

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 16

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte SHYH-MING CHANG, CHIH-CHIANG CHU and YU-CHI LEE

Appeal No. 1997-1173
Application No. 08/428,775¹

ON BRIEF

Before HAIRSTON, MARTIN and FLEMING, Administrative Patent Judges.

HAIRSTON, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal from the final rejection of claims 1 through 4.

The disclosed invention relates to a bonded structure for flip chip bonding between an integrated circuit element and a

¹ Application for patent filed April 24, 1995. The application is a division of Application No. 08/239,380 filed May 6, 1994, now Patent No. 5,431,328.

Appeal No. 1997-1173
Application No. 08/428,775

substrate. Specifically, the bonded structure provides physical and electrical connections between input/output pads on the integrated circuit element and input/output pads on the substrate. Each of the physical and electrical connections includes a soldering metal and a composite bump comprising a polymer body coated with metals.

Claim 1 is illustrative of the claimed invention and reads as follows:

1. A bonded structure, comprising:

an integrated circuit element having input/output pads;

a substrate having input/output pads; and

a plurality of physical and electrical connections between said integrated circuit element input/output pads and said substrate input/output pads wherein each said connection includes a soldering metal and a composite bump comprised of a single polymer body with a conductive metal coating covering said polymer body wherein said physical and electrical connections are formed by said soldering metal.

The references relied on by the examiner are:

Matsubara et al. (Matsubara) 12, 1990 (Japanese Patent Application)	2-180036	July
Feilchenfeld et al. (Feilchenfeld) 28, 1989	4,883,744	Nov.
Afzali-Ardakani et al. (Afzali-Ardakani)	5,397,863	Mar. 14, 1995

Appeal No. 1997-1173
Application No. 08/428,775

Anderson, Jr. et al. (Anderson, Jr.) 4,504,007 Mar. 12,
1985

Claim 1 stands rejected under 35 U.S.C. § 102(b) as being anticipated by Matsubara.

Claim 2 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Matsubara in view of Feilchenfeld.

Claim 3 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Matsubara in view of Afzali-Ardakani.

Claim 4 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Matsubara in view of Anderson, Jr.

Reference is made to the brief and the answer for the respective positions of the appellants and the examiner.

OPINION

We have carefully considered the entire record before us, and we will reverse the rejections of claims 1 through 4.

Rejection of claim 1 under 35 U.S.C. § 102(b).

Anticipation of a claim is established only when a single prior art reference discloses every limitation of the claimed invention, either explicitly or inherently. *RCA Corp. v.*

Applied Digital Data Systems, Inc., 730 F.2d 1440, 1444, 221

Appeal No. 1997-1173
Application No. 08/428,775

USPQ 385, 388 (Fed. Cir. 1984), *cert. dismissed*, 468 U.S. 1228 (1984), citing *Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760, 772, 218 USPQ 781, 789 (Fed. Cir.1983).

Claim 1 calls for a bonded structure which comprises *inter alia* "a plurality of physical and electrical connections between said integrated circuit element input/output pads and said substrate input/output pads . . . wherein said *physical and electrical connections are formed by said soldering metal*" (emphasis added). In rejecting claim 1 as anticipated by *Matsubara et al.*, the examiner has taken the position that the bonded structure in Fig. 1 of *Matsubara et al.* meets such a limitation (Answer, page 3). Appellants argue that *Matsubara et al.* does not teach that "the physical and electrical connections are formed by the soldering metal" because the semiconductor device and the liquid crystal display of *Matsubara et al.* are "joined by a hardened adhesive filling the space between them" (Brief, pages 8-9). We agree with the appellants.

It is axiomatic that the claims of a pending application will be given their broadest reasonable interpretation

Appeal No. 1997-1173
Application No. 08/428,775

consistent with the specification. *In re Prater*, 415 F.2d 1393, 1404, 162 USPQ 541, 550 (CCPA 1969); however, "[c]laim language must be read in light of the specification as it would be interpreted by one of ordinary skill in the art." *In re Johnson*, 558 F.2d 1008, 1016, 194 USPQ 187, 194 (CCPA 1977). According to Webster's Third New International Dictionary (Unabridged, 1971), the term "physical" is defined *inter alia* as "of or relating to natural or material things as opposed to things mental, moral, spiritual, or imaginary." When claim 1 is given a broadest reasonable interpretation consistent with appellants' specification, we interpret the claimed limitation "wherein said physical and electrical connections are formed by said soldering metal" to comprise the soldering metal (i.e., physical connections) connecting the integrated circuit element input/output pads to the substrate input/output pads (as illustrated by numeral reference 38 in appellants' Figures 2 and 4), rather than the soldering metal connecting the composite bumps to the input/output pads (as illustrated by numeral reference 38 in appellants' Figures 6 and 8).

Appeal No. 1997-1173
Application No. 08/428,775

Accordingly, we conclude that one of ordinary skill in the art would not interpret the claimed limitation "wherein said physical and electrical connections are formed by said soldering metal" to include the bonded structure such as that disclosed by Matsubara in which the connections between integrated circuit element input/output pads 11 and composite bumps 15 (not between integrated circuit element input/output pads 11 and substrate input/output pads 3) are formed by soldering metal 20. Thus, we find that the examiner's interpretation of claim 1 is not reasonable. Since each element of claim 1 is not found in

Appeal No. 1997-1173
Application No. 08/428,775

Matsubara, the examiner's rejection of claim 1 under 35 U.S.C. § 102(b) is reversed.

Rejections of claims 2 through 4 under 35 U.S.C. § 103(a).

Claims 2 through 4, which depend from claim 1, further recite "wherein said polymer is polyamic acid polyimide" (claim 2), "wherein said conductive metal coating is a composite of chrome/copper/gold having thicknesses of about 500 Angstroms chrome/500 Angstroms copper/2000 Angstroms gold" (claim 3), and "wherein said soldering metal is 95% lead-5% tin" (claim 4), respectively. Although claims 2 through 4 depend from claim 1, and the rejection of claim 1 as being anticipated by Matsubara et al. has not been sustained, it is still necessary to consider whether claims 2 through 4 would have been obvious within the meaning of 35 U.S.C. § 103(a).

In rejecting claims under 35 U.S.C. § 103(a), the examiner bears the initial burden of establishing a *prima facie* case of obviousness. *In re Rijckaert*, 9 F.3d 1531, 1532, 28 USPQ2d 1955, 1956 (Fed. Cir. 1993). As noted *supra*,

Appeal No. 1997-1173
Application No. 08/428,775

we cannot agree with the examiner's interpretation of claim 1. Matsubara does not disclose the claimed limitation "wherein said physical and electrical connections are formed by said soldering metal" and the entire record is devoid of any teaching, suggestion, or motivation as to why it would have been obvious to one of ordinary skill in the art to modify Matsubara in order to have a bonded structure which comprises *inter alia* "a plurality of physical and electrical connections between said integrated circuit element input/output pads and said substrate input/output pads . . . wherein said physical and electrical connections are formed by said soldering metal." Determining obviousness/nonobviousness under 35 U.S.C. § 103(a) involves factual inquiries into: (1) the scope and content of the prior art; (2) the level of ordinary skill in the art; (3) the differences between the claimed invention and the prior art; and (4) objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18, 148 USPQ 459, 467 (1966). Failure to address the differences between claims 2 through 4 and the

Appeal No. 1997-1173
Application No. 08/428,775

applied prior art references results in a failure to establish a *prima facie* case of obviousness. Therefore, the examiner's rejections of claims 2 through 4 under 35 U.S.C. § 103(a) are reversed.

Appeal No. 1997-1173
Application No. 08/428,775

DECISION

The decision of the examiner rejecting claim 1 under 35 U.S.C. § 102(b), and claims 2 through 4 under 35 U.S.C. § 103(a) is reversed.

REVERSED

KENNETH W. HAIRSTON)	
Administrative Patent Judge)	
)	
)	
)	
)	BOARD OF PATENT
JOHN C. MARTIN)	APPEALS
Administrative Patent Judge)	AND
)	INTERFERENCES
)	
)	
)	
MICHAEL R. FLEMING)	
Administrative Patent Judge)	

jrg

Appeal No. 1997-1173
Application No. 08/428,775

George O. Saile
20 McIntosh Drive
Poughkeepsie, NY 12603