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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte YUYA NONAKA and YOZO IKEDO¹
(Applicant: ASM IP Holding B.V.)

Appeal 2019-001308
Application 14/609,758
Technology Center 1700

Before BEVERLY A. FRANKLIN, JEFFREY B. ROBERTSON, and
MONTÉ T. SQUIRE, *Administrative Patent Judges*.

FRANKLIN, *Administrative Patent Judge*.

DECISION ON APPEAL

¹ Appellant identifies the real party in interest as ASM IP Holding B.V.
Appeal Br. 2.

Appellant requests our review under 35 U.S.C. § 134(a) of the Examiner's decision rejecting claims 1–3 and 6. We have jurisdiction over the appeal under 35 U.S.C. § 6(b).

STATEMENT OF THE CASE

Claim 1 is illustrative of Appellant's subject matter on appeal and is set forth below:

1. A film forming apparatus comprising:
 - a chamber having a processing space;
 - a stage provided in the processing space and having a substrate placed thereon;
 - an electrode provided above the stage and having openings formed therein;
 - an intermediate plate provided above the electrode, having openings formed therein, and formed of an insulating material;
 - a diffusion tube positioned above the electrode and the intermediate plate and connected to the chamber so that a diffusion space communicating with the processing space is provided right above the stage; and
 - a gas supply tube extending from the outside of the diffusion tube into the diffusion space through a portion of the diffusion tube and having a gas supply orifice in a portion thereof inside of the diffusion space,
 - wherein the gas supply orifice is formed so as to eject a material gas in a direction away from the stage, and
 - the gas supply orifice is provided only at a center of the diffusion space as viewed in plan.

The Examiner relies on the following prior art references as evidence of unpatentability:

Von Der Waydbrink et al. ("Von Der Waydbrink")	US 2009/0061088 A1	Mar. 5, 2009
Chao et al. ("Chao")	US 2009/0211707 A1	Aug. 27, 2009
Satake et al. ("Satake")	US 2009/0288602 A1	Nov. 26, 2009

THE REJECTIONS

1. Claims 1–3 and 6 are rejected under 35 U.S.C. § 103 as being unpatentable over Satake in view of Applicant’s Admitted Prior Art (Fig. 6, hereafter “AAPA”)² and Von Der Waydbrink.
2. Claims 1–3 and 6 are rejected under 35 U.S.C. § 103 as being unpatentable over AAPA, in view of Chao and Satake.

ANALYSIS

Upon consideration of the evidence and each of the respective positions set forth in the record, we find that the preponderance of evidence supports Appellant’s position in the record. We thus reverse the Examiner’s decision for the reasons provided by Appellant in the record, and add the following for emphasis.

Rejection 1

The Examiner proposes to modify Satake in view of AAPA to reduce the number of gas injection holes 727 of Satake to a single one. Ans. 3–4. The Examiner proposes a further modification of locating that single gas injection hole to be in the center of the diffusion space because one skilled in the art would have known that the single hole needs to be in the center in the X-direction in order to provide more uniform distribution across the width of the substrate. Ans. 4–5.

Appellant argues that it would not have been obvious to have reduced the number of gas injection holes 727 of Satake to a single one because such a modification would reduce the gas-dispersion uniformity of Satake. Appeal Br. 4–5. Appellant also argues that the Examiner’s position that it would have been obvious to locate the single gas injection hole in the center of the diffusion space

² We use US publication 2016/0222513 A1, published on August 4, 2016 for AAPA disclosure.

because one skilled in the art would have known that the single hole needs to be in the center in the X-direction in order to provide more uniform distribution across the width of the substrate, is unsupported by sufficient reasoning and a preponderance of the evidence in the record. Reply Br. 1–2.

We are persuaded by Appellant’s argument. The Examiner bears the initial burden of presenting a *prima facie* case of obviousness. *In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992). “[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) *quoted with approval in KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007). Also, establishing a *prima facie* case of obviousness requires an apparent reason to modify the prior art as proposed by the Examiner. *See KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007). Here, we agree with Appellant that the Examiner has not provided sufficient reasoning to modify Satake to include one gas injection hole “for its suitability with predictable results” in view of Von Der Waydbrink (Final Act. 5–6), because Von Der Waydbrink discloses “one or more openings” (¶ 42) such that it is unclear whether in locating one gas injection hole in the center in the X-direction in Satake would even maintain the uniformity of the reactant gas over the whole surface of the substrate in Satake, or reduce uniformity as argued by Appellant notwithstanding the presence of an intermediate plate having openings as disclosed in AAPA. (Appeal Br. 4; *see* Ans. 8.) Thus, the Examiner has not established a sufficient reason for the proposed modifications, which would have been apparent to one of ordinary skill in the art in view of the relied-upon prior art.

In view of the above, we reverse Rejection 1.

Rejection 2

The Examiner proposes to modify AAPA in view of Chao by re-arranging the gas supply tube 33 of AAPA to extend into the center of the diffusion tube 30 of AAPA in view of Chao. Ans. 5–6. The Examiner also proposes to further modify AAPA (in view of Chao) by re-arranging the opening of AAPA’s gas supply tube 33, extending into the diffusion tube 30 of AAPA, to a upward direction in view of Satake for the purpose of improving the uniformity of the distribution of the deposited film. Ans. 6.

Appellant argues, *inter alia*, that one skilled in the art would recognize that the showerhead configurations of AAPA and Chao are not analogous to the processing apparatus of Satake and therefore the Examiner’s rejection relying on the implementation of the teachings of Satake with AAPA in view of Chao is improper and is based on improper hindsight reasoning. Appeal Br. 5–6.

Appellant also argues that it is only a bald assertion by the Office, without any evidence, that modifying the gas inlet in a showerhead structure (such as in Chao and AAPA) to eject reactant gas away from a processing surface would improve the uniformity of a deposited film. Appeal Br. 6. Appellant submits that the Examiner’s statement (made on page 4 of the Advisory Action) that the proposal to further modify AAPA (in view of Chao) by re-arranging the opening of AAPA’s gas supply tube 33 to a upward direction in view of Satake would improve uniformity of the distribution because “more travel time would allow more even flow distribution” is an unsupported assertion. Appeal Br. 6.

We are persuaded by Appellant’s argument in this regard. As mentioned *supra*, the Examiner bears the initial burden of presenting a *prima facie* case of obviousness. *Oetiker*, 977 F.2d at 1445. Thus, as previously discussed above, rejections on obviousness grounds cannot be sustained by mere conclusory statements, but instead require some articulated reasoning with some rational

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underpinning to support the legal conclusion of obviousness (*Kahn*, 441 F.3d at 988), and require an apparent reason to modify the prior art in view of the relied-upon prior art (*KSR*, 550 U.S. at 418). Thus, for the reasons stated in the record by Appellant, we agree that the Examiner has not met this burden.

DECISION

Each rejection is reversed.

ORDER
REVERSED