

United States Court of Appeals for the Federal Circuit

02-1587

THE UNIVERSITY OF COLORADO FOUNDATION, INC.,
THE UNIVERSITY OF COLORADO, THE BOARD OF REGENTS OF THE
UNIVERSITY OF COLORADO, ROBERT H. ALLEN,
and PAUL A. SELIGMAN,

Plaintiffs-Appellees,

v.

AMERICAN CYANAMID COMPANY,

Defendant-Appellant.

Mark A. Lemley, Keker & Van Nest L.L.P., of San Francisco, California, argued for plaintiffs-appellees. Of counsel on the brief were Harold A. Haddon, Saskia A. Jordan, and Ty Gee, Haddon, Morgan, Mueller, Jordan, Mackey & Foreman, P.C., of Denver, Colorado. Also of counsel on the brief were Robert N. Miller, Frederick T. Winters, and Stephanie E. Dunn, Perkins Coie, LLP, of Denver, Colorado.

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Appealed from: United States District Court for the District of Colorado

Senior Judge John L. Kane, Jr.

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THE UNIVERSITY OF COLORADO, THE BOARD OF REGENTS OF THE
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v.

AMERICAN CYANAMID COMPANY,
Defendant-Appellant.

DECIDED: September 3, 2003

Before RADER, BRYSON, and GAJARSA, Circuit Judges.

GAJARSA, Circuit Judge.

Drs. Robert H. Allen and Paul A. Seligman (collectively, “the Doctors”) developed an idea to reformulate a prenatal multivitamin/mineral supplement. The Doctors described their idea in a confidential manuscript to American Cyanamid Company’s (“Cyanamid’s”) Chief of Nutritional Science, Dr. Leon Ellenbogen, who copied parts of that manuscript to obtain U.S. Patent No. 4,431,634 (“the ‘634 patent”). The United States District Court for the District of Colorado held, inter alia, Cyanamid liable for fraudulent nondisclosure and unjust enrichment. Univ. of Colo. Found., Inc. v. Am. Cyanamid Co., 216 F. Supp. 2d 1188 (D. Colo. 2002) (“Cyanamid V”). In addition to compensatory damages, the district court awarded exemplary damages of \$500,000 to each of the Doctors. Because the district court did not err in its determination of unjust enrichment and calculation of damages, we affirm.

I. BACKGROUND

A. The Patented Claims

We briefly revisit the long and storied history of this litigation^[1] as a preface to the discussion of the issues on appeal. Our recitation of the facts is based on the findings made by the district court after trial.

Prenatal supplements containing 60-65 mg of iron are widely used to ensure that pregnant

women absorb the approximately 3.5 mg of supplemental iron per day they require because iron deficiency is a serious concern for pregnant and lactating women. Cyanamid's Lederle Laboratories manufactures and markets Materna 1.60 ("Materna"), a prenatal multivitamin/mineral supplement containing 60 mg of iron.

In 1979, Stuart Pharmaceutical, the manufacturer of a competing prenatal supplement Stuartnatal 1+1 ("Stuartnatal"), began advertising that its product provided superior iron absorption to that of Materna. To refute these claims and protect Cyanamid's market share,^[2] Dr. Ellenbogen asked his friend and long-time professional colleague, Dr. Allen, a professor of medicine, professor of biochemistry, and Director of hematology at the University of Colorado Health Sciences Center, if he would be interested in performing a study to compare the iron absorption in women of Stuartnatal to that of Materna. Dr. Allen together with his colleague Dr. Seligman, a hematologist and professor of medicine at the University of Colorado Health Sciences Center, conducted the comparison study ("Study I") in the summer of 1979.

Study I, which determined that pregnant women taking Stuartnatal absorbed 2.0 mg of supplemental iron per day while women taking Materna absorbed 2.8 mg of supplemental iron per day, concluded that the amount of iron absorbed by pregnant women taking Materna was no less, and in fact, slightly better, than by those taking Stuartnatal. Study I also indicated, however, that neither product provided iron absorption in an amount approaching the 3.5 mg of supplemental iron per day recommended for pregnant women.

The Doctors conducted three follow-up studies ("Studies IA, II, and IIA") and determined that large amounts of calcium carbonate and magnesium oxide in Materna were inhibiting iron absorption and that Materna could be reformulated to reduce or eliminate this effect. Studies IA, II, and IIA, were conceived of, designed and conducted by the Doctors independently of Dr. Ellenbogen and Cyanamid. Test subjects were paid from the University of Colorado ("University") hematology division's general account.

Importantly, Study IIA, conducted in February of 1980, revealed that there was an

inhibitory “threshold effect with calcium carbonate” and determined the specific levels of calcium carbonate and magnesium oxide at which the inhibitory effect occurs. As Dr. Allen explained at trial, “It wasn’t [that] you got inhibition increasing at every level, but at 200 milligrams, somewhat more than that, you did not get inhibition, and that led to the second reformulation, the one I described in the March 1980 letter.” Dr. Allen sent a letter to Dr. Ellenbogen in March of 1980 referencing the enclosed results of Study IIA:

The data indicate that there is no significant inhibition of iron absorption by either 350 mg of calcium in the form of calcium sulfate or 200 mg of calcium in the form of calcium carbonate. As we have discussed previously, I believe that the next step would be for Lederle to reformulate their Materna preparation such that it contains 200 mg of calcium in the form of calcium carbonate and 25 mg of magnesium in the form of magnesium sulfate or magnesium oxide. Once this is done, we will test this preparation versus iron alone and I would expect that the absorption of iron from the new Materna should be similar to that of iron alone.

While there is no dispute that the Doctors communicated with Dr. Ellenbogen throughout this process, and designed their studies, in part, around Cyanamid’s marketing interests with respect to Stuartnatal, the idea for reformulating Materna, and the research concepts and ideas for reformulating Materna with the appropriate combinations of calcium carbonate and magnesium oxide were entirely the Doctors’.

After receiving Dr. Allen’s letter in March 1980, Dr. Ellenbogen drafted a “protocol” for the already completed Study IIA, which he sent to Dr. Allen, and asked Dr. Allen, if he would be interested in performing a new study comparing the iron absorption of Stuartnatal with the various reformulations of Materna suggested by the Doctors. Dr. Allen agreed and in October of 1980, Study III was conducted using two reformulations of Materna suggested by the Doctors’ work in Studies IA, II, and IIA. Reformulation A kept the 350 mg of calcium carbonate present in original Materna but reduced the amount of magnesium oxide from 100 mg to 25 mg. Reformulation B, the formulation ultimately manufactured and marketed as “reformulated Materna,” reduced the amount of calcium carbonate from 350 mg to 250 mg and also reduced

the amount of magnesium oxide from 100 mg to 25 mg of magnesium oxide. Study III, as predicted by the Doctors based on the results of Study IIA, concluded that the reduction in calcium carbonate in the Reformulation B improved iron absorption to 5.0 mg, which was greater than the 3.5 mg recommended for pregnant women.

Subsequently, Cyanamid asked the Doctors to perform another study (“Study IV”) comparing the absorption of iron alone with the absorption of iron from reformulated Materna, Stuartnatal, and two other competing prenatal multivitamin/mineral supplements. Study IV, performed in March of 1981, confirmed that reformulated Materna provided the highest iron absorption of the four prenatal multivitamin/mineral supplements tested.

The Doctors wrote up the results of their studies in an article entitled, “Inadequate Iron Absorption from Many Prenatal Multivitamin-Mineral Supplements.” The focal point of scientific interest in the article was Table I, which presented the results of the Studies I, II, III, and IV in a distinctive format with four main columns, nine subcolumns, and 12 rows. The Doctors submitted a manuscript of the article to the New England Journal of Medicine for consideration in July of 1981, and sent a confidential copy to Dr. Ellenbogen.^[3] In the manuscript, the Doctors claimed credit for the design and conduct of the studies, and the discovery and testing of a range of reformulations to increase iron absorption from prenatal multivitamin/mineral supplements. Dr. Ellenbogen voiced no complaint or objection to this, nor to the fact that he was never mentioned or credited in the manuscript with any of the studies’ designs or results. Nevertheless, and within days of receiving the confidential manuscript, Dr. Ellenbogen filled out a Cyanamid form claiming inventorship of the reformulated Materna, and Cyanamid began the first steps toward patenting it.

Cyanamid began selling a reformulated Materna in the fall of 1981. Reformulated Materna improved iron absorption over the previous version of the product. Shortly before announcing the reformulation, and without informing the Doctors or the University, Cyanamid filed a patent application in December of 1981, claiming exclusive rights to the reformulation and naming Dr. Ellenbogen as its sole inventor. Cyanamid copied significant portions of the

confidential manuscript, including Table I and its supporting Figures 1-4 in their entirety, into a patent application. The '634 patent issued from this application in 1984.

Reformulated Materna contained, inter alia, 250 mg of calcium carbonate and 25 mg of magnesium oxide per dose. The '634 patent covered a broad range of formulations, as shown by claim 1:

1. A method of enhancing the absorption of iron in multimineral, iron-supplement preparations comprising the use of limited quantities of oxides and carbonates of calcium and magnesium administered in said preparations to not more than 300 mg and 75 mg respectively per unit dosage based upon the weight of elemental calcium and magnesium in said oxide and carbonate salts.

'634 patent, col. 5, ll. 42-50. From issuance of the '634 patent in February of 1984 until Cyanamid ceased enforcing the '634 patent due to this pending litigation in December of 1994, Cyanamid enforced its patent rights six times to exclude generic competitors from using the reformulations contemplated by the results and data in Table I and Figures 1-4 of the confidential manuscript. Notwithstanding the Doctors' longstanding personal and professional relationship with Dr. Ellenbogen, to secure the Doctors' continued cooperation and work, neither Dr. Ellenbogen nor Cyanamid mentioned anything about the patent application, the filing of an affidavit in support of the application crediting Dr. Ellenbogen with instigating and supervising all of the studies, the issuance of the '634 patent, or the six civil enforcement actions brought by Cyanamid to prevent generic drug companies from using the patented technology. When the Doctors finally obtained a copy of the '634 patent and saw the copied data table and the content based almost entirely on their confidential manuscript, they and the University filed an action against Cyanamid asserting claims for fraudulent nondisclosure, unjust enrichment, and equitable remedy under the federal patent laws.

B. The Proceedings to Date

In a July 7, 1997 opinion, the district court described the "egregious" conduct of Dr. Ellenbogen and Cyanamid, including the wholesale copying by Cyanamid of the confidential

manuscript, which Cyanamid incorporated into its patent application and found Cyanamid liable for fraud and unjust enrichment and awarded approximately \$45 million in damages. Cyanamid III, 974 F. Supp. at 1366. After Cyanamid appealed the judgment, this court remanded the case for a determination of inventorship under “federal patent law principles,” stating that if the district court found that the doctors were the inventors under federal law, it should redetermine damages in accordance with this court’s opinion. Cyanamid IV, 196 F.3d at 1374.

Applying federal patent law, the district court on remand concluded that the Doctors were the inventors and that Ellenbogen had no role in conceiving the invention. The court granted Cyanamid a new trial on damages and separately addressed the Doctors’ alternative claims for fraudulent nondisclosure, unjust enrichment, and equitable remedy under federal patent law.

First, on the fraudulent nondisclosure claim, the district court based its compensatory damages award on the “payment that Cyanamid would have made to secure the Doctors’ cooperation in filing the required documents with the PTO [Patent and Trademark Office], an assignment of ownership rights and/or an exclusive license from the University.” The district court found Cyanamid liable to the plaintiffs for \$22,546,000 in fraud damages (royalties at 6% from issuance of the '634 patent in 1984 until Cyanamid ceased enforcing the '634 patent due to this pending litigation in 1994).

Second, to determine the equitable remedy for unjust enrichment, the district court calculated the “incremental profits” from the sale of Materna attributable to the right to exclude generic competition that Cyanamid gained from the '634 patent. The district court found that Cyanamid was unjustly enriched by \$23,243,228 at the plaintiffs’ expense. Finding that the plaintiffs are not entitled to double recovery for their fraud and unjust enrichment claims, the district court only awarded an equitable remedy for unjust enrichment and struck the award of fraud damages.

Third, as to the federal equitable remedy, the district court found that the Doctors’ status as equitable titleholders of the '634 patent constituted a separate and independent ground mandating that Cyanamid disgorge its incremental profits.

Last, the district court awarded \$500,000 in exemplary damages to each of the Doctors because Cyanamid’s conduct was attended by circumstances of fraud, malice, and willful and wanton conduct. Cyanamid timely appealed the liability judgments on the claims for fraudulent nondisclosure, unjust enrichment, equitable remedy under federal patent law, the associated monetary awards, and the district court’s award of exemplary damages. We have jurisdiction pursuant to 28 U.S.C. § 1295(a)(1).

II. STANDARD OF REVIEW

The legal question of inventorship is reviewed without deference. Winbond Elecs. Corp. v. Int'l Trade Comm'n, 262 F.3d 1363, 1370 (Fed. Cir. 2001). This court reviews the findings of fact upon which a district court's inventorship determination is based for clear error. Ethicon, Inc. v. U.S. Surgical Corp., 135 F.3d 1456, 1460 (Fed. Cir. 1998). "Where there are two permissible views of the evidence, the factfinder's choice between them cannot be clearly erroneous." The Am. Original Corp. v. Jenkins Food Corp., 774 F.2d 459, 462 (Fed. Cir. 1985); see First Interstate Bank v. United States, 61 F.3d 876, 882 (Fed. Cir. 1995) ("Indeed, credibility determinations by the trial judge 'can virtually never be clear error.'" (quoting Anderson v. City of Bessemer City, 470 U.S. 564, 575 (1985))).

We generally review nonpatent issues according to the law of the regional circuit where appeals from the district court would normally lie. Tronzo v. Biomet, Inc., 236 F.3d 1342, 1346 (Fed. Cir. 2001). The Tenth Circuit reviews a district court's determination of state law de novo. See Salve Regina Coll. v. Russel, 499 U.S. 225, 231 (1991). The Tenth Circuit will not disturb a district court's findings of fact, however, unless those findings are clearly erroneous giving due regard to the district court's opportunity to determine the witnesses' credibility. Fed. R. Civ. P. 52(a); Rascon v. US West Communications, Inc., 143 F.3d 1324, 1329 (10th Cir. 1998). A finding of fact is clearly erroneous if it is without factual support in the record or if, after reviewing all of the evidence, the court is left with the definite and firm conviction that a mistake has been made. Raydon Exploration, Inc. v. Ladd, 902 F.2d 1496, 1499 (10th Cir. 1990).

III. DISCUSSION

A. The Unjust Enrichment Claim Is Not Preempted

The district court determined that the work, studies and ideas ultimately patented by Cyanamid were discovered by the Doctors, "[e]ntirely independent of Cyanamid." Cyanamid III, 974 F. Supp. at 1347. The district court also found that Cyanamid had no co-inventorship interest in the reformulations and had no right to patent the reformulations by copying the Doctors' confidential manuscripts. The district court's findings addressed the respective inventorship rights of the parties and not the rights of third parties not before the court. In other

words, the district court applied principles of unjust enrichment to determine the parties' rights with respect to each other and declined to assess the parties' rights to exclude as against the rest of the world pursuant to federal patent principles.

Cyanamid, citing Waner v. Ford Motor Co., 331 F.3d 851 (Fed. Cir. 2003), argues that federal patent law precludes any state law unjust enrichment award, because the Doctors did not protect their ideas either as trade secrets or patents. Further, Cyanamid alleges the district court's findings regarding unjust enrichment essentially create state patent rights – a result the Supreme Court prohibited in Bonito Boats, Inc. v. Thunder Craft Boats, Inc., 489 U.S. 141 (1989). We rejected a similar argument in Cyanamid IV.

Federal preemption takes three basic forms: First, Congress may explicitly preempt state law; second, a federal scheme may occupy a given field and thus preempt state law in that field; and third, when compliance with both state and federal law is impossible, the conflicting state law is preempted. English v. Gen. Elec. Co., 496 U.S. 72, 78-79 (1990). Whatever the form, the key is whether the operation of state law “stands as an obstacle to the accomplishment and execution of the full purposes and objectives of Congress.” Kewanee Oil Co. v. Bicron Corp., 416 U.S. 470, 479 (1974) (internal quotation marks and citation omitted).

Here, although federal patent law plainly does not provide for explicit preemption, 35 U.S.C. §§ 1-376 (2000), a state may not offer patent-like protection to intellectual creations that would otherwise remain unprotected as a matter of federal law, Bonito Boats, 489 U.S. at 156; Midwest Indus., Inc. v. Karavan Trailers, Inc., 175 F.3d 1356, 1363 (Fed. Cir. 1999). Through the federal patent laws, Congress has balanced innovation incentives against promoting free competition, and state laws upsetting that balance are preempted. See Bonito Boats, 489 U.S. at 152. Thus, a tangible invention or intangible process that does not satisfy the requirements of federal patent law – novelty, nonobviousness, and the like – cannot be protected under either federal or state law.

Under the Supremacy Clause, “it has been settled that state law that conflicts with federal law is ‘without effect.’” Cipollone v. Liggett Group, Inc., 505 U.S. 504, 516 (1992) (quoting Maryland v. Louisiana, 451 U.S. 725, 746 (1981); citing McCulloch v. Maryland, 17 U.S. (4

Wheat.) 316, 427 (1819)). However, the Supremacy Clause does not require full consonance between federal and state intellectual property protections. See Goldstein v. California, 412 U.S. 546 (1973) (holding that federal copyright law does not preempt state copyright law providing greater protection); Kewanee Oil, 416 U.S. at 485 (holding that federal patent law does not preempt state trade secret law protecting unpatentable processes). The Supreme Court has summarized its preemption approach as follows: “States may not offer patent-like protection to intellectual creations which would otherwise remain unprotected as a matter of federal law.” Bonito Boats, 489 U.S. at 156 (emphasis added); see also Dow Chem. Co. v. Exxon Corp., 139 F.3d 1470, 1475 (Fed. Cir. 1998) (construing Supreme Court precedent to preempt state laws that “seek to offer patent-like protection to intellectual property inconsistent with the federal scheme”). In that case, the Supreme Court struck down a state statute that prohibited copying boat hull designs, because “[t]he Florida statute allows petitioner to [a]ssert a substantial property right in the idea, thereby constricting the spectrum of useful public knowledge.” Bonito Boats, 489 U.S. at 159 (emphasis added).

The right involved here and compensated for under a theory of unjust enrichment, however, is not “patent-like” at all. As we explained in Cyanamid IV, “the unjust enrichment claim springs not from an attempt to enforce intellectual property rights, but instead from Cyanamid’s alleged wrongful use of the Doctors’ research results.” Cyanamid IV, 196 F.3d at 1371-72. As Cyanamid IV recognizes, then, a claim for unjust enrichment is “not simply an attempt to enforce property rights,” id.; rather, under Colorado law, as discussed below, Part III.C, infra, the Doctors’ claim of unjust enrichment is a legal claim to remedy the breach of a contract implied in law for disclosure of their confidential manuscript in exchange for a promise not to disseminate the idea without the Doctors’ consent. See DCB Constr. Co. v. Cent. City Dev. Co., 965 P.2d 115, 119 (Colo. 1998) (characterizing an unjust enrichment claim as a contract implied in law). The fact that Cyanamid improperly secured the '634 patent and used this patent to obtain incremental profits only pertains to restitution for the unjust enrichment

claim.

In Aronson v. Quick Point Pencil Co., 440 U.S. 257 (1979), the Supreme Court held that a state contract law enforcing a royalty agreement for an unpatentable invention was not preempted. In reaching that result, the Supreme Court reviewed three purposes of the patent system: (1) to foster and reward invention, (2) to stimulate further innovation, and (3) to ensure free use of ideas in the public domain. Because the contract involved did not conflict with any of these goals, its enforcement was not preempted by federal patent law. Applying these principles to the present case, we conclude that the Doctors' claim of unjust enrichment does not undermine the purposes of the federal patent scheme: the Doctors can collect the fruits of their research, which fosters both specific and general incentives to innovate, while their reformulations stimulate further innovation; at the same time, no information in the public domain is denied free circulation. The unjust enrichment claim does not prevent the public from using these ideas. Instead, it simply affects Cyanamid's use of confidential information it improperly copied to secure the '634 patent. Lastly, the claim of unjust enrichment does not withdraw ideas from the public domain as the reformulations were not in the public domain before Cyanamid filed the '634 patent application by copying the Doctors' confidential manuscript.

Allowing the doctors to recover damages for improper use of their confidential manuscript, which was also submitted to a journal for publication, provides another incentive separate and apart from the patent laws. As the Supreme Court has said, "certainly the patent policy of encouraging invention is not disturbed by the existence of another form of incentive to invention." Kewanee Oil, 416 U.S. at 484. There is no patent law preemption in the instant case.

Accordingly, contrary to Cyanamid's argument, we find no conflict with the Supreme Court's decision in Bonito Boats. Unlike the state law at issue in Bonito Boats, enforcement of the quasi-contract in this case does not substantially impede public use of an unpatentable intellectual creation. See Bonito Boats, 489 U.S. at 156-57. Importantly, the application of an unjust enrichment claim does not impermissibly interfere with the federal patent scheme, see id.

at 165, but rather benefits society by requiring “[a] person who has been unjustly enriched at the expense of another . . . to make restitution to the other,” Restatement of Restitution § 1 (1937).

We also find no conflict with our decision in Waner. In Waner, the plaintiff designed and manufactured a novel fender liner for dual rear wheel trucks, sold the same to a Ford dealer, and contacted Ford Motor Company to see if it was interested in additional purchases. Waner, 331 F.3d at 853. Ford declined to negotiate with Waner, choosing instead to utilize Waner’s idea commercially, without payment or permission. Id. Waner sued for unjust enrichment, seeking compensation for Ford’s unauthorized use of his fender liner idea during the period before issuance of the patent. Id. We held that “absent secrecy, state law cannot create a collateral set of rights available as an adjunct or expansion to patent rights,” id. at 856 (citing Bonito Boats, 489 U.S. at 149), and affirmed the district court’s grant of summary judgment dismissing Waner’s unjust enrichment claim.

Unlike the inventor in Waner, the Doctors here did not seek to prevent the use of information they placed in the public domain; rather, they seek to prevent Cyanamid from unjustly securing the '634 patent and obtaining the incremental profits by copying significant portions of the Doctors’ confidential manuscript describing the invention. The district court’s unjust enrichment remedy was specifically limited to the incremental profits Cyanamid wrongfully made by obtaining the '634 patent and did not encompass total profits Cyanamid made by selling a product incorporating the Doctors’ invention. Moreover, the Doctors are not attempting to enforce patent-like rights before issuance of a patent as in Waner. Instead, consistent with a separate theory of unjust enrichment, the remedy here was calculated based on the period after issuance of the patent, not on the date of public disclosure. We therefore conclude that the district court properly determined that federal patent law does not preclude an unjust enrichment award under Colorado law.

B. Inventorship

Cyanamid argues that the district court erred in not construing the claims, but nevertheless concluding that “the scope of the patent claims is precisely that of the Doctors’ Article”—even though the patent claims contain limitations that are never mentioned in the Article and the Doctors did not even allege that they conceived of such limitations. Cyanamid also asserts that the Doctors’ “inventorship” evidence consists solely of uncorroborated oral testimony.

The University responds that it overcame the presumption that Dr. Ellenbogen was the inventor of the '634 technology, corroborated the Doctors’ testimony, and proved by facts supported by clear and convincing evidence that they are the sole inventors. The University

asserts that Cyanamid's only response to this evidence was to point to the testimony of Dr. Ellenbogen, which the district court found not credible. The University argues that the district court considered each claim in the '634 patent and found that the Doctors conceived the entire numerical range of calcium as calcium carbonate and magnesium as magnesium oxide in the claims.

We reject Cyanamid's arguments. "Conception is the touchstone to determining inventorship." Fina Oil & Chem. Co. v. Ewen, 123 F.3d 1466, 1473 (Fed. Cir. 1997). "[Conception] is 'the formation in the mind of the inventor of a definite and permanent idea of the complete and operative invention, as it is hereafter to be applied in practice.'" Burroughs Wellcome Co. v. Barr Labs. Inc., 40 F.3d 1223, 1228 (Fed. Cir. 1994) (quoting Hybritech Inc. v. Monoclonal Antibodies, Inc., 802 F.2d 1367, 1376 (Fed. Cir. 1986)). There is a presumption that the inventors named on an issued patent are correct, so nonjoinder of inventors must be proven by facts supported by clear and convincing evidence. See Fina Oil, 123 F.3d at 1472; see also Hess v. Advanced Cardiovascular Sys., Inc., 106 F.3d 976, 980 (Fed. Cir. 1997) ("[T]he burden of showing misjoinder or nonjoinder of inventors is a heavy one."); Price v. Symsek, 988 F.2d 1187, 1191 (Fed. Cir. 1993). What is required is "corroborating evidence of a contemporaneous disclosure that would enable one skilled in the art to make the invention." Burroughs Wellcome, 40 F.3d at 1228. "The determination of whether a person is a joint inventor is fact specific, and no bright-line standard will suffice in every case." Fina Oil, 123 F.3d at 1473.

Here, the district court carefully followed the remand instructions from this court and applied federal patent law principles to determine that the Doctors were the inventors of the technology of the '634 patent based on, inter alia, four findings of fact. First, the district court found that the '634 patent discloses that large amounts of calcium carbonate and magnesium oxide inhibit the absorption of iron, and iron absorption from prenatal multivitamin/mineral

supplements may be enhanced by decreasing the total amounts of these calcium and magnesium salts. Second, the district court found that the Doctors, not Dr. Ellenbogen, invented the subject matter of the '634 patent because: (a) the Doctors in late 1979 conceived of and tested the idea that calcium carbonate and magnesium oxide inhibited iron absorption in prenatal multivitamin/mineral supplements based on Studies IA and II and conceived of the idea that reducing those components would improve iron absorption in pregnant women based on Study II; (b) the Doctors described their invention with particularity in Dr. Allen's December 1979 and March 1980 letters and in their confidential manuscript; and (c) the December 1979 letter, March 1980 letter, and confidential manuscript constitute compelling corroborative evidence. Third, the district court rejected Cyanamid's contention that the "presumption of correctness" to which issued patents are entitled had not been overcome by the evidence presented by the University because Cyanamid had no other evidence besides the testimony of Dr. Ellenbogen, which the district court expressly discredited:

I found Dr. Ellenbogen's testimony lacking in credibility based on my careful consideration of his demeanor on the witness stand and the substance of his testimony on direct and cross-examination. I found Dr. Ellenbogen misrepresented to Dr. Raymond and to Cyanamid generally his role in the Studies and in their design, and in the design and conception of the invention ultimately patented.

Finally, the district court rejected Cyanamid's assertion that the Doctors were at most joint inventors with Dr. Ellenbogen because the idea of the complete invention was exclusively that of the Doctors. Based on the record and the district court's findings of fact, we hold that the district court did not err in concluding that there were facts supported by clear and convincing evidence that the Doctors were the sole inventors of the subject matter in the '634 patent.

C. Unjust Enrichment

Cyanamid argues that the judgment on the claim for unjust enrichment should be reversed because the plaintiffs failed to prove a material element of that claim. Specifically, Cyanamid asserts that the Doctors have no basis for a claim of unjust enrichment, because the benefits that the Doctors admittedly derived through their collaboration with Cyanamid, together with the fact that they never sought to patent or practice the invention at issue, establish that the '634 patent was not obtained at the plaintiffs' expense, as is required under Colorado law. We reject this argument.

Under Colorado law, the elements of the claim of unjust enrichment are stated as: (1) at plaintiff's expense (2) defendant received a benefit (3) under circumstances that would make it unjust for defendant to retain the benefit without paying for it. DCB Constr. Co., 965 P.2d at 119-20 (citing Restatement of Restitution § 1 cmt. a (1937)). The Restatement of Restitution states "[a] person who has been unjustly enriched at the expense of another is required to make restitution to the other." Restatement of Restitution § 1 (1937). The comment to this section explains that "[a] person is enriched if he has received a benefit. A person is unjustly enriched if the retention of the benefit would be unjust."

The Doctors' claim of unjust enrichment is a legal claim in quasi-contract for money damages based upon principles of restitution. See 1 George E. Palmer, The Law of Restitution §§ 1.1, 1.2 (1978). When restitution is the primary basis of a claim, as opposed to a remedy for bargains gone awry, it invokes what has been characterized in Colorado as a "contract implied in law." DCB Constr. Co., 965 P.2d at 119; see also Ninth Dist. Prod. Credit Ass'n v. Ed Duggan, Inc., 821 P.2d 788, 794-95 (Colo. 1991) (characterizing an unjust enrichment claim as a contract implied in law).

The unjust enrichment claim in the context of a contract implied in law does not depend in any way upon a promise or privity between the parties. Wistrand v. Leach Realty Co., 364 P.2d 396, 397 (Colo. 1961). The claim arises "not from consent of the parties, as in the case of contracts, express or implied in fact, but from the law of natural immutable justice and equity." DCB Constr., 965 P.2d at 119. Thus, "a 'contract implied in law' is not really a contract at all, and may even be imposed in the face of a clearly expressed contrary intent if justice requires." Id. (citing Sears Roebuck & Co. v. Ragucci, 495 A.2d 923, 926 (N.J. Super. Ct. Law. Div. 1985)). We next proceed to review the application of the general test for recovery under a theory of unjust enrichment in the context of the Doctors' confidential manuscript.

Considering the first prong of the test, in this case there is no question that any benefit Cyanamid received came at the Doctors' expense. The Doctors conducted and the University funded the three critical follow-up studies (Studies IA, II, and IIA) and determined that large amounts of calcium carbonate and magnesium oxide in Materna were inhibiting iron absorption and that Materna could be reformulated to reduce or eliminate this effect. The Doctors therefore performed critical Studies IA, II, and IIA on their own initiative and at their own expense.

The second prong examines whether Cyanamid was benefited or enriched. The district court found that Cyanamid was unjustly enriched by its conduct in taking for itself exclusivity rights in the Doctors' reformulation technology and then secretly patenting that technology without the Doctors' or University's knowledge or consent. This taking not only deprived the University of the financial gain it could have realized had Cyanamid paid for an exclusive license or assignment of rights and filed its patent application, but also betrayed the Doctors and deprived both them and the University of their prerogative not to patent the Doctors' invention or to exclude others from benefiting from it.

Finally, the third prong of the test requires consideration of whether it would be unjust to allow Cyanamid to retain the benefit conferred without paying for its value. The incremental profits Cyanamid earned by virtue of its possession and enforcement of the wrongfully secured '634 patent are the direct result of misconduct. It is undisputed that Cyanamid copied the text of the confidential manuscript; incorporated Table I in its entirety without substantive amendment

into the '634 patent application, leading the district court to state, “[t]he completeness, and obviousness, of the wholesale lifting of the Doctors’ work in Table I and Figures 1-4 cannot be overstated.” Univ. of Colo. Found., Inc. v. Am. Cyanamid Co., 105 F. Supp. 2d 1164, 1179 n.9. The incremental profits constitute ill-gotten and undeserved gains for which Cyanamid did not pay and would not have received, because the rights that generated them would never have been sold.

In short, in the situation where an invention is involved, there is a production which by manufacturing copies can be put to marketable use. Whoever copies parts of a confidential manuscript to obtain a patent takes benefits or profits which otherwise would generally go to the producer. Here, the relationship between the parties before and after the disclosure in the confidential manuscript, the promise by Dr. Ellenbogen not to disseminate the idea without the Doctors’ consent, the specific character, novelty, and patentability of the Doctors’ invention, the subsequent use made of it by Cyanamid to secure the '634 patent and obtain the incremental profits, and the lack of compensation given to the Doctors all indicate that the application of unjust enrichment is appropriate.

D. Damages

1. The Determination for Unjust Enrichment Correctly Measured Damages

We must next determine the appropriate measure of Cyanamid’s unjust enrichment. Cyanamid argues that the proper measure of damages is the value that Cyanamid would have paid in 1981 to acquire the research results and for any cooperation needed to apply for the '634 patent, not disgorgement of Cyanamid’s profits as the district court found. Neither Cyanamid IV nor Colorado case law supports Cyanamid’s assertions.

In Cyanamid IV, our review was limited to the matters appealed. We did not disturb any of the district court’s factual findings regarding unjust enrichment, noting that “Cyanamid does not argue that the district court erred in any findings under its unjust enrichment analysis. Therefore, this court does not review those findings.” We did not expunge the facts elicited at trial or remand the case for a new trial. Such a mandate – premised on federal patent standards to resolve the threshold question of inventorship – simply required the district court on remand to apply the correct law to the facts already determined to be sufficient to meet the correct legal standard. Indeed, Cyanamid agreed on remand that no further evidence regarding liability should be introduced. Accordingly, based on the evidence presented at trial, the district court found on remand that, under Colorado law, the Doctors were entitled to equitable relief on their unjust enrichment claim separate and independent from their remedy at law for fraudulent nondisclosure.

We conclude that under Colorado law, the district court did not abuse its discretion by ordering Cyanamid to disgorge the incremental profits directly attributable to its misconduct. Colorado law supports the benefits-based approach used by the district court to effect equitable relief in appropriate cases. See Earthinfo, Inc. v. Hydrosphere Res. Consultants, Inc., 900 P.2d 113, 118 (Colo. 1995) (en banc) (adopting a case by case approach to determining whether profits may be awarded as restitution in a claim for unjust enrichment). This is true even if it results in plaintiff receiving a greater reward than if simply awarded damages for the defendant’s misconduct:

Restitution, which seeks to prevent unjust enrichment of the defendant, differs in principle from damages, which measure the remedy by the plaintiff's loss and seek to provide compensation for that loss. As a consequence, "in some cases the defendant gains more than the plaintiff loses, so that the two remedies may differ in practice as well as in principle."

Id. (quoting 1 Dan B. Dobbs, Law of Remedies § 4.1(1), at 555, 557 (2d ed. 1993)) (emphasis added).

No wooden formulas exist for determining when restitution of profits realized by a party is permissible. Id. at 119. Because it is an equitable remedy, "whether profits are awarded to a nonbreaching party shall be determined within the discretion of the trial court on a case by case basis." Id. at 118. As the Colorado Supreme Court envisioned it, in determining whether restitution of profits or disgorgement in a given case is appropriate:

[C]ourts must resort to general considerations of fairness, taking into account the nature of the defendant's wrong, the relative extent of his or her contribution, and the feasibility of separating this from the contribution traceable to the plaintiff's interest. 1 George E. Palmer, The Law of Restitution § 2.12 at 161 (1978) [hereinafter "Palmer"]. Thus, the more culpable the defendant's behavior, and the more direct the connection between the profits and the wrongdoing, the more likely that plaintiff can recover all defendant's profits. See, e.g., Douglas Laycock, The Scope and Significance of Restitution, 67 Tex. L. Rev. 1277, 1289 (1989). The trial court must ultimately decide whether the whole circumstances of a case point to the conclusion that the defendant's retention of any profit is unjust.

Id. at 119.

Applying these principles of Colorado law to this case, we conclude that the district court properly limited the equitable remedy by calculating the incremental profits from the sale of Materna attributable to the right to exclude generic competition that Cyanamid gained from the '634 patent—not the total profits Cyanamid made by selling a product incorporating the Doctors' invention. The district court found Cyanamid liable in the amount of \$53,106,066, which included \$22,243,228 for unjust enrichment, 8% statutory prejudgment interest through January 1, 2002, and the additional prejudgment interest that had accrued from January 1, 2002, to the date of judgment. This measure of damages comports with our opinion in Cyanamid IV, which allowed the district court to base its damages calculation on evidence of the incremental profit or benefit that Cyanamid realized from the Doctors' invention. Assuming that the determination of damages finds support in the evidence and was not the product of procedural error, we conclude that the district court relied on an appropriate measure of damages and would support a valid final judgment. Accordingly, we must next consider whether the measure of damages was supported by sufficient evidence or was flawed by any legal error occurring at trial.

2. Substantial Evidence Supports the Damages Determination

We conclude that ample evidence in the record supports the district court's determination of damages. The district court found that Professor Rubinfeld, an expert economist, ably addressed the amount of profits to be returned, performing an analysis that calculated the incremental profits, i.e., sales less production and marketing/distribution costs, of Cyanamid that were attributable to the right to exclude generic competition. Specifically, Professor Rubinfeld calculated Cyanamid's incremental profit in terms of Materna sales, from the issuance of the '634 patent in 1984 until Cyanamid ceased enforcing the '634 patent due to this pending litigation in 1994, less Cyanamid's production and marketing/distribution costs, and compared them with the sales of co-industry leader Stuartnatal's unpatented product, less production and marketing/distribution costs, over the same period of time. Based on this analysis, which the district court determined to be credible, persuasive, and conservative, the district court found Cyanamid was unjustly enriched by \$23,243,228. Accordingly, the district court did not clearly err in its factual findings underlying its award of damages for unjust enrichment.

E. Exemplary Damages

Cyanamid argues that the award of exemplary damages was erroneous because the trial evidence provides no basis for an award of exemplary damages. We reject this argument.

Under § 13-12-102(1) of the Colorado Revised Statutes, a factfinder may award exemplary damages in an amount not to exceed the amount of actual damages if it determines that the defendant's tortious conduct "is attended by circumstances of fraud, malice or willful and wanton conduct." The district court cited this express language when it awarded exemplary damages of \$500,000 to each of the Doctors. As discussed above, the district court detailed Cyanamid's misconduct in numerous factual findings. Accordingly, we affirm the district court's award of exemplary damages to each of the Doctors.

F. Fraudulent Nondisclosure, Equitable Remedy Under Federal Patent Law

In light of our conclusion that the district court properly awarded damages for unjust enrichment, we need not review the district court's alternative grounds for damages based on fraudulent nondisclosure and equitable remedy under the federal patent laws.

IV. CONCLUSION

For the foregoing reasons, the judgment of the district court is

AFFIRMED.

[1] Univ. of Colo. Found., Inc. v. Am. Cyanamid, 880 F. Supp. 1387 (D. Colo. 1995) (Cyanamid I) (rejecting, as a matter of law, plaintiffs' common law claim of conversion as well as plaintiffs' claim for correction of patent under 35 U.S.C. § 256, but finding plaintiffs had standing to pursue claims for equitable title/relief under the Patent Act); Univ. of Colo. Found., Inc. v. Am. Cyanamid Co., 902 F. Supp. 221 (D. Colo. 1995) (Cyanamid II) (agreeing with Cyanamid, on reconsideration of Cyanamid I, that plaintiffs' equitable title claim must fall with claim for relief under § 256 of Patent Act); Univ. of Colo. Found., Inc. v. Am. Cyanamid Co., 974 F. Supp. 1339 (D. Colo. 1997) (Cyanamid III) (finding in favor of plaintiffs and against Cyanamid on plaintiffs' claims for fraudulent nondisclosure and unjust enrichment and awarding approximately \$45 million in damages); Univ. of Colo. Found., Inc. v. Am. Cyanamid Co., 196 F.3d 1366 (Fed. Cir. 1999) (Cyanamid IV) (vacating the liability judgments against Cyanamid because the district court did not use the federal standard for determining inventorship of the '634 patent).

[2] In the late 1970s, Stuartnatal and Materna were the two leading prescription prenatal supplements, with each product commanding 40% -45% of the market.

[3] As part of their longstanding personal and professional relationship, Dr. Ellenbogen requested Dr. Allen to provide him with prepublication copies of manuscripts Dr. Allen wrote so that Dr. Ellenbogen could keep his knowledge of the field current. Cyanamid III, 974 F. Supp. at 1334. Dr. Ellenbogen agreed to treat these manuscripts in a confidential manner and not to disseminate them without Dr. Allen's consent. Id.