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Damien Howard

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**A Discussion on the Patentability of Signals:
Examining *In re Nuijten***

Damien Howard



A Discussion on the Patentability of Signals: Examining *In re Nuijten*

By Damien Howard*

I. INTRODUCTION

¶1 The Constitution of the United States establishes a fundamental right to protect one's intellectual property.¹ One type of intellectual property that the Constitution enumerates as protected is the discoveries of inventors, or inventions. To determine what types of discoveries federal law protects, one must turn to Title 35 of the United States Code (U.S.C.), which concerns patents.

¶2 Patentable inventions include "any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof."² "The term 'process' means process, art or method, and includes a new use of a known process, machine, manufacture, composition of matter, or material."³ To the casual observer, it may seem that Title 35 makes clear what constitutes a patentable invention. However, because of the rapid advancement of technology, one cannot easily determine what is statutory-eligible subject matter under 35 U.S.C. §101. For example, there has been, until recently, a lack of consensus in the Court of Appeals for the Federal Circuit ("Federal Circuit") on whether business methods or computer software should constitute statutory subject matter under 35 U.S.C. § 101.⁴ Currently, both business methods and computer software are patentable.⁵

¶3 The field of signals is another subject matter area where patentability is in dispute. Are signals statutory subject matter under 35 U.S.C. § 101? If not, should 35 U.S.C. § 101 be amended to include signals as statutory subject matter? According to the Federal Circuit, the answer to both questions is no.⁶ This comment will examine and evaluate whether the Federal Circuit made the correct decision. Section II begins the discussion by describing *In re Nuijten*, the case in which the Federal Circuit denied the patentability of signals.⁷ Section III describes the weaknesses in the Federal Circuit's analysis of signal patentability. Section IV discusses, from a policy perspective, the question of

* J.D. Candidate 2010, Northwestern University School of Law. Special thanks to my wife and daughter who supported me and forgave my many late nights away from them as I tackled the challenges of law school.

¹ "To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries." U.S. CONST. art. I, § 8, cl. 8.

² 35 U.S.C. § 101 (2007).

³ 35 U.S.C. § 100 (2007).

⁴ See *In re Bilski*, 545 F.3d 943, 1010 (Fed. Cir. 2008) (Mayer, J., dissenting), cert. granted, 129 S. Ct. 2735 (2009).

⁵ See *Diamond v. Diehr*, 450 U.S. 175 (1981); *State St. Bank & Trust Co. v. Signature Fin. Group, Inc.* (*State Street*), 149 F.3d 1368 (Fed. Cir. 1998).

⁶ *In re Nuijten*, 500 F.3d 1346, 1357 (Fed. Cir. 2007), cert. denied, 129 S. Ct. 70 (2008).

⁷ *Id.*

whether signals should be patentable. Finally, Section V concludes with a plea to the Supreme Court to not only address the issue of signal patentability, but to clarify the tests for subject matter patentability under 35 U.S.C. § 101.

II. CURRENT AFFAIRS: *IN RE NUIJTEN*

A. *Focusing on the Issue*

¶4 As stated above, in *In re Nuijten* the Federal Circuit decided that signals are not patentable subject matter.⁸ Nuijten's patent application is directed towards a technique for reducing the noise that is created in a signal by the introduction of watermarks⁹ into the signal.¹⁰ The technique involves modifying the watermarked signal in such a way as to compensate for the distortion that the inclusion of the watermark creates.¹¹ The United States Patent and Trademark Office (USPTO) rejected Nuijten's claims that cover the resulting signals with the low-distortion watermark for being "directed to nonstatutory subject matter under § 101."¹² However, it is important to note that the USPTO did grant Nuijten a patent that includes "the process he invented, a device that performs that process, and a storage medium holding the resulting signals."¹³ Thus, only the claims that "seek to cover the resulting encoded signals *themselves*" were on appeal.¹⁴ The only independent claim included with the claims rejected by the USPTO read:

A *signal* with embedded supplemental data, the signal being encoded in accordance with a given encoding process and selected samples of the signal representing the supplemental data, and at least one of the samples preceding the selected samples is different from the sample corresponding to the given encoding process.¹⁵

The Board of Patent Appeals and Interferences (BPAI) upheld the Examiner's 35 U.S.C. § 101 rejection of the signals claims on two bases.¹⁶ First, the BPAI held that a signal has no physical attributes and therefore is an unpatentable abstract idea.¹⁷ Second, the BPAI held that the claims on the signals themselves do not fall under any of the "four statutory categories of patentable subject matter: 'process, machine, manufacture, or composition of matter'" and are therefore not patentable.¹⁸

⁸ *Id.*

⁹ Watermarking, in the context of signal processing, is a technique that involves manipulating a signal, such as an audio or video signal, to embed additional information (a so-called "watermark") within the signal. Ideally, the watermark should be imperceptible to an end user. Some publishers use watermarks to facilitate the prevention of unauthorized copying of electronic media. *Id.* at 1348.

¹⁰ *Id.*

¹¹ *Id.* at 1349.

¹² *Id.* at 1351.

¹³ *Id.*

¹⁴ *Id.* (emphasis in original).

¹⁵ *Id.* (emphasis in original).

¹⁶ *Id.*

¹⁷ *Id.* at 1352. The BPAI cited *Diamond v. Diehr*, 450 U.S. 175 (1981) in support of the claim that an abstract idea is unpatentable.

¹⁸ *In re Nuijten*, 500 F.3d at 1352 (citing 35 U.S.C. § 101 (2007)).

¶5 Although the Federal Circuit affirmed the BPAI’s rejection of the signal claims, the Court did not completely agree with the BPAI’s analysis of the signal claims.¹⁹ Primarily, the Court disagreed with the BPAI over whether the independent signal claim was an abstract claim, or whether it was directed to some physical instance or substance.²⁰ The BPAI asserted that the signal claims were merely data and were not limited to a physical embodiment.²¹ However, the Federal Circuit held that even though the signal claims make no mention of a physical component or some physical embodiment, the very nature of a signal implies a physical element.²²

¶6 Despite the USPTO coming to a different conclusion than the Federal Circuit regarding the physical element of the signal claims, both the USPTO and the Federal Circuit agreed that an electromagnetic signal is transitory in nature.²³ Thus, the Federal Circuit framed the issue of whether signals are patentable as “whether a transitory, propagating signal is within any of the four statutory categories: process, machine, manufacture, or composition of matter.”²⁴

¶7 The Federal Circuit’s analysis in *In re Nuijten* appears to contradict its decision in *State Street Bank & Trust Co. v. Signature Financial Group, Inc. (State Street)*.²⁵ In *State Street*, the Federal Circuit explained that the analysis of patentable subject matter “should not focus on which of the four categories of subject matter a claim is directed to . . . but rather on the essential characteristics of the subject matter, in particular, its practical utility.”²⁶ Such a statement is a step in the right direction for increasing the flexibility of subject matter analysis to accommodate the unpredictability that is inherent in invention. However, the Federal Circuit took a step backward by brushing aside *State Street* in *In re Nuijten*. According to the *In re Nuijten* court, *State Street* intended only to suggest that discussion over which category of statutory subject matter was applicable to a potential invention was irrelevant so long as one category applied.²⁷ This means that one must still analyze a potential invention in terms of the four statutory categories of subject matter specified in 35 U.S.C. § 101 to determine if it includes patentable subject matter. Therefore, even if a signal was to be considered new and useful subject matter, if the signal claims cannot be placed into one of the four statutory categories identified in 35 U.S.C. § 101, then the signal is unpatentable.²⁸

B. How the Federal Circuit Analyzed Signal Patentability

¶8 Nuijten asserted that a signal is a “process” under the statutory meaning of that term.²⁹ He relied on the inclusion of the terms “art” and “method” in the statutory

¹⁹ *Id.* at 1357.

²⁰ *Id.* at 1353.

²¹ *Id.*

²² *Id.*

²³ See *Ex parte Nuijten*, Appeal 2003-0853, 2006 WL 3939192, at *6 (B.P.A.I. Jan. 24, 2006); *In re Nuijten*, 500 F.3d at 1353.

²⁴ *In re Nuijten*, 500 F.3d at 1353.

²⁵ *State St. Bank & Trust Co. v. Signature Fin. Group, Inc. (State Street)*, 149 F.3d 1368, 1375 (Fed. Cir. 1998).

²⁶ *Id.* at 1375.

²⁷ *In re Nuijten*, 500 F.3d at 1354.

²⁸ *Id.*

²⁹ *Id.*

definition of “process”³⁰ to argue that the meaning of “process” is somehow more expansive than the usual understanding of process: an act or a series of steps.³¹ Citing the legislative history of Title 35, the court pointed out that the term “art,” as used in the definition of “process,” differs from the phrase “useful art” in the Constitution and the word “art” in other places of the statutes.³² Referring to the same Senate Report, it is clear that the term “art” was intended to be synonymous with the terms “process” and “method.”³³ Thus, Congress intended to limit the term “process” in Title 35 to a series of steps and hence, the Federal Circuit was correct in holding that a signal claim is not a process because it does not involve a series of steps.³⁴ It is also important to note that just because the signal claims may include acts, it does not transform the claims intended to cover the signal itself into process claims.³⁵

¶9 The Federal Circuit also held that a signal is not a machine.³⁶ The Supreme Court has stated that “[a] machine is a concrete thing, consisting of parts, or of certain devices and combination of devices.”³⁷ “The principle of a machine is properly defined to be ‘its mode of operation,’ or that peculiar combination of devices which distinguish it from other machines.”³⁸ As the Federal Circuit pointed out, “[a] transitory signal made of electrical or electromagnetic variances is not made of ‘parts’ or ‘devices’ in any mechanical sense.”³⁹ Thus, a signal claim does not fall under the statutory machine category of 35 U.S.C. § 101.⁴⁰

¶10 Although Nuijten did not challenge the BPAI’s conclusion that his signal claims did not relate to a composition of matter, the Federal Circuit addressed this statutory category as well.⁴¹ The court noted that the Supreme Court has previously defined a composition of matter to mean “all compositions of two or more substances and all composite articles, whether they be the results of chemical union, or of mechanical mixture, or whether they be gases, fluids, powders or solids.”⁴² The Federal Circuit held that Nuijten’s signal claims did not fall within the Supreme Court’s definition of a composition of matter.⁴³ It should be noted that, although Nuijten did not specify the type of signal towards which his claims were directed, the Federal Circuit based its decision upon the assumption that Nuijten’s claims related to electromagnetic signals,⁴⁴

³⁰ “The term ‘process’ means process, art or method, and includes a new use of a known process, machine, manufacture, composition of matter, material.” 35 U.S.C. § 100 (2007).

³¹ *In re Nuijten*, 500 F.3d at 1354.

³² *Id.* at 1354-55.

³³ S. REP. NO. 82-1979, at 4 (1952), *reprinted in* 1952 U.S.C.C.A.N. 2394, 2398-99 (“The word ‘process’ has been used to avoid the necessity of explanation that the word ‘art’ as used in this place means ‘process or method,’ . . .”).

³⁴ *In re Nuijten*, 500 F.3d at 1355.

³⁵ *Id.*

³⁶ *Id.* at 1356.

³⁷ *Burr v. Duryee*, 68 U.S. 531, 570 (1864).

³⁸ *Id.*

³⁹ *In re Nuijten*, 500 F.3d at 1355.

⁴⁰ *Id.* at 1356.

⁴¹ *Id.* at 1357.

⁴² *Id.* (quoting *Diamond v. Chakrabarty*, 447 U.S. 303, 308 (1980)).

⁴³ *Id.*

⁴⁴ *Id.*

which is a fair assumption given the context of the subject matter and that signal claims generally refer to electromagnetic signals.⁴⁵

¶11 The last statutory category relates to manufacture. This is the category that is the most contentious in relation to signal claims. The court held that a signal is not a manufacture because it is transient, requires special equipment to be detected, and is not tangible.⁴⁶ None of these reasons provide a good basis for determining whether a signal is patentable. The next section will describe in detail why none of these reasons are valid bases for excluding signal claims, at least signal claims relating to electromagnetic signals, from the manufactures statutory category.

III. WHY THE FEDERAL CIRCUIT ERRED IN ITS “MANUFACTURES” ANALYSIS

A. What Does “Manufactures” Mean Anyway?

¶12 Before continuing any further, it is first necessary to explain what is meant by the manufactures statutory category. The Supreme Court has interpreted “manufactures” as it is used in 35 U.S.C. § 101 to mean “the production of articles for use from raw or prepared materials by giving to these materials new forms, qualities, properties, or combinations, whether by hand-labor or by machinery.”⁴⁷ Using the same dictionary as that used in *American Fruit Growers, Inc. v. Brogdex Co.*, the court in *Nuijten* defined “article” as “a particular substance or commodity: as, an *article* of merchandise; an *article* of clothing; salt is a necessary *article*.”⁴⁸

¶13 The selection of a dictionary that is over a century old to define a term that is used to facilitate determining the patentability of potentially cutting-edge technology is weak at best. However, it is also important that one can rely on a consistent interpretation of the relevant statutes. Inconsistent interpretations of statutes make it difficult for the public to determine what subject matter can be patented and how to best describe the subject matter when writing the claims and the specification. Furthermore, inconsistent definitions will lead the courts to make inconsistent rulings. This is a complex issue that relates to many areas of the law and is beyond the scope of this paper. Thus, the rest of this paper will use the definition of “article” adopted by the Federal Circuit.

¶14 Before proceeding with a discussion on whether a signal is an article, the next three subsections will discuss several principles that the Federal Circuit has adopted in its patentable subject matter analysis. These principles are important in answering the question of whether a signal is an article as well as whether signals are patentable subject matter. In particular, the next three sections will discuss the concepts of tangibility, perceptibility and transience.

⁴⁵ Stephen G. Kunin & Bradley D. Lytle, *Patent Eligibility of Signal Claims*, 89 J. PAT. & TRADEMARK OFF. SOC’Y 877, 881 (2007).

⁴⁶ *In re Nuijten*, 500 F.3d at 1356-57.

⁴⁷ *Diamond v. Chakrabarty*, 447 U.S. 303, 308 (1980) (quoting *Am. Fruit Growers, Inc. v. Brogdex Co.*, 283 U.S. 1, 11 (1931)).

⁴⁸ *In re Nuijten*, 500 F.3d at 1356 (quoting 1 CENTURY DICTIONARY 326 (William Dwight Whitney ed., 1895)) (emphasis in original).

B. Tangibility

¶15 Over the years, courts have read several guiding principles into Title 35, which the USPTO has used to facilitate determining whether a patent application is directed towards a patentable invention.⁴⁹ One such principle is that a claimed invention must produce a “useful, concrete and tangible result.”⁵⁰ This begs the question: What is tangible? According to Black’s Law Dictionary, “tangible” can refer to something physical that can be touched or seen, or it can refer to something that can be understood by the mind.⁵¹

¶16 With *In re Nuijten*, the Federal Circuit is again reading new limitations into 35 U.S.C. § 101. Professor John F. Duffy, writing in support of Nuijten’s petition for certiorari, argued⁵² that the Federal Circuit is reading three new limitations, or distinctions, into 35 U.S.C. § 101—limitations that Congress never intended. More specifically, Professor Duffy asserts that

[t]hese three distinctions—which may be termed (i) equipment perceptibility; (ii) fleeting nature; and (iii) arguable tangibility—have never been recognized, either singly or in combination, as limitations on the scope of § 101. Imposing such new and unprecedented limitations on the scope of § 101 is directly contrary to the teachings of this Court concerning the proper approach that courts should take in interpreting the extremely broad language employed by Congress in defining patentable subject matter.⁵³

In drafting 35 U.S.C. § 101, Congress used broad general language because, as the Supreme Court pointed out, inventions are unforeseeable.⁵⁴ To allow only for the patenting of foreseeable inventions would stifle innovation and conflict with the core reason for the patent system.⁵⁵

¶17 Just as inventions are unforeseeable, it is not possible to foresee all of the possible subject matter that one might desire to patent. For this reason, courts are often put in the situation of determining on appeal whether the USPTO wrongly rejected a patent application. Furthermore, it is for this reason that, when necessary, the Court should include appropriate qualifiers in the test already found in the patent statutes. If the Court

⁴⁹ UNITED STATES PATENT AND TRADEMARK OFFICE, MANUAL OF PATENT EXAMINING PROCEDURE 2106 (8th ed., rev. 2008) [hereinafter MPEP].

⁵⁰ *State St. Bank & Trust Co. v. Signature Fin. Group, Inc. (State Street)*, 149 F.3d 1368, 1373 (Fed. Cir. 1998).

⁵¹ “Tangible, *adj.* 1. Having or possessing physical form; CORPOREAL. 2. Capable of being touched and seen; perceptible to the touch; capable of being possessed or realized. 3. Capable of being understood by the mind.” BLACK’S LAW DICTIONARY 1494 (8th ed. 2004). Johnson’s dictionary defines tangible as “perceptible to the touch.” SAMUEL JOHNSON ET AL., JOHNSON’S DICTIONARY, IMPROVED BY TODD, ABRIDGED FOR THE USE OF SCHOOLS; WITH THE ADDITION OF WALKER’S PRONUNCIATION; AN ABSTRACT OF HIS PRINCIPLES OF ENGLISH PRONUNCIATION, WITH QUESTIONS; A VOCABULARY OF GREEK, LATIN, AND SCRIPTURE PROPER NAMES; AND AN APPENDIX OF AMERICANISMS 336 (Charles J. Hendee) (1836), available at <http://books.google.com/>.

⁵² Brief Amici Curiae of Intellectual Property Academics in Support of the Petitioner at 3-4, *Nuijten v. Dudas*, 129 S. Ct. 70 (2008) (No. 07-1404), 2008 WL 2435919 (cert. denied).

⁵³ *Id.*

⁵⁴ *Diamond v. Chakrabarty*, 447 U.S. 303, 316 (1980).

⁵⁵ *Id.* Some argue that having a patent system at all stifles innovation. However, this argument is beyond the scope of this paper.

reads a new limitation into the Title 35 statutes that Congress disagrees with, Congress is free to overturn the Court by amending the statutes to specify what it intended the statutes to mean.

1. Validity of the Tangibility Criterion

¶18 In the present case, Professor Duffy argues that the Federal Circuit is introducing a new tangibility limitation into 35 U.S.C. § 101.⁵⁶ While Professor Duffy is correct that the Federal Circuit did introduce a new limitation into 35 U.S.C. § 101 when they introduced the tangibility limitation, it is not a recent or new limitation. The tangibility limitation was first introduced in *In re Alappat*⁵⁷ almost fifteen years ago when the Federal Circuit first used the phrase “useful, concrete, and tangible result.”⁵⁸ The Federal Circuit has used this limitation in more recent cases as well, such as the *State Street*.⁵⁹ Furthermore, the USPTO has adopted the language in the patentability section of its MPEP,⁶⁰ which the USPTO issues to its patent examiners to facilitate their examination of patent applications.⁶¹

¶19 If Congress disagrees with the Federal Circuit’s introduction of the tangibility limitation, it can voice its opinion by altering Title 35. However, Congress has not done so in the almost fifteen years since *In re Alappat*. Thus, it is fair to say that Congress either does not consider the introduction of the tangibility limitation into 35 U.S.C. § 101 an incorrect reflection of its intentions, or does not consider the effect of the new limitation significant enough to warrant Congress’s attention.

¶20 Nevertheless, the Supreme Court has recently weighed in on the tangibility limitation.⁶² In *Laboratory Corporation of American Holdings v. Metabolite Laboratories, Inc.*, the Court dismissed its writ of certiorari as improvidently granted⁶³ but Justice Breyer, joined by Justice Stevens and Justice Souter, dissented, pointing out that the Supreme Court never made a statement similar to the Federal Circuit’s “useful, concrete, and tangible result.”⁶⁴ Furthermore, Justice Breyer asserted that if the statement were taken literally, it “would cover instances where [the Supreme] Court has held the contrary.”⁶⁵ However, the Supreme Court has not fully analyzed the tangibility limitation as it was only mentioned in dicta. In addition, although Justice Breyer strongly hinted that he disagrees with the tangibility limitation, he did not explicitly indicate that he would overrule it. Even if he had wanted to explicitly overrule the tangibility limitation, he was writing for the dissent, so it is unclear if the majority would have supported his view on the tangibility limitation. Thus, as it currently stands, the tangibility limitation

⁵⁶ Brief for the Petitioner, *supra* note 51, at 3.

⁵⁷ *In re Alappat*, 33 F.3d 1526 (Fed. Cir. 1994).

⁵⁸ *Id.* at 1544.

⁵⁹ *State St. Bank & Trust Co. v. Signature Fin. Group, Inc. (State Street)*, 149 F.3d 1368, 1373 (Fed. Cir. 1998).

⁶⁰ MPEP, *supra* note 49, at 2106 (Patent Subject Matter Eligibility).

⁶¹ MPEP, *supra* note 49 (Foreword).

⁶² *See Lab. Corp. of Am. Holdings v. Metabolite Labs., Inc.*, 548 U.S. 124, 136 (2006) (Breyer, J., dissenting from denial of certiorari).

⁶³ *Id.* at 125.

⁶⁴ *Id.* at 136.

⁶⁵ *Id.* at 136-37 (citing several instances where claims were invalidated despite producing useful, concrete, and tangible results).

has not been overruled and is still part of 35 U.S.C. § 101 as read into the statute by the Federal Circuit.

2. Tangibility Applied to Signals

¶21 Having established that the tangibility limitation still exists, regardless of whether it should or not, one is still left with the question of whether a signal is tangible or not. To answer this question, it is first necessary to define “signal.” The relevant definition in Black’s Law Dictionary specifies that a signal is “a means of communication.”⁶⁶ This definition is too broad and is inclusive of inarguably unpatentable forms of signals, such as whistling. Furthermore, although both the BPAI and the Federal Circuit believe that Nuijten’s signal claims are not limited to any specific type of signal,⁶⁷ the Federal Circuit interpreted Nuijten’s signal claims as being directed towards electromagnetic signals.⁶⁸ Because the term signal has such an expansive definition and because the Federal Circuit’s analysis in *In re Nuijten* is primarily based on electromagnetic signals, the rest of this work will use the word signal to mean electromagnetic signal unless stated otherwise.

¶22 Applying the third definition of tangible as defined by the Black’s Law Dictionary,⁶⁹ a signal is tangible because the mind can perceive or understand a signal. This is evident by the numerous scientific books that provide students with an understanding of signals and ways they can be applied in the real world.⁷⁰

¶23 Nevertheless, whether the mind can understand a signal is not the appropriate question. The mind can understand many things, including abstract concepts, which courts have previously held as unpatentable.⁷¹ Moreover, just because concepts relating to signals can be taught and understood, it does not mean that signals are not abstract concepts themselves. After all, math can be taught, understood, and applied in the real world, and yet mathematical formulas are considered abstract concepts that are not patentable within the meaning of 35 U.S.C. § 101.⁷²

¶24 Since the third definition does not help in determining whether a signal is tangible within the meaning of 35 U.S.C. § 101, it is evident that the Federal Circuit intended the meaning captured by the first pair of definitions for tangible as defined by the Black’s Law Dictionary.⁷³ Thus, a signal must be something physical that is capable of being touched or seen to be considered tangible.

¶25 As the Federal Circuit has acknowledged, a signal is physical as “it exists in the real world and has tangible causes and effects.”⁷⁴ This should be sufficient to prove that a signal is indeed tangible. However, the Federal Circuit denies the tangibility of signals

⁶⁶ BLACK’S LAW DICTIONARY 1415 (8th ed. 2004).

⁶⁷ See *Ex parte Nuijten*, Appeal 2003-0853, 2006 WL 3939192, *3 (B.P.A.I. Jan. 24, 2006); *In re Nuijten*, 500 F.3d 1346, 1353 (Fed. Cir. 2007), *cert. denied*, 129 S. Ct. 70 (2008).

⁶⁸ *In re Nuijten*, 500 F.3d at 1356.

⁶⁹ BLACK’S LAW DICTIONARY 1494.

⁷⁰ See, e.g., ALAN V. OPPENHEIM, SIGNALS & SYSTEMS (2d ed. 1997); B.P. LATHI, LINEAR SYSTEMS AND SIGNALS (2005).

⁷¹ *Diamond v. Diehr*, 450 U.S. 175, 201 (1981).

⁷² *Id.*

⁷³ BLACK’S LAW DICTIONARY 1494.

⁷⁴ *In re Nuijten*, 500 F.3d 1346, 1356 (Fed. Cir. 2007), *cert. denied*, 129 S. Ct. 70 (2008).

because they are not perceptible.⁷⁵ This is an incorrect assertion and will be discussed further in the following section.

¶26 Before proceeding, it is worth noting that whether or not a signal is tangible in itself is not really the relevant question. As the *In re Nuijten* dissent points out, *In re Alappat* “does not impose a requirement that a patentable manufacture must be a tangible thing.”⁷⁶ “Rather, the fact that an invention gives rise to some tangible result is one indication that it is not an unpatentable abstract idea.”⁷⁷

C. Perceptibility

¶27 The Federal Circuit implies that signals are not tangible because they cannot be perceived.⁷⁸ The court states that for signals to be perceived, they “must be measured at a certain point in space and time by equipment capable of detecting and interpreting the signal.”⁷⁹ However, the Federal Circuit’s conclusion that signals cannot be perceived is incorrect. It is true that a large range of signals cannot be perceived via the naked eye;⁸⁰ however, until now, the court has never required that an invention be perceptible without the assistance of special equipment.

¶28 By requiring that only signals perceptible by the naked eye are tangible, the Federal Circuit is introducing a new perceptibility requirement into 35 U.S.C. § 101, which would invalidate a number of existing patents. “The subject matter of scores of patents can be perceived only with the aid of advanced equipment capable of discerning qualities that are undetectable to the unaided human senses.”⁸¹ For example, patents covering technologies as diverse as “‘quantum dot’ semiconductor devices, isolated DNA and fragments of DNA, [and] ‘nanotube’ and other nanotechnologies”⁸² would all be invalidated under the Federal Circuit’s new test. Although many of these inventions are perceptible only by special equipment, they have each had and continue to have a large role in the advancement of technology and society.⁸³ Thus, adopting a perceptibility requirement as part of the statutory requirements under 35 U.S.C. § 101 and thereby invalidating patents associated with the above example technologies is contrary to the core idea of patent law that patents should facilitate the progress of the useful arts by pushing back the frontiers of science and technology.⁸⁴

¶29 Furthermore, adopting such a perceptibility requirement would prevent an unknowable number of future inventions from being protected through the patent system. Not only would the perceptibility requirement bar any number of future inventions relating to currently known technologies that are imperceptible without special

⁷⁵ *Id.* at 1356-57.

⁷⁶ *Id.* at 1359 n.1 (Linn, J., concurring in part and dissenting in part) (citing *In re Alappat*, 33 F.3d 1526, 1544 (Fed. Cir. 1994)).

⁷⁷ *Id.*

⁷⁸ *Id.* at 1356 (majority opinion).

⁷⁹ *Id.*

⁸⁰ *Cf.* *Applied Materials, Inc. v. Tokyo Seimitsu, Co., Ltd.*, 446 F. Supp. 2d 538, 545 (E.D. VA. 2006) (indicating that light is the part of the electromagnetic spectrum which is visible to the human eye).

⁸¹ Brief Amici Curiae of Intellectual Property Academics in Support of the Petitioner, *supra* note 52, at 4.

⁸² *Id.* at 4-5.

⁸³ *Id.* at 5.

⁸⁴ *See* *Diamond v. Chakrabarty*, 447 U.S. 303, 316 (1980).

equipment, but it would bar any number of additional unforeseen technologies that are imperceptible without special equipment.

¶30 Prior to the Federal Circuit's recent introduction of the new perceptibility requirement, the courts were not concerned with whether an invention required special equipment to be perceived. The Supreme Court held that micro-organisms are patentable⁸⁵ even though micro-organisms are not perceptible to the human eye without special equipment. Thus, the Federal Circuit's argument that signals are not tangible because most signals require special equipment to be perceived breaks with precedent.

D. Transience

¶31 The Federal Circuit states that signals are not tangible because they are transient or fleeting and "devoid of any semblance of permanence during transmission."⁸⁶ This is an overly vague concept without any foundation in precedent. How is one to determine what length of time should be used to determine whether something is fleeting? As Professor Duffy points out in his *amicus curiae* brief, what we consider a long period of time has changed over the years, particularly as scientific advancements have enabled people to shorten the length of time it takes to complete a task.⁸⁷ For example, it once may have taken a person several minutes to add up a page of numbers. With the invention of calculators, the amount of time required was drastically reduced and the modern computer has made such a task almost instantaneous.

¶32 Furthermore, why does it even matter if something is transient? Should an invention that advances the frontiers of technology and science be ineligible for patent protection because it only exists for five minutes or maybe five seconds? There is no semblance of a logical rationale for such a restriction, and it "is inconsistent with basic patent policy."⁸⁸

¶33 Moreover, previously unassailable natural phenomena or processes that are used as benchmarks for measuring the speed of many scientific advancements are no longer beyond the control of modern science. For example, not only can light now be slowed down, it can be stopped and restarted thanks to modern scientific advancements.⁸⁹ Given the ability of science to drastically increase the speed of such technology as microprocessors and to slow down natural phenomena such as light, it seems illogical to "incorporat[e] a new and undefined concept of fleetness as a strike against patentability."⁹⁰ To do so would cause great harm to the patent system, and there is little connection between the value of an invention and its transience.⁹¹

¶34 Just as perceptibility should not be incorporated into the statutory tests of 35 U.S.C. § 101, neither should transience. In short, the Federal Circuit's holding that signals are

⁸⁵ *Id.* at 309.

⁸⁶ *In re Nuijten*, 500 F.3d 1346, 1356 (Fed. Cir. 2007), *cert. denied*, 129 S. Ct. 70 (2008).

⁸⁷ Brief Amici Curiae of Intellectual Property Academics in Support of the Petitioner, *supra* note 52, at 6.

⁸⁸ Brief Amici Curiae of Intellectual Property Academics in Support of the Petitioner, *supra* note 52, at 5.

⁸⁹ Erin Biba, *Harvard Physicist Plays Magician with the Speed of Light*, WIRED, Issue 15.11 (Oct. 23, 2007) available at http://www.wired.com/science/discoveries/magazine/15-11/st_alphageek.

⁹⁰ Brief Amici Curiae of Intellectual Property Academics in Support of the Petitioner, *supra* note 52, at 7.

⁹¹ *Id.*

not tangible because they are transient or fleeting is a dangerous precedent that, as the dissent points out, overturns existing precedent.⁹²

E. Are Signals Articles?

¶35 The Federal Circuit has acknowledged that signals are physical,⁹³ and therefore signals should be classified as tangible. However, the Federal Circuit has also held otherwise, arguing that signals are imperceptible and “devoid of any semblance of permanence.”⁹⁴ The arguments relating to imperceptibility and lack of permanence are not only flawed, but also irrelevant in determining whether a signal is tangible or patentable.

¶36 First, signals are perceptible. The effects of receiving and sending signals can be perceived. Furthermore, signals themselves can be perceived with special equipment. Although the Federal Circuit implies that this is insufficient,⁹⁵ such an argument would invalidate a number of useful patents thereby seriously undermining the patent system and the incentives it provides inventors. For example, all nanotechnology patents would be invalidated. Thus, even if one were to accept that signals are imperceptible under the Federal Circuit’s interpretation of perceptibility in *In re Nuijten*,⁹⁶ it is not relevant in answering the question of whether signals are patentable. Title 35 has no such perceptibility requirement and to include one in 35 U.S.C. § 101 would cause great harm to the patent system because of the useful patents that would be invalidated. Thus, it seems unlikely Congress could have ever intended the statute to include such a perceptibility requirement.

¶37 Second, signals can have permanence. As acknowledged by the Federal Circuit, signals can be stored in a storage medium.⁹⁷ Thus, when the court asserts that signals lack permanence, it is only referring to signals in the process of transmission. However, a signal’s existence during transmission need not be ephemeral. Due to the development of repeaters, a signal can be kept in transmission almost indefinitely.⁹⁸

¶38 Moreover, as the *Nuijten* dissent points out, precedent holds that what is patentable is the overall signal, not the manifestation of an individual bit in transmission.⁹⁹ Therefore, as long as the transmission of a signal is in process, the signal exists.¹⁰⁰ This could be a significant period of time, especially if the signal is the encoding of a streaming video or audio file.¹⁰¹ Thus, the argument that signals are intangible because they lack permanence during transmission is flawed.

⁹² *In re Nuijten*, 500 F.3d 1346, 1359 (Fed. Cir. 2007), *cert. denied*, 129 S. Ct. 70 (2008) (Linn, J., dissenting).

⁹³ *Id.* at 1356 (majority opinion).

⁹⁴ *Id.*

⁹⁵ *Id.*

⁹⁶ *Id.*

⁹⁷ *Id.* at 1356 n.6.

⁹⁸ See U.S. Patent No. 7,406,295 (filed Sept. 10, 2003) (providing a description of the functionality of a repeater).

⁹⁹ *In re Nuijten*, 500 F.3d at 1360 (dissenting opinion) (citing *In re Hruby*, 54 C.C.P.A. 1196, 373 F.2d 997 (1967)).

¹⁰⁰ *Id.*

¹⁰¹ *Id.*

¶39 Furthermore, whether or not signals lack permanence has no impact on the usefulness of signals and therefore should have no relevance in determining whether signals are patentable. Most articles are not permanent. Virtually everything has a lifespan, so the real question is not whether something is permanent, but how long something need exist before we consider it permanent. Setting a threshold of permanence before something can be patented would be nothing more than an arbitrary determination that would needlessly prevent inventors from protecting potentially useful inventions that do not exist long enough to pass the arbitrary threshold. Therefore, the Federal Circuit should not read into 35 U.S.C. § 101 a new perceptibility test.

¶40 The Federal Circuit interpreted articles of manufacture “as being tangible articles or commodities.”¹⁰² The court’s basis for rejecting signals was that they were not tangible because, despite the Federal Circuit acknowledging that signals are physical, signals are imperceptible and lack any type of permanence.¹⁰³ However, as argued above, neither criterion is true or relevant in the determination of whether a signal is patentable. Therefore, a signal should be classified as tangible. Moreover, a signal should be considered an article of manufacture because it is a physical man-made creation that is tangible. Further, the use of signals gives rise to tangible results.

¶41 Even if one were swayed by the argument that signals are not articles, this would not invalidate the notion that signals are patentable under the manufacture category of 35 U.S.C. § 101. As the *Nuijten* dissent points out, the Supreme Court in *American Fruit* provides two definitions for “manufacture.”¹⁰⁴ A manufacture is not limited to the production of articles, but can also include “anything made for use from raw or prepared materials.”¹⁰⁵ Signals used in communication, such as the ones at issue in *Nuijten*’s patent application, are made from electromagnetic energy.¹⁰⁶ This electromagnetic energy can be thought of as the raw material used to produce a signal. Therefore, whether or not they are considered articles, signals are patentable under the manufacture category of 35 U.S.C. § 101.

IV. SHOULD SIGNALS BE PATENTABLE?

A. *Are Signals too Fundamental to Patent?*

¶42 Whether or not the Federal Circuit was correct in holding that signals are not patentable, one question still remains: Should signals be patentable? The Constitution explicitly authorizes Congress to “promote the Progress of Science and useful Arts.”¹⁰⁷ It thus follows that the “basic purpose of the patent system . . . [is to advance] the useful arts — the process today called technological innovation.”¹⁰⁸ Therefore, one should consider whether allowing signals to be patented would help advance the useful arts.

¹⁰² *Id.* at 1356 (majority opinion).

¹⁰³ *Id.*

¹⁰⁴ *Id.* at 1360 (dissenting opinion).

¹⁰⁵ *Am. Fruit Growers, Inc. v. Brogdex Co.*, 283 U.S. 1, 11 (1931).

¹⁰⁶ *See* Electromagnetic Signals,

http://www.inetdaemon.com/tutorials/basic_concepts/communication/signals/signals.shtml, (last visited February 14, 2009).

¹⁰⁷ U.S. CONST. art. I, § 8, cl. 8.

¹⁰⁸ *Paulik v. Rizkalla*, 760 F.2d 1270, 1276 (Fed. Cir. 1985).

¶43 In deciding whether patenting signals would advance the useful arts, it is important to consider how fundamental signals are to the many related technical fields that use signals. Granting a patent on an invention that is “so basic and fundamental to future advances . . . would unduly burden future inventors.”¹⁰⁹ Therefore, to help promote the advancement of science and technology, the USPTO and courts should evaluate the most fundamental inventions in any field closely before a patent is granted covering the invention.

¶44 The direction of the evolution of science and technology is unpredictable. Thus, it is doubtful that either the courts or Congress can develop a clear and simple rule for determining *a priori* whether an invention is so fundamental to a particular technical field that it should be unpatentable for the sake of not stifling progress. However, signals most certainly are one field that the USPTO should not consider as patentable subject matter because too many different areas of science and technology are dependent on them.

B. Excessive Patent Protection

¶45 Allowing inventors to patent signals would cause tremendous harm to innocent patent infringers. The American patent system is generally a no-fault system, meaning that if you infringe a patent, you pay regardless of your state of mind.¹¹⁰ This means that any Internet Service Provider (ISP) or any other third party that produces a system capable of reading a signaling standard could be liable for patent infringement regardless of intent.¹¹¹

¶46 For example, if an inventor obtains a signal patent, the only thing the inventor needs to show for an infringement claim is that the signal was transmitted.¹¹² Although the most likely person who caused the transmission is an end-user, or a customer of an ISP, the patentee will probably sue the ISP because the ISP will have much deeper pockets.¹¹³ To prevent such a lawsuit, the ISP would be forced to develop an extensive oversight system. Not only would this be prohibitively expensive, but it would violate law-abiding customers’ privacy.

¶47 Because an inventor can patent both methods and devices for creating the signal, there is no need to patent the signal itself. Allowing the signal to be patented will only lead to abusive lawsuits against ISPs and other third parties, not to the promotion of and advancement of science.

C. Patent Economics

¶48 Many people believe that money is what drives most people, particularly in a capitalist society. To that end, the patent system is designed to “grant for a limited time to inventors of the exclusive right to their inventions.”¹¹⁴ This provides an incentive to

¹⁰⁹ ROBERT PATRICK MERGES & JOHN FITZGERALD DUFFY, *PATENT LAW AND POLICY: CASES AND MATERIALS* 137 (4th ed. 2007).

¹¹⁰ Richard H. Stern, *Patenting Signals*, *IEEE MICRO* 6, 8 (Mar./Apr. 1998).

¹¹¹ *Id.*; Kunin & Lytle, *supra* note 45, at 884.

¹¹² Stern, *supra* note 110, at 8.

¹¹³ *Id.* at 8.

¹¹⁴ *Great Atl. & Pac. Tea Co. v. Supermarket Equip. Corp.*, 340 U.S. 147, 154 (1950) (Douglas, J., concurring).

inventors because it enables them to profit from their work. Without such an incentive, inventors might decide that it is not worth their effort to work towards scientific advancement or technological innovation. Patents enable inventors to prevent free riders who did not contribute to the inventing process from unfairly competing with the inventors who expended resources and effort in developing the invention. Thus, in exchange for pushing back the frontiers of science and technology, Congress grants inventors a temporary monopoly over their invention.¹¹⁵

¶49 Signals have a number of uses. For example, they enable people to communicate with each other over long distances by the use of cell phones and voice over internet protocol (VoIP).¹¹⁶ In addition, signals enable people to watch streaming movies from the comfort of their home.¹¹⁷ Thus, signals certainly appear to be in the class of inventions that push back the frontiers of science.

¶50 However, just because some types of signals help to advance science does not mean they should be patentable, or used to grant their inventors a monopoly. The primary purpose of patents is to benefit the community at large, not to indiscriminately line the pockets of inventors.¹¹⁸ This means that in determining whether a new type of technology should be patentable, the courts should first determine whether the granting of a monopoly, even for a limited time, will result in a greater benefit or a greater harm to the community as a whole.

¶51 With regard to signals, it is more likely to cause harm than benefit to society to allow for the patenting of signals. The benefits to society of allowing for the patenting of signals are small compared to the harms. If an inventor is driven by the love of science or by a sense of utilitarianism he or she will continue to work towards advancing science. For inventors who require more, the patent system is designed to give them the extra incentive of a limited monopoly. Inventors who create a better signal do not need to patent the signal to gain the benefit of their invention because of the nature of signals. Signals require a method of generation or a process, a device to perform the process, and a type of storage medium to contain the signals, even if only briefly. All of these types of claims are patentable, and indeed Nuijten was granted a patent for these claims.¹¹⁹ Thus, inventors can still use the patent system to protect their signal inventions.

¶52 So, why protect the signal itself? Protecting the signal with a patent enables an inventor to stop other inventors from developing a method to create the same signal without infringing on the process patent. This would make the inventor's patent more valuable because it ensures less competition over the time of the monopoly. However, this would harm society because it would reduce innovation. For example, if the creator of a popular device that communicated with similar devices using wireless signals were to patent the wireless signals, other companies would be hard pressed to compete.

¹¹⁵ *Id.*

¹¹⁶ *See, e.g.*, U.S. Patent No. 4,737,978 (filed Oct. 31, 1986) (teaching a method of controlling handoff of cell phones when signal drops below a given threshold); U.S. Patent No. 7,451,486 (filed Sept. 30, 2004) (describing an intrusion-detection system for detecting VoIP-based intrusion attempts).

¹¹⁷ *See, e.g.*, U.S. Patent Application 2007/0276902 (filed May 24, 2006) (disclosing a method for accessing content, such as a movie, over a network).

¹¹⁸ *Motion Picture Patents Co. v. Universal Film Mfg. Co.*, 243 U.S. 502, 511 (1917) (quoting *Kendall v. Winsor*, 62 U.S. 322, 327-28 (1858)).

¹¹⁹ *In re Nuijten*, 500 F.3d 1346, 1351 (Fed. Cir. 2007), *cert. denied*, 129 S. Ct. 70 (2008) (majority opinion).

Consumers who did not already own the device would be more likely to buy the device than a competing device because they would want to communicate with all their friends who already owned the device. Thus, the market leader would have less incentive to innovate because competition is unlikely.

¶53 It is true that this problem exists to some degree with any patent, such as a patent that covers a signal generator, but the problem is less pronounced. One could potentially invent around the signal generator by creating a signal generator that generates the same signal, but in a different, perhaps more efficient, manner. This is not possible with the signal itself, because the signal is unique. A different new signal could be created, but unless the device that uses the new signal can also interpret the patented signal, consumers would not purchase the competing device, assuming that the device that uses the patented signal already has a significant market share.

¶54 Thus, even though signals are patentable subject matter under a textual interpretation of 35 U.S.C. § 101, the court was correct to deny Nuijten’s patent claims related to the signals themselves because the point of a patent is not to enable inventors to profit, but to benefit society.¹²⁰ It is more beneficial for society that signals are not patentable.

V. CONCLUSION

¶55 At the commencement of the writing of this work, a petition for certiorari was pending for *In re Nuijten*.¹²¹ However, since then, the Supreme Court has reviewed the petition and denied it without comment.¹²²

¶56 Although the outcome of *In re Nuijten* was correct, the Federal Circuit’s reasoning was not. In reaching its holding, the court introduced new criteria and misinterprets existing criteria for determining whether an invention is patentable under 35 U.S.C. § 101. Thus, the Supreme Court should have accepted the petition to resolve the issues introduced by *Nuijten* and the Federal Circuit in its decision. It is very unfortunate that the Supreme Court decided not to accept this case “because § 101 of the Patent Act is a fundamental provision that regulates the entire domain of [the] patent system.”¹²³ Therefore, it is important to address fundamental changes to patent law, such as those introduced by *In re Nuijten*, before they have an opportunity to cause harm to the patent system.

¶57 *In re Nuijten* would have been a good case for the Supreme Court to have reviewed because it would have allowed the Court to address several important issues in one case. The Court could have tackled the inclusion of new tests or requirements within the 35 U.S.C. § 101 statutory categories. Furthermore, the Court could have clarified its stance on the tangibility requirement. Currently, determining whether an invention is tangible, or at least produces a tangible result is part of the test for patentability. However, at least three members of the Supreme Court, Justice Breyer, Justice Stevens, and Justice Souter,

¹²⁰ *Motion Picture Patents Co.*, 243 U.S. at 511.

¹²¹ Petition for a Writ of Certiorari, *Nuijten v. Dudas*, 129 S. Ct. 70 (2008) (No. 07-1404), 2008 WL 2050801.

¹²² *Nuijten v. Dudas*, 129 S. Ct. 70 (2008) (petition denied).

¹²³ Brief Amici Curiae of Intellectual Property Academics in Support of the Petitioner, *supra* note 52, at 14.

have indicated that tangibility should not be a test for patentability.¹²⁴ Yet, the Court has never overruled the cases that introduce and support the tangibility requirement, nor has the Court endorsed it. *In re Nuijten* would have been a good case for the Supreme Court to take a stand on tangibility as well as the new perceptibility and transience requirements.

¶58 Furthermore, the Supreme Court could have used *In re Nuijten* not only to affirm that signals should not be patentable, but to provide a proper rule. Under 35 U.S.C. § 101, signals are patentable, but the Court could have explained that allowing signals to be patented would be counter to the purpose of patent law because it would not promote the progress of science and the useful arts. Additionally, the Supreme Court could have used the opportunity to make a statement about handling the patenting of fundamental technologies that have the potential to stifle innovation rather than promote innovation.

¶59 It is important for society to have clear patent rules because otherwise, inventors do not know what is patentable, and how to word their patent applications. Unfortunately, inventors cannot wait for clarification from the courts or Congress. Inventors “must proceed with filing their patent applications as the inventions are created.”¹²⁵

¶60 Thus, in closing, the Supreme Court is urged to accept the next case that would enable the Supreme Court to clarify the tests for patentability under 35 U.S.C. § 101 and to give guidance on patenting technology fundamental to future advances. Furthermore, the Court is urged to accept the next case that would enable it to set a rule that otherwise patentable subject matter should not be patentable if it is contrary to the purpose of patent law as set out by the Constitution.

¹²⁴ *Lab. Corp. of Am. Holdings v. Metabolite Labs., Inc.*, 548 U.S. 124, 136 (2006) (Breyer, J., dissenting from dismissal of writ of certiorari).

¹²⁵ Scott D. Locke & William D. Schmidt, *Business Method Patents: The Challenge of Coping with an Ever Changing Standard of Patentability*, 18 *FORDHAM INTELL. PROP. MEDIA & ENT. L.J.* 1079, 1094 (2008).