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The Library of Babel for Prior Art: Using Artificial Intelligence to Mass Produce Prior Art in Patent Law

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Artificial intelligence is playing an increasingly important role in the invention and innovation processes of our society. To date, though, much of the academic discussion on the interaction of artificial intelligence and the patent system focuses on the patentability of inventions produced by artificial intelligence. Little attention has been paid to organizations that are seeking to use artificial intelligence to defeat the patentability of otherwise patent-worthy inventions by mass producing prior art. This Note seeks to highlight the consequences of allowing mass-produced, AI-generated prior art to render valuable inventions unpatentable. Specifically, this Note concludes that AI-generated prior art decreases the incentive for researchers to disclose valuable knowledge through the patent system without providing an adequate substitute source of such knowledge. This Note also examines a number of patent law doctrines that should, but likely will not, prevent deficient AI-generated prior art from rendering valuable inventions unpatentable. To resolve these issues, this Note proposes a solution that modifies the current novelty inquiry and breathes new life into the patent law doctrine of conception. This solution advances the patent system's purpose of promoting technological advancement while still allowing artificial intelligence to play a large role in that technological advancement.

INTRODUCTION

If artificial intelligence ("AI") publishes a description of an invention on the internet, but no person, or even the AI itself, recognizes that the text *actually* describes a new invention, does society gain anything from the publication? Probably not. But that same description could prevent a later inventor from receiving a patent, thus diminishing the inventor's incentive to create, disclose, and commercialize the invention. This could delay or completely prevent the public from ever benefitting from the invention.

It is no surprise that artificial intelligence will play a major role in future innovation.[1] Around the world, researchers have already filed patent applications on AI-created inventions, such as a drink container based on fractal geometry and a device that uses flickering light to

1. *See, e.g.*, Ryan Abbott, *I Think, Therefore I Invent: Creative Computers and the Future of Patent Law*, 57 B.C. L. REV. 1079 (2016) (arguing that creative computers should receive inventor status and discussing the potential implications that may arise under such an Intellectual Property regime); Ralph D. Clifford, *Intellectual Property in the Era of the Creative Computer Program: Will the True Creator Please Stand Up?*, 71 TUL. L. REV. 1675, 1681, 1702–03 (1997) (arguing that the output of creative computers should not receive protection under intellectual property laws and should enter the public domain instead).

assist in search and rescue operations.[2] Currently though, the U.S. and European Patent Offices reject patent applications that lack a human inventor.[3] Without the incentive of receiving a patent, there is little motivation for businesses to invest in AI-produced inventions.[4] Yet these applications may still be useful because, if published, they can prevent human inventors from obtaining a patent on the same invention.[5] As a result, some organizations are using AI to indiscriminately prevent others from receiving patent protection for their inventions rather than using AI to invent.[6]

These organizations are using AI to algorithmically generate millions of lines of text, the equivalent of the Library of Babel,[7] with the hope that some of the text will contain descriptions of new inventions.[8] Rather than pursuing patents for these inventions, the entities publish, or "strategically disclose," these texts.[9] A patent examiner[10] may then use these published texts as prior art—evidence that an invention is already known to the public or would be obvious to make—which may

2. Dennis Crouch, *USPTO Rejects AI-Invention for Lack of a Human Inventor*, PATENTLY-O (Apr. 27, 2020), https://patentlyo.com/patent/2020/04/rejects-invention-inventor.html [https://perma.cc/EAE9-4YHL]; Emma Woollacott, *European Patent Office Rejects World's First AI Inventor*, FORBES (Jan. 3, 2020, 7:39 AM), https://www.forbes.com/sites/emmawoollacott/2020/01/03/european-patent-office-rejects-worlds-first-ai-inventor/#991508c5cd00 [https://perma.cc/68BM-SQUF].

3. Crouch, *supra* note 2; Woollacott, *supra* note 2.

4. *See infra* note 16 and accompanying text.

5. *See* 35 U.S.C. § 102(a) (prohibiting patents for inventions that are "otherwise available to the public").

6. *See Benefits*, CLOEM, https://www.cloem.com/flat/benefits/ (last visited Dec. 16, 2020) [https://perma.cc/4FB4-EHS3] (offering the production of prior art through artificial intelligence as a service to prevent others from obtaining patents); *About*, ALL PRIOR ART, http://allpriorart.com/about/ (last visited Dec. 16, 2020) [https://perma.cc/B4ZJ-LZGZ] ("All Prior Art is a project attempting to algorithmically create and publicly publish all possible new prior art, thereby making the published concepts not patent-able.").

7. The Library of Babel, which is highly analogous to large-scale AI-generation of prior art, is a fictional library that contains all possible books and, thus, the solutions to all possible problems. Jorge Luis Borges, *The Library of Babel*, *in* COLLECTED FICTIONS 112, 112 (Andrew Hurley trans., Penguin Books 1999) (1944). But "[f]or every rational line or forthright statement there are leagues of senseless cacophony . . . ." *Id.* at 114. "[T]he Library is the greatest imaginable source of information . . . . But the Library's vastness and disorganization also make it almost completely useless . . . ." James Grimmelmann, *Information Policy for the Library of Babel*, 3 J. BUS. & TECH. L. 29, 29 (2008) (footnotes omitted).

8. *See* Ben Hattenbach & Joshua Glucoft, *Patents in an Era of Infinte Monkeys and Artificial Intelligence*, 19 STAN. TECH. L. REV. 32, 35 (2015) ("Cloem is attempting . . . to use brute-force computing to mechanically compose text for thousands of patent claims covering potentially novel inventions . . . .").

9. *See supra* note 6 and accompanying text.

10. Patent Examiners have the primary role of examining patent applications and then granting or rejecting the applications. Sue A. Purvis, *The Role of a Patent Examiner*, U.S. PAT. & TRADEMARK OFF. (Apr. 8, 2013), https://www.uspto.gov/sites/default/files/about/offices/ous/04082013_StonyBrookU.pdf [https://perma.cc/N88B-AMTX].

defeat the patentability of an invention if the evidence meets certain statutory and judicial requirements.[11]

The amount of information a piece of prior art must disclose to defeat the patentability of an invention is notably less than what a patentee must disclose in a patent application for the patent to issue.[12] The divergent standards for patent application disclosure and prior art disclosure may have been inconsequential with traditional forms of strategic disclosure. But the increasing presence of AI-generated prior art exploits these differences to thwart patents from issuing on valuable inventions while providing fewer societal benefits than traditional strategic disclosure. This undermines patent law's goal of incentivizing the creation and disclosure of new inventions because, as the likelihood of receiving a patent decreases, inventors may protect their inventions under less societally beneficial trade secret law or may not invent at all.[13]

This Note argues that courts should adapt to AI-generated prior art by eliminating the existing presumption that prior art is enabling and by implementing a conception requirement for prior art. Part II discusses some of the standards for patentability and the disclosure requirements for prior art and patent applications. Part III analyzes whether current AI-generated disclosures satisfy the requirements to be prior art, explains the impact that large-scale AI-generated prior art has on the patent system, and distinguishes AI-generated disclosures from traditional prior art. Part IV presents a solution for managing large-scale AI-generated prior art, not by categorically excluding AI-generated disclosures from being prior art but by eliminating the

11. *See* Vic Lin, *What Is Prior Art?*, PAT. TRADEMARK BLOG, http://www.patenttrademarkblog.com/what-is-prior-art/ (last visited Dec. 15, 2020) [https://perma.cc/SL9C-5CFR] ("The term 'prior art' is frequently used in the patent world to refer to what already exists. It's the old stuff that can't be patented again. Prior art may consist of documents, things and processes that have been sold or used in the past."); *see also infra* Section I.C.1 (discussing the requirements for a disclosure to be prior art).

12. *See* Sean B. Seymore, *Rethinking Novelty in Patent Law*, 60 DUKE L.J. 919, 936–40 (2011) (discussing the differences in the standards and burdens of proof for patent-supporting and patent defeating enablement).

13. Trade Secrets provide less benefit to society because the owner of a trade secret does not have to provide the public with details about the invention, unlike a patent applicant, who must provide enough teaching in the patent application to allow others to make and use the invention. *See* TianRui Grp. Co. v. Int'l Trade Comm'n, 661 F.3d 1322, 1343 (Fed. Cir. 2011) (Moore, J., dissenting) (discussing how incentivizing inventors to keep information secret "denies society the benefits of disclosure stemming from the patent system, which are anathema to trade secrets"); Scott Baker & Claudio Mezzetti, *Disclosure as a Strategy in the Patent Race*, 48 J.L. & ECON. 173, 173–75 (2005) (discussing how firms can retain trade secrets while disclosing enough information to thwart rival patents).

presumption that prior art is enabling[14] and requiring that all potential pieces of prior art satisfy a conception requirement before qualifying as prior art. In doing so, this solution advances the utilitarian purposes of the patent system of promoting innovation and the dissemination of information while giving credence to the ability of AI to generate new and useful information.

I. THE DIFFERING REQUIREMENTS FOR PATENTABILITY AND PRIOR ART

A. The Utilitarian Justification for Patent Law

To understand the problems amplified by large-scale AI-generated disclosures, it is crucial to understand the purpose of U.S. patent law. The patent system is predominantly justified on utilitarian grounds.[15] Referred to as the patent law quid pro quo, the patent system gives inventors a limited monopoly on their inventions in exchange for disclosing their inventions to the public.[16] Without a monopoly, inventors would be underincentivized to create and disclose their inventions.[17] And without disclosure of the inventions, society may

14. The enablement requirement in patent law often refers to the statutory requirement that a patent application must teach how to make and use the described invention in order for a patent to be granted. *See* 35 U.S.C. § 112(a) ("The specification shall contain a written description . . . of the manner and process of making and using [the invention], in such full, clear, concise, and exact terms as to enable any person skilled in the art . . . to make and use the [invention] . . . ."). However, like patent applications, prior art must be enabling to serve as patentability-defeating prior art. *See infra* notes 55–68 (discussing the anticipatory enablement requirement of prior art). The major difference between anticipatory enablement, the level of enablement required from prior art, and enablement required from a patent application is that patent applications must enable an ordinary person in the relevant field to *make and use* the invention while prior art must simply teach such a person how to make the invention. *In re* Hafner, 410 F.2d 1403, 1405 (C.C.P.A. 1969) ("[Section] 112 provides that the [patent application] must enable one skilled in the art to 'use' the invention whereas § 102 makes no such requirement as to [prior art].").

15. 1 PETER S. MENELL, MARK A. LEMLEY & ROBERT P. MERGES, INTELLECTUAL PROPERTY IN THE NEW TECHNOLOGICAL AGE 2019: PERSPECTIVES, TRADE SECRETS AND PATENTS 167 (2019).

16. *See, e.g.*, Brenner v. Manson, 383 U.S. 519, 534 (1966) ("The basic *quid pro quo* . . . for granting a patent monopoly is the benefit derived by the public from an invention with substantial utility." (emphasis added)); Universal Oil Prods. Co. v. Globe Oil & Refin. Co., 322 U.S. 471, 484 (1944) ("[T]he *quid pro quo* is disclosure of a process or device in sufficient detail to enable one skilled in the art to practice the invention once the period of the monopoly has expired . . . ." (emphasis added)).

17. This is because information, unlike tangible property, is nonrivalrous and nonexcludable. CRAIG ALLEN NARD, THE LAW OF PATENTS 30 (4th ed. 2017). Information is nonexcludable because once disclosed, it is difficult to prevent others from using it. *Id.* at 31. Information is nonrivalrous because many people can benefit from it without preventing others from using it at the same time. *Id.* This is because inventors need to disclose and commercialize their inventions in order to recoup their research and development costs, but an unprotected disclosure would allow competitors to copy the invention and compete with the inventor. *Id*. Thus, there is a need to limit access and use of the information to prevent competition from others who have not invested in the production of the information. *Id.* Increased competition from those who did not invest in producing the information would decrease market prices and result in under-investment in invention. *Id.* at 35.

never receive the benefits of the knowledge that a patent application provides to the public, which allows others to improve upon the patented invention and grows the general storehouse of knowledge.[18] This disclosure function also places a limit on a patent monopoly by enabling others to make and use an invention once the patent has expired[19] and by preventing the patentee from extending his monopoly beyond the patent term by keeping details of the invention secret.[20] Thus, at the cost of a limited monopoly, the patent system benefits society by incentivizing the disclosure of new information that ultimately "foster[s] the cross-pollination of ideas" and "drive[s] [ ] more creative innovation."[21]

B. What Is Prior Art?

As will be discussed in Section II.C, an invention must meet certain requirements—namely, that it be new and nonobvious—before a patent can be granted.[22] Particularly, the invention must be new and nonobvious compared to the prior art. The term "prior art" refers generally to the existing body of knowledge in a field from which an examiner can draw to find that an invention is unpatentable.[23] A prior art reference is a particular piece of evidence that shows what information was known in the field before a given invention was made.[24] Almost anything can be a prior art reference. The categories of prior art references are enumerated in 35 U.S.C. § 102 and include patents,

18. *Id.* at 91.

19. *See* United States v. Dubilier Condenser Corp., 289 U.S. 178, 186–87 (1933) (discussing how the public receives the knowledge of the invention and the ability to practice it after the expiration of the patent).

20. *See* Timothy R. Holbrook, *Possession in Patent Law*, 59 SMU L. REV. 123, 130 (2006). (discussing how the disclosure requirements prevent patentees from retaining important details for practicing an invention in the best manner while giving an inferior disclosure to the public).

21. Sean B. Seymore, *The Teaching Function of Patents*, 85 NOTRE DAME L. REV. 621, 661 (2010).

22. *See infra* Section II.C.

23. *See* Lin, *supra* note 11 ("The term 'prior art' is frequently used in the patent world to refer to what already exists."). However, the term "prior art" is sometimes used to refer only to prior art references that can legally be used to support a rejection of a patent application. Gene Quinn, *What Is Prior Art?*, IPWATCHDOG, (Oct. 2, 2010), https://www.ipwatchdog.com/2010/10/02/what-is-prior-art/id=12677/ [https://perma.cc/7WPM-QXF6].

24. *See, e.g.*, Timothy R. Holbrook, *Patent Prior Art and Possession*, 60 WM. & MARY L. REV. 123, 149, 192 (referring to particular pieces of prior art as references).

printed publications, and events, like a public use[25] or sale[26], that make the invention publicly available.[27] Even movie scenes and the Bible can be prior art references.[28]

For a prior art reference to be a patentability-defeating prior art reference—one an examiner can legally use to support the rejection of a patent application—the reference must meet certain requirements. These prior art requirements fall into two categories: practical and substantive. The practical requirements, found in 35 U.S.C. § 102(a)–(b), dictate the availability and timing required for a reference or disclosure to be patentability-defeating prior art against a particular patent application.[29] The substantive requirements dictate the information or knowledge a disclosure must provide to be patentability-defeating prior art.[30] The substantive requirements discussed below, such as strict identity and anticipatory enablement, are judicial doctrines.[31]

1. The Practical Requirements

The foremost practical requirement for a disclosure to be patentability-defeating prior art is that the disclosure was made publicly available before the earliest effective filing date of the patent

25. A public use includes both public uses by the inventor as well as "any use of [the claimed] invention by a person other than the inventor who is under no limitation, restriction or obligation of secrecy to the inventor." Netscape Commc'ns. Corp. v. Konrad, 295 F.3d 1315, 1320 (Fed. Cir. 2002) (alteration in original) (quoting Petrolite Corp. v. Baker Hughes Inc., 96 F.3d 1423, 1425 (Fed. Cir. 1996)).

26. For the definition of a sale, see Meds. Co. v. Hospira, Inc., 827 F.3d 1363, 1365 (Fed. Cir. 2016) ("[T]o be on sale under § 102(b), a product must be the subject of a commercial sale or offer for sale, and that a commercial sale is one that bears the general hallmarks of a sale pursuant to Section 2-106 of the Uniform Commercial Code.") (internal quotation marks omitted).

27. 35 U.S.C. § 102(a)(1). Note that this list is nonexhaustive of the forms of prior art because Congress added the phrase "or otherwise available to the public" during the enactment of the America Invents Act. *Compare* Patent Act of 1952, 35 U.S.C § 102 (2006) (omitting the phrase "or otherwise available"), *with* Leahy-Smith America Invents Act, 35 U.S.C. § 102 (including the phrase "or otherwise available").

28. Stewart Walsh, *Prior Borat? Non-traditional Prior Art Rejections!*, IPWATCHDOG (Mar. 24, 2012), https://www.ipwatchdog.com/2012/03/24/prior-borat-non-traditional-prior-art-rejections/id=22837/ [https://perma.cc/6L3E-6MWZ].

29. 35 U.S.C. § 102(a)-(b).

30. For example, strict identity requires that a prior art reference contain each and every limitation of the invention. *See, e.g.*, Therasense, Inc. v. Becton, Dickinson & Co., 593 F.3d 1325, 1332 (Fed. Cir. 2010) ("Anticipation requires the presence in a single prior art disclosure of all elements of a claimed invention arranged as in the claim." (quoting Connell v. Sears, Roebuck & Co., 722 F.2d 1542, 1548 (Fed. Cir. 1983))).

31. *See* NARD, *supra* note 17, at 5–6, 253–56 (discussing the development of these doctrines).

application at issue.[32] The earliest effective filing date may be the actual filing date of the patent application at issue, or it may be the filing date of a related patent application.[33] While a disclosure or reference may take many statutorily enumerated forms,[34] AI-produced disclosures are most analogous to the category of "printed publications."[35] Thus, this discussion will focus on printed publications.

Public accessibility is the "touchstone" for determining whether a reference is a "printed publication" under § 102.[36] A court will deem a reference publicly accessible if it was "disseminated or otherwise made available [so] that persons interested and ordinarily skilled in the . . . art exercising reasonable diligence, can locate it."[37] While disclosures such as academic journals are clearly printed publications, the analysis is more complicated in cases like a doctoral thesis indexed in a library, a slide presentation at a conference, or an online article.[38] Regardless of form, courts generally interpret "exercising reasonable diligence" without considering the actual efforts required to access the information, which allows references that are practically inaccessible to still qualify as patentability-defeating prior art references.[39]

For cases in which the disclosure is a document, such as a doctoral thesis, courts often analyze public accessibility by looking to see if the disclosure was catalogued in "a meaningful way" in a public

32. *See* 35 U.S.C. § 102(a)-(b) ("A person shall be entitled to a patent unless the claimed invention was . . . available to the public before the effective filing date of the claimed invention . . . .").

33. 35 U.S.C. § 100(i)(1).

34. For a list of the statutorily enumerated categories of prior art, see *supra* note 27 and accompanying text. Notably, this list is nonexclusive. 35 U.S.C. § 102(a)-(b).

35. Hattenbach & Glucoft, *supra* note 8, at 37.

36. *In re* Bayer, 568 F.2d 1357, 1359 (C.C.P.A. 1978); *In re* Wyer, 655 F.2d 221, 224 (C.C.P.A. 1981).

37. Kyocera Wireless Corp. v. Int'l Trade Comm'n, 545 F.3d 1340, 1350 (Fed. Cir. 2008) (quoting SRI Int'l, Inc. v. Internet Sec. Sys. Inc., 511 F.3d 1186, 1194 (Fed. Cir. 2008)).

38. *See* NARD, *supra* note 17, at 292.

39. In many cases where a reference is found to be a printed publication, the circumstances indicate that it is extremely unlikely that a PHOSITA would have located the disclosure. *See, e.g.*, Bruckelmyer v. Ground Heaters, Inc., 453 F.3d 1352, 1353 (Fed. Cir. 2006) (Newman, J., dissenting from denial of petition to hear en banc):

> It is undisputed that these cancelled drawings are not available in any database or any library, and that no index, no catalog, no abstract suggests their existence or their content. . . . [T]he only way to obtain these drawings (although their existence was unknown) is to personally go to the Canadian Patent Office in Hull, Quebec, and ask to examine the file wrapper . . . of this particular patent . . . .;

see also In re Hall, 781 F.2d 897, 897–98, 900 (Fed. Cir. 1986) (holding that a single thesis deposited in one German library and indexed in a special dissertations catalogue was "sufficient[ly] accessibil[e] to those interested in the art exercising reasonable diligence").

archive.[40] For disclosures that are not printed publications in the traditional sense, like a poster presentation, the Federal Circuit has outlined several factors for analyzing whether disclosure was publicly accessible: the length of time of the display,[41] the expertise of the target audience,[42] the existence of reasonable expectations that the display would not be copied,[43] and the ease with which the display could have been copied.[44]

For online publications, courts will examine both the indexing of the disclosure and the circumstances surrounding the disclosure to determine if it was publicly accessible.[45] For example, in *Voter Verified, Inc. v. Premier Election Solutions, Inc.*, the Federal Circuit found that an unindexed internet article was still publicly available prior art.[46] The court determined that the article's availability on a well-known website dedicated to the invention's technology field made it publicly accessible despite it not being indexed in a search engine.[47] Thus, for online publications, indexing is "a relevant factor" but not "a necessary condition" for an online reference to be publicly available, and courts will consider other factors.[48]

2. The Substantive Requirements

To be a patentability-defeating prior art reference under § 102, a prior art reference must meet two substantive requirements. First, there must be strict identity between the now-claimed invention and the invention disclosed in the prior art reference, and second, the prior

40. *In re* Cronyn, 890 F.2d 1158, 1161 (Fed. Cir. 1989) (finding that student theses indexed alphabetically by authors name were not sufficiently accessible because indexing bore no relationship to the subject of the theses). *But see In re* Lister, 583 F.3d 1307, 1314–16 (Fed. Cir. 2009) (holding that databases searchable by keyword, but not databases only searchable by authors name or first word of the title, were publicly accessible for the contained disclosures to constitute printed publications); *In re* Hall, 781 F.2d at 897–98, 900 (holding that a single thesis deposited indexed in a special catalogue in one German library was sufficiently accessible).

41. *See, e.g.*, Regents of the Univ. of Cal. v. Howmedica, Inc., 530 F. Supp. 846, 860 (D.N.J. 1981) (holding that a limited duration slide presentation did not allow a PHOSITA to make or use the invention and thus the presentation was not prior art).

42. *See* Jockmus v. Leviton, 28 F.2d 812, 813–14 (2d Cir. 1928) (stating that a reference may be a printed publication if it "goes direct to those whose interests make them likely to observe and remember whatever it may contain that is new and useful").

43. *See In re* Klopfenstein, 380 F.3d 1345, 1351 (Fed. Cir. 2004) ("Where professional and behavioral norms entitle a party to a reasonable expectation that the information displayed will not be copied, [a court] is more reluctant to find something a 'printed publication.' ").

44. *See id.* ("The more complex a display, the more difficult it will be for members of the public to effectively capture its information.").

45. Hattenbach & Glucoft, *supra* note 8, at 37.

46. 698 F.3d 1374, 1380 (Fed. Cir. 2012).

47. Hattenbach & Glucoft, *supra* note 8, at 37.

48. *Voter Verified*, 698 F.3d at 1380.

art reference must satisfy the anticipatory enablement requirement.[49] Strict identity requires a single prior art reference disclose every limitation[50] of the claimed invention, arranged as in the claims of the patent application at issue.[51] But the reference need not expressly disclose every limitation of the invention. The inherent anticipation doctrine softens the strict identity requirement by allowing "a prior art reference [to] anticipate [a claimed invention] without disclosing [every limitation] of the claimed invention if the missing [limitation] is necessarily present . . . in the single [prior art] reference."[52] A limitation is necessarily present in a prior art reference if it naturally flows from what the reference explicitly discloses.[53] Further, although a single prior art reference must expressly or inherently disclose all limitations, an examiner may use secondary references to show that the missing

49. Seymore, *supra* note 12, at 931.

50. A limitation is any component or part of an invention that the patentee claims as part of the invention in a patent application. *See* Andrew Schulman, *Patent Litigation Part Three: An Introduction to Patent Claims, "Limitations," Infringement, and Invalidity*, DISPUTESOFT (Dec. 11, 2018, 10:00 AM), https://www.disputesoft.com/patent-litigation-part-three-an-introduction-to-patent-claims-limitations-infringement-and-invalidity/#:~:text=Patent%20claims%20are%20made%20up,a%20wide%20scope%20of%20infringement [https://perma.cc/W9DH-EETX]. A patentee may claim a limitation in physical or functional form. *See* 35 U.S.C. § 112(f) (allowing for functional claim limitations). For example, a patentee applying for a patent on a new coffee mug might claim the limitation that the coffee mug "has a C-shaped handle" (physical limitation) or might claim the limitation that the coffee mug has "means for holding the coffee mug" (functional limitation).

51. *See, e.g.*, Therasense, Inc. v. Becton, Dickinson & Co., 593 F.3d 1325, 1332 (Fed. Cir. 2010) ("Anticipation requires the presence in a single prior art disclosure of all elements of a claimed invention arranged as in the claim." (quoting Connell v. Sears, Roebuck & Co., 722 F.2d 1542, 1548 (Fed. Cir. 1983)). For example, an inventor applies for a patent claiming a chair with the limitations or elements of a square seat, four legs attached at the corners of the seat, and a seat back. If the examiner finds a published book describing a chair with a square seat, four legs attached at the corners of the seat, and a seatback arranged as in the inventor's patent application, the book satisfies the strict identity requirement. However, if the book describes a chair having a round seat, having only three legs, or not having a seatback, the book would not satisfy the strict identity requirement because it failed to disclose each limitation of the claimed invention. Further, if the book described a chair with a square seat, four legs, and a seatback, but the legs were not attached at the corners of the seat portion, the chair would fail the strict identity requirement because the legs would not be arranged as in the claimed invention.

52. Schering Corp. v. Geneva Pharms., Inc., 339 F.3d 1373, 1377 (Fed. Cir. 2003). *See also* NARD, *supra* note 17, at 254 (articulating the test for inherent anticipation to be that "a claim limitation is inherently anticipated if the limitation is necessarily present in or inevitably flows from the reference; or, if the reference is an actual device, the claim limitation would necessarily result from the use of the device for its intended purpose").

53. *Schering Corp.*, 339 F.3d at 1379. For example, if an invention was described as "a container having a cap and a body that is waterproof when the cap is secured to the body" it would naturally flow from the explicit disclosure that a seal exists between the cap and the body. This seal is inherently present despite not being explicitly described.

feature was inherently present in a single prior art reference.[54] Thus, the strict identity requirement is not so strict in application.

Second, a reference or disclosure must meet the anticipatory enablement requirement to be prior art under § 102. Under the anticipatory enablement requirement, to be prior art, a disclosure must provide enough knowledge or information to enable a person having ordinary skill in the art (a "PHOSITA") to *make* the described invention without undue experimentation.[55] The anticipatory reference need only enable a single embodiment of an invention that falls within the scope of the patent claims in the patent-at-issue to satisfy this requirement though.[56]

Requiring that a piece of prior art "enable" rather than "teach" a PHOSITA to make an invention means that the anticipating reference does not, by itself, have to "explain every detail" because a PHOSITA's knowledge can fill in the gaps in a disclosure.[57] Examiners can use secondary references to show what is within the PHOSITA's knowledge.[58] Further, whether a prior art reference is enabling is determined as of the filing date of the application at issue.[59] Thus, even if a secondary reference arose after a reference or disclosure was made but before the filing date of the patent-at-issue, an examiner can use that secondary reference to show that the primary reference was enabling.[60] Therefore, a reference that was not enabling upon publication may become enabling years later.[61]

The anticipatory enablement requirement's ability to filter out substandard prior art is further diminished because examiners can presume that prior art references are enabling.[62] This means that an

54. *See* Cont'l Can Co. USA, Inc. v. Monsanto Co., 948 F.2d 1264, 1268 (Fed. Cir. 1991) ("To serve as an anticipation when the reference is silent about the asserted inherent characteristic, such gap in the reference may be filled with recourse to extrinsic evidence.").

55. Finisar Corp. v. DirecTV Grp., Inc., 523 F.3d 1323, 1336 (Fed. Cir. 2008) (citing *In re* Omeprazole Pat. Litig., 483 F.3d 1364, 1379 (Fed. Cir. 2007)).

56. *Schering Corp.*, 339 F.3d at 1381.

57. *In re* Paulsen, 30 F.3d 1475, 1480 (Fed. Cir. 1994).

58. *See In re* Samour, 571 F.2d 559, 562–63 (holding that secondary references could be used to show that a primary reference was enabling); *see also* Timothy R. Holbrook*, Patent Disclosure and Time*, 69 VAND. L. REV. 1459, 1477 (2016) ("Non-prior art references can be useful to inform the background state of the PHOSITA's knowledge.").

59. *See* Holbrook, *supra* note 58, at 1471 ("Novelty under the AIA is assessed as of the filing date.").

60. *See id.* at 1477 ("[Secondary] references may arise *after* the prior art reference, so long as they are prior to or contemporaneous with the appropriate date for assessing novelty (or obviousness).").

61. *See id.* at 1470 ("The time gap between a prior art disclosure and the validity assessment means that the knowledge of the PHOSITA has an opportunity to grow.").

62. Amgen Inc. v. Hoechst Marion Roussel, Inc., 314 F.3d 1313, 1354 (Fed. Cir. 2003); *In re* Sasse, 629 F.2d 675, 681 (C.C.P.A. 1980) (citing *In re* Jacobs, 318 F.2d 743, 746 (C.C.P.A. 1963)).

examiner can reject an applicant's claim to an invention without inquiring into whether the anticipating reference is enabling.[63] Thus, examiners can make a prima facie case of anticipation so long as the reference satisfies the strict identity requirement.[64] The burden then shifts to the applicant to rebut the presumption of enablement by a preponderance of the evidence.[65] If the applicant succeeds, the examiner can submit additional evidence to show the prior art reference is enabling.[66] While the examiner has the ultimate burden of persuasion,[67] this burden-shifting may continue as each side submits new evidence.[68]

Notably, a prior art reference needs to satisfy these substantive requirements only if it is supporting a rejection under § 102 for lack of novelty.[69] An examiner may assert a prior art reference to render a patent obvious without it meeting the strict identity[70] or enablement requirements for rejections based on a lack of nonobviousness under 35 U.S.C. § 103.[71] For the purposes of the nonobviousness requirement, "[e]ven if a reference discloses an inoperative device, it is prior art for all that it teaches."[72]

C. Ensuring the Patent Bargain

To minimize the "abhorrence"[73] of granting a monopoly, there are several statutory requirements a patentee must satisfy before

63. *Amgen Inc.*, 314 F.3d at 1355.

64. *See In re* Wilder, 429 F.2d 447, 451 (C.C.P.A. 1970) ("[A] prima facie case is made out whenever a reference is shown to contain a disclosure which is specific as to every critical element of the appealed claims.").

65. *In re Sasse*, 629 F.2d at 681 (citing *In re Jacobs*, 318 F.2d at 746).

66. *Id.* (citing *In re* Payne, 606 F.2d 303, 303 (C.C.P.A. 1979)).

67. *See* Graham v. John Deere Co., 383 U.S. 1, 18 (1966) ("[T]he primary responsibility for sifting out unpatentable material lies in the Patent Office.").

68. *See In re Sasse*, 629 F.2d at 681–82 (explaining how the burden shifted from the PTO, to the applicant, back to the PTO, and to the applicant once more).

69. The patentability standards of § 102 and § 103 are discussed below in Section C. Ensuring the Patent Bargain.

70. *See* 35 U.S.C. § 103 ("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 . . . .") (emphasis added).

71. *See* Reading & Bates Constr. Co. v. Baker Energy Res. Corp., 748 F.2d 645, 652 (Fed. Cir. 1984) (stating, after finding a reference was nonenabled to be prior art under § 102, that it "may qualify as a prior art reference under § 103, but only for what is disclosed in it.") (emphasis omitted). This does not mean that an invention that would otherwise be novelty defeating if it were enabling can be the *sole* prior art reference of an obviousness rejection. *See* Seymore, *supra* note 12, at 939–940 n.104 ("[A]n examiner cannot rely on § 103 to circumvent the requirement for enabling prior art. . . . But the prior art as a *whole* must be enabling, not just a single reference." (emphasis added)).

72. Beckman Instruments, Inc. v. LKB Produkter AB, 892 F.2d 1547, 1551 (Fed. Cir. 1989).

73. Graham v. John Deere Co., 383 U.S. 1, 7 (1966).

receiving a patent to ensure the public receives the full benefit of the patent bargain. These standards include novelty (35 U.S.C. § 102),[74] nonobviousness (35 U.S.C. § 103),[75] and the disclosure requirements (35 U.S.C. § 112).[76] While not the only requirements, these present the greatest implications for large-scale AI-generated prior art.

1. An Invention Must Be Novel

It is a foundational principle of patent law that only truly novel inventions—inventions that are not already known, made, sold or used—are patentable.[77] From the utilitarian perspective, if an invention is already known to the public, then "the public have acquired nothing from the [disclosure] of the patentee[] which they did not possess before," and thus, there is no quid pro quo that justifies the grant of a patent.[78] Granting a patent for an invention that lacks novelty would actually harm the public by removing existing knowledge from the public domain.[79]

A court or examiner will determine whether an invention is new by comparing the invention to the prior art to see if the invention already exists.[80] If the invention already exists, the invention is not novel and is "anticipated" by the prior art.[81] As stated above, an examiner must find strict identity between the claimed invention and an enabling prior art reference to issue a novelty rejection.[82]

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74. 35 U.S.C. § 102.

75. *Id.* § 103.

76. *Id.* § 112.

77. *See* Cridlebaugh v. Rudolph, 131 F.2d 795, 800 (3d Cir. 1942) (stating that the absence of novelty automatically precludes patentability); *Graham*, 383 U.S. at 5–6 (explaining that congressional authorization for patents that would remove technology from the public domain would be unconstitutional).

78. GEORGE TICKNOR CURTIS, A TREATISE ON THE LAW OF PATENTS FOR USEFUL INVENTIONS IN THE UNITED STATES § 292 (Boston, Little, Brown & Co. 2d ed. 1854). Unlike in copyright law, an inventor cannot obtain protection for an invention that is in the public domain, even if he independently created an invention. Robert P. Merges, *A Few Kind Words for Absolute Infringement Liability in Patent Law*, 31 Berkeley Tech. L.J. 1, 20 (2016).

79. *See* Bonito Boats, Inc. v. Thunder Craft, Inc., 489 U.S. 141, 148 ("[P]atent protection [for] knowledge that is already available to the public . . . would not only serve no socially useful purpose, but would in fact injure the public by removing existing knowledge from public use.").

80. *See, e.g.*, Therasense, Inc. v. Becton, Dickinson & Co., 593 F.3d 1325, 1332 (Fed. Cir. 2010) ("Anticipation requires the presence in a single prior art disclosure of all elements of a claimed invention arranged as in the claim." (quoting Connell v. Sears, Roebuck & Co., 722 F.2d 1542, 1548 (Fed. Cir. 1983)). *See also supra* note 51 and accompanying text (providing relevant examples).

81. *See* NARD, *supra* note 17, at 246 ("The novelty requirement asks whether the claimed invention is new. If an invention is not new, it is said to be *anticipated* by the prior art.").

82. *See supra* Section I.B.2.

2. The Nonobviousness Requirement: An Invention Must Be Significant

Patents are also not granted for inventions that would have been obvious to a PHOSITA as of the application filing date.[83] While the novelty requirement ensures that claimed inventions do not already exist in the prior art, the nonobviousness requirement ensures that patented inventions are a sufficient improvement over the prior art to justify the grant of a patent.[84] The rationale for not granting patents on obvious inventions is that these inventions would likely come to be without the incentive of patent protection.[85] Thus, granting patents on obvious inventions would not actually promote technological progress.

Similar to the novelty requirement, an examiner will determine if an invention is obvious by comparing the invention to the prior art. If, in the examiner's judgement, the invention is not a significant improvement over the prior art, the examiner will reject the invention as obvious. Importantly, the nonobviousness requirement is more rigorous than the novelty requirement for several reasons. First, multiple prior art references may combine to support an obviousness rejection, so even if a particular invention has not yet been made and is unknown, it may still be unpatentable if it is an insignificant change over the prior art.[86] Second, obviousness is judged as of the application filing date.[87] Thus, an invention that is not obvious the day it is made may become obvious as technology advances between the time when the invention is made and the filing of the patent application.[88] Third, an examiner determines nonobviousness from the perspective of the PHOSITA, while presuming that a PHOSITA has knowledge of all analogous prior art[89] and can combine prior art references with

83. 35 U.S.C. § 103.

84. NARD, *supra* note 17, at 329; *see also* United States v. Adams, 383 U.S. 39, 48 (1966) ("[N]ovelty and nonobviousness . . . are separate tests of patentability and all must be satisfied in a valid patent.").

85. *See, e.g.*, ROBERT P. MERGES, JUSTIFYING INTELLECTUAL PROPERTY 155 (2011) (stating that "[a]n obvious invention will likely soon be made even without the award of a patent right").

86. NARD, *supra* note 17, at 351; *see also supra* notes 51–54 and accompanying text (discussing the strict identity requirement).

87. Holbrook, *supra* note 58, at 1472.

88. *See id.* at 1470 ("The time gap between a prior art disclosure and the validity assessment means that the knowledge of the PHOSITA has an opportunity to grow.").

89. *See* Custom Accessories, Inc. v. Jeffrey-Allan Indus., Inc., 807 F.2d 955, 962 (Fed. Cir. 1986) ("The person of ordinary skill [for purposes of determining obviousness] is a hypothetical person who is presumed to be aware of all the pertinent prior art."). Analogous Prior Art is prior art that comes from the same field of endeavor or is reasonably pertinent to the particular problem the invention addresses. NARD, *supra* note 17, at 401.

ordinary creativity.[90] This allows the examiner some discretion in determining whether an invention is obvious. Thus, the nonobviousness requirement is often the biggest hurdle for obtaining a patent.[91]

3. Disclosing the Invention

Those seeking patent protection in the United States must also satisfy the three disclosure requirements: (1) written description, (2) enablement, and (3) best mode.[92] The written description requirement ensures that the scope of patent protection is proportional to the scope of what the patentee disclosed in the application.[93] To satisfy the written description requirement, the patentee must describe the invention in enough detail to establish that the patentee possessed the invention as of the application filing date.[94] A written description that merely renders the invention obvious is insufficient to satisfy the written description requirement.[95] The corollary to this statement, discussed below,[96] is that a prior art disclosure may render an invention

90. KSR Int'l Co. v. Teleflex Inc., 550 U.S. 398, 421 (2007) ("A person of ordinary skill is also a person of ordinary creativity, not an automaton.").

91. Lack of nonobviousness rejections are the most common rejection at the USPTO. Katrina Brundage & James Cosgrove, *Section 103 Rejections: How Common Are They and How Should You Respond?*, IPWATCHDOG (Oct. 3, 2016), https://www.ipwatchdog.com/2016/10/03/103-rejections-common-respond/id=73214/ [https://perma.cc/YL5D-PQEF].

92. These statutory disclosure requirements appear in the first paragraph of § 112:

> 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, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.

35 U.S.C. § 112(a). While the best mode requirement still exists in § 112 under the AIA, it is no longer a ground for invalidating a granted patent. Lisa Larrimore Ouellette, *Do Patents Disclose Useful Information?*, 25 HARV. J.L. & TECH. 545, 552 (2012). For this reason, the best mode requirement has only minor implications for the large-scale AI-generated prior art and is not analyzed in this Note.

93. NARD, *supra* note 17, at 138–39.

94. *Id.* at 551; Holbrook, *supra* note 20, at 127. However, in a patent law context, possession does not mean physical possession because the thing being possessed is the intangible idea of the invention. *Id.* at 146. Courts have repeatedly stated that actual possession or reduction to practice, by building a working prototype, is neither necessary nor sufficient for satisfying the written description requirement. *See, e.g.*, Ariad Pharms., Inc. v. Eli Lilly & Co., 598 F.3d 1336, 1352 (en banc). Rather, the specification itself must show that the inventor possessed the invention as of the filing date. *Id.* at 1351–52 (characterizing written description requirement as "possession as shown in the disclosure"). Practically, this means that the patentee must describe the invention and not merely the result the invention produces to satisfy the written description requirement. *Id.* at 1350 (citing Regents of Univ. of Cal. v. Eli Lilly & Co., 119 F.3d 1559, 1568 (Fed. Cir. 1997)).

95. *Ariad*, 598 F.3d at 1352.

96. *See infra* Section II.B (discussing how prior art may be insufficient to meet the written description requirement itself, while still barring patentability for a claimed invention).

obvious without itself satisfying the written description requirement for patentability.[97]

While the written description requirement compels patentees to describe what the invention is, the enablement requirement compels patentees to describe how to make and use the invention.[98] The statutory, or patent-supporting,[99] enablement requirement of § 112 is "arguably the most important patent doctrine after obviousness"[100] and is a separate requirement from the written description requirement.[101] Enablement ensures that the invention enters the public domain when the patent expires.[102] Like the written description requirement, the enablement requirement also serves to limit the scope of patent protection to what the inventor actually teaches in the patent.[103]

The statutory enablement requirement demands that the specification of the patent "enable any person skilled in the art . . . to make *and* use the [invention]."[104] An examiner can reject a patent application if it fails to teach a PHOSITA either how to *make* the invention or how to *use* the invention.[105] Thus, statutory enablement is

97. *Cf. Ariad*, 598 F.3d at 1352 (stating that a description that "merely renders the invention obvious does not satisfy the requirement").

98. *See* 35 U.S.C. § 112(a) (requiring a written description of the invention and "of the manner and process of making and using it"). Although found in the same paragraph, these requirements are doctrinally separate. *Ariad*, 598 F.3d at 1344.

99. This Note refers to the enablement requirement of § 112 as statutory or patent-supporting enablement, in contrast to anticipatory or patent-defeating enablement discussed in Section I.C.2.

100. *See, e.g.*, Enzo Biochem, Inc. v. Gen-Probe Inc., 323 F.3d 956, 982 (Fed. Cir. 2002) (Rader, J., dissenting from denial of rehearing en banc). To illustrate the difference between written description and enablement, the court in *In re DiLeone* provided an example of a disclosure that would satisfy the enablement requirement but not the written description requirement: "consider the case where the specification discusses only compound A and contains no broadening language of any kind. This might very well enable one skilled in the art to make and use compounds B and C; yet the class consisting of A, B and C has not been described." 436 F.2d 1404, 1405 n.1 (C.C.P.A. 1971). On the other hand, it is easier to see how an application could satisfy the written description requirement, while failing the enablement requirement. *See, e.g.*, *In re* Hafner, 410 F.2d 1403, 1405 (C.C.P.A. 1969) (holding that enablement requirement of § 112 was not satisfied because the disclosure did not teach how to use the invention, although it fully described the invention).

101. *Ariad*, 598 F.3d at 1344.

102. Holbrook, *supra* note 20, at 128.

103. The scope of the claimed invention in a patent must fall within scope of enablement. *Id.* at 157–58; *see also* Nat'l Recovery Techs., Inc. v. Magnetic Separation Sys., 166 F.3d 1190, 1196 (Fed. Cir. 1999) ("The scope of enablement, in turn, is that which is disclosed in the specification plus the scope of what would be known to one of ordinary skill in the art without undue experimentation."). The specification is the part of the patent where the inventor describes the invention. 35 U.S.C. § 112(a).

104. 35 U.S.C. § 112(a) (emphasis added).

105. *See In re Hafner*, 410 F.2d at 1405 (holding that the requirements of § 112 were not met because the "how to use" requirement was not satisfied, "though the manner of 'making,' as distinguished from 'using,' the invention [was] also fully disclosed"); *see also* Holbrook, *supra* note 20, at 127 (noting that the specification must disclose how to make and use the invention). The

a more stringent requirement than anticipatory enablement, which applies to prior art, because anticipatory enablement requires only that a reference enable a PHOSITA to *make* the described invention to be prior art.[106]

The level of teaching that a patent application must provide to be enabling is the level sufficient to allow a PHOSITA to make and use the claimed invention *without undue experimentation*.[107] The enablement analysis, like the nonobviousness analysis, is complex because it is performed from the perspective of the PHOSITA.[108] Thus, a patentee can use extrinsic evidence to show what was within the PHOSITA's knowledge, [109] which may change over time.[110]

Further, a reference need only enable a single embodiment of an invention that falls within the scope of the patent-at-issue to support a novelty rejection;[111] whereas, statutory enablement requires a patent application to enable the full scope of the claimed subject matter.[112] "These differing standards reveal a curious asymmetry"[113] that "a disclosure [may be] entirely adequate to anticipate [an invention] . . . and, at the same time, entirely inadequate to support the

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"use" component can be a crucial distinction for chemical inventions because an inventor cannot obtain a patent on a chemical compound if there is no known use, even if the inventor invents the compound and method for making it. Holbrook, *supra* note 20, at 129.

106. *In re Hafner*, 410 F.2d at 1405 ("[Section] 112 provides that the specification must enable one skilled in the art to 'use' the invention whereas § 102 makes no such requirement as to an anticipatory disclosure.").

107. NARD, *supra* note 17, at 116 (emphasis added). Courts thus recognize that some experimentation may be necessary to practice an invention, but a patent is only nonenabling when the experimentation becomes undue. *See* Atlas Powder Co. v. E.I. du Pont De Nemours & Co., 750 F.2d 1569, 1576 (Fed. Cir. 1984) ("That some experimentation is necessary does not preclude enablement; the amount of experimentation, however, must not be unduly extensive."). Courts have identified several factors for determining when experimentation is undue. These factors include:

> (1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims.

In re Wands, 858 F.2d 731, 737 (Fed. Cir. 1988).

108. For a deeper discussion of the implications of analyzing enablement from the perspective of the PHOSITA, see *supra* notes 57–61 and accompanying text.

109. *See In re* Samour, 571 F.2d 559, 562–63 (C.C.P.A. 1978) (holding that secondary references could show enablement).

110. *See* Holbrook, *supra* note 58, at 1468 ("[I]t is conceivable that a prior art reference that was not enabled as of its effective prior art date *could become* enabled over time as the knowledge of the PHOSITA expands.").

111. Schering Corp. v. Geneva Pharms., Inc., 339 F.3d 1373, 1381 (Fed. Cir. 2003).

112. *Compare* Liebel-Flarsheim Co. v. Medrad, Inc., 481 F.3d 1371, 1379 (Fed. Cir. 2007) ("[T]he full scope [of the claimed invention] must be enabled . . . ."), *with* AK Steel Corp. v. Sollac, 344 F.3d 1234, 1244 (Fed. Cir. 2003) ("[T]he applicant's specification must enable one of ordinary skill in the art to practice the full scope of the claimed invention.").

113. Seymore, *supra* note 12, at 933.

[issuance of a patent on the invention]."[114] As discussed below, AI-generated disclosures exploit these different standards to preempt patent protection for desirable inventions and thus inhibit the disclosure of knowledge that such patents provide, without providing society with an adequate substitute disclosure.[115]

D. The Current State of AI-Generated Prior Art

Currently, there are several entities using brute-force computing power to algorithmically generate disclosures that cover potentially novel inventions.[116] Some entities, like the company Cloem, market AI-generated prior art as a service to other organizations for competitive purposes, such as preempting the patents of competitors and creating freedom to operate around the organization's own patents.[117] Other organizations, like All Prior Art ("APA"), altruistically use AI-generated prior art "to democratize ideas, provide an impetus for change in the patent system, and to preempt patent trolls."[118]

Although the current entities trying to use artificial intelligence to generate prior art have diverse purposes, the underlying AI technologies that produce the disclosures have several similarities.[119] First, these technologies use "linguistic manipulation" to alter text from existing patents into disclosures covering potentially novel inventions.[120] AI performs this linguistic manipulation using grammatical algorithms and technical lexicons to create a description

114. *In re* Hafner, 410 F.2d 1403, 1405 (C.C.P.A. 1969).

115. *See infra* Section II.B.

116. The two entities primarily focused on in this article are Cloems and All Prior Art.

117. *See Benefits*, *supra* note 6 (explaining the offensive and defensive competitive benefits of using Cloem services).

118. *About*, *supra* note 6. A patent troll, or nonpracticing entity, is an entity that commercializes its patent portfolio by licensing its patents to others rather than practicing the inventions contained in the patents. J. Jason Williams, Mark V. Campagna & Olivia E. Marbutt, *Strategies for Combating Patent Trolls*, 17 J. INTELL. PROP. L. 367, 368 n.1 (2010).

119. *See* Felix Hamborg, Moustafa Elmaghraby, Corinna Breitinger & Bela Gipp, *Automated Generation of Timestamped Patent Abstracts at Scale to Outsmart Patent-Trolls*, *in* PROCEEDINGS OF THE 2ND JOINT WORKSHOP ON BIBLIOMETRIC-ENHANCED INFORMATION RETRIEVAL AND NATURAL LANGUAGE PROCESSING FOR DIGITAL LIBRARIES 101, 102 (Philipp Mayr, Muthu Kumar Chandrasekaran & Kokil Jaidka eds., 2017) (describing the similarities and common shortcomings of *All Prior Art*, *Cloem*, and *Transform Any Text into a Patent Application*).

120. *See* Hattenbach & Glucoft, *supra* note 8, at 35–36 (describing the creation of AI-generated disclosures from existing patent claim language through linguistic manipulation).

of the physical structure.[121] These technologies then timestamp and publish the disclosures online.[122]

It is important to see how these AI technologies produce the disclosures in contrast to how a human would write such disclosure. A human would first conceive of an idea and would then reduce that idea into words on a page. In contrast, these AI technologies start with words on a page. They then use linguistic manipulation to create the final product—more words on a page. The critical difference is that the AI never converts the description into anything more than words on a page. In a sense, the AI creates a description of an invention without actually "thinking" about the idea or structure it is describing. This drastically reduces the quality of these AI-generated disclosures.

AI technologies have several other limitations. First, the technologies are only effective at producing disclosures in certain technical fields. Cloem's technology works best with software and mechanical inventions[123] while APA generates disclosures on data processing systems.[124] Further, the generated disclosures are not syntactically diverse from the base patent language that the technologies use.[125] Lastly, these technologies mostly produce nonsensical,[126] although grammatically correct, disclosures.[127] Thus, these technologies must produce millions of nonsensical disclosures to

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121. *Features*, CLOEM, https://www.cloem.com/flat/features/ (last visited Dec. 17, 2020) [https://perma.cc/3EW6-NP8Y] (discussing the algorithms and specialized dictionaries that Cloem uses to create texts). For example, one APA disclosure reads:

> A wearable electric device includes a main body with a circuit module inside and at least a detachable battery strap with a battery module inside, and the main body and the detachable battery strap are detachably fastened together. The test device includes an addressable memory. . . . Each of the strips is radially offset from one another. In the sealing step, long side edges of the battery case are crimped by a forming surface having a rounded cross section, and arc-shaped edges connecting both long side edges are crimped by a flat forming surface.

Prior Art, ALL PRIOR ART, http://allpriorart.com/ (last visited Dec. 17, 2020) [https://perma.cc/4SH8-4ST].

122. *See Features*, *supra* note 121 (describing timestamping technology); *About*, *supra* note 6 (same).

123. *F.A.Q.*, CLOEM, https://www.cloem.com/flat/faq/ (last visited Dec. 17, 2020) [https://perma.cc/S32L-FLVE].

124. Hamborg et al., *supra* note 119, at 102.

125. *See id.* (stating that the linguistic manipulation techniques of Cloem and APA are not syntactically diverse).

126. For an example of the nonsensical nature of the claims produced by these technologies see *supra* note 121. These claims sound technologically complex and are grammatically correct but make little sense when one tries to convert the words into a real-world item. Importantly, even if it would be possible to make the invention described, it is even more difficult to see what the use or benefit of such invention would be.

127. *About*, *supra* note 6; *F.A.Q.*, *supra* note 123.

generate a few meaningful disclosures.[128] In the near future, though, the technology for producing AI-generated disclosures will likely overcome these limitations.

E. The Strategy of Strategic Disclosure

Although AI-generated prior art is revolutionary, publishing technical information to intentionally create prior art is not a new concept.[129] Many companies publish, or strategically disclose, technical information to prevent rivals from obtaining patents.[130] Although this may be socially detrimental if companies merely retain trade secrets while preventing rivals from obtaining patents,[131] strategic disclosure is beneficial when it expands the domain of public knowledge without the burden of a patent monopoly.[132] Therefore, this Note advocates for a solution that differentiates between current socially beneficial strategic disclosures and socially harmful AI-generated strategic disclosures.

II. THE AVAILABILITY AND IMPLICATIONS OF AI-GENERATED PRIOR ART

As discussed above, patent law has requirements that a patentability-defeating prior art reference must meet, although the requirements for what a patent application must disclose are more stringent. This Section analyzes why the patent law doctrines discussed above are incapable of preventing AI-generated disclosures from rendering some societally beneficial inventions unpatentable. Without intervention, AI-generated disclosures will stifle the progress of science

128. *See About*, *supra* note 6 (asserting that producing millions of these texts increases the odds of creating potential prior art); *F.A.Q.*, *supra* note 123 (stating that Cloem produces thousands of AI-generated patent claims at a time).

129. *See* Scott Baker & Claudio Mezzetti, *Disclosure as a Strategy in the Patent Race*, 48 J.L. & ECON. 173, 173–77 (2005) (discussing the methods and purposes of large-scale "targeted" disclosures).

130. There are companies, such as IP.com and Research Disclosure, that exist specifically to provide strategic disclosure as a service to other companies. *Id.* at 173. Other companies, such as IBM and Xerox, published their own technical journals to prevent other competitors from pursuing patents in the field of their technology. *Id.* at 174.

131. *See id.* at 176 (discussing how firms might use strategic disclosure to disclose enough information to thwart patents for rivals while retaining the rest of its research as a trade secret).

132. Douglas Lichtman, Scott Baker & Kate Kraus, *Strategic Disclosure in the Patent System*, 53 VAND. L. REV. 2175, 2199–200 (2000). Indeed, these strategic disclosures often reveal valuable information, as the PTO has cited thousands of strategic disclosure publications as prior art in granted patents. *See* Baker & Mezzetti, *supra* note 129, at 174 (finding that granted patents have cited strategic disclosure publications over fifty thousand times).

because it does not provide an adequate replacement for the knowledge contained in patent applications or traditional strategic disclosures.

A. Scrutinizing AI-Generated Disclosures Under the Prior Art Requirements

A court would probably not consider existing AI-generated disclosures to be prior art because the disclosures are insufficiently accessible to the public. Additionally, the strict identity requirement also poses a barrier for AI-generated disclosures to render some inventions unpatentable under the novelty requirement. But even if AI-generated disclosures rarely meet the strict identity requirement, they may still affect the patent system by supporting obviousness rejections. Further, minor technological leaps may overcome the current inadequacies of AI in producing prior art.

1. Capturing Knowledge from AI-Generated Disclosures

In determining whether an AI-generated disclosure satisfies the practical requirements for being patentability-defeating prior art, a court or examiner would most likely classify these disclosures into the "printed publications" category of prior art under § 102(a).[133] For a reference to be a printed publication, a court will evaluate whether the document was publicly accessible by analyzing whether an interested PHOSITA exercising reasonable diligence could locate it.[134] Although current AI-generated disclosures are available on the internet, they are unlikely to possess the requisite indexing or context that courts have examined when determining whether a disclosure was publicly accessible.[135] For example, APA produces vastly unrelated "inventions" without organizing them by subject matter or in any other "meaningful way."[136] Yet unlike many "printed publication" cases,[137] APA disclosures are searchable by keyword because they are indexed

133. *See supra* notes 34–35 and accompanying text.

134. Kyocera Wireless Corp. v. Int'l Trade Comm'n, 545 F.3d 1340, 1350 (Fed. Cir. 2008).

135. *See supra* notes 36–44 and accompanying text (discussing public accessibility).

136. *In re* Cronyn, 890 F.2d 1158, 1161 (Fed. Cir. 1989); *see also Publications*, ALL PRIOR ART, http://allpriorart.com/publications/ (last visited Dec. 17, 2020) [https://perma.cc/A72Y-XR5K]. For example, one volume of the all prior art disclosures displays consecutively inventions for "A monobloc piston assembly," "[a]n input display apparatus," and "a process for reducing the level of pollutants in the exhaust of a diesel engine" consecutively. Alexander Reben, *Volume 1*, ALL PRIOR ART, https://ia800402.us.archive.org/6/items/AllPriorArt/AllPriorArt-Vol1.txt (last visited Dec. 17, 2020) [https://perma.cc/BG7P-RAJP].

137. *See, e.g.*, *Cronyn*, 890 F.2d at 1161 (finding that student theses indexed alphabetically by authors name were not sufficiently accessible because indexing bore no relationship to the subject of the theses).

in a search engine.[138] The court in *In re Lister* held that searchability by keyword was enough to make disclosures in a database printed publications.[139]

But the database in *In re Lister* did not contain any nonsensical entries like APA and Cloem disclosures do.[140] Thus, one interested in the art would have to exercise the incremental degree of diligence required to filter through nonsensical disclosures when searching for prior art in APA or Cloem databases. It is possible a court may view this incremental level of diligence as beyond that of an interested PHOSITA exercising reasonable diligence.[141]

Regardless, indexing is only "a relevant factor" for online publications to be publicly accessible, not "a necessary condition."[142] An examiner would likely consider other factors.[143] For online disclosures like APA and Cloems, there is no expectation of privacy, and the disclosures remain online for an extended period of time—both factors that weigh in favor of the disclosures being printed publications.[144] On the other hand, it is questionable whether the nature of Cloem and APA disclosures allows for easy copying by those who view them.[145] Because the Cloem and APA disclosures contain nonsensical text, it is more difficult for a person interested in the art to copy, or "effectively capture,"[146] the actual knowledge contained in the disclosures.

Examiners would probably also consider the location of AI-generated disclosures, just as the court in *Voter Verified* considered that the disclosure at issue was located on a website specific to the technology area of the invention and well-known to those in the

138. *See What Is Search Engine Indexing?*, BRICK MKTG. , https://www.brickmarketing.com/define-search-engine-index.htm (last visited Dec. 17, 2020) [https://perma.cc/RR3A-PRYH] ("It is the search engine index that provides the results for search queries . . . .").

139. *In re* Lister, 583 F.3d 1307, 1314–17 (Fed. Cir. 2009).

140. *See About*, *supra* note 6; *F.A.Q.*, *supra* note 123. The database in *In re Lister* was a copyright office database. 583 F.3d at 1310.

141. Courts are often reluctant to consider the actual effort required to find a reference when determining if a reference was publicly accessible. *See supra* note 39 and accompanying text.

142. Voter Verified, Inc. v. Premier Election Sols., Inc., 698 F.3d 1374, 1380 (Fed. Cir. 2012).

143. Although the "printed publication" in *Klopfenstein* was a printed publication, it is likely that a factfinder would still find these factors relevant in deciding whether a disclosure was publicly accessible. *In re* Klopfenstein, 380 F.3d 1345, 1351 (Fed. Cir. 2004). For a discussion of other factors that courts will consider when deciding if a nontraditional publication is publicly accessible, see *supra* notes 41–44 and accompanying text.

144. *See supra* notes 41, 43 and accompanying text (discussing factors in whether non-traditional publication is publicly accessible).

145. Copying in this instance does not mean literal copying but rather the ability to take and practice the information contained. *See In re Klopfenstein*, 380 F.3d at 1351. ("The more complex a display, the more difficult it will be for members of the public to effectively capture its information.").

146. *Id.*

industry.[147] While APA and Cloems generate disclosures only for mechanical, electrical, and data-processing inventions,[148] these fields are broader than the field—electronic voting technologies—identified by the court in *Voter Verified*.[149] The broad field of inventions covered and the volumes of unorganized, nonsensical inventions in collections of AI-generated disclosures make it unlikely that workers in any industry would use or value Cloem or APA databases as technical resources. Thus, even "those interested in the art exercising reasonable diligence" would have no reason to look for prior art within the databases of current AI-generated disclosures.[150]

The recurring issue with current AI-generated disclosures is that the few valuable disclosures are dispersed among volumes of nonsensical texts. This makes it difficult to index the inventions by subject matter because it is impossible to categorize a nonsensical invention. The amount of nonsensical ideas would also undermine the legitimacy of AI-generated disclosures as a resource for industry experts.[151] Thus, a person interested in finding such information would either choose not to, or would have to put forth an unreasonable amount of effort to, search through existing collections of AI-generated disclosures.

Looking forward, technological advancements will likely overcome the issues plaguing current AI-generated disclosures. Revolutionary deep-learning techniques now allow computers to imitate human creativity.[152] If Cloems and APA utilized these technologies, the quality of their disclosures would increase. Because both Cloems and APA publish their disclosures with the intent that they will constitute patentability-defeating prior art references,[153] these organizations have incentive to develop more advanced AI. Additionally, as computing power increases,[154] AI-generated disclosures will become more plentiful, which will result in more AI-generated disclosures of value. Researchers have estimated that merely

147. 698 F.3d at 1380.

148. *See supra* notes 123–124 and accompanying text (discussing Cloem and APA and the kind of disclosures generated).

149. 698 F.3d at 1380.

150. *In re* Hall, 781 F.2d 897, 900 (Fed. Cir. 1986).

151. For an example and discussion of the nonsensical nature of these AI-generated disclosures, see *supra* notes 121, 127.

152. *See* Nina I. Brown, *Artificial Authors: A Case for Copyright in Computer-Generated Works*, 20 COLUM. SCI. & TECH. L. REV. 1, 7–9 (2018) (defining deep learning and explaining how it surpasses traditional AI-coding methods).

153. *See supra* Section I.D (discussing the current state of AI-generated prior art).

154. Mike Murphy, *As Moore's Law Turns 50, Computer Chips Continue to Get Cheaper and More Powerful*, QUARTZ (Apr. 21, 2015), https://qz.com/387490/as-moores-law-turns-50-computer-chips-continue-to-get-cheaper-and-more-powerful/ [https://perma.cc/PUQ4-9QU8].

improving linguistic manipulation techniques could bring the quality of current AI-generated disclosures twenty percent closer to the quality of actual patents.[155] Thus, AI-generated disclosures will likely soon meet the current standards for prior art.

2. Enablement Troubles

Some AI-generated disclosures may very well meet the anticipatory enablement standard, thus satisfying one of the two substantive prior art requirements. Current AI-generated disclosures themselves contain very little teaching,[156] but the anticipatory enablement standard is not enough to prevent these disclosures from constituting prior art for three reasons. First, the anticipatory enablement standard requires only that a disclosure enable a PHOSITA to *make* the invention.[157] Second, a PHOSITA's knowledge can fill in any gaps in a disclosure,[158] and third, prior art references are presumed enabling.[159] These factors create a risk that AI-generated disclosures will mistakenly be found enabling.

The key flaw in the anticipatory enablement requirement that would allow AI-generated disclosures to pass as prior art is that it does not require a disclosure to enable the PHOSITA to *use* the described invention. Under the current anticipatory enablement standard, AI-generated disclosures are enabling as long as they describe the invention enough to enable a PHOSITA to make the invention.[160] But because many current disclosure-generating AI technologies use linguistic manipulation to only describe a physical structure, these technologies are incapable of identifying a use for the invention.[161] These disclosures cannot enable a PHOSITA to use the invention

155. *See* Hamborg et al., *supra* note 119, at 105 (providing survey evidence in table one that modified algorithms can increase the quality of AI-generated claim by twenty percent in relation to actual patent claims).

156. The disclosures of APA are limited to mere recitations of structure. *See supra* note 121 (discussing algorithms and dictionaries Cloem uses to create text).

157. *See supra* note 55 and accompanying text (discussing the anticipatory enablement requirement).

158. *See supra* note 57 and accompanying text (explaining that a PHOSITA's knowledge can fill in the gaps in a disclosure).

159. *See supra* note 62 and accompanying text (explaining that examiners can presume prior art references are enabling).

160. *See supra* notes 55, 106 and accompanying text (discussing the anticipatory enablement standard).

161. *See supra* notes 119–121 and accompanying text (discussing similarities among entities using artificial intelligence). The use that a prior art reference would need to identify would likely need to be a specific and substantial use, as 35 U.S.C. § 101 requires. *See In re* Fisher, 421 F.3d 1365, 1370–71 (Fed. Cir. 2005) (defining specific utility as not "so general as to be meaningless" and a substantial utility as "significant and presently available benefit to the public").

because the AI cannot teach what it cannot identify.[162] Thus, if the anticipatory enablement standard required a disclosure to enable the PHOSITA to use an invention, an examiner would likely find current AI-generated disclosures do not qualify as prior art.

There is actually an increased likelihood that AI-generated disclosures will meet the anticipatory enablement requirement, however, because current disclosure-generating AI produces disclosures only in certain technology fields, like the mechanical and electrical fields.[163] These fields are predictable and require less teaching to be enabling because a PHOSITA can more easily fill any gaps in the disclosure using his own knowledge.[164] The knowledge of a PHOSITA can be shown using secondary references, such as the patents that serve as the base language for current AI-generated disclosures.[165] Since AI-generated disclosures are likely just variations of the original patent language, the original patent may contain evidence of the PHOSITA's knowledge and information about how to practice the invention and other related inventions.[166] Therefore, the original patent could show that a PHOSITA could make the invention described in the AI-generated disclosures.[167]

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162. *In re* Ziegler, 992 F.2d 1197, 1200–01 (Fed. Cir. 1993). For this reason, examiners often issue rejections for utility and enablement together. MPEP § 2164.07 (9th ed. Rev. 08.2017, Jan. 2017).

163. Cloem's AI technology works best with mechanical and electrical inventions while APA claims that they limit their inventions to data processing systems. *See supra* notes 123–124 and accompanying text.

164. *See In re* Vaeck, 947 F.2d 488, 496 (Fed. Cir. 1991) (stating that the requisite disclosure to enable an invention in a predictable field, like mechanical or electrical inventions, may require less disclosure than is necessary for an invention, such as a "diverse and relatively poorly understood group of microorganisms," which is in an unpredictable field). The scope of enablement includes the information in the disclosure and information known to the PHOSITA. Nat'l Recovery Techs., Inc. v. Magnetic Separation Sys., 166 F.3d 1190, 1196 (Fed. Cir. 1999).

165. *See supra* notes 57–58, 120 and accompanying text (discussing the anticipatory enablement requirement and creation of disclosures).

166. Indeed, a granted patent must teach a PHOSITA how to make and use the invention or the patent would not have issued. 35 U.S.C. § 112 ("The specification *shall* contain . . . the manner and process of *making* and using [the invention]." (emphasis added)). The court in *In re DiLeone* provided an example of how a patent could enable a PHOSITA to make and use an invention without even describing that invention: "Consider the case where the specification discusses only compound A and contains no broadening language of any kind. This might very well enable one skilled in the art to make and use compounds B and C; yet the class consisting of A, B and C has not been described." 436 F.2d 1404, 1405 n.1 (C.C.P.A. 1971).

167. It is important to note that the original patents themselves could not be what enables the AI-generated disclosure but rather could only show what is within the knowledge of the PHOSITA. *See In re* Samour, 571 F.2d 559, 562–63 (C.C.P.A. 1978) (allowing additional references to support a § 102 rejection for the sole purpose of showing what would have been known or obvious to a PHOSITA).

Further, in the Patent & Trademark Office ("PTO"), a prior art reference receives a presumption of enablement.[168] This presents a challenge to patentees seeking to disqualify AI-generated disclosures as prior art because the patentee must prove what is *not* within the knowledge of the PHOSITA by a preponderance of the evidence.[169] Of course, the patentee's failure to meet this standard of proof does not mean that the prior art reference is actually enabling, but rather, it simply means that the patentee failed or determined it was not worth trying to show what a PHOSITA could not do.[170] In such cases, the presumption of enablement and the burden shifting framework allow substandard disclosures to be prior art against a patent application. Thus, AI-generated disclosures may defeat the novelty of some inventions without themselves enabling a PHOSITA to make and use the invention.

3. Accuracy by Volume: Achieving Strict Identity Through Large-Scale Disclosure

In addition to satisfying the practical requirements and the anticipatory enablement requirement, an AI-generated disclosure must have strict identity with an invention in order to render the invention unpatentable for lack of novelty.[171] It may seem unlikely that AI could, by happenstance, produce a disclosure that contains every limitation or component of a claimed invention arranged as described in the patent given the infinite number of components and ways to combine them.[172] Even using specialized algorithms and existing patent text as a starting point may not create a high likelihood that a given AI-generated disclosure will describe an invention that is later the subject of a patent application.[173] As a result, entities like APA and Cloem publish millions

168. *See In re* Sasse, 629 F.2d 675, 681 (C.C.P.A. 1980) (stating that the appellant must rebut the presumption of enablement once the PTO cites a disclosure).

169. *Id.*; *see also* LISA G. LERMAN & PHILIP G. SCHRAG, ETHICAL PROBLEMS IN THE PRACTICE OF LAW 458 (4th ed. 2016) ("Proving a negative is difficult . . . .").

170. *See supra* notes 62–68 and accompanying text (describing the burden-shifting framework). *See also* Seymore, *supra* note 12, at 939 (stating that this burden-shifting may continue as each side produces new evidence).

171. *See supra* notes 49–51 and accompanying text (discussing the strict identity requirement).

172. Any current AI-generated disclosures that contain patentable inventions are best described as occurring by happenstance because, although disclosure-generating AI uses algorithms to increase the likelihood that a disclosure will describe a patentable invention, many disclosures do not. *See supra* notes 120, 127–128 and accompanying text (discussing the large quantity of nonsensical disclosures produced by technologies to produce a few meaningful ones).

173. *See supra* note 120 and accompanying text (discussing how technologies produce disclosures).

of AI-generated disclosures to increase the chance of anticipating an invention.[174]

Yet large-scale publication of AI-generated disclosures is not the only reason there is an increased chance of strict identity occurring between AI-generated disclosures and the later claimed inventions. It is common for a patent application to claim a broad genus[175] that may contain thousands or millions of different embodiments within it.[176] But a prior art disclosure merely needs to describe one of the potentially millions of embodiments that falls within a genus claimed in a patent application to support a lack of novelty rejection.[177] This is because a patent cannot cover any invention embodiment that lacks novelty, or it would be harming the public by removing knowledge from the public domain.[178] While patentees may be able to overcome these rejections by narrowing the scope of the claim, narrowing claim scope certainly reduces the value of the resulting patents because they will offer less protection.[179] Therefore, it is probable that at least some of the millions of AI-generated disclosures will achieve strict identity with inventions claimed in patent applications, which in turn will result in narrower and less valuable patents issuing.

4. Raising the Bar for Nonobviousness

An AI-generated disclosure can support a lack of nonobviousness rejection under § 103 even if it cannot support a lack of novelty rejection under § 102 because it lacks anticipatory enablement or strict identity. Because a factfinder may combine multiple references to form a § 103 rejection, secondary references can supplement AI-generated disclosures that may not contain each and every limitation of an invention claimed in a patent application.[180] Further, to support a lack

174. *See supra* note 128 and accompanying text (explaining that millions of nonsensical disclosures are produced and only a few meaningful ones).

175. In patent law, a genus is a broad category of inventions that may encompass many specific inventions, called species. *See* Mike Ervin, *Genus and Species*, BUS. OF PATS., http://www.the-business-of-patents.com/genus-and-species.html (last visited Dec. 17, 2020) [https://perma.cc/KF2S-7MKT] (explaining the concepts of genus and species in patent law). For example, the term beverage container is a genus that would cover many species such as a mug, cup, bottle, jug, etc.

176. *See* Seymore, *supra* note 12, at 927 n.38 (discussing how savvy drafters can write broad genus claims that cover millions of species and noting one patent in particular that covers over one novemdecillion, or 10^{60} species).

177. MPEP § 2131.02(I) (9th ed. Rev. 08.2017, Jan. 2017) (citing *In re* Gosteli, 872 F.2d 1008 (Fed. Cir. 1989)).

178. *See supra* notes 77–79 and accompanying text.

179. *See* Paul Klemperer, *How Broad Should the Scope of Patent Protection Be?*, 21 RAND J. ECON. 113, 115 (1990) (discussing the relationship between the scope of a patent and the value of a patent).

180. *See supra* note 86 and accompanying text (discussing nonobvious requirement).

of nonobviousness rejection under § 103, AI-generated disclosures do not even have to be enabling as long as "the prior art as a *whole* [is] enabling."[181] Although an AI-generated disclosure would still need to be a printed publication to support a § 103 rejection, it would circumvent many of the § 102 standards that filter out substandard prior art.[182]

The ability of AI-generated disclosures to support nonobviousness rejections under § 103 makes it almost certain that these disclosures will affect the patentability of some inventions. As put forth by Scott Baker and Claudio Mezzetti, the patentability of knowledge can be understood using a linear model.[183] In this model, the amount of knowledge already known to the public is quantified as p and the amount of knowledge that an inventor has is quantified as i.[184] For an inventor to receive a patent on his knowledge, and thus not receive a rejection under § 103, his knowledge must exceed the knowledge available to the public by an incremental quantity, Δ.[185] Thus, to get a patent, i must be equal to or greater than $p + \Delta$.[186] However, public knowledge, p, increases through normal technological advancement.[187] Therefore, inventors have to increase the growth rate of i at a rate greater than the growth rate of p to continue to receive patents.

AI-generated disclosures could increase the growth rate of p and therefore increase the growth rate of i required to receive a patent. Even if a single AI-generated disclosure increases public knowledge by only a trivial amount, the total increase in public knowledge resulting from millions of AI-generated disclosures would be anything but trivial. Thus, the value of p will be greater in the presence of AI-generated disclosures than it would be in its absence. This will inevitably render some number of inventions obvious and unpatentable as inventors become unable to increase the growth rate of i to keep up with p. Thus, inventions that would be patentable in the absence of AI-generated

181. *See* Seymore, *supra* note 12, at 939–40 n.104 (emphasis added) (citing Holbrook, *supra* note 20, at 171–73) (discussing standard and burden of proof in patenting process). This means that if multiple references are combined to form an obviousness rejection, no single reference needs to be enabling so long as all the references combined would enable a PHOSITA to make the invention without undue experimentation. *Id.*

182. MPEP § 2141.01 (9th ed. Rev. 08.2017, Jan. 2017).

183. *See* Baker & Mezzetti, *supra* note 13, at 179 (discussing how firms can disclose some information to thwart rival patents, but also maintain trade secrets).

184. *See id.* (describing the relationship between nonobviousness, disclosure, and public knowledge in the context of a two firm patent race).

185. *See* NARD, *supra* note 17, at 329 ("[Nonobviousness] demands that the claimed invention be sufficiently removed from the prior art, meaning in most cases the invention reflects a leap forward.").

186. Baker & Mezzetti, *supra* note 13, at 180.

187. *See id.* (explaining that strategic disclosure "increase[es] p and rais[es] the threshold of patentability, $p + \Delta$").

disclosures will increasingly become unpatentable as the value of p increases.

B. Inhibiting the Promotion of the Progress of Science

The use of mass-produced, AI-generated prior art will have a profound effect on the patent system's ability to promote the progress of science.[188] Allowing AI-generated disclosures to serve as prior art will increase prosecution and litigation costs and decrease the value of patents. As a result, inventors will likely shift to seeking protection under less societally beneficial trade secret law, which circumvents patent law's disclosure function.[189] Further, the information contained in AI-generated disclosures is not an adequate substitute for the disclosure in patents.

First, mass-produced, AI-generated disclosures will increase patent prosecution costs by compelling more extensive prior art searches. Patentees often conduct prior art searches before filing an application to determine if the likelihood of obtaining a patent justifies the cost of filing an application.[190] Additionally, examiners must conduct their own prior art search to determine if an invention is truly novel and nonobvious.[191] Searching through masses of AI-generated disclosures will require more resources to complete a thorough search. Patentees will bear these costs directly by paying for their own patent searches and indirectly by paying increased patent application fees the PTO will use to offset its increased costs.[192] Therefore, even though AI-generated prior art costs next to nothing to produce,[193] it creates large externalities for patentees that disincentivize inventors from pursuing patent protection.

Further, AI-generated prior art will increase the costs of litigating patents because defendants will incur greater costs in

188. The patent system promotes innovation by both incentivizing new inventions and incentivizing the disclosure of inventions, which allows for follow-on innovations and cross-pollination of ideas. Seymore, *supra* note 21, at 661.

189. *See* sources cited *supra* note 13.

190. *What Is a Prior Art Search*, ELLENOFF GROSSMAN & SCHOLE LLP (Mar. 13, 2019), https://www.egsllp.com/blog/what-is-a-prior-art-search [https://perma.cc/UQ5Z-VK8U].

191. MPEP § 704.01 (9th ed. Rev. 08.2017, Jan. 2017).

192. The USPTO charges fees to patentees. Thus, if the cost of examining patents increase, the USPTO would likely respond by increasing patent application fees and other fees. *See* U.S. Pat. & Trademark Off., Letter to Patent Public Advisory Council Regarding Proposed Patent Fees (Aug. 8, 2018), https://www.uspto.gov/sites/default/files/documents/Letter_from_the_Director_to_PPAC.pdf [https://perma.cc/5QDM-3FGH] ("The Office's costs increase along with inflation, and the proposed five percent increase to most patent-related fees will help keep up with rising costs.").

193. *See About*, *supra* note 6 ("[T]he cost to computationally create and publish millions of ideas is nearly zero . . . .").

searching for and asserting prior art, which plaintiffs will then have to defend against.[194] One common defense strategy in a patent infringement lawsuit is for a defendant to assert that the patent is invalid based on prior art.[195] To use this defense, a defendant must search for prior art that could potentially invalidate the claim.[196] These searches contribute heavily to the already high costs of patent litigation.[197] As with patent prosecution, prior art search costs during litigation will increase as AI produces masses of prior art, and patent litigators may be required to conduct these searches to exercise due diligence.[198] Further, patent owners will incur increased costs defending against invalidity challenges based on AI-generated prior art.

In addition to increasing the costs of prosecuting and litigating patents, mass-produced, AI-generated prior art will decrease the value of patents. AI-generated prior art resembles "secret" prior art[199] in that it is difficult to locate, even though it is publicly available.[200] The potential for "secret" AI-generated disclosures to surface and invalidate patents later in their life increases the uncertainty about the validity of a patent.[201] The resulting uncertainty about patent validity will

194. *See* Roger Allan Ford, *Patent Invalidity Versus Noninfringement*, 99 CORNELL L. REV. 71, 78, 101 (2013) (discussing the defense strategy of asserting invalidity and the accompanying costs).

195. *See id.* at 78 ("The defendant accused of patent infringement then has two principal defenses, invalidity and noninfringement . . . .").

196. *Id.* at 101.

197. *Id.* (citing AM. INTELL. PROP. L. ASS'N, REPORT OF THE ECONOMIC SURVEY 2011, at I-153 (2011)).

198. A patent litigator may expose themselves to liability in a malpractice suit if they fail to complete a thorough check for prior art and assert the affirmative defense of invalidity. *See, e.g.*, Cobrin Gittes v. GMIS, Inc., No. 95 Civ. 2296 (BSJ), 1999 U.S. Dist. LEXIS 10645, at *12–14 (S.D.N.Y. July 13, 1999) (denying summary judgement to a counter-claim defendant that was alleged to have committed malpractice by conducting an inadequate prior art search that compromised the counter-claim plaintiffs invalidity defense in a prior patent litigation suit); Michael J. Canning, *Avoid Legal Malpractice – Timely Assert Affirmative Defenses*, NAT'L L. REV. (Oct. 29, 2012), https://www.natlawreview.com/article/avoid-legal-malpractice-timely-assert-affirmative-defenses [https://perma.cc/PA5A-P87T] (asserting that a malpractice suit will likely result from failing to assert an affirmative defense).

199. "Secret prior art" is a term used to describe prior art, commonly unpublished patent applications, that may not be available until after the filing date of a patent yet may still be prior art against the later filed patent. C. Douglas Thomas, *Secret Prior Art—Get Your Priorities Straight!*, 9 HARV. J.L. & TECH. 147, 149–50 (1996).

200. Although a court may find that AI-generated disclosures are publicly available for the purpose of prior art, they may not actually be easy to locate in practice. For an analysis on the public availability, see *supra* note 39 and accompanying text.

201. A larger universe of prior art would likely lead to a greater increase in the already large number of challenges to patent validity. Robert Stoll, *Study of the Post Grant Procedures Is Needed Now*, IPWATCHDOG (July 19, 2015), https://www.ipwatchdog.com/2015/07/19/study-post-grant-procedures-now/id=59930/ [https://perma.cc/8KVH-QU96] (finding that, as of 2015, more petitions for post-grant procedures challenging the validity of a patent had been filed than the USPTO expected, that these procedures were instituted 70% of the time, and that most claims were found

ultimately decrease the value of patents and increase transaction costs in licensing.[202] It will also disincentivize inventors from pursuing patent protection as patents are less valuable and cost more to obtain.

As patent protection loses its appeal, inventors will seek protection under trade secret law.[203] Patentees can receive protection under trade secret law even if an invention is unpatentable.[204] But "incentiv[izing] . . . inventors to keep their innovation secret . . . denies society the benefits of disclosure stemming from the patent system, which are anathema to trade secrets."[205] The loss to society includes the ideas contained in the patents, the details on how to make and use the invention,[206] and the potential for follow-on innovation and cross pollination of ideas.[207] Thus, society also suffers the costs created by AI-generated disclosures.

The disclosure contained in AI-generated disclosures is not an adequate replacement for the information contained in patent disclosures. Current AI-generated disclosures often lack information that would be found in patent applications, like teachings that would

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invalid). These high rates of invalidation may be because in some post-grant procedures at the USPTO, patent claims are not afforded a presumption of validity. Amanda Murphy, Michael Stramiello, Jonathan Stroud, Stacy Lewis & Tom Irving, *Impact of America Invents Act on Biotech Intellectual Property*, 5 COLD SPRING HARBOR PERSPS. MED., Sept. 2015, at 21, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4561394/ [https://perma.cc/HP3J-GULG].

202. *See* Neal Solomon, *The Problem of Patent Valuation*, IPWATCHDOG (Aug. 15, 2017), https://www.ipwatchdog.com/2017/08/15/problem-patent-valuation/id=86840/ [https://perma.cc/VZ3G-3AV9] ("By attacking patents in IPRs, the value of patents is diminished because the risks of patent validity reviews substantially increase transaction costs."); *see also* Liza Vertinsky, *Reconsidering Patent Licensing in the Aftermath of* Medimmune, 45 HOUS. L. REV. 1609, 1642–43 (2009) ("To the extent that greater opportunity to challenge patents leads to greater litigation, which has unpredictable outcomes, the transaction costs of doing business using patented technology will increase.").

203. Inventors often choose between either patent protection or trade secret protection, so the weakening of one type of protection will likely push inventors towards the other kind of protection. *See, e.g.*, John J. Mahon, Jr., *Trade Secrets and Patents Compared*, 50 J. PAT. OFF. SOC'Y 536, 536 (1968) (comparing patent and trade secrets as two alternative courses for legally protecting inventions); Leythem Wall & Katherine Banks, *Patents and Secrets in the Chemical Industry*, 269 MANAGING INTELL. PROP. 32, 32 (2017) ("The choice between keeping proprietary information secret and applying for patent protection is a key commercial decision, and often the first question to be asked with any new technology . . . .").

204. Federally, trade secrets are defined broadly as almost any information that the owner of the information has taken reasonable measures to maintain secrecy and that "derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable through proper means by, another person who can obtain economic value from the disclosure or use of the information." 18 U.S.C. § 1839(3)(A)-(B).

205. TianRui Grp. Co. Ltd. v. Int'l Trade Comm'n, 661 F.3d 1322, 1343 (Fed. Cir. 2011) (Moore, J., dissenting).

206. UMC Elecs. Co. v. United States, 816 F.2d 647, 664–65 (Fed. Cir. 1987) (Smith, J., dissenting).

207. Seymore, *supra* note 21, at 661.

enable a PHOSITA to use the invention.[208] Further, AI-generated disclosures could render additional inventions obvious, and thus unpatentable under § 103, beyond just what is described in the AI-generated disclosure.[209] An AI-generated disclosure could render an invention obvious without itself containing the written description necessary to receive a patent.[210] This creates an inherent gap between the information contained in current AI-generated disclosures and the information provided in patent applications, slowing the progress of science.[211]

C. Differentiating AI-Generated Disclosures from Traditional Strategic Disclosures

So how do AI-generated disclosures, which impose such externalities on society and the inventor, differ from currently accepted strategic disclosure practices? Simply put, current AI technologies that produce AI-generated disclosures lack the ability to comprehend the ideas that they describe. In contrast, the ideas contained in traditional strategic disclosures are the result of careful research and analysis, which injects those ideas into the realm of public knowledge, allows for the valuation of those ideas, and advances technology. An example is helpful to illustrate this distinction.

Think of disclosure-generating AI as a monkey on a typewriter.[212] The monkey may type an incredible book, yet to the monkey, the words are no more than shapes on the page. Unlike a human author, the monkey does not recognize the value of what it has created. Even if the monkey's book resides in a library or is published

208. *See supra* note 121 and accompanying text (providing an example of deficiencies in an AI-generated disclosure).

209. *Cf.* Ariad Pharms., Inc. v. Eli Lilly & Co., 598 F.3d 1336, 1351–52 (en banc) (discussing how a description that merely renders an invention obvious is insufficient to meet the written description requirement). Remember that a reference may render a claimed invention obvious without actually describing or having strict identity with the claimed invention. *See supra* note 86 and accompanying text.

210. *Cf. Ariad*, 598 F.3d at 1351–52. In Ariad, the court held that a description that "merely renders the invention obvious does not satisfy the requirement." *Id.* at 1352. This implies that a description can be sufficient to render an invention obvious without meeting the written description requirement for patentability. This discrepancy has been recognized by others. *See, e.g.*, *In re* Hafner, 410 F.2d 1403, 1405 (C.C.P.A. 1969); Seymore, *supra* note 12, at 933.

211. One way that the patent system seeks to promote the progress of science is through the disclosure of information in publications of issued patents. *See supra* notes 16–18 and accompanying text.

212. The idea that a monkey typing on a typewriter might randomly produce something of value comes from classic proposition of Émile Borel. PRAKASH GORROOCHURN, CLASSIC PROBLEMS OF PROBABILITY 208–10 (2012). Disclosure-generating AI may be more likely to create something of value than a monkey on a typewriter, but importantly for the purposes of this illustration, disclosure-generating AI and a monkey both are unable to comprehend what they actually produce.

on the internet, it does not have value until someone comes along, reads it, and discovers its value. That is the point at which the information would actually enter the realm of public knowledge, but under current patent doctrines, the book will still be prior art as of the date it appeared in the library (given other requirements are met).[213]

The importance of the comprehension and recognition of prior art is underrecognized because it exists inherently in traditional prior art. People rarely sit down, randomly type on a keyboard, and publish the result. Rather, they conduct research, test various solutions, and condense the results into a publication.[214] The process of researching, testing, and analyzing has a filtering effect that, although imperfect,[215] separates more valuable ideas from less valuable ones. This allows inventors and society to focus resources on developing the ideas that are most likely to produce long-term value. Without separating between superior and inferior inventions, there is no way to efficiently allocate resources.

In short, although many prior art requirements exist, the advancement of AI technology coupled with weak prior art requirements will permit AI-generated disclosures to render deserving inventions unpatentable. As a result, the incentives for inventors to invent and disclose new technologies will decrease as prosecution and litigation costs increase and patent value decreases. Meanwhile, those in the best position to utilize the information contained in AI-generated disclosures will have to struggle through the disarray of AI-generated disclosures without an efficient way to separate the wheat from the chaff.

III. A FRAMEWORK FOR ANALYZING AI-GENERATED DISCLOSURES

To ensure inadequate AI-generated disclosures do not render otherwise novel inventions unpatentable, the patentability assessment must undergo several changes. First, prior art should satisfy a

213. *See In re* Hall, 781 F.2d 897, 899–900 (Fed. Cir. 1986) (holding that general library procedures for indexing, cataloging, and shelving a thesis were conclusive evidence that the reference was prior art prior to the critical date of the patent).

214. *See* Akweli Parker, *You Have an Idea for an Invention . . . Now What?*, HOWSTUFFWORKS, https://science.howstuffworks.com/innovation/inventions/you-have-an-idea-for-an-invention-now-what1.htm (last visited Dec. 17, 2020) [https://perma.cc/3HGA-GERR] (discussing how many inventors write down or make auditory recordings of their ideas, take lots of notes on their work, or record experimental results).

215. Many ideas are not appreciated by society at large in their time; however, at least some people must appreciate the value of these inventions in order to continue to pursue their development. *See* Clinton Nguyen, *7 World-Changing Inventions That Were Ridiculed when They Came Out*, BUS. INSIDER, (Aug. 2, 2016, 12:55 PM), https://www.businessinsider.com/inventions-that-were-ridiculed-2016-8 [https://perma.cc/LP4T-GCYK].

conception requirement before it can invalidate a patent. Second, AI-generated disclosures should not receive the presumption of enablement, and the party asserting the AI-generated disclosure as prior art should have the burden of showing that it is enabling.

A. Conception of the Knowledge in AI-Generated Disclosures

Implementing a conception requirement for prior art will ensure that AI-generated disclosures have actually contributed to public knowledge and have undergone some evaluation before they can render an invention unpatentable. Before the enaction of the Leahy Smith America Invents Act ("AIA"), conception was a significant doctrine in patent law.[216] The PTO defines conception as "the complete performance of the mental part of the inventive act and . . . the formation in the mind of the inventor of a definite and permanent idea of the complete and operative invention as it is thereafter to be applied in practice."[217] For conception to occur, there must be "contemporaneous recognition and appreciation of the invention."[218] However, conception does not mean that the inventor knows that the invention will work or is patentable.[219]

A factfinder would apply a conception requirement similarly to other substantive prior art requirements. For example, when an examiner analyzes whether a reference satisfies the prior art requirements, he would make an additional determination of whether conception of the disclosure had occurred. Proof of conception would vary for different types of prior art. Any form of reduction to practice would be proof of conception because reduction to practice necessarily

216. Pre-AIA, if two inventors filed an application for the same invention, the inventor who submitted the application later could receive priority over the earlier-filing inventor if he could prove that he conceived of the invention first and worked diligently to reduce the invention to practice. *See* MPEP § 2138.01(I) (9th ed. Rev. 08.2017, Jan. 2017). The rules surrounding the first-to-invent system will remain relevant until approximately 2034. Murphy et al., *supra* note 201, at 1.

217. MPEP § 2138.04 (9th ed. Rev. 10.2019, June 2020) (quoting Townsend v. Smith, 36 F.2d 292, 295 (C.C.P.A. 1930)). Courts have given similar definitions for conception throughout the twentieth century and into the twenty-first century. *See, e.g.*, Hybritech Inc. v. Monoclonal Antibodies, Inc., 802 F.2d 1367, 1376 (Fed. Cir. 1986) (using the discussed definition of conception); Hitzeman v. Rutter, 243 F.3d 1345, 1356 (Fed. Cir. 2001) (quoting Burroughs Wellcome Co. v. Barr Lab'ys, Inc., 40 F.3d 1223, 1228 (Fed. Cir. 1994)) (same).

218. MPEP § 2138.04(II) (9th ed. Rev. 10.2019, June 2020) (citing Silvestri v. Grant, 496 F.2d 593, 596 (C.C.P.A. 1974); Invitrogen, Corp. v. Clontech Lab'ys, Inc., 429 F.3d 1052, 1064 (Fed. Cir. 2005); Langer v. Kaufman, 465 F.2d 915, 918 (C.C.P.A. 1972)).

219. *Id.* (citing *Burroughs*, 40 F.3d at 1228; Dow Chem. Co. v. Astro-Valcour, Inc., 267 F.3d 1334, 1341 (Fed. Cir. 2001)).

requires recognition and appreciation for an invention.[220] Thus, patents and patent applications would satisfy the conception requirement per se because filing a patent application constitutes a constructive reduction to practice.[221] Further, producing a physical or tangible embodiment of an invention, which constitutes actual reduction to practice, would also be proof of conception.[222]

A conception requirement would make a difference mostly in the prior art class of printed publications. The examiner would look for evidence of conception in the circumstances surrounding the publication. Publications like journal articles would certainly satisfy the conception requirement, as the author and editors would necessarily recognize and appreciate the invention when writing and reviewing the article. A similar analysis would occur with internet sources like blog posts that could be traced back to a person. To prevent AI-generated blog posts from passing through, a factfinder would need to treat disclosures that cannot be traced back to a person as AI-generated disclosures.[223]

An AI-generated disclosure alone would not satisfy the conception requirement. AI-generated disclosures would require further proof of conception either by evidence that a person reviewed the disclosure and recognized the described invention or by evidence that the AI itself was able to recognize and appreciate the idea. It is important to note that recognition only means that the invention underwent some evaluation, not that the assessed value was correct. Evidence that a person has recognized and appreciated the invention in an AI-generated disclosure could be in the form of a written analysis or

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220. Reduction to practice is a patent law term of art referring to the moment when the inventive process is complete. NARD, *supra* note 17, at 246. Reduction to practice can come in two forms: (1) constructive reduction to practice by filing a patent application that satisfies the § 112 requirements or (2) actual reduction to practice by constructing the invention and testing that it works. *Id.*; MPEP § 2138.05(I)-(II) (9th ed. Rev. 10.2019, June 2020).

221. MPEP § 2138.05(IV) (9th ed. Rev. 10.2019, June 2020) (citing Estee Lauder Inc. v. L'Oreal S.A., 129 F.3d 588, 593 (Fed. Cir. 1997)).

222. *See id.* § 2138.05(II). One important exception to the general rule that reduction to practice would show conception would be when AI generates a design that it then 3D prints. This is certainly a possibility as AI is already assisting in 3D printing. *See* Lucie Gaget, *Artificial Intelligence and 3D Printing: Meet the Future of Manufacturing*, SCULPTEO (Oct. 24, 2018), https://www.sculpteo.com/blog/2018/10/24/artificial-intelligence-and-3d-printing-meet-the-future-of-manufacturing/ [https://perma.cc/EX6T-2KRP] (discussing the present and future roll of AI in 3D printing). Such a reference would still require further evidence that the AI was able to recognize and appreciate the design produced in order to qualify as prior art. *See infra* note 224 and accompanying text.

223. It is not unthinkable that AI could be used to develop fake blog posts. Chris O'Brien, *AI-Generated Fake Content Could Unleash a Virtual Arms Race*, VENTUREBEAT (Nov. 11, 2019, 5:36 AM), https://venturebeat.com/2019/11/11/ai-generated-fake-content-could-unleash-a-virtual-arms-race/ [https://perma.cc/64YS-Y3SC].

an actual reduction to practice of the idea. Proof of AI conception could be in the form of computer-simulated tests of the invention.[224]

Implementing a conception requirement would offer several benefits to both patentees and society. First, a conception requirement would prevent substandard prior art from rendering deserving inventions unpatentable—inventions that may only come to existence because of the incentive of a patent monopoly.[225] Prior art that has not undergone conception is inherently substandard because it has not contributed any value to society. This is because, as discussed in the monkey example above,[226] until conception occurs, an invention cannot be evaluated, categorized, built, commercialized, or innovated upon. But prior art that has undergone conception has passed through the knowledge filters of recognition and appreciation that help expose valuable ideas that could be pursued further. Additionally, inventors will more easily be able to find ideas that have undergone conception, which prevents inventors from repeating work and drives more creative innovation for which inventors can receive patents. Thus, a conception requirement prevents AI-generated disclosures from decreasing the incentive for inventors to develop new knowledge without providing an equivalent alternative source of knowledge.

Further, because the conception requirement is not a blanket exclusion on using AI-generated disclosures as prior art, it provides incentives for programmers to develop advanced AI that is more beneficial to society. The AI revolution is the first time in the history of the patent system that a new source of prior art will develop.[227] Thus, a unique opportunity exists for the patent system to shape prior art rather than conform to the existing forms of prior art. This allows the patent system "[t]o promote the [p]rogress of [s]cience and useful [a]rts" in a new way.[228]

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224. *See generally* Eric Winsburg, *Computer Simulations in Science*, STAN. ENCYC. OF PHIL. (Sept. 26, 2019), https://plato.stanford.edu/entries/simulations-science/#SimExp [https://perma.cc/D38R-4UTK] (discussing the operation and capabilities of computer simulations and experiments, which if conducted by AI on inventions contained in AI-generated disclosures, could be sufficient to satisfy a conception requirement).

225. The nonobvious standard limits the grant of patents to only those inventions that would not come about without the incentive provided by a patent. *See supra* note 85 and accompanying text. Thus, if an AI-generated disclosure were to render an otherwise patentable invention unpatentable, it would eliminate the patent incentive and some inventions may never come into existence as a result.

226. *See supra* Section II.C.

227. Other forms of prior art mentioned in § 102 like public uses, sales, patents, and human-generated publications were around long before the patent system's birth in 1793. 35 U.S.C § 102(a)(1); *see also* Patent Act of 1793, ch. 11, 1 Stat. 318 (creating the earliest predecessor to the current U.S. patent system).

228. U.S. CONST. art. I, § 8, cl. 8.

Another advantage of the conception requirement is the ease of implementation. Most of the substantive requirements for prior art are judicially developed doctrines.[229] Because the conception requirement would be similar to these existing doctrines, it would likely take only a decision from the Federal Circuit to introduce the requirement.[230] The requirement could be statutorily justified under the AIA, which states that prior art includes anything that is "available to the public," on the grounds that conception is a prerequisite to public availability.[231] Further, there is already an abundance of case law defining conception.[232] Thus, this requirement would not create much uncertainty for practitioners and, even once implemented, would begin to change case outcomes only as AI-generated prior art becomes more common.

These benefits would come at a cost. While case law on conception is abundant, the evidence needed to prove conception for AI-generated disclosures may be uncertain. Further, the types of evidence needed to show conception for an AI-generated disclosure may only be accessible to AI owners and not the defendants and patent examiners asserting the prior art.[233] This could increase discovery costs and create uncertainty as the evidentiary laws develop.

Further, as most prior art is discovered during patent prosecution, patent examiners would assume the burden of showing that prior art meets the conception requirement. [234] This burden on patent examiners could increase the costs of patent prosecution and the pendency of patent applications. There may be some irony, however, in that AI may help alleviate any burden that the conception requirement creates for patent examiners. Some have proposed that AI could help

229. *See supra* note 31 and accompanying text (discussing the relevant judicial doctrines).

230. The Federal Circuit has nationwide jurisdiction over all appeals in patent cases filed in federal district courts and from decisions of the U.S. Patent Trial and Appeal Board. *Court Jurisdiction*, U.S. CT. OF APPEALS FOR THE FED. CIR., http://www.cafc.uscourts.gov/the-court/court-jurisdiction (last visited Dec. 17, 2020) [https://perma.cc/K69S-QKV5]. Nearly 67% of the cases heard by the Federal Circuit involve patent disputes. *Id.* Thus, the Federal Circuit has an incredible amount of influence over the development of patent law jurisprudence.

231. 35 U.S.C. § 102(a)(1). The Supreme Court has held that this language, which the AIA introduced, was not an attempt to change the well settled common-law doctrines surrounding prior art. Helsinn Healthcare S.A. v. Teva Pharms. USA, Inc., 139 S. Ct. 628, 630 (2019). Thus, public accessibility is still a "touchstone" of determining whether a disclosure is available as prior art. *See* sources cited *supra* note 36. Therefore, the statute language could justify a conception requirement as a prerequisite for public accessibility.

232. *See supra* notes 216–218 and accompanying text (providing relevant examples).

233. For proposed types of evidence of conception for AI-generated disclosures, see *supra* note 220 and accompanying text.

234. Only 1.5% of patents are ever litigated, while examiners compare every patent to the prior art during examination. Mark A. Lemley & Carl Shapiro, *Probabilistic Patents*, 19 J. ECON. PERSPS. 75, 75, 79 (2005).

examiners handle their dockets by performing tasks like prior art searches.[235] This would allow examiners to focus on inspecting the quality of prior art. Thus, as examiners have more time to consider and examine the prior art under the proposed requirements, there should ultimately be an increase in the quality of the patents issued.[236]

B. Removing the Presumption of Enablement

Prior art, or at least AI-generated prior art, should not receive the presumption of enablement.[237] Rather, the party asserting a prior art reference should have to show that it is enabling because they are the least-cost avoider for producing the evidence.[238] Once the proponent of the prior art reference has met this burden, the opposing party may then offer evidence to rebut the proponent's showing of enablement. The burden could still shift back and forth, but the ultimate burden to show that the prior art is enabling would still be on the proponent.[239] Further, under this proposal, the standard for anticipatory enablement would not change. Prior art would need to enable a PHOSITA only to *make*, rather than *make and use,* a prior art invention in order to satisfy the anticipatory enablement requirement.[240] Additionally, like the

235. *See* Udi Cohen, *Artificial Intelligence Will Help to Solve the USPTO's Patent Quality Problem*, IPWATCHDOG (Nov. 23, 2019), https://www.ipwatchdog.com/2019/11/23/artificial-intelligence-will-help-solve-usptos-patent-quality-problem/id=116302/ [https://perma.cc/PS4Z-JWMJ] (discussing how AI will help increase the efficiency of the patent application review process by helping examiners conduct prior art searches).

236. The poor quality of issued patents is a major issue. Based on invalidation rates by courts, the estimated number of patents that are invalid in whole or in part may be as high as forty to forty-five percent. *See* Josh Landau, *A Little More Than Forty Percent: Outcomes at the PTAB, District Court, and the EPO*, PAT. PROGRESS (May 1, 2018), https://www.patentprogress.org/2018/05/01/a-little-more-than-forty-percent/ [https://perma.cc/4U2U-LASG] (analyzing patent invalidation rates at the Patent Trial and Appeal Board and the European Patent Office).

237. Other academics have suggested eliminating the presumption that prior art references are enabling as a way to restrict insufficient prior art in other contexts. *See supra* Seymore, note 12, at 959–60 (arguing for eliminating the presumption of enablement and restricting what secondary references can show that prior art is enabling as a way of preventing inadequate prior art from rendering an invention unpatentable).

238. *See supra* note 169 and accompanying text (discussing issues associated with proving a negative).

239. Under the current regime, while the proponent of the prior art disclosure receives a presumption that it is enabling, she still carries the ultimate burden of showing enablement. *See In re* Caveney, 761 F.2d 671, 674 (Fed. Cir. 1985) ("[P]reponderance of the evidence is the standard that must be met by the PTO in making rejections . . . ."). This would not change under the new regime.

240. Although changing the anticipatory enablement standard to require that prior art enable a PHOSITA to make and use the invention contained in a prior art disclosure, current shortcomings with the utility requirement of § 101 make a use requirement in anticipatory enablement undesirable. For a discussion of nominal utility and other shortcomings of the utility requirement, see Nathan Machin, Comment, *Prospective Utility: A New Interpretation of the Utility*

conception requirement, the Federal Circuit could probably eliminate the presumption of enablement without legislative intervention by overturning its own precedent.[241]

By eliminating the presumption of enablement, nonenabling AI-generated disclosures will no longer be able to pass as enabling merely because of the difficulty of proving that they are nonenabling.[242] Further, either the AI-generated disclosure itself or secondary references[243] must affirmatively show that the AI-generated disclosure would enable a PHOSITA to make the described invention. Even if the disclosure contained a method of making the contained invention, the disclosure would not receive a presumption of enablement. The proponent of the disclosure would still need to show that the method in the AI-generated disclosure is enabling.

One benefit of eliminating the presumption of enablement is that it will incentivize programmers to create more robust techniques for AI-generation of disclosures. Requiring AI-generated disclosures to prove enabling will require better AI techniques to generate the more robust disclosures, or alternatively, persons could supplement the AI-generated disclosures with additional text to satisfy the anticipatory enablement requirement.[244] Like the addition of the conception requirement, eliminating the presumption of enablement is not a blanket exclusion on AI-generated disclosures. Rather, it incentivizes creating more powerful AI, which indirectly furthers patent law's purpose of "promot[ing] the [p]rogress of [s]cience and useful [a]rts."[245]

Requirement of Section 101 of the Patent Act, 87 CALIF. L. REV. 421, 433–35 (1999) (discussing how the utility requirement of § 101 is so low that it may be satisfied with merely a nominal utility).

241. Although patents enjoy a statutory presumption of enablement under 35 U.S.C. § 282, other printed publications do not. Yet courts still apply a presumption of enablement to nonpatent references. *See In re* Antor Media Corp., 689 F.3d 1282, 1288 (Fed. Cir. 2012) (holding that the presumption of enablement applied to nonpatent publications). Thus, the Federal Circuit could take a step back and eliminate this presumption. *See also supra* notes 229–230 and accompanying text (discussing the ease of implementing a conception requirement).

242. *See supra* note 169 and accompanying text (discussing difficulties associated with the burden of proving a negative).

243. The scope of enablement would still only include what is in the disclosure and what is within the knowledge of a PHOSITA. Thus, secondary references could only show what was within the knowledge of a PHOSITA. For a discussion of the current use of secondary references in showing enablement, see *supra* notes 57–61 and accompanying text.

244. Supplementing the prior art disclosure using human generated texts could also be one way of satisfying the conception requirement. *See supra* note 220 and accompanying text (discussing how AI-generated prior art could satisfy conception).

245. U.S. CONST. art. I, § 8, cl. 8.

Further, eliminating the presumption of enablement will ensure that prior art itself contributes to the advancement of technology before it renders deserving inventions unpatentable.[246] The details of the invention, like how to make and use the invention, are what a patent provides as consideration in the patent law quid pro quo.[247] In contrast, the quid pro quo inherent in strategic disclosure is that an inventor will publicly disclose some details of the invention in exchange for the PTO *not* granting a patent to anyone else.[248] The party seeking to strategically disclose an invention, however, should still provide some benefit to society through this exchange.[249] The basic description of the physical structure of an invention in current AI-generated disclosures does not provide enough benefit to society to justify the strategic disclosure quid pro quo. Thus, eliminating this presumption will guarantee that society receives valuable information either through strategic disclosure or a patent application.

The costs of eliminating the presumption of enablement, like implementing a conception requirement, include burdening patent examiners.[250] Unlike a conception requirement, removing the presumption of enablement would increase an examiner's workload with respect to every reference they cite against a patent application. Because it is common to assert multiple prior art references against a single patent application,[251] the burden of showing that prior art is enabling may multiply several times in a single rejection. If this were a substantial burden on patent examiners, it may increase the patent prosecution costs and patent application pendency. Both represent costs that may pass to patentees who must pay patent filing fees[252] or who

246. For a discussion of how unenabled prior art may pass through the anticipatory enablement requirement, see *supra* Sections I.B.2 and II.A.2.

247. UMC Elecs. Co. v. United States, 816 F.2d 647, 664–65 (Fed. Cir. 1987) (Smith, J., dissenting) ("It is the details of how to make and use an invention that are of value in the patent disclosure.").

248. Lichtman et al., *supra* note 132, at 2177 (discussing how a competitor may publish a strategic disclosure in order to prevent an inventor from receiving patent protection).

249. *See supra* note 247 and accompanying text.

250. *See supra* note 234 and accompanying text (discussing current burdens experienced by patent inspectors).

251. Dennis Crouch, *References Cited*, PATENTLY-O (Nov. 21, 2016), https://patentlyo.com/patent/2016/11/references-cited.html [https://perma.cc/78L9-EE2L] (stating that the average patent issued in 2016 has over fifty references cited against it).

252. *See supra* note 192 (discussing how the PTO could pass off future costs to patentees).

receive patents with shorter enforceable terms.[253] Thus, while these requirements would protect some patentees from having their inventions rendered unpatentable, all patentees would bear the financial burden.

One way to alleviate some of this burden is to eliminate the presumption of enablement for only nonpatent disclosures. For patents that have already issued, a patent examiner has presumably previously found that the patent would enable a PHOSITA to make and use the disclosed invention.[254] Requiring patent examiners to repeat the work of their colleagues would be wasteful and show disdain for the patent examination process. Thus, allowing the presumption of enablement to remain with respect to issued patents would reduce some of the burden on patent examiners and would be consistent with the statutory requirement that patents are valid.[255] Additionally, like with the conception requirement, AI could play a role in alleviating the burden on patent examiners during prosecution.[256]

CONCLUSION

The purpose of the patent system is to incentivize inventors to develop and disclose inventions by providing a patent monopoly. Mass-produced, AI-generated disclosures, however, are threatening to defeat the patentability of deserving inventions and thus the incentive for inventors to develop and disclose their invention. These AI-generated disclosures are poor substitutes for the information provided by patent applications. Current patent law doctrines are ill-equipped to handle the unique problems associated with AI-generated disclosures. By creating a conception requirement and eliminating the presumption of enablement for AI-generated disclosures, the patent system will be able to exclude substandard AI-generated disclosures from serving as prior

253. The current patent term is 20 years from the earliest effective filing date. *Patent Term Adjustment: Everything You Need to Know*, UPCOUNSEL, https://www.upcounsel.com/patent-term-adjustment (last visited Dec. 17, 2020) [https://perma.cc/GGT2-5724]. Thus, time spent prosecuting a patent results in a shorter life of enforceability. *See id.* (stating that Congress found that patent prosecution delays were eating into the lifespan of patents). However, patent term adjustments, granted for certain delays at the patent office, may reduce the impact of increased pendency. *Id.*

254. To issue, a patent must enable a PHOSITA to make and use the claimed invention. 35 U.S.C. § 112(a).

255. 35 U.S.C. § 282.

256. *See supra* note 235–236 and accompanying text (discussing specific uses for AI as a burden alleviator).

art, which preserves the incentive for inventors to pursue patent protection while creating an incentive for programmers to develop more robust AI capable of producing information-rich disclosures. Thus, this Note proposes a solution that helps maximize technological advancement by stimulating AI-driven and human-driven innovation.

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