[CLAIMS]

[Claim 1]

A production method of an alloy member comprising:

an additive manufacturing step of forming a shaped member through an additive manufacturing method using an alloy powder containing elements Co, Cr, Fe, Ni, and Ti each in a range of 5 atom% or more to 35 atom% or less and containing Mo in a range exceeding 0 atom% and 8 atom% or less, the remainder being unavoidable impurities; and

an aging heat treatment step of holding the shaped member obtained through the additive manufacturing step in a temperature range higher than 500°C and lower than 900°C in a state where a melt solidification structure in which a microcell structure with an average particle diameter of 10 μm or less is provided at least in crystal grains of a surface layer part.

[Claim 2]

The production method of an alloy member according to claim 1, the method comprising the following steps between the additive manufacturing step and the aging heat treatment step:

a solution heat treatment step of heating the shaped member formed through the additive manufacturing step and holding the shaped member in a temperature range of 1080°C or more to 1180°C or less;

a cooling step of cooling the shaped member after the solution heat treatment step; and then

a remelting and resolidifying step of melting and solidifying the surface layer part of the shaped member again.

[Claim 3]

The production method of an alloy member according to claim 1, the method comprising the following steps between the additive manufacturing step and the aging heat treatment step:

a solution heat treatment step of heating the shaped member and holding the shaped member in a temperature range of 1080°C or more to 1180°C or less;

a cooling step of cooling the shaped member after the solution heat treatment step; and then

a surface layer-adding and shaping step of forming a melt solidification layer on the surface layer part of the shaped member that has undergone the cooling step, through the additive manufacturing method using the alloy powder.

[Claim 4]

The production method of an alloy member according to any one of claims 1 to 3,

wherein, in the additive manufacturing step, a heat source used in the additive manufacturing method is a laser beam or an electron beam.

[Claim 5]

An alloy member comprising:

elements Co, Cr, Fe, Ni, and Ti each in a range of 5 atom% or more to 35 atom% or less;

Mo in a range exceeding 0 atom% and 8 atom% or less; and

unavoidable impurities as a remainder,

wherein the alloy member comprises a microcell structure with an average particle diameter of 10 μm or less at least in crystal grains of a surface layer part,

wherein a boundary part of the microcell structure has a dislocation having a surface density higher than that inside the microcell structure, and

wherein ultrafine particles having an average particle diameter of 50 nm or less are dispersed and precipitate at least inside the microcell structure.

[Claim 6]

The alloy member according to claim 5,

wherein Ti is concentrated at the boundary part of the microcell structure.

[Claim 7]

The alloy member according to claim 5 or 6,

wherein minute particles having an average particle diameter of 100 nm or less are dispersed and precipitate in parent phase crystal grains inside the member which are located at an inner portion of the surface layer part.

[Claim 8]

The alloy member according to any one of claims 5 to 7, further comprising:

a portion having a Vickers hardness of 550 HV or more.

[Claim 9]

A product using the alloy member according to any one of claims 5 to 8.

[Claim 10]

The product according to claim 9,

wherein the product is any one of an impeller of a fluid machine, a screw of an injection molding machine, and a die.