

Illustrating the Invention: Lessons for Today Drawn From The Patent Models Of A Different Age

May 02, 2024

Patent law has evolved in many ways since 1790. One of the most notable is that physical models are no longer required, as they were until around 1880.

Recently, The New Yorker published a [fantastic article](#) in its March 12, 2024 issue entitled “America’s Last Top Models,” which got us thinking about what we can learn from those models in drafting patent applications today. Modern patent law includes requirements that, taken together, try to reach the same level of clarity and completeness provided by patent models. Even though many inventions today are not tangible to the naked eye, patent models still have lessons for inventors and the patent attorneys who help them draft applications directed to inventions enabled by generative AI, quantum computing, biotechnology, and other modern wonders.

I. History of Patent Models

For many years, making an invention and filing a patent application often involved actually making a physical device that works.^[1] The first patent law, the U.S. Patent Act of 1790, required inventors to submit models with their patent applications “if the nature of the invention or discovery will admit of a model.”^[2] The 1793 Patent Act omitted the earlier requirement for all applicants to submit a model, specifying instead that a model was required only if the Secretary of State considered it necessary for understanding the invention.^[3] The Patent Act of 1836 restored the model requirement, suggesting that a model was necessary in almost all cases.^[4] Overall, most patent applications, between 1790 to 1880, were to be accompanied by models, which made sense, as those applications mostly concerned technologies at visible scales with mechanical parts.



Figure 1: Robert Bogle's patent from May 5, 1857, describes an enhancement for duck-shooting boats. This invention includes a floating base featuring integrated waterproof leggings where a hunter can remain concealed.^[5] (Photograph courtesy of Hagley Museum and Library)

The requirement to submit a model was finally dropped in the Patent Act of 1952, which is the basic patent law that still applies today. Before 1952, the Commissioner of Patents could still request a model if it was deemed necessary to fully understand a patent application. Most patent models were lost to time and fires, but those that survive provide a unique window into American invention and can also serve to give life and meaning to the standards codified in the 1952 Patent Act.



Figure 2: The patent granted to Constantine De Bodisco and Pedro De Rivera on September 21, 1869, included an artificial sledding hill and the model as shown above. During the cold months, the slope was soaked with water to create a hard, slick surface suitable for sledding. Additionally,

the structure featured a tower equipped with both an elevator and a spiral staircase to allow individuals to easily ascend to the starting point at the top.^[6] (Photograph courtesy of Hagley Museum and Library)

II. Post-1952: The Age of Intangible Inventions

The Patent Act of 1952, codified in Title 35 of the United States Code, made significant contributions to U.S. patent law by introducing or codifying several key features and concepts that continue to define the U.S. patent system today. These include non-obviousness, contributory infringement, and statutory subject matter. Notably, the 1952 Act did not require inventors to submit models or prototypes of their inventions, and no longer assumed that the invention was approaching commercialization – rather, it only required a written description of something that works, accompanied by necessary illustrations or figures.^[7] The 1952 Act also codified patent law principles of enablement, written description, best mode, and definiteness, which are set forth in 35 U.S.C. Section 112.

The Patent Act of 1952 did not single-handedly kill patent models, but rather codified and continued the practice after 1880 where models were not a general requirement for filing a patent application. Advancements in patent documentation also contributed to the removal of the model requirement. More detailed drawings and specifications made invention disclosures more efficient, improving communication of the inventions' structures and features.^[8] Advancements in technology, wherein even mechanical inventions became complicated and expensive to model outside of drawings, really made patent models obsolete.

III. Today's Technology and the Enablement Requirement

Today's technology spans a wide range. This includes, *inter alia*, pharmaceuticals, large language models and generative AI systems, computer-enabled data and process management systems, and all kinds of hardware and mechanical systems. These technologies involve complex elements including nanoscale and semiconductor structures, as well as systems with hundreds or thousands of components.

To manage this complexity, U.S. patent law and regulations mandate that a patent applicant describe, through drawings and text, their inventions to the extent that any person skilled in the application's field can not only make the invention, but also use it.^[9] This mandate is often referred to as "enablement." This can be done with words, with figures, with flow charts, and with chemical structures. It can be done with test results, measurement requirements, really any methods of describing the structure, characteristics, or operation of the invention.

A patent's scope is not defined by all of this descriptive material, however – it is defined by the claims at the end of the patent. Patent models used to provide a key link between the scope of the patent and the description. How does the enablement requirement do that today?

Last year, the U.S. Supreme Court, in *Amgen et al. v. Sanofi*, 598 U.S. 594 (2023), addressed this question. The Court was asked to decide whether the definition of enablement in 35 USC §112 requires that (1) the specification of a patent teaches those skilled in the art *to make and use some embodiments of the claimed invention*, or whether (2) the specification must enable those skilled in the art *to reach the full scope of claimed embodiments without undue experimentation*.

The Court concluded that the second option is the correct one: enablement means a person skilled in the art must be able to reach the full scope of claimed embodiments, without undue experimentation and substantial time and effort, upon reading the patent application.^[10] The Court supported its holding by pointing to the Patent Act of 1790, the very same act which first required patent models. The Court referenced the 1790 Act's concern with public benefits of patents, which include benefits of inventions and discoveries. The Court also noted that the enablement requirement remains largely intact even as Congress has revised the patent laws over time.^[11]

In view of the Supreme Court's holding, patent applicants are advised to explain their invention, through drawing and text, to the extent a reader having skill in the relevant field could reproduce multiple examples of the invention with little difficulty. And to focus their claims on the enabled examples, rather than reach more broadly for any embodiment that might have the same function as the examples in the application.

In effect, Applicants must present “virtual models” in drawings and in text and provide drawings “where necessary for the understanding of the subject matter sought to be patented,”^[12] which is almost every invention.^[13]

Even patents directed to generative artificial intelligence systems should have a clear visual patent disclosure. A visual disclosure aids in describing an invention in sufficient detail so that one skilled in the relevant art can reasonably conclude that the inventor had possession (i.e., by providing a detailed account of the claimed invention, including all its specifications, through the use of comprehensive descriptions, structures, figures, diagrams, and formulas that thoroughly outline the invention’s components and functions).^[14] Describing the invention in the manner above leads to satisfaction of the “written description” requirement, which is included in 35 U.S.C. §112.

For example, inventors working for OpenAI illustrate a system for generating an image corresponding to a text input as follows:

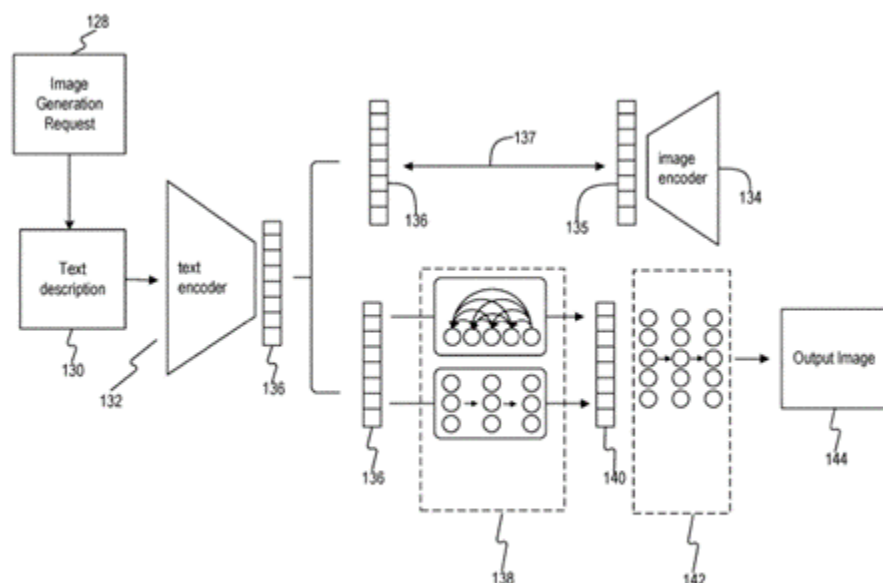


Fig. 1B

Figure 3: A drawing from U.S. Patent No. 11,922,550.

The image above presents a virtual system through reference to conceptual structural parts. Each part has a numeral, and the numerals are referenced throughout the patent application to aid a reader in understanding the system. The patent application uses a “show-and-tell” style of disclosure, following the basic format that would be used in describing a physical model.

For example, think of a patent application as a cookbook. An effective cookbook shows a cook with basic skills how to reproduce a dish without resorting to a physical model of the dish. An ineffective cookbook would cause its reader to experiment and be uncertain as to how to reproduce the dish. Different readers would prepare different tasting and looking final dishes. An effective patent application enables persons skilled in the relevant field, picking up the application and reading it carefully, to consistently reproduce the dishes described and illustrated in the drawings.

Patent applicants should still try to describe today’s inventions in a way that makes them feel like they could be held in our hands. So, rather than describing a large language model only as a “neural network,” which could be visualized in many different ways, careful structural descriptions of the physical and software components of the large language model that work together to embody the invention at issue should

be provided. For example, a large language model, while requiring significant computational power, typically is provided by a physical server equipped with physical high-performance graphics processing units. Large language models also need storage hardware, and that hardware may be connected to an aspect of the large language model, such as a layer of computational units. Computational units may include conceptual tokens, which are analogous to pieces of texts. By using structural terms to explain how the large language model works, when accompanied by a drawing making it clear that the structure is intangible, a patent examiner, a judge, and a jury will have an easier time visualizing and understanding how the invention works.

IV. Patentable Subject Matter Must Be Made By Man

Today's technologies have advanced to the extent that some of those technologies may be capable of making inventions on their own. Today's patent laws are clear, however, that only a human being can be an inventor, not a machine or a large language model.^[15] For example, large language models may draft claims with little to no assistance from an individual prompting the model. This has led to the U.S. Patent and Trademark Office issuing guidance on "AI-assisted inventions." The guidance teaches that, among other things, "while AI systems and other non-natural persons [13] cannot be listed as inventors on patent applications or patents, the use of an AI system by a natural person(s) does not preclude a natural person(s) from qualifying as an inventor (or joint inventors) if the natural person(s) significantly contributed to the claimed invention...." The human touch is still needed to make as well as describe an invention.

The 1952 Patent Act codified the scope of patentable subject matter as "any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof."^[16] That is, natural phenomena, laws of nature, and abstract ideas (e.g., mathematical formulas and methods which can be performed solely by humans, without any technological aid) are not patent-eligible subject matter.^[17] The Supreme Court has famously said that "anything under the sun that is made by man" is eligible for patent protection.^[18]

The patent models of yesteryear made it easy to see that the invention was "made by man." In the case of *AI Visualize, Inc. v. Nuance Communications, Inc.*, the Federal Circuit affirmed the lower court's decision that the asserted claims were directed to an abstract idea—specifically, "retrieving user-requested, remotely stored information."^[19] The details provided at oral arguments by AI Visualize's attorney regarding how new frames are created and transmitted were not reflected in the claims or the detailed description of the patent specification.^[20] Chief Judge Moore specifically noted during the oral arguments that the patent specification lacked detailed information on how the server actually implements the creation of virtual views.^[21] This absence indicated that the technical specifics mentioned at oral arguments were not part of the invention as claimed in the patent.^[22] Since the claims did not sufficiently incorporate these technical details, they were found to merely embody the abstract idea itself, using conventional computer technology, and thus did not meet the criteria for patent eligibility.^[23]

The *AI Visualize* case highlights the need for inventors to provide a detailed and clear description of their technology when applying for a patent. This can be easily accomplished with clear and detailed drawings or visualizations, which can play a crucial role in demonstrating how an invention moves beyond an abstract idea to a concrete application. For example, the subject matter of the *AI Visualize* case involved technology for visualizing 3D/4D medical scans via a web portal.^[24] Such a visualization technology inherently relies on detailed graphical representations to explain how it functions differently from prior art or standard methods. Without adequate **visual** and textual descriptions that clearly delineate the novel aspects of the technology, the patent claims can be deemed too abstract. Comprehensive drawings and visualizations that had depicted these processes might have strengthened the argument that the invention involved more than just abstract ideas and utilized a novel application of technology.

Conclusion

In conclusion, as we navigate through the complexities of modern technology, the precision of patent descriptions becomes paramount. Just as a physical model once offered a tangible grasp of an invention, detailed textual and visual representations in patent applications must now serve a similar purpose. Ensuring that these descriptions are as informative and accessible as holding a model in one's hand is crucial, not only

for protecting intellectual property but also for fostering innovation and public understanding. Clear and comprehensive patent documentation ensures that once a patent expires, the knowledge remains with the public, enabling widespread application and further innovation.

America's Last Top Models, Nicola Twilley, The New Yorker, March

Nicola Twilley, The New Yorker © Conde Nast

[1] See *Clark Thread Co. v. Willimantic Linen Co.*, 140 U.S. 481, 489 (1891) ("It is evident that the invention was not completed until the construction of the machine."); *Earle v. Sawyer*, 8 F. Cas. 254, 256 (C.C.D. Mass. 1825) (Story, J.).

[2] Patent Act of 1790, Ch 7, 1 Stat 109–112 (10 April 1790), s 2. On the legislative history of this provision see Kendall J. Dood 'Patent Models and the Patent Law: 1790–1880 (Part I)' (1983) 65 J of the Patent Office Society 187–216, esp at pp 193–200.

[3] Patent Act of 1793, Ch 11, 1 Stat 318–323 (21 February 1793), s 3.

[4] Patent Act of 1836, section 6 ("and he shall moreover furnish a model of his invention, in all cases which admit of a representation by model, of a convenient size to exhibit advantageously its several parts")

[5] Nicola Twilley, *America's Last Top Models*, <https://www.newyorker.com/culture/culture-desk/americas-last-top-models> (March 12, 2024).

[6] Nicola Twilley, *America's Last Top Models*, <https://www.newyorker.com/culture/culture-desk/americas-last-top-models> (March 12, 2024).

[7] See Edmund W. Kitch, *The Nature and Function of the Patent System*, Journal of Law and Economics, Vol. 20, No. 2, pgs. 270–271 ("[P]ressures to immediate application exist because the patent system does not require a finished, commercially relevant invention. It only requires something that works.").

[8] Alain Pottage and Brad Sherman, *Figures of Invention, A History of Modern Patent Law*, pg. 94, ISBN 978–0–19–959563–1 ("This commentary also suggested the ultimate reason for the decline of the patent model—the evolution of drawings and textual descriptions that could embody inventions in a form that could be more widely communicated").

[9] 35 U.S.C. 112(a).

[10] *Amgen Inc. v. Sanofi*, 598 U.S. 594, 610–11(2023) ("[T]he specification must enable the full scope of the invention as defined by its claims. The more one claims, the more one must enable...[t]hat is not to say a specification always must describe with particularity how to make and use every single embodiment within a claimed class...[n]or is a specification necessarily inadequate just because it leaves the skilled artist to engage in some measure of adaptation or testing.").

[11] *Amgen, Inc.*, 598 U.S. at 604–605 ("Congress has exercised this authority from the start. The Patent Act of 1790 promised up to a 14-year monopoly to any applicant who 'invented or discovered any useful art, manufacture, ... or device, or any improvement therein not before known or used.'...Reflecting the quid-pro-quo premise of patent law, the statute required the applicant to deposit with the Secretary of State a 'specification ... so particular ... as not only to distinguish the invention or discovery from other things before known and used, but also to

enable a workman or other person skilled in the art or manufacture ... to make, construct, or use the same.'...The statute made clear that this disclosure would ensure 'the public may have the full benefit [of the invention or discovery], after the expiration of the patent term.'").

[12] 35 U.S.C. 113

[13] <https://www.uspto.gov/patents/basics/apply/utility-patent#:~:text=for%20more%20information.-,Drawings,Most%20patent%20applications%20contain%20drawings.> ("Most patent applications contain drawings.")

[14] *Lockwood v. Amer. Airlines, Inc.*, 107 F.3d 1565, 1572, 41 USPQ2d 1961, 1966 (Fed. Cir. 1997).

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

[16] 35 U.S.C. Section 101.

[17] *Diamond v. Diehr*, 450 U.S. 175, 185 (1981); *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 573 U.S. 208, 216 (2014) (citations omitted); *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980).

[18] *Diamond v. Chakrabarty*, 447 U.S. 303, 309-10 (1980) ("Judged in this light, respondent's micro-organism plainly qualifies as patentable subject matter. His claim is not to a hitherto unknown natural phenomenon, but to a nonnaturally occurring manufacture or composition of matter — a product of human ingenuity "having a distinctive name, character [and] use.") (citation omitted).

[19] *AI Visualize, Inc. v. Nuance Commc'ns, Inc.*, 97 F.4th 1371, 1376–77 (Fed. Cir. 2024).

[20] *Id.* at 1380.

[21] Oral Arg. 05:53–05:59.

[22] *Id.*

[23] *AI Visualize, Inc.*, 97 F.4th at 1379.

[24] *Id.* at 1374–75.

related professionals

John M. Griem, Jr. / Partner

D 212-238-8659

griem@clm.com

Jodutt Marwan Basrawi / Associate

D (212) 238-8767

basrawi@clm.com