

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today
(1) was not written for publication in a law journal and
(2) is not binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte HIDETOSHI MATSUMOTO
and HIROSHI TOMIYASU

Appeal No. 96-0626
Application 08/187,328¹

ON BRIEF

Before JERRY SMITH, BARRETT, and HECKER, **Administrative Patent Judges.**

HECKER, **Administrative Patent Judge.**

DECISION ON APPEAL²

This is a decision on appeal from the final
rejection of claims 1 through 13, all of the claims pending in
the present application.

¹ Application for patent filed January 26, 1994.

² With respect to the Order for Compliance of Paper No. 16, this issue is moot since the required information was located in the file.

Appeal No. 96-0626
Application 08/187,328

The invention relates to a magnetoresistive thin film head (MR head) capable of reading out data recorded on a magnetic recording medium.

Referring to Figure 1 of the drawings and page 7 lines 12-23 of the specification, the MR head includes a substrate 50, an insulating layer 51, a shield layer 52, an insulating layer 53, a magnetoresistive element layer 54, lead layers 55 and 56, an insulating layer 57 and a shield layer 58. Each layer is stacked on substrate 50 in the order recited *supra*.

When in use, the magnetoresistive element 54 works like a resistor and is heated due to the sense current flowing through it. The heat generated in magnetoresistive element 54 is radiated to the substrate 50 via insulating layers 51, 53 and 57. The maximum sense current allowable is determined by the ability of the magnetoresistive element 54 to radiate the heat generated. Too much heat will cause the magnetoresistive element 54 to be fused, leading to rupture of the MR head. By using silicon or diamond-like carbon as insulating layers 51, 53 and 57, Appel-lants have increased heat dissipation for the magnetoresistive element 54, allowing larger sense currents to

Appeal No. 96-0626
Application 08/187,328

safely flow, thereby obtaining a MR head with greater sensitivity.

The independent claim 1 is reproduced as follows:

1. A magnetoresistive thin film head comprising:
a magnetoresistive element;

lead means for supplying a sense current to said magnetoresistive element; and

an insulating layer provided in the vicinity of said magnetoresistive element;

wherein said insulating layer is formed of a material which has an electrical resistivity greater than $1 \times 10^4 \text{ } \Omega\text{cm}$ and a thermal conductivity greater than $100\text{W}/(\text{mK})$.

The Examiner relies on the following references:

Nakamura	4,616,281	Oct. 7, 1986
Hayashi et al. (Hayashi)	5,258,206	Nov. 2, 1993
Suyama	EP 0 521 442	Jan. 7, 1993

Claims 1, 3, 4, 6, 12 and 13 stand rejected under 35 U.S.C. § 103 as being unpatentable over Appellants' admitted prior art in view of Hayashi.

Claims 1, 3, 4, 6-9 and 11-13 stand rejected under

Appeal No. 96-0626
Application 08/187,328

35 U.S.C. § 103 as being unpatentable over Suyama in view of Hayashi.

Claims 1, 2, 4, 5, 12 and 13 stand rejected under 35 U.S.C. § 103 as being unpatentable over Appellants' admitted prior art in view of Nakamura.

Claims 1, 2, 4, 5, 7-10, 12 and 13 stand rejected under 35 U.S.C. § 103 as being unpatentable over Suyama in view of Nakamura.

Rather than reiterate the arguments of Appellants and the Examiner, reference is made to the briefs and answer for the respective details thereof.

OPINION

We will not sustain the Examiner's rejection of claims 1 through 13 under 35 U.S.C. § 103.

The Examiner has failed to set forth a **prima facie** case. It is the burden of the Examiner to establish why one having ordinary skill in the art would have been led to the claimed invention by the reasonable teachings or suggestions found in the prior art, or by a reasonable inference to the artisan contained in such teachings or suggestions. **In re**

Appeal No. 96-0626
Application 08/187,328

Sernaker, 702 F.2d 989, 995, 217 USPQ 1, 6 (Fed. Cir. 1983).
1239 (Fed. Cir. 1995), **citing W. L. Gore & Assocs. v. Garlock, Inc.**, 721 F.2d 1540, 1548, 220 USPQ 303, 309 (Fed. Cir. 1983), **cert. denied**, 469 U.S. 851 (1984).

Appellants argue the following issues:

1. Appellants assert that the Examiner has not established a **prima facie** case of obviousness in that no requisite motivation has been demonstrated for combining the layered structure of Appellants' admitted prior art (or that of Suyama) with Nakamura to obtain a silicon layer or with Hayashi to obtain a diamond-like carbon layer. As to Hayashi, Appellants argue that they have not discovered that diamond-like carbon has excellent insulating properties or conductivity, but that it improves MR heads. Further, Appellants contend that Nakamura teaches away from using silicon as an insulating layer (other than as a substrate) since Nakamura uses four insulating layers which are not

Appeal No. 96-0626
Application 08/187,328

silicon. (Brief at page 9, **et seq.** and Reply Brief at page 4, **et seq.**)

The Examiner contends that since diamond-like carbon and silicon are good insulators, it would be obvious to use either of them as an insulating layer in a MR head.

(Examiner's response to the Reply Brief, Paper No. 13, page 4, **et seq.**)

We find no motivation to use silicon or diamond-like carbon as the prior art insulating layers of a MR head in Appellants' admitted prior art or Suyama. The Federal Circuit states that "[t]he mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." **In re Fritch**, 972 F.2d 1260, 1266 n.14, 23 USPQ2d 1780, 1783-84 n.14 (Fed. Cir. 1992), **citing In re Gordon**, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984). "Obviousness may not be established using hindsight or in view of the teachings or suggestions of the inventor." **Para-Ordnance Mfg. v. SGS Importers Int'l**, 73 F.3d 1085, 1087,

Appeal No. 96-0626
Application 08/187,328

37 USPQ2d 1237, 1239, **citing W. L. Gore & Assocs. v. Garlock, Inc.**, 721 F.2d 1540, 1553, 220 USPQ 303, 312-13 (Fed. Cir. 1983), **cert. denied**, 469 U.S. 851 (1984).

2. Appellants assert that the Examiner has failed to establish a **prima facie** case of obviousness to use silicon or diamond-like carbon as an insulator, and to adjust their electrical resistivity and thermal conductivity ranges (Brief at page 11 et seq.). The Examiner responds that silicon and diamond-like carbon are **per se** known insulators, and that routine experimentation and optimization would result in the claimed ranges since the results (insulation with better heat dissipation) would be expected, and not lead to something unobvious (Answer at page 6, lines 13-18, and response to Reply Brief, Paper No. 13, page 5, paragraph 5).

Appellants do not dispute that silicon and diamond-like carbon are well known insulators, and we find that experimentation and optimization will result in the claimed ranges. Determining the optimal values of result effective variables would have been obvious and ordinarily within the skill of the art. **In re Boesch**, 617 F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980). With regard to the electrical

Appeal No. 96-0626
Application 08/187,328

conductivity range, Appellants show on page 10 of their specification, TABLE 1, that the admitted prior art insulators (alumina and SiO₂) already have the claimed electrical resistivity.

Since the Examiner has based the rejection of all claims on the substitution of insulation material in the layers of Appellants' admitted prior art or the layers of Suyama, as discussed supra, we will not sustain the rejection of any claims.

We have not sustained the rejection of claims 1 through 13 under 35 U.S.C. § 103. Accordingly, the Examiner's decision is reversed.

NEW GROUND OF REJECTION

Pursuant to the provisions of 37 CFR § 1.196(b), we hereby enter the following new rejections.

Claims 1 and 2 are rejected under 35 U.S.C. § 103 as being unpatentable over Nakamura. Nakamura teaches the claimed invention using a silicon insulating layer as the substrate. Since the substrate (S in Figure 21B of Nakamura)

Appeal No. 96-0626
Application 08/187,328

is "in the vicinity of" (Appellants' claim 1, line 5) the magnetoresistive element of Nakamura, the only missing limitations are the electrical resistivity and thermal conductivity claimed. Since Appellants' specification, at TABLE 1, page 10, acknowledges that currently used insulators meet the claimed electrical resistivity, little or no experimentation or optimization would be needed to meet this parameter. As to the claimed thermal conductivity, Nakamura recites that silicon is being used for its "excellent heat radiation property" (column 10, lines 34-37). It would have been obvious to one of ordinary skill in the art at the time of invention to have optimized this property and achieved the claimed thermal conductivity. As noted *supra*, determining the optimal values of result effective variables would have been obvious and ordinarily within the skill of the art. ***In re Boesch.***

Claims 1 and 3 are rejected under 35 U.S.C. § 103 as unpatentable over Yoda (62-33317, of record but not previously relied upon in a rejection). Yoda teaches the claimed invention using a diamond-like insulating layer 11. Since the layer (or film) 11 in Yoda is "in the vicinity of"

Appeal No. 96-0626
Application 08/187,328

(Appellants' claim 1 line 5) the magnetoresistive element 10 of Yoda, the only missing limitations are the electrical resistivity and thermal conductivity claimed. Since Appellants' specification, at TABLE 1 page 10, acknowledges that currently used insulators meet the claimed electrical resistivity, little or no experimentation or optimization would be needed to meet this parameter. As to the claimed thermal conductivity, Yoda recites that a diamond film is more effective because of its excellent heat conductivity. It would have been obvious to one of ordinary skill in the art at the time of invention to have optimized this property and achieved the claimed thermal conductivity. As noted *supra*, determining the optimal values of result effective variables would have been obvious and ordinarily within the skill of the art. *In re Boesch*.

Claim 12 is rejected under 35 U.S.C. § 103 as unpatentable over Yoda in view of Suyama. Yoda teaches the claimed invention as noted *supra* with respect to claims 1 and 3. However, Yoda does not recite that the "magnetoresistive element has a width approximating a height" (Appellants' claim

Appeal No. 96-0626
Application 08/187,328

12, line 2). Suyama shows in Figure 3, a magnetoresistive element 1 with

a width approximating a height. It would have been obvious to one of ordinary skill in the art at the time of invention to have assumed Yoda's MR element had the typical geometry depicted in Suyama. Appellants argue that one "cannot rely on the drawings in Suyama when the measurements are described in terms of microns", Reply Brief at page 7, lines 6 and 7. It is first noted that the claim does not recite any terms of measurement, let alone microns. However, Appellants' arguments are not persuasive in the absence of any evidence refuting that which is clearly shown in Suyama's figure.

This decision contains a new ground of rejection pursuant to 37 CFR § 1.196(b)(amended effective Dec. 1, 1997, by final rule notice, 62 Fed. Reg. 53,131, 53,197 (Oct. 10, 1997), 1203 Off. Gaz. Pat. & Trademark Office 63, 122 (Oct. 21, 1997)). 37 CFR § 1.196(b) provides that, "A new ground of rejection shall not be considered final for purposes of judicial review."

Appeal No. 96-0626
Application 08/187,328

37 CFR § 1.196(b) also provides that the appellants, ***WITHIN TWO MONTHS FROM THE DATE OF THE DECISION***, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of proceedings (§ 1.197(c)) as to the rejected claims:

Appeal No. 96-0626
Application 08/187,328

(1) Submit an appropriate amendment of the claims so rejected or a showing of facts relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the application will be remanded to the examiner. . . .

(2) Request that the application be reheard under § 1.197(b) by the Board of Patent Appeals and Interferences upon the same record. . . .

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

REVERSED
37 CFR § 1.196(b)

JERRY SMITH)	
Administrative Patent Judge)	
)	
)	
)	
)	
)	
LEE E. BARRETT)	BOARD OF PATENT
Administrative Patent Judge)	APPEALS AND
)	INTERFERENCES
)	
)	
STUART N. HECKER)	
Administrative Patent Judge)	

Appeal No. 96-0626
Application 08/187,328

SNH/cam
Lowe, Price, LeBlanc, Becker & Shur
99 Canal Center Plaza
Suite 300
Alexandria, VA 22314