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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte YISONG LU and LYNDON AMBRUSON

Appeal 2019-005737
Application 15/374,154
Technology Center 2800

Before KAREN M. HASTINGS, JAMES C. HOUSEL, and LILAN REN, *Administrative Patent Judges.*

HOUSEL, *Administrative Patent Judge.*

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant[1] appeals from the Examiner's decision to reject claims 1–32.[2] We have jurisdiction under 35 U.S.C. § 6(b).

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[1] We use the word Appellant to refer to "applicant" as defined in 37 C.F.R. § 1.42. Appellant identifies the real party in interest as Allegro MicroSystems, LLC. Appeal Brief ("Appeal Br.") filed October 25, 2018, at 2.

[2] Appellant only lists claims 1–4, 8, 9, 11–17, 19, 23–27, and 29 under the status of the claims, but asserts that claims 1–32 are patentable in the conclusion. *Compare* Appeal Br. 2 and 11.

We REVERSE.[3]

CLAIMED SUBJECT MATTER

The invention relates to methods and apparatus for a brushless direct current ("BLDC") electric motor controller "including a magnetic field sensing element having an output that is processed to generate polarity and amplitude signals for regulating an output current to reduce acoustic noise during startup in comparison with conventional systems." Spec. 2:2–5.

Claim 1, reproduced below from the Claims Appendix to the Appeal Brief, is illustrative of the claimed subject matter:

> 1. A method for three-phase motor startup, comprising:
>
> receiving differential outputs from a magnetic field sensing element;
>
> generating a polarity signal from the differential outputs;
>
> receiving the differential outputs and generating an amplitude signal;
>
> generating a motor direction drive signal from the polarity signal; and
>
> generating sinusoidal motor drive signals during the motor startup from a measured motor current signal and the amplitude signal, wherein the motor drive signals drive the motor in a direction corresponding to the motor direction drive signal.

[3] This Decision also cites to the Specification ("Spec.") filed December 9, 2016, the Final Office Action ("Final Act.") dated June 27, 2018, the Examiner's Answer ("Ans.") dated May 15, 2019, and the Reply Brief ("Reply Br.") filed July 11, 2019.

Independent claim 12 recites a motor controller system having a control module configured to receive polarity and amplitude information generated from differential outputs from magnetic field sensing element and to generate a motor driving direction signal from the polarity information and an amplitude control signal from the amplitude information and measured motor current information. Independent claim 23 recites a control means for performing the same functions as the control module of claim 12.

REFERENCES

The Examiner relies on the following prior art:

Name	Reference	Date
Brannen	US 9,083,273 B2	July 14, 2015
Ng	US 2014/0055064 A1	Feb. 27, 2014

REJECTIONS

The Examiner maintains, and Appellant requests our review of, the following rejections:

A. Claims 1–4, 8, 9, 11–17, 19, 23–27, and 29 under 35 U.S.C. § 102(a)(1) as anticipated by Brannen; and

B. Claims 5–7, 10, 18, 20–22, 28, and 30–32 under 35 U.S.C. § 103 as unpatentable over Brannen in view of Ng.

OPINION

We review the appealed rejections for error based upon the issues Appellant identifies, and in light of the arguments and evidence produced thereon. *Ex parte Frye*, 94 USPQ2d 1072, 1075 (BPAI 2010) (precedential) (cited with approval in *In re Jung*, 637 F.3d 1356, 1365 (Fed. Cir. 2011)

("[I]t has long been the Board's practice to require an applicant to identify the alleged error in the examiner's rejections."). After considering the record before us, we are persuaded of reversible error in the pending rejections.

Anticipation is established when a single prior art reference discloses all features of the claimed invention. *ClearValue, Inc. v. Pearl River Polymers, Inc.*, 668 F.3d 1340, 1344 (Fed. Cir. 2012); *Celeritas Techs., Ltd. v. Rockwell Int'l Corp.*, 150 F.3d 1354, 1361 (Fed. Cir. 1998) (A claim is anticipated only where "each and every limitation is found either expressly or inherently in a single prior art reference."); *In re Spada*, 911 F.2d 705, 708 (Fed. Cir. 1990); *Verdegaal Bros., Inc. v. Union Oil Co. of Cal.*, 814 F.2d 628, 631 (Fed. Cir. 1987) ("A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.").

The Examiner finds that Brannen teaches the method of claim 1, the motor controller of claim 12, and the motor controller system of claim 23. Final Act. 3–5. In particular, the Examiner finds that Brannen teaches, among other things, a motor controller generating a polarity signal and an amplitude signal from the differential outputs from a magnetic field sensing element. *Id.* at 3. In support of this finding, the Examiner notes that Brannen teaches that the differential outputs are nearly sinusoidal with an amplitude of a few hundred millivolts, which is amplified and interpreted by a motor control integrated circuit ("IC"). Ans. 4; Brannen 4:6–11. In addition, the Examiner notes that Brannen teaches that a commutation logic decodes the amplified polarity information in order to determine which of the pre-driver H-Bridge driver switches will be turned on, and ultimately the direction of current flow in the stator windings. Ans. 4; Brannen 4:17–21.

Appellant argues that Brannen only generates a polarity signal from the sensing element's differential outputs and fails to teach generating an amplitude signal from these outputs. Appeal Br. 5. Appellant asserts that Brannen, Figure 4, shows the amplified polarity signal generated from the sensor's differential outputs is a logic signal consisting of only 0's and 1's. *Id.* at 5–6. Moreover, Appellant asserts that Brannen's differential outputs are received by a single amplifier which is only capable of generating a single signal, i.e., a polarity signal, whereas Appellant's differential outputs are received by amplifier 202 for generating the polarity signal and rectifier 210 for generating the amplitude signal. *Id.* at 6–7.

Appellant's argument is persuasive of reversible error. As Appellant argues, Brannen, Figure 4, clearly shows the output of the amplifier receiving the sensor differential outputs is a polarity signal consisting of only 0's and 1's, i.e., only zero volts representing a negative voltage of the sensor output and a setpoint voltage representing a positive voltage of the sensor output. Notably, the Examiner fails to respond to Appellant's argument in this regard. Further, as Appellant asserts, Brannen's Hall sensor differential outputs are sent only to the Hall Amplifier 108. Although, as the Examiner correctly finds, Appellant's claims (other than claim 9) do not recite a second electronic element, e.g., a rectifier, for producing the amplitude signal, the claims require the generation of both a polarity signal and an amplitude signal from the sensor's differential outputs.

Brannen's amplifier is only capable of producing the single polarity signal shown in Figure 4. This conclusion is consistent with Brannen's disclosure in column 4, lines 4–21. Brannen's sensor outputs are indeed sinusoidal having an amplitude of a few hundred millivolts. Brannen 4:8–10.

However, Brannen amplifies this "small differential signal" by the Hall Amplifier and provides a motor control IC to interpret the amplified output signal as north and south rotor positions, i.e., polarity information only. *Id.* at 4:10–12. Brannen teaches that this amplified signal "is pinned out of the IC as an open drain output on the Tach (tachometer) pin" whose "Tach signal toggles between a logical one and zero." *Id.* at 4:12–15. In addition, Brannen's Commutation Logic 112 decodes the polarity information from the amplified signal to ultimately determine the direction of current flow of the stator windings, i.e., the motor direction drive signal. *Id.* at 4:17–21. The Examiner fails to direct our attention to any teaching in Brannen that an amplitude signal, distinct from the polarity signal, is generated from the sensor's differential outputs, much less generating sinusoidal motor drive signals from this amplitude signal and a motor current signal or information, nor do we find any.

Accordingly, we do not sustain the Examiner's anticipation rejection of claims 1–4, 8, 9, 11–17, 19, 23–27, and 29 by Brannen.

The Examiner additionally relies on Ng in rejecting claims 5–7, 10, 18, 20–22, 28, and 30–32 as unpatentable under 35 U.S.C. § 103. However, the Examiner does not rely on Ng to remedy the deficiencies in Brannen discussed above. As such, the Examiner's obviousness rejection lacks sufficient factual underpinning. *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) ("[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." quoted with approval in *KSR Int'l Co. v. Teleflex Inc*., 550 U.S. 398, 418 (2007)).

Accordingly, we likewise do not sustain the Examiner's obviousness rejection of claims 5–7, 10, 18, 20–22, 28, and 30–32 over Brannen and Ng.

CONCLUSION

Upon consideration of the record and for the reasons set forth above and in the Appeal and Reply Briefs, the Examiner's decision to reject claims 1–32 is *reversed*.

More specifically,

the rejection of claims 1–4, 8, 9, 11–17, 19, 23–27, and 29 under 35 U.S.C. § 102(a)(1) as anticipated by Brannen is *reversed*; and

the rejection of claims 5–7, 10, 18, 20–22, 28, and 30–32 under 35 U.S.C. § 103 as unpatentable over Brannen in view of Ng is *reversed*.

DECISION SUMMARY

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1–4, 8, 9, 11–17, 19, 23–27, 29	102(a)(1)	Brannen		1–4, 8, 9, 11–17, 19, 23–27, 29
5–7, 10, 18, 20–22, 28, 30–32	103	Brannen, Ng		5–7, 10, 18, 20–22, 28, 30–32
Overall Outcome				1–32

REVERSED