UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte STEPHEN WU

Appeal 2007-3712
Application 10/846,860[1]
Technology Center 2800

Decided: June 26, 2008

Before ANITA PELLMAN GROSS, ROBERT E. NAPPI, and MARC S. HOFF, *Administrative Patent Judges*.

HOFF, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF CASE

Appellant appeals under 35 U.S.C. § 134 from a Final Rejection of claims 1, 2, 5-10, and 13-17.[2] We have jurisdiction under 35 U.S.C. § 6(b).

We affirm-in-part.

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[1] Application filed May 17, 2004. The real party in interest is Broadcom Corporation.

[2] Claims 3, 4, 11, and 12 remain pending and stand objected to as dependent on a rejected base claim, but would be allowable if rewritten in independent form.

Appellant's invention relates to a charge pump interlinked with an auxiliary charge pump, which improves the linearity of the charge pump current by improving the accuracy of the amount of charge charged or discharged by the charge pump as a proportion of the phase difference between reference and oscillation clocks. Improving the charge pump linearity improves the phase noise of the output clock (Spec. 1-2).

Claims 1 and 6 are exemplary:

1. A method, comprising:
providing a first and a second interlinked charge pump;
supplying an auxiliary bias current at the first pump; and
generating a charge proportional to a phase difference between a VCO and a reference clock in a PLL,
wherein the first and second interlinked charge pumps are substantially identical, and
wherein the first and second interlinked charge pumps are configured to permit a current through both the first and the second interlinked charge pump simultaneously.

6. The method of claim 1, wherein the PLL includes a fractional-N PLL.

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

Narahara	US 5,886,551	Mar. 23, 1999
Park	US 2003/0107419 A1	Jun. 12, 2003
Maeda	US 6,914,464 B2	Jul. 5, 2005

Claims 1, 2, 5, 8-10, 13, and 16 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Park.

Claims 1, 7, 9, and 15 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Narahara.

Claims 6, 14, and 17 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Park.

Appellant contends that neither Park nor Narahara teaches first and second interlinked charge pumps that are substantially identical, and that the Examiner has failed to establish why the person having ordinary skill in the art would have modified Park to include a fractional frequency divider.

Rather than repeat the arguments of Appellant or the Examiner, we make reference to the Brief (filed November 13, 2006), the Reply Brief (filed March 19, 2007) and the Answer (mailed March 1, 2007) for their respective details.

ISSUES

There are two principal issues in the appeal before us.

The first issue is whether the Examiner erred in holding that Park teaches first and second interlinked charge pumps that are substantially identical.

The second issue is whether the Examiner erred in holding that Narahara teaches first and second interlinked charge pumps configured to permit a current through both interlinked charge pumps simultaneously.

FINDINGS OF FACT

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

The Invention

1. According to Appellant, he has invented a charge pump having improved linearity of the charge pump current due to improved accuracy of the amount of charge charged or discharged by the charge pump as a proportion of the phase difference between reference and oscillation clocks. Improving the charge pump linearity improves the phase noise of the output clock (Spec. 1-2).

2. Appellant's invention refers to a single "charge pump" 120, which is actually made up of a "first or primary" pump 200 and a "second or auxiliary" pump 210 (Spec. 5).

Park

3. Park teaches a charge pump circuit which includes an input circuit to charge and discharge a voltage associated with an output terminal in response to a first input signal. The device also includes a dummy input circuit responsive to a second input signal (the inverted version of the first input signal) to reduce jitter in the voltage associated with the output terminal (para. [0029]).

4. Park's "charge pump circuit," illustrated at Figure 4, includes an input unit 210 for charging or discharging an electric charge, and a dummy input unit 220, "which has the identical configuration of the input unit for inversely switching signals of the input unit" (para. [0041]; Fig. 4).

5. Input unit 210 and dummy input unit 220 are identically configured, except for transistors C1 and C2 in unit 220, which are connected to function as capacitors (Fig. 4; para. [0048]).

6. Park teaches that capacitors C1 and C2 are "compensating capacitors" for "symmetrically forming a parasitic capacitance of the input unit 210 and 220", or "making the size of the parasitic capacitors identical" (para. [0048] and [0051]).

Narahara

7. Narahara teaches a charge pump circuit which substantially eliminates the influence of parasitic capacitance based on the concept that the charge stored in the parasitic capacitor be canceled out (col. 4, ll. 12-16).

8. In Narahara's charge pump circuit, when transistors 74 and 83 are both on, a current I_{P2} will pass through transistor 74 of main circuit block 70, while a current I_{P3} passes through transistor 83 of excess current cancel block 80 (Fig. 11).

9. As admitted by the Examiner, I_{P3} is smaller than I_{P2} (col. 7, l. 23).

Maeda

10. Maeda teaches a phase locked loop including a fractional frequency divider (Fig. 1).

Dictionary definitions

11. "Substantial" is defined, in pertinent part, as

> 1. of ample or considerable amount, quantity, size, etc.: a substantial sum of money.
> 2. of a corporeal or material nature; tangible; real.
> 3. of solid character or quality; firm, stout, or strong: a substantial physique.

4. basic or essential; fundamental: two stories in substantial agreement.

substantial. (n.d.). *Dictionary.com Unabridged (v 1.1)*. Retrieved June 17, 2008, from Dictionary.com website: http://dictionary.reference.com/browse/substantial

12. "Essential" is defined, in pertinent part, as

1. absolutely necessary; indispensable: Discipline is essential in an army.
2. pertaining to or constituting the essence of a thing.
3. noting or containing an essence of a plant, drug, etc.

essential. (n.d.). *Dictionary.com Unabridged (v 1.1)*. Retrieved June 17, 2008, from Dictionary.com website: http://dictionary.reference.com/browse/essential

PRINCIPLES OF LAW

Anticipation is established when a single prior art reference discloses expressly or under the principles of inherency each and every limitation of the claimed invention. *Atlas Powder Co. v. IRECO, Inc.*, 190 F.3d 1342, 1347 (Fed. Cir. 1999); *In re Paulsen*, 30 F.3d 1475, 1478-79 (Fed. Cir. 1994).

In rejecting claims under 35 U.S.C. § 103, the Examiner bears the initial burden of establishing a prima facie case of obviousness. *In re Piasecki*, 745 F.2d 1468, 1472 (Fed. Cir. 1984). The Examiner can satisfy this burden by showing some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness. *KSR Int'l. v. Teleflex Inc.*, 127 S. Ct. 1727, 1741 (2007) (*citing In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)). Only if this initial burden is met does the burden of coming forward with evidence or argument shift to the Appellant. *Piasecki*, 745 F.2d at 1472. Thus, the Examiner must not only assure that the requisite

findings are made, based on evidence of record, but must also explain the reasoning by which the findings are deemed to support the Examiner's conclusion.

During *ex parte* prosecution, claims must be interpreted as broadly as their terms reasonably allow since Applicants have the power during the administrative process to amend the claims to avoid the prior art. *In re Zletz*, 893 F.2d 319, 322 (Fed. Cir. 1989).

ANALYSIS

The § 102 rejection over Park

We select claim 1 as representative of this group, pursuant to our authority under 37 C.F.R. § 41.37(c)(1)(vii).

Appellant argues that Park does not teach two substantially identical charge pumps; that Park's two charge pumps are not identical because they have different names; that the two charge pumps are not structurally substantially identical because unit 220 contains capacitors C1 and C2 not present in unit 210; and that the two charge pumps are not functionally substantially identical because dummy input unit 220 (Br. 8-10) "is an additional unit for the stable operation of the input unit 210" (Br. 10 quoting Park, para. [0050]).

We are not persuaded by Appellant's arguments. Park describes Figure 4 as "a diagram of a charge pump circuit" (para. [0041]). That circuit includes an input unit 210 for charging or discharging an electric charge (FF 4). Park's charge pump circuit further comprises a dummy input unit 220, "which has the identical configuration of the input unit 210 for inversely switching signals of the input unit 210" (*Id.*). One may readily see by

inspecting Figure 4 that units 210 and 220 are identically configured, except for transistors C1 and C2 in unit 220, which are connected to function as capacitors (FF 5). Further, the Examiner correctly points out that Appellant discloses a single "charge pump" 120 in Figure 2, which itself comprises "a first or primary pump 200 and a second or auxiliary pump 210" (FF 2). We find that the Examiner did not err in characterizing unit 210 and 220 as first and second charge pumps.

Appellant's argument that Park's charge pumps are not substantially identical because they have different names (Br. 9-10) is not persuasive. A patent applicant is permitted to be his own lexicographer, and prior inventors may have had valid reasons for calling substantially identical circuits by different names.

We agree with Appellant that Park's charge pumps 210 and 220 are not identical circuits, because "dummy input unit 220" includes transistors C1 and C2, connected as capacitors (FF 5). We observe that during prosecution, Appellant could have chosen to claim "identical" charge pumps, but made the choice to claim "substantially identical" charge pumps instead. The term "substantially" clearly leaves room for *some* difference between the two things being compared. From the dictionary definition of the word "substantial," definition #8 appears to be most pertinent: "of or pertaining to the essence of a thing; essential, material, or important" (FF 11). The word "essential" is defined as "absolutely necessary; indispensable" (FF 12). Taking these definitions together, Claim 1 thus requires first and second interlinked charge pumps that are identical with regard to those things that are absolutely necessary or indispensable.

Appellant's arguments have not persuaded us that Park's interlinked charge pumps are not identical with regard to "absolutely necessary" elements. Appellant has only established that that units 210 and 220 are not *completely* identical, due to the presence of capacitors C1 and C2 in unit 220 (FF 5). We agree with the Examiner's position that Park's charge pumps are identical with respect to absolutely necessary elements, in that both units teach the same transistors, interconnected in the same way.

Appellant alleges that Park paragraphs [0048] and [0051] emphasize the importance of capacitors C1 and C2 (Br. 10). Park paragraphs [0048] and [0051] teach, however, that capacitors C1 and C2 are "compensating capacitors" for "symmetrically forming a parasitic capacitance of the input unit 210 and 220", or "making the size of the parasitic capacitors identical" (FF 6). Park teaches, therefore, that capacitors C1 and C2 are included in "dummy input unit" 220 to provide a discrete capacitance that is *identical* to the parasitic capacitance present in unit 210. We find, therefore, that Park's two charge pumps 210 and 220, while not structurally identical, are structurally and functionally *substantially* identical, because the added elements C1 and C2 serve to make the two circuits function more like each other.

Because we are not persuaded that Park does not teach first and second interlinked charge pumps that are substantially identical, we do not find error in the Examiner's rejection of claim 1, nor that of claims 2, 5, 8-10, 13, and 16 not separately argued, under 35 U.S.C. § 102.

The § 102 rejection over Narahara

We select claim 1 as representative of this group, pursuant to our authority under 37 C.F.R. § 41.37(c)(1)(vii).

Appellant argues that the Examiner erred in rejecting claim 1 as anticipated by Narahara because (a) Narahara does not teach two substantially identical charge pumps (Br. 15), and (b) the charge pumps of Narahara are not configured to permit "a current" (i.e., the same current) through both charge pumps simultaneously (Br. 16).

Notwithstanding the Examiner's failure to explain the rejection in detail, we are not persuaded that Narahara's charge pumps 70 and 80 are not identical, since an inspection of Figure 11 suggests that the circuitry of the two elements is the same. We do agree with Appellant, however, that Narahara does not teach that the same current flows through both charge pumps simultaneously. As noted by Appellant, when transistors 74 and 83 are both on, a current I_{P2} will pass through transistor 74 of main circuit block 70, while a current I_{P3} passes through transistor 83 of excess current cancel block 80 (FF 8; Reply Br. 9-10). It is admitted by the Examiner that I_{P3} is smaller than I_{P2} (Ans. 6; FF 9). Because non-equal currents flow through the two charge pumps of Narahara, Narahara does not teach permitting a current through both simultaneously.

We therefore find error in the Examiner's rejection of claims 1, 7, 9, and 15 under 35 U.S.C. § 102 as anticipated by Narahara.

The § 103 rejection of claims 6, 14, and 17

The Examiner argues that it would have been obvious to modify the "general" frequency divider of Park to include a fractional frequency

divider, in order to meet the claim recitation of a "fractional-N PLL." We agree with Appellant, however, that the Examiner has failed to establish a motivation for the person having ordinary skill in the art to make the modification. The Examiner's proffered motivation that the proposed modification would have been obvious "for the purpose of providing a fractional relationship between the input signal and output signal" (Ans. 5) amounts only to a statement that it would have been obvious to provide the element in order to do what the element does, as contrasted with a reason why the skilled artisan would have found the element's function desirable. In the absence of such motivation, the Examiner's citation of Maeda in the Answer, as evidence that fractional frequency dividers are well known in the art, is not persuasive.

We therefore find error in the Examiner's rejection of claims 6, 14, and 17 under 35 U.S.C. § 103.

CONCLUSION

We conclude that Appellant has not shown that the Examiner erred in rejecting claims 1, 2, 5, 8-10, 13, and 16. Claims 1, 2, 5, 8-10, 13, and 16 are not patentable.

We conclude that Appellant has shown that the Examiner erred in rejecting claims 6, 7, 14, 15, and 17. On the record before us, claims 6, 7, 14, 15, and 17 have not been shown to be unpatentable.

DECISION

The Examiner's rejection of claims 1, 2, 5, 8-10, 13, and 16 is affirmed. The Examiner's rejection of claims 6, 7, 14, 15, and 17 is reversed.

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-IN-PART

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