

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. 36

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex Parte IONEL JITARU

Appeal No. 2003-2145
Application No. 09/310,627¹

ON BRIEF

Before, KIMLIN, DELMENDO and JEFFREY T. SMITH, *Administrative Patent Judges*.

JEFFREY T. SMITH, *Administrative Patent Judge*.

Decision on appeal under 35 U.S.C. § 134

Applicant appeals the decision of the Primary Examiner finally rejecting claims 43 to 54, 56 and 59 to 62. We have jurisdiction under 35 U.S.C. § 134.²

¹ According to the patent assignment data base, the present application is assigned to ASCOM ENERGY SYSTEMS AG 303 Belpstrasse 37 CH-3000 Berne 14, Switzerland.

² In rendering this decision, we have considered Appellant's arguments presented in the Brief filed March 3, 2003 and the Reply Brief filed July 3, 2003.

BACKGROUND

Appellant's invention is directed to a printed circuit board assembly. According to Appellant, the invention has improved thermal conductivity through the use of thermally conductive plug placed within the vias. (Specification, p. 3). Claims 43, 47 and 53 which are representative of the invention are reproduced below:

43. A printed circuit board assembly, comprising:

a metal plated first via extending through the printed circuit board;

a thermally conductive plug extending into said first via, said plug including a plurality of grooves on an exterior surface thereof;

solder disposed between said grooves and the walls of said first via;

a separable heat sink component adapted for connection to the printed circuit board; and

a separate layer of copper foil for disposition between the heat sink component and the printed circuit board, to provide thermal communication between said heat sink component and said plug.

47. A printed circuit board assembly, comprising:

a metal plated first via extending through the printed circuit board;

a thermally conductive plug extending into said first via, said plug having an internal channel extending therethrough for conducting solder from one side of the printed circuit board to the other; and

a separable heat sink component adapted for connection to the printed circuit board so as to be in thermal communication with said plug.

53. A printed circuit board assembly, comprising:

- a metal plated first via extending through the printed circuit board;
- a thermally conductive plug extending into said via;
- an electronic component having a body portion and a lead portion;
- solder disposed between said body portion of said electronic component and said plug and between said body portion of said electronic component and a side of the printed circuit board;
- a separable heat sink component; and
- a layer of copper foil for disposition between the heat sink component and the printed circuit board.

CITED PRIOR ART

As evidence of unpatentability, the Examiner relies on the following prior art:

August et al. (August)	4,628,407	Dec. 09, 1986
Alexander et al. (Alexander)	5,189,261	Feb. 23, 1993
Kubo et al. (Kubo)	5,656,798	Aug. 12, 1997
Hunninghaus et al. (Hunninghaus)	5,708,566	Jan. 13, 1998

THE REJECTIONS

The Examiner entered the following rejections:³

Claims 43 to 52 as unpatentable under 35 U.S.C. § 103(a) over the combination of Alexander, August and Kubo; and claims 53, 54, 56 and 59 to 62 as unpatentable under 35 U.S.C. § 103(a) over the combination of Alexander, August, Kubo and Hunninghaus. (Answer, pp. 3-6).

Appellant has indicated (Brief, page 9) that, for the purposes of this appeal, “[t]he claims do not stand or fall together.” We will consider the claims separately only to the extent that separate arguments are of record in this appeal. 37 CFR § 1.192 (c)(7)(2002).

Upon consideration of the present record, we will affirm the rejections of claims 43 to 54, 56 and 59 to 62 under 35 U.S.C. § 103(a).

OPINION

Claims 43-46, 53, 54, 56, 59-61

The Examiner rejected claims 43 to 46 as unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Alexander, August and Kubo.

We have carefully considered all of the arguments advanced by the Appellant and the Examiner and agree with the Examiner for the reasons stated in the Answer that

³ The Examiner has withdrawn the rejection under 35 U.S.C. § 112, second paragraph. (Answer, p. 2).

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the rejection of the claims is well founded. Accordingly, we affirm the rejection of claims 43-46.

Appellant argues that the plated via in August is neither a layer of copper foil nor is it separate from the printed circuit board. (Brief, p.14). Appellant also argues that the copper pads of August are inseparably bonded to the fiberglass substrate as a result of electrodeposition. (Reply Brief, p. 2).

We are not persuaded by Appellant's arguments. Claim 43 requires a separate layer of copper foil for disposition between the heat sink component and the printed circuit board. The copper layer of August is disposed between the heat sink component and the printed circuit board. The claim language does not specify the dimension of the layer and does not preclude the copper from being bonded to a separate substrate.

Appellant argues that the subject matter of claims 43-46, 51 and 52 comprises a plug that has a plurality of grooves and none of the cited references teaches or suggest the use of grooves to enhance heat dissipation. (Brief, p.15-16). This argument is not persuasive because the motivation to combine or modify the references does not have to be identical to that of the Appellant to establish obviousness. *See In re Kemps*, 97 F.3d 1427, 1430, 40 USPQ2d 1309, 1311 (Fed. Cir. 1996). Appellant in the Brief, page 16, acknowledges that Kubo suggests the use of grooves in the plug to eliminate the use of solder flux and improve the reliability of the connection.

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The Examiner rejected claims 53, 54, 56 and 59 to 61 as unpatentable under 35 U.S.C. § 103(a) over the combination of Alexander, August, Kubo and Hunninghaus.

We have carefully considered all of the arguments advanced by the Appellant and the Examiner and agree with the Examiner for the reasons stated in the Answer that the rejection of the claims is well founded. Accordingly, we affirm the rejection of claims 53, 54, 56 and 59 to 61.

Appellant repeats the arguments about the copper foil and the plug with grooves which have been discussed above. Appellant also argues that Hunninghaus teaches using an electrically insulating layer between a separate heat sink. (Brief, p. 20).

We are not persuaded by Appellant's argument. Hunninghaus teaches disposing solder between the body portion of an electronic component and the printed circuit board. The electronic component is placed on the circuit board opposite of the heat sink. Thus, a person of ordinary skill in the art would have reasonably expected that solder was suitable for use in such an arrangement. Appellant's argument does not address the suitability of using solder between the body portion of an electronic component and the printed circuit board.

Appellant asserts that claims 44, 48, 54 and 59 recite the plug has higher thermal conductivity than solder and claims 45, 49 and 60 recite the plug is substantially pure copper. (Brief, p. 21).

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Appellant acknowledges that Alexander was cited for teaching the use of a copper plug but does not teach substantially pure copper. Appellant has not established that substantially pure copper is patentably distinct from the copper plug disclosed by Alexander. A person of ordinary skill in the art would have recognized the suitability of using the appropriate purity of copper for a printed circuit board.

Claims 47-52 and 62

The Examiner rejected claims 47 to 52 as unpatentable under 35 U.S.C. § 103(a) over the combination of Alexander, August and Kubo; and claim 62 as unpatentable under 35 U.S.C. § 103(a) over the combination of Alexander, August, Kubo and Hunninghaus.

We have carefully considered all of the arguments advanced by the Appellant and the Examiner and agree with the Examiner for the reasons stated in the Answer that the rejection of the claims is well founded. Accordingly, we affirm the rejection of claims 47-52 and 62.

Appellant argues that Alexander does not teach the same purpose for the internal channel of the eyelet. Appellant also argues that the internal channel is too short to conduct solder from one side of the circuit board to the other. (Brief, p. 18).

We are not persuaded by Appellant's arguments. Claims 47 and 62 require a plug that has an internal channel extending for conducting solder from one side of the

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printed circuit board to the other. The Examiner asserts that the eyelet of Alexander meets this claim limitation. We agree. Alexander discloses that the eyelet is an opening that allows gas to flow from one side of the circuit board to the other. (Col. 6, ll. 6-8). Although Alexander does not suggest the channel in the eyelet could be used for conducting solder therethrough, Alexander recognizes that solder would run out of the through-hole if present during assembly. (Col. 6, ll. 25-31). This teaching would also apply to a eyelet plug that contains a through-hole.

Appellant in the Reply Brief, page 7, argues that the flow of solder through the eyelet of Alexander is contrary to its intended purpose. This argument is not persuasive. The purpose of the opening in the reference does not have to be the same as Appellant. We note that Appellant has failed to argue that the opening in the eyelet of Alexander is not capable of allowing solder to flow from one side of the circuit board to the other.

Appellant asserts that claims 46, 50 and 56 require the plug to extend through the via of the circuit board and into a second via. (Brief, p. 21).

August teaches the means suitable for attaching a separable heat sink to a printed circuit board. A person of ordinary skill in the art would have reasonably expected that plugs that extend through the circuit board and into the heat sink were suitable for this purpose.

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CONCLUSION

For the reasons stated above and in the Answer, the rejection of claims 43 to 52 as unpatentable under 35 U.S.C. § 103(a) over the combination of Alexander, August and Kubo; and the rejection of claims 53, 54, 56 and 59 to 62 as unpatentable under 35 U.S.C. § 103(a) over the combination of Alexander, August, Kubo and Hunninghaus are affirmed.

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Time period for response

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED

EDWARD C. KIMLIN
Administrative Patent Judge

ROMULO H. DELMENDO
Administrative Patent Judge

JEFFREY T. SMITH
Administrative Patent Judge

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