

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte VADIM GUTNIK and JERRELL P. HEIN

Appeal 2008-1983
Application 10/303,398
Technology Center 2819

Decided: July 23, 2008

Before MAHSHID D. SAADAT, JOHN A. JEFFERY, and KEVIN F.
TURNER, *Administrative Patent Judges*.

JEFFERY, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134 from the Examiner's
rejection of claims 1, 3, 8, 10-15, 21, 22, 24, and 25. Claims 2, 4-7, 9, 16-

20, and 23 have been indicated as containing allowable subject matter.¹ We have jurisdiction under 35 U.S.C. § 6(b). We reverse.

STATEMENT OF THE CASE

Appellants invented an integrated circuit (IC) with a compensation circuit that adjusts a slice level that is used to determine a binary (i.e., 0 and 1) threshold level for an incoming signal. The compensation is based on differences between the IC's internal resistance and a known resistance.²

Claim 12, the broadest independent claim on appeal, is illustrative:

12. A method comprising compensating a slice level used to determine a 0 and 1 threshold level for an incoming signal, according to a difference between an internal resistance (R_{INT}) and a predetermined resistance (R).

The Examiner relies on the following prior art references to show unpatentability:

¹ We presume this claim status due to an inconsistency in the status of the claims as noted by the Examiner and Appellants. Appellants indicate that claims 2, 4-7, 9, 11, 14-20, and 23 are not rejected, but rather contain allowable subject matter (App. Br. 1-2). Although the Examiner agreed with this claim status (Ans. 2), the Examiner nonetheless includes claims 11, 14, and 15 in the rejections on appeal (Ans. 3, 7). This inconsistency was also present in the Final Rejection. *Compare* Final Rej. 3, 8 (rejections including claims 11, 14, and 15) *with* Final Rej. 8 (indicating claims 11 and 14 as containing allowable subject matter). *But see* Final Rej. Office Action Summary Form (indicating claims 11 and 14-20 are objected to and not rejected).

² *See generally* Spec. ¶¶ 1010; Abstract.

Katsuma	US 5,469,068	Nov. 21, 1995
Nagaraj	US 6,041,084	Mar. 21, 2000
Kim	US 6,611,485 B2	Aug. 26, 2003 (filed Jul. 10, 2001)

1. Claims 1, 10-12, 21, 22, 24, and 25 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Nagaraj and Katsuma (Ans. 3-6).
2. Claims 3, 8,³ 10, 11 [sic],⁴ and 13-15 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Nagaraj, Katsuma, and Kim (Ans. 6-7).

Rather than repeat the arguments of Appellants or the Examiner, we refer to the Briefs and the Answer for their respective details. In this decision, we have considered only those arguments actually made by Appellants. Arguments which Appellants could have made but did not make in the Briefs have not been considered and are deemed to be waived. *See* 37 C.F.R. § 41.37(c)(1)(vii).

The Obviousness Rejection Over Nagaraj and Katsuma

We first consider the Examiner's obviousness rejection of claims 1, 10-12, 21, 22, 24, and 25 over Nagaraj and Katsuma. Regarding independent claim 24, Appellants argue that not only does the prior art fail

³ Although the Examiner omitted claim 8 from the statement of the rejection (Ans. 6), the Examiner nonetheless included claim 8 in the corresponding discussion pertaining to the rejection (Ans. 7). We therefore presume that the Examiner intended to include claim 8 in this rejection.

⁴ Since claims 10 and 11 were rejected over Nagaraj and Katsuma in Rejection (1) above, we presume the Examiner's rejection of these claims here was a typographical error.

to teach or suggest the recited termination resistance, it also fails to disclose a compensation circuit configured to generate a slice level according to a difference between first and second resistances, as claimed. Appellants emphasize that Nagaraj applies the offset voltage to the input of slicer 16 to center the applied signal to the slicer at a zero level, the reference therefore teaches away from the claimed compensation circuit that generates a slice level according to the difference in resistance values (App. Br. 5-7; Reply Br. 2-3).

Appellants add that the secondary reference to Katsuma fails to cure the deficiencies of Nagaraj. According to Appellants, not only is the image data in Katsuma not at a slice level, the reference is non-analogous art as it pertains to a thermal printer in which image data is corrected depending on each heating element's resistance (App. Br. 7-8). Moreover, Appellants contend, Katsuma's heating elements are controlled with an accuracy incompatible with the data transmission rates of Nagaraj and the references do not teach or suggest how to combine the high-frequency slice circuit of Nagaraj with the low-frequency heating element control of Katsuma (App. Br. 8-9).

Regarding independent claims 1, 12, 21, and 22, Appellants make similar arguments with respect to the failure of the cited prior art to teach or suggest the recited compensation technique based on the difference between resistances and the alleged improper rationale to combine the references (App. Br. 9-17).

The Examiner acknowledges that Nagaraj fails to adjust a slice level according to differences in resistance values, but maintains that such a feature would have been obvious to ordinarily skilled artisans in light of

Katsuma's teaching of signal compensation based on the difference between the actual and ideal resistance (Ans. 8-9). According to the Examiner, the references are combinable since they both pertain to compensation circuits that employ resistance elements (Ans. 9-10). The Examiner essentially reiterates this position with respect to independent claims 1, 12, 21, and 22 (Ans. 10-16).

ISSUE

The issue before us, then, is whether Appellants have shown that the Examiner erred in combining the respective teachings of Nagaraj and Katsuma to arrive at the invention recited in independent claims 1, 12, 21, 22, and 24. The issue turns on whether the prior art teaches or suggests compensating a slice level used to determine a 0 and 1 threshold level according to a difference between first and second resistances. The issue also turns on whether the references are properly combinable in the manner proposed by the Examiner. For the following reasons, we find Appellants have shown such an error.

FINDINGS OF FACT

"A slice level can be thought of as the threshold voltage at which an incoming signal is determined to be either a '1' bit or a '0' bit." (Spec. ¶ 1006.)

Nagaraj discloses a slicer circuit with a fixed threshold level for slicing and a variable offset voltage combined with the voltage level of a received binary signal to maintain the mid-point of the binary signal applied to the slicer at a fixed threshold slicing level (Nagaraj, Abstract; col. 1, ll.

40-45). This system, shown schematically in Figure 4, uses variable voltage sources 18 to ensure that the amplified output signal applied to the slicer 16 is always centered around zero, thus automatically optimizing slicing (Nagaraj, col. 5, ll. 8-22; Fig. 4).

To implement this functionality, the circuit of Figure 6 is used. In that circuit, converter 50 generates variable currents that are applied to two resistors 34P and 34N. The resulting variable voltages developed across these resistors are inputted to slicer 16 as additive and subtractive offset voltages, respectively (Nagaraj, col. 5, ll. 23-38; col. 6, ll. 23-33; Fig. 6).

Katsuma discloses a thermal printer that corrects image data calculated for each heating element based on differences between the actual and ideal resistance values for a particular heating element 49a-n (Katsuma, col. 7, ll. 33-50; Figs. 4, 7).

PRINCIPLES OF LAW

In rejecting claims under 35 U.S.C. § 103, it is incumbent upon the Examiner to establish a factual basis to support the legal conclusion of obviousness. *See In re Fine*, 837 F.2d 1071, 1073 (Fed. Cir. 1988). In so doing, the Examiner must make the factual determinations set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966).

Discussing the question of obviousness of a patent that claims a combination of known elements, *KSR Int'l v. Teleflex, Inc.*, 127 S. Ct. 1727 (2007), explains:

When a work is available in one field 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. *Sakraida* [v. *AG Pro, Inc.*, 425 U.S. 273 (1976)] and *Anderson's-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57 (1969)] are illustrative—a court must ask whether the improvement is more than the predictable use of prior art elements according to their established functions.

KSR, 127 S. Ct. at 1740. If the claimed subject matter cannot be fairly characterized as involving the simple substitution of one known element for another or the mere application of a known technique to a piece of prior art ready for the improvement, a holding of obviousness can be based on a showing that “there was an apparent reason to combine the known elements in the fashion claimed.” *Id.* at 1740-41. Such a showing requires “some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness. . . . [H]owever, the analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.” *Id.* at 1741 (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

If the Examiner’s burden is met, the burden then shifts to the Appellants to overcome the prima facie case with argument and/or evidence. Obviousness is then determined on the basis of the evidence as a whole and the relative persuasiveness of the arguments. *See In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992).

ANALYSIS

Nagaraj discloses a slicer circuit with a fixed threshold level for slicing and a variable offset voltage combined with the voltage level of a received binary signal to maintain the mid-point of the binary signal applied to the slicer at a fixed threshold slicing level (Nagaraj, Abstract; col. 1, ll. 40-45). This system, shown schematically in Figure 4, uses variable voltage sources 18 to ensure that the amplified output signal applied to the slicer 16 is always centered around zero, thus automatically optimizing slicing (Nagaraj, col. 5, ll. 8-22; Fig. 4).

To implement this functionality, the circuit of Figure 6 is used. In that circuit, converter 50 generates variable currents that are applied to two resistors 34P and 34N. The resulting variable voltages developed across these resistors are inputted to slicer 16 as additive and subtractive offset voltages, respectively (Nagaraj, col. 5, ll. 23-38; col. 6, ll. 23-33; Fig. 6).

Although we find that this circuit compensates a slice level at least with respect to centering the amplified output signal at a zero level, we do not find that this circuit achieves this compensation (or any other compensation) via a difference in resistances, as claimed. There is simply nothing in Nagaraj to suggest that the two resistors 34P and 34N—each labelled “RL” in Figure 6—would or should have different resistance values, let alone that the values of these resistances would be compared to each other or another resistance to compensate the slice level.

Indeed, the reference suggests just the opposite. As noted above, the variable offset voltages in Nagaraj are produced as a result of *variable currents* (generated by the converter 50) directed through the resistors. The values of these resistors therefore dictate the voltage developed across them.

But any difference in resistance values is simply not considered in this compensation technique, nor is it a factor accounted for in that technique. In fact, since the respective offset voltages produced by these resistors are complementary, ordinarily skilled artisans would recognize that these resistances would likely be the same—not different. That the label “RL” is used for each resistor in Figure 6 only reinforces our conclusion that they would likely have the same value of resistance.

The Examiner’s reliance on Katsuma to cure the deficiencies of Nagaraj is unavailing. Although Katsuma corrects image data calculated for each heating element based on differences between the actual and ideal resistance values for a particular heating element 49a-n in a thermal printer (Katsuma, col. 7, ll. 33-50; Figs. 4, 7), we fail to see why ordinarily skilled artisans would apply such a teaching to Nagaraj’s slice level compensation system.

First, Katsuma is non-analogous art. “Two separate tests define the scope of analogous prior art: (1) whether the art is from the same field of endeavor, regardless of the problem addressed and, (2) if the reference is not within the field of the inventor's endeavor, whether the reference still is reasonably pertinent to the particular problem with which the inventor is involved.” *In re Bigio*, 381 F.3d 1320, 1325 (Fed. Cir. 2004). Not only is Katsuma in a completely different field of endeavor (thermal printing), the reference is simply not reasonably pertinent to the particular problem with

which Appellants are involved, namely compensating for a slice level⁵ to reliably determine a binary signal threshold level in an integrated circuit.

Although both Nagaraj and Katsuma disclose compensation circuits with resistors as the Examiner indicates, Katsuma's resistors are electric heating elements in a thermal print head. As is well known in the art, the resistance of electric heating elements can vary⁶ due to, among other things, the heat generated by the heater itself (and adjacent heaters) that causes thermal expansion, degradation of the material of the electric heating element due to repeated heat-up and cool-down, etc.

We find nothing on this record suggesting that the variation in resistance typically encountered with electric heaters (e.g., heaters used in thermal printers) would reasonably be encountered in a signal processing circuit for slicing binary signals in a receiver such as disclosed by Nagaraj. While Nagaraj's resistors 34P and 34N are key components in that slice level compensation circuit, there is simply nothing to suggest that the differences between the values of these resistors (or some other resistance) would or should be accounted for. To somehow incorporate a heater compensation circuit to Nagaraj's binary slicing circuit (even if it could be done)⁷ to solve a problem that is not even contemplated by Nagaraj simply

⁵ "A slice level can be thought of as the threshold voltage at which an incoming signal is determined to be either a '1' bit or a '0' bit." (Spec. ¶ 1006.)

⁶ According to Katsuma, such resistance variation is about 5% (Katsuma, col. 1, ll. 59-60).

⁷ In this regard, we note that the Examiner has failed to rebut Appellants' contention that Katsuma's heating elements are controlled with an accuracy incompatible with the data transmission rates of Nagaraj and the references do not teach or suggest how to combine the high-frequency slice circuit of

strains reasonable limits and, in our view, is tantamount to hindsight reconstruction of the invention.

For the foregoing reasons, Appellants have persuaded us of error in the Examiner's rejection of independent claims 1, 12, 21, 22, and 24. Therefore, we will not sustain the Examiner's rejection of those claims, and dependent claims 10, 11, and 25 for similar reasons.

The Obviousness Rejection Over Nagaraj, Katsuma, and Kim

Regarding the rejection of dependent claims 3, 8, 10, 11, and 13-15, since we find that the disclosure to Kim does not cure the deficiencies noted above with respect to their respective independent claims, the obviousness rejection is also not sustained for the reasons noted above.

CONCLUSIONS OF LAW

Appellants have shown that the Examiner erred in combining the respective teachings of Nagaraj and Katsuma to arrive at the invention recited in the claims on appeal. Therefore, we conclude that the Examiner's obviousness rejections based on these references are in error.

Nagaraj with the low-frequency heating element control of Katsuma (App. Br. 8-9). In any event, even if such an argument were rebutted, we still find the Examiner's combination of references problematic for the reasons discussed in the opinion.

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DECISION

We have not sustained the Examiner's rejections with respect to any claims on appeal. Therefore, the Examiner's decision rejecting claims 1, 3, 8, 10-15, 21, 22, 24, and 25 is reversed.

REVERSED

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