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opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.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. 29

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Ex parte SAMUEL HELLER

Appeal No. 95-4842
Application 08/216,090[1]

ON BRIEF

Before HAIRSTON, KRASS, and BARRETT, *Administrative Patent Judges*.

BARRETT, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the final rejection of claims 1 and 7, the only claims pending in the application. Claims 2-6 have been cancelled.

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[1] Application for patent filed March 22, 1994, entitled "Rotary Induction Machine Having Control of Secondary Winding Impedance," which is a continuation of Application 07/789,993, filed November 11, 1991, now abandoned, which is a continuation of Application 07/489,894, filed March 6, 1990, now abandoned, which is a continuation-in-part of Application 07/218,575, filed July 12, 1988, now abandoned.

The invention is directed to a rotary induction generator with a three-phase rotor and a three-phase stator. Induction generators are essentially like induction motors, but are driven by a prime mover at speeds slightly above synchronous speed, forcing the unit to generate power due to the reverse (negative) slip. The following description is provided from Syad A. Nasar, Electric Machines and Power Systems (McGraw-Hill 1995), page 182:

> To understand the generator operation, we consider a three-phase induction machine to which a prime mover is coupled mechanically. When the stator is excited, a synchronously rotating magnetic field is produced and the rotor begins to run, as in an induction motor, while drawing electrical power from the supply. The prime mover is then turned on (to rotate the rotor in the direction of the rotating field). When the rotor speed exceeds synchronous speed, the direction of electrical power reverses. The power begins to flow into the supply as the machine begins to operate as a generator. The rotating magnetic field is produced by the magnetizing current supplied to the stator winding from the three-phase source. This supply of the magnetizing current must be available as the machine operates as an induction generator. For induction generators operating in parallel with a three-phase source capable of supplying the necessary exciting current, the voltage and the frequency are fixed by the operating voltage and frequency of the source supplying the exciting current.

Appellant's invention is to place capacitors directly across each of the secondary windings, which is said to increase the efficiency of the generator as shown in figures 6-8 and described in the specification at pages 6-8 and Table I, page 8a.

Claims 1 and 7 are reproduced below.

1. A rotary induction generator comprising a stator having wound thereon stator windings defining a three-phase stator;

a rotor mounted for rotation in said stator and having wound thereon three rotor windings defining a three-phase rotor;

said three-phase stator windings adapted to be connected to a source of electrical power and serving as primary windings whereby the applied power causes current to flow in said three-phase windings and provide a rotating magnetic field;

said other three-phase windings serving as secondary winding coupled to said magnetic field whereby currents are induced in said secondary windings which in turn induce power in said primary windings in response to rotation of the rotor;

capacitive means connected directly across each of said secondary windings having a value sufficient to increase the efficiency of said machine; and

resistive means connected in series with said secondary windings to control the power output for different rotor speeds.

7. A rotary induction generator having polyphase, primary and secondary windings including a resistor connected in series with each secondary winding to control the power output for different rotary speeds, and a capacitor connected between each pair of polyphase secondary winding terminals to increase the power output and the efficiency of the machine.

The examiner relies upon the admitted prior art in figure 3 of the specification and the following U.S. patents:

Okuyama et al. (Okuyama)	4,206,395	June 3, 1980
Divan	4,833,584	May 23, 1989[2]

Claims 1 and 7 stand rejected under 35 U.S.C. § 103 as being unpatentable over the admitted prior art of appellant's figure 3, Okuyama, and Divan. We refer to the Examiner's Answer, pages 4-5, for a statement of the examiner's rejection.

OPINION

We reverse the examiner's rejection.

According to the specification (page 5, lines 10-16) (emphasis added):

> The prior art teaches that the operating characteristics of an induction motor <u>or generator</u> are substantially improved by adding in the secondary windings a reactive impedance. A prior art machine is shown in Figure 3. Potentiometers 31, 32 and 33 are connected in series, one with each winding to provide adjustable resistance. The winding resistance is shown at 36, 37 and 38. The potentiometer wiper is connected to a parallel combination of a bridging capacitor 41, 42 and 43 and an inductor 46, 47 and 48.

The difference between the admitted prior art and claims 1 and 7 is that in the admitted prior art the capacitors are connected in parallel with the potentiometer resistances and the combination of potentiometer and capacitor and inductor are in series with the secondary winding, whereas claim 1 requires the capacitive

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2 Filing date of October 16, 1978.

means to be directly across the secondary windings with the resistive means in series and claim 7 requires a capacitor connected between each pair of secondary winding terminals.

Figure 1 of Okuyama is described as follows (column 2, lines 25-29):

> Reference numeral 1 denotes a wound-rotor type three-phase induction motor with the primary or stator windings thereof connected to the AC bus or the AC power supply. Numeral 2 denotes a resonant circuit including capacitors C in series with reactors L_1 which resonant circuit is connected through a switch 6 to the secondary or rotor windings of the induction motor 1. The reactors L_1 of the resonance circuit 2 may be omitted as the case demands. Numeral 3 denotes a bypass or rotor winding current conducting circuit including reactors L_2 and resistors R_1, which circuit makes up a passage of secondary current at a slip frequency.

The switch 6 is closed so the resonant circuit 2 is connected during normal operation (column 2, lines 53-55). The connection for normal operation is shown in figure 2 (column 2, lines 56-60). The capacitance of capacitor C is chosen to satisfy the resonance condition to eliminate the fifth and seventh harmonics (column 3, lines 57-62).

The topology of the circuit in normal operation in figure 2, without inductors L_1 (which Okuyama discloses may be omitted) seems to satisfy the capacitive and resistive means arrangement limitations of claim 1. Resistors R are connected in series with the secondary windings and capacitors C are connected directly across the windings; two capacitors C in series in Okuyama are equivalent to a single capacitor shown in appellant's figure 4.

The differences between Okuyama and claims 1 and 7 are that Okuyama: (1) is operated as a motor, not a generator; (2) the capacitors in Okuyama are disclosed to be for the purpose of eliminating harmonics, not to increase efficiency of a generator, and there is no way to tell whether the capacitors have "a value sufficient to increase the efficiency of said machine," as recited in claim 1, or "to increase the power output and efficiency of the machine," as recited in claim 7.

Divan has been applied to show "that the use of filter elements to eliminate voltage at the switching frequency can be utilized at either the source 172 and/or inductive load 143 in a power conversion system" (Examiner's Answer, page 5). Further, "[i]t has been pointed out than an ac machine can be used as a motor or generator, however Divan has been cited to illustrate that the substitution between motor and generator operation with a filtering system for an ac machine system is known in the art" (Examiner's Answer, page 7). Divan was first applied in the Final Rejection (Paper No. 23) to counter appellant's arguments in the amendment filed August 24, 1994 (Paper No. 22) that Okuyama did not disclose a generator, nor the use of capacitors to increase the efficiency of the generator. Divan is not an induction generator.

While the bits and pieces of the claimed invention seem to exist in the references, we are of the opinion that the examiner applied hindsight in combining the pieces to conclude that the claimed subject matter would have been obvious and has not addressed the difference of capacitor values. There seems to be no disagreement with the examiner's finding it was well known that induction motors could be used as induction generators. However, the problem is that design considerations for a motor are not necessarily the same as for a generator or, at least, the examiner has failed to establish that the considerations are the same. Therefore, the examiner has failed to provide the necessary motivation for one skilled in the art to use teachings regarding the arrangement of capacitors to eliminate harmonics in a motor or in a generator "to increase the efficiency of the machine," as recited in claim 1, or "to increase the power output and efficiency of the machine," as recited in claim 7. Elimination of harmonics and increasing generator efficiency are not the same problem and the examiner has not explained how solutions to one problem would solve the other problem or how values of capacitors chosen to solve one problem would be the same for the other problem. To the extent there is an unexpressed argument that Okuyama could be operated as a generator, the examiner has not provided any inherency arguments about the capacitors in Okuyama having a "value sufficient to increase the efficiency of the machine." For these reasons, the rejection is reversed.

CONCLUSION

The rejection of claims 1 and 7 is reversed.

REVERSED

KENNETH W. HAIRSTON Administrative Patent Judge	
ERROL A. KRASS Administrative Patent Judge	BOARD OF PATENT APPEALS AND INTERFERENCES
LEE E. BARRETT Administrative Patent Judge	

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FLEHR, HOHBACH, TEST,
ALBRITTON & HERBERT
Suite 3400
Four Embarcadero Center
San Francisco, CA 94111