# UNITED STATES PATENT AND TRADEMARK OFFICE

**UNITED STATES DEPARTMENT OF COMMERCE**
**United States Patent and Trademark Office**
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 13/217,531 | 08/25/2011 | Zhong Wu | 10-16763-00-US | 6171 |

105639 7590 11/18/2016
Duane Morris LLP (10/11) Seagate
IP Docketing
2475 Hanover Street
Palo Alto, CA 94304-1194

| EXAMINER |
|---|
| CHAU, LISA N |

| ART UNIT | PAPER NUMBER |
|---|---|
| 1785 | |

| MAIL DATE | DELIVERY MODE |
|---|---|
| 11/18/2016 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

UNITED STATES PATENT AND TRADEMARK OFFICE

---

BEFORE THE PATENT TRIAL AND APPEAL BOARD

---

*Ex parte* ZHONG WU,
LI TANG, SHOUTAO WANG,
and ABEBE HAILU

---

Appeal 2015-004866
Application 13/217,531
Technology Center 1700

---

Before KAREN M. HASTINGS, GEORGE C. BEST, and
N. WHITNEY WILSON, *Administrative Patent Judges*.

WILSON, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants[1] appeal under 35 U.S.C. § 134 from the Examiner's May 8, 2014 decision finally rejecting claims 1–20. We have jurisdiction over the appeal under 35 U.S.C. § 6(b).

We affirm.

---

[1] Appellants identify the real party in interest as Seagate Technology LLC. (Appeal Br. 3).

## CLAIMED SUBJECT MATTER

Appellants' invention is directed to a perpendicular magnetic recording stack with a dual continuous layer for storing information (Spec. ¶¶ 1, 13). Independent claim 1 is representative and is reproduced below from the Claims Appendix of the Appeal Brief (*key claim limitations shown in italics*):

> 1. A magnetic recording stack comprising:
>
> a substrate;
>
> *one or more magnetic granular recording layers* disposed over the substrate, each of the one or more magnetic granular recording layers *having a lateral exchange coupling*;
>
> *a first continuous layer having an intermediate lateral exchange coupling higher than the lateral exchange coupling of the one or more magnetic granular recording layers*; and
>
> *a second continuous layer having a higher lateral exchange coupling than the lateral exchange coupling of the first continuous layer*, wherein the first continuous layer is disposed between the one or more magnetic granular recording layers and the second continuous layer.

Appeal Br. 22 (Claims App.).

## REJECTIONS

(1) Claims 1–5 and 7 are rejected under 35 U.S.C. § 103(a) as unpatentable over Oka[2] in view of Berger.[3]

(2) Claim 6 is rejected under 35 U.S.C. § 103(a) as unpatentable over Oka in view of Berger, and further in view of Oikawa.[4]

---

[2] Oka, U.S. Patent Pub. 2009/0226763 A1, published September 10, 2009.
[3] Berger et al., U.S. Patent Pub. 2008/0070065 A1, published March 20, 2008.
[4] Oikawa et al., U.S. Patent Pub. 2009/0011281 A1, published January 8, 2009.

(3) Claims 8–20 are rejected under 35 U.S.C. § 103(a) as unpatentable over Oka in view of Berger, and further in view of Oikawa.

Appellants do not offer separate arguments in support of any of the dependent claims or independent claims 8 and 15; arguments are directed to limitations recited in independent claim 1 (*see generally*, Appeal Br. 12–19; Reply Br. 5–8). Accordingly, the claims will stand or fall together, and our discussion will focus on the rejection of claim 1. 37 C.F.R. § 41.37(c)(1)(iv).

## DISCUSSION

The Examiner finds Oka teaches that "[o]f the three magnetic recording layers (5, 6, and 7), the at least one granular recording layer[] (5) ha[s] the lowest lateral exchange coupling due to the magnetic grains being segregated by oxides . . ." (Final Act. 6). The Examiner further finds that Oka teaches each of the magnetic recording stack's limitations recited in claim 1, except "Oka does not specifically teach . . . the second continuous layer (7) having a higher lateral exchange coupling than the lateral exchange coupling of the first continuous layer (6)" (*id.*). The Examiner relies on Berger for suggesting the requisite relative lateral exchange coupling of the claimed continuous layers (*id.*). The Examiner finds that Berger teaches a magnetic lateral coupling layer having a higher lateral exchange coupling than the second magnetic layer's lateral exchange coupling (*id.*, citing Berger ¶¶ 29, 32, 36, and 39). Therefore, according to the Examiner, it would have been obvious to the ordinary skilled artisan "to have Oka's second continuous layer (7) have a higher lateral exchange coupling than the lateral exchange coupling of the first continuous layer (6) in order to achieve

a tunable intergranular exchange in the medium to reduce noise" (Final Act. 6, citing Berger ¶ 46).

Appellants make the following arguments urging reversal of the Examiner's § 103(a) rejections: (1) Berger teaches away from claim 1 because Berger's "cited layers . . . are exchange-decoupled from one another" (Appeal Br. 12, citing Berger ¶ 29, ll. 10–11); (2) neither Oka nor Berger teaches or suggests the limitations reciting "a first continuous layer having an intermediate lateral exchange coupling higher than the lateral exchange coupling of the one or more magnetic granular recording layers" and "a second continuous layer having a higher lateral exchange coupling than the lateral exchange coupling of the first continuous layer" (Appeal Br. 13; *see* claim 1); (3) "the Examiner's interpretation of continuous layers comprising magnetic grains that are not segregated with a nonmagnetic/insulating material is not consistent with and not supported by" Oka (Appeal Br. 14–15); and (4) The Examiner's June 27, 2014 Advisory Action fails to address Appellants' previously presented argument that Berger teaches away from Claim 1 (*id.* at 17).

With respect to argument (1), Appellants argue that Berger teaches away from the requisite relative lateral exchange coupling of each layer because the ordinary skilled artisan, "upon reading Berger, would be led to *have magnetic grains* in the soft layer *that are* <u>*exchange-decoupled*</u> *from one another*" ((emphasis added) Appeal Br. 12, citing Berger ¶ 29, ll. 10–11). Appellants further argue that Berger's "*cited layers . . . are exchange-decoupled from one another*" ((emphasis added) Appeal Br. 12, citing Berger ¶ 29, l. 11). In other words, Appellants assert that not only does Berger teach exchange-decoupling of grains intralayer, but Berger also

teaches interlayer exchange-decoupling (Appeal Br. 12). These disclosures, according to Appellants, amount to a teaching away from the claimed invention (*id.*; *see* Spec. ¶ 13 (explaining the benefits of vertical exchange coupling between the dual continuous layer and the magnetic granular recording layer.)).

Whether a reference teaches away from a claimed invention is a question of fact. *In re Harris*, 409 F.3d 1339, 1341 (Fed. Cir. 2005). For a reference to "teach away," it must criticize, discredit, or otherwise discourage the claimed solution. *See In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004).

In this instance, Appellants' arguments are not persuasive because they fail to identify any teaching in the applied prior art that criticizes, discredits, or discourages a magnetic recording stack with the requisite relative lateral exchange coupling of each layer as claimed. Berger would have led the ordinary skilled artisan to include magnetic grains that are exchange-decoupled from each other *within* the magnetically soft layer (*see* Berger ¶ 29). As the Examiner determined, however, the ordinary skilled artisan would have understood that the *intergranular exchange coupling* within the soft layer would be low, thus teaching a magnetic recording stack layer with at least some degree of lateral exchange coupling (Ans. 3, citing Berger ¶ 29).[5] Therefore, Berger's disclosure does not adequately support a finding that Berger teaches away from a magnetic recording stack with at least some degree of lateral exchange coupling intralayer.

---

[5] We discern no reversible error in the Examiner's finding that Berger's "nomenclature 'intergranular exchange coupling'. . . is synonymous with Appellants' lateral exchange coupling (i.e.[,] the coupling is <u>within the layer</u> itself . . .)" (Ans. 3–4, emphasis in original).

Appellants, furthermore, mischaracterize Berger by asserting that Berger's cited layers "are exchanged-decoupled from one another" (Appeal Br. 12). Rather, Berger teaches the benefits of one layer "introducing an effective intergranular exchange coupling" in an adjacent layer facilitated by differences in intergranular exchange coupling within each layer (*see* Berger ¶ 39). As the Examiner found, Berger's MAG2 layer, which corresponds to the claimed first continuous layer, has a very low intergranular exchange coupling, but Berger's LCL (lateral coupling layer), which corresponds to the claimed second continuous layer, has a higher intergranular exchange coupling than MAG2's intergranular exchange coupling (Ans. 6, citing Berger ¶ 39). The applied prior art thus encourages vertical or interlayer exchange coupling between Berger's LCL and MAG2 layers (*see* Berger ¶ 39). Therefore, we are unpersuaded by Appellants' teaching away argument.

Appellants contend, in connection with argument (2), that "<u>Berger teaches a granular MAG2 [layer], upon which the Examiner is incorrectly reading [as] the claimed first continuous layer</u>" ((emphasis in original) Reply Br. 7; *see also* Appeal Br. 13–14). Specifically, Appellants argue that Berger discloses that MAG2 is a granular layer and cannot be a continuous layer because:

> Paragraph [0015] of Berger recites: "The ferromagnetic alloy in the [lateral coupling layer ("LCL")] has significantly greater intergranular exchange coupling than the ferromagnetic alloy in MAG2, which <u>typically will include segregants such as oxides</u>.["] For example, Paragraph [0015] of Berger also recites: "Because the LCL grain boundaries <u>overlay the boundaries of the generally segregated and decoupled grains of MAG2</u> with which it is in contact, and the LCL and MAG2 grains are strongly coupled perpendicularly." (Paragraph [0039] of Berger echoes

> the foregoing.) For example, Paragraph [0036] of Berger recites: "MAG2 may [. . .] be a layer of granular polycrystalline cobalt alloy, such as a CoPt or CoPtCr alloy, with a suitable segregant such as oxides of Si, Ta, Ti, Nb, Cr, V and B."

(Reply Br. 6–7, emphasis in original).

It is, however, well established that a reference is good for all it fairly teaches a person having ordinary skill in the art, even when the teaching is a cursory mention. *E.g.*, *In re Mills*, 470 F.2d 649, 651 (CCPA 1972). We do not read the cited disclosures as requiring that Berger's MAG2 layer must include nonmagnetic material segregants, such as oxides. Rather, Berger's teaching that MAG2 "typically will include segregants . . ." merely states that segregants are optional (Berger ¶ 15). Likewise, Berger teaches that "MAG1 and MAG2 may each be a layer of granular polycrystalline cobalt alloy . . . with a suitable segregant such as oxides . . ." (*id.,* ¶ 36). Thus, Berger suggests that it is possible that each of MAG1 and MAG2 layers not include optional segregants, such as oxides.

Furthermore, Appellants' argument is not persuasive because of the scope of the term "continuous layer" as used in claim 1. It is well established that: "[T]he PTO must give claims their broadest reasonable construction consistent with the specification. . . . Therefore, we look to the specification to see if it provides a definition for claim terms, but otherwise apply a broad interpretation." *In re ICON Health & Fitness, Inc.*, 496 F.3d 1374, 1379 (Fed. Cir. 2007). "[A]s applicants may amend claims to narrow their scope, a broad construction during prosecution creates no unfairness to the applicant or patentee." *Id.*

With regards to the claim term "continuous layer," as found by the Examiner, paragraph 20 of the Specification explicitly discloses that

magnetic granular layers of the invention have "a granular structure, which includes magnetic crystal grains segregated by nonmagnetic substances, such as oxides, at the grain boundaries" (Ans. 9, citing Spec. ¶¶ 20, 33). The Specification, furthermore, provides that continuous layers may be comprised of substantially similar Co alloys as the magnetic granular layer, except that no nonmagnetic substances, such as oxides, are present (*see* Spec. ¶¶ 33, 37). Moreover, the Examiner cites evidentiary support that the ordinary skilled artisan would have understood that continuous layers may comprise magnetic grains, but must not be segregated with a nonmagnetic material (Ans. 9; *see also* Berger ¶ 15 (noting that "LCL grain boundaries" are still present although "[t]he LCL alloy should preferably not include any oxides or other segregants . . . .")). Appellants' arguments (*see* Appeal Br. 14–16; Reply Br. 8) have not identified reversible error in either the Examiner's broadest reasonable construction of claim 1 (Ans. 8–9), which we adopt, or the Examiner's evidentiary support in the art of record (*id.* at 9).

Thus, we determine that a "continuous layer," as used in the claims, may comprise magnetic grains, but these grains must not be segregated with a nonmagnetic material. Because Berger fairly teaches that the MAG2 layer's segregants, such as oxides, are optional, we discern no error in the Examiner's finding that Berger's MAG2 meets the limitation of a "continuous layer" as recited in claim 1. Therefore, we are unpersuaded by Appellants' argument (2).

With regard to argument (3), Appellants assert that Oka cannot "support []the Examiner's assertion that continuous layers are granular layers not segregated with nonmagnetic/insulating material" (Appeal Br.

15). We are unpersuaded because, *inter alia*, the Examiner does not associate the claimed continuous layers with Oka's granular layers (*see* Ans. 8). Rather, the Examiner finds that Oka's structure of a granular layer, a non-granular layer (1), and a non-granular layer (2) corresponds to Appellants' magnetic granular recording layer, a first continuous layer, and a second continuous layer, respectively (*id.*; *see also* Final Act. 5–6, citing Oka Fig. 4; ¶¶ 29, 37, 67). Therefore, we are unpersuaded by Appellants' argument (3).

Regarding Appellants' arguments (2) and (3), the Supreme Court has made clear that an obviousness analysis "need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007). That is because "[a] person of ordinary skill is also a person of ordinary creativity, not an automaton." *Id.* at 421. As pointed out by the Examiner, Oka explicitly suggests that "[o]f the three magnetic recording layers (5, 6, and 7), the at least one granular recording layer[] (5) ha[s] the lowest lateral exchange coupling due to the magnetic grains being segregated by oxides . . ." (Final Act. 6). The Examiner further found that Berger exemplifies that it was known to construct an "uppermost/third magnetic [continuous] layer having a higher lateral exchange coupling than the second magnetic layer's [] lateral exchange coupling" (*e.g.*, *id.*, citing Berger ¶¶ 29, 32, 36, 39).

Thus, a preponderance of the evidence supports the Examiner's reasonable position that it would have been prima facie obvious to have Oka's second continuous layer (7) have a higher lateral exchange coupling

than the lateral exchange coupling of the first continuous layer (6), with each continuous layer having a higher lateral exchange coupling than the lateral exchange coupling of granular recording layer (5), as required by the claim.

Appellants have not directed us to any persuasive technical reasoning or evidence to refute the Examiner's determination that the construction of magnetic recording stack with multiple layers, which vary in lateral exchange coupling strength from each other, would have been no more than the predictable implementation of a known prior art feature for its known function in producing a balance between mechanical robustness and improved recording performance.

Regarding argument (4), we are likewise not persuaded that the Examiner's June 27, 2014 Advisory Action failed to address Appellants' previously presented argument that Berger teaches away from Claim 1 (Appeal Br. 17). As set forth above, we are unpersuaded by Appellants' teaching away arguments. The Examiner, furthermore, substantively addressed these arguments in the Advisory Action (Adv. Act. 3–4, citing Berger ¶ 29).

Accordingly, we affirm the rejections of claims 1–20 for the reasons set forth above and explained in the Examiner's Final Office Action and Answer.

## CONCLUSION

We AFFIRM the rejection of claims 1–5 and 7 under 35 U.S.C. § 103(a) as obvious over Oka in view of Berger.

We AFFIRM the rejection of claim 6 under 35 U.S.C. § 103(a) as obvious over Oka in view of Berger, and further in view of Oikawa.

We AFFIRM the rejection of claims 8–20 under 35 U.S.C. § 103(a) as obvious over Oka in view of Berger, and further in view of Oikawa.

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

AFFIRMED