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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/523,780	05/02/2017	Tatsuya SHOUJI	Q232548	9058
23373	7590	03/03/2020	EXAMINER	
SUGHRUE MION, PLLC 2000 PENNSYLVANIA AVENUE, N.W. SUITE 900 WASHINGTON, DC 20006			WALCK, BRIAN D	
			ART UNIT	PAPER NUMBER
			1736	
			NOTIFICATION DATE	DELIVERY MODE
			03/03/2020	ELECTRONIC

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte TATSUYA SHOUJI,
YUKIO SHINJI, and KATSUFUMI KURODA

Appeal 2019-004651
Application 15/523,780
Technology Center 1700

BEFORE MICHAEL P. COLAIANNI, GEORGE C. BEST, and
DEBRA L. DENNETT, *Administrative Patent Judges*.

DENNETT, *Administrative Patent Judge*.

DECISION ON APPEAL¹

Pursuant to 35 U.S.C. § 134(a), Appellant² appeals from the Examiner's decision to reject claims 1 and 2 of Application 15/523,780. Final Act. 1; Appeal Br. 6–13. We have jurisdiction under 35 U.S.C. § 6.

For the reasons set forth below, we AFFIRM.

¹ In our Decision, we refer to the Specification filed May 2, 2017 (“Spec.”) of Application 15/523,780 (“the ’780 Application”); the Final Office Action dated May 31, 2018 (“Final Act.”); the Appeal Brief filed Oct. 31, 2018 (“Appeal Br.”); the Examiner’s Answer dated Mar. 26, 2019 (“Ans.”); and the Reply Brief filed May 23, 2019 (“Reply Br.”).

² We use the word “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42. Appellant identifies Hitachi Metals, Ltd. as the real party in interest. Appeal Br. 2.

BACKGROUND

The '780 Application relates to cold work tools, such as a die for pressing, forging, and rolling; or a tool for cutting metal. *See* Spec 1:3–4. The '780 Application describes that a cold work tool is conventionally constructed from standardized JIS-G-4404 alloy tool steel, such as SKD10 or 11 type series. *Id.* 1:10–11. These alloy tool steel materials provide the cold work tool improved wear resistance from repeated contact with a hard workpiece. *Id.* 1:9–10. The '780 Application describes a cold work tool, which is said to have improved wear resistance in comparison to conventional cold work tools. *Id.* 2:31–32, 3:1–2.

Claim 1 is representative of the '780 Application's claims and is reproduced below from the Claims Appendix of the Appeal Brief with key limitations italicized.

1. A cold work tool having a composition comprising: by mass,
 - C: 1.30 to 2.40%
 - Cr: 8.0 to 15.0%
 - Mo and W alone or in combination in an amount of (Mo + $\frac{1}{2}$ W): 0.50 to 3.00%
 - V: 0.10 to 1.50%
 - Si: not more than 2.00%
 - Mn: not more than 1.50%
 - P: not more than 0.050%
 - S: not more than 0.0500%
 - optionally Ni: 0 to 1.00%
 - optionally Nb: 0 to 1.50%, and
 - the balance of Fe and impurities,

and *having a martensitic structure,*

wherein the tool has a hardness of not lower than 58 HRC,

wherein an area ratio of carbides having a circle equivalent diameter of not less than 5 μm in a cross-sectional structure of the tool is not lower than 4.0 area%, and

wherein a carbon solid solution ratio is not less than 75.0%, where the carbon solid solution ratio is defined as a ratio, by mass, of an amount of carbon solid-soluted in the structure of the tool to a total amount of carbon included in the tool.

Appeal Br. 14–15 (emphasis added).

REFERENCES

The Examiner relies on the following prior art in rejecting the claims on appeal:

Name	Reference	Date
Shimizu	US 2009/0107587 A1	Apr. 30, 2009
Barbosa et al. ("Barbosa")	US 2009/0123322 A1	May 14, 2009

REJECTIONS

On appeal, the Examiner maintains the following rejections:³

1. Claims 1 and 2 under 35 U.S.C. § 102(a)(1) and 35 U.S.C. § 102(a)(2) as anticipated by or, in the alternative, under 35 U.S.C. § 103 as obvious over Shimizu. Final Act. 4–5.

³ Because this application was filed after the March 16, 2013, effective date of the America Invents Act, we refer to the AIA version of the statute.

2. Claims 1 and 2 under 35 U.S.C. § 103 as obvious over Barbosa. Final Act. 5–7.
3. Claims 1 and 2 on the ground of nonstatutory double patenting over the claims of co-pending Application Nos. 14/914,380 (“the ’380 Application”); 15/517,618 (“the ’618 Application”); and 15/566,812 (“the ’812 Application”).⁴ Final Act. 8–9.

DISCUSSION

Appellant’s arguments focus on limitations recited in independent claim 1. Appeal Br. 6–13; Reply Br. 4–7. We select claim 1 as representative of the group. Claim 2 stands or falls with claim 1. *See* 37 C.F.R. § 41.37(c)(1)(iv).

Ground 1: Rejection of claims 1 and 2 as anticipated by or, in the alternative, as obvious over Shimizu

Regarding claim 1, the Examiner finds Shimizu’s comparative steel 3 composition: (i) comprises each requisite element in a wt% concentration, which lies within each element’s claimed wt% range, and (ii) has a hardness of 59 HRC, which lies within the claimed HRC range. Final Act. 4–5 (citing Shimizu Abstract; Tables 1, 2).

With regard to the structural property limitations recited in claim 1, the Examiner finds Shimizu’s comparative steel 3 would have been “expected to have the same or similar properties as the instantly claimed

⁴ We note that the claims of the ’380 Application, the ’618 Application, and the ’812 Application, are allowed as US 9,890,435 B2, issued Feb. 13, 2018; US 9,994,925 B2, issued June 12, 2018; and US 10,407,747 B2, issued Sept. 10, 2019, respectively.

steel because it has the same composition.” Final Act. 5; *see* Shimizu Tables 1, 2. The Examiner reasoned that because Shimizu’s martensitic cold work tool steel structure “is substantially identical to that of the claims,” the “claimed properties or functions are presumed to be inherent.” Final Act. 5; *see* Shimizu ¶¶ 3, 53, 133.

A *prima facie* case of obviousness may be shown where structural similarities exist between the claimed and prior art compositions and reason or motivation exists to make the claimed composition. *In re Dillon*, 919 F.2d 688, 692 (Fed. Cir. 1990) (en banc) (“[the] structural similarity between claimed and prior art subject matter, . . . where the prior art gives reason or motivation to make the claimed compositions, creates a *prima facie* case of obviousness”); *In re Best*, 562 F.2d 1252, 1255–56 (Fed. Cir. 1977); *In re Wilder*, 429 F.2d 447, 450 (CCPA 1970). Where the claimed and prior art products are identical or substantially identical, or are produced by identical or substantially identical processes, the PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his claimed product. *Best*, 562 F.2d at 1256.

Appellant argues that Shimizu’s comparative steel 3 would not have possessed the claimed carbides’ area ratio and the carbon solid solution ratio because the conditions for producing Shimizu’s steel are different than those described in the Specification. Appeal Br. 6–7 (citing Spec. ¶¶ 38–40). Appellant argues that the inventive steel requires a cooling time “within 60 minutes.” Appeal Br. 8 (citing Spec. ¶ 38).⁵

⁵ The Specification describes that, within this time, “coarsening of precipitated carbides can be suppressed for example by cooling the molten

Appellant proffers the Shouji Declaration, which calculates that the time to cool Shimizu's SKD11-compliant comparative tool steel 3 would have exceeded the time required in the Specification by 107 minutes. Appeal Br. 7. The Shouji Declaration avers that comparative tool steel 3's cooling time is "substantially identical" to comparative tool 4's cooling time of 168 minutes, as described in the Specification. *Id.* at 8 (citing Spec. ¶¶ 42–58). Appellant argues that Shimizu's comparative tool steel 3 cannot inherently possess the claimed structural properties because the Specification's comparative tool 4, which is also SKD11-compliant and formed with a substantially similar cooling time, does not possess the claimed properties. Appeal Br. 8 (citing Spec. Table 4).

In response, the Examiner argues that Shimizu's comparative tool steel 3 is not analogous to the Specification's comparative tool 4 "because they have different compositions." Ans. 6. The Examiner's argument is based on the finding that "the solidus temperature of comparative tool steel 3 of Shimizu is not 1200 °C as alleged by [Appellant], but rather 1180 °C." *Id.* at (citing Shimizu Table 2).

We are not persuaded that a 20°C difference in Shimizu's disclosed solidus temperature detracts from Appellant's comparison of these steels. As Appellant argues, even "if 1180°C is used in the calculation to determine the cooling time period instead of 1200°C, the cooling time period would [have] be[en] 183 minutes . . . , which is even longer than the 167 minutes

steel poured into the mold so as to quickly pass the solid-liquid phase coexistence region." Spec. ¶ 38. The Specification also describes that quenching is "effective in increasing the amount of carbon solid-soluted in the structure of the tool." *Id.* (emphasis added); *see also* Claim 1 (Appeal Br. 14–15).

calculated by using 1200°C and thus is even further from within 60 minutes,” as required by the Specification. Reply Br. 4 (citing Spec. ¶ 38); *see also* Reply Br. 4–5 (surmising that Shimizu’s comparative tool steel 3 would have exhibited undesirably less suppression of precipitated carbides coarsening and a lower carbon solid solution ratio than those properties exhibited by the Specification’s comparative tool steel 4).

The Examiner further responds to arguments made in the Appeal Brief by asserting that Appellant has not made a sufficient showing of criticality for the cooling time period over the claimed range. Ans. 7.

We are not persuaded by the Examiner’s response as Appellant did not proffer the Shouji Declaration to establish unexpected results over a claimed range.⁶ Rather, Appellant filed the Shouji Declaration as evidence showing that Shimizu’s comparative tool steel 3 cannot inherently possess the claimed structural properties. *See* Appeal Br. 9.

In the Answer, the Examiner finds that Shimizu’s “broader disclosure . . . contemplates cooling rates of up to 5.0 °C/min” for Shimizu’s inventive steel. Ans. 6–7 (citing Shimizu ¶¶ 62–64). The Examiner concludes that

[i]t would have been obvious to one of ordinary skill in the art at the time the invention was made to increase the cooling rate of Shimizu up to 5.0 °C/min (which by [A]ppellant’s calculations would [have] allow[ed] for cooling times of 40 minutes, within the range disclosed by [A]ppellant) if for no other reason than to reduce the production time costs associated with manufacturing the steel of Shimizu.

Ans. 7.

⁶ We note that claim 1 does not recite a range of critical cooling time. *See* Appeal Br. 14–15.

Appellant acknowledges that one of ordinary skill in the art “might wish to reduce the production time costs associated with manufacturing [Shimizu’s] steel.” Reply Br. 6. Appellant, however, persuasively argues that such an ordinarily skilled artisan “would not have thought to reduce the production time costs associated with manufacturing *a steel* (such as comparative tool steel 3) *which is not a steel of Shimizu*, and thus the claimed invention would not have been obvious from Shimizu.” *Id.* at 9 (emphasis added).

On this record, based on a preponderance of evidence, Appellant has sufficiently shown that Shimizu’s comparative steel 3 would not have possessed the claimed carbides’ area ratio and the carbon solid solution ratio. *Best*, 562 F.2d at 1256.

We do not sustain the rejection of claim 1 as anticipated by or, in the alternative, as obvious over Shimizu. For the same reasons, we do not sustain the rejection of claim 2.

Ground 2: Rejection of claims 1 and 2 as obvious over Barbosa

With respect to claim 1, the Examiner finds Shimizu’s martensitic cold work tool steel composition: (i) comprises each requisite element in a wt% amount, which overlaps each element’s claimed wt% range, and (ii) has a hardness of 64 HRC, which lies within the claimed HRC range. Final Act. 5–6 (citing Barbosa Abstract; ¶¶ 9–34, 45).

The Examiner finds Barbosa’s steel would have been “expected to have the same or similar” structural property limitations “as the instantly claimed steel because it has the same or similar composition.” Final Act. 7. The Examiner reasoned that because Barbosa’s martensitic cold work tool

steel structure “is substantially identical to that of the claims,” the “claimed properties or functions are presumed to be inherent.” *Id.* at 6.

Similar to Appellant’s arguments regarding Shimizu in Ground 1, *supra*, Appellant argues that Barbosa fails to “teach or suggest the conditions for obtaining the cold work tool having the claimed structure,” as described in the Specification. Appeal Br. 10 (citing Spec. ¶¶ 38–40). According to Appellant, Barbosa merely discloses that “[t]he ingot fusion was made at a close procedure for such five alloys [including Examples PI1, PI2, and PI3], in a vacuum induction oven, and poured into iron cast moulds, resulting in a 55-kg ingot.” Appeal Br. 10 (citing Barbosa ¶ 47). Appellant argues that Barbosa’s carbide structure is distinguished from claim 1 because Examples PI1, PI2, and PI3 “are made such that carbides having a size greater than 5 µm decrease but total carbides increase,” which results in a decrease in solid-soluted carbon. Appeal Br. 10 (citing Barbosa Table 6).

Appellant’s arguments are not persuasive because Barbosa’s teachings are not limited to the carbide structures of Examples PI1, PI2, and PI3. A reference is not limited to a preferred embodiment or example. *See In re Applied Materials, Inc.*, 692 F.3d 1289, 1298 (Fed. Cir. 2012) (“A reference must be considered for everything that it teaches, not simply the described invention or a preferred embodiment.”). The Examiner reasonably makes a prima facie case of obviousness because the ranges of elements required by claim 1 overlap ranges of the same elements disclosed in Barbosa’s broad disclosure.⁷ *In re Boesch*, 617 F.2d 272, 275 (CCPA 1980) (where ranges

⁷ Barbosa’s general disclosure differs from the Examiner’s application of Shimizu in Ground 1, *supra*, because Shimizu’s relied-upon disclosure is limited to a specific steel composition, i.e., comparative steel 3.

overlap, a prima facie case of obviousness is made out); *see also In re Harris*, 409 F.3d 1339, 1341 (Fed. Cir. 2005) (a prima facie case of obviousness typically exists when the ranges of a claimed composition overlap the ranges disclosed in the prior art); *In re Peterson*, 315 F.3d 1325, 1329 (Fed. Cir. 2003).

Appellant has not met the burden of proving that Barbosa's steel compositions comprising each requisite element in a wt% amount, which overlaps each element's claimed wt% range, do not necessarily or inherently possess the claimed structural properties. Barbosa, therefore, would have suggested the disputed structural property limitations recited in claim 1.

We sustain the rejection of claim 1 as obvious over Barbosa. For the same reasons, we sustain the rejection of claim 2.

Ground 3: Provisional rejection of claims 1 and 2 for nonstatutory double patenting over the claims of the '380 Application, the '618 Application, and the '812 Application

The Examiner finds that the “[A]pplications each recite a composition overlapping that of the instantly claimed composition.” Final Act. 8. The Examiner determines that “[i]t would have been obvious to one of ordinary skill in the art at the time the invention was made to select any portion of the disclosed ranges of the . . . [A]pplications[,] including the instantly claimed [range] because the . . . [A]pplications disclose the same utility throughout the disclosed ranges.” *Id.* at 8–9.

The Examiner finds that the steel disclosed in the '380, '618, and '812 Applications would have been “expected to have the same or similar” structural property limitations “as the instantly claimed steel because” the steel disclosed in these Applications “has the same . . . composition.” *Id.* at 9.

Appellant argues that the conditions for obtaining the cold work tool having the claimed structure would not have been obvious from the '380, '618, and '812 Applications. Appeal Br. 12. In particular, Appellant argues that these Applications “do not even state to cool the hot-worked steel to generate a *martensitic transformation*.” *Id.* at 12 (emphasis added) (citing the '380 Application ¶ 60; the '618 Application ¶ 95; and the '812 Application ¶ 45).

The Examiner does not respond to Appellant’s argument. Specifically, the Examiner does not rebut Appellant’s assertion that the '380, '618, and '812 Applications do not teach or suggest conditions for forming the claimed martensitic structure. *See generally* Ans. 6–8; *see also* Spec. ¶ 39.

“After evidence or argument is submitted by the applicant in response, patentability is determined on the totality of the record, by a preponderance of evidence with due consideration to persuasiveness of argument.” *In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992); *see also In re Sullivan*, 498 F.3d 1345, 1352 (Fed. Cir. 2007) (“Whether the composition would have been obvious cannot be determined without considering evidence attempting to rebut the prima facie case.”); *In re Rinehart*, 531 F.2d 1048, 1052 (CCPA 1976) (“When prima facie obviousness is established and evidence is submitted in rebuttal, the decision-maker must start over.”).

On the record before us, Appellant’s contention that the '380, '618, and '812 Applications do not teach or suggest conditions for forming the claimed martensitic structure is persuasive of reversible error by the Examiner.

We do not sustain the provisional rejection of claims 1 and 2 on the ground of nonstatutory double patenting over the claims of the '380 Application, the '618 Application, and the '812 Application. For the same reasons, we do not sustain the provisional rejection of claim 2.

CONCLUSION

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1, 2	102(a)(1), 102(a)(2), or 103	Shimizu		1, 2
1, 2	103	Barbosa	1, 2	
1, 2		Nonstatutory double patenting		1, 2
Claims Rejected			1, 2	

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)(iv).

AFFIRMED