Paper No. 13

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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Ex parte HUI-HUA CHANG

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Appeal No. 1998-2620
Application No. 08/512,033

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ON BRIEF

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Before WARREN, WALTZ, and DELMENDO, **Administrative Patent Judges**.

WALTZ, **Administrative Patent Judge**.

DECISION ON APPEAL

This is a decision on an appeal under 35 U.S.C. § 134 from the examiner's final rejection of claims 1 through 6. Claims 7 through 16, the remaining claims in this application, stand withdrawn from further consideration by the examiner as being directed to a non-elected invention (see the Brief, page

2).

According to appellant, the invention is directed to a method for reducing particulate contamination in a system for chemical vapor deposition (CVD), including the steps of heating the section of the pumping line immediately adjacent to the reaction chamber and by maintaining a slight negative pressure within the reaction chamber whenever the chamber is open to the atmosphere (Brief, page 3). A copy of illustrative claim 1 is attached as an Appendix to this decision.[1]

The examiner has relied upon the admitted prior art (as shown by appellant's Figure 1) and the following references as evidence of obviousness:

Chiang	4,395,438	Jul. 26, 1983
Ilderem et al. (Ilderem)	4,957,777	Sep. 18, 1990
Ozaki	5,498,292	Mar. 12,

[1]We note that claim 1 from the Appendix to the Brief is incorrect, although the examiner states that this copy of the claims is correct (Answer, page 2). For example, the step after "inserting the substrate into said chamber" should be "closing the bypass vent," not "opening" the bypass vent. The other amended portions of this claim are also incorrectly reproduced in appellant's Appendix. See claim 1 as found in the amendment dated May 19, 1997, Paper No. 6.

1996
(filed Jan. 19, 1995)

Kobino et al. (JP '775) 2-107775 Apr. 19, 1990
(published Japanese Kokai Patent Application)[2]

Claims 1, 3, 5 and 6 stand rejected under 35 U.S.C. § 103(a) as unpatentable over the admitted prior art in view of JP '775 and Ozaki (Answer, page 3). Claim 2 stands rejected under 35 U.S.C. § 103(a) as unpatentable over the references applied above further in view of Chiang (Answer, page 5). Claim 4 stands rejected under 35 U.S.C. § 103(a) as unpatentable over the references as applied against claims 1, 3, 5 and 6 further in view of Ilderem (*id.*). We *reverse* all of the examiner's rejections essentially for the reasons stated in the Brief and the reasons set forth below.

OPINION

The examiner finds that the admitted prior art as shown by appellant's Figure 1 differs from the subject matter of

[2]We rely upon and cite from an English translation of this document, now of record. It is apparent from the record that appellant and the examiner have only relied upon an English abstract of this document (Answer, page 4; Brief, page 5), but for a full and complete understanding of this reference we must consider the above-noted translation.

claim 1 on appeal in three ways: (1) controlling a bypass valve to prevent by-products from feeding back into the main reaction chamber; (2) heating the section of the pumping system closest to the reaction chamber; and (3) performing the claimed steps in sequence (Answer, page 4). The examiner applies JP '775 to show an "operable bypass valve" in an exhaust line of a conventional LPCVD (low pressure CVD) process (Answer, page 4). The examiner finds that "the bypass valve has long been used in exhaust lines of CVD apparatus for reducing contamination in CVD chambers as evidenced by JP02-107,775." *Id.* The examiner applies Ozaki for the teaching to heat the section of the pumping system that is closest to a CVD chamber because "it has been recognized in the CVD art that vacuum line can be heated in order to eliminate condensation of possible impurities on internal walls of the line." Answer, paragraph bridging pages 4-5. Regarding difference (3) between the prior art sequence of steps and the claimed sequence of steps, the examiner concludes that "optimization of opening and closing by-pass valves during CVD processes in order to obtain the optimized effect would have been within the expected skill to a routineer in the CVD art."

Answer, page 5.

Ozaki discloses the problem in CVD processes that a great amount of heat is dissipated from each of the opening ends and uniform heating at the setting temperature can only be obtained at a longitudinal central portion of the heating furnace (col. 1, ll. 55-59). Ozaki solves this problem by disposing a pair of auxiliary furnaces at each longitudinal opening end of the main furnace to save heat calories and provide a uniform heating region throughout the reaction chamber (col. 1, l. 60-col. 2, l.

25; col. 3, ll. 6-8). Therefore the exhaust conduit is formed at and protruded from a hole in one of the auxiliary heating furnaces (col. 3, ll. 20-27).

It is well settled that the initial burden rests with the examiner to present evidence to support a *prima facie* case of obviousness. *See In re Oetiker,* 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). It is equally well settled that the examiner must identify, when combining references, some suggestion, teaching or motivation to combine the references as proposed, and this suggestion or teaching may come from the prior art references themselves, the knowledge of one of ordinary skill in the art, or from the nature of the problem to be solved. *See In re Dembiczak,* 175 F.3d 994, 999, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999); *and In re Rouffet,* 149 F.3d 1350, 1355-56, 47 USPQ2d 1453, 1456 (Fed. Cir. 1998). Here the examiner has not met the initial burden of proof and has failed to identify any reason or suggestion, much less a convincing one, to combine Ozaki with the admitted prior art. The examiner has failed to provide any factual evidence or support for his statement on page 5 of the Answer

that "it has been recognized in the CVD art that vacuum line can be heated in order to eliminate condensation of possible impurities on internal walls of the line."

JP '775 does disclose a bypass valve used in connection with the main valve to help reduce particulate contamination (see page 9 of the translation). However, JP '775 does not disclose or teach the same sequence of steps as recited in claim 1 on appeal (see the Brief, pages 6-7). For example, the process of claim 1 on appeal requires the step of opening the bypass vent before the substrate is removed from the reaction chamber while JP '775 does not disclose or teach this step at all (translation, page 10, lines 13-15). The examiner's statement that the sequence of steps is optimization and "would have been within the expected skill to a routineer in the CVD art" (Answer, page 5) is totally without any factual support or reasoning. "Where the legal conclusion [of obviousness] is not supported by facts it cannot stand." *In re Warner,* 379 F.2d 1011, 1017, 154 USPQ 173, 178 (CCPA 1967).

For the foregoing reasons and those stated in the Brief, we determine that the examiner has not met the initial burden

of establishing a *prima facie* case of obviousness for the subject matter of claim 1 on appeal. Accordingly, the examiner's rejection of claims 1, 3, 5 and 6 under 35 U.S.C. § 103(a) over the admitted prior art in view of JP '775 and Ozaki is reversed.

The examiner has further applied Chiang against claim 2 for the teaching of forming silicon nitride films by LPCVD using a mixture of ammonia and dichlorosilane (Answer, page 5). The examiner has applied Ilderem against claim 4 for the teaching of forming polysilicon films by LPCVD using a precursor gas comprising SiH_4 (Answer, page 6). Therefore it is clear that the additional references to Chiang and Ilderem fail to remedy the deficiencies noted above in the rejection. Accordingly, the examiner's rejection of claim 2 under 35 U.S.C. § 103(a) over the admitted prior art in view of JP '775, Ozaki, and Chiang is reversed. Similarly, the examiner's rejection of claim 4 under 35 U.S.C. § 103(a) over the admitted prior art in view of JP '775, Ozaki and Ilderem is reversed.

The decision of the examiner is reversed.

REVERSED

CHARLES F. WARREN Administrative Patent Judge	)	
THOMAS A. WALTZ Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
ROMULO H. DELMENDO Administrative Patent Judge	)	

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APPENDIX

1. A method for performing Low Pressure Chemical Vapor Deposition onto a substrate, comprising the sequential steps of:

providing a heated reaction chamber, including a source of reactive gases and a pumping system controlled through a gate valve;

providing an end plate for sealing said reaction chamber;

providing an openable bypass vent for said gate valve;

opening said bypass vent, thereby causing air to flow from the reaction chamber to the pumping system;

inserting the substrate into said chamber;

closing the bypass vent;

then sealing said reaction chamber with said end plate;

opening said gate valve, thereby causing said chamber to be evacuated;

admitting said reactive gas to the chamber, thereby causing the reaction products of the decomposition of said reactive gas to deposit as a layer on said substrate;

heating the section of the pumping system that is closest to the reaction chamber;

terminating the admission of the reactive gas;

continuing to evacuate the reaction chamber until the reactive gas has been substantially removed from the reaction chamber;

then closing said gate valve and admitting air into the reaction chamber until it is in equilibrium with the atmosphere;

removing said end plate;

opening said bypass vent, thereby causing a stream of air to flow from the reaction chamber towards the pumping system; and

removing the substrate from the reaction chamber.