

The opinion in support of the decision being entered today was **not** written for publication and is **not** precedent of the Board.

Paper No. 23

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte TADAAKI HONMA
and TAKESHI ARAI

Appeal No. 2002-1640
Application No. 09/296,806

HEARD: March 6, 2003

Before KIMLIN, OWENS, and PAWLIKOWSKI, **Administrative Patent Judges**.

PAWLIKOWSKI, **Administrative Patent Judge**.

DECISION ON APPEAL¹

This is an appeal from the final rejection of claims 7, 8, 9, 10, and 11. Claims 1-6 have been cancelled.

A copy of claim 7 is set forth below as representative of the subject matter on appeal:

Claim 7 The apparatus for thin film growth in which with a

¹ Appellants have submitted a supplemental brief after oral hearing, and this supplemental brief has been entered as Paper No. 23. However, we do not consider this paper because the rules do not provide for submission of arguments after oral hearing.

substrate placed on a susceptor set in a process vessel, a silicon single crystal thin film is grown in vapor phase on the substrate while raw material gas is supplied into the process vessel, characterized in that

the apparatus for thin film growth has a lift pin made of a base material lower in thermal conductivity than a base material of the susceptor which is inserted into a through hole bored in a pocket of the susceptor serving for placement of the substrate, wherein the lift pin is capable of being lifted or lowered so as to be brought into or out of contact with a rear surface of the substrate, such lowering or lifting allowing the substrate to be, respectively, set on or removed on the susceptor,

wherein the base material of the lift pin is SiC whose thermal conductivity is not more than 40 w/mK at 1000°C,

wherein the susceptor is made of a carbon base material coated with SiC.

The examiner relies upon the following references as of unpatentability:

Tietz et al. (Tietz) 5,879,128 Mar. 09, 1999

Johnsgard et al. (Johnsgard) 6,002,109 Dec. 14, 1999
(Filed Jul. 10, 1995)

Askeland, The Science and Engineering of Materials, Second Edition, PWS-Kent Publishing Co., pp. 460, 764-765 (1989).

Claims 7-11 stand rejected under 35 U.S.C. § 103 as being unpatentable of Johnsgard in view of Tietz and Askeland.

OPINION

We have carefully reviewed appellants' brief and attachments, and the reply brief and attachments, as well as the examiner's answer. This review leads us to conclude that the examiner's rejection does not set forth a prima facie case.

I. The 35 U.S.C. § 103 Rejection

Beginning on page 4 of the brief, appellants argue that Johnsgard does not recognize the relationship between the thermal conductivity of the lift pin and the thermal conductivity of the susceptor. Appellants also argue that Johnsgard's process is for rapid thermal processing and not for thin film growth processing. Appellants argue that Tietz is from the field of chemical vapor deposition. Appellants argue that a review of the entire chapter of Askeland, rather than just the pages provided by the examiner, shows that there is no suggestion to select carbon from the "great universe" of ceramic type materials. (brief, pages 4-9).

On page 3 of the answer, with regard to Johnsgard, the examiner rebuts and states that the manner in which an apparatus operates is not germane to the issue of patentability of the apparatus itself. We disagree with the examiner's conclusion of obviousness for the following reasons.

A recitation with respect to the material intended to be worked upon by a claimed apparatus does not impose any structural limitations upon the claimed apparatus, which differentiates it from a prior art apparatus satisfying the structural limitations of that claimed. See Ex parte Masham, 2 USPQ2d 1647, 1648 (Bd. Pat. App. & Int. 1987). Also see In re Rishoi, 197 F.2d 342, 344, 94 USPQ 71, 72 (CCPA 1952); and In re Young, 75 F.2d 996, 997, 25 USPQ 69, 70 (CCPA 1935). Similarly, a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the structural limitations of that claimed. See

Ex parte Masham, 2 USPQ 1647, 1648 (Bd. Pat. App. & Int. 1987). Also see In re Yanush, 477 F.2d 958, 959, 177 USPQ 705, 706 (CCPA 1973); In re Finsterwalder, 436 F.2d 1028, 1032, 168 USPQ 530, 534 (CCPA 1971); In re Casey, 370 F.2d 576, 580, 152 USPQ 235, 238 (CCPA 1967); and In re Otto, 312 F.2d 937, 939, 136 USPQ 458, 459 (CCPA 1963).

However, absent structure capable of performing the functional limitations of the means being claimed, the prior art cannot meet the claims. In re Mott, 557 F.2d 266, 269, 194 USPQ 305, 307 (CCPA 1977). Here, the examiner has not shown that Johnsgard's apparatus is capable of performing thin film growth processing. In this context, the examiner's rejection does not explain how to modify the apparatus of Johnsgard by the teachings of Tietz or Askeland to arrive at appellants' claimed apparatus for thin film growth. (Paper No. 11, pages 2-6, answer pages 3-7).² On this issue, beginning on page 11 of the brief, appellants state that the examiner does not explain how he would combine the thermal processor of Johnsgard with the CVD device

² We note that on pages 3-4 of Paper No. 11, the examiner's reasons for combining Johnsgard, Tietz, and Askeland are "to yield an apparatus as in Claim 1 because process vessels, susceptors (i.e. pedestals), lift pins, and substrate holding mechanisms were known in the art and their combination would have been anticipated to produce a functioning process apparatus. In addition, the use of these components interchangeably in their known capacities would have had, from the skilled artisan's view point, reasonable expectation of success. Motivation of using the known ceramic lift pins in Johnsgard et al.'s apparatus is given in that these pins were already known to have utility in this capacity (i.e. they work)." On page 4 of Paper No. 11, the examiner also states "optimization of the inherent property of thermal conductivity would have also been obvious since Johnsgard et al. describes the importance of heating uniformity of the susceptor and by extension the wafer to be treated." On page 4 of the answer, the examiner also states that just because appellants do not agree with the examiner's presented motivation for the combination of references, this does not mean that the presented motivation can be ignored. The examiner states that the materials used to form the apparatus were known in the art, and that the thermal conductivity of ceramics was a known important property. All of these reasons provided by the examiner do not explain how the combination yields an apparatus for thin film growth.

of Tietz. We agree with appellants' comments in this regard.

Hence, we determine that the examiner's rejection does not fulfill the basic requirements stated in the case of Graham v. John Deere Co., 86 S.Ct. 684, 383 U.S. 1, 17-18, 148 USPQ 459, 467 (1966) (Obviousness under § 103 is a legal conclusion based upon **facts revealing the scope and content of prior art, the differences between the prior art and the claims at issue**, the level of ordinary skill in the art, and objective evidence of nonobviousness [emphasis added]). Also, as stated supra, because the applied art does not yield structure capable of performing the functional limitations of the means being claimed, the prior art cannot meet the claims. In re Mott, 557 F.2d 266, 269, 194 USPQ 305, 307 (CCPA 1977).

Furthermore, even assuming, *arguendo*, that the combination yields an apparatus for thin film growth (which it does not, as a matter of fact and law, as discussed above), the rejection does not explain how the applied art makes it obvious to one of ordinary skill in the art to make the selection of the type of materials for the susceptor and the lift pin such that the lift pin is made of a base material lower in thermal conductivity than a base material of the susceptor. In this regard, it appears that the examiner's reasoning is that the particular type of material used for a susceptor and lift pin is known in the art and therefore it would have been obvious to choose the type of materials claimed by appellants for the susceptor and lift pin. (Paper No. 11, pages 3-4 and answer, pages 4-7).

Formulating a position most favorable to the examiner, the applied art sets forth use of lift pins and a susceptor. The lift pins can be made of silicon carbide or ceramic. The

susceptor can be made of silicon carbide coated graphite, silicon carbide, or quartz. See Johnsgard, columns 9 and 10. Tietz teaches the use of quartz lift rods. See Figure 3A and column 4, lines 45-48. Askeland teaches that graphite, a form of carbon, is classified as a ceramic material. See pages 460 and 764-765 of Askeland.

However, as argued throughout the brief and reply brief by appellants, the examiner does not point to any disclosure that can be found in the applied art that teaches to select, from the types of materials disclosed in the applied art, the particular materials for the susceptor and the lift pin, such that the lift pin is made of a base material lower in thermal conductivity than the base material of the susceptor.

Hence, particularly with respect to the selection of carbon as the pin material, or quartz as the pin material, such that the base material of the pin is lower in thermal conductivity than the base material of the susceptor, it is clear that the examiner's rejection is based on improper hindsight reasoning. In re Fine, 837 F.2d 1071, 1075, 5 USPQ2d 1596, 1600 (Fed. Cir. 1988) ("One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention."). We note that a selection must even be made from the disclosure of Johnsgard alone to yield a base material of the pin that is lower in thermal conductivity than the base material of the susceptor.

We also note that where an obviousness determination is based on a combination of prior art references, there must be some "teaching, suggestion or incentive supporting the combination." In re Geiger, 815 F.2d 686, 688, 2 USPQ2d 1276, 1278 (Fed. Cir. 1987). "[T]he factual inquiry whether to combine references must be thorough and searching." McGinley v. Franklin Sports, Inc., 262 F.3d 1339, 1351-52, 60 USPQ2d 1001, 1008 (Fed. Cir. 2001). It is impermissible to conclude that an invention is obvious based solely on what the examiner considers to be basic knowledge or common sense.³ See In re Zurko, 258 F.3d 1379, 1386, 59 USPQ2d 1693, 1697 (Fed. Cir. 2001). Thus, the burden is on the examiner to identify concrete evidence in the record to support his conclusion that it would have been obvious to modify the teachings of the cited references to achieve the claimed invention. See id.; In re Kotzab, 217 F.3d 1365, 1370, 55 USPQ2d 1313, 1316-17 (Fed. Cir. 2000). In the present case, as discussed above, the examiner has simply failed to meet this burden.

Hence, we determine that the examiner has not set forth a prima facie case of obviousness, and reverse the rejection.

³ For example, on page 5 of the answer, the examiner states that "applicant chooses to ignore the common knowledge in the art that graphite (e.g. pyrolytic graphite) is a form of carbon material used to shape high temperature devices and objects".

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III. Conclusion

The rejection of record is reversed.

REVERSED

EDWARD C. KIMLIN)	
Administrative Patent Judge)	
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)	APPEALS AND
TERRY J. OWENS)	INTERFERENCES
Administrative Patent Judge)	
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BEVERLY A. PAWLIKOWSKI)	
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BAP/sld

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