

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 24

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte ZINE-EDDINE BOUTAGHOU

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Appeal No. 2000-0617  
Application 08/706,025<sup>1</sup>

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ON BRIEF

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Before LEE, GARDNER-LANE and MEDLEY, Administrative Patent Judges.

MEDLEY, 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 13, 15-23 and 25.

**A. Findings of Fact**

1. The applicant states that the real party in interest is International Business Machines Corporation. (Brief at 1).

2. The application on appeal contains claims 13, 15-23 and 25.

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<sup>1</sup> Application for patent filed August 30, 1996, which is a division of application 08/446,381, filed May 22, 1995.

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3. Claims 1-12, 14 and 24 have been canceled.

4. Claims 13, 15-23 and 25 have been rejected as being unpatentable under 35 U.S.C. § 103 over Nagata et al.

(Nagata), U.S. Patent 5,486,054, issued January 23, 1996, based on application 08/304,545, filed September 12, 1994 in view of Nakagawa, Kokai patent application Hei 5[1993]-176520, published July 13, 1993.

5. Claims 13, 15 and 16<sup>2</sup> have been rejected as being unpatentable under 35 U.S.C. § 103 over Inoue et al. (Inoue), U.S. Patent 4,856,918, issued August 15, 1989 in view of Moriwaki et al. (Moriwaki), Kokai patent application Sho 62[1987]-255611, published November 7, 1987, and Nakagawa.

6. Claims 19, 20, 23 and 25<sup>3</sup> have been rejected as being unpatentable under 35 U.S.C. § 103 over Inoue in view of Moriwaki and Brown, U.S. Patent 2,063,787, issued December 8, 1936.

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<sup>2</sup> The examiner indicates that claim 14 is rejected. (Answer at 5). This appears to be a typographical error, since claim 14 has been canceled. See Paper No. 10, entered October 20, 1997.

<sup>3</sup> The examiner indicates that claim 24 is rejected. (Answer at 5). This appears to be a typographical error, since claim 24 has been canceled. See Paper No. 10, entered October 20, 1997.

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7. Claims 21 and 22 have been rejected as being unpatentable under 35 U.S.C. § 103 over Inoue in view of Moriwaki and Brunner, U.S. Patent 1,920,546, issued August 1, 1933.

The invention

8. The disclosed invention pertains to an electric motor with a stator and rotor. The rotor rotates about an axis in successive 360 degree turns and is supported by two balls positioned at either end of the rotor.

9. Independent claim 13 is the only independent claim and is as follows:

An electric motor, comprising:

a stationary base;

an electro-magnetic stator attached to said base;

a bearing assembly for supporting a rotor, said rotor rotating about an axis in successive 360 degree turns, said bearing assembly comprising:

(a) a first freely rotating ball and a second freely rotating ball, said balls being centered on said axis and axially separated;

(b) a first stationary rotor mounting, said first mounting having a first concave bearing surface centered about said axis and in contact with said first ball;

(c) a second stationary rotor mounting, said second

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mounting having a second concave bearing surface centered about said axis and in contact with said second ball; and

a rotor comprising:

(a) a rotor housing;

(b) means for imparting torque to said rotor in response to an electro-magnetic field generated by said stator;

(c) a third concave bearing surface centered about said axis and in contact with said first ball, said third concave bearing surface opposing said first concave bearing surface along said axis, said first and third concave bearing surfaces confining said first ball, and

(d) a fourth concave bearing surface centered about said axis and in contact with said second ball, said fourth concave bearing surface opposing said second concave bearing surface along said axis, said second and fourth concave bearing surfaces confining said second ball;

wherein said third concave bearing surface and said fourth concave bearing surface are positioned between said first concave bearing surface and said second concave bearing surface, said rotor being supported entirely by said first and second balls.

#### The Nagata reference

10. Nagata discloses a bearing system in a motor for a floppy disk drive.

11. Nagata describes a rotor 8 supported at one end by a pivot bearing 11 and at the other end by a pivot bearing 23. (Fig. 1).

12. The pivot bearings 11 and 23 each comprise three

balls (13, 14 and 24, 25) for supporting the rotor 8. (Fig. 1).

13. Prior art Fig. 3 of Nagata shows a three ball pivot bearing 63 at one end and a single ball pivot bearing 61 at the other end.

14. Prior art Fig. 3 further shows an intermediate bearing 62.

15. Nagata describes the need to eliminate the intermediate bearing 62, and does so by replacing the single ball pivot bearing 61 with a three ball pivot bearing. (Nagata, column 2, lines 12-19).

#### The Nakagawa reference

16. Nakagawa describes a bearing structure for a stepping motor.

17. Nakagawa describes a rotor 1 with a ball 4 at one end. (Figs. 1-3).

18. The other end of the rotor 1 does not show a ball pivot bearing. (Fig. 1).

19. The rotor is further supported by intermediate bearing 2. (Figs. 1 and 4).

20. Nakagawa describes a prior art pivot bearing with three balls. (Fig. 4).

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21. Nakagawa describes that a single ball bearing is preferable over the three ball bearing arrangement in order to reduce the number of components for the bearing. (Nakagawa section 0005 at 3).

The Inoue reference

22. Inoue describes a bearing device with a rotor for a magnetic head.

23. Inoue describes a rotor 10 and a stator with stator coil 35 and magnet 34. (Fig. 2).

The Moriwaki reference

24. Moriwaki describes an elastic bearing device with a rotary shaft 21 supported by a ball (23, 25) at either end of the shaft. (Fig. 1).

25. The Moriwaki reference describes a bearing assembly with a main body 11 and an arm 26. (Figs. 1 and 2).

26. The arm 26 is attached to the rotary shaft 21, such as to pivot back and forth as illustrated by the arrow in Fig. 2.

**B. Discussion**

The rejections of the claims on appeal cannot be sustained. A reversal of the rejection on appeal should not

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be construed as an affirmative indication that the applicants' claims are patentable over prior art. We address only the positions and rationale as set forth by the examiner and on which the examiner's rejection of the claims on appeal is based.

Nagata in view of Nakagawa

The applicant argues that Nagata affirmatively teaches away from the proposed combination. (Brief at 5). We agree. "A reference may be said to teach away when a person of ordinary skill, upon reading the reference, . . . would be led in a direction divergent from the path that was taken by the applicant." In re Gurley, 27 F.3d 551, 553, 31 USPQ2d 1130, 1131-32 (Fed. Cir. 1994).

The purpose of Nagata is to eliminate the intermediate bearing supporting the rotor. Nagata does this by replacing the combination of a single ball pivot bearing at one end of the rotor and a three ball pivot bearing located at the other end of the rotor with a three ball pivot bearing at both ends of the rotor. (Findings 13-15). Thus, Nagata teaches that a three ball pivot bearing on both ends of the rotor are necessary in order to eliminate the intermediate bearing. In contrast, the claimed invention recites that the rotor is

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supported entirely by a single ball at one end of the rotor and a single ball at the other end of the rotor, e.g. with no intermediate bearing. (Finding 9). The examiner has failed to sufficiently demonstrate why one of ordinary skill in the art would have arrived at the claimed invention based on the combination of Nagata and Nakagawa, despite Nagata teaching that a single ball bearing is not desirable for its stated purpose, e.g. to eliminate an intermediate bearing. It has not been sufficiently demonstrated why a person of ordinary skill, upon reading the Nagata reference, would not be led in a direction divergent from the path that was taken by the applicant.

In the Answer, the examiner argues that "the general term pivot bearing would suggest to a person skilled in the art that other pivot bearings may be incorporated to achieve the desired goal." (Answer at 7). While this ordinarily may be true, here the Nagata reference actually discourages using a single ball pivot bearing. Therefore, why would one of ordinary skill in the art want to incorporate the type of bearing that Nagata expressly states that it does not want to use? The test under 35 U.S.C. § 103 is whether the teachings of the prior art, taken as a whole, would have made obvious

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the claimed invention. In re Keller, 642 F.2d 413, 425, 208 USPQ 871, 881-882. (CCPA 1981). Here, based on the record before us, we find that the Nagata reference teaches away from combining Nagata with Nakagawa.

Accordingly, we will reverse the decision of the examiner rejecting claims 13, 15-23 and 25 as being unpatentable under 35 U.S.C. § 103 over Nagata in view of Nakagawa.

Inoue in view of Moriwaki and Nakagawa

The applicant argues that the Moriwaki reference is nonanalogous art. (Brief at 7). We agree for the following reasons. "In order to rely on a reference as a basis for rejection of the applicant's invention, the reference must either be in the field of the applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned." See In re Deminski, 796 F.2d 436, 442, 230 USPQ 313, 315 (Fed. Cir. 1986). In re Oetiker, 977 F.2d 1443, 1447, 24 USPQ2d 1443, 1445 (1992).

The first inquiry is whether the Moriwaki reference is in the field of applicant's endeavor. The field of applicant's endeavor is a bearing assembly for a motor. Moriwaki describes a bearing assembly not for a motor, but for what

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appears to be a mechanical device. Along with the figures, Moriwaki describes a "bearing that axially supports a rotary shaft to support, for instance, a robot arm, in such a manner that it can freely rotate." (Moriwaki at 2). An "arm" 26 is shown in Figs. 1 and 2. It is clear that the "arm" can not rotate 360 degrees like the rotor of a motor. The main body 11 prevents 360 degree rotation of the arm 26. (Findings 25 and 26).

The examiner asserts that the relevant field of endeavor is "ball bearing systems for rotating shafts." (Answer at 8). We disagree that the field of endeavor is so broad as to cover all ball bearings for all shafts. Further, when determining if a reference is analogous, one must consider the similarities and differences of structure and function of an invention disclosed in a reference. See In re Ellis, 476 F.2d 1370, 1372, 177 USPQ 526, 527 (CCPA 1973). The Moriwaki bearing assembly is for a mechanical arm that does not rotate 360 degrees as does the claimed rotor, e.g. its used in a different structure and functions differently. Based on this record, the examiner has failed to sufficiently demonstrate why one of ordinary skill in the art would look to Moriwaki to design a bearing assembly for a rotor that rotates at high

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speeds in successive 360 degree turns.

We next address whether the Moriwaki reference is reasonably pertinent to the particular problem with which applicant was concerned. The problem to which applicant was concerned was to reduce the size of the bearing assembly in a disk drive system. The applicant proposes to do this by reducing the number of parts in the bearing assembly.

(08/706,025 specification page 3, line 24 to page 4, line 1 and page 5, lines 1-2 and 5-6).

The examiner relied on the Moriwaki reference to teach the claimed bearing assembly. Moriwaki does not state that the bearing assembly is used in a motor. Moreover, the Moriwaki reference describes a bearing assembly with a main body 11 and an arm 26. The arm 26 is shown in Figs. 1 and 2 attached to the rotary shaft 21, such as to pivot back and forth as illustrated by the arrow in Fig. 2. What is further apparent from the Moriwaki reference is that the rotary shaft does not rotate 360 degrees successively as claimed. The main body 11 prevents the arm 26 from rotating 360 degrees.

(Findings 25 and 26). It appears that the bearing is for a mechanical type device and not for an electric motor. The examiner has failed to sufficiently demonstrate otherwise.

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The problem to be solved is to decrease the size of the bearing arrangement for an electric motor. A consideration to be taken when attempting to solve the problem would include how the rotor operates in its environment. The bearing assembly of the disclosed invention is for a rotor that rotates at high speeds in successive 360 degree turns. One of ordinary skill in the art would keep in mind that the bearing assembly, reduced in size, would have to be able to rotate at high speeds in successive 360 degree turns.

The examiner has failed to sufficiently demonstrate why one of ordinary skill in the art would look to Moriwaki to solve the problem faced by the inventor. Moriwaki's bearing assembly is for a device that pivots back and forth, but does not rotate 360 degrees. Why then would one of ordinary skill in the art expect the bearing device of Moriwaki to solve the problems faced with reducing the size of a bearing assembly for a disk drive apparatus?

Even if the examiner is correct that Moriwaki is analogous art, we further find, based on the record before us, that there would be no reasonable expectation of success, such that one of ordinary skill would want to combine Inoue with Moriwaki. It has long been settled that an invitation to

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experiment is not obviousness. In re O'Farrell, 853 F.2d 894, 903, 7 USPQ2d 1673, 1680-81 (Fed. Cir. 1988). Rather, for obviousness what is required is a reasonable expectation of success. In re O'Farrell, 853 F.2d 894, 904, 7 USPQ2d 1673, 1681 (Fed. Cir. 1988); Merck & Co. v. Biocraft Labs., 874 F.2d 804, 809, 10 USPQ2d 1843, 1847 (Fed. Cir. 1989). While it may have been obvious to try the bearing assembly of Moriwaki in the Inoue motor assembly, it has not been sufficiently demonstrated that there would have been a reasonable expectation of success.

It has not been sufficiently demonstrated that one of ordinary skill in the art would have had a reasonable expectation that a bearing assembly for an arm that rotates back and forth, and not in successive 360 degree turns would work in an electric motor. The artisan of a bearing assembly of a rotor for an electric motor knows that such a rotor must be capable of rotating at high speeds in successive 360 degree turns. What will work for a rotor in the motor environment, may not work for a rotor in another environment. Similarly, a rotor that does not rotate at high speeds in successive 360 degree turns, but rather rotates back and forth, as described in Moriwaki may not work for a rotor in an electric motor.

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While it may be obvious to try the Moriwaki bearing assembly in an electric motor, one would have no reasonable expectation that such a bearing assembly would be appropriate or work for an electric motor.

The examiner further relies on Nakagawa to teach a concave surface on the axis of rotation for supporting the ball bearings. (Answer at 5). As applied by the examiner, Nakagawa does not make up for the deficiencies of Moriwaki.

For the above reasons, the rejection of claims 13, 15 and 16 under 35 U.S.C. § 103 over Inoue in view of Moriwaki and Nakagawa cannot be sustained.

Inoue, Moriwaki and Brown or Brunner

As applied by the examiner, neither Brown nor Brunner make up for the deficiencies of Moriwaki. Accordingly, we do not sustain the rejection of claims 19-23 and 25 over Inoue in view of Moriwaki and either Brown or Brunner.

**C. Decision**

The examiner's rejection of claims 13, 15-23 and 25 as being unpatentable under 35 U.S.C. § 103 over Nagata in view of Nakagawa is reversed.

The examiner's rejection of claims 13, 15 and 16 as being unpatentable under 35 U.S.C. § 103 over Inoue in view of

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Moriwaki and Nakagawa is reversed.

The examiner's rejection of claims 19, 20, 23 and 25 as being unpatentable under 35 U.S.C. § 103 over Inoue in view of Moriwaki and Brown is reversed.

The examiner's rejection of claims 21 and 22 as being unpatentable under 35 U.S.C. § 103 over Inoue in view of Moriwaki and Brunner is reversed.

**REVERSED**

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JAMESON LEE	)	
Administrative Patent Judge	)	
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_____	)	BOARD OF PATENT
SALLY GARDNER-LANE	)	APPEALS AND
Administrative Patent Judge	)	INTERFERENCES
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SALLY C. MEDLEY	)	
Administrative Patent Judge	)	

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