

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 71

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte TAKAYUKI MATSUKAWA

Appeal No. 96-1567
Application No. 08/112,914¹

ON BRIEF

Before THOMAS, FLEMING, and DIXON, **Administrative Patent Judges**.
DIXON, **Administrative Patent Judge**.

DECISION ON APPEAL

This is a decision on appeal from the Examiner's final rejection of claims 13, 15 and 16, which are all of the claims pending in this application.

We REVERSE.

¹ Application for patent filed August 27, 1993. Appellant states that this application is a continuation of Serial No. 07/609,146 filed November 5, 1990 which is a continuation of Serial No. 07/344,511 filed April 20, 1989 which is a continuation of Serial No. 07/041,672 filed April 23, 1987.

BACKGROUND

The appellant's invention relates to a semiconductor trench isolation structure. The trench is formed and manufactured in a manner to avoid any offset thereby avoiding a steep step in a transistor region which would increase the leakage current of the transistor. An understanding of the invention can be derived from a reading of exemplary claim 13, which is representative of the claimed invention and reproduced below:

13. A semiconductor device for supporting a plurality of mutually electrically isolated semiconductor elements, comprising:

a semiconductor substrate of a first conductivity type having a major surface; and

an isolation structure for electrically isolating semiconductor elements on said substrate from each other, the isolation structure including

(a) a plurality of island regions for said semiconductor elements, separated by trenches formed on the major surface of said semiconductor substrate, each of said trenches including first and second substantially parallel opposed sidewalls and a bottom surface, said first opposed sidewall being of at least a given width within a common plane;

(b) a first isolated oxide film formed on said first opposed sidewall and extending from said bottom surface of said trench to said major surface, said first isolated oxide film

limited to less than the given width of said first opposed sidewall and spaced apart from said second opposed sidewall;

(c) a second isolated oxide film formed on the bottom surface of said each trench and connected to said first isolated oxide film; and

(d) a third isolated oxide film formed on the major surface of said semiconductor substrate and in contact [with] said first isolated oxide film at the upper edge of said first sidewall of said trench.

The prior art reference of record relied upon by the Examiner in rejecting the appealed claims is:

Koyanagi US 5,021,842 Jun. 04, 1991
(Eff. Filing Date Apr. 16, 1984)

Claims 13, 15 and 16 stand rejected under 35 U.S.C. § 103 as being unpatentable over Koyanagi.

Rather than reiterate the conflicting viewpoints advanced by the Examiner and the appellant regarding the above-noted rejection, we make reference to the Examiner's answer (Paper No. 65, mailed June 27, 1995) for the Examiner's complete reasoning in support of the rejections, and to the appellant's brief (Paper No. 64, filed May 30, 1995) for the appellant's arguments thereagainst.

OPINION

In reaching our decision in this appeal, we have given careful consideration to the appellant's specification² and claims, to the applied prior art reference, and to the respective positions articulated by the appellant and the Examiner. As a consequence of our review, we make the determinations which follow.

As pointed out by our reviewing court, we must first determine the scope of the claim. "[T]he name of the game is the claim." *In re Hiniker Co.*, 150 F.3d 1362, 1369, 47 USPQ2d 1523, 1529 (Fed. Cir. 1998).

In rejecting claims under 35 U.S.C. § 103, the Examiner bears the initial burden of presenting a *prima facie* case of obviousness. **See In re Rijckaert**, 9 F.3d 1531, 1532, 28 USPQ2d 1955, 1956 (Fed. Cir. 1993). A *prima facie* case of obviousness is established by presenting evidence that the reference teachings would appear to be sufficient for one of ordinary skill in the relevant art having the references before him to make the proposed combination or other modification. **See In re Lintner**, 458 F.2d 1013, 1016, 173 USPQ 560, 562 (CCPA 1972). Furthermore, the conclusion that the

² We note that this application has been pending for an extended period of time and that the specification and drawings contain a number of spelling errors and mislabeling of drawing legends which makes it difficult to easily understand the invention.

claimed subject matter is *prima facie* obvious must be supported by evidence, as shown by some objective teaching in the prior art or by knowledge generally available to one of ordinary skill in the art that would have led that individual to combine the relevant teachings of the references to arrive at the claimed invention. **See In re Fine**, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988).

After a careful review of the record in this case, we are compelled to agree with appellant that the Examiner's conclusion of obviousness is not supported by the types of factual findings necessary to reach this conclusion. Our reading of the Examiner's reasons for the determination of obviousness causes us to conclude that the Examiner merely believes the claimed invention to be obvious because it seems that it would have been obvious. The Examiner attached marked up copies of the prior art figures 6a, 6b 18a and 18b which were relied upon by the Examiner to teach the relative orientation of the invention as set forth in claim 13. We have reviewed the Examiner's interpretation of the prior art teaching and do not find that the combination of limitations set forth in claim 13 are met by the teachings of Koyanagi.

Appellant argues that Koyanagi does not teach the limitation "a first isolated film limited to less than the given width of the first opposed sidewall within a common

plane.” (See brief at page 6 and reply at pages 2-3.) This argument is a combination of two separate limitations found in claim 13. The first limitation is that “said first opposed sidewall being of at least a given width within a common plane” (paragraph (a)) and “said first isolated oxide film limited to less than the given width of said first opposed sidewalls and spaced apart from said second opposed sidewalls” (paragraph (b)). In the two embodiments of Koyanagi that the Examiner discusses, we disagree with the Examiner’s characterization and interpretation of the orientation of the teaching. No matter how the examiner defines the “first sidewall” and “given distance” the oxide film is over the entire surface of the trench sidewalls according to the teachings of Koyanagi. Therefore, the limitation of “less than the given width” cannot be satisfied.

To define the “first sidewall” as the entire portion of the “C” shaped trench, as the Examiner did in Figure 6a, 6b, 18a and 18b would not meet the limitation set forth in paragraph (a) that the sidewalls are substantially parallel. With the Examiner’s definition of the “first sidewall,” a portion thereof would be perpendicular to the second sidewall. Therefore, the first sidewall may be only that portion which is parallel and in a common plane. On that portion of the sidewall, the oxide film covers the entire width of the sidewall.

Therefore, Koyanagi does not teach "said first isolated oxide film limited to less than the given width of said first opposed sidewall" as set forth in claim 13.

The Examiner's answer is silent in responding to this argument beyond the marked up Figures of the prior art to Koyanagi discussed above. Therefore, we agree with appellant in the absence of a clear teaching or suggestion in the prior art or a convincing line of reasoning by the Examiner.

In reaching our decision in this appeal, we have given careful consideration to the appellant's specification and claim, to the applied prior art reference, and to the respective positions articulated by the appellants and the Examiner. Upon evaluation of all the evidence before us, it is our conclusion that the evidence adduced by the Examiner is not sufficient to establish a *prima facie* case of obviousness with respect to claim 13. Accordingly, we will not sustain the Examiner's rejection of claim 13 under 35 U.S.C. § 103.

Since all the limitations of independent claim 13 are not taught or suggested by the applied prior art, we cannot sustain the Examiner's rejection of appealed claims 15 and 16 which depends therefrom, under 35 U.S.C. § 103.

CONCLUSION

To summarize, the decision of the Examiner to reject claim 13, 15 and 16 under 35 U.S.C. § 103 is reversed.

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

REVERSED

JAMES D. THOMAS)	
Administrative Patent Judge)	
)	
)	
)	
)	BOARD OF PATENT
MICHAEL R. FLEMING)	APPEALS
Administrative Patent Judge)	AND
)	INTERFERENCES
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JOSEPH L. DIXON)	
Administrative Patent Judge)	

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Appeal No. 96-1567
Application No. 08/112,914

Page 9

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APPEAL NO. 96-1567 - JUDGE DIXON
APPLICATION NO. 08/112,914

APJ DIXON

APJ FLEMING

APJ THOMAS

DECISION: **REVERSED**

Prepared By: Vasco

DRAFT TYPED: 21 Mar 00

FINAL TYPED: