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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte TANYA ROS YANEZ and AMAR KUMAR DE

Appeal 2020-001246
Application 13/738,257
Technology Center 1700

Before TERRY J. OWENS, BRADLEY W. BAUMEISTER, and
BRIAN D. RANGE, *Administrative Patent Judges*.

BAUMEISTER, *Administrative Patent Judge*, CONCURRING.

OWENS, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), the Appellant¹ appeals from the Examiner's decision to reject claims 1, 2, 4, 7–12, 14, 17–22, and 25–28. We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

¹ We use the word “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42. The Appellant identifies the real party in interest as ArcelorMittal. (Appeal Br. 2).

CLAIMED SUBJECT MATTER

The claims are directed to a nickel aluminide alloy and a furnace roll comprising the alloy. Claims 1 and 25, reproduced below, are illustrative of the claimed subject matter:

1. A nickel-aluminide alloy comprising:
0.15 wt % or less Zr;
2.5 to 3.0 wt. % Mo;
7.5 to 8.5 wt.% Cr; and
7.5 to 8.5 wt.% Al;
at least 80 wt.% Ni; and
a remainder being Ni.
25. A nickel-aluminide alloy comprising:
0.15 wt % or less Zr;
2.5 to 3.0 wt. % Mo;
7.5 to 8.5 wt.% Cr; and
7.5 to 8.5 wt.% Al; and
a remainder being Ni,
wherein the alloy contains no more than trace amounts of the
other elements from group IVB, VB and VIB of the periodic table.

REFERENCES

The prior art relied upon by the Examiner is:

Name	Reference	Date
Brill-Edwards	US 3,617,685	Nov. 2, 1971
Liu	US 5,108,700	Apr. 28, 1992
Ray	US 2004/0055725 A1	Mar 25, 2004

REJECTIONS

The claims stand rejected under 35 U.S.C. § 103(a) as follows:
claims 1, 2, 4, 7–10, and 25 over Brill-Edwards as evidenced by Ray;
claims 11, 12, 14, 17–22, and 26–28 over Brill-Edwards in view of admitted

prior art and Ray; claims 1, 4, 7–10, and 25 over Liu; and claims 11, 14, 17–22, and 26–28 over Liu in view of admitted prior art.²

OPINION

Rejections involving Brill-Edwards

Brill-Edwards discloses a nickel-base superalloy containing about 5–12 wt% Cr, about 3–8 wt% Mo, about 2.3–10 wt% Ta (where the combined Mo and Ta is about 5–14 wt%), about 5–15.5 wt% Co, up to about 7 wt% Ti, up to about 8 wt% Al (where the combined Ti and Al is about 5–9 wt%), up to about 0.3 wt% C, up to about 0.05 wt% B, up to about 1 wt% Zr, up to about 2 wt% Hf, up to about 2 wt% Fe, and the balance essentially nickel (col. 1, ll. 32, 38–46).³

The Examiner finds (Final Rej. 3–4):

Regarding Ni at least 80%, the fact US'685 discloses Cr 5–12%, combined of Mo and Ta 5–14%, combined Ti and Al 5–9% and Co 5–15% (Claim 1 Col 4 lines 52–62) suggests minimum 20% wt% combined weight of elements including Cr, Mo, Ta, Al, Ti and Co, leaving 80wt% remaining Ni in the composition. The fact there is no minimum amount required for additional element of C, B, Zr, Hf and Fe suggests C, B, Zr, Hf and Fe may be 0%. Thus, 80wt% of Ni meets instant claimed "at least 80% Ni". Even if combined weight of elements Cr, Mo, Ta, Al, Ti and Co is 20.3%, leaving 79.6% Ni remaining in the composition, 79.6% is still considered close to instant claim 1 required "at least 80%" due to close enough according to MPEP 2144.05 I.

² The Examiner relies upon admitted prior art for a disclosure of use of Ni3Al alloy to form a furnace roll (claimed in independent claims 11 and 26) (Final Rej. 6, 11).

³ The Examiner relies upon Ray for evidence that Brill-Edwards's Ni-base superalloy is a nickel-aluminide alloy (Final Rej. 3),

The Appellant's independent claims require 7.5–8.5 wt% Cr and 7.5–8.5 wt% Al. Thus, to meet the Appellant's claims, Brill-Edwards's composition must contain at least 7.5 wt% Cr and at least 7.5 wt% Al, and therefore cannot contain 5 wt% Cr and 5 wt% combined Al and Ti as found by the Examiner. Brill-Edwards's composition also contains at least 3 wt% Mo and at least 2.3 wt% Ta. Consequently, Brill-Edwards's composition's maximum Ni content is 74.7 wt%, which is less than the at least 80 wt% required by the Appellant's claims 1 and 11.

The Appellant's claims 25 and 26 require that the alloy contains no more than trace amounts of the other elements from group IVB, VB and VIB of the periodic table. Brill Edwards's composition contains at least about 2.3 wt% Ta, which is more than a trace amount of a group VB element.

Rejections involving Liu

Liu claims:

1. A nickel aluminide composition consisting essentially of nickel and, in at. %, from about 14 to about 18% aluminum, from about 6 to about 9% chromium, from about 0.1 to about 1.5% zirconium, from about 0.015 to about 0.3% boron, and from about 0.5 to about 4% of one or more elements selected from the group consisting of molybdenum and niobium.

The Examiner converts the 0.1 at% zirconium in that claim to 0.17 wt% (Final Rej. 8). The Examiner states that “0.17 wt% is considered close to presently claimed 0.15% or less according to MPEP 2144.05 I.” (Final Rej. 8).

The Examiner provides no evidence that Liu's about 0.17 wt% Zr is sufficiently close to the Appellant's 0.15 wt% Zr to have suggested 0.15 wt% Zr to one of ordinary skill in the art.

The Examiner finds (Final Rej. 8–9):

[T]he fact Liu expressly disclose[s] varying amounts of Zr (Col[.] 2 line 5) leads [t]o different YS [(yield strength)] and elongation as illustrated in Figure 2a and 2b suggests Zr amount is a result effective variable to be adjusted. If a particular parameter is recognized as a result-effective variable as Liu disclosed, then the determination of the optimum or workable ranges of said parameter might be characterized as routine experimentation.

The Examiner concludes (Final Rej. 9):

[I]t would have been obvious to one skilled in the art to have adjusted the result-effective variable of Zr amount, in the Nickel-aluminide alloy of Liu in order to achieve a desired VS and elongation. See MPEP 2144.05 II.

The result effective variable in Liu’s Figures 2a and 2b is Mo concentration, not Zr concentration. The yield strength values for all three Zr concentrations (0.3 at%, 0.5 at%, and 1.0 at%) are along the same curves, with points for 0.3 at% Zr falling between points for 0.5 at% Zr and 1.0 at% Zr.

Thus, the Examiner has not set forth a factual basis that is sufficient to support a conclusion of obviousness of the Appellant’s claimed invention. *See In re Warner*, 379 F.2d 1011, 1017 (CCPA 1967) (“A rejection based on section 103 clearly must rest on a factual basis, and these facts must be interpreted without hindsight reconstruction of the invention from the prior art”). Accordingly, we reverse the rejections.

CONCLUSION

The Examiner’s rejections are reversed.

DECISION SUMMARY

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1, 2, 4, 7–10, 25	103(a)	Brill-Edwards, Ray		1, 2, 4, 7–10, 25
11, 12, 14, 17–22, 26–28	103(a)	Brill-Edwards, admitted prior art, Ray		11, 12, 14, 17–22, 26–28
1, 4, 7–10, 25	103(a)	Liu		1, 4, 7–10, 25
11, 14, 17–22, 26–28	103(a)	Liu, admitted prior art		11, 14, 17–22, 26–28
Overall Outcome				1, 2, 4, 7–12, 14, 17–22, 25–28

REVERSED

BAUMEISTER, *Administrative Patent Judge*, concurring.

I agree with the Majority's finding and conclusions. I write separately because I would exercise the Board's discretionary authority under 37 C.F.R. § 41.50(b) and newly reject claims 1, 2, 4, 7 to 12, 14, 17 to 22, 27, and 28 under 35 U.S.C. § 112(b) (or pre-AIA § 112, ¶ 2).

Independent claim 1, for example, sets forth the claimed invention, as follows (with emphasis added):

1. A nickel-aluminide alloy *comprising*:
0.15 wt[.]% or less Zr;
2.5 to 3.0 wt.% Mo;
7.5 to 8.5 wt.% Cr; and
7.5 to 8.5 wt.% Al;
at least 80 wt.% Ni; and
a remainder being Ni.

Due to the manner in which claim 1 twice recites the inclusion of nickel in the alloy, in combination with the fact that claim 1's preamble recites that the alloy *comprises* the recited elements, the metes and bounds of claim protection being sought for claim 1 are not reasonably clear. I, therefore, would reject claim 1 under 35 U.S.C. § 112(b) (or pre-AIA § 112, ¶ 2,) as being indefinite.

The metes and bounds of claim 1 would have been reasonably clear if the last limitation, "a remainder being Ni," were omitted from the claim. In such a hypothetical case, it would be reasonably clear that claim 1 is setting forth a nickel-aluminide alloy that contains the recited amounts of Zr, Mo, Cr, Al, and Ni, and that the alloy also optionally could comprise one or more additional, unclaimed elements, so long as the elements' combined weight percentages allows the weight percentage of the nickel to be greater than or

equal to 80%. But claim 1's further inclusion of the last limitation, "a remainder being Ni," renders it less than reasonably clear how that last limitation is intended to further limit the other limitations of claim 1 and what the claim language, read as a whole, means.

Presumably, the last limitation, "a remainder being Ni," is intended to further limit claim 1 beyond merely requiring a nickel concentration of 80 weight percent or more. "A claim construction that gives meaning to all the terms of the claim is preferred over one that does not do so." *Merck & Co. v. Teva Pharms. USA, Inc.*, 395 F.3d 1364, 1372 (Fed. Cir. 2005). In light of claim 1 already setting forth that the nickel concentration has to be at least 80 weight percent, the only additional meaning that reasonably can be ascribed to the further requirement of "a remainder being Ni" is that claim 1 does not permit the alloy to contain any further elements beyond Zr, Mo, Cr, Al, and Ni. But this interpretation does not seem reasonable because claim 1 also employs the open-ended transition term "comprising," which usually would indicate that while the named elements are essential, other elements may be added and still form a construct within the scope of the claim. *Genentech, Inc. v. Chiron Corp.*, 112 F.3d 495, 501 (Fed. Cir. 1997).

Also, if Appellant had intended to limit claim 1 to alloys that possess only the elements that are expressly recited, Appellant could have drafted claim 1's preamble to set forth that the nickel-aluminide alloy either *consists of* or *consists essentially of* the recited elements. *See In re Herz*, 537 F.2d 549, 551–52 (CCPA 1976). ("Consisting essentially of" here is used as a transitional phrase, and as such, it limits the scope of a claim to the specified materials or steps "and those that do not materially affect the basic and novel

characteristic(s)” of the claimed invention.); *see also* MPEP § 2111.03 (“Transitional Phrases”).

Furthermore, various dependent claims also provide evidence that claim 1’s last limitation is not intended to limit the scope to alloy that are composed exclusively of Zr, Mo, Cr, Al, and Ni. For example, dependent claim 7 additionally recites, “wherein said alloy [of claim 1] further comprises about 0.015 wt.% B or less.” Dependent claim 8 further limits the boron concentration to about 0.01%. And dependent claim 9 sets forth that the alloy of claim 1 further comprises maximum weight percentages for the additional elements, carbon, silicon, iron, sulfur, manganese, phosphorus, and copper.

If the language of claim 1, when read as a whole, were intended to limit the alloy’s composition to Zr, Mo, Cr, Al, and Ni, exclusively, then dependent claims 7–9, for example, would violate statutory provision 35 U.S.C. § 112(d) (pre-AIA § 112, ¶ 4) by adding additional elements to the alloy of claim 1, and, thereby, failing to further limit the scope of claim 1. *See* pre-AIA § 112, ¶ 4 (“[A] claim in dependent form shall contain a reference to a claim previously set forth and then specify a further limitation of the subject matter claimed. A claim in dependent form shall be construed to incorporate by reference all the limitations of the claim to which it refers.”).

Because claim 1 is susceptible to being interpreted to in two different ways, and because neither interpretation seems reasonable for the reasons stated above, unreasonable ambiguity exists in relation to the intended scope of the claim. Language in a claim is unclear if it is “ambiguous, vague, incoherent, opaque, or otherwise unclear in describing and defining the

claimed invention,” *In re Packard*, 751 F.3d 1307, 1311 (Fed. Cir. 2014), or if it is “is amenable to two or more plausible claim constructions,” *Ex parte Miyazaki*, 89 USPQ2d 1207, 1211 (BPAI 2008) (precedential); *see also Ex parte Kristensen*, 10 USPQ2d 1701 (BPAI 1989) (Where a claim directed to a device can be read to include the same element twice, the claim may be indefinite.).

Independent claim 11 contains a similar ambiguity, setting forth, “[a] furnace roll *comprising*, [elements of specified compositional ranges]; at least 80 wt.% Ni; and a remainder being Ni.” Accordingly, I would reject independent claims 1 and 11, and also dependent claims 2, 4, 7 to 10, 12, 14, 17 to 22, 27, and 28, as being indefinite under 35 U.S.C. § 112(b) [or pre-AIA § 112, ¶ 2] for the reasons set forth above in relation to claim 1.

Independent claims 25 and 26 differ slightly from independent claims 1 and 11. Independent claim 25, for example, reads as follows (emphasis added):

25. A nickel-aluminide alloy *comprising*:
0.15 wt[.]% or less Zr;
2.5 to 3.0 wt.% Mo;
7.5 to 8.5 wt.% Cr; and
7.5 to 8.5 wt.% Al;
a remainder being Ni,
wherein the alloy contains no more than trace amounts of
the other elements from group IVB, VB and VIB of the
periodic table.

Claim 25 differs from claim 1, then, because claim 25 does not include a double recitation of the nickel composition. That is, claim 25 omits claim 1’s limitation of “at least 80% wt.% Ni.” Nonetheless, claim 25 still raises some clarity questions regarding the intended metes and bounds of claim protection being sought due to the fact that the preamble employs

the transition term “comprising,” while the claim also recites that a remainder of the alloy is nickel.

Standing alone, this claim may well be reasonably clear in meaning that the alloy can contain additional elements beyond the recited elements, and nickel makes up the rest of the alloy. But that interpretation is based on the meaning of the limitation, “a remainder being Ni,” being reasonably clear. And as explained above, the recitation of this limitation in claim 1, in combination with the recitation, “at least 80 wt.% Ni,” raises reasonable doubt as to what the language, “a remainder being Ni,” is intended to mean.

As such, I would leave it to the Examiner, upon further prosecution and in light of any future claim amendments and arguments, to additionally consider whether the metes and bounds of claim 25 are reasonably clear. I, likewise, would leave it to the Examiner to consider the clarity of independent claim 26, which recites similar claim language. *See* MPEP § 1213.01 (“The Board’s primary role is to review the adverse decision as presented by the Examiner, and not to conduct its own separate examination of the claims. Further, since the exercise of authority under 37 CFR 41.50(b) is discretionary, no inference should be drawn from a failure to exercise that discretion.”).

And for the reasons discussed above in relation to dependent claims 7–9, I also would leave it to the Examiner, upon further prosecution, to determine whether any of the dependent claims as currently drafted, or as amended in the future, should be reject claims under 35 U.S.C. § 112(d) (or pre-AIA § 112, ¶ 4) for failing to limit the subject matter of the claims from which they depend. *See* MPEP § 1213.01.