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Paper No. 45
Filed: November 30, 2016

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SONY CORPORATION,
SAMSUNG ELECTRONICS, CO., LTD.,
SAMSUNG ELECTRONICS AMERICA, INC., and
SAMSUNG SEMICONDUCTOR, INC.,
Petitioner,

v.

RAYTHEON COMPANY,
Patent Owner.

Case IPR2016-00209[1]
Patent 5,591,678

Before JO-ANNE M. KOKOSKI, JENNIFER MEYER CHAGNON, and JEFFREY W. ABRAHAM, *Administrative Patent Judges*.

CHAGNON, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
Inter Partes Review
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

[1] Case IPR2016-00962 has been joined with the instant proceeding.

I. INTRODUCTION

We have jurisdiction to hear this *inter partes* review under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons discussed herein, we determine that Petitioner has shown, by a preponderance of the evidence, that claims 1–18 of U.S. Patent No. 5,591,678 (Ex. 1001, "the '678 patent") are unpatentable.

A. Procedural History

Sony Corporation ("Petitioner") filed a Petition (Paper 2, "Pet.") for *inter partes* review of claims 1–18 ("the challenged claims") of the '678 patent. Petitioner included a Declaration of Dr. Richard A. Blanchard (Ex. 1002) to support its positions. Raytheon Company ("Patent Owner") timely filed a Preliminary Response (Paper 10, "Prelim. Resp.").

Pursuant to 35 U.S.C. § 314(a), on March 29, 2016, we instituted an *inter partes* review of the challenged claims to determine whether claims 1–4, 6, 7, 10, and 11 are unpatentable under 35 U.S.C. § 102 as anticipated by Liu;[2] whether claims 2–4 and 11 are unpatentable under 35 U.S.C. § 103 as obvious in view of Liu and Black;[3] whether claims 5 and 12–16 are unpatentable under 35 U.S.C. § 103 as obvious in view of Liu and Riseman;[4] whether claim 8 is unpatentable under 35 U.S.C. § 103 as obvious in view of Liu and Oldham;[5] whether claim 10 is unpatentable under 35 U.S.C. § 103 as obvious in view of Liu and Wen;[6] whether claim 9 is unpatentable under

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[2] U.S. Patent No. 4,422,091, issued Dec. 20, 1983 (Ex. 1003).
[3] U.S. Patent No. 4,426,768, issued Jan. 24, 1984 (Ex. 1007).
[4] U.S. Patent No. 4,106,050, issued Aug. 8, 1978 (Ex. 1009).
[5] U.S. Patent No. 4,681,718, issued July 21, 1987 (Ex. 1005).
[6] U.S. Patent No. 3,846,198, issued Nov. 5, 1974 (Ex. 1004).

35 U.S.C. § 103 as obvious in view of Liu, Wen, and Ying;[7] whether claim 17 is unpatentable under 35 U.S.C. § 103 as obvious in view of Liu, Riseman, and Kusunoki;[8] and whether claim 18 is unpatentable under 35 U.S.C. § 103 as obvious in view of Liu, Riseman, and Oldham. Paper 12 ("Inst. Dec.").

Subsequent to institution, Patent Owner filed a Patent Owner Response (Paper 36,[9] "PO Resp."), along with a Declaration of Dr. Eugene A. Fitzgerald (Ex. 2001[10]) to support its positions. Petitioner filed a Reply (Paper 27, Paper 28 (redacted version), "Pet. Reply") to the Patent Owner Response. After Petitioner's Reply was filed, institution was granted in *Samsung Electronics, Co. v. Raytheon Co.*, Case IPR2016-00962, and that proceeding was joined with the instant proceeding. *See* Paper 29. An oral hearing was held on October 13, 2016. A transcript of the hearing is included in the record. Paper 44 ("Tr.").

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[7] U.S. Patent No. 3,864,819, issued Feb. 11, 1975 (Ex. 1006).

[8] JP App. Pub. No. 3-108776, published May 8, 1991. Kusunoki is a Japanese-language reference (Ex. 1014). Citations to Kusunoki herein are to the certified English translation submitted by Petitioner (Ex. 1008).

[9] Pursuant to our telephonic authorization, Patent Owner filed a Corrected Patent Owner Response (Paper 36) that corrects specific citations to Dr. Fitzgerald's Declaration. A red-line version was filed as Exhibit 2030. Paper 36 replaces the originally filed Patent Owner Response (Paper 22), and all citations herein are to the corrected version.

[10] Exhibit numbers 2001–2003 were re-used by Patent Owner at the time of filing the Patent Owner Response. We note this is in violation of 37 C.F.R. § 42.63(c). For clarity, citations herein to Exhibits 2001–2003 are to the documents filed on June 15, 2016.

B. Related Proceedings

The ’678 patent has been asserted in *Raytheon Co. v. Samsung Electronics Co.*, No. 2:15-cv-00341 (E.D. Tex.), and *Raytheon Co. v. Sony Kabushiki Kaisha*, No. 2:15-cv-00342 (E.D. Tex.). Paper 5, 2; Pet. 1. Petitioner Sony also has challenged the ’678 patent in *Sony Corp. v. Raytheon Co.*, Case IPR2015-01201 (“the 1201 IPR”). Pet. 1–2; Paper 5, 2. The ’678 patent also has been challenged in *Samsung Electronics, Co. v. Raytheon Co.*, Case IPR2016-00739, which currently is pending.

C. The ’678 Patent

The ’678 patent, titled “Process of Manufacturing a Microelectric Device Using a Removable Support Substrate and Etch-Stop,” relates to a method of fabricating a microelectronic device, in which the microelectronic device is moved from one support to another during fabrication. Ex. 1001, 1:12–13. According to the ’678 patent, “[t]he invention permits microelectronic devices to be prepared using well-established, inexpensive thin-film deposition, etching, and patterning techniques, and then to be further processed singly or in combination with other such devices, into more complex devices.” *Id.* at 2:9–14.

Figure 1 of the ’678 patent is reproduced below.

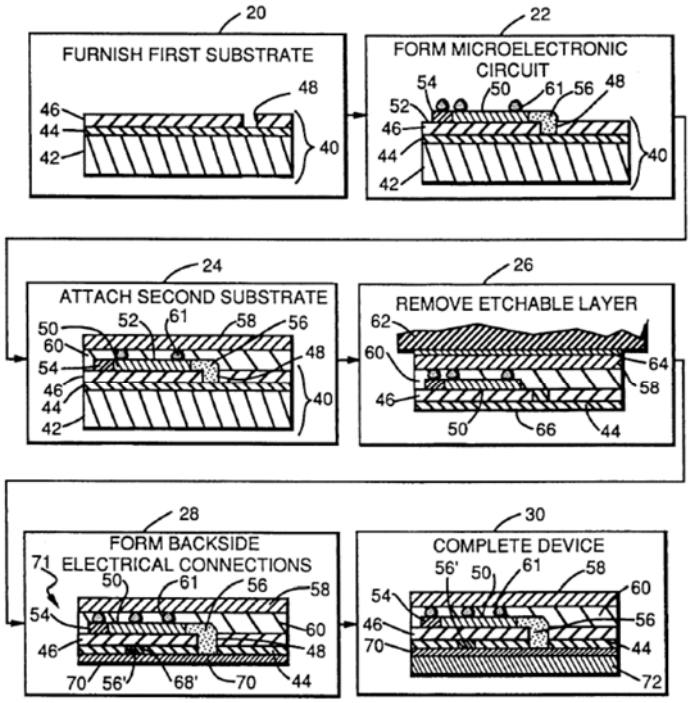

FIG. 1.

Figure 1 is a process flow diagram of the method of the ’678 patent, schematically illustrating each stage of fabrication of a microelectronic device formed in accordance with the method. *Id.* at 3:48–50. As shown in box 20, first substrate 40 is provided, the first substrate including etchable layer 42, etch-stop layer 44, and wafer layer 46. *Id.* at 3:65–4:2. As noted in the ’678 patent, “[s]uch substrates can be purchased commercially,” or “prepared by applying well-known microelectronic techniques.” *Id.* at 4:2, 4:22–23. In a preferred embodiment, etchable layer 42 is a layer of bulk silicon, etch-stop layer 44 is a layer of silicon dioxide, and wafer layer 46 is a layer of single crystal silicon. *Id.* at 4:3–15.

Microelectronic circuit element 50 is formed in wafer layer 46, as shown in box 22. *Id.* at 4:37–52. The ’678 patent notes that “the present invention is not limited to any particular circuit element 50,” and, for

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