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# The Artificial Intelligence Solution to the Patent Obviousness Problem

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## Abstract

*Seeking a patent requires surrendering trade secrets. The decision whether to seek patent protection or maintain a trade secret is a pivotal one for innovators. A critical impediment to a rational decision lies in uncertainty as to whether a patent will be granted once the trade secret has been surrendered, and a particular source of uncertainty arises because of the unpredictability of the application of the "obviousness" standard for patentability. This Article explores the history and application of obviousness determinations and proposes the use of artificial intelligence to increase objectivity and predictability into this critical phase of patent prosecution. After outlining the relationship between trade secrets and patents, and the history and challenges of determining obviousness, it proposes using AI tools to reduce subjectivity (and, in particular, hindsight bias), speed patent prosecution, and thereby reduce the uncertainty of the trade secret/patent decision-making process. It also demonstrates the feasibility of applying AI through an experiment. Finally, it addresses potential legal and ethical issues associated with AI's role in patent examination and outlines the requirements for integrating an AI system into the patent prosecution process.*

## Introduction

Patents are offered as an incentive to surrender trade secrets. While trade secrets have no fixed term and do not protect against independent duplication

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of the innovation, patents offer innovators a guaranteed fixed term of protection against the use of their innovations. Patents require the surrender of trade secrets, so an innovator must choose either one form of protection or the other. Which of these forms of protection is "better" depends on many factors, some of which are unpredictable. One critical unpredictable factor is whether a patent is available or not. Because most patent applications are published (and therefore destroy the trade secret) before there is a determination that a patent will be granted, the innovator's decision must include a prediction as to whether there will be a patent or not—if not, then the trade secret will have been given up and nothing received in return.

Among the hurdles which a patent application must clear are two that require comparing the innovation to the prior art. Prior art is defined in 35 U.S.C. §102. Although detailed, the definition primarily encompasses things which were publicly available, through sources other than the innovator, before the innovator filed an application for the patent.[1] If a prior art reference exactly discloses the innovation, the innovation is not patentable because it is not novel; this is a comparatively straightforward determination. The more difficult hurdle is showing that the innovation is non-obvious. That requires resolving the question of whether someone of ordinary skill in the field would consider it obvious to combine known elements of the prior art to achieve the innovation.

Obviousness is the most common reason for rejecting claims in a patent application.[2] Making obviousness determinations more objective and predictable would make it easier for an innovator to decide whether to give up trade secrets in pursuit of patents and would be welcomed by innovators. The indeterminacy of non-obviousness has been described a critical challenge in

[1] 35 U.S.C. § 102(a) provides: "NOVELTY; PRIOR ART. A person shall be entitled to a patent unless (1) the claimed invention was patented, described in a printed publication, or in public use, on sale, or otherwise available to the public before the effective filing date of the claimed invention; or (2) the claimed invention was described in a patent issued under section 151, or in an application for patent published or deemed published under section 122(b), in which the patent or application, as the case may be, names another inventor and was effectively filed before the effective filing date of the claimed invention." Subsections (b) through (d) provide certain exceptions and clarifications.

[2] The USPTO provides a tool for analyzing performance statistics, available at https://developer.uspto.gov/visualization/agency-trends-rejections-office-actions-patent-applications. Using this tool, the statistics for the year ending on February 1, 2024 show that the USPTO rejected 3,150,675 claims. Of those rejections, the most frequent basis for rejection (39%) was obviousness; the next most frequent basis for rejections was lack of enablement (24%).

patent law that has engendered a "suite of ills for the patent system and technological innovation" by sometimes rewarding the mundane and forcing true innovators to face a "patent minefield."[3] The Federal Circuit has attempted to provide rules for making that determination, but the Supreme Court has rejected them, leaving patent applicants (and the U. S. Patent Office and the courts) with the challenging task of determining whether a hypothetical person of ordinary skill would have considered the innovation obvious.

This Article proposes using artificial intelligence ("AI") as a tool for introducing objectivity and predictability into the process. Section I describes the relationship between trade secrets and patents, the choice faced by innovators, and the role of obviousness in making that choice; it then traces the historical development and role of the obviousness concept in patent law. Section II describes the practical problems in making obviousness determinations. Section III explains how features of the patent prosecution system exacerbate the problems created by the unpredictability of obviousness determinations. Section IV proposes the use of AI tools to reduce the degree of subjectivity involved in making these determinations, thereby improving predictability and making the patent bargain fairer. Section V describes an experiment showing the feasibility of using AI tools. Section VI identifies issues that are presented by the proposed AI solution and how they can be addressed.

## I. Trade Secrets, the Patent System, and the Role of Obviousness

### *A. The Trade Secret/Patent Exchange*

All innovation begins as a trade secret. A trade secret is an intellectual property right[4] automatically created upon the development of valuable information that is not generally known, provided that the developer of the information takes reasonable steps to maintain its secrecy.[5] Well-known examples

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[3] Gregory Mandel, *The Non-Obvious Problem: How the Indeterminate Nonobviousness Standard Produces Excessive Patent Grants*, 42 U.C. Davis L. Rev. 57, 127, 59 (2008).

[4] In Ruckelshaus v. Monsanto Co., the Court held that trade secrets were property rights within the meaning of the Fifth Amendment, and that disclosure of a trade secret by the government constituted a taking. 467 U.S. 986, 1016 (1984).

[5] The Uniform Trade Secrets Act defines a trade secret as "information . . . that: (i) derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable by proper means by, other persons who can obtain economic value from its disclosure or use, and (ii) is the subject of efforts

of products protected as trade secrets include the formula for Coca-Cola and the "secret herbs and spices" used in Kentucky Fried Chicken. Ownership of trade secret gives its owner the power to prevent misappropriation—a defined term of art which basically covers disclosure or use of a trade secret that has been obtained from the owner by improper means. As long as the requirements for trade secrecy are met, a trade secret may be maintained indefinitely, and competitors may be prevented from misappropriating the trade secret information to compete.[6] Thus, at least in theory, a trade secret could last forever. However, it can also be destroyed by factors beyond the owner's control. For example, a competitor might independently learn the secret and disclose it. Public disclosure destroys trade secrets,[7] and most states recognize reverse engineering of a publicly sold product as beyond the protection of trade secret law.[8]

The patent system is specifically designed to destroy trade secrets. It offers an exchange of a patent for disclosure of trade secrets. While the owner of a trade secret can prevent misappropriation for as long as the trade secret is maintained, the owner of a patent can prevent infringement[9] (which is generally defined as the manufacture, use, sale, or importation of a product

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that are reasonable under the circumstances to maintain its secrecy." Unif. Trade Secrets Act § 1(4) (Nat. Conf. of Comm'r on Unif. State Laws 1985). Defining innovation as something that has value satisfies the "economic value" part of the definition. It also meets the "not generally known" and "reasonable efforts to maintain secrecy" requirements of the second part of the definition because at the moment of innovation the innovator has told no one and the innovation exists only in the innovator's mind. *Id.*

[6] *Id.* The requirements for maintaining a trade secret are that valuable confidential information is not publicly known and that the owner is taking reasonable steps to maintain its confidentiality. *Id.*

[7] Unif. Trade Secrets Act § 1 cmt. (Nat. Conf. of Comm'r on Unif. State Laws 1985).

[8] *See, e.g.*, Kewanee Oil Co. v. Bicron Corp., 416 U.S. 470, 476 (1974). The Uniform Trade Secrets Act prohibits acquisition of trade secrets by improper means. Misappropriation may be enjoined or give rise to damages. Unif. Trade Secrets Act §§ (2)(a), (3) (Nat. Conf. of Comm'r on Unif. State Laws 1985). Misappropriation is defined as "acquisition of a trade secret of another by a person who knows or has reason to know that the trade secret was acquired by improper means." *Id.* § 1(2)(i).

[9] Patent infringement gives rise to damages, which are to be no less than a reasonable royalty, and the possibility of an injunction. 35 U.S.C. §§ 283, 284. The Supreme Court has held, however, that even in patent cases, a court must apply traditional equitable factors in deciding whether it is appropriate to issue an injunction. eBay, Inc., v. MercExchange, LLC, 547 U.S. 388, 394 (2006).

incorporating a patented invention)[10] for a period beginning on the date the patent is issued[11] and ending twenty years after the date the patent application was filed.[12] Patent infringement gives rise to damages which are to be no less than a reasonable royalty[13] and the possibility of an injunction[14] and attorney fees in certain cases.[15]

Thus, trade secret rights depend on whether the alleged infringer obtained the information from the trade secret owner while patent rights do not. Patents are enforceable even against those who independently discover the same innovation. Anyone who independently discovers a trade secret is free to disclose it and thereby destroy it—disclosure by an independent discoverer is not misappropriation, and publication means the information is no longer "not generally known." The term of a trade secret is therefore beyond the owner's control. Patents are, by definition, disclosed by the government, which destroys any trade secrets contained in the patent, but disclosure does

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[10] 35 U.S.C. § 271. There are also provisions prohibiting inducing infringement (knowingly supplying a material component especially adapted for use in infringing), *id.* § 271(c), supplying substantial portions of a patented invention to induce the combination into the patented invention, *id.* § 271(f), or carrying out a patented process outside the United States, then importing the product into the United States, *id.* § 271(g).

[11] *Id.* § 154(a)(2).

[12] The patent expires twenty years after the date the earliest application was filed (i.e., if there are a series of related patent applications, referred to as "continuing applications," the term is measured from the date the first in the series was filed) and is subject to adjustment in certain circumstances related to delays in processing by the USPTO. *Id.*

[13] 35 U.S.C. § 284. Although the statute specifies that damages be "no less" than a reasonable royalty, in practice damages rarely exceed what is determined to be a reasonable royalty. *See* Third Wave Tech., Inc. v. Stratagene Corp., 405 F. Supp. 2d 991, 1011 (W.D. Wis. 2005) (explaining that under § 284, courts "imagine a negotiation between the patentee and infringer taking place at the moment the infringement began" which "is an approach that experts have employed for decades in patent cases.").

[14] The language of the statute regarding injunctions is permissive, not mandatory: "Courts may grant injunctions in accordance with the principles of equity to prevent the violation of any right secured by patent, on such terms as the court deems reasonable." 35 U.S.C. § 283. However, since a patent is, by definition, unique, *id.* § 102, it might seem by analogy to real property law that injunctions should always be issued because damages would never provide a complete remedy for infringement. The Supreme Court has held, however, that even in patent cases, a court must apply the traditional equitable four-factor test in deciding whether it is appropriate to issue an injunction. eBay, Inc., v. MercExchange, LLC, 547 U.S. 388 (2006).

[15] 35 U.S.C. § 285.

not destroy patent rights.[16] A patent has a fixed, but guaranteed, expiration date.[17] Thus, trade secrets and patents differ both in duration and scope.

The authority for a federal patent system is found in Article I, Section 8 of the Constitution, which grants Congress the power to "promote progress" by granting monopolies for a limited-time.[18] Title 35 of the U.S. Code reflects Congress' decision as to how to exercise that authority.[19] Because the constitutional goal is to promote progress, patents[20] require the surrender of trade secrets in return for the possibility[21] of a government-granted, limited-term

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[16] Under the first-to-file system, a second inventor can destroy the first inventor's right to a patent by disclosing the invention before the first inventor discloses the invention (and files an application within a year from the disclosure) or files a patent application. *Id.* § 102. The first inventor can minimize or eliminate this risk by filing promptly.

[17] *Id.* § 154 (subject to the owner's payment of periodic maintenance fees).

[18] U.S. Const. art. I, § 8, cl. 8 ("[Congress shall have Power t]o 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."). For a detailed history of the clause, see Edward C. Walterscheid, *To Promote the Progress of Science and Useful Arts: The Background and Origin of the Intellectual Property Clause of the United States Constitution*, 2 J. Intell. Prop. L. 1 (1994).

[19] 35 U.S.C. § 101.

[20] There are three types of patents issued by the United States: utility patents, design patents, and plant patents. Of these, the largest category—and the category which most people mean when referring to a "patent"—is the utility patent. The term "patent" is used in this Article to refer to utility patents.

[21] Before the American Inventors Protection Act ("AIPA"), patent applications were confidential until a patent was issued, so there was an exchange of patent rights for the surrender of trade secret rights. The AIPA provided that any application filed on or after November 29, 2000, would be published 18 months after filing unless it qualified for an exemption. Under current law, most patent applications are published 18 months after filing, whether a patent has been granted or not, and all patents are published. 35 U.S.C. § 154. The requirement of 35 U.S.C. § 112(a)—that "the specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains . . . to make and use the same[.]"—precludes maintaining trade secrecy. Therefore, under current law, trade secrets must be surrendered before the applicant knows whether a patent will be granted in return or not. For statistics on the number of patents issued within the 18-month period of non-publication, and other dilemmas facing patent applicants, *see* Max Stul Oppenheimer, *The Innovator's Dilemma*, 4 Am. U. Bus. L. Rev. 371, 381–82 (2015); Max Stul Oppenheimer, *Rethinking Compact Patent Prosecution*, 25 Alb. L.J. Sci. & Tech. 257, 268 (2015).

monopoly[22] over the manufacture, use, importation, sale, or offer for sale of an innovation.[23] This disclosure is thought to benefit society—and therefore justify granting a limited-term monopoly—because disclosure provides ideas for further research to a larger pool of researchers.[24] In *United States v. Dubilier Condenser Corp.*, the Supreme Court noted that an inventor "may keep his invention secret and reap its fruits indefinitely. In consideration of its disclosure and the consequent benefit to the community, the patent is granted. . . . [U]pon the expiration of that period, the knowledge of the invention inures to the people, who are thus enabled without restriction to practice it and profit by its use."[25] This statement was accurate when the *Dubilier* case was decided in 1933 and would still be accurate if an innovator could file an application for patent[26] and maintain the trade secret until the application for patent was approved. In that case, the innovator could make an informed choice—keep the trade secret, with all its risks and benefits or give up the trade secret and accept in its stead a patent, with all its risks and benefits.[27]

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[22] An economist would view a patent as a monopoly because it gives its owner the exclusive rights to make, use, sell, offer to sell, or import the patented invention. 35 U.S.C. § 154(a)(1). Violation of any of these rights is infringement and gives rise to damages and (subject to equitable considerations) injunctions. *Id.* § 283; eBay, Inc., v. MercExchange, LLC, 547 U.S. 388 (2006). The Supreme Court, however, does not: "Though often so characterized a patent is not, accurately speaking, a monopoly, for it is not created by the executive authority at the expense and to the prejudice of all the community except the grantee of the patent. The term 'monopoly' connotes the giving of an exclusive privilege for buying, selling, working, or using a thing which the public freely enjoyed prior to the grant. Thus, a monopoly takes something from the people. An inventor deprives the public of nothing which it enjoyed before his discovery, but gives something of value to the community by adding to the sum of human knowledge." United States v. Dubilier Condenser Corp., 289 U.S. 178, 186 (1933) (footnote omitted) (citation omitted).

[23] 35 U.S.C. § 154(a)(2).

[24] Kewanee Oil Co. v. Bicron Corp., 416 U.S. 470, 485 (1974); Peter Lee, *Patents, Paradigm Shifts and Progress in Biomedical Science*, 114 Yale L.J. 659, 686–90 (2004) (arguing that patents promote hypothesis generation).

[25] *Dubilier*, 289 U.S. at 186–87.

[26] Patent applications are filed with, and examined by, the USPTO, an administrative agency subject to the Administrative Procedure Act. 5 U.S.C. §§ 701, 703. The USPTO has adopted notice and comment regulations in Title 37 of the Code of Federal Regulations. It has also adopted guidance for its patent examiners in the Manual of Patent Examining Procedure ("MPEP").

[27] A trade secret lasts as long as it meets the definition of being valuable information, not generally known, subject to reasonable efforts to maintain its secrecy. A patent generally lasts less than 20 years. A trade secret prevents misappropriation, which generally involves improper means; a patent prevents manufacture, use, sale, offer

Unfortunately, the current system no longer provides the innovator with that choice. Changes in the patent statute, coupled with the backlog of pending patent applications and the speed at which the United States Patent and Trademark Office ("USPTO") works, have resulted in patent applications being made public before there has been a decision on patentability. The result is that innovators must give up their trade secrets, not knowing whether they will get anything in return. The delay in decision by the USPTO might be acceptable—or at least more tolerable—if the outcome of the USPTO review were predictable.

A rational innovator deciding whether to give up trade secrets would want to know what was being offered in exchange. Because the decision generally must be made before a patent is issued, part of the innovator's decision-making process requires a prediction: whether a patent will be issued for their innovation and, if so, the scope of protection.

### *B. Predicting Patentability*

While trade secret rights arise automatically as soon as the statutory definition is met,[28] patent rights do not exist until a review[29] by the USPTO determines that the claimed invention:

(1) is statutory subject matter;[30]

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for sale, or importation of a product incorporating a patented invention regardless of whether the infringer used improper means to learn the innovation. Thus, while a trade secret might last longer than a patent, it also might be destroyed sooner (for example, if another party independently discovered it and made it public) and it could not be enforced against an independent developer of the same trade secret. A patent has a guaranteed term and can be enforced against an independent developer, but it also has a fixed expiration date. The patent system therefore provides motivation for holders of patent-eligible trade secrets to disclose them (and therefore surrender protection under trade secret law) in exchange for rights which are broader in scope but potentially shorter in duration. A patent has a fixed, but guaranteed, expiration date, 35 U.S.C § 154 (subject to the owner's payment of periodic maintenance fees), while the term of a trade secret is uncertain and depends on events beyond the owner's control, Unif. Trade Secrets Act § 1 (Nat. Conf. of Comm'r on Unif. State Laws 1985). For more detail, *see* Oppenheimer, *The Innovator's Dilemma*, *supra* note 21.

[28] Note 5, *supra*.

[29] 35 U.S.C. § 131.

[30] Statutory subject matter consists of machines, manufactures, compositions of matter and processes, *id.* § 101, and only those categories. Kewanee Oil Co. v. Bicron Corp., 416 U.S. 470, 483 (1974) ("[N]o patent is available for a discovery, however

(2) is useful;[31]
(3) is novel;[32]
(4) is not obvious to a hypothetical person of ordinary skill in the field;[33]
(5) is described well enough that those in the field can make and use the invention;[34] and
(6) is defined well enough to apprise the public of what is covered by the patent.[35]

The process of USPTO review, known as patent prosecution, begins with an applicant filing a written application.[36] If any of the claims are determined to comply with the statutory requirements, a patent may be issued covering those claims[37] and granting the patent owner the right to stop others from making, using, selling, or offering to sell products incorporating the claims during the term of the patent.[38]

Two hurdles which a patent application must clear require comparing the claims to the prior art: the application must show that the innovation is novel under 35 U.S.C. § 102 and that it is not obvious under 35 U.S.C. § 103.[39] If a prior art reference discloses exactly what is asserted in a patent

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useful, novel, and nonobvious, unless it falls within one of the express categories of patentable subject matter of 35 U.S.C. § 101[.]"). Certain types of inventions have been held unpatentable even though they fall within the literal terms of the statute. "Phenomena of nature, though just discovered, mental processes, and abstract intellectual concepts are not patentable, as they are the basic tools of scientific and technological work." Gottschalk v. Benson, 409 U.S. 63, 67 (1972). "[Laws of nature] are part of the storehouse of knowledge. . . free to all men and reserved exclusively to none." Funk Bros. Seed Co. v. Kalo Inoculant Co., 333 U.S. 127, 130 (1948).

[31] 35 U.S.C. § 101. The USPTO interprets § 101 to require that the claimed invention have a "specific, substantial, and credible" use. MPEP § 2107 (9th ed. Rev. 1, Jan. 2024).

[32] 35 U.S.C. §§ 101, 102.

[33] *Id.* § 103.

[34] *Id.* § 112.

[35] *Id.*

[36] *Id.* § 111(a)(1).

[37] Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent thereof, subject to the conditions and requirements of this title. *Id.* §§ 101, 151.

[38] Possible infringement remedies include injunctions, *id.* § 283, damages, *id.* § 284, and attorney fees, *id.* § 285.

[39] Many of the earlier cases refer to activity prior to the date of invention as prior art. As amended by the America Invents Act ("AIA"), novelty and obviousness are

claim, the reference is said to "anticipate" the claim and makes it unpatentable because it is not novel.[40] That is a comparatively straightforward determination,[41] and easy to justify: if the public already has access to the invention, there is no need to grant a monopoly to get disclosure.[42]

The analysis and justification become more difficult if the claim is not anticipated but can be duplicated by combining two or more prior art references. The mere fact that something is novel does not mean that the public could not have access to it if the public wanted access. Many things are instantly obvious and are just as instantly rejected as impractical, uneconomical, or unmarketable.[43] The complication is explained in *KSR Int'l Co. v. Teleflex Inc.*:

> [A] patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art. . . . [I]nventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known . . . Granting patent protection to advances that would occur in the ordinary course without real innovation retards progress[.][44]

The Supreme Court has recognized the need for "uniformity and definiteness,"[45] but drawing the line has shown itself to be difficult.[46]

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now measured as of the effective filing date of the patent application (under 35 U.S.C. § 122, the "effective filing date" of an application may be earlier than the actual filing date if the application claims priority from an earlier application) rather than as of the date of invention.

[40] 35 U.S.C § 102

[41] An anticipating reference "must bear within its four corners adequate directions for the practice of the patent invalidated." Dewey & Almy Chem. Co. v. Mimex Co., 124 F.2d 986, 989 (2d Cir. 1942). *See also* Lincoln Stores, Inc. v. Nashua Mfg. Co., 157 F.2d 154, 159–60 (1st Cir. 1946); Gordon Form Lathe Co. v. Walcott Mach. Co., 32 F.2d 55, 58 (6th Cir. 1929). Therefore, to defeat patentability because of lack of novelty, there must be one single reference that discloses each and every element of the claimed invention.

[42] *See* Bonito Boats, Inc. v. Thunder Craft Boats, 489 U.S. 141 (1989) (holding that Congress cannot remove information from the public domain because removal would thwart the constitutional mandate to promote the progress of science and the useful arts); *see also* Miller v. Eagle Mfg. Co., 151 U.S. 186, 197 (1894) (holding that if two identical inventions are claimed, it is proper to reject them as not novel).

[43] Think "peanut butter/anchovy ice cream" or "diamond automobile bumpers."

[44] 550 U.S. 398, 418–19 (2007).

[45] Graham v. John Deere, 383 U.S. 1, 18 (1965).

[46] Anticipation is a question of fact, subject to review under the clearly erroneous standard. Tyler Refrigeration v. Kysor Indus. Corp., 777 F.2d 687, 690 (Fed. Cir. 1985).

Attempts by the Federal Circuit to provide guidance and predictability have been rejected by the Supreme Court,[47] leaving the vague statutory standard of whether a hypothetical person of ordinary skill in the art would have considered the innovation obvious.[48] As a result, a major source of uncertainty is whether the USPTO will consider an innovation obvious—and therefore unpatentable. Obviousness is the most common reason for rejecting claims in a patent application, accounting for nearly 40% of all rejections in 2023.[49]

## II. Purpose and History of the Obviousness Bar to Patentability

A central tenet of patent law is that patents should not withdraw anything from the public domain. The prior art requirements of the statute[50] further the Constitutional requirement that the patent statute "promote progress": if the public already had access to the technology, then there would be no progress-promoting benefit to granting a patent and therefore no reason to give a monopoly in the technology.

The novelty requirement, set by Section 102 of the current statute, has been a requirement since the first patent statute was passed in 1793. As currently written, 35 U.S.C. § 102 provides (with certain exceptions):

> (a) NOVELTY; PRIOR ART.—A person shall be entitled to a patent unless—
> (1) the claimed invention was patented, described in a printed publication, or in public use, on sale, or otherwise available to the public before the effective filing date of the claimed invention.[51]

A literal reading of the requirement might suggest that any change, however minor, to existing technology would be patentable. As Thomas Jefferson recognized, that would lead to patenting changes that were not genuinely innovative: "[A] change of material should not give title to a patent. [A]s the making a ploughshare of cast rather than of wrought iron; a [c]omb of iron, instead of horn, or of ivory . . . [A] mere change of form should give no

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[47] *See, e.g.*, *KSR*, 550 U.S. at 398 (rejecting the Federal Circuit's requirement that references can be combined to establish obviousness only if the prior art contains some teaching, suggestion, or motivation to combine them).

[48] 35 U.S.C. § 103.

[49] In a 12-month period ending on February 1, 2024, the USPTO rejected 3,150,675 claims. Of those rejections, 39% were based on obviousness. *See supra* note 2.

[50] 35 U.S.C §§ 102, 103.

[51] 35 U.S.C. § 102(a)(1).

right to a patent[] as a high-quartered shoe, instead of a low one[,] a round hat, instead of a three-square[,] or a square bucket instead of a round one."[52] While some of Jefferson's examples might actually satisfy the requirements of the statute,[53] the concern is certainly well-founded. As early as 1851, cases interpreted novelty to require something more than a minor variation.[54]

The Supreme Court addressed the issue in *Hotchkiss v. Greenwood*, where the innovation involved cabinet knobs made of a different material than previously available.[55] The statute at the time did not have a non-obviousness requirement—it only required that to be patentable the innovation must be "new."[56] The innovator argued that by providing a familiar product made of a new material, that standard was met.[57] The Supreme Court held that such a minor change did not meet the standards of patentability.[58] This remained the judicial approach to the meaning of novelty under a statute that denied patents to innovations that were not "new" but did not explicitly deny patents to applications involving minor changes that were technically new but not innovative.[59]

It was not until the major revision of the patent statute in 1952 that non-obviousness became a statutory requirement. This requirement is now reflected in 35 U.S.C. § 103, which precludes granting a patent if "the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious . . . to a person having ordinary skill in the art to which the claimed invention pertains."[60]

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[52] Thomas Jefferson, *Thomas Jefferson to Isaac McPherson*, *13 August 1813*, Founders Online, National Archives, https://founders.archives.gov/documents/Jefferson/03-06-02-0322 [https://perma.cc/5SWT-UWBH] (footnotes omitted).

[53] The first person to produce a square bucket might well have had to overcome different technological challenges than the manufacturer of round buckets, and a square bucket might well serve purposes that round buckets could not.

[54] *See, e.g.*, Hotchkiss v. Greenwood, 52 U.S. 248 (1851).

[55] *Id.* at 265.

[56] *Id.* at 260–61.

[57] *Id.* at 264.

[58] *Id.* at 267.

[59] In 1950, the Supreme Court held that a "patent for a combination which only unites old elements with no change in their respective functions . . . obviously withdraws what already is known into the field of its monopoly and diminishes the resources available to skillful men" and therefore would not meet what was then the novelty standard of the statute. Great Atl. & Pac. Tea Co. v. Supermarket Equip. Corp., 340 U.S. 147, 152 (1950).

[60] Pre-AIA 35 U.S.C. § 103(b) provided special rules for biotechnological processes; subsection (c) provided special rules for certain commonly-owned or -funded innovations.

Courts have adopted the fiction that the hypothetical person may have only ordinary skill but has extraordinary resources—with a presumption of complete knowledge of the prior art.[61]

The meaning of this new section of the statute was challenged shortly after its adoption. In *Graham v. John Deere*,[62] the Court held that the addition of Section 103 to the statute did not change the analysis, but rather codified the *Hotchkiss* approach.[63] The Court also explained the proper process for determining obviousness:

> Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented. As indicia of obviousness or nonobviousness, these inquiries may have relevancy.[64]

While a faithful catalog of the statutory requirements, it should be apparent that the Court's explanation of the standard for determining obviousness involves a high degree of subjectivity and judgment. The final step in the *Graham* approach is "the obviousness or nonobviousness of the subject matter is determined," offering no guidance as to how that determination is made.[65]

In an effort to bring more predictability to the obviousness analysis, the Federal Circuit[66] introduced a "teaching, suggestion, or motivation" test for

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[61] *In re* Winslow, 365 F.2d 1017, 1020 (C.C.P.A. 1965).

[62] 383 U.S. 1 (1966).

[63] "In *Graham v. John Deere Co. of Kansas City* . . . the Court set out a framework for applying the statutory language of § 103, language itself based on the logic of the earlier decision in *Hotchkiss* v. *Greenwood* . . . and its progeny." KSR Int'l Co. v. Teleflex Inc., 550 U.S. 398, 406 (2007).

[64] *Graham*, 383 U.S at 17–18.

[65] *Id.* at 17.

[66] The Federal Circuit was, itself, created in order to bring greater consistency and predictability to the interpretation of the patent statute. *See, e.g.*, Pauline Newman, *The Federal Circuit: Judicial Stability or Judicial Activism?*, 42 AM. U. L. REV. 683, 687 (1993) ("A centralized court would be expected to apply a more consistent interpretation of the complex provisions of the patent statute. With a consistent nationwide application of the law, I would hope for and expect a greatly enhanced degree of predictability of the outcome of patent litigation."); statement of Chief Judge of U.S. Court of Customs and Patent Appeals, *id.* at 246 ("[T]he consolidation concept

obviousness. Under that test, a determination of obviousness required that the prior art contain some teaching, suggestion, or motivation to combine a prior art in the manner executed by the invention.[67]

In *KSR v. Teleflex*,[68] the Supreme Court rejected the Federal Circuit's attempt to make the analysis more objective. *Teleflex* involved the validity of a patent issued to Steven Engelgau for an automobile pedal.[69] The pedal was adjustable and had a sensor mounted on the pedal support that detected the pedal's position and transmitted it to a computer which controlled the car's throttle.[70] Adjustable brake pedals, sensors mounted on pedal support, and computer-controlled throttles all existed, but they had not been combined before.[71] The USPTO concluded that the claimed invention was not obvious and was therefore patentable.[72] When Engelgau's assignee attempted to enforce the patent, it was challenged as invalid because of its obviousness.[73] The district court concluded that industry dynamics would have inevitably led to the combination of features, making it obvious and therefore not patentable.[74] The Federal Circuit reversed, applying a requirement that the prior art contain some "teaching, suggestion, or motivation" to combine pre-existing components: the "TSM" test. Under that test, the Federal Circuit held that the district court failed to make "findings as to the specific understanding or principle within the knowledge of a skilled artisan that would have motivated one with no knowledge of [the] invention . . . to attach an electronic control to the support bracket[.]"[75]

The Supreme Court reversed, finding the invention obvious and rejecting the Federal Circuit's TSM test:

> The obviousness analysis cannot be confined by a formalistic conception of the words teaching, suggestion, and motivation, or by overemphasis on the importance of published articles and the explicit content of issued

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would increase clarity and reliability of the law . . . there is a crying need for definitive uniform judicial interpretation of the national law of patents[.]").

[67] *In re* Kahn, 441 F.3d 977, 986 (Fed. Cir. 2006).

[68] KSR Int'l Co. v. Teleflex Inc., 550 U.S. 398 (2007).

[69] Adjustable Pedal Assembly with Electronic Throttle Control, U.S. Patent Application No. 09/643,422. The application was a continuation of Application 09/236,975, meaning that it was treated as though it had been filed on January 26, 1999 and the issue of obviousness which ultimately reached the Supreme Court in *KSR v. Teleflex* would be measured as of that date.

[70] *Id.*

[71] *Id.*

[72] U.S. Patent No. 6,237,565 (filed May 29, 2001).

[73] An issued patent is presumed valid, but the presumption is rebuttable. *See* 35 U.S.C. § 282.

[74] Teleflex Inc. v. KSR Int'l, 298 F. Supp. 2d 581, 596 (E.D. Mich. 2003).

[75] Teleflex Inc. v. KSR Int'l Co., 119 F. App'x 282, 288 (Fed. Cir. 2005).

> patents. . . . Granting patent protection to advances that would occur in the ordinary course without real innovation retards progress and may, in the case of patents combining previously known elements, deprive prior inventions of their value or utility.[76]

Thus, there are two avenues for denying a patent application based on the prior art: lack of novelty, meaning that the claimed invention is disclosed in a single source; and obviousness, meaning that someone of ordinary skill would have thought it obvious to combine what is disclosed in multiple prior art sources.

Determining novelty is a relatively simple exercise because it only involves comparing the claimed innovation with a single piece of prior art and determining if all the elements of the claimed invention are disclosed by the prior art—an objective exercise.

Determining obviousness[77] not only greatly expands the universe of comparison (allowing the combination of any number of prior art references) but also introduces a subjective element to the analysis, requiring an answer to the question of whether a hypothetical person of ordinary skill in the art would consider it obvious to combine those references to arrive at the claimed innovation. In addition to the increased complexity, this introduces practical problems in making the obviousness determination.

## III. The Practical Problems of 103: Predictability and Objectivity

It should be clear from the above that applying the obviousness requirement is a complex exercise requiring subjectivity. Of the *Graham* factors, the first two—determining the prior art and the differences between the

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[76] KSR Int'l Co. v. Teleflex Inc., 550 U.S. 398, 403 (2007).

[77] The current statutory standard of obviousness, revised since the *Graham* decision to reflect the change from first-to-invent to first-to-file, provides:

> A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains.

35 U.S.C. § 103. Other than the change from "before the invention" to "before the effective filing date" the language is unchanged from the version analyzed in *Graham*, and the decision process set forth in *Graham* is the same. *KSR Int'l Co.,* 550 U.S. at 398.

innovation and the prior art—are usually straightforward. There may be a difference of opinion as to the third factor (the level of ordinary skill in the pertinent art, or even as to what the "pertinent art" is) but again this is usually a straightforward decision.[78]

The subjectivity arises in applying the fourth factor: "Against this background, the obviousness or nonobviousness of the subject matter is determined."[79] The determination is made from the viewpoint of a hypothetical person of ordinary skill in the field, assumed to have complete knowledge of the prior art. However, that is not the person making the decision. The USPTO does not have a staff of people with ordinary skill in various fields; it has a corps of patent examiners, and those examiners are tasked with concluding what such a hypothetical person would think.[80] Patent examiners are not typically attorneys, but rather are people with training in the particular field of technology that they examine.

In reaching that conclusion, the examiner is at a serious disadvantage:[81] one of the requirements of a patent application is that it teach someone of ordinary skill in the art how to make and use the invention.[82] Therefore, in deciding whether someone of ordinary skill would consider the innovation obvious, the decision-maker has just been told—in terms and with sufficient detail that someone of ordinary skill would understand—exactly how to combine the prior art to achieve the innovation.

The USPTO is, of course, aware of the dangers of this potential hindsight bias, and it has taken the steps it can to prevent it. The statute itself says that obviousness is to be determined "as of the effective filing date of

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[78] For example, issues that could have been raised in the *Graham* case would include whether the pertinent art was plow manufacturing or farming, and the related issue of whether the level of skill was a degree in engineering or years of plowing fields. *See Graham*, 383 U.S. 1.

[79] *Id.* at 17.

[80] *Classes Arranged by Art Unit*, U.S. Pat. & Trademark Off. (Nov. 2022), https://www.uspto.gov/sites/default/files/documents/caau.pdf [https://perma.cc/VQ26-YCZ5] (stating that patent examination is conducted within art units and each art unit characterized by the type of technology it reviews. When an application is filed, one of the early steps taken by the USPTO is to classify the field of the application so that it can be sent to an examiner within an appropriate art unit).

[81] Or advantage, depending on viewpoint.

[82] *See* 35 U.S.C. § 112(a) (requiring that the application "shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains . . . to make and use the same . . .").

the application"[83] which precludes using the application itself to supply the rationale for combining prior art to reach a conclusion of obviousness. In addition, the USPTO's instructions to its examiners reinforce this constraint.[84]

Notwithstanding these protections, they are difficult instructions to carry out and it would not be irrational to question their effectiveness. The problem is similar to that faced in jury trials when there is a sustained objection to the admissibility of testimony. The standard approach is to "cure" the problem with a jury instruction.[85] There is an "almost invariable assumption of the law that jurors follow their instructions."[86] The assumption is not, however, based on reality. The rule that juries are presumed to follow their instructions is a pragmatic one, rooted less in the absolute certitude that the presumption is true than in the belief that it represents a reasonable, practical accommodation of the interests of the state and the defendant in the criminal justice process.[87] The effectiveness of such an instruction is, in fact, openly questioned: in *Bruton v. United States*,[88] the Court held that a jury instruction was insufficient to protect a co-defendant when the other co-defendant's confession, naming the first co-defendant as a participant, was admitted.[89] As Learned Hand observed, asking a jury to disregard what it has heard is a

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[83] *See* 35 U.S.C. § 103.

[84] MPEP § 2141.01(III) (9th ed. Rev. 1, Jan. 2024) ("The pre-AIA 35 U.S.C. 103(a) requirement 'at the time the invention was made' is to avoid impermissible hindsight. Likewise, the AIA 35 U.S.C. § 103 requirement 'before the effective filing date of the claimed invention' serves the same purpose."). MPEP is the USPTO's internal manual of instructions for the patent prosecution process and contains instructions to examiners as to how to handle applications. The Federal Circuit requires that a finding of obviousness must be supported by an explanation. *See In re* Stepan Co., 868 F.3d 1342 (Fed. Cir. 2017) (citing *In re* Lee, 277 F.3d 1338, 1346 (Fed. Cir. 2002), a pre-*KSR* decision) ("The agency tribunal must make findings of relevant facts, and present its reasoning in sufficient detail that the court may conduct meaningful review of the agency action").

[85] The alternative is to declare a mistrial, but that is an expensive option, both in terms of cost and of delay.

[86] Richardson v. Marsh, 481 U.S. 200, 206 (1987) (citing Francis v. Franklin, 471 U.S. 307, 325 n.9 (1985)). Justice Scalia lists several examples of evidence that can be admitted so long as the jury is instructed accordingly. *Id.* at 207.

[87] *See id.* at 211.

[88] 391 U.S. 123, 137 (1968).

[89] When two defendants are tried together, the Confrontation Clause precludes admission of the confession of one defendant against the other unless the confessing defendant takes the stand. Pointer v. Texas, 380 U.S. 400, 407 (1965).

"recommendation to the jury of a mental gymnastic which is beyond, not only their powers, but anybody's else."[90]

In patent prosecution, the patent examiner is the jury, and the patent application that the examiner is supposed to review is the inadmissible evidence.[91] Judges are human and even judges, experts on admissibility, have difficulty ignoring information even when instructed to do so.[92] Patent examiners are human, too. Perhaps the answer is that "a defendant is entitled to a fair trial but not a perfect one"[93] and likewise a patent applicant is entitled to a fair review but not a perfect one. If, however, there is a tool that provides a fairer review, particularly one at a reasonable cost, that tool should be used.

The importance of the subjectivity and hindsight problems is magnified by another aspect of the current patent system: delay. By design, the patent system requires the surrender of trade secrets in exchange for a patent.[94] When a patent is issued, the patent and the correspondence between the applicant and the USPTO are published. That publication, of course, will destroy any trade secrets contained in those documents because they are now public.[95] The trade secret will be lost, but at the same time, the innovator will receive a patent.

In most cases, however, the current structure of the statute requires that an innovator make the decision to surrender the trade secret before knowing that a patent will be granted in exchange. The statute requires that an applicant for a patent must file a written application that provides sufficient detail to teach those of ordinary skill in the field how to make and use the innovation.[96] In other words, the application will need to disclose any trade secrets involved in the innovation. Filing the application itself does not destroy the trade secrets because patent applications are initially maintained in confidence.

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[90] Nash v. United States, 54 F.2d 1006, 1007 (2d Cir. 1932). The caselaw skepticism is supported by studies from the field of psychology. *See*, *e.g.*, William C. Thompson, Geoffrey T. Fong, & D. L. Rosenhan, *Inadmissible Evidence and Juror Verdicts,* 40 J. Pers. & Soc. Psych. 453 (1981) (finding that juries appear to be influenced by information they were told to ignore); Andrew J. Wistrich, Chris Guthrie, & Jeffrey J. Rachlinski, *Can Judges Ignore Inadmissible Information? The Difficulty of Deliberately Disregarding*, 153 U. Pa. L. Rev. 1251 (2005) (finding that in most instances judges appear to be influenced by information they were told to ignore).

[91] It is inadmissible for the purposes of determining obviousness.

[92] Wistrich et al., *supra* note 90, at 1323.

[93] Lutwak v. United States, 344 U.S. 604, 619 (1953).

[94] *See* note 21*, supra.*

[95] *See* note 7*, supra.*

[96] *See* 35 U.S.C. §§ 111–112.

The statute requires, however, that applications be published eighteen months after filing.[97] Given delays, patent applications are rarely resolved by this date, meaning their patent application will likely be published.[98] This publication destroys any trade secrets contained in the application by making them generally known.[99] The inventor therefore must make a choice before eighteen months from filing the application. For this reason, pendency becomes important. If patent applications were resolved as either patentable or not within eighteen months, predictability would not matter. The innovator would know if a patent were unavailable and, if so, could abandon the application, thereby avoiding publication and maintaining the trade secrets.

There are two pendency periods of interest: "first action pendency," the time from the filing of a complete patent application until a patent examiner substantively reviews the application and issues a first action regarding patentability, and "disposition pendency," the time from filing until the application is disposed of, either by allowance and issue as a patent or by abandonment.[100] Ideally, the applicant would like a final disposition within 18 months in order to make an informed choice. The applicant would then know exactly what is being offered in exchange for the trade secret. But even a first action can be extremely helpful in evaluating the prospects for the ultimate allowance of the application.[101]

The USPTO measures both average first action pendency and disposition pendency. While it holds a long-term strategic goal of disposing of

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[97] Generally, applications are published eighteen months after their priority date. 35 U.S.C. § 122(b). An applicant can avoid pre-grant publication, but in order to do so must agree that the application will not be filed in any country which publishes applications before the grant of a patent, including under the Patent Cooperation Treaty. 35 U.S.C. § 122(b)(2); 37 C.F.R. § 1.213 (2024); MPEP § 1122 (9th ed. Rev. 1, Jan. 2024). In other words, the applicant must, in effect, not seek patent protection in any other economically important country.

[98] The USPTO's most recent data indicates that the average pendency is over two years. *Patents Pendency Data September 2024*, U.S. Pat. & Trademark Off. (last visited Nov. 18, 2024), https://www.uspto.gov/dashboard/patents/pendency.html [https://perma.cc/2DAB-M2FW].

[99] Allowing publication would also destroy the trade secret as it fails to make reasonable efforts to maintain its secrecy.

[100] *Patents Pendency Data September 2024,* U.S. Pat. & Trademark Off. (last visited Nov. 18, 2024), https://www.uspto.gov/dashboard/patents/pendency.html [https://perma.cc/FR5U-ADUF].

[101] The first action is rarely the end of prosecution, but it does provide insight into how the USPTO views the application. Under a policy known as "compact prosecution," examiners are directed to raise all known issues in the first office action. *See* Max Stul Oppenheimer, *Rethinking Compact Patent Prosecution*, note 21, *supra*.

applications within 18 months of filing,[102] the most recent data indicates that the USPTO is far from achieving that goal. In September 2024, the average time to first action was 19.9 months and the average time to disposition, not including subsequent applications, was 26.3 months.[103]

The combination of the subjectivity of the process and the delay of the decision beyond the point where the applicant can still preserve trade secrets makes the decision to pursue patent protection a risky one—counter to the constitutional purpose of promoting progress by motivating disclosure.[104] If the risk of disclosure without compensation increases, the incentive to disclose decreases, and those who have the option[105] of commercializing their innovation while maintaining trade secrets will be more likely to maintain trade secrets rather than seek patents.[106]

### *A. How Artificial Intelligence May Help*

Recent advances in AI have been dramatic. There have been reports of AI models producing passing answers to bar exam questions,[107] passing the

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[102] *See* U.S. Pat. & Trademark Off., The 21st Century Strategic Plan 10 (2003).

[103] *Patents Pendency Data September 2024,* U.S. Pat. & Trademark Off. (last visited Nov. 18, 2024), https://www.uspto.gov/dashboard/patents/pendency.html [https://perma.cc/FR5U-ADUF].

[104] Public disclosure is thought to be of greater benefit to society than trade secrets because it provides information to a wider variety of people who can learn from the invention and build on it. Patents only prevent manufacture, use, sale, offer for sale, and importation, not learning or discussion. Once the patent term expires, there are no restrictions on the public. "[T]he primary purpose of our patent laws is not the creation of private fortunes for the owners of patents, but is 'to promote the progress of science and useful arts . . . .'" Motion Picture Pats. Co. v. Universal Film Mfg. Co., 243 U.S. 502, 511 (1917); Graham v. John Deere Co., 383 U.S. 1, 5 (1966); KSR Int'l Co. v. Teleflex Inc., 550 U.S. 398, 427 (2007).

[105] *See supra* note 6 for limitations on the ability to commercialize an innovation without surrendering trade secrets.

[106] There is also an argument, that does not appear to have been raised in any case, that requiring disclosure before determining that a patent will be available would be an uncompensated taking, inconsistent with the Fifth Amendment. A response might be that the compensation is the opportunity to seek a patent rather than the patent itself.

[107] Pablo Arredondo, *GPT-4 Passes the Bar Exam: What That Means for Artificial Intelligence Tools in the Legal Profession*, Stan. SLS Blogs (Apr. 19, 2023), https://law.stanford.edu/2023/04/19/gpt-4-passes-the-bar-exam-what-that-means-for-artificial-intelligence-tools-in-the-legal-industry/ [https://perma.cc/D7U4-WNMZ];

Certified Public Accountant exam,[108] and passing academic exams in several disciplines.[109] The "large language models" that make such results possible are applications of neural networks trained on vast amounts of data.[110]

The USPTO attempted to use AI to assist its patent examiners in identifying relevant prior art but abandoned the project in 2020 after concluding that only computer scientists could use it profitably.[111] Yet four years is a long time at this point in the development of AI, and if AI could power an engine to make obviousness determinations with an accuracy rate comparable to that currently achieved by examiners,[112] it would be a significant step toward solving the basic problems posed above.

First, AI could solve the key challenge for examiners that is noted above: hindsight bias. The statute requires that applicants provide an explanation of how to make and use the innovation they seek to patent.[113] Thus, the same person who must decide whether an innovation is obvious has already been given an explanation of exactly how the innovation is produced and used. A good explanation should make the innovation obvious,[114] posing the risk of hindsight bias. The statute (and the internal guidance for examiners) requires

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Karen Sloan, *Bar Exam Score Shows AI Can Keep Up With 'Human Lawyers,' Researchers Say*, Reuters (Mar. 15, 2023), https://www.reuters.com/technology/bar-exam-score-shows-ai-can-keep-up-with-human-lawyers-researchers-say-2023-03-15/ [https://perma.cc/TA44-DJPH].

[108] David Jolly, *ChatGPT4 Passes the CPA Exam, But It's Not Yet an Accountant*, Bloomberg Law (May 22, 2023), https://news.bloomberglaw.com/artificial-intelligence/chatgpt4-passes-the-cpa-exam-but-its-not-yet-an-accountant [https://perma.cc/4D55-VUYM].

[109] Samantha Murphy Kelly, *ChatGPT Passes Exams From Law and Business Schools*, CNN Business (Jan. 26, 2023), https://www.cnn.com/2023/01/26/tech/chatgpt-passes-exams/index.html [https://perma.cc/NVL2-L5K7].

[110] For a detailed explanation of how neural networks, in general, and ChatGPT, in particular, work, *see* Stephen Wolfram, *What Is ChatGPT Doing . . . and Why Does It Work?*, Stephen Wolfram Writings (February 14, 2023), writings.stephenwolfram.com/2023/02/what-is-chatgpt-doing-and-why-does-it-work [https://perma.cc/3GGV-ZYC6].

[111] Dani Kass, *AI Offers "Substantial" Pros at USPTO, But Not Without Risks*, Law360 (Feb. 18, 2020), https://www.law360.com/articles/1244928/ai-offers-substantial-pros-at-uspto-but-not-without-risks [https://perma.cc/72HT-KKBX].

[112] One measure of "correctness" of decisions would be the proportion of judicial decisions reversing the determination of obviousness by the USPTO. It would certainly be an imperfect measure, as the great majority of decisions are never challenged in court. Should those decisions count as "correct"?

[113] 35 U.S.C. § 112(a).

[114] *Id.* The statute explicitly requires that the application teach a person of ordinary skill in the field how to make and use the inventions.

that the examiner, in determining obviousness, ignore what the applicant has taught in the application.[115] That is clearly a difficult task for a human: as the Court recognized in *Bruton*, it is difficult for someone to fully ignore information they have just received.

In an AI system, hindsight bias could be reduced in one of two ways. The strongest protection against hindsight bias could be achieved by omitting the application from the data set supplied to the AI—something that cannot be done with a human examiner. If the patent application were not included in the data, the AI could not be guided by it and could not be biased to find obviousness based on what the applicant had provided. If that approach posed problems, an alternative approach would be to provide the application as part of the AI's data set, but instruct the AI not to use the application in reaching a conclusion as to obviousness. This is the same instruction given to examiners, but the advantage of the AI in this situation would be the absence of any machine bias and the absence of an understandable human difficulty in ignoring what one already knows.

An AI-based determination could also provide greater predictability—and at an earlier stage—than a determination made by an examiner. This could be achieved straightforwardly by the USPTO providing applicants access to the AI assessing an invention's obviousness. After all, the goal of the USPTO is not to defeat applicants, but to reach the correct result. The process could be made completely transparent without impairing the USPTO's objectives.[116] In fact, there would be benefits to allowing applicants to test their application against the USPTO "obviousness engine" even before the application was filed.[117]

Although providing applicants access to the AI system might risk allowing applicants to "draft around" the rejection, that option already exists in the system. If an application is rejected, the applicant is permitted to respond

[115] MPEP § 2141.01 (9th ed. Rev. 1, Jan. 2024).

[116] The USPTO publishes its instructions to examiners on how to conduct examinations, including its legal positions and justifications, in MPEP (9th ed. Rev. 1, Jan. 2024), available online at https://www.uspto.gov/web/offices/pac/mpep/index.html [https://perma.cc/6F4B-Z45X].

[117] One reason for the pendency problem is the backlog of applications the USPTO faces. If a potential applicant could determine ahead of time that its application would likely be rejected as obvious—and especially if the applicant found the reasoning convincing—they might withdraw their application. At scale, this would reduce the number of applications and therefore the USPTO workload.

by arguing that the rejection is improper or by amending the claims to avoid the rejection.[118]

Finally, AI could speed up the application process and thereby reduce the length of application pendency by providing assistance to the examiners. It could at least provide a first draft of a decision on one aspect of the application, the obviousness determination.

In order to be a suitable tool, however, the AI system would need to satisfy the following criteria:

1. It would need to follow predefined, objectively correct, rules.
2. It would need to be constrained to consider only legally permissible prior art.
3. Its conclusion would need to be testable on appeal—it would need to document its analysis.

In theory, it would seem that these criteria could be met by current AI models. The rules can be extracted from Supreme Court cases. The prior art can be determined in the same fashion as it currently is: during prosecution of a patent application the applicant is required to disclose any known prior art,[119] and a patent examiner conducts an independent review of the application to determine prior art.[120] The AI tool could be given the appropriate cutoff date,[121] instructed to consider the prior art produced by the applicant and the examiner, but to exclude any prior art dated after the effective date of the application. The application itself could be excluded from the data provided to the AI engine, or the AI engine could be instructed to exclude the patent application itself from the prior art and from its reasoning, thereby eliminating hindsight bias. Finally, the prompt given to the AI tool could include instructions to explain its reasoning.

To probe the feasibility of an AI-based solution, a representative experiment based on the *Graham v. John Deere* case[122] was conducted using the ITUS model:[123] the author submitted the prior art as described by the courts,

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[118] *See* MPEP § 714 (9th ed. Rev. 1, Jan. 2024).

[119] 37 C.F.R. § 1.56 (2023); MPEP § 2001 (9th ed. Rev. 1, Jan. 2024).

[120] For an overview of the patent application examination process, *see* Oppenheimer, *Rethinking Compact*, *supra* note 21.

[121] Under current law, the appropriate cutoff date is known: the effective filing date of the patent application under consideration. *See* 35 U.S.C. §§ 102–03.

[122] Graham v. John Deere, 383 U.S. 1 (1965).

[123] ITUS AI, available at itus.ai [https://perma.cc/PFD2-5ZF9] (last visited Dec. 3, 2024).

the text of the patent application, and instructions to determine whether the invention is obvious.[124] The AI model responded that it "leaned to" a determination of obviousness.

### *B. Issues*

The experiment indicates that use of AI to tackle one of the thorniest problems in patent practice is feasible. It also leaves a number of issues that would need to be resolved in order to create the level of public confidence in the system necessary for its acceptance. One reaction might be: "If you give it the same facts as the Court had, and give it the rule the Court applied, of course it will reach the same result that the Court reached." But that is exactly what would make AI a valuable addition to the patenting process—reaching a predictable result that is consistent with the law.

It would, however, be reasonable to observe that the experiment, as designed, avoided a number of problems that would arise in general application: agreement on necessary training of the engine, including formulation of the applicable rules; agreement on the appropriate data and how to get permission to use it; agreement on the appropriate prompt; agreement on how to interpret the output of the inquiry; and confidentiality of the system, both as to data and results. These are certainly issues that apply generally to AI engines, but in the context of using an AI engine to make obviousness determinations in patent prosecution, most if not all of them should pose no technological problem other than finding the funding.

The problem of funding, of course, should not be dismissed. The system would need not only a set of rules but also a huge data set—at a minimum, every issued U.S. Patent, every published patent application and a wide

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[124] The prompt, in part, read:

> Obviousness is determined by applying a set of rules to a claim and prior art. Here are the rules you are to use for determining whether a claim is obvious: 1. the scope and content of the prior art are to be determined; 2. differences between the prior art and the claim are to be ascertained; 3. and the level of ordinary skill in the pertinent art resolved. 4. Against this background, the obviousness or nonobviousness of the subject matter is determined. 5. The claim is obvious if the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious to a person having ordinary skill in the art to which said subject matter pertains[.] 6. if the claim simply arranges old elements with each performing the same function it had been known to perform and yields no more than one would expect from such an arrangement, the combination is obvious.

variety of scientific articles (many of which are copyrighted). The USPTO already has much of this, but there would still be licenses to be negotiated and the ongoing job of continuing to update the data. The USPTO, given its responsibility for the subject matter, seems the appropriate organization to take on this task: it has an annual budget for fiscal year 2023 of $4.25 billion, anticipates a profit of $100 million,[125] and already possesses a large internal database of prior art, including all issued U.S. Patents.[126] That does not mean that other organizations would be precluded. In the future, if the USPTO made its engine (including its databases) available to the public,[127] it would be logical for practitioners to use it—but some practitioners and innovators might choose to develop their own special-purpose tools as well.[128] It is certainly possible that some private tools might be better than the USPTO's at predicting judicial decisions, but that is not the objective of this proposal—the objective is to make the USPTO's decision-making more transparent and more predictable. There would need to be agreement on what rules the AI should follow. In the experiment described in section above, the Supreme Court rules were used. While that would seem to be the correct set of rules, others might be proposed.

Choice of the prior art data set could be thought of as a larger issue. AI has progressed to the point that it has attracted academic attention and

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[125] *Fiscal Year 2023: The President's Budget and Congressional Justification*, U.S. Pat. & Trademark Off. (March 2022), https://www.commerce.gov/sites/default/files/2022-03/FY2023-USPTO-Congressional-Budget-Submission.pdf [https://perma.cc/M3VJ-4HWT].

[126] Patent Public Search, https://www.uspto.gov/patents/search/patent-public-search [https://perma.cc/3FMG-7VNJ] (last visited Nov. 19, 2024). It also has access to pending patent applications, but only those that had been published could be made publicly available. The USPTO has a process for deferring prosecution of a patent application if it is aware of a pending application that would make the application unpatentable, but it cannot act on that knowledge to reject the application until the potentially problematic application has been published or issued. MPEP § 2146.03(a) (9th ed. Rev. 1, Jan. 2024).

[127] As discussed at note 113, *supra*, there is no apparent reason not to make it publicly available, and in fact there would appear to be some benefits to doing so.

[128] In a 2023 article, Professor Freilich reported several examples of privately funded efforts to use machine-assisted tools for evaluation of patent positions. Janet Freilich, *Patents' New Salience*, 109 Va. L. Rev. 595, 611–28 (2023). Yet Professor Freilich also noted that "fully automated anticipation and obviousness analyses are still not possible." *Id.* at 643.

discussion of its potential role in the legal world.[129] Early versions[130] have gained acceptance as tools that can automate fundamental tasks to provide raw materials for lawyers, but concerns have been raised over inserting machines into the actual legal decision-making process.[131] One sensible suggestion has been to introduce AI in steps,[132] for example by starting with employing it to create first drafts for review by attorneys or judges,[133] then expanding its role "as society becomes more accustomed to AI and more willing to trust machine-made decisions."[134] In the view of the USPTO:

A proper search is the mainstay of the U.S. Patent system. It usually takes years of training to fully develop the skills required to ascertain a proper search strategy after analyzing an application. The examiner must be trained in the art of analyzing the scope of the claims and searching.[135]

The proposal, though, is not to eliminate the examiner's search, but only to produce the analysis based on that search. Current patent practice produces the list of prior art considered in a patent application from two sources: first, the applicant is required to disclose to the USPTO any relevant prior art known to the applicant, and, second, the examiner assigned to the application is instructed to carry out an independent search. Neither of these procedures should be changed. Because of the judicial fiction adopted in *In re Winslow*[136] that the hypothetical person of ordinary skill in the field

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[129] *See, e.g.*, Eugene Volokh, *Chief Justice Robots*, 68 Duke L. J. 1137 (2019); Peter K. Yu, *Artificial Intelligence, the Law-Machine Interface, and Fair Use Automation*, 72 Ala. L. Rev 187 (2020); Ray Worthy Campbell, *Artificial Intelligence in the Courtroom: The Delivery of Justice in the Age of Machine Learning*, 18 Colo. Tech. J. 323 (2020).

[130] Examples of widely accepted machine-based tools are Westlaw and Lexis research tools and their predecessor, the Air Force's "Project Lite" (in use since 1962). Richard C. Davis, *LET THERE BE LITE*, 8 Jurimetrics 118 (1966). "By actual use of the LITE system, we have found that a computer can do a better job of library research than we humans." *Id.* at 118.

[131] Campbell catalogs several concerns: the need for large volumes of data and the conflict that poses with privacy, the possibility of bias in the data, the inability of AI to adapt to changed conditions. Campbell, *supra* note 129, at 328–329.

[132] Yu, *supra* note 129, at 220–221.

[133] Volokh, *supra* note 129, at 1151.

[134] Yu, *supra* note 129, at 220.

[135] U.S. Pat. & Trademark Off., Automated Financial or Management Data Processing Methods (Business Methods) 14, https://www.uspto.gov/sites/default/files/web/menu/busmethp/whitepaper.pdf [https://perma.cc/TFN3-MPHX].

[136] 365 F. 2d 1017, 1021 (C.C.P.A. 1965). *In re Winslow* was decided by the Court of Customs and Patent Appeals, the predecessor of the United States Court of Appeals for the Federal Circuit. Its decisions are binding on the Federal Circuit. South Corp. v. United States, 690 F.2d 1368, 1369 (Fed. Cir. 1982).

is presumed to have complete knowledge of all relevant prior art, neither the applicant nor the examiner should have a veto over what the other proposes for consideration. Therefore, there should be no dispute as to the data set—anything proposed by either the applicant or the examiner would be included, subject to the instruction that anything subsequent to the effective filing date ought to be excluded, as required by the statute.

Another issue of general concern in the AI world is whether potential bias is introduced by choices made concerning the content of the training dataset. That concern is easily met here: in patent prosecution, both the USPTO and the applicant are allowed to introduce whatever data they want into the process.[137] The standard for admissible data is information that was "available to the public"[138] as of the date the application for patent was filed.[139]

A point that might require resolution is the identity of the "person having ordinary skill in the art," and two issues that flow from that. The first issue is what elements of the prior art data set that individual would use; the second issue is how sophisticated the analysis of the prior art could be in determining whether the patent application's claims were obvious. Although using AI does not introduce a new issue, it may present situations in which there must be a preliminary step before utilizing AI. The statutory standard is that obviousness is measured by a hypothetical person of ordinary skill in the relevant field. The human examiner is not the hypothetical person of ordinary skill; that person is hypothetical. The examiner is tasked with trying to construct such a person and divine whether that person would deem a particular innovation obvious or not. Since the hypothetical person must be constructed, it is hard to see an argument that that construction—or at least the first draft of that construction—could not be carried out by a machine.

Under the current system, the obviousness determination made by the (human) patent examiner is prepared in writing and subject to review, first by the applicant for patent, then by an internal USPTO review board and ultimately by courts.[140] AI is capable of producing a written analysis, which should be subject to the same system of review.

A critical decision, and that preliminary step, concerns the prompt to give the AI machine. It could be as simple as just the following: a quotation from the most recent Supreme Court formulation of the legal standard,

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[137] *See, e.g.*, MPEP § 2129 (9th ed. Rev. 1, Jan. 2024).

[138] 35 U.S.C. § 102.

[139] Technically, the relevant date is the application's "effective filing date" but that date can be no later than the date of the actual filing. 35 U.S.C. § 102.

[140] MPEP § 2141 (9th ed. Rev. 1, Jan. 2024).

the relevant prior art, the claimed invention, an instruction to exclude any prior art from after the patent application date, and a prompt to determine obviousness written in the style of a patent examiner and including reasons. Modifications would undoubtedly be suggested as the system was used, and decisions as to what modifications should be adopted could be made following the process required by the Administrative Procedure Act. However, this style of prompt would not only provide an answer—obvious or not obvious—to the ultimate question but would also provide a chain of reasoning. This reasoning could then be examined by an appellate body in case of a challenge to the prompt or the result.

One technological problem that would need to be overcome is the current ineffectiveness of AI in extracting information from images (which can be prior art). That did not matter in the actual experiment because the conclusion was that the invention was obvious; images could only provide further evidence supporting that conclusion or provide no further evidence, in which case the conclusion would still be that the innovation was obvious. Had the conclusion been that the invention was not obvious, then adding information based on the drawings in the prior art might have made a difference.[141] Therefore, in practical application, allowances will need to be made—either through technological advance or through human intervention—to account for non-textual prior art. Even so, certain domains have recently witnessed significant progress in AI's ability to analyze images.[142]

Finally, it may be objected that the AI engine is not a person. Yet, AI is well-suited to obviousness determinations in part because the patent process does not demand qualities inherent in a human. For example, one might object to an AI engine on the basis that it cannot testify. This objection has two aspects, one of which is easily answered: patent examiners do not ordinarily testify either. USPTO employees are prohibited from testifying without the approval of the agency's general counsel,[143] which may be granted "in extraordinary situations, when the interest of justice requires."[144] They may only

[141] It might be that there were no written documents that would establish the obviousness of the claimed invention, but that access to an image would do so. On the other hand, if written documents established obviousness, there would be no need to look for images. Once obviousness is established, the invention is not patentable—there are not degrees of obviousness. *See* 35 U.S.C. § 103.

[142] *See* Luís Pinto-Coelho, *How Artificial Intelligence Is Shaping Medical Imaging Technology: A Survey of Innovations and Applications*, 10 Bioengineering 1435, 1435 (2023).

[143] *See* 37 C.F.R. § 104.22(b) (2024).

[144] *Id.* § 104.3.

testify to facts of which they have personal knowledge and may not provide expert testimony.[145]

Another aspect is that the USPTO has taken the position, sustained so far in court,[146] that AI cannot be an inventor because only humans can invent. But that premise does not suggest that AI cannot be used for analysis. Even if one accepted the soundness of the USPTO's position with respect to invention, which is beyond the scope of this Article, AI is not being called on to invent.[147] The role of the examiner and applicant in prosecuting a patent application would not change. As in the current system, when a claim is rejected, the applicant would have the right to present arguments to attempt to change the decision. As with the current system, an examiner's final decision would still be appealable, first to the USPTO's internal review board and ultimately to the courts. The use of AI would therefore pose no more problem than allowing a police officer to use a radar gun to issue a ticket.

These are problems that could be overcome in the development of the details of the AI engine and decisions as to how it would be used and who would have access to it. Making the USPTO AI tool publicly available would seem to offer the greatest insight into the likelihood that a patent application would be granted, and therefore the greatest reduction in uncertainty for applicants. If the USPTO did not make its tool publicly available, it is likely that private companies would fill the gap. Even if the USPTO did make it available, there would be value in proprietary systems with features that differed from those at the USPTO. Competition among systems should lead to better systems—the theory behind the Constitution's intellectual property clause. However, even if none of this happened—if the USPTO developed a system but kept it confidential and no private systems were developed—that of itself should result in faster prosecution and the possibility of reaching decisions on patentability before the applicant needed to surrender trade secrets. The potential for reducing one of the major sources of uncertainty in patent prosecution, and the resulting encouragement of giving up trade secrets by applying for patents, should further the constitutional goal of promoting progress and make the effort worthwhile.

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[145] *Id.* § 104.23(a)(1).

[146] Thaler v. Vidal, 43 F.4th 1207 (Fed. Cir. 2022).

[147] The point does, however, raise the interesting philosophical question (beyond the scope of this Article) of whether one that cannot invent can make judgements as to invention.

## Conclusion

The decision whether to seek patent protection or maintain an innovation as a trade secret is a critical one, with implications for both innovators and the constitutional goal of promoting innovation. The requirement that an innovation be more than an "obvious" advance over the prior art is challenging, and the outcome of the determination is difficult to predict, notwithstanding two Supreme Court decisions discussing the standard. AI offers a promising solution, largely by reducing the risk of hindsight bias while speeding up the examination process. As with all AI implementations, there will be challenges, although the patent examination process itself contains several safeguards that mitigate these challenges. Following the standards suggested in this Article, the integration of AI into the patent examination process has the potential to provide a faster and more predictable outcome, to the benefit of patent applicants and the public in general.