The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.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. 15

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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Ex parte DAVID EDWARD KOTECKI
and
KATHERINE LYNN SAENGER

_____

Appeal No. 2003-1300
Application No. 09/643,372[1]

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ON BRIEF

_____

Before KIMLIN, DELMENDO, and JEFFREY T. SMITH, Administrative Patent Judges.

DELMENDO, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on an appeal under 35 U.S.C. § 134 from the examiner's final rejection of claims 37 and 39 through 49, which are all the claims pending in the above-identified

[1] Contrary to the appellants' statement under the heading "RELATED APPEALS AND INTERFERENCES" (appeal brief filed Sep. 21, 2002, paper 12, p. 2), an appeal under 35 U.S.C. § 134 (2002) was filed in the parent application, namely application 09/037,849 filed Mar. 10, 1998. For completeness, we attach hereto a copy of the decision rendered in the parent application.

application.[2]

The subject matter on appeal relates to a method for fabricating a dual-diameter electrical conductor for use in a microelectronic structure, wherein a neck portion of the conductor is fabricated with a diameter smaller than a lithographically defined diameter of a body portion. (Specification, pages 1-9.) According to the appellants (id. at page 1), "[t]he use of this dual-diameter plug geometry provides a misalignment tolerance wherein the body portion of the plug is protected from exposure to subsequently deposited materials and process ambients when only the neck portion of the plug is completely overlapped by a subsequentially [sic] deposited conductor." Further details of this appealed subject matter are recited in representative claim 37 and 44, the only independent claims on appeal, reproduced below:

> 37. A method for fabricating a dual-diameter electrical conductor comprising the steps of:
> providing a substrate having a first conductive region formed of a first conductive material,
> depositing a layer of a first dielectric material on said substrate,

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[2] In reply to the final Office action mailed Apr. 26, 2002 (paper 8), the appellants submitted an amendment pursuant to 37 CFR § 1.116 (2001) on Jun. 26, 2002 (paper 9), proposing change(s) to claim 44. The examiner indicated that this amendment will be entered for purposes of this appeal. (Advisory action mailed Jul. 29, 2002 (paper 10).

etching a first opening in said first dielectric material layer by reactive ion etching to expose said first conductive region in the substrate,

depositing a second conductive material into said first opening in said first dielectric material layer forming a body portion of the conductor,

removing a surface layer of said second conductive material to at least partially expose an upper sidewall surface in aid [sic] first opening,

forming sidewall spacers of a second dielectric material on said upper sidewall surface of said first opening thereby defining a second opening through which said body portion of the conductor is exposed, and

depositing a third conductive material into said second opening and forming a neck portion of the conductor that is in contact with the body portion of said conductor, said neck portion having a diameter at a top surface of the neck portion smaller than a diameter of said body portion.

44. A method for fabricating a dual-diameter electrical conductor comprising the steps of:

providing a substrate having a first conductive region formed of a first conductive material,

depositing a layer of a first dielectric material on said substrate,

etching a first opening in said first dielectric material to expose said first conductive region in the substrate,

depositing a second conductive material into said first opening in said first dielectric material layer forming a body portion of the conductor,

removing a surface layer of said second conductive material to at least partially expose an upper sidewall surface in said first opening,

forming sidewall spacers of a second dielectric material on said upper sidewall surface of said first opening thereby defining a second opening through which said body portion of the conductor is exposed,

depositing a third conductive material into said second opening and forming a neck portion of the conductor that is in contact with the body portion of said conductor, said neck portion having a diameter at

a top surface of the neck portion smaller than a diameter of said body portion, and

depositing and forming a stacked capacitor electrode on top of and in electrical communication with said neck portion of said electrical conductor.

The examiner relies on the following prior art references as evidence of unpatentability:

Blalock et al. (Blalock)	5,252,517	Oct. 12, 1993
Liou et al. (Liou)	5,847,460	Dec. 08, 1998 (filed Dec. 19, 1995)
Tseng	5,899,716	May 04, 1999 (filed May 19, 1997)

Claims 37 and 39 through 49 on appeal stand rejected under 35 U.S.C. § 103(a) as unpatentable over Blalock in view of Tseng and Liou. (Examiner's answer mailed Dec. 19, 2002, paper 13, pages 3-7.)

We reverse.

The examiner states that Blalock "show[s] most aspects of the instant invention" but admits, inter alia, that the reference does not "explicitly" describe a method in which the neck portion of the conductor has a smaller diameter at a top surface than a diameter of the body portion. (Answer, pages 3-4.) In an effort to account for this difference, the examiner relies on the teachings of Liou. Specifically, the examiner held (id. at page 5):

> Liou et al. teach (e.g. Figure 8) to put a liner 34 in a via 40 and under sidewall spacers 38 to protect the conductive layer during subsequent processing steps (Column 6 Lines 24 to 29). By putting this liner in the via, the top diameter of the neck portion of Blalock et al. will be smaller than the diameter of the body portion. It would have been obvious to a person of ordinary skill in the art at the time of invention to form a liner and to subsequently have a top surface of said neck portion having a diameter smaller than a diameter of said body portion as taught by Liou et al. in the process of Blalock et al. to protect the conductive layer during subsequent processing steps.

We disagree with the examiner's analysis. As pointed out by the appellants (appeal brief, pages 6-7), the relied upon teachings of Liou have nothing to do with the formation of a dual-diameter electrical conductor in which the neck portion of the conductor has a smaller diameter at a top surface than a diameter of the body portion. Instead, Figure 8 of the reference merely shows a conductive layer 14 overlying an insulating layer 12. While it is true that Liou teaches the deposition or growth of a thin oxide layer 34 "to cover the exposed conducting layer 14 in the bottom of opening 20 to protect the conducting layer during subsequent processing steps" (column 6, lines 25-29), the examiner has not identified sufficient evidence to establish that such protection would even be a concern in Blalock's method.

Tseng has been cited for an aspect of the invention unrelated to the relationship between the diameter of the neck portion and the diameter of the body portion.

For these reasons, we reverse the examiner's rejection under 35 U.S.C. § 103(a) of appealed claims 37 and 39 through 49 as unpatentable over Blalock in view of Tseng and Liou.

The decision of the examiner is reversed.

REVERSED

Edward C. Kimlin Administrative Patent Judge	)	
Romulo H. Delmendo Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
Jeffrey T. Smith Administrative Patent Judge	)	

RHD/kis

RANDY W TUNG
TUNG & ASSOCIATES
SUITE 120
838 W LONG LAKE ROAD
BLOOMFIELD HILLS MI 48302