Paper No. 29

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opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte KENDALL S. WILLS
and PAUL A. RODRIGUEZ

Appeal No. 95-2483
Application 08/098,008[1]

ON BRIEF

Before THOMAS, HAIRSTON and CARMICHAEL, Administrative Patent Judges.

THOMAS, Administrative Patent Judge.

DECISION ON APPEAL

Appellants have appealed to the Board from the examiner=s final rejection of claims 1 to 6, 11 to 15, 26 to 29, 34 to 36

[1] Application for patent filed July 27, 1993. According to appellants, this application is a continuation of Application 07/817,972, filed January 6, 1992, now abandoned, which is continuation of Application 07/575,744, filed August 31, 1990, now abandoned.

and 38 to 45. The examiner has allowed claim 37 and appellants have canceled claims 7 to 10, 16 to 25 and 30 to 33.

Representative claim 1 is reproduced below:

1. A packaged device, comprising:

a semiconductor die;

a lead frame positioned around said die;

a filler material continuous from said die to said lead frame; and

at least one conductive bond lead formed on said filler material from a bond pad on said die to said lead frame.

The reference relied on by the examiner is:

Lai et al. (Lai)	4,888,634	Dec. 19, 1989

Claims 1 to 6, 11 to 15, 26 to 29, 34 to 36 and 38 to 45 stand rejected under 35 U.S.C. ' 103. As evidence of obviousness, the examiner relies on Lai alone.

Rather than repeat the positions of the appellants and the examiner, reference is made to the brief and the answer for the respective details thereof.

OPINION

At the outset, we make reference to a prior decision of this Board, Appeal No. 93-1672, issued on July 15, 1993, in which we affirmed the rejection of most of the claims on appeal under 35 U.S.C. ' 103 in a parent case to this application. In light of the reasoning presented there as to certain dependent claims presently still pending in this application as well as the

reasoning advanced by the examiner in the answer as to those dependent claims and present independent claims 1 and 15 on appeal, we will sustain the rejection of claims 1 to 6, 11 to 15, 26 to 29, 34 to 36, 40, 41, and 44. As set forth later in this opinion, the rejection of claims 38, 39, 42, 43, and 45 is reversed.

The following language of independent claims 1 and 15 on appeal is common to each of them and argued by appellants: that the claimed filler material is stated to be Acontinuous from said die to said lead frame@; and that the at least one conductive bond lead be Aformed on said filler material@ from a bond pad on said die to the lead frame.

As to the limitation of the filler material being continuous from the die to the lead frame, we agree with the examiner=s position between the statement of the rejection at page 3 of the answer and the responsive arguments portion at page 5 of the answer, that the filler material 22 is continuous between the semiconductor die 20 and the lead frame paddle 26 in Figure 2 of Lai. That is, there is a vertical continuity between them. Although Figure 2 does not show the details of this relationship, it is apparent from the corresponding Figure 1 showing that the adhesive 14, comprising both the binder 16 and the glass spheres

18 is continuous between the bottom of the chip 10 and the top surface of the supporting substrate 12. Moreover, the binder 16 alone in Figure 1 is shown to be continuous in this relationship between the bottom region of the chip 10 and the top region of the supporting substrate 12 since it is shown to be continuous interstitially between the glass spheres 18 between these regions. Although a lead frame is not shown, per se, in Figure 1, it would have been apparent to the artisan that the basic structural arrangement just described with respect to Figure 1 applies to the lead frame embodiments shown in Figure 2 of Lai.

Even in a horizontal sense, there is filler material comprising the curable bonding material 22 and the encapsulating plastic package material 24 between the left and right edge portions of the chip 20 in Figure 2 of Lai and the horizontal showing of the legs of the lead frame horizontally adjacent thereto. There are no air gaps in that region. To the extent the claim may be interpreted as requiring that the same filler material be present in this horizontal sense, it would have been obvious to the artisan to increase the uniform thermal resistance characteristics of the chip 20 embedded in the bonding material 22 by extending this thermal resistant binder material 22 to the edges of the lead frame legs, particularly in higher power device

environments. Column 1, lines 14 to 27, line 66 to column 2, line 29.

We also agree with examiner=s reasoning as to the second argument presented by appellants relating to the at least one conductive bond lead being formed on the filler material from a bond pad on the die itself to the lead frame. We agree with the examiner=s reasoning at page 3 of the answer that the bond leads shown in Figure 2 of Lai are shown to be Aon@ the filler material 22 at the point of the interface of the plastic packaging material 24 and the filler material 22, which itself supports the conductive leads of the wire of the bond leads shown. The examiner has properly amplified this reasoning somewhat at page 5 of the answer by indicating that the surface of the filler material 22 is at the boundary where the filler 22 and encapsulating plastic packaging material 24 touch. Thus, the conductive bond lead labeled in the Figure 2 version of Lai is Aon@ the surface of the filler material at least at the point or arcuate region where the lead is in contact with both the filler material 22 and the plastic packaging material 24. Thus, in this sense, the embedding of the bond leads in the curable bonding material 22 and in the encapsulating plastic material 24 makes it Aon@ some portion of both of them.

In light of these considerations, appellants= argument that their view that the reference teaches only the bonding material being formed on the bond leads and on the semiconductive die itself is misplaced. To us, the examiner=s view is just as reasonable as appellants= just noted view as to this claimed feature. In any event, the discussion at the top of page 2 of appellants= specification recognizes that the prior art fabrication processes and techniques were aware that bonding wires may be caught within a coating material during the curing operation, which clearly indicates that at least with respect to the coating material below the wire bonds, they are therefore Aon@ it.

We sustain the rejection of claims 2 to 6, 11 to 14, and 26 to 29 for the reasons set forth by the examiner in the answer, which relies in-part upon our reasoning at pages 3 to 5 of our earlier opinion. Appellants= general assertions with respect to these claims at pages 5 through 7 of the brief on appeal are misplaced and, first of all, they make only a general assertion that the reference fails to teach or suggest the noted features. In accordance with appellants= own arguments at the middle of page 5 of the brief, this is an incomplete consideration of the obviousness issues since the knowledge of the artisan and the

line of reasoning advanced by the examiner with respect to the artisan=s knowledge are a part of the determination of the obviousness of the referenced claimed subject matter as well as expressed or implied teachings and suggestions from Lai itself. Additionally, appellants have presented no reasons traversing our findings from our earlier opinion as to these claims.

We treat separately the remaining claims. The subject matter of dependent claim 34 is obvious for the same reasons as we articulated from our earlier discussion of claim 15, and claim 35 appears redundant with the subject matter of its parent claim 15.

The rejection of dependent claim 36 is affirmed for the same reasons we expressed earlier with respect to our affirmance of the rejection of claims 1 and 15. It is implicit within our affirmance of the rejection of independent claims 1 and 15, as well as dependent claim 36, that we find no patentable distinction alone in the mere Aformation@ or Adeposition@ of anything on another material in the integrated circuit art. First of all, no such process limitation is argued with respect to this language in the product claims on appeal. The normal placement in the art of the unlabeled bond leads in Figure 2 of Lai and in the art is clearly enough in our judgment to meet the

scope of the meaning that may be reasonably attributed to these two broad terms. Again, the top of page 2 of appellants= specification as filed indicates that the prior art recognizes that such bond leads may be Aformed on@ or otherwise Adeposited on@ the top of existing coating materials.

Claims 40 and 44 set forth the same subject matter but respectively depending from independent claims 1 and 15 on appeal. The showing of the bond leads in Figure 2 is Asubstantially@ horizontal and they are normally in the art to the extent broadly recited in these claims. The extent of the vertical rise of the bond leads is dependent upon conventional fabrication techniques, which obviously could be variable within the art or the manufacturing of any individual device different from another type of device in integrated circuit form. Bond wires with high loops are disfavored in the art. Specification, prior art discussion at page 3, lines 12 to 19.

Finally, the subject matter of claim 41 is rejected for the same reason that we have rejected its corresponding claim 6 at page 5 of our earlier opinion. Lai plainly teaches that the binder material may be epoxy or polyamide, both of which are broadly considered to be plastics.

We reverse the rejection of dependent claims 38, 39, 42, and 43, which respectively set forth the same subject matter but with different dependencies. We also reverse the rejection of dependent claim 45. With respect to each of these claims, the examiner has provided no line of reasoning on the basis of Lai alone and no additional prior art combined with Lai in any manner to provide a basis to reject the specific features recited in these enumerated claims. Therefore, the examiner has presented no prima facie case of obviousness of the subject matter of these respective claims. Furthermore, we can find no reasoning of our own to advance based upon the teachings and suggestions of Lai alone in the artisan=s view of these teachings and suggestions to provide an independent basis for confirming the propriety of the rejection of these noted claims.

In view of the foregoing, we have sustained the rejection of claims 1 to 6, 11 to 15, 26 to 29, 34 to 36, 40, 41, and 44 but have reversed the rejection of claims 38, 39, 42, 43, and 45. Accordingly, the decision of the examiner is affirmed-in-part.

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

James D. Thomas Administrative Patent Judge	)	
Kenneth W. Hairston Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
James T. Carmichael Administrative Patent Judge	)	

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