

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opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.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. 31

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JOHN A. COSTELLO, HARRY BUHAY,
RICHARD R. PAPANIA, PROSENJIT RAI-CHOUDHURY,
KENNETH J. PETROSKY and GENE A. MADIA

Appeal No. 95-0638
Application 08/011,094¹

ON BRIEF

Before HAIRSTON, JERRY SMITH and BARRETT, Administrative Patent Judges.

JERRY SMITH, Administrative Patent Judge.

DECISION ON APPEAL

¹ Application for patent filed January 29, 1993. According to the applicants this application is a continuation of Application 07/793,233, filed November 8, 1991, now abandoned, which is a continuation of Application 07/453,287, now abandoned.

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This is a decision on the appeal under 35 U.S.C. § 134 from the examiner's rejection of claims 1-15, 36-43, 45-49 and 74-89. Claim 44 has been cancelled. Claims 16-35 and 50-73 stand withdrawn from consideration by the examiner as being directed to a nonelected invention. An amendment after the first action final rejection in this case was filed on June 28, 1993 and was entered by the examiner. This amendment resulted in the removal of a rejection of claim 1 under the second paragraph of 35 U.S.C. § 112.

The disclosed invention pertains to the field of power microwave generating transistor modules and power transistor packages. These modules and packages generate a substantial amount of heat which limits the density of components which can be interconnected in a given space. Appellants have discovered that the conventional metallic heat dissipation layers can be replaced by copper layers of a specific thickness which improve the dissipation of heat so that the density of the device and the applied power can be increased without a corresponding increase in the temperature of the device.

Representative claim 75 is reproduced as follows:

75. A power transistor package, comprising:
a metallic base member;

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a substrate having a ceramic core with first and second opposite planar surfaces, each of the planar surfaces having a layer of copper with a thickness in the range of approximately 0.5 to 7 mils bonded to each of the planar surfaces by a metallic film;

a layer of nickel having a thickness substantially less than the copper layer plated on the copper layer, at least a portion of the first planar surface being electrically isolated from the base member for supporting a plurality of power transistors, the copper layer having the characteristics and thickness to spread heat from power microwave transistors mounted on the electrically isolated planar surface, the second planar surface being brazed to the metallic base member; and

a frame assembly brazed to a metallic surface surrounding and spaced from the electrically isolated planar surface of the substrate for connecting electrically at least two terminals exterior the respective package, the two terminals being electrically isolated from the substrate and the base member and from each other.

The examiner relies on the following references:

Freedman et al. (Freedman)	3,814,633	June 04, 1974
Kurihara et al. (Kurihara '899)	4,556,899	Dec. 03, 1985
Kurihara et al. (Kurihara '733) (Japanese Kokai)	59-175733	Oct. 04, 1984

The admitted prior art of appellants' Figure 13.

Claims 1-15, 36-43, 45-49 and 74-89 stand rejected under 35 U.S.C. § 103. As evidence of obviousness the examiner offers the admitted prior art of appellants' Figure 13 in view of the teachings of either Kurihara '733 or Freedman. Claims 76-79 stand additionally rejected based on the admitted prior art in view of Kurihara '899.

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Rather than repeat the arguments of appellants or the examiner, we make reference to the brief 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 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 brief 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 collective evidence relied upon 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 1-15, 36-43, 45-49 and 74-89. Accordingly, we reverse.

Appellants have argued all the claims subject to each rejection as a single group. Accordingly, all the claims before us will stand or fall together. Note In re King, 801 F.2d 1324,

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1325, 231 USPQ 136, 137 (Fed. Cir. 1986); In re Sernaker, 702 F.2d 989, 991, 217 USPQ 1, 3 (Fed. Cir. 1983).

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 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 Hospital Systems, Inc. v. Montefiore Hospital, 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

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obviousness. Note In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992).

Admitted prior art Figure 13 is the primary reference for each of the rejections. Figure 13 shows a fragmentary sectional view of a typical substrate 24 and base assembly 34 upon which a power transistor package 20 is placed. The metallized substrate 28 in Figure 13 is coated on both sides by a molybdanum (MoMn) coating. This coating is selected for its adhesive and thermal characteristics. The examiner asserts that prior art Figure 13 shows all the claimed features except for the "thick copper layer bonded to a thin nickel layer for spreading heat from the transistors to the plate" [answer, page 3]. The difference between Figure 13 and the claimed invention which is argued to be critical is that the MoMn coating of Figure 13 has been replaced in the invention by a copper layer of a particular thickness which is bonded to the ceramic substrate.

Kurihara '733 discloses an insulated semiconductor device in which a ceramic substrate 2 has copper layers 203 and 204 on both sides each having a thickness of about 100 mm [translation, page 11]. Kurihara '899 also discloses an insulated semiconductor device in which a ceramic substrate 2 is placed between a composite metal plate 3 and a metal support 1. The

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metal support has a copper layer with a thickness of 1.5 mm, and the composite metal plate has a copper layer of 0.2 mm [column 4, lines 22 and 44]. Freedman discloses a thermoelectric module which has a metallized ceramic 18 covered on both sides by a brazed sheet of copper [column 2, lines 53-63]. Freedman offers no indication of the dimensions of the various layers used in his device.

Each of the examiner's rejections basically uses the same rationale for obviousness. Specifically, the examiner relies on any one of the secondary references to teach the placement of copper layers on both sides of a ceramic substrate. The examiner asserts that the claimed recitation of the copper layers having a thickness between 0.5 and 7 mils would have been an obvious design variation to the artisan.

Appellants present similar arguments in response to each of the rejections made by the examiner. Specifically, appellants argue that none of the applied references teaches each copper layer of the device having a thickness in the range of 0.5 to 7 mils. Appellants argue that this particular range of thicknesses is critical to the invention and gives the invention its superior properties. It is noted that the thickness in Kurihara '733 translates to 3,937 mils, while the thickness in Kurihara '899

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translates to 7.9 mils. Each of these values is outside the claimed range. Appellants argue that since none of the applied prior art teaches the thickness of the copper layers as recited in the claims, there is no prima facie showing of obviousness by the examiner.

The examiner argues that the claims do not recite the usefulness of the thickness of the copper layers. It is not the function of the claims to describe the useful properties of the device. The specification in this application properly describes the advantages of using copper layers of the claimed thickness.

It is enough that the claims on appeal clearly recite a structural limitation of the thickness of the copper layers. The examiner cannot ignore clear structural limitations in a claim, and it is improper to look to the claim for a recitation of the advantages of a structural limitation.

The examiner also argues that the superior properties of the claimed invention which are argued by appellants are not properly incorporated into the claims. However, the superior properties result from the selection of specific values of thickness for the copper layers. These specific values of thickness are in the range of 0.5 to 7 mils and this range is

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clearly recited in the claims. Therefore, the limitation cannot be ignored or dismissed as not being properly included within the claims.

Finally, the examiner asserts that the claimed thickness of the copper layers could have been obtained by trial and error without undue experimentation or hardships by the artisan. This standard clearly is inappropriate under 35 U.S.C. § 103. There must be something in the prior art which would have led the artisan to make the claimed modification. It is not enough that the prior art could have been modified to arrive at the claimed invention. The prior art must suggest such modification to the

inventor. The only teaching on this record of using copper layers in this art having a thickness between 0.5 and 7 mils comes from appellants' own disclosure. In the absence of appellants' disclosure, there would be no motivation to use copper layers of the claimed thickness.

Thus, for each of the rejections, the issue comes down to the examiner's bare assertion that the thickness of the copper layers is a mere design choice compared to appellants' arguments that the specific claimed values represent a critical discovery

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which is not suggested by any of the applied references. On this record we agree with appellants that the examiner has failed to factually support his case. Therefore, we reverse each of the examiner's prior art rejections of the claims.

Accordingly, the decision of the examiner rejecting claims 1-15, 36-43, 45-49 and 74-89 is reversed.

REVERSED

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JERRY SMITH)	
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