

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

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte MUTSUMI MASUMOTO

Appeal 2006-3286
Application 10/422,290
Technology Center 1700

Decided: January 27, 2007

Before EDWARD C. KIMLIN, THOMAS A. WALTZ, and
CATHERINE Q. TIMM, *Administrative Patent Judges*.

WALTZ, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on an appeal from the Primary Examiner's final rejection of claims 1 through 12 and 16 through 19, which are the only claims pending in this application. We have jurisdiction pursuant to 35 U.S.C. § 134.

According to Appellant, the invention is directed to a method of thinning a semiconductor wafer, where the wafer has two flat surfaces and a

round periphery between the flat surfaces. The method comprises selecting a generally circular support tape to place below the wafer, and thinning the wafer by removing semiconductor material from the second wafer surface until the intended thickness is achieved (Br. 2).¹ The diameter of the tape is selected to be greater than the diameter of the wafer at each side by an amount about equal to the length of the rounding at the edge of the wafer after thinning is accomplished (*id.*).

Appellant states that the claims should be considered as three groups (Br. 5). However, Appellant does not discuss each group of claims under a separate heading and only presents specific, substantive arguments regarding claims 1, 11, and 16 (e.g., Br. 6; Answer 2). Accordingly, we limit our consideration to claims 1, 11, and 16 to the extent these claims are separately argued. Illustrative independent claim 1 is reproduced below:

1. A method of thinning a semiconductor wafer having first and second flat surfaces of a first diameter and a rounded periphery between said flat surfaces, comprising the steps of:

selecting a generally circular support tape for said wafer, said tape having a second diameter;

selecting said second diameter to be greater than said first diameter by an amount about equal to the length of said peripheral wafer rounding as obtained in said wafer after said thinning step is completed;

placing said first flat wafer surface on said tape; and removing semiconductor material from said second wafer surface until the intended thickness is achieved.

¹ We refer to and cite from the “Response to Non-Compliant Appeal Brief” dated Apr. 19, 2006.

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

Xin	US 6,227,944 B1	May 08, 2001
Yamamoto	US 6,767,426 B1	Jul. 27, 2004

ISSUES ON APPEAL

The claims on appeal stand rejected under 35 U.S.C. § 103(a) as unpatentable over Yamamoto in view of Xin (Answer 3).

Appellant contends that neither reference discloses the selection of a support tape where the diameter of the tape is greater than the diameter of the wafer by an amount about equal to the length of the peripheral wafer rounding after thinning (Br. 6). Appellant also contends that the definition of the diameter of the wafer in this application is different from the diameter as disclosed by the applied references (Br. 7-9).

The Examiner contends that Yamamoto teaches that the diameter of a support tape layer for a semiconductor wafer in a thinning process may be greater than the diameter of the wafer surface while Xin teaches the advantages of providing a rounded periphery for each wafer (Answer 3).

Accordingly, we determine that the issue in this appeal is whether the combination of references disclose or suggest a support tape in a thinning process with the same relative diameter as required by claim 1 on appeal, based upon a rounded periphery between the surface edges of the wafer.

Based on the totality of the record, we AFFIRM this rejection on appeal essentially for the reasons stated in the Answer, as well as those reasons set forth below.

OPINION

The Examiner finds, and Appellant does not dispute, the following facts:

- (1) Yamamoto discloses a semiconductor wafer having first and second flat surfaces of a first diameter (Answer 3);
- (2) Yamamoto discloses a thinning process where semiconductor material may be removed from the second wafer surface by grinding or etching until the intended thickness is achieved (*id.*);
- (3) Yamamoto teaches that a support tape having a second diameter may be used, where the second diameter is greater than the first diameter (*id.*);
- (4) Yamamoto does not disclose that the periphery between the wafer edges may be rounded (*id.*); and
- (5) Xin teaches that the peripheral edge of each wafer may first be rounded before further processing in order to reduce the risk of wafer damage during this processing (*id.*).

It is well-established that before a conclusion of obviousness may be made based on a combination of references, there must have been a reason, suggestion, or motivation to lead an inventor to combine these references.

See Pro-Mold and Tool Co. v. Great Lakes Plastics, Inc., 75 F.3d 1568, 1573, 37 USPQ2d 1626, 1629 (Fed. Cir. 1996). “When relying on numerous references or a modification of prior art, it is incumbent upon the examiner to identify some suggestion to combine references or make the modification. [Citation omitted].” *In re Mayne*, 104 F.3d 1339, 1342, 41 USPQ2d 1451, 1454 (Fed. Cir. 1999).

We determine that the Examiner has clearly identified a reason or motivation to combine the references, namely the advantage of providing peripheral rounding of wafer edges to avoid the risk of wafer damage during subsequent processing (Answer 3). We note that Appellant does not dispute this teaching of Xin but merely argues that no rounding is evident in Figure 3 of Xin (Br. 7). However, we note that a reference is not limited to its examples but is available for all that it discloses or suggests to one of ordinary skill in the art. *See In re Widmer*, 353 F.2d 752, 757, 147 USPQ 518, 523 (CCPA 1965). Additionally, we determine that Xin teaches that such rounding is conventional in this art (col. 1, ll. 20-23), and rounding is specifically taught for the Xin process, although not shown (col. 4, ll. 1-4).

Appellant's arguments regarding the determination of diameters in the references as opposed to the diameters recited in the claims on appeal are also not persuasive. Yamamoto specifically teaches that the protective tape is cut into the "approximately same shape as the wafer" but may be cut into a shape having a diameter larger than the outer diameter of the wafer (col. 8, ll. 9-12; *see also* col. 2, ll. 45-47). We determine that Xin discloses that one surface of the wafer can be covered with a protective tape, where the tape adheres to the front surface of the wafer but can be removed after the back surface damaging (thinning) operation (col. 5, ll. 4-10). We further determine that Xin teaches that the protective layer covering the front surface functions to "protect(s) the front surface against damaging engagement" with the belt of the pressure jetting machine (or other apparatus used for thinning) (col. 5, ll. 40-42). We thus determine that it would have been obvious to one of ordinary skill in this art to employ a tape with a diameter that would accomplish the function desired for the tape

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layer, namely to protect and support one side of the wafer and any peripheral edge that was not being thinned, i.e., protect the wafer up to the point of thinning.

For the foregoing reasons and those reasons stated in the Answer, we determine that the Examiner has established a *prima facie* case of obviousness in view of the reference evidence. Based on the totality of the record, including due consideration of Appellant's arguments, we determine that the preponderance of evidence weighs most heavily in favor of obviousness within the meaning of § 103(a). Accordingly, the rejection of claims 1-12 and 16-19 under § 103(a) over Yamamoto in view of Xin is affirmed.

The decision of the Examiner is 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)(2007).

AFFIRMED

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