

The opinion in support of the decision being entered today was *not* written for publication and is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JON RAYMOND GROH
and MICHAEL JOSEPH GAMBONE

Appeal No. 2005-0567
Application 10/280,391

ON BRIEF

Before KIMLIN, PAK and WARREN, *Administrative Patent Judges*.

WARREN, *Administrative Patent Judge*.

Decision on Appeal

This is an appeal under 35 U.S.C. § 134 from the decision of the examiner finally rejecting claims 1 through 16, all of the claims in the application.

Claim 1 illustrates appellants' invention of a composition of matter that consists essentially of at least the specified elements and encompasses a nickel-base alloy which is castable and weldable (specification, e.g., page 1), and is representative of the claims on appeal:

1. A composition of matter having a composition consisting essentially of, in weight percent, from about 16 percent to about 21 percent chromium, from about 6 percent to about 12 percent iron, from about 6 percent to about 12 percent cobalt, from about 2.8 percent to about 3.3 percent molybdenum, from about 5 percent to about 5.4 percent niobium, from zero to about 2 percent tantalum, from about 0.65 percent to about 1.15 percent titanium, from about 0.2 percent to about 0.8 percent aluminum, from about 0.01 percent to about 0.05 percent carbon, from about 0.005 percent to about 0.01 percent boron, less than about 0.1 percent zirconium, balance nickel and impurities.

The references relied on by the examiner are:

Stalker	3,758,347	Sep. 11, 1973
Sekino et al. (Sekino)	3,865,581	Feb. 11, 1975
Fried	4,820,124	Apr. 11, 1989
Hummel	5,711,474	Jan. 27, 1998

The examiner has advanced the following grounds of rejection on appeal:

claims 1 through 4, 12, 15 and 16 stand provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1 through 17 of copending application 09/687,424 (answer, page 3);

claims 1 through 6 and 8 through 10 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Sekino (answer, pages 3-6);

claims 7 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Sekino as applied to claim 6 above, and further in view of Stalker (answer, page 6);

claim 11 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Sekino as applied to claim 6 above, and further in view of Fried (answer, page 7); and

claims 12 through 16 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Sekino as applied to claims 1 through 6 and 8 through 10 above, and further in view of Hummel (answer, pages 7-8).

According to the official electronic records of the USPTO, application 09/687,424 has not been refiled and was assigned the status of abandoned on March 25, 2005. Accordingly, the provisional rejection under the judicially created doctrine of obviousness-type double patenting is moot.

Appellants state with respect to the remaining grounds of rejection that the appealed claims “do not stand or fall together except as stated next” (brief, page 4). The examiner states that the claims “stand or fall together” because the brief does not provide supporting reasons (answer, page 2). We find that appellants have presented certain arguments with respect to claims 1 through 5, 7 through 12 and 15. We find that appellants merely point to the limitations of claims 13, 14 and 16 which does not constitute argument for separate patentability of these claims. Thus, we decide this appeal based on appealed claims 1, 6, 7, 11 and 12 as representative of the grounds of rejection and of claims 2 through 5 and 8 through 10 and 15 to the extent that the patentability thereof is argued by appellants. 37 CFR § 1.192(c)(7) (2003); *see In re McDaniel*, 293 F.3d 1379, 1383, 63 USPQ2d 1462, 1465 (Fed. Cir. 2002) (“*See* 37 CFR 1.192(c)(7) (2001). If the brief fails to meet either requirement, the Board is free to select a

single claim for each group of claims subject to a common ground of rejection as representative of all claims in that group and to decide the appeal of the rejection based solely on the selected representative claim.”); *see also* 37 CFR § 41.37(c)(1)(vii) (effective September 13, 2004; 69 Fed. Reg. 49960 (August 12, 2004); 1286 Off. Gaz. Pat. Office 21 (September 7, 2004)).

We affirm.

Rather than reiterate the respective positions advanced by the examiner and appellants, we refer to the answer and to the brief for a complete exposition thereof.

Opinion

We have carefully reviewed the record on this appeal and based thereon find ourselves in agreement with the supported position advanced by the examiner that, *prima facie*, one of ordinary skill in this art routinely following the teachings of Sekino would have reasonably arrived at compositions of matter which can be alloys falling within appealed claims 1 through 5, and that, *prima facie*, the combined teachings of Sekino with each of Stalker, Fried and Hummel would have reasonably suggested to this person that such alloys can be successfully cast and successfully welded such that this person would have reasonably arrived at the methods of appealed claims 6 through 12 and 15.

In order to consider whether the claimed alloys encompassed by the appealed claims would have been obvious from the alloys taught by Sekino, we must first interpret the language of appealed claims 1 through 12 and 15 by giving the claim terms their broadest reasonable interpretation consistent with the written description provided in appellants' specification as it would be interpreted by one of ordinary skill in this art, *see, e.g., In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997); *In re Zletz*, 893 F.2d 319, 321-22, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989); *In re Herz*, 537 F.2d 5649, 551, 190 USPQ 461, 463 (CCPA 1976), without reading into these claims any limitation or particular embodiment which is disclosed in the specification. *See Zletz, supra; In re Priest*, 582 F.2d 33, 37, 199 USPQ 11, 15 (CCPA 1978).

We determine from the plain language thereof that each of claims 1 through 12 and 15 encompass “compositions” which can be alloys, that consist essentially of at least the stated elements in amounts falling within the “weight percent” range for the respective elements, with nickel and impurities making up the “balance,” regardless of the amounts of any other elements

that can be included in the “composition” by reason of the term “consisting essentially of.” We point out that it is the “composition” as a whole that is being claimed in each of these claims in terms of the individual weight percent range or value of each of the elements thereof, and not the weight percent range or value of an element *per se*. We note that the same “composition” is recited in independent claims 1, 6 and 12, and in dependent claims 4 and 9, with a different “composition” recited in each of dependent claims 2, 3 and 5. Claims 7, 8, 10, 11, and 15 require the same “composition” as the claims on which they depend. Thus, we interpret the “composition” specified in the appealed claims only with respect to claims 1 through 6, 9 and 12.

Each of claims 1, 6 and 12, and thus claims 3 and 4, specify that the element tantalum can either be absent or present in view of the range of “from zero to about 2 percent,” except that in claims 2 and 5, dependent on claim 1, the “content” range is “less than about 1 percent” and “less than about 0.01 percent,” respectively, with the lower end of these two ranges being “zero” in view of the language “less than.” Thus, the claimed weight percent for tantalum is in the range of “from zero to about 2 percent” in claims 1, 3, 4, 6 and 12, of “zero” to about 0.999 percent in claim 2, and of “zero” to about 0.00999 percent in claim 5. Claim 3 contains the limitation that the “total of iron plus cobalt is from about 17 to about 19 percent,” each of which elements is specified in claim 1 to be present in the amount of “from about 6 percent to about 12 percent,” and thus, the limitation of claim 3 specifies that at least about 6 weight percent of each of iron and cobalt must be present, with the remaining about 5 to 7 weight percent of the limitation made of up either or both of these elements, mindful that no more than 12 weight percent of either element can be present. In claims 4 and 9, the iron “content” is in the range of “from about 8 percent to about 9.5 percent.” Claim 5 delimits the “content” range of the stated elements from that specified in claim 1. Claim 5 does not specify the amount of zirconium, nickel and impurities contents which are specified by claim 1, and thus, the compositions of matter encompassed by claim 5 must comply with the claim 1 limitations of “less than about 0.1 percent zirconium,” which, of course, includes “zero” zirconium, and the “balance nickel and impurities.” With respect to zirconium, the claimed weight percent range is “zero” to about 0.0999 percent.

We determine on this record that the term “about” reasonably opens the specified weight percentage ranges at the end(s) where it appears. *See Pall Corp. v. Micron Separations Inc.*,

66 F.3d 1211, 1217-18, 36 USPQ2d 1225, 1229 (Fed. Cir. 1995) (“The use of the word ‘about,’ avoids a strict numerical boundary to the specified parameter. Its range must be interpreted in its technological and stylistic context.”); *see also Eiselstein v. Frank*, 52 F.3d 1035, 1038-40, 34 USPQ2d 1467, 1470-71 (Fed. Cir. 1995).

The term “consisting essentially of” defining the “composition in claims 1 through 6, 9 and 12 is used in claim construction to indicate that “the invention necessarily includes the listed ingredients and is open to unlisted ingredients that do not materially affect the basic and novel properties of the invention.” *PPG Indus., Inc. v. Guardian Indus. Corp.*, 156 F.3d 1351, 1354, 48 USPQ2d 1351, 1353-54 (Fed. Cir. 1998). Thus, the interpretation of this term requires a determination of whether the inclusion in the claimed composition of additional element(s) in the amount(s) taught in the applied prior art would materially affect the basic and novel characteristics of the claimed composition, because this term customarily excludes such materials. *See Herz, supra* (explaining *Ex parte Davis*, 80 USPQ 448 (Pat. Off. Bd. App. 1948)). In arriving at this determination, the written description of the written description in appellants’ specification must be considered. *Herz; supra* (“[I]t is necessary and proper to determine whether [the] specification reasonably supports a construction” that would exclude or include particular ingredients.); *see also PPG Indus.*, 156 F.3d at 1354-57, 48 USPQ2d at 1353-56 (Patentees “could have defined the scope of the phrase ‘consisting essentially of’ for purposes of its patent by making clear in its specification what it regarded as constituting a material change in the basic and novel characteristics of the invention. The question for our decision is whether PPG did so.”).

Our review of the written description in the specification reveals no teachings of additional elements that materially affect the basic and allegedly novel characteristics of the claimed compositions, which are disclosed to form alloys that are castable and weldable (specification, e.g., page 2, [0007]). Therefore, it is appellants’ burden to establish that elements contained by the alloys of Sekino which are not specified in appealed claims 1 through 6, 9 and 12 would be deleterious to the basic and allegedly novel characteristics of the compositions falling within these claims, and thus excluded from the claims by use of the transitional term “consisting essentially of.” *See PPG Indus., supra; Herz, supra.*

The method of providing a cast article encompassed by appealed claim 6 comprises at least the steps of providing a molten mass of metal having the specified composition by any process, and casting the molten metal by any process to form a cast article, which articles can be hot isostatic pressed by any process, otherwise heat treated by any process, placed into any service application at a maximum service temperature of at least about 1300°F (704.444°C), that is, at a service temperature range having an limit that is equal to or exceeds about 1300°F (704.444°C), and welded to any piece of any metal by any process, as in claims 7, 8, 10, and 11, respectively. The method of preparing a welded article encompassed by appealed claim 12 comprises at least the steps of providing a piece of material having the specified composition by any process, and welding the piece of metal to any piece of metal by any process to form the welded article, which can include surface welding by any process as in claim 15. The transitional term “comprising” in claims 6 and 12 opens appealed claims 6 through 12 and 15 to methods that include any manner of steps and materials in addition the steps and compositions listed. *See In re Baxter*, 656 F.2d 679, 686-87, 210 USPQ 795, 802-03 (CCPA 1981) (“As long as one of the monomers in the reaction is propylene, any other monomer may be present, because the term ‘comprises’ permits the *inclusion* of other steps, elements, or materials.”).

The examiner relies on the heat resistant alloys having excellent hot workability containing the elements set forth in Sekino claim 2 (answer, page 4). We find the same disclosure at col. 2, ll. 1-11 of the reference, and refer only to this disclosure in the remainder of our opinion.

We find that, *prima facie*, one of ordinary skill in this art routinely following the teaching at col. 2, ll. 1-11, in light of the other disclosure in Sekino¹ would have reasonably arrived at compositions that are heat resistant nickel alloys which have the properties taught by the reference. In other words, one of ordinary skill in this art can select the elements from among those disclosed, in any amount within the weight percent range taught for each element, to form

¹ It is well settled that a reference stands for all of the specific teachings thereof as well as the inferences one of ordinary skill in this art would have reasonably been expected to draw therefrom, *see In re Fritch*, 972 F.2d 1260, 1264-65, 23 USPQ2d 1780, 1782-83 (Fed. Cir. 1992); *In re Preda*, 401 F.2d 825, 826, 159 USPQ 342, 344 (CCPA 1968); *Aller*, 220 F.2d at 458-59, 105 USPQ at 237, presuming skill on the part of this person. *In re Sovish*, 769 F.2d 738, 743, 226 USPQ 771, 774 (Fed. Cir. 1985).

heat resistant nickel alloys having excellent hot workability that are castable. Indeed, Sekino would have disclosed to one of ordinary skill in this art the function of the elements of the alloys in these respects (cols. 1-4 and the Examples).

The hot working disclosed in Sekino includes processes wherein the “alloys are usually deformed at high temperatures (hot worked) . . . [by] a working method which makes use of the character of the alloys that they soften at high temperatures . . . [such] that products of good dimensional accuracy can be easily obtained by small working power” (col. 1, ll. 6-15). Sekino discloses that “conventional alloys have a vital defect that they are susceptible to hot work cracking” and that the disclosed alloys overcome such defects (col. 1, ll. 16-47). Sekino discloses that certain elements provide the disclosed alloys with improved hot workability at temperatures of from 1,100°C to 1,150°C, that is 2,012°F to 2,102°F (e.g., col. 3, ll. 43-47, and col. 3, l. 65, to col. 4, l. 5). Sekino discloses several “ordinary production methods which includes melting and refining” that produce cast articles which “may be subjected to temper treatments” (col. 4, ll. 43-62, and the Examples, cols. 5-6).

Upon comparing the claimed compositions encompassed by claims 1 through 6, 9 and 12 as we have interpreted these claims above, with the heat resistant nickel alloys thus set forth at col. 2, ll. 1-11, we find that the claimed weight percent ranges for each of chromium (Cr), cobalt (CO), molybdenum (Mo), carbon (C) and boron (B) fall *within* the weight percent ranges for these elements in Sekino. The claimed weight percent ranges for each of niobium (Nb), titanium (Ti) and aluminum (Al) also fall *within* the weight percent ranges for the respective elements in the reference. The claimed weight percent for tantalum (Ta) in claims 1, 2 through 4, 6, 9 and 12 (*see above* p. 4) *overlaps* with the weight percent range for this element in Sekino, while there is a *minor difference* between the upper limit of about 0.00999 percent of the range of claim 5 and the lower limit of 0.05 percent of the range in Sekino of about 0.04001 percent. We find no disclosure in the written description in the specification of an amount of Ta less than the amount of about 0.00999 percent.

The total weight percent range for the elements Nb, Ta, Ti and Al in claims 1, 3, 4, 6, 9 and 12 is about 5.85 percent to about 9.35 percent, in claim 2 is about 5.85 percent to about 8.349 percent, and in claim 5 is about 6.50 to about 6.5099 percent, each of which ranges falls *within* the weight percent range of 0.05 to 10.0 percent for these four elements and the additional

elements of vanadium (V), copper (Cu) and yttrium (Y) at col. 2, ll. 9-10 of Sekino, the last three elements not specified in the appealed claims. With respect to the latter limitation in the reference, we find that one of ordinary skill in this art routinely working within this teaching of the reference can select Nb, Ta, Ti and Al in amounts falling within in the weight ranges in the claims, or in the case of Ta, in an amount close to the amount in claim 5, and as desired, can select none, one or more of V, C, and Y in amounts up to the amount limitation for each element and the limitation on the total amount of these seven elements.

We find that zirconium (Zr) is present in the claimed compositions in the range of “zero” to about 0.0999 percent (*see above* p. 4) while this element is present in the range of 0.001 to about 6.0 percent in Sekino. Thus, the claimed range *overlaps* the lower end of the range of the reference. We observe that there is no disclosure in the written description in appellants’ specification of an amount of Zr that is less than the amount of 0.001 percent, the lower end of the range in the reference. We interpreted claim 5 above to include the same weight percent range of this element as claim 1.

We further find that the appealed claims specify that iron (Fe) must be present in the range of about 6 to about 12 percent while this element is disclosed to constitute the “balance” of the alloys of Sekino. The last specified element of the claimed compositions is nickel (Ni) which forms the “balance” of the claimed compositions, and is present in the range of 22.0 to 80.0 percent in the alloys of Sekino. Considering first Fe, we find from a review of the weight percent ranges of the elements in the alloys of Sekino col. 2, ll. 1-11, that the “balance” of this element can cover a broad range which would *encompass* the range specified in the appealed claims, that is, the range of Fe in the claimed compositions falls *within* the range for this element in the teachings of Sekino. Indeed, while the “balance” amount of Fe is about 50.94 percent in Sekino Example B, which contains 20.0 percent Ni, in Sekino Examples E, F, G, J and K, which contain 50.0 percent or 75.0 percent Ni, the “balance” ranges from about 7.32 to about 7.90 percent. Thus, we determine that one of ordinary skill in this art can determine the “balance” of Fe which can be used in the alloys, and that amount can fall *within* the range of from about 6 percent to about 12 percent for this element in claims 1, 2, 6 and 12, and *encompasses* the amount of Fe in claims 3 through 5 and 9 (*see above* p. 4).

The “balance” with respect to Ni in the claimed compositions depends on all of the elements and the amounts thereof present in the composition, including those unspecified elements which do not materially affect the basic and allegedly novel properties of the claimed compositions that would be included therein by reason of the transitional term “consisting essentially of” as we discussed above. We determine that alloys which have *only* the ingredients specified in the claims contain Ni in the range of about 42.1901 percent to about 63.3350 percent in claims 1, 3, 4, 6, 9 and 12, in the range of about 42.1901 percent to about 64.3360 percent in claim 2, and in the range of about 54.3531 percent to about 54.4630 percent in claim 5, which are all *within* the range of 22.0 to 80.0 percent for Ni disclosed in Sekino.

The examiner points out that, *prima facie*, Sekino would have disclosed to one of ordinary skill in this art the functions served by the inclusion of the disclosed amounts of Si and Mn, of one or more of Ce, Mg and Be, as well as of any of W, V, Cu and Y, wherein V, Cu and Y are limited by the total amount of Ti, Nb, Ta, Al, V, Cu and Y, that may be present in the alloys of Sekino col. 2, ll. 1-11, with respect to forming a heat resistant alloy having excellent hot workability which can be cast, and thus would not materially affect the basic and novel properties of the claimed compositions (answer, pages 4-6). In the absence of a disclosure in the written description in the specification of elements or amounts thereof which materially affect the basic and allegedly novel properties of the claimed compositions, and in view of the disclosure of the functions of the elements and amounts thereof with respect to alloy properties in cols. 1-4 of Sekino, we agree with the examiner’s analysis. In this respect, the amount of the elements that are unspecified in the appealed claims and shown in Sekino added to the amounts of the elements that are specified in the claims, results in a content of Ni in the claimed compositions of claims 1 through 6, 9 and 12 in the range of about 22.00 percent to about 63.2120 percent which falls *within* the range of 22.0 percent to 80.0 percent in Sekino col. 2, ll. 1-11.

Therefore, *prima facie*, the disclosure of Sekino provides substantial evidence in support of the examiner’s position that all of the claimed compositions encompassed by appealed claims 1 through 12 and 15 fall *within* the alloys encompassed by Sekino col. 2, ll. 1-11, taken in light of the other disclosure in the reference, with the exception of those claimed compositions which contain less than about 0.0499 weight percent Ta and/or less than about 0.001 weight percent Zr.

In the former respect, one of ordinary skill in the art would have reasonably arrived at a workable or even optimum range for each of the elements set forth in Sekino col. 2, ll. 1-11, through routine experimentation, thus arriving at compositions having the properties set forth in the reference, that are encompassed by the appealed claims, as indeed, *all* of the claimed compositions in this respect fall *within* the alloys of Sekino col. 2, ll. 1-11. *See In re Peterson*, 315 F.3d 1325, 1330, 65 USPQ2d 1379, 1382 (Fed. Cir. 2003) (the claimed ranges for the alloy elements *fell within* the corresponding prior art ranges: “Selecting a narrow range from *within* a somewhat broader range disclosed in a prior art reference is no less obvious than identifying a range that simply *overlaps* a disclosed range. In fact, when, as here, the claimed ranges are completely encompassed by the prior art, the conclusion is even more compelling than in cases of mere overlap. The normal desire of scientists or artisans to improve upon what is generally known provides the motivation to determine where in a disclosed set of percentage ranges is the optimum combination of percentages. [Citations omitted.]”); *In re Aller*, 220 F.2d 454, 456-58, 105 USPQ 233, 235-37 (CCPA 1955) (“[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.”).

With respect to those claimed compositions which contain less than about 0.0499 weight percent Ta and/or less than about 0.001 weight percent Zr, the claimed ranges and those of the reference clearly have a slight *overlap* with respect to Ta and Zr and further a *minor difference* with respect to the Ta range of claim 5. On this record, we determine that, *prima facie*, one of ordinary skill in this art would have reasonably expected that such claimed compositions encompassed by the slight overlap or the minor difference in the weight percent range for these elements would have the same properties as the alloys of the reference which contain 0.05 weight percent Ta and 0.001 weight percent Zr. *See generally, In re Geisler*, 116 F.3d 1465, 1470, 43 USPQ2d 1362, 1365 (Fed. Cir. 1997), citing *In re Malagari*, 499 F.2d 1297, 1303, 182 USPQ 549, 553 (CCPA 1974); *Haynes Int’l, Inc. v. Jessop Steel Co.*, 8 F.3d 1573, 1576-77, 1577 n.3, 28 USPQ2d 1652, 1654-55, 1655 n.3 (Fed. Cir. 1993); *In re Woodruff*, 919 F.2d 1575, 1577-78, 16 USPQ2d 1934, 1936-37 (Fed. Cir. 1990); *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 783, 227 USPQ 773, 779 (Fed. Cir. 1985) (“[T]he Russian article discloses two alloys having compositions very close to that of claim 3, which is 0.3% Mo and

0.8% Ni, balance titanium. The two alloys in the prior art have 0.25% Mo - 0.75% Ni and 0.31% Mo - 0.94% Ni, respectively. The proportions are so close that prima facie one skilled in the art would have expected them to have the same properties.”); *In re Boesch*, 617 F.2d 272, 275-76, 205 USPQ 215, 218-19 (CCPA 1980).

Therefore, the evidence of record establishes that, *prima facie*, one of ordinary skill in this art routinely following the teachings of Sekino col. 2, ll. 1-11, in light of the other disclosure in the reference, would have reasonably arrived at the claimed compositions encompassed by appealed claims 1 through 5 as well as by appealed claims 6 through 12 and 15, without resort to appellants’ specification and claims.

Accordingly, with respect to the claimed compositions of matter encompassed by appealed claims 1 through 5, the burden has shifted to appellants to show that the claimed compositions would not have been obvious over the compositions taught by Sekino. *See generally, Peterson*, 3156 F.3d at 1330, 65 USPQ2d at 1382-83; *Geisler, supra; Woodruff, supra; Titanium Metals, supra; Boesch, supra; Malagari, supra; Aller, supra; see also In re Best*, 562 F.2d 1252, 1255-56, 195 USPQ 430, 433-34 (CCPA 1977).

With respect to the methods of providing a cast article from the specified compositions in claims 6 and 8 through 10, as we interpreted these claims above, *prima facie*, the disclosure of Sekino provides substantial evidence in support of the examiner’s position that the claimed methods would have been taught to one of ordinary skill in this art by the disclosure of casting compositions falling within these claims into articles, hot working and temper treating, that is, heat treating, the cast articles and using the articles at temperatures of at least 1300°F (704.444°C) (answer, page 6). Indeed, with respect to the service temperature of claim 10, we found above that Sekino discloses that the disclosed heat resistant alloys can be hot worked at temperatures of from 1,100°C to 1,150°C, that is 2,012°F to 2,102°F, which is well in excess of the claimed threshold service temperature, and, as the examiner points out, Sekino further discloses different applications for the cast and treated articles produced from alloys at such temperatures (e.g., col. 1, ll. 6-25, col. 4, ll. 57-67, and Examples, cols. 5 and 6). Accordingly, with respect to the claimed methods by appealed claims 6 and 8 through 10, the burden has shifted to appellants to show that the claimed methods would not have been obvious over the methods taught by Sekino. *See generally, Peterson, supra; Geisler, supra; Woodruff, supra*

(“The law is replete with cases in which the difference between the claimed invention and the prior art is some range or other variable within the claims. [Citations omitted.] These cases have consistently held that in such a situation, the applicant must show that the particular range is *critical*, generally by showing that the claimed range achieves unexpected results relative to the prior art range. [Citations omitted.]”); *Titanium Metals, supra*; *Boesch, supra*; *Best, supra*; *Malagari, supra*; *Aller, supra*.

Turning now to claim 7, which specifies that the method of casting of claim 6 include, after the casting step, hot isostatic pressing the cast article, the examiner finds that, *prima facie*, the combined teachings of Sekino and Stalker would have suggested to one of ordinary skill in this art to hot isostatic press the heat resistant alloys of Sekino by the method of Stalker (e.g., col. 2, ll. 1-25) in the reasonable expectation of improving structural integrity by removing casting defects (answer, page 6). We find that, *prima facie*, the combined teachings of Sekino and Stalker provide substantial evidence in support of the examiner’s position. We interpreted claim 7 to encompass any hot isostatic pressing step for a cast article of the composition of claim 6, and we find that Stalker in fact would have disclosed the application of such treatment to superalloys that nominally include the elements Ni, Co, Fe and Ti and can be treated in the range of 1300-2250° F., that is, 704.444-1232.22° C. (e.g., col. 2, ll. 1-35, table I and the Examples). We further find that one of ordinary skill in this art would have recognized that the alloys so described by Stalker would include the heat resistant alloys of Sekino which can be hot worked at temperatures within the range of the Stalker process, and Sekino does disclose that such alloys can exhibit hot work cracking (e.g., col. 1; *see above* pp. 6-7). Thus, *prima facie*, one of ordinary skill in this art routinely following the combined teachings of Sekino and Stalker would have arrived at the claimed invention, including each and every limitation of claim 7 arranged as required by that claim, without resort to appellants’ specification and claim. *In re Dow Chem. Co.*, 837 F.2d 469, 473, 5 USPQ2d 1529, 1531 (Fed. Cir. 1988) (“The consistent criterion for determination of obviousness is whether the prior art would have suggested to one of ordinary skill in the art that [the claimed process] should be carried out and would have a reasonable likelihood of success, viewed in light of the prior art. [Citations omitted.] Both the suggestion and the expectation of success must be founded in the prior art, not in the applicant’s disclosure.”); *In re Keller*, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981)(“The test for

obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art.”); *see also In re O’Farrell*, 853 F.2d 894, 903-04, 7 USPQ2d 1673, 1680-81 (Fed. Cir. 1988) (“Obviousness does not require absolute predictability of success. . . . There is always at least a possibility of unexpected results, that would then provide an objective basis for showing that the invention, although apparently obvious, was in law nonobvious. [Citations omitted.] For obviousness under § 103, all that is required is a reasonable expectation of success. [Citations omitted.]”).

The method of claim 11 specifies that any piece of metal can be welded by any process to a cast article of the composition of claim 6. The examiner finds that, *prima facie*, the combined teachings of Sekino and Fried would have suggested to one of ordinary skill in this art that a cast alloy article of the heat resistant alloys of Sekino can be welded to another alloy as shown by Fried in the reasonable expectation of obtaining an alloy welded to a cast alloy (answer, page 7). We find that, *prima facie*, the combined teachings of Sekino and Fried provide substantial evidence in support of the examiner’s position. Indeed, Fried would have disclosed to one of ordinary skill in this art a rotating thermal machine blading assembly comprising shroud plate **5** “made from a nickel-based superalloy (it being fundamentally possible to use a forged or cast non-dispersion-hardened alloy)” (col. 3, ll. 53-56; see also col. 11, ll. 26-30), as illustrated in Fried Example 1 wherein “[a] shroud plate **5** was cast from a non-dispersion-hardened nickel based cast superalloy” (col. 6, ll. 21-37). Fried further discloses that smooth, straight wire **10** prepared from a heat-resisting forged non-hardening nickel-based superalloy, inserted into groove **8** to lock shroud plate **5** to tip **2** of the airfoil, and illustrates such a composition in Fried Example 1 (e.g., col. 2, ll. 7-12 and 42-59, col. 4, ll. 9-23 and 33-42, col. 6, l. 53, to col. 7, l. 12, and col. 11, ll. 14-20). Fried teaches that wire **10** can be secured to shroud plate **5** by, among others, welding (col. 11, ll. 23-26).

While the illustrative nickel based cast superalloy composition for shroud plate **5** in Fried Example 1 does differ from the heat resistant alloy compositions of the nickel-based, castable compositions of Sekino in the absence of several elements, we are of the opinion that this person would have used heat resistant alloys disclosed by Sekino for casting shroud plate **5** in the

reasonable expectation of obtaining a shroud plate with the necessary properties for use in a rotating thermal machine blading assembly as stated by the examiner. We find no disclosure in either Sekino or Fried which would have suggested to one of ordinary skill in this art that the castable compositions of either reference cannot be welded as taught by Fried. Thus, *prima facie*, one of ordinary skill in this art routinely following the combined teachings of Sekino and Fried would have arrived at the claimed invention, including each and every limitation of claim 11 arranged as required by that claim, without resort to appellants' specification and claim. *Dow Chem., supra; Keller, supra; see also O'Farrell, supra.*

The method of claim 12 comprises at least the steps of welding any piece of metal that includes the specified composition that is prepared by any processes, to any piece of metal by any process to form a welded article, which can include surface welding by any process as in claim 15. The examiner finds that, *prima facie*, the combined teachings of Sekino and Hummel would have suggested to one of ordinary skill in this art that tubing made of an alloy such as the heat resistant nickel alloys of Sekino can be welded together as shown by Hummel in the reasonable expectation of obtaining welded tubing (answer, pages 7-8). We find that, *prima facie*, the combined teachings of Sekino and Hummel provide substantial evidence in support of the examiner's position. Indeed, Hummel would have disclosed to one of ordinary skill in this art that the welding method taught therein is suitable for welding, among others, "heat-resistant alloys," "aluminum alloys, . . . copper alloys, magnesium alloys, nickel alloys, titanium alloys, and zirconium alloys" (col. 6, ll. 32-38), which would have reasonably suggested using tubing prepared from the heat resistant nickel alloys of Sekino which contain also contain aluminum, copper, magnesium, titanium and zirconium elements. Furthermore, with respect to the method of claim 15, as the examiner points out, as a matter of fact one of ordinary skill in this art would have readily observed that the welding of the tubing in Hummel involves surface welding because the surfaces of the end of the tube are necessarily welded to form the butt joint (answer, page 8). Thus, *prima facie*, one of ordinary skill in this art routinely following the combined teachings of Sekino and Hummel would have arrived at the claimed invention, including each and every limitation of claims 12 and 15 arranged as required by that claim, without resort to appellants' specification and claims. *Dow Chem., supra; Keller, supra; see also O'Farrell, supra.*

Therefore, in view of the *prima facie* case of obviousness established over the teachings of Sekino alone and as combined with Stalker, with Fried and with Hummel by the examiner, we again evaluate all of the evidence of obviousness and nonobviousness based on the record as a whole, giving due consideration to the weight of appellants' arguments in the brief. *See generally, In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992); *In re Piasecki*, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984).

We cannot agree with the arguments advanced by appellants with respect to the claimed compositions specified in claims 1 through 6, 9 and 12, which involve the transitional term "consisting essentially of" and a comparison of such claimed compositions and the heat resistant alloys taught by Sekino at col. 2, ll. 1-11 (brief, pages 6-11). The examiner, noting the transitional term, takes the position that "the additional elements of [Sekino] . . . do not materially affect the novel characteristics of the inventive alloy" (answer, page 4). Thus, the principal issue in this appeal is whether the claimed composition as encompassed by these claims using said transitional term exclude the additional elements which either are required in or can be present in the alloys of Sekino col. 2, ll. 1-11, and not whether such additional elements of Sekino materially affect the basic characteristics of such alloys of Sekino. Indeed, the mere fact that Sekino col. 2, ll. 1-11, does not disclose alloys in the exact same language used in appealed claims 1, 6 and 12 does not, as appellants contend, constitute a "teaching away" under the authority of *In re Gurley*, 27 F.3d 551, 552-53, 31 USPQ2d 1130, 1131-32 (Fed. Cir. 1994), and it is well settled that applicants' mere intent as to the scope of the claimed invention does not so limit the scope of a claim which is otherwise definite when construed in light of the specification as it would be interpreted by one of ordinary skill in the art. *In re Cormany*, 476 F.2d 998, 1000-02, 177 USPQ 450, 451-53 (CCPA 1973). Accordingly, as we set forth above (*see p. 5*), appellants have the burden to establish that the additional elements contained by the alloys of Sekino col. 2, ll. 1-11, would be deleterious to the basic and novel characteristics of the compositions encompassed by appealed claims 1 through 6, 9 and 12, and we find no convincing argument in this respect.

Furthermore, the differences in ranges of amounts of elements between the appealed claims and Sekino col. 2, ll. 1-11, does not confer patentability to the claimed alloys because the alloy compositions as a whole so claimed are either encompassed by the alloy compositions as a

whole disclosed at Sekino col. 2, ll. 1-11, or, on this record, the difference therebetween is minor, thus shifting the burden to appellants to establish that the claimed alloys would not have been obvious over those of Sekino. We also do not agree with appellants' arguments that the teachings of the ranges of the claimed amounts of Ni and Fe are not found in Sekino (brief, pages 8-9 and 12), because one of ordinary skill in this art would have looked to the teachings of the whole of the disclosure of Sekino, including the illustrative Examples therein, with respect to the disclosure at col. 2, ll. 1-11, and accordingly, we remain of the opinion expressed in these respects above based on the facts in the reference (*see above* pp. 8-9). We further note with respect to appellants' arguments (brief, pages 10-11), that the disclosure of the alloy compositions at Sekino col. 2, ll. 1-11, is couched in the same format used by appellants in specifying the compositions in claims 1 through 6, 9 and 12. Finally, with respect to appellants' argument that certain material in Sekino is "cast and wrought" (brief, page 11), we find no limitation in appealed claims 6 and 8 through 10 which excludes "wrought" because the specified limitations require only "casting . . . into a mold to form a cast article" which cast article can then be further treated as permitted by the transitional term "comprising," and indeed, claims 7, 8 and 11 include a further treatment step of the cast article.

We are not convinced by appellants' arguments with respect to appealed claim 7 (brief, pages 12-15) that the teachings of Sekino and Stalker would not have been combined by one of ordinary skill in this art because we remain of the opinion stated above that the disclosure of Stalker would have suggested to this person that the method thereof can be applied to cast articles of the heat resistant alloys of Sekino Col. 2, ll. 1-11. Indeed, even if we adopted appellants' unsupported argument² that the hot working of the cast article as taught by Sekino "largely removes the casting defects that Stalker is seeking to remedy," the so hot worked casting of Sekino would still contain defects at least to some extent, and thus would benefit from the Stalker method.

We are also not convinced by appellants' arguments with respect to appealed claim 11 (brief, pages 15-16) that the teachings of Sekino and Fried would not have been combined by

² It is well settled that arguments not supported by evidence are entitled to little, if any, weight. *See In re Payne*, 606 F.2d 303, 315, 203 USPQ 245, 256 (CCPA 1979); *In re Lindner*, 457 F.2d 506, 508, 173 USPQ 356, 358 (CCPA 1972).

one of ordinary skill in this art because appellants' unsupported allegations do not address the clear teachings in Fried of the weldable alloys used only for shroud plate **5**, not the whole of the gas turbine blade, which alloys would encompass the heat resistant alloys of Sekino Col. 2, ll. 1-11. Appellants' arguments also do not establish that such heat resistant alloys are taught in Sekino to be of limited "end use."

We now turn to appellants' arguments with respect to appealed claims 12 and 15 (brief, pages 16-18). Considering first claim 15, appellants contend that the rejection did not "recognize the conventional usage of 'surface weld'" as set forth in para. [0014] and [0039] (brief, pages 16 and 18), which paragraphs appear at pages 4 and 7-8 of the specification and refer to specification **FIGs. 3, 4 and 5**. We fail to find in the written description in the specification the claim term "surface welding" or a specific definition thereof as indeed, there is no specialized "welding" method associated with this term in the disclosure:

The piece 60 is welded, numeral 52 [of FIG. 3]. The welding may be accomplished, numeral 52, by any operable approach, with and without a filler metal. Where used, the filler metal is preferably but not necessarily of the same composition as the piece 60. . . . In FIG. 4, surface cracks 62 in the single piece 60 of the alloy are welded closed with a filler metal of the same alloy composition as the piece 60, to produce a filled crack 64. This approach is used to repair those surface cracks 62 that are present following casting. [Page 9, ll. 3-9.]

Thus, we give the term "surfacing welding" its broadest reasonable interpretation which is to weld the alloy at its surface to another metal, which is all that is disclosed in the specification, even though the welding can serve additional purposes, mindful that limitations in the specification are not to be read into the claims. *See, e.g., Morris, supra; Zletz, supra* ("During patent prosecution the pending claims must be interpreted as broadly as their terms reasonably allow. When the applicant states the meaning that the claim terms are intended to have, the claims are examined with that meaning, in order to achieve a complete exploration of the applicant's invention and its relation to the prior art. *See In re Prater*, 415 F.2d 1393, 1404-05, 162 USPQ 541, 550-51 (CCPA 1969).").

We recognize that, as appellants point out, there is no express teaching in Sekino or Hummel to weld the alloys of Sekino col. 2, ll. 1-11, at a surface of an article thereof or otherwise (brief, pages 17-18). However, as we found above, Hummel discloses welding a number of alloys including heat resistant alloys and nickel alloys as well as alloys based on

aluminum, copper, magnesium, titanium and zirconium which elements are found in the heat resistant alloys of Sekino. We are of the opinion that this disclosure provides substantial evidence in support of the position that one of ordinary skill in this art would thus have had a reasonable expectation of success in welding the butt surfaces of tubing prepared from the heat resistant alloys of Sekino by the method of Hummel, which is all that is required to establish a *prima facie* case of obviousness, rebuttable by appellants. We are of the view that appellants' arguments here do not constitute effective rebuttal argument. *See O'Farrell, supra; Dow Chem., supra; Keller, supra.*

Accordingly, based on our consideration of the totality of the record before us, we have weighed the evidence of obviousness found in Sekino alone and as combined with Stalker, with Fried and with Hummel with appellants' countervailing evidence of and argument for nonobviousness and conclude that the claimed invention encompassed by appealed claims 1 through 15 would have been obvious as a matter of law under 35 U.S.C. § 103(a).

The examiner's decision is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a)(1)(iv) (effective September 13, 2004; 69 Fed. Reg. 49960 (August 12, 2004); 1286 Off. Gaz. Pat. Office 21 (September 7, 2004)).

AFFIRMED

EDWARD C. KIMLIN)	
Administrative Patent Judge)	
)	
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)	
CHUNG K. PAK)	BOARD OF PATENT
Administrative Patent Judge)	APPEALS AND
)	INTERFERENCES
)	
)	
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Appeal No. 2005-0567
Application 10/280,391

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