Paper No. 14

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Ex parte KAZUHIKO HAYASHI, SHIGERU MORI, and MASAFUMI NAKADA

Appeal No. 2002-1701
Application No. 09/076,111

ON BRIEF

Before HAIRSTON, KRASS, and BARRY, *Administrative Patent Judges*.
BARRY, *Administrative Patent Judge*.

DECISION ON APPEAL

A patent examiner rejected claims 1, 5, 9, 13, 17, 21, and 25-31. The appellants appeal therefrom under 35 U.S.C. § 134(a). We reverse.

BACKGROUND

The invention at issue on appeal concerns magnetoresistance ("MR") effect devices. A MR sensor can read data recorded on a magnetic storage medium. More specifically, the sensor detects magnetic field signals through resistance changes that vary with the strength and direction of magnetic flux sensed. (Spec. at 1.)

The appellants' MR effect device features a sequence of layers including a sublayer, a NiFe layer, a nonmagnetic layer, an MR enhancement layer, a fixed magnetic layer, and an antiferromagnetic layer. The sublayer comprises either Ta that is not less than 0.2 nm thick and less than 1.0 nm thick, Hf that is not less than 0.2 nm thick and not more than 1.5 nm thick, or Zr that is not less than 0.2 nm thick and not more than 2.5 nm thick. According to the appellants, their sequence enhances "crystallinity" and improves heat resistance. (Appeal Br. at 2.)

A further understanding of the invention can be achieved by reading the following claim.

1. A magnetoresistance effect device comprising:

a substrate;

a sublayer directly on and contacting said substrate, said sublayer being one of (1) Ta that is not less than 0.2 nm thick and less than 1.0 nm thick, (2) Hf that is not less than 0.2 nm thick and not more than 1.5 nm thick, and (3) Zr that is not less than 0.2 nm thick and not more than 2.5 nm thick;

an NiFe layer directly on and contacting said sublayer;

a non-magnetic layer directly on and contacting said NiFe layer;

a fixed magnetic layer directly on and contacting said non-magnetic layer; and

an antiferromagnetic layer directly on and contacting said fixed magnetic layer.

Claims 1 and 26 stand rejected under 35 U.S.C. § 103(a) as obvious over U.S. Patent No. 5,717,550 ("Nepela") and U.S. Patent No. 5,796,560 ("Saito"). Claims 5 and 27 stand rejected under § 103(a) as obvious over U.S. Patent No. 5,764,056 ("Mao") and Saito. Claims 9, 17, 25, 28, and 30 stand rejected under § 103(a) as obvious over U.S. Patent No. 5,761,011 ("Miyauchi") and Saito. Claims 13, 21, 29, and 31 stand rejected under § 103(a) as obvious over Mao, Miyauchi, and Saito.

OPINION

Rather than reiterate the positions of the examiner or the appellants *in toto*, we address the point of contention therebetween. Admitting that "Nepela discloses a Ta underlayer thickness of 3.0 nm," (Examiner's Answer at 3); "Mao discloses a Ta underlayer thickness of 3.5 nm," (*id.* at 4); and "Miyauchi discloses a Ta underlayer thickness of 50 nm," (*id.* at 5); the examiner asserts, "the teaching of Saito of underlayer thicknesses down to 1 nm, and even less (albeit with difficulty) still serves as evidence that an underlayer thickness may be made that small." (*Id.* at 8.) The appellants argue, "[o]ne of skill in the art considering all of the references would find nothing to motivate the artisan to make the film less than 1 nm thick" (Appeal Br. at 4.)

In addressing the point of contention, the Board conducts a two-step analysis. First, we construe claims at issue to determine their scope. Second, we determine whether the construed claims would have been obvious.

1. CLAIM CONSTRUCTION

"Analysis begins with a key legal question -- *what* is the invention *claimed*?" *Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561, 1567, 1 USPQ2d 1593, 1597 (Fed. Cir. 1987). Here, independent claim 1 recites in pertinent part the following limitations: "said sublayer being one of (1) Ta that is not less than 0.2 nm thick and less than 1.0 nm thick. . . ." Independent claims 5, 9, 13, 17, 21, and 25 include similar limitations. Accordingly, the limitations require that a Ta sublayer be less than 1.0 nm thick.

2. OBVIOUSNESS DETERMINATION

Having determined what subject matter is being claimed, the next inquiry is whether the subject matter would have been obvious. "'A *prima facie* case of obviousness is established when the teachings from the prior art itself would . . . have suggested the claimed subject matter to a person of ordinary skill in the art.'" *In re Bell*, 991 F.2d 781, 783, 26 USPQ2d 1529, 1531 (Fed. Cir. 1993) (quoting *In re Rinehart*, 531 F.2d 1048, 1051, 189 USPQ 143, 147 (CCPA 1976)). "A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be

discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant." *In re Gurley*, 27 F.3d 551, 553, 31 USPQ2d 1130, 1131 (Fed. Cir. 1994)

Here, Saito discloses "[a] multilayer film consisting of a nonmagnetic undercoating film and a magnetic undercoating film. . . ." Col. 9, l. 67 - col. 10, l. 2. For its part, the nonmagnetic undercoating film can be formed from Ta, col. 10, ll. 7-8, which "has a thickness in the range of 1 nm to 10 nm." *Id.* at ll. 27-28. Regarding the lower thickness, the reference warns, "[i]f the thickness is less than 1 nm, the film will not be easily formed as a single-layer film." *Id.* at ll. 28-30. Because Saito discourages a thickness less than 1 nm, the reference teaches away from reducing the thickness below 1.0 nm.

Of course, "[w]hen prior art contains apparently conflicting references, the Board must weigh each reference for its power to suggest solutions to an artisan of ordinary skill. The Board must consider all disclosures of the prior art. . . ." *In re Young*, 927 F.2d 588, 591, 18 USPQ2d 1089, 1091 (Fed. Cir. 1991) (citing *In re Lamberti*, 545 F.2d 747, 750, 192 USPQ 278, 280 (CCPA 1976)). *See, e.g., In re Merck*, 800 F.2d 1091, 1097, 231 USPQ 375, 380 (Fed. Cir. 1986) ("Petersen must be read, not in isolation, but for what it fairly teaches in combination with the prior art as a whole."). In weighing

each reference, we "must consider the passages and references which point away from the invention as well as those said to point toward it." *General Tire & Rubber Co. v. Firestone Tire Co*., 349 F.Supp. 345, 359, 174 USPQ 427, 445 (N.D. Ohio 1972).

Here, although the examiner refers to a "benefit to be gained" from reducing the thickness below 1 nm, (Examiner's Answer at 8), he offers no evidence of such a benefit. His opinions regarding the benefit are "not 'evidence.'" *In re Dembiczak*, 175 F.3d 994, 999, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999) (citing *McElmurry v. Arkansas Power & Light Co.*, 995 F.2d 1576, 1578, 27 USPQ2d 1129, 1131 (Fed. Cir. 1993); *In re Sichert*, 566 F.2d 1154, 1164, 196 USPQ 209, 217 (CCPA 1977)). Because Saito teaches away from reducing the thickness below 1 nm, and the examiner offers no reference that points toward it, we are not persuaded that an artisan would have been motivated to so reduce the thickness. Therefore, we reverse the rejection of claim 1; of claim 26, which depends therefrom; of claim 5; of claim 27, which depends therefrom; of claim 9; of claim 28, which depends therefrom; of claim13; of claim 29, which depends therefrom; of claim 17; of claim 30, which depends therefrom; of claim 21; of claim 31, which depends therefrom; and of claim 25.

CONCLUSION

In summary, the rejections of claims 1, 5, 9, 13, 17, 21, and 25-31 under § 103(a) are reversed.

REVERSED

KENNETH W. HAIRSTON Administrative Patent Judge	)
ERROL A. KRASS Administrative Patent Judge	) BOARD OF PATENT) APPEALS) AND) INTERFERENCES
LANCE LEONARD BARRY Administrative Patent Judge	)

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