

The opinion in support of the decision being entered today is  
*not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* HOLGER JURGENSEN,  
GERHARD KARL STRAUCH  
AND JOHANNES KAPPELER

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Appeal 2007-2095  
Application 10/378,493  
Technology Center 1700

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Decided: June 26, 2007

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Before EDWARD C. KIMLIN, CHUNG K. PAK, and THOMAS A.  
WALTZ, *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 Primary Examiner's final rejection of claims 1-3 and 12. Claims 4-11 are the only other claims pending in this application, and the Examiner has indicated that claim 11 is allowed while claims 4-10 are objected to as

allowable but depending on a rejected claim (Br. 2).<sup>1</sup> We have jurisdiction pursuant to 35 U.S.C. § 6(b).

According to Appellants, the invention is directed to a device for depositing crystalline layers on a crystalline substrate in a process chamber by means of reaction gases, where the device includes a process chamber, a carrier plate consisting of graphite, a gas-admission element, a cover plate consisting of graphite, and a single-part gas-discharge ring consisting of solid graphite with a multiplicity of radial gas outlet openings (Br. 2-3).

Claim 1 is representative of the invention and is reproduced below:

1. A device for depositing in particular crystalline layers on one or more, in particular likewise crystalline substrates in a process chamber by means of reaction gases which are introduced into the process chamber where they react pyrolytically, having a carrier plate which forms a wall of the process chamber which is heated from the rear, in particular using high frequency and consists of inert-coated graphite, having a gas-admission element, which is disposed in the center of the process chamber the chamber being circular in cross section, and is associated with a cover plate which consists of graphite and is disposed at a spacing from the carrier plate, and a gas-discharge ring which forms the outer boundary of the process chamber and has a multiplicity of radial gas outlet openings, characterized in that the gas-discharged ring is formed as a single-part consisting of solid graphite and is located in a radiation field of a high-frequency coil.

The Examiner has relied on the following references as evidence of obviousness:

Hayashi	US 4,888,142	Dec. 19, 1989
Frijlink	US 4,976,217	Dec. 11, 1990
Sillmon ('855)	US 6,325,855 B1	Dec. 04, 2001
Löfgren	US 6,481,368 B1	Nov. 19, 2002

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<sup>1</sup> We refer to and cite from the "Substitute Appeal Brief Under 37 C.F.R. § 41.37" dated Dec. 27, 2005.

Strauch	US 2003/0177977 A1	Sep. 25, 2003
Sillmon ('289)	US 6,716,289 B1	Apr. 06, 2004

## ISSUES ON APPEAL

Claims 1 and 12 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Strauch in view of Sillmon '855 and Löfgren (Answer 3).

Claims 2-3 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Strauch in view of Sillmon '855, Löfgren, and Hayashi (Answer 5).<sup>2</sup>

Claims 1-3 and 12 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Frijlink in view of Sillmon '289, Hayashi, and Löfgren (Answer 5-6).

Appellants contend that neither Sillmon nor Löfgren disclose a cover plate which consists of graphite as required by claims 1 and 12 on appeal (Br. 6). Appellant further contends that Löfgren discloses walls made of graphite but does not teach a cover plate (Br. 7).

Appellants contend that Strauch "teaches away" from the claimed subject matter by teaching the importance of forming the gas-discharge ring from quartz (Br. 7-8), and does not teach any "generically described" elements (Br. 9).

Appellants contend that none of Frijlink, Sillmon, Hayashi, and Löfgren teach a cover plate of graphite (Br. 11).

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<sup>2</sup> Appellants do not contest this rejection (Br. 4-5). Therefore, we consider this rejection as standing or falling with the rejection of claims 1 and 12 under § 103(a) over Strauch in view of Sillmon '855 and Löfgren.

Appellants contend that Frijlink “teaches away” from the claimed invention by requiring a foldable, elastic plate of molybdenum (Mo) as the gas-discharge ring (Br. 11).<sup>3</sup>

The Examiner contends that Strauch discloses the basic structure as claimed, while the secondary references Sillmon ‘855 and Löfgren teach the well known use of graphite as a material to form the cover plate and gas-discharge ring (Answer 10-11).

The Examiner contends that Strauch does not “teach away” from the claimed invention since Appellants’ argument is directed to the quartz frit discharge ring of the gas-admission element, not the gas-discharge ring for exhausting the process chamber (Answer 11-12).

The Examiner contends that Frijlink does not “teach away” from the claimed invention since Sillmon ‘289 specifically teaches an improvement over the Mo gas-discharge ring of Frijlink (Answer 15-16).

The Examiner contends that graphite is well known in the art and commonly used as a material for construction of components in deposition process chambers, as taught by Sillmon ‘289 and Löfgren (Answer 13-14).

Accordingly, the issues presented on the record in this appeal are as follows: (1) was it well known and common in this art to use graphite as a construction material for components in deposition process chambers?; and (2) do Strauch and/or Frijlink “teach away” from the claimed subject matter?

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<sup>3</sup> We note that Appellants’ “Reply Brief” dated Dec. 28, 2006, has not been considered or entered by the Examiner (*see* the Letter dated Mar. 16, 2007). From the record in this application, it appears that Appellants have not filed a petition under 37 C.F.R. § 1.181 requesting entry of this Reply Brief. Accordingly, we do not consider this Reply Brief as part of the record in this appeal.

We determine that the Examiner has established a *prima facie* case of obviousness based on the reference evidence in this record, which *prima facie* case has not been adequately rebutted by Appellants' arguments. Therefore, we AFFIRM all grounds of rejection presented in this appeal essentially for the reasons stated in the Answer, as well as those reasons set forth below.

#### OPINION

##### A. The Rejection over Strauch, Sillmon '855, and Löfgren

We determine the following factual findings from the record in this appeal:

- (1) Strauch discloses an apparatus for depositing crystalline layers on a substrate that includes a processing chamber, a graphite carrier plate heated from the rear by a high frequency coil, a cover plate, a gas admission element, and a gas-discharge ring with a plurality of gas outlet openings (Answer 3-4; *see* Strauch, Abstract; Fig. 1; ¶¶ [0002], [0003], [0004], [0015], [0016], and [0017]);
- (2) Sillmon '855 discloses a gas-discharge ring constructed from various types of materials capable of withstanding the operating conditions within the reaction chamber of an epitaxial reactor, where this material may be graphite (Answer 4; *see* Sillmon '855, col. 2, ll. 30-31; and col. 4, ll. 40-47); and
- (3) Löfgren discloses a device for the heat treatment of an object in a susceptor, including epitaxial growth, in which all the walls of the processing chamber are made of graphite (Answer 4; *see* Löfgren, col. 1, ll. 7-18; col. 1, ll. 37-39; and col. 4, ll. 14-19).

Under 35 U.S.C. § 103, the factual inquiry into obviousness requires a determination of: (1) the scope and content of the prior art; (2) the differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) secondary considerations. *See Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17-18, 148 USPQ 459, 467 (1966). The analysis supporting obviousness should be made explicit and should “identify a reason that would have prompted a person of ordinary skill in the art to combine the elements” in the manner claimed. *KSR Int'l Co. v. Teleflex, Inc.*, 127 S. Ct. 1727, 1731, 82 USPQ2d 1385, 1389 (2007).

Applying the preceding legal principles to the factual findings in the record of this appeal, we determine that the Examiner has established a *prima facie* case of obviousness. As shown by factual finding (1) listed above, we determine that Strauch discloses all limitations of the claimed device as recited in claim 1 on appeal with the exception of the material used to construct the cover plate and gas-discharge ring (i.e., graphite; *see* the Answer 4). As shown by factual findings (2) and (3) listed above, we determine that the Examiner has clearly shown that it was well known to one of ordinary skill in the art of epitaxial growth deposition process chambers to use graphite as a suitable material to form the top wall (cover plate) and gas-discharge ring (Answer 10-11). Accordingly, we agree with the Examiner’s explicit analysis supporting obviousness, namely that it would have been well within the ordinary skill in this art to use graphite as the construction material for the cover plate and gas-discharge ring of Strauch, since graphite was known in the art as a suitable material capable of

withstanding the operating conditions within the reaction chamber of an epitaxial reactor (Answer 11; *see* factual findings (2) and (3) listed above).

For the foregoing reasons and those stated in the Answer, we affirm the rejection of claims 1 and 12 under § 103(a) over Strauch in view of Sillmon '855 and Löfgren. We also summarily affirm the rejection of claims 2 and 3 under § 103(a) over the above-noted references further in view of Hayashi, since, as discussed above, Appellants do not dispute or contest this rejection.

B. The Rejection over Frijlink, Sillmon '289, Hayashi, and Löfgren

We determine the following factual findings from the record in this appeal:

(4) Frijlink discloses an apparatus for depositing epitaxial layers on a substrate that includes a processing chamber, a carrier plate, a cover plate, a gas-admission element, and a gas-discharge ring

with a plurality of gas outlet openings, where the ring preferably is made from a plate of molybdenum (Mo) (Answer 6; *see* Frijlink, Figs. 1 and 3; col. 1, l. 66-col. 2, l. 6; and col. 2, ll. 26-61);

(5) Sillmon '289 discloses a gas collector which is an improvement over Frijlink, where it was essential to use a folded plate of Mo as the gas collector, with Sillmon '289 teaching the advantages of using graphite as a rigid body for forming the gas collector

(Answer 6; *see* Sillmon '289, col. 1, l. 57-col. 2, l. 23; col. 2, ll. 50-54 and 63-67; col. 5, ll. 4-5; col. 6, ll. 4-5; col. 7, ll. 18-19, 35-36, 38-40, and 65-67; and col. 8, ll. 1-22);

- (6) Hayashi teaches heating substrates with an induction heating coil located above and below the substrate (Answer 6; *see* Hayashi, Fig. 1; and col. 3, ll. 42-43); and
- (7) Löfgren is applied for the same factual finding as noted in finding (3) listed above.

We also incorporate the legal principles as discussed above. Applying these legal principles to the factual findings in the record of this appeal, we determine that the Examiner has established a *prima facie* case of obviousness. As shown by factual finding (4) listed above, we determine that Frijlink discloses every limitation of claim 1 on appeal with the exception of the graphite used to form the carrier plate, the cover plate, and the gas-discharge ring, as well as heating from the rear (Answer 6). As shown by factual findings (5) and (7) listed above, we determine that it was well known in the art to use graphite as a suitable construction material for the carrier plate, the cover plate, and the gas-discharge ring in epitaxial processing chambers (*see the* Answer 14). We also determine that Sillmon ‘289 specifically suggests the replacement of the Mo gas-discharge ring of Frijlink by a graphite material (*see* factual finding (5) listed above). Finally, we determine that Hayashi teaches heating a substrate from the rear by a high frequency coil, and this finding has not been disputed by Appellants (*see* factual finding (6) listed above and the Brief in its entirety). Accordingly, we agree with the Examiner’s explicit analysis supporting obviousness, namely that it would have been well within the ordinary skill in this art to replace the Mo gas-discharge ring disclosed by Frijlink with the graphite gas-discharge ring as taught by Sillmon ‘289, as well as use

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graphite as a well known suitable construction material for the carrier plate and cover plate of Frijlink, as taught by Löfgren.

For the foregoing reasons and those stated in the Answer, we affirm the rejection of claims 1-3 and 12 under § 103(a) over Frijlink in view of Sillmon '289, Hayashi, and Löfgren.

C. Summary and Time Period for Response

All grounds of rejection present in this appeal have been affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv)(2006).

AFFIRMED

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