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## The Perks of Being Human

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# The Perks of Being Human

Max Stul Oppenheimer\*

## *Abstract*

*The power of artificial intelligence has recently entered the public consciousness, prompting debates over numerous legal issues raised by use of the tool. Among the questions that need to be resolved is whether to grant intellectual property rights to copyrightable works or patentable inventions created by a machine, where there is no human intervention sufficient to grant those rights to the human. Both the U.S. Copyright Office and the U.S. Patent and Trademark Office have taken the position that in cases where there is no human author or inventor, there is no right to copyright or patent protection. That position has recently been upheld by a federal court. This article argues that the Constitution and current statutes do not compel that result, that the denial of protection will hinder innovation, and that if intellectual property rights are to be limited to human innovators that policy decision should be made by Congress, not an administrative agency or a court.*

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## INTRODUCTION

In *Thaler v. Vidal*,<sup>1</sup> the Federal Circuit was “asked to decide if an artificial intelligence (AI) software system can be listed as the inventor on a patent application.”<sup>2</sup> The Court concluded that, although “at first, it might seem that resolving this issue would involve an abstract inquiry into the nature of invention or the rights, if any, of AI systems”, the question admitted of a simple answer: “we do not need to ponder these metaphysical matters. . . . our task begins – and ends – with consideration of the applicable definition in the relevant statute.”<sup>3</sup> One might then expect to find a statutory definition of “inventor” that conclusively answered the question. One would be disappointed.

### I. THE CASE AND ITS IMPORTANCE

The case arose when Stephen Thaler filed two applications for U.S. patents.<sup>4</sup> Thaler filed as applicant and assignee, which is a normal procedure under the statute.<sup>5</sup> What set Thaler’s application apart from the norm was the form accompanying the application: in the space for naming the inventor (a step that is required even if the inventor is not the applicant),<sup>6</sup> Thaler

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1. 43 F.4th 1207 (Fed. Cir. 2022).

2. *Id.* at 1209.

3. *Id.*

4. U.S. Application No. 16/524,350, U.S. PAT. AND TRADEMARK OFF. (“Neural Flame”, filed July 29, 2019), <https://perma.cc/GZD9-CY2U> and U.S. Application No. 16/524,532 (“Fractal Container”, filed July 29, 2019). Notices, petitions, and decisions were issued in each of the pending applications, but as they were all on the same grounds, only one is cited in this Article.

5. See Manual of Patent Examining Procedure, U.S. Patent Office (hereinafter “MPEP”) 605.01.

6. U.S. Patent Law requires that an application name the inventor or inventors, and that each inventor sign an oath attesting to inventorship. 35 U.S.C. § 115. There are provisions for situations in which the inventor is

asserted that “the invention [was] generated by artificial intelligence”—created by an AI machine he had created and called DABUS.<sup>7</sup> The Patent Office concluded that an application that did not list at least one inventor was “incomplete” and therefore the appropriate response was to issue a “Notice to File Missing Parts” requiring that an inventor be named.<sup>8</sup> In Thaler’s view, the machine was the inventor under U.S. Patent Law: it had conceived of the invention and all that Thaler did was reduce it to practice.<sup>9</sup> Therefore, unable to comply with the Notice, Thaler instead petitioned the PTO director to exercise supervisory authority and vacate the Notice.<sup>10</sup> The PTO denied the petition, maintaining the position that an inventor must be named and “a machine does not qualify as an inventor.”<sup>11</sup>

Thaler filed suit in the District Court<sup>12</sup> to compel the PTO to grant his petition, but the District Court concluded that the patent statute required that an “inventor” be an “individual” and the plain meaning of “individual” is a natural person and granted summary judgment for the PTO.<sup>13</sup>

On appeal, the Federal Circuit noted that “[i]n resolving disputes of statutory interpretation, we begin with the statutory text, and end there as well if the text is unambiguous” and concluded “[h]ere, there is no ambiguity: the Patent Act requires

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unavailable or refuses to sign the oath. 35 U.S.C. § 118. This case, however, did not involve an inventor refusing to sign the oath but rather an assertion that the proper “person” to be named as the inventor was not human.

7. *Thaler*, 43 F.4th at 1209 (explaining that in lieu of a last name, Thaler inserted that A.I. was the inventor on his patent application).

8. Under Patent Office procedure, when such a Notice is filed, the applicant is given two months to respond, and a failure to respond results in the application becoming abandoned. *See* MPEP 506 (I)(C).

9. *See infra* note 10.

10. *In re* Application of Thaler, 2020 WL 1970052, at \*1–2.

11. *See id.* Notices, petitions, and decisions were issued in each of the pending applications, but as they were all on the same grounds, only one is cited in this Article.

12. Thaler had also filed applications in Europe, which were also denied on the basis that the inventor was not human. Decision on U.K. applications GB1816909.4 and GB1818161.0, BL O/741/19, INTELL. PROP. OFF. (Dec. 4, 2019), <https://perma.cc/STD4-4LCJ>. However, unlike the U.S. statute, the European Patent Convention explicitly requires that inventors be human. European Patent Convention, article 81, rule 19, Oct. 5, 1973, 2020 O.J. EPO A3.

13. *Thaler v. Hirshfeld*, 558 F. Supp. 3d 238 (E.D. Va. 2021).

that inventors must be natural persons; that is, human beings.”<sup>14</sup>

The Court acknowledges that the Patent Act does not define “individual” but, in the Court’s view, the lack of ambiguity is amply illustrated by 35 U.S.C. § 100(f) which (in the Court’s view) “defines” inventor as “the *individual* or, if a joint invention, the *individuals* collectively who invented or discovered the subject matter of the invention” and 35 U.S.C. § 100(g) which (again, in the Court’s view) “defines” joint inventor and “coinventor as “any 1 of the *individuals* who invented or discovered the subject matter of a joint invention.”<sup>15</sup>

Perhaps, however, even assuming that Section 100 defines inventor, the appropriate focus is better placed on Section 101, which provides that “[w]hoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.”<sup>16</sup>

Unfortunately, looking at both sections 100 and 101 makes the “unambiguity” fade and requires a more detailed exploration of the purpose and constitutional foundation of the patent statute before reaching a conclusion as to the plain meaning of the statute.

Putting aside for the moment the ultimate question decided by the Court (whether inventions made by machines are “patentable”)<sup>17</sup>, there can be no doubt that machines are at the point where they can create “patentable subject matter”. The distinction is that “patentable subject matter” is one step in patentability. Sometimes referred to as the “gatekeeper”, Section 101 of the Patent Statute lists the types of inventions that are patentable.<sup>18</sup> The list is exhaustive - anything not on the list is not patentable, regardless of how innovative or important an advance it might be.<sup>19</sup>

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14. *Thaler v. Vidal*, 43 F.4th 1207, 1210 (Fed. Cir. 2022).

15. *Id.* at 1211.

16. 35 U.S.C. § 101 (emphasis added).

17. *Thaler*, 43 F.4th at 1209.

18. *See* 35 U.S.C. § 101 (listing permissible categories of patentable inventions).

19. The statutory categories are: machines, manufactures, compositions of matter and processes. “If a claim covers material not found in any of the four

The potential offered by artificial machine intelligence is clearly an important advance. Artificial intelligence has enabled computer game-playing programs that can defeat human players in games once thought to require intelligence, such as Chess and Go; AI machines can now pass the Turing test.<sup>20</sup> The Final Report of the National Security Commission on Artificial Intelligence concluded: “No comfortable historical reference captures the impact of artificial intelligence (AI) on national security.”<sup>21</sup> In 2021, *The Economist* magazine posed the fictional possibility that in the near future an AI machine might be awarded the Nobel Prize, noting that “[t]hrough the statutes of the Nobel Foundation have historically been interpreted as implying that only a human can win the award, another of its dictates was deemed to take precedence: recognition for having

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statutory categories, that claim falls outside the plainly expressed scope of § 101 even if the subject matter is otherwise new and useful.” *In re Nuijten*, 500 F.3d 1346, 1354 (Fed. Cir. 2007). The exclusivity of the four categories set forth in § 101 is also implicit in the Supreme Court’s decisions excluding certain inventions from patentability even though they are within the literal language of § 101. *See Bilski v. Kappos*, 561 U.S. 593, 601 (2010) (“The Court’s precedents provide three specific exceptions to § 101’s broad patent-eligibility principles: ‘laws of nature, physical phenomena, and abstract ideas’”). Recent examples of such cases include *Alice Corp. Pty. Ltd. v. CLS Bank Int’l*, 573 U.S. 208 (2014) (deciding the patent eligibility of computer-implemented schemes used for mitigating settlement risk under §101); *Association for Molecular Pathology v. Myriad Genetics, Inc.*, 569 U.S. 576, 589 (2013) (quoting *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66 (2012)); *Diamond v. Diehr*, 450 U.S. 175 (1981) (determining whether a process for curing synthetic rubber is patentable material under §101); *Parker v. Flook*, 437 U.S. 584 (1978) (determining whether a mathematical formula used for updating alarm limits is eligible for patent protection); and *Gottschalk v. Benson*, 409 U.S. 63 (1972) (determining whether a method for converting binary-coded decimal (BCD) numerals into pure binary numerals is a “process” within the meaning of the Patent Act).

20. *See* Raymond Keene, *Can This Be True? AI, Go and Chess*, ARTICLE (Feb. 25, 2023), <https://perma.cc/8YMX-T9FR> (mentioning how an A.I. machine defeated the human world Go champion in 2016); *see also*, Will Oremus, *Google’s AI Passed A Famous Test – and Showed How the Test is Broken*, WASH. POST (June 2022), <https://perma.cc/6BDT-L9LU> (discussing how AI explicitly passed the benchmark turning test).

21. *Final Report: Executive Summary*, NAT’L SEC. COMM’N ON A.I., (Mar. 2021) <https://perma.cc/AZM2-82X3> (discussing the potential impact of artificial intelligence on national security).

‘conferred the greatest benefit to humankind’ in the preceding year.”<sup>22</sup>

Artificial intelligence machines are now routinely used in pharmaceutical development, automotive design and shows every sign of becoming increasingly important to the world economy.<sup>23</sup>

## II. THE STATUTE AT ISSUE

Patents are purely federal and purely statutory. The constitutional power to enact patent laws is found in Article I, Section 8, Clause 8, the Intellectual Property Clause:

The Congress shall have Power . . . To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.<sup>24</sup>

The Constitutional preamble (“To promote the Progress of Science and useful Arts”) is a limitation on the power of Congress to grant patents.<sup>25</sup> It does not, of course, literally limit

22. *Rage Against the Machine, December 2036: What if an AI Won the Nobel Prize for Medicine?*, THE ECONOMIST (July 3, 2021), <https://perma.cc/K4FB-B6P4>. The article explores the question “[s]hould the greatest prize in medical research be awarded to a non-human?” *Id.*

23. See Irving Wladawsky-Berger, *The Impact of Artificial Intelligence on the World Economy*, WALL ST. J. (Nov. 2018), <https://perma.cc/3TL5-YJUJ> (discussing the impact of artificial intelligence on the world economy).

24. U.S. CONST. art. I, § 8, cl. 8. For a history of how the clause was drafted and adopted, see Edward C. Walterscheid, *To Promote the Progress of Science and Useful Arts: The Background and Origin of the Intellectual Property Clause of the United States Constitution*, 2 J. INTELL. PROP. L. 1, 2–3 (1994) (discussing the origins of U.S. patent and copyright law). At the time the Constitution was ratified, the term “author” included “he to whom anything owes its origin . . .” *Burrow-Giles Lithographic Co., v. Sarony*, 111 U.S. 53, 58 (1884). For a detailed discussion of the contemporary meaning of the word “inventor”, see Max Stul Oppenheimer, *Harmonization Through Condemnation: Is New London the Key to World Patent Harmony?*, 40 VAND. J. TRANSNAT’L L. 445, 457–60 (2007) (providing an overview of current U.S. patent law).

25. See *Motion Picture Patents Co. v. Universal Film Mfg. Co.*, 243 U.S. 502, 511 (1917) (“[T]he primary purpose of our patent laws is not the creation of private fortunes for the owners of patents, but is ‘to promote the progress of science and useful arts.’”); *Bonito Boats v. Thunder Craft Boats, Inc.*, 489 U.S. 141, 146 (1989) (holding that Congress cannot withdraw technology from the public domain because that would thwart the constitutional mandate to

the power with respect to the “humanity” of the author or inventor—it merely limits the power to the purpose of promoting the progress of science and useful arts.<sup>26</sup>

The Supreme Court has not been called upon to determine whether there is an implied humans-only limit in the patent statute. However, neither the Intellectual Property Clause itself nor the available records of the Constitutional debates appear to contain anything that would compel denying patents to nonhuman inventors.<sup>27</sup> To the contrary, the Supreme Court has held “the powers of Congress to legislate upon the subject of patents is plenary by the terms of the Constitution, and . . . there are no restraints on its exercise . . .”<sup>28</sup> and has cautioned the lower courts that they “should not read into the patent laws limitations and conditions which the legislature has not expressed.”<sup>29</sup>

The Federal Circuit was, therefore, correct to look at the literal terms of the Patent Statute.

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promote the progress of science and the useful arts); *see also* *Graham v. John Deere Co.*, 383 U.S. 1, 5 (1966) (stating congressional limitation on patentability of inventions); *KSR Intl Co. v. Teleflex, Inc.*, 550 U.S. 398, 427 (2007).

26. *See* Joshua Sarnoff, *Shaking The Foundations of Patentable Subject Matter*, BROOKINGS (Apr. 2, 2008), at 15, <https://perma.cc/YUW7-Q5ML> (arguing that Congress’ power is limited to ensuring that an invention constitutes a significant technological advance over prior public knowledge).

27. *See* Paul J. Heald & Suzanna Sherry, *Implied Limits on the Legislative Power: The Intellectual Property Clause as an Absolute Constraint on Congress*, 2000 U. ILL. L. REV. 1119, 1132 (2000) (“Consistent with the most sophisticated literature on original intent, however, the Court tends not to emphasize the drafters’ debates. According to originalist theory, the legitimacy of judicial review depends on the Constitution’s status as a popularly ratified document. Thus, the intent of particular drafters—mere proponents of ideas rather than enactors . . . is not as important as how the words were popularly understood at the time.”). In this case, it is unlikely that popular understanding would have differed from that of the drafters or that either could have conceived of the development of artificial intelligence.

28. *See* *McClurg v. Kingsland*, 42 U.S. 202, 206 (1843) (ruling on congressional powers over patent law).

29. *See* *United States v. Dubilier Condenser Corp.*, 289 U.S. 178, 199 (1933) (stating that the court should not read into patent law limitations that Congress has not expressed); *Diamond v. Chakrabarty*, 447 U.S. 303, 308 (1980) (quoting *Dublier*, 289 U.S. 178).



The Patent Office<sup>30</sup> operates under the authority of Title 35 of the U.S. Code.<sup>31</sup> The statute authorizes the issuance of patents in general to “[w]hoever invents or discovers any new and useful process, machine, manufacture, or composition of matter” and further provides “[a] person shall be entitled to a patent” *unless* certain disqualifying conditions (not related to the identity of the inventor) are met.<sup>32</sup>

Consistent with the constitutional mandate to promote progress, the patent statute appears designed to grant patents when—but only when—the patent application provides the public with the details of how to make and use a significant scientific advance.<sup>33</sup> The pattern established by Section 101 of the Patent Statute is a broad statement of policy (“who ever invents . . . may obtain a patent therefor”) followed by the conditions for obtaining a patent (“subject to the conditions and requirements of this title”).<sup>34</sup>

The first substantive “requirement” is set forth in Section 101 itself, which lists the types of things that may be patented: a “process, machine, manufacture, or composition of matter, or any new and useful improvement thereof”, so-called “statutory

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30. See *USPTO: About Us*, U.S. PAT. & TRADEMARK OFF., <https://perma.cc/PA3Y-CWDJ>.

31. See 35 U.S.C. § 1ff (creating the U.S. patent system and establishing the role of the U.S. Patent and Trademark Office).

32. *Id.* § 101 (providing that “[w]hoever invents or discovers any new and useful process, machine, manufacture, or composition of matter . . . may obtain a patent therefor”); see, e.g., *id.* (precluding patents that are essentially the same as prior patented inventions); *id.* § 103 (precluding patents due to obviousness of the invention); *id.* § 112(a)–(b) (precluding patents that fail to adequately describe how to make and use the invention as well as those that fail to adequately describe what is claimed as the invention); *id.* § 111 (barring patents for those that fail to submit a satisfactory application); see *id.* § 102(a) (listing the things that preclude a person’s right to a patent, principally lack of novelty or obviousness).

33. See Sean Seymore, *The Teaching Functions of Patents*, 85 *Notre Dame L. Rev.* 62, 622–23 (2010) (stating that the disclosure of a patent to the public must be detailed enough to enable an individual of ordinary skill to practice the invention and set out the best way to do so).

34. 35 U.S.C. § 101 (“Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.”).

subject matter.”<sup>35</sup> The list is exhaustive: “no patent is available for a discovery, however useful, novel, and nonobvious, unless it falls within one of the express categories of patentable subject matter of 35 U.S.C. § 101 . . . .”<sup>36</sup>

A second substantive requirement is set by Section 102: novelty. While the language of Section 102 is detailed and contains exceptions, the basic rule is that, consistent with the constitutional mandate to further progress, patents are not granted on technology available to the public before the application was filed.<sup>37</sup> It states generally that “[A] person shall be entitled to a patent unless— (1) the claimed invention was . . . available to the public before the effective filing date of the claimed invention . . . .”<sup>38</sup>

A third substantive requirement is set by Section 103: non-obviousness. Under Section 103, patents are not granted for obvious scientific advances.<sup>39</sup>

These three requirements relate, not to the identity of the inventor, but to the nature of the technology (§101) and its relationship to what the public already had (§102/§103).

The statute also sets what can be characterized as procedural requirements. A written application must be submitted to the PTO.<sup>40</sup> The application must contain a

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35. See *id.* (establishing the broad categories of inventions that may be patented).

36. See *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 483 (1974) (listing the only categories of patentable subject matter of 35 U.S.C. § 101).

37. See 35 U.S.C. § 102(a)(1) (expressing when patents may not be granted in light of the prior art).

38. See *generally* 35 U.S.C. § 102.

39. See *generally* 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, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains.

40. See 35 U.S.C. § 111(a)(1) (stating the requirements for a written application).

description of how to make and use the invention.<sup>41</sup> The application must specifically claim the invention.<sup>42</sup> The application must include illustrations if necessary to understand the disclosure.<sup>43</sup> The application for a patent is submitted to the U.S. Patent and Trademark Office, which examines the application to determine compliance with the Patent Statute.<sup>44</sup> Upon successful examination, a U.S. Patent is issued, covering the claimed invention.<sup>45</sup>

Nothing in the statute explicitly limits patents to inventions made by humans. On the other hand, concluding that non-humans are capable of creating patentable inventions would not mean that all AI-generated inventions were patentable. As with any invention, an AI invention would be tested by the entirety of the Patent Statute—the issue before the Thaler court was whether all AI inventions should be excluded from patentability, notwithstanding meeting all other statutory requirements, merely because of their origin.<sup>46</sup>

### III. THE “INTUITIVE” ANSWER

There are those who have argued that inventors must be human because it is just plain common sense.<sup>47</sup> To be sure, there

41. See 35 U.S.C. § 112(a) (stating the requirements for a written description of an invention).

42. See 35 U.S.C. § 112(b) (setting forth the requirements for patent claims).

43. See 35 U.S.C. § 113 (stating the requirement to furnish drawings when necessary).

44. See 35 U.S.C. § 131 (explaining the process of the director examining the application for denial or approval).

45. See *id.*

46. Thaler v. Vidal, 43 F.4th 1207, 1210 (Fed. Cir. 2022) (deciding whether an A.I. software system can be an “inventor” under the Patent Act).

47. A similar argument was offered in the copyright context in Sam Ricketson, *The 1992 Horace S. Manges Lecture—People or Machines: The Bern Convention and the Changing Concept of Authorship*, 16 COLUM.-VLA J.L. & ARTS 1, 8 (1991) (arguing that the definition of “author” in copyright statutes is not explicitly restricted to humans because it is so clear as to make explicit definition unnecessary). The Copyright Office takes the same position: “because copyright law is limited to original intellectual conceptions of the author, the Office will refuse to register a claim if it determines that a human being did not create the work. U.S. COPYRIGHT OFF., COMPENDIUM OF U.S. COPYRIGHT OFFICE PRACTICES § 306, at 7 (3d ed. 2021 - hereinafter the “Compendium”) (citing Trade-Mark Cases, 100 U.S. 82, 94 (1879); Burrow-

is an intuitive appeal to the rhetorical question “how can anyone/anything other than a human possess the creativity necessary to make an invention (or create a work of art)?”<sup>48</sup>

The Thaler Court characterizes its analysis as pure textual analysis of an unambiguous statute.<sup>49</sup> It begins with the statutory definition of “inventor” in Section 100(f):

The term “inventor” means the individual or, if a joint invention, the individuals collectively who invented or discovered the subject matter of the invention.<sup>50</sup>

The term “invention” is defined in Section 100(a), but the definition does not advance the inquiry:

The term “invention” means invention or discovery.<sup>51</sup>

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Giles Lithographic Co. v. Sarony, 111 U.S. 53, 58 (1884)). Both ignore statutory provisions that seem, if not outright inconsistent with the intuitive approach, to require explanation of why they are consistent with that approach. Although, under U.S. law ownership of a copyright initially vests in the work’s author (17 U.S.C. § 201(a), providing that “[c]opyright in a work protected under this title vests initially in the author or authors of the work”) the statute does not define the term “author”. The statute does, however, define the term “anonymous work” as “a work on the copies or phonorecords of which *no natural person* is identified as author” 17 U.S.C. § 101 (emphasis added) and makes clear that such works are copyrightable. 17 U.S.C. § 302(c) (“In the case of an anonymous work . . . the copyright endures for a term of 95 years from the year of its first publication, or a term of 120 years from the year of its creation, whichever expires first.”). Moreover, the statute provides that if a work is created by an employee, the “author” is the employer (which may, of course, be a corporation). 17 U.S.C. § 201(b).

48. The Ninth Circuit has denied copyright protection to a selfie taken by a monkey, *Naruto v. Slater*, 888 F.3d 418, 420 (9th Cir. 2018), and, consistent with its policy as expressed in the COMPENDIUM that “copyright law is limited to original intellectual conceptions”, COMPENDIUM, *supra* note 47 § 707, at 6–7, the Copyright Office has refused to register copyrights for paintings created by elephants. Eriq Gardner, “A Mural Painted by an Elephant,” and Other Things That Can’t Be Copyrighted, THE HOLLYWOOD REPORTER (Aug. 20, 2014, 11:15 AM), <https://perma.cc/F9G9-E6HB>. For readers who might wish to make their own independent judgment as to the intellectual conception ability of elephants, examples are available online at <https://perma.cc/5AS9-9E97> and <https://perma.cc/GG56-3W2M>.

49. *Thaler v. Vidal*, 43 F.4th at 1213 (reasoning that their analysis does not stray beyond the plain text of the statute because Congress determined that only a natural person could be an inventor).

50. *Id.* at 1211 (quoting the Patent Act’s definition of inventor).

51. 35 U.S.C. § 100(a) (defining the term “invention”).

The Court must then define “individual”. Interestingly, it finds support for its interpretation of the Patent Statute’s use of the term “individual” by referring to a case involving interpretation of the term under the Torture Victim Protection Act of 1991<sup>52</sup> yet balks at finding that the term “whoever” should be interpreted consistently within the Patent Statute itself.<sup>53</sup>

It bolsters its analysis, however, with a review of the dictionary meaning of “individual.” It notes the use of the terms “himself” and “herself” (but not “itself”) when referring to inventors.<sup>54</sup>

In reaching its conclusion, it must also overcome the fundamental section of the statute: Section 101, which states:

“Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.”<sup>55</sup>

The term “whoever” is used in other sections of the Patent Statute to refer (clearly) to non-human entities. It is also a term defined in “The Dictionary Act” as follows:

the words “person“ and “whoever” include corporations, companies, associations, firms, partnerships, societies, and joint stock companies, as well as individuals . . .<sup>56</sup>

The Court concludes, in effect, that Congress chose to deny patentability to inventions made by non-humans by

52. Thaler v. Vidal, 43 F.4th at 1211 (citing to Mohamad v. Palestinian Auth., 566 U.S. 449 (2012)).

53. *Id.* at 1212 (“That non-humans may infringe patents does not tell us anything about whether non-humans may also be inventors of patents.”). The infringement section and the inventorship section both used the term “whoever” – the Court held that in one section “whoever” included entities, in the other section “whoever” only included humans. *See id.*

54. *See id.* at 1211 (deducing the intent of Congress by their failure to use the word “itself”). These terms are often used when referring to animals, and ships are routinely referred to as “she”. *See, e.g.*, Herman Melville, *MOBY DICK*, Chapter 54 (1979); Department of the Navy, *A Report on Policies and Practices of the U.S. Navy for Naming the Vessels of the Navy*, pp 44, 45, 47, 48 (referring to a ship as “she” and also referring to “her sister ships”), 55, 60 and 68.

55. 35 U.S.C. § 101 (emphasis added).

56. 1 U.S.C. § 1 (defining the words person and whoever).

granting it directly in Section 101 (subject to the rest of the statute), then taking it away indirectly through the requirement of inventorship and the definition of inventor in Section 100.<sup>57</sup>

The Court may be correct in its ultimate conclusion. Concluding that it is correct that there is no ambiguity in the statute is a harder task.

#### IV. THE SUPREME COURT APPROACH

The Supreme Court has explained its role in construing the Patent Statute:

Congress has performed its constitutional role in defining patentable subject matter in § 101; we perform ours in construing the language Congress has employed. In so doing, our obligation is to take statutes as we find them, guided, if ambiguity appears, by the legislative history and statutory purpose.<sup>58</sup>

Presumably those roles would remain the same for all sections of the Patent Statute, here the definition of “inventor.”

Following the Supreme Court’s guidance, one would look at the statutory definition of inventor and determine if it were ambiguous. If not, one would apply the unambiguous language; if so, one would look to the legislative history and statutory purpose (and presumably any Constitutional constraints) for guidance.

Looking to the statutory definition of “inventor” is less than helpful, and certainly does not eliminate any ambiguity.

The definition merely provides that an inventor is the individual who made the invention.<sup>59</sup> A related term - “invention” - is defined, but that definition is less than helpful on the issue in the *Thaler* case. The statutory definition reads: “The term ‘invention’ means invention or discovery.”<sup>60</sup> This would be more helpful if we already knew what “invention” meant.

This leaves a choice: if an invention is made by a machine, interpret “invention” so that the owner of the machine (or some

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57. See generally *Thaler*, 43 F.4th 1207.

58. *Diamond v. Chakrabarty*, 447 U.S. 303, 315 (1980).

59. See 35 U.S.C. § 100(f) (defining the term inventor).

60. See 35 U.S.C. 100(a) (defining the term invention).

other contributor) may be considered its inventor, or interpret “inventor” to include the possibility that the inventor might not be human. The only other choice is to conclude that, notwithstanding the broad terms of Section 100, some inventions that met all of the requirements of the statute might not be patentable by anyone.

If anything, however, this definition points to a meaning of “invention” that is intended to be broader than the common meaning of the term, since it also includes discoveries.<sup>61</sup> A contemporary dictionary (bearing in mind that the statute underwent a major revision in 2005) defines “invention” as “The action, faculty, or manner of inventing” and defines the root word “Invent” as “To find out or produce by mental activity.” Whether AI has gotten to the point that its activity can be called mental, there are certainly animals who engage in mental activity.<sup>62</sup> Expanding the dictionary meaning of “invention” to include “discovery” (as the statute defines invention) makes the point even stronger. The Oxford English Dictionary defines discovery as “(a) The action of finding out or becoming aware of something for the first time; the action of being the first to find (a place); the action of bringing to light something (as a substance, scientific phenomenon, etc.) which was previously unknown . . . .” Again, the question may be difficult regarding AI, but animals certainly make discoveries – and therefore are also capable of making statutory inventions.

While the Court may still be correct that machines cannot be inventors, it goes too far in concluding that only humans may be inventors. It also leaves unanswered a question raised in an earlier Federal Circuit case involving another exception to the language of 35 U.S.C. 101:

With all of its legal sophistry, the [Federal Circuit] court’s new test for eligibility today does not answer the most fundamental question of all: *why* would the expansive language of section 101 preclude protection of innovation

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61. *See Id.*

62. *See KOKO: A TALKING GORILLA* (Warner Bros. 1978). Stanford researchers taught Koko, a gorilla, to communicate with humans using more than 300 words in sign language—and Koko was able to use the words to create words for concepts where she was given no vocabulary. For example, having no word for ring, she used the signs for “finger bracelet”; to express the concept that a roll was stale, she used the signs for “cookie rock.” *Id.*

simply because it is not transformational or properly linked to a machine (whatever that means)? Stated even more simply, why should some categories of invention deserve no protection?<sup>63</sup>

Case law has attempted to clarify the steps involved in “invention,” but does so by reference to acts of the “inventor.” Under the cases, the act of invention may be viewed as a two-step process. Step one is “conception,” a mental step: imagining the invention “so clearly . . . in the inventor’s mind that only ordinary skill would be necessary to reduce the invention to practice, without extensive research or experimentation.”<sup>64</sup> Step two is “reduction to practice”: demonstration that the invention works as imagined.<sup>65</sup> This still leaves the question of whether non-humans are capable of conception as the term is used in the field.

Even accepting Court’s logic, it is hard to conclude that the statute is unambiguous. Once it is necessary to look beyond words of an unambiguous statute, the rest of the process specified by the Supreme Court come into play. Analysis—including an exploration of the legislative history and purpose of the statute are required. The Thaler Court may be absolutely correct: the policy of limiting authorship and inventorship to humans has a certain intuitive appeal.<sup>66</sup> However, it deserves analysis from the perspectives of constitutionality, statutory interpretation, and policy: does the Constitution require that patentable inventions can only be created by humans; if not, does the current statute, reasonably construed, so limit patentable inventions; if not, then AI machines should be able to make patentable inventions and if there are policy considerations that argue against this result, then Congress should change the statute—in either direction—and thereby resolve the question definitively. Its power to legislate in the IP area is plenary.

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63. *In re Bilski*, 545 F.3d 943, 1012 (Fed. Cir. 2008) (Rader, J., dissenting) (emphasis in original).

64. *Burroughs Wellcome Co. v. Barr Lab’s, Inc.*, 40 F.3d 1223, 1227–28 (Fed. Cir. 1994).

65. *Applegate v. Scherer*, 332 F.2d 571, 573 (C.C.P.A. 1964).

66. *See generally Thaler*, 43 F.4th 1207.



## V. POLICY

There are two principal, but related, justifications for patent law. In one view, “[t]he primary rationale for granting patents is to encourage innovation, which is normally perceived to be a sufficient public benefit to justify granting a temporary monopoly to the patent holder.”<sup>67</sup> If that is the justification (as the preamble to the Intellectual Property Clause seems to indicate), then it would be counterproductive to exclude the mechanism that may be a primary source of innovation in the near future.<sup>68</sup>

In the other view, “[e]vidence from the founding . . . suggests that inducing *dissemination*—as opposed to creation—was viewed as an appropriate means to promote science.”<sup>69</sup> If that is the purpose of intellectual property law, then the argument for allowing protection for nonhuman innovations is even stronger. Denying patent protection to a nonhuman entity reduces the incentive for humans to invest the time and money necessary to enable the entity to create.<sup>70</sup> The world loses inventions.

While inappropriate for a court to delve into policy considerations in the case of unambiguous statutory language, it should be clear that the definition of “inventor” is far from unambiguous. It is therefore fair to look at the policy behind the patent law to see if it favors one interpretation over another.

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67. *Id.*; see also 153 CONG. REC. S2204, S2214 (daily ed. Feb. 17, 2007) (statement of Sen. Carl Levin) (arguing that tax strategies should be excluded from patentability because the desire to “minimize, avoid, defer, or otherwise affect the liability” for taxes provided all the incentive that was necessary).

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

69. *Golan v. Holder*, 565 U.S. 302, 326 (2012). The *Golan* case involved copyrightable works, not products incorporating patentable inventions. The function of disseminating ideas is, however, central to both copyrights and patents. Under patent law, patents must contain enough information to teach how to make and use the invention. 35 U.S.C. § 112.

70. See *Golan*, 565 U.S. at 326 (discussing intellectual property law as “the economic incentive to create and disseminate ideas”) (emphasis omitted).

Patents are monopolies, and monopolies are disfavored.<sup>71</sup> Thomas Jefferson, however, argued that patents were a special case “worth the embarrassment” of allowing a monopoly. Patents are designed to incentivize progress, and do so by encouraging public disclosure of new inventions.<sup>72</sup> An innovator has a choice: keep the innovation secret using the tool of trade secret law or disclose it.<sup>73</sup> Secrecy may make it harder to profit from the innovation, but disclosure has its own set of disincentives: competitors who see a commercially valuable innovation can copy it without having spent the time and money to develop it.<sup>74</sup> This gives the competitor an advantage over the originator since the competitor’s pricing does not need to recover the cost of development—and creates a strong disincentive to disclose innovations.<sup>75</sup> The Patent Statute is intended to overcome the advantage of maintaining a trade secret<sup>76</sup> and incentivize disclosure by granting a limited term monopoly over the disclosed innovation, thereby forestalling competition and allowing the innovator to charge enough to recover the costs of innovation.<sup>77</sup>

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71. See *Chakrabarty*, 447 U.S. 303 at 319 (1980) (“The patent laws attempt to reconcile this Nation’s deep-seated antipathy to monopolies with the need to encourage progress.”) (Brennan, J., dissenting).

72. While a copyright case, the Court’s language in *Sony v. Universal Studios* is broad and covers inventors as well as authors by its terms: “The monopoly privileges that Congress may authorize are . . . [i]ntended to motivate the creative activity of authors and inventors . . . and to allow the public access to the products of their genius after the limited period of exclusive control has expired.” *Sony Corp. of Am. v. Universal City Studios, Inc.*, 464 U.S. 417, 429 (1984).

73. See generally Max Stul Oppenheimer, **Error! Main Document Only.** *The Innovator’s Dilemma*, 4 AM. U. BUS. L. REV. 371 (2015).

74. See *id.*

75. See *id.*

76. The Uniform Trade Secrets Act, which is the basis of most states’ trade secret law, defines a “trade secret” as:

[I]nformation . . . that: (i) derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable by proper means by, other persons who can obtain economic value from its disclosure or use, and (ii) is the subject of efforts that are reasonable under the circumstances to maintain its secrecy.

UNIF. TRADE SECRETS ACT § 1(4). State law generally provides a remedy against misappropriation of trade secrets. UNIF. TRADE SECRETS ACT §§ 2–3.

77. John R. Thomas, CONG. RSCH. SERV., R41391, *THE ROLE OF TRADE SECRETS IN INNOVATION POLICY* 1 (2014).

Note that nothing in this policy suggests restricting those who may take advantage of the system: the more innovators and disclosures, the more progress.<sup>78</sup>

Perhaps a better line of analysis would look to the “products of nature” cases in patent law. In a line of cases dating to at least 1948, the Supreme Court has created a judicial exception to the inclusive language of 35 U.S.C. § 101: inventions, even if included within the list of patentable subject matter are nonetheless not patentable if they are merely scientific principles or products of nature.<sup>79</sup> The Court’s explanation for reading this exception into the statutory language is summed up in a dissenting opinion that ultimately won over the Court in a later case: “the reason for the exclusion is that sometimes too much patent protection can impede rather than ‘promote the Progress of Science and useful Arts.’”<sup>80</sup>

As the Court held in *Funk Brothers*:

The qualities of these bacteria, like the heat of the sun, electricity, or the qualities of metals, are part of the storehouse of knowledge of all men. They are manifestations of laws of nature, free to all men and reserved exclusively to none. He who discovers a hitherto unknown phenomenon of

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78. There is at least one historical example of an intellectual property statute that did not follow this logic. Under the Copyright Act of 1870, only U.S. citizens or residents could obtain U.S. Copyrights. Copyright Act of 1870 ch. 230, § 86, 16 Stat. 198, 212. However, this was a copyright statute, and while it is possible to commercialize some inventions without making them public, it is hard to imagine a situation in which a copyrighted work could have been commercialized in 1870 while kept secret. Thus, this is more an example of authorizing use of foreign works without compensation than it is of discouraging foreign innovation and disclosure.

79. *Funk Bros. v. Kalo*, 333 U.S. 127, 134–35 (1948). This judicial exception has been criticized. In the *Funk Bros.* case itself, Justice Frankfurter concurred in the result but was troubled by the rationale:

It only confuses the issue . . . to introduce such terms as “the work of nature” and the “laws of nature.” For these are vague and malleable terms infected with too much ambiguity and equivocation. Everything that happens may be deemed “the work of nature,” and any patentable composite exemplifies in its properties “the laws of nature.” (Frankfurter, J., concurring).

*Id.*; see also *In re Bilski*, 545 F.3d 943, 1012 (Fed. Cir. 2008) (Rader, J., dissenting).

80. *Lab’y Corp. of Am. Holding v. Metabolite Lab’ys, Inc.*, 548 U.S. 124, 126–27 (2006) (Breyer, J., dissenting) (emphasis omitted) (citing U.S. CONST. art. I, § 8, cl. 8).

nature has no claim to a monopoly of it which the law recognizes. If there is to be invention from such a discovery, it must come from the application of the law of nature to a new and useful end.<sup>81</sup>

In subsequent cases, the Court broadened the categories of inventions that could not be patented, and refined its theory, ultimately concluding that “[p]henomena of nature, though just discovered, mental processes, and abstract intellectual concepts are not patentable, as they are the basic tools of scientific and technological work.”<sup>82</sup>

The Court drew the line, however, in *Diamond v. Chakrabarty*, a case involving an attempt to patent a genetically modified bacterium.<sup>83</sup> The patent office had rejected the claim on the grounds that living things were unpatentable per se.<sup>84</sup> The Federal Circuit reversed, finding no such limitation in 35 U.S.C. § 101.<sup>85</sup> The Supreme Court viewed the issue as “a narrow one of statutory interpretation requiring us to construe 35 U.S.C. § 101” constrained by “our obligation . . . to take statutes as we find them, guided, if ambiguity appears, by the legislative history and statutory purpose.”<sup>86</sup> The Court found nothing in the language or legislative history of the statute barring patentability of living organisms and, to the contrary, concluded that Congress had chosen broad terms to define statutory subject matter and therefore “plainly contemplated that the patent laws would be given wide scope.”<sup>87</sup>

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81. *Funk Bros.*, 333 U.S. at 130.

82. *Gottschalk v. Benson*, 409 U.S. 63, 67 (1972).

83. *Chakrabarty*, 447 U.S. at 303, 305. Chakrabarty had inserted plasmids into *Pseudomonas* bacteria which gave the bacteria a new property, the ability to break down multiple components of crude oil, a property “which is possessed by no naturally occurring bacteria” and “believed to have significant value for the treatment of oil spills.” *Id.* at 305.

84. *Id.*

85. *Id.* at 306.

86. *Id.* at 307, 315.

87. *Id.* at 308–09. The Committee Report accompanying the 1952 Act included a statement that “a person may have ‘invented’ a machine or a manufacture, which may include anything under the sun that is made by man, but it is not necessarily patentable under section 101 unless the conditions of the title are fulfilled.” S. REP. NO. 82-1979, at 4 (1952); H.R. REP. NO. 82-1923, at 6 (1952). The Court interpreted the language as “inform[ing] us that Congress intended statutory subject matter to ‘include anything under the sun

This line of analysis would seem to lead to a conclusion that, absent an explicit limitation to humans in the statute or something in the legislative history suggesting that intent, the limitation should not be read into the statute. In 1990, it is quite likely that many experts could have been found who would have felt “of course you can’t patent living things—it’s just common sense.”

The language of 35 U.S.C. § 101 does not appear ambiguous on its face.<sup>88</sup> Congress has apparently had no difficulty in defining the terms “person” and “human” and applying them in situations it thought appropriate.<sup>89</sup>

From a constitutional perspective, the identity of the inventor is simply irrelevant to accomplishing the constitutional purpose of furthering progress.<sup>90</sup> Why should it matter if the advance is provided by a human, a nonhuman animal, or a machine? The benefit to society is the same, and the balance of the statute protects against granting patents that are not warranted by the benefit to society.<sup>91</sup>

## VI. TECHNICAL PROBLEMS

There are admittedly technical issues that arise in connection with nonhuman originators. Their solution is beyond the scope of this article. The solutions may be so difficult as to convince Congress to avoid them by changing the law. It is not, however, good judicial policy to reject an answer because it is hard and an easier, though imperfect, one is available.

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that is made by man.” *Chakrabarty*, 447 U.S. at 309 (quoting S. REP. NO. 82-1979; H.R. REP. NO. 82-1923).

88. See 35 U.S.C. § 101 (“Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.”).

89. See Leahy-Smith America Invents Act, Pub. L. No. 112-29, § 33, 125 Stat. 284, 340 (2011) (amending 35 U.S.C. § 101) (declaring human organisms unpatentable).

90. See U.S. CONST. art. I, § 8, cl. 8.

91. See 35 U.S.C. § 101 (“Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.”).

One hard question would be drawing the line between the Supreme Court's "natural phenomena" exclusion from patentability and phenomena that, while not natural, may occur without human intervention. If animals can be inventors, then how should we determine when they are merely following the laws of nature and when they are exercising "intellect." Of course, the patent statute deals with that same problem in the context of human activity and handles it through the vehicle of the Section 103 non-obviousness requirement, but it is easy to see how the analysis would be complicated by the addition of non-human actors.

Another hard question would be drawing the dividing line on obviousness under Section 103. The statutory standard is "a person having ordinary skill in the art."<sup>92</sup> "Person" can be read to include non-human persons<sup>93</sup> but in practice has always referred to humans. Should the standard be clarified to a "human of ordinary skill in the art" as it is in practice now, or should the inquiry be broadened to determine if a machine of ordinary skill in the art might find an invention obvious?

Practical concerns might be raised as to the ability of the PTO to handle the increased volume of patent applications that might ensue. This same concern was raised when the U.S. changed its patent law from a first-to-file system to a first-to-invent system.<sup>94</sup> This seems unlikely to be a persistent problem. Each patent application requires a filing fee<sup>95</sup> and the fees are sufficient for the Patent Office to operate at a profit, so more applications should mean more revenue, presumably enough to cover the cost of more patent examiners if necessary.<sup>96</sup>

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92. See generally 35 U.S.C. § 103.

93. Corporations are, for example, legal "persons." See, e.g., *Citizens United v. FEC*, 558 U.S. 310, 343 (2010) ("The Court has thus rejected the argument that political speech of corporations or other associations should be treated differently under the First Amendment simply because such associations are not 'natural persons.'"); *First Nat'l Bank of Boston v. Bellotti*, 435 U.S. 765, 780, n. 15 (1978) ("It has been settled for almost a century that corporations are persons within the meaning of the Fourteenth Amendment.").

94. See Oppenheimer, *The Inventor's Dilemma*, *supra* note 73, at 434.

95. MPEP 600 (8th ed. Rev. 7, Sept. 2008).

96. See U.S. PAT. & TRADEMARK OFF., FISCAL YEAR 2021 CONGRESSIONAL JUSTIFICATION 128 (2020). If the added revenue were insufficient, Congress could simply raise the filing fees, either across the board or specifically for nonhuman authors and inventors. The Patent Office already has a system that

It may also be argued that AI inventors will have an advantage over human inventors, and that AI may possibly preempt entire fields of technological advancement. This argument misunderstands the purpose of patent law. “[T]he primary purpose of our patent laws is not the creation of private fortunes for the owners of patents, but is ‘to promote the progress of science and the useful arts.’”<sup>97</sup> If AI can produce innovations that benefit society, that purpose has been served. The public has access to technology it did not previously have. If the owners of the AI machines make fortunes, it is because the public has found the new technology worth the price.

The question should come down to one policy decision: does Congress believe that progress is best promoted by allowing or denying non-human inventors. Until machines gain standing in courts and administrative agencies, actions will need to be taken by human agents. Until machines have money and a profit incentive, the constitutional purpose of motivation will need to focus on those who build and run machines, not the machines themselves. Even so, granting or denying patent protection to the work of machines will have a motivating effect on those who decide whether to invest in the work of those machines, so the Constitutional purpose can be accomplished, however indirectly.<sup>98</sup>

Note that the identity of the innovator is irrelevant to these policy objectives.<sup>99</sup> If the goal is to motivate innovation and disclosure of the innovations, then the focus should be on the innovation and the party who controls the decision to disclose.

If these issues prove too complicated for solution—or lead to undesirable results—Congress can avoid them. While Congress’ power under the Intellectual Property Clause is

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charges different fees for different types of inventors, offering for example a 50% reduction on most fees if the inventor is an individual or small company. See 35 U.S.C. § 41(h); 37 C.F.R. § 1.27 (2020); Oppenheimer, *The Inventor’s Dilemma*, *supra* note 73, at 434.

97. *Motion Picture Patents Co.*, 243 U.S. at 511 (1917) (citing U.S. CONST. art. I, § 8, cl. 8).

98. See Ryan Abbot, *I Think, Therefore I Invent: Creative Computers and the Future of Patent Law*, 57 B.C. L. REV. 1079, 1104 (2016) (“[A]llowing computers to be listed as inventors would reward human creative activity upstream from the computer’s inventive act . . .”).

99. See U.S. CONST. art. I, § 8, cl. 8.

plenary,<sup>100</sup> there is no Constitutional requirement that it be exercised to the fullest. If Congress were to limit inventorship to humans, there would seem to be no Constitutional basis on which to challenge that decision.<sup>101</sup>

#### CONCLUSION

Congress has written a deliberately broad patent statute. There has been no suggestion that, read broadly, it exceeds Congress' Constitutional power. There may be policy reasons that have only recently come to light that suggest narrowing the statute. If that is so, it is Congress—not the courts and not agencies—that should consider those reasons and change the statute if it concludes that policy requires it.

What does not get rewarded does not get done. If the goal is to promote progress, why exclude any source of progress? In particular, the identity (or humanity) of an inventor seems irrelevant to the Constitutional goal. However, if there is a persuasive answer to the question, Congress has the power to amend the statute.

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100. See U.S. CONST. art. I, § 8, cl. 8; see also *McClurg*, 42 U.S. at 206 (“[T]he powers of Congress to legislate upon the subject of patents is plenary by the terms of the Constitution . . .”).

101. Congress has previously removed certain types of inventions from the general rules of the Patent Statute. Most generally, it has limited patents to the four categories of invention listed in 35 U.S.C. § 101, but beyond that it has excluded certain inventions that otherwise met that definition: atomic energy, medical procedures, humans, and tax strategy patents.