Art Unit 2107

Paper No. 25

Appeal No. 93-2123

LS

ON BRIEF

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte Gregory I. Rozman

Application for Patent filed April 2, 1990, Serial No. 07/504,102, which is a Continuation of Serial No. 07/279,863, filed December 5, 1988, now abandoned. VSCF Start System With Precise Voltage Control.

F. William McLaughlin, for appellant.

Primary Examiner - David Smith, Jr.

Before Lynch, Krass and Cardillo, Examiners-in-Chief.

Krass, Examiner-in-Chief.

ON REQUEST FOR RECONSIDERATION

Appellant requests that we reconsider our decision of June 10, 1993 wherein we sustained the rejection of claims 2-4, 6 and 8-10 because, alleges appellant, that decision was based on an improper reading of the scope of the prior art relative to the claims at issue.

The instant invention relates to a circuit for controlling the duty cycle of inverter switching responsive to a difference between an output voltage reference and an output voltage feedback. Thus, appellant stresses, the control "relates to trying to maintain a desired, i.e., reference, output voltage" [emphasis in the original]. Appellant admits that the Peterson reference relates to the control of a duty cycle but stresses that it is responsive to a "speed error." Appellant contends that equating speed with voltage is improper because the "form of a signal is different from what the signal represents." We disagree.

It may be that the form of a signal is different from what the signal represents but the fact remains that although Peterson's signals are representative of speed, the signals themselves are voltage signals. Since Peterson discloses the control of a duty cycle responsive to speed signals represented by voltage signals, the reference, in fact, does disclose the control of a duty cycle responsive to a voltage command signal, as claimed. Further, as explained at page 4 of our decision, since Markunas disclosed a specific manner of producing such a voltage command (column 3, lines 12-17) in a similar environment, it would have been obvious to have applied the "estimator" of

Markunas in generating the speed command (i.e., a voltage reference value) in Peterson. We also indicated in our decision (page 4) that output 36' of Markunas represented a "modified motor speed signal," a characterization with which appellant, calling this signal a "voltage reference" [emphasis in the original-page 4 of the request for reconsideration], disagrees. However, since speed is one input to the performance estimator of Markunas, and the estimator operates upon this signal, in conjunction with other signals, the output is, broadly, a "modified speed signal" since the output is a "modification" of its input signals.

It is our view that appellant gives a too restrictive interpretation to the instant claim language. When applying the prior art to the claims, we give the claim language its broadest, reasonable interpretation consistent with the specification.

We have granted appellant's request to the extent that we have reconsidered our decision of June 10, 1993 but appellant's request is denied with respect to making any changes therein.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR 1.136(a). See the final rule notice, 54 F.R. 29548 (July 13, 1989), 1105 O.G. 5 (August 1, 1989).

DENIED

Thomas E. Lynch
Examiner-in-Chief

Errol A. Krass
Examiner-in-Chief

Raymond F. Cardillo
Examiner-in-Chief

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Art Unit 2107

MAILED

JUN 10 1993

BOARD OF PATENT APPEALS & INTERFERENCES

Paper No. 23

LS

Appeal No. 93-2123

ON BRIEF

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Ex parte Gregory I. Rozman

Application for Patent filed April 2, 1990, Serial No. 07/504,102, which is a Continuation of Serial No. 07/279,863, filed December 5, 1988, now abandoned. VSCF Start System With Precise Voltage Control.

F. William McLaughlin, for appellant.

Primary Examiner - David Smith, Jr.

Before Lynch, Krass and Cardillo, Examiners-in-Chief.

Krass, Examiner-in-Chief.

This is a decision on appeal from the final rejection of claims 2 through 4, 6 and 8 through 10. Claims 5 and 11, the only other pending claims, have been allowed by the examiner.

The invention is directed to maintaining control of a synchronous motor. Representative independent claim 2 is reproduced as follows.

2. A control system for a brushless machine having a rotor and a stator having a stator coil which is controllably

energized from a source of DC power defining a positive and a negative DC voltage for imparting rotation to the rotor, comprising:

switching means coupled between the source of DC power and said stator coil for alternately applying the positive and negative voltage to said coil, said switching means defining an output voltage;

first means for generating an output voltage reference;

second means for generating a commutation angle command;

first sensing means for sensing the speed of rotational movement of the rotor;

second sensing means for sensing current through the stator coil;

means coupled to said second generating means and said first and second sensing means for calculating a feedback value representing an estimate of stator coil voltage responsive to said commutation angle command, said rotor speed and said stator current; and

control means coupled to said first generating means and said calculating means for controlling duty cycle of said switching means in response to a voltage command, said voltage command being determined responsive to a difference between said feedback value and said output voltage reference so that said switching means develop an output voltage to minimize the difference between said output voltage reference and said voltage estimate feedback value.

The examiner relies on the following references.

Peterson et al. (Peterson)	4,546,293	Oct. 8, 1985
Markunas	4,751,438	June 14, 1988

Claims 2 through 4, 6 and 8 through 10 stand rejected under 35 U.S.C. 103 as unpatentable over Peterson in view of Markunas.

Reference is made to the briefs and answers for the respective positions of appellant and the examiner.

OPINION

We agree with the examiner that the instant claimed subject matter would have been obvious, within the meaning of 35 U.S.C. 103. We agree with the reasoning espoused by the examiner in the answers and adopt such reasoning as our own to which we add the following amplifying comments.

With regard to instant claim 2, the only arguments advanced by appellant are that

> Neither of the cited references discloses controlling duty cycle responsive to a difference between a voltage reference and a voltage feedback value. Also, neither discloses calculating a voltage feedback value responsive to a commutation angle command, rotor speed and stator current [page 5 of the principal brief].

However, as seen in Figure 3 of Peterson, the duty cycle therein is controlled responsive to a difference between a reference signal on line 37 and a signal feedback value on line 68c. Although these signals in Peterson are representative of speed, they are certainly voltage signals. Thus, Peterson does disclose the controlling of a duty cycle responsive to a difference between a voltage reference (albeit representative of speed) and

a voltage feedback value (again, representative of speed). With regard to the "voltage feedback value," as claimed, this refers to the output of the disclosed motor voltage estimator 96 which calculates the feedback signal from inputs comprising rotor speed, commutation angle and stator current. However, as pointed out by the examiner, Figure 5 of Markunas clearly teaches such an estimator having the claimed inputs and at least one output 36' representing a modified motor speed signal. It would have been obvious to artisans to employ such an estimator in generating the speed command (i.e., the voltage reference value) in Peterson.

With regard to claim 3, as explained supra, Peterson's voltage reference is representative of motor speed. Therefore, the voltage reference is, indeed, generated responsive to speed of rotational movement of the rotor.

With regard to independent claim 6, our comments, supra, with regard to claim 2, apply.

With regard to claims 4 and 8, the frequency to voltage converter 67 of Peterson converts an input frequency to a voltage output signal in a linear manner, as shown by the graph at the output of the element in Figure 3 of the reference. Therefore, element 67 of Peterson acts to multiply the rotor speed by a constant representing a desired voltage to speed ratio.

With regard to claim 9, even accepting appellant's argument that neither applied reference teaches the control of a field coil because they relate to permanent magnet motors, we agree with the examiner that page 6, lines 11-16 of the instant disclosure describes what is set forth in the additional limitations of claim 9 as "conventional." Therefore, we do not find the limitations added by claim 9, when considered in combination with the other claimed elements, to distinguish over the prior art.

With regard to claim 10, we refer to page 10 of the principal answer wherein the examiner correctly points out that Markunas teaches the utilization of a phase advance means coupled to a current sensor for controlling the torque angle to maintain motor current at the current reference. Appellant argues that Markunas does not use the torque angle in calculating an estimate of feedback value. However, commutation angle, which Markunas does employ, is directly related to torque angle (in fact, as stated at the bottom of page 3 of the instant disclosure, at "unity power factor operation, the torque angle is equal to the commutation angle.")

With regard to appellant's argument that the applied references are not directed to the same problem as is appellant, we disagree. The problems sought to be solved are similar in respect to more efficient or more accurate motor control.

We have sustained the rejection of claims 2 through 4, 6 and 8 through 10 under 35 U.S.C. 103. Accordingly, the examiner's decision is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR 1.136(a). See the final rule notice, 54 F.R. 29548 (July 13, 1989), 1105 O.G. 5 (August 1, 1989).

AFFIRMED

Thomas E. Lynch
Examiner-in-Chief

Errol A. Krass
Examiner-in-Chief

Raymond F. Cardillo
Examiner-in-Chief

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