Paper No. 17

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte DAVID B. SCOTT
and HENG-CHIN LIN

Appeal No. 2002-0934
Application No. 09/392,276

ON BRIEF

Before PAK, TIMM and JEFFREY T. SMITH, ***Administrative Patent Judges***.

JEFFREY T. SMITH, ***Administrative Patent Judge.***

DECISION ON APPEAL

Applicants appeals the decision of the Primary Examiner finally rejecting claims 1 to 10, 12 and 13, all of the pending claims. We have jurisdiction under 35 U.S.C. § 134.

CITED PRIOR ART

As evidence of unpatentability, the Examiner relies on the following references:

Tran et al. (Tran)	4,829,362	May 09, 1989
Hshieh et al. (Hshieh)	6,172,398	Jan. 09, 2001

Appellants' admitted prior art (APA), specification pages 1-4, 7-8 and Figure 1.

The Examiner has rejected claims 1 to 10, 12 and 13 as unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Tran, Hshieh and APA.

DISCUSSION

We have carefully reviewed the claims, specification and applied prior art, including all of the arguments advanced by both the Examiner and Appellants in support of their respective positions. This review leads us to conclude that the Examiner's § 103 rejection is not well founded. ***See In re Oetiker***, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992); ***In re Piasecki,*** 745 F.2d 1468, 1471-72, 223 USPQ 785, 787-88 (Fed. Cir. 1984).

Rather than reiterate the conflicting viewpoints advanced by the Examiner and Appellants concerning the above-noted rejection, we refer to the Answer and the Brief and Reply Brief. Appellants' invention is directed to a semiconductor

device that receives power from two power supply voltage sources. One of the power supply voltage sources is coupled to the back side of the semiconductor die. (Brief, p. 2). Claim 1, which is representative of the claimed invention, appears below:

> 1. In a semiconductor device that receives power from a first power supply voltage source and a second power supply voltage source different from said first power supply voltage source, a power supply arrangement, comprising:
>
> a semiconductor die having a top side and an opposing back side, the die including
>
> a semiconductor substrate relatively heavily doped with impurities of a first conductivity type and providing the back side of the semiconductor die, and
>
> a first semiconductor layer disposed over the substrate relatively more lightly doped than said semiconductor substrate with impurities of the first conductivity type;
>
> said first power supply voltage conductor coupled to the back side of the die and to said first power supply voltage source for utilization within said die.

Since we reverse the Examiner's rejection, we need to address only the independent claims, i.e., claims 1 and 9.

The semiconductor device of claims 1 and 9 require two power supply sources. Both the claims require a power supply source to provide voltage to the bottom surface of the device.

The Examiner asserts that the claimed invention is obvious over the combination of Tran, Hshieh and APA. Specifically, the Examiner states:

> APA teaches in figure 1 a semiconductor device 100 receiving power from first and second power supply voltages (page 3, line 19 to page 4, line 3) different from each other for utilizing within the die, a power supply arrangement comprising a semiconductor die having a top side and a back side, the die including a P+ semiconductor substrate 102 having an exposed bottom surface and providing the back side of the die, a P- first epitaxial semiconductor layer 104 over the substrate, an N type well 106 having a top surface remote from the bottom surface, and a second power supply conductor coupled to the top surface of the N type well 106 via region 114.
>
> APA teaches that the device of figure 1 is not suitable for routing power supply voltages through the substrate when using 1 micron technology, because the resistivity of the substrate is about 2 ohm-cm (page 7). However, the device of figure 1 is suitable for routing power supply voltages through the substrate when using 0.2 micron technology, because then the resistivity of the substrate is only about 0.2 ohm-cm (page 8). Therefore, the device of figure 1 is suitable for routing power supply voltages through the substrate. Note that nowadays it is well known in the art to use 0.2 micron technology for semiconductor devices, of which official notice is taken.
>
> Regarding the claimed limitations of first and second power supply voltages different from each other, any device must include first and second power supply voltages different from each other, because the device would not operate if the first and second voltages are not different from each other (devices need source voltage and ground voltage to operate).
>
> APA does not teach a first power supply conductor coupled to the back side of the die. Tran et al. teach figure 2 a first power supply conductor coupled to the back side of the die (column 3, lines 63-66).
>
> Hshieh teaches forming an epitaxial layer having a thickness of about 3 microns and resistivity of about 0.1 ohm-cm.
>
> It would have been obvious to a person of ordinary skill in the art at the time the invention was made to form the APA device using

> 0.2 micron technology and to connect the first power supply conductor to the back side of the die in order to remove the need for "flying leads", as taught by Tran et al., in order to reduce the space required for wiring and to be able to use only one lead and one pin for the electrical connection (column 3, lines 33-40). The combination is motivated by the teachings of Tran et al. who point out the advantages of coupling a first power supply conductor to the back side of the die. [Answer, pages 4-6].

To hold an invention obvious in view of a combination of references, there must be some suggestion, motivation, or teaching in the prior art that would have led a person of ordinary skill in the art to select the references and combine them in the way that would produce the claimed invention. ***See, e.g., Heidelberger Druckmaschinen AG v. Hantscho Commercial Prods., Inc.,*** 21 F.3d 1068, 1072, 30 USPQ2d 1377, 1379 (Fed. Cir. 1994) (When the patent invention is made by combining known components to achieve a new system, the prior art must provide a suggestion, or motivation to make such a combination.); ***Northern Telecom v. Datapoint Corp.,*** 908 F.2d 931, 934, 15 USPQ2d 1321, 1323 (Fed. Cir. 1990) (It is insufficient that the prior art disclosed the components of the patented device, either separately or used in other combinations; there must be some teaching, suggestion, or incentive to make the combination made by the inventor.); ***Uniroyal, Inc. v. Rudkin-Wiley Corp.,*** 837 F.2d 1044, 1044, 1051, 5 USPQ 1434, 1438 (Fed. Cir. 1988).

The Examiner's assertion that the device of figure 1 is suitable for routing power supply voltages through the substrate appears to have been derived from Appellants' specification. The Examiner has not identified a basis in the prior art and the admitted art to modify the semiconductor device of figure 1 to use 0.2 micron technology in the manner proposed by the Examiner. The Examiner's statement "that nowadays it is well known in the art to use 0.2 micron technology for semiconductor devices, of which official notice is taken" does not provide motivation for modifying the device of figure 1 to meet the requirements of claims 1 and 9. The Examiner has not refered to any evidence that teaches or suggests the connection of a power supply to the back side of a semiconductor device that uses 0.2 micron technology.[1] The mere fact that the prior art could be modified would not have made the modification obvious unless the prior art suggested the desirability of the modification. ***In re Gordon,*** 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984); ***In re Laskowski,*** 871 F.2d 115, 117, 10 USPQ2d 1397, 1398 (Fed. Cir. 1989). The record indicates that the motivation relied upon by the Examiner suggesting the combination of APA, Tran and Hshieh came from the Appellants' description of their invention in the specification rather than from the

[1] Contrary to the Examiner's assertion in the Answer, we find no unequivocal admission on the part of the Appellants at pages 7 and 8 of the specification.

applied prior art and that, therefore, the Examiner used impermissible hindsight in rejecting the claims. ***See W.L. Gore & Associates v. Garlock, Inc.,*** 721 F.2d 1540, 1553, 220 USPQ 303, 312-13 (Fed. Cir. 1983); ***In re Rothermel,*** 276 F.2d 393, 396, 125 USPQ 328, 331 (CCPA 1960). For the reasons stated above and in Appellants' Briefs, we reverse the Examiner's rejection under 35 U.S.C. § 103(a).

CONCLUSION

The rejection of claims 1 to 10, 12 and 13 under 35 U.S.C. § 103(a) as obvious over Tran, Hshieh and Appellants' admitted prior art is reversed.

REVERSED

CHUNG K. PAK ***Administrative Patent Judge***	)
CATHERINE TIMM ***Administrative Patent Judge***	) **BOARD OF PATENT**) **APPEALS**) **AND**) **INTERFERENCES**
JEFFREY T. SMITH ***Administrative Patent Judge***	)

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