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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/909,978	02/03/2016	Tadashi NAKANISHI	168959	1280
25944	7590	11/07/2019	EXAMINER	
OLIFF PLC P.O. BOX 320850 ALEXANDRIA, VA 22320-4850			WALCK, BRIAN D	
			ART UNIT	PAPER NUMBER
			1736	
			NOTIFICATION DATE	DELIVERY MODE
			11/07/2019	ELECTRONIC

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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* TADASHI NAKANISHI, SHINJI KOSEKI, YOSHIHIKO ODA,  
and HIROAKI TODA

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Appeal 2019-001029  
Application 14/909,978  
Technology Center 1700

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Before KAREN M. HASTINGS, JEFFREY B. ROBERTSON, and  
JANE E. INGLESE, *Administrative Patent Judges*.

INGLESE, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant<sup>1</sup> requests our review under 35 U.S.C. § 134(a) of the Examiner's decision to finally reject claims 1–8.<sup>2</sup> We have jurisdiction over this appeal under 35 U.S.C. § 6(b).

We REVERSE.

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<sup>1</sup> We use the word “Appellant” to refer to the “applicant” as defined in 37 C.F.R. § 1.42. Appellant identifies JFE Steel Corporation as the real party in interest. Appeal Brief filed March 23, 2018 (“Appeal Br.”) at 1.

<sup>2</sup> Final Office Action entered October 27, 2017 (“Final Act.”) at 1.

### CLAIMED SUBJECT MATTER

Appellant claims a non-oriented electrical steel sheet. Claim 1, the sole pending independent claim, illustrates the subject matter on appeal, and is reproduced below with contested subject matter italicized:

1. A non-oriented electrical steel sheet having a chemical composition comprising:

C: not more than 0.010 mass%,

Si: 1.0–7.0 mass%,

Mn: 0.001–3.0 mass%,

sol. Al: 0.0001–3.5 mass%,

P: 0.01–0.2 mass%,

S: not more than 0.010 mass%,

N: not more than 0.010 mass%, and

the remainder being Fe and inevitable impurities,

wherein:

*a ratio ( $P_{120}/Fe_{700}$ ) of a peak-peak height  $P_{120}$  of P near to an electronic energy of 120 eV to a peak-peak height  $Fe_{700}$  of Fe near to an electronic energy of 700 eV in an Auger differential spectrum obtained by analyzing a broken surface of a grain boundary through Auger electron spectroscopy is not less than 0.1, and*

a sheet thickness is 0.10–0.50 mm.

Appeal Br. A-1 (Claims Appendix) (emphasis added).

### REJECTIONS

The Examiner maintains the following rejections in the Examiner's Answer entered September 21, 2018 ("Ans."):

I. Claims 1, 3, 5, and 7 under 35 U.S.C. § 102(a) as anticipated by, or alternatively, under 35 U.S.C. § 103 as unpatentable over, Tanaka (US 2009/0202383, published August 13, 2009);

II. Claims 2, 4, 6, and 8 under 35 U.S.C. § 103 as unpatentable over Tanaka;

III. Claims 1–8 for nonstatutory, obviousness-type double patenting over claim 1 of Oda (US 9,466,411 B2, issued October 11, 2016); and

IV. Claims 1–8 provisionally rejected under 35 U.S.C. § 101 for claiming the same invention as that claimed in U.S. patent applications 14/413,658, 14/435,314, 14/759,891, 14/767,735, 14/774,258, 14/775,925, 14/909,940, 15/111,310, 15/500,435, and 15/503,508.

### FACTUAL FINDINGS AND ANALYSIS

Upon consideration of the evidence relied upon in this appeal and each of Appellant’s contentions, we reverse the Examiner’s rejection of claims 1, 3, 5, and 17 under 35 U.S.C. § 102(a) as anticipated by, or alternatively, under 35 U.S.C. § 103 as unpatentable over, Tanaka; the Examiner’s rejection of claims 2, 4, 6, and 8 under 35 U.S.C. § 103 as unpatentable over Tanaka; and the Examiner’s rejection of claims 1–8 for nonstatutory double patenting over claim 1 of Oda. We decline to reach the Examiner’s provisional double patenting rejection of claims 1–8 under 35 U.S.C. § 101 for the reasons discussed below.

#### I and II. Rejection of claims 1, 3, 5, and 17 under 35 U.S.C. § 102(a) as anticipated by, or under 35 U.S.C. § 103 as unpatentable over, Tanaka, and rejection of claims 2, 4, 6, and 8 under 35 U.S.C. § 103 as unpatentable over Tanaka

Claim 1 requires the recited non-oriented electrical steel sheet to have a ratio ( $P_{120}/Fe_{700}$ ) of a peak-peak height P120 of P near to an electronic energy of 120 eV to a peak-peak height Fe700 of Fe near to an electronic energy of 700 eV in an Auger differential spectrum obtained by analyzing a broken surface of a grain boundary through Auger electron spectroscopy of not less than 0.1. The Specification indicates that the recited  $P_{120}/Fe_{700}$  ratio

quantifies an amount of phosphorus (P) on the surface of the crystal grain boundary of the non-oriented electrical steel sheet of Appellant's invention, and explains that if the ratio is not less than 0.1 as recited in claim 1, iron loss at a high frequency region can be reduced without deteriorating magnetic flux density. Spec. ¶¶ 10, 26, 43. The Specification further explains that the recited  $P_{120}/Fe_{700}$  ratio is achieved by producing the steel sheet according to a method comprising a finishing annealing process that includes an initial finishing annealing step conducted in either a continuous annealing furnace or a box annealing furnace, followed by heat treatment at 700–800°C for not less than 2 hours, preferably more than 5 hours, or heat treatment at 700–800°C for 1–10 hours, depending on whether the initial finishing annealing step is conducted continuously, or in a box annealing furnace. Spec. ¶¶ 44, 51–52.

The Examiner finds that Tanaka exemplifies a non-oriented steel sheet having “the same composition” as the non-oriented steel sheet of claim 1. Final Act. 4–5 (citing Tanaka Example U, Table 3, ¶ 149). The Examiner finds that, consequently, Tanaka's non-oriented steel sheet “would be expected to have the same or similar properties as the instantly claimed steel,” including the same  $P_{120}/Fe_{700}$  ratio, because “when the structure recited in the [prior art] reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent.” Final Act. 4–5.

Appellant argues that data provided in Appellant's Specification show that the  $P_{120}/Fe_{700}$  ratio recited in claim 1 is inherently dependent on not only the composition of the claimed non-oriented steel sheet, but instead results from inclusion of a heat treatment step during production of the non-oriented

steel sheet following a finishing annealing step. Appeal Br. 5–6 (citing Spec. ¶¶ 51, 52, 61, 62 (Table 2), 63 (Table 3), 64). Appellant argues that because Tanaka discloses a different method for producing the non-oriented steel sheet described in the reference, which does not include a heat treatment step following a finishing annealing step, the Examiner does not establish that Tanaka's non-oriented steel sheet would have a  $P_{120}/Fe_{700}$  ratio as recited in claim 1. Appeal Br. 6–7; Reply Br. 3–4.

Appellant's arguments are persuasive of reversible error in the Examiner's rejection of claim 1 under § 102(a), and alternative rejection of claim 1 under § 103, for reasons that follow. Appellant's Specification describes preparing two groups of steel sheet samples in which corresponding samples (a–r) in each group had the same composition, but were prepared using different processes. Spec. ¶¶ 56, 58. Table 1 shows that all of the samples (a–r) of both groups included components in amounts encompassed within the corresponding ranges recited in claim 1, and thus all of the samples were within the scope of claim 1. Spec. ¶ 57.

The processes used to prepare both groups of samples involved, in the following order, hot rolling, hot band annealing at 1000°C for 30 seconds, cold rolling, and finishing annealing at 1100°C for 10 seconds. Spec. ¶¶ 56, 58. The first group of samples (group A) was not further treated, while the second group of samples (group A') was subjected to heat treatment at 750°C for 5 hours after the finishing annealing step. Spec. ¶ 58. Table 2 shows that the samples of group A, which were not subjected to heat treatment following finishing annealing, had  $P_{120}/Fe_{700}$  ratios of 0.02, 0.03, or 0.04, which are outside the range recited in claim 1, and Table 3 shows that the samples of group A', which were subjected to heat treatment

following finishing annealing, had  $P_{120}/Fe_{700}$  ratios ranging from 0.10 to 0.48, which are within the range recited in claim 1. Spec. ¶¶ 62, 63. As Appellant argues, these results show that non-oriented steel sheets having a chemical composition as recited in claim 1 may or may not have a  $P_{120}/Fe_{700}$  ratio as recited in the claim, depending on the process used to prepare the non-oriented steel sheets. Appeal Br. 5–6. The Specification, therefore, demonstrates that the  $P_{120}/Fe_{700}$  ratio recited in claim 1 is not an intrinsic characteristic of a non-oriented steel sheet having a composition as recited in the claim, but, rather, is a further requirement imposed by claim 1 on the claimed non-oriented electrical steel sheet.

Although the steel sheet of Tanaka's Example U cited by the Examiner has a composition encompassed by claim 1, Tanaka discloses producing the steel sheet of Example U by a process differing from the process described in Appellant's Specification that results in a  $P_{120}/Fe_{700}$  ratio as recited in claim 1. Tanaka ¶ 149. Tanaka also discloses a more general process for producing the steel sheet of Tanaka's invention that also differs from the process described in Appellant's Specification. Tanaka ¶¶ 99–138. More specifically, Tanaka provides a general description of producing the non-oriented electrical steel sheet of Tanaka's invention using a process that involves, in the following order, hot rolling, optional hot-rolled band annealing, cold rolling a single time or cold rolling at least two times with intermediate annealing between each cold rolling step, and soaking at 820°C or less by box annealing or continuous annealing. Tanaka ¶¶ 99–138. Tanaka exemplifies producing numerous steel sheets by several processes that differed according to whether the processes included a hot-rolled band annealing step, and whether they involved cold rolling once, or

cold rolling twice with intermediate annealing. Tanaka ¶ 149. All of the exemplary processes described in Tanaka, however, including the process used to produce the steel sheet of Example U, involved, in the following order, hot rolling, cold rolling (once or twice with intermediate annealing), and a soaking treatment conducted by continuous annealing for 30 seconds at a temperature of from 650°C to 800°C, with the exception of Example 1-10, in which the soaking treatment was conducted at 500°C for 10 hours. Tanaka ¶ 149, Table 3.

The process generally described in Tanaka for producing the non-oriented electrical steel sheet of Tanaka's invention, and the exemplary processes described in the reference, therefore, each involve a soaking treatment involving box annealing or continuous annealing at 820°C or less immediately following cold rolling. In contrast, as discussed above, Appellant's Specification shows that cold rolling, followed by finishing annealing, and then heat treating at 750°C for 5 hours, yields a non-oriented steel sheet having a  $P_{120}/Fe_{700}$  ratio as recited in claim 1.

Although the Examiner asserts that "Tanaka does teach a heat treatment step after finish annealing at 750°C, which is the same temperature as that of the instant specification (700–800 °C)," Tanaka discloses conducting the heat treatment step following either a single cold rolling step, or following the final cold rolling step if cold rolling is performed more than once, rather than performing a heat treatment step following finishing annealing, as described in Appellant's Specification. Ans. 7 (citing Tanaka ¶¶ 131–135, 149).

Accordingly, because Tanaka's process does not include a heat treatment step following a finishing annealing step, which Appellant's

Specification demonstrates results in a  $P_{120}/Fe_{700}$  ratio as recited in claim 1, the Examiner does not provide a sufficient factual basis to establish that the relied-upon non-oriented electrical steel sheet disclosed in Tanaka would necessarily or inherently have a  $P_{120}/Fe_{700}$  ratio as recited in claim 1. *In re Robertson*, 169 F.3d 743, 745 (Fed. Cir. 1999) (“Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.”).

The Examiner also does not identify any disclosure in Tanaka that would have suggested modifying Tanaka’s non-oriented electrical steel sheet to have a  $P_{120}/Fe_{700}$  ratio as recited in claim 1.

Consequently, because claims 3, 5, and 7 each depend from claim 1, we do not sustain the Examiner’s rejection of claims 1, 3, 5, and 7 under 35 U.S.C. § 102(a) as anticipated by, or alternatively, under 35 U.S.C. § 103 as unpatentable over, Tanaka. We also do not sustain the Examiner’s rejection of claims 2, 4, 6, and 8 under 35 U.S.C. § 103 as unpatentable over Tanaka because this rejection suffers from the same deficiencies as the Examiner’s rejection of claim 1 under 35 U.S.C. § 103.

### III. Rejection of claims 1–8 for nonstatutory, obviousness-type double patenting over claim 1 of Oda

The Examiner finds that “[a]lthough the claims at issue are not identical, they are not patentably distinct from each other because [claim 1 of] the above cited patent [Oda] recites a non-oriented electrical steel with a composition overlapping that of the instant claims.” Final Act. 7.

As discussed above, however, Appellant’s Specification includes experimental data demonstrating that non-oriented steel sheets having a

chemical composition as recited in claim 1 may or may not have a  $P_{120}/Fe_{700}$  ratio as recited in the claim, depending on the process used to prepare the non-oriented steel sheets. The Specification thus shows that the  $P_{120}/Fe_{700}$  ratio recited in claim 1 is not an intrinsic characteristic of a non-oriented steel sheet having a composition as recited in the claim, but, rather, is a further requirement imposed by claim 1 on the claimed non-oriented electrical steel sheet. As Appellant argues (Reply Br. 7–8), in view of this showing in Appellant’s Specification, although the non-oriented electrical steel of Oda’s claim 1 may have a composition “overlapping that of the instant claims,” the Examiner does not identify any feature in claim 1 of Oda that would have indicated or suggested that a  $P_{120}/Fe_{700}$  ratio as recited in Appellant’s claim 1 would be inherent in the non-oriented electrical steel sheet of Oda’s claim 1.

We, accordingly, do not sustain the Examiner’s rejection of claims 1–8 for nonstatutory, obviousness-type double patenting over claim 1 of Oda.

#### IV. Provisional double patenting rejections of claims 1–8 under 35 U.S.C. § 101

We decline to reach these rejections because at least some of the claims relied upon in the provisional double patenting rejections on appeal either clearly are, or may be, different in language or status from the claims originally relied upon when these rejections were initially made by the Examiner. *See Ex parte Jerg*, Appeal No. 2011-000044, (BPAI April 13, 2012) (informative) (“Panels have the flexibility to reach or not reach provisional obviousness-type double-patenting rejections.”) (citing *Ex parte Moncla*, Appeal No. 2009-006448 (BPAI June 22, 2010) (precedential)).

CONCLUSION

Claims	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1, 3, 5, 7	102(a)	Tanaka		1, 3, 5, 7
1, 3, 5, 7	103	Tanaka		1, 3, 5, 7
2, 4, 6, 8	103	Tanaka		2, 4, 6, 8
1-8		Obviousness-type Double Patenting		1-8
1-8	101	Provisional Double Patenting <sup>3</sup>		
<b>Overall Outcome</b>				1-8

REVERSED

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<sup>3</sup> As discussed above, we do not reach this provisional rejection.