

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. 27

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte GUY R. WAGNER
and
CHANDRAKANT PATEL

Appeal No. 2003-1021
Application No. 09/507,507

ON BRIEF

Before OWENS, PAWLIKOWSKI, and POTEATE, **Administrative Patent Judges**.

POTEATE, **Administrative Patent Judge**.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 from the final rejection of claims 1-4, 8-13 and 15-24, which are the only claims pending in the application.

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Claim 1 is representative of the subject matter on appeal and is reproduced below:

1. A heat sink for a heat generating device, the device having a first coefficient of thermal expansion and a first thermal conductivity, the heat sink comprising:

a body for removing heat from the heat generating device, the body having a second coefficient of thermal expansion greater than the first coefficient of thermal expansion and a second thermal conductivity greater than the first thermal conductivity; and

an intermediate region between the heat generating device and the body, the intermediate region comprising a material having a coefficient of thermal expansion substantially matching the first coefficient of thermal expansion and the intermediate region having a thermal conductivity greater than the first thermal conductivity and less than or equal to the second thermal conductivity;

wherein said intermediate region is discrete from the body; and

wherein said heat sink further comprises one or more discrete layers between the top of said intermediate region and the bottom of the body.

The references relied upon by the examiner are:

Gondusky et al. (Gondusky)	5,050,040	Sept. 17, 1991
Toy et al. (Toy)	5,931,222	Aug. 3, 1999

GROUND OF REJECTION

1. Claim 24 stands rejected under 35 U.S.C. § 112, first paragraph.

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2. Claims 1, 9, 13 and 16-22 stand rejected under 35 U.S.C. § 102(b) as anticipated by Gondusky.

3. Claims 2-4, 8, 10-13 and 15 stand rejected under 35 U.S.C. § 103 as obvious over Gondusky.

4. Claims 23 and 24 stand rejected under 35 U.S.C. § 103 as obvious over Gondusky in view of Toy.

We reverse as to all four grounds of rejection.

BACKGROUND

High efficiency integrated circuit devices, such as central processing units for computers, typically generate significant amounts of heat energy during operation. Specification, page 1, lines 17-20. If the heat is not continuously removed, the device may be damaged or experience a reduction in operating performance. *Id.* at lines 20-22. One method of removing excess heat from central processing units is to use a heat sink device. *Id.* at lines 23-24. Problems typically encountered with heat sinks include wear and tear on the underlying electronics due to thermal cycling and damage to the electronics resulting from inefficient heat dissipation. *Id.*, page 2, lines 9-11 and 30-32. The purpose of the present

invention is to overcome these drawbacks of the prior art devices and provide a thermally matched interface between a heat producing electronic device and a heat sink. *Id.*, page 1, lines 6-7.

DISCUSSION

1. Rejection of claim 24 under 35 U.S.C. § 112, first paragraph

Claim 24 is a dependent claim which requires that the claim 1 heat sink comprise a plurality of discrete layers between the body of the heat sink and an intermediate region which is between a heat generating device and the body. In particular, claim 24 requires that each of the plurality of discrete layers has a coefficient of thermal expansion greater than the layer beneath it.

Appellants maintain that the language of claim 24 complies with the requirements of 35 U.S.C. § 112, first paragraph, because this language appeared in original claim 6, now cancelled. See Appeal Brief, Paper No. 22, received September 10, 2002, page 14. Appellants note that although this language did not appear in the original specification, the specification has since been amended in a manner consistent with originally filed claim 6. *Id.* The examiner maintains that the

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rejection is proper since the original specification stated that each layer has "a higher thermal conductivity than the one underneath it" which is inconsistent with the claim 24 requirement that each of the plurality of discrete layers "has a coefficient of thermal expansion greater than the layer beneath it." Examiner's Answer, Paper No. 23, mailed December 17, 2002, pages 6-7.

We are in agreement with appellants that it is clear from the specification and claims that each of the layers may have both a higher coefficient of thermal expansion and a higher thermal conductivity relative to the layers beneath it. See Appeal Brief, page 17. Thus, we are in agreement with appellants that the examiner's rejection of claim 4 is improper.

Accordingly, this ground of rejection is reversed.

**2. Rejection of claims 1, 9, 13 and 16-22 under
35 U.S.C. § 102(b) as anticipated by Gondusky**

A prior art reference anticipates a claim when the reference discloses every feature of the claimed invention either explicitly or inherently. **See Hazani v. United States ITC**, 126 F.3d 1473, 1477, 45 USPQ2d 1358, 1361 (Fed. Cir. 1997).

"Inherent anticipation requires that the missing descriptive material is 'necessarily present,' not merely probably or

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possibly present, in the prior art." ***Trintec Indus., Inc. v. Top-U.S.A. Corp.***, 295 F.3d 1292, 1295, 63 USPQ2d 1597, 1599 (Fed. Cir. 2002) (citations omitted).

The examiner's rejection of the claims under 35 U.S.C. § 102(b) is limited to the following statement: "The patent of Gondusky et al., in column 5 and Figure 1 discloses applicant's [sic] claimed invention." Examiner's Answer, page 4. With respect to claim 1, appellants argue that Gondusky does not anticipate because the reference fails to teach one or more discrete "layers" between the top of the intermediate region and bottom of the body. See Appeal Brief, pages 19-20. In particular, appellants maintain that Gondusky's solder, braze, epoxy or thermal adhesive used to bond layers of metal material does not constitute a "discrete layer" as required by claim 1. ***See id.***, page 20. We agree with appellants that Gondusky fails to teach that the bonding material constitutes a discrete layer. See Gondusky, column 3, lines 46-53.

With respect to the remaining independent claims 9, 16, 17 and 19, the examiner maintains that since Gondusky's device structurally meets the claimed limitations, it must also inherently meet the uniform gradient language which requires that

the material composition of the body vary along a gradient. See Examiner's Answer, page 8. We are in agreement with appellants that in reaching his conclusion of inherency, the examiner incorrectly interprets the language relating to the gradient as a property or function rather than a structural limitation. See Appeal Brief, pages 21-32. More specifically, the present claims require a variation in the "material composition" of the body. Although Gondusky may utilize the same metals for his layers, he does not disclose or suggest varying the composition of the layers along a gradient. Accordingly, we cannot agree with the examiner's conclusion that Gondusky's device inherently meets the claim language relating to varying the material composition of the body.

We further note that Gondusky fails to specify the claimed relationships between the coefficients of thermal expansion for the heat sink, body and intermediate region, and for the thermal conductivities of the heat sink, body and intermediate region (see claims 1, 9, 16, 17 and 19). Rather, Gondusky merely requires that

the first component 28 comprises a material of relatively low coefficient of thermal expansion substantially corresponding to the coefficient of expansion of the semiconductor

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device for reliably mounting the device on the component and also provides suitably high thermal conductivity properties for rapidly withdrawing heat from the semiconductor device.

Column 5, lines 32-39.

Accordingly, the rejection under 35 U.S.C. § 102(b) is reversed.

3. Rejection of claims 2-4, 8, 10-13 and 15 under 35 U.S.C. § 103 as unpatentable over Gondusky

According to the examiner, Gondusky discloses the features of claims 2-4, 8, 10-13 and 15 with the exception of the specifically claimed values and materials. Examiner's Answer, page 5. The examiner maintains that it would have been obvious to one of ordinary skill in the art at the time of the invention to have selected the claimed materials since it is within the skill of the worker in the art to select a known material on the basis of its suitability for an intended use as a matter of obvious design choice. *Id.* The examiner further maintains that the specifically claimed values are "obvious design expedients." *Id.*

As discussed above in connection with claim 1, from which claims 2-4 and 8 depend, Gondusky fails to teach a discrete

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layer between the top of the intermediate region and bottom of the body. Moreover, the examiner has failed to establish why it would have been obvious to one of ordinary skill in the art at the time of the invention to have used a discrete layer in Gondusky's heat sink. Gondusky also fails to disclose or suggest varying the material composition of the body along a substantially uniform gradient as discussed above in connection with claim 9, from which claims 10-13 and 15 depend.

Accordingly, we find that the examiner has failed to establish a **prima facie** case of obviousness with respect to claims 2-4, 8, 10-13 and 15. Moreover, we are in agreement with appellants that the examiner's reliance on common knowledge for a teaching of the features recited in the dependent claims is not sufficient to establish a **prima facie** case of obviousness. See Appeal Brief, page 34. **See In re Zurko**, 258 F.3d 1379, 1386, 59 USPQ2d 1693, 1697 (Fed. Cir. 2001) (It is impermissible to reach conclusions based on what the examiner believes to be basic knowledge or common sense. Rather, the examiner must identify concrete evidence in the record in support of his findings.)

Accordingly, the rejection is reversed.

**4. Rejection of claims 23 and 24 under 35 U.S.C. § 103
as unpatentable over Gondusky in view of Toy**

The examiner relies on Toy for a disclosure of using two layers between a heat sink 22 and cap 18 to secure the heat sink to the cap. In particular, Toy discloses the use of a thin adherent metal interface layer 20 and silicone elastomer material layer 21. See column 8, lines 58-61.

Where an obviousness determination is based on a combination of prior art references, there must be some "teaching, suggestion or incentive supporting the combination." *In re Geiger*, 815 F.2d 686, 688, 2 USPQ2d 1276, 1278 (Fed. Cir. 1987). Although the examiner's conclusion that it would have been obvious to have employed a plurality of layers in Gondusky to attach a heat sink body to an intermediate layer in view of Toy's disclosure may seem plausible, it is simply unsupported by the references.

Accordingly, we conclude that the examiner has failed to establish a *prima facie* case of obviousness and the rejection is reversed.

In sum, we reverse as to all four grounds of rejection.

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REVERSED

TERRY J. OWENS)	
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