

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board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. 19

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte ROBERT C. DOCKERTY,  
RONALD M. FRAGA, CIRO N. RAMIREZ,  
SUDIPTA K. RAY and GORDON J. ROBBINS

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Appeal No. 2000-0159  
Application 08/688,073

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ON BRIEF

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Before THOMAS, HAIRSTON and BARRETT, Administrative Patent Judges.

THOMAS, Administrative Patent Judge.

DECISION ON APPEAL

Appellants have appealed to the Board from the examiner's final rejection of claims 1-10 and 21-24.

Representative claim 1 is reproduced below:

1. In a system for connecting a substrate having a low coefficient of thermal expansion to a printed circuit board having a materially higher coefficient of thermal expansion using an array of solder columns and reflow bonding, a supporting structure with effective heat sink coupling to the substrate, comprising:

an array of high melting temperature solder columns of first cross-sectional area attached to an array of electrically transmitting pads on a first side of the substrate;

a set of high melting temperature solder structural support columns of second cross-sectional area, the second cross-sectional area exceeding the first by a factor of five or greater, attached to pads at perimeter locations on the first side of the substrate;

a plurality of connections between first and second cross-sectional area solder columns and respectively located surface mount pads on the printed circuit board using reflowed low melting temperature solder; and

a heat sink thermally contacting a structural element on a second side, opposite the first side, of the substrate.

The following references are relied on by the examiner:

Kohara et al. (Kohara)	4,561,011	Dec. 24, 1985
Gaudenzi et al. (Gaudenzi)	5,490,040	Feb. 6, 1996

Appellants' admitted prior art in Figure 1 discussed at page 6, line 11 through page 7, line 33.

Claims 1-10 and 21-24 stand rejected under 35 U.S.C. § 103 according to the final rejection. As to claims 1-10 and 21-24, the examiner relies upon appellants' admitted prior art in view of Gaudenzi, with the addition of Kohara as to claims 2-5.

Rather than repeat the positions of the appellants and the examiner, reference is made to the brief and the answer for the respective details thereof.

OPINION

We reverse.

Each of independent claims 1 and 21 on appeal requires an array of solder columns of a first cross-sectional area and a set of solder structural support columns of second cross-sectional area which exceeds the first by a factor of 5 or greater.

We generally agree with the examiner's view expressed at page 3 of the answer that appellants' admitted prior art shows all the features of independent claims 1 and 21 on appeal except for the set of solder structural support columns of second cross-sectional area. We do not agree with the examiner's view that Gaudenzi teaches the use of solder columns and pin-in-hole conductive pins are equivalent approaches for mounting a device to a printed circuit board. What the examiner characterizes as a pin-in-hole arrangement is shown in Figures 6-8 of Gaudenzi as conductive pins 58. In this respect, we agree with appellants' observation at the bottom of page 4 of the brief that the structure in Gaudenzi is substantially identical to appellants' admitted prior art in Figure 1.

The earlier-noted equivalence asserted by the examiner is based upon the statement at column 6, lines 17-19 of Gaudenzi which states "[i]t is readily apparent that pins can be incorporated with other solder techniques such as solder columns." Whereas Gaudenzi teaches and shows in Figures 6-8 that

solder balls 56 may be used with electrical conductive pins 58, this noted portion at column 6 of Gaudenzi indicates that solder columns may be used with the electrical conductive pins 58 instead. If anything, Gaudenzi teaches an equivalence of solder balls to solder columns and not solder columns to conductive pins as suggested by the examiner's reasoning.

Therefore, Gaudenzi does not teach or suggest to the artisan the use of two sets of solder columns of different cross-sectional area as claimed. This column 6 location of Gaudenzi does not teach or suggest to the artisan the substitutability of solder columns for the conductive pins 58 in Gaudenzi's Figures 6-8 as urged by the examiner. Gaudenzi teaches to substitute the use of solder balls or solder columns, either of which must be used with a conductive pins taught in this reference.

In view of the foregoing considerations, the examiner has not set forth a prima facie case of obviousness of independent claims

1 and 21 on appeal. Therefore, the decision of the examiner rejecting these claims and their respective dependent claims must be reversed.

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Application 08/688,073

Accordingly, the decision of the examiner rejecting claims  
1-10 and 21-24 under 35 U.S.C. § 103 is reversed.

REVERSED

James D. Thomas	)	
Administrative Patent Judge	)	
	)	
	)	
	)	
Kenneth W. Hairston	)	BOARD OF PATENT
Administrative Patent Judge	)	APPEALS AND
	)	INTERFERENCES
	)	
	)	
Lee E. Barrett	)	
Administrative Patent Judge	)	

JDT/cam

Casimer K. Salys  
International Business Machines Corp.  
Intel Prop Law Dept. Internal ZIP 4054  
11400 Burnet Road  
Austin, TX 78758