

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

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte STEFAN PAULUS, ALBERT AUBURGER,
OSWALD HAINZ, HELGA HAINZ, DIETMAR LANG,
MARTIN PETZ, and MICHAEL WEBER

Appeal 2007-1104
Application 09/962,697
Technology Center 2800

Decided: May 23, 2007

Before JAMES D. THOMAS, JOSEPH L. DIXON and JEAN R. HOMERE,
Administrative Patent Judges.

HOMERE, *Administrative Patent Judge.*

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellants appeal under 35 U.S.C. § 134 from the Examiner's Final Rejection of claims 13 through 15. Claims 1 through 4, 6 through 9 and 11 have been withdrawn. Claims 5, 10 and 12 have been canceled. We have jurisdiction under 35 U.S.C. § 6(b) to decide this appeal.

Appellants invented a system for manufacturing an integrated circuit (IC) (1) having a plurality of contact pads (11) on which electrically conductive bumps (2) and elevations (10) are disposed. The IC (1) is applied to the base of a substrate (4). Subsequently, a plastic material (3) is used to encapsulate the IC (1). (Specification 4.)

Claim 13 is illustrative of the claimed invention. It reads as follows:

13. A component, comprising:

an integrated circuit having an active main side with contact pads disposed on said active main side;

electrically conductive bumps having a height and being connected to said contact pads;

a plurality of electrically conductive elevations commonly formed and separated from a base substrate, said electrically conductive elevations connected to said electrically conductive bumps, and said electrically conductive elevations having a height greater than said height of said electrically conductive bumps;

a sealing compound encapsulating said integrated circuit, said electrically conductive bumps and parts of said electrically conductive elevations resulting in an encapsulated component having an underside, said electrically conductive elevations encapsulated in said sealing compound being accessible on said underside of said encapsulated component and forming external contacts with anchor means anchored in said sealing compound.

In rejecting the claims on appeal, the Examiner relied upon the following prior art:

Fukutomi
Jung

US 5,976,912
US 6,495,909 B1

Nov. 2, 1999
Dec. 17, 2002

The Examiner rejected the claims on appeal as follows:

- A. Claims 13 through 15 stand rejected under 35 U.S.C. § 102 as being anticipated by Fukutomi.
- B. Claims 13 and 14 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Fukutomi and Jung.

First, Appellants contend¹ that Fukutomi does not anticipate claims 13 through 15. Particularly, Appellants contend that Fukutomi does not teach electrically conductive elevations having a height greater than the height of electrically conductive bumps. (Br. 8; Reply Br. 2.) The Examiner, in contrast, contends that as depicted in Figures 2A through 2F, Fukutomi teaches the limitations of representative claim 13. (Answer 5 and 9.) The Examiner therefore concludes that Fukutomi anticipates claims 13 through 15. (Id.)

Second, Appellants contend that the combination of Fukutomi and Jung does not render claims 13 and 14 unpatentable. (Br. 11.) Particularly, Appellants contend that the combination of Fukutomi and Jung does not teach or suggest a plurality of conductive elevations commonly formed and separated from a base substrate, the electrically conductive elevations connected to the electrically conductive bumps, and the electrically conductive elevations having a height greater than the height of the electrically conductive bumps, as recited in claim 13. (Br. 13.) Similarly, Appellants contend that the cited combination does not teach or suggest the

¹ This decision considers only those arguments that Appellants submitted in the Appeal and Reply Briefs. Arguments that Appellant could have made but chose not to make in the Briefs are deemed to have been waived. *See* 37 C.F.R. § 41.37(c)(1) (vii)(eff. Sept. 13, 2004). *See also In re Watts*, 354 F.3d 1362, 1368, 69 USPQ2d 1453, 1458 (Fed. Cir. 2004).

dimensioning of T-shaped elevations, as recited in claim 14. (Br. 14.) Additionally, Appellants contend that the Examiner failed to establish a showing of a teaching or motivation to combine the teachings of Fukutomi with Jung. (Br. 15.) In response, the Examiner contends that the combination of Fukutomi and Jung teaches all the limitations of claims 13 and 14. Further, the Examiner concludes that it would have been obvious to one of ordinary skill in the art to combine the teachings of Fukutomi and Jung to yield claims 13 and 14. (Answer 8 and 13.) The Examiner therefore concludes that the combination of Fukutomi and Jung renders claims 13 and 14 unpatentable. (Id.)

We affirm.

ISSUES

The *pivotal* issues in the appeal before us are as follows:

- (1) Have Appellants shown that the Examiner failed to establish that Fukutomi anticipates the claimed invention under 35 U.S.C. § 102, when Fukutomi teaches an elevation that appears to be greater in height than the height of a bump connected thereto?
- (2) Have Appellants shown that the Examiner failed to establish that one of ordinary skill in the art, at the time of the present invention, would have found that the combination of Fukutomi and Jung renders the claimed invention unpatentable under 35 U.S.C. § 103(a)?

FINDINGS OF FACT

The following findings of fact are supported by a preponderance of the evidence.

The invention

1. Appellants invented a system for manufacturing an IC (1) having a plurality of contact pads (11) whereupon electrically conductive bumps (2) are applied. (Specification 10.)
2. Each electrically conductive bump (2) is subsequently connected to an electrically conductive elevation (10) disposed on the base of the substrate. (Id. 14.)
3. The electrically conductive elevations (10) are constructed to have a T-shape or a trapezoidal cross section. (Id.)
4. As depicted in figure 10, each elevation appears from the original drawings to have a height greater than the height of the electrically conductive bump connected thereto (2).²
5. The electrically conductive elevations (10) appear from the original drawings to be commonly formed and separated from the base substrate.³

² We note that Appellants' original Specification does not discuss the characteristics of the electrically conductive elevations or bumps. Particularly, we fail to find any discussion in the original Specification pertaining to the elevations as being commonly formed and separated from the substrate. Similarly, we fail to find any discussion in the original Specification pertaining to the height of the elevations as being greater than the height of the bumps. It appears to us that such teachings were inferred from figures 7, and 9 through 12 of Appellants' original drawings. However, we have no indication on the record before us that these drawings are drawn to scale.

6. The IC (1) is applied to the base of a substrate, and it is subsequently encapsulated in a plastic material (3). (Specification 14).

The Prior Art Relied upon

7. Fukutomi teaches a system for manufacturing an LSI chip (3) having gold bumps (8) connected to terminal portions of the wirings (2) disposed on the base substrate (1). (Title, Abstract, col. 9, ll. 30-35.)

8. Fukutomi teaches, as depicted in figure 2B, the two wirings appear to be commonly formed and separated from the base substrate.

9. Similarly, Fukutomi teaches, as depicted in figure 2B, the height of the wirings (2) appears to be greater than the height of the gold bumps (8).

10. Fukutomi teaches that the LSI (3) chip is subsequently encapsulated using epoxy resin (9). (Col. 9, ll. 35-49).

11. Jung teaches a method and system for manufacturing an IC (200) coupled to T-shaped connection pads (230) through bonding wires (212) exposed at the bottom of the package to permit contact with external devices. (Col. 2, l. 57- col. 3, l. 7).

12. Jung teaches that the T-shaped profile of the connection pads provides the benefit of prolonging the path and time diffusion into the package, as well as enhancing the locking of the pads into a predetermined place the package body. (Id.)

³ Id.

PRINCIPLES OF LAW

1. ANTICIPATION

It is axiomatic that anticipation of a claim under § 102 can be found if the prior art reference discloses every element of the claim. *See In re King*, 801 F.2d 1324, 1326, 231 USPQ 136, 138 (Fed. Cir. 1986) and *Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 1457, 221 USPQ 481, 485 (Fed. Cir. 1984).

In rejecting claims under 35 U.S.C. § 102, a single prior art reference that discloses, either expressly or inherently, each limitation of a claim invalidates that claim by anticipation. *Perricone v. Medicis Pharmaceutical Corp.*, 432 F.3d 1368, 1375-76, 77 USPQ2d 1321, 1325-26 (Fed. Cir. 2005), citing *Minn. Mining & Mfg. Co. v. Johnson & Johnson Orthopaedics, Inc.*, 976 F.2d 1559, 1565, 24 USPQ2d 1321, 1326 (Fed. Cir. 1992). Anticipation of a patent claim requires a finding that the claim at issue “reads on” a prior art reference. *Atlas Powder Co. v. IRECO, Inc.*, 190 F.3d 1342, 1346, 51 USPQ2d 1943, 1945 (Fed Cir. 1999) (“In other words, if granting patent protection on the disputed claim would allow the patentee to exclude the public from practicing the prior art, then that claim is anticipated, regardless of whether it also covers subject matter not in the prior art.”) (internal citations omitted).

2A. OBVIOUSNESS (Prima Facie)

The Supreme Court in *Graham v. John Deere*, 383 U.S. 1, 17-18, 148 USPQ 459, 467 (1966), stated that three factual inquiries underpin any determination of obviousness:

Under § 103, (1) the scope and content of the prior art are to be determined; (2) differences between the prior art and the claims at issue are to be ascertained; and (3) the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented. As indicia of obviousness or nonobviousness, these inquiries may have relevancy.

In rejecting claims under 35 U.S.C. § 103, the Examiner bears the initial burden of establishing a prima facie case of obviousness. *In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). *See also In re Piasecki*, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984). The Examiner can satisfy this burden by showing some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness. *KSR Int'l. v. Teleflex Inc.*, No. 04-1350, 2007 WL 1237837 at 13, 82 USPQ2d 1385, 1396 (Apr. 30, 2007) (*citing In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006)). Only if this initial burden is met does the burden of coming forward with evidence or argument shift to the Appellant. *Oetiker*, 977 F.2d at 1445, 24 USPQ2d at 1444. *See also Piasecki*, 745 F.2d at 1472, 223 USPQ at 788. Thus, the Examiner must not only assure that the requisite findings are made, based on evidence

of record, but must also explain the reasoning by which the findings are deemed to support the Examiner's conclusion.

2B. OBVIOUSNESS (Motivation)

On appeal, Appellant bears the burden of showing that the Examiner has not established a legally sufficient basis for combining the teachings of the references that the Examiner relied upon. Appellant may sustain this burden by showing that the Examiner failed to provide sufficient evidence to support that one having ordinary skill in the art would have combined disclosures of the references, as proposed by the Examiner, to yield Appellant's invention. *In re Kahn*, 441 F.3d at 987-88, 78 USPQ2d at 1336-37; *DyStar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick, Co.*, 464 F.3d 1356, 1360-1361, 80 USPQ2d 1641, 1645 (Fed. Cir. 2006). The mere fact that all the claimed elements or steps appear in the prior art is not *per se* sufficient to establish that it would have been obvious to combine those elements. *United States v. Adams*, 383 U.S. 39, 50-52, 148 USPQ 479 (1966); *Smith Industries Medical Systems, Inc. v. Vital Signs, Inc.*, 183 F.3d 1347, 1356, 51 USPQ2d 1415, 1420 (Fed. Cir. 1999). However, "[a]s long as some motivation or suggestion to combine the references is provided by the prior art taken as a whole, the law does not require that the references be combined for the reasons contemplated by the inventor." *In re Beattie*, 974 F.2d 1309, 1312, 24 USPQ2d 1040, 1042 (Fed. Cir. 1992). Motivation to combine references under 35 U.S.C. § 103 must come from a teaching or suggestion within the prior art, within the nature of the problem to be solved, or within the general knowledge of a person of ordinary skill in the field of

the invention, to look to particular sources, to select particular elements, and to combine them as combined by the inventor. *Ruiz v. A.B. Chance Co.*, 234 F.3d 654, 665, 57 USPQ2d 1161, 1167 (Fed. Cir. 2000).

“[A]n implicit motivation to combine exists not only when a suggestion may be gleaned from the prior art as a whole, but when the ‘improvement’ is technology-independent and the combination of references results in a product or process that is more desirable, for example because it is stronger, cheaper, cleaner, faster, lighter, smaller, more durable, or more efficient In such situations, the proper question is whether the ordinary artisan possesses knowledge and skills rendering him *capable* of combining the prior art references.” *DyStar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co.*, 464 F.3d 1356, 1368, 80 USPQ2d 1641, 1651 (Fed. Cir. 2006).

ANALYSIS

35 U.S.C. § 102 REJECTION

As set forth above, representative claim 13 recites, inter alia, (1) a plurality of electrically conductive elevations commonly formed and separated from a base substrate, and (2) the electrically conductive elevations having a height greater than the height of the electrically conductive bumps. As detailed in the findings of fact section above, we have found that figure 2B of Fukutomi teaches the elevations as having a height that is greater than the height of the gold bumps to the same extent that figure 10 of Appellants’ drawings disclose that limitation. (Findings of

fact 5 and 9.) Similarly, we have found that figure 2B⁴ of Fukutomi teaches the conductive elevations as being commonly formed and separated from the base substrate to the same extent that figure 10 of Appellants' drawings disclose that limitation. (Findings of fact 5 and 8.) We have also found that Appellants' drawings (particularly, figures 7 and 9 through 12) and Specification suffer of these same deficiencies raised in Appellants' contentions above.⁵ As previously noted, we find nowhere in Appellants' original Specification any discussion pertaining to the height of the electrically conductive bumps or elevations.⁶ Therefore, Appellants cannot rely on these same premises to persuasively rebut the Examiner's prima facie case of anticipation. In light of these findings, it is our reasoned opinion that Fukutomi's teachings amount to electrically conductive elevations being commonly formed and separated from the base substrate where the conductive elevations have a height greater than the height of the

⁴ At page 8 of the Brief, Appellants state:

"Figs. 2a-2f of Fukutomi do not disclose a height of the gold bump (8). Accordingly (sic) Fukutomi does not provide teaching for the relationship of the height of the gold bumps (8) with respect to the wiring (2). Therefore, in Fukutomi, a conclusion that height of the wirings is greater than the height of the gold bumps cannot be made... The other figures of Fukutomi showing wire-bonding connections are silent about the selection of the dimensions for the gold bumps and offer no indication of how the gold bumps are dimensioned... The descriptions of figs. 2a-2f at column 9, lines 28-49, provides no indication for the height relationship between the gold bumps (8) and the wiring (2)."

Further, at page 2 of the Reply Brief, Appellants argue that figures 2A-2F of Fukutomi are not true to scale.

⁵ *Id.*

⁶ *See supra* note 2.

conductive bumps. It follows that the Examiner did not err in rejecting representative claim 13 as being anticipated by Fukutomi.

Appellants did not offer separate arguments against the rejection of claims 14 and 15. Therefore, they fall together with representative claim 13. *See* 37 C.F.R. § 41.37(c)(1)(vii)(2004.)

35 U.S.C. § 103(a) REJECTION

Now, we turn to the rejection of claims 13 and 14 as being unpatentable over the combination of Fukutomi and Jung. As discussed above, we have found that Fukutomi teaches electrically conductive elevations being commonly formed and separated from the base substrate where the conductive elevations have a height greater than the height of the conductive bumps. Further, we have found that Jung teaches the use of T-shaped connection pads to allow the chip to establish contacts with external devices, as well as to enhance the locking of the pads in the chip. (Findings of fact 11 and 12). We agree with the Examiner that one of ordinary skill in the art would have readily recognized that Jung's connection pads would have allowed Fukutomi's encapsulated chip to enhance the locking of elevations in the encapsulated chip. Therefore, it is our view that the ordinarily skilled artisan would have been motivated to combine the teachings of Fukutomi and Jung to yield the invention as recited in claims 13 and 14. It follows that the Examiner did not err in rejecting claims 13 and 14 as being unpatentable over Fukutomi and Jung.

CONCLUSION OF LAW

On the record before us, Appellants have not shown that the Examiner failed to establish that Fukutomi anticipates the claimed invention under 35 U.S.C. § 102. Further, Appellants have not shown that the Examiner failed to establish that one of ordinary skill in the art at the time of the present invention, would have concluded that Fukutomi in combination with Jung renders the claimed invention unpatentable under 35 U.S.C. § 103(a).

DECISION

We affirm the Examiner's decision to reject claims 13 through 15 under 35 U.S.C. § 102 as being anticipated by Fukutomi. We also affirm the Examiner's decision to reject claims 13 and 14 under 35 U.S.C. § 103(a) as being unpatentable over the combination of Fukutomi and Jung.

AFFIRMED

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