

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

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opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 24

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte FRANCIS M. HOULIHAN

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Appeal No. 1995-1539  
Application No. 07/950,388<sup>1</sup>

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HEARD: November 10, 1997

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Before KIMLIN, PAK and WARREN, Administrative Patent Judges.  
PAK, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on an appeal from the examiner's refusal to allow claims 1, 2, 4 and 5, which are all of the claims pending in the application. Claim 3 stands withdrawn from consideration by the examiner as being directed to a non-elected invention.

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<sup>1</sup> Application for patent filed September 23, 1992.

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According to appellant (Brief, page 3),

claims 1 and 2 rise or fall together.  
However, claims 3 and 5 [sic, 4 and 5] have  
additional limitations which even more  
clearly demonstrate patentability over the  
cited art.

Appellant, however, has supplied no substantive arguments for  
the separate patentability of claim 4. See Brief, Applicant's  
Response to the Examiner's Answer (Reply Brief), and  
Supplemental Reply Brief in their entirety. Therefore, for  
purposes of this appeal, we will limit our discussion to  
claims 1 and 5 which are reproduced below:

1. A process for making a composition of matter, said  
process comprising the steps of chemically reacting  
substituted 4-hydroxystyrene to form said composition  
characterized in that said substituted 4-hydroxystyrene is  
made by treating a protected phenol with a base and  
interaction in the presence of base of the resulting  
deprotected phenol with a reagent comprising a member of the  
group consisting of an acid halide, a halogen substituted  
alkyl, a dicarbonate, and an acid anhydride wherein said  
substituted 4-hydroxystyrene undergoes said chemical reaction  
without previous distillation.

5. The process of claim 1 wherein said acid chloride  
comprises a compound of the formula  $X - SO_2R'''$  where X is a  
halogen and R''' is aryl or alkyl.

As evidence of unpatentability of the claimed subject  
matter, the examiner relies on the following prior art:

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Nader et al.(Nader)  
1992

5,082,965

Jan. 21,

(filed Oct. 29, 1990)

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Kvakovszky et al. (Kvakovszky) 0,486 267 A1 May 20, 1992  
(Published European Patent Application)

Pine et al. (Pine), Organic Chemistry, Fourth Ed., McGraw-Hill  
Book Company, pp. 314-322 and 712-715 (1980).

Appellant's admission regarding utility of substituted styrene  
monomers at pages 1 and 2 of the specification (admitted prior  
art).

The appealed claims stand rejected as follows:

- (1) Claims 1, 2, 4 and 5 under 35 U.S.C. § 112, second  
paragraph, as indefinite for failing to particularly point out  
and distinctly claim the subject matter which appellant  
regards as the invention (Answer, page 3, together with the  
Office action dated Feb. 1, 1993, page 3);
- (2) Claims 1, 2 and 4 under 35 U.S.C. § 102 as anticipated by  
the disclosure of Nader (first Supplemental Answer, page 2);
- (3) Claims 1 and 4 under 35 U.S.C. § 102 as anticipated by  
the disclosure of Kvakovszky (first Supplemental Answer, page  
3);
- (4) Claim 5 under 35 U.S.C. § 103 as unpatentable over the  
combined disclosures of Nader, Kvakovszky, Pine and the  
admitted prior art (first Supplemental Answer, page 3); and
- (5) Claims 1, 2, 4 and 5 under 35 U.S.C. § 103 as  
unpatentable over the combined teachings of Pine and the

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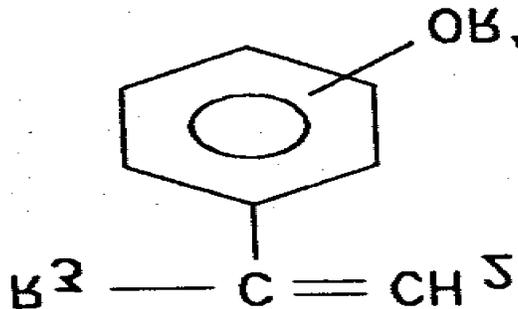
admitted prior art (Answer, page 4, together with the Office action dated Feb. 1, 1993, page 4).

In reaching our decision in this appeal, we have reviewed the specification, claims and applied prior art, including all of the arguments advanced by both the examiner and appellant in support of their respective positions. As a result of this review, we make the determinations which follow.

We begin our consideration of the issues before us by determining the scope of the claimed subject matter. ***Gechter v. Davidson***, 116 F.3d 1454, 1457, 43 USPQ2d 1030, 1032 (Fed. Cir. 1997); ***In re Paulsen***, 30 F.3d 1475, 1479, 31 USPQ2d 1671, 1674 (Fed. Cir. 1994). We give words in the claims the broadest reasonable interpretation in light of the specification. ***In re Morris***, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997). When there is an apparent intent in the specification to utilize those words in a more limited sense, we give them such meaning. ***See, e.g., Vitronics Corp. v. Conceptor, Inc.***, 90 F.3d 1576, 1582, 39 USPQ2d 1573, 1576 (Fed. Cir. 1996); ***Paulsen***, 30 F.3d at 1480, 31 USPQ2d at 1674.

The claimed subject matter is directed to "[a] process for making a composition of matter". See claim 1. The process comprises reacting a protected phenol with a base to form a deprotected phenol (corresponding phenolate, e.g., 4-hydroxy styrene); reacting the resulting deprotected phenol with a reagent in the presence of the base to form a

substituted  
hydroxystyrene  
chemically  
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hydroxystyrene  
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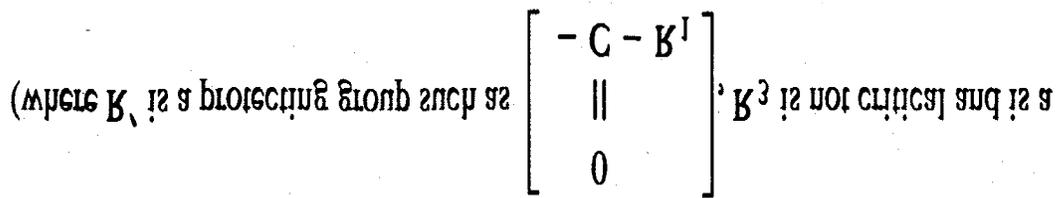


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distillation, to form a desired composition of matter. See specification, pages 2-3, together with claim 1. The protected phenol is defined as follows (specification, page 2, line 31 to page 3, line 3):

The reagent employed comprises an acid halide, a halogen substituted alkyl, a dicarbonate or an acid anhydride. See claim 1. The substituted 4-hydroxy styrene produced is

atoms) with an aqueous base to remove the protecting group followed, without priority such as lower alkyl, and R<sup>1</sup> is hydrogen or a lower alkyl, e.g., 1 to 2 carbon



e of the reagent employed. *Id.* Note, however, that the claimed process does not preclude the presence of additional

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ingredients or steps. **See *In re Baxter***, 656 F.2d 679, 686, 210 USPQ 795, 802 (CCPA 1981) (the term "comprising" permits inclusion of additional ingredients or steps which are not recited in a claim). According to appellant (specification, page 2, lines 26-28), the substituted 4-hydroxystyrene produced in the claimed process is "of sufficient purity that distillation is not required for **most** applications (emphasis ours)."

We turn first to the rejection of claims 1, 2, 4 and 5 under 35 U.S.C. § 112, second paragraph. The purpose of the second paragraph of Section 112 is to basically insure, with a **reasonable** degree of particularity, an **adequate** notification of the metes and bounds of what is being claimed. **See *In re Hammack***, 427 F.2d 1378, 1382, 166 USPQ 204, 208 (CCPA 1970). According to ***In re Moore***, 439 F.2d 1232, 1235, 169 USPQ 236, 238 (CCPA 1971), the determination of whether the claims of an application satisfy the requirements of the second paragraph of Section 112 is

merely to determine whether the claims do, in fact, set out and circumscribe a particular area with a **reasonable** degree of precision and particularity. It is here where the definiteness of language

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employed must be analyzed -- not in a vacuum, but always in light of the teachings of the prior art and of the particular application disclosure as it would be interpreted by one possessing the ordinary level of skill in the pertinent art. [Emphasis ours; footnote omitted.]

Applying these precedents to the expressions criticized by the examiner, we are convinced that claims 1, 2, 4 and 5 are not indefinite.

The examiner, for example, criticizes the use of the expression "composition of matter" in claim 1. See Answer, pages 4-6. However, it is clear to us that the claimed "composition of matter" refers to those products resulting from the claimed process steps. Although the terminology is very broad, breadth is not indefiniteness. *In re Miller*, 441 F.2d 689, 693, 169 USPQ 597, 600 (1971).

The examiner also criticizes the claim language as convoluted and hard to understand. See Answer, page 5. The examiner, however, does not specify any particular claim language or phrases as being indefinite. Nor does the record indicate that the examiner has considered claim language in light of "the teachings of the prior art and of the application disclosure".

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Under this circumstance, it cannot be said that the examiner has demonstrated that the claim language involved is considered indefinite. Accordingly, we reverse this ground of rejection. We turn next to the § 102 rejections. The examiner has rejected claims 1, 2 and 4 as anticipated by the disclosure of Nader and claims 1 and 4 as anticipated by the disclosure of Kvakovszky. "Under 35 U.S.C. § 102, every limitation of a claim must identically appear in a single reference for it to anticipate the claim." [citation omitted]. **Gecter v. Davidson**, 116 F.3d at 1457, 43 USPQ2d at 1032.

The Nader reference discloses reacting an acyloxystyrene (protected phenol) with a strong base at a low temperature to the corresponding phenolate (deprotected phenol). See column 2, lines 63-65, in conjunction with column 3, lines 11-15. Suitable acyloxystyrenes (protected phenol) can "have from 1 to 4 carbon atoms in the acyl group." See column 2, lines 66-68. "Other substituents which do not interfere with the process of the invention can [also] be present on the styrene ring." See column 2, line 68 to column 3, line 2. The preferred acyloxystyrene, however, is 4-acetoxystyrene. See

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column 3, lines 2-3. To the resulting reaction mixture containing the phenolate (deprotected phenol) formed from 4-acetoxystyrene and a base, a phase transfer catalyst and an alkoxy-carbonylation agent in a solvent are added. See column 3, lines 19-22. "The reaction of the phenolate formed in situ with the alkoxy-carbonylation agent is conducted at a temperature of 110°C to about 30°C . . . ." See column 3, lines 45-48 and column 2, lines 37-40. The preferred alkoxy-carbonylation agent employed is di-*t*-butyldicarbonate (a dicarbonate). See column 3, line 32. Once the desired alkoxy-carbonyloxystyrene (substituted 4-hydroxystyrene) is formed, "additional organic solvent is added to aid in easy separation of the organic phase [from the aqueous phase]." See column 3, lines 53-57 and 63-68. The desired alkoxy-carbonyloxystyrene may be subsequently "isolated using conventional known techniques, such as distillation." See column 3, lines 58-61. If desired, however, the desired alkoxy-carbonyloxystyrene is derivatized directly (chemically reacted directly) "in the organic phase after separation

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without isolation or purification." See column 3, line 68 to column 4, line 2.

The Kvakovszky reference, like the Nader reference, discloses reacting 4-acetoxystyrene (protected phenol) with a base in a solvent to form the salt of 4-hydroxystyrene (deprotected phenol) and then subsequently or simultaneously reacting the salt of 4-hydroxystyrene with di-tertiary-butyl-dicarbonate (a dicarbonate) in situ (in the presence of both the base and 4-acetoxystyrene). See abstract, together with page 2, lines 41-49. According to Kvakovszky, it is important to not isolate the 4-hydroxystyrene prior to reacting it with di-tertiary-butyl-dicarbonate. See page 6, lines 16-17. The organic phase containing 84% yield of 4-tertiary-butoxycarbonyloxystyrene (substituted 4-hydroxystyrene) is recovered. See example 3 at page 7. Alternatively, 84% yield of 4-tertiary-butoxycarbonyloxystyrene is recovered after distillation. See example 4 at page 7. The recovered 4-tertiarybutoxycarbonyloxystyrene is polymerized (chemically reacted) to form a photoresist material. See page 2, lines 28-29.

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Appellant argues that both Nader and Kvakovszky do not teach one of ordinary skill in the art to avoid distilling 4-tertiary-butoxycarbonyloxystyrene (a substituted 4-hydroxystyrene) prior to a subsequent chemical reaction. According to appellant, both Nader and Kvakovszky are directed to forming a photoresist material which cannot tolerate the presence of alkali metal impurities. Appellant then refers to his own statement at page 4, lines 26-28, of the specification which states:

Although bases within this range will promote the reaction, bases such as sodium hydroxide having metal moieties should typically be avoided for electronic applications where contaminants such as sodium are quite undesirable.

Appellant goes on to conclude that the need to remove alkali metal impurities would have led one of ordinary skill in the art to employ distillation prior to a subsequent chemical reaction. We do not agree.

As indicated *supra*, we observe that the Nader reference specifically teaches derivatizing (chemically reacting) directly a substituted 4-hydroxystyrene in the organic phase without isolation (distillation) or purification. Appellant's

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argument simply fails to take into account this clear teaching on the part of the Nader reference.

As also indicated *supra*, we observe that the Kvakovszky reference does not require distillation prior to polymerization. Accordingly, we read the Kvakovszky reference to teach polymerization of the resulting substituted 4-hydroxystyrene, without distillation. This reading is especially appropriate since the Kvakovszky reference describes forming a product containing the same level (84%) of a substituted 4-hydroxy-styrene, with or without distillation. Compare examples 3 and 4. Appellant has not demonstrated by objective evidence that the exemplified organic phase having a substituted 4-hydroxystyrene (example 3) in the Kvakovszky reference contains alkali metal impurities. Nor has appellant demonstrated by objective evidence that the amount of alkali metal impurities in the above-mentioned organic phase is detrimental to forming a photoresist material.

On this record, we agree with the examiner that the claimed subject matter as a whole is anticipated by the disclosure of Nader or Kvakovszky. Thus, we affirm the

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examiner's decision rejecting claims 1, 2 and 4 under 35  
U.S.C. § 102.<sup>2</sup>

We turn next to the § 103 rejection of claim 5 over the combined disclosures of Nader, Kvakovszky, Pine and the admitted prior art. At issue is what the combined teachings of the references would have suggested to those of ordinary skill in the art. *In re Young*, 927 F.2d 588, 591, 18 USPQ2d 1089, 1091 (Fed. Cir. 1991); *In re Keller*, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981). The examiner concludes that it would have been obvious to employ the claimed sulfonating reagent for the alkoxycarbonylation agent in the process described in, for example, Nader or Kvakovszky. Supplemental Answer, page 3. In support of this conclusion, the examiner finds (Supplemental Answer, pages 3 and 4) that

said sulfonating reagent is notoriously  
well known to the prior art and one of ordinary  
skill in the art would expect that said reagent

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<sup>2</sup> In the event of further prosecution, the examiner is to determine whether the appealed claims embrace an admittedly known process of making a composition of matter comprising chemically reacting a class of known compounds, substituted 4-hydroxystyrenes, with an unspecified reactant, or by itself, since the claim language, which recites how the substituted 4-hydroxystyrene is prepared, is in product-by-process format.

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would react in a conventional manner with a 4-hydroxy styrene salt generated in situ... that sulfonated esters of 4-hydroxy esters of 4-hydroxystyrene would have the same or similar utility as the alkoxycarbonyloxystyrene [sic, alkoxycarbonyloxystyrene] (e.g., utility as monomers used in the manufacture of polymers).

Appellant does not dispute the above findings and conclusion.

Appellant only argues that the above prior art references do not teach, nor would have suggested, chemically reacting a substituted 4-hydroxystyrene without previous distillation.

However, we are not persuaded by this argument for the reasons indicated *supra*. Accordingly, we affirm the examiner's decision

rejecting claim 5 under 35 U.S.C. § 103 over the combined disclosures of Nader, Kvakovszky, Pine and the admitted prior art.

We turn next to the § 103 rejection of claims 1, 2, 4 and 5 over the combined disclosures of Pine and the admitted prior art. The Pine reference does not disclose the claimed starting (protected phenol) material. Nor does the Pine reference disclose converting the claimed intermediate (deprotected phenol) materials in the presence of both base

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and the claimed reagent to form the claimed substituted 4-hydroxystyrene. The admitted prior art relied upon by the examiner does not remedy any of the above deficiencies since it is relied on to show only a known utility of substituted styrene monomers. The examiner also has not supplied sufficient evidence to demonstrate that the claimed starting and intermediate materials, which are structurally different from those described in the Pine reference, would have behaved in the same or similar manner in the presence of a base and a reagent as those in the Pine reference. Under this circumstance, we do not believe that the prior art relied upon by the examiner renders the claimed subject matter *prima facie* obvious to one of ordinary skill in the art. Accordingly, we reverse the examiner's decision rejecting claims 1, 2, 4 and 5 under 35 U.S.C. § 103 over the combined disclosures of Pine and the admitted prior art.

In summary:

- (1) The § 112 rejection of claims 1, 2, 4 and 5 is not sustained;
- (2) The § 102 rejection of claims 1, 2 and 4 over Nader is sustained;

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(3) The § 102 rejection of claims 1 and 4 over Kvakovszky is sustained;

(4) The § 103 rejection of claim 5 over the combined disclosures of Nader, Kvakovszky, Pine and the admitted prior art is sustained; and

(5) The § 103 rejection of claims 1, 2, 4 and 5 over the combined disclosures of Pine and the admitted prior art is not sustained.

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Accordingly, the decision of the examiner is affirmed.

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

AFFIRMED

EDWARD C. KIMLIN	)	
Administrative Patent Judge	)	
	)	
	)	
	)	
	)	BOARD OF PATENT
CHUNG K. PAK	)	APPEALS
Administrative Patent Judge	)	AND
	)	INTERFERENCES
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CHARLES F. WARREN	)	
Administrative Patent Judge	)	

jrg

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