

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SONY CORPORATION,
Petitioner,

v.

FUJIFILM CORPORATION,
Patent Owner.

Case IPR2018-01751
Patent 6,835,451 B2

Before JO-ANNE M. KOKOSKI, JEFFREY W. ABRAHAM, and
MICHELLE N. ANKENBRAND, *Administrative Patent Judges*.

KOKOSKI, *Administrative Patent Judge*.

DECISION
Denying Institution of *Inter Partes* Review
35 U.S.C. § 314(a)

I. INTRODUCTION

Sony Corporation (“Petitioner”) filed a Petition to institute an *inter partes* review of claims 1–14 of U.S. Patent No. 6,835,451 B2 (“the ’451 patent,” Ex. 1001). Paper 2 (“Pet.”). Fujifilm Corporation (“Patent Owner”) filed a Preliminary Response. Paper 7 (“Prelim. Resp.”). With Board authorization, Petitioner filed a Reply (“Reply,” Paper 12), and Patent Owner filed a Sur-Reply (“Sur-Reply,” Paper 13).

Institution of an *inter partes* review is authorized by statute when “the information presented in the petition . . . and any response . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314; *see* 37 C.F.R. § 42.4. Upon consideration of the briefing and the evidence of record, we determine that Petitioner has not established a reasonable likelihood of prevailing with respect to the unpatentability of any of claims 1–14 of the ’451 patent. Accordingly, we deny the Petition and do not institute an *inter partes* review.

A. *Related Proceedings*

The parties identify the following related proceedings involving the ’451 patent: (1) *Fujifilm Corp. v. Sony Corp.*, 1-17-cv-01309 (D. Del. 2017); and (2) *Certain Magnetic Data Storage Tapes and Cartridges Containing the Same*, 337-TA-1076 (USITC Sept. 19, 2017). Pet. 5; Paper 3, 1.

B. *The ’451 Patent*

The ’451 patent, titled “Magnetic Recording Medium,” is directed “to a magnetic recording medium capable of high-density recording.” Ex. 1001, 1:5–6. The ’451 patent explains that “the use of high-sensitivity

magnetoresistive heads (referred to hereinafter as “MR heads”) in reproduction has been proposed and put into practice” because “the trend [in magnetic recording media] has been toward high densification accompanied by narrowing of the track width and shortening of the recording wavelength.” *Id.* at 1:14–19. The ’451 patent further explains that “[w]hen employing MR heads, characteristics different from those of conventional inductive head media are required,” including adding nonmagnetic powder “to the magnetic layer to achieve a volume packing density of 15 to 35 percent in the magnetic layer in an attempt to achieve both saturation and low noise.” *Id.* at 1:20–38. However, “nonmagnetic powder and magnetic powder aggregate, resulting in nonuniform distribution,” which is “problematic in that uniform distribution of magnetic particles in the magnetic layer, required to reduce noise, is not achieved.” *Id.* at 1:45–49. According to the ’451 patent, “[t]he present inventors conducted extensive research into medium noise, resulting in the discovery of the structural parameters of the magnetic layer that are required to reduce noise from the perspective of micromagnetics,” and “also discovered that by controlling these structural parameters, it was possible to achieve reduction in noise to an unprecedented level.” *Id.* at 2:4–10.

In that regard, the ’451 patent discloses that “in MR heads, it is known that high residual magnetization is not necessarily associated with improved performance,” and, therefore, “the residual magnetization Φ_r of the magnetic layer is made 5 to 50 mA based on the element thickness and saturation of the MR head employed, thereby preventing saturation of the head.” *Id.* at 2:40–46. The ’451 patent further discloses that, “particularly when microparticles are employed [in the magnetic layer], there are problems in

that the magnetic particles aggregate, generating a portion behaving just like a large magnetic material and diminishing the S/N [signal to noise] ratio.”

Id. at 2:67–3:3. Because “magnetic blocks (referred to hereinafter as ‘magnetic clusters’) measured by magnetic force microscopy (MFM) were related to medium noise, changing with aggregation and magnetostatic bonding of magnetic particles,” a good S/N ratio is achieved when “the ratio (S_{dc}/S_{ac}) of the average area S_{dc} of magnetic clusters under DC magnetized condition to the average area S_{ac} of magnetic clusters under AC erased condition” falls within a range of 0.8 to 2.0. *Id.* at 3:4–14.

C. Challenged Claims

Petitioner challenges claims 1–14 (“the challenged claims”) of the ’451 patent. Claim 1, the only independent claim, is reproduced below.

1. A magnetic recording medium comprising a magnetic layer comprising a ferromagnetic powder and a binder on a nonmagnetic support, wherein

the magnetic layer has a residual magnetization Φ_r ranging from 5 to 50 mA, and

ratio (S_{dc}/S_{ac}) of average area S_{dc} of magnetic clusters under DC magnetized condition to average area S_{ac} of magnetic clusters under AC erased condition ranges from 0.8 to 2.0.

Ex. 1001, 14:14–22.

D. The Asserted Ground of Unpatentability

Petitioner challenges the patentability of claims 1–14 of the ’451 patent under 35 U.S.C. § 103 as obvious over the combined teachings of

Ejiri,¹ Hokkyo,² and Chen.³ Petitioner relies on the Declaration of Kevin Coffey, Ph.D. (Ex. 1004) in support of its contentions. Patent Owner relies on the Declaration of Jian-Gang (Jimmy) Zhu, Ph.D. (Ex. 2001) in support of its Preliminary Response.

II. ANALYSIS

A. *Level of Ordinary Skill in the Art*

Petitioner argues that a person having ordinary skill in the art (“POSA”) at the time of the ’451 patent “would have had a bachelor’s degree in chemical engineering, physics, materials science, or a related field, plus several years of experience with magnetic storage systems, magnetic materials and/or magnetic properties or similar advanced post-graduate education.” Pet. 7 (citing Ex. 1005 ¶¶ 10–14). Patent Owner responds that a POSA would have had “a bachelor’s degree in materials science, physics, electrical engineering, mechanical engineering, chemistry, or a closely related field, and a least five years of experience in the field of magnetic recordings,” or a Master’s degree or higher in the same fields “with an emphasis in magnetic recording, and at least two years of experience in the field of magnetic recording.” Prelim. Resp. 16 (citing Ex. 2001 ¶ 16). The parties agree that the level of skill is high, and Patent Owner further states

¹ U.S. Patent App. Pub. No. US 2002/0015861 A1, published Feb. 7, 2002 (Ex. 1006).

² *Theory of Particulate Recording Medium Noise and Estimation of Noise Sources*, JOURNAL OF THE MAGNETIC SOCIETY OF JAPAN, Vol. 21, no. 4–1 (1997) 149–159 (Ex. 1007). Our references to “Hokkyo” are to the English translation of the original reference.

³ *Magnetic cluster and medium noise in CoCrTa/Cr longitudinal film media studied by magnetic force microscopy*, J. OF APP. PHYS., Vol. 85, No. 2 (1999) 1037–1042 (Ex. 1008).

that under either Petitioner's or Patent Owner's proposed level of skill, "the Challenged Claims are not invalid in view of the art cited by Petitioner." *Id.*

We agree with the parties that a POSA would have had a background in engineering, chemistry, physics, material science, or a closely related field, and would have had experience with magnetic recording, which is consistent with the level of ordinary skill in the art at the time of the invention as reflected in the prior art in this proceeding. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (explaining that specific findings regarding ordinary skill level are not required "where the prior art itself reflects an appropriate level and a need for testimony is not shown" (quoting *Litton Indus. Prods., Inc. v. Solid State Sys. Corp.*, 755 F.2d 158, 163 (Fed. Cir. 1985))). Although we do not fully adopt either party's definition of the POSA, our determination regarding Petitioner's challenge does not turn on the differences between Petitioner's and Patent Owner's definitions, and we note that our conclusions would be the same under either assessment.

B. Claim Interpretation

We interpret claims of an unexpired patent using the "broadest reasonable construction in light of the specification of the patent in which [the claims] appear[]." 37 C.F.R. § 42.100(b) (2017).⁴ Consistent with the

⁴ The Office recently changed the claim construction standard applicable to an *inter partes* review. *See* Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board, 83 Fed. Reg. 51,340 (Oct. 11, 2018). The rule changing the claim construction standard, however, does not apply to this proceeding because Petitioner filed its Petition before the effective date of the final rule, i.e., November 13, 2018. *Id.* at 51,340 (rule effective date and applicability date), 51,344 (explaining how the Office will implement the rule).

broadest reasonable construction, claim terms are presumed to have their ordinary and customary meaning as understood by a person of ordinary skill in the art in the context of the entire patent disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). Only those terms in controversy need to be construed, and only to the extent necessary to resolve the controversy. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (“[W]e need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy.’”) (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

Petitioner proposes constructions for the terms “residual magnetization Φ_r ,” “average area [S_{dc} or S_{ac}] of magnetic clusters,” and “ratio (S_{dc}/S_{ac}) of average area S_{dc} of magnetic clusters under DC magnetized condition to average area S_{ac} of magnetic clusters under AC erased condition.” Pet. 29–31. Patent Owner responds to Petitioner’s proposed constructions, and does not argue that we should construe any other claim terms. Prelim. Resp. 16–23. For purposes of this Decision, based on the record before us, we determine that no claim term requires explicit construction.

C. Overview of the Prior Art

1. Ejiri

Ejiri is directed to particulate magnetic recording media for high-density recording. Ex. 1006 ¶ 2. Ejiri describes a magnetic recording medium comprising a lower layer containing a nonmagnetic powder and binder, and a magnetic layer comprising a ferromagnetic powder and binder, provided on a flexible nonmagnetic substrate in that order. *Id.* ¶ 8. Ejiri

teaches that the ferromagnetic powder contained in the “magnetic layer is an acicular ferromagnetic alloy powder having an average major axis length equal to or less than 0.1 μm and a saturation magnetization as equal to or less than 120 A.m²/kg (120 emu/g).” *Id.* Ejiri describes preferred embodiments wherein the ferromagnetic alloy powder has an average particle volume in the range of from 1500 to 15000 nm³ and a volume packing density equal to or more than 30%. *Id.* ¶¶ 9–11.

2. *Hokkyo*

Hokkyo “reviews theories on noise in magnetic recording arising from particulate recording media, focusing on ac-erased noise and dc-magnetized noise.” Ex. 1007, 149. Hokkyo explains that AC-erased noise “is noise in a situation where a medium undergoes AC erasure by an alternating damping magnetic field,” and DC-magnetized noise “is noise that appears when a medium is magnetized in one direction by a direct-current magnetic field and reproduction is performed.” *Id.* Hokkyo teaches that AC-erased noise “is caused by the medium having magnetic discontinuities consisting of magnetic particles,” and DC-magnetized noise “is caused by incomplete particle dispersion (concentration unevenness of particle dispersion in a magnetic layer of the medium, aggregation of the particles, vacancies in the magnetic layer, or the like).” *Id.* at 149–150. Hokkyo further teaches that “[t]o decrease medium- and low-frequency-region components of a noise spectrum—particularly, DC-magnetized noise—aggregation must be decreased by improving dispersion of the magnetic particles.” *Id.* at 155.

3. *Chen*

Chen describes using a “two-dimensional analysis method of magnetic force microscopy” in order “to investigate magnetic cluster and

medium noise in CoCrTa/Cr longitudinal film.” Ex. 1008, 1037. Chen explains that “magnetic cluster, the direct result of magnetic interparticle interaction, is considered to be one of the most important factors that cause medium noise,” but that “the detailed information about the formation of magnetic cluster and origin of medium noise has not been understood until now.” *Id.* Chen concludes “that both the magnetic cluster size and root mean square (rms) noise intensity are dependent on recording density and the rms noise intensity strongly enhances with the increase of magnetic cluster size.” *Id.*

D. Obviousness over Ejiri, Hokkyo, and Chen

Petitioner contends that the combined teachings of Ejiri, Hokkyo, and Chen teach or suggest each limitation of claims 1–14. Pet. 42–68. Petitioner contends that “Ejiri expressly discloses the elements of each of the challenged claims except the limitations related to the average area of magnetic clusters, namely S_{dc} , S_{ac} , and the ratio (S_{dc}/S_{ac}),” and that a “POSA would have had reasons, based on Hokkyo and Chen, to optimize Ejiri in a manner that would have resulted in a medium that met each and every limitation of” the challenged claims. *Id.* at 43.

In that regard, Petitioner contends that “Ejiri seeks to provide a medium with low noise and improved performance,” and “uses dispersion and shear techniques to ‘prevent electromagnetic characteristics loss or the like of magnetic recording media due to aggregation of ferromagnetic particles.’” *Id.* (quoting Ex. 1006 ¶ 7; citing Ex. 1006 ¶ 60; Ex. 1004 ¶¶ 96–108). Petitioner contends that Hokkyo identifies sources of noise and “explicitly concludes that ‘aggregation must be decreased by improving dispersion of the magnetic particles,’” and that Chen teaches “that, even

when magnetic cluster size is assessed by MFM, an increase in cluster size leads to a decrease in SNR [signal-to-noise ratio].” *Id.* at 44 (citing Ex. 1007, 149, 155; Ex. 1008, 1037; Ex. 1004 ¶¶ 115, 133). Petitioner also contends that “magnetic cluster size was widely known to be a result-effective variable.” *Id.* at 45 (citing Ex. 1004 ¶¶ 25–33).

A showing of obviousness must be supported by an articulated reasoning with rational underpinning to support a motivation to modify the prior art teachings. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (2007) (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) (“[R]ejections based on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with rational underpinning to support the legal conclusion of obviousness.”)). We are not persuaded that Petitioner establishes sufficiently why a POSA would have attempted to improve Ejiri’s magnetic recording medium by looking to Hokkyo and Chen.

Ejiri seeks to solve the problem of deteriorating electromagnetic characteristics in thin magnetic layers (thickness of 2 μm or less) applied on a nonmagnetic substrate, with the object of providing “a particulate recording medium showing a high C/N [carrier-to-noise ratio or CNR] in high density magnetic recording (especially using an MR head for reproducing).” Ex. 1006 ¶¶ 4, 7. Ejiri solves this problem by “providing a magnetic layer containing an acicular magnetic alloy powder having relatively small magnetization amount and average major axis length on a lower magnetic layer containing a nonmagnetic powder” with “an average major axis length of 0.14 μm or less and an aspect ratio greater than that of said acicular magnetic alloy powder.” *Id.* ¶ 14. Ejiri further teaches using a

specific range of particle volume to reduce noise (*id.* ¶ 16), and that “coating solutions in the coating head should be desirably subjected to shearing” in order “to prevent electromagnetic characteristics loss . . . due to aggregation of ferromagnetic particles” (*id.* ¶ 60).

Petitioner does not explain adequately why modifying Ejiri in view of the teachings of Hokkyo and Chen would have been an improvement on what Ejiri already provides, or why Ejiri is deficient in any respect, such that a POSA would have looked to references like Hokkyo and Chen. In other words, Ejiri already addresses the problem of improving performance properties of magnetic recording media. *See* Pet. 48 (“Ejiri teaches media having satisfactory noise performance assessed by CNR.”). Moreover, to the extent that Petitioner is arguing that a desire to minimize magnetic cluster size would have been the motivating reason to modify Ejiri, Ejiri already teaches how to minimize particle aggregation in the magnetic layer it describes. Ex. 1006 ¶ 60. Thus, it is not evident why Ejiri’s magnetic recording medium would have benefitted from modifications based on Hokkyo and Chen.

We are also not persuaded by Petitioner’s argument that magnetic cluster size “was widely known to be a result-effective variable.” Pet. 45. In that regard, Petitioner argues that “[l]ong before the ’451 patent, POSAs understood” (1) that “magnetic clusters should be minimized in order to improve SNR and media performance generally,” (2) that the size of magnetic clusters is impacted by the dispersion and coating process, and (3) the “conventional methods of optimizing dispersion and coating minimize magnetic clusters.” *Id.* at 31–32 (citing Ex. 1004 ¶¶ 22, 38, 42, 91). Petitioner further argues that “a POSA would have known how to

utilize these manufacturing techniques to optimize dispersion to reduce magnetic clusters, while still maintaining the other disclosed attributes of Ejiri.” *Id.* at 46 (citing Ex. 1004 ¶ 136). According to Petitioner,

[t]he very act of optimizing magnetic cluster size through conventional dispersion techniques drives S_{dc} and S_{ac} toward a state in which both are characteristic of particle size, and thus drive the “ratio (S_{dc}/S_{ac})” towards a value of 1. While complete isolation of particles is not feasible, S_{dc} and S_{ac} will nonetheless approach the same value as dispersion improves. . . . By applying routine optimization of dispersion processes to the tape medium disclosed in Ejiri, then, a POSA would have devised a medium in which the average cluster size is no more than two (or 1.7 or 1.5) times the S_{ac} , resulting in a S_{dc}/S_{ac} ratio of less than 2.0 (or 1.7 or 1.5).

Id. at 47 (internal citations omitted).

What is missing from Petitioner’s optimization discussion is an explanation, supported by evidence that a POSA would have understood that optimizing magnetic cluster size for improved noise characteristics would yield a ratio S_{dc}/S_{ac} within the claimed ranges. For example, Petitioner’s declarant Dr. Coffey testifies that:

As each of Ejiri, Hokkyo and Chen establish, magnetic cluster size was a known result effective variable, as it was known that increases in magnetic cluster size disadvantageously reduced the noise performance of the medium (SNR and CNR). It would have been a matter of routine optimization to minimize the average cluster size in Ejiri so that the average cluster size is not greater than 2, 1.7, or 1.5 times the size of the average particle. Such a medium would meet the claimed S_{dc}/S_{ac} ratio.

Ex. 1004 ¶ 127. Neither Petitioner nor Dr. Coffey sufficiently explain, however, why an optimum magnetic cluster size would be “2, 1.7, or 1.5 times the size of the average particle,” or that a POSA would have understood those values to be optimal. In that regard, Petitioner only points

to the '451 patent's disclosure that "when the Sdc/Sac ratio 'exceeds 2.0, noise increases and good S/N ratio cannot be achieved.'" Pet. 48 (quoting Ex. 1001, 2:7–10; 3:17–19). Petitioner's reliance on the teachings of the '451 patent is an indication that Petitioner's analysis suffers from hindsight reasoning.

In an obviousness determination, we must avoid analyzing the prior art through the prism of hindsight. Instead, we must "cast the mind back to the time the invention was made" and "occupy the mind of one skilled in the art who is presented only with the references, and who is normally guided by the then-accepted wisdom in the art." *W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1553 (Fed. Cir. 1983); *see also Kinetic Concepts, Inc. v. Smith & Nephew, Inc.*, 688 F.3d 1342, 1368 (Fed. Cir. 2012) (quoting *Innogenetics, N.V. v. Abbott Labs.*, 512 F.3d 1363, 1374 n.3 (Fed. Cir. 2008) ("We must still be careful not to allow hindsight reconstruction of the references to reach the claimed invention without any explanation as to how or why the references would be combined to produce the claimed invention.")).

Here, Petitioner's asserted reason as to why a POSA would have been motivated to modify Ejiri appears to be nothing more than a desire to provide a magnetic recording medium that meets the elements claimed in the '451 patent. *See* Pet. 43 ("A POSA would have had reasons, based on Hokkyo and Chen, to optimize Ejiri in a manner that would have resulted in a medium that met each and every limitation of claims 1–14 of the '451 patent."), 47 ("By applying routine optimization of dispersion processes to the tape medium disclosed in Ejiri, a POSA would have devised a medium in which the average cluster size is no more than two (or 1.7 or 1.5) times

the Sac, resulting in a Sdc/Sac ratio of less than 2.0 (or 1.7 or 1.5).”). Thus, we interpret Petitioner’s position as an attempt to imbue the POSA with knowledge of the claimed invention, and, in particular, the claimed ratio Sdc/Sac, when no prior art references, references of record, or other evidence conveys or suggests such knowledge. It is, however, “impermissible to use the claimed invention as an instruction manual or ‘template’ to piece together the teachings of the prior art so that the claimed invention is rendered obvious.” *In re Fritch*, 972 F.2d 1260, 1266 (Fed. Cir. 1992) (citing *In re Gorman*, 933 F.2d 982, 987 (Fed. Cir. 1991)); see *KSR*, 550 U.S. at 421 (stating that the fact finder must be aware “of the distortion caused by hindsight bias and must be cautious of arguments reliant upon *ex post* reasoning”).

Based on our review of the record, we find that there is insufficient explanation supported by record evidence as to why a POSA would have combined the teachings of Ejiri, Hokkyo, and Chen in the manner Petitioner proposes. Accordingly, we determine that Petitioner does not demonstrate a reasonable likelihood that it would prevail in showing that the combined teachings of Ejiri, Hokkyo, and Chen would have rendered obvious claims 1–14 of the ’451 patent.

D. Patent Owner’s Argument Under 35 U.S.C. §314(a)

Patent Owner argues that “the Board should exercise its discretion to deny institution” because similar issues were adjudicated in the related proceeding before the International Trade Commission. Prelim. Resp. 3. Having already determined that Petitioner has not established a reasonable likelihood of prevailing on its challenge, we do not reach the merits of Patent Owner’s argument.

III. CONCLUSION

Based on the arguments in the briefing, and the evidence of record, we determine that Petitioner has not established a reasonable likelihood that it would prevail on its challenges that claims 1–14 of the '451 patent are unpatentable.

IV. ORDER

In consideration of the foregoing, it is hereby
ORDERED that the Petition is *denied*.

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