

United States Court of Appeals for the Federal Circuit

99-1569, -1570

VISKASE CORPORATION,

Plaintiff-Appellee,

v.

AMERICAN NATIONAL CAN COMPANY,

Defendant-Appellant.

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Appealed from: U.S. District Court for the Northern District of Illinois

Judge Elaine E. Bucklo

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DECIDED: July 31, 2001

Before NEWMAN, LOURIE, and RADER, Circuit Judges.

NEWMAN, Circuit Judge.

This patent infringement suit concerns six patents owned by Viskase Corporation on heat-shrinkable films and their use to make plastic bags for packaging food articles. Viskase charged American National Can Company (ANC) with infringement. The district court held a Markman hearing, construed the claims, decided various motions for summary judgment, held a jury trial, conducted post-trial proceedings, entered judgment that the patents were valid and willfully infringed by ANC, and awarded damages.¹ The court denied motions brought under Federal Rules of Civil Procedure 50(b), 59, and 60. This appeal followed. We affirm in part, reverse in part, and remand for further proceedings.

The Patented Inventions

The patents in suit relate to heat-shrinkable multilayer thermoplastic compositions having very low density polyethylene copolymers (VLDPE) in biaxially stretched outer layers, and core layers of various vinyl plastics as oxygen barriers, typically a copolymer of vinylidene chloride or an ethylene/vinyl alcohol copolymer. The "first family" patents, as the parties and the district court call them, are United States Patents Nos. 4,863,769; 4,976,898; 5,059,481; and 5,256,351; all relate to outer film layers of VLDPE having specific density limits and other parameters. Claim 33 of the '769 patent is illustrative, with emphases added to the aspects of concern in this litigation:

33. A heat-shrinkable, puncture resistant, biaxially stretched, thermoplastic film suitable for use in fabricating bags for packaging food articles such as

¹ Viskase Corp. v. American Nat'l Can Co., 947 F. Supp. 1200 (N.D. Ill. 1996) (claim interpretation and infringement); 979 F. Supp. 697, 45 USPQ2d 1675 (N.D. Ill. 1997) (new trial); 18 F. Supp.2d 873 (N.D. Ill. 1998) (infringement); No. 93 C7651 (N.D. Ill. July 1, 1999) (final judgment).

frozen poultry, said film comprising a very low density polyethylene which is a linear copolymer of ethylene and higher alpha olefin containing from 3 to 8 carbon atoms, having a density below about 0.91 g/cm^3 , a 1% secant modulus below about 140,000 kPa, and said film being formed using a double bubble method and wherein said film heat-shrinks from about 30 percent to about 50 percent at a temperature of about 90E C. in the transverse direction.

The "second family" patents relating to heat-shrinkable films, United States Patent Nos. 4,863,784 and 4,988,465, also use VLDPE in the outer layers of a multilayer thermoplastic film, and as the core layer a copolymer of vinylidene chloride and methyl acrylate (MA-saran).

Claim 1 of the '784 patent is illustrative (with emphases added):

1. A coextruded, thermoplastic, heat shrinkable, multilayer film wherein:
 - (a) said multilayer film comprises a first layer comprising very low density polyethylene of density not greater than about 0.915 grams per cubic centimeter, a core layer comprising vinylidene chloride-methyl acrylate copolymer . . . and a second layer comprising very low density polyethylene of density not greater than about 0.915 grams per cubic centimeter; and
 - (b) said first layer is adhered directly to one side of said core layer without adhesive material therebetween and said second layer is adhered directly to the other side of said core layer without adhesive material therebetween.

The dispute as to infringement turns on the scope of the densities of VLDPE encompassed in "below about 0.91 g/cm^3 " for the first family patents and "not greater than about 0.915 g/cm^3 " for the second family patents, and the degree of branching of the VLDPE. Also on appeal are questions of validity and related issues.

I

CLAIM CONSTRUCTION

The ANC heat-shrinkable films at issue have a MA-saran core and either a linear

ethylene copolymer having a density of 0.912 g/cm^3 (a product of the Dow Chemical Company having the brand name "Attane"), or an ethylene copolymer having a density of 0.908 g/cm^3 whose linear/branched structure was disputed (a Dow product having the brand name "Affinity").

"Density" - The First Family

The district court construed the density term "about 0.91 g/cm³" to mean densities between 0.905 and 0.914, based on the reasoning that numbers in this range would be rounded to 0.91. We agree that this is a standard scientific convention when a number has not been carried to the next mathematically significant figure. However, ANC disputes the applicability of this convention to the facts of this case.

ANC argues that the specification and prosecution history make clear that "below about 0.91 g/cm³" is not entitled to broader scope than "below about 0.910 g/cm³", citing conventional descriptions of the densities of various classes of polyethylenes. ANC states that 0.91 g/cm³ is a generally accepted dividing line between "very low" and "low" density polyethylenes, and that a density range of the breadth adopted by the district court is contrary to this accepted usage, for it takes "very low density" into the range of "linear low density." ANC points out that during prosecution of the first family patents Viskase used 0.91 with a zero in the third decimal place. ANC also cites Viskase's incorporation into the first family patents of the process descriptions in commonly owned United States Patent No. 4,302,566 (Karol), which designated 0.91 g/cm³ as the upper boundary for very low density polyethylenes. The first family '769 patent states that Karol teaches that:

In order to produce ethylene copolymers having a density below 0.91 g/cm³ by means of a fluid bed process, it is necessary to employ gaseous reaction mixtures containing higher amounts of higher alpha olefin comonomer vis-a-vis the amount of ethylene employed, than are employed to produce copolymers having a density of greater than 0.91 g/cm³.

'769 patent, col. 2, lines 53-59. Another patent referenced in the first family specifications, United States Patent No. 4,302,565 (Goeke), contains a similar process description. ANC argues that these usages of "below 0.91" and "greater than 0.91" are meaningless if 0.91

g/cm^3 were intended to have a range as high as the 0.914 g/cm^3 holding of the district court. Thus ANC argues that a scope significantly higher than 0.910 g/cm^3 is not a reasonable construction of the usage "below about 0.91" in the claims of the first family.

Viskase disagrees, and points out that the second family '784 patent, filed one month after filing of the '769 application, defines "very low density" as reaching to "about 0.915 g/cm^3 ":

[T]hose copolymers having a density in the range of from about 0.86 to about 0.915 grams per cubic centimeter are commonly referred to as a very low density polyethylene, while those having a density greater than about 0.915 grams per cubic centimeter are commonly referred to as linear low density polyethylene.

'784 patent, col. 9, lines 14-20. Viskase states that the scientific literature accepts this higher figure, and that in all events the inventors made clear the definition they intended. ANC responds with other sources that draw a line at 0.910 , citing Ferguson Patent No. 4,640,856, filed in 1985, which defines very low density polyethylenes as having a density "of less than 0.910 [while] conventional polyethylenes and LLDPEs [linear low density polyethylenes] have densities as low as 0.912 ."

ANC stresses that during prosecution of the first family, Viskase itself treated 0.91 as if it were 0.910 . In discussing Shibata United States Patent No. 4,429,079 when Viskase cited this reference to the patent examiner, Viskase recognized that Shibata describes a multilayer heat-shrinkable composition using a linear low density polyethylene copolymer (Shibata's "A" copolymer) having a density range of " 0.910 to 0.940 g/cm^3 ." Viskase distinguished its products from Shibata by stating:

The "A" copolymer is clearly not pertinent to the present application in that it does not have a density below about 0.910 g/cm^3 as defined in all pending claims.

We agree with ANC that this statement is highly relevant, for it relies on the third significant figure of the 0.910 g/cm^3 density to distinguish the first family densities, claimed as "below about 0.91 g/cm^3 ," from the prior art densities of 0.910 to 0.940 g/cm^3 .

Viskase states that its use of 0.910 in distinguishing the first family from the Shibata product was an error by its patent attorney, and points out that 0.910 does not appear in any of the first family specifications or claims or elsewhere in the prosecution history. An asserted error in the prosecution record must be viewed as are errors in documents in general; that is, would it have been apparent to a person experienced in this technology that an error was made, or at least that the information should not be relied upon. See Biotec Biologische Naturverpackungen GmbH & Co. v. Biocorp, Inc., 249 F.3d 1341, 1348, 58 USPQ2d 1737, 1742-43 (Fed. Cir. 2001). The district court agreed with Viskase, and ruled that this isolated usage of the density figure 0.910 did not outweigh the extensive usages of 0.91 in the first family patents. The court declined to construe "below about 0.91 g/cm^3 " as meaning below 0.910 g/cm^3 or below about 0.910 g/cm^3 .

We do not share the district court's conclusion. It is clear that the prosecution argument to distinguish Shibata was presented as necessary to draw a line in this crowded field of technology, and that Viskase drew the line between "very low density" and other polyethylenes at 0.910 g/cm^3 . Although we agree that this line is not used in all cases, for example in the second family patents, it is reflected in several cited references including the Goeke and Karol patents of common ownership. In addition, the first family specifications illustrate use of the third decimal place for the densities of other classes of polyethylenes, as shown in Table 3 in the '769 patent:

<u>Resin Type</u>	<u>Density</u>
VLDPE	0.90
LDPE	0.917
LLDPE	0.918
EVA-13	0.940
EVA-5	0.920
IONOMER	0.950

'769 patent, col. 12, lines 15-25.

Although Viskase argues that the evidence does not establish a dividing line between VLDPE and LDPE at precisely 0.910 g/cm^3 , we conclude that Viskase itself set the boundary at 0.910 g/cm^3 for the first family patents. A person experienced in this field could reasonably be expected to rely on this specificity in the prosecution record, in view of the other references that use 0.910 to distinguish very low from linear low density polyethylenes, and considering Ferguson's statement that 0.912 is the density of linear low density, not very low density, polyethylenes. At a minimum, we conclude that a person knowledgeable in the field of polyethylene copolymers, reading the first family specifications and prosecution histories, would not view "below about 0.91" as extending to an upper limit of 0.914. Thus, we hold that the correct construction of the claims of the first family patents is that "below about 0.91 g/cm^3 " means "below about 0.910 g/cm^3 ." We need not decide what range is reasonably encompassed in the "about" in "about 0.910," for in all events it can not reach films having a density of 0.912, a product at issue in this suit.

"Density" - The Second Family

The second family patents are specific to coextruded films that use as the core layer a vinylidene chloride/methyl acrylate (MA-saran) copolymer and omit the adhesive layers binding the core layer to the VLDPE layers. These patents state that the VLDPE used in these

compositions has a density of "from about 0.860 to about 0.915 g/cm³." The Shibata reference was not cited in the prosecution history of the second family and its relevance is not pressed by ANC, we assume because Shibata does not show MA-saran cores. ANC presents no additional argument concerning the density description for the second family, other than to describe the range chosen by Viskase as "greedy." ANC's further arguments concerning these patents relate to validity and inventorship, as we discuss in Part III. Thus there is no issue of claim construction with respect to the density definition in the second family claims.

"Linear"

The term "linear" for the VLDPE copolymer appears in all of the first family claims. Viskase does not dispute that the VLDPE described in the specification of the second family patents is also linear, although the term does not appear in the claims.

The district court defined "linear" as meaning "without significant long chain branching." The parties agreed with this definition, but disagreed as to the meaning of "significant." ANC advocated a definition of "significant" as meaning having the ability to affect commercial properties, while Viskase stated that "insignificant" long chain branching means that there is not enough branching to affect the density of the polymer. Although ANC argues that the district court's definition is insufficiently precise, ANC does not now offer a more precise definition, stating that this aspect is "not important for the present appeal." ANC's objection to the district court's claim construction is deemed waived.

The district court ruled that the disputed fact of whether the Affinity brand copolymers used by ANC are "linear" required trial. We discern no error in this procedure, for the question

was not of claim construction but of the structure of a product whose use is charged with infringement.

II

INFRINGEMENT

The Attane7 Copolymer - First Family Patents

On its claim construction that the first family patents cover a density range up to 0.914 g/cm³, the district court granted summary judgment that the ANC products containing the Attane copolymer literally infringe these patents. However, on our corrected claim construction there can not be literal infringement of the first family patents based on use of the Attane copolymer, whose density is 0.912 g/cm³. The judgment of literal infringement of first family patents as to the Attane-containing products is reversed.

The Attane7 Copolymer - Second Family Patents

For the second family patents, ANC argues that the claims are invalid if interpreted to include its films. The district court treated the defense of invalidity as a separate defense from that of non-infringement. While an invalid claim can not be infringed, Richdel, Inc. v. Sunspool Corp., 714 F.2d 1573, 1580, 219 USPQ 8, 12 (Fed. Cir. 1983), in this case the district court's ruling that the claims are valid has been sustained, as discussed post. Although we have held claims invalid on the claim construction presented by a patentee as necessary to support the charged infringement, see Anderson v. Int'l Eng'g and Mfg., Inc., 160 F.3d 1345, 48 USPQ2d 1631 (Fed. Cir. 1998), for the second family no issue of claim construction is presented. On the plain reading of the claims, the summary judgment of infringement of the second family patents, by the Attane-containing compositions, is affirmed.

The Affinity7 Copolymer - Literal Infringement

The density of the Affinity very low density ethylene copolymer, 0.908 g/cm^3 , is within the literal density parameters of both families of patents. The question that was tried concerning the Affinity copolymer was whether it was "linear," a limitation viewed as applying to both families. At the trial, on conflicting expert testimony concerning the appropriate characterization of the structure of the Affinity copolymer, the jury found literal infringement of both families by the Affinity-containing products.

A Viskase expert witness (now deceased) testified that he had been present and personally observed the tests that were performed by an independent laboratory concerning the linear or branched structure of the Affinity very low density ethylene copolymers. In post-trial discovery (an unusual event, flowing from new information) it was learned that he was not present during any of the tests. The district court commented that the witness had lied "at least 15 times" about his role in this testing. Based on this perjury, the district court vacated the judgment of literal infringement and granted a new trial.

It is not disputed that Viskase was not aware of the perjury. ANC states that the perjured testimony was critical to the verdict, while Viskase argues that the test data themselves were not challenged, only whether this witness personally watched the tests. Although Viskase suggests that the jury verdict could now be reinstated, we agree with the district court that the jury verdict was irretrievably tainted and was properly set aside.

The Affinity7 Copolymer - The Doctrine of Equivalents

Nearly a year later the district court vacated the new trial order and granted Viskase's motion for summary judgment of infringement by the Affinity-containing films under the doctrine

of equivalents. ANC argues that there were many disputed questions of material fact on the issue of equivalency, and that if these facts were resolved or reasonable factual inferences drawn in favor of ANC as non-movant, summary judgment could not properly be granted in favor of Viskase.

Summary judgment is inappropriate unless the evidence is such that a reasonable jury could not find for the non-movant. Anderson v. Liberty Lobby, Inc., 477 U.S. 242, 254 (1986). In deciding a motion for summary judgment on the question of equivalency, the court must view in favor of the nonmovant all factual issues that were properly raised and adequately supported in response to the motion, EMI Group North America, Inc. v. Intel Corp., 157 F.3d 887, 891, 48 USPQ2d 1181, 1184 (Fed. Cir. 1998), drawing all reasonable inferences in favor of the nonmovant.

The factual question of equivalency requires determination of whether the accused composition is only insubstantially changed from what is claimed, applying appropriate criteria to the determination of insubstantial change. See generally Warner-Jenkinson Co. v. Hilton Davis Chem. Co., 520 U.S. 17, 25, 41 USPQ2d 1865, 1869 (1997) (discussing the Graver Tank criteria of equivalency as requiring substantially the same function, way, and result). Due consideration must be given to all relevant factors, including the nature of the invention, the prosecution history, the prior art, and any estoppels that may pertain. "A finding of equivalence is a determination of fact. . . . Like any other issue of fact, final determination requires a balancing of credibility, persuasiveness and weight of evidence." Graver Tank & Mfg. v. Linde Air Products Co., 339 U.S. 605, 609-10, 85 USPQ 328, 331 (1950).

In response to Viskase's motion, ANC proffered evidence that the Affinity copolymer has significant long-chain branching in its molecular structure, and that this has a significant

effect on its properties and therefore its utility in heat-shrinkable bags, as compared with its linear counterpart polyethylenes. ANC proffered evidence that the Affinity copolymer "behaved very differently from linear polyethylene plastic when used in shrink films" because it permitted use of less ethylene/vinyl acetate copolymer in the sealant layer, thereby improving heat sealability without loss of strength; it permitted faster production runs and the use of thinner films; and it improved the performance of three-layer bags in competition with five-layer bags. ANC states that these advantages were due to the long-chain branching in the Affinity copolymer's molecular structure, which also led to its lower density as well as improved rheological properties in heat-shrinkable films. ANC states that a reasonable jury could have found that these were not insubstantial differences, especially when viewed in light of the crowded art and the significance in this field of even relatively small differences among polyethylenes.

Viskase disagrees, stating that the Affinity films are extremely similar in structure, properties, and use to other very low density ethylene copolymer films, that they are processed in the double-bubble process like other such films, and have the same heat-shrinkable properties. Viskase points out that the only difference relates to the degree of branching, and argues that although the degree of branching was disputed, that question is not material because any added branching does not affect the interchangeability of these very similar copolymers. Thus Viskase argues that no material facts were in dispute, that there was no obstacle to the grant of summary judgment based on equivalency, and that the judgment was correct.

ANC counters that the areas of similarity identified by Viskase as applying to all such films were known to the prior art, citing Newsome Patent No. 4,457,960, which shows linear

low density polyethylene copolymers in heat-shrinkable films. ANC points out that it was known to use linear ethylene copolymers in heat-shrinkable films, and that Viskase's only contribution, for both families of patents, was to substitute very low density linear ethylene copolymers for low or moderately low density copolymers, after it became known how to make these very low density products. Thus ANC argues that the question of equivalency of a branched very low density copolymer in place of a linear very low density copolymer was not amenable to an adverse summary judgment. ANC argues that the nature and significance of the differences between these products must be found by a trier of fact, in light of the prior art and the contribution of the patents in suit to this art.

We agree with ANC that the grant of summary judgment was inappropriate. ANC presented evidence whereby a reasonable jury could have found that the Affinity-containing films were not equivalent to films made using the linear copolymers described in the patents of the first and second families. We express no opinion as to the resolution of this question; we hold only that the matter could not be summarily decided. The issue requires trial.

III

PATENT VALIDITY

After the evidence had been presented, the district court granted judgment as a matter of law that the six patents in suit were valid, removing the issue from the jury. A court may grant JMOL if a party has been fully heard on an issue and there is "no legally sufficient basis for a reasonable jury to find for that party on that issue." Fed. R. Civ. P. 50(a)(1).

Our review of the grant of JMOL is plenary. If reasonable jurors could reach only one verdict, the grant of JMOL is appropriate and must be affirmed. See Allied Colloids Inc. v. American Cyanamid Co., 64 F.3d 1570, 1572-73, 35 USPQ2d 1840, 1841 (Fed. Cir. 1995). ANC challenges the court's grant of JMOL instead of permitting the jury to decide the question of validity. ANC also challenges the merits of the judgment, pointing to weaknesses in the patents and directing our attention to ongoing reexamination proceedings.

The district court limited ANC's presentation of prior art to the references listed in ANC's second pretrial invalidity statement. The court accepted this second statement, although it was tardy and did not conform with the court's rules. However, the court declined to accept ANC's third invalidity statement, stating: "Rather than informing Viskase of its invalidity position even then [in the second statement], ANC waited until the pretrial order was due, long after all discovery had closed, to suddenly assert a myriad of new defenses." ANC does not challenge this ruling, and we discern no basis on which to intrude upon the district court's response to ANC's disregard of the court's procedures. See, e.g., Abbott Labs. v. Brennan, 952 F.2d 1346, 1351, 21 USPQ2d 1192, 1196 (Fed. Cir. 1991) ("It is improper on appeal to disturb a district court's trial management, absent clear abuse of judicial discretion.")

ANC argues invalidity on this appeal, citing references in addition to those that were

before the district court. While the Federal Rules of Civil Procedure permit relief from judgment where evidence has been "newly discovered," see Fed. R. Civ. P. 60(b), the district court expressly found ANC's proffers tardy. To the extent that ANC presents evidence on appeal that was not before the trial court, only rarely will such evidence and issues be entertained when not properly raised in proceedings below. See Bellotti v. Baird, 428 U.S. 132, 143-44 n. 10 (1976); Boggs v. West, 188 F.3d 1335, 1337 (Fed. Cir. 1999). Although courts have occasionally permitted such review, it raises questions of fairness and surprise on appeal. Hormel v. Helvering, 312 U.S. 552 (1941). We discern no error in the trial court's exercise of its discretion, nor has compelling reason been presented to consider references that were available during the pre-trial period. Therefore, we decline to consider the new arguments.

In addition to the references that were before the patent examiner, at the trial ANC relied on the Newsome patent as grounds of invalidity. Newsome shows three-layer heat-shrinkable films having a core layer of the compositions shown in the first family patents, and outer layers containing linear low density ethylene copolymers. The Newsome copolymers are of higher density than those of either the first or second families, and all of the copolymers exemplified in the Newsome reference have densities of at least 0.919 g/cm³. Although Newsome was not cited during PTO examination, Viskase states that Newsome's teachings do not differ from those of the Tse United States Patent No. 4,894,107 or its European counterpart, and that Tse was considered by the PTO. ANC states that Tse "played no role" in the PTO's examination because Viskase antedated the April 29, 1985 Tse filing date. However, the prosecution history shows argument by Viskase of the substance of the Tse teachings. ANC witnesses testified that at the time of Newsome's filing (1982) the density of

linear low density copolymers "could be" as low as 0.91 g/cm^3 ; however, they conceded that such products did not then exist, and no reference was cited to suggest that it was known how to make them.

ANC also relied on the Goeke and Karol patents, which were incorporated in the specifications of the first family patents as teaching processes for making ethylene copolymers. These references do not show heat-shrinkable films, but Goeke states that his process produces linear low density polyethylenes with densities as low as "about 0.91 ." Karol also describes a process for making ethylene copolymers having densities " 0.91 ." Despite these general terms, the resins that are specifically exemplified in the Goeke patent all have densities above 0.920 g/cm^3 , and Karol's specific examples all show densities of at least 0.919 g/cm^3 . The witnesses generally agreed that ethylene copolymers having densities below 0.91 g/cm^3 did not exist at the time of filing of the Goeke and Karol patents.

ANC also relied on Baird Patent No. 3,022,543 and Pahlke Patents Nos. 3,555,604 and 3,456,044, which show polyethylene film-making methods including the double bubble method. However, these patents do not add new information about very low density copolymers in the claimed range.

The second family patents, as we have mentioned, are directed to compositions having a methyl acrylate/vinylidene chloride (MA-saran) core layer, in combination with outer layers containing very low density ethylene copolymers having a maximum density of 0.915 g/cm^3 . ANC again relied on Newsome, Ferguson, Tse, Baird, and Pahlke '604 and '044. As for the first family, Newsome and Tse were cited as showing linear low density ethylene copolymers in heat-shrinkable multilayer films, and Ferguson for describing very low density ethylene copolymers. Tse showed a core layer of MA-saran with linear low density copolymer films.

Baird and Pahlke showed the double-bubble method. Viskase responded with evidence of the unexpected and advantageous properties and production of the specific composition of MA-saran and VLDPE, not possessed by prior art products, in that this combination did not need layers of adhesive to bond the core and outer layers.

The district court ruled that ANC had not provided clear and convincing evidence of invalidity. On appeal ANC points to no evidence of a suggestion, teaching, or motivation in the prior art to combine these cores with very low density ethylene copolymers for use in heat-shrinkable bags. See Brown & Williamson Tobacco Corp. v. Philip Morris Inc., 229 F.3d 1120, 1124-25, 56 USPQ2d 1456, 1459 (Fed. Cir. 2000) ("[A] showing of a suggestion, teaching, or motivation to combine the prior art references is an 'essential component of an obviousness holding.'" quoting C.R. Bard, Inc. v. M3 Sys. Inc., 157 F.3d 1340, 1352, 48 USPQ2d 1225, 1232 (Fed. Cir. 1998)).

Although ANC complains that the district court, who ruled from the bench, did not set forth a detailed Graham analysis, the record shows that the district court received full argument of the issues of validity. See Consolidated Aluminum Corp. v. Foseco Int'l Ltd., 910 F.2d 804, 814, 15 USPQ2d 1481, 1489 (Fed. Cir. 1990) ("An appellate court need not close its eyes to the record [where] there is a way clearly open to affirm the district court's action."); Baxter Healthcare Corp. v. Spectramed, Inc., 49 F.3d 1575, 1582, 34 USPQ2d 1120, 1125 (Fed. Cir. 1995) (an appellate court is free to examine the record to determine whether the facts support the judgment). On the record before the trial court, the district court's grant of JMOL, upholding the validity of the patents in suit, is affirmed.

Reexamination

After the trial ANC sought reexamination in the Patent and Trademark Office of one patent from each family. ANC asks us to take judicial notice of these proceedings, and has provided copies of various documents. The district court declined to stay or reopen the proceedings in light of the ongoing reexaminations. See Ethicon v. Quigg, 849 F.2d 1422, 1428, 7 USPQ2d 1152, 1157 (Fed. Cir. 1988) ("challenging validity in a court and requesting PTO reexamination 'are concepts not in conflict,'" quoting In re Etter, 756 F.2d 852, 857, 225 USPQ 1, 4 (Fed. Cir. 1985) (en banc)).

The court is not required to stay judicial resolution in view of the reexaminations. See Slip Track Systems, Inc. v. Metal Lite, Inc., 159 F.3d 1337, 1341, 48 USPQ2d 1055 (Fed. Cir. 1998) (while stay of patent litigation may be appropriate in certain circumstances, where the copending actions are "neither duplicative nor dependent on one another, there is neither any need nor any justification" for a stay); cf. Patlex Corp. v. Mossinghoff, 758 F.2d 594, 225 USPQ 243 (Fed. Cir. 1985) (a stay for purposes of reexamination is within the district court's discretion).²

We affirm the district court's denial of ANC's motions to stay or reopen the case.

² We take judicial notice that patentability of the second family '784 patent has recently been confirmed.

Inventorship

In the course of the reexamination proceedings, the examiner rejected the second family patent by citing as prior art the earlier-filed first family patent. Although the patents were commonly owned, the inventive entities differed. The named inventors for the first family were Lustig, Mack-Roble, Vicik, and Schuetz; for the second family they were Lustig and Schuetz. Viskase then petitioned the PTO to correct inventorship for the second family to name the same four inventors. The PTO granted the petition over ANC's objection.

ANC then moved the district court to reopen the judgment and dismiss the infringement counts as to the second family based on the inventorship change. ANC also filed a separate declaratory action seeking to invalidate the second family patents based on asserted irregularities in the process of correcting inventorship, and to declare the true inventors. The district court consolidated that action with the present case and then dismissed the declaratory counts as raising no new issues. No flaw has been shown in this procedure.

ANC argued that Viskase lacked standing at the time of suit because the inventors were not then correctly named and had not executed an assignment of ownership to Viskase. ANC also argued that the second family patents were invalid for the period of incorrect inventorship. The district court denied ANC's motion to dismiss the suit as to Viskase's second family patents.

It is well established that all entities having substantial rights in the patent must join or be joined in infringement litigation. See, e.g., Vaupel Textilmaschinen KG v. Meccanica Euro Italia S.P.A., 944 F.2d 870, 875-76, 2 USPQ2d 1045, 1049 (Fed. Cir. 1991) (discussing nature of substantial rights as between patentee and exclusive licensee). The purpose of this rule is to prevent the possibility of multiple suits against the same defendant. Crown Die &

Tool Co. v. Nye Tool & Mach. Works, 261 U.S. 24, 38 (1923). Inventors who have an obligation to assign their inventions have no ownership interest in the patents on those inventions.

Absent fraud or deceptive intent, the correction of inventorship does not affect the validity or enforceability of the patent for the period before the correction. Cf. Stark v. Advanced Magnetics, Inc., 119 F.3d 1551, 1554-56, 43 USPQ2d 1321, 1323-26 (Fed. Cir. 1997). It was not shown that Viskase was not the owner of the patents in suit; or that the incorrect ownership affected Viskase's ownership rights. 35 U.S.C. §256 provides that an error of inventorship does not invalidate the patent if such error "can be corrected as provided in this section." The district court correctly refused to reopen the judgment on this ground.

IV

DAMAGES - WILLFUL INFRINGEMENT

The jury verdict did not distinguish between damages based on infringement of the first or second family patents, or between damages accruing from use of the Attane or the Affinity copolymers. On remand, the district court may determine whether the jury's assessment of damages can be reconstructed from the accounting evidence, with respect to the products for which the verdict of infringement is sustained; that is, the Attane-containing products made under the second family patents. If reasonably severable, this aspect of the damages award may be awarded in the district court's discretion.

In view of our rulings negating the other grounds on which infringement was found, the verdict of willful infringement is deprived of adequate support. That judgment is vacated, as is the enhancement of damages based thereon.

We discern no abuse of discretion in the court's refusal to award attorney fees and full

interest to Viskase, as a response to the perjury of Viskase's expert witness, despite Viskase's ignorance of the perjury.

Summary

The first family patents are not literally infringed by ANC's use of products containing Attane brand copolymers; the judgment of infringement is reversed as to these patents and products.

The judgment of infringement of the second family patents by films containing Attane brand copolymers is affirmed, as is the jury verdict of damages for this aspect, subject to the feasibility of allocation of damages.

The summary judgment of infringement of both families of patents by the Affinity-containing products is vacated; trial is required.

The judgment of validity is affirmed, as are the district court's rulings with respect to inventorship, standing, and reexamination.

No costs.

AFFIRMED IN PART, REVERSED IN PART, AND REMANDED