

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

KINIK COMPANY,
Petitioner,

v.

CHIEN-MIN SUNG,
Patent Owner.

Case IPR2014-01523
Patent 8,777,699 B2

Before MICHAEL W. KIM, DONNA M. PRAISS, and
BARRY L. GROSSMAN, *Administrative Patent Judges*.

KIM, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. INTRODUCTION

A. *Background*

Kinik Company (“Petitioner”) filed a Petition requesting *inter partes* review of claims 1–19 of U.S. Patent No. 8,777,699 B2 (“the ’699 patent”) (Ex. 1001) pursuant to 35 U.S.C. §§ 311–319. Paper 1. Chien-Min Sung (“Patent Owner”) filed a Preliminary Response (“Prelim. Resp.”). Paper 11.

On February 20, 2015, we instituted an *inter partes* review of claims 1–12 and 17–19 on certain grounds of unpatentability alleged in the Petition. Paper 16 (“Dec.”). After institution of trial, Patent Owner filed a Patent Owner Response (Paper 18; “PO Resp.”) and Petitioner filed a Reply (Paper 20; “Reply”). An oral hearing was held on September 21, 2015. Paper 25 (“Tr.”).

The Board has jurisdiction under 35 U.S.C. § 6(c). In this Final Written Decision, issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73, we determine that Petitioner has shown by a preponderance of the evidence that all claims for which trial is instituted, claims 1–12 and 17–19, are unpatentable.

A. *The ’699 patent*

The ’699 patent relates to superabrasive tools and methods for making the same, specifically, for Chemical Mechanical Polishing (“CMP”) pad dressers. Ex. 1001, 1:30–31. Polishers, such as CMP pads, and grinders are used directly on a surface of a silicon wafer, and CMP pad dressers are used to clean the CMP pads, for example, by cleaning and removing debris. Tr. 6:16–8:5; PO Resp. 15. The ’699 patent discloses the following:

Of central importance in all CMP processes is the attainment of high performance levels in aspects such as uniformity of polished wafer, smoothness of the IC circuitry, removal rate for productivity, longevity of consumables for CMP economics, etc.

Ex. 1001, 1:22–26. To that end, the ’699 patent discloses a method of making CMP pad dressers including disposing a first monolayer of superabrasive particles on a metal support layer, and disposing a second monolayer of superabrasive particles on the metal support layer on a side opposite the first monolayer, where the superabrasive particles of the second

monolayer are positioned to have substantially the same distribution as the superabrasive particles of the first monolayer. Ex. 1001, 1:56–63. The results of implementing of these method steps are illustrated in Figure 3 of the '699 patent set forth as follows:

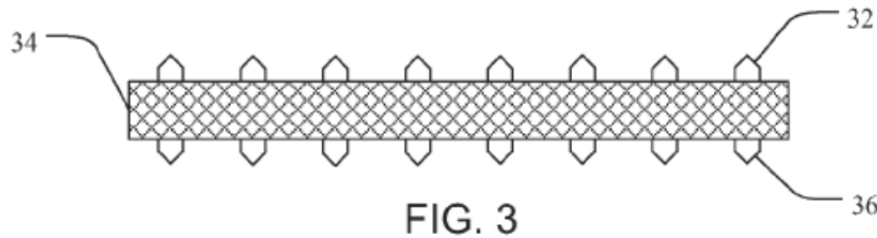


Figure 3 is a schematic side view of an exemplary CMP pad dresser.

Ex. 1001, Fig. 3. The method further includes bonding the first monolayer of superabrasive particles and the second monolayer of superabrasive particles to the metal support layer such that symmetrical forces due to the substantially similar distribution between the first monolayer and the second monolayer precludes substantial warping of the metal support layer.

Ex. 1001, 1:63–2:2. The results of implementing of these method steps are illustrated in Figure 4 of the '699 patent set forth as follows:

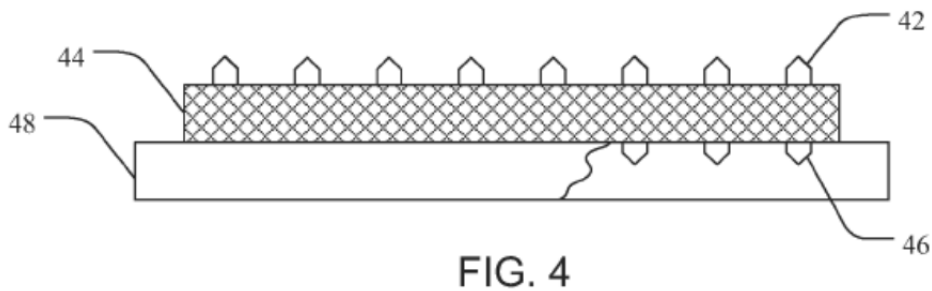


Figure 4 is a schematic side view of an exemplary CMP pad dresser.

Ex. 1001, Fig. 4.

B. Related Matters

Petitioner and Patent Owner identify the following related district court proceedings between Petitioner and Patent Owner that involve the '699 patent: *Chien-Min Sung v. Kinik Co. and Intel Corp.*, Nos. 4:14-CV-01026 (D. Del.); *Chien-Min Sung v. Kinik Co. and WaferTech LLC*, 4:14-CV-01027 (D. Del.). Pet. 1; Paper 4, 1–2.

C. Illustrative Claim

Independent claim 1 is reproduced below:

1. A CMP pad dresser, comprising:
a first monolayer of superabrasive particles disposed on and coupled to one side of a metal support layer; and
a second monolayer of superabrasive particles disposed on and coupled to the metal support layer on an opposite side from the first monolayer, wherein the superabrasive particles of the second monolayer are positioned to have substantially the same distribution as the superabrasive particles of the first monolayer; and
further comprising a rigid support coupled to the second monolayer of superabrasive particles opposite the first monolayer.

E. Prior Art References Applied by Petitioner and Instituted Grounds of Unpatentability

The Board instituted a trial concerning the patentability of claims 1–12 and 17–19 on the basis of the following items of prior art:

US 2010/0022174 A1 (“Chou”)	Jan. 28, 2010	Ex. 1004
US 2008/0271384 A1 (“Puthanangady”)	Nov. 6, 2008	Ex. 1005
US 6,416,878 B2 (“An”)	July 9, 2002	Ex. 1006

Specifically, the Board instituted a trial on claims 1–12 and 17–19 of the '699 patent based on the following specific grounds of unpatentability (Dec. 25):

Reference(s)	Basis	Challenged Claims
Chou	§ 102(b)	1–3, 5, 6, 8–12, and 17–19
Puthanagady and Chou	§ 103(a)	1–12 and 17–19
Chou and An	§ 103(a)	8, 9, and 12

II. ANALYSIS

A. Claim Construction

In an *inter partes* review, a claim in an unexpired patent shall be given its broadest reasonable construction in light of the specification of the patent in which it appears. 37 C.F.R. § 42.100(b); *see also In re Cuozzo Speed Techs., LLC*, 793 F.3d 1268, 1278 (Fed. Cir. 2015) (“We conclude that Congress implicitly approved the broadest reasonable interpretation standard in enacting the AIA.”) Under the broadest reasonable construction standard, claim terms are given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). Any special definition for a claim term must be set forth in the specification with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). We must be careful not to read a particular embodiment appearing in the written description into the claim if the claim language is broader than the embodiment. *In re Van*

Geuns, 988 F.2d 1181, 1184 (Fed. Cir. 1993). We construe the terms below in accordance with these principles.

1. “coupled” or “coupling”

Each of claims 1, 8, 9, 11, 18, and 19 recite one of “coupled” or “coupling.” In the Decision on Institution, based on Petitioner’s position and evidence (Pet. 13–14), we construed “coupled” or “coupling” as “attached to, either directly or through an intermediate layer or layers.” Neither Patent Owner nor Petitioner has expressed disagreement with this construction. After considering anew the basis for our previous construction, we see no need for modification.

2. *CMP pad dresser*

The preambles of independent claims 1 and 11 each recite “CMP pad dresser.” Patent Owner asserts that this recitation of “CMP pad dresser” should be considered limiting. PO Resp. 13–18. Petitioner disagrees. Reply 4–9. We agree with Petitioner.

Generally, a preamble is not construed as a limitation. *Allen Eng’g Corp. v. Bartell Indus., Inc.*, 299 F.3d 1336, 1346 (Fed. Cir. 2002). In particular, when the claim body describes a structurally complete invention such that deletion of the preamble phrase does not affect the structure or steps of the claimed invention,” the preamble is not considered a limitation. *Catalina Mktg. Int’l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 809 (Fed. Cir. 2002). Accordingly, we begin from the general premise that “CMP pad dresser” is not limiting, and from there we determine that the deletion of “CMP pad dresser” from each of independent claims 1 and 12 would not affect the rest of the claim. For the reasons set forth herein, we are unpersuaded by Patent Owner that we should deviate from these principles.

Patent Owner asserts that the evidence establishes that the inventor intended for the claims to be limited to a CMP pad dresser. Patent Owner's assertions are misplaced, as an inventor's subjective intent is not relevant in a claim construction analysis.

Patent Owner asserts further that “[w]hile the ‘699 patent specification states at one point that the invention may be applied to a superabrasive ‘tool’ (*see, e.g.*, Ex. 1001, 1:31), the only such tool taught or described by the ‘699 patent is a CMP pad dresser. (*See, e.g., id.* at 2:64–3:4.).” PO Resp. 14. As noted by Patent Owner, however, the Specification discloses expressly that the invention may be applied to superabrasive tools, generally, and discloses in a latter portion that “while the above disclosure refers primarily to CMP pad dressers, other precision grinding and/or abrading tools are considered to be within the present scope.” Ex. 1001, 11:42–46.

Patent Owner asserts additionally that “[t]he Patentee chose to specify that each independent claim recite a ‘CMP pad dresser or a method of making a ‘CMP pad dresser.’” PO Resp. 14. We are unpersuaded, however, as this argument is circular; that the preamble should be considered limiting because of what the preamble recites.

Patent Owner asserts also that because there are material differences between grinders, polishers, and CMP pad dressers, that the preamble should be considered limiting. Patent Owner's assertions are misplaced, as the fact that there are differences between those three items is not relevant to whether or not the recitation of CMP pad dressers in the preamble should be considered limiting.

Patent Owner asserts the following:

The '699 patent specification reflects this specialty application of CMP pad dressers. It teaches that the purpose of the CMP pad dressers of the '699 patent is not to “grind away” the CMP pad, but to carefully clean and remove debris from precision CMP pads, which themselves are used in precision polishing of semiconductor wafers

PO Resp. 15 (citing Ex. 1001, 1:22–25). Patent Owner’s assertions are misplaced, as the purpose of the CMP pad dresser is not relevant to whether or not the recitation of CMP pad dressers in the preamble should be considered limiting.

More practically, however, even if we were to consider the recitation of “CMP pad dresser” in the preamble limiting, we are unclear as to what limitation it would place on independent claims 1 and 11. For example, the body of independent claim 1 appears to recite a complete structure. Under Patent Owner’s construction, however, if a prior art structure only had the elements recited in the body of independent claim 1, it still would not meet independent claim 1, because it is lacking “something” that would make it a CMP pad dresser. We are unclear what that “something” would be, and at oral argument, despite a lengthy exchange with the panel, Patent Owner could not identify that “something” with any reasonable clarity. Tr. 28:16–37:24, 47:1–51:2. Patent Owner makes citations to the Specification that allude to the fact that a CMP pad dresser would need to carefully clean and remove debris. We are unclear as to why the structure recited in independent claim 1 cannot clean or remove debris. Perhaps Patent Owner is asserting that some additional structure is needed to clean or remove debris. If that is the case, however, the body of independent claim 1 needs to recite explicitly that additional structure. Absent that, Patent Owner is

asserting essentially that we import that additional structure into independent claim 1 based on the recitation in the preamble of “CMP pad dresser.” As an initial matter, Patent Owner does not identify from the Specification what that additional structure would be. Moreover, limitations in the Specification are not to be imported into the claims, absent some narrow exceptions. Patent Owner has not shown persuasively why any of those narrow exceptions should apply here. The same analysis applies to the method recited in independent claim 11.

Patent Owner asserts additionally that one of ordinary skill would know the structural differences between CMP pad dressers and other grinders/polishers, and, thus, that express disclosures of those differences are not necessary. For support, Patent Owner identifies paragraph 15 of Puthanagady for allegedly being equally as vague concerning the structural features of CMP pad dressers. We are unpersuaded by Patent Owner’s assertions because paragraph 15 of Puthanagady is the opening paragraph of the “Detailed Description of the Invention” section, and, thus, we discern that it provides merely a high level overview of the rest of Puthanagady. This is borne out by the fact that Puthanagady goes on to describe, for example, many shapes, sizes, and materials of particles that would be acceptable to include in a CMP pad dresser. Thus, unlike the Specification and claims of the ’699 patent, Puthanagady discloses its desired structural features for its CMP pad dresser, even going so far as to place some of those features in its claims, for example, size and material. *See, e.g.*, Ex. 1005, claims 1, 3, 9, 10, 11, 14, 16, 17, 18, 23, 28, 29, 31, 34, 36, 37, 41, 42, 43, 46. Thus, Puthanagady actually goes against Patent Owner’s assertion, as its disclosure of desired structural features for its CMP pad dresser indicates

that there is a wide breadth and range of CMP pad dressers, confirming that the bare recitation of “CMP pad dresser,” by itself, is not limiting to one of ordinary skill.

Patent Owner recites several cases in support of their position. First, Patent Owner cites *American Medical Systems, Inc. v. Biolitec, Inc.*, 618 F.3d 1354, 1358 (Fed. Cir. 2010), for the proposition that although a mere “statement of use” in a preamble is not considered limiting, a preamble may be construed as limiting “if it is necessary to give life, meaning, and vitality to the claim.” As noted above, however, without an articulation of the structural differences that the recitation of “CMP pad dresser” would impart, “CMP pad dresser” is, in effect, an intended use. And without such an articulation of the structural differences, we are unclear how it can be considered to breathe “life, meaning, and vitality to the claim.”

Patent Owner also cites *Corning Glass Works v. Sumitomo Elec. U.S.A., Inc.*, 868 F.2d 1251, 1257 (Fed. Cir. 1989), for the proposition that any terminology in the preamble that limits the structure of the claimed invention must be treated as a claim limitation. As set forth above, however, we are unpersuaded that “CMP pad dresser” limits the structure, at least in part because the body of the claim recites a complete structure, and at least in part because we are unclear as to what those limitations on structure would be for a “CMP pad dresser.”

Patent Owner further cites *Pac-Tec Inc. v. Amerace Corp.*, 903 F.2d 796, 801 (Fed. Cir. 1990), as asserting that the determination of whether preamble recitations are structural limitations can be resolved only on review of the entirety of the application “to gain an understanding of what the inventors actually intended to encompass by the claim.” We have

reviewed the entire application and, as set forth above, the Specification is unambiguous that its disclosures are meant to apply to superabrasive tools in general, and not just CMP pad dressers. *See, e.g.*, Ex. 1001, 1:31, 11:42–46.

Accordingly, in summary, we do not construe as limiting the recitation of “CMP pad dresser” in the preambles of independent claims 1 and 11. Moreover, even if they were limiting, we are unpersuaded that the recitation of “CMP pad dresser” limits independent claims 1 and 11 in a substantive manner.

3. *whether the coupling step must be
performed before the bonding step of independent
claim 11*

Independent claim 11 recites “bonding the first monolayer of superabrasive particles and the second monolayer of superabrasive particles to the metal support layer such that symmetrical forces due to the substantially similar distribution between the first monolayer and the second monolayer precludes substantial warping of the metal support layer; and coupling the second monolayer of superabrasive particles to a rigid support.” In their assertions concerning the grounds of patentability, Patent Owner asserts that the bonding step must be performed before the coupling step. PO Resp. 35–37. Petitioner disagrees. Reply 9–12. We agree with Petitioner.

Patent Owner asserts that the explicit ordering of the steps in independent claim 11 requires that they be performed in that order. Patent Owner’s assertions are misplaced. There is no question that, grammatically, the bonding step is recited before the coupling step. It is the general rule, however, that “[u]nless the steps of a method actually recite an order, the steps are not ordinarily construed to require one.” *Interactive Gift Express*,

Inc. v. CompuServe Inc., 256 F.3d at 1342 (citing *Loral Fairchild Corp. v. Sony Corp.*, 181 F.3d 1313, 1322 (Fed. Cir. 1999)). Perhaps Patent Owner is asserting that grammatically reciting the steps in an order is an actual order for claim construction purposes. We disagree because the converse would make superfluous *Interactive Gift Express*, supra. In all patent claims, individual steps must be written grammatically in some sequence. Unless there is something in the claim language itself, however, that would denote a specific sequence of steps relative to each other, no order is presumed. To that end, the sequence of the two “disposing” steps of independent claim 11 are illustrative. The second “disposing” step recites “disposing a second monolayer of superabrasive particles on the metal support layer on a side opposite the first monolayer.” By logic, this second “disposing” step requires that the first “disposing” step of “disposing a first monolayer” have occurred. Otherwise, it is impossible to perform the second “disposing” step. By contrast, Patent Owner has not identified, and we are unable to determine, that there is any express language in either the “bonding” step or the “coupling” step that requires one be performed before the other.

Patent Owner asserts additionally that the Specification discloses performing the “coupling” step after the “bonding” step, and that several disadvantages, set forth in the Specification and articulated by Dr. Sung, would result from performing the “coupling” step prior to the “bonding” step. Patent Owner’s assertions are misplaced, as if a specific order was desirable, for whatever reason, Patent Owner could have easily evinced that desire, for example, by placing the phrase “after the bonding step,” prior to “coupling the second monolayer of superabrasive particles to a rigid

support.” Absent such language, Patent Owner asks us, essentially, to import a limitation from the Specification into the claim. We decline to do so.

Patent Owner may be asserting that, given the disclosures of the Specification, the express claim limitations, and the testimony of Dr. Sung, one of ordinary skill could not help but understand that the bonding step must be performed before the coupling step, because to do otherwise would result in a warped, and thus essentially useless, CMP pad dresser. We have reviewed the cited portions of the Specification, and column 14, lines 38–45 do indicate a desire to minimize warpage, which comports with the express limitation of independent claim 11 to “preclude[] substantial warping of the metal support layer.” Neither the Specification nor the claim, however, indicates that performing the coupling step before the bonding step would increase warpage, and that the increase in warpage would be unacceptable. The Specification and claim language only disclose expressly that the symmetrical forces from the two opposing monolayers of superparticles during bonding would preclude substantial warping, but does not provide any indication as to what effect a prior implementation of the coupling step would or would not have on that bonding process.

Regarding the testimony of Dr. Sung, in analogous contexts, the Federal Circuit has held repeatedly that in order to guard “against courts being deceived by inventors who may be tempted to mischaracterize the events of the past through their testimony,” the law requires corroboration of a putative inventor’s credible testimony, the sufficiency of which is measured under a “rule of reason” standard. *Gen. Elec. Co. v. Wilkins*, 750 F.3d 1324, 1330 (Fed. Cir 2014) (citing *Martek Biosciences Corp. v.*

Nutrinova, Inc., 579 F.3d 1363, 1374 (Fed. Cir. 2009)); *see also Bell & Howell Document Mgmt. Prod. Co. v. Altek Sys.*, 132 F.3d 701, 706 (Fed. Cir. 1997) (“the testimony of an inventor . . . concerning claim construction . . . often is self-serving, after-the-fact attempt to start what should have been part of his or her patent application”). To that end, while Patent Owner cites paragraphs 26 and 27 of Dr. Sung’s Declaration in support of their claim construction position here, they do not cite to any corroborative evidence. Furthermore, the content of those paragraphs are largely conclusory. For example, the Declaration asserts that “if a rigid support is also present on one side of the tool but not on the other side, the benefits of the substantially similar distribution of superabrasive particles cannot be achieved and the warpage of the tool will not be mitigated.” Ex. 1012 ¶ 26. The aforementioned assertion does not further analyze why the benefits could not be achieved and the warpage mitigated, and implicit in asserting that the warpage would not be mitigated is that even without the rigid support, some warpage would occur. Yet, there is no analysis as to how much warpage is or is not acceptable, and how the rigid support would take the warpage beyond that acceptable level. A similar analysis is applicable to the Declaration’s assertion that “[a]n attempt to couple the rigid support before the monolayers are bonded to the metal support layer would result in a disk that would be inoperative for CMP pad dressing.” Ex. 1012 ¶ 27. Accordingly, we determine that Dr. Sung’s testimony is entitled to little weight on this issue.

We determine that independent claim 11 does not require that the “bonding” step must be performed prior to the “coupling” step.

B. Claims 1–3, 5, 6, 8–12, and 17–19 as Anticipated by Chou

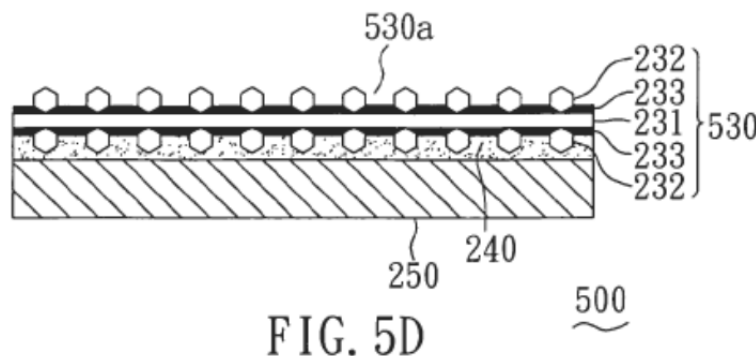
Petitioner contends that claims 1–3, 5, 6, 8–14, and 16–19 are anticipated by Chou. Pet. 16–29 (citing Exs. 1004, 1007). Patent Owner disagrees. PO Resp. 12–27 (citing Exs. 1001, 1004, 1007, 1012, 1013). Petitioner replied. Reply 12–16. Claims 1 and 11 are independent.

1. Chou (Ex. 1004)

Chou relates to a grinding tool and a method for fabricating the same that can improve the precision and lifetime of products, reduce the cost of production, and enhance the machining efficiency. Ex. 1004 ¶ 2. Chou discloses the following under a heading entitled “Description of Related Art”:

Grinding and polishing are ultra-precision machining technologies with the ability to make the surface of a workpiece have acceptable smoothness and flatness. Accordingly, grinding and polishing are widely used in precision machining of the surface of an object, such as hard and brittle metals, ceramics, glass and wafers. Thereby, it is an important issue to develop various grinding tools that can meet process requirements.

Ex. 1004 ¶ 4. Figure 5D of Chou is illustrated as follows:



Ex. 1004, Fig. 5D. Figure 5D discloses grinding plate 530 having working surface 530a, where grinding plate 530 includes abrasive particles 232, combining layer 233, and soft substrate 231. *Id.* ¶ 54. The abrasive particles

can be directly formed on the surface of the soft substrate by brazing, sintering, or electroplating. *Id.* ¶ 9. Backplane 250 is retained on a non-working surface of grinding plate 530 via adhesive layer 240. *Id.* ¶ 56. Backplane 250 can be made of a material that can be easily machined and exhibit improved chemical resistance and be less remaining stress, such as stainless steel, so that the stability of the products can be enhanced. *Id.* ¶ 12.

2. Analysis

Based on the information presented in the Petition, Patent Owner Response, and Reply, as well as all supporting evidence, we are persuaded that Petitioner has shown, by a preponderance of the evidence, that claims 1–3, 5, 6, 8–12, and 17–19 are anticipated by Chou. Pet. 16–29; PO Resp. 12–27; Reply 12–16. For example, independent claim 1 recites a CMP pad dresser. Petitioner asserts that Chou discloses a grinding tool, and that because “CMP pad dresser” is only recited in the preamble and does not further limit the structure of the claimed invention, it should be treated as an intended use that does not substantively limit the claim. Pet. 16–17. Independent claim 1 further recites “a first monolayer of superabrasive particles disposed on and coupled to one side of a metal support layer; and a second monolayer of superabrasive particles disposed on and coupled to the metal support layer on an opposite side from the first monolayer.” Petitioner cites Chou for disclosing grinding plate 530 having working surface 530a, where grinding plate 530 includes abrasive particles 232, combining layer 233, and soft substrate 231. *Id.* at 17–18 (citing Ex. 1004 ¶ 54). Independent claim 1 additionally recites “wherein the superabrasive particles of the second monolayer are positioned to have substantially the same distribution as the superabrasive particles of the first monolayer.” Petitioner

cites Figure 5D of Chou as disclosing that the particles of the first and second monolayers are exactly aligned. *Id.* at 18–20. Independent claim 1 then recites “a rigid support coupled to the second monolayer of superabrasive particles opposite the first monolayer.” Petitioner cites Chou for disclosing that backplane 250 is retained on a non-working surface of grinding plate 530 via adhesive layer 240. *Id.* at 20 (Ex. 1004 ¶ 56). Petitioner provides similar analyses for claims 2, 3, 5, 6, 8–12, and 17–19.

Patent Owner asserts that Chou is directed to a grinding or polishing tool, which does not correspond properly to the recited CMP pad dresser, because the grinding or polishing tool of Chou does not account adequately for the specialized design parameters of a CMP pad dresser. As set forth above, we are unpersuaded that the recitation of “CMP pad dresser” in the preambles are limiting, and even if they were, we are persuaded that at least some of the grinding or polishing tools disclosed in Chou could be used as CMP pad dressers.

To the extent that Patent Owner is asserting the claimed invention and Chou are non-analogous art, we are unpersuaded. The title of the ’699 patent is “Superabrasive Tools.” The Specification discloses superabrasive tools used in manufacturing silicon wafers (Ex. 1001, 1:15–31) and discloses further that “while the above disclosure refers primarily to CMP pad dressers, other precision grinding and/or abrading tools are considered to be within the present scope.” Ex. 1001, 11:42–46. Chou discloses “[t]he present invention relates to a grinding tool” for use in “ultra-precision machining technologies,” for example, grinding and polishing wafers. Ex. 1004 ¶¶ 1–2. Indeed, the ’699 patent and Chou are both categorized in U.S. prior art class 451, and, at deposition, Dr. Sung agreed with the

following disclosure set forth in one of his other patent applications:

“Though much of the following discussion relates to CMP pad dressers, it should be understood that the methods and tools according to aspects of the presently-claimed invention, are equally applicable to any tool that utilizes abrasive or superabrasive materials.” Ex. 1014, 135:2–136:15 (citing ¶ 50 of U.S. Patent Application Publication No. 2008/0096479 A1 to Chien-Min Sung). Thus, it is clear that the claimed invention and Chou are in the same field and directed to the same problems. Patent Owner does cite to paragraphs 15–17 of Dr. Sung’s Declaration in support of their position. While we have considered these paragraphs, we determine that they are insufficient to outweigh the aforementioned express disclosures of the Specification and Chou, especially where the aforementioned paragraphs are the testimony of an interested inventor that do not cite to any corroborative evidence.

Insofar as Patent Owner is asserting that every grinding or polishing tool disclosed in Chou must be a CMP pad dresser in order for Chou to anticipate a CMP pad dresser, Patent Owner is mistaken. As an example, if a claim recites a species, “the letter A,” and a prior art reference discloses a genus of “the alphabet,” the prior art reference is still anticipating because it discloses the entire genus, i.e., the alphabet, including the letter A, even if the alphabet also includes other species, i.e., letters, that are not the letter A. To that end, Chou discloses a wide range of grinding and polishing tools made of all sorts of materials and have all sorts of configurations, and we are persuaded that at least some of those grinding or polishing tools disclosed in Chou could be used as CMP pad dressers.

Patent Owner asserts further that Chou does not disclose “wherein the superabrasive particles of the second monolayer are positioned to have substantially the same distribution as the superabrasive particles of the first monolayer,” as recited in independent claim 1, because Petitioner’s sole evidentiary support is Figures 3A–3D and 5A–5D of Chou, and Chou does not add any additional disclosure concerning the alignment of the particles in Figures 3A–3D and 5A–5D. More specifically, Patent Owner asserts Chou does not enable one of ordinary skill to implement the disclosures of Figures 3A–3D and 5A–5D without undue experimentation. We disagree. After considering the entire record, we are unpersuaded that arriving at the alignment of particles disclosed in Figures 3A–3D and 5A–5D would have involved undue experimentation, for the reasons set forth below.

Patent Owner asserts that the text of Chou is silent as to how the alignment of particles in Figures 3A–3D and 5A–5D was achieved, and asserts that Dr. Blanchard agrees with them. We agree to an extent, as Chou does disclose that it is desirable to distribute the abrasive particles evenly over both surfaces to prevent deformation (Ex. 1004 ¶¶ 9, 39), albeit the text of Chou does not disclose any specifics as to what would be considered “even.” Even if this factor, however, was given full weight, it is still insufficient to persuade us that undue experimentation would have been required, especially where Figures 3A–3D and 5A–5D disclose the exact alignment of particles recited in the aforementioned limitations of independent claim 1. Drawings and pictures can anticipate claims if they clearly show the structure which is claimed. *In re Mraz*, 455 F.2d 1069, 1072 (CCPA 1972). When the reference is a utility patent, it does not matter that the feature shown is unintended or unexplained in the specification. The

drawings must be evaluated for what they reasonably disclose and suggest to one of ordinary skill in the art. *In re Aslanian*, 590 F.2d 911, 914 (CCPA 1979) (“a drawing in a utility patent can be cited against the claims of a utility patent application even though the feature shown in the drawing was unintended or unexplained in the specification of the reference”).

Patent Owner asserts further that paragraphs 9 and 39 of Chou, which disclose only that particles are distributed over both surfaces of the substrate in Chou, is inconsistent with a finding that Chou discloses a precise alignment of particles. We disagree. The aforementioned paragraphs disclose that particles are distributed, but make no comment on their alignment, while Figures 3A–3D and 5A–5D show a particular, exemplary alignment. We see nothing inconsistent between those two findings.

Patent Owner asserts additionally that Figures 3A–3D and 5A–5D show other schematic details, such as identical particle sizes and shapes, that even Dr. Blanchard agrees were probably for the ease of the draftsmen, and do not actually reflect, for example, hexagonal particles in the real world. We agree that some schematic details are more the result of a draftman’s convenience, and do not reflect an actual reality. We disagree, however, that alignment is one of those schematic details. Even at a schematic level, figures must convey some information, and while we agree such things as shape and color of objects in Figures 3A–3D and 5A–5D are not meant to convey much information, we discern that Figures 3A–3D and 5A–5D, if nothing else, disclose to one of ordinary skill the alignment of certain objects relative to other objects. And as the distribution of particles is one of those alignments disclosed, we are unpersuaded that the symmetrical alignment should be interpreted as being primarily for the draftman’s convenience.

Patent Owner provides paragraphs 19 and 20 of Dr. Sung's Declaration in support their position concerning alignment. Those paragraphs suffer from the same deficiency as Dr. Sung's Declaration generally, namely, conclusory assertions with little analysis, and no corroborative evidence. Furthermore, in paragraph 18, Dr. Sung asserts that "aligning the diamond particles on each monolayer in a substantially similar manner is technically cumbersome (low yield and high cost)." We agree. Being technically cumbersome, with a low yield and high cost, however, indicates that such an ability was known — to be sure, difficult, but known nonetheless — and thus within the abilities of one of ordinary skill.

Patent Owner cites MPEP § 2121.01 and *Elan Pharm., Inc. v. Mayo Found. For Med. Educ. & Research*, 346 F.3d 1051, 1054 (Fed. Cir. 2003) in support of their positions concerning alignment. Regarding MPEP § 2121.01, it has been considered, but we are unpersuaded that it outweighs the other considerations set forth above. Regarding *Elan*, the case is distinguishable because it is directed to the more unpredictable arts, such as chemistry. In the present proceeding, we consider the claimed physical alignments as being more readily apparent and predictable.

Patent Owner asserts further that Chou's disclosure of "brazing" at paragraph 9 is insufficient to correspond properly to the "braze alloy" recited in claims 8, 9, and 12. Specifically, Patent Owner asserts that since Chou only discloses brazing, but not what is used for brazing, Petitioner must show that Chou inherently discloses that brazing necessarily requires using braze alloys. As the evidence from both experts shows, however, brazing can be performed with pure metals, Chou does not necessarily require using a braze alloy, and so Petitioner cannot meet its burden of showing inherency.

Patent Owner's assertion is misplaced. We are persuaded that Chou discloses brazing, and thus inherently discloses using a brazing material, i.e., a genus. We are persuaded also that this genus would consist of only two species, pure metals and metal alloys, because those are the only two options available. Furthermore, Dr. Blanchard testified that while perhaps brazing would be possible to do without an alloy, it would be unlikely in practice. Ex. 1013, 51:2–53:8. Thus, we are persuaded that Chou's disclosure of brazing discloses, inherently, both pure metals and metal alloys, and metal alloys in particular.

Patent Owner asserts additionally that Chou does not disclose two layers of superabrasive particles have “the same distribution,” as recited in dependent claim 10, or the superabrasive particles of the two layers “are positioned to align with [one another],” as recited in dependent claim 17, for reasons similar to those set forth previously for “wherein the superabrasive particles of the second monolayer are positioned to have substantially the same distribution as the superabrasive particles of the first monolayer,” as recited in independent claim 1. On this record, our analysis is the same as set forth above, and need not be repeated here.

Patent Owner asserts further that some weight should be given to the fact that the Examiner found the Chou reference in a search, and yet chose not to make a rejection based on Chou. We agree with Patent Owner that this factor should be given some weight, however, we are unpersuaded that it outweighs Petitioner's identification and our express consideration herein of the actual disclosures of Chou, especially where the Examiner did not make any express substantive representations concerning Chou, listing it only as a relevant reference.

3. Conclusion

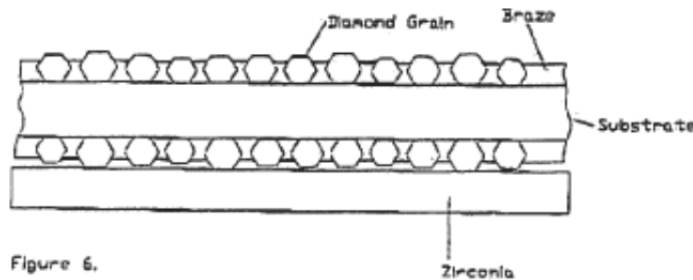
For the foregoing reasons, we determine that Petitioner has shown, by a preponderance of the evidence, that claims 1–3, 5, 6, 8–12, and 17–19 are anticipated by Chou.

C. Claims 1–12 and 17–19 as Obvious over Puthanangady and Chou

Petitioner contends that claims 1–12 and 17–19 are obvious over Puthanangady and Chou. Pet. 43–54 (citing Exs. 1004, 1005, 1007)¹. Patent Owner disagrees. PO Resp. 27–38 (citing Exs. 1001, 1004, 1007, 1012, 1013). Petitioner replied. Reply 17–20.

1. Puthanangady (Ex. 1005)

Puthanangady relates to tools and techniques for conditioning polishing pads such as CMP pads used in the microelectronics industry. Ex. 1005 ¶ 2. Figure 6 of Puthanangady is illustrated as follows:



Ex. 1005, Fig. 6. Figure 6 discloses a CMP pad conditioning tool having a single layer of abrasive particles brazed to a front side and a single layer of abrasive particles brazed to a back side of the CMP pad conditioning tool.

¹ The ground of obviousness based on Puthanangady and Chou refers also to certain sections of pages 29–43 of the Petition, which are directed to the ground of anticipation based on Puthanangady alone. Additionally, a trial was not instituted as to dependent claims 13, 14, and 16.

Ex. 1005 ¶ 10. Figure 6 discloses the CMP pad conditioning tool being supported by a zirconia support while it is being fired in a furnace. Ex. 1005 ¶ 14. Puthanangady discloses that numerous abrasive grain pattern and sub-pattern schemes are possible, and that inter-particle spacing may be substantially the same for all particles. Ex. 1005 ¶¶ 27–28.

2. *Analysis*

Based on the information presented in the Petition, Patent Owner Response, and Reply, as well as all supporting evidence, we are persuaded that Petitioner has shown, by a preponderance of the evidence, that claims 1–12 and 17–19 are obvious over Puthanangady and Chou. Pet. 29–54; PO Resp. 27–38; Reply 17–20. For example, independent claim 1 recites a CMP pad dresser. Petitioner cites Puthanangady for disclosing tools and techniques for conditioning polishing pads such as CMP pads used in the microelectronics industry. Pet. 45–46 (citing Ex. 1005 ¶ 2). Independent claim 1 further recites “a first monolayer of superabrasive particles disposed on and coupled to one side of a metal support layer; and a second monolayer of superabrasive particles disposed on and coupled to the metal support layer on an opposite side from the first monolayer.” Petitioner cites Puthanangady for disclosing a CMP pad conditioning tool having a single layer of abrasive particles brazed to a front side and a single layer of abrasive particles brazed to a back side of the CMP pad conditioning tool. Pet. 46–47 (Ex. 1005 ¶ 10). Independent claim 1 additionally recites “wherein the superabrasive particles of the second monolayer are positioned to have substantially the same distribution as the superabrasive particles of the first monolayer.” Petitioner cites Puthanangady for disclosing that numerous abrasive grain pattern and sub-pattern schemes are possible, and that inter-particle spacing

may be substantially the same for all particles. Pet. 47–49 (Ex. 1005 ¶¶ 27–28). Petitioner then cites the Declaration of Dr. Blanchard to support the following:

One of ordinary skill in the art would appreciate that applying the same brazing alloy to both the first and second sides to apply the above-described pattern of superabrasive particles would provide for superabrasive particles of a second monolayer that are positioned to have substantially the same distribution as superabrasive particles of a first monolayer.

Pet. 48–49 (citing Ex. 1007). Independent claim 1 then recites “a rigid support coupled to the second monolayer of superabrasive particles opposite the first monolayer.” Petitioner cites Chou for disclosing that backplane 250 is retained on a non-working surface of grinding plate 530 via adhesive layer 240. Pet. 49–50 (citing Ex. 1004 ¶ 56). For combining the aforementioned disclosures of Puthanangady and Chou, Petitioner provides the following rationale:

Chou specifically teaches a backplane, such as a stainless steel rigid support, that is coupled to the second monolayer of superabrasive particles through an adhesive resin. See Ex. 1004, ¶¶ 12–16, 49–52, 58, at Fig. 5D. As *Chou* explains, the inclusion of a backplane advantageously enhances the stability of the resulting device or abrasive tool. *Id.* ¶ 12. Thus, *Chou*’s disclosure provides additional teachings that one of ordinary skill in the art would be motivated to use to further improve the embodiments described in *Puthanangady*. Ex. 1007, at tbl. C, r. 5. More specifically, one of ordinary skill in the art would have been motivated to combine the backplane disclosed by *Chou* with the aforementioned embodiments of *Puthanangady* to arrive at a more stable abrasive tool. *Id.*

Pet. 50 (citing Ex. 1007); see also Pet. 43–45 (citing Ex. 1004, 1005, 1007). Petitioner provides similar analyses for claims 2–12 and 17–19.

Patent Owner asserts that one of ordinary skill would not look to combine Puthanangady and Chou in the manner set forth by Petitioner because Chou relates to grinding tools, which serve a different purpose and have different considerations than the CMP polishing tools of Puthanangady. We are not persuaded by Patent Owner's assertion, because Chou discloses expressly that grinding and polishing wafers are, at a minimum, related arts. Ex. 1004 ¶ 4.

Patent Owner asserts further that Chou is non-analogous art, and cites paragraphs 15–17 of Dr. Sung's Declaration in support. We have addressed these assertions and evidence above, and that analysis need not be repeated here.

Patent Owner asserts additionally that one of ordinary skill would not have modified Puthanangady to include the backplane of Chou to provide support, the rationale for modification proffered by Petitioner, because Puthanangady already discloses that its support member is sufficiently rigid. We disagree, as whether Puthanangady is sufficiently rigid is a subjective determination, and we are unpersuaded that just because an object is rigid, that indicates that the object could not be made more rigid, should more rigidity be desired.

Patent Owner asserts also that modifying Puthanangady to include the backplane of Chou would eliminate a purported advantage of Puthanangady, namely having two working surfaces. As an initial matter, we note that the purported advantage is, again, a subjective determination. Furthermore, Figures 1 and 3 of Puthanangady disclose substrates with only one working surface. To be sure, those substrates do not have particles disposed on both sides, but nevertheless, Puthanangady discloses that having only one

working surface was known, and we are persuaded that one of ordinary skill would have been able to assess the readily apparent tradeoff for making the proffered modification, namely, rigidity versus two working surfaces. Furthermore, Puthanagady discloses the following: “FIG. 2 illustrates a pad conditioner that has two working surfaces (*although both need not be used*).” Ex. 1005 ¶ 18 (emphasis added). Accordingly, Puthanagady discloses expressly that even if you had two working surfaces, it was known to only use one. Patent Owner cites to paragraphs 22 and 23 of Dr. Sung’s Declaration, however, we do not discern anything in those paragraphs that would alter our analysis on this issue.

Patent Owner asserts further that independent claim 11 recites that the coupling step must be performed after the brazing step, and that Petitioner has not shown adequately that Puthanangady and Chou suggests that sequence. As set forth above in our claim construction analysis, we are unpersuaded that the coupling step must be performed after the brazing step. Accordingly, given that the coupling step and the brazing step do not need to be performed in a particular order, it is inapposite that Petitioner did not set forth how a combination of Puthanangady and Chou suggests that sequence.

3. Conclusion

For the foregoing reasons, we determine that Petitioner has shown, by a preponderance of the evidence, that claims 1–12 and 17–19 would have been obvious over Puthanangady and Chou.

D. Dependent Claims 8, 9, and 12 as Obvious over Chou and An

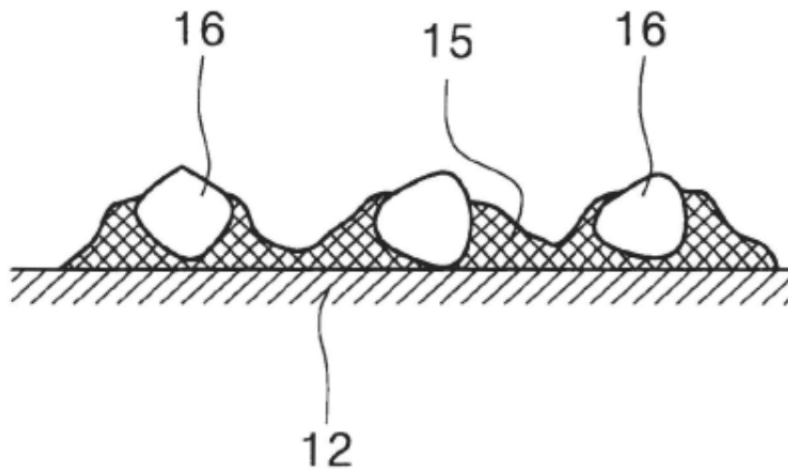
Petitioner contends that claims 8, 9, and 12 would have been obvious over Chou and An. Pet. 55–58 (citing Exs. 1004, 1006, 1007). Patent

Owner disagrees. PO Resp. 38–42 (citing Exs. 1001, 1004, 1006, 1007).
Petitioner replied. Reply 21.

1. *An (Ex. 1006)*

An relates to an abrasive dressing tool used for mechanical and chemical planarization abrasion of the surface of the work pieces as can be used for semiconductor wafers or the like which require precise, planar and micro polishing, and a method for manufacturing the same dressing tool.

Ex. 1006, 1:5–10. Figure 3 of An is reproduced below:



Ex. 1006, Fig. 3. Figure 3 discloses a metal substrate 12 with diamond particles 16, parts of diamond particles 16 being enclosed by sintered metal layers 15. Ex. 1006, 3:65–67. In one example, brazing metal slurry solution 14 is coated on metal substrate 12. Ex. 1006, 5:33–34. Brazing metal slurry solution 14 may include at least 60 wt. % of nickel as the main component, and as the additional components, respective 5 wt. % to 15 wt. % of one or more metals chosen from the group of chromium, silicone, cobalt, tungsten, tungsten carbide, and boron. Ex. 1006, 5:45–49. Diamond particles 16 are then uniformly distributed on coated brazing metal slurry solution 14, and the assembly is dried. Ex. 1006, 5:50–56. After completion of drying,

brazing metal slurry solution 14 is sintered so as to form sintered metal layer 15. Ex. 1006, 5:58–6:3.

2. *Dependent Claims 8, 9, and 12*

Based on the information presented in the Petition, Patent Owner Response, and Reply, as well as all supporting evidence, we are persuaded that Petitioner has shown, by a preponderance of the evidence, that claims 8, 9, and 12 would have been obvious over Puthanangady, Chou, and An. Pet. 55–58; PO Resp. 38–42; Reply 21. Specifically, each of claims 8, 9, and 12 recite coupling the superabrasive particles to the metal support layer with a braze alloy. Petitioner cites An for disclosing using brazing metal slurry solution 14 to enclose diamond particles 16 on metal substrate 12 with sintered metal layers 15.

Patent Owner asserts that An does not disclose a first and second monolayer of superabrasive particles with substantially the same distributions, as required by claims 8, 9, and 12. Patent Owner's assertion is misplaced, as Petitioner cites Chou for disclosing the first and second monolayer of superabrasive particles with substantially the same distributions.

Patent Owner asserts that one of ordinary skill would not look to combine An and Chou in the manner set forth by Petitioner, because Chou relates to grinding tools, which serve a different purpose and have different considerations than the abrasive dressing tool used to process semiconductor wafers in An. We are not persuaded by Patent Owner's assertion for the same reasons as discussed above with respect to Chou and CMP pad dressers, the analysis of which need not be repeated here.

3. *Conclusion*

For the foregoing reasons, we determine that Petitioner has shown, by a preponderance of the evidence, that claims 8, 9, and 12 would have been obvious over Puthanangady, Chou, and An.

III. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 1–12 and 17–19 of the '699 patent are held unpatentable; and

FURTHER ORDERED that because this is a final written decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

IPR2014-01523
Patent 8,777,699 B2

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