

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. 28

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte NICOLAAS P. WILLARD, HENRICUS J.A.P. VAN DEN BOOGAARD,
CORNELIS H.J. VAN DEN BREKEL, and ELISABETH VANDERSLUIS

Appeal No. 1998-0754
Application No. 08/652,253¹

ON BRIEF

Before McKELVEY, PAK, and TIERNEY, Administrative Patent Judges.

TIERNEY, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 from the examiner's refusal to allow

¹Application for patent filed May 23, 1996. This application is a continuation under 35 U.S.C. § 120 of U.S. Application No. 08/321,187 filed October 11, 1994, which claims priority under 35 U.S.C. § 119 to Belgium application 93-01063 filed October 11, 1993. The real party in interest is U.S. Philips Corporation. Philips Electronics N.V. is the ultimate parent of U.S. Philips Corporation.

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claims 2-9, 12-18 and 20-23. Upon consideration of the record, including the Appeal Brief (Paper No. 24), the Reply Brief (Paper No. 26) and the Examiner's Answer (Paper No. 25), we affirm the examiner's rejection of claims 5-9 and 20-23 as unpatentable over Halliwell in view of De Bakker. Conversely, we reverse the examiner's rejection of claims 2-4 and 12-18 as being unpatentable over Halliwell in view of De Bakker.

The Invention

The appellants' invention relates to a method of providing a metal pattern on an electrically insulating substrate in an electroless process where the substrate is pretreated with an aqueous palladium ("Pd") sol which is tin ("Sn") free. (Specification, page 1, lines 1-5 and page 4, lines 15-19). A copy of the claims under appeal is set forth in the appendix to the Appellants' Brief. Independent claim 21 and dependent claim 2 are illustrative of the invention and read as follows:

21. A method of providing a metal pattern on an electrically insulating substrate in an electroless process, in which method the substrate is pretreated and subsequently exposed to light according to a pattern, whereafter the substrate is brought into contact with an aqueous metal salt solution to metallize unexposed areas of the substrate, thereby forming the metal-pattern on the substrate, characterized in that the substrate is pretreated by bringing it into contact with an aqueous Sn free Pd sol which is stabilized with a water-soluble polymer, thereby depositing Pd nuclei on the substrate, and in that the substrate, thus provided with the Pd nuclei, is exposed according to the pattern to a pulsed light beam of such energy content per pulse that the Pd nuclei are removed from the exposed areas and in that an electroless metallization bath is used to metallize the unexposed areas of the substrate thereby forming the metal pattern on the substrate.

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2. A method as claimed in Claim 21, characterized in that a glass substrate is used.

The References

The prior art references of record relied upon by the examiner in rejecting the appealed claims are:

Halliwell <i>et al.</i> (Halliwell)	4,681,774	Jul. 21, 1987
De Bakker <i>et al.</i> (De Bakker)	0,518,422	Dec. 16, 1992

We note that Halliwell is available as prior art under 35 U.S.C. § 102(b) and De Bakker is available as prior art under 35 U.S.C. § 102(a).

The Rejections

Claims 2-9, 12-18 and 20-23 stand rejected under 35 U.S.C. § 103 as being unpatentable over Halliwell in view of De Bakker. De Bakker was assigned to N.V. Philips at the time of publication.

Findings of Fact

1. *Halliwell et al., U.S. Patent No. 4,681,774*

Halliwell relates to a method for maskless deposition of metals onto a workpiece by first applying a sensitizing solution to the workpiece and then directing a laser beam onto the workpiece to flash evaporate the sensitizer from the workpiece in areas which are not to be plated. (Abstract, col. 2, lines 24-36 and claim 1). Having lasered the workpiece surface, the workpiece is then contacted with an electroless plating solution to deposit a layer of metal in those areas where the sensitizer was not flashed off. (Abstract, col. 2, lines 36-40 and claim 1). Those areas from which the sensitizer was not removed by laser energy will not be plated.

(Col. 2, lines 40-42). Halliwell teaches that the workpieces, *i.e.*, substrates, can be any material known in the art which is normally solid at room temperature, such as polymeric materials, semiconductor materials, metals or glass. (Col. 3, lines 3-14). Suitable polymers include polypropylene and polyethylene. (Col. 3, lines 7-11). According to Halliwell, the sensitizer or activator to be applied to the workpiece “is a conventional one, such as PdCl₂-SnCl₂-HCl solution, or the like.” (Col. 2, lines 8-9).

2. *De Bakker et al., EP 518,422*

De Bakker describes a method of selectively providing a pattern of a material other than glass on a substrate by electroless metallization. De Bakker achieves this objective through the application of a Pd sol which is stabilized using a water-soluble polymer. (Page 1, lines 1-7 and page 2, lines 41-54).

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The use of a Pd sol which is stabilized with such a polymer does not activate glass, but it does activate other materials such as metals, semiconductors and polymers. (Page 2, lines 46-54). De Bakker describes a comparative example in which a Sn-Pd sol is tested. (Comparative example, page 5, lines 34-54). In the comparative example,

De Bakker states that:

Using this pretreatment process, only the reactive nickel bath on the basis of pyrophosphate (pH = 11) leads to metallization of the ITO [indium tin oxide] surfaces; with the other baths no metallization is observed. Besides, the adhesion of the nickel layer obtained in the pyrophosphate bath is of a poor quality: in the tape-test the entire nickel layer is pulled off the ITO. Apparently, the Sn-Pd sol nucleation of ITO is very mediocre. (Comparative example, page 5, lines 44-54).

Additionally, De Bakker teaches that Sn-Pd sols require additional processing steps as compared to a Pd sol which is stabilized using a water-soluble polymer. (Page 2, lines 25-28 and lines 41-55).

The Prima Facie Case

The examiner has rejected claims 2-9, 12-18 and 20-23 under 35 U.S.C. § 103 as unpatentable over Halliwell in view of De Bakker.² Briefly, the examiner has rejected the claims as unpatentable in light of Halliwell's teaching of a method for plating a workpiece, such as a polymer,

²As noted by appellants on page 6 of the Brief, claims 5-9 and 20-23 stand or fall together and claims 2-4 and 12-18 stand or fall together. Therefore, in accordance with the provisions of 37 CFR § 1.192(c)(7) we decide the grounds of rejection in this appeal on the basis of independent claim 21, and dependent claim 2.

glass or metal, by contacting the workpiece with a conventional sensitizer, such as PdCl₂-SnCl₂-HCl.

The examiner further cites Halliwell as describing the evaporation of the sensitizer from the desired areas of the workpiece surface by laser beam energy and subsequently electrolessly depositing a metal onto the areas of the workpiece where the sensitizer remains. (See Examiner's Answer, pages 4-5).

The examiner, however, recognizes that Halliwell does not specifically recite appellants' aqueous Sn free Pd sol which is stabilized with a water-soluble polymer. The examiner relies upon De Bakker as teaching the utility of using polymer stabilized Pd compositions which are free of Sn for sensitizing substrates prior to electroless deposition. (Examiner's Answer, page 5). The examiner concludes that it would have been obvious to a person skilled in the art to employ De Bakker's polymer modified sensitizing solution in Halliwell's process because Halliwell's teaching that any known conventional sensitizer may be used.

It is well settled that "a *prima facie* case of obviousness is established when the teachings from the prior art itself would appear to have suggested the claimed subject matter to a person of ordinary skill in the art." *In re Bell*, 991 F.2d 781, 783, 26 USPQ2d 1529, 1531 (Fed. Cir. 1993) (quoting *In re Rinehart*, 531 F.2d 1048, 1051, 189 USPQ 143, 147 (CCPA 1976)). Any motivation to modify the prior art references must flow from some teaching in the art that suggests the desirability or incentive to make the modification needed to arrive at the claimed invention. *In re Napier*, 55 F.3d 610, 613, 34 USPQ2d 1782, 1784 (Fed Cir. 1995); *In re Gorman*, 933 F.2d 982, 986-87, 18 USPQ2d 1885,

1888, (Fed. Cir. 1991). (“When it is necessary to select elements of various teachings in order to form the claimed invention, we ascertain whether there is any suggestion or motivation in the prior art to make the selection made by the applicant. [Citations omitted] . . . The extent to which such suggestion must be explicit in, or may be fairly inferred from, the references, is decided on the facts of each case in the light of the prior art and its relationship to the applicants’ invention.”).

As to claims 5-9 and 20-23, we conclude that the examiner has established a *prima facie* case of obviousness with respect to the claimed pretreatment of electrically insulating substrates with an aqueous Sn free Pd sol which is stabilized with a water-soluble polymer. In particular, Halliwell teaches: 1) a laser induced electroless plating process where a substrate is pretreated with a sensitizer; 2) exposing the sensitized substrate to a laser light source to selectively remove portions of the sensitizer from the substrate; and 3) electrolessly plating the laser treated surface with a metal in those substrate areas still possessing the sensitizer. Moreover, Halliwell specifically states that the sensitizer “is a conventional one, such as PdCl₂-SnCl₂-HCl solution, or the like.” (Col. 2, lines 8-9). Accordingly, Halliwell instructs one skilled in the art to employ conventional sensitizers.

That Halliwell instructs one skilled in the art to use sensitizers other than PdCl₂-SnCl₂-HCl is further confirmed by Halliwell’s claims. Under the doctrine of claim differentiation, “which is ultimately based on the common sense notion that different words or phrases used in separate claims are presumed to indicate that the claims have different meanings and scope, [citation omitted], normally

means that limitations stated in dependent claims are not to be read into the independent claim from which they depend.” *Karlin Technology Inc., v. Surgical Dynamics, Inc.*, 177 F.3d 968, 971-72, 50 USPQ2d 1465, 1468 (Fed. Cir. 1999). In *Halliwell*, independent claims 1, 10 and 17 recite methods for plating a metal onto a workpiece where the workpiece is treated with a sensitizer. Yet, dependent claims 2, 11 and 18, which depend from claims 1, 10 and 17 respectively, recite that the sensitizer is PdCl₂-SnCl₂-HCl. Thus, it is clear that *Halliwell* instructs one skilled in the art that conventional sensitizers, beyond the specifically recited PdCl₂-SnCl₂-HCl solutions, can be used to pretreat substrates in metal plating processes.

As discussed above, *De Bakker*, apparently assigned to N.V. Philips, teaches that an aqueous Sn free Pd sol which is stabilized with a water-soluble polymer is not only an effective sensitizer for pretreating metal surfaces but also is an improvement compared to previous PdCl₂-SnCl₂ sensitizers.³ In particular, *De Bakker* demonstrates that it is easier to plate a surface treated with an aqueous Sn free Pd sol which is stabilized with a water-soluble polymer than with the previously known PdCl₂-SnCl₂ sensitizers. (See *De Bakker*, comparative example, p. 5). Therefore, we concur with the examiner that it would have been obvious to one skilled in the art to conduct appellants’ claimed process of providing a metal pattern on an electrically insulating substrate (claims 5-9 and 20-23) in an electroless process

³We note that the present application, apparently assigned to U.S. Philips Corporation whose parent is Philips Electronics N.V., similarly determined that an excellent Pd coating is obtained on materials other than glass when using the Pd sols of *De Bakker*. (*Appellants’ specification*, page 4, lines 15-19 and page 6, lines 2-6).

wherein the substrate is pretreated with an aqueous Sn free Pd sol which is stabilized with a water-soluble polymer. In particular, appellants' claimed process of claims 5-9 and 20-23 would have been obvious as Halliwell teaches appellants' plating process where any conventional sensitizer may be employed and as the claimed sensitizers are known in the art as effective sensitizers that provide improved bonding properties for metal plating.

Yet, while the examiner has established a *prima facie* case for appellants' pretreatment of electrically insulating substrates, the examiner has failed to establish such a case with respect to claims 2-4 and 12-18 where the claims require the pretreatment of a glass substrate. In particular, De Bakker teaches that glass, quartz, and glass ceramics are not activated by a polymer-stabilized Sn free Pd sol sensitizer and as such metals will not plate on these surfaces even after treatment with the sensitizer. (De Bakker, col. 2, line 56 to col. 3, line 2 and col. 3, lines 34-42). Indeed, De Bakker teaches only those portions of a glass substrate which possess a metal, semiconductor or polymer will be activated by the claimed Pd sol. Accordingly, while De Bakker teaches that metal, metal oxides, semiconductors and polymer surfaces can be activated with the claimed Pd sol, De Bakker fails to motivate one skilled in the art to treat a glass surface with the claimed aqueous Sn free Pd sol.

Appellants' Appeal Brief

Appellants' Appeal Brief fails to convince us that the examiner erred in establishing a *prima facie* case of obviousness with respect to claims 5-9 and 20-23. According to appellants, Halliwell fails to teach or suggest the claimed method defined by the claims on appeal. Specifically, appellants state that Halliwell teaches Sn²⁺ ions in contrast to the claimed Sn free Pd sol which is stabilized with a water-soluble polymer and that the claimed Pd sol is significantly more useful for nickel electroless plating processes. As discussed in detail above, Halliwell is not limited in its teachings to Sn²⁺ ion containing sensitizers. Indeed, it is clear that Halliwell instructs one skilled in the art to employ conventional sensitizers, beyond the specifically recited PdCl₂-SnCl₂-HCl solutions, to pretreat substrates in metal plating processes.

As to appellants' statement that the claimed Pd sensitizing bath is significantly more useful, mere argument of counsel cannot take the place of evidence in the record. *Este Lauder, Inc. V. L'Oreal, S.A.*, 129 F.3d 588, 595, 44 USPQ2d 1610, 1615 (Fed. Cir. 1997). In the present appeal, no convincing evidence has been called to our attention to support the argument that the claimed Pd bath provides an unexpected, significant improvement over the prior art Pd sensitizers. This is especially true in light of De Bakker which teaches that the claimed Pd sensitizers provide several advantages over previous Sn-Pd sols.

Appellants also argue that De Bakker teaches water-soluble stabilized Sn free Pd sol for

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substrates other than glass. We conclude that De Bakker fails to motivate one skilled in the art to activate a glass surface using the claimed Sn free Pd sol as De Bakker specifically teaches that glass surfaces are not activated by the application of such a sensitizer. Appellants' claims 5-9 and 20-23, however, are not limited to such a glass substrate. Rather, appellants' claims 5-9 and 20-23 stand or fall on claim 21 which recites an electrically insulating substrate. As Halliwell teaches that suitable substrates include polymeric materials, such as polypropylene and polyethylene, and De Bakker teaches that suitable surfaces to be activated include polymers, the prior art teachings motivate one skilled in the art to conduct the claimed pretreatment of electrically insulating substrates. *In re Costello*, 480 F.2d 894, 897, 178 USPQ 290, 292 (CCPA 1973). ("The argument that both the bath and method claims cover the coating of metal and are therefore too broad in the sense of 35 U.S.C. § 103 cannot be accepted in toto. We agree that appellants' method claims, all of which are broadly drawn to "applying a nickel coating to *articles*" (emphasis added), are not rendered unobvious by a showing that plastic substrates may also be coated. Hence the method claims still read on obvious subject matter." *See also In re Muchmore*, 433 F.2d 824, 826, 167 USPQ 681, 683 (CCPA 1970)).

Appellants' further argue that De Bakker fails to teach that the Pd activating layer provided on the substrate may be patterned by laser light pulses to leave areas free of Pd and which are not metallized by a subsequent electroless metallization process. Yet, it is the combined teachings of

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Halliwell and De Bakker that provide the motivation to use the claimed sensitizer as a Pd activating layer which is patterned by laser light pulses. Furthermore, it is the teachings of Halliwell that are relied upon as describing the use of laser light pulses to pattern a sensitized activating layer in a selective metallization process. *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; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art.”).

Appellants also contend that the teachings of Halliwell and De Bakker are so divergent that a person of ordinary skill in the art would have no reason to combine their teachings. Both Halliwell and De Bakker are directed to activation of a surface such that the surface may be plated with a metal in an electroless process. That Halliwell further describes the ability to selectively activate portions of a treated surface fails to provide a basis for suggesting that Halliwell and De Bakker are divergent in their “teachings.”

Conclusion

The decision of the examiner to reject claims 5-9 and 20-23 under 35 U.S.C. § 103(a) as unpatentable over Halliwell in view of De Bakker is Affirmed. The rejection of claims 2-4 and 12-18

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under 35 U.S.C. § 103(a) as unpatentable over Halliwell in view of De Bakker 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

FRED E. McKELVEY)	
Administrative Patent Judge)	
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CHUNG K. PAK)	APPEALS
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