

The opinion in support of the decision being entered today was *not* written for publication and is *not* binding precedent of the Board.

**UNITED STATES PATENT AND TRADEMARK OFFICE**

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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

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*Ex parte* Richard F. Post

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Appeal No. 2005-2042  
Application No. 09/946,298

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ON BRIEF

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Before HAIRSTON, BARRY, and BLANKENSHIP, *Administrative Patent Judges*.  
BARRY, *Administrative Patent Judge*.

A patent examiner rejected claims 11 and 12.<sup>1</sup> The appellant appeals therefrom under 35 U.S.C. § 134(a). We affirm-in-part.

I. BACKGROUND

The invention at issue on appeal concerns bearings used to support and stabilize a rotor. An armature and a field winding are the primary elements of motors. In low power applications, the armature is the rotor part of the motor, while the field winding is

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<sup>1</sup>In contrast to claims 11 and 12, the examiner explains, "Claims 13, 14, 15 and 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims." (Examiner's Answer at 6.)

the stator. Accordingly, the armature rotates through magnetic lines of induction provided by the stationary field winding. In high-power industrial applications, the field winding rotates, while the armature constitutes the stator.

Regardless of the configuration, the rotor requires a degree of freedom to rotate about its longitudinal axis. Mechanical bearings, such as journal bearings, ball bearings, and roller bearings are commonly used for this purpose. Such bearings necessarily involve friction between the rotating element and the bearing components. This reduces the efficiency of the unit and introduces heat and wear. (Spec. at 1.)

In contrast, the appellant interleaves conductive lap windings with conventional loops in the stator of his motor. The motor's rotor provides magnetic induction lines that, when rotated, cut across the lap windings and the loops. When the rotor is laterally displaced from its equilibrium axis of rotation, the magnetic lines of induction induce a current in the lap windings. The induced current interacts with the magnetic lines of induction to generate a radial force that returns the rotor to its equilibrium axis of rotation. (*id.* at 2-3.)

A further understanding of the invention can be achieved by reading the following claims.

11. An apparatus for restoring a rotor to an equilibrium position having an axis of rotational equilibrium comprising:

the rotor for rotating on an axis of rotation around a stator;

the rotor including a Halbach array of magnets;

the stator including conductive loops and lap windings, wherein said lap windings are interleaved with said conductive loops;

a space in between the Halbach array and the stator;

the space being radially symmetrical when the axis of rotation is collinear with the axis of equilibrium and being asymmetrical when the axis of rotation is displaced from the axis of equilibrium; and

rotation of the Halbach array relative to the lap windings inducing a net current in said conductive loops and in said lap windings and generating a restorative force acting on the rotor when the spacing is asymmetrical, tending to restore the axis of rotation to collinearity with the axis of equilibrium.

12. The restoring apparatus as defined in Claim 11 wherein:

the lap windings include parallel lateral sections that lie parallel to the axis of equilibrium;

the restorative force being reactive to an induced force acting on the parallel lateral sections; and

the induced force being induced by rotation of the Halbach array around the stator.

Claim 11 stands rejected under 35 U.S.C. § 103(a) as obvious over U.S. Patent No. 6,111,332 ("Post"); U.S. Patent No. 3,176,206 ("Lund"); and U.S. Patent No. 5,155,402 ("Bichler"). Claim 12 stand rejected under § 103(a) as obvious over Post; Lund; Bichler; and U.S. Patent No. 6,353,273 ("Heshmat").

## II. OPINION

Our opinion addresses the claims in the following order:

- claim 11
- claim 12.

### A. CLAIM 11

Rather than reiterate the positions of the examiner or the appellant *in toto*, we focus on the following points of contention therebetween:

- teachings of the references
- motivation to combine the teachings.

#### *1. Teachings of the References*

The examiner makes the following detailed findings.

(a) Appellant's claim 11 reads as following:

"*An apparatus for restoring a rotor to an equilibrium position. . . .*" Post (6,111,332) discloses having a rotor 10, which uses windings and Halbach magnets for restoring the rotor to an equilibrium position (column 4, lines 56-59).

(b) The claim further reads, "*the stator including conductive loops and lap windings, wherein the lap windings are interleaved with said conductive*

*loops;*" Lund (3,176,206) discloses having conductive loops 17, 18, 19, 20, which have interleaved windings 67, 77, 87 (see figure 2). Moreover, Lund discloses interleaved windings, which interact with conductive loops 21 and 22 (see figure 2) to induce a flux, thus conductive loops 21 and 22 and interleaved windings are used for producing and conducting flux through out the electrical device. There are also other interleaved windings, which interact with the conductive loops to conduct and produce flux (column 6, lines 73 - column 7, line 5., column 7, lines 36 - 41; column 8, lines 7 - 11). Also, Lund uses such interleaved windings since it is desirable to coincide at null a signal generator to the null of a torque generator (column 2, lines 32-34; column 7, lines 16 - 19, column [sic]) and that achieving such task by the prior art was very difficult to achieve (column 1, lines 42 - 45).

(c) The Applicant's claim reads, "*a space in between the Halbach array and the stator; the space being radially symmetrical when the axis of rotation is collinear with the axis of equilibrium and being asymmetrical when the axis of rotation is displaced from the axis of equilibrium.*" Post discloses that is known to have an air gap between the stator and the rotor (column 1, lines 55, 56). Moreover, figures 1A and 1B show a gap between the rotor and the stator. The Halbach magnets are used for creating a strong radial stabilizing action for centering purposes of the device (column 4, lines 57 - 59; column 5, lines 4 - 7, 52 - 67, column 6, lines 9 - 12). Also, Post discloses inherently that the space shown in figure 1A would be radially asymmetrical when the axis of rotation is displaced from the axis of equilibrium since the rotor 10 and the stator would be off centering.

(d) Claim 11 finally recites, "*rotation of the Halbach array relative to the lap windings inducing a net current in said conductive loops and in said lap windings and generating a restorative force acting on the rotor when the spacing is asymmetrical, tending to restore the axis of rotation to collinearity with the axis of equilibrium.*" Post discloses that the Halbach array of magnets induce a current with the windings to generate a restorative force acting on the rotor when asymmetry exists (column 5, lines 57 - 67).

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Moreover, Bichler (US 5,155,402) . . . show[s] more explicitly that it is well known in the art that magnets 21 function with windings 19 to induce a flux between the rotor and the stator for levitating purposes in electrodynamic machines (see figure 2 & abstract; column 1, lines 51 - 54; column 4, lines 55 - 59).

(Examiner's Answer at 6-9.) The appellant alleges, "Since the Primary Post reference, the Secondary Lund reference, and the Tertiary Bichler reference all fail to show the structural elements identified above, a combination of the primary, secondary, and tertiary references could not show the claimed invention." (Appeal Br. at 13.)

In addressing the point of contention, the Board conducts a two-step analysis. First, we construe the claim at issue to determine its scope. Second, we determine whether the construed claim would have been obvious.

#### a. Claim Construction

"Analysis begins with a key legal question — *what is the invention claimed?*"

*Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561, 1567, 1 USPQ2d 1593, 1597 (Fed. Cir. 1987). Here, claim 11 recites in pertinent part the following limitations:

An apparatus for restoring a rotor to an equilibrium position having an axis of rotational equilibrium comprising:

. . .

the stator including conductive loops and lap windings, wherein said lap windings are interleaved with said conductive loops;

a space in between the Halbach array and the stator;

the space being radially symmetrical when the axis of rotation is collinear with the axis of equilibrium and being asymmetrical when the axis of rotation is displaced from the axis of equilibrium; and

rotation of the Halbach array relative to the lap windings inducing a net current in said conductive loops and in said lap windings and generating a restorative force acting on the rotor when the spacing is asymmetrical, tending to restore the axis of rotation to collinearity with the axis of equilibrium.

b. Obviousness Determination

"Having determined what subject matter is being claimed, the next inquiry is whether the subject matter would have been obvious." *Ex Parte Massingill*, No. 2003-0506, 2004 WL 1646421, at \*3 (Bd.Pat.App & Int. 2004) The question of obviousness is "based on underlying factual determinations including . . . what th[e] prior art teaches explicitly and inherently. . . ." *In re Zurko*, 258 F.3d 1379, 1383, 59 USPQ2d 1693, 1696 (Fed. Cir. 2001) (citing *Graham v. John Deere Co.*, 383 U.S. 1, 17-18, 148 USPQ 459, 467 (1966); *In re Dembiczak*, 175 F.3d 994, 998, 50 USPQ 1614, 1616 (Fed. Cir. 1999); *In re Napier*, 55 F.3d 610, 613, 34 USPQ2d 1782, 1784 (Fed. Cir. 1995)). "For each rejection under 35 U.S.C. 103, the [appellant's] argument shall specify the errors in the rejection and, if appropriate, the specific limitations in the rejected claims which are not described in the prior art relied on in the rejection, and

shall explain how such limitations render the claimed subject matter unobvious over the prior art." 37 C.F.R. § 1.192(c)(8)(iv)(2004).<sup>2</sup>

Here, the examiner has made specific findings, *supra*, of where the references teach the limitations at issue. For his part, although the appellant has identified limitations in claim 11 allegedly not described in those references, he has not addressed the specific findings of the examiner, let alone showed error therein. Just as "[i]t is not the function of [the U.S. Court of Appeals for the Federal Circuit] to examine the claims in greater detail than argued by an appellant, looking for nonobvious distinctions over the prior art," *In re Baxter Travenol Labs.*, 952 F.2d 388, 391, 21 USPQ2d 1281, 1285 (Fed. Cir. 1991), it is not the function of this Board to examine claims in greater detail than argued by an appellant, looking for nonobvious distinctions over the prior art.

## 2. *Motivation to Combine the Teachings*

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<sup>2</sup>We cite to the version of the C.F.R., i.e., the Code of Federal Regulations, in effect at the time of the appellant's brief.

The examiner finds the following motivation to combine teachings of Post and Lund.

Lund discloses that is highly desirable to have interleaved windings with conductive loops in order to ensure a complete flux path (column 7, line 1-5, 37 - 43). Such complete flux path induces a null net voltage and (column 7, lines 16 - 19) an improved and easy to manufacture electrical device can be made (column 1, lines 42 - 45; column 2, lines 24, 25).

(Examiner's Answer at 9.) The appellant argues, "Since there is no reference that supplies a teaching of the combination of elements set out in Appellant's claim 11, the proposed combination of the Primary Post reference (US 6,111,332), the Secondary Lund reference (US 3,176,206), and the Tertiary Bichler reference (US 5,155,402) would not be obvious within the meaning of 35 U.S.C. § 103(a)." (Appeal Br. at 14.)

"The presence or absence of a motivation to combine references in an obviousness determination is a pure question of fact." *In re Gartside*, 203 F.3d 1305, 1316, 53 USPQ2d 1769, 1776 (Fed. Cir. 2000) (citing *In re Dembiczak*, 175 F.3d 994, 1000, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999)). For each rejection under § 103, the appellant's argument shall also include "an explanation of why features disclosed in one reference may not properly be combined with features disclosed in another reference." 37 C.F.R. § 1.192(c)(8)(iv).

Here, the examiner has found, *supra*, specific reasons for combining teachings of Post and Lund. For his part, the appellant has not addressed the specific findings of the examiner, let alone showed error therein. Furthermore, we are unpersuaded by the appellant's reasoning that the failure of any one of the references to teach all the limitations in the claim evidences that combining teachings of the references "would not be obvious within the meaning of 35 U.S.C. § 103(a)." (Appeal Br. at 14.) Therefore, we affirm the obviousness rejection of claim 11.

#### B. CLAIM 12

The examiner finds, "Heshma[t] et al discloses that the windings 54a, 54c are used for inducing a radially movement force on the rotor 22 (column 7, lines 5 - 12). Thus there is an induced force acting on the parallel sections." (Examiner's Answer at 10.) The appellant argues, "the Primary Post reference, the Secondary Lund reference, the Tertiary Bichler reference, and the Quaternary Heshma[t] et al reference all fail to show the structural elements of Appellant's claim 12. . . ." (Appeal Br. at 15.)

##### 1. Claim Construction

"The Patent and Trademark Office (PTO) must consider all claim limitations when determining patentability of an invention over the prior art." *In re Lowry*, 32 F.3d 1579, 1582, 32 USPQ2d 1021, 1034 (Fed. Cir. 1994) (citing *In re Gulack*, 703 F.2d 1381,

1385, 217 USPQ 401, 403-04 (Fed. Cir. 1983)). Here, claim 12 recites in pertinent part the following limitations: "the restorative force being reactive to an induced force acting on the parallel lateral sections; and the induced force being induced by rotation of the Halbach array around the stator."

## 2. Obviousness Determination

"In rejecting claims under 35 U.S.C. Section 103, the examiner bears the initial burden of presenting a *prima facie* case of obviousness." *In re Rijckaert*, 9 F.3d 1531, 1532, 28 USPQ2d 1955, 1956 (Fed. Cir. 1993) (citing *In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992)). "A *prima facie* case of obviousness 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." *In re Bell*, 991 F.2d 781, 783, 26 USPQ2d 1529, 1531 (Fed. Cir. 1993) (quoting *In re Rinehart*, 531 F.2d 1048, 1051, 189 USPQ 143, 147 (CCPA 1976)).

Here, in contrast to his rejection of claim 11, the examiner does not address the aforementioned limitations of claim 12. We will not "resort to speculation," *In re Warner*, 379 F.2d 1011, 1017, 154 USPQ 173, 178 (CCPA 1967), as to whether the references would have suggested the specific limitations. Therefore, we reverse the obviousness rejection of claim 12.

### III. CONCLUSION

In summary, the rejection of claim 11 under § 103(a) is affirmed. The rejection of claim 12 under § 103(a), however, is reversed.

"Any arguments or authorities not included in the brief will be refused consideration by the Board of Patent Appeals and Interferences. . . ." 37 C.F.R. § 1.192(a). Accordingly, our affirmance is based only on the arguments made in the brief. Any arguments or authorities omitted therefrom are neither before us nor at issue but are considered waived. *Cf. In re Watts*, 354 F.3d 1362, 1367, 69 USPQ2d 1453, 1457 (Fed. Cir. 2004) ("[I]t is important that the applicant challenging a decision not be permitted to raise arguments on appeal that were not presented to the Board.") No time for taking any action connected with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED-IN-PART

KENNETH W. HAIRSTON  
Administrative Patent Judge

LANCE LEONARD BARRY  
Administrative Patent Judge

HOWARD B. BLANKENSHIP  
Administrative Patent Judge

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