

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board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. 17

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte WILLIAM BREARLEY,
LAERTIS ECONOMIKOS, PAUL F. FINDEIS,
KIMBERLEY A. KELLY, BOUWE W. LEENSTRA,
ARTHUR G. MERRYMAN, ERIC D. PERFECTO,
CHANDRIKA PRASAD, JAMES P. WOOD
and ROY YU

Appeal No. 1999-2403
Application 08/576,185

ON BRIEF

Before THOMAS, HAIRSTON and KRASS, Administrative Patent Judges.
THOMAS, Administrative Patent Judge.

DECISION ON APPEAL

Appellants have appealed to the Board from the examiner's final rejection of claims 14-21. Of these claims, the examiner has indicated the allowability of claims 15-17 at page 2 of the answer. Appellants have canceled claims 1-13. Therefore, only claims 14 and 18-21 remain on appeal.

Representative claim 14 is reproduced below:

14. A method of depositing solder ball connection to input-output (I/O) pad on a surface of a substrate, comprising the steps of:

(a) depositing solder in a cavity of a depositor, wherein said depositor has a protrusion in said cavity,

(b) mating said depositor to said substrate having said I/O pad such that said solder is in contact with said I/O pad,

(c) reflowing said solder such that a solder ball is formed between said I/O pad and said protrusion, and a contact surface is formed between said protrusion and said solder ball,

(d) separating said depositor from said substrate a sufficient distance to separate said solder ball from said protrusion, and

(e) reflowing said solder ball such that said contact surface becomes spherical.

The following reference is relied on by the examiner:

Kushima	4,906,823	March 6,
1990		

The following reference is relied on by the Board:

Aulicino	5,658,827	August 19,
1997		

(filing date Oct. 31, 1995)

Claims 18-21 stand rejected under the written description portion of the first paragraph 35 U.S.C. § 112, the examiner alleging that appellants did not have possession of the claimed invention in these claims at the time this application was filed. These claims were added by the amendment filed on June 22, 1998,

which amendment also added two paragraphs to page 10 of the specification as filed. Claims 14 and 18-21 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Kushima.

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

OPINION

We reverse both rejections of the claims on appeal and introduce our own new rejection under 35 U.S.C. § 103 of claims 14 and 18-21 in accordance with the provisions of 37 CFR § 1.196(b).

We turn first to the rejection of claims 18-21 under the written description portion of 35 U.S.C. § 112, first paragraph.

The manner in which the specification as filed meets the written description requirement is not material. The requirement may be met by either an express or an implicit disclosure. In re Wertheim, 541 F.2d 257, 262, 191 USPQ 90, 96 (CCPA 1976). It is permissible to add inherent properties or characteristics of the invention to the disclosure and claims. Kennecott Corp. V. Kyocera Int'l, Inc., 835 F.2d 1419, 1422, 5 USPQ2d 1194, 1197 (Fed. Cir. 1987), cert. denied, 486 U.S. 1008 (1988). An invention claimed need not be described in ipsis verbis in order

to satisfy the written description requirement of 35 U.S.C. § 112, first paragraph. In re Lukach, 442 F.2d 967, 969, 169 USPQ 795, 796 (CCPA 1971). The question is not whether an added word was the word used in the specification as filed, but whether there is support in the specification for the employment of the word in the claims, that is, whether the concept is present in the original disclosure. See In re Anderson, 471 F.2d 1237, 1244, 176 USPQ 311, 336 (CCPA 1973).

Following this guidance, it is readily apparent to us that appellants had an adequate basis within the original disclosure to have later claimed the subject matter of claims 18-21.

Appellants' prior art discussion at pages 1 and 2 of the specification as filed indicates that it was known in the art for implementing controlled collapse chip connection (C4) semiconductor interconnection structures to have used a fixture including a so-called depositor within which solder had been placed subject to being reflowed. This depositor permitted the fixture apparatus of the prior art to place solder balls on a structure to receive them. It is thus apparent that upon the application of the proper reflow temperature the depositor released the solder within its cavities in order to form the

solder balls upon the receiving structure. This is essentially set forth in lines 1-13 of the originally filed claim 11, which amounts to the preamble of this Jepson-type claim, thus impliedly admitting that such structures within this portion of the preamble were admitted prior art.

The paragraph bridging pages 1 and 2 of the specification as filed details known problems in the prior art with the prior art depositor devices indicating that after the reflow operation has been performed there was no true solder ball shape achieved because there remains thereon an impression of the depositor structure. This assessment is essentially duplicated in the first paragraph, lines 1-22, at page 8 of the specification as filed.

We reverse the rejection because there is ample evidence in the specification and claims as filed that depositor structures subject to releasing solder at reflow temperatures were essentially known in the art and relied upon by the appellants in their approach to disclosing the presently claimed invention. Appellants' reliance upon Aulicino in the amendatory material at page 10 of the specification as filed is not regarded as being an introduction of new matter. This reference itself is prior art to the presently filed application because of its filing date of

October 31, 1995, and does indicate within its four corners that the elements recited in questioned dependent claims 18-21 were then known in the art anyway. The discussion at columns 1-3 of this reference indicates that it was known in the art to utilize titanium, molybdenum or graphite as a material (claim 18) which was non-wettable by solder thus permitting its release when heated. This discussion in the short paragraph bridging columns 7 and 8 indicates that the composition of the solder was known in the art. As such, the temperature necessary to permit reflow operation as set forth in dependent claims 19-21 was a well-known physical property in the art as well. Moreover, the examiner's reliance upon Kushima indicates as well that all these features were known in the art as of its patent date of March 6, 1990 with an effective filing date of June 3, 1988.

When all this is considered in its entirety, we conclude that the specification as filed has reasonably conveyed to us that appellants implicitly had possession of the subject matter of dependent claims 18-21 on appeal when taken from an artisan's perspective. Therefore, we reverse the rejection of claims 18-21 under the written description portion of the first paragraph of 35 U.S.C. § 112.

We also reverse the rejections of claims 14 and 18-21 under

35 U.S.C. § 103 as being anticipated by Kushima. We are satisfied that the examiner has provided evidence in Kushima of the teachings of clauses (a) through (c) of claim 14 on appeal, which is consistent with what appellants have admitted in the prior art anyway according to our outline of the specification as filed earlier in this opinion. There is, however, no teaching in Kushima of the remaining clauses (d) and (e). According to the features recited essentially at column 4 in the summary of Kushima and the corresponding more detailed discussion at column 6 of this reference, there is no separating feature analogous to clause

(d) nor is there an additional reflow operation in clause (e) of claim 14 taught in this reference. There would apparently be no need for such according to the teachings of Kushima anyway because the requirement of the second reflow operation at the end of claim 14 on appeal of achieving a spherical shape of the solder balls is achieved with a single reflow operation as reflected in the noted portions of column 4 and column 6 of Kushima and generally indicated in process Figure 4(c). Because we do not sustain the rejection for these reasons of independent claim 14, the rejection of the remaining claims 18 through 21 on appeal must also be reversed.

As indicated earlier in this opinion, we introduces a new rejection under 35 U.S.C. § 103 of claims 14 and 18-21 in view of the earlier noted portions of the specification as filed as to what appellants have indicated was in the prior art, further in view of Aulicino. The earlier paragraph in this opinion relating to the bridging paragraphs at columns 1 and 2 of the specification as filed and the noted paragraph at page 8 of the specification as filed indicate there was a known problem in the art as to the deformation of the solder balls according to the prior art approach. It appears to us that Aulicino is somewhat representative of these admissions.

Thus, clauses (a) through (c) were known in the art as to claim 14.

Because the prior art left an impression of the depositor upon the solder ball structure according to the prior art approach, this led to the unpredictability in the subsequent solder ball connections in prior art C4 connection operations for

semiconductor devices and components as set forth generally at specification page 2, lines 12-18. This is consistent with the similar discussion at page 8 of the specification as filed at lines 14-22.

It appears to us that the artisan would have found it obvious within 35 U.S.C. 103 to have separated the depositor from the underlying substrate receiving the solder balls and performed a subsequent reheating or reflowing operation as is conventional in the art to achieve the needed true spherical or complete solder ball shape as set forth in clauses (d) and (e) of independent claim 14 on appeal. It is known that eutectic solder forms spheres when heated on metalized pads. See Aulicino column 1, line 66 to column 2, line 14 and specification page 7, lines 30-34. As indicated earlier, the subject matter of dependent claims 18-21 was also well known in the art and taught in Aulicino as noted by us earlier in this opinion as to the features recited in these claims.

In summary, we have reversed the rejection of claims 18-21

under the written description portion of 35 U.S.C. § 112 and also have reversed the rejection of claims 14 and 18-21 under 35 U.S.C.

§ 102. We have also introduced a new rejection of claims 14 and 18-21 under 35 U.S.C. § 103 in accordance with the provisions of 37 CFR § 1.196(b).

This decision contains a new ground of rejection pursuant to 37 CFR § 1.196(b). 37 CFR § 1.196(b) provides that, "A new ground of rejection shall not be considered final for purposes of judicial review."

37 CFR § 1.196(b) also provides that the appellants, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of proceedings (§ 1.197(c)) as to the rejected claims:

(1) Submit an appropriate amendment of the claims so rejected or a showing of facts relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the application will be remanded to the examiner. . . .

(2) Request that the application be reheard under § 1.197(b) by the Board of Patent Appeals and Interferences upon the same record. . . .

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No time period for taking any subsequent action in connection

with this appeal may be extended under 37 CFR § 1.136(a).

REVERSED

37 CFR § 1.196(b)

James D. Thomas)	
Administrative Patent Judge)	
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Kenneth W. Hairston)	BOARD OF PATENT
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