

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. 17

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte YU-CHONG TAI, FUKANG JIANG,
and
CHIHMING HO

Appeal No. 2003-0799
Application No. 09/567,818

ON BRIEF

Before GARRIS, TIMM, and MOORE, *Administrative Patent Judges*.
TIMM, *Administrative Patent Judge*.

DECISION ON APPEAL

This appeal involves claims 1 and 3-5 which are all the claims pending in the application.
We have jurisdiction over the appeal pursuant to 35 U.S.C. § 134.

INTRODUCTION

Claim 1 is illustrative of the subject matter on appeal:

1. A flexible microelectronic device, comprising:

a plurality of silicon islands having substantially vertical sidewalls formed by RIE;

a lower polyimide layer which covers a lower surface of each of said silicon islands and at least partially fills gaps between silicon islands, said polyimide layer coming into contact with said sidewalls; and

an upper polyimide layer which covers an upper surface of each silicon island.

The Examiner maintains a rejection of all the claims under 35 U.S.C. § 103(a). As evidence of obviousness, the Examiner relies upon the combination of U.S. Patent 4,587,719 issued to Barth on May 13, 1986 (Barth) in combination with the Admitted Prior Art (APA)(specification: Figs. 1A-1C, Brief Description of Figs. 1A-1C, and p. 6).

Appellants state that none of the claims stand or fall together (Brief, p. 3). In so far as the claims are separately argued in conformance with 37 CFR § 1.192(c)(8)(2001), we will consider them separately.

We affirm the rejection with respect to the subject matter of claims 1, 4, and 5. Because we conclude that claim 3 is indefinite such that a review with regard to obviousness is not possible, we procedurally reverse with regard to claim 3 and enter a new ground of rejection under 35 U.S.C. § 112, ¶ 2 as per our authority under 37 CFR § 1.196(b)(2002). Our reasons follow.

OPINION

Claim 1

Claim 1 is directed to a device. In terms of structure, the device must have silicon islands “having substantially vertical sidewalls” as well as a lower polyimide layer and an upper polyimide layer.

Appellants do not dispute that Barth describes a device having silicon islands and the upper and lower polyimide layers required by the claim. Instead, Appellants argue that the use of RIE to form substantially vertical sidewalls on the silicon islands is not taught by Barth, either alone or in view of the APA and that the Examiner’s rejection is based on hindsight (Brief, pp. 4-5).

First, we note that the words “formed by RIE” do not serve to restrict the device to one formed using that specific process. “The patentability of a product does not depend on its method of production.” *In re Thorpe*, 777 F.2d 695, 697, 227 USPQ 964, 966 (Fed. Cir. 1985). The device of the claim must have “substantially vertical sidewalls” however they are made.

Second, the APA cited by the Examiner provides evidence that three etching processes were known for forming silicon islands: (1) an isotropic HNA etching process which results in the structure shown in Figure 1A, (2) a caustic anisotropic etching process which results in the structure of Figure 1B, and (3) a combination of anisotropic and reactive ion etching (RIE) which results in the structure of Figure 1C (specification, pp. 5-6).

Barth does not specify what type of etching is used to form the silicon islands described therein (Barth, col. 3, ll. 63-64 merely specifies etching). Selection of one of the three etching processes which Appellants' specification indicates were known in the art would have been obvious to one of ordinary skill. The use of the combination anisotropic etching and RIE process depicted in Figure 1C would have resulted in silicon islands with substantially vertical sidewalls. Appellants themselves indicate that RIE results in the shape shown in Fig. 1B and 1C (specification, p. 8, ll. 1-3) and no particular definition for "substantially vertical" is provided in the specification. We, therefore, agree with the Examiner's conclusion that the prior art as a whole suggests the device of claim 1.

Appellants argue that the claimed device with the substantially vertical sidewalls provides a special advantage that is not in any way taught or suggested by Barth alone or in view of the APA. But that there is some additional advantage does not render the device unobvious. "[T]he motivation in the prior art to combine the references does not have to be identical to that of the applicant to establish obviousness." *In re Kemps*, 97 F.3d 1427, 1430, 40 USPQ2d 1309, 1311 (Fed. Cir. 1996). It is enough that some reason, suggestion or motivation exists in the prior art taken as a whole for making the combination. *In re Beattie*, 974 F.2d 1309, 1312, 24 USPQ2d 1040, 1042 (Fed. Cir. 1992). Here, there was reason for one of ordinary skill in the art to seek out known etching processes for conducting the etching of Barth and Appellants' specification indicates that the combination of anisotropic etching and RIE was known for this

use. Thus, there is a suggestion for the combination within the prior art. We, therefore, are unpersuaded by Appellants' argument.

Claim 4

Appellants argue that the aluminum patches of claim 4 are not taught or suggested by the cited prior art. Barth describes conductive metal patterns 10, 12 interconnecting device contacts 12, 16 with external contacts 18, 20 which are covered by polyimide upper and lower layers 22, 23 (Barth, col. 3, ll. 37-42). These conductive metal patterns extend across the gap between the silicon islands 24, 26 as shown in Figs. 1A and 1B. While Barth does not identify the metal used, the APA indicates that metal leads were conventionally formed of aluminum (Figs 1A-1C, specification, p. 7, ll. 12-14). We, therefore, agree with the Examiner's conclusion that it would have been obvious to one of ordinary skill in the art to have selected aluminum for the metal patterns of Barth as such a selection was conventional in the art.

Claim 5

Appellants argue that the cited prior art does not teach or suggest the at least one MEMS device of claim 5 in combination with the specific islands used (Brief, p. 7). As pointed out by the Examiner, Barth describes a MEMS device such as a thermometer array probe (Barth, col. 2, ll. 5-8). We, therefore, agree with the Examiner's conclusion that the subject matter of claim 5 would have been obvious to one of ordinary skill in the art at the time of the invention.

As a final point, we note that Appellants base no arguments upon objective evidence of non-obviousness such as unexpected results. We conclude that the Examiner has established a

prima facie case of obviousness with respect to the subject matter of claims 1, 4 and 5 which has not been sufficiently rebutted by Appellants.

Claim 3

In regard to claim 3, we make the following new ground of rejection: Claim 3 is rejected under 35 U.S.C. § 112, ¶ 2.

According to 35 U.S.C. § 112, ¶ 2, “[t]he specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.” To meet the requirements of this portion of §112, it must be clear, from a reading of the specification that (1) the invention set forth in the claim is what “the applicant regards as his invention” and (2) the bounds of the claim can be understood by those of ordinary skill in the art. *Allen Eng’g Corp. v. Bartell Indus., Inc.*, 299 F.3d 1336, 1348, 63 USPQ2d 1769, 1775 (Fed. Cir. 2002).

Claim 3 is directed to a flexible microelectronic device including, in addition to silicon islands, a “lower polyimide layer”, an “upper polyimide layer” and “another polyimide layer.” Claim 3 also requires the inclusion of “at least one aluminum patch.”

Looking to the specification to determine how the device is described therein, we note that the specification does not use the terminology “lower”, “upper” or “another” to describe the various polyimide layers. Nor is any aluminum element described as a “patch.” Instead, the specification describes a device with “first polyimide layer 210,” “second polyimide layer 214,” and “third polyimide layer 224.” (specification, p. 7). There are two aluminum layers: a “first

aluminum layer 206 which is patterned” and a “second aluminum layer 212.” (specification, p. 7).

The differences in terminology coupled with how placement of various layers is described in the claim render the claim indefinite and also indicate that Appellants are not claiming what they regard as their invention. Particularly, it is not clear which of the polyimide layers are encompassed by the “upper polyimide layer” and “another polyimide layer” language of the claim and which aluminum layer is encompassed by the “aluminum patch” language of the claim. Claim 3 requires that at least one aluminum patch be encased between the upper polyimide layer and another polyimide layer. The specification does not describe any aluminum structure as encased by polyimide layers nor is the claimed configuration apparent from the figures. Figures 2B and 2C depict patterned aluminum 206 between the front side 208 of the silicon wafer upon which silicon nitride 204 is used as a mask and first polyimide layer 210 (specification, p. 7, ll. 3-12). Patterned aluminum 206, therefore, appears to be encased by silicon nitride and polyimide layers, not two polyimide layers. Second aluminum layer 212 is not encased by any layers. Moreover, it is not clear if “another polyimide layer” refers to a third layer of polyimide or if this language is meant to encompass the lower polyimide layer.

With regard to the examiner's rejection of claim 3 as obvious, it is our view that since the appealed claim is indefinite and indeterminate in scope for the reasons stated above, it is not possible to apply the prior art to this claim in deciding patentability without disregarding portions of the express wording of the claim and thus resorting to speculation and conjecture as

to the particular invention defined therein. We, therefore, procedurally reverse with respect to claim 3. *See In re Wilson*, 424 F.2d 1382, 165 USPQ 494 (CCPA 1970) and *In re Steele*, 305 F.2d 859, 134 USPQ 292 (CCPA 1962). We make no determination at this time with regard to the merits of the obviousness rejection.

OTHER ISSUES

Upon further prosecution, correction of the drawings and specification with regard to the reference numerals is required. Specifically, numeral 200 referring to the back side of a Si wafer is not contained in Figures 2A and 2C (specification, p. 7, ll. 3-4 and 16-17). The specification refers to silicon nitride as numeral 204 at one location (specification, p. 7, ll. 4-5) and as numeral 205 in another location (specification, p. 7, ll. 8). Numeral 205 points, in Figure 2B, to a layer designated as the second aluminum layer 212. The layer labeled “nitride or dielectric” in Figure 2A and designated as “silicon nitride 204” in the specification is labeled “polyimide” in Figure 2B. Moreover, Figures 3A-3H contain none of the reference numerals discussed in the specification.

CONCLUSION

To summarize, the decision of the Examiner to reject claims 1, 4, and 5 under 35 U.S.C. § 103(a) is affirmed. The decision of the Examiner to reject claim 3 is procedurally reversed and we enter a new ground of rejection under 35 U.S.C. § 112, ¶ 2 as per our authority under 37 CFR § 1.196(b)(2002).

This decision contains a new ground of rejection pursuant to 37 CFR § 1.196(b)(amended effective Dec. 1, 1997, by final rule notice, 62 Fed. Reg. 53,131, 53,197 (Oct. 10, 1997), 1203 Off. Gaz. Pat. & Trademark Office 63, 122 (Oct. 21, 1997)). 37 CFR § 1.196(b) provides that "[a] new ground of rejection shall not be considered final for purposes of judicial review."

37 CFR § 1.196(b) also provides that the appellant, ***WITHIN TWO MONTHS FROM THE DATE OF THE DECISION***, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of proceedings (37 CFR § 1.197(c)) as to the rejected claims:

(1) Submit an appropriate amendment of the claims so rejected or a showing of facts relating to the claims so rejected, or both, and have the matter considered by the examiner, in which event the application will be remanded to the examiner. . . .

(2) Request that the application be reheard under § 1.197(b) by the Board of Patent Appeals and Interferences upon the same record. . . .

Should the appellants elect to prosecute further before the Primary Examiner pursuant to 37 CFR § 1.196(b)(1), in order to preserve the right to seek review under 35 U.S.C. §§ 141 or 145 with respect to the affirmed rejection, the effective date of the affirmance is deferred until conclusion of the prosecution before the examiner unless, as a mere incident to the limited prosecution, the affirmed rejection is overcome.

If the appellants elect prosecution before the examiner and this does not result in allowance of the application, abandonment or a second appeal, this case should be returned to the

Board of Patent Appeals and Interferences for final action on the affirmed rejection, including any timely request for rehearing thereof.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED-IN-PART, 196(b)

BRADLEY R. GARRIS)	
Administrative Patent Judge)	
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)	BOARD OF PATENT
CATHERINE TIMM)	APPEALS
Administrative Patent Judge)	AND
)	INTERFERENCES
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