UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte DAVID COPE and DAVID FISCHER

Appeal 2008-0949
Application 10/634,434[1]
Technology Center 2800

Decided: September 4, 2008

Before ROBERT E. NAPPI, MARC S. HOFF,
and KEVIN TURNER, *Administrative Patent Judges*.

HOFF, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF CASE

Appellants appeal under 35 U.S.C. § 134 from a Final Rejection of claims 1-20. We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

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[1] Application filed August 5, 2003. The real party in interest is Engineering Matters, Inc.

Appellants' invention relates to a DC mitigation system. A control circuit evaluates an amount of DC and/or harmonic AC in a transmission line. Switches are controlled to provide a current into a winding of a transformer. The current provided to the winding generates a magnetic flux that offsets a flux created by the DC in the transmission line (Spec. 4).

Claim 1 is exemplary:

1. A DC mitigation circuit, comprising:

a control circuit for evaluating an amount of DC current resulting from the DC in a transmission line; and

switches for providing a current into a winding of a transformer, said switches being controlled by said control circuit;

wherein said current provided to said winding generates a magnetic flux that offsets a flux created by said DC current resulting from the DC in said transmission line.

The prior art relied upon by the Examiner in rejecting the claims on appeal is:

Oliver	US 5,179,489	Jan. 12, 1993
Liu	US 5,521,487	May 28, 1996
Kern	US 6,282,104 B1	Aug. 28, 2001

M. Machmoum, *A Practical Approach To Harmonic Current Compensation By A Single-Phase Active Filter*, Sept. 19, 1995, pp. 1-6

Claims 1-5, 7, 8, and 12-20[2] stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Kern in view of Liu.

[2] Claims 19 and 20 are not included in the statement of rejection of claims 1-5, 7, 8, and 12-18 in the Final Rejection and the Examiner's Answer.

Claim 6 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Kern in view of Liu and Oliver.

Claims 9-11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Kern in view of Liu and Machmoum.

Appellants contend, inter alia, that neither Kern nor Liu teach mitigating DC on a *transmission line* (App. Br. 13); that Kern only mitigates *one cause* of DC on a transmission line (*id.*); that Kern in view of Liu fail to disclose or suggest generating a magnetic flux to offset the flux caused by DC current (App. Br. 14, Reply Br. 6); and that there is no motivation to combine Kern and Liu, because the person having ordinary skill in the art would not have employed the method of treating odd harmonics (from Liu) as an offset means in Kern to treat DC current (App. Br. 15).

Rather than repeat the arguments of Appellants or the Examiner, we make reference to the Brief (filed January 22, 2007), the Reply Brief (filed June 20, 2007), and the Answer (mailed April 20, 2007) for their respective details.

ISSUE

The principal issue in the appeal before us is whether the Examiner erred in holding that Kern in combination with Liu teaches switches for providing a current into a winding of a transformer, wherein the current provided to the winding generates a magnetic flux that offsets a flux created by the DC current resulting from the DC in the transmission line.

However, claims 19 and 20 are discussed within the body of the rejection, and Appellants raise no objection to the inclusion of claims 19 and 20 with that group of claims (since, in fact, Appellants argue all the claims together).

FINDINGS OF FACT

The following Findings of Fact (FF) are shown by a preponderance of the evidence.

The Invention

1. According to Appellants, the invention relates to a DC mitigation system. A control circuit evaluates an amount of DC and/or harmonic AC in a transmission line. Switches are controlled to provide a current into a winding of a transformer. The current provided to the winding generates a magnetic flux that offsets a flux created by the DC in the transmission line (Spec. 4).

2. Appellants' DC mitigation system provides "current to a winding of the transformer 1 to offset flux created by the DC or harmonic currents resulting from the DC" (Spec. 10:14-16), and "if the result output from the summing block 22 is not zero, then a signal indicating the amount of current necessary to offset the flux created by DC current in the primary winding 15 is amplified in block 23 and outputted to the H-bridge 24" (Spec. 8: 14-16).

Kern

3. Kern teaches a DC injection and even harmonics control system for connection between a power source and a utility and/or AC loads (col. 3).

4. Kern teaches a controller that operates a reference device 24 to adjust the DC offset in the reference signal on lead 62. Controller 40 may be designed to transmit a control signal that operates the reference device 24 to adjust the DC offset to minimize the magnitude of the current THD.

Controller 40 may also control the reference device 24 to minimize the magnitude of the second harmonic current into voltage transformer 26. These controller 40 actions serve to zero out the DC current injection entering the voltage transformer 26 (col. 10, ll. 3-17).

Liu

5. Liu teaches an active filter for filtering the current and improving the power factor of a single-phase overhead contact wire energized locomotive (col. 1).

6. Liu teaches the use of switches, as shown in elements bridge circuits 10 and 11 in Figure 1 for providing a current into a winding of a transformer (Fig. 1). Liu teaches that these switching elements may comprise IGBT transistors (col. 3, ll. 25-30) or GTO thyristors (col. 3, l. 36).

Oliver

7. Oliver teaches reducing the effects of large direct currents along electric power distribution systems by reducing the potential difference of the grounds, and by altering the magnetic circuit of power-line transformers in response to this direct current (col. 1).

Machmoum

8. Machmoum teaches simultaneous compensation of harmonic currents and fundamental reactive power by a voltage single-phase active filter (Abstract).

PRINCIPLES OF LAW

"Section 103 forbids issuance of a patent when 'the differences between the subject matter sought to be patented and the prior art are such

that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.'" *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1734, (2007). The question of obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of the prior art, (2) any differences between the claimed subject matter and the prior art, (3) the level of skill in the art, and (4) where in evidence, so-called secondary considerations. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18, (1966). *See also KSR*, 127 S.Ct. at 1734 ("While the sequence of these questions might be reordered in any particular case, the [*Graham*] factors continue to define the inquiry that controls.")

In *KSR*, the Supreme Court emphasized "the need for caution in granting a patent based on the combination of elements found in the prior art," *id.* at 1739, and discussed circumstances in which a patent might be determined to be obvious. In particular, the Supreme Court emphasized that "the principles laid down in *Graham* reaffirmed the 'functional approach' of *Hotchkiss*, 11 How. 248." *KSR*, 127 S.Ct. at 1739 (citing *Graham v. John Deere Co.*, 383 U.S. 1, 12 (1966) (emphasis added)), and reaffirmed principles based on its precedent that "[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results." *Id.* The Court explained:

> When a work is available in one form of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, § 103 likely bars its patentability. For the same reason, if a technique has been used to improve one device, and a person of ordinary

> skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.

Id. at 1740. The operative question in this "functional approach" is thus "whether the improvement is more than the predictable use of prior art elements according to their established functions." *Id.*

ANALYSIS

Claims 1-5, 7, 8, and 12-20

Appellants present a single set of arguments for all claims. We select claim 1 as representative of the group of claims rejected under 35 U.S.C. § 103(a) as being unpatentable over Kern in view of Liu, pursuant to our authority under 37 C.F.R. § 41.37(c)(1)(vii).

Appellants argue that neither Kern nor Liu teaches a control circuit for evaluating DC current on a transmission line, because neither patent is directed to transmission lines (App. Br. 13). We agree with the Examiner that this argument is not persuasive, because Appellants have not supplied a specific definition of "transmission line." Thus, the phrase may be construed broadly, as, for example, "the conduction path of power from a power source to a load and/or utility" (Ans. 9). Under this construction, the Examiner is correct that Kern teaches this limitation. Appellants' further argument that Kern has no means of determining the DC on a transmission line (App. Br. 14) fails for the same reason.

Appellants' argument that Kern's insertion of a transformer would not be workable for a transmission line arrangement (App. Br. 13) is not persuasive, as it is not germane to the claimed invention.

Appellants argue that Kern evaluates and mitigates *one cause* of DC current on a transmission line, rather than evaluating and mitigating the DC current on the transmission line (App. Br. 13). We are not persuaded by this argument, because (a) as noted *supra*, Kern *does* teach evaluating and mitigating DC on a transmission line (*see* FF 4), and (b) to the extent Appellants are suggesting that the prior art must evaluate and mitigate all causes of DC current on a transmission line, we observe that no such language is present in the claim.

Appellants further argue that neither Kern nor Liu teaches, discloses, or suggests generating a magnetic flux to offset the flux caused by DC current, as claim 1 requires (App. Br. 14). Appellants' argument, essentially, is that neither Kern nor Liu mention magnetic flux.

Claim 1 requires, in pertinent part, "switches for providing a current into a winding of a transformer … wherein said current provided to said winding generates a magnetic flux that offsets a flux created by said DC current resulting from the DC in said transmission line." It is clear, both from basic principles of physics and from Appellants' Specification and claims, that the magnetic flux existing in Appellants' system (and, therefore, in Kern and Liu) *inheres* from the existence of the DC current. Appellants' Specification discloses DC mitigation that "provides current to a winding of the transformer 1 to offset flux created by the DC or harmonic currents resulting from the DC," and "if the result output from the summing block 22 is not zero, then a signal indicating the amount of current necessary to offset the flux created by DC current in the primary winding 15 is amplified in block 23 and outputted to the H-bridge 24" (FF 2). Appellants'

Specification does not disclose any extra steps or equipment necessary to (produce a current that) generates a magnetic flux that offsets flux created by DC current. Appellants merely disclose providing current, because magnetic flux associated with that current is known to be inherent. Because we agree with the Examiner that Kern teaches providing offset current into a winding of a transformer (Ans. 4), we further agree with the Examiner that Kern's current generates a magnetic flux that offsets a flux created by the DC current existing on Kern's transmission line 42 (Fig. 1).

Appellants' final argument is that one skilled in the art would not combine Kern and Liu, because Liu is limited to a means for mitigating odd harmonics, and because the active filter in Liu would have no impact on DC current in the primary winding (App. Br. 15). We are not persuaded by Appellants' argument, because the Examiner relies on Liu only to show that one of ordinary skill in the art would recognize the use of switches as a known means to inject the DC offset signal in the transmission line (FF 6; Ans. 10), a subject on which Kern is silent. Liu is not relied up on to teach a particular mitigation scheme, nor an active filter. Appellants' argument is therefore not considered relevant to the rejection at issue.

Because we agree with the Examiner that Kern in combination with Liu teaches all the elements of the claimed invention, we do not find error in the Examiner's rejection of claim 1, nor that of claims 2-5, 7, 8, and 12-20 not separately argued, under 35 U.S.C. § 103(a).

Claims 6 and 9-11

The Examiner has separately rejected dependent claims 6 and 9-11, relying upon the teachings of Kern and Liu to teach the limitations of

independent claim 1 and the additional teachings of Oliver or of Machmoum to teach the limitations of claims 6 and 9-11, which ultimately depend upon claim 1. As discussed *supra*, Appellants present one argument directed to all claims on appeal by discussing the rejection as it applies to independent claim 1. Thus, Appellants' arguments with respect to these rejections are the same as presented with respect to claim 1, which (as discussed *supra*) are not persuasive of error. Accordingly, we sustain the Examiner's rejections of claims 6 and 9-11 under 35 U.S.C. § 103(a) for the reasons discussed above with respect to claim 1.

CONCLUSION OF LAW

We conclude that Appellants have not shown that the Examiner erred in rejecting claims 1-20. Claims 1-20 are not patentable.

DECISION

The Examiner's decision rejecting claims 1-20 is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

KIS

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