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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/293,346	12/02/2005	Ward Ruby	STI-002	3262
23410	7590	02/12/2013	EXAMINER	
Vista IP Law Group LLP 2040 MAIN STREET, Suite 710 IRVINE, CA 92614			LUND, JEFFRIE ROBERT	
			ART UNIT	PAPER NUMBER
			1716	
			MAIL DATE	DELIVERY MODE
			02/12/2013	PAPER

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* WARD RUBY, KURT VON DESSONNECK, and  
BRIAN MOECKLY

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Appeal 2011-007425  
Application 11/293,346  
Technology Center 1700

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Before RICHARD E. SCHAFER, BEVERLY A. FRANKLIN, and  
MICHAEL P. COLAIANNI, *Administrative Patent Judges*.

SCHAFER, *Administrative Patent Judge*.

DECISION ON APPEAL

Ward Ruby, Kurt Von Dessonneck, and Brian Moeckly (Applicants) appeal from an Examiner's decisions rejecting claims 1-5, 7, 9, 44-48, 53, and 54 under 35 U.S.C. § 103(a). 35 U.S.C. §§ 6(b) and 134(a). We affirm.

*EXEMPLARY CLAIMS*

Claim 1.

A heater for growing a thin film on substrates comprising:  
a plurality of heater elements configured to radiatively heat the substrates to a uniform temperature, wherein at least two of the plurality of heater elements are moveable with respect to one another;  
an oxygen pocket member at least partially surrounded by the plurality of heater elements; the oxygen pocket member comprising an upper surface and a lower surface and an opening extending between the upper surface and the lower surface, the opening being configured to provide access to a source chamber adapted to contain a source of flux, the upper surface of the oxygen pocket member including a recessed pocket therein, the recessed pocket being operatively connected to a pressurized oxidizer source, wherein the recessed pocket contains a localized region of pressurized oxidizer; and  
a substrate support member configured to hold the substrates, the substrate support member supportable on a vertically oriented spindle configured for rotation about an axis, the spindle being further configured for movement in the vertical direction so as to dynamically adjust a gap formed between the substrate support member and the upper surface of the oxygen pocket member during the process of thin film formation, the gap having a width small enough to minimize leakage of the pressurized oxidizer from the recessed pocket.

Brief, 23 (Claims Appendix).

Claim 44.

The heater of claim 1, further comprising  
a vertically oriented support plate;

a motor assembly mounted on the vertically oriented support plate, the motor assembly comprising a shaft operatively coupled to the spindle; and  
a moveable cam having first and second inclined surfaces configured to engage with the vertically oriented support plate, wherein movement of the cam against the vertically oriented support effectuates vertical movement of the support plate, motor assembly, and spindle.

Brief, 24-25 (Claims Appendix).

### *REJECTIONS*

In the Answer, the Examiner maintained the following rejections, all based on 35 U.S.C. § 103(a):

1. Claims 1-3, 5, 53, and 54 over the combined teachings of Matijasevic,<sup>1</sup> and Kuznetsov;<sup>2</sup>
2. Claim 7 over Matijasevic and Kuznetsov as applied to claims 1-3, 5, 53, and 54 combined with the teachings of Amano;<sup>3</sup>
3. Claim 9 over Matijasevic and Kuznetsov as applied to claims 1-3, 5, 53, and 54 combined with the teachings of Shrader;<sup>4</sup>
4. Claims 44-48 over Matijasevic and Kuznetsov as applied to claims 1-3, 5, 53, and 54, combined with the teachings of Oda;<sup>5</sup>
5. Claims 1-5, 53, and 54 over the combined teachings of Moeckly,<sup>6</sup> Kuznetsov, and Matijasevic;

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<sup>1</sup> Matijasevic, US Patent 6,527,866 B1.

<sup>2</sup> Kuznetsov, US Patent Application Publication 2003/0209200 A1.

<sup>3</sup> Amano, US Patent 6,565,662 B2.

<sup>4</sup> Shrader, US Patent 4,002,141.

<sup>5</sup> Oda, US Patent 6,606,154 B1.

<sup>6</sup> Moeckly, US Patent Application Publication 2005/0116204 A1.

6. Claim 7 over Moeckly, Kuznetsov, and Matijasevic applied to claims 1-5, 53, and 54 combined with Amano's teachings,

7. Claim 9 over Moeckly, Kuznetsov, and Matijasevic applied to claims 1-5, 53, and 54 combined with Shrader's teachings;

8. Claims 44-48 over Moeckly, Kuznetsov, and Matijasevic as applied to claims 1-5, 53, and 54 combined with Oda's teachings.

### *DISCUSSION*

#### **I. Rejections of Claims 1-3, 5, 7, 9, 53 and 54 relying on Matijasevic, Kuznetsov, Amano and Shrader**

Applicants contend that the Examiner erred in rejecting claims 1, 3-5, 7, 9, 53 and 54 because Matijasevic:

does not disclose or otherwise suggest any structure that is capable of dynamically adjusting in real time a gap formed between a substrate support holder and the recessed pocket of the oxygen pocket member (a feature in independent claims 1 and 53). Rather, Matijasevic . . . discloses that the gap is adjusted prior to beginning the deposition process. Col. 8, lines 58-59.

Brief, 8 (emphasis omitted).

We disagree. We find that Matijasevic suggests dynamically adjusting the gap between the substrate support holder and the recessed pocket:

In some instances, either the chamber 142 or the substrate holder 104 and rotation/support members 110 is movable to permit adjustment of the gap between the walls of the chamber 142 and the substrate holder 104. For example, the substrate holder 104 can be held using a bellows arrangement or some other adjustable arrangement that can be adjusted to move the substrate holder up or down to reduce the space between the substrate holder and the chamber walls, while still allowing free rotation. In some embodiments, the gap between the substrate holder 104 and the walls of the chamber 142 is no more than 2

mm and can be 0.5 mm or less. Typically, this adjustment is made prior to beginning the deposition process.

Matijasevic, 8:46-59 (emphasis added). Matijasevic's statement that the adjustment is "typically" made prior to the beginning of the deposition process is suggestive that the adjustment can be made dynamically, i.e., during the deposition process, even if it is not typical. In evaluating the teachings of the references it is appropriate to consider express teachings as well as the inferences one having ordinary skill in the art would be reasonably expected to draw. *In re Preda*, 401 F.2d 825, 826 (CCPA 1968). References are good for everything they teach by way of technology and are not limited to the particular invention they attempt to protect. *EWP Corp., v. Reliance Universal Inc.*, 755 F.2d 898, 907 (Fed. Cir. 1985), *cert. denied*, 474 U.S. 843 (1985). Applicants have not alleged or provided evidence that Matijasevic's disclosure is not enabling or is not capable of dynamic adjustment of the gap. The Matijasevic reference is a U.S. patent which is presumed valid. 35 U.S.C. § 282. Accordingly, the reference's specification is presumptively enabling as to everything disclosed therein including "non-typical" embodiments. *Accord, Renz v. Jacob*, 326 F.2d 792, 796 (CCPA 1964) (the filing of an application effects a constructive reduction to practice of everything disclosed therein regardless of what is claimed).

Applicants further contend that the Examiner erred in applying the teachings of the Kuznetsov reference. Brief, 12-15. The Examiner found that the difference between the subject matter of Claim 1 and Matijasevic was the use of movable heating elements. Answer, 5. The Examiner further found that Kuznetsov teaches a reactor that includes multiple heating elements that are moved apart when the reactor is loaded and unloaded. Answer, 5. The Examiner concluded that it would have been obvious to incorporate movable heating elements into Matijasevic's

heater to provide a method or alternative method of loading or unloading the heater. Answer, 6. Applicants have not challenged the Examiner's finding relating to Kuznetsov's teaching or the Examiner's conclusion based upon that finding. Rather, Applicants argue that because Matijasevic's heater heats by radiation and Kuznetsov's heats by conduction, one skilled in the art would not look to a device using conductive heating to improve a device that used radiant heating. Brief, 10.

On this point we agree with the Examiner's reasoning expressed in the paragraph bridging pages 19 and 20 of the Answer. Additionally, the Examiner relied upon Kuznetsov for the concept and the benefits of using moveable heating elements not for the specific type of heating. On this point we note that Matijasevic specifically teaches that multiple heaters can be used "to tailor the temperature to the particular desirable reaction or reaction rate in a particular reaction zone." Matijasevic, 9:39-42. Kuznetsov's adjustable heating elements allow the heating pattern applied to the substrate to be "tuned" to obtain the desired heating profile. Kuznetsov, ¶¶ 52-54. One having ordinary skill in the art would have recognized that Kuznetsov's heating element system would give greater control in tailoring the temperature profile used during thin film deposition with Matijasevic's apparatus. It would have been obvious to use adjustable heating elements in conjunction with Matijasevic's reactor.

Applicants also argue that Kuznetsov teaches against uniform heating of the substrate. Brief, 10-11. The Examiner disagreed. Answer, 20-21. We do not find this argument particularly relevant to the obviousness issue. One having ordinary skill in the art would understand the need to control the temperature to obtain the desired end result. In any event, the rejection is premised on employing the concepts involved in Kuznetsov's heating system, including moveable heater elements, in Matijasevic's reactor. As we noted above, the ability to have better

control over the heating conditions provides ample reason to use moveable heating elements as part of the heating system in Matijasevic's reactor. The use of moveable heating elements in conjunction with Matijasevic's reactor would have been obvious.

Applicants do not provide separate arguments as to the subject matter of Claims 2-3, 5, 53 and 54. We affirm the rejection of Claims 1-3, 5, 53 and 54.

With respect to the subject matter of Claims 7 and 9, Applicants contend only that the Amano and Shrader references do not remedy the alleged failure of Matijasevic and Kuznetsov to teach dynamic gap adjustment. Brief, 11-12. We held above that Matijasevic suggests a dynamically adjustable gap. We also affirm the rejections of Claims 7 and 9.

## **II. Rejection of Claims 44-48 relying on Matijasevic, Kuznetsov, and Oda**

Claims 44-48 depend from Claim 1. These claims add subject matter directed to the mechanism for vertically moving the spindle and adjusting the gap formed between the substrate support member and the upper surface of the oxygen pocket member during thin film formation. The mechanism includes a vertical support plate, a motor attached to the plate that drives the rotation of the spindle, and a cam that engages the support plate. The cam causes the support plate, motor and spindle to move vertically. The claims require that the cam have two surfaces inclined at different angles. The different angles cause the support plate to move at different vertical speeds.

The Examiner relies on Oda as suggesting the claimed mechanism. Answer, 7-10.

Applicants challenge the Examiner's reliance on Oda on three grounds:

1. That Oda relates to an inspection apparatus for a semiconductor wafer and not a semiconductor wafer or heater (Brief, 12-13);
2. Oda does not describe a motor coupled to the vertically oriented spindle that causes rotation of the spindle (Brief, 13-14); and
3. Oda does not teach a cam having first and second inclined surfaces (Brief, 14-15).

With respect to the first point, we agree with the Examiner's reasoning and conclusions on analogous art expressed on page 22 of the Answer. Applicants have not responded to the Examiner's arguments.

On the second point, Applicants do not argue that it would not have been obvious to substitute a known vertical adjustment mechanism of the type taught by Oda for Matijasevic's vertical adjustment mechanism. Rather, Applicants argue to the effect that physical substitution of Oda's adjustment mechanism into Matijasevic's would not result in the claimed mechanism. Specifically, according to Applicants, the substitution would not result in a motor coupled to a vertically oriented spindle that causes the shaft to rotate. Brief, 13-14.

It is well established that a determination of obviousness based on teachings from multiple references does not require an actual, physical substitution of elements. *In re Etter*, 756 F.2d 852, 859 (Fed. Cir. 1985) (en banc) ("Etter's assertions that Azure cannot be incorporated in Ambrosio are basically irrelevant, the criterion being not whether the references could be physically combined but whether the claimed inventions are rendered obvious by the teachings of the prior art as a whole."); *In re Sneed*, 710 F.2d 1544, 1550 (Fed. Cir. 1983) ("[I]t is not necessary that the inventions of the references be physically combinable to render obvious the invention under review."); *In re Keller*, 642 F.2d 413, 425 (CCPA

1981) (“The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference.”).

Oda shows a mechanism for providing vertical movement. One having ordinary skill in the art would have understood the theory and principles of operation of Oda’s vertical adjustment mechanism. It would have been within the skill of the art to make the relatively minor modifications necessary to adapt Oda’s device to provide vertical movement for Matijasevic’s spindle and motor. The combination of familiar elements according to known methods and that does no more than yield the predictable results is generally obvious. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007).

Applicants also argue that Oda fails to describe a moveable cam having two inclined surfaces that are configured to engage the vertical support and cause vertical movement. Oda, while depicting three cam surfaces, shown as 23a, 23b and 23c in Oda’s Figure 2 (not reproduced), only shows one inclined surface. On this point the Examiner concluded:

[I]f it is held that the Oda does not teach a first and second inclined surface, it would be obvious to one of ordinary skill in the art at the time the invention was made to provide a second inclined surface with the proper angle. The motivation to do so is to provide the desired rate of vertical movement to the spindle.

Answer, 9.

We think the Examiner’s reasoning is sound. One having ordinary skill in the art would understand the principles by which Oda’s cam movement translates into vertical movement of the support plate. In light of this understanding, using multiple cam inclines to provide different vertical speed capabilities would be within the skill of the art and obvious. The inclusion of multiple inclined plains

would provide no more than the predictable use of established functions. The inclusion of multiple inclined surfaces does not provide an unobvious distinction.

The Examiner's decision holding Claims 44-48 unpatentable is affirmed.

**III. Rejections of Claims 1-5, 7, 9, 44-48, 53 and 54 relying on Moeckly, Matijasevic, Kuznetsov, Amano, Shrader and Oda**

Applicants make a single argument with respect to all the rejections based on the Moeckly reference. Relying on the declarations of Ward Ruby and Brian Moeckly, two of the three named inventors of the involved application, Applicants argue only that the Moeckly reference is not prior art as to the involved application. Brief, 16-20.

Applicants are incorrect. The Examiner relied upon Moeckly as prior art available under, inter alia, 35 U.S.C. § 102(e): "2005/00116204 [Moeckly] is applied under 102a or e." Answer, 28. Under § 102(e)(1) an application by "another" published under § 122(b) and filed in the U.S. before the invention by the "applicant" is prior art to the applicant. The application that published as the Moeckly reference was filed on December 1, 2003, and was published pursuant to § 122(b). The only established date of invention for the subject matter of the involved application is its filing date, December 2, 2005. Thus, the earlier filing and publication requirements of § 102(e)(1) are met for the Moeckly publication.

Applicants argue that § 102(e) is not applicable with respect to the Moeckly reference because the Ward and Moeckly declarations identify "that the cited portions of [the Moeckly reference] is their own work." Brief, 16. However, that "work" has not been shown to be the work of the "applicant" of the involved application -- Von Dessonneck, Ruby and Moeckly.

An applicant may "remove" a reference considered to be prior art under § 102(e) by means of declarations or other evidence attributing the relevant

disclosure in the reference to the inventors named in the application. *In re DeBaun*, 687 F.2d 459, 463 (CCPA 1982). The relevant question in such cases is whether the applicant invented the relevant disclosure in the reference. *Id.* Stated in terms of the Moeckly reference, the question becomes: have the Applicants, i.e., Von Dessonneck, Ruby and Moeckly, demonstrated the relevant portions of the Moeckly reference to be their work? The declarations attribute the relevant portions only to Ruby and Moeckly. Ruby and Moeckly are “another” for the purposes of § 102(e) compared to Von Dessonneck, Ruby and Moeckly. *In re Land*, 368 F.2d 866, 875-76 (CCPA 1966) (“‘Another’ clearly means another than ‘the applicant(s).’”) The combination of Ruby and Moeckly, on the record before us, is not the same as the inventive entity of the involved application. The Moeckly reference remains the work of “another” compared to the Applicants (Von Dessonneck, Ruby and Moeckly).<sup>7</sup>

To the extent that the subject matter of some of the claims may be the invention only of Ruby and Moeckly (*see* 35 U.S.C. § 116), Applicants, not the Office, are uniquely in a position to provide information as to the inventorship of the individual claims and have not directed us to such information in the record. Nor have Applicants directed us to evidence showing that the conditions of 35 U.S.C. § 103(c) or 37 C.F.R. § 1.131 have been met.

The Examiner’s decisions rejecting Claims 1-5, 7, 9, 44-48, 53 and 54 relying on the Moeckly, Matijasevic, Kuznetsov, Amano, Shrader and Oda references are affirmed.

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<sup>7</sup> The same analysis would be applicable considering the Moeckly publication as prior art under § 102(a). The Moeckly published application is a printed publication known by others before Applicants’ “invention” (filing) date of November 2, 2005. Moeckly was published earlier on June 2, 2005 and thus publically known.

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*DECISIONS*

The Examiner's decisions rejecting Claims 1-5, 7, 9, 44-48, 53 and 54 under 35 U.S.C. § 103(a) are 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).

**AFFIRMED**

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