

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

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte RAMANAN V. CHEBIAM,
VALERY M. DUBIN and HARSONO S. SIMKA

Appeal No. 2006-0313
Application 10/300,276

ON BRIEF

Before GARRIS, PAK and WARREN, *Administrative Patent Judges*.

WARREN, *Administrative Patent Judge*.

Decision on Appeal

This is an appeal under 35 U.S.C. § 134 from the decision of the examiner finally rejecting claims 1 through 30, all of the claims in the application.

Claim 1 illustrates appellants' invention of an electroless cobalt plating solution, and is representative of the claims on appeal:

1. An electroless cobalt plating solution, consisting essentially of:
a solvent;
cobalt ions;
at least one reducing agent; and
an ammonia-free complexing/buffering agent.

The reference relied on by the examiner is:

Dubin et al. (Dubin)

6,696,758

Feb. 24, 2004

The examiner has rejected appealed claims 1 through 30 under 35 U.S.C. § 102(e) (2002) as anticipated by Dubin (answer, page 4).

The examiner also set forth the ground of rejection of claims 1 through 4, 9, 11 through 14 and 19 under 35 U.S.C. § 102(b) as anticipated by Malik et al. (Malik) (answer, page 3), but then withdrew the rejection (*id.*, page 5). We have considered this matter below (*see below* pp. 9-10).

Appellants do not present argument with respect to a claim or group of claims with respect to the ground of rejection advanced on appeal. Thus, we decide this appeal based on appealed claim 1. 37 CFR § 41.37(c)(1)(vii) (September 2004).

We affirm.

Rather than reiterate the respective positions advanced by the examiner and appellants, we refer to the answer and to the brief for a complete exposition thereof.

Opinion

We have carefully reviewed the record on this appeal and based thereon find ourselves in agreement with the supported finding advanced by the examiner that as a matter of fact, *prima facie*, appealed claim 1 is anticipated by Dubin. Accordingly, since a *prima facie* case of anticipation has been established by the examiner, we again evaluate all of the evidence of anticipation and non-anticipation based on the record as a whole, giving due consideration to the weight of appellants' arguments in the brief. *See generally, In re Spada*, 911 F.2d 705, 707 n.3, 15 USPQ2d 1655, 1657 n.3. (Fed. Cir. 1990).

In order to review the examiner's application of Dubin to appealed claim 1, we first interpret the claim by giving the terms thereof the broadest reasonable interpretation in their ordinary usage in context as they would be understood by one of ordinary skill in the art in light of the written description in the specification unless another meaning is intended by appellants as established in the written description of the specification, and without reading into the claims any limitation or particular embodiment disclosed in the specification. *See, e.g., In re Am. Acad. of Sci. Tech. Ctr.*, 367 F.3d 1359, 1364, 70 USPQ2d 1827, 1830 (Fed. Cir. 2004); *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997); *In re Zletz*, 893 F.2d 319, 321-22, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989).

The plain language of product claim 1 specifies a “solution” consisting essentially of at least the four specified ingredients, each of which can be present in any amount, however small. In this respect, we determine that when the phrase “[a]n electroless cobalt plating solution” is considered in the context of the claim language as a whole as well as in light of the written description in appellants’ specification, it reflects the intended use of the “solution,” which is a composition. Thus, on this record, the preambular language requires only that the claim encompass compositions which must be capable of functioning as an electroless cobalt plating solution and otherwise adds no additional limitation(s) to the ingredients therein. *See generally, Corning Glass Works v. Sumitomo Elect. U.S.A., Inc.*, 868 F.2d 1251, 1257, 9 USPQ2d 1962, 1966 (Fed. Cir. 1989); *In re Stencel*, 828 F.2d 751, 754-55, 4 USPQ2d 1071, 1073 (Fed. Cir. 1987); *In re Tuominen*, 671 F.2d 1359, 213 USPQ 89 (CCPA 1982). To the extent that the preambular language of product claim 1 is intended by appellants as a method or process of *use* limitation of the claimed composition, such a limitation has no place in a product claim. *Cf. In re Wiggins*, 397 F.2d 356, 359 n.4, 158 USPQ 199, 201-02 n.4 (CCPA 1968), and cases cited therein (“[A]ppellant’s discovery of the analgesic properties of ‘O₂’ and of a composition containing it could properly be claimed only as a method or process of using that compound or composition in accordance with the provisions of 35 U.S.C. 100(b) and 101.”).

Thus, we interpret product claim 1 to encompass compositions consistently essentially of at least the four specified ingredients as of the time the ingredients are mixed together. *Exxon Chem. Pats., Inc. v. Lubrizol Corp.*, 64 F.3d 1553, 1556-58, 35 USPQ2d 1801, 1803-05 (Fed. Cir. 1995) (“Consequently, as properly interpreted, Exxon’s claims are to a composition that contains the specified ingredients at any time from the moment at which the ingredients are mixed together.”). Contrary to appellants’ arguments (brief, pages 7-10), we find no limitation in the claim language which limits the ingredients to those specified. The phrase “an ammonia-free complexing/buffering agent” specifies that the claimed compositions must include some amount, however small, of one or more agents which are “ammonia-free” and act as both a “complexing” agent and a “buffering” agent. *See Collegenet, Inc. v. Applyyourself, Inc.*, 418 F.3d 1225, 1232, 75 USPQ2d 1733, 1739 (Fed. Cir. 2005), quoting *Tate Access Floors, Inc. v. Interface Architectural Res., Inc.*, 279 F.3d 1357, 1370 (Fed. Cir. 2002) (“It is well settled that the term ‘a’ or ‘an’ ordinarily means ‘one or more.’”).

Thus, the subject language does not exclude ingredients which act as either a “complexing” agent or a “buffering” agent and can generate ammonia, and particularly since appellants have not established that such ingredients would be excluded from the claimed composition because of the transitional term “consisting essentially of.” This transitional phrase is used in claim construction to indicate that “the invention necessarily includes the listed ingredients and is open to unlisted ingredients that do not materially affect the basic and novel properties of the invention.” *PPG Indus., Inc. v. Guardian Indus. Corp.*, 156 F.3d 1351, 1354, 48 USPQ2d 1351, 1353-54 (Fed. Cir. 1998). Thus, the interpretation of this transitional term requires a determination of whether the inclusion in the claimed compositions of additional element(s) in the amount(s) taught in the applied prior art would materially affect the basic and novel characteristics of the claimed composition, because this phrase customarily excludes such materials. *See In re Herz*, 537 F.2d 549, 551-52, 190 USPQ 461, 463 (CCPA 1976) (explaining *Ex parte Davis*, 80 USPQ 448 (Pat. Off. Bd. App. 1948)). In arriving at this determination, the the written description in appellants’ specification must be considered. *Herz; supra* (“[I]t is necessary and proper to determine whether [the] specification reasonably supports a construction” that would exclude or include particular ingredients.); *see also PPG Indus.*, 156 F.3d at 1354-57, 48 USPQ2d at 1353-56 (Patentees “could have defined the scope of the phrase ‘consisting essentially of’ for purposes of its patent by making clear in its specification what it regarded as constituting a material change in the basic and novel characteristics of the invention. The question for our decision is whether PPG did so.”).

Our review of the written description in the specification reveals no teachings of additional elements that materially affect the basic and allegedly novel characteristics of the claimed compositions, which are disclosed to constitute an “electroless plating solution, which reduces or substantially eliminates pH instability and ammonia evaporation” (specification, page 3 ll. 19-20). Indeed, the compositions are disclosed as “including an ammonia-free complexing/buffering agent” (page 2, l. 8); the compositions “comprising cobalt ions, at least one reducing agent, and an ammonia-free complexing/buffering agent (such as glycine,

triethanolamine, and tris(hydrozomethyl)aminoethane [*sic*, tris(hydroxymethyl)aminoethane¹])” (page 5, ll. 8-11). We determine that the synonymic terms “including” and “comprising” are used in these disclosures in their common usage, open-ended meaning. This comports with appellants’ intention set forth in the specification that the “detailed description is, therefore, not to be taken in a limiting sense, and the scope of the present invention is defined only by the appended claims” in which the transitional term “comprising” is used in original claim 1 (page 4, l. 17, to page 5, l. 7, and page 10). *See Exxon Chem. Pats.*, 64 F.3d at 1555, 35 USPQ2d at 1802 (“The claimed composition is defined as comprising - meaning containing at least - five specific ingredients.”); *In re Baxter*, 656 F.2d 679, 686-87, 210 USPQ 795, 802-03 (CCPA 1981) (“As long as one of the monomers in the reaction is propylene, any other monomer may be present, because the term ‘comprises’ permits the *inclusion* of other steps, elements, or materials.”). In this respect, we find that appellants permissively disclose that “[i]n one example, the ammonia-free electroless cobalt plating solution may include” certain ingredients; that one of the advantages that the claimed solution “may have” is “creates less odor during plating (i.e., less or no ammonia outgassing);” that “[i]t is, of course, understood that the present invention is not limited to the formation of” certain structures and “layers” and can be used “in the fabrication of various electronic devices as well as other industries;” and that “the invention defined by the appended claims is not limited by the particular details set forth in the above description” (page 6, l. 3, page 7, ll. 1-2 and 6-7, page 8, ll. 7-10, and page 9, ll. 19-22).

It is appellants’ burden to establish that the components of the compositions of Dubin, and indeed of Malik, which are not specified in appealed claim 1, would be deleterious to the basic and allegedly novel characteristics of the composition of matter falling within this claims, and thus, excluded from the claims by use of the transitional term “consisting essentially of.” *See PPG Indus., supra; Herz, supra.* On this record, we determine that appellants have not carried their burden.

Considering the examiner’s grounds of rejection of claim 1 under § 102(e) over Dubin, it is well settled that the examiner has the burden of establishing a *prima facie* case of anticipation under § 102(e) in the first instance by pointing out where each and every element of the claimed

¹ *See* Monograph 9902. Tromethamine, *The Merck Index* 9899 (Twelfth Ed., Whitehouse

invention, arranged as required by the claim, is described identically in a single reference, either expressly or under the principles of inherency, in a manner sufficient to have placed a person of ordinary skill in the art in possession thereof. *See generally, Spada*, 911 F.2d at 708, 15 USPQ2d at 1657. It is further well settled that if a reference does not disclose a specific embodiment which satisfies all of the claim limitations, the reference will nonetheless describe the claimed invention within the meaning of § 102 if it “clearly and unequivocally . . . [directs] those skilled in the art to [the claimed invention] without *any* need for picking, choosing, and combining various disclosures not directly related to each other by the teachings of the cited reference.” *In re Arkley*, 455 F.2d 586, 587, 172 USPQ 524, 526 (CCPA 1972). Whether a reference provides clear and unequivocal direction to the claimed invention is determined on the total circumstances with respect to the disclosure of the reference, *see In re Petering*, 301 F.2d 676, 682, 133 USPQ 275, 280 (CCPA 1962), including “not only specific teachings of the reference but also the inferences which one skilled in the art would reasonably be expected to draw therefrom.” *In re Preda*, 401 F.2d 825, 826, 159 USPQ 342, 344 (CCPA 1968); *see also In re Graves*, 69 F.3d 1147, 1152, 36 USPQ2d 1697, 1701 (Fed. Cir. 1995), and cases cited therein (a reference anticipates the claimed method if the step that is not disclosed therein “is within the knowledge of the skilled artisan.”). Such direction is provided to one skilled in the art where the totality of the reference provides a “pattern of preferences” which describes the claimed invention without the necessity for judicious selection from various disclosures thereof. *See In re Sivaramakrishnan*, 673 F.2d 1383, 213 USPQ 441 (CCPA 1982) (“[T]he fact remains that one of ordinary skill informed by the teachings of [the reference] would not have had to choose judiciously from a genus of possible combinations of resin and salt to obtain the very subject matter to which appellant’s composition per se claims are directed.”); *In re Schaumann*, 572 F.2d 312, 316-17, 197 USPQ 5, 9-10 (CCPA 1978); *Petering*, 301 F.2d at 681-82, 133 USPQ at 279-80.

The examiner finds that the disclosure of Dubin at col. 4, ll. 20-35, and col. 5, l. 12, to col. 6, l. 33, describes to one skilled in this art compositions that fall within appealed claim 1. Appellants contend that plating solutions taught by Dubin can include chelating agents and

organic additives as optional ingredients, arguing that since these ingredients need not be present, then they are not present, and thus, “without the chelating agent, all of the limitations of the present application are not taught and the Section 102 rejection is without merit” (brief, page 9). Appellants further argue that “[t]he additional [*sic*, addition] of both phosphorous and boron are not optional, rather they are a mandatory teaching, and would result in a cobalt/phosphorous/boron layer, rather than a cobalt layer,” and “both of which are beyond the limitation of the transitional phase ‘consisting essentially of’ and which would materially affect the basic and novel characteristic(s) of the claimed invention” (*id.*, pages 9-10).

The examiner responds that Dubin teaches plating solutions that contain chelating agents with and without organic additives, both of which fall within appealed claim 1 (answer, page 5). The examiner finds that “[a]mmonium hypophosphite (a phosphorous source) and dimethylamine borate (a boron source) are well known reducing agents and are not excluded by” appealed claim 1, and “it is clear from [Dubin] that the phosphorous and boron in the plate would follow from the oxidation of the hypophosphite and dimethylamine borate reducing agents” (*id.*, pages 5-6).

We find substantial evidence in Dubin supporting the examiner’s position. We find as a matter of fact that Dubin provides a pattern of preferences describing electroless cobalt plating solutions encompassed by appealed claim 1, as we interpreted this claim above, to one skilled in this art within the meaning of 35 U.S.C. § 102(e). Indeed, the electroless plating solutions described by Dubin contain the four ingredients specified in claim 1. In this respect, Dubin discloses to one skilled in this art that shunt material **180** is formed on copper interconnect material **160**, which can be a copper alloy, by electroless plating which involves placing structure **100** in a bath containing metal ions to be plated and one or more reducing agents (e.g., col. 4, ll. 31-35 and 60-62, and col. 5, ll. 12-24; **FIGs. 1 and 2**). Dubin teaches that the shunt material can be cobalt and alloys of cobalt, including cobalt phosphorous and cobalt-boron, and that phosphorous and boron “are added to the shunt material as a result of reducing agent oxidation” (col. 5, ll. 30-33 and 50-52). Dubin provides direction to an electroless cobalt plating solution through the following pattern of preferences: “introducing metal ions of cobalt, metal ions (shunt precursors) such as cobalt chloride, cobalt sulfate, . . . alone” (col. 5, l. 63, to col. 6, l. 1); “[t]o introduce the metal ions onto a conductive surface such as copper . . . one or more

reducing agents are included in the bath . . . such as ammonium hypophosphite, dimethylamine borate[, that is, dimethylamineborane,] and/or glyoxylic acid” (col. 6, ll. 7-15.);” “[t]he bath may also include one or more . . . chelating agents such as citric acid, ammonium chloride, glycine, acetic acid and/or malonic acid . . . for, in one respect, complexing copper” (col. 6, ll. 15-19); “may also include organic additives” (col. 6, ll. 19-25); and “[a]n alkaline metal-free pH adjuster . . . may be included in the bath to achieve a suitable pH range” (col. 6, ll. 25-33).

The principal arguments advanced by appellants focus on the two optional ingredients in the solutions described by Dubin. We cannot subscribe to appellants’ position because claim 1 encompasses solutions containing additional ingredients as we determined above. The first optional ingredient is chelating agents, of which only glycine is identified by the examiner as an ammonia-free complexing/buffering agent specified by claim 1. We find that Dubin directs one skilled in the art to use one or more of the five listed chelating agents, including glycine, “for complexing copper” where the cobalt ions are introduced onto a copper surface (col. 6, ll. 15-19). We find as a matter of fact that one skilled in this art would not have had to choose judiciously from large group of possible complexing agents in order to select glycine, thus obtaining the very electroless cobalt plating solutions containing the ammonia-free complexing/buffering agent glycine encompassed by appealed claim 1. *See Sivaramakrishnan*, 673 F.2d at 213 USPQ 441; *Schaumann*, 572 F.2d at 316-17, 197 USPQ at 9-10; *Petering*, 301 F.2d at 681-82, 133 USPQ at 279-80. With respect to the other optional substituent, organic additives, we find no disclosure in the written description in appellants’ specification which establishes that such additives listed by Dubin would materially affect the basic and novel characteristics of the claimed electroless plating solutions as appellants contend, and indeed, Dubin teaches one skilled in this art that such ingredients are beneficial in electroless cobalt plating solutions. We agree with the examiner that Dubin would have described the claimed electroless solutions to one skilled in this art with and without organic additives.

With respect to the other ingredients specified in claim 1, appellants do not dispute that the solutions described by Dubin contain a source of cobalt ions in a solvent. Appellants also do not dispute that the solutions described by Dubin contain a reducing agent falling within the claimed solutions. Two of the reducing agents listed by Dubin, ammonium hypophosphite and dimethylamineborane, that is, dimethylamineborane, are disclosed and claimed by appellants

(appealed claims 5 and 7), and contrary to appellants' arguments, Dubin teaches that these agents respectively provide phosphorous and boron ions to the solution, as the examiner points out.

Accordingly, based on our consideration of the totality of the record before us, we have weighed the evidence of anticipation found in Dubin with appellants' countervailing arguments for non-anticipation in the brief, and based thereon, conclude that the claimed invention encompassed by appealed claims 1 through 30 would have been anticipated as a matter of fact under § 102(e) (2002).

The examiner's decision is affirmed.

Other Issues

We have affirmed the decision of the examiner with respect to all of the claims on appeal and thus, we decline to exercise our authority under the provisions of 37 CFR § 41.50(b) (September 2004) and enter on the record new grounds of rejection based on Malik and Dubin, leaving it to the examiner to address these matters upon further prosecution of the appealed claims subsequent to the disposition of this appeal.

We find that the electroless cobalt plating solutions disclosed by Malik, as explained by the examiner (answer, pages 3-4), would have described and thus anticipated the claimed electroless cobalt plating solutions encompassed by appealed claim 1, as we have interpreted this claim above, within the meaning of 35 U.S.C. § 102(b). Indeed, each of Malik Examples I-III discloses an electroless cobalt plating bath which exists *per se* before the disc is placed therein, *see Exxon Chem. Pat.*, 64 F.3d at 1556-58, 35 USPQ2d at 1803-05, and are described as "a cobalt bath" (e.g., col. 9, ll. 8-9). Furthermore, the language of appealed claim 1 does not exclude the presence of sodium citrate (*see above* pp. 3-5). We find no basis in the claim language or in the written description in the specification on which to read the disclosure that certain "agents have been found to act as both a buffer and a complexing agent, which eliminates the need to add an additional complexing agent (such as citric acid discussed above)" (specification, page 6, ll. 16-18) into claim 1 as a limitation as appellants argue (brief, pages 8-9). *See Morris*, 127 F.3d at 1054-55, 44 USPQ2d at 1027; *Comark Communications, Inc. v. Harris Corp.*, 156 F.3d 1182, 1186, 48 USPQ2d 1117, 1124 (Fed. Cir. 1998); *In re Paulsen*, 30 F.3d 1475, 1480, 31 USPQ2d 1671, 1674 (Fed. Cir. 1994); *In re Van Genus*, 988 F.2d 1181, 1184, 26 USPQ2d 1057, 1059 (Fed. Cir. 1993); *Zletz*, 893 F.2d at 321-22, 13 USPQ2d at 1322.

Appeal No. 2006-0313
Application 10/300,276

We further suggest that the examiner apply each of Malik and Dubin to the appealed claims under 35 U.S.C. 103(a) in order to fully comprehend the scope of the claimed invention encompassed by the appealed claims vis-à-vis the applied prior art.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a)(1)(iv) (2005).

AFFIRMED

