

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.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 JEROME ALIEU, CHRISTOPHE LAIR and MICHEL HAOND

Appeal No. 2004-0605
Application 09/411,129

ON BRIEF

Before OWENS, DELMENDO, JEFFREY T. SMITH, *Administrative Patent Judges*.

OWENS, *Administrative Patent Judge*.

DECISION ON APPEAL

This appeal is from the final rejection of claims 13-30, which are all of the claims pending in the application.

THE INVENTION

The appellants claim a process for forming an air-filled region between a pair of conductors of an integrated circuit by depositing a sacrificial layer consisting essentially of polycrystalline germanium in a region between the conductors and

Appeal No. 2004-0605
Application 09/411,129

removing the sacrificial layer to form the air-filled region.

Claim 23 is illustrative:

23. A process for producing at least one air-filled region between a pair of conductive elements of an integrated circuit, comprising the steps of:

depositing a sacrificial layer consisting essentially of polycrystalline germanium in at least one region between the pair of conductive elements; and

removing the polycrystalline germanium to form the at least one air-filled region between the plurality of conductive elements.

THE REFERENCES

Iranmanesh et al. (Iranmanesh)	5,302,551	Apr. 12, 1994
Fitch et al. (Fitch)	5,324,683	Jun. 28, 1994

THE REJECTION

Claims 13-30 stand rejected under 35 U.S.C. § 103 as being unpatentable over Fitch in view of Iranmanesh.

OPINION

We reverse the aforementioned rejection and remand the application to the examiner. Regarding the rejection, we need to address only the independent claims, i.e., claims 13, 22 and 27.

Each of the appellants' independent claims requires that a polycrystalline germanium sacrificial layer is deposited in a region between a pair of conductive elements in an integrated circuit and is removed to form an air-filled region.

Fitch discloses that such an air-filled region can be formed by depositing and removing a germanium-silicon alloy sacrificial layer (col. 8, lines 22-28).

Iranmanesh discloses an integrated circuit which includes a layer (6) of polycrystalline germanium or polycrystalline germanium/silicon alloy which is planarized by chemical mechanical polishing to form electrical isolation regions between metal interconnect lines (2) (col. 2, lines 54-56; col. 3, lines 63-67; col. 4, lines 6-11 and 39-48; col. 4, line 56 - col. 5, line 4; figure 3).

The examiner argues that it would have been obvious to one of ordinary skill in the art to replace Fitch's germanium-silicon alloy with Iranmanesh's polycrystalline germanium to provide a superior end product after planarization and to provide a layer having relatively high resistivity which can be increased by adding oxygen to the germanium (Iranmanesh, col. 4, lines 60-62) (answer, page 4). The examiner has not explained why one of ordinary skill in the art, given that Fitch's germanium-silicon alloy layer is removed to form an air space, would have been led to form Iranmanesh's polycrystalline germanium layer as part of Fitch's end product. Moreover, the examiner has not explained how, even if this substitution were made, the appellants' claimed

Appeal No. 2004-0605
Application 09/411,129

process, wherein polycrystalline germanium is removed to form an air space, would be obtained.

The examiner argues that the appellants' claims do not exclude the presence of part of the polycrystalline germanium in the final product, and that in the appellants' specification the final product includes polycrystalline germanium layer 32i (answer, pages 11-13). The examiner has not established that this argument is correct in view of the appellants' disclosure that the polycrystalline germanium is removed (specification, page 14, lines 23-29; page 15, lines 5-7). Regardless, even if some of the appellants' polycrystalline germanium can remain in the final product, the examiner has not established that some of Fitch's germanium-silicon alloy can remain in Fitch's final product. The examiner has not explained why, if none of Fitch's germanium-silicon alloy can remain in the final product, one of ordinary skill in the art would have been led to leave Iranmanesh's polycrystalline germanium in Fitch's final product.

For the above reasons we conclude that the examiner has not carried the burden of establishing a *prima facie* case of obviousness of the appellants' claimed invention. Accordingly, we reverse the examiner's rejection.

REMAND

The examiner and the appellants have not addressed on the record whether Fitch's disclosure of a germanium-silicon alloy sacrificial layer would have fairly suggested, to one of ordinary skill in the art, a polycrystalline germanium-silicon alloy sacrificial layer, and whether such a polycrystalline germanium-silicon alloy would fall within the appellants' claim term "consisting essentially of polycrystalline germanium".

The germanium in Fitch's germanium-silicon alloy can be in only three forms: polycrystalline, single crystalline or amorphous. As disclosed by Iranmanesh (col. 3, lines 65-66) and other references,¹ polycrystalline germanium-silicon alloy was known in the art at the time of the appellants' invention. Hence, the examiner and the appellants should address whether the prior art would have fairly suggested, to one of ordinary skill in the art, polycrystalline germanium as the germanium in Fitch's germanium-silicon alloy.

The appellants' term "consisting essentially of" includes not only the polycrystalline germanium in the sacrificial layer, but also any other materials which do not materially affect the

¹ See, e.g., Saraswat et al., U.S. 5,250,818, issued October 5, 1993.

Appeal No. 2004-0605
Application 09/411,129

basic and novel characteristics of the sacrificial layer. *See In re Herz*, 537 F.2d 549, 551-52, 190 USPQ 461, 463 (CCPA 1976).

The examiner and the appellants should state on the record what they consider to be the basic and novel characteristics of the appellants' sacrificial layer, and address whether the silicon in a polycrystalline germanium-silicon alloy would materially affect those basic and novel characteristics.

If the prior art would have fairly suggested, to one of ordinary skill in the art, polycrystalline germanium as the germanium in Fitch's germanium-silicon alloy, and the silicon in the alloy would not materially affect the basic and novel characteristics of the appellants' sacrificial layer, then the appellants should explain why they consider the claimed invention to be patentable.

Appeal No. 2004-0605
Application 09/411,129

DECISION

The rejection of claims 13-30 under 35 U.S.C. § 103 over Fitch in view of Iranmanesh is reversed. The application is remanded to the examiner.

REVERSED and REMANDED

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TERRY J. OWENS)	
Administrative Patent Judge)	
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)	BOARD OF PATENT
ROMULO H. DELMENDO)	
Administrative Patent Judge)	APPEALS AND
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Appeal No. 2004-0605
Application 09/411,129

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