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EXAMINER
CHANG, KENT WU

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte IGOR KRAVETS, ROMAN OGIRKO, HANS KLEIN, and OLEKSANDR HOSHTANAR

Appeal 2018-004796
Application 14/978,442[1]
Technology Center 2600

Before JAMES R. HUGHES, NORMAN H. BEAMER, and SCOTT B. HOWARD, *Administrative Patent Judges*.

HUGHES, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellants seek our review under 35 U.S.C. § 134(a) of the Examiner's final decision rejecting claims 1–14, which constitute all the claims pending in this application. Claims 15–20 have been withdrawn from

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[1] The application on appeal has an effective filing date of Sept. 9, 2015. Therefore, the Leahy-Smith America Invents Act (AIA) amendments to the U.S. Code (§§ 102, 103) are applicable. See MPEP § 2159.02 (9th ed. 2018) (the amended sections "apply to any patent application that contains . . . a claimed invention that has an effective filing date that is on or after March 16, 2013."

consideration. Final Act. 1; Appeal Br. 1.[2, 3] We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

Appellants' Invention

The invention "relates generally to fingerprint sensing, and more particularly to the construction and use of a fingerprint sensing array." Spec. ¶ 2. More specifically, the invention relates to differential capacitance measurement circuits and methods for measuring a capacitance in a half-bridge circuit comprising a first mutual capacitor and a second mutual capacitor coupled to a first input of an amplifier, and a listener electrode coupled to a second input of the amplifier. *See* Spec. ¶¶ 5–7; Abstract.

Representative Claims

Independent claims 1 and 9, reproduced below, further illustrate the invention:

> 1. A differential capacitance measurement circuit comprising:
>
> a half-bridge circuit comprising a first mutual capacitor and a second mutual capacitor coupled to a first input of an amplifier; and

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[2] We refer to Appellants' Specification ("Spec.") filed Dec. 22, 2015 (claiming benefit of US 62/216,253 and US 62/216,241 both filed Sept. 9, 2015), Appeal Brief ("Appeal Br.") filed Aug. 21, 2017, Supplemental Appeal Brief ("Supp. Appeal Br.") filed Oct. 19, 2017, and Reply Brief ("Reply Br.") filed Apr. 5, 2018. We also refer to the Examiner's Final Office Action (Final Rejection) ("Final Act.") mailed Dec. 20, 2016, and Answer ("Ans.") mailed Feb. 7, 2018.

[3] Appellants' Appeal Brief lacks page numbers. We reference the Appeal Brief as if numbered sequentially beginning with the page having the "**REAL PARTY IN INTEREST**" heading numbered as page 2.

a listener electrode coupled to a second input of the amplifier.

9. A method for measuring a capacitance comprising:

receiving a first signal derived from the capacitance on a receive node, the receive node coupled to a first input of an amplifier;

receiving a second signal derived from a buried capacitance on the receive node;

receiving a third signal on a listener electrode, the listener electrode coupled to a second input of the amplifier;

generating a differential output of the amplifier;

converting the differential output of the amplifier to a digital value representative of the capacitance.

Rejections on Appeal

1. The Examiner rejects claims 1 and 8 under 35 U.S.C. § 102(a)(1) as being anticipated by Benkley, III (US 2013/0009651 A1, published Jan. 10, 2013) (hereinafter "Benkley 1"). *See* Final Act. 4–5.

2. The Examiner rejects claims 4, 6, and 7 under 35 U.S.C. § 103 as being unpatentable over Benkley 1 and Benkley, III (US 2003/0035570 A1, published Feb. 20, 2003) (hereinafter "Benkley 2"). *See* Final Act. 5–8.

3. The Examiner rejects claim 5 under 35 U.S.C. § 103 as being unpatentable over Benkley 1, Benkley 2, and Gozzini (US 8,115,497 B2, issued Feb. 14, 2012). *See* Final Act. 8–9.

4. The Examiner rejects claims 2 and 3 under 35 U.S.C. § 103 as being unpatentable over Benkley 1, Benkley 2, and Bird et al. (US 6,108,438, issued Aug. 22, 2000) (hereinafter "Bird"). *See* Final Act. 9–11.

5. The Examiner rejects claims 9 and 11–13 under 35 U.S.C. § 103 as being unpatentable over Benkley 1 and Kalnitsky et al. (US 2003/0035572 A1, published Feb. 20, 2003) (hereinafter "Kalnitsky"). *See* Final Act. 11–12.

6. The Examiner rejects claim 10 under 35 U.S.C. § 103 as being unpatentable over Benkley 1, Kalnitsky, and Bird. *See* Final Act. 12–13.

7. The Examiner rejects claim 14 under 35 U.S.C. § 103 as being unpatentable over Benkley 1, Kalnitsky, and Benkley 2. *See* Final Act. 13–14.

ISSUES

Based upon our review of the record, Appellants' contentions, and the Examiner's findings and conclusions, the issues before us are as follows:

1. Did the Examiner err in finding Benkley 1 discloses "a half-bridge circuit comprising a first mutual capacitor and a second mutual capacitor coupled to a first input of an amplifier," as recited in Appellants' claim 1?

2. Did the Examiner err in finding that the combination of Benkley 1 and Kalnitsky collectively would have taught or suggested "receiving a second signal derived from a buried capacitance on the receive node" as recited in Appellants' claim 9?

ANALYSIS

The 35 U.S.C. § 102 Rejection of Claims 1 and 8

The Examiner rejects independent claim 1 as anticipated by Benkley 1. *See* Final Act. 4–5; Ans. 2–6. The Examiner finds that Benkley 1 describes a half-bridge circuit including "a first mutual capacitor ([t]he

capacitance generated by 902n and 906n) and a second mutual capacitor ([t]he capacitance generated by [a second instance] . . . of 902n and 906n) coupled to a first input of an amplifier (980, Fig. 9c)" (Final Act. 5). *See* Final Act. 4–5; Ans. 2–6 (citing Benkley 1, Fig. 9c). The Examiner explains that Benkley 1 describes the mutual capacitances (first mutual capacitor and second mutual capacitor) as being "'coupled' to the input of [the] differential amplifier, albeit separately at different stages." Ans. 2. The Examiner further explains that Appellants' claim 1 does not require the mutual capacitors to be "'directly electrically coupled'" (Ans. 3)—the Examiner distinguishes "coupled" from "directly electrically coupled," i.e., simultaneously electrically connected. *See* Ans. 2–6.

Appellants[4] contend that Benkley 1 does not anticipate the disputed features of claim 1. *See* Appeal Br. 9–13; Reply Br. 2–6. More specifically, Appellants contend that Benkley 1 "discloses neither a 'half-bridge circuit' nor a half-bridge circuit 'comprising a first mutual capacitor and a second mutual capacitor' as claimed" (Appeal Br. 11 (quoting claim 1)) because there is only one capacitance/capacitor coupled to the amplifier at any time —"[t]here are no other capacitances coupled to the input of differential amplifier 980. All other analog switches are opened and all other buffer power switches are coupled to ground" (Appeal Br. 13; *see* Appeal Br. 12–13 (citing Benkley 1 Fig. 9c and ¶ 122)).

We agree with Appellants that the Examiner's interpretation of claim 1 and Benkley 1 are unreasonable, and that the Examiner does not explain sufficiently how the cited portions of Benkley 1 disclose the disputed

[4] According to Appellants, the real party in interest is Cypress Semiconductor Corp. Appeal Br. 4.

features—a first mutual capacitor and a second mutual capacitor coupled to an amplifier input. Benkley 1 explains that only one mutual capacitance is connected to the Differential Amplifier (980) through Buffer (982) and Analog Switch (930) at any one time. *See* Benkley 1 ¶ 122; Fig. 9c. Appellants' Specification describes the "half-bridge circuit," as including "a first mutual capacitor" and "a second mutual capacitor" connected or "coupled" to a differential amplifier input at the same time. Spec. ¶ 5; *see* Spec ¶¶ 23–26. According to Appellants' Specification the half-bridge circuit includes matching mutual capacitances (capacitors) electrically connected to a differential amplifier input such that the circuit output is (ideally) zero. *See* Spec ¶¶ 23–26. The Examiner does not interpret Appellants' claim 1 in view of Appellants' Specification, resulting in an unreasonably broad interpretation of the disputed claim limitation.

Consequently, we are constrained by the record before us to find that the Examiner erred in finding Benkley 1 anticipates Appellants' claim 1. Dependent claim 8 depends from and stands with claim 1. Accordingly, we do not sustain the Examiner's anticipation rejection of claims 1 and 8.

The 35 U.S.C. § 103 Rejection of Claims 9 and 11–13

The Examiner rejects independent claim 9 as obvious in view of Benkley 1 and Kalnitsky. *See* Final Act. 11–12; Ans. 6–7. The Examiner finds that Benkley 1 does not describe a buried capacitance and relies, instead, on Kalnitsky as teaching "a buried capacitor plates system" (Final Act. 11). *See* Final Act. 11–12; Ans. 6–7 (citing Kalnitsky ¶¶ 28, 44).

Appellants contend that Benkley 1 and Kalnitsky do not describe the disputed features of claim 9—namely the buried capacitance. *See* Appeal Br. 13–18; Reply Br. 6–8. Appellants further contend the Specification (*see*

Spec. ¶ 24) explains that a "buried capacitance" not only requires that the electrodes be "buried," but that the capacitance does not change due to an external influence. *See* Appeal Br. 13–18; Reply Br. 6–8 (citing Spec. ¶ 24).

We agree with the Appellants that the Specification defines the "buried capacitance" recited in Appellants' claim 9. When read in context with the claim language and Appellants' description of the circuit in the Specification (*see* Spec ¶¶ 23–26), the buried capacitance must be arranged such that it does not change when a conductive object is placed near the electrode array—that is, in the vicinity of the buried electrodes that form the buried capacitance. Even if we were to accept the Examiner's definition of a buried capacitance—as reading on Kalnitsky's "dielectric-buried capacitor plates" (Ans. 6; *see* Final Act. 11–12 and Ans. 6–7 (citing Kalnitsky ¶ 28, 44)), the Examiner does not sufficiently explain how the buried capacitance/capacitor of Kalnitsky would have been incorporated with the circuit of Benkley 1 (*see supra*) to meet the disputed claim 9 features.

Consequently, we are constrained by the record before us to find that the Examiner erred in concluding that the combination of Benkley 1 and Kalnitsky renders obvious Appellants' independent claim 9. Dependent claims 11–13 depend from and stand with independent claim 9. Accordingly, we do not sustain the Examiner's obviousness rejection of claims 9 and 11–13.

The 35 U.S.C. § 103 Rejection of Claims 2–7, 10, and 14

The Examiner rejects dependent claims 2–7 as obvious in view of Benkley 1 in combination with additional references (claims 2 and 3 are rejected over Benkley 1, Benkley 2, and Bird; claims 4, 6, and 7 are rejected over Benkley 1 and Benkley 2; and claim 5 is rejected over Benkley 1,

Benkley 2, and Gozzini). *See* Final Act. 5–11. The Examiner rejects dependent claims 10 and 14 over Benkley 1 and Kalnitsky in combination with additional references (claim 10 is rejected over Benkley 1, Kalnitsky, and Bird; and claim 14 is rejected over Benkley 1, Kalnitsky, and Benkley 2). *See* Final Act. 12–14.

With respect to claims 2–7 the Examiner relies on the same reasoning as claim 1 (*supra*). *See* Final Act. 5–11. The Examiner does not address, in the Examiner's Answer, Appellants' arguments with respect to these dependent claims. *See* Ans. 2–7; Appeal Br. 19–21. Based on the Examiner's improper interpretation of claim 1 (*supra*), we find the Examiner does not explain in sufficient detail how the additional cited references overcome or cure the aforementioned deficiency of Benkley 1.

With respect to claims 10 and 14 the Examiner relies on the same reasoning as claim 9 (*supra*). *See* Final Act. 12–14. The Examiner does not address, in the Examiner's Answer, Appellants' arguments with respect to these dependent claims. *See* Ans. 2–7; Appeal Br. 18–19. The Examiner has not established on this record that the additional cited references overcome or cure the aforementioned deficiency of the Benkley 1 and Kalnitsky combination.

CONCLUSIONS

Appellants have shown that the Examiner erred in rejecting claims 1 and 8 under 35 U.S.C. § 102(a)(1).

Appellants have shown that the Examiner erred in rejecting claims 2–7 and 9–14 under 35 U.S.C. § 103.

DECISION

We reverse the Examiner's rejections of claims 1–14.

REVERSED