NOTE: This disposition is nonprecedential.

United States Court of Appeals for the Federal Circuit

SOLENIS TECHNOLOGIES, LP,
Appellant

v.

SNF SAS,
Appellee

2019-2013

Appeal from the United States Patent and Trademark Office, Patent Trial and Appeal Board in No. 95/002,397.

Decided: May 26, 2020

DAVID S. MORELAND, Meunier Carlin & Curfman, LLC, Atlanta, GA, for appellant. Also represented by JOHN W. HARBIN.

BILLY AARON SCHULMAN, Stites & Harbison PLLC, Alexandria, VA, for appellee.

Before LOURIE, REYNA, and HUGHES, *Circuit Judges*.

LOURIE, *Circuit Judge.*

Solenis Technologies L.P. ("Solenis") appeals from the decision of the United States Patent Office Trial and Appeal Board (the "Board") affirming the examiner's rejection of claims 2–55 of U.S. Patent 6,454,902 ("the '902 patent") in an *inter partes* reexamination. *SNF SAS v. Ciba Speciality Chems. Water Treatments Ltd.*, No. 2015-007695, 2018 WL 3456088, at *1 (P.T.A.B. July 16, 2018) ("*Second Board Decision*"), *reh'g denied*, 2019 WL 1580145 (P.T.A.B. Apr. 10, 2019). For the reasons detailed below, we affirm.

BACKGROUND

Generally, to make paper, an aqueous suspension called cellulosic stock is fed into a headbox of a papermaking machine. The process may involve the addition of "flocculating" solutions, which cause the cellulosic stock to clump.

The '902 patent provides a process for making paper from cellulosic stock using two flocculating steps. The process involves forming a cellulosic suspension, flocculating the suspension, draining the suspension on a screen to form a sheet, drying the sheet, mechanically shearing it, and then flocculating it again.

The parties' arguments in this appeal focus on two claims: claim 10 and claim 13. In the proceedings below, claim 1 was cancelled, and its limitations were imported into amended claim 13. Claim 1 recites:

> 1. A process for making paper or paper board comprising forming a cellulosic suspension, flocculating the suspension, draining the suspension on a screen to form a sheet and then drying the sheet, wherein the cellulosic suspension is flocculated by the addition of a *water soluble cationic synthetic polymer of intrinsic viscosity of at least 4 dl/g*, wherein the flocculated cellulosic suspension is subjected to mechanical shearing and then

> reflocculated by a subsequent addition of a reflocculating system, and in which the reflocculating system comprises
>
> i) a siliceous material and
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> ii) a water soluble anionic polymer of intrinsic viscosity *at least 4 dl/g*, and in which the siliceous material (i) and water soluble anionic polymer (ii) are added to the cellulosic suspension subsequent to the centriscreen and wherein the cationic polymer is added to a thin stock stream of the cellulosic suspension.

'902 patent col. 13 ll. 29–45 (emphases added). The "centriscreen" appears to be a shearing step, and the specification describes the reflocculating polymer as being added late in the papermaking process. Claim 13 depends from claim 1, reciting "[a] process according to claim 1 in which the water soluble anionic polymer has an intrinsic viscosity of *at least 7 dl/g*." *Id.* at col. 14 ll. 33–35 (emphasis added).

Claim 10 also depends from cancelled claim 1 and recites a process for making paper or paper board wherein the second flocculating step uses a "branched" "water soluble polymer which exhibits a rheological oscillation value of tan delta at 0.005 Hz of above 0.7 (calculated on a 1.5% by weight aqueous solution of the polymer)." *Id.* at col. 14 ll. 22–26. All claims in this appeal rise and fall with either claim 10 or 13.

SNF SAS ("SNF") filed a request for inter partes reexamination, which was ordered for claims 1–9 and 11–18. Solenis then cancelled claim 1, amended claim 13 to incorporate its limitations, and added new claims 26–55. *See* J.A. 1553. The examiner, in his discretion, brought claim 10 into the reexamination as well. J.A. 1511.

The reexamination produced a series of opinions, but the relevant history is as follows. The examiner rejected

claim 13 but allowed claim 10. Solenis appealed to the Board, and the Board affirmed the rejection of claim 13 but issued a new ground of rejection for claim 10. *SNF SAS v. Ciba Speciality Chems. Water Treatments Ltd.*, No. 2015-007695, 2016 WL 4437952, at *1 (P.T.A.B. Aug. 19, 2016) ("*First Board Decision*"). Solenis requested to reopen prosecution, arguing that the Board issued a new ground of rejection for both claim 10 and 13, J.A. 2046–2076, but the Board disagreed and declined to remand claim 13. *SNF SAS v. Ciba Speciality Chems. Water Treatments Ltd.*, No. 2015-007695 (P.T.A.B. Feb. 28, 2017) ("*Remand Order*"). On remand, the examiner allowed claim 10, but the Board reversed the examiner again. *Second Board Decision*, 2018 WL 3456088, at *5. Solenis then moved for rehearing, which was denied. *SNF SAS v. Ciba Speciality Chems. Water Treatments Ltd.*, No. 2015-007695, 2019 WL 1580145, at *1 (P.T.A.B. Apr. 10, 2019) ("*Rehearing Decision*").

Relevant to this appeal are three references: WO 98/24973 ("WO '973"); European Patent Application EP 0877120 A1 ("EP '120"); and U.S. Patent 5,958,188 ("the '188 patent"). WO '973 discloses a process for making paper wherein a "main aqueous flow" of cellulosic fibers and filler are fed into the headbox. WO '973 at 3. The main flow comprises at least a "high consistency" (HC) flow and a "low consistency" (LC) flow. *Id.* A cationic polymer is introduced into the HC flow as a retention agent. *Id.* at 8. WO '973 specifies that cationic acrylamide-based polymers are preferred. *Id.* at 6. The LC flow may include an "additive" that may comprise an anionic polymer. The molecular weight of the "main polymer" is "usually above 200,000, suitably above 300,000, preferably at least 500,000 and most preferably at least 1,000,000." *Id.* The polymer weight is below about 20,000,000. *Id.*

EP '120 teaches a papermaking process that uses an ionic water-soluble polymer produced by dispersion polymerization. The disclosure teaches a method for producing the polymer by polymerizing water-soluble, ionic,

vinyl monomers under agitation in a salt solution. The "polymerization mechanism" is not described, but the application states that "it is assumed that a polymer having a specific molecular structure, such as a branched polymer or block copolymer, is produced" and that "the specific molecular structure" of the produced polymer "is a primary factor of improving retention and/or drainage." EP '120 at 4.

The '188 patent teaches a process for making paper where a polymer is made by reacting monomers. The specification explains that "one way of indicating that [a] branched polymer is in solution . . . rather than being in the form of cross linked particles is by observing that the defined tan delta value is relatively high (above 0.5 and preferably above 0.7)." '188 patent col. 4. ll. 26–36.

The Board's merits determinations for two claims are relevant to this appeal: (1) the rejection of claim 13 based on the Board's finding that WO '973 discloses a cationic polymer with an intrinsic viscosity of at least 4 dl/g and an anionic polymer with an intrinsic viscosity of at least 7 dl/g; and (2) the rejection of claim 10 based on the Board's finding that EP '120 in view of the '188 patent teaches a branched, water-soluble cationic polymer with a rheological oscillation value of tan delta at 0.005 Hz of above 0.7. The examiner considered both issues in the first instance.

The examiner relied on WO '973 to teach both cationic and anionic polymers of the claimed intrinsic viscosities in claim 13. The examiner calculated the intrinsic viscosity of poly(N,N'-dimethylacrylamide) with a weight range of 50,000 to 1.22 million, treating it as representative of *both* the cationic and anionic polymers of WO '973.

To calculate the intrinsic viscosity of the prior art materials, the examiner used the Mark-Houwink-Sakurada (MHS) equation:

$$[n] = KM^a.$$

In the MHS equation, "[n]" is the intrinsic viscosity, "K" is a constant in dl/g, and "M" is the molecular weight. Relying on "K" and "a" values from the Polymer Handbook,[1] the examiner calculated the intrinsic viscosity of poly(N,N'-dimethylacrylamide) as 16.8 dl/g. According to the examiner's determination, the intrinsic viscosity of WO '973's "preferred polymer" (*i.e.*, an acrylamide-based polymer) at the preferred molecular weight met both claimed viscosity limitations.

Regarding claim 10, the examiner relied on a combination of WO '973, EP '120, and the '188 patent. The examiner found that WO '973 teaches an LC flow, which may comprise an anionic polymer and preferably an acrylamide-based polymer with a molecular weight above 1 million. Relying on the value calculated above for poly(N,N'-dimethylacrylamide), the examiner found that the anionic polymer would also have an intrinsic viscosity of at least 16.8 dl/g. But the examiner ultimately found claim 10 would not have been obvious because there was no disclosure in EP '120 or the '188 patent showing a cationic water-soluble polymer with the claimed rheological oscillation value.

On appeal, the Board affirmed the examiner's decision regarding intrinsic viscosity and claim 13. The Board specifically agreed with the examiner's reliance on poly(N,N'-dimethylacrylamide) as representative for cationic polymers because WO '973 discloses cationic acrylamide-based polymers as particularly preferred with molecular weights of at least 1 to about 20 million.[2] The Board found no

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[1] POLYMER HANDBOOK, IV-21 (J. Brandrup & E.H. Immergut eds., 1966).

[2] The Board also commented that high molecular weight cationic polymers used in retention systems are characterized by intrinsic viscosities of about 4 dl/g and that such cationic polymers have molecular weights above

evidence of record suggesting that poly(N,N'-dimethylacrylamide) could not be used as an example of an acrylamide-based polymer sufficient to establish the relationship between intrinsic viscosity and molecular weight with respect to the polymers described in WO '973. The Board also commented that Solenis had not explained why a cationic polymer would have a significantly different K value. Citing that WO '973 discloses anionic polymers of similarly high weights—most preferably above 10,000,000—the Board extended its conclusion for the intrinsic viscosity of the cationic polymer to the anionic polymer. *First Board Decision*, 2016 WL 4437952, at *7–8.

Regarding claim 10, the Board held that EP '120 discloses water-soluble ionic polymers that are either branched polymers or block copolymers, which is the primary factor in improving retention or drainage. Thus, the Board read EP '120 to teach branched cationic polymers. Then, relying on the '188 patent, the Board held that a branched polymer in solution has a relatively high tan delta value, above 0.5 and preferably above 0.7. Thus, the Board held that EP '120 discloses water-soluble polymers, which would have a relatively high rheological oscillation value. In the Board's view, the value taught by the prior art matched that in the claims because the '188 patent expressly teaches that a tan delta of above 0.7 is preferred. Thus, the Board entered a new rejection of claim 10 as obvious over WO '973 and EP '120.

On remand to the examiner, Solenis submitted a declaration from its expert, Christian Jehn-Rendu, and the examiner relied on the declaration to find that EP '120 discloses a polymer in a dispersion, and polymers in

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500,000, but this finding was vacated on rehearing to make clear that the Board was affirming the examiner's rationale and not providing a new basis for rejection. *Rehearing Decision*, 2019 WL 1580145, at *2.

dispersions have a tan delta value of less than 0.5, outside the scope of the claim.

On appeal from that decision, the Board reversed. It found that EP '120 did disclose a method for producing water-soluble cationic polymers by dispersion polymerization, but the dispersion was produced during polymer formulation. Ultimately, in the Board's view, the process yielded a water-soluble polymer. Alternatively, the Board also found that, even if the claim's oscillation value was not inherent in the water-soluble branched polymers of EP '120, it would have been obvious to select a branched water-soluble polymer as taught by EP '120 because of the desire for a water-soluble, easily-dissolvable cationic polymer. According to the Board, a "skilled artisan would seek to utilize a fine cationic polymer exhibiting a tan delta above 0.7 due to the express disclosure in the '188 patent that polymer systems having a tan delta value above 0.7 have more soluble polymer and less cross-linked polymer." *Second Board Decision*, 2018 WL 3456088 at *5.

Solenis moved for rehearing on all the above issues, but the Board reiterated its previous reasoning and denied rehearing. Solenis appealed, and we have jurisdiction under 28 U.S.C. § 1295(a)(4)(A).

DISCUSSION

We review the Board's legal determinations *de novo*, *In re Elsner*, 381 F.3d 1125, 1127 (Fed. Cir. 2004), and its fact findings for substantial evidence, *In re Gartside*, 203 F.3d 1305, 1316 (Fed. Cir. 2000). A finding is supported by substantial evidence if a reasonable mind might accept the evidence as sufficient to support the finding. *Consol. Edison Co. v. NLRB*, 305 U.S. 197, 229 (1938).

Obviousness is a question of law, supported by underlying fact questions. *In re Baxter Int'l, Inc.* 678 F.3d 1357, 1361 (Fed. Cir. 2012). In evaluating obviousness, we consider the scope and content of the prior art, differences

between the prior art and the claims at issue, the level of ordinary skill in the pertinent art, and any relevant secondary considerations. *Graham v. John Deere Co. of Kan. City*, 383 U.S. 1, 17–18 (1966).

"The inherent teaching of a prior art reference, a question of fact, arises both in the context of anticipation and obviousness." *In re Napier*, 55 F.3d 610, 613 (Fed. Cir. 1995) (citing *In re Grasselli*, 713 F.2d 731, 739 (Fed. Cir. 1983)). The use of inherency, however, "must be carefully circumscribed in the context of obviousness." *PAR Pharm., Inc. v. TWI Pharm., Inc.*, 773 F.3d 1186, 1195 (Fed. Cir. 2014) (first citing *In re Rijckaert*, 9 F.3d 1531, 1533–34 (Fed. Cir. 1993); then citing *In re Oelrich*, 666 F.2d 578, 581 (C.C.P.A. 1981); and then citing *Application of Shetty*, 566 F.2d 81, 86 (C.C.P.A. 1977)).

Solenis raises two arguments on appeal: (1) that the Board's determinations regarding claims 10 and 13 lack substantial evidence; and (2) that the Board erred in failing to consider the Jehn-Rendu declaration in its review of the intrinsic viscosity limitation of claim 10 after prosecution was reopened. We address each issue in turn.

A.

Solenis argues that the Board's determinations for claim 13's intrinsic viscosity limitations and claim 10's rheological oscillation value limitation lack substantial evidence.

First, Solenis challenges the examiner's and the Board's analysis regarding claim 13. According to Solenis, the examiner failed to provide sufficient detail concerning his MHS equation calculation and did not adequately explain why poly(N,N'-dimethylacrylamide) was representative of all cationic and anionic polyacrylamides. Thus, in Solenis's view, the examiner failed to show that WO '973 necessarily and inherently discloses cationic and anionic polyacrylamides of the claimed intrinsic viscosities. SNF

responds that the Board's decisions are supported by substantial evidence and that the Board properly analyzed the record.

We agree with SNF. WO '973 discloses cationic and anionic polymers with molecular weights of above 1 million. *See* WO '973 at 6 ("Examples of suitable main polymers include anionic, amphoteric and cationic acrylamide-based polymers . . . . The molecular weight of the main polymer is usually above 200,000 . . . and most preferably at least 1,000,000."). Selection of an acrylamide-based polymer like poly(N,N'-dimethylacrylamide) was reasonable on this record as acrylamides were designated in WO '973 as preferred. Solenis may disagree with the examiner and Board's designation of poly(N,N'-dimethylacrylamide) as representative, but the selection certainly meets the substantial evidence standard on appeal. *Consol. Edison,* 305 U.S. at 229.

We also agree with the examiner's and Board's determination that the dimethylacrylamide polymer meets the intrinsic viscosity limitation of the claim. Solenis identifies no errors in the examiner's calculation using the MHS equation. Nor do we find error in his determination that, based on the MHS equation, intrinsic viscosity is proportional to molecular weight such that the intrinsic viscosity of the WO '973 polymers with molecular weights preferably greater than 1 million would be expected to have higher intrinsic viscosities than 16.8 dl/g.

The Board and examiner used a well-known equation to determine an inherent property—the intrinsic viscosity—of a polymer in the prior art. The inherency of a claimed material is not at issue in this analysis; it is the inherency of a property that is at issue, and substantial evidence shows that the polymer possesses that property. We discern no error in this analysis.

Regarding claim 10, Solenis argues that EP '120 does not inherently disclose branched polymers because the

disclosure does not specify whether branched or block copolymers are formed. According to Solenis, because the EP '120 polymers are not necessarily branched, the polymers do not necessarily have the claimed tan delta values. Solenis also argues that, since the EP '120 polymers are not necessarily branched, the Board's alternative conclusion that EP '120 would have motivated a person skilled in the art to use a branched, water-soluble cationic polymer lacks substantial evidence.

It is unclear that the Board relied on inherency to find polymers disclosed by EP '120 are necessarily branched. The Board determined that it would have been obvious to use branched cationic polymers because EP '120 discloses branched or block copolymers. EP '120 describes a dispersion polymerization reaction that yields a water-soluble polymer. The polymerization mechanism is unknown, and the inventors "assumed that a polymer having a specific molecular structure, such as a branched polymer or block copolymer, is produced." EP '120 at 4.

The Board's determination that "it would have been obvious to optimize the water soluble cationic polymer to select a branched soluble polymer as taught by EP '120 because of the desire for a water soluble and easily dissolvable cationic polymer" is supported by the record. *Second Board Decision*, 2018 WL 3456088, at *5. EP '120 credits the structure of the generated polymer as a "primary factor of improving retention and/or drainage," and therefore teaches that a branched polymer may be responsible for improvements to the papermaking process. EP '120 at 6. It was thus reasonable for the Board to conclude that it would have been obvious for a skilled artisan to use branched copolymers based on EP '120's express disclosure, and the Board's obviousness conclusion is supported by substantial evidence.

B.

After the first Board decision, Solenis requested reopening prosecution under 37 C.F.R. § 41.77(b)(l) and submitted the Jehn-Rendu declaration. The request was granted for claim 10, which was subject to a new ground of rejection, but was denied for claim 13. *Remand Order*, No. 2015-007695, slip op. at 3; J.A. 1975. Specifically, the Board entered a new ground of rejection based on its finding that a combination of WO '973, EP '120, and the '188 patent discloses branched polymers of a rheological oscillation tan delta value of above 0.7.

As a preliminary matter, in its request to reopen prosecution, Solenis argued the issue of intrinsic viscosity with respect to claim 13 alone. *See* J.A. 1946–49. Solenis's arguments regarding claim 10 address only whether EP '120 and the '188 patent disclose a branched water-soluble polymer with the claimed rheological oscillation value. J.A. 1940–43. The examiner considered the declaration and the request in his determination on remand. J.A. 1989–90. Thus, it is not surprising that the examiner's analysis on remand addresses the Jehn-Rendu declaration only as it relates to the claimed tan delta value of claim 10.

On remand to the examiner after the Board issues a new ground of rejection, 37 C.F.R. § 41.77(d) tasks the examiner to consider whether new evidence not previously of record overcomes the new ground of rejection in the Board's decision. The Manual of Patent Examining Procedure ("MPEP") § 2682 (9th ed., rev. Jan. 2018), provides similar guidance, explaining that "examiner will not comment on any entered arguments or comments that are not limited to the new ground(s) of rejection issued in the Board's decision (e.g., arguments or comments that addressed a

rejection affirmed in the Board's decision)."[3] The examiner clearly followed the applicable regulations and guidance in considering the Jehn-Rendu declaration for the limited purpose of the new ground of rejection. Solenis has failed to identify any procedural error warranting a remand.

CONCLUSION

We have considered Solenis's remaining arguments but find them unpersuasive. Accordingly, the decision of the Board finding claims 2–55 of the '902 patent unpatentable is affirmed.

AFFIRMED

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[3] "While the MPEP does not have the force of law, it is entitled to judicial notice as an official interpretation of statutes or regulations as long as it is not in conflict therewith." *Molins PLC v. Textron, Inc.*, 48 F.3d 1172, 1180 n.10 (Fed. Cir. 1995) (citing *Litton Sys., Inc. v. Whirlpool Corp.*, 728 F.2d 1423, 1439 (Fed. Cir. 1984)).