

United States Court of Appeals for the Federal Circuit

ORGANIK KIMYA AS,
Appellant

v.

ROHM AND HAAS COMPANY,
Appellee

2015-1983, 2015-2001

Appeals from the United States Patent and Trade-
mark Office, Patent Trial and Appeal Board in Nos.
IPR2014-00185, IPR2014-00350.

Decided: October 11, 2017

JAMES R. BARNEY, Finnegan, Henderson, Farabow,
Garrett & Dunner, LLP, Washington, DC, argued for
appellant. Also represented by CHARLES COLLINS-CHASE,
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represented by JAMES BAKER, FRANK CHARLES CALVOSA,
EVANGELINE SHIH; PHILIP CHARLES STERNHELL, Washing-
ton, DC.

Before PROST, *Chief Judge*, NEWMAN and TARANTO,
Circuit Judges.

NEWMAN, *Circuit Judge*.

Organik Kimya AS (“Organik”) appeals the decisions of the Patent Trial and Appeal Board (“PTAB” or “Board”) in two related inter partes review (“IPR”) proceedings for which Organik is the Petitioner. The Patent Owner is the Rohm and Haas Company. The PTAB sustained the patentability of claims 1–5 of U.S. Patent No. 6,020,435 (“the ’435 Patent”), and claims 1–7 of its division, U.S. Patent No. 6,252,004 (“the ’004 Patent”).¹ On appellate review, we affirm the PTAB’s decisions.

BACKGROUND

The ’435 Patent and the ’004 Patent are directed to processes for preparing certain emulsion polymers having improved opacity. These polymers are described as used in opaque coatings such as paints, coatings, inks, and other products benefitting from opacity. ’435 Patent, col. 1, ll. 21–25.² These products provide opacity by absorbing and scattering light, a property produced by voids (hollows) within the polymer particles.

Hollow emulsion polymers were previously known. ’435 Patent, col. 1, ll. 39–45. The patents at issue state that their method of manufacture produces products of improved opacity and low density, based on the “discover[y] that by providing an aqueous emulsion of a multi-

¹ *Organik Kimya AS v. Rohm & Haas Co.*, 2015 WL 3430121 (P.T.A.B. May 27, 2015) (“’435 Pat. Op.”); *Organik Kimya AS v. Rohm & Haas Co.*, 2015 WL 3982308 (P.T.A.B. June 26, 2015) (“’004 Pat. Op.”). The appeals have been consolidated.

² Citations are to the ’435 Patent specification; the ’004 Patent has the identical specification.

stage emulsion polymer, monomer and swelling agent under conditions wherein there is no substantial polymerization of the monomer, we can enhance the extent of swelling of the multistage emulsion polymer.” *Id.* col. 7, ll. 56–60.

In the claimed processes a base swelling agent and excess monomer are introduced into an aqueous emulsion of the polymer, under conditions in which there is no substantial polymerization. *Id.* col. 7, ll. 43–60. The base permeates the outer shell of the polymer particle and neutralizes the acid core, creating a hydrophilic salt in the core. *Id.* col. 9 ll. 10–15. The hydrophilic salt promotes diffusion of water into the core, swelling the polymer particle; when the product is dried the water evaporates, leaving the enlarged hollow core. *Id.* col. 9, ll. 15–33. The patents state that suitable swelling agents include fixed or permanent bases such as potassium hydroxide. *Id.* col. 8, ll. 45–52.

DISCUSSION

Standard of Review

These proceedings were instituted on grounds of anticipation and obviousness. Anticipation is a question of fact; findings of a PTO tribunal are reviewed for support by substantial evidence in the record before the PTO. *Kennametal, Inc. v. Ingersoll Cutting Tool Co.*, 780 F.3d 1376, 1381 (Fed. Cir. 2015). Obviousness is a matter of law and receives plenary review on appeal, with any underlying findings of fact reviewed for support by substantial evidence in the PTO record. *Id.*

In its claim construction, the PTAB relied principally on the intrinsic evidence of the patent specification and the prosecution history, whereby the claim construction receives de novo review on appeal. *Microsoft Corp. v. Proxyconn, Inc.*, 789 F.3d 1292, 1297 (Fed. Cir. 2015). Any PTAB factual findings based on extrinsic evidence,

such as expert testimony and documents not previously of record, are reviewed for support by substantial evidence in the record before the PTO. *Id.*

I

The '435 Patent

The '435 Patent is entitled "Process for Preparing Polymer Core Shell Type Emulsions and Polymers Formed Therefrom." The PTAB instituted review of claims 1–5 on the ground of anticipation by U.S. Patent No. 5,360,827 ("Toda"), and obviousness over U.S. Patent No. 5,077,320 ("Touda"). Claim 1 was deemed representative:

1. A process for preparing emulsion polymer particles comprising:

(a) providing an aqueous emulsion of

(i) multi-stage emulsion polymer, comprising a core stage polymer and a shell stage polymer, wherein the core stage polymer comprises, as polymerized units, from 5 to 100 percent by weight, based on the weight of the core stage polymer, of hydrophilic monoethylenically unsaturated monomer, and from 0 to 95 percent by weight, based on the weight of the core stage polymer, of at least one nonionic monoethylenically unsaturated monomer; and wherein the shell stage polymer comprises, as polymerized units, at least 50 percent by weight of nonionic monoethylenically unsaturated monomer;

- (ii) monomer at a level of at least 0.5 percent by weight based on the weight of the multi-stage emulsion polymer; and
 - (iii) swelling agent under conditions wherein there is no substantial polymerization of the monomer; and
- (b) reducing the level of monomer by at least fifty percent.

The PTAB found that the specification “describes a swelling agent not merely as being capable of permeating a shell and swelling the core of a multistage emulsion polymer in the abstract, but specifically under the conditions of the specific process for which the agent is to be used.” ’435 Pat. Op. at *6. The PTAB then found that the Toda and Touda references provide a general teaching of hollow multistage emulsion polymers, but concluded, as we shall discuss, that the processes here described and claimed are not anticipated by or obvious from the cited references.

For the ’435 Patent, Organik argues that the Board adopted an overly narrow interpretation of the term “swelling agent,” and improperly added a “swelling step” into the claims. Organik also argues that the Board erred in finding that the Toda and Touda references do not disclose a “swelling agent.”

Claim Construction

Each challenged claim of the ’435 Patent requires the addition of a swelling agent as part of the claimed process. The Board construed “swelling agent” as follows:

expressing a structural element, i.e., “an aqueous or gaseous, volatile or fixed base, or combinations thereof,” in functional terms, i.e., “capable of per-

meating the shell and swelling the core, in the presence of the multistage polymer and monomer, under the conditions of the specific process for which the agent is to be used.”

'435 Pat. Op. at *6. Organik states that the Board's construction improperly limited the term “swelling agent” in a manner that inappropriately distinguished the prior art. Organik argues that “the claims-at-issue merely recite providing or adding a ‘swelling agent’ and do not recite a swelling *step*—let alone one that includes the additional limitations imported into the claims by the Board’s construction[.]” Organik Br. 2.

Organik objects to the Board’s inclusion in its definition that the swelling agent operates “under the conditions of the specific process for which the agent is to be used.” Organik asserts that the “swelling agent” requires only the addition of any base, without reference to whether the reaction conditions are suitable for swelling. The Board did not agree with this position, which does not accord with the specification.

The specification describes the swelling agent as a base that permeates the shell and produces swelling by hydration of the hydrophilic core:

The core polymer of the multistage emulsion polymer swells when the core is subjected to a basic swelling agent that permeates the shell to at least partially neutralize the hydrophilic-functionality of the core, preferably to a pH of at least about 6 to at least about 10, and thereby result in swelling by hydration of the hydrophilic core polymer.

'435 Patent, col. 9, ll. 10–15. The specification describes the factors that affect these chemical process steps, including monomer concentration, base concentration, and temperature. *See, e.g., id.* col. 4, ll. 48–55; col. 8, ll. 60–66; col. 8, l. 66–col. 9, l. 6.

Dr. Schork, the Rohm and Haas expert, testified that the “swelling agent” is defined in the specification with reference to the process conditions in which it is used. ’435 Pat. Op. at *5. For example, Dr. Schork testified that persons in the field of the invention would “not consider KOH a ‘swelling agent’ when the reaction temperature of [Toda] Example 9 is increased to 80°C.” Decl. of F. Joseph Schork ¶93 (quoted in ’435 Pat. Op. at *9). There was no evidence to contravene either the patent specification or the expert testimony. Organik’s expert Dr. Urban testified that the function of the base depends on the conditions of its use. J.A. 1778, ll. 7–12 (“Q: My question was: In a given reaction does the function of sodium hydroxide depend on the conditions of the reaction? A: Yes, it does . . .”).

Grammatical Ambiguity

Organik also argues that the ’435 specification provides an open-ended definition of “swelling agent,” and that the Board improperly adopted the narrower of two possible constructions of a “grammatically ambiguous passage.” Organik Br. 34. Organik argues that the broader construction of any ambiguity is required by law, citing *In re Cuozzo Speed Technologies, LLC*, 793 F.3d 1268, 1275-79 (Fed. Cir. 2015), *aff’d sub nom. Cuozzo Speed Technologies, LLC v. Lee*, 136 S. Ct. 2131 (2016), as authorizing the broadest reasonable construction in PTO examination practice.

The asserted ambiguity is in the following passage in the specification:

Suitable swelling agents **include, are those which**, in the presence of the multistage emulsion polymer and monomer, are capable of permeating the shell and swelling the core. Swelling agents may be aqueous or gaseous, volatile or fixed bases or combinations thereof.

'435 Patent, col. 8, ll. 40–44 (boldface added). Organik argues that the word “include” opens the definition of “swelling agent” to include bases that do not act by penetrating the shell, that are not used under the conditions described in the specification, and that have not been shown to achieve swelling. Thus, Organik argues that the presence of a base in the emulsion polymer processes of the prior art anticipates and invalidates the '435 Patent claims.

The Board did not deem the criticized words to be ambiguous, observing that “the Specification’s use of the word ‘include,’ in this instance, is modified by the phrase immediately following it, i.e., ‘are those which,’ suggesting that suitable swelling agents include only those which exhibit the functional characteristics thereafter described.” '435 Pat. Op. at *5. The Board is correct, for the specification makes clear that the swelling agent is a base capable of permeating the shell and swelling the core under the reaction conditions described in the specification. *See, e.g., Microsoft*, 789 F.3d at 1298 (“Even under the broadest reasonable interpretation, the Board’s construction ‘cannot be divorced from the specification and the record evidence,’ and ‘must be consistent with the one that those skilled in the art would reach.’” (quoting *In re NTP, Inc.*, 654 F.3d 1279, 1288 (Fed. Cir. 2011) and *In re Cortright*, 165 F.3d 1353, 1358 (Fed. Cir. 1999))).

Error has not been shown in the Board’s construction of “swelling agent” as conforming to the conditions and process in which it is used, as stated in the specification.

Validity of the '435 Patent

The Board found that both the Toda and Touda references show the production of voided emulsion polymers, but do not teach the use of a “swelling agent” to produce these polymers. Organik argues that since the references show voided emulsion polymerization and the presence of a base, this suffices to render the claims invalid. The

Board recognized the differences between the prior art and the subject matter described and claimed in the '435 Patent, and held that unpatentability had not been shown.

A

The Toda Reference

The Board recognized that Toda produces hollow emulsion particles by a different process than is described in the '435 and '004 Patents. Toda shows a "base treatment" followed by an "acid treatment," and states that examination by electron microscope showed that its "polymer particles have, at first, several small holes, respectively, and with progress of the acid treatment these small holes gather to form a uni-hollow particle." Toda, col. 7, l. 61–col. 8, l. 3. As the Board recognized, Toda does not show that the base permeates the shell and neutralizes and swells the core.

Organik directs attention to Toda's Example 9, which shows the production of hollow polymer particles in a reaction where 3 parts of styrene are added to latex-containing polymer particles at 20°C, then 30 parts of aqueous 10% potassium hydroxide solution are added, and the mixture is heated to 80°C for 3 hours; 80 parts of aqueous 5% methacrylic acid and 50 parts of styrene are then added and heated at 80°C for 3 hours; finally, 10 parts of 3% potassium sulfate solution are added and the mixture is heated at 80°C for 2 hours. Toda, col. 12, ll. 38–59. Toda observes that "small holes gather" to form a hollow particle during the methacrylic acid treatment step. Toda col. 7, l. 61–col. 8, l. 3.

Organik argues that the potassium hydroxide used by Toda must be a swelling agent because it is a base, and the same type of voided polymer particles are produced by the methods disclosed in Toda as in the '435 Patent. However, Toda does not describe or show potassium

hydroxide as a swelling agent, and states that the hollow void is produced during the methacrylic acid treatment.

Dr. Schork explained the mechanism of Toda's Example 9: at 20°C, the initial reaction temperature of Example 9, the latex shell would be too hard for the potassium hydroxide to permeate; after heating to 80°C polymerization would occur, such that at no time would the reaction conditions be such that the base could permeate the shell and swell the core under conditions of no substantial polymerization, as required by the '435 Patent claims. '435 Pat. Op. at *9 (citing Decl. of F. Joseph Schork ¶¶ 86, 92); *see also* Decl. of F. Joseph Schork ¶ 85 (criticizing Organik's expert's discussion of Toda Example 9).

Toda's Example 9 shows the presence of the potassium hydroxide base, but not as a swelling agent and not under conditions that swell the core. Dr. Schork so verified by experimentation, without contradictory evidence from Organik. Organik criticizes Dr. Schork's evidence as "irrelevant" and his methodology "flawed," Organik Br. 46–52. However, Organik did not provide any contrary evidence, as the Board observed:

[Organik's expert] Dr. Prud'homme has not provided experimental data demonstrating that a different manner of performing the process of Example 9 would have provided results that differ from those observed in Dr. Schork's replications. Nor has the Petitioner provided any experimental data or evidence establishing that the process of Toda's Example 9 inherently disclosed a "swelling agent," as required by claims 1–5 of the '435 patent.

'435 Pat. Op. at *10. On this appeal, Organik argues that it was error for the Board to require Organik to conduct experiments to support its argument of inherency. However, the issue is not whether experiments by Organik were required, but whether Organik provided sufficient

evidence and argument to negate and outweigh the evidence and argument provided by Rohm and Haas. The Board correctly held that Dr. Schork's experimental evidence outweighed the unsupported criticism of Dr. Schork's methodology.

There was substantial evidence in support of the conclusion that a person of ordinary skill would not have understood the bases as used by Toda to permeate the polystyrene shell and swell the core. The PTAB decision that the '435 Patent claims are not anticipated by the Toda reference is affirmed.

B

The Touda Reference

Organik also argues that the '435 Patent claims are invalid on the ground of obviousness in view of Touda's use of a base that Organik states is a "swelling agent." Touda shows a process "for producing polymer particles containing one microvoid or two or more discrete microvoids," where the base sodium hydroxide is present in the polymerization. Touda, Abstract. Touda's Example 1B describes, in the Board's words,

charging the same reactor used in the production of the seed latex with 870 parts of deionized water, 100 parts of the filled polymer latex, 1 part of sodium dodecyl-benzenesulfate, 30 parts of toluene, and 33 parts of a 10% aqueous solution of sodium hydroxide ("NaOH"); stirring the mixture at 80° C for three hours; adding 300 parts of a 1% aqueous solution of hydrochloric acid; stirring the mixture at 80° C for three hours; cooling the reaction mixture to room temperature; and removing the organic solvent under reduced pressure.

'435 Pat. Op. at *12 (citing Touda, col. 7, ll. 4-24). Touda states that microvoids are formed in the polymer particles during the step of acid treatment. Touda, col. 5, ll. 59-64.

Dr. Schork replicated Touda's Example 1, and reported that "no observable swelling occurred during the reported 'swelling stage.'" Decl. of F. Joseph Schork ¶ 151. Dr. Schork concluded that the experiment "demonstrates that the NaOH used in Example 1 is not capable of permeating the shell and swelling the core of the emulsion under the conditions described therein." *Id.* ¶ 130.

The Board referred to Dr. Schork's explanation that "the core and the shell are only slightly acidic," *id.* ¶ 128, and that the shell of the Touda polymer would be too hard for the bases to permeate under the conditions described in Example 1. Dr. Schork concluded, and the Board agreed, that "the NaOH would be unlikely to permeate and neutralize any part of the particle. Certainly, NaOH would not permeate the shell and swell the core. Instead, to the extent that any swelling occurred, it would take place in the shell." '435 Pat. Op. at *13 (citing Decl. of F. Joseph Schork at ¶ 128). Organik presented no contradictory evidence.

Organik's expert Dr. Prud'homme criticized Dr. Schork's procedures and his reasoning, but did not reproduce his experiments or any of the Touda examples. Organik criticized Dr. Schork for only trying to reproduce Example 1 of Touda twice—but Organik did not itself provide evidence of reproducing Example 1. The Board reasonably observed the absence of support for Organik's arguments, in the face of Dr. Schork's experimentation. '435 Pat. Op. at *14 ("Petitioner has not provided any experimental evidence contradicting Dr. Schork's results or supporting its position that Touda uses a 'swelling agent' . . .").

The Board concluded that Touda does not render obvious the subject matter of claims 1–5 of the '435 Patent. This conclusion is in accordance with law and is supported by substantial evidence in the record.

II

The '004 Patent

The PTAB held a separate hearing on the '004 Patent, and instituted review on the grounds that claims 1–6 were obvious over the Touda reference, that claim 7 was obvious over the combination of Touda and U.S. Patent No. 5,292,660 (“Overbeek”), and that claims 1–7 were obvious over Toda in view of U.S. Patent No. 2,574,020 (“Crouch”). The challenged claims are directed to a process in which polymerization is stopped by “adding an effective amount of one or more polymerization inhibitors or reducing agents,” such as cresol. Claim 1 was deemed representative:

1. A process for preparing emulsion polymer particles comprising:
 - (a) providing an aqueous emulsion of
 - (i) multi-stage emulsion polymer, comprising a core stage polymer and a shell stage polymer, wherein the core stage polymer comprises, as polymerized units, from 5 to 100 percent by weight, based on the weight of the core stage polymer, of hydrophilic monoethylenically unsaturated monomer, and from 0 to 95 percent by weight, based on the weight of the core stage polymer, of at least one nonionic monoethylenically unsaturated monomer; and wherein the shell stage polymer comprises, as polymerized units, at least 50 percent by weight of nonionic monoethylenically unsaturated monomer;
 - (b) adding an effective amount of one or more polymerization inhibitors or reduc-

- ing agents to substantially stop any polymerization;
- (c) providing monomer at a level of at least 0.5 percent by weight based on the weight of the multi-stage emulsion polymer;
 - (d) adding swelling agent; and
 - (e) reducing the level of monomer by at least fifty percent.

The PTAB construed “swelling agent” as in the ’435 Patent opinion, and with respect to the Toda and Touda references the Board reached the same conclusion as for the ’435 Patent, on substantially the same analysis. The Board also held that it would not have been obvious to modify Example 2 of Touda to include a polymerization inhibitor by substituting cresol for the toluene used in Touda’s Example 2. ’004 Pat. Op. at *9. The Board did not make specific findings as to additional claim limitations.

On this appeal Organik challenges the same “swelling agent” interpretation as the Board applied to the ’435 Patent. For the reasons we have discussed, we conclude that the Board was correct in interpreting the term “swelling agent” as conforming to the conditions and process for which it is used.

Organik again challenges the Board’s findings that the Toda and Touda references do not disclose a “swelling agent.” Organik does not challenge the Board’s findings as to the nonobviousness of the substitution of cresol—a polymerization inhibitor—for toluene in Example 2 of Touda. Nor does Organik address the other limitations of the ’004 Patent claims.

A

The Toda Reference

With respect to Toda, the Board focused on Toda's Example 11. Example 11 follows the same procedure as Example 9, discussed *supra*, but increases the amount of 10% KOH to 40 parts. Toda, col. 13, ll. 3–34. The Board found, consistent with Dr. Schork's explanations and experimentation, that "a person of ordinary skill in the art would understand that at [the temperature of 20°C] the polystyrene shell would be too hard for potassium hydroxide to permeate it." '004 Pat. Op. at *13 (citing Decl. of F. Joseph Schork ¶¶ 100, 149).

The Board also found persuasive Dr. Schork's replication of Example 11 of Toda, with the addition of hydroquinone as the polymerization inhibitor. Dr. Schork reported "no evidence of swelling during the base treatment step," including analysis of TEM [transition electron microscopy] images. '004 Pat. Op. at *14 (quoting Decl. of F. Joseph Schork ¶ 147).

Organik repeats these arguments on this appeal with respect to the '004 Patent. As for the '435 Patent, we conclude that no error has been shown in the Board's analysis.

B

The Touda Reference

With respect to the Touda reference, the Board reached the same conclusion as to the absence of a "swelling agent" as for the '435 Patent, presenting substantially the same analysis. We again conclude Organik has not shown error in that analysis.

The Board also addressed the recitation of a polymerization inhibitor in the '004 Patent claims. Organik argued below that it would have been obvious to modify Touda's Example 2A to substitute cresol, a polymerization

inhibitor, for the toluene in the Touda example. The Board found persuasive Dr. Schork's experimentation and explanation that cresol, when added in the polymerization process of Example 2A, prevented the initial formation of the shell polymer. '004 Pat. Op. at *9. Dr. Schork reported that after substituting cresol for Touda's toluene, the "monomer was only 2.5% converted to polymer after the required eight hours." '004 Pat. Op. at *10 (quoting Decl. of F. Joseph Schork ¶ 95).

Accordingly, the Board held it would not have been obvious to substitute cresol for toluene. Substantial evidence supports the Board's conclusion.

The Board also discussed the additional references cited during institution, *viz.* the combination of Toda and Crouch and Touda and Overbeek. These secondary citations do not disclose a swelling agent as claimed in the '435 and '004 patents, and do not affect the Board's decisions.

CONCLUSION

The Board concluded that neither Toda nor Touda discloses or suggests a "swelling agent" as required by the '435 and '004 Patents. The Board's decisions are in accordance with law and supported by substantial evidence in the record, and are affirmed.

AFFIRMED