

The opinion in support of the decision being entered
is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte AJIT PARANJPE and KANGZHAN ZHANG

Appeal 2007-2384
Application 10/943,424
Technology Center 2800

Decided: September 11, 2007

Before JOSEPH L. DIXON, ROBERT E. NAPPI and JOHN A. JEFFERY,
Administrative Patent Judges.

DIXON, *Administrative Patent Judge.*

DECISION ON APPEAL

Appeal 2007-2384
Application 10/943,424

This is a decision on appeal under 35 U.S.C. § 134 from the Examiner's final rejection of claims 1-3, 5-9, and 21-29. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

BACKGROUND

Appellants' invention relates to a poly-silicon-germanium gate stack and method for forming the same. An understanding of the invention can be derived from a reading of exemplary claim 1, which is reproduced below.

1. A gate stack for semiconductor MOS device comprising:
 - a dielectric film formed on a semiconductor substrate of said semiconductor MOS device;
 - a first α-Si layer formed on the dielectric film having a thickness from about 30 Å to about 50 Å;
 - a poly-SiGe layer formed on the first α-Si layer;
 - a second α-Si layer formed on the poly-SiGe layer; and
 - a poly-Si layer formed on the second α-Si layer.

PRIOR ART

The prior art references of record relied upon by the Examiner in rejecting the appealed claims are:

KIM	US 2003/0025165 A1	Feb. 6, 2003
RYU	US 6,855,641 B2	Feb. 15, 2005
BAE	US 6,878,580 B2	Apr. 12, 2005

REJECTIONS

Claims 1, 3, 5-8, 21, and 23-28 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Ryu in view of Bae.

Claims 2, 9, 22, and 29 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Ryu in view of Bae as applied to claims 1, 3, 5-8, 21, and 23-28 above, and further in view of Kim.

Rather than reiterate the conflicting viewpoints advanced by the Examiner and the Appellants regarding the above-noted rejections, we make reference to the Examiner's Answer (mailed Nov. 28, 2006) for the reasoning in support of the rejections, and to Appellants' Brief (filed Sep. 5, 2006) and Reply Brief (filed Jan 29, 2007) for the arguments thereagainst.

OPINION

In reaching our decision in this appeal, we have given careful consideration to Appellants' Specification and claims, to the applied prior art references, and to the respective positions articulated by Appellants and the Examiner. As a consequence of our review, we make the determinations that follow.

35 U.S.C. § 103

A rejection under 35 U.S.C. § 103(a) must be based on the following factual determinations: (1) the scope and content of the prior art; (2) the differences between the claimed invention and the prior art; (3) the level of ordinary skill in the art; and (4) objective indicia of non-obviousness.

Appeal 2007-2384
Application 10/943,424

DyStar Textilsfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co.,
464 F.3d 1356, 1360, 80 USPQ2d 1641, 1645 (Fed. Cir. 2006) (citing
Graham v. John Deere Co., 383 U.S. 1, 17, 148 USPQ 459, 467 (1966)).

“The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.” *Leapfrog Enter., Inc. v. Fisher-Price, Inc.*, 485 F.3d 1157, 1161, 82 USPQ2d 1687, 1691 (Fed. Cir. 2007) (quoting *KSR Int'l v. Teleflex, Inc.*, 127 S. Ct. 1727, 1739, 82 USPQ2d 1385, 1395 (2007)). “One of the ways in which a patent's subject matter can be proved obvious is by noting that there existed at the time of invention a known problem for which there was an obvious solution encompassed by the patent's claims.” *KSR*, 127 S. Ct. at 1742, 82 USPQ2d at 1397.

Discussing the question of obviousness of a claimed combination of elements of prior art, *KSR* explains:

When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, § 103 likely bars its patentability. For the same reason, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill. *Sakraida [v. AG Pro, Inc.]*, 425 U.S. 273, 189 USPQ 449 (1976) and *Anderson's-Black Rock [Inc. v. Pavement Salvage Co.]*, 396 U.S. 57, 163 USPQ 673 (1969) are illustrative—a court must ask whether the improvement is more than the predictable use of prior art elements according to their established functions.

KSR, 127 S. Ct. at 1740, 82 USPQ2d at 1396. Where, on the other hand, the claimed subject matter involves more than the simple substitution, one

Appeal 2007-2384
Application 10/943,424

known element for another or the mere application of a known technique to a piece of prior art ready for the improvement, a holding of obviousness must be based on “an apparent reason to combine the known elements in the fashion claimed.” *KSR*, 127 S. Ct. at 1740-41, 82 USPQ2d at 1396. That is, “there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *Id.*, 127 S. Ct. at 1741, 82 USPQ2d at 1396 (quoting *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006)). However, it is not necessary to look only to the problem the patentee was trying to solve; “any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed,” *KSR*, 127 S. Ct. at 1742, 82 USPQ2d at 1397 (emphasis added).

The reasoning given as support for the conclusion of obviousness can be based on interrelated teachings of multiple patents, the effects of demands known to the design community or present in the marketplace, and the background knowledge possessed by a person having ordinary skill in the art. *KSR*, 127 S. Ct. at 1740-41, 82 USPQ2d at 1396. *See also Leapfrog*, 485 F.3d at 1162, 82 USPQ2d at 1691 (holding it “obvious to combine the Bevan device with the SSR to update it using modern electronic components in order to gain the commonly understood benefits of such adaptation, such as decreased size, increased reliability, simplified operation, and reduced cost”).

With respect to the role of the Examiner as finder of fact, the Court of Appeals for the Federal Circuit has stated: “the examiner bears the initial burden, on review of the prior art or on any other ground, of presenting a *prima facie* case of unpatentability.” *In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). In rejecting claims under 35

Appeal 2007-2384
Application 10/943,424

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 must make the factual determinations set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 17, 148 USPQ 459, 467 (1966). Furthermore, “there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness’ [H]owever, the analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.” *KSR*, 127 S. Ct. at 1741, 82 USPQ2d at 1396 (quoting *In re Kahn*, 441 F.3d at 988, 78 USPQ2d at 1336). Further, as pointed out by our reviewing court, we must first determine the scope of the claim. “[T]he name of the game is the claim.” *In re Hiniker Co.*, 150 F.3d 1362, 1369, 47 USPQ2d 1523, 1529 (Fed. Cir. 1998). Therefore, we look to the limitations as recited and disputed in independent claim 1.

Appellants dispute the Examiner's contention that the combination of Ryu and Bae on the grounds that the polysilicon seed layer of Ryu may be replaced with an amorphous silicon layer by Bae. Appellants contend that Ryu teaches away from substituting amorphous silicon for polysilicon as the seed layer (Brief 9.)

Appellants maintain that Ryu teaches away from using amorphous silicon as layer 106 because amorphous silicon would prevent germanium from diffusing. Appellants further maintain that because Ryu has expressly stated the desire to "expedite diffusion of germanium" with the polysilicon layer, changing the polysilicon layer to a layer that would "prevent germanium from diffusing" would contradict the express purpose of Ryu.

Appeal 2007-2384
Application 10/943,424

According to Appellants, replacing the polysilicon layer 106 of Ryu with an amorphous silicon layer would not have been obvious (Br. 9). Appellants, therefore, contend that the combination of Ryu and Bae do not teach, show, or suggest the gate stack for a semi-conductor MOS device as recited in independent claims 1 and 21 and their respective dependent claims (*Id.*).

The Examiner maintains that the combination of Ryu and Bae would produce the claimed invention (Answer 4). The Examiner maintains that the disclosed advantage is not necessary to produce a working MOSFET because the reference discloses that the seed layer is optional (Ryu, col. 6, ll. 63-66). Therefore, the use of polysilicon as a seed layer is disclosed to merely be a preferred embodiment. The Examiner maintains that disclosed examples and preferred embodiments do not constitute a teaching away from a broader disclosure or non-preferred embodiments (Answer 4-5). The Examiner maintains that a reference may be relied upon for all that it would have reasonably suggested to one of ordinary skill in the art including non-preferred embodiments (*Id.*). The Examiner maintains that the disclosure in Bae that a working MOSFET is produced by using a SiGe gate grown on an amorphous silicon seed layer would have provided further indication that a working MOSFET would have been produced using amorphous silicon as the seed layer in the process of Ryu and that one skilled in the art, therefore, would have had a reasonable expectation of success that the process of the combination would produce a useful device with the expectation that the advantage of using a polysilicon seed layer disclosed in Ryu would not be obtained (Answer 5-6).

Appellants again maintain that Ryu expressly teaches away from using a seed layer that prevents diffusion (Reply Br. 2). We cannot agree with Appellants. Here, we find that Appellants' arguments go beyond the

Appeal 2007-2384
Application 10/943,424

express language of independent claim 1 since we find no mention of diffusion or prevention thereof in the language of independent claim 1.

Therefore, Appellants' argument is not persuasive.

From our review of the teachings of Ryu and Bae, we find that the Examiner has made a persuasive initial showing which we do not find has been adequately rebutted or shown error therein by Appellants. Therefore, we will sustain the rejection of independent claim 1 and independent claim 21 and those claims grouped therewith by Appellants at page 9 of the Brief.

With respect to dependent claims 2, 9, 22 and 29, Appellants merely reiterate the language of the claim and advance the same arguments set forth with respect to independent claim 1 and independent claim 21. We do not find these to be separate arguments for patentability, and Appellants have not shown error in the Examiner's rejection using the combination of Ryu, Bae, and Kim. Therefore, we will sustain the rejections of dependent claims 2, 9, 22, and 29.

Appeal 2007-2384
Application 10/943,424

CONCLUSION

To summarize, we have sustained the rejection of claims 1-3, 5-9, and 21-29 under 35 U.S.C. § 103(a).

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

Appeal 2007-2384
Application 10/943,424

AFFIRMED

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