

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.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. 16

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte STANLEY M. ALBRECHTA, CHRISTINA M. BOYKO,
KATHLEEN L. COVERT, NATALIE B. FEILCHENFELD,
VOYA R. MARKOVICH, WILLIAM E. WILSON,
and
MICHAEL WOZNIAK

Appeal No. 1998-3401
Application No. 08/495,277

ON BRIEF

Before GARRIS, PAK, and DELMENDO, Administrative Patent Judges.
DELMENDO, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on an appeal under 35 U.S.C. § 134 from the examiner's refusal to allow claims 1 through 9, which are all of the claims pending in the subject application.¹

The subject matter on appeal relates to a method for producing a circuit board. Further details of this appealed subject matter are recited in illustrative claim 1 reproduced

¹ In response to the final Office action of July 16, 1997 (paper 8), the appellants filed an amendment under 37 CFR § 1.116 (1981) on September 15, 1997 (paper 9), proposing changes to claims 1 and 9. The examiner indicated in the advisory action of

below:

1. A method of producing a circuit board, comprising the steps of:
 - (a) patterning a resist layer that overlays a substrate of the circuit board to define desired circuit paths;
 - (b) removing the patterned resist layer in the desired circuit paths;
 - (c) depositing a conductive material on the circuit board in the pattern defined by the removed resist layer so that the height of the conductive material relative to the substrate exceeds the height of the resist layer relative to the substrate;
 - (d) applying a low-reactive solution, over at least the conductive material, that initially removes a surface portion of the conductive material and forms a film barrier that inhibits any further removal of the conductive material;
 - (e) disrupting the film barrier to thereby stimulate removal of additional surface portion and formation of additional film barrier; and
 - (f) repeating step (e) until the conductive material is at a desired uniform height relative to the height of the resist layer above the substrate.

The examiner relies on the following prior art references as evidence of unpatentability:

Ashcraft	4,693,959	Sep. 15, 1987
Kumar et al. (Kumar)	5,118,385	Jun. 2, 1992
Dull	5,468,409	Nov. 21, 1995
		(filed Nov. 3, 1993)
Shigeta	60-006462	Jan. 14, 1985
(JP '462) (published JP patent document)		

September 23, 1997 (paper 10) that the amendment will be entered upon the filing of a notice of appeal and an appeal brief.

Claims 1, 2, 5, 6, and 9 on appeal stand rejected under 35 U.S.C. § 103(a) as unpatentable over the combined teachings of Kumar and Dull. (Examiner's answer, pages 3-5.) Further, claims 3, 4, and 7 on appeal stand rejected under 35 U.S.C. § 103(a) as unpatentable over the combined teachings of Kumar, Dull, and Ashcraft. (Id. at pages 5-6.) Additionally, claim 8 on appeal stands rejected under 35 U.S.C. § 103(a) as unpatentable over the combined teachings of Kumar, Dull, and JP '462. (Id. at page 6.)

We reverse the aforementioned rejections.

As in any appeal, we start by analyzing the scope and meaning of each contested claim limitation in order to determine whether the examiner applied the prior art correctly against the appealed claims. Gechter v. Davidson, 116 F.3d 1454, 1457, 1460 n.3, 43 USPQ2d 1030, 1032, 1035 n.3 (Fed. Cir. 1997); In re Paulsen, 30 F.3d 1475, 1479, 31 USPQ2d 1671, 1674 (Fed. Cir. 1994). It is true that, in proceedings before the U.S. Patent and Trademark Office (PTO), claims must be interpreted by giving words their broadest reasonable meanings in their ordinary usage, taking into account the written description found in the specification. In re Morris, 127 F.3d 1048, 1054, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997); In re Zletz, 893 F.2d 319, 321-22, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989). However, the interpretation of the claim language must be "reasonable in light of the totality of the written description." In re Baker Hughes Inc., 215 F.3d 1297, 1303, 55 USPQ2d 1149, 1153 (Fed. Cir. 2000).

In the present case, we observe that appealed claim 1 recites, as step (e), "disrupting the film barrier to thereby stimulate removal of additional surface portion and formation of additional film barrier."² As pointed out by the appellants (reply brief, pages 3-4), it is clear from a reading of the specification that one skilled in the relevant art would understand the phrase "disrupting the film barrier..." recited in step (e) to require removal of the film barrier. (Specification, page 4, lines 5-10; page 5, lines 25-27; page 6, lines 16-19; page 8, line 18 to page 9, line 5; Fig. 10.)

With this understanding of the meaning of the contested claim limitation, we now consider the merits of the examiner's rejections. The examiner states that Kumar, the principal reference applied in all of the rejections, discloses a method comprising: (a) patterning a resist layer 40 that overlays a substrate of a circuit board; (b) removing the patterned resist layer in the desired circuit paths; (c) depositing a conductive material 46 on the circuit board in the pattern defined by the removed resist layer so that the height of the conductive material relative to the substrate exceeds the height of the resist layer relative to the substrate; and (d) applying a low-reactive solution, over at least the conductive material. (Examiner's answer, pages 3-4.) The examiner further refers to

² Appealed claim 9, the only other independent claim, recites step (e) as follows: "removing the film barrier and

Kumar's teaching that the conductive material may be planarized by chemical-mechanical polishing or wet etching. (Column 3, lines 39-46.)

Realizing that Kumar does not describe step (e) as recited in the appealed claims, the examiner relies on the teachings of Dull to account for this difference. Regarding Dull, the examiner states:

Dull discloses that cupric chloride is a known etchant for copper (claim 1), and that such a composition provides for a slow etch rate in order to precisely form close tolerances (col. 2, lines 48-52). The etchant of Dull is the same as that used by applicants as their "low-reactive solution" and thus is expected to behave similarly, i.e., form a film barrier that substantially inhibits further removal of the conductive material. [Examiner's answer, p. 4.]

The examiner then concludes:

It would have been obvious to use the etchant of Dull in a method similar to Kumar et al because Dull teaches that it provides for a slow etch rate that gives close tolerances...The method of the combination of Kumar et al and Dull inherently initially removes a surface portion of the conductive material and forms a film barrier that inhibits any further removal of the conductive material because the same etchant and process steps are used. It would have been obvious to one with ordinary skill in the art to disrupt the film barrier to thereby stimulate removal of additional surface portion and formation of additional barrier solution until the desired height is achieved in the modified method of Kumar et al in order to make the etching process effective. [Id.]

In responding to the appellants' argument (e.g., appeal

thereby stimulating removal of additional surface portions and formation of additional film barrier."

brief, page 10) that none of the applied references teach "disrupting the film barrier..." as recited in the applied claims, the examiner states:

Note that the disrupting step, as broadly claimed, reads on a chemically disrupting step (not merely mechanically disrupting) which is disclosed by Kumar et al. The claims do not cite an agitation step. Further, an immersion technique as taught by Dull also reads on the claimed disrupting step because the disrupting step can be chemical. [Id. at p. 7.]

We cannot agree with the examiner. As we discussed at the outset, step (e) of the claimed method requires removal of the film barrier that is formed upon applying the low-reactive solution. Although the examiner relies on Dull's teachings, we must agree with the appellants that these teachings are insufficient. Specifically, Dull teaches that the board is immersed in a tank containing the etchant and placed there for about 25-45 minutes before it is checked for completion. (Column 2, lines 31-42.) Dull further discloses: "The part [board] is monitored after checking until the desired line width is achieved. During immersion, there is no agitation." (Column 2, lines 42-44.) Nowhere in Dull, or any other applied prior art reference, is there any teaching, suggestion, or motivation to remove a film barrier as recited in the appealed claims.

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For these reasons, we reverse the examiner's rejections under 35 U.S.C. § 103(a).

The decision of the examiner is reversed.

REVERSED

BRADLEY R. GARRIS)	
Administrative Patent Judge)	
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)	BOARD OF PATENT
CHUNG K. PAK)	
Administrative Patent Judge)	APPEALS AND
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ROMULO H. DELMENDO)	
Administrative Patent Judge)	

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