

Appeal No. 2000-0421  
Application 08/912,429

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.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

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte CHI SHIH CHANG, WILLIAM T. CHEN,  
and AJIT TRIVEDI

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Appeal No. 2000-0421  
Application 08/912,429

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ON BRIEF

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Before JERRY SMITH, RUGGIERO, and DIXON, 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 1-3, 5-7, 9-11 and 13-15, which constitute all the claims remaining in the application. An

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amendment after final rejection was filed on December 2, 1998 and was entered by the examiner.

The disclosed invention pertains to a method of packaging a flip chip and to the flip chip package which results therefrom.

Representative claim 1 is reproduced as follows:

1. A method of packaging a flip chip, comprising the following steps:

coupling an integrated circuit (IC) chip to a first side of a package substrate;

placing at least one first electrical interconnection on a second side of said package substrate which is coupled to said IC chip; and,

positioning at least one second electrical interconnection on said second side of said package substrate and underlying a shadow region of said IC chip, wherein said at least one second electrical interconnection reduces the shear and bending stress on said at least one first electrical interconnection.

The examiner relies on the following references:

Pastore et al. (Pastore)	5,285,352	Feb. 08, 1994
Ho	5,598,036	Jan. 28, 1997
Bond et al. (Bond)	5,642,261	June 24, 1997

Claims 1, 2, 5, 6, 9, 10, 13 and 14 stand rejected under 35 U.S.C. § 102(b) as being anticipated by the disclosure of Pastore. Claims 1, 2, 5, 6, 9, 10, 13 and 14 also stand rejected under 35 U.S.C. § 102(e) as being anticipated by the disclosure of Bond. Claims 1-3, 5-7, 9-11 and 13-15 stand rejected under 35 U.S.C. § 103. As evidence of obviousness the examiner offers Ho

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taken alone. Additional rejections which were made in the final rejection were withdrawn in the examiner's answer.

Rather than repeat the arguments of appellants or the examiner, we make reference to the briefs and the answer 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 anticipation and obviousness relied upon by the examiner as support for the rejections. We have, likewise, reviewed and taken into consideration, in reaching our decision, the appellants' 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 answer.

It is our view, after consideration of the record before us, that the disclosures of Pastore and Bond do fully meet the claimed invention as asserted by the examiner. We are also of the view that the teachings of Ho and the level of skill in the particular art would not have suggested to one of ordinary skill in the art the obviousness of the invention as set forth in claims 1-3, 5-7, 9-11 and 13-15. Accordingly, we affirm-in-part.

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We consider first the rejection of claims 1, 2, 5, 6, 9, 10, 13 and 14 under 35 U.S.C. § 102(b) as being anticipated by the disclosure of Pastore. Anticipation is established only when a single prior art reference discloses, expressly or under the principles of inherency, each and every element of a claimed invention as well as disclosing structure which is capable of performing the recited functional limitations. RCA Corp. v. Applied Digital Data Systems, Inc., 730 F.2d 1440, 1444, 221 USPQ 385, 388 (Fed. Cir.); cert. dismissed, 468 U.S. 1228 (1984); W.L. Gore and Associates, Inc. v. Garlock, Inc., 721 F.2d 1540, 1554, 220 USPQ 303, 313 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984).

The examiner indicates how he reads the claimed invention on the disclosure of Pastore [answer, pages 5-6]. Appellants argue that Pastore does not disclose the claimed second electrical interconnection. According to appellants, the solder balls 26 in Pastore provide a thermal conduction path only, and not a second electrical connection [brief, page 7]. The examiner responds that Pastore [column 5, lines 54-57] teaches that the thermal conductor can also be used as an electrical conductor [answer, pages 10-11]. Appellants respond that a ground trace is not a signal path [reply brief, page 3].

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We will sustain this rejection. We agree with the examiner that the solder ball 26 located under thermal conductor 28 also functions as a second electrical interconnection underlying a shadow region of the integrated circuit chip as pointed out by the examiner. We also note that Pastore discloses five solder balls under the integrated circuit chip [Figure 4], but only one of these solder balls is also under the thermal chip 28. Therefore, the other four solder balls clearly provide an electrical interconnection path and underlie a shadow region of the integrated circuit chip as claimed. The argument that a ground trace is not a signal path is not understood because it still appears to be an electrical interconnection as claimed. Accordingly, Pastore clearly anticipates the invention recited in claims 1, 2, 5, 6, 9, 10, 13 and 14.

We now consider the rejection of claims 1, 2, 5, 6, 9, 10, 13 and 14 under 35 U.S.C. § 102(e) as being anticipated by the disclosure of Bond. The examiner indicates how he reads the claimed invention on the disclosure of Bond [answer, page 6]. Appellants argue that Bond does not disclose the claimed second electrical interconnection. According to appellants, the solder balls 80' in Bond provide a thermal conduction path only, and not a second electrical connection [brief, page 7]. The examiner

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responds that Bond [column 7, lines 45-49] teaches that the thermal conductor can also be used as an electrical conductor [answer, pages 11-12]. Appellants respond that a ground path is not a signal path [reply brief, page 3].

We will also sustain this rejection. We agree with the examiner that the solder balls 80' located under thermal conductor 72 also function as second electrical interconnections underlying a shadow region of the integrated circuit chip as pointed out by the examiner. The argument that a ground path is not a signal path is not understood as noted above. Accordingly, Bond clearly anticipates the invention recited in claims 1, 2, 5, 6, 9, 10, 13 and 14.

We now consider the rejection of all claims under 35 U.S.C. § 103. 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

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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, 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 appellants have been considered in this decision. Arguments which appellants could have made but chose

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not to make in the brief have not been considered and are deemed to be waived by appellants [see 37 CFR § 1.192(a)].

The examiner indicates how he finds the claimed invention to be obvious over the teachings of Ho [answer, pages 8-9].

Appellants argue that Ho teaches away from using solder ball joints within the shadow of the integrated circuit chip because it is difficult to route signal lines to solder joints located at the package center [brief, pages 8-9]. The examiner responds that the thermal conductors of Ho could also be used as electrical conductors to improve the electrical performance of the package, apparently relying on the teachings of Pastore [answer, pages 12-13]. Appellants respond that the examiner has incorrectly relied on Pastore, which was not applied in the statement of the rejection. Appellants also argue that there is no motivation to combine the teachings of Ho and Pastore [reply brief, pages 1-3].

We will not sustain this rejection of the claims on appeal. The examiner's rejection improperly relies on teachings of Pastore to support the rejection. References which are not listed in the statement of the rejection are not considered by us or by the courts. Even if we were to consider the combination of Ho and Pastore, appellants have presented several cogent

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arguments as to why the artisan would not have been motivated to combine the teachings of Ho with the teachings of Pastore. None of these arguments have been addressed by the examiner.

Therefore, the examiner has failed to establish a prima facie case of the obviousness of the claims on appeal over the teachings of Ho taken alone.

In summary we have sustained the examiner's rejections of claims 1, 2, 5, 6, 9, 10, 13 and 14 under 35 U.S.C. § 102, but we have not sustained the rejection of claims 1-3, 5-7, 9-11 and 13-15 under 35 U.S.C. § 103 based on the teachings of Ho. Accordingly, the decision of the examiner rejecting claims 1-3, 5-7, 9-11 and 13-15 is affirmed-in-part.

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

AFFIRMED-IN-PART

JERRY SMITH	)	
Administrative Patent Judge	)	
	)	
	)	
	)	BOARD OF PATENT
JOSEPH F. RUGGIERO	)	
Administrative Patent Judge	)	APPEALS AND
	)	
	)	INTERFERENCES
	)	
JOSEPH L. DIXON	)	
Administrative Patent Judge	)	

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