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opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.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. 16

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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Ex parte JAMES J. FINLEY, THOMAS J. WAYNAR
and LARRY A. MILLER

_____

Appeal No. 96-0317
Application 08/042,185[1]

_____

ON BRIEF

_____

Before WINTERS, JOHN D. SMITH and OWENS, *Administrative Patent Judges.*

OWENS, *Administrative Patent Judge.*

DECISION ON APPEAL

This is an appeal from the examiner's final rejection of claims 1-10 and 12-20, which are all of the claims remaining in the application.

[1] Application for patent filed April 2, 1993.

THE INVENTION

The subject matter of appellants' claimed invention is directed toward a method for bonding a silicon-containing composition, such as a sputtering target, to a metal surface, such as the surface of a cooling plate, by arc spraying onto a coarse silicon-containing surface, in order, a metal adhesion layer, a solderable layer and a solder layer, and soldering the solder layer to the metal surface. Claim 1 is illustrative and reads as follows:

1. A method for bonding a silicon-containing composition to a metal surface comprising the steps of:

a. providing a coarse silicon-containing surface;

b. arc-spraying a metal adhesion layer onto the coarse silicon-containing surface;

c. arc-spraying a solderable layer onto the metal adhesion layer;

d. arc-spraying a solder layer onto the solderable layer; and

e. soldering the solder layer to the metal surface.

THE REFERENCES

Lindmayer (Lindmayer '391)	4,297,391	Oct. 27, 1981
Lindmayer (Lindmayer '812)	4,492,812	Jan. 8, 1985
Leas	4,511,600	Apr. 16, 1985

W.E. Ballard, "Preparation of Surfaces for Metal Spraying", *Metal Spraying and Sprayed Metal,* Ch. VI, 95-119 (Charles Griffin & Co., London, 3d ed. 1948) (Ballard).

THE REJECTION

Claims 1-10 and 12-20 stand rejected under 35 U.S.C. § 103 as being unpatentable over appellants' acknowledged prior art in view of Leas, Lindmayer '391 or Lindmayer '812, and Ballard.

OPINION

We have carefully considered all of the arguments advanced by appellants and the examiner and agree with the examiner that the invention recited in claims 1-7, 10 and 12-17 would have been obvious to one of ordinary skill in the art at the time of appellants' invention over the applied references. Accordingly, the aforementioned rejection of these claims will be affirmed. However, we agree with appellants that the above rejection of claims 8, 9 and 18-20 is not well founded. We therefore will reverse this rejection.

At the outset, we note that appellants state that the claims stand or fall in five groups as follows: 1) claims 1-7, 16 and 17; 2) claims 8 and 18; 3) claims 9, 19 and 20; 4) claims 10, 13 and 14; 5) claims 12 and 15 (brief, pages 3-4). Appellants, however, separately argue only the first three groups (brief, pages 4-7). We therefore consider the claims in the fourth and fifth groups to stand or fall with the broadest claim argued, i.e., claim 1, and limit our discussion of the first, fourth and fifth groups to that claim. *See In re Ochiai*, 71 F.3d 1565, 1566 n.2, 37 USPQ2d 1127, 1129 n.2 (Fed. Cir. 1995); 37 CFR § 1.192(c)(5)(1993).

The acknowledged prior art relied upon by the examiner (answer, page 4) includes

appellants' discussion of U.S. Patent No. 4,341,816 which, appellants state, discloses attachment of a sputtering target to a cooling plate by plasma spraying a metal adhesive layer onto a surface of the target, coating the adhesive layer with a solderable layer by plasma spraying, and soldering the solderable layer onto the surface of the cooling plate (specification, page 1). The examiner also relies upon appellants' statements (specification, page 1) that plasma spraying an aluminum layer onto a sputtering target was known in the art and that it was known in the art that silicon was difficult to wet with solder (answer, pages 4-5).

Appellants argue that Lauterbach et al. do not disclose depositing a solder layer onto a solderable layer by any method, much less by arc spraying (brief, pages 4-6). In our view, the teaching that the solderable layer is soldered to the cooling plate would have fairly suggested, to one of ordinary skill in the art, use of solder to achieve the soldering. We are not persuaded by the argument that the reference does not disclose applying a solder layer by arc spraying because such a layer is made of metal (specification, page 5), and both Lindmayer '391 (col. 2, lines 62-68) and Lindmayer '812 (col. 1, line 64 - col. 2, line 1) teach that it was known in the art to apply layers of metallic material by arc spraying.

Appellants argue that there is no apparent incentive for one of ordinary skill in the art of bonding silicon-containing targets to metal to even consider the Lindmayer references which pertain to the solar cell art wherein arc spraying is disclosed as an

alternative to plasma spraying for forming electrical contact points (brief, page 6).

Appellants apparently are arguing that the secondary references are nonanalogous art. The test of whether a reference is from a nonanalogous art is first, whether it is within the field of the inventor's endeavor, and second, if it is not, whether it is reasonably pertinent to the particular problem with which the inventor was involved. *See In re Wood*, 599 F.2d 1032, 1036, 202 USPQ 171, 174 (CCPA 1979). A reference is reasonably pertinent if, even though it may be in a different field of endeavor, it is one which because of the matter with which it deals, logically would have commended itself to an inventor's attention in considering his problem. *See In re Clay*, 966 F.2d 656, 659, 23 USPQ2d 1058, 1061 (Fed. Cir. 1992).

In our view, an inventor who was considering the problem addressed by appellants of using thermal spraying to bond metal layers to silicon-containing substrates reasonably would have considered references directed toward using such spraying techniques to apply metal layers to silicon-containing substrates generally. The secondary references, therefore, logically would have commended themselves to the inventor’s attention. Moreover, in the discussion of the prior art in their specification (page 1), appellants state that it was well known in the art that silicon can be metallized with aluminum to form electrodes for solar cells. This disclosure indicates that appellants considered the art of metallizing silicon for making solar cells, and therefore would have taken into account

references such as the Lindmayer references which are directed toward that art.

Appellants argue that the secondary references relate to the solar cell art where only an electrically conductive contact is applied on a silicon solar cell, and that there is no suggestion that the various thermal spray techniques disclosed therein are universally equivalent or that arc spraying could be substituted for plasma spraying of adhesive layers on a silicon-containing target material or for applying solderable layers (brief, page 5).

Lindmayer '391 teaches that arc spraying and plasma spraying both are suitable for applying metallic material to a solar cell (col. 2, lines 54-68). In our view, this teaching would have been sufficient to reasonably suggest, to one of ordinary skill in the art that, that either of these methods is effective for applying metal layers onto silicon surfaces, whether in a pattern as in the Lindmayer methods or as a bonding layer as in the Lauterbach method. Furthermore, Lindmayer '391 teaches that a plasma flame can be part of an electric arc (col. 5, lines 50-64), which would have indicated to one of ordinary skill in the art that electric arc spraying and plasma spraying are sufficiently similar in nature that an electric arc process would be a suitable alternative to the plasma spraying process of Lauterbach.

Lindmayer '812 indicates that both arc spraying and plasma spraying can be used for coating surfaces in general with metallic material (col. 1, lines 64-68), which would have fairly suggested, to one of ordinary skill in the art, that arc spraying would be effective for

applying the metal layers in the Lauterbach method. Also, the statement by Lindmayer '812 that the terms arc spraying and plasma spraying are used synonymously by Lindmayer '812 in the context of spraying metallic material onto the surface of a solar cell (col. 1, line 64 - col. 2, line 3) would have fairly suggested, to one of ordinary skill in the art, that these are alternative methods for applying metal layers to silicon-containing surfaces.

One of ordinary skill in the art may have expected each of arc spraying and plasma spraying to have advantages and disadvantages relative to the other and therefore expected one to be more advantageous in a particular application than the other. However, the teachings in the Lindmayer references discussed above, in our view, would have been sufficient to motivate one of ordinary skill in the art to use either plasma spraying or arc spraying to apply the metal layers in the Lauterbach method, and would have provided such a person with a reasonable expectation of success in doing so. Thus, we conclude that use of arc spraying to apply the metal layers in the Lauterbach method would have been *prima facie* obvious to one of ordinary skill in the art. *See In re Vaeck*, 947 F.2d 488, 493, 20 USPQ2d 1438, 1442 (Fed. Cir. 1991)*; In re O'Farrell*, 853 F.2d 894, 902, 7 USPQ2d 1673, 1680 (Fed. Cir. 1988); *In re Longi*, 759 F.2d 887, 892-93, 225 USPQ 645, 648 (Fed. Cir. 1985).

Appellants argue that Ballard does not appear to suggest any method for preparing silicon surfaces for metallization (brief, page 7). Ballard discloses a known method for

metallizing glass wherein metal is applied directly to hot glass, and then teaches that glass can be shot blasted (page 118). Such shot blasting, Ballard teaches, prepares surfaces for coatings (page 95). These teachings would have fairly suggested, to one of ordinary skill in the art, shot blasting glass prior to metallizing the glass.

For the above reasons, we conclude, based on the preponderance of the evidence and argument in the record, that the invention recited in appellants' claims 1-7, 10, and 12-17 would have been obvious to one of ordinary skill in the art within the meaning of 35 U.S.C. § 103.[2]

Appellants argue that the applied references do not teach or suggest the application of a metal layer or the further application to a solder layer to the surface of a metal backing plate by any method, much less arc spraying as recited in claims 8, 9 and 18-20 (brief, pages 5-7). The examiner argues that appellants do not state why claims 8, 9 and 18-20 are patentably distinct by virtue of the limitations recited therein, and therefore considers the claims to stand or fall together (answer, page 2). However, appellants' argument is a substantive argument that the references do not disclose or suggest the subject matter recited in those claims, and therefore should have been addressed by the examiner. Since we do not find in the applied references a disclosure or suggestion to arc spray a metal layer onto the metal surface to be bonded to the silicon-containing surface,

[2] A discussion of Leas is not necessary to our decision.

or to arc spray a layer of solder onto the metal layer, we do not sustain the rejection of claims 8, 9 and 18-20.

DECISION

The rejection of claims 1-7, 10, and 12-17 under 35 U.S.C. § 103 over appellants' acknowledged prior art in view of Leas, Lindmayer '391 or Lindmayer '812, and Ballard, is affirmed. The rejection of claims 8, 9 and 18-20 under 35 U.S.C. § 103 over these references 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

SHERMAN D. WINTERS Administrative Patent Judge	)	
JOHN D. SMITH Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
TERRY J. OWENS Administrative Patent Judge	)	

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