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opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.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. 17

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte DANIEL G. STEARNS,
STEPHEN P. VERNON,
NATALE M. CEGLIO,
and ANDREW W. HAWRYLUK

Appeal No. 97-1627
Application No. 08/202,991[1]

ON BRIEF

Before THOMAS, BARRETT, 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 1-19. We reverse.

BACKGROUND

[1] The application, entitled "Giant Magnetoresistive Sensor," was filed February 28, 1994.

The invention at issue in this appeal relates to magnetoresistive sensors. It is a giant magnetoresistive (GMR)

sensor comprising a three-dimensional microstructure of alternating magnetic layers and nonmagnetic, spacer layers. The sensor achieves a strong magnetoresistive response, high sensitivity, and high spatial resolution. It is useful in magnetic read/write heads for storing and retrieving high density data.

Claim 1, which is representative for our purposes, follows:

> 1. A giant magnetoresistive (GMR) sensor, comprising:
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> a sensor element formed of a plurality of alternating layers of a magnetic material and a nonmagnetic conducting material patterned in a three-dimensional microarchitecture with a length L and a width W and a total thickness B, wherein L $ W > B and W is between about 0.1 microns and about 5 microns, and wherein each magnetic layer is a single magnetic domain and the layers of nonmagnetic material have a thickness such that exchange coupling between adjacent magnetic layers is less than magnetostatic coupling;
>
> means for flowing a current through the sensor element and for detecting resistance changes. (Spec. at 15.)

Claims 1-19 stand rejected under 35 U.S.C. § 112, ¶ 1, as non-enabled. The claims also stand rejected under 35 U.S.C. § 112, ¶ 2, as indefinite. (Examiner's Answer at 3.) 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 specification would enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention without undue experimentation. It is also our view that the claims particularly point out and distinctly claim the subject matter regarded as the invention. Accordingly, we reverse.

We begin our consideration of the patentability of the claims by recalling that in rejecting claims, the patent

examiner bears the initial burden of presenting a prima facie case of unpatentability. If the burden of establishing a prima facie case is met, the burden of coming forward with evidence or argument shifts to the appellant. After evidence or argument is submitted by the appellant in response, patentability is determined on the totality of the record, by a preponderance of evidence with due consideration to persuasiveness of argument. In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992).

In reviewing the examiner's decision on appeal, the Board of Patent Appeals and Interferences (Board) must weigh all the evidence and argument. An observation by the Board that the examiner made a prima facie case is not improper, if the ultimate determination of patentability is made on the entire record. Id., 24 USPQ2d at 1444. With this in mind, we consider the enablement and definiteness of the claims.

Enablement

The examiner rejects claims 1-19 under 35 U.S.C. § 112, ¶ 1, for three reasons. We address these reasons seriatim.

The first reason is that the "claims are inadequately disclosed under 112
par.1 if read to encompass any number of layers, any L/W ratio, and any total thickness." (Final Rejection at 3.)

We find, however, that the examiner misconstrues the claimed sensor as comprising any number of layers, any length-to-width (L/W) ratio, and any total thickness. The Examiner ignores many claim limitations. Among the ignored limitations of independent claims 1 and 14 are a plurality of alternating layers of a magnetic material and a nonmagnetic (NM), conducting material; a three-dimensional microarchitecture with L $ W > B and O.1Fm # W # 5Fm; each magnetic layer acting as a single magnetic domain; the layers of NM material having a thickness such that exchange coupling between adjacent layers is less than magnetostatic coupling; and a means or conductive layers for flowing a current through the sensor and for detecting changes in resistance. (Spec. at 15, 17.)

Accordingly, we find that the examiner's first reason for rejecting the claims does not satisfy his burden of

establishing a prima facie case of non-enablement. We turn to his second reason.

The examiner's second reason for rejecting the claims under 35 U.S.C. § 112, ¶ 1, is that the claims fail to recite features that the specification teaches are critical. Although the examiner presents this reason in a rejection under the second paragraph of section 112, (Final Rejection at 3-4), the language indicates that he is relying on the first paragraph, which requires that claims be supported by an enabling disclosure. See In re Mayhew, 527 F.2d 1229, 1232, 188 USPQ 356, 358 (CCPA 1976).[2]

The examiner begins his explanation by alleging, "[t]he disclosure clearly indicates critical limitations for the number of layers, L/W ratio, and total thickness." (Final Rejection at 3.) He ends it by concluding, "these claims are

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[2] At the time of the answer, examiners were instructed that "[a] feature which is taught as critical in a specification and is not recited in the claims should result in a rejection of such claim under the enablement provision section of 35 U.S.C. 112." Manual of Patent Examining Procedure § 2164.08(c) (6th ed., Rev. 2, July 1996).

indefinite and incomplete for failing to clearly and completely recite the critical features of the sensor." (Id. at 4.)

We find, however, that the unclaimed number of layers (N), L/W ratio, and total thickness (B) of the sensor are not critical limitations. In determining whether an unclaimed feature is critical, the entire disclosure must be considered. Broad language in the disclosure including language in the abstract that omits an allegedly critical feature tends to rebut an argument of criticality. In re Goffe, 542 F.2d 564, 567, 191 USPQ 429, 431 (CCPA 1976).

Here, it is true that a few parts of the appellants' specification mention ranges for N, the L/W ratio, and B. In determining what is disclosed, however, we cannot restrict our consideration only to parts of the disclosure. The appellants are entitled to have the whole of their disclosure considered. Neither the broad disclosures of the appellants' abstract nor their summary of the invention refers to N, the L/W ratio, or B at all. Although claim 1 mentions the total thickness,

the claim merely recites that the total thickness of the sensor is less than its width. (Spec. at 15.) The claim, moreover, does not even note N or the L/W ratio. These omissions evidence that the appellants did not regard the number of layers, L/W ratio, or total thickness of their sensor as critical. Cf. In re Anderson, 471 F.2d 1237, 1240-41, 176 USPQ 331, 333 (CCPA 1973) (finding that omissions of a hemostatic primary layer from an abstract and original claim 1 "make clear that appellant did not regard his invention as limited" to such a layer).

The parts of the specification that mention ranges for these limitations, moreover, are brief and inexact. One part mentions

that the sensor "may" comprise "400 or more" layers. (Spec. at 6 (emphasis added).)[3] Another part adverts that the L/W ratio will "typically be greater than 1," (Id. at 7 (emphasis added)), and adds that L/W ratios as great as 50:1 "are also possible for some applications." (Id.) An additional part mentions that B is "typically between 15 nm and 1000 nm." (Id. at 6 (emphasis added).) The use of the equivocal language further evidences that these ranges are not critical to the operability of the invention. Cf. In re Armbruster, 512 F.2d 676, 679-80, 185 USPQ 152, 155 (CCPA 1975) (finding that two statements in a specification that hydrolysate has a D.E. between about 5 and about 15 do not imply that a D.E. of at least 5 is essential). We also agree with the appellants, (Reply Br. at 4), that the "great" size of the ranges is more evidence of their lack of criticality.

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[3] It is true that the disclosure fixes a lower-bound of three for the number of layers. (Spec. at 6.) We agree with the appellants, however, that one skilled in the art would know that there must be a minimum of two magnetic layers, which switch from antiparallel to parallel orientations, and there must be a NM layer to separate the magnetic layers. (Reply Br. at 4.) Thus, the recitation of three layers is not critical.

Accordingly, we find that the examiner's second reason for rejecting the claims does not satisfy his burden of establishing

a prima facie case of non-enablement. We turn to his third and last reason.

The examiner's third reason for rejecting the claims under 35 U.S.C. § 112, ¶ 1, follows.

> The disclosure lists many different materials for the magnetic and non-magnetic layers, states that materials different from those listed could also be used, states that each layer of the laminate can be formed using a different material, states that any number of layers can be used, states that addition [sic] unspecified layers may be used in unspecified locations, and lists very broad numerical ranges for the layer thicknesses.
>
> The disclosure presents so many alternatives that it represents no guidance to one skilled in the art. It really requires one skilled in the art to extensively experiment with untold numbers of combinations of materials, sizes for each element, and configurations to determine some that will actually work. (Final Rejection at 2-3.)

We observe that this reason satisfies the examiner's burden of establishing a prima facie case of non-enablement. In response, the appellants came forward with argument. We now consider their argument.

The appellants' argument follows.

> [T]he Examiner focusses on statements in the application about different materials and thicknesses, and wide range of layers .... Beyond this statement

there is nothing to show that one skilled in the art could not easily select operative combinations, i.e. make and use a sensor. Appellant has provided ample reasons that show one skilled in the art can practice the invention. The choice of materials is a nonissue; Appellant has shown that the only requirement for the FM and NM materials is that they be magnetic and conductive. The thicknesses depend on the material properties, magnetostatic coupling, and single magnetic domain size. The number of layers depends on desired sensitivity. Of course, one does not need to produce every variation that is encompassed by the claims. For example, one does not need to make every layer of a different material; one can use one material for all FM layers. But the claims need to cover the case of using some other material for some of the layers; otherwise one could avoid infringement merely by adding some layers of a different material when they are functionally the same. (Reply Br. at 3.)

To be enabling under § 112, a patent must contain a description that enables one skilled in the art to make and use the claimed invention. That some experimentation is necessary does not preclude enablement. All that is required is that experimentation not be unduly extensive. Atlas Powder Co. v. E. I. Du Pont de Nemours & Co., 750 F.2d 1569, 1576, 224 USPQ 409, 413 (Fed. Cir. 1984).

We find that one skilled in the art could make and use the appellants' sensor without undue experimentation. The appellants defined ranges of materials for, numbers of, and

thicknesses of the sensor's magnetic and NM layers.

Specifically, materials that can be used for the magnetic layers include cobalt, nickel,

iron, and magnetic alloys such as permalloy. Materials for the NM layers include copper, silver, and gold. (Spec. at 6, 12.) Different magnetic and NM materials can be used for different layers of the sensor. (Id. at 5.) The minimum number of layers is 3; the maximum, 400. The thickness of each magnetic and NM layer is between 0.1 nm and 100 nm. (Id. at 12.)

Given these ranges and the level of skill in the art, one skilled in the art could make and use the invention. Although some experimentation might be required to decide which materials, numbers, and thicknesses would be optimum for a particular application of the sensor, the disclosure indicates that any combination within the parameters would produce a working sensor. Thus, the experimentation would not be undue.

For the foregoing reasons, we find that the specification would enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention without undue experimentation.

Therefore, we reverse the rejection of claims 1-19 under 35 U.S.C. § 112, ¶ 1.

Definiteness

We begin our consideration of the definiteness of claims 1-19 by recalling that the test for the definiteness of a claim is whether one skilled in the art would understand the bounds of the claim when read in light of the specification. If the claim read in light of the specification would reasonably apprise one so skilled of the scope of the invention, 35 U.S.C. § 112 demands no more. Miles Labs., Inc. v. Shandon Inc., 997 F.2d 870, 875, 27 USPQ2d 1123, 1126 (Fed. Cir. 1993). Breadth of a claim, moreover, is not to be equated with its indefiniteness. In re Miller, 441 F.2d 689, 693, 169 USPQ 597, 600 (CCPA 1971). With this in mind, we analyze the examiner's rejection.

The examiner begins his rejection by alleging, "[t]he disclosure clearly indicates critical limitations for the number of layers, L/W ratio, and total thickness." (Final Rejection at 3.) He ends it by concluding, "these claims are indefinite and incomplete for failing to clearly and completely recite the critical features of the sensor." (Id. at 4.)

We agree that some of the claims do not recite the number of layers, L/W ratio, and total thickness of the sensor. This omission, however, does not offend the second paragraph of 35 U.S.C. § 112. While the claim language under consideration may be broad, breadth is not indefiniteness. Instead, the second paragraph simply requires that the claims, read in light of the specification, reasonably apprise one skilled in the art of the scope of the invention.

The examiner has not articulated any reason why one so skilled would have any difficulty ascertaining the inventions' scope. He did not satisfy the burden of establishing a prima facie case of indefiniteness. Therefore, we reverse the rejection of claims 1-19 under 35 U.S.C. § 112, ¶ 2.

CONCLUSION

To summarize, the decision of the examiner to reject claims 1-19 under 35 U.S.C. § 112, ¶ 1, and under 35 U.S.C. § 112, ¶ 2, is reversed.

REVERSED

JAMES D. THOMAS Administrative Patent Judge	)	
LEE E. BARRETT Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
LANCE LEONARD BARRY Administrative Patent Judge	)	

LLB/dal

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