

The opinion in support of the decision being entered today was not written for publication in a law journal and is not binding precedent of the Board.

Paper No. 20

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte KIMBERLY A. KELLY and ROY YU

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Appeal No. 1998-2144  
Application No. 08/568,847

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ON BRIEF

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Before BARRETT, LALL, and BLANKENSHIP, Administrative Patent Judges.

BLANKENSHIP, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the examiner's final rejection of claims 21-34 and 36.

We reverse.

BACKGROUND

The invention is directed to a module containing an integrated circuit chip, with the module including columns capable of transferring heat. Claim 21 is reproduced below.

21. In a module that has a case with electrical contacts thereon and contains an integrated circuit chip and a circuit board therein which circuit board and chip have electrical connections on facing surfaces thereof formed by a controlled collapse chip contact connection method and which board has electrically conducting vias therein for the conduction of electricity to and from said connections to the electrical contacts, the improvement comprising:

columnar means formed of additional conductive vias, in said circuit board, configured for the transfer of heat in the circuit chip through the electrical connections on the facing surfaces of the circuit board and chip through the circuit board towards the case of the module; and

contact means on the interior of the case to transfer heat from the columnar means to the case.

The examiner relies on the following references:

Sumida	5,543,661	Aug. 6, 1996 (filed May 24, 1995)
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Thermal Enhancement of Thermal Cap, 31 IBM Technical Disclosure Bulletin No. 4, 372-73, Sept. 1988 (the IBM TDB).

Claims 21-34 and 36 stand rejected under 35 U.S.C. § 103 over the IBM TDB and Sumida. Claim 35 has been objected to as depending from a rejected claim, but deemed to contain allowable subject matter. Claims 1 through 20 have been canceled.

We refer to the Final Rejection (Paper No. 10) and the Examiner's Answer (Paper No. 15) for a statement of the examiner's position and to the Brief (Paper No. 14) and the

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Reply Brief (Paper No. 16) for appellants' position with respect to the claims which stand rejected.

### OPINION

At the outset we note that each of the three independent claims before us (21, 31, and 36) are drafted in the well-known Jepson format. We interpret each respective claim as setting forth elements which are conventional or known in the portion preceding "the improvement comprising," with the conventional or known elements forming part of the combination. See, e.g., Rowe v. Dror, 112 F.3d 473, 478, 42 USPQ2d 1550, 1553 (Fed. Cir. 1997). The prior-art elements set forth in the respective claims are found in module 10 (Figure 1), as described in the "Background of the Invention" section of the instant specification.

We also note an ambiguity in at least claims 21 and 36. The original disclosure (including the original claims) does not refer to a "contact means." The term "contact means" appeared when the original claims were canceled and present claims 21 through 35 were added by the amendment filed November 15, 1996 (Paper No. 6). In the Remarks accompanying the amendment, appellants' only apparent reference to what may correspond to the claimed "contact means" appears on page 5, referring to Figure 3: "These columnar connections can extend all the way from a C4 contact 70 to a connection 66b [sic] on the interior surface of the base of the module for direct cooling of the C4

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contact....” However, reference numeral 70 in Figure 3 refers to a region of the chip 12 that will not be used in the electric circuitry of the module 60. (See specification, page 6, lines 9-11.) Reference numeral 66B refers to columns which are vias that have been enlarged to provide heat transfer capabilities that are not present when vias are only used to conduct electricity; not a “connection...on the interior surface of the base of the module.” (See id. at lines 14-16.)

The use of the term “means” in the recitation of “contact means” triggers a presumption that the statutory procedures of 35 U.S.C. § 112, sixth paragraph, apply. See Greenberg v. Ethicon Endo-Surgery, Inc., 91 F.3d 1580, 1584, 39 USPQ2d 1783, 1787 (Fed. Cir. 1996). Lack of any structure in the disclosure corresponding to the “means” would indicate that the claims fail to pass muster under 35 U.S.C. § 112, second paragraph. See, e.g., Atmel Corp. v. Information Storage Devices, Inc., 198 F.3d 1374, 1381-82, 53 USPQ2d 1225, 1230 (Fed. Cir. 1999); In re Dossel, 115 F.3d 942, 944-46, 42 USPQ2d 1881, 1883-85 (Fed. Cir. 1997). Therefore, there must be some structure in the disclosure that performs the claimed function.

In view of the location and function of elongate columns 66E (see Figure 3 and specification, page 6, last paragraph), it is possible that those columns may correspond to the claimed “contact means.” However, that raises the question why the written description would refer to “columns,” but the claims setting forth “columnar means” and “contact means.” The further question is raised as to how the structure of the “elongate columns”

may differ from the prior art (Figure 1) structures on the interior surface of substrate 31 which resemble the “elongate columns” of Figure 3 (i.e., what the improvement over the prior art may be with respect to the “contact means”). If, on the other hand, particular interior surface portions of substrate 72 (Figure 3) correspond to the “means,” the question is raised as to how the particular portions differ from the surface portions in prior art Figure 1. Finally, the location of the claimed “contact means” is required merely to be “on the interior” -- within -- the case, rather than on the interior surface of the case. Again, however, it is unclear what disclosed structure may correspond to such a “contact means.”

Although what the disclosed structure may be which corresponds to the “contact means” is unclear to us, and neither appellants nor the examiner have explained the limitation, there is no rejection under 35 U.S.C. § 112, second paragraph for claim indefiniteness. We therefore presume that the claims pass muster under section 112, and leave it to appellants and the examiner to clarify the record.

Turning to the rejection, the examiner offers as evidence of obviousness of the claimed subject matter the IBM TDB, which “discloses a module that has a case (1) with electrical contacts thereon and contains an integrated circuit chip (2) connected to a circuit board (4) by the C4 method.” (Final Rejection, page 2.) For “columnar means and contact means,” the examiner turns to Sumida. “Sumida teaches a module including a circuit board (10) formed of electrically conducting vias (8a-8c) connected to electrical connections (1, 2); columnar means formed of additional conductive vias (4a, 4b) for heat

transfer through electrical connections (1, 2); and contact means on the backside of the package (note column 4, lines 46-63).” (Id. at 3.)

The IBM TDB discloses a ceramic cap 1, but no electrical contacts are shown. (Compare with appellants’ Figure 3, having electrical contacts (I/O pins) 34.) A chip 2 is shown, which is connected in some fashion to substrate 4. Sumida discloses (Figure 1) insulator layers 10 having electrically conductive vias 8a through 8c and thermal vias 4. Column 4, lines 46 through 63 of Sumida refers to “the backside of the package,” but does not appear to describe any “contact means,” on the backside of the package or anywhere else.

The IBM TDB and Sumida appear to have similar teachings. As shown in Figure 2 of the IBM TDB, thermally conducting vias 8 are in place for transferring heat from chip 2, through thermal paste 7, through ceramic cap 1, and to heat sink 5. (Compare appellants’ Figure 3, with columns 66F between backside 26 of chip 12 and cap 64.) Figure 1 of Sumida shows a package having the general orientation of appellants’ prior art Figure 2, having chip mounting portion 3 and external terminals on the superior portion of the package. The thermal vias, however, are situated to remove heat from the backside of a chip mounted on chip mounting portion 3. The general teachings of the references are similar, but with orientations -- what constitutes the “backside” of the chip -- differing by 180 degrees.

Each of independent claims 21 and 36 require, inter alia, “a module that has a case with electrical contacts thereon and contains an integrated circuit chip and a circuit board therein which circuit board and chip have electrical connections on facing surfaces thereof...and which board has electrically conducting vias therein for the conduction of electricity to and from...connections to the electrical contacts.” Independent claim 31 recites similar limitations, although using the language “component board” and “facing front side surfaces.”<sup>1</sup> While such structure is clearly shown in appellants’ prior art Figure 1 (consistent with the implied admission related to the Jepson format), we do not see how the basic structures of the claims are disclosed or suggested by the IBM TDB and Sumida.<sup>2</sup> The examiner refers to substrate 4 of the IBM TDB as the “circuit board,” but no module having a case with electrical contacts thereon is disclosed; how the provision of “electrically conducting vias” within the circuit board for conducting electricity to contacts would have been suggested is problematic, in view of no contacts being disclosed. Sumida fails to remedy the basic deficiencies in the rejection.

Perhaps the problem with the rejection lies in erroneous claim interpretation. In general, the preamble of an apparatus claim may be entitled to little patentable weight if

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<sup>1</sup> We note in passing that the claim 31 recitation “the metal contacts” lacks proper antecedent in the claim, but apparently refers to the “electrical contacts” on the case.

<sup>2</sup> There is nothing in the statement of the rejection to suggest that appellants’ admitted prior art is relied upon as part of the evidence of alleged obviousness, nor is any rationale supplied for why the combined teachings of the admitted prior art and the applied references would have rendered the claimed subject matter obvious.

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the language merely sets out an intended field of use. However, an accepted principle in the interpretation of a Jepson-type claim is that the preamble represents actual scope of the claim, rather than mere field of use. Therefore, a rejection under 35 U.S.C. § 103, which is required to set out underlying factual findings as described by Graham v. John Deere Co., 383 U.S. 1 (1966), must show how the combination as a whole would have been rendered obvious by the prior art, including the limitations in the preamble of the claim. The claims are not directed merely to “improvements,” but to improvements within the prior art structures set forth.

Since the references as applied fail to establish prima facie obviousness of the claimed subject matter as a whole, we cannot sustain the rejection under 35 U.S.C. § 103.

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CONCLUSION

The rejection of claims 21-34 and 36 is reversed.

REVERSED

LEE E. BARRETT	)	
Administrative Patent Judge	)	
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	)	BOARD OF PATENT
PARSHOTAM S. LALL	)	APPEALS
Administrative Patent Judge	)	AND
	)	INTERFERENCES
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HOWARD B. BLANKENSHIP	)	
Administrative Patent Judge	)	

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