

Inventorship: Navigating the Muddy Waters of Inventorship Determination and Correction

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I. Introduction

The United States Constitution provides inventors with an exclusive right to their discoveries.² Because of this, an application for a patent must be made by the inventor or, when the inventor is dead, cannot be located, or refuses to cooperate, by persons on behalf of the inventor.³ When two or more people make an invention, they must file jointly, “even though (1) they did not physically work together or at the same time, (2) each did not make the same type or amount of contribution, or (3) each did not make a contribution to the subject matter of every claim of the patent.”⁴ It is particularly important that the inventors named on a patent application be accurate because a patent can be held invalid if it names one who is not an inventor or if it fails to name someone who is an inventor, although these errors may be corrected if it can be shown that they were not committed with an intent to deceive.⁵

In many other countries, patent applications are filed in the name of the corporate entities who own the technology. But in the U.S., even though the employer of the inventor may be the real party in interest and own the patent for which its inventors apply, a U.S. patent always names one or more individuals as inventors, and the corporate owner is only listed as an “assignee” (*i.e.*, owner).⁶

The determination of who, among the many individuals who participated in developing an invention, is an inventor carries substantial legal importance, yet it may present difficulties even to seasoned patent attorneys. The joint inventorship determination has been characterized by at least one court as “one of the muddiest concepts in the muddy metaphysics of the patent law.”⁷ Although procedures exist to correct inventorship of both patent applications and issued patents, these procedures present their own difficulties, often requiring the reconstruction of past events and sometimes resulting in the loss of patent term. Correction also can be costly and time consuming, depending upon when the error is identified. These difficulties are further compounded if an incorrectly named inventor is no longer associated with the entity that owns the application. Incorrect inventorship also can cause the ownership of a patent to be different than expected, because every inventor has an equal, undivided interest until that interest is conveyed.

1 * The authors gratefully acknowledge the contributions of John S. Pratt and Kristin M. Crall to an earlier edition of this work.

2 U.S. CONST. art. 1, § 8, cl. 8.

3 35 U.S.C. §§ 111, 118 (2000); 37 C.F.R. § 1.47 (2008); U.S. DEP’T OF COMMERCE, U.S. PATENT & TRADEMARK OFFICE, MANUAL OF PATENT EXAMINING PROCEDURE § 409.01-03 (8th ed., rev. 6 2007) [hereinafter MPEP].

4 *Id.* § 116.

5 *Id.* § 256.

6 Corporate policies usually dictate that inventors assign ownership of a patent to the company.

7 *See Mueller Brass Co. v. Reading Indus., Inc.*, 352 F. Supp. 1357, 1372 (E.D. Pa. 1972), *aff’d*, 487 F.2d 1395 (3d Cir. 1973). Recently, the Federal Circuit agreed: “The line between actual contributions to conception and the remaining, more prosaic contributions to the inventive process that do not render the contributor a co-inventor is sometimes a difficult one to draw.” *Eli Lilly & Co. v. Aradigm Corp.*, 376 F.3d 1352, 1359 (Fed. Cir. 2004).

KILPATRICK STOCKTON

As a result, the difficult task of properly investigating inventorship and naming the correct inventors should be done prior to filing a patent application to minimize reliance on correction procedures. This may require political and communication skills, as well as an understanding of the legal niceties of inventorship, particularly where financial rewards or increased prestige result from being named as an inventor. If a valid patent is to be obtained, however, the temptation to name everyone involved with the project as an inventor (or to exclude one who is truly an inventor to avoid creating an ownership interest in the resulting patent) must be overridden by the legal reality that naming incorrect inventors can be fatal to validity if it can be proven that the incorrect naming was done with deceptive intent.

II. Inventorship is Determined by Conception

Inventing involves at least two legal stages or activities: conception and reduction to practice. A third activity, diligence in reducing the invention to practice, sometimes becomes important in determining who is the first to invent.

Conception is the mental part of inventing, the formation in the mind of the inventor of a definite and permanent idea of the complete and operative invention as it is to be subsequently claimed. Conception is complete if the inventor could make a complete disclosure of his idea to those of ordinary skill in the art that is sufficiently detailed to allow them physically to make the invention without undue experimentation or inventive activity of their own.⁸ This hypothetical disclosure must be possible with a high degree of particularity; a disclosure that includes merely research plans that should be pursued or that only states general goals would not indicate that conception was complete at that time.⁹

Reduction to practice can be actual or constructive. Actual reduction to practice occurs when someone, *e.g.*, a technician working under the direction and supervision of the inventor, actually carries out the conception of the inventor and places it into tangible form.¹⁰ Constructive reduction to practice occurs when a patent application is filed describing the invention in a way that allows one of ordinary skill in the art to carry out an actual reduction to practice without extensive further research or invention.¹¹

In determining inventorship, the rule is that inventorship is determined by conception.¹² Put another way, inventors are only those who conceive or contribute to the conception of the invention. Those who merely reduce the invention to practice, working at the direction of those who conceived, are not inventors, unless they contribute some original conception of the invention that ultimately is claimed. In short, “conception is the touchstone” to inventorship.¹³

Some nonexclusive examples of acts that are *not* considered acts of inventorship include:

⁸ *Mergenthaler v. Scudder*, 11 App. D.C. 264, 1897 C.D. 724, 731 (D.C. Cir. 1897); *see also In re Tansel*, 253 F.2d 241, 242 (C.C.P.A. 1958).

⁹ *See Burroughs Wellcome Co. v. Barr Labs., Inc.*, 40 F.3d 1223, 1228 (Fed. Cir. 1994).

¹⁰ *See, e.g., De Solms v. Schoenwald*, 15 U.S.P.Q.2d 1507, 1510 (Bd. Pat. App. & Inter. 1990).

¹¹ *See Burroughs Wellcome Co.*, 40 F.3d at 1228.

¹² *See Fiers v. Revel*, 984 F.2d 1164, 1168 (Fed. Cir. 1993).

¹³ *See Burroughs Wellcome Co.*, 40 F.3d at 1227.

- (1) supplying a product available in the marketplace and explaining its use or merely explaining well-known principles;¹⁴
- (2) making only minor or superficial changes;¹⁵ or
- (3) suggesting an idea of a result to be accomplished rather than providing the steps or the way to accomplish that result.¹⁶

Because conception is a mental act, courts may require corroborating evidence of a contemporaneous disclosure that would enable one skilled in the art to make the invention.¹⁷ One way to establish corroborating evidence (as well as to avoid or minimize potential disputes over inventorship) is to keep good contemporaneous records, such as technical notebooks with non-removable pages that are signed and witnessed regularly (e.g., “Read and understood, Brady Johnson, January 1, 2005.”). These records should preferably refer to “investigators” and not “inventors” to avoid a premature conclusion of inventorship. The witnesses should be individuals capable of understanding the research document and what it contains, but should not include those who are working on the project and therefore might ultimately be named as inventors of the patent application.

Although in most areas of technology, conception occurs before reduction to practice, both may occur simultaneously for purposes of inventorship, particularly in some areas of technology characterized as “unpredictable,” such as the biotechnology and chemical arts.¹⁸ “[C]onception of a chemical compound requires that the inventor be able to define it so as to distinguish it from other materials, and to describe how to obtain it.”¹⁹ In addition, the Federal Circuit reasoned in *Amgen* that a gene is a chemical compound, and therefore, it is not sufficient to define a gene solely by its principal biological property.²⁰ The court held that “when an inventor is unable to envision the detailed [DNA sequence] of a gene so as to distinguish it from other materials, as well as a method for obtaining it, conception has not been achieved until reduction to practice has occurred, *i.e.*, until after the gene has been isolated.”²¹ The conception must be sufficient to allow one of ordinary skill to make and use the claimed invention.

Similarly, the Federal Circuit held that DNA encoding a particular protein cannot be conceived until the actual nucleotide sequence has been determined.²² “[A]n adequate written description of genetic

14 See e.g., *Hess v. Advanced Cardiovascular Sys., Inc.*, 106 F.3d 976, 981 (Fed. Cir. 1997); *Ethicon Inc. v. U.S. Surgical Corp.*, 135 F.3d 1456, 1460 (Fed. Cir. 1998).

15 See *Hoop v. Hoop*, 279 F.3d 1004 (Fed. Cir. 2002).

16 See *Eli Lilly & Co. v. Aradigm Corp.*, 376 F.3d 1352, 1359 (Fed. Cir. 2004).

17 See *Burroughs Wellcome Co.*, 40 F.3d at 1228.

18 See *Amgen, Inc. v. Chugai Pharm. Co.*, 927 F.2d 1200, 1206 (Fed. Cir. 1991) (finding that in certain instances, conception is not possible until the inventor has reduced the invention to practice through a successful experiment, resulting in a simultaneous conception and reduction to practice).

19 *Id.*, citing *Oka v. Youssefyeh*, 849 F.2d 581, 583 (Fed. Cir. 1988).

20 See also *In re Wallach*, 378 F.3d 1330, 1335 (Fed. Cir. 2004) (“[I]t is well established in our law that conception of a chemical compound requires that the inventor be able to define it so as to distinguish it from other materials, and to describe how to obtain it.”) (quoting *Amgen*, 927 F.2d at 1206).

21 *Amgen*, 927 F.2d at 1206; see also *Chiron Corp. v. Abbott Labs.*, 902 F. Supp. 1103 (N.D. Cal. 1995).

22 *Fiers v. Revel*, 984 F.2d 1164, 1168 (Fed. Cir. 1993).

KILPATRICK STOCKTON

material requires a precise definition, such as by structure, formula, chemical name, or physical properties, not a mere wish or plan for obtaining the claimed chemical invention . . .”²³

Two district courts in California have held that the doctrine of simultaneous conception and reduction to practice also applies in the context of claims directed to an isolated virus.²⁴ Both courts held that conception did not occur until the feline immunodeficiency virus was isolated “and its definitive structure, name, chemical and physical properties were determined.”²⁵ These cases provide that, with respect to claims directed to an isolated virus, when an individual provides a concept (*e.g.*, that a virus might be responsible for disease symptoms), but does not contribute to the isolation of the virus or to the determination of its structure, name, or chemical or physical properties, that individual is not an inventor of claims to the isolated virus.²⁶

Simultaneous conception and reduction to practice can occur in other contexts as well, such as where the invention is produced unintentionally, provided that the inventor appreciated or recognized the conception at the time of its occurrence.²⁷ Thus, no conception or reduction to practice of a new form of catalyst for use in reforming naphtha occurred where the patent applicant did not recognize the existence of the new catalyst until years after filing the application.²⁸

III. Sole and Joint Inventorship

As mentioned above, determining whether conception (and therefore inventorship) is sole or joint is difficult but necessary in view of the realities of modern research. Mere involvement with a research project does not qualify an individual as a joint inventor. Clearly, if a single individual conceives and reduces the invention to practice without assistance from any other, that individual is a sole inventor. If a single individual conceives of the invention in sufficient detail that it can be reduced to practice by another, and a second individual assists the first by making the invention in tangible form based on the conception of the first individual, the first individual is still a sole inventor. The second individual is merely functioning as a “pair of skilled hands” for the first individual, and has not contributed to the conception of the invention.²⁹

If, however, it should turn out that the first individual did not have as complete an idea of how to make the invention as he thought, and it is necessary for the second individual to carry out more than routine experimentation in placing the invention into tangible form, the second individual’s contribution may be sufficient for both individuals to be joint inventors.³⁰ For example, if there are failed prototypes, a significant number of unsuccessful experiments, or problems not recognized until the idea is carried out, which leads to someone adding new elements to the originally conceived

23 *Enzo Biochem. Inc. v. Gen-Probe Inc.*, 323 F.3d 956, 964 (Fed. Cir. 2002) (citations and internal quotation marks omitted).

24 *See Brown v. Regents of the Univ. of Cal.*, 866 F. Supp. 439 (N.D. Cal. 1994); *Regents of the Univ. of Cal. v. Synbiotics Corp.*, 849 F. Supp. 740 (S.D. Cal. 1994).

25 *Regents*, 849 F. Supp. at 742; *see also Brown*, 866 F. Supp. at 444.

26 *See Regents*, 849 F. Supp. at 742; *Brown*, 866 F. Supp. at 445.

27 *See, e.g., Dow Chem. Co. v. Astro-Valcour, Inc.*, 267 F.3d 1334, 1340-41 (Fed. Cir. 2001), citing to *Heard v. Burton*, 333 F.2d 239 (C.C.P.A. 1964).

28 *See id.*

29 *See Harris v. Clifford*, 363 F.2d 922, 927 (C.C.P.A. 1966).

30 *See Mattor v. Coolegem*, 530 F.2d 1391, 1393-94 (C.C.P.A. 1976).

idea, and those elements are included in the claims of the patent application, then those contributing to the solutions are likely to be considered inventors of those new elements.

Although it may seem obvious, inventorship must be determined for the invention defined by the claims at the end of a patent application.³¹ This is challenging because claims can be amended, deleted, or added during prosecution of the patent application into a patent. Therefore, a final inventorship determination should be made when allowable claims are identified. It is useful to note that because there are often multiple claims with multiple elements, it is possible for a joint inventor to contribute to only a single claimed feature, or to a feature recited in only a single claim. However, if that feature or claim is cancelled from the claims of the application, the contributor of that feature should be deleted from the list of named inventors. The first step in assessing (or reassessing) inventorship is to construe the claims (*i.e.*, determine what the invention is), and then compare the contributions of asserted inventors or co-inventors with the claimed subject matter.³² This means that it is useful to keep a record of the contributions of various individuals involved in the development process. If, in the course of prosecution of the patent application, all claims that reflect the contribution of one inventor are cancelled or rejected, that inventor's name must be removed.

In any case, joint inventorship can only occur where there has been some communication between the joint inventors, and where the contributions of each are embodied in the claimed invention (including how to make a claimed product). It is unnecessary that inventors work together, that they make equal contributions, that they each contribute to the subject matter of every claim, or that they conceive their contributions at the same time—although two inventors who are unaware of each other's conceptions are sole, rather than joint, inventors.

IV. Authorship is not Inventorship

Sometimes an invention is described in a scholarly or scientific publication as well as in a patent application. The group of individuals who may appropriately be named as authors of the publication and the inventors who may be properly named in the patent application may sometimes overlap, but are not necessarily identical. This is true because the standard for inventorship is different than the standard for selecting authors for an article.³³ A researcher might list as co-authors colleagues who made their labs and equipment available, discussed and helped evaluate data, performed some of the experiments, or helped draft the paper for publication. However, these individuals would be co-inventors of the invention *only* if they contributed to its conception. Moreover, while co-authors may choose not to be named on a paper, U.S. patent laws require that every person who contributes any part of what is claimed in a patent application must be named as an inventor.

There is an implicit lack of equality in co-authorship. Generally, the first or last listed author is considered to be primary originator of the new ideas and data in the paper, and the others are assumed to be secondary collaborators. Joint inventors, however, have equal rights to their patent

31 *Ethicon, Inc. v. U.S. Surgical Corp.*, 135 F.3d 1456, 1460 (Fed. Cir. 1998).

32 *See id.* at 1461-62.

33 *See, e.g.*, MPEP § 716.10 (“[t]he designation of authorship or inventorship does not raise a presumption of inventorship with respect to the subject matter disclosed in the article or with respect to the subject matter disclosed but not claimed in the patent or published application so as to justify a rejection under 35 U.S.C. § 102(f).”)

KILPATRICK STOCKTON

unless they agree otherwise.³⁴ Even though they did not conceive exactly the same idea together, or each created a different part of the whole invention, or the contribution of one was only a small but essential part of the invention, all are joint inventors and, absent an agreement to the contrary, share an equal right to exclude others from making, using, or selling the claimed invention without accounting to the other inventors.³⁵

In contrast to scientific publications, the order of inventors listed on a patent is irrelevant. By convention, the surname of the first inventor is printed at the top of the patent cover sheet and some members of the patent community or courts refer to the patent by that name. Others tend to use the name of the assignee or the last three digits of the patent number. Therefore, if there is a desire to refer collectively to a grouping of patents having at least one inventor in common, it might be useful to list the name of that inventor first. On the other hand, if it is important for an organization to recognize each inventor individually from a group of inventors named on several patents or to distinguish the patents from each other, then it would be advantageous to rotate the order of those named first on the patent.

V. Management is not Inventorship

There is sometimes a tendency in corporate research settings to consider individuals only tangentially involved with a research project to be an inventor of the inventions that result from that project. This tendency appears to increase in proportion to the particular individual's status in the corporation or the financial rewards or incentives offered by the corporation in connection with being named as an inventor of a patented invention. That an individual is involved in the management or funding of a research project does not make that individual an inventor if the individual did not contribute to the conception of the invention claimed in the patent application, as discussed above. In other words, a supervisor or team leader should not automatically be named as an inventor without first identifying his or her contribution to the conception of the invention. In evaluating whether a particular individual should be named as inventor, the detrimental effect on the validity of the patent that results from errors in inventorship should always be kept in mind.

VI. Correction of Inventorship

Despite the best efforts of those involved in the patent application preparation process to name the proper inventors, times may exist when the initial determination of inventorship is incorrect. Errors in inventorship may be corrected in a number of ways, which can be categorized according to when the error is discovered and the correction attempted. As a general rule, inventorship should be corrected as soon as an error is discovered.³⁶ It is usually the case that the earlier the error is discovered, the easier it is to correct. In almost all situations, however, it will be necessary to establish that the error in inventorship occurred without deceptive intent.³⁷

³⁴ See 35 U.S.C. § 262 (2000).

³⁵ See *id.*

³⁶ See MPEP § 201.03 (“Although 37 CFR 1.48 does not contain a diligence requirement for filing the request, once an inventorship error is discovered, timeliness requirements under 37 CFR 1.116 and 37 CFR 1.312 apply.”).

³⁷ See *Pannu v. Iolab Corp.*, 155 F.3d 1344, 1350 (Fed. Cir. 1998).

For example, errors in inventorship discovered during prosecution of a patent application may be corrected by filing a petition to correct inventorship.³⁸ This petition must be accompanied by (1) a statement from each person being added as an inventor and each person being deleted as an inventor that the error in inventorship occurred without deceptive intent on his or her part; (2) a new oath or declaration signed by the actual inventors; (3) the consent of any assignee(s) to the change; and (4) a petition fee.³⁹

Less stringent requirements apply for correcting inventorship when the originally named inventors were correct, but the prosecution of the application has resulted in the cancellation of all claims to which one or more of the inventors contributed.⁴⁰ These inventors can be deleted by filing a petition acknowledging that the deleted inventor's invention is no longer being claimed and paying a petition fee.⁴¹

The procedural requirements of petitioning to correct inventorship can be avoided, provided that at least one true inventor was originally named when the application was filed. In this situation, a "continuation" application naming the correct inventors can be filed.⁴² This requires a new oath or declaration by the correct inventors, but does not require a petition or statement from the inventors. Filing a continuation may cause the loss of patent term in certain cases, however, and the new application fee charged by the United States Patent and Trademark Office is higher than the fee for filing a petition.

A patent that issues with incorrect inventorship is invalid.⁴³ A defective patent omitting one or more inventors can be corrected to add the omitted inventors in the absence of deceptive intent by the applicant.⁴⁴ Misjoinder of an inventor (*i.e.*, when a patent incorrectly lists a person as an inventor) can be corrected regardless of intent.⁴⁵ The originally named inventors and assignees can file a petition to the Commissioner of Patents and Trademarks to issue a certificate naming the correct inventors.⁴⁶ All originally named inventors and representatives of each assignee must submit statements agreeing to the change of inventorship in the patent. Each person being added as an inventor must state that the inventorship error occurred without deceptive intent on his or her part. In situations where the inventorship issue is contested or all parties are not in agreement, and where an issued patent is assigned to one or more entities, the assignee(s) of the entire interest of the patent may file a reissue application to correct inventorship without the original inventor's consent.⁴⁷

38 Note that evidence of incorrect inventorship—such as an admission by an applicant presented in a failed request to correct inventorship under 37 C.F.R. § 1.48(a)—can serve as a basis for a rejection of claims of an application under 35 U.S.C. § 102(f). *See* MPEP § 2137.01.

39 *See* 35 U.S.C. § 116 (2000); 37 C.F.R. § 1.48(a) (2008).

40 37 C.F.R. § 1.48(b) (2008).

41 *Id.*

42 *Id.* § 1.53(b)(1)(2).

43 *See* 35 U.S.C. § 256 (2000).

44 *See id.*; *Pannu*, 155 F.3d at 1350. If deceptive intent is found, a court can also render the patent unenforceable due to inequitable conduct. *See PerSeptive Biosys., Inc. v. Pharmacia Biotech, Inc.*, 225 F.3d 1315 (Fed. Cir. 2000).

45 *See Stark v. Advanced Magnetics, Inc.*, 119 F.3d 1551, 1555 (Fed. Cir. 1997) (“[S]ection 256 allows deletion of a misjoined inventor whether that error occurred by deception or by innocent mistake.”).

46 *See* 35 U.S.C. § 256 (2000); 37 C.F.R. § 1.324 (2008).

47 *See* MPEP § 1412.04.

KILPATRICK STOCKTON

If the error is discovered during litigation, the patent is not automatically declared invalid.⁴⁸ Instead, if the court is satisfied that the error occurred without deceptive intent by the applicant, it can order the Commissioner of Patents to issue the certificate of correction.⁴⁹

VII. Summary of Rules for Identification of Inventors

The definition of “joint inventor,” especially in the university setting, was clearly summarized in *Monsanto Co. v. Kamp*:⁵⁰

A joint invention is the product of collaboration of the inventive endeavors of two or more persons working toward the same end and producing an invention by their aggregate effort . . . [I]t is necessary that each of the inventors work on the same subject matter and make some contribution to the inventive thought and to the final result. Each needs to perform but a part of the task if an invention emerges from all of the steps taken together. It is not necessary that the entire inventive concept should occur to each of the joint inventors, or that the two should physically work on the project together. One may take a step at one time, the other an approach at different times.

One may do more of the experimental work while the other makes suggestions from time to time. The fact that each of the inventors plays a different role and that the contribution of one may not be as great as that of another, does not detract from the fact that the invention is joint, if each makes some original contribution, though partial, to the final solution of the problem.

In summary, one should ask the following questions to identify whether the individual participated in conception of the invention. If the answer to any question is “yes,” the individual is an inventor and should be listed on the patent application.

- (1) Did the individual form in his or her mind a definite and permanent idea of the complete and operative invention such that someone else, skilled in the same area, would be enabled by the idea to perform the method or make the product under the direction of the individual without extensive research or experimentation?
- (2) Did the individual conceive a part of the invention as it is described and claimed in the application?
- (3) Did the individual, independently and not under the direction of another, design experiments or resolve a problem that made the whole invention or some part of it operable?
- (4) Did the individual take the idea of another and add new and independent alterations that became part of the invention as claimed in the patent application?
- (5) Did the individual advise another inventor on how to improve the basic inventive concept by modification or addition such that the advice was incorporated into the invention as claimed in the patent application?

⁴⁸ See, e.g., *C.R. Bard, Inc. v. M3 Sys., Inc.*, 157 F.3d 1340 (Fed. Cir. 1998).

⁴⁹ See 35 U.S.C. § 256.

⁵⁰ 269 F. Supp. 818, 824 (D.D.C. 1967).

- (6) Did the individual's independent mental processes result in a contribution, such as new experimental designs, that resolved a problem in the basic inventive concept and made it operable or useful?
- (7) Did the individual, during the course of experimentation, make an unexpected discovery and recognize the discovery as new and useful?

Practically speaking, the key questions on which inventorship turn are whether the individual in question modified, contributed, or added to the basic inventive concept and whether this contribution was communicated to the other inventor or joint inventors. If the contribution by an individual, which was the result of his or her own independent mental activity, could be deleted from the application without changing the invention as claimed, that individual is *not* a joint inventor.

