

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte MAOSHENG ZHAO, JUAN CARLOS ROCHA-ALVAREZ,
INNA SHMURUN, SOOVA SEN, MAO D. LIM,
SHANKAR VENKATAREMAN, and JU-HYUNG LEE

Appeal 2007-1171
Application 10/354,214
Technology Center 1700

Decided: October 19, 2007

Before BRADLEY R. GARRIS, CHUNG K. PAK, and
CATHERINE Q. TIMM, *Administrative Patent Judges*.

TIMM, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134(a) from the Examiner's decision rejecting claims 10-15, 17, 19, and 28-34.¹ We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

¹ Claims 16 and 18 are pending, but are not subject to a rejection and, therefore, are not subject to this appeal.

I. BACKGROUND

The invention relates to a semiconductor substrate processing system and, specifically, to a chamber within such system. Claim 10 is illustrative of the subject matter on appeal:

10. A semiconductor substrate processing system comprising a chamber for processing a substrate, said chamber comprises:

a first portion comprising a substrate support pedestal;

a second portion comprising a blocking plate electrode and a source of radio-frequency power;

a showerhead electrode electrically isolated from the first portion and the second portion; and

a switch that couples the showerhead electrode to the first portion or the second portion.

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

Shinagawa (as translated)	JP 01-192118	Aug. 02, 1989
Sasaki (as translated)	JP 10-177993	Jun. 30, 1998
Morita	US 5,815,366	Sep. 29, 1998
Mumola	US 5,292,400	Mar. 08, 1994

The Examiner rejects the claims as follows:

1. Claims 10-13, and 17 under 35 U.S.C. § 102(b) as anticipated by Shingawa;
2. Claims 28, 29, and 31-33 under 35 U.S.C. § 102(b) as anticipated by Sasaki;
3. Claims 14 and 15 under 35 U.S.C. § 103(a) as unpatentable over Shingawa in view of Morita;

4. Claim 19 under 35 U.S.C. § 103(a) as unpatentable over Shingawa in view of Mumola;
5. Claim 30 under 35 U.S.C. § 103(a) as unpatentable over Sasaki in view of Morita; and
6. Claim 34 under 35 U.S.C. § 103(a) as unpatentable over Sasaki in view of Mumola.

II. DISCUSSION

Anticipation by Shingawa

With regard to the rejection of claims 10-13 and 17 as anticipated by Shingawa, the dispute between Appellants and the Examiner centers around the interpretation of language within claim 10, specifically, the interpretation of the claim clause “a switch that couples the showerhead electrode to the first portion or the second portion.” There being no arguments directed to any other claim, we limit our review to claim 10.

The Examiner interprets the switch language as requiring coupling to only one of the first portion or the second portion. Appellants contend that the Examiner erred in interpreting the claim. According to Appellants,

The scope of the claim is intended to define the recited embodiment, a showerhead electrode, a first portion, a second portion, and a switch that couples the showerhead electrode to either the first portion or the second portion. The Examiner errs in reading the claim to cover an A/B switch that specifies A is either the first portion or A is the second portion while B is undefined. Applicants submit that the only valid interpretation of the claim is that the switch connects to A or B.

(Reply Br. 3). The issue on appeal arising from the contentions of Appellants and the Examiner is: Have Appellants established that the Examiner's interpretation of the disputed claim language is unreasonable?

During examination, "claims . . . are to be given their broadest reasonable interpretation consistent with the specification, and . . . claim language should be read in light of the specification as it would be interpreted by one of ordinary skill in the art." *In re Am. Acad. of Sci. Tech. Ctr.*, 367 F.3d 1359, 1364, 70 USPQ2d 1827, 1830 (Fed. Cir. 2004).

We determine that the Examiner's interpretation is reasonable. By the use of the alternative expression "or," the claim encompasses embodiments in which the showerhead electrode is coupled to only the second portion. There is simply no language in the claim further limiting the structure involved. Nor do we find in the Specification a definition or any other disavowal of meaning that limits the claimed switch to a structure with connections allowing switching to both the first and second portions.

Appellants have not convinced us of a reversible error in the findings of the Examiner. Shingawa describes a chamber having each and every structure required by claim 10 including a switch coupling the showerhead electrode (electrode 23) to a second portion (electrode 22), that structure being within the scope of the claim.

Anticipation by Sasaki

The Examiner rejects claims 28, 29, and 31-33 as anticipated by Sasaki. Appellants argue the claims as a group. Therefore, we limit our review to the issues as they apply to claim 28.

Sasaki illustrates a chamber in Figure 7 including a first portion comprising a substrate pedestal (pedestal 2), a second portion (housing 8) coupled to radio-frequency power (power supply 7), a showerhead (electrode 3), and a switch (9).

There is no dispute that Sasaki describes a first portion, a second portion, and a showerhead as claimed. As stated by Appellants, “Sasaki recites a showerhead (upper electrode) 3, lower electrode 2, and vacuum housing 8, i.e., chamber walls.” (Reply Br. 4). Rather Appellants contend that

Claim 28 recites that the second portion is coupled to the source of RF power and that the switch couples the showerhead electrode to the first portion or the second portion. The showerhead is not directly coupled to the source of RF power as taught by Sasaki. As discussed above, a switch couples the showerhead either to the first portion or the second portion. (Reply Br. 4).

The Examiner contends that the structure illustrated in Sasaki’s Figure 7 meets the requirements of claim 28. The dispositive issue is: Does Sasaki describe a chamber comprising each and every limitation of claim 28?

We answer this question in the affirmative.

Sasaki couples a second portion to a source of radio-frequency power as claimed. Coupling occurs when the switch is closed between the showerhead 3 and second portion (housing 8). While, as pointed out by Appellants, the showerhead 3 of Sasaki is directly coupled to the source of RF power, claim 28 does not define the manner of coupling. Direct coupling of the showerhead, as shown by Figure 7 of Sasaki, is not excluded by claim 28.

With regard to the switch, we find that Sasaki couples the switch as claimed even under Appellants' narrow interpretation of the switching limitation. Sasaki shows the claimed switch with connections allowing alternative coupling to both the first and second portions. The electrical line from the showerhead electrode 3 enters the switch from the right. Two lines exit the switch on the left: One line leads to the "first portion" (pedestal 2); and another line leads to the "second portion" (housing 8). Therefore, we find that the switch couples the showerhead to the first portion when the circuit is completed to the line leading to pedestal 2, and that the switch couples the showerhead to the second portion when the switch is flipped to complete the circuit to the line leading to housing 8. The structure of the switch meets the requirements of claim 28.

Appellants have not shown that the Examiner reversibly erred in rejecting claims 28, 29, and 31-33 under 35 U.S.C. § 102.

Obviousness over Shingawa or Sasaki in view of Morita

The Examiner rejects claims 14 and 15 as obvious over Shingawa in view of Morita and claim 30 over Sasaki in view of Morita. Claim 14 requires that the isolation of the showerhead electrode be accomplished with isolators of ceramic or polyimide. Claims 15 and 30 further limit the isolators to alumina isolators. In each rejection, the Examiner relies upon Shingawa and Sasaki in the same manner as in the anticipation rejections. Morita is added to show that it would have been obvious to one of ordinary skill in the art to electrically isolate either the showerhead electrode of Shingawa or that of Sasaki using a ceramic material such as alumina (Answer 7).

Appellants contend that Morita's isolators 42 and 46 do not isolate a showerhead, and that the references alone or in combination do not teach or suggest the claimed chamber structure (Br. 10, 11; Reply Br. 5, 6).

The dispositive issue is: Have Appellants overcome the rejection by showing that the evidence does not support the Examiner's conclusion of obviousness?

"On appeal to the Board, an applicant can overcome a rejection by showing insufficient evidence of prima facie obviousness or by rebutting the prima facie case with evidence of secondary indicia of nonobviousness." *In re Kahn*, 441 F.3d 977, 985-86, 78 USPQ2d 1329, 1335 (Fed. Cir. 2006) (emphasis omitted).

The Examiner finds, and Appellants do not dispute, that both Shingawa and Sasaki electrically isolate a showerhead electrode from the first portion and second portion (Answer 4-5, 6, 11, and 11-12). Electrical isolation means using an insulating material to prevent conduction of electricity. Morita describes alumina as such an insulating material. Morita uses alumina insulators as shielding members around electrode 41 (Fig. 1; col. 2, ll. 8-14). Morita, therefore, establishes that alumina isolators were familiar elements known for placement around electrodes with the predictable result of electrically isolating the electrodes. "The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results." *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1739 (2007).

Appellants have not shown that the Examiner reversibly erred in rejecting claims 14 and 15 as obvious over Shingawa in view of Morita or in rejecting claim 30 over Sasaki in view of Morita.

Obviousness over Shingawa or Sasaki in view of Mumola

The Examiner rejects claim 19 as obvious over Shingawa in view of Mumola and claim 34 as obvious over Sasaki in view of Mumola. Claims 19 and 34 specify that the switch further comprises an actuator to operate the switch. The Examiner relies upon Shingawa and Sasaki in the same manner as in the anticipation rejections and adds Mumola to show that it was known in the art to include actuators to operate switches (Answer 7 and 8).

Appellants contend that Mumola does not recite an electrically isolated showerhead, that Sasaki does not teach a showerhead electrode, and that the references alone or in combination do not teach or suggest what is claimed (Br. 10-11; Reply Br. 5-6 and 6-7).

The dispositive issue is: Have Appellants overcome the rejection by showing that the evidence does not support the Examiner's conclusion of obviousness? We answer this question in the negative.

Shingawa and Sasaki both describe chamber structures including a switch. Mumola describes a chamber structure with a relay actuated switch that can instantly switch RF power from one electrode to another (Mumola, col. 3, l. 68 to col. 4, l. 10). It follows that it would have been obvious to one of ordinary skill in the art to use the known relay actuated switch according to its known function for the predictable result of allowing instantaneous switching between electrodes. Again, “[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.” *KSR*, 127 S. Ct. at 1739.

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Appellants have not established that the Examiner committed a reversible in rejecting claim 19 as obvious over Shingawa in view of Morita or in rejecting claim 34 as obvious over Sasaki in view of Morita.

III. DECISION

The decision of the Examiner is affirmed.

IV. TIME PERIOD FOR RESPONSE

No time period for taking any subsequent action in connection with this appeal maybe extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

PL/LT initials:
sld/ls

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