Appeal decision

Appeal No. 2015-4722

USA
Appellant TITANIUM METALS CORPORATION

Tokyo, Japan
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The case of appeal against the examiner's decision of refusal of Japanese Patent Application No. 2013-523353, entitled "Low-Cost Alpha-Beta Titanium Alloy with Good Ballistic and Mechanical Properties" (International publication No. WO2012/054125 published on April 26, 2012, National Publication of International Patent Application No. 2013-541635 published on November 14, 2013) has resulted in the following appeal decision:

Conclusion

The appeal of the case was groundless.

Reason

No. 1 History of the procedures

The application was originally filed on August 5, 2011 as an International Patent Application, the examiner's decision of refusal was issued on October 24, 2014, an appeal against the examiner's decision of refusal was requested on March 11, 2015 while a written amendment was submitted at the same time, reasons for refusal dated March 25, 2016 were noticed by the body, a written opinion and a written amendment were submitted on June 16, 2016, reasons for refusal dated August 2, 2016 were noticed by the body again, and a written opinion was submitted on November 1, 2016.

No.2 Inventions of the application

While Inventions relating to Claims 1 to 22 of the application are specified

according to the matters in Claims 1 to 22 in the scope of claims for patent in the written amendment dated June 16, 2016, the Invention acccording to Claim 1 is as follows:

"[Claim 1]

A titanium alloy consisting essentially of, in weight percent, 4.2 to 5.4% aluminum, 2.5 to 3.5% vanadium, 0.5 to 0.7% iron, and 0.15 to 0.19% oxygen, with incident impurities and the balance titanium,

wherein a maximum concentration of any one impurity element present in the titanium alloy is 0.1 wt% and the combined concentration of all impurities is less than or equal to 0.4 wt%." (hereinafter referred to as the "Invention")

No. 3 Described matters in Cited Publications

Japanese Unexamined Patent Application Publications Nos. H03-134124 (hereinafter, referred to as "Cited Publication 1") and H04-103737 (hereinafter, referred to as "Cited Publication 2"), which had been distributed in Japan prior to the filing date of the present application and were cited in the reasons for refusal dated March 25, 2016 and noticed by the body describe as follows.

1. Cited Publication 1

(1a) " [Claims]

(1) A titanium alloy that is excellent in erosion resistance, and consists of, in weight percent, 2.0 to 8.0% vanadium, 0.5 to 5.0% iron, 2.0 to 7.0% aluminum, and 0.1 to 0.3% oxygen, with the balance being titanium and inevitable impurities."

(1b) "The limiting reasons of the composition ratio in the present invention are as follows:

First, as illustrated in FIG. 2, when the content of vanadium is 5.0 wt%, the erosion resistance reaches a peak, and when the content of vanadium is less than 2.0 wt% or more than 8.0 wt%, the erosion weight loss increases, and the alloy does not show excellent erosion resistance.

When the content of iron is less than 0.5 wt%, the alloy does not show excellent erosion resistance, because sufficient hardness cannot be obtained even by heat treatment. When the content of iron is more than 5.0 wt%, the alloy has increased hardness to become more embrittled, resulting in poor workability.

When the content of aluminum is less than 2.0 wt%, the precipitation of the alpha phase by an aging treatment is insufficient so that sufficient hardness cannot be

obtained, and thus the alloy does not show excellent erosion resistance. When the content of aluminum is more than 7.0 wt%, the alloy has increased hardness to become more embrittled by precipitation of Ti_3Al, resulting in poor workability.

When the content of oxygen is less than 0.1 wt%, sufficient hardness cannot be obtained, and thus the alloy does not show excellent erosion resistance. Meanwhile, when the content of oxygen is more than 0.3 wt%, the workability is degraded, and thus it is difficult to produce plates or weld rods for buildup welding from the alloy." (See the description from the 9th line of the upper left column to the 11th line of the upper right column on page 3.)

2. Cited Publication 2

(2a) " [Claims]

(1) A high strength and high toughness titanium alloy consisting of, in weight percent,
Al: 4.0% or more but less than 7.0%,
V: 3.0% or more but less than 5.0%,
Fe: 0.3% to 5.0%, and
Ti and inevitable impurities: the balance."

(2b) "The inevitable impurities include C, H, oxygen, N, Y, and the like, which are generally permitted to be contained within the following ranges.

C: 0.10% or less, H: 0.0125% or less, oxygen: 0.20% or less, N: 0.05% or less, and Y:0.005% or less." (See the description from the 17th line of the upper left column to the 2nd line of the upper right column on page 4.)

3. Cited Invention

According to the above described matters (1a) and (1b), Cited Publication 1 discloses

"a titanium alloy that is excellent in erosion resistance, and consists of, in weight percent, 2.0 to 8.0% vanadium, 0.5 to 5.0% iron, 2.0 to 7.0% aluminum, and 0.1 to 0.3% oxygen, with the balance being titanium and inevitable impurities." (Hereinafter, referred to as "Cited Invention.")

No. 4 Comparison / Judgment

In comparing the Cited Invention to the Invention, the "inevitable impurities" in the Cited Invention correspond to the "incident impurities" in the Invention.

Therefore, both are similar in that they are titanium alloys consisting essentially

of 4.2 to 5.4wt% aluminum, 2.5 to 3.5wt% vanadium, 0.5 to 0.7wt% iron, and 0.15 to 0.19wt% oxygen with incident impurities and the balance being titanium. The difference between them is as follows.

(Difference)

While the concentration of any impurity elements in the titanium alloy is at most 0.1 wt% and the summation of the concentrations of all impurities is 0.4 wt% or less in the Invention, they are not defined in the Cited Invention.

The above difference will now be discussed below.

In general, a maximum concentration of any one inevitable impurity present in a Ti-Al-V-Fe-O alloy is 0.1 wt% and the summation of concentrations of all impurities is 0.4 wt% or less (see the above-described Cited Publication 2, for example), and thus the difference cannot be said to be substantial.

Therefore, the Invention is identical to the invention disclosed in Cited Publication 1.

Appellant's allegations in the written opinion dated June 16, 2016 (see the items "(4)(i) and (ii)") are summarized as follows.

A. "We consider that the Invention 1 significantly differs from the invention described in Cited Publication 1 in terms of a structure, an effect, and a technical idea. ... In particular, while the contents of the iron and the oxygen in Invention 1 of the application are "0.5 to 0.7% iron, and 0.15 to 0.19% oxygen", which are narrower than those of the invention disclosed in Cited Publication 1, which are "0.5 to 5.0% iron, and 0.1 to 0.3% oxygen." Namely, it can be said the contents of the components according to the Invention narrowly limited in comparison with the invention disclosed in Cited Publication 1, and thus the Invention differs from the invention disclosed in Cited Publication 1.

In addition, because of the above-described structural difference, the invention described in Cited Publication 1 cannot demonstrate effects equivalent to those caused by the Invention 1 in terms of 'ballistic and mechanical properties.' ... The content of the iron in the titanium alloy in the invention described in Cited Publication 1 exceeds 0.7 wt%, so that excessive solute segregation occurs during ingot solidification to exert an adverse effect on the ballistic and mechanical properties of the titanium alloy (see paragraph [0025] and the like in the specification of the Invention). Thus, the titanium alloy relating to Invention 1 in which the composition is limited to specific ranges

shows unexpected results regarding mechanical strength and ballistic properties in comparison with the titanium alloy of Cited Publication 1 that has wider composition ranges."

B. "An additional experiment (proof AA) was conducted in order to explain the difference in effects of mechanical strength and ballistic properties between the invention described in Invention 1 and the invention described in Cited Publication 1.
...

According Tables 1 to 3 and Figures 1 to 4 in the above proof AA, it can be said that there is a significant difference in terms of tensile property, ultimate tensile strength, V50 ballistic limit, and tensile elongation between titanium alloys which are disclosed in Cited Publication 1 and pertain to the composition ranges defined in Invention 1 (to be more specific, the content ranges of iron, oxygen, and/or aluminum) and titanium alloys which are disclosed in Cited Publication 1 and slightly exceed the composition ranges defined in Invention 1.

It is apparent that the invention described in Cited Publication 1 does not teach the technical idea of Invention 1 of the application that a low-cost titanium alloy with good ballistic and mechanical properties can be obtained by limiting the contents of aluminum, vanadium, iron, and oxygen to the specific narrow ranges. That can be understood since the invention described in Cited Publication 1 does not intend to 'satisfy both of ballistic properties and mechanical properties,' and the ranges of their contents of iron and oxygen are wider than those of Invention 1 of the application.
(ii) Therefore, since the invention described in Invention 1 significantly differs in terms of an alloy structure from the invention described in Cited Publication 1, the novelty of Invention 1 cannot be denied on the basis of Cited Publication 1. In addition, since the invention described in Invention 1 significantly differs in terms of an effect and a technical idea from the invention described in Cited Publication 1, there is no reason that Invention 1 could be easily made on the basis of the invention described in Cited Publication 1, and thus the obviousness of Invention 1 can be denied on the basis of Cited Publication 1."

The body’s opinion on the above allegations is as follows:
A.

All the content ranges of the components (including iron and oxygen) specified in the Invention are sufficiently covered by the same components specified in the Cited Invention although the content ranges of the components in the Invention are more

limited than those in the Cited Invention. Therefore, the Invention does not differ from the Cited Invention in terms of the content ranges of the components.

Moreover, since the Invention is defined with only the component composition of the alloy, it cannot be said that the Invention differs from the Cited Invention in terms of the component composition.

In view of the above, it can be said that the Cited Invention inherently has mechanical strength and ballistic properties, and thus it cannot be said that the Invention differs from the Cited Invention in these terms.

B.

In view of mechanical strength and ballistic properties, while the appellant alleges that those properties of the Invention are remarkable, "the invention (new data)" in an additional experiment (proof AA) conducted by the appellant allegedly according to the Invention are not identical to Example 1 described in the specification of the application in terms of component amounts. Further, it shows that, on one hand, mechanical properties of "the invention (new data)" are better than those of Example 1, and, on the other hand, the properties of tensile elongation of "the invention (new data)" are the same as those of Example 1.

Thus, it cannot be said that the above results of the additional experiment show that there is certainly a significant difference in properties between the Invention and the Cited Invention.

The appellant alleges that "the invention described in Cited Publication 1 does not teach the technical idea of Invention 1 that a low-cost titanium alloy with good ballistic and mechanical properties can be obtained by limiting the contents of aluminum, vanadium, iron, and oxygen to the specific narrow ranges." However, the Invention is defined by the component composition of the alloy alone defines but it is not defined by "ballistic and mechanical properties" and usages based on those properties.
Accordingly, the allegation by the appellant cannot be accepted by the body since it is not based on the Claims.

No. 5 Remaining reasons for refusal regarding Article 36(6)(i) of the Patent Act

It is not acknowledged that any arguments to overcome the reasons for refusal regarding Article 36(6)(i) of the Patent Act dated August 2, 2016 have been provided in the written opinion submitted on November 1, 2016 in response to the notice of the reasons for refusal. (In spite of the appellant’s allegation, [EXAMPLE] discloses only

an alloy having one kind of component composition, and the description [0034] relates to only a material for producing an alloy.)

According to the descriptions ([0010] to [0011], [0018], [0021], [EXAMPLE], and the like) in the specification of the application, the problem to be solved by the Invention is acknowledged to obtain a low-cost titanium alloy with good ballistic and mechanical properties.

However, Claim 1 specifies only a component composition for a titanium alloy.

The titanium alloy of Claim 1 can be understood to be low-cost because it includes Ti-Al-V-Fe-O as basic components without the other basic components. However, Claim 1 does not define ballistic and mechanical properties.

It is a common general technical knowledge that alloys have various properties depending on components and alloy structures. So, it can be said that the titanium alloy according to Claim 1 does not always solve the above problem to be solved because the components alone are defined but alloy structure or properties are not defined in Claim 1.

Therefore, it cannot be said that the invention of Claim 1 is an invention described in the detailed description of the application."

No. 6 Closing

As described above, the Invention falls under Article 29(1)(iii) of the Patent Act, and in the present application, the description of the scope of claims for patent does not meet the requirement stipulated in Article 36(6)(i) of the Patent Act, and the appellant should not be granted a patent for the invention.

Therefore, the present application should be rejected.

February 27, 2017

Chief administrative judge: ITAYA, Kazuhiro
Administrative judge: SUZUKI, Masaki
Administrative judge: TOMINAGA, Yasunori