

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 20

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte YUZURU SUZUKI, SAKAE FUJITANI
TAKETOSHI OHYASHIKI, and KENICHI MAKINO

Appeal No. 1998-1797
Application No. 08/609,943

HEARD: Nov. 15, 2000

Before KRASS, GROSS, and JERRY SMITH, Administrative Patent Judges.

KRASS, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the final rejection of claims 1-7, all of the pending claims.

The invention is directed to a brushless DC motor. More particularly, hall element position detectors are

Appeal No. 1998-1797
Application No. 08/609,943

consecutively arranged at equal intervals in slots provided between stator magnetic poles and spaced from each other by a spatial angle about the center of the rotor, the angle being defined in terms of the number of revolutions per second and the mechanical time constant (in units of seconds) of the motor.

Independent claim 1 is reproduced as follows:

1. A brushless DC motor with N phases, where $N \geq 2$, having position detectors from which signal outputs are indicative of the location of magnetic poles of a rotor, controlling the rotation for a constant speed, comprising:

N position detectors disposed between magnetic poles, wherein any two adjacent position detectors are spaced from each other by a spatial angle θ_i in radians about a center of the rotor, $(1/n) * (\theta_i / 2B) < KM$ is established, where $i = 1$ to $N-1$, $0 < \theta_i < 2B/N$, KM is the mechanical time constant of the motor (sec), and n is the number of revolutions (rps).

The examiner relies on the following references:

Petersen 1988	4,745,345	May 17,
Elsässer et al. (Elsässer) 1989	4,843,500	Jun. 27,
Kordik 1992	5,164,622	Nov. 17,

Claims 1-7 stand rejected under 35 U.S.C. 103. As evidence of obviousness, the examiner relies on either one of Petersen or Kordik, in view of the level of skill of the

Appeal No. 1998-1797
Application No. 08/609,943

artisan, with regard to claims 1-5, adding Elsässer to each of the alternative rejections with regard to claims 6 and 7.

A rejection under 35 U.S.C. 112, second paragraph, has been withdrawn by the examiner and is no longer before us on appeal.

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

OPINION

We reverse.

Both Petersen and Kordik are directed to brushless DC motors, as is the instant invention. The examiner points to Figures 7 and 13 and column 11, lines 27-55 of Petersen as disclosing two position detectors (Hall sensors H1 and H2) mounted apart by a spatial angle of 45 degrees. This satisfies the claimed angle range since the value is between 0 and $2B/N$ (or 180 degrees) since N, the number of phases, is 2 in Petersen. We agree with the examiner on this point.

The examiner points to Figures 2 and 6 and column 7, lines 49-54 [sic, 48-53], of Kordik as disclosing three position detectors (Hall sensors 62, 64, 66) mounted apart by a spatial angle of 60 degrees. This satisfies the claimed

Appeal No. 1998-1797
Application No. 08/609,943

angle range since the value is between 0 and 120 degrees (N=3 in the Kordik disclosure). We, again, agree with the examiner on this point.

The examiner recognized that neither Petersen nor Kordik discloses the claimed relationship of the spatial angle to n, the number of revolutions, and KM, the mechanical time constant of the motor. However, the examiner finds that this relationship would have been obvious in each, alternative, rejection under 35 U.S.C. 103 because it is merely "a matter of expressing a well-known knowledge [sic] in terms of mathematic [sic]" [answer-page 4].

In response to appellants' argument that the prior art did not teach or suggest the claimed relationship between the spatial angle and the number of revolutions and mechanical time constant of the motor, the examiner contended that the mechanical time constant and the number of revolutions relate to parameters of a motor speed operation and not to structural limitations.

It is our view that the examiner has not established a prima facie case of obviousness since the applied prior art

Appeal No. 1998-1797
Application No. 08/609,943

fails to teach or suggest that the mechanical time constant, KM, is in any way related to the variables recited in claim 1. Appellants choose the relationship between the spatial angle and the mechanical time constant and the number of revolutions of the motor in order to produce what appellants consider to be superior, or advantageous, results regarding minimization of a variation of Hall voltage output of each position detector due to magnetic imbalances. Without a particular teaching, or at least some clear suggestion of this claimed relationship, the examiner's finding of obviousness would appear to be based on a hindsight reconstruction of appellants' invention.

The examiner has not shown anything in the applied prior art which would indicate a desire to relate the spatial angle to the mechanical time constant of the motor and so we fail to see how the examiner can be considered to have established a prima facie case of obviousness with regard to the instant claimed subject matter.

The decision of the examiner rejecting claims 1-7 under 35 U.S.C. 103 is reversed.

REVERSED

Appeal No. 1998-1797
Application No. 08/609,943

	Errol A. Krass)	
	Administrative Patent Judge)	
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	Anita Pellman Gross)	BOARD OF
PATENT)	
	Administrative Patent Judge)	APPEALS AND
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Appeal No. 1998-1797
Application No. 08/609,943

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