

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(2) is not binding precedent of the Board.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. 25

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte RYOICHI TAKAHATA,  
MOTOAKI SHIBAYAMA and  
HIROSHI TAKAICHI

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Appeal No. 96-2202  
Application 08/117,088<sup>1</sup>

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ON BRIEF

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Before THOMAS, HAIRSTON, and FLEMING, Administrative Patent  
Judges.

HAIRSTON, Administrative Patent Judge.

DECISION ON APPEAL

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<sup>1</sup> Application for patent filed February 8, 1994. According to applicants, this application is a National stage application under 35 U.S.C. § 371 of PCT/JP92/00301 filed March 13, 1992.

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This is an appeal from the final rejection of claims 2 and 4 through 10. In an Amendment After Final<sup>2</sup> (paper number 17), claims 5 and 8 were amended, and claims 2 and 4 were canceled. Accordingly, claims 5 through 10 remain before us on appeal.

The disclosed invention relates to a superconducting bearing device.

Claim 5 is illustrative of the claimed invention, and it reads as follows:

5. A superconducting bearing device comprising:  
a rotary body;

an annular permanent magnet portion disposed concentrically with the rotary body, the permanent magnet portion having an end face, the permanent magnet portion being provided on the rotary body such that the magnetic flux distribution does not alter around the axis of the rotary body, the permanent magnet portion comprising a disk fixedly mounted on the rotary body and a plurality of annular permanent magnets arranged on the disk at a spacing radially of the rotary body, each of the permanent magnets having axially opposite ends magnetized to polarities opposite to each other, the permanent magnets adjacent to each other being magnetized to polarities opposite to each other at their ends positioned toward the same axial direction, and the permanent magnets being spaced from each other 0.2 to 1.0 times their width as measured radially; and

a superconductor opposed to the end face of the permanent magnet portion and spaced apart therefrom axially of the rotary body, the superconductor being arranged at a position spaced apart from the permanent magnet portion and permitting a

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<sup>2</sup> In view of the amendment, the 35 U.S.C. § 102(a) rejection of claims 2 and 5 through 7 was withdrawn.

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specified quantity greater than zero of magnetic flux of the permanent magnet portion to penetrate thereinto.

The references relied on by the examiner are:

Baermann	3,233,950	Feb. 8, 1966
Rosensweig	3,612,630	Oct. 12, 1971
Meeks	3,614,181	Oct. 19, 1971
Wasson	4,072,370	Feb. 7, 1978
Agarwala	5,126,317	June 30, 1992
McMichael et al. (McMichael)	5,177,387	Jan. 5, 1993
Hanami (Japanese patent application)	57-97917	June 17, 1982 <sup>3</sup>

Claims 5 through 7 stand rejected under 35 U.S.C. § 103 as being unpatentable over Baermann or Hanami in view of McMichael.

Claims 8 through 10 stand rejected under 35 U.S.C. § 103 as being unpatentable over Rosensweig, Meeks or Wasson in view of McMichael or Agarwala.

Reference is made to the brief and the answer for the respective positions of the appellants and the examiner.

#### OPINION

We have carefully considered the entire record before us, and we will sustain the obviousness rejection of claims 5 through 7, and we will reverse the obviousness rejection of claims 8 through 10.

The examiner is of the opinion that:

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<sup>3</sup>A copy of the translation for this Japanese patent application is attached.

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Baerman [sic, Baermann], and Japan (917) each teach the magnetic bearing structure including the specific arrangement of rotor [sic] the permanent magnets. Bauman [sic] uses only permanent magnets, while Japan (917) uses an electromagnet on the stator in combination with the permanent rotor magnets. McMichael teaches providing a superconductor opposing permanent magnets to act as a bearing. Use of a superconductor [sic] in lieu of either permanent or standard electromagnets has the advantage of increased capacity for the bearing. For at least this reason it would have been obvious to one of ordinary skill in the art to provide Baerman [sic] or Japan (917) with a superconductive stator (Answer, page 3).

Appellants respond with the argument that "the adjacent permanent magnets of Baerman [sic] and Japan '917 directly abut upon each other, instead of being spaced apart," and as a result of this touching of the permanent magnets, the "magnetic fluxes converge," and "[t]his makes it difficult for the fluxes to penetrate into the superconductors" (Brief, page 9). We agree. The plurality of annular magnets in Figures 1 through 5 of Baermann, and the plurality of annular magnets in Figures 2, 4 and 5 of Hanami (Japan '917) are not arranged on a disk at a "spacing" radially of a rotary body as claimed. On the other hand, Figure 1 of McMichael discloses a superconductor bearing device in which disk shaped stator 106 has a plurality of annular permanent magnets 108 and 110 "arranged on the disk at a spacing radially" of the body of the stator, and a superconductor 104 opposed to an end face of the stator, and axially spaced from the

stator as required by claim 5. Although the distance between the permanent magnets is not expressly set forth in McMichael, Figure 1 plainly discloses that the distance between the permanent magnets is not greater than the width of either magnet.

Appellants' arguments (Brief, page 10) to the contrary notwithstanding, the distance between the two permanent magnets is, therefore, greater than 0.0 and less than 1.0 times the radial width of either permanent magnet. The lower end of the range in McMichael is probably around 0.5 times the radial width of either permanent magnet. The only difference between Figure 1 of McMichael and the superconductor bearing of claim 5 is the mounting of the permanent magnets on a stator as opposed to a rotor, and the mounting of the superconductor on a rotor as opposed to a stator. With respect to this difference, we are of the opinion that the skilled artisan would have known that the roles of the stator and the rotor are reversible, and that the magnetic flux<sup>4</sup> would not be altered in any way in Figure 1 of McMichael. For example, Figure 13 of McMichael discloses the permanent magnets 390 and 391 arranged on the rotor, and the superconductor is the stator. In view of the well-known

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<sup>4</sup> Appellants acknowledge (Brief, page 9) that the "magnetic fluxes emitted by McMichael's permanent magnets are permitted to penetrate into the superconductor."

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interchangeability of a rotor and a stator, it would have been obvious to one of ordinary skill in the art to reverse the roles of the rotor and stator in Figure 1 of McMichael, and arrange the permanent magnets 108 and 110 on a rotor, and the superconductor 104 on a stator.

Although the obviousness rejection is based upon Baermann or Hanami in view of McMichael, it is perfectly permissible to sustain the rejection of claim 5 in light of McMichael alone. See In re Bush, 296 F.2d 491, 495-96, 131 USPQ 263, 266-67 (CCPA 1961). Accordingly, the obviousness rejection of claim 5 is sustained. The obviousness rejection of claims 6 and 7 is sustained because of appellants' grouping of the claims (Brief, page 6).

In response to the obviousness rejection of claims 8 through 10, appellants argue (Brief, pages 12 through 16) that the permanent magnets in Rosensweig, Meeks, Wasson and Agarwala "abut" each other, and that McMichael and Agarwala do not cure the deficiencies of Rosensweig, Meeks and Wasson. We agree. The obviousness rejection of claims 8 through 10 is reversed.

#### DECISION

The decision of the examiner rejecting claims 5 through 10 under 35 U.S.C. § 103 is affirmed as to claims 5 through 7 and is

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reversed as to claims 8 through 10. Thus, the decision of the examiner is affirmed-in-part.

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

AFFIRMED-IN-PART

	)	
JAMES D. THOMAS	)	
Administrative Patent Judge	)	
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	)	
	)	BOARD OF PATENT
KENNETH W. HAIRSTON	)	
Administrative Patent Judge	)	APPEALS AND
	)	
	)	INTERFERENCES
	)	
MICHAEL R. FLEMING	)	
Administrative Patent Judge	)	

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