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EXAMINER
TAKEUCHI, YOSHITOSHI

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BEFORE THE PATENT TRIAL
AND APPEAL BOARD

Ex parte GANJIANG FENG,
SHYH-CHIN HUANG, and JIAN ZHENG

Appeal 2011-013598
Application 12/187,049
Technology Center 1700

Before MARK NAGUMO, MICHAEL P. COLAIANNI, and
GEORGE C. BEST, *Administrative Patent Judges*.

COLAIANNI, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134 the final rejection of claims 1-17, 19, and 20. We have jurisdiction over the appeal pursuant to 35 U.S.C. § 6(b).

We AFFIRM.

Appellants' invention is directed to nickel-base superalloy compositions that are castable as single-crystal articles suitable for use as components of gas turbines and other high temperature applications (Spec. para. [0001]).

Claim 1 is illustrative and is reproduced below, with the key limitation in this appeal italicized:

> 1. A nickel-base superalloy having a composition consisting of, by weight:
>
> 6% to 8% chromium;
>
> 6% to 9% cobalt;
>
> 0% to 2% molybdenum;
>
> 4% to 6% tungsten;
>
> 6.4% to 6.9% tantalum;
>
> 0% to 2% titanium;
>
> 5% to 7% aluminum;
>
> 2.7% to 3.0% rhenium;
>
> *0.5% to 0.7% hafnium*;
>
> 0.04% to 0.08% carbon;
>
> 0.002% to 0.006% boron;
>
> 0% to 0.075% yttrium;

0.002% to 0.004% zirconium;

the balance being nickel and incidental impurities.

Appellants appeal the following prior art rejection:
Claims 1-17, 19, and 20 are rejected under 35 U.S.C. § 103(a), as being unpatentable over DeCrescente (US 4,895,201 issued Jan. 23, 1990).

Appellants argue the claims in the following two groupings: (1) claims 1-6, 9, 13, and 14, and (2) claims 7, 10-12, 15-17, 19, and 20 (App. Br. 16, 26). We select claim 1 as representative of group (1) and claim 19 as representative of group (2).

CLAIM 1

ISSUE

1. Have Appellants shown that the Examiner reversibly erred in finding that DeCrescente, which discloses a nickel-base alloy having elemental ranges that fully encompass the elemental ranges of claim 1, would have rendered the claimed composition prima facie obvious? We decide this issue in the negative.
2. Did the Examiner reversibly err in finding that Appellants' evidence of unexpected results was insufficient to establish unexpected results over the entire range of hafnium in claim 1? We decide this issue in the negative.

FINDINGS OF FACT AND ANALYSES

Issue (1): Prima Facie Case of Obviousness

The Examiner's findings and conclusions are located on pages 4-6 of the Answer. The Examiner finds that DeCrescente discloses a nickel-based superalloy composition that is useful in a gas turbine engine that consists of the same elements as recited in claim 1 with ranges of these elements that overlap or encompass the claimed ranges (Ans. 4-5). The Examiner concludes that DeCrescente's nickel-based superalloy with elemental ranges that overlap or encompass the claimed elemental ranges would have rendered obvious the nickel-based superalloy of claim 1 (*id.* at 5-6). The Examiner, therefore, required Appellants to present evidence that their claimed composition was unexpectedly different from the prior art composition.

Appellants argue that DeCrescente's composition stands in a genus specie relationship with their claimed composition. Appellants argue that the Examiner therefore had the burden of explaining why it would have been obvious to select Appellants' claimed specie from the genus as the Manual of Patent Examining Procedure (MPEP) § 2144.08 explains should be done (App. Br. 17-20). Appellants contend that DeCrescente discloses a composition that includes a "very large number of possible distinct compositions within the broad ranges of DeCrescente's alloy" (*id.* at 18). Appellants contend that the Examiner has not followed the guidance of MPEP § 2144.08 regarding how to establish obviousness of specie when the prior art discloses a genus (*id.* at 17-20).

We agree with the Examiner that the claims present an overlapping or encompassing range situation and Appellants have not shown that a genus-specie relationship exists (Ans. 6-10). Appellants have not provided evidence that establishes that DeCrescente's alloy ranges are so broad as to encompass a very large number of patentably distinct compositions. While Appellants cite 32 known alloys that fall within DeCrescente's alloy composition ranges and argue that many others would be included, it appears to us that Appellants' claims are as broad as DeCresecente's composition in the scope of possible combinations of elements (App. Br. 14 n. 1, 18). Though the ranges of the elements are narrower for Appellants' composition, Appellants have not established that their claims are so narrowly tailored as compared to DeCrescente's elemental ranges that DeCrescente's composition stands in a genus-specie relationship to Appellants' claimed alloy. *In re Peterson*, 315 F.3d 1325, 1330 n.1 (Fed. Cir. 2003) (citing *In re Baird*, 16 F.3d 380 (Fed. Cir. 1994) and *In re Jones*, 958 F.2d 347 (Fed. Cir. 1992)). Indeed, *Baird* and *Jones* which are cited by Appellants in their reproduction of MPEP § 2144.08 as supporting the proposition that a genus-specie relationship is presented by the current claims, are distinguishable from the facts of the present appeal[1] (App. Br. 17).

In *Jones*, the claims were drawn to a particular compound (i.e., 2-(2'-aminoethoxy) ethanol salt of dicamba). *Jones*, 958 F.2d at 348. The prior

[1] Because the issue was not before the Court of Appeals for the Federal Circuit, the court refrained from deciding whether an alloy composition is of such breadth as might present a situation analogous to the cases involving the failure of a very broad disclosed genus of substances to render prima facie obvious specific substances within its scope. *In re Peterson*, 315 F.3d at 1330 n.1 (citations to *Baird* and *Jones* omitted).

art, Richter, disclosed a generic formula where different moieties may be substituted as substituent "X" in the formula. *Id.* at 349. None of Richter's substituted forms disclosed the claimed 2-(2'-aminoethoxy) ethanol salt of dicamba but the Examiner rejected the claims over Richter based on the "structural similarity" of the compounds resulting from substituting X with moieties that yielded a similar compound to the claimed dicamba salt. *Id.* The court found that compounds resulting from substituting X with particular substitutents were not structurally similar to the particularly claimed dicamba salt. *Id.* at 350.

In *Baird*, the claims were drawn to a toner composition comprising a binder resin which is a bisphenol A polyester containing an aliphatic di[carboxylic] acid selected from the group consisting of succinic acid, glutaric acid, and adipic acid. *Baird*, 16 F.3d at 381. The Examiner rejected the claims over the prior art, Knapp, that taught developer compositions comprised of the polymeric esterification product of a dicarboxylic acid of a generic formula and a diphenol of a generic formula. *Id.* at 381-82. The Examiner concluded that the claimed composition would have been obvious because bisphenol-A resulted from Knapp's generic diphenol formula when particular substituents were selected and Knapp taught the three dicarboxylic acids. *Id.* at 382. The court reversed, citing *Jones* for the proposition that the fact that a claimed compound may be encompassed by a disclosed generic formula does not by itself render the compound obvious. *Id.*

In both *Baird* and *Jones* the claims were drawn to compounds that were very narrow compared to the reference disclosures whereas the prior art taught a generic formula with a multitude of possible substituents to describe particular compounds. In contrast, the present claims are drawn to

alloy compositions that include a list of suitable elements wherein each element must be present in the alloy composition within a particularly required range. In other words, the present claims include a multitude of alloy compositions, not a very narrowly claimed compound as in *Baird* and *Jones*.

Moreover, the Examiner finds that DeCrescente's compositions have been optimized for a particular use in gas turbine applications for its mechanical properties and resistance to environmental degradation (Ans. 7). The Examiner finds that because of this optimization the alloy composition is not, as the Appellants suggest, so broad as to disclose a very large number of distinct compositions, each of which might be analogous to a species. *Id.* Appellants do not specifically respond to this finding. Both DeCrescente's composition and the claimed composition have been formulated for the particular use in gas turbines and other high temperature applications. Therefore, in our view, the facts of this appeal do not present a genus-specie relationship where the genus is too vast to render obvious a claimed species. Rather this case involves two nickel-based superalloy compositions that are in an overlapping range relationship.

Because we find that Appellants have not shown that the prior art range is so much broader than the range of the claimed superalloy, the Examiner's unrebutted finding that the prior art ranges encompass each of the claimed ranges of the elements suffices to conclude that the claimed invention would have been obvious. *In re Peterson*, 315 F.3d at 1329. The burden shifts to Appellants to show that the claimed invention would not have been obvious. *Id.* at 1330. We now consider Appellants' evidence of nonobviousness.

Issue (2): Unexpected Results

Appellants argue that the data in the Specification establishes unexpectedly better freckle reduction because the evidence shows that Alloy B with 0.5% hafnium has smaller freckle chain length than Alloy A that contained 0.2% hafnium or the "Baseline" composition that contained 0.14% hafnium (App. Br. 23-25).

The Examiner finds that Appellants' evidence is insufficient because it fails to establish criticality over the entire claimed range of hafnium that includes the upper end of the range (i.e., 0.7%) (Ans. 10). The Examiner further finds that Appellants' evidence is insufficient because the evidence shows that freckling reduction occurs with hafnium amounts outside the claimed range (i.e., 0.2%) (*id.* at 11).

We agree with the Examiner that Appellants' evidence is insufficient because it fails to show criticality in the hafnium range over the entire range (i.e., 0.5 to 0.7%). *In re Clemens*, 622 F.2d 1029, 1036 (CCPA 1980). The greatest value used in Appellants' evidence is 0.5% which is the lower end of the claimed range only. Appellants achieve improved freckling reduction with a hafnium concentration outside the claimed range (i.e., 0.2%), which further undermines the probative value of the evidence of nonobviousness.

CLAIM 19

In appealing the rejection of Group 2, Appellants rely on the same arguments made regarding claim 1 and thus present the same issues for

review (App. Br. 26). We find these arguments unpersuasive for the same reasons noted *supra*.

Appellants further argue unexpected results with regard to the ability of the composition containing particular amounts of Al, Ta, Re, W, and Zr to resist freckling (*id.* at 26-27).

As with the rejection of claim 1, Appellants' evidence fails to establish criticality over the entire claimed range for any one of the particular elements. While Appellants argue that claim 19 includes elemental amounts within the ranges disclosed in paragraph [0029] of the Specification as being significant, Appellants do not provide any evidence of criticality over the entire claimed range for any one of the argued elements in the alloy composition. For the same reasons discussed above, we find Appellants' evidence of not probative of nonobviousness .

On this record, we affirm the Examiner's § 103(a) rejection over DeCrescente.

DECISION

The Examiner's decision is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1).

ORDER

AFFIRMED

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