

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.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. 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 DONALD R. WALL,  
JOHN J. GARANT,  
KEVIN M. PRETTYMAN,  
and  
SRINIVASA S.N. REDDY

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Appeal No. 2001-0130  
Application No. 09/050,491

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ON BRIEF

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Before GARRIS, DELMENDO, and JEFFREY T. SMITH, 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 final rejection of claims 1 through 22 and 30 through 47, which are all of the claims pending in the above-identified application.

The subject matter on appeal relates to a process for depositing at least one metal source (e.g., Ni or Ni alloy) onto at least one receiving metal (e.g., Mo, W, or alloys, compounds, or mixtures thereof) securely bonded to a ceramic substrate. According to the appellants, "it is very desirable that the solid metal source material and the metal area to be plated are kept in close physical proximity to each other" because it results in "a reasonable rate of deposition." (Specification, page 3, lines 22-27.) But when the metal source is kept in close proximity to the receiving metal, "the metal source material can at least at some point, also come into direct physical contact with the metal surface to be plated" and "can weld together and form a bond," which will eventually result in the formation of defects. (Id. at page 3, line 28 to page 4, line 13.) To avoid this problem, it is said that at least one inert material (i.e., an inert stand-off material) can be placed in "floating contact" with the receiving metal. (Id. at page 4, lines 14-30; page 8, lines 12-23; page 10, line 10 to page 11, line 6.) Further details of this appealed subject matter are recited in illustrative claims 1, 3, 4, 9, and 15 reproduced below:

1. A process for depositing at least one source metal onto at least one receiving metal, wherein said

receiving metal is securely bonded to a ceramic substrate, comprising the steps of:

(a) placing said ceramic substrate containing said receiving metal in a chamber containing at least one source metal, and wherein at least a portion of at least one inert material is in floating contact with at least a portion of said at least one receiving metal,

(b) heating said chamber and its contents in a non-oxidizing environment at a temperature in the range from between about 700°C to about 1,000°C, for a period of time ranging to a maximum of about 200 minutes,

(c) allowing said chamber and its contents to cool so that said receiving metal has at least one layer of said source metal adhered thereto, and

(d) removing said ceramic substrate containing said adhered layer of source metal to said receiving metal, from said chamber.

3. The process of Claim 1, wherein said at least one source metal is nickel or an alloy thereof.

4. The process of Claim 3, wherein said nickel alloy is selected from the group consisting of nickel-copper and nickel-cobalt.

9. The process of Claim 1, wherein a thickness of said layer of source metal over said receiving metal is between about 0.01 micron to about 15 microns, and preferably between about 3 microns to about 10 microns.

15. The process of Claim 1, wherein said heating of said chamber and its contents are done in a furnace.

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

Park  
(Park '095)

4,590,095

May 20, 1986

Park (Park '942)	4,664,942	May 12, 1987
Reddy et al. (Reddy)	5,869,134	Feb. 9, 1999 (filed Jun. 21, 1996)

The appealed claims stand rejected as follows:

- I. claims 9 and 36 under 35 U.S.C. § 112, second paragraph, as indefinite (examiner's answer of Apr. 20, 2000, paper 10, page 3);
- II. claims 1 through 3, 5 through 16, 18, 19, 21, 22, 30, 32 through 42, 44, 45, and 47 under 35 U.S.C. § 102(b) as anticipated by Park '942 (id. at page 4);
- III. claims 1 through 3, 5 through 11, 14, 16, 18 through 22, 30, 32 through 37, 40, 42, and 44 through 47 under 35 U.S.C. § 102(b) as anticipated by Park '095 (id. at pages 4-5);
- IV. claims 4 and 31 under 35 U.S.C. § 103(a) as unpatentable over Park '942 or Park '095, each in view of Reddy (id. at page 5); and
- V. claims 15, 17, 41, and 43 under 35 U.S.C. § 103(a) as unpatentable over Park '095 (id. at page 6).

We affirm rejections III through V but reverse rejections I and II.<sup>1</sup>

Rejection I: 35 U.S.C. § 112, ¶ 2

The examiner reasons that claims 9 and 36 are indefinite because "it is unclear if the scope of the claims are open to the broader claimed range or if it is limited to the more narrow range." (Answer, page 3.) In support of this reasoning, the examiner cites Ex parte Wu, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989). (Answer, pages 6-7.)

We cannot agree with the examiner on this issue.

As an initial matter, it is important to emphasize that the examiner bears the initial burden of presenting a prima facie case of unpatentability, whether it be based on prior art or on any other ground. In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). Further, the test for definiteness

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<sup>1</sup> The appellants have not contested the examiner's holding that the "Argument" section of the appeal brief filed Mar. 23, 2000 (paper 9) does not comply with 37 CFR § 1.192(c)(7) (1997) because it does not include reasons why certain claims of each group subject to a common ground of rejection should be considered separately patentable. Accordingly, we confine our discussion to claim 1 for rejection III, claim 4 for rejection IV, and claim 15 for rejection V. In re McDaniel, 293 F.3d 1379, 1383, 63 USPQ2d 1462, 1465 (Fed. Cir. 2002) ("If the brief fails to meet either requirement [of 37 CFR § 1.192(c)(7)], the Board is free to select a single claim from each group of claims subject to a common ground of rejection as representative of all claims in that group and to decide the appeal of that rejection based solely on the selected representative claim.").

under the second paragraph of 35 U.S.C. § 112 is whether one skilled in the relevant art would understand the bounds of the claim when read in light of the specification. Orthokinetics, Inc. v. Safety Travel Chairs, Inc., 806 F.2d 1565, 1576, 1 USPQ2d 1081, 1088 (Fed. Cir. 1986). That is, a claim complies with the second paragraph of section 112 if, when read in light of the specification, it reasonably apprises those skilled in the relevant art of the scope of the invention. Hybritech Inc. v. Monoclonal Antibodies, Inc., 802 F.2d 1367, 1385, 231 USPQ 81, 94 (Fed. Cir. 1986).

In this case, it is our judgment that the examiner has not satisfied the initial burden of proof by establishing that the claims, when read in light of the specification, would not reasonably apprise those skilled in the relevant art of the scope of the invention. Specifically, appealed claim 9 recites in part: "wherein a thickness of said layer of source metal over said receiving metal is between about 0.01 micron to about 15 microns, and preferably between about 3 microns to about 10 microns."<sup>2</sup> Regarding this limitation, the specification further enlightens one skilled in the relevant art that the thickness of

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<sup>2</sup> Appealed claim 36 recites similar language.

the nickel layer (i.e., the source metal layer) "can be from between about 0.01 microns to layer thicknesses exceeding about 10-15 microns." (Page 14, lines 2-5.) When we give the term "preferably" its ordinary meaning as it would be understood by one skilled in the relevant art,<sup>3</sup> we determine that the narrower range that follows this term is merely a desirable or preferred range, not a required range. This interpretation accords with the well settled principle that unpatented 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).

The examiner's reliance on the Wu case as controlling legal authority is misplaced. In that case, we held (the Board) that the recitation "optionally containing a polyamine" did not render a method claim indefinite. Wu, 10 USPQ2d at 2032, 2033. In Wu, the question of whether the recitation of a relatively broad range of numerical values followed by a preferred narrower

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<sup>3</sup> Webster's New World College Dictionary 1133 (1999), copy attached, defines the term "preferable" as "more desirable; to be preferred."

range renders indefiniteness under 35 U.S.C. § 112, second paragraph, was not before the Board.

For these reasons, we hold that the examiner has not established a prima facie case of unpatentability under 35 U.S.C. § 112, second paragraph.

Rejection II: 35 U.S.C. § 102(b) over Park '942

"To anticipate a claim, a prior art reference must disclose every limitation of the claimed invention, either explicitly or inherently." In re Schreiber, 128 F.3d 1473, 1477, 44 USPQ2d 1429, 1431 (Fed. Cir. 1997).

Here, we determine that Park '942 does not describe each and every limitation of the invention recited in the appealed claims. Park '942 describes a process for the nickel metallization of a discrete exposed tungsten metal- or molybdenum metal-covered area bonded to a ceramic substrate comprising the steps of: (a) cleaning the ceramic substrate and metal-covered area; (b) placing the cleaned ceramic substrate and a mixture of nickel powder, powdered activator and particulate inert filler in a chamber, the substrate not being in contact with the mixture; (c) heating the chamber and its contents in a non-oxidizing environment at a temperature in the range of from about 650°C to about 1000°C for a period of time

ranging to a maximum of about ten hours; and (d) removing the ceramic substrate from the chamber, the discrete metal-covered area having nickel diffusion-bonded thereto. (Column 3, lines 26-46.) Park '942 further teaches that the process is carried out in an inert atmosphere. (Column 6, lines 12-26.)

The examiner's basic theory behind the conclusion of anticipation is that the inert atmosphere described in Park '942 meets the limitation "at least one inert material is in floating contact with at least a portion of said at least one receiving metal" recited in appealed claim 1. We disagree.

As described in the specification (page 4, lines 14-30; page 8, lines 12-23; page 10, line 10 to page 11, line 6), the recited "inert material" is an inert "stand-off material" that is solid. Accordingly, we find the examiner's interpretation of "inert material...in floating contact" as including gaseous atmospheres to be unreasonable. It follows then that Park '942 does not describe each and every element of appealed claim 1.

Rejection III: 35 U.S.C. § 102(b) over Park '095

As pointed out by the examiner (answer, page 5), Park '095 describes a process that anticipates claim 1. Specifically, Park '095 describes a process comprising: (a) providing an ultrasonically cleaned ceramic chip carrier with tungsten

metallization; (b) completely embedding the chip in a pre-mixed pack of 30% by weight of Ni powder, 3% by weight of  $\text{NH}_4\text{I}$ , and the balance alumina powder<sup>4</sup> in a cylindrical workboat; (c) heating the chip to 850°C for one hour in a flowing stream of argon maintained at 2 SCFH; (d) cooling the workboat to about 50°C; (e) removing the chip carrier from the pack; (f) cleaning the chip carrier in flowing distilled water at room temperature; and (g) cleaning the chip carrier ultrasonically in alcohol.

(Example 1.)

The examiner's position is succinctly stated as follows

(answer, page 5):

The inert alumina filler is an inert material in contact with the receiving metal. At least some of the alumina will physically separate some of the receiving metal and nickel. As it is disclosed in the examples that the deposited nickel coating is uniform and essentially pore free, the alumina filler is clearly in "floating contact" with the receiving metal surface, given appellants' definition for floating contact at page 10, line 16 to page 11, line 6 of their specification...

We are in complete agreement with the examiner's analysis.

On this point, we note that 67% by weight of the "pre-mixed pack" described in Example 1 of Park '095 is alumina, one of the appellants' preferred inert materials. Thus, it was reasonable

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<sup>4</sup> The specification enlightens one skilled in the relevant art that alumina is a preferred "inert material." (P. 8, ll. 20-23.)

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on the part of the examiner to shift the burden of proof to the appellants to prove that at least a portion of the alumina (i.e., inert material) would not inherently or necessarily be in "floating contact" with at least a portion of the tungsten layer (i.e., receiving layer). MEHL/Biophile Int'l Corp. v. Milgraum, 192 F.3d 1362, 1366, 52 USPQ2d 1303, 1307 (Fed. Cir. 1999); In re Woodruff, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990); In re Spada, 911 F.2d 705, 708, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990); In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977).

The appellants argue that Park '095 discloses a process where a chip carrier has porous tungsten metallization and nickel metallization. (Appeal brief, page 22.) This argument is not persuasive, because appealed claim 1 reads on such a structure.

The appellants also contend that the ceramic chip carrier with the tungsten metallization in Park '095 is exposed to ambient air. (Id.) We note, however, that appealed claim 1 reads on the structure described in Park '095.

The appellants urge that "Park '095 has never taught that the chip carrier 10, should be positioned so that the tungsten metallization that is exposed, be facing any nickel layer." (Id.) Further, the appellants argue that "the chemistry and

mechanism of the Park process and Appellants' process are NOT the same." (Id. at page 24.) Appealed claim 1, however, does not recite the requirements on which the appellants rely for patentability. In re Self, 671 F.2d 1344, 1348, 213 USPQ 1, 5 (CCPA 1982) ("Many of appellant's arguments fail from the outset because, as the solicitor has pointed out, they are not based on limitations appearing in the claims.").

For these reasons, we uphold the examiner's rejection under 35 U.S.C. § 102(b) of appealed claims 1 through 3, 5 through 11, 14, 16, 18 through 22, 30, 32 through 37, 40, 42, and 44 through 47 as anticipated by Park '095.

Rejection IV: 35 U.S.C. § 103(a) over Park '942  
or Park '095 in View of Reddy

The examiner relies on Reddy for the teaching that nickel alloys, as recited in appealed claims 4 and 31, "are also effective in addition to nickel as a source metal to apply to metallizations of tungsten to make them brazable or solderable..." (Answer, page 5.) From this teaching in Reddy, the examiner determined that it would have been prima facie obvious to use nickel alloys as the metal source in Park '095. (Id.)

The appellants argue that Reddy does not disclose the claimed process, in particular the "floating contact" concept. (Appeal brief, pages 27-28.) However, the examiner is relying on Reddy only for the teaching that nickel alloys "are also effective in addition to nickel as a source metal to apply to metallizations of tungsten to make them brazable or solderable..." In re Keller, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981) ("The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference... Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art.").

The appellants argue that there is no motivation to combine Reddy with Park '095. (Appeal brief, page 32.) We disagree. Reddy teaches that Ni and Ni alloys are interchangeable metal sources in a chemical vapor deposition process that is similar to that described in Park '095. This teaching would have led one of ordinary skill in the art to combine the references in the manner proposed by the examiner.

Rejection V: 35 U.S.C. § 103(a) over Park '095

With respect to appealed claim 15, the examiner found that Park '095 does not disclose heating the chamber and its contents

in a furnace. (Answer, page 6.) Nevertheless, the examiner reasoned that conventional heating means, such as furnaces, would have been recognized by one of ordinary skill in the art to be effective for providing the non-oxidizing atmosphere of Park '095. (Id.)

The appellants do not really dispute the examiner's reasoning with respect to the furnace. Rather, the appellants repeat their argument with respect to appealed claim 1 that Park '095 does not disclose the "floating contact" concept.

Under these circumstances, we uphold the examiner's rejection on this ground for the same reasons given above for appealed claim 1.

#### Summary

In summary, our disposition of this appeal is as follows:

- I. the rejection of claims 9 and 36 under 35 U.S.C. § 112, second paragraph, as indefinite is reversed;
- II. the rejection of claims 1 through 3, 5 through 16, 18, 19, 21, 22, 30, 32 through 42, 44, 45, and 47 under 35 U.S.C. § 102(b) as anticipated by Park '942 is reversed;

- III. the rejection of claims 1 through 3, 5 through 11, 14, 16, 18 through 22, 30, 32 through 37, 40, 42, and 44 through 47 under 35 U.S.C. § 102(b) as anticipated by Park '095 is affirmed;
- IV. the rejection of claims 4 and 31 under 35 U.S.C. § 103(a) as unpatentable over Park '095 in view of Reddy is affirmed; and
- V. the rejection of claims 15, 17, 41, and 43 under 35 U.S.C. § 103(a) as unpatentable over Park '095 is affirmed.

The decision of the examiner is therefore affirmed in part.

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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).

AFFIRMED IN PART

Bradley R. Garris	)	
Administrative Patent Judge	)	
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	)	BOARD OF PATENT
Romulo H. Delmendo	)	
Administrative Patent Judge	)	APPEALS AND
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Jeffrey T. Smith	)	
Administrative Patent Judge	)	

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AZIZ M AHSAN  
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