

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opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.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. 11

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte THOMAS H. BLAIR et al.

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Appeal No. 1997-0439  
Application 08/348,414<sup>1</sup>

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ON BRIEF

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Before THOMAS, DIXON and FRAHM, Administrative Patent Judges.

FRAHM, Administrative Patent Judge.

DECISION ON APPEAL

Appellants have appealed to the Board from the examiner's final rejection of claims 8 to 14 and 18 to 22, which constitute all of the pending claims in the application before us. Claims 1 to 7 and 15

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<sup>1</sup> Application for patent filed December 2, 1994.

to 17 have been canceled.

### BACKGROUND

The subject matter on appeal is directed to optical waveguides and corner coupling of electronic devices using an interconnect substrate (see specification, page 1). More specifically, appellants disclose an interconnect substrate (see appellants' Figure 1) and a method of making an interconnect substrate having a cleaved end surface which creates a corner edge contact (see specification, pages 1 to 2; Brief, page 3). Appellants recognized that by cutting or cleaving a channel 109 in an end surface 105 and an upper surface 104 after an electrically conductive material (e.g., solder) has been added, electronic devices 152 can be more easily connected and coupling can be performed more easily and efficiently (see specification, page 1).

Representative independent apparatus claim 8 is reproduced below:

8. An interconnect substrate comprising:

a substrate having a first surface with an electrical trace;

a channel formed in the first surface and filled with an electrically conductive material;

the substrate being cut through the first surface and the channel to form an end surface, the channel and the electrically conductive material defining a contact in the end surface and a contact in the first surface; and

the electrical trace being operably coupled to the electrically conductive material in the channel.

Representative independent method claim 18 is reproduced below:

18. A method for making an interconnect substrate comprising the steps of:

forming a substrate having a first surface;

forming a channel in the substrate;

filling the channel with an electrically conductive material; and

cleaving the substrate through the channel with the electrically conductive material to generate a contact positioned at a nexus and an end surface, thereby bridging the first surface and the end surface.

The following reference is relied on by the examiner:

Hartman et al. (Hartman)

5,282,071

Jan. 25, 1994

Claims 8 to 14 and 18 to 21 stand rejected under 35 U.S.C. § 103. As evidence of obviousness, the examiner relies upon Hartman alone.<sup>2</sup>

Rather than repeat the positions of appellants and the examiner, reference is made to the Brief and the Answer for the respective details thereof.<sup>3</sup>

### OPINION

At the outset, we note that appellants (Brief, page 4) assert that the claims on appeal should stand or fall together in three groupings: a first group consisting of apparatus claims 8 to 14; a second

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<sup>2</sup> We note that claim 22 was rejected by the examiner in the final rejection, but that after reconsideration the examiner has withdrawn the obviousness rejection of claim 22 in the Answer (see Answer, page 2). As a result, claim 22 is not being considered here on appeal.

<sup>3</sup> We note that the after final amendment submitted March 27, 1996, was neither entered nor considered as per the Answer (see page 2 therein) and the Advisory Action of April 2, 1996.

group consisting of method claims 18 to 20; and a third group consisting of method claim 21.<sup>4</sup> Because we find that method claims 18 to 20 and 21 all involve the same basic issue as to patentability, for purposes of our decision we will discuss claim 8 as being representative of the first group (apparatus claims 8 to 14) and we will discuss claim 18 as being representative of both the second and third groups (method claims 18 to 21). See 37 CFR 1.192(c)(7) (1995).

In reaching our conclusion on the issues raised in this appeal, we have carefully considered appellants' specification and claims, the Hartman reference, and the respective viewpoints of appellants and the examiner. As a consequence of our review, we are in agreement with the examiner (Answer, pages 6 to 7) that broadly recited apparatus claims 8 to 14 on appeal would have been obvious to one of ordinary skill in the art at the time the invention was made in light of the applied reference to Hartman. We note that apparatus claims 8 to 14 do not require the interconnect substrate be made by a particular method or in a particular fashion. However, we find ourselves in agreement with appellants (Brief, pages 6 to 7) that method claims 18 to 21 on appeal are nonobvious since Hartman fails to teach or suggest the step of cleaving a substrate after filling a channel of the substrate with electrically conductive material (i.e., solder). For the reasons set forth by the examiner and for those which follow, we will sustain the decisions of the examiner rejecting claims 8 to 14 under 35 U.S.C. § 103 as being

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<sup>4</sup> We note that although claim 22 was included in this grouping by appellants in their Brief, the rejection as to this claim stands objected to by the examiner as being allowable if re written in independent form including all of the limitations of the base claim 21,

unpatentable over Hartman. For the reasons generally set forth by appellants and for those which follow, we will reverse the decision of the examiner rejecting claims 18 to 21 under 35 U.S.C. § 103.

Rejection of Claims 8 to 14 Under 35 U.S.C. § 103:

We agree with appellants (Brief, pages 5 to 6) that Hartman's Figure 3 embodiment does not disclose an end surface which has been formed by cutting through channel 360 and indents 301/302. Appellants are correct that Hartman's Figure 3 is a cross-sectional view and that therefore the substrate 300 in Figure 3 has no right hand end. Accordingly, we must agree that Hartman's embodiment of Figure 3 fails to meet the specific limitation of representative claim 8 of a substrate which is cut through a first surface and a channel. However, we note that in the responsive arguments section of the Answer (Answer, pages 6 to 7) the examiner has relied upon Figures 1 and 2 of Hartman, which disclose a different embodiment than Figure 3 of Hartman.

We find ourselves in agreement with the examiner (Answer, pages 6 to 7) that Hartman's embodiment of Figures 1 and 2 would have taught or suggested the features of an interconnect substrate recited in apparatus claims 8 to 14 on appeal, especially to the extent claimed. We note that representative claim 8 merely calls for "the substrate being cut" through a first surface and a channel in

order to form an end surface. We find that Hartman (see Figures 1 and 2) teaches indents/contacts 101/102 and 221/222 and corresponding channels 104 and 244 which are cut or cleaved out of substrate 100/200. Hartman teaches that the substrate of Figures 1 to 3 is "made using a variety of fabrication methods, such as milling, chemical etching, molding, or the like" (column 2, lines 41 to 43). We conclude that "milling" teaches or strongly suggests "cutting" as

required by representative apparatus claim 8 on appeal, and that the substrate of Hartman has been "cut" or milled to the extent defined in appellants' claim 8. Accordingly, we will sustain the rejection of claims 8 to 14 under 35 U.S.C. § 103 as being unpatentable over Hartman.

As to appellants' general argument that "claims 8 - 14 are neither disclosed nor obvious in view of Hartman" (Brief, page 6), we cannot agree with this statement in light of our discussion of the Figures 1 and 2 embodiment above. We note that appellants *had* the opportunity to file a Reply Brief in response to the examiner's reliance in the Answer on the Figures 1 and 2 embodiment of Hartman, and failed to do so. As a result, we see no prejudice to appellants in the examiner's reliance on the Figures 1 and 2 embodiment of Hartman in the rejection under 35 U.S.C. § 103.

Rejection of Claims 18 to 21 Under 35 U.S.C. § 103:

We turn next to method claims 18 to 21, which recite a process for making an interconnect

substrate including the steps of "forming a channel," of "filling the channel with an electrically conductive material," and then of "cleaving the substrate through the channel . . ." (independent claims 18 and 21 on appeal). We cannot agree with the examiner's assertion (Answer, page 8) that the steps of claims 18 to 21 "are inherently disclosed in the Hartman et al. reference."

Appellants argue (Brief, pages 6 and 7) that Hartman fails to teach or suggest the step of cleaving the substrate in order to form the "end surface" recited in claims 18 and 21. We agree. We find that the particular order of the steps used in the manufacture of the interconnect substrate recited in appellants' representative claim 18 on appeal is neither taught nor suggested by Hartman. This includes Hartman's Figures 1 and 2 embodiment, as well as the Figure 3 embodiment. In addition, we find that Hartman's Figure 3 embodiment fails to meet the limitation required in claim 18 that the substrate be cleaved through the channel to create "a contact positioned at a nexus and an end surface."

Specifically, appellants' claim 18 requires that first a channel be formed, then the channel be filled with an electrically conductive material (i.e., solder), and then the substrate be cleaved through the channel which already has the material therein. We find that Hartman, in contrast, first forms a channel in a substrate by milling or cutting (see column 2, lines 40 to 43), then Hartman fills the channel with solder (see columns 3 and 4). Thus, the timing of the process steps in Hartman are opposite from what is required by appellants' method claims 18 to 21 (i.e., first filling the channel with solder and then cleaving or milling the substrate). We note that although Hartman discusses an etching step (see column

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4, lines 36 to 68), this etching process is chemical and not mechanical or electromechanical as disclosed by appellants (see specification, page 6). In any event, Hartman's etching step is performed on the solder (i.e., electrically conductive material) and not on the substrate as recited in claim 18.

We also find that Hartman's Figure 3 embodiment, in contrast to the requirement of claim 18, fails to cleave the substrate through the channel 360 to create the recited corner contact, since as discussed, supra, Hartman's Figure 3 embodiment has no right hand end, and therefore there exists no contact "bridging the first surface and the end surface" as recited in claim 18.

In light of the foregoing, we cannot sustain the rejection of method claims 18 to 21 under 35 U.S.C. § 103 over Hartman.

#### CONCLUSION

The decision of the examiner rejecting claims 8 to 14 under 35 U.S.C. § 103 over Hartman is affirmed.

The decision of the examiner rejecting claims 18 to 21 under 35 U.S.C. § 103 over Hartman is reversed.

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

AFFIRMED-IN-PART

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Administrative Patent Judge	)	
	)	
	)	
	)	BOARD OF PATENT
JOSEPH L. DIXON	)	
Administrative Patent Judge	)	APPEALS AND
	)	
	)	INTERFERENCES
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