

United States Court of Appeals for the Federal Circuit

05-1363,-1461

CONOCO, INC. and CONOCO SPECIALTY PRODUCTS, INC.,

Plaintiffs-Appellees,

v.

ENERGY & ENVIRONMENTAL INTERNATIONAL, L.C.,

Defendant-Appellant,

and

GERALD B. EATON, RONALD N. GRABOIS and MICHAEL MONAHAN,

Defendants.

Marcus E. Sernel, Kirkland & Ellis LLP, of Chicago, Illinois, argued for plaintiffs-appellees. With him on the brief were Jamie H. McDole, Kirkland & Ellis, and Lee L. Kaplan, Smyser Kaplan & Veselka, LLP, of Houston, Texas. Of counsel were Justin M. Waggoner, Kristen L. McKeever and Kristen E. Adler, Smyser Kaplan & Veselka, LLP.

Clarence E. Eriksen, Clarence E. Eriksen & Associates, of Houston, Texas, argued for defendant-appellant. With him on the brief were Gordon G. Waggett, Gordon G. Waggett, P.C., and Michael J. Schaengold, Patton Boggs LLP, of Washington, DC.

Appealed from: United States District Court for the Southern District of Texas

Judge John D. Rainey

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DECIDED: August 17, 2006

Before BRYSON, Circuit Judge, ARCHER, Senior Circuit Judge, and GAJARSA, Circuit Judge.

GAJARSA, Circuit Judge.

Conoco, Inc. (“Conoco”) brought suit against Energy & Environmental International, L.C. (“EEI”), Gerald Eaton, Ronald Grabois, and Michael Monahan for the alleged infringement of U.S. Patent Nos. 5,244,937 (“the ’937 patent”) and 6,172,151

(“the ‘151 patent”) (collectively “the patents in suit”). EEI stipulated that the patents in suit were valid and enforceable for purposes of the litigation. On April 1, 2004, the district court entered a Markman order construing the patent claims. Conoco, Inc. v. Energy & Envtl. Int’l, L.C., No. H-01-4242 (S.D. Tex. Apr. 1, 2004) (“Markman Order”). Thereafter, the court partially granted EEI’s motion for summary judgment of non-infringement of the ‘151 patent by holding that there was no genuine issue of material fact that EEI literally infringed the ‘151 patent, but that there was a sufficient issue of fact regarding Conoco’s remaining claims for doctrine of equivalents infringement. Conoco, Inc. v. Energy & Envtl. Int’l, L.C., No. H-01-4242 (S.D. Tex. Apr. 27, 2004) (“Summary Judgment Order”).

The district court held a bench trial and found inter alia that EEI literally infringed claim 1 of the ‘937 patent, that EEI infringed claims 1-3 of the ‘151 patent under the doctrine of equivalents, and that defendants Eaton and Grabois did not have personal liability for the infringement.¹ Conoco, Inc. v. Energy & Envtl. Int’l, L.C., No. H-01-4242, slip op. at 59, 62 (S.D. Tex. Mar. 31, 2005) (“Findings of Fact & Conclusions of Law”). The court further enjoined EEI from infringing the patent, id. at 68-69, and later extended its injunction to include the use of polyethylene wax (“PE wax”), Conoco, Inc. v. Energy & Envtl. Int’l, L.C., No. H-01-4242 (S.D. Tex. June 23, 2005) (“Contempt Order”). EEI now appeals the district court’s claim construction for the ‘937 patent, its partial denial of summary judgment of non-infringement for the ‘151 patent, its factual findings and legal conclusions of infringement, and its extension of the injunction. As we discuss below, we agree with the district court and affirm.

¹

Conoco settled with Monahan prior to trial.

I. BACKGROUND

A. The Patents in Suit

The patents in suit encompass processes for making drag reducing agents (“DRA”) that are injected into oil and gas pipelines to reduce friction inherent in pumping operations. By reducing friction, a supplier is able to pump more liquid more efficiently. The active ingredients in DRAs are high molecular weight polymers.

Developed in the 1970s, the first DRAs were gel-based with a jello-like consistency. These gel-based DRAs, however, were difficult to handle. Operators had difficulty storing and injecting the gel, and the gel-based DRAs had difficulty dissolving in the oil.

Eventually, a second, suspension-based DRA was developed with improved handling and dissolution characteristics. Suspension-based DRAs involve grinding a polymer at cryogenic temperatures and mixing them in a suspending material. One problem with suspension-based DRAs, however, is that the cryoground polymer may stick together or “agglomerate” after they are ground. To prevent agglomeration, operators coat the polymer with a partitioning agent during grinding.

1. The '937 Patent

In general, the '937 patent teaches a process by which high-molecular-weight polyalphaolefin drag reducing polymer particles could be suspended in a water or water-alcohol liquid medium that was non-solvent with respect to the solid polymer particles. Conoco brought suit alleging infringement of claim 1, which reads:

1. A Process for the preparation of a stable nonagglomerating suspension of a solid oil soluble polyolefin friction reducing agent obtained from the polymerization of olefins containing from 2 to about 30 carbon atoms which comprises:

(1) subjecting said solid polyolefin friction reducing agent to grinding at cryogenic temperatures in the presence of an inert solid material to provide free flowing, finely divided polymer particles coated with said solid material, and

(2) combining the coated polymer particles with a water soluble polymeric thickening agent and a suspending material selected from the group consisting of water and water-alcohol mixtures, whereby a stable nonagglomerating suspension of the solid friction reducing agent is obtained.

'937 patent, col.7, l.66 – col.8, l.13 (emphasis added).

2. The '151 Patent

According to Conoco, even though the '937 patent was widely accepted, it still had flaws. Some refiners were reluctant to inject a water-containing substance into certain products like gasoline or diesel fuel. Furthermore, the commonly used metal stearate partitioning agent was not ideal for gasoline injection due to the metal emissions it caused during use and the formation of a thick paste that could not be injected when suspended in a pure-alcohol medium.

The invention disclosed in the '151 patent represents a process by which polymer particles could be suspended in alcohols and/or glycols using a fatty acid wax partitioning agent to provide a stable, nonagglomerating suspension. At trial, Conoco alleged that EEI infringed claims 1-3 of the '151 patent. Claim 1, a representative claim of the three, reads:

1. A method of reducing turbulent drag in a hydrocarbon liquid stream flowing through conduits, which comprises:

(a) forming a solid hydrocarbon soluble polyolefin friction reducing agent from olefins containing from 2 to 30 carbon atoms;

(b) finely dividing said soluble polyolefin friction reducing agent in the presence of a partitioning agent to provide a free flowing, polyalphaolefin material, said partitioning agent being a fatty acid wax;

(c) dispersing the free-flowing polyalphaolefin particles in a substantially nonaqueous suspending fluid medium selected from the group consisting of alcohols containing 14 or less carbon atoms, glycols and glycol-ethers; and

(d) adding said suspension to said hydrocarbon liquid stream in an amount of up to 100 ppm of said reducing agent to reduce friction during turbulent flow through said conduits.

'151 patent, col.7, l.59 – col.8, l.9 (emphasis added). The main contention in these claims is the use of the term “fatty acid wax.” The specification notes that fatty acid waxes are “necessary” during the cryogrinding process. Col. 4, l. 17.

During prosecution, the applicants claimed from the beginning that the DRA was formed with a fatty acid wax partitioning agent such as stearamides. The examiner rejected the claims as obvious because, even though the prior art taught the use of talc, clay and metal stearates as partitioning agents, the prior Widiger patent taught the use of stearamides for preventing adhesion of films in the food packaging industry.

The applicants responded by pointing out that the Widiger patent was nonanalogous art. However, the examiner maintained the rejection, stating:

the definition of a fatty acid wax is an ester of long-chain fatty acids and long-chain alcohols, the applicants include stearamides in their definition of the fatty acid wax. It seems that the applicants is [sic] defining the fatty acid wax as the long-chain fatty acids and its derivatives; thus the metal stearates of Johnston seems to be functionally equivalent to stearamide.

Conoco subsequently cancelled its original claims and submitted 22 new claims that continued to claim the fatty acid wax limitation. Upon submission of the 22 new claims, one proposed claim, claim 21, did not contain the fatty acid wax limitation. This element was later added by examiner amendment with no explanation.

After a meeting between the applicants and the examiner to explain the differences between metal stearate partitioning agents in a water or water/alcohol system and fatty acid waxes in a nonaqueous system, the examiner allowed the claims of the '151 patent, explaining that

Johnston et al. do not teach or reasonably suggest their coating agent to be a fatty acid wax such as stearamides and the like. Although Widiger et al. teach slip additives of amides such as stearamide for preventing the adhesion between surfaces of polyolefin articles, since applicant has shown the criticalities of using fatty acid wax as the partitioning agent over metal stearates (the salt forms of the fatty acid wax) in the video tape provided during the interview of August 4, 2000, thus, the instant claims are deemed novel.

(emphasis in original).

B. Claim Construction

Before trial, the parties asked the court to explicitly construe “water-alcohol mixture” in the '937 patent and “fatty acid wax” in the '151 patent. The court construed “water-alcohol mixture” to be “a suspending material containing more than negligible amounts of water and alcohol.” Markman Order at 8. The court rejected EEI’s proposed construction that incorporated language from the specification noting a water-alcohol mixture that contained 30% water. Furthermore, the court read the specification to require more than negligible amounts of water because the specification required an “aqueous” suspending material that it defined as a “medium ‘made from, with or by means of water.’” Id. at 7 (citing Webster’s New International Dictionary 135 (2d ed. 1934)).

The court construed “fatty acid wax” to be “stearamides and similar amide derivatives.” Id. at 12. The court recognized that the applicants accepted the

examiner's more limited definition of "fatty acid wax" during prosecution that excluded the derivatives of fatty acids such as metal stearates.

C. Alleged Infringing Activity

EEI began producing DRAs in 1996 with a gel-based product. In late 1999, EEI developed and began selling a suspension-based DRA called XPAND High Internal Product Ratio ("HIPR"). The Original Process for making HIPR used Alfol-2 as a suspending medium, and the district court found that HIPR contained the following materials: (1) Alfol-2 – 67 percent; (2) Carbopol – 0.7 percent; (3) PE Wax – 0.8 percent; (4) C30+ Wax – 8.7 percent; (5) Polymer – 23 percent; and (6) Acid – 0.5 percent.

The district court found that Alfol-2, the accused "suspending material," contained 8 to 15 percent water and 80 to 82.31 percent ethanol. The remaining ingredients consist primarily of a denaturing agent known as methyl isobutyl ketone ("MIBK"), which is added to industrial alcohols to avoid paying liquor taxes and to avoid human consumption. EEI presented evidence that Alfol-2 consisted of the following materials: (1) Water – 8 percent; (2) Ammonia – 0.08 percent; (3) Ethanol – 82.31 percent; (4) Other Hydrocarbons – 0.38 percent; (5) Isopropanol – 2.35 percent; (6) Methanol – 0.09 percent; (7) Butanol – 0.94 percent; (8) MIBK – 4.7 percent; (9) Heptane – 1.12 percent. The district court found that any non-alcohol and non-water components in Alfol-2, such as the ammonia, heptane and MIBK, were impurities.

In April of 2001, EEI switched from its Original Process that used Alfol-2 to its Current Process that used Alfol-6. Alfol-6 was composed of substantially-pure hexanol as a suspending medium; therefore, the Current Process did not infringe the '937 patent

because the suspending medium was not composed of a water-alcohol mixture. However, Conoco claimed the Current Process infringed the '151 patent.

At trial, EEI conceded that the Current Process met every element of claims 1-3 of the '151 patent except for the requirement that the partitioning agent be a "fatty acid wax." EEI's Current Process uses C30+ wax as the partitioning agent. C30+ wax is not a "fatty acid wax" or stearamide as defined by the patent. It is a straight hydrocarbon wax.

D. District Court Orders

1. Summary Judgment

Before trial, EEI moved for summary judgment of non-infringement on the '151 patent claims. It argued that Conoco was estopped from alleging doctrine-of-equivalents infringement because the inventors argued during prosecution that "fatty acid wax" applied to stearamides and the like, therefore excluding all other equivalent compounds. The district court denied the motion and stated that Conoco was not estopped because the fatty acid wax limitation was present throughout prosecution, the limitation was not amended for reasons related to patentability, and during prosecution Conoco only surrendered application of the limitation to metal stearates, not hydrocarbon waxes. Furthermore, even if there had been a narrowing of the claims, the district court held that Conoco could rebut any estoppel presumption because the evidence indicated that the use of C30+ wax was unforeseeable and only tangentially related to the metal stearate disclaimer.

2. Findings of Fact and Conclusions of Law

After conducting a bench trial, the district court issued its findings of fact and conclusions of law. In regards to the '937 patent, the court found that EEI's HIPR product was a stable nonagglomerating suspension when it entered the pipeline based on EEI memos and expert testimony. Further, EEI's Original Process contained a meaningful amount of water in its suspending medium that made it a "water-alcohol mixture" for purposes of the claims. The court found that any water-alcohol mixture over 1 to 2 percent water was not negligible in this context because it would "impact[] the density and suspension capabilities of the suspending medium." Findings of Fact and Conclusions of Law at 18. Last, the court found that all other non-water and non-alcohol components, such as MIBK, were impurities that were not to be counted against the exclusive "consisting of" language. Thus, EEI's Original Process for manufacturing HIPR literally infringed the '937 patent.

Next, the district court found that the C30+ wax was equivalent to the "fatty acid wax" limitation in the '151 patent under the function-way-result test. The C30+ wax served the same function by preventing agglomeration of the polymer in a nonaqueous suspension. The C30+ wax performed this function in substantially the same way by coating the polymer during the cryogrinding process. The C30+ wax achieved the same result by creating a free-flowing polymer suspended in a nonaqueous solution.

3. Contempt Hearing

In the district court's final judgment, it enjoined EEI to "cease all manufacturing, offers for sale, and sales of its infringing HIPR slurry drag reducing agent product effective immediately." EEI, however, continued to manufacture its HIPR product and

substituted PE wax for the C30+ wax. Conoco moved to find EEI in contempt of the injunction. The court denied the motion because its order was unclear and could be read to allow the use of PE wax. The district court clarified its order and extended the injunction to include EEI's reformulated process using PE wax.

EEI filed a timely appeal in this court, and we have jurisdiction pursuant to 28 U.S.C. § 1295(a)(1).

II. DISCUSSION

A. Standard of Review

"On appeal from a bench trial, we review a district court's decision for errors of law and clearly erroneous findings of fact." Brown & Williamson Tobacco Corp. v. Philip Morris, Inc., 229 F.3d 1120, 1123 (Fed. Cir. 2000). Claim construction is a question of law that we review de novo. See Cybor Corp. v. FAS Techs., Inc., 138 F.3d 1448, 1456 (Fed. Cir. 1998) (en banc). Whether an accused device meets all the limitations of those claims is a factual question we review for clear error. See Playtex Prods., Inc. v. Procter & Gamble Co., 400 F.3d 901, 906 (Fed. Cir. 2005).

Infringement under the doctrine of equivalents is also a factual question that we review for clear error. See Biovail Corp. Int'l v. Andrx Pharm., Inc., 239 F.3d 1297, 1300 (Fed. Cir. 2001). However, we review issues relating to the application of prosecution history estoppel de novo. See Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., 344 F.3d 1359, 1368 (Fed. Cir. 2003) (en banc).

We review a district court's decision to extend injunctive relief for an abuse of discretion. See Eli Lilly & Co. v. Medtronic, Inc., 872 F.2d 402, 404 (Fed. Cir. 1989). We review the factual findings during a contempt proceeding for clear error. Additive

Controls & Measurement Sys., Inc. v. Flowdata, Inc., 154 F.3d 1345, 1351 (Fed. Cir. 1998).

B. The '937 Patent

First, EEI contends that it did not literally infringe the '937 patent because the district court erred in its claim construction and infringement analysis. As part of its recitation of error, EEI claims that the district court erred by construing "water-alcohol mixture" to mean more than negligible amounts of water, by finding Alfol-2 was a suspending medium "consisting of" a water-alcohol mixture, and by finding the accused product to be stable and nonagglomerating.

1. "Water-Alcohol Mixture"

First, EEI asserts that the district court misconstrued the term "water-alcohol mixture" because it did not limit the term composition to at least 30 percent water as described in the specification. In Phillips v. AWH Corp., we reaffirmed our often stated rule that the "words of a claim 'are generally given [the] ordinary and customary meaning'" that they would have to a person of ordinary skill in the art at the time of the invention. 415 F.3d 1303, 1312-13 (Fed. Cir. 2005) (en banc) (quoting Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1582 (Fed. Cir. 1996)). However, this "person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification." Id. at 1313; see also Markman v. Westview Instruments, Inc., 52 F.3d 967, 979 (Fed. Cir. 1995) (en banc), aff'd, 517 U.S. 370 (1996) (holding that the claims "must be read in view of the specification, of which they

are a part"). Indeed, an inventor may use the specification to intentionally disclaim or disavow the broad scope of a claim. Phillips, 415 F.3d at 1316.

However, this intention must be clear, see Teleflex, Inc. v. Ficosa N. Am. Corp., 299 F.3d 1313, 1325 (Fed. Cir. 2002) ("The patentee may demonstrate an intent to deviate from the ordinary and accustomed meaning of a claim term by including in the specification expressions of manifest exclusion or restriction, representing a clear disavowal of claim scope."), and cannot draw limitations into the claim from a preferred embodiment, see Phillips, 415 F.3d at 1323 ("[W]e have expressly rejected the contention that if a patent describes only a single embodiment, the claims of the patent must be construed as being limited to that embodiment."). Moreover, "when a claim term is expressed in general descriptive words, we will not ordinarily limit the term to a numerical range that may appear in the written description or in other claims." Renishaw PLC v. Marposs Societa' per Azioni, 158 F.3d 1243, 1249 (Fed. Cir. 1998); Modine Mfg. Co. v. U.S. Int'l Trade Comm'n, 75 F.3d 1545, 1551 (Fed. Cir. 1996).

Here, the specification states that the "amount of alcohol employed in the suspending material may vary widely but it usually forms between about 0 and 70 weight percent of the suspending material, and more usually between about 30 and about 50 weight percent." '937 patent, col.5, ll.19-23 (emphasis added). EEI maintains that this language explicitly limits the amount of alcohol in the suspending medium to a numerical range—between 0 and 70 percent. However, this language refers to a preferred embodiment of the invention, and the given numerical ranges are not used in a context meant to limit the claims. In fact, the language itself inherently recognizes that the numerical range should not limit the claim by noting that the amount of alcohol "may

vary widely" and "usually" falls within a numerical range. Thus, the patentee did not limit the claim term as EEI suggests,² and the district court did not err in its claim construction.

2. "Consisting of" and "Stable Nonagglomerating Suspension" Claim Terms

Next, EEI argues that the district court erred by misconstruing the terms "consisting of" and "stable nonagglomerating suspension." EEI suggests that the court has erred in its claim construction and that we should review the construction of both terms de novo. Conversely, Conoco argues that EEI waived its right to ask for explicit claim construction on both terms because it conceded they were not in dispute by not raising the issue before, during, or after trial.³

Normally, a district court faced with a patent infringement suit engages in a two-step analysis, involving: (1) construing the disputed claims of the patent—a matter of law—and (2) comparing the accused device to the patent claims—a matter of fact. Cybor Corp., 138 F.3d at 1454, 1456. However, legal issues in patent infringement suits are not immune to the doctrine of waiver on appeal, and except for certain circumstances, those issues not raised below at the district court cannot be heard for

² EEI further contends that the district court's construction reads the "water" limitation out of the claim because it only requires a non-negligible amount of water. EEI's additional argument stems from the description of the invention as "inexpensive and environmentally safe." It maintains that for the product to be inexpensive and environmentally safe it needs to contain a substantial amount of water. We, however, find even less support for EEI's proposed construction because this language only serves to describe the benefits of having an aqueous suspending material and not a specific range of water in that material.

³ Conoco contends that EEI failed to raise these issues at any time below, however, there was at least sufficient argument post trial to address the issue on appeal. Here, we address any failure to argue claim construction either before or during trial.

the first time on appeal. Interactive Gift Express, Inc. v. Compuserve, Inc., 256 F.3d 1323, 1344-45 (Fed. Cir. 2001). Thus, a party may not introduce new claim construction arguments on appeal or alter the scope of the claim construction positions it took below. Id. at 1346-47; see also NTP, Inc. v. Research in Motion, Ltd., 418 F.3d 1282, 1296 (Fed. Cir. 2005). Moreover, litigants waive their right to present new claim construction disputes if they are raised for the first time after trial. See Eli Lilly & Co. v. Aradigm Corp., 376 F.3d 1352, 1360 (Fed. Cir. 2004).

In Eli Lilly, the appellant argued that the district court erred by not construing a claim before sending the underlying inventorship issue to the jury. Id. However, we held that because the appellant waited to raise the argument until after the presentation of all the evidence to the jury, it waived the right to seek a construction of the newly disputed terms. Id. As a result, the appellant “implicitly conceded that the meanings of the terms in [the claim] are clear and not in need of construction.” Id.

On the other hand, a district court may engage in claim construction during various phases of litigation, not just in a Markman order. We have recognized that district courts may engage in “rolling claim construction, in which the court revisits and alters its interpretation of the claim terms as its understanding of the technology evolves.” Guttman, Inc. v. Kopykake Enters., Inc., 302 F.3d 1352, 1361 (Fed. Cir. 2002) (citing Sofamor Danek Group, Inc. v. DePuy-Motech, Inc., 74 F.3d 1216, 1221 (Fed. Cir. 1996)).

In the present case, EEI suggests that we review the terms “consisting of” and “stable nonagglomerating suspension” de novo. Because “consisting of” is a term of art in patent law with its own construction, MPEP § 2111.03 (8th ed., Rev. 1, Feb. 2003);

see also Vehicular Techs. Corp. v. Titan Wheel Int'l, Inc., 212 F.3d 1377, 1382 (Fed. Cir. 2000), we will apply that legal construction, discussed below, and review the court's infringement analysis for clear error.⁴ The second term, "stable nonagglomerating suspension," is not such a term of art. As Conoco suggests, EEI waived its right to have that term construed and therefore conceded that the construction was clear and not in need of construction. However, the district court explicitly construed the term in its Findings of Fact and Conclusions of Law stating,

53. The Court reads the term "stable nonagglomerating suspension" to mean that the polymer particles are stable and not agglomerating at the time that the DRA is introduced into the pipeline

54. Under the '937 patent, a product is stable when the polymer particles are suspended in water or a mixture of water and alcohol with the addition of a water soluble thickening agent, if needed Other things being equal the nearer the density of the suspending medium is to the density of the polymer, the easier it is to form the stable suspension of the invention.

Because the court explicitly construed the term sua sponte and applied that construction to the facts, we must review its construction de novo. See Allen Eng'g Corp. v. Bartell Indus., 299 F.3d 1336, 1343-45 (Fed. Cir. 2002) (reviewing a court's claim construction within its findings of fact and conclusions of law after a bench trial de novo).

a. "Consisting of"

First, EEI alleges that the patentee's use of "consisting of" limits the scope of the '937 patent to exclude products performing only the recited steps of the patent "and nothing else." EEI contends that the district court erred by allowing the accused

⁴ Though it is not inconceivable that a patentee could break with conventional claim construction and become his own lexicographer, see Phillips, 415 F.3d at 1316, we find no instances where EEI asked for a contrary claim construction nor any instance where the court specially construed the term sua sponte. Thus, any argument that "consisting of" take on a special meaning is waived.

process's suspension medium to include MIBK, a non-alcohol, in spite of the limitation that the suspending medium consist of water or a water-alcohol mixture.

Transitional phrases, such as "comprising," "consisting of," and "consisting essentially of," are terms of art in patent law that "define the scope of the claim with respect to what unrecited additional components or steps, if any, are excluded from the scope of the claim." MPEP § 2111.03; accord Vehicular Techs. Corp., 212 F.3d at 1382-83. The phrase "consisting of" signifies restriction and exclusion of unrecited steps or components. MPEP § 2111.03. Although "consisting of" is a term of restriction, the restriction is not absolute. The Patent Board of Appeals has interpreted "consisting of" to "close[] the claim to the inclusion of materials other than those recited except for impurities ordinarily associated therewith." Ex parte Davis, 80 U.S.P.Q. 448, 450 (Pat. Office Bd. App. 1948); see also Bethell v. Koch, 427 F.2d 1372, 1373-74 (C.C.P.A. 1970) (noting the parties' concession of a similar meaning of "consisting of").

We have explained that "consisting of" does not exclude additional components or steps that are unrelated to the invention. See Norian Corp. v. Stryker Corp., 363 F.3d 1321, 1331-32 (Fed. Cir. 2004). In Norian Corp., the District Court for the Northern District of California found as a matter of law that a product containing an unrecited element did not infringe U.S. Patent No. 6,002,065 ("the '065 patent") because the transitional phrase "consisting of" excluded the additional element from the protection of the patent. Id. at 1331. Specifically, the '065 patent taught a kit containing specified chemicals; the infringing kit contained all the recited elements of the '065 patent, but added one element unrelated to the invention disclosed in the '065 patent—a spatula.

Id. The district court held that adding the spatula to an otherwise infringing product avoided infringement of the '065 patent.

On appeal, we reversed the district court's holding and explained,

"Consisting of" is a term of patent convention meaning that the claimed invention contains only what is expressly set forth in the claim. However, while "consisting of" limits the claimed invention, it does not limit aspects unrelated to the invention. It is thus necessary to determine what is limited by the "consisting of" phrase.

Id. at 1331-32 (citation omitted). We held that the invention disclosed in the '065 patent was directed to a kit containing specified chemicals, and although the claims explicitly recited that no other chemical could be included in the composition, a competitor could not avoid infringement by adding a component unrelated to the invention. Id.

Similarly, impurities that a person of ordinary skill in the relevant art would ordinarily associate with a component on the "consisting of" list do not exclude the accused product or process from infringement. EEI contends that MIBK is not an impurity because it was purposely added to the alcohol to denature it. However, the intentional addition of a component does not change its status as an "impurity ordinarily associated therewith." See Davis, 80 U.S.P.Q. at 450.

MIBK is a common impurity in industrial alcohols in order to prevent a liquor tax from being applied. If, however, MIBK had been added to adjust the stability of the suspending medium or prevent agglomeration of polymer, it may not have been an impurity and therefore EEI would most likely not infringe. Thus, impurities normally associated with the component of a claimed invention are implicitly adopted by the

ordinary meaning of the components themselves.⁵ See Phillips, 415 F.3d at 1312-13 (“The ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art . . .”).

The district court found as a matter of fact that Alfol-2 consisted of water and alcohol and that any non-alcohol and non-water components, such as MIBK, were impurities. This conclusion was based on the testimony of EEI’s expert, who acknowledged that the small amounts of ammonia and heptane in the suspension were impurities and was impeached by prior testimony indicating MIBK was also an impurity. The court’s findings were based on the testimony of persons of ordinary skill in the art who testified that MIBK has little to no effect on the present invention and is normally associated with industrial alcohols to reduce tax liability. Accordingly, there was substantial evidence to support the district court’s findings that the MIBK and the other non-alcohol/non-water components were impurities, and the district court did not clearly err by finding that Alfol-2 met the claim limitations of the suspending medium.

b. “Stable Nonagglomerating Suspension”

Next, EEI argues that the district court misconstrued the claim term “stable nonagglomerating suspension.” After consideration of the court’s Findings of Fact and Conclusions of Law and the parties’ arguments, the primary contention centers on the word “stable.”⁶ Though the court does not give a short concise construction of the term as it did for other terms in its Markman order, we may paraphrase the court’s

⁵ We are not presented with the question of whether impurities not normally associated with a component would exclude the accused process from infringement; however, as in Norian Corp., the additional component must be related to the invention. 363 F.3d at 1331-32.

construction from its findings as follows: a suspension is stable under the '937 patent when the density of the polymer closely matches the density of the suspending material and thickening agent. The suspension may separate over time, but when the suspension is injected into the pipeline it is stable.

EEI maintains that the court improperly construed the term to mean stable "at the time the DRA is introduced into the pipeline." Appellant's Br. at 42. Alternatively, EEI argues that the proper construction requires a suspension capable of being "shipped over large distances while retaining [its] properties." Id. at 43. EEI's argument stems from a section of the specification stating:

The suspensions obtained by the described procedures are homogeneous dispersions, stable and nonagglomerating, and may be shipped over large distances while retaining these properties.

'937 patent, col.4, ll.46-49. We agree in part with EEI's argument, but we do not find error in the district court's reasoning. Rather, the court's apparent construction can be read congruently with EEI's proposed construction. In other words, a stable suspension at the time of pipeline injection will be stable enough to retain its properties over a long period of time, e.g., a period long enough to ship the product over large distances. As the court's construction implicitly recognizes, there is no limitation in the claim that requires the patented DRA to be transported over large distances or sit for long periods of time before it is introduced to a pipeline.

Claim construction involves the search for the ordinary and customary meaning of a claim term to a person of ordinary skill in the art. Phillips, 415 F.3d 1312-13. This

⁶ The parties do not contest the meaning of "nonagglomerating," which requires that the ground polymer particles remain separate individual particles.

meaning may be informed by the surrounding claim language, the specification, the prosecution history, and extrinsic evidence. Id. at 1314-19. Though not preferred over intrinsic evidence, id. at 1317,

extrinsic evidence in the form of expert testimony can be useful to a court for a variety of purposes, such as to provide background on the technology . . . , to explain how an invention works, to ensure that the court's understanding of the technical aspects of the patent is consistent with that of a person of ordinary skill in the art, or to establish that a particular term in the patent or prior art has a particular meaning in the pertinent field.

Id. at 1318. In this case, the claim language itself suggests that a person practicing the patent will create a stable suspension from a mixture of the polymer, suspending material, and thickening agent. '937 patent, col.8, ll.8-13. Further, the specification elaborates that “[o]ther things being equal the nearer the density of suspending medium is to the density of the polymer the easier it is to form the stable suspension of the invention.” Col.5, ll.12-14. The specification describes an embodiment of the process to include adding thickening agent—thereby increasing density of the suspending medium—“until a stable suspension is obtained.” Col. 4, ll. 34-35. These statements suggest that stability is inversely proportional to the density difference between the suspending liquid and the solid polymer particles. In other words, as the difference between the density of the polymer particles and the suspending liquid decreases (i.e., their densities reach the same or similar value), the stability of the suspension increases.

However, the experts agreed that any suspension will eventually separate given enough time. As Conoco's expert witness, Joel Barlow, noted in his direct testimony,

And as we discussed . . . stable has a time frame associated with it, . . . you can look at a mountain and say it's stable, but it's not stable geologically. So, it's a time frame issue.

And here I think everybody in the business says stable has to mean that the material stays suspended long enough to be useful in delivery and pumping into the pipelines.

Therefore, considering both the intrinsic and extrinsic evidence for the ordinary meaning of "stable nonagglomerating suspension," the district court's construction was not in error. The court's construction requiring that the suspension be stable at the time it is introduced was merely a recognition that the process could be completed at the time of pipeline introduction and did not have to be shipped over long distances. The court's construction of the term "stable" is correct.

Likewise, the court did not err in its application of the facts to that construction. EEI contends that it presented evidence that the accused product was not stable and that the polymer quickly settled out. However, Conoco presented contrary evidence comprising (1) EEI's representations to customers that its product was stable and nonagglomerating, (2) EEI's representations of stability to the PTO, and (3) EEI's concession that the product is stable when injected into the pipeline. Moreover, the district court determined that Conoco's witnesses were more credible than EEI's. See Energy Capital Corp. v. United States, 302 F.3d 1314, 1329 (Fed. Cir. 2002) ("As for the relative weight given to the testimony of both sides' expert witnesses, we accord the trial court broad discretion in determining credibility because the court saw the witnesses and heard their testimony."). Thus, there is sufficient evidence to support the district court's finding.

C. The '151 Patent

EEI further contends that the district court erred in its application of prosecution history estoppel to Conoco's doctrine of equivalents claim under the '151 patent. EEI asserts that Conoco was precluded from claiming a "fatty acid wax" equivalent because of an amendment and arguments made during prosecution. This argument is based on two events that occurred during prosecution. First, an examiner's amendment during prosecution added the "fatty acid wax" term to one of the patent claims without explanation. Second, during prosecution the applicant argued that metal stearates were not covered by the "fatty acid wax" limitation. EEI maintains that either of these events acts to estop Conoco from asserting that C30+ wax is an equivalent of a fatty acid wax.

Under the doctrine of equivalents, Conoco may lay claim to "those insubstantial alterations that were not captured in drafting the original patent claim but which could be created through trivial changes." Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., 535 U.S. 722, 733 (2002). However, prosecution history estoppel limits the broad application of the doctrine of equivalents by barring an equivalents argument for subject matter relinquished when a patent claim is narrowed during prosecution. Id. at 733-34. We have recognized that prosecution history estoppel can occur during prosecution in one of two ways, either (1) by making a narrowing amendment to the claim ("amendment-based estoppel") or (2) by surrendering claim scope through argument to the patent examiner ("argument-based estoppel"). Deering Precision Instruments, LLC v. Vector Distrib. Sys., Inc., 347 F.3d 1314, 1324 (Fed. Cir. 2003). EEI argues that both occurred here.

1. Amendment-based Estoppel

First, EEI argues that the examiner's amendment that added "fatty acid wax" to one of 22 new claims estopped Conoco's equivalents argument. When a patentee makes a narrowing amendment to a claim, the patent holder has the burden to demonstrate that the reason for the amendment was unrelated to patentability (e.g., to avoid prior art). Warner-Jenkinson Co. v. Hilton Davis Chem. Co., 520 U.S. 17, 33 (1997). When the record lacks explanation for the amendment, we "presume that the PTO had a substantial reason related to patentability for including the limiting element added by amendment." Id.; accord Festo, 535 U.S. at 735, 739.

Yet, this presumption is not an absolute bar, and the patent holder can rebut the presumption that the doctrine of equivalents will not apply. To do so, "the patentee must show that at the time of the amendment one skilled in the art could not reasonably be expected to have drafted a claim that would have literally encompassed the alleged equivalent." Festo, 535 U.S. at 741. A patentee may demonstrate this by showing "[1] [t]he equivalent may have been unforeseeable at the time of the application; [(2)] the rationale underlying the amendment may bear no more than a tangential relation to the equivalent in question; or [(3)] there may be some other reason suggesting that the patentee could not reasonably be expected to have described the insubstantial substitute in question." Id. at 740-41.

Here, there was an examiner's amendment to add the fatty acid wax limitation to one of the claims. Conoco maintains that the amendment was not related to patentability, but instead added merely to correct an obvious omission. We agree and therefore find no error in the district court's finding.

Each of the 16 original claims of the '151 patent application limited the partitioning agent to a fatty acid wax directly or through relation to an independent claim. Throughout the prosecution history, the examiner and applicants focused their attention on the meaning of the "fatty acid wax" limitation as compared to metal stearate partitioning agents.

Moreover, once the applicants cancelled the original claims and submitted 22 new claims, all but the first claim lacked the fatty acid wax limitation—presumably making the new claims broader than originally argued. Nevertheless, the examiner and applicants continued to focus their arguments as if the limitation was present, arguing the difference between fatty acid waxes and metal stearates. Such evidence indicates that the amendment was the correction of an inadvertent omission rather than the intentional narrowing of a broad claim for patentability purposes. Thus, the district court did not err by finding that the claim was not amended for purposes of patentability.

2. Argument-based Estoppel

Next, EEI contends that Conoco is also estopped by the repeated arguments the patentees made to explain the term "fatty acid wax" during prosecution. EEI maintains that the patentees cannot claim an equivalent because it specifically limited the term by arguing that fatty acid wax referred to stearamides and did not include metal stearates. To invoke argument-based estoppel, however, "the prosecution history must evince a clear and unmistakable surrender of subject matter." Deering Precision, 347 F.3d at 1326 (citation and punctuation omitted). Unlike amendment-based estoppel, we do not presume a patentee's arguments to surrender an entire field of equivalents through simple arguments and explanations to the patent examiner. Though arguments to the

examiner may have the same effect, they do not always evidence the same clear disavowal of scope that a formal amendment to the claim would have. Compare Festo, 535 U.S. at 739 (requiring courts “to presume that the patentee surrendered all subject matter between the broader and the narrower language” when an amendment is made for purposes of patentability) with Deering Precision, 347 F.3d at 1326 (requiring the prosecution history to “evince a clear and unmistakable surrender of subject matter” before estopping an equivalents argument). “The relevant inquiry is whether a competitor would reasonably believe that the applicant had surrendered the relevant subject matter.” Cybor, 138 F.3d at 1457.

Here, for instance, there is clear surrender of metal stearates, but there has not been a clear surrender of other possible equivalents. As the examiner noted, “applicant [showed] the criticalities of using fatty acid wax as the partitioning agent over metal stearates” in a video presented to the examiner. In reference to stearamides, the patentees merely explained what a fatty acid wax was and how it operated in the invention. The prosecution history arguments here merely demonstrate to the examiner that a fatty acid wax was not the same as a metal stearate to alleviate the examiner’s obviousness concerns. Though this may be enough to clearly disavow metal stearates as equivalents of fatty acid waxes, it is not a clear surrender of all fatty acid wax equivalents.

D. The Contempt Hearing and Expansion of the Injunction

Lastly, EEI argues that the district court should have considered evidence and conducted further evidentiary hearings to determine whether PE wax was the equivalent of “fatty acid wax” and was therefore infringing. “Contempt proceedings are appropriate

as long as the new issue does not raise a substantial question of infringement.” Additive Controls & Measurement Sys. v. Flowdata, Inc., 154 F.3d 1345, 1350 (Fed. Cir. 1998). If an accused infringer merely makes colorable changes to the accused product that infringed, a court may properly extend the injunction to the new device and find the party in contempt. See id. at 1350-51. Here, the court heard testimony that PE wax was the same as C30+ wax and that they functioned similarly in this context. Thus, the court’s decision to extend the injunction to encompass PE wax was not an abuse of discretion.

III. CONCLUSION

In this appeal, EEI asks us to review the district court’s final judgment that found EEI liable for infringement of Conoco’s ’937 and ’151 patents. For the reasons stated in this opinion, we find no reversible error. Accordingly, we affirm.

AFFIRMED

Costs to Appellee.