

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

VICOR CORPORATION
Requester

v.

SYNQOR, Inc.
Patent Owner and Appellant

Appeal 2014-007587
Reexamination Control 95/001,637¹
Patent No. US 7,272,021 B2²
Technology Center 3900

Before JAMES T. MOORE, STEPHEN C. SIU, and
DENISE M. POTHIER, *Administrative Patent Judges*.

MOORE, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Patent Owner SynQor appeals under 35 U.S.C. §§ 134(b) and 315(a) (2002) from the rejection of claims 1, 9, 15, 16, 21–27, 29–31, 39, 45–47,

¹ Filed by Vicor Corporation on May 31, 2011.

² Issued September 18, 2007 to Martin Schlecht and Richard Farrington, and assigned to SynQor, Inc. (the “’021 patent”). The ’021 patent issued from Application 11/407,699, filed November 23, 2006.

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49, and 50 as set forth in the Right of Appeal Notice (“RAN”) mailed May 18, 2012. Patent Owner filed an Appeal Brief August 20, 2012. Requester Vicor Corporation filed a Respondent Brief on September 20, 2012. The Examiner mailed an Examiner’s Answer on February 26, 2014, which incorporated the RAN by reference and maintained all rejections. Patent Owner filed a Rebuttal Brief on March 26, 2014. Oral argument was conducted before a panel of this Board on October 15, 2014 in combined Reexamination Proceeding Appeal Numbers 2014-007362 and 2014-007587, and a transcript of the proceedings is of record. We have jurisdiction under 35 U.S.C. §§ 134 and 315.

We AFFIRM.

According to Patent Owner, U.S. Patent No. 7,564,702 was asserted in *SynQor, Inc. v. Artesyn Technologies, Inc. et al.*, Case No. 2:07-CV-497 (E.D. Tex.) (“SynQor I”) and in *SynQor, Inc. v. Ericson, Inc.*, Case No. 2:11-CV-00054-TJW-CE (E.D. Tex) (“SynQor II”). PO App. Br. 1. SynQor I was appealed to the Federal Circuit (Br. 1), and it appears to have been affirmed. It appears SynQor II lives on and has been severed into claims against Cisco Systems (2:14-CV-286) and claims against Vicor Corporation (2:14-CV-287) by order dated March 31, 2014, in the Eastern District of Texas.

We note that this Board was recently reversed by the United States Court of Appeals for the Federal Circuit in a related case, *Vicor Corporation v. SynQor, Inc.*, No. 2014-1578 (Fed. Cir. March 13, 2015) (nonprecedential).

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To the extent the evidence relied upon during litigation and decisions of the District Courts and Federal Circuit are preclusive, persuasive or informative, we have considered them as such.

The '021 Patent concerns power conversion. The power converter system comprises a normally non-regulating isolation stage and a plurality of non-isolating regulation stages, each receiving the output of the isolation stage and regulating a regulation stage output. '021 Patent, 2:3–8.

Claim 1 is representative, and reproduced below.

1. A power converter system comprising:

a normally non-regulating isolation stage comprising:

a primary winding circuit;

a secondary winding circuit coupled to the primary winding circuit, the secondary winding circuit comprising a secondary transformer winding in series with a controlled rectifier having a parallel uncontrolled rectifier, the secondary winding circuit providing a normally non-regulated output of the isolation stage; and

a control circuit which controls duty cycle of the primary winding circuit, the duty cycle causing substantially uninterrupted flow of power through the primary and secondary winding circuits during normal operation; and

a plurality of non-isolating regulation stages, each receiving the non-regulated output of the isolation stage and regulating a regulation stage output.

'021 Patent 6:22–39.

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EVIDENCE OF RECORD

The Examiner relies upon the following prior art in rejecting the claims on appeal:

Steigerwald US 5,274,539 December 28, 1993

Steigerwald US 5,377,090 December 27, 1994

A.I. Pressman, Switching and Linear Power Supply, Power Converter Design 1–372 (1977) (“Pressman”).

THE REJECTIONS

I. Claims 1, 9, 15, 21, 24, 26, 31, 39, 45, and 47 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Steigerwald '090.

II. Claims 22, 23, 25, and 27–30 stand rejected under 35 U.S.C. § 103(a) over Steigerwald '090 in view of the knowledge of one of ordinary skill in the art.

III. Claim 49 stands rejected under 35 U.S.C. § 103(a) over Steigerwald '090 and Pressman.

IV. Claim 50 stands rejected under 35 U.S.C. § 103(a) over Steigerwald '090, Pressman, and Admitted Prior Art.³

I. The Rejection of Claims 1, 9, 15, 21, 24, 26, 31, 39, 45, and 47 under 35 U.S.C. § 102(b) as being anticipated by Steigerwald '090.

This rejection was adopted from the Request, pages 5–21. RAN 4–5. According to the Examiner through the adoption of the rejection in the Request, Steigerwald '090 incorporates Steigerwald '539 by reference.

³ Said to be contained in U.S. Patent No. 5,999,417. RAN 5.

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Accordingly, Steigerwald '539 is considered by the Examiner to be part of the disclosure of Steigerwald '090. Req. 6.

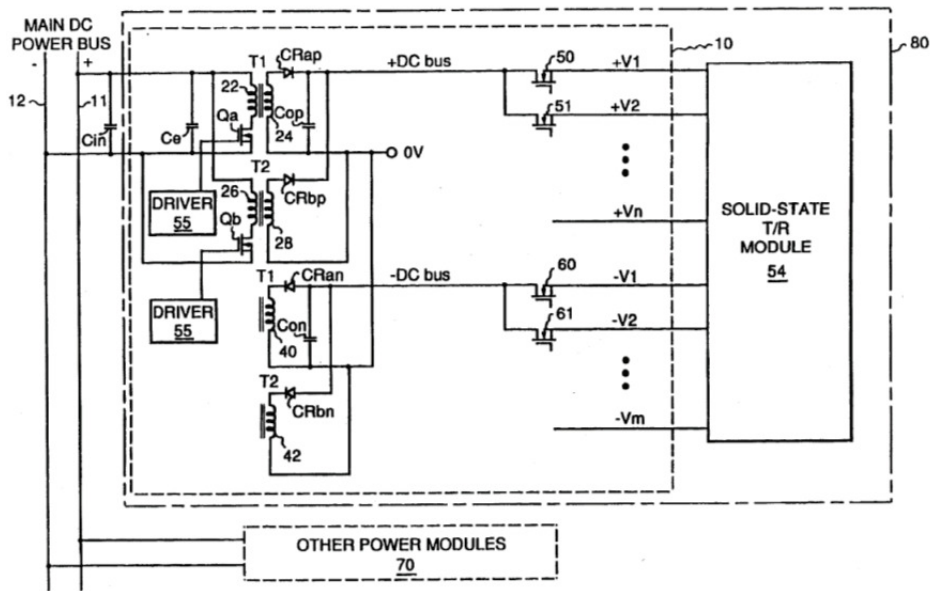
More specifically, Steigerwald '539 is said to describe a two stage power converter, having a regulation stage followed by an isolation stage. The isolation stage includes two transformers that operate in opposite phase, each at a complementary 50% duty cycle. "As a consequence, the energy storage capacitor C_e is always transformer coupled to the dc output." Req. 6-7, citing Steigerwald '539 3:33-38.

Steigerwald '539 is said to teach further that, in alternative embodiments, the diode rectifiers used in the isolation stage may be replaced by synchronous rectifiers. Req. 7.

Steigerwald '090 is said to teach an extension of Steigerwald '539, in which multiple output voltages may be provided. This is said to be accomplished by replacing the single regulation stage, which in the '539 patent is upstream of the isolation stage, with multiple regulation stages that are downstream of the isolation stage. Because each regulation stage may regulate a different output voltage, multiple output voltages may be provided using only a single non-regulating isolation stage. Req. 8, citing Steigerwald '090, 2:44-50.

Steigerwald '090 contains a single figure, reproduced on the following page.

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The Figure is a circuit diagram of a power converter

The Steigerwald '090 power converter illustrates diodes as rectifiers. The Requester asserts that Steigerwald '539 describes the use of diodes or synchronous rectifiers as rectifiers. Req. 9, citing Figs 4 and 8 of Steigerwald '539, reproduced below.

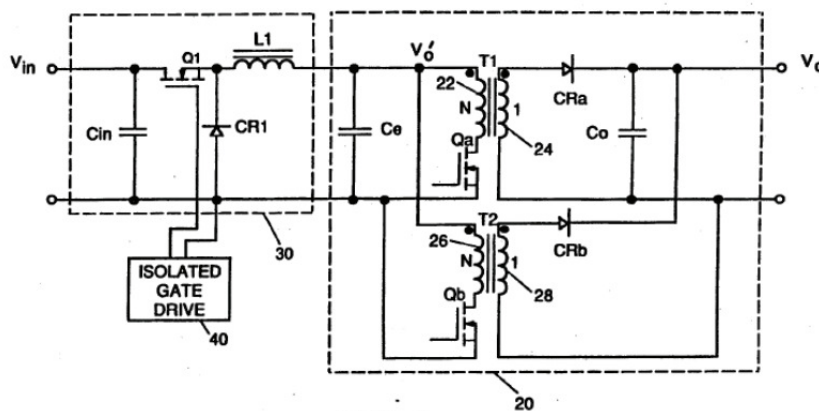


FIG. 4

Figure 4 is a circuit diagram of a power converter using diodes

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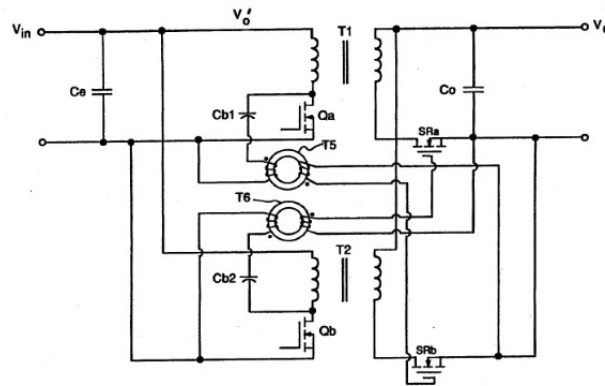


FIG. 8

Figure 8 is a circuit diagram of a power converter using controlled rectifiers

The Patent Owner takes issue with the incorporation by reference, arguing that it is insufficient to be effective. PO App. Br. 14. Thus, it is urged, as Steigerwald '090 does not incorporate Steigerwald '539 such that the disclosures can be treated as a single document, none of the claims are anticipated. *Id.* 20.

Patent Owner additionally observes that even assuming the Steigerwald '539 document is deemed incorporated, the alternative embodiment set up by the Examiner is drawn from separate embodiments. PO App. Br. 20. Patent Owner also urges that the embodiment does not teach substantially uninterrupted power flow. *Id.* at 22.

Also of interest is the Federal Circuit's recent decision in the related appeal from *inter partes* reexamination proceeding Control No. 95/001,702, noted above. *Vicor Corporation v. SynQor, Inc.*, No. 2014-1578 (Fed. Cir. March 13, 2015) (nonprecedential). While the decision in that case is not

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precedential, it does have some persuasive value to the instant proceeding, because the cited art is largely identical.

The Court was presented with this precise issue as to whether the embodiments of the different Steigerwald references could be combined into a single embodiment as Requester and the Examiner have done here. The Federal Circuit stated that it was appropriate to do so, reversing an earlier decision of this Board in favor of SynQor. The Federal Circuit's decision is reproduced below in pertinent part:

We therefore hold that Steigerwald '090 incorporates by reference at least those teachings of Steigerwald '539 that relate to its capacitance-multiplying converter 20. The incorporated teachings include Steigerwald '539's alternative embodiment, which teaches a substitution that takes place within the isolation stage:

In other alternative embodiments, such as those of FIGS. 7-9, synchronous rectifiers SRa and SRb are used instead of diodes CRa and CRb of FIGS. 4 and 6.

Steigerwald '539 col.4 ll.58-60; *see also id.* at fig.4 (showing that diodes CRa and CRb are within the capacitance multiplying converter 20).

Vicor Corporation v. SynQor, Inc., No. 2014-1578, slip op. at 10–11.

Further, the court concluded:

We accordingly hold that the combined reference teaches substituting controlled rectifiers for diodes within the capacitance-multiplying converter 20 of both Steigerwald '539's Figure 4 and Steigerwald '090's Figure 1. The combined reference teaches a single embodiment that anticipates all elements of representative claim 20, and we reverse the Board's conclusion to the contrary.

Id., slip op. at 11.

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The decision is premised in part upon the description of the reference numeral 20 in Steigerwald '090. The decision notes no such numeral appears in the '090 drawings, and its inclusion was enough for a person of ordinary skill to understand that Steigerwald '090 identified the capacitance multiplying converter with reference numeral 20 in Steigerwald '539 with detailed particularity. *Id.*, slip op. at 10.

With the Federal Circuit's latest guidance in mind, we resolve the embodiment issue in favor of the Requester. *Cf. B&B Hardware v. Hargis Industries, Inc.*, 135 S.Ct. 1293 (2015)(agency decision is grounds for issue preclusion in litigation). That leaves open for resolution only the issue as to whether the embodiment would deliver substantially uninterrupted power flow raised by the Patent Owner.

According to the Patent Owner, the Steigerwald patents are specifically directed to radar applications, which are characterized by the typical pulsed load as illustrated in Steigerwald '539 Figure 2. PO App. Br. 23. It is further urged that the bias voltage is applied to reduce the threshold for power flow and does not expressly or inherently require power to flow through the converter. *Id.*

While it is true that the applications of the Steigerwald patents are for pulsed radar loads, the language of the claims broadly requires "substantially uninterrupted flow of power through the primary and secondary winding circuits during normal operation." The Requester and Examiner have observed that the converters of Steigerwald '090 have substantially uninterrupted power flow because the two transformers operate

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180 degrees out of phase with a complementary 50% duty cycle Req. 11.
We therefore are not persuaded by the Patent Owner's arguments of error.

We therefore affirm this rejection.

II. The rejection of Claims 22, 23, 25, and 27–30 under 35 U.S.C. § 103(a) over Steigerwald '090

This rejection was adopted from the Request, pages 22–26. RAN 5. According to the Examiner, these claims recite additional features that, although not expressly described in Steigerwald '090, add nothing of patentable significance to claim 1. It has been found, relying upon the declaration of Dr. Patricio Vinciarelli (“the Vinciarelli declaration”), that these claims simply recite various known input and output voltages for the isolation and regulation stages. Req. 22.

The Patent Owner urges that the Examiner erred in not determining the level of ordinary skill in the field. PO App. Br. 24. It is urged that the ordinary level of skill is quite low and that this failure to determine the level of skill undermines the rejections. *Id.* at 25. It is also urged that the Examiner erred by giving weight to the Vinciarelli Declaration.

We disagree.

According to the Examiner, the voltages were in use in the telecom and computer industries prior to the earliest claimed priority date of the '021 patent. The Examiner has determined that a person having ordinary skill in the art at the time of the alleged inventions of the '021 patent would have implemented those voltages as the result of routine design choice for a circuit for use in particular operating environments in which those voltages are used. *Id.*

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The Vinciarelli Declaration, at paragraphs 7 through 10, for example, indicates with some specificity what a person of ordinary skill in the art would have known about power supply design and the voltages used in telecom equipment. Between the patents themselves and this testimony, we find sufficient basis to determine the information a person of ordinary skill would have known, consistent with the Examiner's findings.

The Patent Owner raises numerous additional issues in its briefing, most of which relate to evidence of secondary considerations. We agree that there is substantial evidence of secondary considerations in the record. Were the independent claims rejected as obvious, this evidence would have a substantial bearing on the ultimate determination of patentability. However, the independent claims are rejected as anticipated, upon which the determination the secondary considerations has no bearing.

The dependent claims here recite specific voltage levels or voltage levels to drive standard components. Claims 22 and 30 are exemplary and reproduced below:

22. A power converter system as claimed in claim 1 wherein the output of the isolation stage is about 12 volts.
30. A power converter system as claimed in claim 29 wherein the regulation stage output is of a voltage level to drive logic circuitry.

The Examiner has determined there is a strong case of obviousness, which has been put forth for claims directed to selecting a particular voltage level for output. We observe that the secondary considerations are principally directed to the bus architecture, for example of claim 1, although

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there is some evidence in the record of a determination of direct and induced infringement of claim 30 of the '021 patent. Ex. A20 pages 9– 27.

We therefore determine that any error which might have existed in the Examiner's consideration of the evidence of secondary considerations is harmless, as the presented evidence relates principally to features of the independent claims rejected under an anticipation rejection and does not overcome the case of obviousness for these dependent claims by providing the requisite nexus to the dependent claim features.

III. The Rejection of Claim 49 under 35 U.S.C. § 103(a) over Steigerwald '090 and Pressman

This rejection was adopted from the Requester's comments submitted November 30, 2011, pages 18-21. RAN 5.

Claim 49 recites a “power converter system as claimed in claim 1, wherein the regulation stages are switching regulators.”

The Examiner has found that Steigerwald '090 does not expressly teach switching regulators as part of its regulating output stage. Pressman is found to describe the use of switching regulators at the output stage. Nov. 30, 2011 Requester Comments at 18. Motivation is said to be found in Pressman on page 81, where it states that “[i]f the larger component count of a switching postregulator (Sect.1.2) is acceptable, even higher efficiencies can be achieved.” *Id.* at 20.

The Patent Owner counters that switching regulators have an inductor in the current path that is incompatible with the teaching of the Steigerwald

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patents and would render the combination unsuitable for the intended use.
PO App. Br. 28.

As further evidence, we are pointed generally to the testimony of Dr. Schlecht and Dr. Dickens said to be noting that the Steigerwald '090 circuit uses linear regulators, not switching regulators. *Id* at 29. However, we are not provided with specific citation. Our review of Exhibit A1 (Dr. Schlecht Declaration) fails to find support for this assertion. However, our review of Dr. Dickens' testimony in Exhibit A1D finds some level of support. Ex. A1D ¶ 27–28.

Requester counters that Patent Owner's argument is based entirely upon what Steigerwald's attorney argued during prosecution of its applications, and not on the disclosure of the Steigerwald patents. Resp. Br. 29. Requester also urges that bias voltages would not share such a restriction. *Id.* at 30. The Examiner has also observed that Steigerwald '090 uses non-pulsed loads. RAN 7.

For the capacitance multiplier converter to perform its function efficiently there is evidence in the record to support a conclusion that there must be negligible or no impedance in the path between the converter's input and the load. Dickens Decl. ¶ 10.

Steigerwald '090's sole Figure shows the schematic of the power module without any inductance shown. Claim 1 of Steigerwald '090 uses the phrase 'by a path lacking inductors' seven times (elements a, d, e, h, i, j and k), and the phrase appears four more times in claim 2 (the last four elements). Moreover, the transformer is said to have a "leakage inductance ... as low as possible because such leakage inductance, which appears as an

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equivalent series inductance is an impedance causing ... a voltage drop at the output.” Steigerwald ’539 patent, col. 3, line 65 - col. 4, line 4.

Dickens Decl. ¶ 11. A switching regulator has an inductor. Dickens Decl. ¶ 41.

However, Dr. Dickens also notes that Steigerwald ’090 teaches away from resistance as well. Dickens Decl. ¶ 23A. Yet, the Federal Circuit determined that Steigerwald has an embodiment which includes controlled rectifiers in the capacitance multiplying converter of Steigerwald ’090 sole Figure. *Vicor*, slip op. at 11. This determination by the Federal Circuit weighs heavily against the Patent Owner’s position.

Lastly, as noted above, the evidence of secondary considerations are therefore unavailing for the same reasons.

Accordingly, we are unpersuaded of error.

IV. The rejection of Claim 50 under 35 U.S.C. § 103(a) over Steigerwald ’090, Pressman, and Admitted Prior Art

This rejection was adopted from the Requester’s comments filed November 30, 2011 at pages 21-22. RAN 5–6.

Claim 50 reads as follows:

50. A power converter system as claimed in claim 1 wherein the regulation stages are switching regulators, wherein the DC power source provides a voltage within the range of 36 to 75 volts, and wherein the regulation stage output is of a voltage level to drive logic circuitry.

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The Examiner has found that the voltage levels are admitted in the specification of the 5,999,417 patent (parent to the '021 Patent) as known in the art. *Id.* at 21.

The Patent Owner asserts that this claim requires a switching regulator, and substituting switching regulators would render Steigerwald '090 unfit for its purpose. PO App Br. 68.

Also, as noted above, the evidence of record, including the embodiment introducing resistance into the secondary stage, and the secondary considerations, does not support a conclusion of error.

CONCLUSION

We have carefully considered the evidence of record, including that of secondary considerations submitted by the Patent Owner. We also have considered the evidence submitted by the Requester and the findings and conclusions of the Examiner. Finally, the most recent guidance from the Federal Circuit on the issue of the Steigerwald embodiments has been given substantial weight in our decision.

We are unpersuaded of error.

ORDER

I. The rejection of Claims 1, 9, 15, 21, 24, 26, 31, 39, 45, and 47 under 35 U.S.C. § 102(b) as being anticipated by Steigerwald '090 is affirmed.

II. The rejection of Claims 22, 23, 25, and 27–30 under 35 U.S.C. § 103(a) over Steigerwald '090 is affirmed.

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III. The Rejection of Claim 49 under 35 U.S.C. § 103(a) over Steigerwald '090 and Pressman is affirmed.

IV. The rejection of Claim 50 under 35 U.S.C. § 103(a) over Steigerwald '090, Pressman, and Admitted Prior Art is affirmed.

AFFIRMED

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