EU	= European Patent Office
FR	= France
GB	= United Kingdom
JP	= Japan
US	= United States of America
WO	= PCT applications published by the International Bureau of the World Intellectual Property Organization (WIPO - Geneva).

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1. ALUMINIUM ALLOYS.

1.1 ALUMINIUM ALLOYS WITH SILICON AS THE NEXT MAJOR CONSTITUENT.

1.1.1 ALUMINIUM ALLOYS WITH SILICON AS THE NEXT MAJOR CONSTITUENT AND CONTAINING MAGNESIUM.

SOLDER ALLOY FOR VACUUM BRAZING ALUMINUM

SUKAI ARUMINIYUUMU K.K.
JP 55-38965 1978

PURPOSE: To provide the title alloy capable of forming a solder joint with superior strength, airtightness and corrosion resistance while preventing occurrence of surface shrinkage cavities by restricting the Ca content of an Al-Si-Mg alloy to a specified very low level.

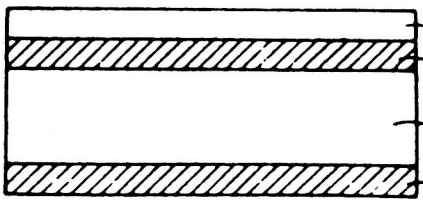
CONSTITUTION: As a solder alloy for vacuum brazing Al an Al alloy is used contg. Si 6~12%, Mg 0.6~3.0% and Ca<0.004%. As the Ca content is lowered, shrinkage cavities formed at a solder joint part are reduced and the strength, corrosion resistance and airtightness of the joint are enhanced.

HIGH STRENGTH ALUMINUM VACUUM BRAZING SHEET

FURUKAWA ALUMINUM KOGYO K.K.
JP 55-161044 1979

PURPOSE: To obtain a high strength Al vacuum brazing sheet by cladding one side of an Al-Zn-Mg alloy as a core material with a diffusion preventing layer of pure Al or the like and an Al-Si-Mg type alloy brazing filler metal for vacuum brazing and the other side with the same Al as the diffusion preventing material.

CONSTITUTION: One side of core material 3 of an Al-Zn-Mg type alloy contg. Zn; 4~7%, Mg; 0.5~2% and one or more among Mn<1.0%, Cr<0.3% and Zr<0.3% is clad with pure Al or an Al alloy contg. Mn<1.5% as layer 2 and Al-Si-Mg type Al alloy brazing filler metal 1 for vacuum brazing. The other side of material 3 is then clad with layer 4 of the same Al material as layer 2. The thickness of layer 2 is adjusted to 10~15% of the thickness of the resulting clad, that of layer 4 to 3~10%, and the total thickness of layers 2, 4 to 13~20%.



ALUMINUM ALLOY FOR FORGING AND ITS MANUFACTURE

SHOWA KEIKINZOKU K.K.
JP 56-69344 1979

PURPOSE: To obtain an Al alloy with superior forgeability by specifying the area percentage, size and dendrite secondary arm space of the 2nd phase particles of an Al alloy.

CONSTITUTION: This Al alloy has a fine structure in which the 2nd phase particles of Al-Si, Mg-Si or the like have ≦25% area percentage, ≦50μm size and ≦20μm dendrite secondary arm space with respect to an arbitrary cross-sectional area, and it consists of, by wt., 4~12% Si, 0.6~1.3% Mg and the balance Al and impurities or further contains ≦1.2% in total of one or more among 0.05~0.2% Ti, 0.02~0.2% V, 0.01~0.1% Li, 0.001~0.05% Be, 0.1~0.5% Cr and 0.02~0.2% Zr as required. This alloy is highly strong and tough and has superior workability, especially forgeability, heat resistance and wear resistance.

ALUMINUM ALLOY FOR FIN

SUMITOMO KEIKINZOKU KOGYO K.K.
JP 56-142846 1980

PURPOSE: To obtain an aluminum alloy for fins, which is excellent in drooping resistance and solderability, from an aluminum alloy containing specific proportions of Mn, Mg, and Si.

CONSTITUTION: An aluminum alloy containing any one or both of 0.4~1.5% Mn and 0.3~0.9% Mg and 0.75~1.6% Si is prepared. Besides the requisite components, 0.03~0.25% Cr, 0.05~0.25% Zr, 0.01~0.1% V, 0.05~0.35% Ti, and traces of Fe may be added.

COATING MATERIAL HAVING SACRIFICIAL ANODE EFFECT FOR BRAZING SHEET FOR VACUUM BRAZING

SHIYOUWA ARUMINIUMU K.K.
JP 57-143463 1981

PURPOSE: To obtain the titled coating material causing less initial corrosion and maintaining the sacrificial anode effect after brazing over a long term by adding Fe and/or Ni to a coating material made of Al-Si-Mg-In alloy as a brazing filler metal.

CONSTITUTION: The titled coating material is made of Al alloy contg., by weight, at least one of 0.3~2% Fe and 0.3~2% Ni besides 4~20% Si, 0.3~4% Mg and 0.02~1% In. By adding Fe and/or Ni, H_2 generated during boehmite treatment for preventing initial corrosion after vacuum brazing is inhibited from entering the interior through the grain boundaries, and a perfect chemical coat is obtd. Less than the lower limit of Fe or Ni does not produce the effect, and more than the upper limit of Fe or Ni causes defects in the coat obtd. by said treatment and tends to break the coat.

PREVENTING METHOD FOR DISCOLORATION OF Al-Si-Mg ALLOY CASTING

HITACHI KINZOKU K.K.
JP 57-[illegible] 1981

PURPOSE: To prevent the discoloration of an Al-Si-Mg alloy casting contg. Sb due to heat treatment by adding Be to the casting.

CONSTITUTION: To an Al-Si-Mg alloy casting contg. ≧0.05% Sb is added 0.001~0.1% Be. Thus, the blackening of the appearance of the casting can be prevented. The blackened part of said Al alloy casting contg. Sb for increasing the toughness formed by heat treatment is a thick oxide film of $Al_2O_3 \cdot MgO$. It is due to a kind of segregation of Mg. Be prevents the oxidation and burning of Mg, and the discoloration is prevented. The Be added Al alloy has a Be film on the surface.

ALUMINUM ALLOY SHEET HAVING SUPERIOR STRENGTH AT HIGH TEMPERATURE AND SUPERIOR EFFECT AS SACRIFICIAL ANODE

SHIYOUWA ARUMINIUMU K.K.
JP 57-207153 1981

PURPOSE: To obtain an Al alloy sheet having superior strength at high temp. and a superior effect as a sacrificial anode by adding Mn, In, Cr and Zr to Al in a specified ratio.

CONSTITUTION: An Al alloy consisting of, by weight, 0.3~1.5%, preferably 0.5~1.0% Mn, 0.005~1.0%, preferably 0.02~0.1% In, 0.01~0.6%, preferably 0.2~0.4% Cr and/or Zr, and the balance Al with inevitable impurities is prepared. To said composition may be added 0.2~0.7% Si and 0.3~0.8% Mg or further additional Sn by an amount almost equal to the amount of In, that is, about 0.005~1.0%.

MANUFACTURE OF ALUMINUM WHEEL FOR VEHICLE

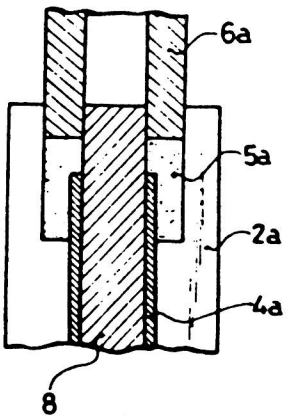
NIHON KEIKINZOKU K.K.
JP 57-207162 1981

PURPOSE: To manufacture a lightweight Al wheel with high productivity by heat treating a cast half-finished product of an Al alloy contg. a prescribed percentage each of Si, Fe, Mg and Mn at a prescribed temp. for a prescribed time, working it with rolls, and heat treating the product having the final shape again.

CONSTITUTION: An Al alloy contg. by weight, 7.0~10.0% Si, 0.3~0.8% Fe, 0.15~0.4% Mg and 0.2~0.8% Mn is cast by a die casting method to form a half-finished product. The product is heat treated by heating at 450~540℃ for 0.5~10hr and slow cooling, and at least part of the product required to improve the strength is worked with rolls to rovide the shape of a finished product. The product is then heat treated again to obtain a finished product. The secondary heat treatment is preferably carried out by heating at 470~540℃ for 0.1~10hr and rapid cooling.

CAST-WELDING ALUMINUM ALLOY AND CAST-WELDING METHOD

KOBE SEIKOSHO K.K.
JP 58-22353 1981



PURPOSE: To obtain an Al alloy having strong cast-welding power, by letting Al contain specified amounts of one or more of Si, Mg, Cr, Ti and Zr.

CONSTITUTION: The composition of a cast-welding Al alloy is determined as, by wt%, one or more of 2~6 Si, 1.2~9 Mg, 0.4~1 Cr and 0.15~0.8 Zr, and the balance Al and inevitable impurities. A steel pipe, degreased by sand-blasting and preheated at 800℃ or so, is located in a main mold 2a. The melt 5a of said cast-welding Al alloy is poured into the main mold 2a. After the laps of 15sec, the melt 5a is charged with hydrostatic pressure of 200kg/cm² or more by pressing it with a press punch 6a. When the steel pipe is welded to an Al alloy by use of the welded joint formed in this way, the welded article satisfying pressure-resistance and joint strength is obtained.

DIE CASTING ALUMINUM ALLOY

FURUKAWA ARUMINIUMU KOGYO K.K.
JP 58-42743 1981

PURPOSE: To obtain the titled alloy having superior corrosion resistance and causing seizing at a low rate during die casting by restricting the amount of Fe in a die casting Al-Si-Mg alloy and adding one or two among Mn, Zr, Cr and Ti.

CONSTITUTION: This alloy consists of 5~10% Si, 0.2~1.0% Mg, 0.3~0.6% Fe, one or two among 0.1~0.6% Mn, 0.1~0.4% Zr, 0.1~0.4% Cr and 0.1~0.5% Ti, and the balance Al with impurities. The lower limit or more of Fe is required to prevent seizing during die casting, yet more than the upper limit of Fe deteriorates the toughness and corrosion resistance. One or two among Mn, Zr, Cr and Ti prevent said seizing, make the structure fine and enhance the toughness, yet in case of less than the lower limits, the effects are not produced. In case or more than the upper limits, the effects are not improved furthermore, and the elements form compounds together with other component elements and impurity elements, resulting in the formation of hard spots.

BRAZING ALLOY FOR VACUUM BRAZING

SUMITOMO KEIKINZOKU KOGYO K.K.

JP 58-93852 1981

PURPOSE: To obtain a brazing alloy for the vacuum brazing of Al with an improved wetting property by combinedly adding Bi and Be to a brazing Al-Si-Mg alloy.

CONSTITUTION: This brazing alloy consists of 6.0~17.0% Si, 0.2~4.0% Mg, 0.002~0.4% Bi, 0.0005~0.25% Be and the balance Al with inevitable impurities. When Bi coexists with Be, it is effective in reducing an oxide film of Al and improving the wetting property of the brazing alloy. Less than the lower limit of Bi does not produce the effects, and more than the upper limit of Bi is liable to cause environmental pollution. Be shows an enough effect in the absence of Bi, yet when Be coexists with Bi, it is very effective in improving the wetting property of the brazing alloy. Less than the lower limit of Be does not produce the effect, and more than the upper limit of Be does not improve the wetting property so much and is liable to cause environmental pollution.

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SOCIETE DE VENTE DE L'ALUMINIUM PECHINEY
FR 2 504 154 1981

PROCEDE D'AFFINAGE DU SILICIUM PRIMAIRE DES ALUMINIUM-SILICIUM HYPEREUTECTIQUES.

Le procédé d'affinage du silicium primaire d'alliages aluminium-silicium hypereutectiques ayant subi un pré-affinage par un produit à base de phosphore est caractérisé en ce que l'on ajoute à cet alliage un produit à base de magnésium immédiatement avant de le couler. L'alliage étant préparé de manière classique et affiné par ajout de 50 à 1000 ppm de phosphore ou d'une quantité correspondante de l'un de ses dérivés, on y ajoute donc du magnésium. Ce dernier peut être à l'état élémentaire ou d'alliages-mères aluminium-magnésium et sous forme de tournures, de poudre ou même de morceaux massifs de dimensions compatibles avec une vitesse de dissolution suffisamment grande.
Les alliages trouvent leur application en particulier lors de la fabrication de chemises de moteurs à combustion interne.

ALUMINUM ALLOY FOR LIQUID METAL FORGING

NIHON KEIKINZOKU K.K.
JP 58-153753 1982

PURPOSE: To enable to obtain high tensile strength and elongation after the aluminum alloy is quenched and tempered by solution heat treatment in a very short time, by making small amounts of Sb and Ca coexist in an Si, Mg-contg. Al alloy having specified composition.

CONSTITUTION: The alloy comrises 4.5~7.5% Si, 0.20~0.60% Mg, 0.02~0.1% Ca, 0.03~0.3% Sb, optionally 0.05~0.2% Ti, or an amt. of B corresponding to ≤1/20 of Ti content in addition to Ti, and the balance Al and impurities. Hence because of the coexistence of said amounts of Ca and Sb, a time necessary for solution heat treatment can be remarkably shortened when the alloy material after being forged in the title manner is subjected to the treatment T, for the improvement of its toughness. In addition, the toughness of the alloy material after being forged can be further improved by the coexistence of said amounts of Ti and B in the alloy.

ALUMINUM ALLOY FOR CASTING

MITSUI ARUMINIUMU KOGYO K.K.
JP 59-64736 1982

PURPOSE: To obtain the titled Al alloy for casting purpose on which the formation of an oxide film is little during melting and which is not blackened after being heat treated, by letting Al contain the specified amounts of Si, Mg, Sb, Be and Ca.

CONSTITUTION: An Al alloy comprising 6~10% Si, 0.2~0.8% Mg, 0.1~0.2% Sb, 0.002~0.010% Be, 0.01~0.07% Ca, optionally 0.1~0.5% Mn, and the balance Al and inevitable impurities is prepared. Hence, the casting Al alloy which is not colored during heat treatment and on which the formation of an oxide film is little is obtained. In order to make the crystal grains of a cast article fine for the improvement of its mechanical property, Ti may be further contained in an amount of about 0.05~0.20%.

ALUMINUM ALLOY FOR CASTING

MITSUI ARUMINIUMU KOGYO K.K.
JP 59-126749 1982

PURPOSE: To obtain an Al alloy for a casting having moderate strength and toughness without requiring any special heat treatment by adding specified percentages of Si, Mg and Sn to Al.

CONSTITUTION: An alloy consisting of 6~10% Si, 0.2~0.8% Mg, 0.01~0.05% Sn and the balance Al with inevitable impurities is prepd. to obtain an Al alloy for a casting having moderate strength and toughness independently of the time required to carry out aging at room temp. after soln. heat treatment and hardening and after tempering. In order to improve the mechanical properties of the casting by grain refining, it is preferable to add about 0.05~0.20% Ti as well as about 0.1~0.2% Sb, about 0.002~0.01% Na or about 0.005~0.1% Sr.

VACUUM BRAZING SHEET FOR ALUMINUM

FURUKAWA ARUMINIUMU KOGYO K.K.
JP 59-126747 1983

PURPOSE: To obtain the titled sheet having improved resistance to eorrosion groove by cladding a core material made of a corrosion resistant Al alloy with a brazing filler metal made of an Al alloy contg. specified percentages of Si, Mg and Bi as a shell material.

CONSTITUTION: A brazing filler metal made of an Al alloy consisting of, by weight, 10.7~13.0% Si, 0.4~2.0% Mg, ≤0.1% Bi and the balance Al with inevitable impurities is prepd. Mg and Bi in the alloy satisfies an equation $Mg\% \leq -16 \times Bi\% + 2$. One side or both sides of a core material made of a corrosion resistant Al alloy are clad with the brazing filler metal as a shell material to manufacture a vacuum brazing sheet for Al. The sheet has improved resistance to errosion groove in vacuum brazing.

VACUUM BRAZING SHEET FOR ALUMINUM

FURUKAWA ARUMINIUMU KOGYO K.K.
JP 59-126748 1983

PURPOSE: To obtain the titled brazing sheet having improved resistance to erosion groove in vacuum brazing by cladding a core material made of a corrosion resistant Al alloy with a brazing filler metal made of an Al alloy contg. specified percentages of Si, Mg and Bi as a shell material.

CONSTITUTION: A brazing filler metal made of an Al alloy consisting of, by weight, 7.0~10.5% Si, 0.4~2.0% Mg, ≤0.018% Bi and the balance Al with inevitable impurities is prepd. One side or both sides of a core material made of a corrosion resistant Al alloy are clad with the brazing filler metal as a shell material to manufacture a vacuum brazing sheet for Al.

VACUUM BRAZING SHEET FOR ALUMINUM

FURUKAWA ARUMINIUMU KOGYO K.K.
JP 59-129749 1983

PURPOSE: To obtain the titled brazing sheet with high suitability to brazing and superior resistance to grooving due to erosion by using a brazing filler metal made of an Al alloy having a specified composition consisting of Si, Mg, Bi, Be and Al as a shell material and a corrosion resistant Al alloy as a core material.

CONSTITUTION: One side or both sides of a core material made of a corrosion resistant Al alloy are clad with a brazing filler metal made of an Al alloy consisting of, by weight, 7~13% Si, 0.4~2% Mg, 0.01~0.2% Bi, 0.0005~0.01% Be and the balance Al with inevitable impurities as a shell material to obtain a vacuum brazing sheet for Al. The sheet forms a satisfactory fillet in vacuum brazing and inhibits grooving due to erosion, so a sound vacuum-brazed article can be obtd.

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SUPERPLASTIC Al ALLOY

MITSUBISHI ARUMINIUMU K.K.
JP 59-157254 1983

PURPOSE: To obtain an Al alloy with superior superplasticity by adding specified percentages of Si, Sb and Sr to Al.

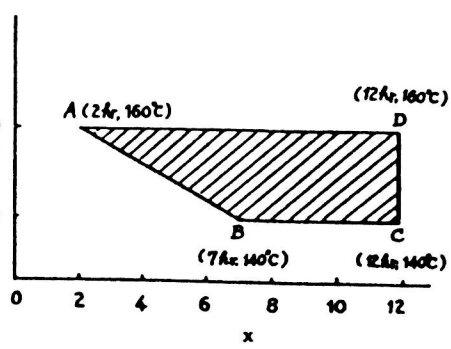
CONSTITUTION: An Al alloy consisting of, by weight, 4~13% Si, 0.05~1% Sb and/or 0.01~0.5% Sr and the balance Al with inevitable impurities is prepd. The alloy may further contain 0.1~2% Mg. When the inevitable impurities are ≦ about 0.5% Fe, ≦ about 0.2% Mn, ≦ about 0.2% Cr, ≦ about 0.3% Ti and ≦ about 0.1% B, they do not deteriorate the characteristics of the Al alloy.

HEAT TREATMENT OF ALUMINUM ALLOY FOR CASTING

MITSUI ARUMINIUMU KOGYO K.K.
JP 60-52565 1983

PURPOSE: To maintain adequate strength and toughness by subjecting a casting consisting of an Al alloy for casting contg. a specific amt. of Si, Mg and Sn to a soln. heat treatment and hardening treatment then resting the same at a room temp. and subjecting the casting further to a tempering treatment at a specific at a specific temp. for specific time.

CONSTITUTION: A casting consisting of an Al alloy for casting contg. 6~10% Si, 0.2~0.8% Mg and 0.01~0.04% Sn is first subjected to a soln. heat treatment. The casting is then quickly cooled and is subjected to a hardening treatment and thereafter the casting is rested for 10min~3hr at a room temp. and in succession the casting is held at 14~160℃ for 2~12hr. The casting is otherwise rested for 3~168hr at a room temp. after the hardening treatment and is then tempered under the conditions of the temp. and time within the hatching part enclosed of the point A (2hr, 160℃), point B (7hr, 140℃), point C (12hr, 140℃) and point D (12hr, 160℃) shown in the figure. The Al alloy casting having adequate strength and toughness is obtd.



FORMATION OF SACRIFICIAL ANODE LAYER ON Al MEMBER

FURUKAWA ARUMINIUMU KOGYO K.K.
JP 60-138061 1983

PURPOSE: To improve the pitting corrosion resistance of an Al member by coating the surface of the Al member with an alloy consisting of prescribed percentages of Si, Mg, Zr and Al by hot dipping to form a sacrificial anode material.
CONSTITUTION: An alloy consisting of, by weight, 6~13% Si, 0.05~3% Mg, 0.2~3% Zr and the balance Al is refined. A part or the whole of the surface of the Al member is coated with the alloy by hot dipping to form a sacrificial anode material. The pitting corrosion resistance of the member is remarkably improved.

Al-7% Si-0.3% Mg TYPE CAST ALUMINUM ALLOY

MAEDA KEIKINZOKU KOGYO K.K.
JP 60-224739 1984

PURPOSE: To manufacture a disk wheel having superior tensile strength, yield strength, elongation and a high impact value by using a cast Al alloy contg. specified amounts of Si, Mg, Ti and Sr as an Al alloy for a disk wheel for an automobile.
CONSTITUTION: An Al alloy contg. 6.5~7.5% Si, 0.2~0.4% Mg, 0.01~0.15% Ti and 0.005~0.03% Sr is used as an Al-7% Si-0.3% Mg type Al alloy for a disk wheel for an automobile. The amount of harmful Fe contained in the alloy as an impurity is ≤0.35%. Inexpensive Al of 99.5~99.7% relatively low purity is used as Al as a starting material for the alloy, and the amount of harmful Fe taken into the alloy from the starting material is restricted to ≤0.35%. A disk wheel is cast in the Al alloy and subjected to soln. heat treatment and aging to make Si grains in the eutectic fine by the presence of Sr and to inhibit the crystallization of needlelike Fe. A disk wheel having superior tensile strength and other superior characteristics is manufactured.

ALUMINUM ALLOY FOR BONDING WIRE

SUMITOMO DENKI KOGYO K.K.
JP 60-248857 1984

PURPOSE: To prevent the formation of an oxidized film of aluminum to form an excellent ball and to increase bonding strength and wire strength and to make wiredrawing workability excellent by constituting the titled alloy of Ni of specified quantity and the balance Al essentially.
CONSTITUTION: Aluminum alloy for bonding wire consists of 0.5~3wt% Ni and if necessary, 0.2~2wt% one or more kinds selected among Si, Mg and Mn and/or 0.02~0.5wt% one or more kinds selected among Zr, Ti, Cr, V, Cu, B and the balance Al essentially. At the time of forming a ball, the formation of an oxidized film of aluminum is inhibited to form the excellent ball and to increase the bonding velocity. Also, the remarkable softening and brittleness close to the ball forming parts are prevented and the reliability is increased. The aluminum alloy is large in wire strength and excellent in wiredrawing workability and inexpensive.

ALUMINUM ALLOY FOR BONDING WIRE

SUMITOMO DENKI KOGYO K.K.
JP 60-243858 1984

PURPOSE: To inhibit the formation of oxidized film of aluminum to form an excellent ball and to increase the bonding strength and to obtain the titled alloy large in wire strength and excellent in wiredrawing workability by constituting the alloy of Be and Ni of specified quantity and the balance Al essentially.

CONSTITUTION: Aluminum alloy for a bonding wire consists of 0.002~0.2wt% Be, 0.5~3wt% Ni and if necessary, 0.5~2wt% one or more kinds selected among Si, Mg, Mn and/or 0.02~0.5wt% one or more kinds selected among Zr, Ti, Cr, V, Cu, B and the balance Al essentially. At the time of forming a ball, the formation of an oxidized film of Al is inhibited to form the excellent ball and to increase the bonding velocity. The remarkable softening and brittleness close to the ball forming parts are prevented to increase the bonding strength and the reliability is increased. The aluminum alloy is large in wire strength and excellent in wiredrawing workability and enabled to low cost.

HIGH TOUGHNESS ALUMINUM ALLOY FOR CASTING

MITSUI ARUMINIUMU KOGYO K.K.
JP 60-255949 1984

PURPOSE: To obtain an Al alloy for a casting which is provided with high toughness and superior tensile strength by short-time heat treatment by adding restricted amounts of Si, Mg and Sb to Al.

CONSTITUTION: This Al alloy for a casting consists of 4~6% Si, 0.3~0.6% Mg, 0.05~0.2% Sb and the balance Al with inevitable impurities or further contains ≦0.2% Ti and 0.005~0.05% Sn. The Al alloy shows higher toughness than a conventional Na treated alloy because Sb is contained. The Al alloy is provided with high toughness by heat treatment at a low temp. without reducing the strength, so the heat treatment time can be shortened and the cost of products can be reduced.

1.1.2 ALUMINIUM ALLOYS WITH SILICON AS THE NEXT MAJOR CONSTITUENT AND CONTAINING MAGNESIUM AND COPPER.

MANUFACTURE OF HIGH STRENGTH ALUMINUM ALLOY MATERIAL

HITACHI SEISAKUSHO K.K.
JP 55-2757 1978

PURPOSE: To provide high strength Al alloy material having high mechanical properties for structural parts, and revolving parts, by plastic working of a portion or whole of the Al alloy casting material of predetermined shape, made by quenching solidification, so as to modify it.

CONSTITUTION: Casting material of predetermined shape having been produced by quenching solidification of Al-Cu-Si-Mg alloy at a cooling rate 3~10°C/sec. is plastic worked at a reduction of area not less than 40 % at a portion or whole of it. Hereby, the structure of the alloy is made very small to increase remarkably the tensile strength and the elongation ratio, so that high strength Al alloy material extensively utilized industrially is obtained.

POROUS ALUMINUM SINTERED ALLOY SLIDING MEMBER

ÓIRESU KOUGIYOU K.K.
JP 55-6439 1978

PURPOSE: The porous Al sintered alloy sliding member which is obtainable by containing the specific amounts of copper, Mg, Si and boron compound to Al and has improved mechanical strength and sliding characteristics and makes its sintering easy.

CONSTITUTION: The respective powder compositions composed of Cu; 0.5 to 6wt%, Mg, Si; 5 to 30%, boron compound such as borax or other evaporated of water of crystallization: 0.5 to 8% and if necessary total of one or more kinds of tin and Sb; 10% or under, lead 20% or under and the rest Al and a small amount of lubricant such as lauryl alcohol, etc. are evenly mixed. This mixed powder is sintered after compaction molding. This method makes possible sintering in the atmosphere and enables the porous Al sintered alloy sliding member having the mechanical strength equivalent to that of the one sintered in a neutral or reducing atmosphere to be obtained.

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