

The opinion in support of the decision being entered today was **not** written for publication and is **not** binding precedent of the Board.

Paper No. 28

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte TOSHIYUKI SATO AND SHINYA KATAYAMA

Appeal No. 1997-3767
Application No. 08/443,556

ON BRIEF

Before GARRIS, PAK, and TIMM, *Administrative Patent Judges*.

TIMM, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the Examiner's final rejection of claims 11-15, which are all of the claims pending in this application.

BACKGROUND

Appellants' invention relates to a method of manufacturing a magnetic recording medium.

Claims 11 and 14 are illustrative:

11. A method of manufacturing a magnetic recording medium in which a magnetic thin film is formed on a substrate directly or via an undercoating film, an abrasion-resistant protective film is formed on said magnetic thin film, and a lubricating organic film is formed on said protective film comprising:

the first step of depositing said protective film consisting essentially of carbon and silicon by sputtering a target composed of a mixture of carbon and silicon as a cathode in a vacuum tank in which a reduced-pressure atmosphere can be formed, said silicon in said protective film ranges from 5 to 25 atomic percent with respect to said carbon in said protective film; and

the second step of heating and oxidizing a part or all of said silicon present on at least a surface of said protective film formed in said first step in an atmosphere containing oxygen before formation of said organic film, said silicon at least in an interface in contact with said organic film being oxidized at least partially to silicon oxide, and said lubricating organic film being bonded to said silicon oxide in said interface thereby said silicon oxide substantially improving adhesion of said lubricating organic film to said protective film.

14. A method of manufacturing a magnetic recording medium in which a magnetic thin film is formed on a substrate directly or via an undercoating film, an abrasion-resistant protective film is formed on said magnetic thin film, and a lubricating organic film is formed on said protective film, comprising:

the first step of depositing said protective film consisting essentially of carbon and silicon by sputtering a target composed of a mixture of carbon and silicon as a cathode in a vacuum tank in which a reduced-pressure atmosphere can be formed, said silicon in said protective film ranges from 5 to 25 atomic percent with respect to said carbon in said protective film; and

the second step of oxidizing, using an oxygen ion plasma, a part or all of said silicon present on at least a surface of said protective film formed in said first step before formation of said organic film, said silicon at least in an interface in contact with said organic film being oxidized at least partially to silicon oxide, and said lubricating organic film being bonded to said silicon oxide in said interface thereby said silicon oxide substantially improving adhesion of said lubricating organic film to said

protective film.

The prior art references of record relied upon by the Examiner in rejecting the appealed claims are:

Futamoto et al. (Futamoto)	4,840,844	June 20, 1989
Kobliska et al. (Kobliska)	4,861,662	Aug. 29, 1989 (filed Feb. 3, 1987)
Tsuno et al. (Tsuno)	5,055,359	Oct. 8, 1991 (eff. filing date: Dec. 14, 1989)
Yokoyama et al. (Yokoyama)	5,069,967	Dec. 3, 1991 (eff. filing date: May 6, 1987)
Funkenbusch	5,098,541	Mar. 24, 1992 (eff. filing date: Feb. 1, 1988)
Hashimoto et al. (Hashimoto)	5,132,173	July 21, 1992 (eff. filing date: Feb. 9, 1990)

Claims 11 and 12 stand rejected under 35 U.S.C. § 103 as being unpatentable over Funkenbusch in view of Hashimoto, Futamoto and Tsuno. Claim 13 stands rejected over those references and further in view of Yokoyama. Claim 14 stands rejected under 35 U.S.C. § 103 as being unpatentable over Funkenbusch and Kobliska in view of Futamoto. Claim 15 stands rejected over the references used to reject claim 14 further in view of Yokoyama. The rejections are reproduced on pages 3 through 11 of the Answer. We reverse all the rejections for the following reasons.

OPINION

“A claimed invention is unpatentable as obvious ‘if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said

subject matter pertains.” *In re Gartside*, 203 F.3d 1305, 1319, 53 USPQ2d 1769, 1778 (Fed. Cir. 2000)(quoting 35 U.S.C. § 103(a) (1994)). The Examiner has the burden under 35 U.S.C. § 103 to establish a *prima facie* case of obviousness. To establish a *prima facie* case of obviousness, “there must be some teaching, suggestion or motivation in the prior art to make the specific combination that was made by the applicant.” *In re Dance*, 160 F.3d 1339, 1343, 48 USPQ2d 1635, 1637 (Fed. Cir. 1998). We agree with the Appellants that the Examiner has failed to adequately show that one of ordinary skill in the art, with no knowledge of the claimed invention, would have selected the elements from the cited prior art references and combined them in the manner claimed. The reasoning presented in the Answer fails to appreciate the differences between magneto optic and magnetic recording media taught by the references and the difference in problems and solutions articulated for those different media. Because of those differences, the references cannot be properly combined to obtain the subject matter of the claims in the way the Examiner suggests.

Claim 11 requires sputtering a protective film of silicon carbide containing 5 to 25 atomic percent silicon onto a magnetic thin film, oxidizing the silicon on the surface, and applying a lubricating organic film so that it is bonded to the oxidized silicon. Funkenbusch, the sole primary reference used to reject claim 11, describes a method of making a magneto optic recording medium (Title). In contrast, the three secondary references used to reject claim 11 are all directed to magnetic recording media (Titles). Magneto optic media use radiant energy through a source, such as a laser beam, to record and interrogate information onto the medium (Funkenbusch, col. 1, lines 23-39). Magneto optic

recording media are not subject to wear by a recording head (col. 1, lines 42-43). In contrast, magnetic recording media, such as those described in the secondary references, are used in a CSS (contact start stop) system in which a magnetic head contacts the magnetic recording media (Tsuno, col. 1, lines 26-48; Futamoto, col. 1, lines 20-26; Hashimoto, col. 1, lines 53-54). In the secondary references, lubricating organic films are added over protective films to prevent damage due to friction and wear caused by magnetic head contact with the recording medium (Tsuno, col. 1, lines 48-56; Hashimoto, col. 2, lines 36-50). Such friction and wear is not a concern in the headless magneto optic environment in which the medium of Funkenbusch is to be used.

It is not clear from the Examiner's remarks whether he is concluding that it is obvious to apply the teachings of the secondary references to the magneto optic media of Funkenbusch or use the silicon carbide protective layer of Funkenbusch in a magnetic recording layer which is used in a CSS system. However, in either case, the media set forth by claim 11 is not suggested by the combination of prior art in such a way as to render the claim *prima facie* obvious.

First, with regard to the formation of a magneto optic medium, the Examiner has pointed to no convincing reason, suggestion, or motivation in the prior art for placing an organic lubricating film on the recording medium of Funkenbusch. While the Examiner indicates that Tsuno describes a process in which a lubricant is coated on a silicon oxide film and that "[t]he motivation for utilizing an oxide layer beneath a lubricant is that such an oxide layer realizes a high coupling force with respect to the lubricant and realizes lubricity and durability" (Answer, page 10), this in itself does not provide a reason,

suggestion, or motivation to provide an organic lubricating film on a magneto optic medium. It is not clear why a lubricating organic layer would be used on a medium which will not be subjected to wear by a magnetic head.

As there is no motivation to include a lubricating film on the medium of Funkenbusch, there is no motivation for adding an oxide layer on the silicon carbide layer of the magneto optic medium. The Examiner reasons that one of ordinary skill would have oxidized the surface of the protective layers as taught by Tsuno to realize a high coupling force with the lubricant (Answer, page 10). If there is no lubricant, then there is no need for a high coupling force.

In addition, we agree with Appellants that Funkenbusch teaches away from forming a magneto optic medium with a protective layer having 5 to 25 percent atomic percent silicon (Brief, page 11). A “reference will teach away if it suggests 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, 31 USPQ2d 1130, 1131 (Fed. Cir. 1994). In the present case, Funkenbusch specifies that the dielectric layer is transparent (col. 3, lines 61-62; col. 4, lines 54-58). Even when the dielectric layer is specified as SiC_x ($x > 1$), it is specified as being transparent (col. 8, lines 37-39). Funkenbusch specifically indicates that when x is greater than or equal to 3, it loses transparency and is less acceptable for magneto optic media applications (col. 7, lines 31-35). Funkenbusch further narrows the range to an x equal to 2.4 or less to ensure sufficient transparency (col. 10, lines 49-57). Funkenbusch thus teaches away from using silicon carbide films in which the atomic percent of silicon is

25 or less.

We are not unmindful of the fact that disclosed examples and preferred embodiments do not constitute a teaching away from a broader disclosure. *In re Susi*, 440 F.2d 442, 446 n.3, 169 USPQ 423, 426 n.3 (CCPA 1971); *see also Merck & Co v. Biocraft Laboratories*, 874 F.2d 804, 807, 10 USPQ2d 1843, 1847 (Fed. Cir. 1989)(A reference may be relied upon for all that it would have reasonably suggested to one having ordinary skill in the art, including non-preferred embodiments). However, the situation here is not one in which the reference describes a broad range in which any value in the broad range will give acceptable results. In the case of *Funkenbusch*, the reference would suggest to one of ordinary skill in the art that the lack of transparency for films containing 25 percent silicon would result in a film unusable in the specified optical application. It is improper to read the disclosure apart from the rest of the reference.

With respect to the formation of a magnetic recording media such as those of the secondary references, we find that the secondary references provide no reason, suggestion, or motivation to use a 5 to 25 atomic percent silicon containing silicon carbide protective layer in a magnetic recording media to be contacted with a magnetic head. Particularly, Hashimoto teaches away from using silicon carbide with 5 to 25 atomic percent silicon in such a media. As pointed out by Appellants, Hashimoto describes a protective layer of not less than 80% of an oxide of silicon (Brief, page 14, citing Hashimoto, col. 5, lines 46-50). We note that Hashimoto indicates that too high a level of certain elements, such as carbon, lowers the protective function (wear resistance) of the protective layer and

thus these elements must be limited in amount, preferably to 10 to 20 percent by weight (col. 6, lines 32-43). This is below the level required by claim 11. Furthermore, the Examiner makes no convincing finding that either Futamoto or Tsuno describe a silicon carbide layer in which the overall percentage of silicon is within the claimed range.

Claim 14 also requires the formation of a silicon carbide protective layer with 5 to 25 atomic percent silicon, oxidizing the silicon and applying a lubricating organic film bonded to the silicon oxide. Claim 14 is rejected over Funkenbusch and Koliska in view of Futamoto. None of these references describe forming an organic lubricating layer on a protective layer as required by claim 14. Furthermore, the Examiner has failed to provide any evidence or argument tending to show that the addition of such a separate organic lubricating film would have been obvious to one of ordinary skill in the art. Therefore, the Examiner has failed to show that one of ordinary skill in the art would have found it obvious to provide such an organic lubricating film over a protective film of silicon carbide having been oxidized at least partially to silicon oxide.

We agree with the Appellants that one of ordinary skill in the art would not arrive at the claimed invention solely by combining the teachings of the prior art with the general knowledge of those of ordinary skill in the art. Absent from the prior art and general knowledge of those of ordinary skill in the art relied on by the Examiner is the requisite suggestion or motivation for combining the applied reference teachings, based upon a reasonable expectation of success, in such a manner as to result in the appellants' claimed subject matter. *In re O'Farrell*, 853 F.2d 894, 903-904, 7 USPQ2d 1673,

1680-1681 (Fed. Cir. 1988).

We conclude that the Examiner has not established a *prima facie* case of obviousness with respect to the subject matter of claims 11-15.

CONCLUSION

To summarize, the decision of the Examiner to reject claims 11-15 under 35 U.S.C. § 103 is reversed.

REVERSED

BRADLEY R. GARRIS)	
Administrative Patent Judge)	
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)	BOARD OF PATENT
CHUNG K. PAK)	APPEALS
Administrative Patent Judge)	AND
)	INTERFERENCES
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APPEAL NO. 1997-3767 - JUDGE TIMM
APPLICATION NO. 08/443,556

APJ TIMM

APJ GARRIS

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DECISION: **REVERSED**

Prepared By: Jenine Gillis

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FINAL TYPED:

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PALM: ____

ACTS 2 ____

BOOK ____

DISK (FOIA) ____

MONTHLY REPORT ____

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