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PATENT ELIGIBILITY AND PHYSICALITY IN THE EARLY HISTORY OF PATENT LAW AND PRACTICE

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I. INTRODUCTION

In recent times, the courts have been asked to determine whether, and to what extent, the patent system protects claims to inventions that do not involve a machine or other physical device and do not involve a physical transformation of matter from one state to another. It is uncontroversial that the patent system exists to provide an incentive to encourage the invention and commercialization of new products and processes and the disclosure by the patent applicant of information sufficient to enable a person skilled in the relevant field of technology to reproduce the claimed invention. This disclosure is the *quid pro quo* of the patent system; it is the benefit the public receives in exchange for the State bestowing monopoly rights on a private individual.[1]

There is no dispute that patent law's incentive function is appropriate for promoting the invention of new and useful physical machines or other devices, along with new methods that physically transform matter. However, what is not clear and what the courts are having difficulty grappling with is whether the concept of patent eligibility is broad enough to encompass non-physical methods, namely those that do not involve a machine or other physical device and do not involve a physical transformation of matter from one state to another.

In this respect, the courts have been charged with formulating rules that can be used to distinguish between inventions that fall within the scope of patentable subject matter and unpatentable abstract ideas or principles. The current state of uncertainty in patentable subject matter jurisprudence is a result of misguided attempts to construct bright-line rules that can supposedly decide the difficult questions of subject matter eligibility according to § 101 of the Patents Act.[2]

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1. *See* Mazer v. Stein, 347 U.S. 201, 219 (1954) ("The economic philosophy behind the clause empowering Congress to grant patents and copyrights is the conviction that encouragement of individual effort by personal gain is the best way to advance public welfare.").

2. 35 U.S.C. § 101 (2015) ("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.").

The issue confronting the courts arises now because the world is in the midst of a shift from the Industrial Age to being a knowledge-based economy of the Information Age.[3] Knowledge-based economies are those in which there is a greater reliance on intellectual capabilities than on physical inputs or natural resources.[4] They are "[those] which are directly based on the production, distribution, and use of knowledge and information."[5] While manufactured products and manufacturing processes continue to be, and will likely always be, of great worth, we recognize that innovation manifests itself in the reduction of new and useful ideas to specific practical application. As such, the production and manipulation of new kinds of information and ideas will be of substantial value.

Identifying the scope of patent eligibility at this time is an undertaking of significant importance and difficulty as inventors seek to challenge the accepted bounds of patentable subject matter. Doing so is integral to determining whether much of the cutting edge innovation we are likely to witness in the emerging technology areas of the Information Age of the late twentieth century and beyond will receive the same encouragement as the industrial and manufacturing technologies of previous times.

Examples of the kinds of rapidly advancing technology for which patents are being sought in the infancy of the Information Age can be seen in recently decided Supreme Court cases, particularly those involving non-physical inventions that are computer-implemented business methods. The Supreme Court in *Bilski v. Kappos* considered whether a method of hedging risk in electricity markets is patentable subject matter; the idea was to minimize the input costs of an electricity provider that must sell to consumers at a fixed rate despite purchasing at a variable rate.[6] But in *Alice Corp. Proprietary Ltd. v. CLS Bank International*, the patents held by Alice Corporation disclosed a computerized trading platform that eliminates "counterparty" or "settlement" risk, being the risk that only one party to a financial transaction performs its obligation to pay, leaving the other party without its principal or the benefit of the counterparty's performance.[7] *Mayo Collaborative Services v. Prometheus Laboratories, Inc.* concerned a method of medical diagnosis designed to ensure a patient receives an optimal dose of a pharmaceutical to maximize the pharmaceutical's effectiveness and minimize its side effects. As the Court's decisions in the cases and the decisions of the courts below

3. *See* ORG. FOR ECON. CO-OPERATION & DEV., THE KNOWLEDGE-BASED ECONOMY 18 (1996).
4. *See id*. at 10, 30.
5. *Id*. at 7.
6. 561 U.S. 593, 597–99 (2010).
7. 134 S. Ct. 2347, 2352, 2359 (2014).

demonstrate, the difficult issues that arise at the margins of patentable subject matter are not easily solved.[8]

The starting point for any discussion of the scope of patent eligible subject matter is 35 U.S.C. § 101, which recites four enumerated categories of patentable subject matter: "[w]hoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title."[9]

While no explicit exclusions follow the broad language of 35 U.S.C. § 101, the Supreme Court has identified three general categories of excluded matter: laws of nature, natural phenomena, and abstract ideas.[10] The rationale for these judicially recognized categories of excluded subject matter is pre-emption, namely that "patent law not inhibit further discovery by improperly tying up the future use of these building blocks of human ingenuity."[11] Various scholars have argued that these categories of excluded matter should be applied restrictively so that we do not exclude from the patent system whole fields of endeavor,[12] that we should rely principally on the other requirements for patentability to preclude undeserving patents,[13] and that we should recognize that § 101 does not impose additional requirements on patentability.[14]

The Supreme Court, in *Mayo*, set down a framework for distinguishing patents that claim laws of nature, natural phenomena, and abstract ideas from those that claim applications of those concepts.[15] The first asks whether claims are directed to a patentable concept.[16] If they are, the second step asks whether the additional elements recited in the claim "transform the nature of the claim" into a patentable application by reciting an "inventive concept" that is "sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [ineligible concept] itself."[17] The

8. 132 S. Ct. 1289, 1294–1295 (2012).

9. Questions of subject matter eligibility pursuant to 35 U.S.C. § 101 are separate to and distinct from the requirements that, to be patentable, an invention must be novel, non-obvious, and useful. 35 U.S.C. §§ 101–103, 112 (2015). The invention claimed must also be described in sufficient detail and enabled so that one with ordinary skill in the subject matter of the patent can make and use the invention. *Id*. at § 112.

10. *Alice Corp.*, 134 S. Ct. at 2354.

11. *Id*. (internal quotation marks omitted) (quoting *Mayo*, 132 S. Ct. at 1301 (citation omitted)).

12. *E.g.*, John F. Duffy, *Rules and Standards on the Forefront of Patentability*, 51 WM. & MARY L. REV. 609, 613–614 (2009).

13. *E.g.*, Mark A. Lemley et al., *Life After Bilski*, 63 STAN. L. REV. 1315, 1342 (2011).

14. *See, e.g.*, Michael Risch, *Everything Is Patentable*, 75 TENN. L. REV. 591, 591–93 (2008).

15. *Mayo Collaborative Servs.*, 132 S. Ct. at 1294.

16. *See id*. at 1297.

17. *Id*. at 1294, 1297.

difficulty lies in identifying when a claimed invention falls into one of these judicially recognized categories of excluded subject matter, and that difficulty is particularly acute when the patent in question is a method that lacks a physical embodiment.

While the Supreme Court to some extent addressed the question in *Bilski v. Kappos* when it held that the presence of a physical aspect in an invention is a "clue" indicating patent eligibility, it failed to set clear guidelines that explain the circumstances in which a non-physical invention might be patentable.[18] Justice Stevens, in his concurring opinion in *Bilski v. Kappos*, rightfully criticized the Court's failure in this regard:

> The Court, in sum, never provides a satisfying account of what constitutes an unpatentable abstract idea. Indeed, the Court does not even explain if it is using the machine-or-transformation criteria. The Court essentially asserts its conclusion that petitioners' application claims an abstract idea. This mode of analysis (or lack thereof) may have led to the correct outcome in this case, but it also means that the Court's musings on this issue stand for very little.[19]

Subsequent Supreme Court decisions have also failed to provide this guidance, despite finding various non-physical inventions to be patent ineligible.[20] The Court's failure in this regard has meant that while it has rejected the notion that a physicality requirement is the sole test for determining patent eligibility, it is not clear whether the lack of a physical embodiment in an invention is being used as a *de facto* proxy for a finding that an invention is an abstract idea and therefore unpatentable subject matter.

These difficulties must be resolved in a way that allows the patent system to accommodate both traditional industrial technologies as well as the new and emerging technologies that are the hallmark of the Information Age. Because the integral elements of the patent system have been apparent since its inception, any discernible rationale for its existence is to be found in both its history and form.[21] As Benjamin Cardozo said, "Some conceptions of the law owe their existing form almost exclusively to history."[22]

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18. *See* 561 U.S. 593, 594 (2010).

19. *Id*. at 621 (2010).

20. *See, e.g.*, Alice Corp. Proprietary Ltd. v. CLS Bank International, 134 S. Ct. 2347, 2354 (2014); Ass'n for Molecular Pathology v. Myriad Genetics, Inc., 133 S. Ct. 2107, 2120 (2013); *Mayo Collaborative Servs.*, 132 S. Ct. at 1289 (2012).

21. *See* BRAD SHERMAN & LIONEL BENTLY, THE MAKING OF INTELLECTUAL PROPERTY LAW: THE BRITISH EXPERIENCE, 1760–1911, (1999); Ramon A. Klitzke, *Historical Background of the English Patent Law*, 41 J. PAT. OFF. SOC'Y 615, 615 (1959) ("The basic truths found by the English 400 years ago are still valid today and should continue to influence us in the interpretation and application of our law, even though it has become greatly refined and perfected."); Paul E. Schaafsma, *An Economic Overview of Patents*, 79 J. PAT. & TRADEMARK OFF. SOC'Y 241, 242 (1997).

Indeed, history is an indelible part of the patentable subject matter test. The term *manufacture* that is used in 35 U.S.C. § 101 is derived from the expression, "manner of new manufacture," which appears in § 6 of the Statute of Monopolies.[23] Furthermore, it is clear that the United States patent system is based upon, adopts, and incorporates many of the features of the English patent practice that preceded it.[24]

The history needed to interpret modern laws was considered in the Federal Circuit's decision in *In re Bilski*[25] but was not replicated in much detail in the opinions published by the Supreme Court when it heard the matter on appeal in *Bilski v. Kappos*.[26] In the Federal Circuit, both Justice Dyk for the concurrence and Justice Newman in dissent asserted that the English patent law and practice that preceded the birth of the United States patent system supported his own view regarding the patent eligibility of non-physical business methods.[27] Justice Dyk expressed the view that "patents registered in England under the Statute of Monopolies before 1793 were limited to articles of manufacture, machines for manufacturing, compositions of matter, and related processes."[28]

Justice Newman, in dissent, took the opposite view that the Statute of Monopolies only prohibited odious monopolies in favor of known industries, trades, products, and processes and that its enactment cannot be used in support of arguments today against the patenting of business methods and other non-physical methods.[29] Her Honor in expressing this view stated that "[i]t is apparent that economic, or 'business method,' or 'human activity' patents were neither explicitly nor implicitly foreclosed from access to the English patent system."[30]

With the purpose of shedding light on the current uncertainty surrounding the patentability of knowledge and information-based method inventions, this article takes up the debate and examines the patent system from its earliest days in the Republic of Venice and in England to its adoption in the United States of America and through to the present day. It does so to demonstrate that the history of patent law and practice supports non-physical method inventions as being within the bounds of patentable subject matter.

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22. BENJAMIN CARDOZO, THE NATURE OF THE JUDICIAL PROCESS 52 (1921).

23. Statute of Monopolies 1623, 21 Ja. 1, c. 3 (Eng.), *available at* http://www.legislation.gov.uk/aep/Ja1/21/3/contents.

24. *See, e.g.*, Pennock v. Dialogue, 27 U.S. 1, 18, (1829).

25. *See In re* Bilski, 545 F.3d 943, 950–52 (Fed. Cir. 2008) (en banc).

26. 561 U.S. 593 (2010).

27. *See In re Bilski,* 545 F.3d at 985–87, (Dyk, J., Concurring, Newman, J., Dissenting).

28. *Id*. at 970.

29. *Id*. at 988–89.

30. *Id*. at 989.

II. THE EARLY HISTORY AND DEVELOPMENT OF PATENT LAW

The history of the patent system reveals it to be a tool to promote innovation and economic development. From its earliest days, monopoly protection has been granted to those who disclose new technological advances that promote the progress of the useful arts. Traditionally, this has been understood as being the domain of the industrial manufacturer, artisan, engineer, and draftsman.[31] This history, coupled with the history of technology's development, has led to a generally held expectation that patent protection is limited to innovation embodied in machines or other physical devices of industrial application and in manufacturing processes that involve manipulating or transforming physical matter.[32]

However, these traditional conceptions do not necessarily accord with what is patentable at law. While the patent eligibility of machines and physically transformative methods is evident from the earliest patent cases,[33] the history of patent law by no means restricts the scope of patent eligibility to the classes of invention these traditional conceptions envisage.

Many significant sources, written mainly in the twentieth century, reveal the early history and rationale of patent law.[34] Those sources reveal that

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31. Richard H. Stern, *Being Within the Useful Arts as a Further Constitutional Requirement for U.S. Patent-Eligibility*, 31 EUR. INTELL. PROP. REV. 6, 15 (2009).

32. The King v. Wheeler (1819) 2 B. & Ald. 345 at 349–50 (Eng.); Diamond v. Diehr, 450 U.S. 175, 184 (1981) ("Industrial processes . . . are the types which have historically been eligible to receive the protection of our patent laws."); LIONEL BENTLY & BRAD SHERMAN, INTELLECTUAL PROPERTY LAW 324 (2d ed. 2004) ("[T]he image of the invention as the human intervention into nature that brings about a resulting physical change that underpins much contemporary jurisprudence, was well entrenched in British law by the mid-nineteenth century.").

33. *See, e.g.*, Crane v. Price (1842) 4 Man. & G. 580 (Eng.); The King v. Wheeler (1819) 2 B. & Ald. 345 (Eng.); Hornblower v. Boulton (1799) 8 T. R. 95 (Eng.); Boulton and Watt v. Bull (1795) 2 H. Bl. 463 (Eng.).

34. 4 WILLIAM HOLDSWORTH, A HISTORY OF ENGLISH LAW (3d ed. 1945); HAROLD G. FOX, MONOPOLIES AND PATENTS: A STUDY OF THE HISTORY AND FUTURE OF THE PATENT MONOPOLY (1947); CHRISTINE MACLEOD, INVENTING THE INDUSTRIAL REVOLUTION, THE ENGLISH PATENT SYSTEM, 1660–1800 (1988); SHERMAN & BENTLY, *supra* note 21; Adam Mossoff, *Rethinking the Development of Patents: An Intellectual History, 1550–1800*, 52 HASTINGS L. J. 1255 (2000–2001); Edward C. Walterscheid, *To Promote the Progress of Useful Arts: American Patent Law and Administration, 1787–1836 (Part 2)*, 80 J. PAT. & TRADEMARK OFF. SOC'Y 11 (1998); Schaafsma, *supra* note 21; Edward C. Walterscheid, *To Promote the Progress of Useful Arts: American Patent Law and Administration, 1787–1836 (Part 1)*, 79 J. PAT. & TRADEMARK OFF. SOC'Y 61 (1997) [hereinafter *American Patent Law (Part 1)]*; Edward C. Walterscheid, *The Early Evolution of the United States Patent Law: Antecedents (Part 5, Part II)*, 78 J. PAT. & TRADEMARK OFF. SOC'Y 665 (1996) [hereinafter *Antecedents (Part 5ii)*]; Edward C. Walterscheid, *The Early Evolution of the United States Patent Law: Antecedents (Part 5, Part I)*, 78 J. PAT. & TRADEMARK OFF. SOC'Y 615 (1996) [hereinafter *Antecedents (Part 5i)*]; Edward C. Walterscheid, *The Early Evolution of the United States Patent Law: Antecedents (Part 4)*, 78 J. PAT. & TRADEMARK OFF. SOC'Y 77

it is often mistakenly thought that the origins of United States patent law and the legal concepts of invention and inherent patentability lie in the English Parliament enacting the Statute of Monopolies in 1624.[35] In truth, patent law's origins predate the Statute of Monopolies and lie in the practice of the English Crown granting monopoly rights in inventions that arose prior to the passing of that statute,[36] which itself was based on the early patent custom in the Republic of Venice.[37]

A. Early Patent Custom in the Republic of Venice

European patent custom originally developed in the Republic of Venice from the desire of rulers in the fifteenth century to encourage the development of new industries within their realms.[38] The idea of granting monopolies originated in early European commerce to encourage individuals, com-

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(1996) [hereinafter *Antecedents (Part 4)*]; Edward C. Walterscheid, *The Early Evolution of the United States Patent Law: Antecedents (Part 3)*, 77 J. PAT. & TRADEMARK OFF. SOC'Y 771 (1995) [hereinafter *Antecedents (Part 3)*]; Edward C. Walterscheid, *The Early Evolution of the United States Patent Law: Antecedents (Part 2)*, 76 J. PAT. & TRADEMARK OFF. SOC'Y 849 (1994) [hereinafter *Antecedents (Part 2)*]; Edward C. Walterscheid, *The Early Evolution of the United States Patent Law: Antecedents (Part 1)*, 76 J. PAT. & TRADEMARK OFF. SOC'Y 697 (1994) [hereinafter *Antecedents (Part 1)*]; Edward C. Walterscheid, *To Promote the Progress of the Science and Useful Arts: The Background and Origin of the Intellectual Property Clause of the United States Constitution*, 2 J. INTELL. PROP. L. 1 (1994) [hereinafter *Science and Useful Arts*]; Frank D. Prager, *Historical Background and Foundation of American Patent Law*, 5 AM. J. LEGAL HIST. 309 (1961) [hereinafter *Historical Background*]; Klitzke, *supra* note 21; Frank D. Prager, *The Early Growth and Influence of Intellectual Property*, 34 J. PAT. OFF. SOC'Y 106 (1952) [hereinafter *The Early Growth*]; Frank D. Prager, *A History of Intellectual Property from 1545 to 1787*, 26 J. PAT. OFF. SOC'Y 711 (1944) [hereinafter *History of Intellectual Property*]; P. J. Federico, *Origins and Early History of Patents*, 11 J. PAT. OFF. SOC'Y 294 (1929); D. Seaborne Davies, *Further Light on The Case of Monopolies*, 48 L. Q. R. 394 (1932); E. Wyndham Hulme, *On the History of Patent Law in the Seventeenth and Eighteenth Centuries*, 18 L. Q. R. 280 (1902) [hereinafter *History of Patent Law]*; E. Wyndham Hulme, *The History of the Patent System Under the Prerogative and at Common Law – A Sequel* [hereinafter *Sequel*], 16 L. Q. R. 44 (1900); E. Wyndham Hulme, *The History of the Patent System under the Prerogative and at Common Law*, 12 L. Q. R. 141 (1896) [hereinafter *History*].

35. Statute of Monopolies 1623, 21 Ja. 1, c. 3 (Eng.), *available at* http://www.legislation.gov.uk/aep/Ja1/21/3/contents.

36. SHERMAN & BENTLY, *supra* note 21, at 208–09 (citing W. Mackinnon, *Patent Laws*, 36 HANSARD COL. 555 (1837)) ("[T]here was 'no express statute according to which patents might be granted . . . the granting did not rest upon the foundation of statute law.'").

37. MACLEOD, *supra* note *34*, at 11; Walterscheid, *Antecedents (Part 1), supra* note 34, at 704–06.

38. MACLEOD, *supra* note 34, at 11; Walterscheid, *Antecedents (Part 2)*, *supra* note 34, at 855–56; Federico, *supra* note 34, at 292; Walterscheid, *Antecedents (Part 1), supra* note 34, at 704–06; Klitzke, *supra* note 21; Giulio Mandich, *Venetian Patents (1450-1550)*, 30 J. OF THE PAT. OFF. SOC'Y 166, 167 (1948) (translated by F.D. Prager); Hulme, *Sequel*, *supra* note 34, at 44–56; Hulme, *History*, *supra* note 34, at 141–54.

panies, and cities to engage in commercial ventures that entailed great risk. These trading monopolies granted exclusive rights to practice a certain art or to make, use, or sell a certain article. Their object was the promotion of new industries that would provide the realm with new and useful products made domestically without the need to import.[39]

In Venice, as was the case throughout medieval Europe, commerce was dominated by guilds.[40] Whoever proposed a new technology needed a specially created power or license, called a privilege, in order to make, sell, or use a new invention or would otherwise contravene existing monopolies granted in favor of the guilds. The privilege was not necessarily given to an individual, but could be thrown open to the public, nor was it necessarily given to the inventor or first importer of a new art.[41] A number of these patents were granted, an early example being the famous patent of 1469 granted to John of Speyer, a German printer, to protect the new art of printing that he introduced to the Republic.[42] The patent "decreed . . . that for five years next following there should be nobody whosoever who would, could, might or dare exercise said art of book printing in Venice and its territories, except master John himself."[43] The patent referred to the reservation of exclusive rights "[i]n the same manner as usual in other useful arts."[44] For a time, patents such as these were issued on a case-by-case basis before a general patent law was implemented.

The application of early patent law in Venice corresponded with the height of economic prosperity in the Republic from 1400 to 1550. Venice's economic prosperity and superiority were due to its being a dominant sea power in control of the major trade routes.[45] That superiority dissolved with the discovery of new sea routes to the Far East around the Cape of Good

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39. Walterscheid, *Antecedents (Part 2)*, *supra* note 34, at 855–56; Federico, *supra* note 34, at 292.

40. *See* Prager, *History of Intellectual Property*, *supra* note 34, at 713. The guilds were a group of masters maintaining a monopoly over a particular trade. This control was maintained by fixing prices and standards; trading collectively with other groups; defending their trade against others, including labourers and foreigners; and providing some security for aged and disabled members of the guild. *Id*.

41. Prager, *The Early Growth*, *supra* note 34, at 112; Prager, *History of Intellectual Property*, *supra* note 34, at 714–15.

42. Giulio Mandich, *Venetian Origins of Inventor's Rights*, 42 J. OF THE PAT. OFF. SOC'Y 378, 381 (1960); Mandich, *supra* note 38, at 169; Prager, *History of Intellectual Property*, *supra* note 34, at 715, 750.

43. Prager, *History of Intellectual Property*, *supra* note 34, at 750. According to Prager, this was the first known patent of monopoly preserved in the records of Venice, and there is a remark in the patent that it was a usual practice to grant such monopolies. *Id*. at 715, 750.

44. Mandich, *supra* note 42, at 380; Mandich, *supra* note 38, at 169; Prager, *History of Intellectual Property*, *supra* note 34, at 715, 750.

45. Walterscheid, *Antecedents (Part 1)*, *supra* note 34, at 710–11.

Hope at the end of the fifteenth century.[46] This marked the reversal of migration of skilled tradesmen and artisans, particularly glass workers, who had in the past moved to Venice, but later sought other parts of Europe, taking with them knowledge of Venice's patent custom. Following this migration, the use of grants of exclusive rights by governments to encourage inventive industry emerged concurrently in several areas in Western Europe in the fifteenth and sixteenth centuries.[47]

The earliest known general patent law is a Venetian statute of 1474 that granted a monopoly for ten years to "every person who shall build any new and ingenious device."[48]

> WE HAVE among us men of great genius, apt to invent and discover ingenious devices; and in view of the grandeur and virtue of our city, more such men come to us every day from divers parts. Now, if provision were made for the works and devices discovered by such persons, so that others who may see them could not build them and take the inventor's honor away, more men would then apply their genius, would discover, and would build devices of great utility and benefit to our commonwealth. Therefore: BE IT ENACTED that, by the authority of this Council, every person who shall build any new and ingenious device in this City, not previously made in our Commonwealth, shall give notice of it to the office of our General Welfare Board when it has been reduced to perfection so that it can be used and operated. It being forbidden to every other person in any of our territories and towns to make any further device conforming with and similar to said one, without the consent and license of the author, for the term of ten years. And if anybody builds it in violation hereof, the aforesaid author and inventor shall be entitled to have him summoned before any magistrate the said infringer shall be constrained to pay him hundred ducats; and the device shall be destroyed at once. It being, however, within the power and discretion of the Government, in its activities, to take and use any such device and instrument, with this condition however that no one but the author shall operate it.[49]

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46. *Id*.

47. *Id*. at 710–11; Prager, *History of Intellectual Property*, *supra* note 34, at 720.

48. Walterscheid, *Antecedents (Part 1)*, *supra* note 34, at 707. While it is generally regarded that the custom of granting patents originated in Italy, there is some question as to whether the practice began in Venice or Florence. *See id*. The Republic of Florence allegedly issued a patent to the architect and inventor, Filippo Brunelleschi in 1421 for his ship, which transported the Carraran marble for the dome of the Florentine Duomo; however, it seems the practice was not continued. BRUCE BUGBEE, THE GENESIS OF AMERICAN PATENT AND COPYRIGHT LAW 17–19 (1967).

49. Mandich, *supra* note 38, at 176–77; Walterscheid, *Antecedents (Part 1)*, *supra* note 34, at 707–09.

The Venetian patent statute of 1474 contains the fundamental features of today's patent system.[50] It provides an incentive to invent through the grant of exclusive rights as an economic tool to encourage technological progress by prohibiting free-riding to protect the "inventor's honor" and presumably economic rights.[51] It reveals novelty in protecting newly invented or imported devices not previously known in the city.[52] It reveals inventiveness by use of the term "ingenious device."[53] It reveals utility by requiring that a device have "been reduced to perfection so that it can be used and operated."[54] It provides a form of patent registration (by giving notice of the invention) that provides a limited monopoly of ten years after which the device falls into the public domain.[55] It reveals an enforcement provision for actions against infringers that sets out a fine and provides for delivery and destruction of offending articles.[56] It demonstrates that the patentee has the right to license the patented device but perhaps not to assign it.[57] Finally, the state is given the option of a compulsory license, with the proviso that "no one but the author shall operate it."[58]

As this early Venetian statute specifically provides that rights of exclusivity will be granted to anyone who builds "any new and ingenious device in this City," it is clear that the statute is directed to the development of an innovation system focused around the invention (or importation) of new physical devices.[59] This focus on the need for a physical embodiment in the subject matter of a patent was arguably a by-product of the conceptions of technology held at the time, rather than perhaps a hard-and-fast rule for patentability that would last for all of time.

B. The Early English Patent Custom

The concepts observed in this early Venetian patent practice were adopted in the later English patent practice as a means of encouraging new manufacturers to the realm. The origins of modern patent law and the legal concepts of invention and patentability lie in the custom of the English Crown awarding monopoly rights by letters patent (literally meaning "open letters") in exercise of royal prerogative to produce specific goods or pro-

50. Walterscheid, *Antecedents (Part 1)*, *supra* note 34, at 709–10. *See* Prager, *History of Intellectual Property*, *supra* note 34, at 720; *see also* BUGBEE, *supra* note 48, at 24.
51. *See* Walterscheid, *Antecedents (Part 1)*, *supra* note 34, at 708.
52. *See id*. at 709.
53. *See id*. at 708–09.
54. *See id*. at 709.
55. *See id*.
56. *See id*. at 709–10.
57. *See* Walterscheid, *Antecedents (Part 1)*, *supra* note 34, at 708–09.
58. *See id*. at 709. The statute was characterized as "a considerable success." *Id.* at 710.
59. *See id*. at 709.

vide specific services.[60] Patents at that time were not understood to have the precise and technical meaning that they have acquired over the last 200 years of a grant by the State of monopoly rights to exploit a product or process for a limited period. Rather, the early English patent custom reveals that letters patent were awarded as a tool of industrial innovation policy designed to bring new trades and industries to the realm by encouraging skilled foreign workmen to bring their established trades and settle in England.[61]

C. Patents Under Queen Elizabeth I

It was not until the reign of Queen Elizabeth I (1558–1603) during the middle of the sixteenth century, however, that we find a truly modern patent grant, one that involved the Crown issuing letters patent to individuals for manufacturing monopolies in accordance with recognized legal principles.[62] From early in her reign, Queen Elizabeth I pursued an innovation policy to enable England to attain economic power and strength relative to other states by regulating commerce and industry in such a way as to favor the creation of new industries and trades. This was to be achieved by stimulating the domestic production of raw and manufactured goods and encouraging the creation of local industries to manufacture products that would otherwise have been imported, including by luring foreign skilled workers to

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60. Federico, *supra* note 34, at 292; Walterscheid, *Antecedents (Part 1)*, *supra* note 34, at 700–01 (citing William Blackstone, 2 COMMENTARIES ON THE LAWS OF ENGLAND 316–17 (1768)) ("The king's . . . grants, whether of land, honors, liberties, franchises, or aught besides, are contained in charters, or letters patent, that is, open letters, literae patentes: so called, because they are not sealed up, but exposed to open view, with the great seal pendant at the bottom; and are usually directed or addressed by the king to all his subjects at large."). In contrast to the open letters of letters patent were letters close. Monarchs in England did much of the business of the state by means of charters, letters patent, and letters close. Letters patent were used to set forth their public directives, whereas letters close were used to provide private instructions to individuals. *Id*.

61. MACLEOD, *supra* note 34, at 10–11; Schaafsma, *supra* note 21, at 242; Klitzke, *supra* note 21, at 620–25; Walterscheid, *Antecedents (Part 2)*, *supra* note 34, at 851–52; Federico, *supra* note 34, 292–93.

62. D. Seaborne Davies argues that under Elizabeth, in 1561, patent law was introduced in England "as a system." Davies, *supra* note 34, at 396–97 ("[T]he Patent System was introduced into England as a system in the second year of Elizabeth's reign"); James Lahore, *The Legal Rationale of the Patent System*, *in* THE ECONOMIC IMPLICATIONS OF PATENTS IN AUSTRALIA 11 (1981). Federico attributes the Elizabethan policy of awarding patents of invention to stimulate the introduction of new industries and trades to a petition made to the Queen in 1559 by the Italian, Giacopo Acontio, that he be protected from those who would copy certain furnaces and "wheel" machines he had invented. *See* Federico, *supra* note 34, at 296–97.

England.[63] Elizabeth's innovation policy focused on introducing new industries and trades to the realm and avoiding interference with existing industries and trades and the livelihoods of the established workforce.[64] This view is substantiated by Lord Coke's argument against monopolies made at the time:

> [A] mans trade is accounted his life, because it maintaineth his life; and therefore the monopolist that taketh away a mans trade, taketh away his life, and therefore is so much the more odious.[65]

For Elizabeth, innovation meant bringing new technology to the realm (particularly from the Continent), rather than invention as we understand the meaning of that term today,[66] as patents were granted both to new inventors and those who first introduced an invention into the realm through importation.[67] Thus, the early English patent custom reflects mercantilist ideas by providing incentives to merchants who had the contacts and the capacity to bring new technologies to England.[68]

The term "inventor" was used to denote the person importing a new art into the realm or the first finder or creator of a new product or process, the rights of the inventor being derived from those of the importer.[69] Use of the phrase "invention and a new trade" was used to mean the importation of a new trade or industry, whereas the term "discovery" was used to mean what contemporary language describes as an invention, which is the use of inventive mental facility to produce something new and non-obvious.[70]

The rule that an inventor included the first importer of patentable ideas was laid down in the early case of *Edgeberry v. Stephens*[71] and followed in *Boulton and Watt v. Bull*.[72] In *Boulton and Watt v. Bull*, Chief Justice Eyre noted that *Edgeberry v. Stephens* establishes that "the first introducer of an invention practised beyond the sea, shall be deemed the first inventor; and it

63. FOX, *supra* note 34, at 61.

64. Hulme, *History*, *supra* note 34, at 151–52; Hulme, *Sequel*, *supra* note 34, at 44; HOLDSWORTH, *supra* note 34, at 314–43; Walterscheid, *Antecedents (Part 2)*, *supra* note 34, at 855–59; Klitzke, *supra* note 21, at 622–25; MACLEOD, *supra* note 34, at 12–13, 18.

65. EDWARD COKE, THE THIRD PART OF THE INSTITUTES OF ENGLAND CONCERNING HIGH TREASON AND OTHER PLEAS OF CROWN AND CRIMINAL CLAUSES 181 (1797).

66. MACLEOD, *supra* note 34, at 11 ("Acquisition of superior Continental technology was the predominant motive for the issue of patents under the guidance of Elizabeth I's chief minister, William Cecil, later Lord Burghley.").

67. *See* Edgeberry v. Stephens (1697) 2 Salk. 447 (Eng.); Boulton and Watt v. Bull (1795) 2 H. Bl. 463 (Eng.) (following the *Edgeberry v. Stephens* decision); s*ee also* Moser v. Marsden (1893) R.P.C. 350 at 350–51 (Eng.)

68. Hulme, *History*, *supra* note 34, at 151–52.

69. *Id*.

70. *Id*. at 151–53, 280–81.

71. (1697) 2 Salk. 447 (Eng.).

72. (1795) 2 H. Bl. 463 (Eng.).

is there said the act is intended to encourage new devices useful to the kingdom and whether acquired by travel or study, it is the same thing."[73]

Encouraging entrepreneurs to assume the costs and risks associated with introducing a new industry or trade required a powerful incentive in the form of the potential to earn a substantial economic return without causing substantial costs to be incurred by the Crown.[74] Thus, patents were not awarded in recognition of some natural right in favor of an inventor to control the use of his or her ideas.[75] Instead, monopolies were primarily granted for the importation of new industries, and many were given to aliens or naturalized subjects of the Crown.[76]

While many of the grants made under the exercise of royal prerogative by Elizabeth I and her successor to the throne, James I, were genuinely intended to encourage new and useful arts,[77] many were said to be an abuse of that power to reward royal favorites.[78] It was alleged that the Crown granted monopolies for the making or importing of products regardless of whether the patentee was the inventor or had brought a new product into the realm.[79] Often these monopolies were granted in relation to commodities already in use. Sometimes monopolies were created over necessities such as salt, starch, saltpetre, paper, and glass, thereby harming the existing trade in known commodities.[80] According to one commentator, "[t]he financial returns to the Crown were at the most negligible, and, while it may be admitted that fiscal policy and the hope of raising revenue were contributing factors, they were not the main nor even an important motivating force."[81] Others have argued that the complaints against the patent system "were a result of a decline in prosperity in the last decade of the sixteenth century, and the first impulse was to seek redress from real or imaginary abuses" including the grant of monopolies.[82]

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73. *Id*. at 491.

74. *See* Marsden v. Saville Street Co. (1878) L.R. Exch. 203 at 206 (Eng.); Plimpton v. Malcolmson (1876) Ch.D. 531 at 555–56 (Eng.); *In re* Wirth's Patent (1879) Ch.D. 303 at 304 (Eng.); *In re* Avery's Patent (1887) Ch.D. 307 at 316–17 (Eng.).

75. MACLEOD, *supra* note 34, at 53; Mossoff, *supra* note 34, at 1256–57.

76. MACLEOD, *supra* note 34, at 11; Walterscheid, *Antecedents (Part 2)*, *supra* note 34, at 855–57; Hulme, *History*, *supra* note 34, at 151–52.

77. Schaafsma, *supra* note 21, at 245.

78. BUGBEE, *supra* note 48, at 36–37; HOLDSWORTH, *supra* note 34, at 346–47; Schaafsma, *supra* note 21, at 245; Lahore, *supra* note 62, at 11; Federico, *supra* note 34, at 299.

79. BUGBEE, *supra* note 48, at 36–37; HOLDSWORTH, *supra* note 34, at 346–47; Schaafsma, *supra* note 21, at 245; Lahore, *supra* note 62, at 11; Federico, *supra* note 34, at 299.

80. BUGBEE, *supra* note 48, at 36–37.

81. FOX, *supra* note 34, at 188.

82. Chris Dent, *Patent Policy in Early Modern England: Jobs, Trade and Regulation*, 10 AUSTL. J. LEGAL HIST. 71, 75 (2006).

Outrage over the Crown's perceived abuses was expressed in 1601 during Elizabeth's last Parliament. The struggle that ensued between Parliament and the Queen was one of the most significant in English constitutional history. At stake were the royal prerogative and its preeminence over the power of Parliament. The struggle was temporarily stayed when Elizabeth I issued a proclamation in Parliament that revoked a great number of objectionable patents and gave the common law courts the power to determine the validity of monopolies granted by the Crown.[83] Her Majesty thereby abandoned her claim to settle disputes arising from the grant privileges under the royal prerogative and even showed indignation that she had been tricked into making such grants.[84]

That, however, was not the end of the matter, as the common law was soon called upon to address the issue. It was the grant to a groom of Queen Elizabeth's Privy Chamber, Edward Darcy, that led to the first common law judicial decision to challenge the nature of the Crown's power to grant monopolies and the nature and power of the royal prerogative.[85] The case was *Darcy v. Allen* (also known as *The Case on Monopolies*).[86]

Darcy v. Allen involved the grant of an exclusive right issued in 1598 to Edward Darcy to manufacture, import, and sell playing cards in England and its dominions, even though the manufacture of playing cards was an established industry.[87] When Allen, a London haberdasher, infringed the patent, Darcy brought suit.[88] Allen admitted selling the cards, but pleaded a right to do so.[89] It was argued on behalf of the patentee that the Crown had the sole prerogative in matters of pleasure and recreation and that the grant had been given to control the number of playing cards in circulation and the time spent by servants and apprentices playing cards.[90] The King's Bench decided the case in the Easter term of 1603 after the Queen's death in

83. BUGBEE, *supra* note 48, at 37.

84. HOLDSWORTH, *supra* note 34, at 348–49; Walterscheid, *Antecedents (Part 2)*, *supra* note 34, at 866–67.

85. Jacob I. Corré, *The Argument, Decision, and Reports of Darcy v. Allen*, 45 EMORY L. J. 1261, 1261 (1996).

86. *Id*. at 1261–62 ("*Darcy v. Allen*'s fame is largely due to the reports of Edward Coke."). Coke appeared as Attorney General before the Kings Bench in *Darcy v. Allen*, was one of the reporters of the case, and was involved in drafting of the Statute of Monopolies. *Id*. at 1262. Two other reports exist in Moore's English Reports and Noy's English Reports. *Id*. at 1261, n.1.

87. Corré, *supra* note 85, at 1261.

88. *Id*.

89. *Id*.

90. *Id*. at 1272–73.

1602.[91] A verdict against Edward Darcy in favor of the defendant, Allen, was given.[92]

No written opinions were given, and in the absence of reasons, counsel's argument for the defense was reported in full and is regarded as being representative of the court's reasoning.[93] The case report reveals that, as a rule, monopolies were stated to be generally contrary to law because they do not benefit the realm, they raise prices, and they reduce the merchantability of goods and reduce employment.[94]

However, the defendant's argument expressed one exception to the rule against monopolies that has become a classic principle. That exception was made in favor of monopolies for invention and importation, limited in duration:

> [W]hen any man by his own charge and industry, or by his own wit and invention doth bring any new trade into the realm, or any engine tending to the furtherance of a trade that never was used before; and that for the good of the realm;—in such cases the king may grant to him a monopoly-patent for some reasonable time, until the subjects may learn the same, in consideration of the good he doth bring by his invention to the commonwealth, otherwise not.[95]

These arguments reflect the common law principles relating to monopolies and have formed the basis of patent systems in England, its dominions, the United States, and many other foreign states.[96]

The Clothworkers of Ipswich, decided in 1615, was the second important case decided before the passing of the Statute of Monopolies.[97] The case involved a claim made by a group of tailors incorporated and chartered by King James I to conduct their business in Ipswich against a tailor who was not part of the corporation but practiced his trade in the town.[98] The court stated that the Crown could create corporations with power to make ordinances governing trade, but the power granted did not extend to the creation of a monopoly harmful to free trade:

> [I]t was agreed by the Court, that the King might make corporations . . . but thereby they cannot make a monopoly for that is to take away free-trade, which is the birthright of every subject. . . . But if a man hath

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91. *Id*. at 1267.
92. *Id*.
93. *See* Corré, *supra* note 85, at 1267–72.
94. Walterscheid, *Antecedents (Part 2)*, *supra* note 34, at 868.
95. Federico, *supra* note 34, at 301; Lahore, *supra* note 62, at 12.
96. Lahore, *supra* note 62, at 11–12.
97. (1615) 78 Eng. Rep. 147. (The case is otherwise known as *The Case of the Taylors of Ipswich*).
98. *Id*. at 147–48.

> brought in a new invention and a new trade within the kingdom, in peril of his life, and consumption of his estate or stock, &c. or if a man hath made a new discovery of any thing, in such cases the King of his grace and favor, in recompence of his costs and travail, may grant by charter unto him, that he only shall use such a trade or trafique for a certain time, because at first the people of the kingdom are ignorant, and have not the knowledge or skill to use it: but when that patent is expired, the King cannot make a new grant thereof: for when the trade is become common, and others have been bound apprentices in the same trade, there is no reason that such should be forbidden to use it.[99]

The judgment contains all the conditions necessary for the grant of letters patent in the mid sixteenth century: the justification for the monopoly is that new industries are introduced into the realm and that no monopoly can issue for preexisting industries; the monopoly rewards the labor and costs of the inventor; the patentee is to train Englishmen in the trade; and that patents are royal grants of privilege given solely for the purpose of achieving policy objectives based upon the common good.[100]

D. The Statute of Monopolies

James I, who succeeded Elizabeth in 1603 shortly before *Darcy v. Allen* was decided, was caught in the same struggle on the question of monopolies as his predecessor. His needs and those of his courtiers demanded that patents be freely granted, while Parliament, in contrast, demanded their regulation. Notwithstanding the outcome in *Darcy v. Allen*, James continued issuing odious monopolies over existing trades and products. In the face of continuing political pressure, James issued in 1610 a "Declaration of His Majesty's Pleasure," which became known as the *Book of Bounty*, which is said to have provided a statement acknowledging the common law principles arising from the reports in *Darcy v. Allen*.[101]

Shortly thereafter, in May 1624, Parliament enacted the Statute of Monopolies.[102] The Statute of Monopolies reflected the common law's suspicion of monopolies but recognized nonetheless that monopolies limited in duration have the potential to serve the public interest by providing an incentive to invent. The principal purpose of the Statute of Monopolies was to

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99. *Id*. at 252–53.

100. Mossoff, *supra* note 34, at 1270.

101. FOX, *supra* note 34, at 96–97.

102. 1623, 21 Ja. 1, c. 3 (Eng.), http://www.legislation.gov.uk/aep/Ja1/21/3/contents. (The Statute of Monopolies is the short title of the Act. The long title is "An Act Concerning Monopolies and Dispensations with Penal Laws and the Forfeiture Thereof.")

declare all grants of monopolies void, other than patents for invention, which it allowed for a limited duration.[103]

From a constitutional perspective, the Statute of Monopolies represents an incredible assertion of parliamentary power and an assertion that the Kingdom was to be ruled by common law, rather than royal prerogative. The object of passing the Statute of Monopolies is said to be the curtailment of the practice of the Crown in granting monopolies to court favorites in goods or businesses which had long before been enjoyed by the public, a practice considered to be contrary to the common law.[104] Thus, the Statute of Monopolies was little more than a declaration of the common law principles then in existence with the exceptions that it fixed a maximum term of fourteen years and transferred jurisdiction for hearing patent disputes from the Exchequer to the common law courts.[105]

Section 6 of the Statute of Monopolies sets out the exception in favor of patents for invention and the conditions to be satisfied in order for a patent to be granted:

> [Monopolies] shall not extend to any tres Patents and Graunt of Privilege for the tearme of fowerteene yeares or under, hereafter to be made of the sole working or makinge of any manner of new Manufactures within this Realme, to the true and first Inventor and Inventors of such Manufactures, which others at the tyme of makinge such tres Patents and Graunts shall not use, soe as alsoe they be not contrary to the Lawe nor mischievous to the State, by raisinge prices of Commodities at home, or hurt of Trade, or generallie inconvenient . . . .[106]

The Statute of Monopolies, by making reference to a "grant of privilege," did not change the position at law of applicants, who did not have a right to be granted a patent and were not granted property rights but were in the position of a petitioner seeking the monarch's favor. Likewise, the words "true and first inventor" referred to the person responsible for the introduc-

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103. *Id*. at § 1. The Statute of Monopolies provides that the central objective of the statute is to encourage free trade and competition by rendering void all monopolies, including those granted under the authority of letters patent. Section 1 provides: "All [Monapolies] and all Commissions Graunts Licences Charters and tres patents heretofore made or graunted or hereafter to be made or graunted to any person or persons Bodies Politique or Corporate whatsoever of or for the sole buyinge sellinge markinge workinge or usinge of any thinge within this Realme . . . are altogether contrary to the Lawes of this Realme, and so are and shalbe utterlie void and of none effecte." *Id*.

104. Graham v. John Deere Co. of Kansas City, 383 U.S. 1, 5 (1966).

105. FOX, *supra* note 34, at 118; Justine Pila, *The Common Law Invention in its Original Form*, 3 INTELL. PROP. Q. 209, 223 (2001); Walterscheid, *Antecedents (Part 2)*, *supra* note 34, at 876 n.111 (stating Coke favored a term limited to one apprenticeship period of seven years); Lahore, *supra* note 48, at 15; Hulme, *Sequel*, *supra* note 34, at 44; Hulme, *History*, *supra* note 34, at 151–54; Federico, *supra* note 34, at 302–04.

106. 21 Ja. 1, c. 3 § 6 (Eng.), http://www.legislation.gov.uk/aep/Ja1/21/3/contents.

tion of the invention into England. Coke, writing contemporaneously, explained the reasoning behind the sort of monopoly permitted by section 6 of the Statute of Monopolies as being "because the inventor bringeth to and for the Commonwealth a new manufacture by his invention, cost and charges, and therefore it is reason, that he should have a privilege for his reward (and the encouragement of others in the like) for a convenient time."[107] Here we have a contemporaneous statement of one involved in the drafting and passage of the Act that describes the incentive function of patent law. In fact, it is clear that even from these early times there was an inextricable link between offerings of rewards and incentives to bring new inventions to the realm.

According to law set out in *Darcy v. Allen*, patents could only be invalidated if they were generally inconvenient for interfering with established industries and trades.[108] These requirements were adopted in the language of the Statute of Monopolies. The Statute of Monopolies did not narrow or eliminate categories of eligible subject matter. It only addressed patent abuses by prohibiting the grant of odious monopolies over known trades. In doing so, it left the existing common law intact.[109]

The focus of the Statute of Monopolies is thus on ensuring that patents are only issued for new trades that had not in recent times been practiced in the realm at the time the patent was applied for.[110] This is seen in the subject matter requirement that a monopoly could only be granted in respect of "any manner of *new* Manufactures" for the reason that a monopoly in respect of a new industry or trade would not be, in the words of section 6, "contrary to the Lawe nor mischievous to the State, by raising prices of Commodities at home, or hurt of Trade, or generallie inconvenient."[111]

The wording of section 6 also contains an implicit reference to utility, in the form of a requirement that the claimed invention be capable of being performed (or that it work).[112] While the more modern and additional strictures of patentability in the form of a requirement of inventiveness and a requirement that the applicant describe the subject matter of the patent in a written patent specification would come later, the wording of the section and

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107. COKE, *supra* note 65, at 184 (altered for readability) (explaining the reasoning behind the sort of monopoly permitted by section 6 of the Statute of Monopolies).

108. Corré, *supra* note 85, at 1263.

109. *See* Prager, *Historical Background*, *supra* note 34, at 313 ("The statute said nothing about meritorious functions of patents, nothing about patent disclosures, and nothing about patent procedures; it was only directed against patent abuses."); Klitzke, *supra* note 21, at 649; s*ee also Graham*, 383 U.S. at 5–6.

110. *See generally* Hulme, *History of Patent Law*, *supra* note 34, at 281–88.

111. Statute of Monopolies 1623, 21 Ja. 1, c. 3 (Eng.), *available at* http://www.legislation.gov.uk/aep/Ja1/21/3/contents.

112. *Id*.

contemporaneous documents that described its operation make no reference to categorical subject matter exclusions.[113]

Therefore, it cannot be said that the Statute of Monopolies restricts the kinds of new processes that can be patentable today merely because it outlawed patents on non-novel businesses in England. As such, business methods, non-physical methods, or methods of organizing human activity were not removed from the scope of patentability by the passing of the Statute of Monopolies.[114]

The Statute of Monopolies governed English patent law for more than 200 years, and it was not until the passing of the *Patent Law Amendment Act 1852* (UK) that England received significant patent law legislation. The Statute of Monopolies, however, continued to be of relevance as it was never repealed and, by reference, expressly formed the basis of the patentable subject matter standard in United Kingdom patent law statutes until 1977 when the United Kingdom abandoned its Statute of Monopolies-based regime in favor of a patent system based on the *European Patent Convention*.[115]

E. Disclosure of the Invention: Consideration for a Patent

In patent law's infancy, the consideration required for the grant of a patent was the creation of a new industry or device and knowledge given to the public by the establishment of an industry in the realm or by training apprentices who would later be able to work the trade or industry under the patentee or independently on the expiration of the patent. Patents were not

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113. *See generally* Liardet v. Johnson (1780), 1 Y. & C.C.C. 526 at 528 (Eng.) (recognizing the common law requirement of a written specification to accompany a patent application).

114. *See In re* Bilski, 545 F.3d at 984–89 (Newman, J.,dissenting) (providing a near-complete list of patents granted between 2 March 1617 and 1 October 1852 with a few missing patents from the 17th century, which was published in the mid-1800s by Bennet Woodcroft, the first head of the English Patent Office. Newman pointed to a number of patents on that list (apparently without having examined them) that appear to involve financial subject matter and require primarily human activity. Those her Honor identified are: No. 1197 to John Knox (July 21, 1778) ("Plan for assurances on lives of persons from 10 to 80 years of age."); No. 1170 to John Molesworth (Sept. 29, 1777) ("Securing to the purchasers of shares and chances of state-lottery tickets any prize drawn in their favor."); No. 1159 to William Nicholson (July 14, 1777) ("Securing the property of persons purchasing shares of State-lottery tickets."). *Id*. (citing Bennet Woodcroft, ALPHABETICAL INDEX OF PATENTEES OF INVENTIONS 383, 410 (U.S. ed. 1969)); *See also* D.F. Renn, *John Knox's Plan for Insuring Lives: A Patent of Invention in 1778*, 101 J. INST. ACTUARIES 285, 285 (1974).

115. *See generally,* Convention on the Grant of European Patents 1977, 13 I.L.M. 268 (EU). The current legislation in the United Kingdom, *Patents Act 1977* (UK), (making no reference to the Statute of Monopolies).

required to contain a description of the invention, either in writing or diagrammatic form.[116]

While the Statute of Monopolies makes no demand for a disclosure of the invention in writing, a few of the early seventeenth century patents contained a specification made by the patentee, for the patentee's benefit, to clarify the scope of the monopoly. Soon a custom of presenting a detailed description of the invention in a specification arose, before being mandated by the courts by the middle of the eighteenth century.[117] The need for a written specification accompanying the patent application was recognized at common law in 1778 in *Liardet v. Johnson*, where Lord Justice Mansfield directed the jury:

The third point is whether the specification is such as instructs others to make it. For the condition of giving encouragement is this: that you must specify upon record your invention in such a way as shall teach an artist, when your term is out, to make it—and to make it as well as you by your directions; for then at the end of the term, the public have the benefit of it. The inventor has the benefit during the term, and the public have the benefit after.[118]

By the end of the eighteenth century, it had become settled law that the consideration for the patent was not the working of the invention per se, but the disclosure of how to make and use the invention.[119] In *Boulton and Watt v. Bull*, Justice Buller declared that "[t]he specification is the price which the patentee is to pay for the monopoly."[120] Consequently, the utility requirement evolved from the question of whether the invention was capable of successful introduction in the realm to whether it could be worked in the manner and so as to achieve the results described in the specification.[121]

The decision in *Liardet v. Johnson* was also instructive on the need for an invention to be novel and what that requirement entailed. According to Lord Mansfield, an allegation of want of novelty had to "be supported either

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116. *See* Walterscheid, *Antecedents (Part 2)*, *supra* note 34, at 860; Hulme, *History of Patent Law, supra* note 34, at 285.

117. *See* Federico, *supra* note 34, at 304; *see also* Hulme, *History of Patent Law*, *supra* note 34, at 285.

118. *See* Federico, *supra* note 34, at 304; Hulme, *History of Patent Law*, *supra* note 34, at 285.

119. Walterscheid, *Antecedents (Part 3)*, *supra* note 34, at 801; Hulme, *History of Patent Law*, *supra* note 34, at 287.

120. Boulton and Watt v. Bull (1795) 2 H. Bl. 463 at 472 (Eng.). The judgment of Lord Chief Justice Eyre also stated that "[t]he modern cases have chiefly turned upon the specifications, whether there was a fair disclosure." *Id*. at 491.

121. Turner v. Winter (1787) 1 T. R. 601 at 604 (Eng.); The King v. Arkwright (1785) 1 Web. Pat. Cas. 64 at 66 (Eng.); Morgan v. Seaward (1837) 2 M. & W. 544 at 548 (Eng.); Liardet v. Johnson (1870) 1 Y. & C.C.C. 526 at 528 (Eng.); Hill v. Thompson (1818) 8 Taunt. 373 at 387 (Eng.); Lewis v. Marling (1829) 4 Car. & P. 53 at 55.

by proof of continuous and successful prior use of the invention" or proof "that the subject matter of the invention was common knowledge in *the trade*".[122]

F. Uncertainty Regarding Processes During the Industrial Revolution

Identifying a historically consistent view of the objects of the patent system is difficult due to the state of uncertainty that existed within English patent law until the mid nineteenth century. It is reported that 150 years after the Statute of Monopolies was enacted, the English patent registers were brimming with patents claiming processes, even though it was not clear whether these were patentable.[123]

One of the first judicial actions involving the scope of patentable subject matter was the 1795 decision of *Boulton and Watt v. Bull*. As patents were not litigated in the common law courts until the Privy Council authorized such suits in 1752, judicial interpretation of various aspects of patent law were essentially absent until *Boulton and Watt v. Bull* was handed down.[124] This lack of judicial guidance as to the scope and content of the notion of "manufacture" was acknowledged by Chief Justice Eyre who said, "Patent rights are no where, that I can find, accurately described in our books."[125]

At issue was the validity of patent in respect to a new method of using an existing steam engine devised by James Watt, which lessened steam and fuel consumption.[126] Watt's improvement was to have the condenser in a separate vessel from the steam cylinder. The method was described in the

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122. Hulme, *History of Patent Law*, *supra* note 34, at 287.

123. Boulton and Watt v. Bull (1795) 2 H. Bl. 463 at 494–95 (Eng.) ("Probably I do not over-rate it when I state that two-thirds, I believe I might say three-fourths, of all patents granted since the statute passed, are for methods of operating and of manufacturing, producing no new substances and employing no new machinery."); Walterscheid, *Antecedents (Part 2)*, *supra* note 34, at 856 ("As one of the earliest texts on the patent law stated in 1806: 'most of the patents now taken out, are by name, for the method of doing particular things . . . '".).

124. MACLEOD, *supra* note 34, at 61; *See also* Mossoff, *supra* note 34, at 1262–63, n.26. According to Mossoff, the prerogative court of Privy Council was invested with jurisdiction to heard patent disputes as early as 1562. *Id*. Mossoff further records that Privy Council divested to the law courts jurisdiction over determining the validity of patents for inventions; thus putting into effect, albeit 130 years late, section 2 of the Statute of Monopolies. *Id*. at 1285.

125. *See* Boulton and Watt v. Bull (1795) 2 H. Bl. 463 at 491 (Eng.); *See also* Wood v. Zimmer (1815) Eng. Rep. 58 at 61 (Eng.) ("The subject of patents for new inventions has not been treated with due precision, as a branch of law by itself, in any of our law books. It is only indeed within a few years that they have become so important a part of our commercial machinery.").

126. *See* Boulton and Watt v. Bull (1795) 2 H. Bl. 463 at 463–64, 495–96 (Eng.).

specification as the application of certain principles of nature in a way to achieve its purpose.[127]

The bench of four was equally divided as to the patent's validity. Chief Justice Eyre and Justice Rooke held the patent to be valid, while Justices Heath and Buller took the opposite view. For Justices Heath and Buller, it was the presence of a physical substance or object that was the basis of an invention being something other than an unpatentable abstract principle.[128] In contrast, Chief Justice Eyre considered that the expression "any manner of new manufacture" used in the Statute of Monopolies bore a much wider meaning.[129]

While each of the judges agreed that there can be no patent for a mere principle, there were differences of opinion as to what this means. Chief Justice Eyre described a principle as being an "abstract notion," as distinct from a "practical manner of doing," while for Justices Rooke and Buller, it was an elementary truth of the arts and sciences.[130] Justice Heath was alone in taking the view that the prohibition on patenting principles extends to preclude patenting methods of production and even patents on the application of a principle.[131]

The involvement of some physical substance was for Justices Heath and Buller the basis for determining whether a claimed invention is something more than a mere principle. According to Justice Heath, the term "manufacture" is reducible to two physical classes: vendible machines or (chemical) substances.[132] Justice Heath took the view that, unless the method resulted in a vendible machine or substance, the method was not patentable, and if it did so result, the patent would be for the vendible machine or substance and not for the method.[133] He opined that "patents for chemical processes" are in truth "for a vendible substance."[134] Justice Buller took the same view, stating that the scope of patentable subject matter extends only as far as inventions embodied in mechanical and chemical forms.[135]

In contrast, Chief Justice Eyre made clear that he did not favor a physicality requirement. He held that new manufactures are things made, the practice of making (thereby endorsing the patentability of processes), and principles reduced to practice in a new manner (thereby endorsing the pa-

127. *Id*. at 496.
128. *Id*. at 483, 485–86.
129. *Id*. at 492–96.
130. *Id*. at 478, 486, 495–96.
131. *Id*. at 482–83.
132. *See* Boulton and Watt v. Bull (1795) 2 H. Bl. 463 at 481–82 (Eng.).
133. *Id*. at 482.
134. *Id*.
135. *Id*. at 485–86.

tentability of non-physical processes).[136] Justice Eyre described "the practice of making" broadly as to include "any art producing effects useful to the public."[137] Chief Justice Eyre noted that a patent for a method involving no new mechanism and producing no new result would necessarily be for the method itself, that is, for the "method detached from all physical existence whatever."[138]

Both the Chief Justice and Justice Rooke indicated that patent eligibility turns on a principle being reduced to a specific practical application capable of producing effects that are of benefit to the public.[139] This is a position that is as true today as it was then and leaves open the possibility that non-physical inventions have been recognized as being patentable since the earliest judicial consideration of the subject matter eligibility standard.

Justice Rooke saw no difficulty with process patents or patents to improvements on existing technologies.[140] He allowed the patent by focusing on the mechanical nature of the improvement, having determined that the invention claimed is more than a mere principle. Rather, Justice Rooke considered the claimed invention to be a principle reduced to a practical application.[141] He said nothing to indicate that producing a physical effect or causing a physical transformation of matter is what distinguishes the abstract from the non-abstract.

When James Watt's steam engine patent was re-litigated in an action on the case four years later in *Hornblower v. Boulton*, the court unanimously upheld the patent and confirmed the reasons and decision of Chief Justice Eyre, rejecting any assertion that the patent claimed a philosophical principle.[142] In that case, Chief Justice Kenyon broadly described the concept of manufacture as pertaining to, or the equivalent of "something made by the hands of man."[143] Justice Grose was of a similar view finding that the patent was "not a patent for a mere principle, but for the working and making of a new manufacture within the words and meaning of the statute."[144]

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136. *Id*. at 492–93.

137. *Id*. at 492.

138. *See* Boulton and Watt v. Bull (1795) 2 H. Bl. 463 at 494 (Eng.).

139. *Id*. at 477–78, 496–97.

140. *Id*. at 478–79.

141. *Id*. at 479–80.

142. (1799) 8 T. R. 95 at 98 (Eng.).

143. *Id*. at 99 ("But having now heard everything that can be said on the subject, I have no doubt in saying that this is a patent for a manufacture, which I understand to be something made by the hands of man.").

144. *Id*. at 101. Watt's steam engine patent was extended for 25 years by an Act of Parliament in 1775 by 15 Geo. III c. 61: An Act for vesting in James Watt, engineer, his executors, administrators, and assigns, the sole use and property of certain steam engines, commonly called fire engines, of his invention, described in the said Act throughout His Majesty's dominions, for a limited time.

The distinction between patentable manufactures and unpatentable principles made in *Boulton and Watt v. Bull* and *Hornblower v. Boulton* was confirmed in *The King v. Wheeler*, a case that concerned a method of drying and preparing malt that involved no new machine.[145] While the patent was declared void because the specification did not adequately describe the claimed invention, Chief Justice Abbott gave some consideration to the concept of manufacture:

> Now the word 'manufactures' has been generally understood to denote either a thing made, which is useful for its own sake, and vendible as such, as a medicine, a stove, a telescope, and many others, or to mean an engine or instrument, or some part of an engine or instrument, to be employed, either in the making of some previously known article, or in some other useful purpose, as a stocking frame, or a steam engine for raising water for mines. Or it may perhaps extend also to a new process to be carried on by known implements, or elements, acting upon known substances, and ultimately producing some other known substance, but producing it in a cheaper or more expeditious manner, or of a better and more useful kind. But no merely philosophical or abstract principle can answer to the word 'manufactures'. Something of a corporeal and substantial nature, something that can be made by man from the matters subjected to his art and skill, or at the least some new mode of employing practically his art and skill, is requisite to satisfy this word.[146]

From three distinct exemplars of patentable subject matter identified in the final sentence of this excerpt, it is clear Chief Justice Abbott considered the distinction between patentable subject matter and an unpatentable philosophical or abstract principle as involving something other than a physicality requirement.

Despite the differences of opinion they contain, the enduring effect of *Boulton and Watt v. Bull*, *Hornblower v. Boulton*, and *The King v. Wheeler* is the idea that there is no place for a physicality requirement in the scope of patentable subject matter and that a lack of physical embodiment in an invention is not to be equated with a claimed invention being a mere abstract or philosophical principle.

At the time, though, the differences in opinion in those cases led to uncertainty as to what the scope of patentable subject matter in England was. That uncertainty is evident in the choices made by the founders of the United States patent system.

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145. (1819) 2 B. & Ald. 345 at 345 (Eng.).
146. The King v. Wheeler, (1819) 2 B. & Ald. 345 at 349–52 (Eng.).

G. The Emergence of Patent Law in the United States

Shortly after gaining independence, the United States established its own national patent regime, independent of the early English patent tradition and the Statute of Monopolies. The first United States Federal Patent Act, the Act of 1790, was largely based on and incorporated features of the English system.[147] Justice Story, in *Pennock v. Dialogue*, acknowledged the influence of the English practice on these early patent laws:

> It is obvious to the careful inquirer, that many of the provisions of our patent act are derived from the principles and practice which have prevailed in the construction of that of England. . . . The language of [the patent clause of the Statute of Monopolies] is not, as we shall presently see, identical with ours; but the construction of it adopted by the English courts, and the principles and practice which have long regulated the grants of their patents, as they must have been known and are tacitly referred to in some of the provisions of our own statute, afford materials to illustrate it.[148]

Against the backdrop of the English system, the Framers of the United States Constitution, at the end of the eighteenth century, explicitly tied patentability to the purpose of advancing "useful arts."[149] In pursuance of this objective the Constitution of the United States authorized the United States Congress to grant exclusive rights to "Inventors" in respect of their "Discoveries."[150] The United States Congress has legislative power to make laws with respect to patents by virtue of the "intellectual property clause" in the, Constitution of the United States, which empowers the Congress:

> 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.[151]

One of the reasons for this departure from "manufactures" in favor of the "useful arts" was the view that "even in Great Britain the phrase 'new

147. *See* Graham v. John Deere Co. of Kansas City, 383 U.S. 1, 5 (1966) (noting that first patent statute was written against the backdrop of English monopoly practices); Walterscheid, *Antecedents (Part 1)*, *supra* note 34, at 698.

148. 27 U.S. 1, 18 (1829).

149. *See In re* Comiskey, 554 F.3d 967, 976–77 (Fed. Cir. 2009); *In re* Bilski, 545 F.3d 943,985–89 (Fed. Cir. 2008); Walterscheid, *Science and Useful Arts*, *supra* note 34, at 12–13, 33–36; George Ramsey, *The Historical Background of Patents*, 18 J. PAT. OFF. SOC'Y 6, 6 (1936); It is also arguable that the United States patent system has its origins in the very first patent system in the Venetian Republic in 1474. S*ee generally* Mandich, *supra* note 38; Mandich, *supra* note 42.

150. U.S. CONST. art. I, § 8, cl. 8.

151. *Id*.

manufactures' was unduly limiting for a patent system because it seemed to exclude new processes."[152]

The United States Congress passed its first patent statute in 1790 and its second in 1793. The first patent statute in 1790 was largely based on and incorporated features of the English patent system, as was the 1793 Act.[153] Patents under the 1790 Act were granted by the executive rather than by Acts enacted by the legislative branch. The four enumerated categories of patentable subject matter established by the 1793 Act (art, machine, manufacture, and composition of matter) remained essentially unchanged until 1952, when Congress amended § 101 by replacing the word "art" with "process" and defining that term in § 100 (b).[154] The Supreme Court has made clear that this change did not alter the substance of the statute; it did not broaden the scope of patentable subject matter.[155]

Both the 1790 and the 1793 Acts adopted a fourteen-year patent term and required the inventor to file a written specification describing the invention claimed.[156] However, in the United States the patent right has never been predicated upon importation and has never been limited to "manufactures."[157]

In the United States it is the language of Congress that dictates what is patentable, rather than history or the common law of England.[158] As the Supreme Court noted in *Diamond v. Chakrabarty*, "[O]ur obligation is to take

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152. Karl B. Lutz, *Patents and Science: A Clarification of the Patent Clause of the U.S. Constitution*, 18 GEO. WASH. L. REV. 50, 53–54 (1949).

153. *See* Walterscheid, *Antecedents (Part 1), supra* note 34, at 698. This is reflected in the Senate Committee Report for the bill that became the 1790 Act, which expressly noted the drafters' reliance on the English practice found in the Senate Committee Report Accompanying Proposed Amendments to HR 41. *Proceedings in Congress During the Years 1789 & 1790 Relating to the First Patent and Copyright Laws,* 22 J. PAT. OFF. SOC'Y. 352, 363 (1940) ("The Bill depending before the House of Representatives for the Promotion of useful Arts is framed according to the Course of Practice in the English Patent Office"); Pennock v. Dialogue, 27 U.S. 1, 18 (1829); s*ee also* Sears, Roebuck & Co. v. Siffel Co., 376 U.S. 255, 229, n.6 (1964) ("Much American patent law derives from English patent law."). Before the enactment of 1790 *Patent Act,* patents were granted by congress. *See Sears, Roebuck & Co.*, 376 U.S. at 227.

154. Patent Act of 1793, Ch. 11, 1 Stat. 318-323 (1793); Act of July 19, 1952, ch. 950, 66 Stat. 797 (1952).

155. Diamond v. Diehr, 450 U.S. 175, 182–83 (1981).

156. Patent Act of 1793 § 1.

157. *See* Gibbons v. Ogden, 22 U.S. 1, 58–59 (1824) (discussing that patents are not awarded in the United States to someone who is not an "inventor," excluding importers); Prager, *Historical Background*, *supra* note 34, at 309; Klitzke, *supra* note 21, at 638 (stating that in Elizabethan times, novelty only required that "the industry had not been carried on within the realm within a reasonable period of time," while today "the proof of a single public sale of an article" or a "printed publication" can destroy novelty).

158. *See* Diamond v. Chakrabarty, 447 U.S. 303, 308 (1980).

statutes as we find them, guided, if ambiguity appears, by the legislative history and statutory purpose."[159]

Given that the Framers did not use the word "manufacture" in the Constitution to describe the subject matter of patents as they might have done had they intended to merely incorporate the English law as it was at that time, it is conceivable, although there is no real evidence for this, that the Framers intended the reference to "useful arts" to signal an expansive scope of patentable subject matter to remove the uncertainty that surrounded the scope of patent protection offered in England in relation to the patentability of processes.[160]

The four enumerated categories of patentable subject matter found in United States patent legislation shows a deliberate choice between competing views prevalent in England at the time of their adoption in the 1793 Patent Act; these four categories were either drawn from the Statute of Monopolies and the common law refinement of its interpretation or were intended to resolve competing views in England at the time.[161]

Arguably, the inclusion of the category of "manufacture" in 35 U.S.C. § 101 manifests an intention to incorporate into United States practice as much of the common law interpretation of "new manufactures" as was then understood but not to limit the scope of patentable subject matter in the United States to that which could be patented in England. It would appear that the inclusion by Congress of any "art" or "process" in the patent system was a deliberate clarification of the English practice, confirming the patentability of methods.[162]

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159. *Id*. at 315.

160. Lutz, *supra* note 152, at 53–54. As noted above, this uncertainty stems from the fact that judicial interpretations of various aspects of patent law were virtually absent from the common law in England until after the Privy Council finally authorized patent suits to be heard in the common law courts in 1752 and the first case involving questions about the scope of patentable subject matter was not resolved until *Boulton and Watt v. Bull* was handed down in 1795. *See supra* Part F.

161. *See* Walterscheid, *American Patent Law (Part 1)*, *supra* note 34, at 67–71.

162. The 1793 Act explicitly included "any new and useful art," in the list of categories of patentable subject matter, a usage that was carried forward until "art" was replaced with "process" in 35 U.S.C. §101 and defined in §100(b) in 1952. *See* Patent Act of 1793 § 1; Act of July 19, 1952, § 100. The inclusion of any "art" or "process" appears to have been a deliberate clarification of a question then unresolved in English law as to whether a process or an improvement of an existing invention is patentable, a question not addressed in England until the decision in *Boulton and Watt v. Bull* was brought down in 1795 and not confirmed until *Hornblower v. Boulton* in 1799. *See* Lutz, *supra* note 152, at 53–54. That the issue to be litigated in *Boulton and Watt v. Bull* was in the minds of those sitting in Congress in 1793 was likely given that the case came before the Chief Justice at sittings after Trinity term (the term beginning after Easter) in 1793. *See* Boulton and Watt v. Bull (1795) 2 H. Bl. 463 at 464 (Eng.). Thus, it would appear that Congress broadened the field of patent eligibility from "new manufactures" to "useful arts" to avoid the possible complication that the English phrase was unduly limited. Lutz, *supra* note 152, at 153–54.

Two conclusions can be drawn from this analysis. The first is that the English patenting practice that preceded the establishment of a United States patent system is of relevance. The second is that the scope of patentable subject matter in the United States ought not be narrower than that in England at the time the United States patent system came into being.

H. Emergence of the Inventive Step Requirement

Of the contemporary requirements of patentability,[163] only novelty (in the sense of prior use rather than prior publication) was recognized in England prior to 1623.[164] Obviousness (or lack of an inventive step) was not clearly recognized as a separate ground of invalidity until late in the nineteenth century, and the clear distinctions drawn today between lack of novelty, obviousness and lack of subject matter in a claimed invention were not fully developed in the case law as it stood in 1900.[165] As the High Court of Australia noted in *National Research Development Corporation v. Commissioner of Patents*, although the Statute of Monopolies had spoken of "any manner of new manufactures within this realme" and of "the true and first inventor and inventors of such manufactures," it nowhere spoke of "the invention."[166]

The term "inventive step" appears first to have been used by Lord Justce Fletcher Moulton in 1908 in the course of his Lordship's judgment in the English case of *British United Shoe Machinery Company Ltd. v. A. Fussell & Sons Ltd.*, a case dealing with a challenge to the novelty of a claimed new combination of known integers, and thus cannot be traced back to the Statute of Monopolies.[167] In 1894, Master of the Rolls Lord Esher responded in *The Edison Bell Phonograph Corporation v. Smith and Young* to a submission that one of the claims of the patent in suit was wanting in subject matter:

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163. The contemporary requirements of patentability are that an invention must fall within one or more of the four categories of patentable subject matter enumerated in 35 U.S.C. § 101, be novel, be non-obvious, and be useful. *See supra* note7. The invention claimed must also be described in sufficient detail and enabled so that one with ordinary skill in the subject matter of the patent can make and use the invention. 35 U.S.C. § 112 (2015).

164. Although the 1474 Venetian patent statute required that an invention be "ingenious," indicating a need for inventiveness, this requirement does not seem to have been imported into English patent law until much later. *See* Walterscheid, *Antecedents (Part 3)*, *supra* note 34, at 800; Walterscheid, *Antecedents (Part 1)*, *supra* note 34, at 707.

165. *R D Werner & Co Inc v Bailey Aluminium Products Pty Ltd* (1989) 25 FCR 565 at 573–575, 595–99 (Austl.).

166. (1959) 102 CLR 252, 268–69 (Austl.)

167. (1908) 25 R.P.C. 631 at 653 (Eng.).

> Now, whenever I hear the objection taken to a patent which has been used, which has been bought and sold, which has been therefore treated by men of business as a useful thing, that it is wanting in subject-matter, I look upon it, I confess, with an amused contempt. . . . It really comes to this, that although the invention is new—that is, that nobody has thought of it before—and although it is useful, yet, when you consider it, you come to the conclusion that it is so easy, so palpable, that everybody who thought for a moment would come to the same conclusion; or, in more homely language, hardly judicial, but rather businesslike, it comes to this, it is so easy that any fool could do it. Well, I look, as I say, upon that objection, when all others have failed, generally with amused contempt.[168]

It was not until the enactment of the Patents and Designs Act of 1907 that a statutory distinction was drawn between novelty and obviousness in the United Kingdom. It was not until The Patent Act of 1952 that the United States[169] and Australia followed suit.[170] The High Court of Australia has explained that "raising the threshold of inventiveness" in this way was appropriate to balance inventors' need for encouragement with the public's need to access information:[171]

> The emergence of the independent requirement for an inventive step, first in case law, then in legislative requirements for patentability as occurred in the United Kingdom, the United States and Australia, has always reflected the balance of policy considerations in patent law of encouraging and rewarding inventors without impeding advances and improvements by skilled, non-inventive persons.[172]

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168. (1894) 11 R.P.C. 389 at 398.

169. 35 U.S.C. § 103 (2015). This provision has no statutory precursor and replaced the judge-made case law requiring that an invention be disclosed before a patent could be granted. *See* Giles S. Rich, *Principles of Patentability*, 28 GEO. WASH. L. REV. 393, 405–06 (1960). The common law origins of the non-obviousness principle are said to lie in *Hotchkiss v. Greenwood*, a case in which the invention related to an old method of making doorknobs whereby the doorknob had a certain shaped hole for the fastening of a shank, and the only difference was that the inventor substituted a clay or porcelain knob for a metallic knob. Hotchkiss v. Greenwood, 52 U.S. 248, 248–49 (1850). The Court described the difference as formal and destitute of ingenuity and invention. *Id*. at 266.

170. *Patents Act 1952* (Cth) (Austl.) s 100(1) (e); *Lockwood Security Products Pty Ltd v Doric Products Pty Ltd (No. 2)* (2007) 235 CLR 173, 192–93 (Austl.); *The Grain Pool of Western Australia v Commonwealth* (2000) 202 CLR 479, 504 (Austl.).

171. *Lockwood Security Products Pty Ltd v Doric Products Pty Ltd (No. 2)* (2007) 235 CLR 173, 194 (Austl.).

172. *Id*.

III. CONSIDERATION OF PHYSICALITY IN PATENT LAW'S HISTORY

From its earliest days, the commercial and technical innovation requirements of the patent system have been about giving the public access to new technologies. The history of the patent system reveals a 500-year-old innovation policy dating back to the Venetian Republic designed to promote innovation, prosperity, employment, and knowledge transfer.

While the Venetian patent statute of 1474 makes explicit reference to the introduction of new devices, the pre-Statute of Monopolies practice of issuing patents demonstrates nothing that ties the patent incentive to physical creations. Rather, we see an incentive to introduce new industries and trades (described as "manufactures") to the realm. This practice continued under the rule of Queen Elizabeth I and James I, but not without alleged abuses of the privilege, which were brought to the fore in *Darcy v. Allen*[173] and ultimately banished sometime after the enactment of the Statute of Monopolies. That the subject matter for which the Crown might grant a patent was broad is clear in the language in which *Darcy v. Allen* is described and in the report of *The Clothworkers of Ipswich*, which links the patent incentive to the introduction of any new trade into the realm, either by way of importation or invention.[174] From the descriptions of patentability in these documents, it seems inconceivable that a patent granted for a new trade at that time would have been invalid if it involved the use of a method that did not operate upon a physical object when invoked.

We see in the Statute of Monopolies no intention to place no fetters on the scope of patentable subject matter so that the patent incentive would be available to encourage the introduction of any new trades and manufactures that might benefit the realm. Although the Statute of Monopolies may have outlawed odious monopolies, it said nothing of the types of subject matter that would qualify for a patent or restrictions on the scope of patentable subject matter. Its language certainly does nothing to impose a physicality requirement.

Instead, the focus of the Statute of Monopolies is newness; the statute was enacted to ensure that monopolies were not granted in respect of existing industries or trades that were known in the realm so as to prevent abuse.

In the Industrial Age cases that were decided after the Privy Council divested itself of the jurisdiction to hear patent matters and passed that jurisdiction to the common law courts in 1752, a line of authority begins in the opinion of Chief Justice Eyre in *Boulton and Watt v. Bull* employing a similarly broad view of the subject matter for which a valid patent might be

173. (1603) 11 Eng. Rep. 84b.
174. (1615) Eng. Rep. 252 at 254 (Eng.).

granted.[175] Evident in that line of cases is an understanding of the concept of an invention as being something independent of its manifestation or form. This is the basis upon which the courts' early understanding of the concept of invention permitted the recognition of non-physical processes as patentable subject matter, and these cases set the scope of patentable subject matter. That scope conveys no place for a physicality requirement in the context of patentable subject matter and that a lack of physical embodiment in an invention is not to be equated with a claimed invention being a mere abstract or philosophical principle.

When the first United States Patent Act came into being in 1790, it was "derived from the principles and practice which have prevailed in the construction of that of England."[176] While it may have been unclear as to whether improvements to existing products or processes that did not involve the creation of a new machine or device were patentable in England, the enumerated categories of statutory subject matter in 35 U.S.C. § 101 make clear that the scope of patentable subject matter was intended to be broad and encompassing, as recognized in modern cases such as *Diamond v. Chakrabarty*.[177]

This article argues that this broad conception of invention is something independent of the subject matter's material form. This argument is as relevant today as it was at the time of *Boulton and Watt v. Bull*, *Hornblower v. Boulton*, and *The King v. Wheeler*. Furthermore, that broad concept of invention was replicated in the United States by framers who intended to improve the English system by ensuring that the scope of patentable subject matter would be less restrictive.

The history of the patent system demonstrates that its original focus on the production, use, and alteration of physical artifacts is a by-product of dated notions of technology, and this does not mean the patent incentive was intended to be so limited.[178] Nothing in patent system history definitively states that the patent incentive was ever limited to inventions of a physical nature. Instead, patent law history supports the development of mercantilist

175. *See* Boulton and Watt v. Bull (1795) 2 H. Bl. 463, 494–96 (Eng.).

176. Pennock v. Dialogue, 27 U.S. 1, 18 (1829).

177. Diamond v. Diehr, 450 U.S. 175, 182 (1981); Diamond v. Chakrabarty, 447 U.S. 303, 309 (1980) ("Congress intended statutory subject matter to 'include anything under the sun that is made by man.'").

178. Erik S. Maurer, *An Economic Justification for a Broad Interpretation of Patentable Subject Matter*, 95 NW. U. L. REV. 1057, 1057 (2001) ("When people think of patented inventions they probably think about well-tooled, oily parts that make machines run – something they can put their hands on, weigh with dead reckoning, and intuitively understand."); Robert P. Merges, *As Many as Six Impossible Patents Before Breakfast: Property Rights for Business Concepts and Patent System Reform*, 14 BERKELEY TECH. L.J. 577, 585 (1999) ("At the very least, for Jefferson, if you put technology in a bag and shook it, it would make some noise.").

and developmental aims. Imposing a physicality requirement is in no way consistent with and does nothing to advance those aims.

The historically justified alternative to using such bright-line criteria is deciding subject-matter eligibility by reference to the simple question of whether a claimed invention reduces a scientific principle, natural phenomena, or idea to a specific and useful practical application. This approach allows novelty, non-obviousness, and adequacy of disclosure to play a greater role in determining whether a patent should issue in respect of a particular invention.[179]

This technology-neutral approach to patent eligibility has been adopted in the drafting of Article 27.1 of the World Trade Organization's Agreement on Trade-Related Aspects of Intellectual Property ("TRIPS Agreement"). Like the Statute of Monopolies that preceded it, the TRIPS Agreement does not define "invention" and does not distinguish between patentable inventions issuing from the laws of science, natural phenomena, and abstract discoveries. It instead requires that patents "shall be available for any inventions . . . in all fields of technology, provided they are new, involve an inventive step[,] and are capable of industrial application."[180] This historically consistent approach recognizes that patent law is about achieving an appropriate balance between the need to provide private rights sufficient to encourage innovation and the public's right to use and build upon existing ideas.

IV. CONCLUSION

While the focus of the patent system has historically been on the production and manipulation of physical artifacts that are the domain of industry, chemistry, and engineering, the history of patent law and practice does not support the view that patent law's incentive function is in fact limited to promoting innovation in these fields. Instead, the history of patent law, from the Venetian patent statute of 1474 to the adoption of a patent system in the United States, supports a broad view of patentable subject matter, free of artificial fetters such as a physicality requirement.

The patent system has always been about creating incentives to innovate, to bring new products and processes to market, and to disclose new technologies to the public. The incentives have always been limited in duration to enable others to learn and use the technology without restriction once

179. *See generally* 35 U.S.C. §§ 102–103, 112(a) (2015).

180. World Trade Organization [WTO], *General Agreement on Tarrifs and Trade – Multilateral Trade Negotiations (The Uruguay Round): Agreement on Trade-Related Aspects of Intellectual Property Rights, Including Trade in Counterfeit Goods*, at Art. 27, Document MTN/FA, (December 15, 1993), *reprinted in* GENERAL AGREEMENT ON TARIFFS AND TRADE-MULTILATERAL TRADE NEGOTIATIONS, 33 I.L.M. 81 (1994).

the exclusivity period has come to an end. This is entirely consistent with the notions that innovation is the production of new information, knowledge, and ideas and that technology is little more than the application of information or knowledge to do new things. It is the process of creating better and more useful information. It is entirely consistent with the notion of information being an ordinary material good that is both an input and a product of the innovative process.

Given the nature of innovation in the Information Age and the relationship it bears with the incentives to innovate and invest in innovation that patent law provides, it makes little sense to limit the scope of patentable subject matter by introducing a physicality requirement. Because the innovation promoted by the patent system is nothing more than the creation of new knowledge and ideas and is not contingent on the creation of new machines, physical devices and transformative methods, its progress will not be served well by limiting the scope of patentable subject matter to traditional manufacturing and physicality-based industrial technologies.