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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* ANTONIO JAVIER ZAMBANO,  
LI TANG, and JOHN DAVID WESTWOOD

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Appeal 2019-004916  
Application 13/632,154  
Technology Center 1700

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

COLAIANNI, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant<sup>1</sup> appeals under 35 U.S.C. § 134(a) the final rejection of claims 1, 2, 4–12, 14, 16, 17, 19, 21–27. We have jurisdiction over the appeal pursuant to 35 U.S.C. § 6(b).

We AFFIRM.

Appellant’s invention is directed to magnetic recording media (Spec. ¶ 1). The Specification describes methods and systems for using magnetic seed layers with hexagonal close-packed (hcp) structures and in-plane

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<sup>1</sup> We use the word “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42. Appellant identifies the real party in interest as Seagate Technology LLC (Appeal Br. 2).

magnetic anisotropy as a layer on a hard disk storage medium (*id.* ¶¶ 12, 14; Figs. 2, 3).

Claim 1 is illustrative (emphasis added):

1. An apparatus comprising:
  - a substrate;
  - a soft underlayer overlying said substrate; and
  - a magnetic seed layer magnetically coupled to and in overlying contact with said soft underlayer, wherein said magnetic seed layer is formed from a hexagonal close-packed with out-of-plane magneto-crystalline anisotropy structure, wherein the magnetic seed layer grown on an adhesion layer has out-of-plane magnetic anisotropy and wherein the magnetic seed layer is in overlying contact with the soft underlayer and maintains magnetization in longitudinal direction, and wherein said magnetic seed layer is permeable by magnetic flux being emanated from a write pole and wherein said magnetic seed layer has a net in-plane magnetic anisotropy in a same direction as in-plane magnetic anisotropy of the soft underlayer and wherein the magnetic flux travels in longitudinal direction in the soft underlayer and the magnetic seed layer when the magnetic flux is applied.*

Appellant appeals the following rejections:

- A. Claims 1, 2, 4–10, 12, 14, 16, 17, 19, and 21–27 are rejected under 35 U.S.C. § 103(a) as unpatentable over Watanabe (US 2012/0028077 A1, published Feb. 2, 2012), as evidenced by University of Minnesota, *Magnetic Anisotropy* (“UMN”) or Institut de Physique des Nanostructures, *Magnetocrystalline anisotropy energy: MAE (K)* (“NANO”), in view of Inamura et al. (US 2008/0075979 A1, published Mar. 27, 2008) (“Inamura”), and further in view of Futamoto et al. (US 6,686,070 B1, issued Feb. 3, 2004) (“Futamoto”).

- B. Claim 11 is rejected under 35 U.S.C. § 103(a) as unpatentable over Watanabe, as evidenced by UMN or NANO, in view of Inamura, Futamoto, and further in view of Acharya et al. (US 7,241,516 B1, issued July 10, 2007) (“Acharya”).
- C. Claims 1, 2, 4–10, 12, 14, 16, 17, 19, 21–24, 26, and 27 are rejected under 35 U.S.C. § 103(a) as unpatentable over Watanabe, as evidenced by UMN or NANO, in view of Girt et al. (US 2009/0011283 A1, issued Jan. 8, 2009) (“Girt”).
- D. Claims 2, 9, 10, and 25–27 are rejected under 35 U.S.C. § 103(a) as unpatentable over Watanabe, as evidenced by UMN or NANO, in view of Girt, and further in view of Inamura.
- E. Claim 11 is rejected under 35 U.S.C. § 103(a) as unpatentable over Watanabe, as evidenced by UMN or NANO, in view of Inamura, in view of Futamoto, and further in view of Acharya.

Appellant argues the claims as a group and offers separate arguments in support of independent claim 1 and dependent claims 2, 21, 26, and 27 (*see generally* Appeal Br. 8–15; Reply Br. 2–7). Claims 4–12, 14, 16, 17, 19, and 22–25 will stand or fall with our analysis of independent claim 1. 37 C.F.R. § 41.37(c)(1)(iv)(2018). Claims 1, 2, 21, 26, and 27 will be discussed separately.

#### FINDINGS OF FACT & ANALYSIS

After review of the respective positions provided by Appellant and the Examiner, we affirm the Examiner’s rejections for the reasons presented by the Examiner and add the following for emphasis.

A. *Rejection of claims 1, 2, 4–10, 12, 14, 16, 17, 19, and 21–27 as unpatentable over the combination of Watanabe, UMN or NANO, Inamura, and Futamoto.*

1. *Claims 1, 4–12, 14, 16, 17, 19, and 22–25*

With respect to claim 1, the Examiner's findings and conclusions regarding Watanabe, UMN or NANO, Inamura, and Futamoto are located on pages 3–5 of the Final Office Action and pages 3–5 of the Answer.

The Examiner finds that Watanabe's magnetic recording medium, comprising a substrate, a soft underlayer overlying the substrate, and a magnetic seed layer overlying the soft underlayer, teaches each limitation of the claimed apparatus, except the magnetic seed layer's and the soft underlayer's particular features (Final Act. 3). The Examiner finds that although Watanabe's magnetic seed layer is formed from an hcp crystalline structure, Watanabe does not disclose that the seed layer possesses: (i) out-of-plane magneto-crystalline anisotropy structure; (ii) a net in-plane magnetic anisotropy in the same direction as the in-plane magnetic anisotropy of the soft underlayer; and (iii) a magnetic flux, which travels in longitudinal direction in the soft underlayer and the magnetic seed layer when the magnetic flux is applied (*id.* at 4).

Regarding missing limitation (i), the Examiner relies on UMN and NANO for providing evidence that Watanabe's hcp crystalline structure would have inherently possessed an out-of-plane magneto-crystalline anisotropy structure (*id.*).

With respect to missing limitations (ii) and (iii), the Examiner finds that the combination of Inamura and Futamoto would have suggested the requisite properties of the magnetic seed layer and the soft underlayer (*id.*).

Figure 3 of Inamura, reproduced below, illustrates a cross-sectional view of a write operation performed in a magnetic recording medium:

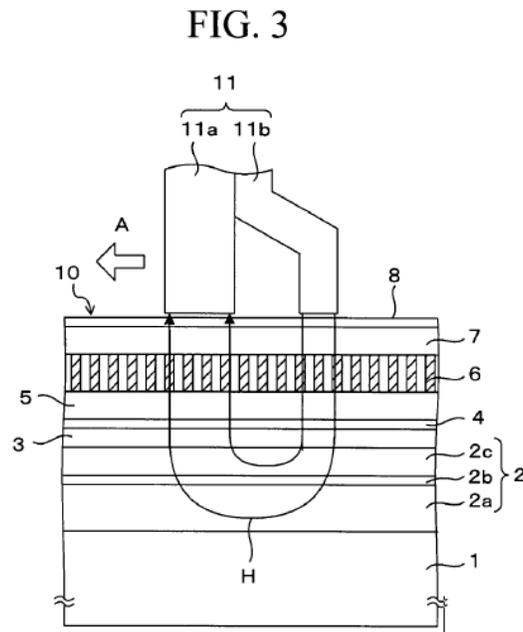


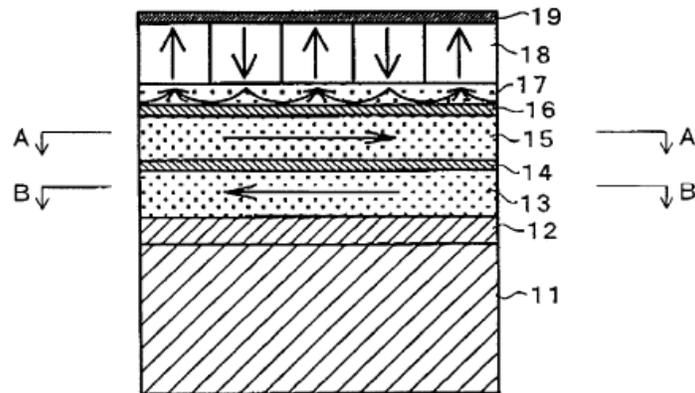
Figure 3 of Inamura illustrates magnetic head 11, which applies magnetic field H in main pole 11b for perpendicular penetration through, *inter alia*, magnetic seed layer 3 and in-plane penetration through soft underlayer 2c (*id.* ¶¶ 41, 42, 63, 64).

The Examiner finds that Inamura discloses crystalline magnetic seed layer 3, which is ferromagnetically coupled to soft underlayer 2c (Final Act. 4). The Examiner finds Inamura teaches that such ferromagnetically coupling synchronizes the magnetic direction of seed layer 3 with soft underlayer 2c (*id.* at 14). The Examiner finds that although soft underlayer 2c has a magnetic flux in an in-plane direction, Inamura does not disclose that soft underlayer 2c possesses a net in-plane direction (*id.* at 4).

The Examiner finds Futamoto discloses that the direction for a layer with soft magnetism can be in a circumferential direction (*id.*). Figure 1 of

Futamato, reproduced below, illustrates a cross-sectional schematic diagram of a perpendicular magnetic recording medium:

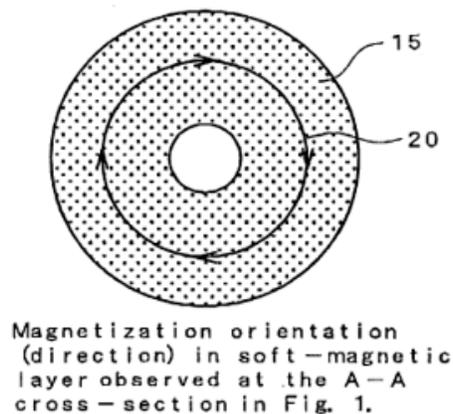
**FIG. 1**

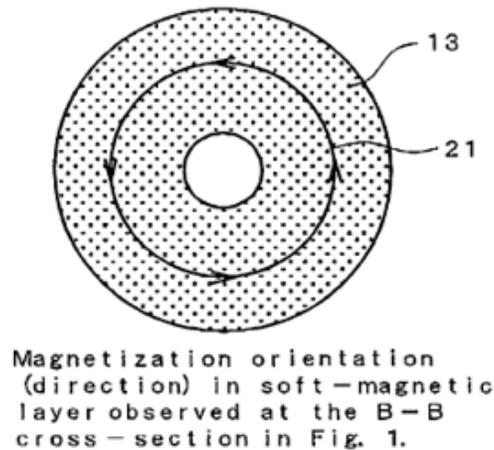


Futamato's figure 1 illustrates, *inter alia*, the magnetization orientations in a perpendicular magnetic recording medium through soft magnetic films 13 and 15 (Futamato 3:3-17).

Figure 2 of Futamato, reproduced below, illustrates the magnetization orientations in the soft magnetic film at the A-A and the B-B cross-sections:

**FIG. 2**





Futamoto's figure 2 illustrates the magnetization orientations 20 and 21 of the soft magnetic films 15 and 13, respectively, at the A-A and the B-B cross-sections shown in Futamoto's figure 1 (*id.* at 3:24-26).

The Examiner finds Futamoto teaches that setting the magnetization orientations in the circumferential direction (i.e., the claimed "net in-plane magnetic anisotropy"; *see id.* at Fig. 1) leads to noise suppression of a magnetic recording medium (Final Act. 4).

The Examiner concludes that it would have been obvious to a person of ordinary skill in the art at the time of the invention to have configured Inamura's soft underlayer 2c to possess Futamoto's magnetic flux in a circumferential in-plane direction in order to suppress the magnetic recording medium's noise (*id.*).

The Examiner determines that it would have been obvious to a person of ordinary skill in the art at the time of the invention to have: (i) matched the magnetic direction of Watanabe's magnetic seed layer and soft underlayer by ferromagnetically coupling these layers, as suggested by Inamura, and (ii) set the magnetization orientation in Watanabe's soft underlayer in the circumferential net in-plane direction to confer desirable

noise suppression, as suggested by Futamoto (*id.* at 5). The Examiner finds “Watanabe discloses that the seed layer functions in the same way as the soft underlayer,” and thus the proposed modification would have resulted in the magnetic seed layer and the soft underlayer possessing the same properties (*id.* (citing Watanabe ¶ 30)). Namely, the properties of modified Watanabe’s magnetic seed layer having a net in-plane magnetic anisotropy in the same direction as the soft underlayer’s in-plane magnetic anisotropy; and the magnetic flux traveling in a longitudinal direction in the soft underlayer and the magnetic seed layer when a magnetic flux is applied from a magnetic head (Final Act. 4–5).

Appellant argues that Inamura teaches away from the requisite magnetic flux direction because the applied magnetic field H travels in the seed layer’s “out-of-plane” direction (Appeal Br. 8–9).

Teaching away requires that a reference “criticize, discredit, or otherwise discourage the solution claimed” by Appellant. *In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004). In this case, Inamura does not criticize or discourage magnetic flux in an in-plane or longitudinal direction through the seed layer. Inamura does not indicate that “the line of development flowing from the reference’s disclosure is unlikely to be productive of the result sought by the applicant.” *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994). Inamura discloses an embodiment of the invention but does not disclose that the seed layer must have a perpendicular magnetic flux direction. (Inamura ¶ 32). Rather, the Examiner determines that Inamura’s teachings in combination with Watanabe’s and Futamoto’s teachings would have suggested making Watanabe’s seed layer have an in-plane magnetic flux direction (Final Act. 4-5). The Examiner’s reasoning is based upon

Watanabe's teaching that the seed layer 3 and soft magnetic layer 2 desirably have the same functionality (Final Act. 5). Therefore, we do not find that Inamura teaches away from the magnetic flux traveling in a longitudinal direction in the magnetic seed layer.

Appellant argues that the Examiner erred in finding that "it is very well known in the magnetic recording media (MRM) arts that the magnetic flux direction in a magnetic soft underlayer is in a longitudinal direction" (Reply Br. 2; *see* Ans. 4).

Appellant, however, admits that Futamoto discloses a magnetization orientation direction in the soft magnetic layer (Appeal Br. 9). Inamura, furthermore, explicitly describes that a magnetic field H's path through soft underlayer 2c in figure 3 includes an in-plane direction (Inamura ¶ 64).

Appellant argues that the Examiner has not provided any evidentiary support that Watanabe's magnetic flux travels in a longitudinal direction (Reply Br. 2).

We are not persuaded by this argument as the Examiner does not rely on Watanabe alone for disclosing or suggesting magnetic flux traveling in a longitudinal direction in the soft underlayer and the magnetic seed layer (Final Act. 3–5). As the Examiner explains, Inamura depicts magnetic flux in soft underlayer 2c having an in-plane, i.e., longitudinal flux direction (Ans. 4; *see* Inamura Fig. 3). The Examiner finds Watanabe teaches that the soft underlayer possesses the same function as the seed layer and, thus, Watanabe's seed layer is permeable to magnetic flux applied from a magnetic head (Final Act. 3 (citing Watanabe ¶ 30 ("a soft magnetic material is more preferably used so that *seed layer 3 functions in the same way as the soft magnetic back layer* [2]")) (emphasis added))). The Examiner

finds Inamura teaches that a ferromagnetically coupled seed layer to a soft underlayer matches the net magnetic direction of the seed layer with the soft underlayer (Final Act. 14; *see also* Inamura ¶ 42; Fig. 2a (depicting parallel saturation magnetizations of Ms2 and Ms3 of second soft magnetic layer 2c and seed layer 3, respectively)). We, therefore, find that the Examiner has provided sufficient evidentiary support for the conclusion that Watanabe's magnetic flux would have traveled in a longitudinal direction (Ans. 4–5).

Appellant contends that Futamoto discloses magnetization orientation direction in the soft magnetic layer, but not in the magnetic seed layer, as required by claim 1 (Appeal Br. 9).

Appellant's argument attacks Futamoto individually instead of addressing what the combined teachings of the applied prior art would have suggested to the ordinarily skilled artisan. *In re Keller*, 642 F.2d 413, 425 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986) (“Non-obviousness cannot be established by attacking references individually where the rejection is based upon the teachings of a combination of references.”). As the Examiner explains, Futamoto's circumferential magnetic flux direction in combination with Inamura's ferromagnetic coupling would have resulted in a seed layer that is ferromagnetically coupled to the soft underlayer, with each layer having the same direction of magnetization orientation (Ans. 5).

Thus, based on a preponderance of evidence in this record, we affirm this rejection of claims 1, 4–12, 14, 16, 17, 19, and 22–25.

## 2. Claims 2, 26, and 27

With respect to claims 2, 26, and 27, the Examiner's findings and conclusions regarding Watanabe, UMN or NANO, Inamura, and Futamoto

are located on pages 6–7 of the Final Office Action and pages 5–6 of the Answer. We select claim 26 as representative of claims 2, 26, and 27 as each claim recites limitations regarding ranges of a layer’s thickness. 37 C.F.R. § 41.37(c)(1)(iv).

Claim 26 is illustrative (emphasis added):

26. The apparatus of Claim 8, *wherein thickness of the magnetic seed layer is between 1–40 Å or greater than 50 Å and less than 100 Å, and wherein a thickness of the soft underlayer is 200 Å.*

Appellant argues that the Examiner reversibly erred in determining that it would have been obvious for the ordinarily skilled artisan at the time of the invention to have determined the optimum value of a result effective variable such as layer thickness (Appeal Br. 11).

We are not persuaded by this argument. The 200 Å thickness of the soft underlayer recited in the claim is overlapped and encompassed by the range of Watanabe’s soft underlayer thickness of 10 nm or more (*see* Ans. 6 (citing Watanabe ¶ 29)), which is sufficient to have rendered the claimed subject matter obvious. *Cf. In re Peterson*, 315 F.3d 1325, 1329 (Fed. Cir. 2003) (holding that a prima facie case of obviousness typically exists when the ranges of a claimed composition overlap the ranges disclosed in the prior art).

Appellant argues that even if the distance between Watanabe’s magnetic head and soft magnetic layer “may be reduced by reducing the thickness of the magnetic layer, the under layer, etc.” this “does not necessarily teach or suggest reducing the thickness of the seed layer” (Appeal Br. 11). Appellant contends that the magnetic seed layer’s claimed thickness was selected so that the magnetic seed layer with hcp lattice

structure and out-of-plane anisotropy “exhibits in-plane magnetic anisotropy when formed on the soft under layer” (*id.*).

We are not persuaded by this argument. As explained by the Examiner, “[t]he seed layer is between the magnetic head and the soft magnetic layer . . . [and] Watanabe discloses that it is advantageous to have a small distance between the magnetic head and the [soft underlayer]” (Ans. 5–6). We, therefore, agree with the Examiner’s conclusions that “the thickness of *any* layers between the head and the . . . [soft underlayer] should be minimized such that magnetic field would [have] be[en] able to penetrate to the . . . [soft underlayer]” (*id.*).

Appellant, furthermore, has not provided any evidence showing the criticality of the claimed parameters (*see* Ans. 6).<sup>2</sup> We, therefore, agree with the Examiner that in the absence of any evidence indicating that the claimed magnetic seed layer’s thickness is critical to the layer exhibiting in-plane magnetic anisotropy, the Examiner has established a *prima facie* case of obviousness (*id.*).

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<sup>2</sup> Appellant responds that “*criticality* for the thickness of the magnetic seed layer” has been provided (Reply Br. 6). However, as the Federal Circuit has explained,

an applicant may overcome a *prima facie* case of obviousness by establishing ‘that the [claimed] range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range.’ That same standard applies when, as here, the applicant seeks to optimize certain variables by selecting narrow ranges from broader ranges disclosed in the prior art. Moreover, the applicant’s showing of unexpected results must be commensurate in scope with the claimed range.

*Peterson*, 315 F.3d at 1330. On this record, Appellant has made no such showing.

Thus, based on a preponderance of evidence in this record, we affirm this rejection of claims 2, 26, and 27.

3. *Claim 21*

With respect to claim 21, the Examiner's findings and conclusions regarding Watanabe, UMN or NANO, Inamura, and Futamoto are located on page 12 of the Final Office Action and page 6 of the Answer.

Claim 21 is illustrative (emphasis added):

21. The apparatus of Claim 1, *wherein said soft underlayer is amorphous and comprises CoZrNb, CoZrTa, CoCrRu, FeCo or FeTaC.*

Appellant argues that “Watanabe discloses that the soft magnetic back layer may be a noncrystalline CoFeTaZr including a total of 8% or more of Ta, Zr, Nb, B or the like . . . , which does not include any of the claimed material such as CoZrNb, CoZrTa, CoCrRu, FeCo or FeTaC” (Appeal Br. 11 (citing Watanabe ¶ 29)).

We are not persuaded by this argument. Claim 21 contains the open transitional term “comprises,” which permits elements and compounds in addition to those specified to be included in the composition of the claim. *In re Crush*, 393 F.3d 1253, 1257 (Fed. Cir. 2004) or *In re Baxter*, 656 F.2d 679, 686 (CCPA 1981). As the Examiner determined, one of ordinary skill in the art would have recognized that Watanabe's *noncrystalline CoFeTaZr* including a total of 8% or more of *Ta, Zr, Nb, B* is encompassed by an *amorphous* soft underlayer comprising CoZrNb, CoZrTa, CoCrRu, FeCo, or FeTaC, within the meaning of claim 21 (*see* Ans. 6).

Thus, based on a preponderance of evidence in this record, we affirm this rejection of claim 21.

*B. Rejection of claim 11 as unpatentable over the combination of Watanabe, UMN or NANO, Inamura, Futamoto, and Acharya.*

With respect to claim 11, the Examiner's findings and conclusions regarding Watanabe, UMN or NANO, Inamura, Futamoto, and Acharya are located on pages 7–8 of the Final Office Action and pages 6–7 of the Answer.

Appellant's arguments regarding claim 11 also rely on the same unpersuasive arguments made regarding claims 1 and 8 in Ground 1 (Appeal Br. 10; 11–12). As discussed above, we have affirmed the rejection of claims 1 and 8 in Ground 1. We, therefore, also affirm this rejection of claim 11.

*C. Rejection of claims 1, 2, 4–10, 12, 14, 16, 17, 19, 21–24, 26, and 27 as unpatentable over the combination of Watanabe, UMN or NANO, and Girt.*

*1. Claims 1, 4–10, 12, 14, 16, 17, 19, and 22–24*

With respect to claim 1, the Examiner's findings and conclusions regarding Watanabe, UMN or NANO, and Girt are located on pages 8–10 of the Final Office Action and pages 7–8 of the Answer.

Appellant argues that the Examiner mischaracterizes the Specification as disclosing that an hcp structure inherently possesses an out-of-plane magneto-crystalline anisotropy structure (Appeal Br. 12; Reply Br. 6).

Appellant's argument is not dispositive as the Examiner relies upon UMN and NANO for providing evidence that Watanabe's hcp crystalline structure would have inherently possessed the disputed property (Ans. 9).<sup>3</sup>

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<sup>3</sup> We are also not persuaded by Appellant's argument that "the multiple rejections under different secondary references appear to be attempts at presenting any possible argument (whether or not they are plausible),

We, furthermore, agree with the Examiner that the Specification's paragraph 14 describes admitted prior art (*id.* at 7–8; *see also* Spec. ¶ 14 (disclosing that “[m]agnetic seed layers with hcp lattice structures were typically not considered because of their out-of-plane or vertical magneto-crystalline anisotropy”)).

Appellant argues that Girt's hcp soft underlayer, which is an interlayer, cannot possess any of the requisite properties that are associated with “the magnetic seed layer,” as recited in claim 1 (Appeal Br. 13). In particular, Appellant argues that Girt's interlayer cannot be the same as a seed layer because: (i) “why in the world would anyone skilled in the art . . . refer to them differently[?]” and (ii) an interlayer “is in between layers[,] whereas the seed layer is the foundation to grow other layers on” (Reply Br. 7).

We are not persuaded by Appellant's arguments. *See In re Danly*, 263 F.2d 844, 847 (CCPA 1959) (holding that, “[r]egardless of the terminology used by the reference, claims are obvious where the prior art discloses or suggests the claimed structure”). As the Examiner finds, Girt's hcp soft underlayer (“SUL”) overlays an amorphous soft magnetic layer (Final Act. 9 (citing Girt's Fig. 2c); *see also* Ans. 8 (citing Girt's Fig. 2d)). Girt, furthermore, explicitly discloses that the hcp SUL is

a layer that can resume both roles, that of an interlayer, *setting the [0002] growth orientation, and that of SUL*. This layer is called hcp SUL. The preferred requirements for hcp SUL are: 1) *to have hcp crystal structure*, 2) *to be ferromagnetic*, 3) *to have*

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regardless of the teachings of the references” (Appeal Br. 12). Rather, what the references would have meant to one of ordinary skill in the art, not their number, is the criterion for determining whether the references would have rendered a claim obvious. *See In re Gorman*, 933 F.2d 982 (Fed. Cir. 1991).

*a large saturation magnetization, . . . [and] 5) to have small in-plane coercivity . . . .*

(Girt ¶ 22) (emphasis added); *see also Fritch*, 972 F.2d at 1264. We, therefore, agree with the Examiner that the growth orientation property of Girt's hep SUL, along with the ability to orient the magnetic moment along the film plane, discloses or suggests "the magnetic seed layer," as recited in claim 1 (Ans. 8).

Thus, based on a preponderance of evidence in this record, we affirm this rejection of claims 1, 4–10, 12, 14, 16, 17, 19, and 22–24.

*2. Claims 2, 21, 26, and 27*

With respect to claims 2, 21, 26, and 27, the Examiner's findings and conclusions regarding Watanabe, UMN or NANO, and Girt are located on pages 10–12 of the Final Office Action.

Appellant's arguments regarding claims 2, 21, 26, and 27 also rely on the same unpersuasive arguments made regarding these claims in Ground 1 (Appeal Br. 13). As discussed above, we have affirmed the rejection of claims 2, 21, 26, and 27 in Ground 1. We, therefore, also affirm this rejection of claims 2, 21, 26, and 27.

*D. Rejection of claims 2, 9, 10, and 25–27 as unpatentable over the combination of Watanabe, UMN or NANO, Girt, and Inamura.*

With respect to claims 2, 9, 10, and 25–27, the Examiner's findings and conclusions regarding Watanabe, UMN or NANO, Girt, and Inamura are located on page 12 of the Final Office Action.

Appellant's arguments regarding claims 2, 9, 10, and 25–27 also rely on the same unpersuasive arguments made regarding claims 2, 26, and 27 in Ground 1 and claims 1, 2, 4–10, 12, 14, 16, 17, 19, 21–24, 26, and 27 in

Ground 3 (Appeal Br. 13–14). As discussed above, we have affirmed the rejection of claims 2, 26, and 27 in Ground 1 and claims 1, 2, 4–10, 12, 14, 16, 17, 19, 21–24, 26, and 27 in Ground 3. We, therefore, also affirm this rejection of claims 2, 9, 10, and 25–27.

*E. Rejection of claim 11 as unpatentable over the combination of Watanabe, UMN or NANO, Girt, and Acharya.*

With respect to claim 11, the Examiner’s findings and conclusions regarding Watanabe, UMN or NANO, Girt, and Acharya are located on page 12–13 of the Final Office Action.

Appellant’s arguments regarding claim 11 also rely on the same unpersuasive arguments made regarding claims 1 and 8 in Ground 3 (Appeal Br. 10; 11–12). As discussed above, we have affirmed the rejection of claims 1 and 8 in Ground 3. We, therefore, also affirm this rejection of claim 11.

## CONCLUSION

In summary:

<b>Claims Rejected</b>	<b>35 U.S.C. §</b>	<b>Reference(s)/Basis</b>	<b>Affirmed</b>	<b>Reversed</b>
1, 2, 4–10, 12, 14, 16, 17, 19, 21–27	103(a)	Watanabe, UMN, NANO, Inamura, Futamoto	1, 2, 4–10, 12, 14, 16, 17, 19, 21–27	
11	103(a)	Watanabe, UMN, NANO, Inamura, Futamoto, Acharya	11	
1, 2, 4–10, 12, 14, 16, 17, 19, 21–24, 26, 27	103(a)	Watanabe, UMN, NANO, Girt	1, 2, 4–10, 12, 14, 16, 17, 19, 21–24, 26, 27	

<b>Claims Rejected</b>	<b>35 U.S.C. §</b>	<b>Reference(s)/Basis</b>	<b>Affirmed</b>	<b>Reversed</b>
2, 9, 10, 25–27	103(a)	Watanabe, UMN, NANO, Girt, Inamura	2, 9, 10, 25–27	
11	103(a)	Watanabe, UMN, NANO, Girt, Acharya	11	
<b>Overall Outcome</b>			<b>1, 2, 4–12, 14, 16, 17, 19, 21–27</b>	

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