

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opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 16

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte TAKAMICHI YAMAKOSHI, YOSHIHARU SHIMANO, and HIROAKI  
YADA

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Appeal No. 97-1167  
Application No. 08/475,062<sup>1</sup>

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HEARD: August 5, 1999

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Before URYNOWICZ, HAIRSTON and BARRY, Administrative Patent  
Judges.

BARRY, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on the appeal under 35 U.S.C. § 134  
from the final rejection of claims 3, 6, and 11-15. The

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<sup>1</sup> The application, entitled "Digital Magnetic Reproduction Apparatus and Digital Magnetic Recording/Reproducing Apparatus" was filed June 7, 1995. The application is a divisional of Application Serial No. 08/284,238, which was filed August 2, 1994, and is now abandoned.

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appellants filed an amendment after final rejection on  
September 6, 1996, which was entered. We reverse.

BACKGROUND

The invention at issue in this appeal relates to digital magnetic recording. It is an apparatus for recording (i.e., writing) data on and reproducing (i.e., reading) data from a magnetic disk. More specifically, the apparatus includes a distortion detector, a measuring circuit, and a bias control circuit. The distortion detector measures a second harmonic distortion (SHD) of a reproduced signal; the measuring circuit measures the signal-to-noise (S/N) ratio of the reproduced signal. The bias control circuit controls the bias current in the reproducing head to maintain the SHD at or below -25 dB while maximizing the S/N ratio. By maximizing the S/N ratio while maintaining the SHD at or below this level, the apparatus minimizes the bit error rate of the data it reproduces.

Claim 3, which is representative for our purposes, follows:

3. A digital magnetic reproducing apparatus comprising a reproducing head to reproduce data from a magnetic recording medium; an equalizer for shaping, by a partial response method, a waveform of the reproduced signal output from said reproducing

head, and a decoder for decoding, by a maximum likelihood decoding method, an equalized reproduced signal obtained from said equalizer;

said apparatus further comprising:

a distortion detector for measuring a second harmonic distortion of the reproduced signal;

a decision circuit for making a decision as to whether or not the second harmonic distortion is -25 dB or lower;

a measuring circuit for measuring a signal-to-noise ratio of the reproduced signal, and

a bias current control circuit supplied with the results of both said decision circuit and said measuring circuit, and controlling the bias current in said reproducing head in such a manner that the signal-to-noise ratio becomes highest in a range where the second harmonic distortion of the reproduced signal is -25 dB or lower.

The references relied on by the patent examiner in rejecting the claims follow:

Tin 1981	4,280,153	Jul. 21,
Shimotashiro et al. (Shimotashiro) 23, 1992	5,124,861	Jun.
Ottesen et al. (Ottesen) 5, 1994	5,301,080	Apr.
	(filed Dec. 31,	
1992).		

Claims 3, 11, 13, and 15 stand rejected under 35 U.S.C. § 103 as obvious over admitted prior art (Admission) in view of Ottesen and Shimotashiro. (Final Rejection at 5.) Claims 6, 12, and 14 stand rejected under § 103 as obvious over

Admission in view of Ottesen and Shimotashiro further in view of Tin. (Id. at 7.) Rather than repeat the arguments of the appellants or examiner in toto, we refer the reader to the appeal and reply briefs and the examiner's answer for the respective details thereof.

OPINION

In reaching our decision in this appeal, we considered the subject matter on appeal and the rejections and evidence advanced by the examiner. We also considered the appellants' and examiner's arguments. After considering the record before us, it is our view that the evidence and level of skill in the art would not have suggested to one of ordinary skill in the art the invention of claims 3, 6, and 11-15. Accordingly, we reverse.

We begin our consideration of the patentability of the claims by recalling that in rejecting claims under 35 U.S.C. § 103, the patent examiner bears the initial burden of establishing a prima facie case of obviousness. A prima facie case is established when the teachings from the prior art itself would appear to have suggested the claimed subject matter to a person of ordinary skill in the art. If the examiner fails to establish a prima facie case, an obviousness rejection is improper and will be overturned. In re Rijckaert, 9 F.3d 1531, 1532, 28 USPQ2d 1955, 1956 (Fed. Cir.

1993). With this in mind, we analyze the examiner's rejections.

The examiner rejects claims 3, 11, 13, and 15 as obvious over Admission in view of Ottesen and Shimotashiro. At the outset, we observe that the examiner fails to map the language of the claims to the disclosures of the Admission or references. Instead, he begins the rejection by characterizing Admission as follows.

On lines 7-16 of page 1, applicant admits that "there is currently in progress the introduction of a signal processing method ... which is a combination of partial response equalization and maximum likelihood decoding". For dependent claims 11 and 13, [Admission] employs a magnetoresistance effect head as a reproducing transducer and uses a magnetic disk as a recording medium. (Final Rejection at 5.)

He admits that Admission "neither measures second harmonic distortion nor signal to noise ratio." (Id.)

The examiner makes the following observation about Ottesen.

Ottesen ... provides a bias servo loop for a magneto-resistive head. FIR bandpass filter 20 and RMS amplitude estimator 24 measure the second

harmonic distortion of the reproduced signal. Decision circuit 26 compares the second harmonic distortion with a reference 28. Current driver 12 adjusts the bias current based on the output of decision circuit 26. (Id.)

He concludes that it would have been obvious to combine Ottesen with Admission "to provide dynamic control of a reproducing head, to maintain it at an optimum operating point ...." (Id. at 5-6.)

The examiner admits that the combination of Admission in view of Ottesen "lacks a circuit for measuring the signal to noise ratio of the reproduced signal." (Id. at 6.)

He notes that Shimotashiro "selects the bias current value as an optimum value for maximizing an overall S/N ratio. Adder 12 combines the S/N ratio resulting from noise with a S/N ratio resulting from distortion. In this way, Shimotashiro ... teach[es] combining noise and distortion measurement to optimize bias current." (Id.) The examiner concludes that it would have been obvious to combine Shimotashiro with Ottesen in view of Admission "to enable a higher recording rate and increase efficiency ...." (Id.)

The examiner rejects claims 6, 12, and 14 as obvious over the combination of Admission in view of Ottesen and Shimotashiro "as applied to claim[s] 3, 11, 13, and 15 above," (id. at 7), further in view of Tin. He begins the rejection by admitting that the combination "does not disclose delaying data with respect to a reference clock signal." (Id.) The examiner observes that Tin "provides a reference clock generator 12 and a delay circuit 20. As depicted in Figure 4, the time interval T corresponds to a delay between recording an elementary information on tape by head 41 and reproducing the same information by head 42." (Id.) The examiner concludes that it would have been obvious to combine Tin with Admission in view of Ottesen and Shimotashiro "to compensate for the distance between the recording and reproducing heads, as suggested by Tin on lines 16-17 of column 2." (Id.)

Although the references omit "the -25 dB limitation," (id. at 6), which is recited in each of the claims, the examiner notes that Ottesen teaches "that reference 28 may vary depending on the changing environment." (Id.) "Since applicant has not disclosed that -25 dB is a critical range,"

opines the examiner, "selection of such a range in [sic, is] considered merely optimization of a range and does not patentably define over Ottesen ..., especially since no new and unexpected results are submitted by applicant. See In re Aller, 105 USPQ 233 (CCPA 1955)." (Id.)

The U.S. Court of Customs and Patent Appeals (CCPA) established the rule that the discovery of an optimum value of a variable in a known process is normally obvious. In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). As with many rules, there are exceptions to the CCPA's rule. One exception is the case where a parameter being optimized was not recognized to be a "result-effective variable." In re Yates, 663 F.2d 1054, 1057, 211 USPQ 1149, 1151 (CCPA 1981); In re Antonie, 559 F.2d 618, 621, 195 USPQ 6, 9 (CCPA 1977). We find this exception applies here.

In determining whether the invention as a whole would have been obvious under § 103, we must first delineate the invention as a whole. In delineating the invention as a

whole, we look to the subject matter recited in the claim and to those properties of the subject matter disclosed in the specification. Antonie, 559 F.2d at 619, 195 USPQ at 8. Here, the invention as a whole is maintaining the SHD of a reproduced signal at or below -25 dB, (Spec. at 9), and its disclosed property. The property is that by maintaining the SHD at or below such a level, the invention minimizes the bit error rate of data it reproduces. (Id.)

The controlling question is simply whether the differences, viz., namely the value of -25 dB and its property, between the prior art and the appellants' invention as a whole are such that the invention would have been obvious. The answer is no. The examiner has not shown that the prior art as a whole recognized that the bit-error-rate depends on the SHD. Recognition of this dependence is essential to the obviousness of conducting experiments to decide the value of the SHD that will offer an acceptable bit-error-rate. Such dependence can be determined from data representing bit-error-rate versus SHD as revealed by the

appellants. (Id., Fig. 3) The examiner has given us no basis for the obviousness of the necessary experiments apart from the appellants' disclosure thereof.

For these reasons, the examiner failed to show that SHD was recognized to be a result-effective variable. Therefore, we find the examiner's rejection does not amount to a prima facie case of obviousness. Because the examiner has not established a prima facie case, the rejection of claims 3, 11, 13, and 15 as obvious over Admission in view of Ottesen and Shimotashiro and of claims 6, 12, and 14 as obvious over Admission in view of Ottesen and Shimotashiro further in view of Tin are improper and are reversed.

#### CONCLUSION

To summarize, the decision of the examiner to reject claims 3, 6, and 11-15 under 35 U.S.C. § 103 is reversed.

REVERSED

STANLEY M. URYNOWICZ, JR.	)	
Administrative Patent Judge	)	
	)	
	)	
	)	
	)	BOARD OF PATENT
KENNETH W. HAIRSTON	)	APPEALS
Administrative Patent Judge	)	AND
	)	INTERFERENCES
	)	
	)	
	)	
LANCE LEONARD BARRY	)	
Administrative Patent Judge	)	

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APPLICATION NO. 08/475,062

APJ BARRY

APJ HAIRSTON

APJ URYNOWICZ

DECISION: **REVERSED**

Prepared by: Gloria Henderson

**DRAFT TYPED:** 01 Aug 00

**FINAL TYPED:**

Gloria, note the following instructions:

Do NOT change style of citations.

Do insert claim and reference(s).

Do check quotations.

Do proofread.