

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opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.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. 21

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte BRENT R. DEN HARTOG,
DENNIS L. FOX, JAMES A. HAGAN,
JOHN C. SHEN,
and KANNIMANGALAM V. VISWANATHAN

Appeal No. 1997-1006
Application 08/184,718¹

ON BRIEF

Before JERRY SMITH, BARRETT, and BARRY, Administrative Patent Judges.

BARRETT, Administrative Patent Judge.

¹ Application for patent filed January 21, 1994, entitled "Substrate Independent Superpolishing Process And Slurry."

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DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the final rejection of claims 9-11, 13-15, and 21-23.

We reverse.

BACKGROUND

The disclosed invention relates to a superpolishing process for making a magnetic disk substrate, for use in a magnetic disk drive, with a surface roughness of less than 4 Å (Ångstroms).

Claim 13 is reproduced below.²

13. A magnetic disk substrate, said magnetic disk substrate comprising:

substrate material having a surface roughness of less than 4A [sic].

The Examiner relies on the following prior art:

Pickering et al. (Pickering)	5,374,412	December 20,
1994		
	(filed October 13,	
1992)		

Claims 13-15 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Pickering.

² The claims should use the symbol Å for Ångstroms instead of the letter A.

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Claims 9-11 and 21-23 stand rejected under 35 U.S.C.
§ 103 as being unpatentable over Pickering.

We refer to the Final Rejection (Paper No. 10) and the Examiner's Answer (Paper No. 16) (pages referred to as "EA__") for a statement of the Examiner's position and to the Appeal Brief (Paper No. 14) (pages referred to as "Br__") for a statement of Appellants' arguments thereagainst.

OPINION

The claims are argued to stand or fall together (Br3).
Claim 13 is taken as representative.

The claims are very broad in that they recite a product having a certain surface roughness and do not recite the process steps for producing the claimed surface roughness. Nevertheless, nothing precludes claiming of the product.

Pickering discloses (col. 4, lines 12-16):

The present invention provides free-standing, cubic ($\text{\$}$) phase SiC which is highly polishable, i.e., about 5 Å RMS or less, preferable [sic] about 3 Å RMS or less, and most preferably about 1 Å RMS or less as measured on a Talystep mechanical contact profiler. Herein, unless otherwise noted, polishability values are as measured on a Talystep mechanical contact profiler. The value of surface roughness (polishability) may vary significantly depending upon the measurement technique. For example, surfaces measured to be 1 Å RMS on a Talystep mechanical contact profiler would measure lower on a Zygo heterodyne profiler and larger on an atomic force microscope.

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The CVD-deposited SiC is machined and polished and then coated with magnetic recording media (col. 3, lines 48-56).

Pickering discloses (col. 4, lines 47-52): "Even though the polished surface may be subsequently coated with several coats of material, including magnetic recording media, an overcoat and optional other layers, any surface irregularities in the polished surface tend to be imparted to the subsequent layers, often in exaggerated form."

Appellants argue "that the Pickering reference does not enable one of ordinary skill in the art to make a disk substrate with a surface roughness of less than 4 Å (claims 9, 13, and 21), much less a disk substrate having a surface roughness of less than 3 Å (claims 10, 14, and 22) or 2 Å (claims 11, 15, and 23)" (Br3). Appellants argue that Pickering's roughnesses were measured using a Talystep mechanical profiler, while Appellants' roughnesses were measured using an atomic force microscope (AFM) and that Pickering acknowledges that the roughnesses would be larger when measured on an AFM. Appellants refer to the article Precision metrology for studying optical surfaces by J.M. Bennett et al., Optics & Photonics News, May 1991, pp. 14-18,

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cited in Pickering (col. 4, lines 25-27), to show that a silicon carbide sample (the material in Pickering) had a roughness of 0.77 Å when measured by a Talystep surface profiler and a roughness of 8.5 Å when measured by an AFM. Thus, Appellants conclude that Pickering's roughness of about 1 Å RMS or less translates to an actual roughness of about 11 Å or less.

The Examiner responds that the fact that the measuring device cannot measure a certain roughness is not conclusive proof that Pickering does not describe a disk polished to 1 Å RMS or less (EA5-7).

The Examiner has failed to establish a prima facie case of anticipation. The 4 Å value in claim 13 must refer to the value as measured by the most accurate measurement device, an AFM. Pickering discloses that "surfaces measured to be 1 Å RMS on a Talystep mechanical contact profiler would measure lower on a Zygo heterodyne profiler and larger on an atomic force microscope" (col. 4, lines 21-24). Thus, Pickering recognizes that the actual roughness measured by an atomic force microscope will be greater than 1 Å RMS. The Bennett article compares roughnesses of polished CVD-deposited SiC for

a Talystep surface profiler and an AFM. The polished CVD-deposited SiC material in the Bennett article is the same as the material in Pickering. Both Pickering and Bennett measure RMS values. Thus, the results in Bennett should apply to Pickering. Bennett shows that a CVD-deposited sample had a roughness of 0.77 Å when measured by a Talystep surface profiler and a roughness of 8.5 Å when measured by an AFM. The 8.5 Å value is greater than the values claimed. Thus, Appellants have demonstrated that a roughness of 1 Å RMS or less as measured on a Talystep mechanical contact profiler does not fall within the 4 Å or less limitations of the claims.

Pickering discloses that the substrate is polished "by conventional means" (col. 6, line 10). Therefore, there can be no speculation that the polished surface in Pickering is somehow smoother than that in Bennett.

Pickering discloses that surface irregularities tend to be imparted to subsequent layers in exaggerated form. Absent additional evidence, we cannot tell whether the subsequent coating processes in Pickering smooths over the scratches from the polishing process which result in the measurement

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difference between the Talystep surface profiler and the AFM.

For the reasons stated above, the rejections of claims 9-11, 13-15, and 21-23 are reversed.

REVERSED

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