

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

Paper No. 19

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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***Ex parte*** ALEKSANDAR PROLE and PHILIP L. ANDREW

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Appeal No. 1999-1134  
Application No. 08/334,465<sup>1</sup>

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ON BRIEF

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Before KRASS, FLEMING, RUGGIERO, **Administrative Patent Judges**.  
FLEMING, **Administrative Patent Judge**.

**DECISION ON APPEAL**

This is a decision on appeal from the final  
rejection  
of claims 11, 13, and 22-24. Claims 15-17 stand withdrawn as

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<sup>1</sup> Application for patent filed November 4, 1994

Appeal No. 1999-1134  
Serial No. 08/334,465

directed to a non-elected invention<sup>2</sup>. Claims 1-10, 12, 14 and 18-21 have been canceled.

The invention relates to a dynamoelectric machine having protuberances to improve the rate of heat transfer within radial ducts through stacked rotor turns (specification, page 1, lines 6-9). More particularly, protuberances (figure 5, item 42a) are formed in radial holes (figure 5, item 26a) which are formed through the stacked turns (figure 5, item 18a) to enhance turbulent flow of the cooling medium which circulates through the rotor windings. Each of the stacked turns has a protuberance projecting from a first wall surface thereof. Various embodiments with differing protuberance placement are disclosed (figures 5-7).

Independent claim 22 is reproduced as follows:

22. A dynamoelectric machine comprising:

a rotor having a plurality of generally radially extending slots circumferentially spaced from one another;

windings for said machine including a plurality of radially spaced rotor turns stacked one on top of another in each of said slots;

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<sup>2</sup> Paper No. 5

Appeal No. 1999-1134  
Serial No. 08/334,465

means for introducing a cooling medium adjacent radially inner portions of said slots;

each stacked rotor turn having an opening in communication with a radially adjacent registering opening of an adjacent stacked turn for flowing the cooling medium from said introducing means through the registering openings in a radially outward direction;

a protuberance carried by at least one rotor turn projecting into and transverse to the direction of flow through the opening and extending in a generally circumferential direction affording a turbulent flow of the cooling medium through the opening of the one rotor turn for positively mixing cooling medium in the opening adjacent the protuberance and cooling medium adjacent a central portion of the opening;

each turn having opposed wall surfaces with one wall surface having said protuberance projecting toward a second opposite wall surface, said second wall surface being relatively smooth.

The Examiner relies on the following references:

Laffoon et al (Laffoon)	1,985,040	Dec. 18, 1934
Kaminski	4,709,177	Nov. 24, 1987
Schneider et al (Schneider)	5,491,370	Feb. 13, 1996 (filed Jan. 28, 1994)

Claims 11, 13 and 22-24 stand rejected under 35 U.S.C. § 103 as being unpatentable over either Laffoon et al or

Appeal No. 1999-1134  
Serial No. 08/334,465

Kaminski, when taken with Schneider.

Rather than reiterate the arguments of Appellants and the Examiner, reference is made to the Brief<sup>3</sup>, Reply Brief<sup>4</sup>, and the Examiner's Answer<sup>5</sup> for the respective details thereof.

**OPINION**

We will not sustain the rejections of claims 11, 13 and 22-24 under 35 U.S.C. § 103.

The Examiner has failed to set forth a *prima facie* case. It is the burden of the Examiner to establish why one having ordinary skill in the art would have been led to the claimed invention by the express teachings or suggestions found in the prior art, or by implications contained in such teachings or suggestions. *In re Sernaker*, 702 F.2d 989, 995,

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<sup>3</sup> The Brief was received March 21, 1997

<sup>4</sup> The Reply Brief was received July 3, 1997. The Examiner mailed a letter on July 23, 1997 stating that Appellants' Reply Brief had been entered and considered but no further response by the Examiner was deemed necessary.

<sup>5</sup> The Examiner's Answer was mailed May 12, 1997

Appeal No. 1999-1134  
Serial No. 08/334,465

217 USPQ 1, 6 (Fed. Cir. 1983). The Federal Circuit states that "[t]he mere fact that the prior art may be modified in the manner suggested by Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." *In re Fritch*, 972 F.2d 1260, 1266 n.14, 23 USPQ2d 1780, 1783-84 n.

14

(Fed. Cir. 1992), *citing In re Gordon*, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984). The Federal Circuit reasoned that for the determination of obviousness, the court must answer whether one of ordinary skill in the art who sets out to solve the problem and who had before him in his workshop the prior art, would have reasonably expected to use the solution that is claimed by Appellants. However, "[o]bviousness may not be established using hindsight or in view of the teachings or suggestions of the invention." *Par Ordnance Mfg. v. SGS Importers Int'l Inc.*, 73 F.3d 1085, 1087-89, 37 USPQ2d 1237, 1239-40 (Fed. Cir. 1995), *citing W. L. Gore & Assocs., Inc. v. Garlock, Inc.* 721 F.2d at 1551, 1553, 220 USPQ at 311, 312-13.

Appeal No. 1999-1134  
Serial No. 08/334,465

On page 6 of the Appeal Brief (hereinafter "brief"), Appellants assert that Schneider does not teach applying perturbent structures to the turns of a dynamoelectric machine, nor any teaching as to how perturbent structures would be applied to turns of a dynamoelectric machine.

In addition, Appellants point out<sup>6</sup> that Schneider provides very general statements of perturbent structures for inducing

turbulent flow in helical passages. Schneider discloses using the perturbent structures in the spiral helical cooling passages (74) around stator (75) of an electric machine to cool the motor (10).

Appellants then argue<sup>7</sup> that the application of the general teachings of Schneider to the specific environment of openings in each turn of a dynamoelectric machine is derived only from Appellants' teachings and not from the applied references. In this regard Appellants point out that neither Laffoon nor Kaminski indicates a need for further cooling, or cooling

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<sup>6</sup> Brief, page 6

<sup>7</sup> Brief, page 8

Appeal No. 1999-1134  
Serial No. 08/334,465

afforded by specific structure disposed in the openings of the turns of the coolant passages, and only Appellants evidence that need.

In response to the Examiner's reliance<sup>8</sup> on Kaminski to teach that rotor windings have "hot spots" and curing that problem by "adjusting the cooling scheme", Appellants point out that Kaminski deals with longitudinal grooves milled into end windings, and not rotor body radial ducts as claimed.

Appellants

assert that the cooling scheme for the end turns in Kaminski has

no applicability to the windings within the rotor not forming part of the end turns.

The Examiner contends<sup>9</sup> that one of ordinary skill in the art would know from the background of the invention section of Kaminski that the cooling of rotor windings is often difficult, and that rotor windings with long ducts produce

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<sup>8</sup> Answer, page 6

<sup>9</sup> Answer, page 6.

Appeal No. 1999-1134  
Serial No. 08/334,465

large temperature rises in coolant gas. The Examiner then finds that Kaminski teaches a need to minimize local hot spots in rotor windings.

The Examiner then finds<sup>10</sup> that one skilled in the art having Kaminski's teaching would have found it obvious to add perturbent structures in the end turns of Kaminski to induce turbulence in the flow of fluid through the passage, and therefore improve cooling.

Upon our review of the Schneider reference, we find that there is no teaching in Schneider of applying perturbent structures to the stacked rotor turns of a dynamoelectric machine. Schneider's sole disclosure of using the perturbent structures is in spiral helical cooling passages around the stator of an electric machine to cool the motor.

Laffoon, which is directed to cooling rotors by flowing of a cooling medium through opening in stacked turns, contains no teaching or indication of a need for further cooling.

Kaminski's invention deals with longitudinal grooves

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<sup>10</sup> Answer, bottom of page 6 through top of page 7.

Appeal No. 1999-1134  
Serial No. 08/334,465

milled into end windings and not rotor body radial ducts as claimed. Furthermore, the discussion of rotor winding cooling problems presented in columns 1 and 2 of Kaminski is directed to coolant flow through a path in a longitudinal duct (or ducts) of a conductor and not the radially adjacent openings in the adjacent stacked turns of the claimed invention.

Therefore, as these prior art references fail to teach a need for further cooling in stacked rotor turns already having coolant flow in both the slots and openings of adjacent stacked turns, the Examiner has not established why one having ordinary skill in this art would have been led to add protuberances to provide additional cooling. Thus, the Examiner has failed to establish why one having ordinary skill in this art would have been led to the claimed invention by the express teachings or suggestions found in the prior art, or by implications contained in such teachings or suggestions.

**CONCLUSION**

Appeal No. 1999-1134  
Serial No. 08/334,465

We have not sustained the rejection of claims 11, 13 and 22-24 under 35 U.S.C. § 103. Accordingly, the Examiner's decision is reversed.

***REVERSED***

ERROL A. KRASS	)	
Administrative Patent Judge	)	
	)	
	)	
	)	BOARD OF PATENT
MICHAEL R. FLEMING	)	APPEALS AND
Administrative Patent Judge	)	INTERFERENCES
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JOSEPH F. RUGGIERO	)	
Administrative Patent Judge	)	

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Appeal No. 1999-1134  
Serial No. 08/334,465

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