

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 13

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JUN-KAI PENG, WEI-KUN YEH
and CHIARN-LUNG LEE

Appeal No. 2001-1700
Application No. 09/160,964

ON BRIEF

Before, OWENS, WALTZ and KRATZ, Administrative Patent Judges.
KRATZ, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's final rejection of claims 1-7, which are all of the claims pending in this application.

BACKGROUND

Appellants' invention relates to a method for processing a semiconductor wafer wherein an anisotropic etch forms a groove in a device surface thereof. The groove has

substantially vertical sidewalls meeting the device surface and sharp edges. The sharp edges are rounded, such as by an isotropic etch, so that the removal of a subsequently applied grinding tape is carried out while avoiding a residue of adhesive being left on the device surface. Exemplary claim 1 is reproduced below.

1. A method for processing a semiconductor wafer having a device surface and a back surface, the method comprising,
 - etching the device surface with an anisotropic etch to form a groove with substantially vertical side walls and sharp edges where the side walls meet the device surface of the wafer,
 - etching the device surface with an isotropic etch to form rounded edges where the edges were previously sharp,
 - and after the etching steps, applying a grinding tape to the device surface of the wafer to protect the device side of the wafer during a subsequent step of grinding the back of the wafer, the grinding tape having an adhesive layer formed on a backing layer, and then grinding the back surface of the wafer to give the wafer a selected thickness,
 - and removing the grinding tape and avoiding a residue of adhesive that would otherwise occur when sharp etched edges of the passivation layer cut into the adhesive layer of the grinding tape.

The prior art references of record relied upon by the examiner in rejecting the appealed claims are:

Farnworth et al. (Farnworth)	5,593,927	Jan.
14, 1997		

Peng et al. (Peng)
1998

5,731,243

Mar. 24,

(filed Sep. 05, 1995)

Claims 1-7 stand rejected under 35 U.S.C. § 103 as being unpatentable over Peng in view of Farnworth.¹

We refer to the brief and to the answer for the opposing viewpoints expressed by appellants and by the examiner concerning the above-noted rejection.

OPINION

¹ The examiner refers to several alleged well known features at page 3 of the final rejection and pages 5 and 6 of the answer. The answer, for the first time, also refers to page 3, lines 10-19 of the specification as representing admitted prior art pertaining to forming rounded edges by isotropic etching in an apparent attempt to support at least one of the alleged well known features. That portion of the specification discusses alleged features of U.S. Patent No. 5,246,883 of Lin et al. We do not consider that patent (U.S. Patent No. 5,246,883) or the so called admitted prior art referenced in the answer as being before us in our consideration of the examiner's rejection (see answer, pages 2 and 3). This is so since the examiner's stated rejection (answer, page 2) does not list U.S. Patent No. 5,246,883 and alleged admitted prior art at page 3, lines 10-19 of the specification as part of the evidence being relied upon. See *In re Hoch*, 428 F.2d 1341, 1342 n.3, 166 USPQ 406, 407 n.3 (CCPA 1970). Consequently, those references have not been considered in reaching our decision.

Upon careful review of the entire record including the respective positions advanced by appellants and the examiner, we find ourselves in agreement with appellants in so far as the examiner has failed to carry the burden of establishing a prima facie case of obviousness. See In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992); In re Piasecki, 745 F.2d 1468, 1471-1472, 223 USPQ 785, 787-788 (Fed. Cir. 1984). Accordingly, we will not sustain the examiner's rejection. Our reasoning follows.

We note that all of the claims on appeal require a method that includes a step of rounding (such as by isotropic etching) sharp edges formed at a semiconductor wafer device surface at the location where substantially vertical sidewalls of a groove formed by anisotropic etching meet that surface. The examiner (answer, page 4) acknowledges that Peng does not teach such a step. According to the examiner (answer, page 4),

In a method for semiconductor device fabrication, Farnworth teaches that the protective layer may be formed with rounded edge to avoid damage to the protective layer or electrical connectors (column 5, lines 1-9). Hence, one skilled in the art at the time of the invention would have found it obvious to modify Peng by using

the rounded edge as taught by Farnworth in order to avoid any interference that would result in any damages caused by sharp edges (e.g., delamination of passivation layer, or scratches on the inserted connectors). Therefore, to one skilled in the art, it would be obvious that any damages, including residue of adhesive, caused by sharp edges could be avoided when the edges are rounded.

Farnworth is directed to a packaging semiconductor device wherein an additional protective layer (36, figure 3) is formed on a die and the die is placed in a die cavity (76, figure 5) of a multi-die holder. See, for example, the abstract, column 3, lines 1-10 and column 4, lines 31-39 of Farnworth. Farnworth (column 4, line 49 through column 5, line 9) is concerned with protecting the face of the die and circuitry formed thereon from damage during insertion of the die in the die cavity of the die holder.

As found by the examiner and noted above, Peng does not disclose using a rounding step as herein claimed for avoiding adhesive residues from a taping process remaining on a wafer surface at sharp edges of an opening formed in the wafer surface by anisotropic etching. Nor has the examiner fairly explained why the disparate teachings of Farnworth concerning protecting a die during a packaging process would have led one

of ordinary skill in the art to modify the method of Peng so as to arrive at the claimed subject matter, including the above-noted limitations. "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 those references." Pro-Mold and Tool Co. v. Great Lakes Plastics Inc., 75 F.3d 1568, 1573, 37 USPQ2d 1626, 1629 (Fed. Cir. 1996). The examiner (answer, pages 4-6) has only made general statements regarding the applicability of the rounded edges of a protective layer for a die in Farnworth in the semiconductor wafer processing method of Peng without persuasively specifying why one of ordinary skill in the art would have been led by any particular disclosure of Farnworth to modify the particular method of Peng so as to arrive at the herein claimed subject matter. The examiner has not fully set forth why one of ordinary skill in the art would have found the tapered edge (37, figure 4) or rounded edges of window (60, figure 4) of the protective layer (36, figure 4) of the dice of Farnsworth (column 5, lines 1-9 of Farnsworth and page 4 of the answer), which are disclosed as having certain advantages

during the packaging of the dice of Farnworth in a multi-die holder, suggestive of a rounding step following the formation of opening (32, figure 5 and column 3, lines 43-46) of Peng. Nor do the alleged well known features asserted by the examiner cure this deficiency. The examiner must provide specific reasons or suggestions for combining the particular teachings and disclosures of the applied references. In this context, the examiner's rejection falls short in not identifying a convincing and particularized suggestion, reason or motivation to combine the references or make the proposed modification in a manner so as to arrive at the claimed invention. See In re Rouffet, 149 F.3d 1350, 1359, 47 USPQ2d 1453, 1459 (Fed. Cir. 1998).

For the foregoing reasons, we determine that the examiner has not established a prima facie case of obviousness in view of the reference evidence.

CONCLUSION

The decision of the examiner to reject claims 1-7 under

35 U.S.C. § 103 as being unpatentable over Peng in view of
Farnworth is reversed.

REVERSED

TERRY J. OWENS)	
Administrative Patent Judge)	
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)	BOARD OF PATENT
THOMAS A. WALTZ)	APPEALS
Administrative Patent Judge)	AND
)	INTERFERENCES
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Administrative Patent Judge)	

PFK/sld

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APPEAL NO. - JUDGE KRATZ
APPLICATION NO.

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DECISION: **ED**

Prepared By:

DRAFT TYPED: 09 Oct 02

FINAL TYPED: