

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board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 DAVID A. BEAUCHAINE,  
AARON S. NEWTON and  
MIKE TABOR

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Appeal No. 2005-1822  
Application 10/260,268

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ON BRIEF

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Before WARREN, WALTZ, and PAWLIKOWSKI, Administrative Patent Judges.

PAWLIKOWSKI, Administrative Patent Judge.

**DECISION ON APPEAL**

This is a decision on appeal under 35 U.S.C. § 134 from the examiner's final rejection of claims 1 through 12. Claims 13 through 22 have been withdrawn from consideration.

Claims 1, 2, 7, and 8 are representative of the subject matter on appeal and are set forth below:

1. A semiconductor heat treatment apparatus comprising an interface between a first part and a second part, separated by an expanded PTFE gasket, wherein the gasket maintains a seal between the first and second parts.

2. The semiconductor heat treatment apparatus according to claim 1, wherein the first part and second part are made of quartz.

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7. A semiconductor heat treatment apparatus comprising:

a reaction tube having a closed end and an open end, wherein the opened end is surrounded by a first flange;

a cap that closes the open end of the reaction tube, wherein the edge of the cap is surrounded by a second flange; and

a seal assembly comprising an expanded PTFE gasket placed between the first flange and the second flange, wherein the seal is maintained by placing the first flange and second flange against the gasket.

8. The semiconductor heat treatment apparatus according to claim 7, wherein the reaction tube and the cap are made of quartz.

The examiner relies upon the following references as evidence of unpatentability:

Hamilton et al. (Hamilton)	5,486,010	Jan. 23, 1996
Yamaga et al. (Yamaga)	5,750,436	May 12, 1998

Claims 1, 3 through 7, and 9 through 12 stand rejected under 35 U.S.C. § 103 as being unpatentable over Yamaga in view of Hamilton.

Claims 2 and 8 stand rejected under 35 U.S.C. § 103 as being obvious over Yamaga in view of Hamilton.

We have carefully reviewed the examiner's answer, and appellants' brief, and the evidence of record.

On page 7 of the brief, appellants state that claims 1, 3-7, and 9-12 fall into one group, and that claims 2 and 8 fall into a second group. We therefore consider claims 1, 2, 7, and 8. See 37 CFR § 41.37(c)(1)(vii) (September 2004); formerly 37 CFR § 1.192(c)(7) (2003). Also see Ex parte Schier, 21 USPQ2d 1016, 1018 (Bd. Pat. App. & Int. 1991).

OPINION

I. The 35 U.S.C. § 103 rejection of claims 1, 3 through 7, and 9 through 12 as being obvious over Yamaga in view of Hamilton

The examiner's position for this rejection is set forth in the Office Action of March 22, 2004, on pages 2 through 4. The examiner's basic position is that Yamaga teaches appellants' claimed semiconductor heat treatment apparatus comprising an interface between a first part and a second part separated by a gasket. However, as discussed on page 4 of the Office Action of March 22, 2004, the examiner recognizes that Yamaga does not teach that the gasket is made of an expanded PTFE material. The examiner points out, on page 2 of the Office Action of March 22, 2004, that the gasket in Yamaga is made of a fluorocarbon rubber and refers to column 13, lines 1 through 13 of Yamaga. The examiner's position is that a fluorocarbon rubber is a genus of PTFE.

On page 4 of the Office Action of March 22, 2004, the examiner relies upon Hamilton for teaching the use of an expanded fluorocarbon rubber (PTFE) in column 3, lines 1 through 9. The examiner states that Hamilton teaches that this material is used in applications requiring high strength and high temperatures of up to 315°C.

The examiner's position is that it would have been obvious to have replaced Yamaga's fluorocarbon rubber with Hamilton's expanded PTFE fluorocarbon rubber and that the motivation exists because Hamilton teaches that expanded PTFE provides a higher strength and more thermally and chemically durable fluorocarbon rubber. See column 3, lines 1 through 9 of Hamilton. Office Action of March 22, 2004, page 4.

Beginning on page 9 of the brief, appellants argue that Yamaga does not disclose the use of expanded PTFE as a gasket

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material. Appellants also argue that while Yamaga may disclose a genus encompassing the claimed use of expanded PTFE, Yamaga does not disclose the particular species required by claim 1 (as well as claim 7). Appellants argue that Yamaga discloses that the sealing means are capable of withstanding wafer processing temperatures of approximately 1000°C and refers to column 12, lines 6 through 62 of Yamaga. Appellants also point out that Yamaga discloses that the fluorocarbon rubber O-rings have good sealing but inferior heat resistance and refers to column 13, lines 4 through 6 of Yamaga. Appellants state that to remedy this problem of the fluorocarbon rubber sealing means, Yamaga requires that the fluorocarbon rubber seal means further include a cooling passage therein and refers to Yamaga, column 13, lines 4 through 6. Appellants also argue that Yamaga does not provide any motivation to use an expanded PTFE gasket nor does it contain any suggestion that the use of an expanded PTFE gasket would produce this superior heat resistant seal achieved by appellants' invention.

Beginning on page 11 of the brief, appellants argue that Hamilton teaches a gasket for use in a sealing plate and that the gasket is made from an expanded PTFE core that is tightly wrapped with a high strength PTFE film to prevent creep and refers to column 4, lines 55 through 64 of Hamilton. Appellants state that Hamilton teaches the use of its gasket material in heat exchangers. Appellants state that Hamilton teaches that the gasket is useful in applications in which the working temperatures are within the range of minus 270°C to 315°C and refers to column 3, lines 5 through 6 and column 10, lines 8 through 24 of Hamilton. Appellants argue that Hamilton does not suggest the use of its expanded PTFE gaskets in semiconductor heat treatment apparatuses, and that Hamilton does not disclose that its gaskets would be useful at temperatures exceeding 315°C.

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Brief, page 11.

On pages 12 through 13 of the brief, appellants also argue that Yamaga and Hamilton are not combinable. Appellants argue that Yamaga discloses high temperature resistant seals that are capable of withstanding a wafer processing temperature of approximately 1000°C. Appellants argue that Hamilton teaches the use of PTFE film wrapped expanded PTFE as a gasket material in applications requiring temperatures of up to 315°C. Appellants conclude that one of ordinary skill in the art would not have been motivated to use the expanded PTFE gasket of Hamilton, which was known in the art as taught by Hamilton, as providing an effective seal at temperatures of up to 315°C, in an application requiring heat resistance at temperatures of up to 1000°C such as in the Yamaga apparatus.

In response, beginning on page 4 of the Answer, the examiner argues that motivation does exist, as provided in Hamilton, where Hamilton teaches that expanded PTFE fluorocarbon rubber provides a higher strength and a more thermally and chemically durable fluorocarbon rubber and refers to column 3, lines 1 through 9 of Hamilton. On page 6 of the Answer, the examiner states that he recognizes that Yamaga does not teach appellants' claimed species (expanded PTFE). The examiner states that the teaching in Yamaga of a genus for PTFE is to demonstrate that the state of the art as taught by Yamaga encompasses, although broadly, appellants' claimed species. The examiner states that he relied upon the teachings in Hamilton for the use of an expanded PTFE.

At the bottom of page 6 of the answer, the examiner states that Hamilton teaches that expanded PTFE has a higher strength than conventional PTFE, and has the chemical inertness of conventional PTFE, and has an increased temperature range of up to 315°C.

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At the top of page 8 of the answer, the examiner more specifically responds to appellants' assertion that the combination of Yamaga in view of Hamilton would render Yamaga's apparatus inoperable. The examiner states that Hamilton teaches an expanded PTFE as having high strength and chemical inertness at temperatures up to 315°C. The examiner states that replacing Yamaga's fluorocarbon rubber with Hamilton's expanded PTFE fluorocarbon rubber, in conjunction with use of Yamaga's cooling circuit, would not render Yamaga's apparatus inoperable, especially when Yamaga's operations can be "the order of 400°C" as taught in column 13, lines 16 through column 14, line 7 of Yamaga.

We observe that appellants' claim 1 requires an expanded PTFE gasket as the sealing means between first and second parts of a semiconductor heat treatment apparatus. This claim does not exclude the use of a cooling mechanism, especially since appellants' specification indicates that a cooling mechanism is desirable to cool gasket 1 when the furnace is used for high temperature applications. Specifically, we refer to paragraph [0029] on page 6 of appellants' specification, wherein it is disclosed that "[a]lthough the expanded PTFE gasket 1 has improved sealing ability and heat resistance, it may be desirable to include a cooling mechanism to cool the gasket 1 when the furnace is used for high-temperature applications." See In re Hertz, 537 F.2d 549, 551-52, 190 USPQ 461, 463 (CCPA 1976). We further note that appellants' claim 1 does not recite temperature requirements.

Therefore, in light of the claim interpretation as discussed, supra, wherein the claim does not exclude the use of a cooling mechanism, and wherein processing temperatures are not recited, we believe substitution of the expanded PTFE gasket taught in Hamilton for the gasket taught in Yamaga would have

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been obvious to one of ordinary skill in the art. As pointed out by the examiner on page 8 of the answer, such substitution would not make Yamaga's apparatus inoperable because Yamaga does teach an embodiment wherein a cooling mechanism can be used. See for example, column 13, lines 5 through 14 of Yamaga.

In view of the above, we therefore determine the examiner has set forth a prima facie case of obviousness.

A prima facie case of obviousness is rebuttable by proof that the claimed invention possesses unexpected advantages or superior properties. In re Papesch, 315 F.2d 381, 386-87, 137 USPQ 43, 44-47 (CCPA 1963). Beginning at the top of page 10 of the brief, appellants argue that their specification discloses that the expanded PTFE creates a seal that is far superior under heat conditions as compared with stock O-rings made of conventional materials, and refers to Table I on page 8 of the specification. Appellants also refer to paragraphs [035] through [039] of their specification with regard to an example therein demonstrating that expanded PTFE gaskets used in vertical processing furnaces maintained superior seals at temperatures of at least 800°C. Upon our review, we find that this data relied upon to by appellants is insufficient to rebut the prima facie case of obviousness for at least the following reasons.

In order to establish unexpected results for a claimed invention, objective evidence of non-obviousness must be commensurate in scope with the claims which the evidence is offered to support. In re Clemens, 622 F.2d 1029, 1035, 206 USPQ 289, 296 (CCPA 1986); In re Greenfield, 571 F.2d 1185, 1198, 197 USPQ 227, 230 (CCPA 1978); In re Lender, 457 F.2d 506, 508, 173 USPQ 356, 358 (CCPA 1972); In re Tiffin, 448 F.2d 791, 792, 171 USPQ 294, 294 (CCPA 1971). In the instant case, Appellants argue that Table I on page 8 of the specification shows that the expanded PTFE of their claims creates a seal that is far

superior. Table I involves a temperature requirement of 800°C, but yet the claims do not recite such a limitation, and therefore encompass any temperature range. Therefore, we determine that the evidence does not overcome the prima facie case of obviousness.

In view of the above, we affirm the 35 U.S.C. § 103 rejection of claims 1, 3 through 7, and 9 through 12 as being obvious over Yamaga in view of Hamilton.

II. The 35 U.S.C. § 103 rejection of claims 2 and 8 as being obvious over Yamaga in view of Hamilton

We consider claims 2 and 8 in this rejection. Claim 2 requires that the first part and second part of the semiconductor heat treatment apparatus is made of quartz. Claim 8 requires that the reaction tube and the cap are made of quartz.

The examiner's position for this rejection is set forth on pages 4 and 5 of the Office Action mailed March 22, 2004. The examiner points out that Yamaga teaches that parts of the apparatus can be made of quartz, and teaches that quartz is a corrosion resistant material, and refers to column 12, lines 16 through 26 of Yamaga. On page 5 of the answer, the examiner additionally points out that in column 2, lines 30 through 46, Yamaga teaches that a manifold of quartz would solve the problem of corrosion and therefore it is an art recognized property of quartz.

Appellants' position for this rejection is set forth on pages 15 through 18 of the brief. Beginning on page 15 of the brief, appellants repeat similar arguments as provided with regard to the previous rejection. We are not convinced by such argument, for the reasons discussed, supra.

Appellants recognize that Yamaga teaches quartz-to-quartz interfaces. However, appellants argue that Yamaga does not teach

an O-ring or gasket may be used to form a seal at quartz-to-quartz interfaces. Brief, page 15.

We find that in column 12, beginning at line 15, Yamaga teaches that processing vessel 204, as depicted in Figure 9, can be formed of quartz. The processing vessel 204 is mainly configured of a quartz inner tube, that is not shown in the figure, and an outer tube, that is provided in a concentric manner, separated by a predetermined spacing from the inner tube. See column 12, lines 22 through 26 of Yamaga. A wafer boat, 208, for holding objects to be processed, can also be made of quartz. See column 12, lines 27 through 28. Figure 10 is discussed in column 12, beginning at line 43. Figure 10 depicts a cap portion 214. A protective layer made of quartz, 222, is formed on the upper surface of the stainless steel cap portion 214. Seal means 232 is provided at a connective portion between a lower edge flange portion 204a of the processing vessel 204 (wherein the processing vessel is made of quartz) and a peripheral portion of the cap portion 214 (wherein an upper surface of the cap portion is protected by a layer of quartz).

Hence, contrary to appellants' assertion, a seal exists at a quartz-to-quartz interface.

In view of the above, we determine the examiner has set forth a prima facie case of obviousness.

Accordingly, we affirm the 35 U.S.C. § 103 rejection of claims 2 and 8 as being obvious over Yamaga in view of Hamilton.

### III. Conclusion

Each of the rejections is affirmed.

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No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a)(1)(iv)(effective Sept. 13, 2004; 69 Fed. Reg. 49960 (Aug. 12, 2004); 1286 Off. Gaz. Pat., Office 21 (Sept. 7, 2004)).

**AFFIRMED**

Charles F. Warren	)	
Administrative Patent Judge	)	
	)	
	)	
	)	BOARD OF PATENT
Thomas A. Waltz	)	APPEALS AND
Administrative Patent Judge	)	INTERFERENCES
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	)	
Beverly A. Pawlikowski	)	
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