CLAIMS

1. A process for producing an alloy member, comprising:

a raw material mixing and melting step of mixing and melting raw materials of the alloy to form a molten metal so that an alloy composition comprises elements of Co, Cr, Fe, Ni, and Ti each in an amount within a range of 5 atomic% or more and 35 atomic% or less and Mo in an amount within a range of more than 0 atomic% and 8 atomic% or less and the remainder consisting of unavoidable impurities;

an atomizing step of forming an alloy powder from the molten metal; and

an additive manufacturing step of forming an alloy laminated molded body having a desired shape by a metal powder additive manufacturing process using the alloy powder, wherein a laser is used as the heat source for the metal powder additive manufacturing process, wherein

the parent phase crystal after the additive manufacturing step has a columnar crystal shape and the crystal structure thereof consists of simple cubic system and face centered cubic system

, wherein the columnar crystal has a structure in which fine columnar crystals are forested along the building direction of the manufactured laminated molded body and the columnar crystal is defined as a crystal having a ratio of the major axis length to the minor axis length of the crystal grain of 2 or more, and wherein the parent phase crystal observed by an electron microscope and an X-ray diffractometer,

the average crystal grain diameter of the parent phase crystal grain is 40 pm or less, and

the alloy member has a breaking elongation of 10% or more.

2. The process for producing an alloy member according to claim 1,

wherein the average diameter of the alloy powder is 10 μm or more and 50 μm or less.

3. The process for producing an alloy member according to claim 1 or 2,

wherein the chemical composition of the alloy member comprises 20 atomic% or more and 35 atomic% or less of Co; 10 atomic% or more and 25 atomic% or less of Cr; 10 atomic% or more and 25 atomic% or less of Fe; 15 atomic% or more and 30 atomic% or less of Ni; and 5 atomic% or more and 15 atomic% or less of Ti.

4. The process for producing an alloy member according to claim 1 or 2,

wherein the chemical composition of the alloy member comprises 25 atomic% or more and 33 atomic% or less of Co; 15 atomic% or more and 23 atomic% or less of Cr; 15 atomic% or more and 23 atomic% or less of Fe; 17 atomic% or more and 28 atomic% or less of Ni; 5 atomic% or more and 10 atomic% or less of Ti; and 1 atomic% or more and 7 atomic% or less of Mo.

5. The process for producing an alloy member according to claim 4,

wherein the chemical composition of the alloy member comprises 25 atomic% or more and less than 30 atomic% of Co; 15 atomic% or more and less than 20 atomic% of Cr; 15 atomic% or more and less than 20 atomic% of Fe; 23 atomic% or more and 28 atomic% or less of Ni; 7 atomic% or more and 10 atomic% or less of Ti; and 1 atomic% or more and 7 atomic% or less of Mo.

6. The process for producing an alloy member according to claim 4,

wherein the chemical composition of the alloy member comprises 30 atomic% or more and 33 atomic% or less of Co; 20 atomic% or more and 23 atomic% or less of Cr; 20 atomic% or more and 23 atomic% or less of Fe; 17 atomic% or more and less than 23 atomic% of Ni; 5 atomic% or more and less than 7 atomic% of Ti; and 1 atomic% or more and 3 atomic% or less of Mo.