

# United States Court of Appeals for the Federal Circuit

01-1001

RHEOX, INC.,

Plaintiff-Appellant,

v.

ENTACT, INC.,

Defendant/Third Party Plaintiff-Appellee,

v.

RMT, INC. and AMERICAN MINERALS, INC.,

Third Party Defendants.

Philip S. Beck, Bartlit Beck Herman Palenchar & Scott, of Chicago, Illinois, argued for plaintiff-appellant. With him on the brief were Mark L. Levine and Andre' M. Pauka.

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Appealed from: United States District Court for the District of New Jersey

Judge Mary L. Cooper

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DECIDED: January 8, 2001

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Before SCHALL, GAJARSA, and LINN, Circuit Judges.

GAJARSA, Circuit Judge.

Appellant, Rheox, Inc. (“Rheox”), the plaintiff in this patent infringement case, appeals from the district court’s grant of summary judgment for the appellees, Entact, Inc. (“Entact”). We affirm the district court’s grant of summary judgment of non-infringement because we conclude that Rheox is precluded from asserting that the claim term “calcium orthophosphate” covers monocalcium orthophosphate and triple superphosphate.

BACKGROUND

Rheox is the assignee of U.S. Patent No. 5,162,600 (“the ’600 patent”). The ’600 patent is directed to an inexpensive method of remediating lead from lead-contaminated soil by application of a composition primarily comprising “calcium orthophosphate.” Claim construction of the term “calcium orthophosphate” is the textual determinative issue in this case. Rheox asserts that the district court incorrectly construed the claim term “calcium orthophosphate” to be limited to tricalcium orthophosphate ( $\text{Ca}_3(\text{PO}_4)_2$ ) and improperly determined that Rheox disclaimed monocalcium orthophosphate ( $\text{Ca}(\text{H}_2\text{PO}_4)_2\text{H}_2\text{O}$ ) and triple superphosphate (“TSP”) (which the parties agree consists mostly of monocalcium orthophosphate,  $\text{Ca}(\text{H}_2\text{PO}_4)_2\text{H}_2\text{O}$ ) from the scope of its claims.

A phosphate is a chemical compound that contains phosphorous (P) and oxygen (O). An orthophosphate contains a  $\text{PO}_4^{3-}$  anion.<sup>1</sup> The parties agree and the district court recognized that the terms “phosphate” and “orthophosphate” are used interchangeably in the art. Although in dispute, it seems clear that a person of ordinary skill in the relevant art would recognize that “calcium orthophosphate” generally refers to a family of compounds, each of which contains a calcium cation,<sup>2</sup>  $\text{Ca}^{2+}$ , and a phosphate anion,  $\text{PO}_4^{3-}$ . Under this definition, there are multiple calcium orthophosphates, including monocalcium orthophosphate and tricalcium orthophosphate.

On December 28, 1990, Rheox filed a patent application which eventually issued as the ’600 patent. The application as originally filed contained eighteen claims, some using calcium orthophosphate as the primary treating agent, and others using monocalcium orthophosphate and TSP fertilizer. The relevant claims as originally filed with the Patent and Trademark Office (“PTO”) provided:

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<sup>1</sup> The word “anion” represents that it carries a negative charge.

<sup>2</sup> The word “cation” represents that it carries a positive charge.

1. A method of treating lead contaminated soil to reduce the amount of mobile lead contained in said soil, the method which comprises:
  - (a) providing an agent selected from the group consisting of calcium, zinc, magnesium or ammonium phosphate compounds, calcium, zinc, magnesium or ammonium phosphite compounds and mixtures thereof; and
  - (b) contacting said agent with said soil to react said agent with mobile lead contained in the soil and form immobilized, water-insoluble lead compounds.
1. The method of claim 1, wherein said agent comprises a calcium phosphate fertilizer selected from the group consisting of triple superphosphate [TSP] and superphosphate.
2. The method of claim 1, wherein said calcium, magnesium, zinc or ammonium phosphate compounds are selected from the group consisting of calcium orthophosphate, . . . dicalcium orthophosphate, . . . monocalcium orthophosphate, . . . tricalcium diorthophosphate. . . .
3. A method of treating lead contaminated soil to reduce the amount of mobile lead contained in said soil, the method which comprises:
  - (a) providing an agent selected from the group consisting of triple superphosphate [TSP], phosphate rock, hydroxyapatite and mixtures thereof; . . . .

(emphasis added).

The written description of the '600 patent does not explicitly define calcium orthophosphate. In both the summary of the invention and in the detailed description of the invention, however, the '600 patent provides that TSP is one of the preferred agents for use in the patented invention.

In the first office action the PTO rejected all eighteen claims. The PTO first indicated that fertilizers (TSP is a fertilizer) are well known in the art and it would have been obvious to one of ordinary skill to treat lead-contaminated soil with fertilizer. The PTO then

rejected the claims as obvious over U.S. Patent No. 4,737,356 (“the O’Hara patent”),<sup>3</sup> which explains the use of phosphate to fix lead in particulate solids.

Following Rheox’s submission of a supplemental Information Disclosure Statement, the PTO issued a final office action rejecting each of Rheox’s 18 claims. The examiner explained that O’Hara taught use of water-soluble phosphate treatment agents. In the final rejection, the examiner stated:

It is also well known to one of ordinary skill in the art that monocalcium phosphate is water soluble and is routinely available as . . . [TSP] . . . . The selection of water soluble phosphates such as monocalcium phosphate . . . readily available as super phosphate and [TSP] and sold in bulk quantities as fertilizers as water soluble phosphate for use in the process of O’Hara et al would be obvious to one of ordinary skill in the art.

After the final office action issued, Rheox’s attorneys met with the examiner for an interview. The examiner’s interview summary provides: “[Rheox’s] [a]ttorney urge [sic] difference based on the use of slightly soluble phosphates versus the soluble phosphates of O’Hara. . . . Solubility data of instant compound and compounds of O’Hara to be provided.”

Rheox filed a response amending claim 1 by replacing the reference to calcium phosphate and other types of compounds with “consisting essentially of calcium orthophosphate.” In its response, Rheox also cancelled claim 2, which explicitly recited TSP, and cancelled claim 3, which explicitly recited monocalcium orthophosphate and tricalcium diorthophosphate.<sup>4</sup> Also, in original claim 18, which is claim 8 of the ’600 patent, Rheox removed the reference to “triple superphosphate [TSP].”

Rheox indicated that it made these cancellations and amendments to “distinguish the invention from the water-soluble compounds and method of treatment taught by O’Hara

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<sup>3</sup> In its first Information Disclosure Statement, Rheox had cited the O’Hara patent.

et al.” O’Hara defines a water-soluble phosphate as a phosphate soluble in water at about 20°C at least to the extent of five weight-volume percent, i.e., 5g/100mL water. Rheox explained that “a central difference between the invention and the prior art is that the presently claimed compound (calcium orthophosphate) is substantially water-insoluble, whereas the compounds utilized in the prior art processes are highly water-soluble.” To support this contention, Rheox provided the solubility of the claimed compound, “calcium orthophosphate,” as 0.002g/100mL water. Notably, the solubility of tricalcium orthophosphate is 0.002g/100mL water. The solubility of TSP is 1.8g/100mL water. Rheox also asserted that the water-soluble phosphates discussed by O’Hara “are believed to be thousands of times more water-soluble than Applicants’ preferred (and presently claimed) calcium orthophosphate material.” In the prosecution history, Rheox further referred to “calcium orthophosphate” with the chemical formula  $\text{Ca}_3(\text{PO}_4)_2$ , which is the chemical formula of tricalcium orthophosphate.<sup>5</sup> Rheox told the examiner that the amendments and cancellations were made “to clarify the invention, and to advance the patentability of the present application.” The examiner allowed the application to issue on November 10, 1992. The allowed final version of Claim 1 of the ’600 patent covers:

1. A method of treating lead contaminated soil to reduce the amount of mobile lead contained in said soil, the method which comprises:
  - (a) providing an agent consisting essentially of calcium orthophosphate;
  - (b) contacting said agent with said soil to react said agent with mobile lead contained in the soil and form immobilized, water-insoluble lead compounds.

’600 patent, col. 7, l. 41 to col. 8, l. 2.

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<sup>4</sup> Rheox states and Entact does not dispute that tricalcium diorthophosphate is the same compound as tricalcium orthophosphate for purposes of this case.

<sup>5</sup> In its response to the final office action, Rheox stated that “O’Hara et al. indicate that calcium orthophosphate,  $\text{Ca}_3(\text{PO}_4)_2$ , is inoperative for immobilizing lead and cadmium.” (emphasis in original).

Rheox filed suit against Entact, alleging that Entact infringed at least claim 1 of the '600 patent by using TSP fertilizer to remediate lead-contaminated soil. It is undisputed that TSP is primarily monocalcium orthophosphate. In fact, the parties agree that if the claimed term "calcium orthophosphate" does not include "monocalcium orthophosphate" then Entact does not infringe the '600 patent. Entact filed counterclaims of invalidity, unenforceability, and antitrust violations. Entact also filed third party indemnification claims against RMT, Inc.

Entact filed a motion for summary judgment based on non-infringement of the '600 patent. After reviewing the prosecution history and construing the disputed limitations of the claim, the district court granted Entact's motion for summary judgment. Rheox, Inc. v. Entact, Inc., No. 98-3731, slip. op. at 28 (D.N.J. Aug. 17, 2000) (memorandum and order granting summary judgment).

The court began by recognizing Rheox's allegation that the ordinary meaning of calcium orthophosphate is a family of compounds containing a "Ca<sup>2+</sup>" cation and a "PO<sub>4</sub><sup>3-</sup>" anion, including monocalcium orthophosphate (and thus TSP), dicalcium orthophosphate, tricalcium orthophosphate, and hydroxyapatite. Id. at 13. The court stated that had the only evidence concerning the meaning of calcium orthophosphate in the '600 patent come from treatises and dictionaries, a deluge of which the parties cited, it would have likely denied Entact's motion for summary judgment. Id. at 15.

The district court then considered the prosecution history and determined that Rheox excluded monocalcium orthophosphate and consequently TSP from the definition of calcium orthophosphate in claim 1 of the '600 patent. Id. The court recognized that Rheox deleted all references in the claims to TSP and monocalcium orthophosphate after the examiner rejected claims to these compounds. Id. at 16. The court cited the second (final) office action where the examiner indicated that monocalcium orthophosphate, which is

routinely available as TSP, is well known in the art as water-soluble and would have been obvious to use in the O'Hara process. Id. The court noted that Rheox responded by canceling original claim 2, which had identified an agent comprising a calcium phosphate fertilizer selected from a group including TSP. Id. at 17. Rheox also amended original claim 18 to delete the reference to TSP. Rheox stated that these changes were accomplished to distinguish the water-soluble compounds and method of treatment taught by O'Hara as well as to clarify the invention and advance the "patentability" of its application. Consequently, the court determined that "[t]he simple chronology of the prosecution history supports a conclusion that Rheox narrowed its claims to exclude TSP so that the patent application would be approved." Id.

The court rejected Rheox's argument that excluding TSP from the construction of calcium orthophosphate reads out the '600 patent's preferred embodiment—TSP. Id. at 24-25. The court determined that the prosecution history revealed that the claims were narrowed to exclude TSP and therefore inconsistencies in the written description were not controlling. Id. Examining the prosecution history, the court further determined that the term "calcium orthophosphate" refers only to tricalcium orthophosphate. Id. at 24.

In sum, the district court found that Entact's use of TSP does not infringe the '600 patent because "calcium orthophosphate" in claim 1 does not include monocalcium orthophosphate or TSP. It then found the claim term "calcium orthophosphate" limited to tricalcium orthophosphate. Accordingly, the court granted Entact's motion for summary judgment of non-infringement. On October 23, 2000, the court entered final judgment pursuant to Federal Rule of Civil Procedure 54(b) on the issue of non-infringement, noting that outstanding counterclaims and third-party claims remained. Rheox, Inc. v. Entact, Inc., No. 98-3731 (D.N.J. Oct. 23, 2000) (order granting partial final judgment). Rheox filed a

timely appeal with this court. We have jurisdiction pursuant to 28 U.S.C. § 1295(a)(1) (1994).

#### STANDARD OF REVIEW

Our review of the grant of summary judgment is de novo. Gen. Mills, Inc. v. Hunt-Wesson, Inc., 103 F.3d 978, 980, 41 USPQ2d 1440, 1441 (Fed. Cir. 1997). Summary judgment is only appropriate when the moving party has shown that “there is no genuine issue as to any material fact and that the moving party is entitled to a judgment as a matter of law.” Celotex Corp. v. Catrett, 477 U.S. 317, 322-23 (1986). Furthermore, in a patent litigation action, “[w]here the parties do not dispute any relevant facts regarding the accused product . . . but disagree over possible claim interpretations, the question of literal infringement collapses into claim construction and is amenable to summary judgment.” Gen. Mills, 103 F.3d at 983, 41 USPQ2d at 1444 (citations omitted). Claim construction is a matter of law, Markman v. Westview Instruments, Inc., 52 F.3d 967, 979, 34 USPQ2d 1321, 1329 (Fed. Cir. 1995) (en banc), aff’d, 517 U.S. 370 (1996), that we review de novo. Cybor Corp. v. FAS Techs., Inc., 138 F.3d 1448, 1456, 46 USPQ2d 1169, 1174 (Fed. Cir. 1998) (en banc).

#### ANALYSIS

Although the district court found that the term “calcium orthophosphate” as used in claim 1 of the ‘600 patent is limited to tricalcium orthophosphate, that determination is not necessary to resolve this case. We need only determine whether the term “calcium orthophosphate” in claim 1 of the ‘600 patent covers monocalcium orthophosphate or TSP. In regard to this limited question, we find that the term does not because those compounds were disclaimed during the prosecution of the patent application. We do not find it necessary to determine whether the term “calcium orthophosphate” is limited to tricalcium orthophosphate.

Arguments and amendments made during prosecution of a patent application must be examined to determine the meaning of terms in the claims. Southwall Techs., Inc. v. Cardinal IG Co., 54 F.3d 1570, 1576, 34 USPQ2d 1673, 1676 (Fed. Cir. 1995). “The prosecution history limits the interpretation of claim terms so as to exclude any interpretation that was disclaimed during prosecution.” Id., 34 USPQ2d at 1676-77 (citations omitted); see also Spectrum Int’l, Inc. v. Sterilite Corp., 164 F.3d 1372, 1378, 49 USPQ2d 1065, 1068-69 (Fed. Cir. 1998) (“[E]xplicit statements made by a patent applicant during prosecution to distinguish a claimed invention over prior art may serve to narrow the scope of the claim.”); Standard Oil Co. v. Am. Cyanamid Co., 774 F.2d 448, 452, 227 USPQ 293, 296 (Fed. Cir. 1985) (“[T]he prosecution history . . . limits the interpretation of claims so as to exclude any interpretation that may have been disclaimed or disavowed during prosecution in order to obtain claim allowance.”). Explicit arguments made during prosecution to overcome prior art can lead to narrow claim interpretations because “[t]he public has a right to rely on such definitive statements made during prosecution.” Digital Biometrics, Inc. v. Identix, Inc., 149 F.3d 1335, 1347, 47 USPQ2d 1418, 1427 (Fed. Cir. 1998).

Rheox stresses that the ordinary and accustomed meaning of “calcium orthophosphate” to one of ordinary skill in the art is a family of compounds containing a  $\text{Ca}^{2+}$  cation and a  $\text{PO}_4^{3-}$  anion, and that claim language should not be interpreted differently from its ordinary and accustomed meaning based on prosecution history unless it contains a clear disavowal of that meaning. Rheox asserts that there was no clear disavowal of TSP in the '600 patent's prosecution history. It contends that a fair reading of the prosecution history is that Rheox intended to cover all of the compounds in the family of calcium orthophosphates, all of which fall substantially below the 5.0g/100mL solubility benchmark set by O'Hara. TSP is substantially water-insoluble under this definition at

1.8g/100mL water. Entact emphasizes and the district court recognized that there is no evidence that Rheox ever made an argument to the examiner that any compound under the 5.0g/100mL water-solubility mark referred to in O'Hara is not water-soluble. The examiner did not limit the final rejection to phosphates that cleared the alleged O'Hara 5.0g/100mL water-solubility limit. To the contrary, the examiner explicitly identified monocalcium orthophosphate and TSP as prior art water-soluble phosphates and stated that it would have been obvious to one of ordinary skill in the art to select such phosphates for use in the O'Hara process.

Entact argues that the relevant inquiry to see if the prosecution history limits the interpretation of a claim is whether a competitor would reasonably believe that the applicant had surrendered the relevant subject matter. Cybor Corp. v. FAS Techs., Inc., 138 F.3d 1448, 1457, 46 USPQ2d 1169, 1175 (Fed. Cir. 1998) (en banc). Entact further argues that Rheox overcame the O'Hara obviousness rejection by canceling and amending its claims to delete all references to monocalcium orthophosphate and TSP and then arguing to the examiner that its amended claims should be allowed because its "presently claimed compound (calcium orthophosphate) is substantially water-insoluble." According to Entact, the prosecution history conclusively shows that Rheox disclaimed and disavowed monocalcium orthophosphate and consequently TSP in order to achieve patentability.

We assess whether a patentee relinquished a particular claim construction based on the totality of the prosecution history, which includes amendments to claims and arguments made to overcome or distinguish references. Elkay Mfg. Co. v. Ebco Mfg. Co., 192 F.3d 973, 979, 52 USPQ2d 1109, 1113 (Fed. Cir. 1999) ("Because it is the totality of the prosecution history that must be assessed, not the individual segments of the presentation made to the Patent and Trademark Office by the applicant, it is irrelevant

whether Elkay relinquished this potential claim construction in an amendment to the claim or in an argument to overcome or distinguish a reference.”).

As originally filed, claim 2 of the '600 patent was specifically directed to TSP, and claim 18 was directed to a group that included TSP, phosphate rock, and hydroxyapatite. After an initial and final rejection and an interview with the examiner, Rheox cancelled claim 2, which was explicitly directed to TSP. With painstaking surgical precision, Rheox also deleted the single reference to TSP in claim 18.<sup>6</sup> Rheox stated that it made the changes to “distinguish the invention from the water-soluble compounds and method of treatment taught by O’Hara.” It continued: “[A] central difference between the invention and the prior art is that the presently claimed compound (calcium orthophosphate) is substantially water-insoluble, whereas the compounds utilized in the prior art processes are highly water-soluble.” It then stated that “[i]n this regard, Applicants point out that the solubility of calcium orthophosphate is 0.002 g/100 [mL] [water].” Rheox finally stated that the “water-soluble phosphates disclosed by O’Hara et al. are believed to be thousands of times more water-soluble than Applicants’ preferred (and presently claimed) calcium orthophosphate material.”

We cannot agree that Rheox only disclaimed coverage of compounds with solubility over 5.0g/100mL, but still retained coverage of TSP or monocalcium orthophosphate. Rheox tried to claim TSP, but had to delete all reference to it to gain patentability. The deletion of only two words: “triple superphosphate [TSP]” from original claim 18, now claim 8, is telling. If Rheox wanted only to distinguish O’Hara based on 5.0g/100mL solubility, it would not have deleted TSP, one of its preferred embodiments, from the claims. In the final

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<sup>6</sup> Rheox also cancelled claim 3, which was directed to monocalcium orthophosphate and tricalcium diorthophosphate. Entact does not dispute Rheox’s claim that tricalcium diorthophosphate is the same compound as tricalcium orthophosphate.

rejection, the examiner stated that it is well known to one of ordinary skill that monocalcium phosphate is water-soluble and routinely available as TSP. The examiner did not reject the original claims based on a 5.0g/100mL solubility limit. Rather, he indicated that monocalcium orthophosphate and TSP are water-soluble. Therefore, when Rheox distinguished the present invention based on its “water-insolubility,” it was arguing around the examiner’s comments and limiting itself to claims not encompassing monocalcium orthophosphate and TSP. Indeed, it stated that the covered compounds were thousands of times less soluble than the soluble compounds of the O’Hara patent, but TSP, with a solubility of 1.8g/100mL water, is not even three times less soluble than O’Hara’s disclosed solubility of 5.0g/100mL water.

Although we recognize that an interpretation excluding a preferred embodiment “is rarely, if ever, correct and would require highly persuasive evidentiary support” Vitronics Corp. v. Conceptoronic, Inc., 90 F.3d 1576, 1583-84, 39 USPQ2d 1573, 1578, (Fed. Cir. 1996), where the prosecution history requires a claim construction that excludes some but not all of the preferred embodiments, such a construction is permissible and meets the standard of “highly persuasive evidentiary support.” This follows from our precedent that “[t]he prosecution history limits the interpretation of claim terms so as to exclude any interpretation that was disclaimed during prosecution.” Southwall Techs., Inc. v. Cardinal IG Co., 54 F.3d 1570, 1576, 34 USPQ2d 1673, 1676 (Fed. Cir. 1995) (citations omitted).

Rheox also argues that the written description of the ’600 patent precludes a finding that TSP was disclaimed, because it indicates that TSP, which is indisputably primarily monocalcium orthophosphate, is defined by the ’600 patent as “calcium orthophosphate.” Reading the written description alone, this argument might be effective, but in light of the prosecution history, which was generated after the written description was drafted, it is apparent that Rheox relinquished any coverage of TSP. Pall Corp. v. PTI Techs., Inc., 259

F.3d 1383, 1392, 59 USPQ2d 1763, 1769 (Fed. Cir. 2001), petition for cert. filed, 70 U.S.L.W. 3341 (Nov. 5, 2001) (“Even where the ordinary meaning of the claim is clear, it is well-established that “[t]he prosecution history limits the interpretation of claim terms so as to exclude any interpretation that was disclaimed during prosecution.”) (citing Southwall, 54 F.3d at 1576, 34 USPQ2d at 1676).

#### CONCLUSION

In this case, the evidence establishes that Rheox disclaimed monocalcium orthophosphate and TSP in order to obtain patentability. It cannot now submit an interpretation of the claims to cover what was disclaimed. For the foregoing reasons, we affirm the district court’s grant of summary judgment based on Rheox’s disclaimer of TSP and monocalcium orthophosphate, and decline to decide whether the claim term “monocalcium orthophosphate” is necessarily limited to tricalcium orthophosphate.

#### AFFIRMED

#### COSTS

No costs.