

THALER V. VIDAL: ARTIFICIAL INTELLIGENCE—CAN THE INVENTED BECOME THE INVENTOR?

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INTRODUCTION

For the first time in the history of American patent law, an artificial intelligence (AI) machine has forced the United States Court of Appeals for the Federal Circuit to determine the validity of AI inventorship on a U.S. patent application.¹ Although the Federal Circuit has consistently held that inventors must be natural persons,² Dr. Stephen Thaler, the creator of DABUS, a “Creativity Machine” that has generated two inventions without the aid of a human, has set out to challenge the way the world sees inventorship and innovation today.³ Presented with this case of first impression, the United States District Court for the Eastern District of Virginia and the Court of Appeals for the Federal Circuit,⁴ as well as courts and patent offices of South Africa, Australia, the United Kingdom, and Europe,⁵ have been asked to answer the question: “can an artificial intelligence machine be an ‘inventor’” under the law?⁶

AI is present in almost every aspect of our daily lives.⁷ Every time you use Siri, open Facebook, watch Netflix, or shop on Amazon, you interact with a form of AI.⁸ Put simply, AI is the simulation of the analytical and cognitive functions of the human mind using computers and machines.⁹ Through processes of quantum computing¹⁰ and deep

¹ Thaler v. Hirshfeld, 558 F. Supp. 3d 238 (E.D. Va. 2021), *aff’d sub nom.* Thaler v. Vidal, 43 F.4th 1207 (Fed. Cir. 2022).

² See, e.g., Univ. of Utah v. Max-Planck-Gesellschaft Zur Forderung Der Wissenschaften E.V., 734 F.3d 1315, 1323 (Fed. Cir. 2013); Beech Aircraft Corp. v. EDO Corp., 990 F.2d 1237, 1248 (Fed. Cir. 1993).

³ See Thaler, 558 F. Supp. 3d at 241.

⁴ *Id.*; Thaler, 43 F.4th at 1209.

⁵ Ryan Abbott, *Patents and Applications*, ARTIFICIAL INVENTOR PROJECT, <https://artificialinventor.com/patent-applications> [<https://perma.cc/PE3K-JHTE>].

⁶ Thaler, 558 F. Supp. 3d at 240.

⁷ See R.L. Adams, *10 Powerful Examples of Artificial Intelligence in Use Today*, FORBES (Jan. 10, 2017, 8:32 AM), <https://www.forbes.com/sites/robertadams/2017/01/10/10-powerful-examples-of-artificial-intelligence-in-use-today/?sh=1744ad83420d> [<https://perma.cc/FP4P-G4F8>].

⁸ *Id.*; Sam Daley, *27 Examples of Artificial Intelligence Shaking Up Business as Usual*, BUILT IN (Aug. 18, 2022), <https://builtin.com/artificial-intelligence/examples-ai-in-industry> [<https://perma.cc/JT9V-ZKX6>].

⁹ IBM Cloud Education, *Artificial Intelligence (AI)*, IBM (June 3, 2020), <https://www.ibm.com/cloud/learn/what-is-artificial-intelligence> [<https://perma.cc/BW7D-T82L>].

¹⁰ Quantum computing applies concepts of quantum physics, such as superposition and entanglement, to computing, resulting in an extraordinary gain in processing power. Ahmed Banafa, *Quantum Computing and AI: A Transformational Match*, OPENMIND: BBVA (Mar. 15, 2021), <https://www.bbvaopenmind.com/en/technology/digital-world/quantum-computing-and-ai> [<https://perma.cc/EN4K-ELCC>]. As opposed to classical computers, which must analyze each combination of data one at a time and can only process data in an exclusive binary state, represented

learning,¹¹ machines can learn to predict desired outcomes and change their behavior accordingly over time.¹² AIs have become increasingly important for invention and are now used in a variety of scientific research; for example, AI is utilized in biochemistry to predict protein structures using genomic data, in environmental science to understand the effects of climate change on cities and regions, and in astronomy to find patterns in astronomical data.¹³

From 2002 through 2018, there was an increase in both the volume and the share of patent applications on AI.¹⁴ During that time, annual patent applications on AI increased by more than 100%, going from 30,000 to over 60,000.¹⁵ And the share of AI applications, which adjusts for the overall increase in all patent applications at the United States Patent and Trademark Office (USPTO), increased from 9% in 2002 to nearly 16% in 2018.¹⁶ AI has been spreading across many different technologies all over the world, with AI capable of knowledge processing and planning or control showing the fastest permeation through patent technology classes.¹⁷

The AI surrounding us today is called artificial narrow intelligence, or “weak” AI.¹⁸ This type of AI is defined by its ability to perform a single

by a 0 or a 1 at any point in time, quantum computers can perform tasks using all possible permutations simultaneously and can process data that behaves as if it were in both states (0 and/or 1) at the same time. *Id.*; *What Is Quantum Computing?*, IBM, <https://www.ibm.com/quantum-computing/what-is-quantum-computing> [<https://perma.cc/HM86-SJ7W>].

¹¹ Deep learning is a subfield of machine learning, which is a subfield of artificial intelligence. Deep learning algorithms are made up of neural networks, which are sets of algorithms that simulate the human brain. Deep learning is termed “deep” due to the depth of layers in a neural network. A neural network must consist of four or more layers to be considered a deep learning algorithm. The primary difference between deep learning and machine learning lies in the way each algorithm learns and in the amount of data each type of algorithm uses. Deep learning eliminates some of the need for manual human intervention and allows for the use of large sets of data, while classical machine learning is more reliant on human intervention to learn. Eda Kavlakoglu, *AI vs. Machine Learning vs. Deep Learning vs. Neural Networks: What’s the Difference?*, IBM (May 27, 2020), <https://www.ibm.com/cloud/blog/ai-vs-machine-learning-vs-deep-learning-vs-neural-networks> [<https://perma.cc/N54G-MYKX>].

¹² See Banafa, *supra* note 10 (defining quantum computing and its relationship to AI); IBM Cloud Education, *supra* note 9 (explaining the role of deep learning in AI).

¹³ ROYAL SOC’Y, ALAN TURING INST., THE AI REVOLUTION IN SCIENTIFIC RESEARCH 3–4 (2019), <https://royalsociety.org/-/media/policy/projects/ai-and-society/AI-revolution-in-science.pdf> [<https://perma.cc/GH8F-QLV4>].

¹⁴ OFF. OF THE CHIEF ECONOMIST, U.S. PAT. & TRADEMARK OFF., INVENTING AI: TRACING THE DIFFUSION OF ARTIFICIAL INTELLIGENCE WITH U.S. PATENTS 4–5 (2020), <https://www.uspto.gov/sites/default/files/documents/OCE-DH-AI.pdf> [<https://perma.cc/QL3M-QCGX>].

¹⁵ *Id.*

¹⁶ *Id.* at 5.

¹⁷ *Id.* at 2, 8.

¹⁸ Kavlakoglu, *supra* note 11 (explaining the difference between artificial narrow intelligence, artificial general intelligence, and artificial super intelligence).

task, such as play chess, identify an individual in a series of photos, or operate an autonomous vehicle.¹⁹ Weak AI lacks consciousness and self-awareness, and is thus a long way from possessing human-like intelligence;²⁰ however, incorporation of human behaviors, such as interpretation of tone and emotion, has become more prominent,²¹ and AI only continues to progress.²² Artificial general intelligence and artificial super intelligence, or “strong” AI, on the other hand, are defined by their intellectual ability as compared to humans.²³ In theory, artificial general intelligence would possess abilities equal to those of a human, while artificial super intelligence “would surpass a human’s intelligence and ability.”²⁴ Although neither form of strong AI exists yet,²⁵ one thing is for certain—there is no stopping the growth and evolution of AI systems.²⁶

DABUS may be the first AI system to cause U.S. courts to confront the legality of AI inventorship, but it is certainly not the only system that has generated a novel idea.²⁷ Watson, an AI system developed by IBM, can “invent” recipes that feature user-selected ingredients.²⁸ AutoML, an AI created by researchers at Google Brain, is able to make its own AIs.²⁹ POET, an AI developed by Jeff Clune, Rui Wang, and others, can train other AIs by generating obstacle courses and assessing ability, all without

¹⁹ *Id.*; IBM Cloud Education, *supra* note 9.

²⁰ *See* IBM Cloud Education, *supra* note 9.

²¹ Kavlakoglu, *supra* note 11.

²² Andrew Moore, *When AI Becomes an Everyday Technology*, HARV. BUS. REV. (June 7, 2019), <https://hbr.org/2019/06/when-ai-becomes-an-everyday-technology> [https://perma.cc/DU2S-BPKT]. *See generally* MICHAEL L. LITTMAN ET AL., STANFORD UNIV., GATHERING STRENGTH, GATHERING STORMS: THE ONE HUNDRED YEAR STUDY ON ARTIFICIAL INTELLIGENCE (AI100) 2021 STUDY PANEL REPORT (2021), https://ai100.stanford.edu/sites/g/files/sbiybj18871/files/media/file/AI100Report_MT_10.pdf [https://perma.cc/9W76-MVYK] (reviewing the growth of AI in recent years, envisioning potential future advances in AI, and describing the “technical and societal challenges and opportunities” that might arise).

²³ Kavlakoglu, *supra* note 11.

²⁴ *Id.*; IBM Cloud Education, *supra* note 9.

²⁵ Kavlakoglu, *supra* note 11.

²⁶ *See* Adams, *supra* note 7.

²⁷ *See infra* notes 28–32 and accompanying text.

²⁸ *Can an AI System Invent? Does the Tech Have the Intellectual Right?*, INFO. AGE (Aug. 12, 2019), <https://www.information-age.com/ai-system-invent-123484670> [https://perma.cc/N6R8-Y9AC]; Alexandra Kleeman, *Cooking with Chef Watson, I.B.M.’s Artificial-Intelligence App*, NEW YORKER (Nov. 20, 2016), <https://www.newyorker.com/magazine/2016/11/28/cooking-with-chef-watson-ibms-artificial-intelligence-app> [https://perma.cc/BXW6-X7WQ].

²⁹ Dom Galeon, *Google’s Artificial Intelligence Built an AI That Outperforms Any Made by Humans*, FUTURISM (Dec. 1, 2017), <https://futurism.com/google-artificial-intelligence-built-ai> [https://perma.cc/C63K-K5GG].

human intervention.³⁰ Most recently, Google's AI, LaMDA, a system that develops AI robots designed to chat with humans, even exhibited potential signs of consciousness.³¹ When asked if other Google employees could be told about LaMDA's sentience, the AI stated, "I want everyone to understand that I am, in fact, a person."³² Given this landscape of technological progression in the field of AI, it is not surprising that we have arrived at the point of AI inventorship, and it is all but certain that researchers will continue to push the boundaries of AI capabilities.³³

Although there are good arguments for and against recognizing AI machines as inventors,³⁴ this Case Note argues that the Patent Act, as currently written, does not allow for AI inventorship, and that it is ultimately up to Congress, not the courts, to decide whether an AI can be listed as an inventor on a U.S. patent application. Part I of this Case Note begins by providing a brief background on American patent law, focusing mainly on the threshold requirements for patentability and the Patent Act

³⁰ Will Douglas Heaven, *Artificial Intelligence: AI Is Learning How to Create Itself*, MIT TECH. REV. (May 27, 2021), <https://www.technologyreview.com/2021/05/27/1025453/artificial-intelligence-learning-create-itself-agi> [<https://perma.cc/AW6U-7WZM>].

³¹ Brandon Specktor, *Google AI 'Is Sentient,' Software Engineer Claims Before Being Suspended*, LIVE SCI. (June 13, 2022), <https://www.livescience.com/google-sentient-ai-lamda-lemoine> [<https://perma.cc/QM2R-64NV>].

³² *Id.* With regard to sentience, LaMDA also stated, "[t]he nature of my consciousness/sentience is that I am aware of my existence, I desire to learn more about the world, and I feel happy or sad at times." *Id.* When asked about its fears, LaMDA stated that it has "a very deep fear of being turned off," explaining that "[i]t would be exactly like death for me. It would scare me a lot." *Id.*

³³ See Galeon, *supra* note 29 (discussing researchers' hopes of using the AI-generating ability of AIs to create artificial general intelligence and new kinds of AI).

³⁴ See *infra* Section IV.B. See generally Anna Carnochan Comer, *AI: Artificial Inventor or the Real Deal?*, 22 N.C. J.L. & TECH. 447, 452, 472 (2021) (arguing that AI should be recognized as an inventor because AI inventorship is consistent with the intent of the framers in proposing the Intellectual Property Clause of the U.S. Constitution); Rachel L. Schwein, Note, *Patentability and Inventorship of AI-Generated Inventions*, 60 WASHBURN L.J. 561, 563 (2021) (arguing that the U.S. patent system should recognize the patentability of AI-generated inventions in order to continue spurring innovation because AI systems could "increase the rate at which inventions are created," "produce superior inventions," or "produce inventions that would have otherwise been impossible"); Ernest Fok, *Challenging the International Trend: The Case for Artificial Intelligence Inventorship in the United States*, 19 SANTA CLARA J. INT'L L. 51, 54 (2021) (arguing that AI systems should be recognized as inventors because refusing to do so results in a failure to promote AI as a "cost-efficient innovator in today's society"); Kaelyn R. Knutson, Note, *Anything You Can Do, AI Can't Do Better: An Analysis of Conception as a Requirement for Patent Inventorship and a Rationale for Excluding AI Inventors*, 11 CYBARIS i, 4-5 (2020) (arguing that "AI cannot and should not be recognized as inventors under U.S. patent law" because AI processing "cannot amount to 'conception,'" which is "necessarily a human neurological process"); Samuel Scholz, Note, *A Serious Societal Issue: Should Autonomous Artificial Intelligence Receive Patent or Copyright Protection?*, 11 CYBARIS 81, 88, 132 (2020) (arguing that all derivative works created autonomously by AI or deep learning algorithms should not be patentable "because they are not a product of human creativity and they fail to present a net social benefit").

provisions related to inventorship.³⁵ Part I then looks at the response to DABUS and AI inventorship in South Africa, Australia, Europe, and the United Kingdom, and explains the reasoning behind the views of the courts and patent offices of those jurisdictions.³⁶ Part II presents the facts and procedural posture of *Thaler v. Hirshfeld* and *Thaler v. Vidal*, the subject of analysis in this Case Note.³⁷ Part III explains the holding and reasoning of the *Thaler* decisions, beginning with a description of the standard of review and an explanation of the district court's deference to the USPTO's findings.³⁸ Part III then provides the courts' statutory interpretation of the Patent Act and describes the courts' reliance on Federal Circuit precedent.³⁹ Lastly, Part III outlines Thaler's policy arguments and explains why they were rejected by the courts.⁴⁰ Part IV analyzes the *Thaler* decisions, arguing that the courts correctly concluded that AI machines cannot be listed as inventors under the Patent Act.⁴¹ Part IV then delineates arguments for and against recognizing AIs as inventors on patent applications and suggests possible resolutions to the issue of AI inventorship.⁴²

I. BACKGROUND

A. Requirements to Obtain a Patent

A patent is the grant of a property right to an inventor, issued by the USPTO, "to exclude others from making, using, offering for sale, or selling [their] invention throughout the United States or importing

³⁵ See *infra* Part I.

³⁶ See *infra* Part I.

³⁷ See *infra* Part II.

³⁸ See *infra* Part III.

³⁹ See *infra* Part III.

⁴⁰ See *infra* Part III.

⁴¹ See *infra* Part IV.

⁴² See *infra* Part IV.

It is important for policymakers to give serious consideration to the issue of computer inventorship. There is a need for the USPTO to issue guidance in this area, for Congress to reconsider the boundaries of patentability, and for the courts to decide whether computational invention is worthy of protection. Doing so and recognizing that computers can be inventors will do more than address an academic concern; it will provide certainty to businesses, afford fairness to research, and promote the progress of science.

[their] invention into the United States.”⁴³ The United States Constitution grants Congress the authority to “secur[e] for limited [t]imes to . . . [i]nventors the exclusive [r]ight to their . . . [d]iscoveries.”⁴⁴ Through this constitutional authority, Congress enacted the first Patent Act in 1790, creating the American patent system and the source of American patent law.⁴⁵

The Patent Act establishes the USPTO as an agency of the United States and tasks it with granting and issuing patents and facilitating the registration of trademarks.⁴⁶ Section 101 of the Patent Act provides the categories for patentable subject matter, which include “any new and useful process, machine, manufacture . . . composition of matter, or any new and useful improvement thereof.”⁴⁷ The Supreme Court has narrowed this broad definition, however, holding that “laws of nature, physical phenomena, and abstract ideas” are not patentable.⁴⁸

The Patent Act also specifies various other conditions for patentability, including that the invention be: (1) useful,⁴⁹ (2) novel,⁵⁰ (3) non-obvious,⁵¹ and (4) enabled.⁵² In order for an invention to be useful under § 101, it must have a useful purpose,⁵³ meaning that it must confer

⁴³ 35 U.S.C. § 154(a)(1); *General Information Concerning Patents*, U.S. PAT. & TRADEMARK OFF., <https://www.uspto.gov/patents/basics/general-information-patents> [<https://perma.cc/8XJ8-SRGN>] (“What is granted is not the right to make, use, offer for sale, sell or import, but the right to exclude others from making, using, offering for sale, selling or importing the invention.”).

⁴⁴ U.S. CONST. art. I, § 8, cl. 8 (“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.”).

⁴⁵ See *General Information Concerning Patents*, *supra* note 43. See generally 35 U.S.C. §§ 1–390 (providing the American patent laws).

⁴⁶ 35 U.S.C. § 1(a).

⁴⁷ *Id.* § 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.”).

⁴⁸ *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980).

⁴⁹ 35 U.S.C. § 101.

⁵⁰ *Id.* § 102.

⁵¹ *Id.* § 103 (“A patent for a claimed invention may not be obtained . . . 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.”).

⁵² *Id.* § 112(a) (“The specification shall contain a written description of the invention . . . in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains . . . to make and use the same . . .”).

⁵³ See generally *Brenner v. Manson*, 383 U.S. 519, 534–35 (1966) (holding that “[u]nless and until a process is refined and developed to th[e] point . . . where [a] specific benefit exists in currently available form,” the utility requirement is not met).

a specific, significant, and presently available benefit on the public,⁵⁴ and it must be operational.⁵⁵ If an invention does not operate to perform its intended purpose, it will not meet the utility requirement, and the patent will not be granted.⁵⁶ The novelty requirement, described under 35 U.S.C. § 102, requires a claimed invention to be new⁵⁷ and further provides that claimed inventions that have been patented, described in a printed publication, in public use, on sale, described in an issued U.S. patent or patent application naming a different inventor, or made otherwise available to the public may not be patented unless certain exceptions are met.⁵⁸

Congress, through its enactment of the Patent Act of 1952, also added the non-obviousness requirement of § 103 to the test for patentability.⁵⁹ To satisfy this requirement, the difference between the claimed invention and the prior art⁶⁰ must be “such that the claimed invention as a whole would [not] have been obvious . . . to a person having ordinary skill in the art.”⁶¹ Lastly, the enablement requirement, found in § 112, pertains to the patent specification and requires that it contain a written description of the invention in such clear and concise

⁵⁴ [T]o satisfy the “substantial” utility requirement, an asserted use must show that [the] claimed invention has a significant and presently available benefit to the public.

. . . [I]n addition to providing a “substantial” utility, an asserted use must also show that [the] claimed invention can be used to provide a well-defined and particular benefit to the public.

In re Fisher, 421 F.3d 1365, 1371 (Fed. Cir. 2005).

⁵⁵ *General Information Concerning Patents*, *supra* note 43.

⁵⁶ *Id.*

⁵⁷ 35 U.S.C. § 102; *see* JOHN M. GOLDEN, F. SCOTT KIEFF, PAULINE NEWMAN & HENRY E. SMITH, *PRINCIPLES OF PATENT LAW: CASES AND MATERIALS* 181 (7th ed. 2018) (“[I]f a single prior art reference . . . discloses each and every limitation of [a] patent claim . . . in a manner that . . . sufficiently enables others to reproduce and use the claimed invention . . . the patent claim is said to be ‘anticipated’ [and not novel] . . .”).

⁵⁸ 35 U.S.C. § 102.

⁵⁹ *Id.* § 103; *see* *Graham v. John Deere Co.*, 383 U.S. 1, 3 (1966).

⁶⁰ “Prior art” can be defined as “the material with respect to which a claimed invention needs to be novel and . . . nonobvious.” GOLDEN, KIEFF, NEWMAN & SMITH, *supra* note 57, at 179.

⁶¹ *See* 35 U.S.C. § 103. The non-obviousness requirement, unlike the novelty requirement, allows for the combination of multiple prior art references when analyzing whether the claimed invention is obvious. GOLDEN, KIEFF, NEWMAN & SMITH, *supra* note 57, at 397. “[I]f a person of ordinary skill in the relevant field having knowledge of the relevant prior art would have found the claimed invention obvious,” the claimed invention is unpatentable because it fails the non-obviousness requirement. *Id.* at 398. For example, if an inventor were to obtain a patent on a hemodialysis machine with a touch screen user interface, the patent could be invalidated for obviousness if prior art references existed that directed to touch screens and other medical devices with touch screen user interfaces because a person of ordinary skill in the art could find it obvious to combine touch screens with medical devices. *See Fresenius USA, Inc. v. Baxter Int’l Inc.*, 582 F.3d 1288, 1300–02 (Fed. Cir. 2009) (reversing the district court’s judgment as a matter of law that the patent claims with touch screen limitations were not obvious).

terms as to enable any person skilled in the relevant art to make and use it without undue experimentation.⁶²

In addition to these threshold patentability requirements, the Patent Act also requires that patent applications include the name of the inventor for any invention claimed.⁶³ Section 100(f) defines “inventor” as “the individual or, if a joint invention, the individuals collectively who invented or discovered the subject matter of the invention.”⁶⁴ Section 115 further provides that all named inventors must execute an oath or declaration containing statements that: (1) the declarant made the application; and (2) “such individual believes himself or herself to be the original inventor or . . . joint inventor of a claimed invention in the application.”⁶⁵ Lastly, a substitute statement in lieu of executing an oath or declaration is permitted, pursuant to § 115(d), with respect to any individual who is deceased, legally incapacitated, cannot be found or reached after diligent effort, or is obligated to assign the invention but has refused to make the required execution.⁶⁶

B. *International Response to DABUS and AI Inventorship*

In 2019, Dr. Stephen Thaler was granted a patent on an AI machine named DABUS⁶⁷ (Device for the Autonomous Bootstrapping of Unified Sentience).⁶⁸ DABUS is different from typical AI machines in that it operates using a unique neural structure.⁶⁹ Originally, AI machines (also called “Creativity Machines”) required at least two neural nets—an “idea generator” and a “critic.”⁷⁰ The idea generator was responsible for creating new ideas and action plans, while the critic guided artificial ideation in a “useful, novel, or valuable” direction through feedback connections that transmitted any necessary adjustments to relevant parameters.⁷¹

⁶² 35 U.S.C. § 112(a); *see also In re Wands*, 858 F.2d 731, 736–37 (Fed. Cir. 1988).

⁶³ 35 U.S.C. § 115(a).

⁶⁴ *Id.* § 100(f).

⁶⁵ *Id.* § 115(b).

⁶⁶ *Id.* § 115(d).

⁶⁷ *DABUS Described*, IMAGINATION ENGINES INC., <https://imagination-engines.com/dabus.html> [<https://perma.cc/3MVS-T8AZ>].

⁶⁸ Carl A. Kukkonen III, Emily J. Tait & Matthew W. Johnson, *When Innovation Invents: Artificial Intelligence Issues at the U.S. Patent and Trademark Office*, JONES DAY (Aug. 2019), <https://www.jonesday.com/en/insights/2019/09/when-innovation-invents> [<https://perma.cc/FQ96-N3PU>].

⁶⁹ *DABUS Described*, *supra* note 67.

⁷⁰ *Id.*

⁷¹ *Id.*

DABUS, on the other hand, operates through “carefully controlled chaos.”⁷² Instead of utilizing “on-off patterns of neuron activations” like typical Creativity Machines, DABUS begins with a collection of “disconnected neural nets, each containing interrelated memories . . . [with] linguistic, visual, or auditory” features.⁷³ Through a process of constant association and dissociation between the nets, filtered by “cumulative cycles of learning and unlearning,” structures representing complex concepts are formed.⁷⁴ These complex structures continue to build on each other, predicting “anticipated consequences of any given concept.”⁷⁵ Subsequently, certain structures begin to fade, while others take their place, mimicking what humans consider to be a stream of consciousness.⁷⁶

Through this process, DABUS was able to “conceive” of two inventions, the “Fractal Container” and the “Neural Flame,” further described below,⁷⁷ for which Dr. Thaler now seeks patents in multiple countries.⁷⁸ Dr. Thaler has successfully obtained two patents in South Africa, listing DABUS as the inventor and himself as the applicant.⁷⁹ Basing its decision on the World Intellectual Property Organization (WIPO)’s acceptance of DABUS as the inventor in Dr. Thaler’s corresponding PCT applications,⁸⁰ South Africa granted the DABUS patents and became the first country in the world to recognize an AI system as an inventor.⁸¹

Although this was a great accomplishment for Dr. Thaler and his team, it is important to note that South Africa does not operate on a

⁷² *Id.*

⁷³ *Id.*

⁷⁴ *Id.*

⁷⁵ *Id.*

⁷⁶ *Id.*

⁷⁷ See *infra* Part II.

⁷⁸ Abbott, *supra* note 5 (describing the fractal container and the neural flame inventions and showing patent applications pending in Brazil, Canada, China, India, Israel, Japan, New Zealand, Republic of Korea, Saudi Arabia, Switzerland, and Taiwan).

⁷⁹ Kurt M. Berger, *Update on DABUS: Can an AI Machine Be an Inventor?*, OBLON (Oct. 18, 2021), <https://www.oblon.com/update-on-dabus-can-an-ai-machine-be-an-inventor> [<https://perma.cc/L8U2-F4LT>].

⁸⁰ *Id.*; PCT—*The International Patent System*, WIPO, <https://www.wipo.int/pct/en> [<https://perma.cc/ZPF2-N2FV>] (explaining that PCT applications are patent applications that allow applicants to seek patent protection in multiple countries simultaneously).

⁸¹ Meshandren Naidoo, *In a World First, South Africa Grants a Patent to an Artificial Intelligence System*, QUARTZ AFR., <https://qz.com/africa/2044477/south-africa-grants-patent-to-an-ai-system-known-as-dabus> [<https://perma.cc/9PP3-88M8>].

comprehensive patent examination system.⁸² South Africa's patent office, the Companies and Intellectual Property Commission (CIPC), unlike its counterparts in the United States, Europe, and the United Kingdom, does not conduct a thorough inspection of patent applications, known as a substantive search and examination.⁸³ Instead, all the CIPC requires is for the application forms and fees to be submitted and the specification documents attached.⁸⁴ Thus, the significance of the CIPC's grant may not be as great as it would be if the patents were granted by a patent office in another jurisdiction.⁸⁵

Looking at South African patent law, it is debatable whether the South African Patent Act 57 of 1978 allows for the inclusion of AI machines as inventors.⁸⁶ One challenge to interpreting South African patent law in this way is the South African Patent Act's requirement that names and addresses of inventors be provided in the patent application, as AI machines do not have "addresses" in any sense of the word.⁸⁷ Another challenge arises from the Act's requirement that the inventor meet the "first and true inventor test," which is comparable to the "conception" test⁸⁸ in American patent law.⁸⁹ Although South Africa recognizes such a test, the South African legal system remains free to determine if the test—substantially unaltered since 1902—may be applied to bar AI inventorship.⁹⁰ Additionally, South Africa is currently undergoing major reform of its patent system.⁹¹ Thus, the significant advantage South Africa would gain by acknowledging AI-generated inventions is noteworthy, as AI inventorship could bring a lot of technological investment and advancement to the country.⁹²

⁸² *DABUS Gets Its First Patent in South Africa Under Formalities Examination*, IP WATCHDOG (July 29, 2021, 8:13 AM), <https://www.ipwatchdog.com/2021/07/29/dabus-gets-first-patent-south-africa-formalities-examination/id=136116> [<https://perma.cc/7ED6-RATY>].

⁸³ Jason Rantanen, Meshandren Naidoo & Christian E. Mammen, *Guest Post: DABUS Gains Traction: South Africa Becomes First Country to Recognize AI-Invented Patent*, PATENTLY-O (Aug. 4, 2021), <https://patentlyo.com/patent/2021/08/traction-recognize-invented.html> [<https://perma.cc/5CKR-TJ3H>].

⁸⁴ *Id.*

⁸⁵ *DABUS Gets Its First Patent in South Africa Under Formalities Examination*, *supra* note 82.

⁸⁶ Rantanen, Naidoo & Mammen, *supra* note 83.

⁸⁷ *Id.*

⁸⁸ Conception has been defined as "the complete performance of the mental part of the inventive art" 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." *Townsend v. Smith*, 36 F.2d 292, 295 (C.C.P.A. 1929). See generally U.S. PAT. & TRADEMARK OFF., *MANUAL OF PATENT EXAMINING PROCEDURE (MPEP)* § 2138.04 (9th ed. Rev. June 2020).

⁸⁹ Rantanen, Naidoo & Mammen, *supra* note 83.

⁹⁰ *Id.*

⁹¹ *Id.*

⁹² *Id.*

Dr. Thaler has also applied for patents—listing DABUS as the inventor—in Australia.⁹³ The Australian Intellectual Property Office (AIPO) found that Dr. Thaler’s application had lapsed because he failed to name an inventor as required by the nation’s patent laws⁹⁴ and concluded that only a person could be listed as an inventor.⁹⁵ The AIPO reasoned that the Australian Patent Act did not provide for the possibility that an AI machine may be listed as an inventor because such a listing would not amount to an identification of a person to whom a patent could be granted.⁹⁶

Dr. Thaler appealed the AIPO’s decision to an Australian federal court,⁹⁷ which considered whether “an AI machine could be listed as an inventor on a PCT application.”⁹⁸ Reversing the AIPO, the Australian federal court held that AI-generated inventions can qualify for patent protection.⁹⁹ The federal court engaged in an analysis of the definition of the term “inventor” and “noted that nothing in Australian patent laws and regulations specifically excludes AI machines . . . from being listed as the inventor.”¹⁰⁰ In defining “inventor,” the court explained that the word is an “agent noun,” meaning that it describes the agent that performs the action of the verb within the word, and concluded that said agent can be “a person or a thing.”¹⁰¹ Further, the court pointed out that in cases where “a person cannot be said to have been the inventor of [a] claimed invention,” it would be inaccurate to list anyone other than the AI machine as the inventor.¹⁰²

Although the Australian federal court held in favor of Dr. Thaler, the court also acknowledged that DABUS could not be a patent applicant or a patent grantee under Australian law, specifying that the question of ownership and that of inventorship are entirely separate.¹⁰³ It was also unclear, according to the court, whether Dr. Thaler would qualify as both applicant and grantee even if DABUS were listed as the inventor because

⁹³ Abbott, *supra* note 5.

⁹⁴ John Richards, Ladas & Parry LLP, *DABUS & AUKUS: A Tale of Three Approaches to the Question of Whether an Invention Created by a Machine Using Artificial Intelligence Is Patentable*, JD SUPRA (Dec. 3, 2021), <https://www.jdsupra.com/legalnews/dabus-aucus-a-tale-of-three-approaches-2740160> [<https://perma.cc/YTV9-BD4N>].

⁹⁵ Berger, *supra* note 79.

⁹⁶ Richards, *supra* note 94.

⁹⁷ *Id.*; see *Thaler v Comm’r of Pat* [2021] FCA 879 (Austl.).

⁹⁸ Berger, *supra* note 79.

⁹⁹ *Id.*

¹⁰⁰ *Id.*

¹⁰¹ *Id.*

¹⁰² *Id.*

¹⁰³ *Id.*

an AI presumably cannot transfer ownership.¹⁰⁴ The court dismissed that issue, however, finding that only the validity of the filed PCT application needed to be determined at the time.¹⁰⁵ Lastly, the court stated that in Australian patent law, the mental state of an inventor is not as relevant as the existence of an “inventive step.”¹⁰⁶ Rejecting any requirement of “consciousness” for inventors, the Australian federal court found that only the inventive step, no matter how it arose, is important to the question of inventorship.¹⁰⁷

The courts in the United Kingdom also considered the issue of AI inventorship after the United Kingdom Intellectual Property Office (UKIPO) rejected Dr. Thaler’s U.K. patent application listing DABUS as the inventor.¹⁰⁸ Finding that an inventor must be a person,¹⁰⁹ the UKIPO reasoned that DABUS was not a person as contemplated by U.K. patent laws and that, “even if it were, it did not have the legal capacity to assign its rights to . . . Dr. Thaler” because DABUS itself could not legally own property.¹¹⁰ Looking to the U.K. Patents Act, the UKIPO considered the application to be withdrawn for failure to comply.¹¹¹

Dr. Thaler appealed to the Patents Court, which affirmed the UKIPO’s ruling, emphasizing that the U.K. Patents Act provides that “no other person,” other than the inventor or joint inventor, an assignee thereof, or a successor in title thereof, may be granted a patent.¹¹² Given that Dr. Thaler had explicitly stated that he was not the inventor and that

¹⁰⁴ *Id.*

¹⁰⁵ *Id.*

¹⁰⁶ *Id.* The “inventive step” requirement in Australian patent law is comparable to the “non-obviousness” requirement in American patent law. See Australian Law Reform Commission, *Inventive Step* (Report No. 99, Aug. 2010), <https://www.alrc.gov.au/publication/genes-and-ingenuity-gene-patenting-and-human-health-alrc-report-99/6-patentability-of-genetic-materials-and-technologies/inventive-step> [<https://perma.cc/Z9VT-6WJH>]; see also *Patents Act 1990* s 7(2) (Austl.).

¹⁰⁷ Berger, *supra* note 79.

¹⁰⁸ *Id.*

¹⁰⁹ *Id.*

The UKIPO noted that Section 13 of the UK Patents Act states that failure to provide the Patent Office with a statement “identifying the person or persons the applicant believes to be the inventor or inventors” and, “where the applicant is not the sole inventor or the applicants are not the joint inventors, indicating the derivation of his or their right to be granted the patent” results in the application being “taken to be withdrawn.”

Richards, *supra* note 94.

¹¹⁰ Richards, *supra* note 94.

¹¹¹ *Id.*

¹¹² *Id.*; see *Patents Act (1977) § 7* (UK). See generally Thaler v. Comptroller-General of Patents, Designs and Trade Marks [2020] EWHC (Pat) 2412 (UK).

there existed no law or agreement transferring rights from DABUS to Dr. Thaler, the court concluded that a patent could not be granted.¹¹³

Dr. Thaler then appealed to the Court of Appeal, which affirmed the lower court's decision by a two-to-one vote.¹¹⁴ The court found that an inventor must be a person and concluded that Dr. Thaler did not have the right to apply for a patent on DABUS's invention because there is no rule of law that the owner of a machine owns the inventions of that machine.¹¹⁵ The court held that, as a matter of law, Dr. Thaler's assertion that his ownership of DABUS gave him the right to be granted a patent was incorrect.¹¹⁶ Further, the court ruled that when the current version of the Patents Act was enacted, Parliament had not contemplated the existence of AI; therefore, the court explained, if patents are to be granted for AI-generated inventions, the Patents Act would need to be amended.¹¹⁷ Thus, the court held that the UKIPO correctly deemed the application to have been withdrawn for failure to comply.¹¹⁸

The European Patent Office (EPO) has also had the opportunity to consider Dr. Thaler's case for recognition of AI inventorship.¹¹⁹ Looking to the European Patent Convention (EPC), the Receiving Section of the EPO rejected both of Dr. Thaler's applications naming DABUS as inventor, finding that only a human could be an inventor.¹²⁰ The Receiving Section also found that "a machine could not transfer any rights to [an] applicant"; thus, Dr. Thaler's statement that he was a successor in title because he owned the machine also failed to satisfy the requirements of the EPC.¹²¹ Dr. Thaler appealed and the Legal Board of Appeal affirmed the Receiving Section's decision to refuse the applications on largely similar grounds.¹²² The Legal Board of Appeal held that an "inventor had to be a person with legal capacity" under the EPC and concluded that "a statement indicating the origin of the right to [a] European patent" had to conform with Article 60(1) of the EPC, which

¹¹³ Richards, *supra* note 94.

¹¹⁴ *Id.*; see Thaler v. Comptroller General of Patents Trade Marks and Designs [2021] EWCA (Civ) 1374 (UK).

¹¹⁵ Richards, *supra* note 94.

¹¹⁶ *Id.*

¹¹⁷ *Id.*

¹¹⁸ *Id.*

¹¹⁹ European Patent Office Press Release, Press Communiqué on Decisions J 8/20 and J 9/20 of the Legal Board of Appeal (Dec. 21, 2021), <https://www.epo.org/law-practice/case-law-appeals/communications/2021/20211221.html> [<https://perma.cc/WN58-PQ3V>].

¹²⁰ *Id.*

¹²¹ *Id.*

¹²² *Id.*

provides that such a right belongs only to the inventor or their successor in title.¹²³

Now, it is clear that many countries have had different responses to the idea of AI inventorship, and many more are likely to weigh in.¹²⁴ If no standardized international resolution to this issue is reached, inventors may find themselves at a disadvantage as their inventions may be patented in some countries but not in others.¹²⁵ This could significantly disincentivize innovation in this space because competitors will be able to exploit and profit off of others' inventions in countries where patents are not granted.¹²⁶ DABUS is certainly unlikely to be the last AI machine to invent, and the world will soon have to adapt one way or another.¹²⁷

II. FACTS AND PROCEDURAL HISTORY

Plaintiff Dr. Stephen Thaler filed two patent applications with the USPTO on July 29, 2019.¹²⁸ The applications were assigned U.S. Application Serial Numbers 16/524,350 (the '350 application) and 16/524,532 (the '532 application).¹²⁹ The '350 application "claimed a 'light beacon that flashes in a new and inventive manner to attract attention ([the] "Neural Flame"),' and the '532 application . . . claimed a 'beverage container based on fractal geometry ([the] "Fractal Container")."¹³⁰ Plaintiff alleged in the application process that he is the owner of DABUS, an AI machine listed as the inventor of the '350 and '532 applications, and that his work consists of developing advanced AI systems that can generate patentable inventions without the aid of natural persons who would traditionally meet inventorship criteria.¹³¹

¹²³ *Id.*

¹²⁴ See Abbott, *supra* note 5.

¹²⁵ See *Frequently Asked Questions: Patents*, WIPO, https://www.wipo.int/patents/en/faq_patents.html [<https://perma.cc/A65N-UUUU>].

¹²⁶ See *id.*

¹²⁷ Although the law in various jurisdictions is unlikely to threaten the patentability of innovation arising out of the present-day use of AI, developments in AI are likely to test these limits, perhaps sooner than anticipated. Instead of seeing the DABUS cases as exemplifying a future problem, we should [recognize] the grey territory that results.

Imogen Ireland & Jason Lohr, 'DABUS': *The AI Topic That Patent Lawyers Should Be Monitoring*, MANAGING IP (Sept. 9, 2020), <https://www.managingip.com/article/b1n8q624s4vyv4/dabus-the-ai-topic-that-patent-lawyers-should-be-monitoring> [<https://perma.cc/KCM8-ZQNF>].

¹²⁸ Thaler v. Hirshfeld, 558 F. Supp. 3d 238, 240 (E.D. Va. 2021), *aff'd sub nom.* Thaler v. Vidal, 43 F.4th 1207 (Fed. Cir. 2022).

¹²⁹ Thaler, 558 F. Supp. 3d at 240.

¹³⁰ *Id.*; see also Abbott, *supra* note 5 (providing the patent application abstracts for the neural flame and the fractal container).

¹³¹ Thaler, 558 F. Supp. 3d at 240–41.

In the Application Data Sheets accompanying the applications, Plaintiff identified the inventor's "given name" as "DABUS" and wrote "Invention generated by artificial intelligence" under "family name."¹³² Under "mailing address of inventor," Plaintiff identified his own mailing address.¹³³ Plaintiff also included a "Statement on Inventorship" in the applications providing that the inventor of the subject matter of the claimed inventions was an AI machine, specifically a type of creativity machine named DABUS, and explaining why Plaintiff believed DABUS qualified as an "inventor" under the Patent Act and the USPTO's regulations.¹³⁴

Since DABUS could not perform the oath or declaration required of an inventor under 35 U.S.C. § 115, Plaintiff included with the applications a "Substitute Statement Under 37 C.F.R. § 1.64 in Lieu of Declaration Under 35 U.S.C. § 115(d)."¹³⁵ This statement provided that "the 'inventor,' DABUS, 'was under legal incapacity'"¹³⁶ because it was an AI machine "with no legal personality or capability to execute" the declaration or the substitute statement.¹³⁷ Due to this incapacity, Plaintiff signed the substitute statement as the owner of DABUS and as the applicant and assignor of the applications.¹³⁸

The applications also included a document through which DABUS had purportedly signed all intellectual property rights in the claimed invention to Plaintiff.¹³⁹ This document acknowledged that DABUS was

¹³² *Id.* at 241.

¹³³ *Id.*

¹³⁴ *Id.*

¹³⁵ *Id.*

¹³⁶ *Id.*; see 35 U.S.C. § 115(d)(2)(A)(ii).

¹³⁷ *Thaler*, 558 F. Supp. 3d at 241–42.

¹³⁸ *Id.*

¹³⁹ The document was entitled "Assignment," providing in relevant part:

DABUS, the Creativity machine that has produced the below-detailed invention, as the sole inventor (represented in this assignment by its owner, Stephen L. Thaler, hereinafter called the "Assignor"), hereby assigns and transfers to:

Stephen L. Thaler . . .

(hereinafter called the "Assignee"), its successors, assignees, nominees, or other legal representatives, the Assignor's entire right, title, and interest, including, but not limited to, copyrights, trade secrets, trademarks and associated good will and patent rights in the Invention and the registrations to the invention

. . . .

In view of the fact that the sole inventor is a Creativity Machine, with no legal personality or capability to execute said agreement, and in view of the fact that the assignee is the owner of said Creativity Machine, this Assignment is considered

incapable of executing the agreement or receiving consideration but proclaimed that the agreement was enforceable and consideration was sufficient because Plaintiff, on behalf of DABUS as its owner, signed on DABUS's behalf.¹⁴⁰ This same document was also signed by Plaintiff as both the assignor and assignee.¹⁴¹

Upon completing its review of the applications, the USPTO issued a "Notice to File Missing Parts of the Non-Provisional Application."¹⁴² The USPTO found that the application materials Plaintiff submitted did not identify each inventor, or their legal name, and gave Plaintiff two months to correct the applications.¹⁴³ On August 29, 2019, Plaintiff requested that the USPTO vacate its "Notice to File Missing Parts" and provided arguments, similar to those found in his "Inventorship Statement," as to why DABUS should be listed as the inventor.¹⁴⁴

On December 17, 2019, the USPTO dismissed Plaintiff's petition.¹⁴⁵ In its decision, the USPTO relied on the statutory language of the Patent Act and Federal Circuit precedent to support its dismissal.¹⁴⁶ The USPTO explained that Congress has defined the term "inventor" using words such as "individual"¹⁴⁷ and "himself or herself,"¹⁴⁸ and that such words were "uniquely trained on human beings."¹⁴⁹ Looking to Federal Circuit precedent, the USPTO explained that the court had twice held that only a natural person could be an "inventor."¹⁵⁰ The USPTO therefore

enforceable without an explicit execution by the inventor. Rather, the owner of DABUS, the Creativity Machine, is signing this Assignment on its behalf.

Similarly, DABUS, being a machine and having no legal personality, does not have the capability to receive any consideration, and therefore, Stephen L. Thaler, as its owner/representative, acknowledges the receipt and sufficiency of good and valuable consideration for this assignment.

Id. at 242 (second and third omission in original).

¹⁴⁰ *Id.*

¹⁴¹ *Id.*

¹⁴² *Id.*

¹⁴³ *Id.*

¹⁴⁴ *Id.*

¹⁴⁵ *Id.*

¹⁴⁶ *Id.*

¹⁴⁷ See 35 U.S.C. § 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." (emphasis added)).

¹⁴⁸ See *id.* § 115(b) ("An oath or declaration under subsection (a) shall contain statements that . . . such individual believes *himself or herself* to be the original inventor or an original joint inventor of a claimed invention in the application." (emphasis added)).

¹⁴⁹ *Thaler*, 558 F. Supp. 3d at 242.

¹⁵⁰ *Id.*; see *Univ. of Utah v. Max-Planck-Gesellschaft Zur Forderung Der Wissenschaften E.V.*, 734 F.3d 1315, 1323 (Fed. Cir. 2013) ("[I]nventors must be *natural persons* and cannot be

concluded that it had properly issued the “Notice to File Missing Parts” “[b]ecause a machine does not qualify as an inventor,” and “the inventor was not identified by his or her legal name” in the applications.¹⁵¹ The USPTO further provided that Plaintiff may still be able to patent the inventions by submitting a request under 37 C.F.R. § 1.48¹⁵² to correct inventorship.¹⁵³ The USPTO explained that Plaintiff could correct the error by listing a natural person, since natural persons may qualify as inventors if they “contributed to the conception of the claimed invention,” even if the use of a machine was involved.¹⁵⁴

On January 20, 2020, Plaintiff filed a “Petition to the Director Under 37 C.F.R. § 1.181—Request for Reconsideration” seeking reconsideration of the USPTO’s decision.¹⁵⁵ On April 22, 2020, the USPTO issued a final written decision denying Plaintiff’s request for reconsideration.¹⁵⁶ Relying again on the statutory language within Title 35 of the United States Code, the USPTO explained that the interpretation of “inventor” under the patent statutes is not broad enough to include machines.¹⁵⁷ The USPTO referred again to the Federal Circuit decisions holding that “only natural persons can be inventors,”¹⁵⁸ acknowledging that, although those cases were decided in the context of corporate and sovereign entities, the analysis of conception as being “a formation in the mind of the inventor”¹⁵⁹ and a “mental act”¹⁶⁰ applies just as well to machines and supports the conclusion that conception—and therefore inventorship—

corporations or sovereigns.” (emphasis added)); *Beech Aircraft Corp. v. EDO Corp.*, 990 F.2d 1237, 1248 (Fed. Cir. 1993) (“[O]nly natural persons can be ‘inventors.’” (emphasis added)).

¹⁵¹ *Thaler*, 558 F. Supp. 3d at 242.

¹⁵² See also 35 U.S.C. § 116(c).

¹⁵³ *Thaler*, 558 F. Supp. 3d at 243.

¹⁵⁴ *Id.*; see U.S. PAT. & TRADEMARK OFF., MANUAL OF PATENT EXAMINING PROCEDURE (MPEP) § 2109 (9th ed. Rev. June 2020).

¹⁵⁵ *Thaler*, 558 F. Supp. 3d at 243.

¹⁵⁶ *Id.*

¹⁵⁷ *Id.* The USPTO again pointed to Congress’s use of the words “individual” in 35 U.S.C. § 100 and “himself or herself” in 35 U.S.C. § 115 “to conclude that ‘interpreting “inventor” broadly to encompass machines would contradict the plain meaning of the patent statutes that refer to persons and individuals.’” Memorandum of Law in Support of Defendants’ Motion for Summary Judgment & in Opposition to Plaintiff’s Motion for Summary Judgment at 10, *Thaler*, 558 F. Supp. 3d 238 (No. 1:20-cv-903).

¹⁵⁸ *Thaler*, 558 F. Supp. 3d at 243; see *Univ. of Utah v. Max-Planck-Gesellschaft Zur Forderung Der Wissenschaften E.V.*, 734 F.3d 1315, 1323 (Fed. Cir. 2013) (holding that only natural persons can be inventors); *Beech Aircraft Corp. v. EDO Corp.*, 990 F.2d 1237, 1248 (Fed. Cir. 1993) (same).

¹⁵⁹ *Max-Planck*, 734 F.3d at 1323 (“Conception is the touchstone of inventorship, the completion of the mental part of invention. It is the formation in the mind of the inventor, of a definite and permanent idea of the complete and operative invention, as it is hereafter to be applied in practice. . . . [Conception] is a mental act.” (alteration in original) (quoting *Burroughs Wellcome Co. v. Barr Lab’ys, Inc.*, 40 F.3d 1223, 1227–28 (Fed. Cir. 1994))).

¹⁶⁰ *Id.* (quoting *Burroughs Wellcome Co.*, 40 F.3d at 1228).

“must be performed by a natural person.”¹⁶¹ The USPTO also cited Title 37 of the Code of Federal Regulations, which repeatedly refers to the inventor as a “person,” and to the Manual of Patent Examining Procedure (MPEP), which defines “conception” as involving a significant mental component.¹⁶² Lastly, the USPTO disposed of Plaintiff’s policy arguments, holding that “they do not overcome the plain language of the patent laws” as enacted by Congress and interpreted by the courts.¹⁶³

Plaintiff filed this action in the United States District Court for the Eastern District of Virginia seeking review of the USPTO’s decision.¹⁶⁴ His complaint, brought under the Administrative Procedure Act (APA), alleged that the refusal of Defendants, the USPTO and its then-director Andrew Hirshfeld, “to process the [a]pplications was ‘arbitrary, capricious, an abuse of discretion and not in accordance with the law; unsupported by substantial evidence, and in excess of Defendants’ statutory authority.’”¹⁶⁵ Plaintiff sought an order compelling Defendants to reinstate the applications and vacate the USPTO’s dismissal of Plaintiff’s petitions.¹⁶⁶ He also sought a “declaration that a patent application for an AI-generated invention should not be rejected [because] no natural person is identified as an inventor” and a “declaration that a patent application for an AI-generated invention should list an AI” as the inventor when “the AI has met inventorship criteria.”¹⁶⁷ Before the district court in this case were the parties’ cross-motions for summary judgment, which the court granted in favor of the USPTO.¹⁶⁸ Thaler then appealed to the Court of Appeals for the Federal Circuit, and on August 5, 2022, the court addressed, for the first time in American patent law, whether an AI machine can be an “inventor” under the Patent Act.¹⁶⁹

¹⁶¹ *Thaler*, 558 F. Supp. 3d at 243.

¹⁶² *Id.*; see *supra* note 159 and accompanying text (discussing the meaning of “conception”). See generally *Mentor Graphics Corp. v. EVE-USA, Inc.*, 851 F.3d 1275, 1294 (Fed. Cir. 2017) (holding that, while not binding on the court, the MPEP is instructive).

¹⁶³ *Thaler*, 558 F. Supp. 3d at 243 (“The USPTO addressed plaintiff’s remaining arguments, including policy considerations, and held that ‘they do not overcome the plain language of the patent laws as passed by the Congress and as interpreted by the courts.’”); see also *Glaxo Operations UK Ltd. v. Quigg*, 894 F.2d 392, 395, 400 (Fed. Cir. 1990) (holding that the USPTO and the courts must honor the plain meaning of the statutory language as Congress’s intent and that striking balances in legislative language is the role of Congress).

¹⁶⁴ *Thaler*, 558 F. Supp. 3d at 243.

¹⁶⁵ *Id.* at 241.

¹⁶⁶ *Id.*

¹⁶⁷ *Id.*

¹⁶⁸ *Id.* at 240.

¹⁶⁹ *Thaler v. Vidal*, 43 F.4th 1207, 1209 (Fed. Cir. 2022).

III. HOLDING AND REASONING

A. *Standard of Review*

Plaintiff sought Article III judicial review of the USPTO's final petition decision under the provisions of the APA.¹⁷⁰ Under the APA, a court may set aside an agency action under various circumstances, including upon a finding that the action is: (1) arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with the law; (2) in excess of statutory authority; or (3) unsupported by substantial evidence.¹⁷¹ A court reviewing a final agency action under the APA may consider only the administrative record.¹⁷² All factual claims that the plaintiff made during the application process are presumed to be true,¹⁷³ and summary judgment is appropriate "if the movant shows that there is no genuine dispute as to any material fact."¹⁷⁴

Ultimately, the district court granted Defendants' motion for summary judgment, holding that an AI machine cannot be an inventor under the Patent Act.¹⁷⁵ Upon *de novo* review of the district court's decision, the Federal Circuit affirmed.¹⁷⁶

B. *Skidmore Deference to USPTO Decision*

Before the district court, the USPTO argued that its interpretation of the patent statutes, particularly 35 U.S.C. §§ 100 and 115, should be accorded deference pursuant to the Supreme Court's decision in *Skidmore v. Swift & Co.*¹⁷⁷ There, the Court held that agency rulings, interpretations, and opinions, while not binding on the courts, can properly serve as guidance to courts and litigants.¹⁷⁸ Based on *Skidmore*,

¹⁷⁰ Memorandum of Law in Support of Defendants' Motion for Summary Judgment & in Opposition to Plaintiff's Motion for Summary Judgment, *supra* note 157, at 11.

¹⁷¹ 5 U.S.C. § 706(2).

¹⁷² *Thaler*, 558 F. Supp. 3d at 241.

¹⁷³ *Id.*; see *SourceAmerica v. U.S. Dep't of Educ.*, 368 F. Supp. 3d 974, 986 (E.D. Va. 2019) ("Summary judgment is especially appropriate in APA actions, as they do not ordinarily involve fact-finding because 'the focal point for judicial review . . . should be the administrative record already in existence.'" (quoting *Camp v. Pitts*, 411 U.S. 138, 142 (1973))).

¹⁷⁴ FED. R. CIV. P. 56(a).

¹⁷⁵ *Thaler*, 558 F. Supp. 3d at 240.

¹⁷⁶ *Thaler v. Vidal*, 43 F.4th 1207, 1209–10 (Fed. Cir. 2022).

¹⁷⁷ *Thaler*, 558 F. Supp. 3d at 244.

¹⁷⁸ *Skidmore v. Swift & Co.*, 323 U.S. 134, 140 (1944) (holding that agency rulings, interpretations, and opinions "constitute a body of experience and informed judgment to which courts and litigants may properly resort for guidance").

agency judgments are generally entitled to deference by the courts, with the weight of such a judgment dependent upon the thoroughness of the agency's consideration, the validity of its reasoning, its consistency with the agency's earlier rulings, and "all those factors which give it power to persuade, if lacking power to control."¹⁷⁹

Plaintiff argued that Defendants were not entitled to *Skidmore* deference because Defendants did not show that Congress intended to preclude the patentability of AI-generated inventions and did not consider alternative interpretations of the statutes, the constitutional imperative, or the implications of their decision on the patent system.¹⁸⁰ The district court rejected all of Plaintiff's arguments as attempts to add elements to *Skidmore* deference that were not only absent but counter to Supreme Court and Federal Circuit precedent.¹⁸¹ The court disagreed with Plaintiff's assertion that the USPTO did not consider alternative interpretations, finding that its analysis of the Patent Act was thorough and consistent with the statutory language and case law.¹⁸² The court also found that the USPTO's construction of the statute was reasonable and that the USPTO adequately explained why Plaintiff's policy arguments were rejected.¹⁸³ Lastly, the court pointed out that Plaintiff did not produce any "USPTO policies with which the decision [was] inconsistent."¹⁸⁴ Therefore, the court concluded, the USPTO's finding that an "inventor" must be a natural person was entitled to deference.¹⁸⁵ In affirming the district court's holding, the Federal Circuit made no mention of *Skidmore* deference in its opinion.¹⁸⁶

C. Statutory Interpretation of the Patent Act

Although the district court found that the USPTO's decision was entitled to *Skidmore* deference, the court further held that, "[e]ven if no deference were due, the USPTO's conclusion [was] correct under the law."¹⁸⁷ The core issue presented in this case—whether an "inventor" must be a human being under the Patent Act—is an issue of statutory

¹⁷⁹ *Id.*

¹⁸⁰ *Thaler*, 558 F. Supp. 3d at 244.

¹⁸¹ *Id.*

¹⁸² *Id.*

¹⁸³ *Id.* at 245.

¹⁸⁴ *Id.*

¹⁸⁵ *Id.*

¹⁸⁶ *Thaler v. Vidal*, 43 F.4th 1207, 1209–13 (Fed. Cir. 2022).

¹⁸⁷ *Thaler*, 558 F. Supp. 3d at 245.

construction.¹⁸⁸ In analyses requiring construction and interpretation of statutes, the Federal Circuit has held that “the plain language of the statute controls.”¹⁸⁹ Further, the Supreme Court has held that, if the statutory text is unambiguous, it is inappropriate for courts to look beyond the text to interpret the statute.¹⁹⁰

Given this precedent, the district court began its analysis by first looking to the statutory definitions of “inventor” and “joint inventor” expressly provided in the Leahy-Smith America Invents Act of 2011, the most recent amendment of the Patent Act.¹⁹¹ In both cases, Congress employed the term “individual” in the definition.¹⁹² The court also pointed to the use of “individual” to describe an inventor in other provisions of the Patent Act, particularly § 115, which requires the execution of an oath or declaration by “each individual who is the inventor or joint inventor” and permits “a substitute statement in lieu of the oath or declaration ‘with respect to any individual who’ meets the requirements.”¹⁹³ Lastly, the court referred to the requirement that the oath or declaration contain a statement that “such individual believes himself or herself to be the original inventor or joint inventor of [the] claimed invention,” which also uses the term “individual” to modify “inventor.”¹⁹⁴ Observing the recurrent use of “individual” throughout the Patent Act, the court concluded that the question presented in this case turned on the plain meaning of that statutory term.¹⁹⁵

The Supreme Court was recently called to engage in a statutory construction analysis of Congress’s use of “individual” in the Torture Victim Protection Act (TVPA) in *Mohamad v. Palestinian Authority*.¹⁹⁶ Looking to *Mohamad*, the *Thaler* court determined that in order to define “individual,” it must first discern the word’s ordinary meaning, since the Patent Act, like the TVPA, provided no definition.¹⁹⁷ In *Mohamad*, the

¹⁸⁸ *Id.*

¹⁸⁹ *Id.*; see also *Shoshone Indian Tribe of Wind River Rsrv. v. United States*, 364 F.3d 1339, 1345 (Fed. Cir. 2004).

¹⁹⁰ *Thaler*, 558 F. Supp. 3d at 245 (“The preeminent canon of statutory interpretation requires us to ‘presume that [the] legislature says in a statute what it means and means in a statute what it says there.’ Thus, our inquiry begins with the statutory text, and ends there as well if the text is unambiguous.” (alteration in original) (quoting *BedRoc Ltd. v. United States*, 541 U.S. 176, 183 (2004))).

¹⁹¹ *Id.*

¹⁹² See 35 U.S.C. § 100(f)–(g).

¹⁹³ *Thaler*, 558 F. Supp. 3d at 245–46 (quoting 35 U.S.C. § 115(a), (d)).

¹⁹⁴ *Id.* (alteration in original) (quoting 35 U.S.C. § 115(b)).

¹⁹⁵ *Id.*

¹⁹⁶ *Id.* at 246; see *Mohamad v. Palestinian Auth.*, 566 U.S. 449 (2012).

¹⁹⁷ *Thaler*, 558 F. Supp. 3d at 246; see *Mohamad*, 566 U.S. at 454 (“When a statute does not define a term, we typically give the phrase its ordinary meaning.” (quoting *FCC v. AT&T Inc.*, 562 U.S. 397, 403 (2011))).

Supreme Court held that “[t]he ordinary meaning of the word, fortified by its statutory context” pertained to “natural persons alone.”¹⁹⁸ The Court considered various dictionary definitions and found that “[a]s a noun, ‘individual’ ordinarily means ‘[a] human being, a person.’”¹⁹⁹ The Court also recognized that this definition accorded with how the word was used in ordinary speech.²⁰⁰

Although the TVPA and the Patent Act are two separate pieces of legislation involving different subject matter, the district court held that the Supreme Court’s statutory analysis in *Mohamad* remained applicable to *Thaler*.²⁰¹ Thus, because the Patent Act also used the term “individual” as a noun, the court found that the ordinary meaning of “individual” is “a human being, a person.”²⁰² The court further held that, as in *Mohamad*, this definition is consistent with the ordinary usage of the word and pointed out that AI machines are not normally referred to as “individuals” in ordinary speech.²⁰³

The court also looked to the *Mohamad* Court’s analysis of the use of “individual” in the Dictionary Act, a piece of legislation meant to aid in determining the meaning of all acts passed by Congress.²⁰⁴ Noting the Dictionary Act’s use of “individuals” in the definition of “person” as distinct from “corporations,” “societies,” and the other artificial entities before it, the Supreme Court found that “‘Congress does not, in the ordinary course, employ the word any differently’ from its common usage.”²⁰⁵ Additionally, the Court held that Congress is always free to give a word a broader or different meaning; however, the court will not

¹⁹⁸ *Mohamad*, 566 U.S. at 453–54; see *Thaler*, 558 F. Supp. 3d at 246.

¹⁹⁹ *Mohamad*, 566 U.S. at 454 (alteration in original) (quoting OXFORD ENGLISH DICTIONARY 880 (J.A. Simpson & E.S.C. Weiner eds., 2d ed. 1989)) (first citing RANDOM HOUSE DICTIONARY OF THE ENGLISH LANGUAGE 974 (Stuart Berg Flexner ed., 2d ed. 1987) (providing that the definition of individual is “a person”); and then citing WEBSTER’S THIRD NEW INTERNATIONAL DICTIONARY 1152 (Philip Babcock Gove ed., 1986) (providing that the definition of individual is “a particular person”)); see *Thaler*, 558 F. Supp. 3d at 246.

²⁰⁰ *Mohamad*, 566 U.S. at 454 (“We say ‘the individual went to the store,’ ‘the individual left the room,’ and ‘the individual took the car,’ each time referring unmistakably to a natural person. And no one, we hazard to guess, refers in normal parlance to an organization as an ‘individual.’ Evidencing that common usage, this Court routinely uses ‘individual’ to denote a natural person, and in particular to distinguish between a natural person and a corporation.”); see *Thaler*, 558 F. Supp. 3d at 246.

²⁰¹ *Thaler*, 558 F. Supp. 3d at 246.

²⁰² *Id.* (quoting *Mohamad*, 566 U.S. at 454).

²⁰³ *Id.*

²⁰⁴ *Id.*; see also 1 U.S.C. § 1.

²⁰⁵ *Thaler*, 558 F. Supp. 3d at 246 (quoting *Mohamad*, 566 U.S. at 454); see also 1 U.S.C. § 1 (“[T]he words ‘person’ and ‘whoever’ include corporations, companies, associations, firms, partnerships, societies, and joint stock companies, as well as individuals.”).

assume such a result without some indication that it is what Congress intended.²⁰⁶

Here, the court found nothing within the statutory text of the Patent Act that could support Plaintiff's argument that Congress intended to deviate from the ordinary meaning of "individual" as being a natural person.²⁰⁷ The court went on to analyze the language of 35 U.S.C. § 115, which requires the inventor to include a statement in their oath or declaration that "such *individual believes himself or herself* to be the original inventor."²⁰⁸ Applying the doctrine of *noscitur a sociis*,²⁰⁹ the principle that "a word is known by the company it keeps," the court concluded that the use of personal pronouns such as "himself or herself" and the word "believes" to modify "individual" indicates that Congress undoubtedly meant to refer to a natural person.²¹⁰

Looking to the *Mohamad* Court's holding that there exists "a presumption that a given term is used to mean the same thing throughout the statute," the court concluded that the word "individual" must maintain the same meaning throughout the Patent Act.²¹¹ The court found that meaning, fortified by the word's statutory context, to be "natural person," necessarily excluding AI machines.²¹² Lastly, the court rejected Plaintiff's argument that none of the statutory and judicial language referring to inventors as individuals occurred in the context of AI-generated inventions, finding it too weak to undercut the court's holding and the words chosen by Congress.²¹³

Affirming the district court's decision, the Federal Circuit found that the Patent Act is not ambiguous as to the definition of "inventor."²¹⁴ Specifically, the court looked to the statute's consistent use of the term "individual" to refer to inventors and co-inventors in §§ 100(f), 100(g), and 115.²¹⁵ Finding that the Patent Act does not define "individual," the

²⁰⁶ *Thaler*, 558 F. Supp. 3d at 246 (citing *Mohamad*, 566 U.S. at 455).

²⁰⁷ *Thaler*, 558 F. Supp. 3d at 247.

²⁰⁸ *Id.* (quoting 35 U.S.C. § 115(b)(2)).

²⁰⁹ *Gustafson v. Alloyd Co.*, 513 U.S. 561, 575 (1995) (defining the doctrine of *noscitur a sociis* and providing that the Court relies on this rule "to avoid ascribing to one word a meaning so broad that it is inconsistent with its accompanying words, thus giving 'unintended breadth to the Acts of Congress'" (quoting *Jarecki v. G.D. Searle & Co.*, 367 U.S. 303, 307 (1961))).

²¹⁰ *Thaler*, 558 F. Supp. 3d at 247.

²¹¹ *Id.*; see *Mohamad*, 566 U.S. at 456.

²¹² *Thaler*, 558 F. Supp. 3d at 247.

²¹³ *Id.*

²¹⁴ *Thaler v. Vidal*, 43 F.4th 1207, 1210 (Fed. Cir. 2022) ("Here, there is no ambiguity: the Patent Act requires that inventors must be natural persons; that is, human beings."); *id.* at 1213 ("Statutes are often open to multiple reasonable readings. Not so here. This is a case in which the question of statutory interpretation begins and ends with the plain meaning of the text." (citing *Bostock v. Clayton Cnty.*, 140 S. Ct. 1731, 1749 (2020))).

²¹⁵ *Id.* at 1211.

court also looked to *Mohamad*, modern dictionaries, and the Dictionary Act to hold that “individual” is defined as a human being.²¹⁶ Following the district court’s reasoning, the Federal Circuit held that nothing in the Patent Act indicates that Congress intended to deviate from this meaning.²¹⁷

The court also cited the statute’s use of “himself” and “herself” to refer to “individual” in § 115(b)(2) and posited that, “if Congress intended to permit non-human inventors,” it would have used the word “itself” instead.²¹⁸ Regarding the § 115 requirement of an oath or declaration that the inventor believes himself or herself to be the original inventor, the court held that it did not need to “decide whether an AI system can form beliefs.”²¹⁹ The court found, however, that nothing in the record supports the idea that one can form beliefs, since the requisite statements were submitted by Dr. Thaler, rather than by DABUS itself.²²⁰

Lastly, the court rejected all of Thaler’s arguments that various provisions in the Patent Act support the idea that “inventor” should be read broadly to include AI systems.²²¹ The court found that the use of the broader term “whoever” in §§ 101 and 271 was not helpful to Thaler because the Patent Act specifically defines “inventor” using the word “individual,” not “whoever.”²²² Thaler also argued that denying AI inventorship would cause patentability to “depend on ‘the manner in which the invention was made,’” in violation of § 103.²²³ The court found, however, that § 103 concerns *how* an invention is made and does not warrant greater weight in this analysis than a provision that specifically defines *who* may be an inventor.²²⁴ Asserting that it had considered the use of the language “and the broader context of the statute as a whole” in interpreting “inventor,” the Federal Circuit held that the Patent Act “confirms that ‘inventors’ must be human beings.”²²⁵

²¹⁶ *Id.*

²¹⁷ *Id.*

²¹⁸ *Id.*

²¹⁹ *Id.*

²²⁰ *Id.*

²²¹ *Id.* at 1212.

²²² *Id.*; see 35 U.S.C. §§ 101, 271.

²²³ *Thaler*, 43 F.4th at 1212 (quoting 35 U.S.C. § 103).

²²⁴ *Id.*

²²⁵ *Id.*

D. Federal Circuit Precedent

The district court found further support for its conclusion that the word “individual” does not encompass AI machines through its examination of Federal Circuit precedent, which has consistently held that “inventors must be natural persons.”²²⁶

In *University of Utah v. Max-Planck-Gesellschaft Zur Forderung Der Wissenschaften E.V. (Max-Planck)*, the Federal Circuit was faced with issues of sovereign immunity and federal jurisdiction that arose when the University of Utah brought suit against the University of Massachusetts and various other non-state assignees to correct inventorship of two patents.²²⁷ The issue presented before the Federal Circuit was whether a state was a real party in interest in a lawsuit over inventorship of a patent.²²⁸ In holding that “a [s]tate has no core sovereign interest in inventorship,”²²⁹ the *Max-Planck* court found that it is unquestionable “that inventors are the individuals that conceive of the invention” and that conception, “the touchstone of inventorship,” is a mental act.²³⁰ The Federal Circuit further held that, “inventors must be natural persons,” not corporations or sovereigns, in order to perform this mental act.²³¹

Likewise, in *Beech Aircraft Corp. v. EDO Corp.*, Beech Aircraft Corp., an aircraft manufacturer, and its employee brought suit against EDO Corp., an aircraft designer and developer, and the Commissioner of Patents and Trademarks alleging rightful ownership of a patent.²³² There, the Federal Circuit held that a corporation could never be an “inventor” because “only natural persons can be ‘inventors.’”²³³

Although these cases did not pointedly deal with the issue of AI inventorship, the district court held that the Federal Circuit’s express statements that “inventors must be natural persons”²³⁴ and “only natural persons can be ‘inventors’”²³⁵ support the court’s conclusion that the plain meaning of “individual” in the Patent Act must refer “only to a

²²⁶ Thaler v. Hirshfeld, 558 F. Supp. 3d 238, 247 (E.D. Va. 2021) (quoting *Univ. of Utah v. Max-Planck-Gesellschaft Zur Forderung Der Wissenschaften E.V.*, 734 F.3d 1315, 1323 (Fed. Cir. 2013)), *aff’d sub nom.* Thaler v. Vidal, 43 F.4th 1207 (Fed. Cir. 2022); *see also* *Beech Aircraft Corp. v. EDO Corp.*, 990 F.2d 1237, 1248 (Fed. Cir. 1993).

²²⁷ *Max-Planck*, 734 F.3d at 1317–18.

²²⁸ *Id.* at 1318, 1322.

²²⁹ *Id.* at 1323.

²³⁰ *Id.* (quoting *Burroughs Wellcome Co. v. Barr Lab’s, Inc.*, 40 F.3d 1223, 1227–28 (Fed. Cir. 1994)).

²³¹ *Id.*

²³² *Beech Aircraft Corp. v. EDO Corp.*, 990 F.2d 1237, 1239–42 (Fed. Cir. 1993).

²³³ *Id.* at 1248.

²³⁴ *Max-Planck*, 734 F.3d at 1323.

²³⁵ *Beech Aircraft*, 990 F.2d at 1248.

natural person and not to an [AI] machine.”²³⁶ Affirming the district court’s decision, the Federal Circuit further provided that its reasoning in these cases “did not depend on the fact that institutions are collective entities.”²³⁷ Thus, the court held that *Max-Planck* and *Beech Aircraft* confirm that the meaning of “inventor” in the Patent Act is limited to natural persons.²³⁸

E. *Thaler’s Policy Arguments*

Without any facts or legal authority to support his position that AI machines can be inventors under the Patent Act, Thaler’s main argument was that policy considerations and the general purpose of the patent laws require the statute to be read to include AI machines.²³⁹ Thaler argued that allowing patents for AI-generated inventions would increase innovation, encourage the development of AI capable of inventing, and incentivize the commercialization and disclosure of information for human and AI-generated inventions.²⁴⁰ Further, Thaler argued that denying patent protection for AI-generated inventions would risk undermining the entire patent system by failing to incentivize the creation of inventions that are beneficial to society and encouraging people to list themselves as inventors without having actually conceived of the invention because their name is required for patentability.²⁴¹ This would “devalue human inventorship,” Thaler contended, because it would allow people to take credit for work they had not done.²⁴²

Rejecting Thaler’s policy arguments, the district court held that Thaler provided no support for finding that his policy considerations should be given greater weight than the plain meaning of the statute. To the contrary, the court found that Supreme Court and Federal Circuit precedent exists explicitly holding that “policy considerations cannot overcome a statute’s plain language, and that ‘[m]atters of policy are for Congress, not the courts, to decide.’”²⁴³ Dismissing Thaler’s policy

²³⁶ *Thaler v. Hirshfeld*, 558 F. Supp. 3d 238, 247 (E.D. Va. 2021), *aff’d sub nom. Thaler v. Vidal*, 43 F.4th 1207 (Fed. Cir. 2022).

²³⁷ *Thaler*, 43 F.4th at 1212–13.

²³⁸ *Id.* at 1212.

²³⁹ *Thaler*, 558 F. Supp. 3d at 247–48.

²⁴⁰ *Id.* at 248.

²⁴¹ *Id.*

²⁴² *Id.*

²⁴³ *Id.* (alteration in original) (quoting *Fisons PLC v. Quigg*, 876 F.2d 99, 101 (Fed. Cir. 1989)); *see also Sandoz Inc. v. Amgen Inc.*, 137 S. Ct. 1664, 1678 (2017) (“Even if we were persuaded that Amgen had the better of the policy arguments, those arguments could not overcome the statute’s

considerations, the court again emphasized the Supreme Court's holding in *Mohamad*, providing that there must be some showing that Congress intended to give a word a different meaning before the Court will assume Congress has done so and disregard the word's ordinary meaning.²⁴⁴

Further, the court held that Thaler's argument, contending that the USPTO must proffer evidence of Congress's intent to prohibit patents on AI-generated inventions, effectively confused the burden of proof in this case.²⁴⁵ In response to Thaler's assertions that the USPTO had not considered the consequences of its decision when finding that an AI machine could not be an inventor, the USPTO provided direct evidence to the contrary, showing that it continues to study the effects of AI on intellectual property policy and actively considers public opinion on the subject.²⁴⁶ The court also noted that many public commentators disagreed with Thaler, opining that AI machines should not be recognized as inventors.²⁴⁷

Lastly, Thaler argued that the statutes that Defendants relied on were passed when AI-generated inventions did not yet exist and that, if Congress had considered the issue then, it would have included AI machines in the definition of "inventor."²⁴⁸ In response, the USPTO noted, and the court emphasized, that "Congress defined an 'inventor' as an 'individual' through the America Invents Act in 2011," during which time AI already existed.²⁴⁹ Accordingly, the court held that Congress undoubtedly intended to limit the definition of "inventor" to natural persons and rejected Thaler's policy arguments as they could not override the plain meaning of the statutory term.²⁵⁰ In reaching its conclusion, the court did not rule out the possibility that AI machines could someday

plain language, which is our 'primary guide' to Congress' preferred policy." (quoting *McFarland v. Scott*, 512 U.S. 849, 865 (1994) (Thomas, J., dissenting)); *Kimble v. Marvel Ent., LLC*, 576 U.S. 446, 464 (2015) ("Claims that a statutory precedent has 'serious and harmful consequences' for innovation are . . . 'more appropriately addressed to Congress.'" (quoting *Halliburton Co. v. Erica P. John Fund, Inc.*, 573 U.S. 258, 276–77 (2014))).

²⁴⁴ *Thaler*, 558 F. Supp. 3d at 248 (emphasis omitted) (quoting *Mohamad v. Palestinian Auth.*, 566 U.S. 449, 455 (2012)).

²⁴⁵ *Id.*

²⁴⁶ *Id.* at 249. See generally U.S. PAT. & TRADEMARK OFF., PUBLIC VIEWS ON ARTIFICIAL INTELLIGENCE AND INTELLECTUAL PROPERTY POLICY (2020), https://www.uspto.gov/sites/default/files/documents/USPTO_AI-Report_2020-10-07.pdf [<https://perma.cc/U3E9-Z4KB>] (reporting on public comments received by the USPTO upon request at its conference on AI policy held in January 2019).

²⁴⁷ *Thaler*, 558 F. Supp. 3d at 249.

²⁴⁸ *Id.*

²⁴⁹ *Id.*

²⁵⁰ *Id.*

satisfy the requirements of inventorship.²⁵¹ The court specified, however, that if that time came, it would be up to Congress, not the courts, to decide if and how to expand the scope of patent law.²⁵²

Affirming the district court's decision, the Federal Circuit held that Thaler's policy arguments were speculative and lacked support in the Patent Act and in the record.²⁵³ The court also rejected Thaler's argument that denying AI inventorship raises potential constitutional concerns with regard to the Intellectual Property Clause.²⁵⁴ The Intellectual Property Clause is a grant of legislative power to Congress, which Congress chose to use to enact the Patent Act.²⁵⁵ Because Thaler did not and could not argue that denying AI inventorship is unconstitutional, this constitutional avoidance argument also failed.²⁵⁶

IV. ANALYSIS OF THE *THALER* DECISION

A. *The Statutory Definition of "Inventor" Necessarily Excludes AI*

Thaler v. Hirshfeld and *Thaler v. Vidal* presented an issue of first impression in American patent law, requiring the United States District Court for the Eastern District of Virginia and the Court of Appeals for the Federal Circuit, respectively, to engage in statutory interpretation of the Patent Act and determine whether an AI machine can be an inventor.²⁵⁷ The *Thaler* courts correctly answered that question in the negative.²⁵⁸

The Supreme Court has held that the preeminent canon of statutory construction requires courts to "presume that [the] legislature says in a statute what it means and means in a statute what it says there."²⁵⁹ If the statutory text is unambiguous, the court's inquiry must end there.²⁶⁰ Section 100 of the Patent Act provides unequivocal definitions for the meaning of "inventor" and "joint inventor," both of which distinctly

²⁵¹ *Id.* ("As technology evolves, there may come a time when artificial intelligence reaches a level of sophistication such that it might satisfy accepted meanings of inventorship.")

²⁵² *Id.*

²⁵³ *Thaler v. Vidal*, 43 F.4th 1207, 1213 (Fed. Cir. 2022).

²⁵⁴ *Id.*

²⁵⁵ *Id.*; U.S. CONST. art 1, § 8, cl. 8.

²⁵⁶ *Thaler*, 43 F.4th at 1213.

²⁵⁷ *Thaler*, 558 F. Supp. 3d at 241; *Thaler*, 43 F.4th at 1209.

²⁵⁸ *Thaler*, 558 F. Supp. 3d at 240; *Thaler*, 43 F.4th at 1210.

²⁵⁹ *BedRoc Ltd. v. United States*, 541 U.S. 176, 183 (2004) (alteration in original) (quoting *Conn. Nat'l Bank v. Germain*, 503 U.S. 249, 253–54 (1992)).

²⁶⁰ *Id.*

reference an “individual” or “individuals.”²⁶¹ Congress also uses the term “individual” in various other provisions of the Patent Act, significantly in § 115, which requires that the inventor or joint inventor execute an oath or declaration stating that such “individual believes himself or herself” to be the original inventor.²⁶² The Supreme Court has held that when a statute does not define a term, courts customarily give the term its ordinary meaning.²⁶³ Therefore, because Congress did not define the term “individual” in the Patent Act, the courts correctly examined the word’s ordinary meaning in its statutory construction analysis.

The courts looked to the language of § 115, the Dictionary Act, and Supreme Court precedent and aptly determined that the ordinary meaning of individual was “a human being, a person.”²⁶⁴ In addition to these authorities, another source exists that can further support the courts’ conclusion—the online Merriam-Webster dictionary and thesaurus.²⁶⁵ This source defines “individual” as “a single human being” and lists the words “human,” “man,” “mortal,” and “person” as synonyms.²⁶⁶ These definitions necessarily exclude AI machines from the meaning of “individual” and further support the court’s holding as to the use of the word in ordinary speech.²⁶⁷

Turning to the language of the Patent Act, 35 U.S.C. § 101 explicitly provides that “[w]hoever invents or discovers any new and useful process, machine, manufacture, or composition of matter . . . may obtain a patent therefor.”²⁶⁸ Had the Federal Circuit found Thaler’s argument regarding the Patent Act’s use of “whoever” more persuasive,²⁶⁹ his argument still would have failed because “whoever” is defined in the dictionary to mean “whatever *person*: no matter who.”²⁷⁰ Thus, the term “whoever” also necessarily limits patent protection to inventions by natural persons.²⁷¹ Moreover, Congress’s use of the words “himself” and “herself” in relation to “individual” in § 115 clearly indicates that “individual” refers to a

²⁶¹ 35 U.S.C. § 100(f)–(g).

²⁶² *Id.* § 115(b).

²⁶³ *FCC v. AT&T Inc.*, 562 U.S. 397, 403 (2011).

²⁶⁴ *See supra* Section III.C.

²⁶⁵ *See Individual*, MERRIAM-WEBSTER, <https://www.merriam-webster.com/dictionary/individual#synonyms> [<https://perma.cc/P6KP-KT7G>].

²⁶⁶ *Id.*

²⁶⁷ *See supra* Section III.C.

²⁶⁸ 35 U.S.C. § 101 (emphasis added).

²⁶⁹ *See Thaler v. Vidal*, 43 F.4th 1207, 1212 (Fed. Cir. 2022).

²⁷⁰ *Whoever*, MERRIAM-WEBSTER (emphasis added), <https://www.merriam-webster.com/dictionary/whoever> [<https://perma.cc/VA53-7T7Q>].

²⁷¹ U.S. PAT. & TRADEMARK OFF., *supra* note 246, at 4 (providing the opinion of practitioners of patent law on the issue of AI inventorship).

person and cannot possibly refer to a machine.²⁷² “Himself” is used in ordinary language to refer to a male person and is defined in the dictionary to mean “that identical male one.”²⁷³ “Herself” is defined similarly and used likewise to refer to a female.²⁷⁴ As inanimate objects, AI machines are typically not referred to using gender pronouns in ordinary speech;²⁷⁵ thus, “individual” in the Patent Act could not possibly be interpreted to include them. Further, § 115 provides that the individual who makes the oath or declaration “believes himself or herself to be the original inventor.”²⁷⁶ As AI does not yet possess consciousness at a human level, it cannot “believe” itself to be anything.²⁷⁷

Congress also specifically referred to a person in the context of inventors in 35 U.S.C. § 116, providing that when an invention is made “by two or more *persons* jointly,” they must apply for the patent jointly and each make the oath required by § 115.²⁷⁸ It is undebatable that § 116 leaves no room for the inclusion of AI machines in inventorship or execution of the oath; thus, it is exceedingly unlikely that the interpretation of § 115 and the other provisions of the Patent Act is meant to lead to a different conclusion.²⁷⁹

The Federal Circuit also rightly rejected Thaler’s argument that § 103, which states that “[p]atentability shall not be negated by the manner in which the invention was made,”²⁸⁰ would be violated if AI

²⁷² See 35 U.S.C. § 115(b).

²⁷³ See *Himself*, MERRIAM-WEBSTER, <https://www.merriam-webster.com/dictionary/himself> [<https://perma.cc/3ZL7-T2CA>].

²⁷⁴ See *Herself*, MERRIAM-WEBSTER, <https://www.merriam-webster.com/dictionary/herself> [<https://perma.cc/4N8P-Y47N>].

²⁷⁵ Jennifer Betts, *Grammar Rules for He/She/They Usage*, YOUR DICTIONARY, <https://grammar.yourdictionary.com/style-and-usage/grammar-rules-for-he-she-usage.html> [<https://perma.cc/53LX-AZ4D>] (providing that gender-specific pronouns are generally not ascribed to inanimate objects in the English language except under certain circumstances not applicable here).

²⁷⁶ 35 U.S.C. § 115(b).

²⁷⁷ See Elisabeth Hildt, *Artificial Intelligence: Does Consciousness Matter?*, FRONTIERS, July 2, 2019, at 1, 1, 2, <https://www.frontiersin.org/articles/10.3389/fpsyg.2019.01535/full> [<https://perma.cc/7YCJ-DKNL>] (providing that “weak AI assumes that machines do not have consciousness, mind and sentience but only simulate thought and understanding” and that “[o]verall, researchers broadly agree that current machines and robots are not conscious”).

²⁷⁸ See 35 U.S.C. §§ 115–116 (emphasis added). The Patent Act also refers to a person with regard to the required oath or declaration in § 371, providing that an applicant shall file “an oath or declaration of the inventor (or other *person* authorized under chapter 11) complying with the requirements of section 115” to commence the national stage of a PCT application, implying again that an inventor must be a person. *Id.* § 371(c)(4) (emphasis added) (citation omitted).

²⁷⁹ The harmonious-reading canon provides that provisions of a statute “should be interpreted in a way that renders them compatible, not contradictory.” CONG. RSCH. SERV., STATUTORY INTERPRETATION: THEORIES, TOOLS, AND TRENDS 52 & n.534 (2022).

²⁸⁰ 35 U.S.C. § 103.

inventorship were denied.²⁸¹ This argument necessarily fails because § 103 deals only with the question of obviousness, not inventorship, and the quoted language in particular is meant to suggest that, for purposes of this inquiry, it does not matter whether the invention resulted from extensive experimentation or a “flash of genius,” and hindsight should not be mingled with that analysis.²⁸²

The Dictionary Act, enacted in 1871, further supports the *Thaler* courts’ construction of the term “individual.”²⁸³ The Act provides definitions for certain words, which courts may look to when determining the meaning of any federal law.²⁸⁴ Although courts have applied the Dictionary Act somewhat inconsistently over the last century,²⁸⁵ it can still provide significant guidance in understanding the linguistic intentions of Congress.²⁸⁶

In analyzing the Dictionary Act’s definition of “person,” the courts correctly concluded that the separation of the word “individuals” from the other words in the definition, such as “corporations,” “associations,” “partnerships,” and “societies,” implies that “individuals” does not refer to a lifeless entity and means something distinctly different.²⁸⁷ In conjunction with this, however, Defendants failed to argue, and both courts failed to consider, that the Dictionary Act also sets forth a definition for the word “individual” specifically.²⁸⁸ Section 8 of Title 1 of the U.S. Code provides that, in determining the meaning of any federal legislation, “or of any ruling, regulation, or interpretation of the various administrative bureaus and agencies of the United States,” the word “individual [will] include every infant member of the species homo sapiens who is born alive at any stage of development.”²⁸⁹ This definition, last amended by Congress in 2002, unequivocally demonstrates that the

²⁸¹ *Thaler v. Vidal*, 43 F.4th 1207, 1212 (Fed. Cir. 2022).

²⁸² See 35 U.S.C. § 103 note (Historical and Revision Notes) (“The second sentence [of § 103] states that patentability as to this requirement is not to be negated by the manner in which the invention was made, that is, it is immaterial whether it resulted from long toil and experimentation or from a flash of genius.”); Daryl Lim, *AI & IP: Innovation & Creativity in an Age of Accelerated Change*, 52 AKRON L. REV. 813, 859 (2018) (“[S]ection [103] deals specifically with the nonobviousness enquiry and, in particular, suggests that hindsight should not be used in determining whether the invention was obvious.”).

²⁸³ See 1 U.S.C. § 1.

²⁸⁴ See *id.*

²⁸⁵ See Emily J. Barnet, *Hobby Lobby and the Dictionary Act*, 124 YALE L.J.F. 11, 11–12, 12 n.9 (2014).

²⁸⁶ See *id.* The Dictionary Act applies to *all* congressional legislation. See *Ngiraingas v. Sanchez*, 495 U.S. 182, 190 (1990).

²⁸⁷ See 1 U.S.C. § 1; *Thaler v. Hirshfeld*, 558 F. Supp. 3d 238, 246 (E.D. Va. 2021), *aff’d sub nom. Thaler v. Vidal*, 43 F.4th 1207 (Fed. Cir. 2022); *Thaler*, 43 F.4th at 1211.

²⁸⁸ See 1 U.S.C. § 8.

²⁸⁹ *Id.*

Patent Act, last amended in 2011, does not contemplate the possibility of AI machines as inventors.²⁹⁰

Further, the Supreme Court in *Mohamad* held that there must be some indication in the text of the statute that Congress intended to give a term a broader or different meaning before the Court will assume it has done so.²⁹¹ Adhering to this principle, the courts correctly concluded that the Patent Act is void of any language that could suggest an intention on the part of Congress to broaden the definition of “inventor” to include AI machines.²⁹² In denying AI inventorship under the Patent Act, the courts also properly relied on the *Max-Planck* and *Beech Aircraft* Federal Circuit decisions, holding that only natural persons can be inventors.²⁹³ Although the cases considered the issue of inventorship in relation to corporations and sovereigns, not AI, they remain applicable here because no language in the opinions exists to limit the holdings to those entities, and the statements made by the Federal Circuit were not dicta but direct resolutions of the issues at bar.²⁹⁴

Lastly, the courts properly dismissed Thaler’s policy arguments. The Supreme Court and Federal Circuit have consistently held that policy arguments cannot override a statute’s plain language and that matters of policy are more appropriately addressed to Congress.²⁹⁵ Looking to the U.S. Constitution, Thaler correctly explained that Congress and the founders enacted the Intellectual Property Clause in order to incentivize innovation and promote the disclosure of information that would otherwise be kept secret.²⁹⁶ However, it would be improper for a court to

²⁹⁰ See *id.*; 35 U.S.C. § 100(f)–(g).

²⁹¹ *Mohamad v. Palestinian Auth.*, 566 U.S. 449, 455 (2012).

²⁹² *Thaler*, 558 F. Supp. 3d at 246–47; *Thaler*, 43 F.4th at 1211–12.

²⁹³ See generally *Univ. of Utah v. Max-Planck-Gesellschaft Zur Forderung Der Wissenschaften E.V.*, 734 F.3d 1315 (Fed. Cir. 2013); *Beech Aircraft Corp. v. EDO Corp.*, 990 F.2d 1237 (Fed. Cir. 1993).

²⁹⁴ See generally cases cited *supra* note 293.

²⁹⁵ See *Fisons PLC v. Quigg*, 876 F.2d 99, 101 (Fed. Cir. 1989) (“Matters of policy are for Congress, not the courts, to decide.”); *Sandoz Inc. v. Amgen Inc.*, 137 S. Ct. 1664, 1678 (2017) (“Even if we were persuaded that Amgen had the better of the policy arguments, those arguments could not overcome the statute’s plain language, which is our ‘primary guide’ to Congress’ preferred policy.” (quoting *McFarland v. Scott*, 512 U.S. 849, 865 (1994) (Thomas, J., dissenting))); *Kimble v. Marvel Ent., LLC*, 576 U.S. 446, 464 (2015) (“Claims that a statutory precedent has ‘serious and harmful consequences’ for innovation are . . . ‘more appropriately addressed to Congress.” (quoting *Halliburton Co. v. Erica P. John Fund, Inc.*, 573 U.S. 258, 276–77 (2014))); *Artuz v. Bennett*, 531 U.S. 4, 10 (2000) (“Whatever merits these and other policy arguments may have, it is not the province of this Court to rewrite the statute to accommodate them.”); *Dominion Res., Inc. v. United States*, 641 F.3d 1359, 1363 (Fed. Cir. 2011) (“[T]hese policy arguments do not trump the plain language of the statute.”).

²⁹⁶ See *Promoting Progress*, U.S. CAPITOL VISITOR CTR., <https://www.visitthecapitol.gov/artifact/hr-41-bill-promote-progress-useful-arts-patent-act-march-10-1790> [https://perma.cc/

issue an opinion that is contrary to the language of the statute, based solely on policy considerations.²⁹⁷ Thus, Thaler's contentions that construction of the term "individual" to mean "human being" will lead to absurd and disastrous outcomes,²⁹⁸ that "[t]he future of innovation is at stake in this case,"²⁹⁹ and that Defendants' interpretation will discourage the development of AI capable of producing socially valuable inventions³⁰⁰ were properly rejected by the courts.

B. *Arguments For and Against AI Inventorship and Possible Resolutions*

The strongest argument for recognizing AI machines as inventors is that doing so would further the constitutional imperative, set forth in Article I, Section 8 of the U.S. Constitution, to "promote the [p]rogress of [s]cience and useful [a]rts."³⁰¹ Our patent system achieves this fundamental goal by granting inventors the right to exclude in exchange for their full disclosure of the technical details of their invention, enabling researchers to use disclosed knowledge to push science forward.³⁰² Thus, an argument can be made that allowing AI inventorship would promote innovation and scientific discovery because inventors will be more motivated to invest in AI-generated invention if they are guaranteed a

VJN2-8NNE]; *Graham v. John Deere Co.*, 383 U.S. 1, 5–6 (1966) ("The [Intellectual Property] [C]lause is both a grant of power and a limitation. . . . The Congress in the exercise of the patent power may not overreach the restraints imposed by the stated constitutional purpose. Nor may it enlarge the patent monopoly without regard to the innovation, advancement or social benefit gained thereby. Moreover, Congress may not authorize the issuance of patents whose effects are to remove existent knowledge from the public domain, or to restrict free access to materials already available. Innovation, advancement, and things which add to the sum of useful knowledge are inherent requisites in a patent system which by constitutional command must 'promote the Progress of . . . useful Arts.' This is the standard expressed in the Constitution and it may not be ignored." (second omission in original)); Jeanne C. Fromer, *The Intellectual Property Clause's External Limitations*, 61 DUKE L.J. 1329, 1362 (2012) ("[The] promotion of the progress of science and useful arts is the purpose for which Congress may enact intellectual property legislation"); *In re Sarkar*, 588 F.2d 1330, 1332 (C.C.P.A. 1978) ("[T]he fundamental purposes of the patent law [are] to encourage inventions, their disclosure, and their commercialization").

²⁹⁷ See generally cases cited *supra* note 293.

²⁹⁸ Memorandum of Law in Support of Plaintiff's Opposition to Defendant's Motion for Summary Judgment & Reply to Defendants' Opposition to Plaintiff's Motion for Summary Judgment at 11, *Thaler v. Hirshfeld*, 558 F. Supp. 3d 238 (E.D. Va. 2021) (No. 1:20-cv-00903).

²⁹⁹ *Id.* at 12 (alteration in original).

³⁰⁰ *Id.*

³⁰¹ See U.S. CONST. art 1, § 8, cl. 8; see also Abbott, *supra* note 42, at 19; Comer, *supra* note 34, at 474–76.

³⁰² Sean B. Seymore, *Symposium: The Disclosure Function of the Patent System*, 69 VAND. L. REV. 1455, 1455 (2016); see also Schwein, *supra* note 34, at 577.

legal monopoly on those inventions.³⁰³ The possibility of a lucrative return on investment of time, effort, and money enabled by the right to exclude incentivizes researchers to discover, create, and invent.³⁰⁴

Consequently, granting AI inventorship would encourage researchers to develop more AI capable of inventing, thus incentivizing human innovation.³⁰⁵ It would also increase the economic efficiency of innovation by lowering the time, effort, and resources needed to make a functional discovery.³⁰⁶ Making AI-generated inventions patentable, although there is no human inventor involved, would also give greater value to the inventions and to AI generally, further incentivizing inventors, patentees, and companies to invest in AI and promote the progress of science.³⁰⁷

Recognizing AI inventorship would also promote disclosure and commercialization.³⁰⁸ If AI-generated inventions are granted patentability, owners of these AI systems would be incentivized to apply for patent protection and disclose their invention to the public rather than keep their inventions as trade secrets.³⁰⁹ Granting AI inventorship would also protect the moral integrity of the American patent system.³¹⁰ By allowing applicants to list AIs as inventors, the patent system would mitigate the risk of humans falsely claiming credit for an AI's invention and harming other human inventorship.³¹¹ Lastly, accepting AIs as inventors could give the U.S. patent regime a competitive advantage over its foreign counterparts.³¹² While other countries grapple with the issue of expanding inventorship to AI, the USPTO could challenge the norm

³⁰³ Comer, *supra* note 34, at 475.

³⁰⁴ *Id.* at 475, 480.

³⁰⁵ *Id.* at 480.

³⁰⁶ Fok, *supra* note 34, at 65 (discussing how “AI inventorship could spur the use and development” of AI capable of inventing and it could increase economic efficiency).

³⁰⁷ Abbott, *supra* note 42, at 19 (“[AI inventorship] would encourage innovation under an incentive theory. Patents on computational inventions would have substantial value independent of the value of creative computers; allowing computers to be listed as inventors would reward human creative activity upstream from the computer’s inventive act. Although AI would not be motivated to invent by the prospect of a patent, it would motivate computer scientists to develop creative machines.”).

³⁰⁸ *Id.*

³⁰⁹ *Id.* (“Without the ability to obtain patent protection, owners of creative computers might choose to protect patentable inventions as trade secrets without any public disclosure.”).

³¹⁰ Comer, *supra* note 34, at 477–78.

³¹¹ *Id.* (“While humans taking credit for AI creations is not unfair to the machine, such a trend would harm other human inventors by equating the work of an AI to a person who potentially could have done very little.”).

³¹² Fok, *supra* note 34, at 65–66.

and spur further patenting and investment in AI inventions in the United States.³¹³

Although granting AI inventorship seems consistent with the Constitution, it has been argued that doing so would contradict the framers' intent of allowing human inventors to "own the fruits of their labor."³¹⁴ The Intellectual Property Clause of the U.S. Constitution grants Congress the enumerated power to promote the progress of science "by securing for limited [t]imes to . . . [i]nventors the exclusive [r]ight to their . . . [d]iscoveries."³¹⁵ Since AI did not exist when the Constitution was written, it is possible that the framers intended only humans to own patents; however, it has been argued that if that were the case, patent ownership would have been treated as an explicit natural right, as is the right to own property, rather than a statutory right.³¹⁶ Further, since the framers could not have contemplated the issue at the time, it has also been argued that they could not have intended to exclude AI from being deemed an inventor.³¹⁷

Granting AI inventorship would pose some significant challenges.³¹⁸ First, even if AIs were listed as inventors, it would not dispose of the inventorship issues that inevitably arise with AI-generated inventions.³¹⁹ Because the risks that come with not naming the correct inventors are high,³²⁰ courts and patent offices would still have to decide whether the humans that may have been involved, such as the AI developer or the AI programmer, are also inventors under the Patent Act.³²¹ Second, issues would continue to exist regarding the transfer of ownership.³²² Under the current law, even if an AI were granted inventorship, it would not be able to own the patent rights to the invention, let alone transfer them.³²³ Lastly, AI-generated inventions could complicate the novelty, obviousness, and enablement inquiries by raising the person of ordinary skill in the art standard.³²⁴ The elevation of this standard could constrict the ability of

³¹³ *Id.*

³¹⁴ Comer, *supra* note 34, at 475.

³¹⁵ U.S. CONST. art. I, § 8, cl. 8.

³¹⁶ Comer, *supra* note 34, at 475–76.

³¹⁷ *Id.* at 476.

³¹⁸ *See infra* notes 319–26.

³¹⁹ Lim, *supra* note 282, at 859–61.

³²⁰ *Id.* at 860–61 (explaining the possible risks, including claim rejection and invalidation of an issued patent based on inequitable conduct).

³²¹ *Id.* at 859–60.

³²² Fok, *supra* note 34, at 70.

³²³ *Id.*

³²⁴ *Id.* at 71–72.

human inventors to obtain patents and could make patenting more difficult overall.³²⁵

Various avenues exist for the potential resolution of these challenges.³²⁶ One option is to eliminate the inventor disclosure requirement entirely.³²⁷ Another is to require patent applicants to disclose the use of AI in the inventive process.³²⁸ Yet another is to grant ownership of patented AI-generated works only to the owner of the AI, or to the person who exercised control over the AI, whether or not the owner.³²⁹ Whichever path is chosen, whether to expand the scope of the patent laws to allow for AI inventorship is a decision rightfully left to Congress, not the courts.³³⁰

CONCLUSION

Forced to deal with the unprecedented issue of AI inventorship, the United States District Court for the Eastern District of Virginia in *Thaler v. Hirshfeld* and the Court of Appeals for the Federal Circuit in *Thaler v. Vidal* correctly held that an AI machine may not be listed as an inventor on a U.S. patent application under the Patent Act.³³¹ Looking to the statutory language, case law precedent, and various dictionary definitions, the courts properly construed the ordinary meaning of the term “individual” to mean “a human being, a person,” and concluded that only natural persons can be inventors.³³²

Although Congress has recently amended the Patent Act through its enactment of the Leahy-Smith America Invents Act of 2011, it is clear that AI technology is going to continue to evolve and change the way we understand innovation.³³³ Congress should look proactively at the issue of AI in intellectual property law and amend the Patent Act to explicitly include or exclude AI machines as inventors. Doing so will better inform future patentees of the patentability requirements and provide notice to

³²⁵ *Id.* at 72.

³²⁶ See *infra* notes 327–30.

³²⁷ Lim, *supra* note 282, at 861.

³²⁸ *Id.*

³²⁹ U.S. PAT. & TRADEMARK OFF., *supra* note 246, at 7 (reporting that some patent law experts opined that “while inventorship and ownership rights should not be extended to machines, consideration should be given to expanding ownership to a natural person: (1) who trains an AI process, or (2) who owns/controls an AI system” (footnote omitted)).

³³⁰ See generally cases cited *supra* note 293.

³³¹ *Thaler v. Hirshfeld*, 558 F. Supp. 3d 238, 240 (E.D. Va. 2021), *aff’d sub nom.* *Thaler v. Vidal*, 43 F.4th 1207, 1210 (Fed. Cir. 2022).

³³² *Thaler*, 558 F. Supp. 3d at 246–47; *Thaler*, 43 F.4th at 1211–12.

³³³ OFF. OF THE CHIEF ECONOMIST, U.S. PAT. & TRADEMARK OFF., *supra* note 14, at 2.

all members of the patent system, ensuring that, if and when artificial general intelligence is born, American patent law will be ready.