

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.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. 20

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte IH-CHIN CHEN

Appeal No. 1998-2884
Application No. 08/495,960

ON BRIEF

Before JERRY SMITH, RUGGIERO, LEVY, Administrative Patent Judges

RUGGIERO, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on the appeal from the final rejection of claims 13-19, 21-26, and 28, which are the only claims remaining in the application.

The disclosed invention relates to semiconductor fabrication processes and particularly to a method of forming a trench isolation structure in a stack trench capacitor

fabrication process.

Representative claim 22 is reproduced as follows:

22. A method of making a semiconductor device having a trench isolation structure formed in a stack trench capacitor fabrication process, comprising the steps of:

forming an interface layer onto a semiconductor substrate;

forming a buffer layer onto the interface layer;

forming a trench region through the interface layer, the buffer layer, and into the semiconductor substrate;

forming a trench wall layer on interior walls of the trench region, the trench wall layer being in contact with a remaining interface layer on the semiconductor substrate;

forming a conductive trench filler layer onto the trench wall layer within the trench region;

forming a dielectric layer onto the trench filler layer within the trench region;

forming a conductive layer onto the dielectric layer within the trench region;

forming a trench cap layer on the conductive layer such that the trench filler layer, the dielectric layer, and the conductive layer are surrounded by the trench wall layer and the trench cap layer; and

forming a well structure on either side of the

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trench isolation structure such that said trench
isolation structure provides inter-well isolation.

The Examiner relies on the following prior art:

1986	Iranmanesh	4,621,414	Nov. 11,
1987	Okada et al. (Okada)	4,700,464	Oct. 20,

Claims 13-19 and 21 stand finally rejected as being based on an inadequate disclosure under the first paragraph of 35 U.S.C.

§ 112. Claims 13-19 and 21 also stand finally rejected under 35 U.S.C. § 112, second paragraph, for failure to particularly point out and distinctly claim the invention. Claims 22-26 and 28 stand finally rejected under 35 U.S.C. § 103(a) as being unpatentable over Iranmanesh in view of Okada.

Rather than reiterate the arguments of Appellant and the Examiner, reference is made to the Briefs¹ and Answer for the

¹The Appeal Brief was filed May 12, 1997. In response to the Examiner's Answer dated October 17, 1997, a Reply Brief was filed December 22, 1997, which was acknowledged and entered by the Examiner as indicated in the communication dated March 2, 1998.

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respective details thereof.

OPINION

We have carefully considered the subject matter on appeal, the rejections advanced by the Examiner, the arguments in support of the rejections and the evidence of obviousness relied upon by the Examiner as support for the prior art rejection. We have,

likewise, reviewed and taken into consideration, in reaching our decision, Appellant's arguments set forth in the Briefs along with the Examiner's rationale in support of the rejections and arguments in rebuttal set forth in the Examiner's Answer.

Although Appellant has nominally asserted (Brief, page 4) the separate patentability of each of the claims on appeal, separate arguments have been provided only for independent claims 13, 15, and 22. We will consider the appealed claims separately only to the extent that separate arguments are of record in this appeal.

Dependent claims 14, 16-19, 21, 23-26, and 28 have not been argued separately in the Briefs and, accordingly, will stand

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or fall with their base claim. Note In re King, 801 F.2d 1324, 1325, 231 USPQ 136, 137 (Fed. Cir. 1986); In re Sernaker, 702 F.2d 989, 991, 217 USPQ 1, 3 (Fed. Cir. 1983).

It is our view, after consideration of the record before us, that the disclosure in this application describes the claimed invention in a manner which complies with the requirements of the first paragraph of 35 U.S.C. § 112. We are also of the view that the claims particularly point out the invention in a manner which

complies with 35 U.S.C. § 112, second paragraph. We are of the conclusion, however, that the evidence relied upon and the level of skill in the particular art would have suggested to one of ordinary skill in the art the obviousness of the invention as set forth in claims 22-26 and 28. Accordingly, we affirm-in-part.

With respect to the 35 U.S.C. § 112, first paragraph, rejection, we note that the Examiner, instead of relying on the "written description" or "enablement" language of the

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statute, has used the terminology "lack of support" in the statement of the rejection. Our reviewing court has made it clear that written description and enablement are separate requirements under the first paragraph of 35 U.S.C. § 112. Vas-Cath Inc. v. Mahurkar, 935 F.2d 1555, 1560, 19 USPQ2d 1111, 1114 (Fed. Cir. 1991). The terminology "lack of support" has also been held to imply a reliance on the written description requirement of the statute. In re Higbee and Jasper, 527 F.2d 1405, 1406 188 USPQ 488, 489 (CCPA 1976).

In view of the factual situation presented to us in this instance we will interpret the Examiner's basis for the 35 U.S.C.

§ 112, first paragraph rejection as reliance on the "written description" portion of the statute. "The function of the description requirement [of the first paragraph of 35 U.S.C. § 112] is to ensure that the inventor has possession, as of the filing date of the application relied on, of the specific

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subject matter later claimed by him." In re Wertheim, 541 F.2d 257, 262, 191 USPQ 90, 96 (CCPA 1976).

In establishing a basis for a rejection under the written description requirement of the statute, the Examiner has the initial burden of presenting evidence or reasons why persons skilled in the art would not recognize in an applicant's disclosure a description of the invention defined by the claims. Wertheim, 541 F.2d at 265, 191 USPQ at 98. After reviewing the arguments of record, however, it is our opinion that the Examiner has not provided sufficient reasons or evidence to satisfy such burden.

The Examiner asserts (Answer, pages 3 and 6-8) a lack of description in Appellant's specification of the formation of a stack trench capacitor "concurrently and integratedly" with the formation of a trench isolation structure in the same fabrication

process as set forth in appealed independent claims 13 and 15. We agree with Appellant however that, in integrated circuit manufacturing, different structures are routinely formed

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concurrently on a substrate with fabrication steps added or eliminated as needed. We further find to be persuasive Appellants' contention (Reply Brief, page 2) that the skilled artisan would find it illogical to include unneeded and possibly undesirable conductive layers in a trench isolation structure as presently claimed unless these layers are formed concurrently during formation of the stack trench capacitor where such conductive layers are necessary.

Further, while we agree with the Examiner (Answer, page 8) that a drawing illustration of the formation of the stack trench capacitor and isolation structure on the same substrate would be beneficial for a complete description of Appellant's invention, we do not find the absence of same to be fatal with regard to a determination of compliance with the written description portion of the statute. "It is not necessary that the application describe the claim limitations exactly, . . . but only so clearly that persons of ordinary skill in the art will recognize from the

disclosure that appellants invented processes including those

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limitations." Wertheim, 541 F.2d at 262, 191 USPQ at 96
citing In re Smythe, 480 F.2d 1376, 1382, 178 USPQ 279, 284
(CCPA 1973).

In view of the above discussion, it is our conclusion
that, under the factual situation presented in the present
case, the statutory written description requirement has been
satisfied because Appellant was clearly in possession of the
invention at the time of filing of the application.
Therefore, we do not sustain the rejection of claims 13-19 and
21 under the first paragraph of 35 U.S.C. § 112.

Turning to a consideration of the 35 U.S.C. § 112, second
paragraph, rejection of claims 13-19 and 21, we note that the
general rule is that a claim must set out and circumscribe a
particular area with a reasonable degree of precision and
particularity when read in light of the disclosure as it would
be by the artisan. In re Moore, 439 F.2d 1232, 1235, 169 USPQ
236, 238 (CCPA 1971). Acceptability of the claim language
depends on whether one of ordinary skill in the art would
understand what is claimed in light of the specification.
Seattle Box Co. v. Industrial Crating & Packing, Inc., 731
F.2d 818, 826, 221 USPQ 568, 574 (Fed. Cir. 1984).

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After reviewing the arguments of record, we are in agreement with Appellant (Brief, page 8) that, contrary to the Examiner's contention, two independent processes are not being recited in independent claims 13 and 15. Rather, it is our view that the skilled artisan reading claims 13 and 15 in light of Appellant's specification would recognize that, as asserted by Appellant, the trench isolation structure is formed within the process flow for forming the stack trench capacitor. Similarly, we find the Examiner's assertion that claim 15 is incomplete to be unfounded.

Claim 15 is directed to the formation of a trench isolation structure, albeit within a DRAM forming process according to the claim preamble; however, all steps required for forming such isolation structure are in fact recited.

It is our view that the skilled artisan, having considered the specification in its entirety, would have no difficulty ascertaining the scope of the invention recited in claims 13-19 and 21. Therefore, the rejection of claims 13-19 and 21 under the second paragraph of 35 U.S.C. § 112 is not sustained.

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We next consider the Examiner's rejection of claims 22-26 and 28 under 35 U.S.C. § 103 as being unpatentable over Iranmanesh in view of Okada. As a general proposition in an appeal involving a rejection under 35 U.S.C. § 103, an Examiner is under a burden to make out a prima facie case of obviousness. If that burden is met, the burden of going forward then shifts to Appellant to overcome the prima facie case with argument and/or evidence. Obviousness is then determined on the basis of the evidence as a whole and the relative persuasiveness of the arguments. See In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992); In re Hedges, 783 F.2d 1038, 1039, 228 USPQ 685, 686 (Fed. Cir. 1986); In re Piasecki, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984); and In re Rinehart, 531 F.2d 1048, 1052, 189 USPQ 143, 147 (CCPA 1976). With respect to representative independent claim 22, after reviewing the Examiner's analysis (Answer, pages 4 and 5), it is our view that the Examiner has pointed out the teachings of the applied Iranmanesh and Okada references, has reasonably indicated the

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perceived differences between this applied prior art and the

claimed invention, and has provided reasons as to how and why this prior art would have been modified to arrive at the claimed invention. In our view, the Examiner's analysis is sufficiently

reasonable that we find that the Examiner has at least satisfied the burden of presenting a prima facie case of obviousness. The burden is, therefore, upon Appellant to come forward with evidence or arguments which persuasively rebut the Examiner's prima facie case of obviousness. Arguments which Appellant could have made but elected not to make in the Briefs have not been considered in this decision (note 37 CFR § 1.192).

Appellant's arguments in response (Brief, page 7) initially attack the Examiner's establishment of a prima facie case of obviousness since neither Iranmanesh or Okada teaches the concurrent fabrication of a trench stack capacitor and a trench isolation structure. We find such arguments to be

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unpersuasive since they are not commensurate with the scope of representative claim 22. It is axiomatic that, in proceedings before the PTO, claims in an application are to be given their broadest reasonable interpretation consistent with the specification, and

that claim language should be read in light of the specification as it would be interpreted by one of ordinary skill in the art. In re Sneed, 710 F.2d 1544, 1548, 218 USPQ 385, 388 (Fed. Cir. 1983). Moreover, limitations are not to be read into the claims from the specification. In re Van Geuns, 988 F.2d 1181, 1184, 26 USPQ2d 1057, 1059 (Fed. Cir. 1993) citing In re Zletz, 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989). As pointed out by the Examiner (Answer, page 8), the process steps set forth in claim 22, contrary to Appellant's assertions, recite only the steps for making a trench isolation structure, a process to which the disclosures of both Iranmanesh and Okada are directed.

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We further find unpersuasive Appellant's argument that it would not be obvious to modify the applied prior art to add conductive layers since such are undesirable in a trench isolation structure. In our view, there is no need to modify the trench isolation structure of Iranmanesh to add upper and lower conductive layers since the conductive polysilicon layers 50 and 70 are already in place. The Examiner's modification of Iranmanesh extends only to the addition of Okada's teachings related to the use of the dual mask layers, trench cap, and well

structure features. Appellant has not argued the obviousness of adding the dual mask layers of Okada to Iranmanesh. Further, in our view, Appellant's arguments related to the trench cap and well structure are unconvincing since a clear teaching exists in Okada for employing such features in an isolation structure.

For the above reasons, it is our opinion that, since the Examiner's prima facie case of obviousness has not been rebutted by any convincing arguments from Appellant, the

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Examiner's obviousness rejection of independent claim 22, as well as dependent claims 23-26 and 28 which fall with claim 22, is sustained.

In summary, we have not sustained the Examiner's 35 U.S.C.

§ 112, first and second paragraph, rejections of claims 13-19 and 21. We have, however, sustained the Examiner's 35 U.S.C. § 103 rejection of claims 22-26 and 28. Therefore, the Examiner's decision rejecting claims 13-19, 21-26, and 28 is affirmed-in-part.

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

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