

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. 21

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte TAKANOBU TAKEUCHI

Appeal No. 1998-0915
Application No. 08/441,194

ON BRIEF

Before HAIRSTON, JERRY SMITH and BARRY, Administrative Patent Judges.

JERRY SMITH, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on the appeal under 35 U.S.C. § 134 from the examiner's rejection of claims 1 and 2. Claim 3 has been cancelled. An amendment after final rejection was filed on September 13, 1996 and was entered by the examiner. This amendment overcame separate rejections of claim 4, and claim 4 is now indicated as containing allowable subject matter.

The disclosed invention pertains to semiconductor pressure detecting devices using piezoelectric resistors. More particularly, the invention is directed to the

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elimination of effects caused by subgrain boundaries within piezoelectric resistors formed of recrystallized silicon film.

Representative claim 1 is reproduced as follows:

1. A semiconductor pressure detecting device including a silicon chip having first portions, a central portion between, connected to, and thinner than said first portions, said central portion of said silicon chip including a surface and at least one gauge resistance on the surface, said gauge resistance comprising a piezoresistance element including a laser recrystallized silicon film, said recrystallized silicon film including a connecting portion having edges, and two contacts electrically connected to each other by said connecting portion, said connecting portion of said recrystallized silicon film including at least one subgrain boundary transverse to and intersecting said edges, wherein the surface is a (100) or equivalent surface and said recrystallized silicon film is P-type and is arranged along a (110) direction of said silicon chip, and including respective, spaced apart metallizations disposed on corresponding subgrain boundaries of said recrystallized silicon film, whereby each of the subgrain boundaries in said connecting portion of said recrystallized silicon film between said contacts is short-circuited by a respective metallization.

The examiner relies on the following references:

Seidel et al. (Seidel)	3,965,453	June 22, 1976
Ipposhi et al. (Ipposhi)	5,471,086	Nov. 28, 1995
		(filed Oct. 31, 1992)

Claims 1 and 2 stand rejected under 35 U.S.C. § 103. As evidence of obviousness the examiner offers Ipposhi alone with

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respect to claim 1 and Ipposhi in view of Seidel with respect to claim 2.

Rather than repeat the arguments of appellant or the examiner, we make reference to the briefs¹ and the answers for the respective details thereof.

OPINION

We have carefully considered the subject matter on appeal, the rejections advanced by the examiner and the evidence of obviousness relied upon by the examiner as support for the rejections. We have, likewise, reviewed and taken into consideration, in reaching our decision, the 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 answers.

It is our view, after consideration of the record before us, that the evidence relied upon and the level of skill in

¹ Appellant has filed a brief, a reply brief, a supplemental reply brief and a second supplemental reply brief [Paper Nos. 13, 15, 17 and 19]. The first three papers were entered and considered by the examiner, but the fourth paper was denied entry by the examiner [Paper No. 20]. Consequently, we have not considered the second supplemental reply brief in reaching our decision in this appeal.

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the particular art would not have suggested to one of ordinary skill in the art the invention as set forth in claims 1 and 2. Accordingly, we reverse.

In rejecting claims under 35 U.S.C. § 103, it is incumbent upon the examiner to establish a factual basis to support the legal conclusion of obviousness. See In re Fine, 837 F.2d 1071, 1073, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). In so doing, the examiner is expected to make the factual determinations set forth in Graham v. John Deere Co., 383 U.S. 1, 17, 148 USPQ 459, 467 (1966), and to provide a reason why one having ordinary skill in the pertinent art would have been led to modify the prior art or to combine prior art references to arrive at the claimed invention. Such reason must stem from some teaching, suggestion or implication in the prior art as a whole or knowledge generally available to one having ordinary skill in the art. Uniroyal, Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 1051, 5 USPQ2d 1434, 1438 (Fed. Cir.), cert. denied, 488 U.S. 825 (1988); Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 293,

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227 USPQ 657, 664 (Fed. Cir. 1985), cert. denied, 475 U.S. 1017 (1986); ACS Hosp. Sys., Inc. v. Montefiore Hosp., 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). These showings by the examiner are an essential part of complying with the burden of presenting a prima facie case of obviousness. Note In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). If that burden is met, the burden then shifts to the applicant 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 Id.; 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). Only those arguments actually made by appellant have been considered in this decision. Arguments which appellant could have made but chose not to make in the brief have not been considered [see 37 CFR § 1.192(a)].

The examiner's position and appellant's position are adequately set forth in the several entered briefs and the several examiner's answers. We essentially base our decision

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on our agreement with appellant's position that Ipposhi fundamentally teaches away from the claimed invention.

Each of independent claims 1 and 2 recites that the connecting portion of a piezoresistance element has at least one subgrain boundary transverse to and intersecting the edges of the recrystallized silicon film on which a gauge resistor is formed. Appellant properly points out that the entire thrust of Ipposhi's disclosure is to prevent such subgrain boundaries from occurring in the claimed location. Although Ipposhi discloses several different embodiments for handling subgrain boundaries in such piezoresistance elements, all of Ipposhi's embodiments avoid the occurrence of subgrain boundaries occurring transverse to the connecting portion of the resistor between the end contacts of the resistor.

The examiner postulates that since Ipposhi teaches that four resistors are connected in a bridge arrangement in piezoelectric pressure detectors, then the interconnection of four such resistors in Ipposhi would necessarily require that the resistors cross such subgrain boundaries. The examiner notes that Ipposhi teaches the presence of conductive portions at the subgrain boundaries [Figure 7], and the examiner finds

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that it would have been obvious to metallize these subgrain boundaries or dope them to eliminate the potential barrier effect of such boundaries.

We do not agree with the examiner's basic assumption that a plurality of resistors in Ipposhi must contain subgrain boundaries located within the resistors as recited in claims 1 and 2. Each of the resistors 4 in the bridge circuit of Ipposhi can be separately formed to individually have no subgrain boundaries within them as taught by Ipposhi. Note that Ipposhi specifically discloses that "each piezo resistance 4 is formed on a region of the single crystal layer provided with no crystal sub-grain boundaries 51" [column 8, lines 58-60]. We see no reason why the interconnection of these resistances 4 would require the introduction of any additional subgrain boundaries. As noted above, Ipposhi specifically excludes the presence of subgrain boundaries occurring within the resistance elements as recited in claims 1 and 2. Any attempt to modify Ipposhi to include such subgrain boundaries would defeat the very purpose of Ipposhi, and would represent a hindsight attempt to reconstruct the claimed invention.

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Since we agree with appellant that the examiner's basic reliance on Ipposhi to support the rejections is misplaced, we do not sustain either of the examiner's rejections which are based on Ipposhi. Accordingly, the decision of the examiner rejecting claims 1 and 2 is reversed.

REVERSED

KENNETH W. HAIRSTON)	
Administrative Patent Judge)	
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)	BOARD OF PATENT
JERRY SMITH)	APPEALS
Administrative Patent Judge)	AND
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