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EXAMINER	
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BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte ALEKSEY S. KHENKIN, FARIBORZ ASSADERAGHI, and PETER CORNELIUS

Appeal 2019-000735
Application 14/293,502
Technology Center 2600

Before JAMES R. HUGHES, CATHERINE SHIANG, and JASON J. CHUNG, *Administrative Patent Judges*.

HUGHES, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Claims 1–25 are pending, stand rejected, are appealed by Appellant,[1] and are the subject of our decision under 35 U.S.C. § 134(a). *See* Non-Final Act. 1; Appeal Br. 3.[2] We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

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[1] We use the word Appellant to refer to "applicant" as defined in 37 C.F.R. § 1.42(a). Appellant identifies the real party in interest as InvenSense Inc. *See* Appeal Br. 2.

[2] We refer to Appellant's Specification ("Spec."), filed June 2, 2014; Appeal Brief ("Appeal Br."), filed Feb. 8, 2018; and Reply Brief ("Reply Br."), filed Nov. 6, 2018. We also refer to the Examiner's Non-Final Office Action ("Non-Final Act."), mailed Sept. 8, 2017; and Answer ("Ans.") mailed Sept. 6, 2018.

CLAIMED SUBJECT MATTER

The invention "relates to microelectromechanical systems (MEMS) sensors." Spec. ¶ 1. More specifically, Appellant's invention relates to sensors, microphone packages, and methods implementing a MEMS acoustic sensor with a digital signal processor (DSP) located in a back cavity (with the acoustic sensor) that generates a control signal and calibrates the MEMS acoustic sensor. *See* Spec. ¶¶ 7–8; Abstract. Claims 1, 14, and 18 are independent. Claim 1, reproduced below, is illustrative of the claimed subject matter:

> 1. A sensor, comprising:
>
> a microelectromechanical systems (MEMS) acoustic sensor configured to generate an audio signal and associated with a back cavity;
>
> *a digital signal processor (DSP) located in the back cavity* and *configured to generate a control signal*, comprising at least one of an interrupt control signal or an Inter-Integrated Circuit (I2C) signal and separate from the audio signal, for a system processor external to the MEMS acoustic sensor, in response to receiving a signal from the MEMS acoustic sensor, wherein the control signal is based at least in part on the audio signal, *and wherein the DSP is configured to calibrate the MEMS acoustic sensor*; and
>
> a package comprising a lid and a package substrate, wherein the package has a port adapted to receive acoustic waves, and wherein the package houses the MEMS acoustic sensor and defines the back cavity associated with the MEMS acoustic sensor.

Appeal Br. 59 (Claims App.) (emphasis added).

REFERENCES

The prior art relied upon by the Examiner is:

Name	Reference	Date
Shuster	US 2008/0274395 A1	Nov. 6, 2008
Suvanto et al. ("Suvanto")	US 2010/0183174 A1	July 22, 2010
Ochs et al. ("Ochs")	US 2014/0072151 A1	Mar. 13, 2014
Furst et al. ("Furst")	US 2014/0348345 A1	Nov. 27, 2014

REJECTIONS[3]

1. The Examiner rejects claims 1–7, 12–14, 18–21, 24, and 25 under 35 U.S.C. § 103 as being unpatentable over Ochs, Suvanto, and Furst. *See* Non-Final Act. 3–9.

2. The Examiner rejects claims 8–11, 15–17, 22, and 23 under 35 U.S.C. § 103 as being unpatentable over Ochs, Suvanto, Furst, and Shuster. *See* Final Act. 9–11.

ANALYSIS

Obviousness Rejection of Claims 1–7, 12–14, 18–21, 24, and 25

The Examiner rejects independent claim 1 (as well as independent claims 14 and 18, and dependent claims 2–7, 12, 13, 19–21, 24, and 25) as being obvious over Ochs, Suvanto, and Furst. *See* Final Act. 3–9; Ans. 11–13. Appellant contends that Ochs, Suvanto, and Furst do not teach the disputed limitations of claim 1. *See* Appeal Br. 12–25; Reply Br. 2–9. Specifically, Appellant contends, *inter alia*, that Furst does not teach a DSP (located in the back cavity) configured to calibrate the MEMS acoustic sensor—"Furst describes first processing with ASIC 304, . . . and then

[3] The Leahy-Smith America Invents Act ("AIA"), Pub. L. No. 112–29, 125 Stat. 284 (2011), amended 35 U.S.C. § 103. Because the present application has an effective filing date (June 2, 2014) after the AIA's effective date, this decision refers 35 U.S.C. § 103.

second or subsequent processing with DSP block 504." "[I]t is Furst'[s] second processing with DSP block 504 that is cited as disclosing the DSP is configured to calibrate the MEMS acoustic sensor." "[N]either Furst's first processing via ASIC 304, nor its second or subsequent processing with DSP block 504, can be said to disclose or render obvious the DSP is configured to calibrate the MEMS acoustic sensor, as recited in independent claim 1." Appeal Br. 15 (emphasis omitted); *see* Appeal Br. 12–25; Reply Br. 2–9.

We agree with Appellant that the Examiner-cited portions of Furst (*see* Furst ¶¶ 39, 40, 43, 45; Figs. 1, 3–5) do not teach or suggest a DSP located in the back cavity with a MEMS acoustic sensor and the DSP being configured to calibrate the MEMS acoustic sensor as required by Appellant's claim 1. *See* Appeal Br. 12–25; Reply Br. 2–9. It is unclear from the Examiner's rejection if (and how) any of Furst's components calibrate the MEMS chip (*see* Fig. 3, element 302) because the charge pump (CHP) (*see* Fig. 4, element 402) in the ASIC (*see* Fig. 3, element 304; Fig. 4, element 400) charges the MEMS, but the cited portions of Furst don't explicitly describe any adjustment of the MEMS. There is no mention of any other input from the ASIC to the MEMS in the cited portions of Furst's disclosure, much less calibration of the MEMS. Further, the Examiner's rejection explicitly utilizes two components—the ASIC (*see* Fig. 3, element 304) in the microphone (*see* Figs. 1 and 3, elements 102, 300) and the DSP (*see* Fig. 5, element 504) in the host (*see* Figs. 1 and 5, elements 104, 500)—to control CHP that charges the MEMS. Neither the ASIC, nor the DSP are explicitly described as performing calibration in the cited portions of the reference. And, the Examiner cited portions of Furst do not describe the host as being located in a back cavity with the MEMS. The Examiner does

not explain sufficiently how the cited portions of Furst in combination with Ochs and Suvanto at least suggest the disputed features of DSP calibrating the MEMS as required by claim 1.[4]

Consequently, we are constrained by the record before us to find that the Examiner erred in finding that the combination of Ochs, Suvanto, and Furst renders obvious Appellant's claim 1. Independent claims 14 and 18 include limitations of commensurate scope. Claims 2–7, 12, 13, 19–21, 24, and 25 depend from and stand with their respective base claims.

Obviousness Rejection of Claims 8–11, 15–17, 22, and 23

The Examiner rejects dependent claims 8–11, 15–17, 22, and 23 under 35 U.S.C. § 103 as being obvious over Ochs, Suvanto, Furst, and Shuster. *See* Non-Final Act. 9–11.

The Examiner does not suggest Shuster cures the deficiencies of Furst (in combination with Ochs and Suvanto) (*supra*). Therefore, we reverse the Examiner's obviousness rejection of dependent claims 8–11, 15–17, 22, and 23 for the same reasons set forth for claim 1 (*supra*).

[4] Our decision should not be construed as concluding that the calibration of a microphone or MEMS acoustic sensor would not have been obvious to a person of ordinary skill in the relevant art. Indeed, Shuster appears to teach calibration. *See e.g.*, Shuster Abstract ("A composite battery capable of adjusting its own power output in response to predetermined signals"). We leave it to the Examiner, in the event of further prosecution, to determine if the calibration of a microphone or MEMS acoustic sensor would have been obvious in view of the knowledge in the art at the time of the instant application.

CONCLUSION

Appellant has shown that the Examiner erred in rejecting claims 1–25 under 35 U.S.C. § 103. We, therefore, do not sustain the Examiner's rejection of claims 1–25.

DECISION SUMMARY

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/ Basis	Affirmed	Reversed
1–7, 12–14, 18–21, 24, 25	103	Ochs, Suvanto, Furst		1–7, 12–14, 18–21, 24, 25
8–11, 15–17, 22, 23	103	Ochs, Suvanto, Furst, Shuster		8–11, 15–17, 22, 23
Overall Outcome				1–25

REVERSED