

Congress Should Reform Patent Eligibility Doctrine to Preserve the U.S. Innovation Economy

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KEY TAKEAWAYS

As a result of the *Alice-Mayo* framework, the U.S. is denying many patent applications or invalidating issued patents for cutting-edge innovations.

This threatens the long-standing world leadership in innovation by the U.S. that has been driven by its once former “gold standard” patent system.

Congress should amend § 101 to abrogate the *Alice-Mayo* framework to staunch the excessive invalidation of patents and rejection of patent applications.

I. Introduction

Property rights are the foundation for flourishing societies and economic growth.¹ This is equally true for patents, which are property rights in new and useful inventions. The economic and historical evidence is overwhelming that reliable and effective property rights in new inventions—patents issued and secured by stable political and legal institutions functioning under the rule of law—are an essential ingredient for growing innovation economies.²

Many people witness this on *Shark Tank* as the venture capitalists always ask inventors if they have a patent to secure their invention.³ Even before *Shark Tank*, students learn in school about the innovators responsible for making modern life a veritable miracle, such as Charles Goodyear (vulcanized rubber), Cyrus McCormick (mechanized reaper), Alexander Graham

This paper, in its entirety, can be found at <http://report.heritage.org/lm257>

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Bell (telephone), Thomas Edison (record players, lightbulbs, electrical systems), Nikola Tesla (electrical systems), Willis Carrier (air conditioning), Steve Wozniak (personal computers), and many others. All of these inventors had the fruits of their productive labors secured to them by reliable and effective patents. Thus, they were willing to create their new inventions and then sell them to consumers in the marketplace, revolutionizing our day-to-day lives in the 21st century.

The United States has long been regarded as the world leader in securing property rights in technological innovations, driving the next wave of innovations with patent protection when the rest of the world hesitated. The U.S. patent system has been successful precisely because it consistently secured reliable and effective property rights in the fruits of inventors' labors.⁴ This pattern of U.S. leadership in patented innovation continued up through the most recent technological revolutions of our modern era: the high-tech revolution,⁵ the biotech revolution,⁶ and the mobile revolution.⁷

Over the past decade, though, the U.S. patent system has been put under an extensive amount of stress from all branches of the federal government. For its part, the Supreme Court is now deciding patent cases at a rate not seen for almost 100 years,⁸ changing the law in all aspects of the patent system. This has sown extensive uncertainty for innovators, which has undermined the reliability of patents as a guaranty that an inventor or creator will be able to rely on them to reap the fruits of their labors.

But it is far worse. The Supreme Court is now *closing off* the patent system to the innovations that it has long recognized as worthy of securing with patent protection. This has had a tremendously negative impact on the inventors and the companies working in the innovation industries that invest millions of dollars in creating the new products and services that drive economic growth, job creation, and higher standards of living. The Supreme Court is undermining America's long-standing comparative advantage among world economies in securing reliable and effective patent rights for all innovators.

This *Legal Memorandum* addresses why Congress should act to reform the patent laws to bring back balance to the U.S. patent system in promoting the innovation that creates new jobs, grows the economy, and makes possible a flourishing society. First, it briefly describes what is a patent and what the Supreme Court has done in recent years in creating a new legal test in an area of patent law known as "patent eligibility doctrine" under a provision of the patent laws enacted by Congress. Second, it identifies the need for congressional action by surveying the incredibly high rates of invalidation of patents by courts and of rejection of patent applications

under this new legal test created by the Supreme Court. The data is striking in both its magnitude and in the stark break from historical norms that these large numbers represent because this doctrine historically was rarely used in patent law. Third, Congress can act, and it has done so before. It has abrogated Supreme Court decisions to correct mistaken interpretations of its patent statutes many times in the past 200 years.⁹ Congress enacts the patent laws pursuant to its authorization in the Constitution, and when the courts misconstrue these laws in ways that undermine the constitutional authorization to Congress “to promote the progress of useful Arts,” it should assert its delegation of power and reclaim its constitutional mandate. Finally, it concludes by identifying what a successful legislative reform of § 101 of the Patent Act would look like, as reflected in a “discussion draft” of an amended § 101 first proposed by Senators Thom Tillis (R–NC) and Chris Coons (D–DE) in May 2019.

This is not simply a matter of ensuring the division of powers between the courts and Congress. In a global economy, research and development (R&D) investments and the venture capital financing that are the lifeblood of innovation can easily move from one country to another in search of more reliable legal security in the fruits of inventive labors. Historically, it was the U.S. that became the home to innovators and R&D financing, which was one reason for its explosive economic growth. Even with periodic upheavals in U.S. patent policy over the past two centuries, the U.S. often forged ahead when other countries hesitated in securing patents in cutting-edge discoveries and inventions, such as in biotechnology and computer software.¹⁰ Alarming, China and European countries are now the ones forging ahead and securing reliable and effective patents in innovation that the U.S. no longer protects due to the closing of its patent system under the Supreme Court’s new test for what counts as an invention or discovery eligible for patent protection.¹¹

II. What Is a Patent and What Makes an Invention or Discovery Patentable

A patent is a property right in a new and useful invention or discovery. Patents are supposed to secure only the discoveries and inventions that become the products and services that are of value in human life—the medical tests administered by physicians and the drugs they prescribe to cure diseases, the batteries in one’s electronic devices, the components of the jet engines that make air travel possible, the software programs that make computers valuable instruments, and the hardware and software that comprise the

supercomputers in our pockets that we call “phones,” to name just a few. To ensure this, Congress has enacted patent laws since the first Patent Act of 1790 that set forth a variety of legal requirements for a valid patent to exist.

III. What Makes an Invention or Discovery Patentable and the Supreme Court’s New Test

Some of the legal requirements for an inventor to receive a patent are commonsensical, such as the basic requirement that an invention must be new, or, in patent law parlance, *novel*. An invention must also be *useful*. The patent applicant must also fully describe the invention so that anyone skilled in that field of technological art can make and use the patented invention once the patent term expires after 20 years and it becomes part of the public domain.

There are other requirements, but the one most relevant today for U.S. innovation policy is the legal rule that an invention or discovery must be something eligible for patent protection. Since the 1790 Patent Act, Congress has also set forth that patents can only be issued on some types of inventions and discoveries. Today, this requirement is set forth in § 101 of the Patent Act as four categories of patent-eligible inventions or discoveries: machine, manufacture, process, and composition of matter. Courts have long construed these statutory categories as containing an implicit prohibition against patents issuing for abstract ideas, laws of nature, or physical phenomena. These “exclusions” from patent eligibility are not in § 101, and thus they represent a judicial gloss on the statutory text.¹²

Among the many changes in the patent system wrought by the Supreme Court in the past decade were four decisions between 2010 and 2014 on patent eligibility doctrine under § 101.¹³ These four decisions culminated in the “*Alice-Mayo* framework”—a new two-factor inquiry that courts and the U.S. Patent & Trademark Office (USPTO) have applied since 2014 in assessing whether an invention or discovery qualifies under § 101 as an invention or discovery that is patentable under the Patent Act even if it is new, useful, and fully disclosed in the patent.¹⁴

The *Alice-Mayo* framework does not apply the statutory text of § 101, but rather the judicially created exclusionary rule prohibiting patents issuing on abstract ideas, laws of nature, or physical phenomena. The two-factor inquiry is: (1) determine whether the patent claims an abstract idea, natural phenomenon, or law of nature that are ineligible for patent protection, and, if so, (2) determine if the patent claims something more that transforms it into a patent-eligible application (an “inventive concept”) of one of

these ineligible categories or is this additional activity in the claim merely well-understood, routine, and conventional activity in the art.

As a new framework for applying patent eligibility doctrine in § 101, the *Alice-Mayo* framework has severely restricted the inventions and discoveries that have long been considered patentable for over two centuries in the U.S. patent system. All of the legal requirements for a valid patent, including that the invention or discovery be eligible for patent protection, are applied by examiners who review patent applications filed at the USPTO. The job of an examiner is to make sure that the applicant is seeking the protection for the fruits of his or her truly inventive labors in creating a new machine or process or in discovering a new composition of matter (such as a molecule that works as a drug treatment for cancer).

Patents should only issue on true inventions or discoveries, otherwise they represent legal protection for something already known or practiced by others in their careers—the monopolies historically granted by the English Crown and that later judges deemed an “odious” violation of other citizens’ rights of liberty and property. Moreover, since examiners are only human and can make mistakes, defendants are permitted to assert in patent infringement lawsuits that a patent is invalid if they can identify new evidence that the examiner missed. Last, Congress created in 2011 a new administrative tribunal at the USPTO, called the Patent Trial & Appeal Board (PTAB), in which anyone can file a petition to have a patent canceled. (There are various review programs and differing legal reviews, but these are not necessary to know for the purpose of this *Legal Memorandum*.)

As will be explained in the next section, the USPTO is dissecting patent applications and courts are dissecting previously granted patents down into the foundational elements that underlie all inventions and discoveries—and denying that these are patentable as such under the *Alice-Mayo* framework. In one recent and notorious example, the courts disintegrated a method of making an axle in an automobile engine down to the laws of thermodynamics that underlie all machines and invalidated the patent.¹⁵ Nineteenth-century industrial technologies are now being denied patent protection in the 21st century, not because they are not new, but because judges and administrative officials are saying they are not even *inventions*. Even worse, given that any invention can be disintegrated down into underlying laws of nature or abstract ideas, patent applicants or patent-owners have no way of predicting when a patent examiner at the USPTO or a judge may choose to do this.

As a result of the *Alice-Mayo* framework, the U.S. is now denying patent applications or invalidating issued patents claiming cutting-edge discoveries in medical care, such as treatments for breast cancer, diabetes,

and strokes, among others.¹⁶ This is an alarming shift from the historical approach of the U.S. in securing reliable and effective patent rights in new innovations, which has been a key driver of economic growth in the U.S. This not only threatens economic growth and the new medical treatments and high-tech products that we rely on in our day-to-day activities in the 21st century, but it threatens the long-standing world leadership in innovation by the U.S. that has been driven by its once “gold standard” patent system.¹⁷

IV. The Closing of the U.S. Patent System to Innovation

The data on the rates of invalidation of patents by courts and of rejection of patent applications by the USPTO is striking. Between 2014 and 2018, there has been widespread application of the *Alice-Mayo* framework, but patent eligibility doctrine was long understood to be “only a threshold test” among the more substantive and searching patentability requirements of novelty, nonobviousness, and disclosure.¹⁸ The data also confirms extensive invalidations of patents and rejections of patent applications under the *Alice-Mayo* framework outside of historical norms. This is concerning, given that it represents a significant break from the successful approach in the U.S. in promoting its own innovation economy. It also now places the U.S. at a relative disadvantage compared to other countries, such as China, that have a clear policy of promoting new inventions as a basis for growing their own innovation economies.¹⁹

Courts are now applying the *Alice-Mayo* inquiry in many more decisions than they have done in the past, and the invalidation rates are very high compared to historical practices. From 2014 to 2019, court decisions applying the *Alice-Mayo* framework increased 730 percent with a 659 percent increase in the number of litigated patents.²⁰ Patent eligibility doctrine is no longer the mere “threshold test” that was rarely applied in patent law.²¹

With this massive increase in court decisions applying patent eligibility doctrine, there are extremely high rates of invalidations of patents under the *Alice-Mayo* framework. As of June 2019, the overall invalidation rate in court decisions is 62 percent.²² In the appeals courts, the invalidation rate is even higher. The Court of Appeals for the Federal Circuit, the federal appeals court created in 1982 that hears all appeals of trial court decisions in patent cases, is invalidating patents under the *Alice-Mayo* framework in 86 percent of its decisions. At the PTAB, where administrative patent judges review business process inventions (known in patent parlance as business method patents), they have applied the *Alice-Mayo* framework in invalidating patents an astounding 97.8 percent in its final decisions.²³

While there has been a slight downward trend in the overall rate of invalidations of patents by courts since 2014, the average invalidation rate appears to have stabilized at a significantly high percentage, fluctuating within a range of 50 percent to 70 percent in the past couple of years.²⁴

These are only the invalidation rates of existing patents by courts and by the PTAB. Patent applicants in many areas of innovation in the 21st-century economy must now run a gauntlet at the USPTO with examiners actively applying the *Alice-Mayo* framework. As of early 2018, there are examination units at the USPTO for inventions in e-commerce, business cryptology, and health care that are *rejecting* patent applications under the *Alice-Mayo* framework at rates well over 80 percent—and sometimes over 90 percent.²⁵

These high rates of rejections of patent applications are not merely a departure from historical U.S. practices. They signal that the U.S. has closed its patent system to innovators, especially compared to China and Europe. A recent study of patent applications between August 2014 and September 2017 found that well over 1,000 patent applications were abandoned after receiving initial or final rejections by an examiner at the USPTO who found the claimed inventions or discoveries to be unpatentable under the *Alice-Mayo* framework. What makes these rejected patent applications important is that, in contrast to the U.S., the patent applications for the same inventions and discoveries were *granted* by China, the European Patent Office, or both.²⁶

Given past U.S. leadership relative to other world economies, this data represents a disturbing trend for the future of the U.S. innovation economy, especially compared to countries like China. Since 2014, patent applications at the USPTO for important inventions in the diagnosis and treatment of breast cancer, lung cancer, gynecological cancer, liver disease, diabetes, ultrasound imaging (used in neonatal care and in other medical treatments), and others were rejected under the *Alice-Mayo* framework. These same inventions and discoveries were secured with patent protection by China, the European Patent Office, or both.²⁷ The signal this sends to inventors and companies is not just that the U.S. has changed course from its own past innovation policy, but that it is diverging from other countries that already have or are developing patent systems securing reliable and effective property rights in cutting-edge innovations.

The high rates of invalidations and rejections is also revealing because the *Alice-Mayo* framework is often accused of being indeterminate and providing little predictability for inventors or lawyers in how a judge or examiner at the USPTO may choose to apply it. Yet it does appear to offer some predictability: the odds of receiving or keeping a patent under the *Alice-Mayo* framework are

not in your favor if you are innovating new products and services in computer software, Internet technologies, cryptology, medical diagnostics, medical devices, and other inventions driving the U.S. innovation economy today.

This invalidation contagion is spreading, too, and is not limited to cutting-edge inventions in the 21st-century innovation economy. Patents covering classic technologies from the Industrial Revolution are now being invalidated as ineligible subject matter under the *Alice-Mayo* framework. One recent example was a patent on operating an oil drilling rig that was invalidated by a court under the *Alice-Mayo* framework for allegedly claiming an abstract idea.²⁸ In another case, the Court of Appeals for the Federal Circuit affirmed a district court's invalidation of a patent on a method of building an axle in an automobile engine because the judges deemed it an unpatentable application of the laws of thermodynamics.²⁹

As every engineer knows, *all* machines are applications of the laws of thermodynamics. What this means is that patent owners are now left to the vagaries of whether a judge chooses to disintegrate their patented innovations down to unpatentable laws of nature—or not. In her stinging dissent, Judge Kimberly Moore complained that the “majority’s validity goulash is troubling and inconsistent with the patent statute and precedent. The majority worries about results-oriented [patent] claiming; I am worried about results-oriented judicial action.”³⁰

Despite numerous requests seeking both clarification of the *Alice-Mayo* framework and development of limiting principles to cabin in the discretionary decision making and excessive invalidations of patents on breakthrough inventions and discoveries, the Supreme Court has denied every certiorari petition since its 2014 decision in *Alice*: Over 45 petitions have been filed and rejected. The Supreme Court appears to be uninterested, unwilling, or unable to fix the problem it has created with the *Alice-Mayo* framework, and thus it rightly falls on Congress. The *Alice-Mayo* framework represents only a judicial gloss on a statute that was first enacted by Congress in 1790 and subsequently re-enacted in varying forms up through 1952.³¹ Thus, Congress can and should act to amend § 101 to abrogate the *Alice-Mayo* framework to staunch the excessive invalidation of patents and rejection of patent applications since 2014.

V. Regulatory Reforms in Examination Guidelines at the USPTO Are Not Enough

In early January 2019, USPTO Director Andrei Iancu, who was confirmed by the Senate in early 2018, issued new examination guidelines under the

Alice-Mayo framework. Director Iancu announced the reforms with the intent to “improve certainty and reliability” in how examiners would use § 101 in reviewing patent applications.³² The USPTO further modified these new examination guidelines in October 2019.³³ Anecdotal reports suggest that patent applications may now be faring a bit better under the *Alice-Mayo* framework than they were in the years between 2014 and 2018.

But Director Iancu is limited in how much he can achieve. First and foremost, he has authority only over the USPTO, not the courts. Thus, even if the USPTO scales back its high rates of rejections under the *Alice-Mayo* framework, courts and the PTAB will continue to invalidate these patents in alarmingly high numbers in their own application of the *Alice-Mayo* framework. This is not merely a law professor’s hypothetical scenario. On April 1, 2019, the Federal Circuit applied the *Alice-Mayo* framework to invalidate another patent on a breakthrough diagnostic method for detecting heart disease; the court held that the patent claimed an unpatentable “law of nature” in allegedly identifying merely the biological processes of the how the heart functions.³⁴ In this case, the patent owner argued that the Federal Circuit should defer to the USPTO’s examination guidelines in finding this invention to be patent eligible. The court expressly *rejected* this contention, stating that “we are not bound by [the USPTO’s] guidance.”³⁵

Second, and related to the first point, Director Iancu lacks the legal authority to change the fundamental cause of the problem: the *Alice-Mayo* framework created by the U.S. Supreme Court. While Director Iancu has some discretion to act within this generalized legal inquiry to lessen its arbitrariness and negative impact in examining patent applications, he must ultimately follow the law set by Congress in the statutes it enacts and the Supreme Court in how it interprets these statutes. In fact, his reforms in the examination guidelines have been criticized by advocacy groups for failing to do just this; after Director Iancu announced plans in early 2019 to change the regulations governing the USPTO’s application of the *Alice-Mayo* framework to patent applications, the Electronic Frontier Foundation (EFF) started a “Save Alice” campaign.³⁶ EFF proclaimed that “Under its new Director, Andre [sic] Iancu, the Patent Office is trying get around *Alice*.”³⁷ In its official comments submitted to the USPTO, EFF explicitly argued that the new examination guidelines are “contrary to law.”³⁸

Lastly, Director Iancu’s regulatory reforms can just as easily be undone, whether by a legal challenge in court for allegedly exceeding his authority as head of an administration agency or by repeal by administrative fiat by a future Director of the USPTO. While Director Iancu’s reforms may constrain some of the excessive use of the *Alice-Mayo* framework in rejecting patent

applications, these regulatory measures cannot offer the promise of permanence, reliability, and stability. Inventors and companies making long-term R&D investment decisions need to rely on a stable set of legal rules in order to create innovative medical treatments and other new technologies. They need Congress to amend § 101 and permanently reestablish the long-standing historical approach of a restrained and limited application of this threshold test.

VI. The Enactment of § 103 in the 1952 Patent Act Is a Guide for Reform of § 101 Today

Congress should reform § 101 today to correct the misinterpretation of this statute by the Supreme Court in its *Alice-Mayo* framework. This would return U.S. innovation policy back to its original path, which has been a wellspring for two centuries of growth in the U.S. innovation economy. The problems faced by innovators today under the *Alice-Mayo* framework are entirely doctrinal—they are the result of a judicial doctrine representing an expansive, non-textual “interpretation” of a statute enacted by Congress.³⁹ This calls for legislative reform.

In reforming § 101, Congress will not tread on new ground. Its enactment of § 103 in the 1952 Patent Act is a model for how Congress can (and should) reform § 101 today.⁴⁰ Congress enacted § 103 to address the exact same legal and policy problems that innovators face today with the *Alice-Mayo* framework.

A. Section 103 Successfully Abrogated a Supreme Court Decision that Undermined the Function of the U.S. Patent System in Promoting Innovation

Similar to the pressing need today to abrogate the *Alice-Mayo* framework, Congress enacted § 103 in 1952 to abrogate the Supreme Court’s 1941 decision in *Cuno Engineering v. Automatic Devices*.⁴¹ In that case, the Supreme Court applied a long-standing legal requirement in U.S. patent law that an invention or discovery must be more than new, useful, and fully disclosed to justify patent protection—it must also be a true invention, as opposed to a minor and obvious step forward in a field of art.⁴² In *Cuno Engineering*, the Supreme Court ruled that an invention must arise from a “flash of creative genius” to justify patent protection.⁴³

Just as today with the *Alice-Mayo* framework, the “flash of creative genius” test was an insuperable hurdle for inventors to overcome. Courts dissected patent claims into their individual elements, found each element

to be lacking a “flash of creative genius,” and thus invalidated many patents. The Supreme Court did just this in *Cuno Engineering*: The Court invalidated a patent on a new electric-powered cigarette lighter in automobiles (we now use these sockets in our automobiles to power our smartphones). The *Cuno Engineering* Court assessed each separate element in the claim, identifying how each part was old, such as an electrical circuit, a heating element, and temperature control by a thermostat, among others. Despite the novel, useful, and inventive combination of these old elements into an innovative device that was widely adopted in the marketplace and became a ubiquitous feature in all automobiles, the Court concluded the invention was not the result of a “flash of creative genius” and thus invalidated the patent.

After *Cuno Engineering*, the Supreme Court was invalidating patents so frequently under the “flash of creative genius” test that Justice Robert Jackson lamented in 1949 that “the only patent that is valid is one which this Court has not been able to get its hands on.”⁴⁴

Justice Jackson’s complaint could just as easily be said today about patent eligibility doctrine and the *Alice-Mayo* framework. Not only are courts invalidating patents and the USPTO rejecting patent applications at very high rates, but, just as in the *Cuno Engineering* decision itself, the Supreme Court invalidated the contested patent claims in its four patent eligibility cases in creating the *Alice-Mayo* framework.⁴⁵

Congress responded in 1952 by enacting § 103, and its central purpose was to abrogate the “flash of creative genius” test created 11 years earlier by the Supreme Court in *Cuno Engineering*. The second sentence in § 103 achieves this goal: “Patentability shall not be negated by the manner in which the invention was made.”⁴⁶ Having performed this function in relegating the “flash of creative genius” test to the historical dustbin of mistaken legal doctrines, this sentence in § 103 has served no role in patent law since 1952. Congress should do this again: It should abrogate the *Alice-Mayo* framework, reinstate the primacy of the statutory language it adopted in § 101 in the Patent Act, and return patent eligibility doctrine back to its limited historical role in the patent system.

B. Section 103 of the Patent Act Is a Model for Congress to Reform § 101 Today

Section 103 is also a model for § 101 reform today: It reflects a key feature of the successful U.S. patent system in mandating technology-neutral patentability requirements, and it is simple in both form and substance. Section 103 is two sentences in length with all of the doctrinal work falling

within the first sentence. In this sentence, § 103 sets forth several doctrinal requirements to ensure that the restyled “nonobviousness” inquiry would be more predictable and bounded in its application.⁴⁷ One requirement expressly brought to an end the judicial practice of dissecting claims into their individual elements and then assessing each basic element as being ordinary, routine, or obvious, just as the Supreme Court did in *Cuno Engineering*.⁴⁸ Thus, § 103 mandates that the obviousness of an invention can be determined only by assessing the “invention as a whole” (reframed as the “claimed invention as a whole” in the America Invents Act of 2011).

Congress adopted the “claimed invention as a whole” requirement in § 103, because this is a basic legal requirement that is fundamental to many provisions of the Patent Act in ensuring proper protection of the rights of inventors and the predictable application of the law.⁴⁹ As the Supreme Court recognized almost four decades ago in a significant patent eligibility case that has been ignored since 2014, it is “inappropriate to dissect the claims” down into their component elements, because an unpatentable abstract idea or law of nature may be used in part of a claim on a process, such as “a mathematical formula,” but “the process *as a whole* does not thereby become unpatentable subject matter” simply because of this single element.⁵⁰

The point is that the patent claims an *invention*—a drug, a diagnostic method, a machine, or a software program—and the courts should interpret and apply the claimed invention in its entirety, and not engage in pettifoggery in dissecting it down into individual words or phrases that are abstract ideas or otherwise meaningless out of context from the rest of the claimed elements of the invention. This is long-settled patent law, and courts even state this legal rule in patent eligibility decisions today, at least in the abstract—before deciding otherwise.⁵¹ Even in the Supreme Court’s 2012 decision in *Mayo Collaborative Services v. Prometheus Laboratories*, it cautioned that “too broad an interpretation of this exclusionary principle [under § 101] could eviscerate patent law,” because “all inventions at some level embody, use, reflect, rest upon, or apply laws of nature, natural phenomena, or abstract ideas.”⁵² This is true of combustion engines that rely on the laws of thermodynamics, as well as drugs that rely on the natural phenomena of how molecules are processed by and affect the human body, and of the software programs performing valuable functions in modern computers that rely on abstract ideas of mathematical algorithms. Each of these innovations—engines, drugs, and software programs—have long been recognized by the courts as representing real-world innovations deserving of patent protection as long as they are novel, useful, and fully disclosed. At

least, this was the law before the *Alice-Mayo* framework was developed by the Supreme Court and applied by lower courts since 2014.

A significant reason for the high rates of invalidation of issued patents and of rejection of patent applications is that courts and examiners are dissecting claims down into their component elements and invalidating them under the *Alice-Mayo* framework as covering unpatentable subject matter with no nonobvious, inventive contributions in these specific elements. For example, the Federal Circuit did exactly this in its recent decision in which it invalidated a patent on the method of making and operating an axle in an automobile engine, ignoring express language in the patent that detailed the working of the axle and instead concluding the patent claimed “some unarticulated number of possible natural laws.”⁵³

The problem is with the *Alice-Mayo* framework. The Supreme Court expressly authorized courts and the USPTO to do this in its 2014 decision in *Alice Corporation v. CLS Bank International*. Contradicting long-standing and settled patent law in assessing or applying a claim as a whole, the Court in *Alice* said that “we consider the elements of each claim both *individually* and ‘as an ordered combination.’”⁵⁴ Who could blame courts and examiners for feeling justified in considering elements “individually” and disintegrating patents down to their underlying (unpatentable) laws of nature or abstract ideas when the Supreme Court instructed them to do so in the *Alice-Mayo* framework?

There are too many examples to review in detail, and thus one illustrative court opinion should suffice. In a recent patent eligibility decision in *TDE Petroleum Data Solutions v. AKM Enterprises*, the district court and the Federal Circuit both concluded that a patent on a computer-operated process for running an oil drilling rig was invalid for claiming an “abstract idea.”⁵⁵ In that case, the Federal Circuit and the district court dissected the patent claim into separate elements and ignored other express elements that comprised the claimed invention as a whole. In its opinion, the Federal Circuit focused solely on a single element in the patent claim, and then asserted that the invention as a whole performed only the “generic computer functions” of this single element.⁵⁶ Thus, the Federal Circuit disintegrated the claimed invention into a single element—reducing it to the single abstract idea of generic and abstract data analysis—and ignored other claim elements, such as the express terms “well operation” in the claim and other language in the patent that made it clear the claimed invention as a whole was for an industrial process in running an oil-drilling operation on an oil rig. The echoes of *Cuno Engineering* and its improper methodology in disintegrating claims into unpatentable ideas are clear. Congress should

abrogate the *Alice-Mayo* framework—just as it rightly abrogated *Cuno Engineering* in enacting § 103.

Even worse, the *TDE Petroleum* decision directly contradicts the Supreme Court’s 1981 decision in *Diamond v. Diehr* that affirmed the patent eligibility under § 101 of an almost identically structured patent claim covering a computer-operated industrial rubber curing process.⁵⁷ In *Diehr*, the data processing element in the claim referred to a well-known equation that had long been used for many years in the even older 150-year-old process of curing rubber. For this reason, the Supreme Court recognized this data processing element in the claim was not patentable *by itself*.⁵⁸ Yet the Supreme Court concluded that the invention was patent eligible under § 101 precisely because the *claimed invention as a whole* was an industrial process.⁵⁹ Unfortunately, the contradiction between *Diehr* and *TDE Petroleum* in the § 101 case law has become very common today as courts decide willy-nilly how and in what ways they will dissect claims into their component parts in determining if the claims fall within the judicially created exclusionary principle in the *Alice-Mayo* framework.

Congressional reform of § 101 in abrogating the *Alice-Mayo* framework should return the U.S. patent system back to its original constitutional function in securing to “Inventors the exclusive Right to their...Discoveries.”⁶⁰ In aggressively applying the *Alice-Mayo* framework today, courts are misapplying what was historically understood to be merely a threshold test. They are also now dissecting claims into their component parts and then focusing on one or two elements that are deemed to represent the “focus” of the entire claim as a whole.⁶¹ Courts thus easily conclude that this single element (or two) is ineligible for patent protection as an abstract idea or law of nature and end up invalidating the patent claim as a whole.

The evidence that this contradicts long-standing U.S. patent doctrine is made clear by explaining how the courts’ application of the *Alice-Mayo* framework today would result in the invalidation of the very first patent that was issued in the U.S. under the first Patent Act of 1790. The first U.S. patent issued was to Samuel Hopkins in 1790 for his discovery of a new method of making potash.⁶² His novel method comprised well-known steps at the time, such as burning and dissolving ash. Hopkins’ claimed discovery was in the timing and order of the steps in the process.⁶³

If Hopkins’ patent were challenged today and the courts applied their now-established methodology in construing it under the *Alice-Mayo* framework, they would first find that the elements of timing one’s steps in a process and using heat are abstract ideas, laws of nature, or natural phenomena—and thus ineligible for patent protection. Under the second

step of the *Alice-Mayo* framework, a court would find that Hopkins did not add anything “inventive” to the steps beyond timing and heating contributions, all of which were well-known and conventional at his time. Thus, it is an entirely logical application of the *Alice-Mayo* framework today to find the first U.S. patent for a process of making potash to be ineligible for patent protection.

This is significant because Hopkins’s patent application was reviewed, approved, and signed by Thomas Jefferson as Secretary of State, who was a member of the three-person committee created under the 1790 Patent Act to review patent applications. Jefferson was both a drafter of some of the early patent laws and is known today for his belief that patents should be granted rarely and for only truly innovative inventions.⁶⁴ Moreover, Hopkins’s patent was issued under the 1790 Patent Act, which was drafted and enacted into law by the original Framers of the Constitution, who were then serving in the First Congress.⁶⁵ In fact, the other two members of the committee that reviewed Hopkins’ application and approved his patent were President George Washington and Attorney General Edmund Randolph, both of whom were members of the Constitutional Convention of 1787.

When a set of Supreme Court decisions between 2010 and 2014 claiming to apply a statutory provision that has been in existence since 1790 would, if applied to the first U.S. patent, call into question its validity, this is cause to question if the Supreme Court has rightly followed the law that has existed since the first Patent Act of 1790. It is especially concerning when this first patent was reviewed and signed by two prominent members of the Constitutional Convention (Washington and Randolph) and a prominent Founder (Jefferson) who is largely known today for his skepticism about patents.

Thus, Congress should return the patent system back to promoting and securing innovation, especially for the key biopharmaceutical and high-tech sectors of the U.S. innovation economy in the 21st century that have been hardest hit by the *Alice-Mayo* framework. It should abrogate the *Alice-Mayo* framework, reestablish the role of the courts to apply the statutory language it has enacted in § 101, and mandate that courts follow basic legal rules applied historically and in other patentability doctrines, such as that courts must always assess the claimed invention *as a whole*.

VII. How Congress Should Amend § 101 Today

As noted in the prior section, § 103 is a guidepost for how Congress should amend § 101 of the Patent Act today. When Congress enacted § 103 in 1952, this provision reflected key features of the U.S. patent system that

economists and other commentators have recognized as essential factors in the long-standing success of the patent system in driving the U.S. innovation economy. For example, similar to all the other legal requirements for a valid patent, § 103 is *technology neutral*. This is a basic tenet of the rule of law. The patent system does not discriminate between different types of innovations: All inventions and discoveries should have the same legal rules applied to them equally.

Furthermore, § 103 is concise in both form and substance, which is essential for ease of understanding by innovators and ease of application by the USPTO and the courts. Thus, it avoids detailed, lengthy sentences with excessive verbiage that attempt to address every conceivable scenario. As experience has shown time and time again, complicated statutory provisions prove only to be a fount of uncertainty and ongoing legal disputes as rent-seeking interest groups (and their lawyers) exploit linguistic ambiguities inherent in complex grammatical structures in statutes.

This is especially important in the statutes that define the legal preconditions for the USPTO and courts to secure property rights in inventions and discoveries. Standardized and easily recognizable legal requirements in property law, such as basic recording systems and the same core package of rights of use and disposal in full title, are key in driving efficient economic activities in the marketplace.⁶⁶ The same insight applies to property rights in inventions, which are the foundation of the economic activities that drive the U.S. innovation economy.⁶⁷ These legal features of the historical patent statutes—technology neutrality and generalized statements of legal requirements—should be followed today by Congress in amending § 101.

It is notable that the “discussion draft” of a proposed § 101 amendment that was released in May 2019 by Senators Thom Tillis (R–NC) and Chris Coons (D–DE) reflects all of these features of successful patent legislation.⁶⁸ Their discussion draft contains other statutory reforms that are unnecessary for the reform of § 101 itself,⁶⁹ but the proposed amendments to § 101 clearly and distinctly abrogate the *Alice-Mayo* framework and reassert the primacy of the statutory language enacted by Congress as the key legal text the courts should apply in assessing the patent eligibility of inventions and discoveries. The discussion draft for § 101 provides:

Section 101:

(a) Whoever invents or discovers any useful process, machine, manufacture, or composition of matter, or any useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

(b) Eligibility under this section shall be determined only while considering the claimed invention as a whole, without discounting or disregarding any claim limitation.

Under the heading of “Additional Legislative Provisions,” Senators Tillis and Coons include the following, additional provisions:

The provisions of section 101 shall be construed in favor of eligibility.

No implicit or other judicially created exceptions to subject matter eligibility, including “abstract ideas,” “laws of nature,” or “natural phenomena,” shall be used to determine patent eligibility under section 101, and all cases establishing or interpreting those exceptions to eligibility are hereby abrogated.

The eligibility of a claimed invention under section 101 shall be determined without regard to: the manner in which the claimed invention was made; whether individual limitations of a claim are well known, conventional or routine; the state of the art at the time of the invention; or any other considerations relating to sections 102, 103, or 112 of this title.

These proposed amendments to § 101 would achieve the same legal and policy goals that Congress achieved with § 103 in nonobviousness doctrine. It abrogates the *Alice-Mayo* framework and the unnecessary judicial gloss on § 101 that has proven to be a nettlesome source of ambiguity and uncertainty in the patent system. It clearly and succinctly reestablishes the fundamental rules guiding courts’ interpretation of patents for over 200 years and which have been essential to the successes of the patent system in securing reliable and effective property rights—one of the key drivers of the U.S. innovation economy.

VIII. Conclusion

The Supreme Court is uninterested, unwilling, or unable to address the serious legal problems and innovation policy concerns created by the *Alice-Mayo* framework in its interpretation of § 101 of the Patent Act. It has repeatedly denied numerous certiorari petitions in follow-on cases in which valuable patents for groundbreaking innovations have been invalidated by courts using the *Alice-Mayo* framework.

Given the high rates of invalidations of patents by courts and the high rates of rejections of patent applications in some fields of technology at the USPTO, it falls on Congress to perform its key constitutional role in

amending its own statutes to ensure that the U.S. patent system it has created produces economic growth, jobs, and a generally flourishing society. Congress has successfully achieved this with the legislation it first enacted with the 1790 Patent Act and has reformed many times over the ensuing two centuries. It is time for it to reform its statutes again.

The guidepost for legislative reform today is Congress' enactment of § 103 in the 1952 Patent Act. Congress adopted § 103 to address a similar problem of unpredictable judicial decision making and extensive invalidations of patents by courts following a mistaken ruling by the Supreme Court in 1941 that created the “flash of creative genius” test—an insurmountable legal obstacle in proving patents were validly issued to innovators. Not only did § 103 abrogate the “flash of creative genius” test created by the Supreme Court, it continued technology-neutral standards of patentability and it imposed necessary limits on the judicial decision-making process in assessing the patentability of an invention, such as requiring assessment only of a claimed invention as a whole.

The innovation industries again face a judicially created doctrine that permits unbounded judicial decision making in dissecting claims and results in high rates of invalidations of patents. Just as Congress successfully resolved the problems created by the Supreme Court by enacting § 103 in the 1952 Patent Act, it should act today to resolve the problems created by the Supreme Court in patent eligibility doctrine in § 101. It should reassert the primacy of the statutory language it has enacted in § 101 (and in its predecessor statutes reaching back to 1790), reestablish that patent eligibility doctrine is only a limited threshold test as it has historically been applied under the patent statutes, and impose on courts express statutory limits that ensure the test for patent eligibility follows long-standing doctrinal practices in all of the patentability requirements.

In sum, it is time for Congress to restore balance to a patent system that has historically secured the fruits of inventive labors with reliable and effective property rights in inventions and discoveries.

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Endnotes

1. See James W. Ely, Jr., *THE GUARDIAN OF EVERY OTHER RIGHT: A CONSTITUTIONAL HISTORY OF PROPERTY RIGHTS* (Oxford University Press, 3d edition, 2007).
2. See Kristina M. L. Acri, née Lybecker, *Economic Growth and Prosperity Stem from Effective Intellectual Property Rights*, 24 *Geo. Mason L. Rev.* 865 (2017) (detailing correlations between IP rights, innovation, and economic growth); Stephen Haber, *Patents and the Wealth of Nations*, 23 *Geo. Mason L. Rev.* 811 (2016) (surveying historical and economic studies confirming that patents are a key factor in successful innovation economies); B. ZORINA KHAN, *THE DEMOCRATIZATION OF INVENTION: PATENTS AND COPYRIGHTS IN AMERICAN ECONOMIC DEVELOPMENT, 1790–1920* (2005) (detailing the key role that reliable and effective property rights in patents have served in spurring markets and economic growth in the U.S.), <https://www.sba.gov/sites/default/files/advocacy/Frequently-Asked-Questions-Small-Business-2018.pdf>.
3. A recent economic study proves that patents more than double a start-up's chances of obtaining venture capital financing, and thus significantly increase a start-up's chances in growing into a small business in the marketplace. See Joan Farre-Mensa et al., *What Is a Patent Worth? Evidence from the U.S. Patent "Lottery"* (Nat'l Bureau of Econ. Research) (March 14, 2017), at <https://ssrn.com/abstract=2704028>. Notably, small businesses create 65.9 percent of net new jobs in the country. See SMALL BUSINESS ADMINISTRATION, OFFICE OF ADVOCACY, FREQUENTLY ASKED QUESTIONS (June 2018).
4. See Adam Mossoff, *Institutional Design in Patent Law: Private Property Rights or Regulatory Entitlements*, 92 *So. Cal. L. Rev.* 921 (2019).
5. See *Diamond v. Diehr*, 450 U.S. 175 (1981) (affirming patentability of industrial process that used a computer software program); Adam Mossoff, *A Brief History of Software Patents (and Why They're Valid)*, 56 *ARIZ. L. REV. SYLLABUS* 62 (2014) (explaining how courts secured computer software within the patent system in an incremental process from the 1980s through the 1990s and why they did so given the value of computer software as a product for consumers and businesses in the marketplace).
6. See *Diamond v. Chakrabarty*, 447 U.S. 303 (1980) (affirming that genetically modified organisms can be patented); see also ROBERT P. MERGES & JOHN F. DUFFY, *PATENT LAW AND POLICY* 77 (4th ed. 2007) (noting how the Supreme Court's decision in *Diamond v. Chakrabarty* was "extremely important for the then nascent biotechnology industry because it established that the fruits of the industry's research...would be eligible for patenting"); LIFE SCIENCES AND BIOTECHNOLOGY: A STRATEGY FOR EUROPE, EUROPEAN COMMISSION (2002) (discussing Europe's "fragile" biotechnology sector and noting that "the US biotechnology industry started earlier, produces more than three times the revenues of the European industry, employs many more people (162,000 against around 60,000), is much more strongly capitalized and, in particular, has more products in the pipeline.").
7. See, e.g., Keith Mallinson, *Don't Fix What Isn't Broken: The Extraordinary Record of Innovation and Success in the Cellular Industry under Existing Licensing Practices*, 23 *Geo. Mason L. Rev.* 967 (2016); Jonathan M. Barnett, *From Patent Thickets to Patent Networks: The Legal Infrastructure of the Digital Economy*, 55 *JURIMETRICS J.* 1 (2014).
8. See John F. Duffy, *The Festo Decision and the Return of the Supreme Court to the Bar of Patents*, 6 *Sup. Ct. Rev.* 273, 288 (2002).
9. See Adam Mossoff, *Statutes, Common Law Rights, and the Mistaken Classification of Patents as Public Rights*, 104 *Iowa L. Rev.* 2591, 2614 (2019) (identifying past examples of Congress abrogating judicially created patent doctrines, including the prohibition on functional claiming, the prohibition on "new use" patents, and the "flash of creative genius" test).
10. See Kevin Madigan & Adam Mossoff, *Turning Gold to Lead: How Patent Eligibility Doctrine Is Undermining U.S. Leadership in Innovation*, 24 *Geo. Mason L. Rev.* 939, 942–946 (2017) (detailing historical approach in biotech and software).
11. See *id.* See also Elizabeth Chien-Hale, *A New Era for Software Patents in China*, *LAW360* (May 25, 2017), <https://www.law360.com/articles/924934/a-new-era-for-software-patents-in-china> ("China's opening up [of its patent system to new high-tech innovation] contrasts with the United States' move to cut back on business method patents and software patents."); Preetika Rana, *Your Cancer Drugs May Soon Be Discovered in China*, *WALL STREET JOURNAL* (Apr. 11, 2017), <https://www.wsj.com/articles/china-emerges-as-powerhouse-for-biotech-drugs-1491816607> (reporting on R&D investment shifting to China given the inability of U.S. companies to obtain patents for their biotech drugs); Jack Ellis, *China Relaxes Rules on Software Patentability—and the United States Loses More Ground*, *IAM* (Mar. 3, 2017), <https://www.iam-media.com/law-policy/china-relaxes-rules-software-patentability-and-united-states-loses-more-ground> ("China's apparent embrace of software patents stands in stark contrast to the situation in the United States, which many would see as the traditional home of the software industry.").
12. See *Bilski v. Kappos*, 561 U.S. 593, 601–02 (2010) (observing that the judicially created exclusionary rule prohibiting patents for "laws of nature, physical phenomena, and abstract ideas" is "not required by the statutory text" in § 101).
13. See *Alice Corp. v. CLS Bank International*, 573 U.S. 208 (2014); *Association for Molecular Pathology v. Myriad Genetics*, 133 U.S. 2107 (2013); *Mayo Collaborative Services LLC v. Prometheus Laboratories, Inc.*, 566 U.S. 66 (2012); *Bilski v. Kappos*, 561 U.S. 593 (2010).
14. See *Alice*, 573 U.S. at 217–18; *Mayo*, 573 U.S. at 75–80.
15. See *American Axle & Manufacturing, Inc. v. Neapco Holdings LLC*, 939 F.3d 1355 (Fed. Cir. 2019).

16. See *id.* at 955–959 (identifying patent applications for significant biomedical tests rejected by USPTO). For a few examples of the many patents invalidated by courts, see *Cleveland Clinic Found. v. True Health Diagnostics LLC*, 760 Fed. Appx. 1013 (Fed. Cir. 2019) (nonprecedential) (invalidating a patent on a biotech-based medical test for detecting heart disease as covering a patent-ineligible law of nature); *Athena Diagnostics, Inc. v. Mayo Collaborative Servs., LLC*, 915 F.3d 743 (Fed. Cir. 2019) (invalidating a patent on a biotech-based medical test for identifying neurological disorders as covering a patent-ineligible law of nature); *Ariosa Diagnostics, Inc. v. Sequenom, Inc.*, 788 F.3d 1371 (Fed. Cir. 2015) (invalidating a patent on a non-invasive prenatal test using fetal DNA found in the blood of the mother as covering a patent-ineligible law of nature and natural phenomenon).
17. See Kevin Madigan & Adam Mossoff, *Turning Gold to Lead: How Patent Eligibility Doctrine Is Undermining U.S. Leadership in Innovation*, 24 *Geo. Mason L. Rev.* 939 (2017).
18. *Bilski*, 561 U.S. at 602.
19. See Adam Mossoff, *Institutional Design in Patent Law: Private Property Rights or Regulatory Entitlements*, 92 *So. Cal. L. Rev.* 921, 944–46 (2019) (describing how China has adopted historical features of the successful U.S. patent system, which the U.S. has forsaken in recent years).
20. See Robert Sachs, *Alice: Benevolent Despot or Tyrant? Analyzing Five Years of Case Law Since Alice v. CLS Bank: Part I*, *IPWATCHDOG* (Aug. 29, 2019), <https://www.ipwatchdog.com/2019/08/29/alice-benevolent-despot-or-tyrant-analyzing-five-years-of-case-law-since-alice-v-cls-bank-part-i/id=112722/>.
21. *Bilski*, 561 U.S. at 602.
22. Sachs, *supra* note 20.
23. See Robert Sachs, *Alice: Benevolent Despot or Tyrant? Analyzing Five Years of Case Law Since Alice v. CLS Bank: Part II*, *IPWATCHDOG* (Sep. 3, 2019), <https://www.ipwatchdog.com/2019/09/03/alice-benevolent-despot-or-tyrant-analyzing-five-years-of-case-law-since-alice-v-cls-bank-part-ii/id=112769/>.
24. Sachs, *supra* note 20.
25. See Adam Mossoff, *Testimony on “The State of Patent Eligibility in America” before the Senate Judiciary Committee, Intellectual Property Subcommittee 6-7* (June 4, 2019), <https://ssrn.com/abstract=3403095>.
26. See Madigan & Mossoff, *supra* note 10, at 956. For a description and link to the complete database of 48,586 total patent applications that received either an initial or final rejection based on the *Alice-Mayo* inquiry and then were subsequently abandoned, see *id.*, at 941 n. 10.
27. See *id.* at 957–958.
28. See *TDE Petroleum Data Solutions v. AKM Enterprise Inc.*, 657 Fed. Appx. 991 (Fed. Cir. 2016) (nonprecedential) (applying *Alice-Mayo* framework to invalidate a patent on a method of operating an oil drilling rig despite exact parallels in claims to those affirmed as patent eligible in *Diamond v. Diehr*, 450 U.S. 175 (1981)).
29. See *American Axle & Manufacturing, Inc. v. Neapco Holdings LLC*, 939 F.3d 1355 (Fed. Cir. 2019).
30. *Id.* at 1375.
31. See *Bilski*, 561 U.S. at 601–02 (noting that the judicially created exclusionary rule prohibiting patents for “laws of nature, physical phenomena, and abstract ideas” is “not required by the statutory text” in § 101); *Bilski*, 561 U.S. at 637 (Stevens, J., concurring) (“[A]lthough the Patent Act was amended, revised or codified some 50 times between 1790 and 1950, Congress steered clear’ of adding statutory requirements of patentability.”) (quoting *Graham v. John Deere Co.*, 383 U.S. 1, 10 (1966)).
32. U.S. Patent and Trademark Office announces revised guidance for determining subject matter eligibility (Jan. 4, 2019), <https://www.uspto.gov/about-us/news-updates/us-patent-and-trademark-office-announces-revised-guidance-determining-subject>.
33. See Update on Patent Subject Matter Eligibility (Oct. 17, 2019), <https://www.uspto.gov/about-us/news-updates/update-patent-subject-matter-eligibility>.
34. See *Cleveland Clinic Foundation v. True Health Diagnostics LLC*, 760 Fed. Appx. 1013 (Fed. Cir. 2019) (nonprecedential).
35. See *id.* at 1020 (“While we greatly respect the PTO’s expertise on all matters relating to patentability, including patent eligibility, we are not bound by its guidance. And, especially regarding the issue of patent eligibility and the efforts of the courts to determine the distinction between claims directed to natural laws and those directed to patent-eligible applications of those laws, we are mindful of the need for consistent application of our case law.”).
36. See *Save Alice: Tell the Patent Office to Apply Supreme Court Law*, <https://act.eff.org/action/save-alice-tell-the-patent-office-to-apply-supreme-court-law> (last visited Dec. 10, 2019).
37. *Id.*
38. See Stuart P. Meyer, *No Shortage of Viewpoints on New USPTO Patent Eligibility Guidelines*, *BilskiBlog* (Mar. 26, 2019), <https://www.bilskiblog.com/2019/03/no-shortage-of-viewpoints-on-new-uspto-patent-eligibility-guidelines/> (quoting from EFF’s comment filed with the USPTO). Another EFF attorney, Daniel Nazer, referred to Director Iancu’s regulatory reforms as “the agency’s most radical move yet” in permitting “a renewed flood of bogus patents.” Daniel Nazer, *Call to Action: Tell the Patent Office Not to Reopen the Software Patent Floodgates* (Feb. 6, 2019), <https://www.eff.org/deeplinks/2019/02/call-action-tell-patent-office-not-reopen-software-patent-floodgates> (last visited May 30, 2019).

39. See *Bilski*, 561 U.S. at 601–02 (noting that the judicially created exclusionary rule prohibiting patents for “laws of nature, physical phenomena, and abstract ideas” is “not required by the statutory text” in § 101).
40. See Patent Act of 1952, Pub. L. No. 82-593, § 103, 66 Stat. 792, 798.
41. *Cuno Engineering Corp. v. Automatic Devices Corp.*, 314 U.S. 84 (1941).
42. This hoary patentability requirement was renamed in § 103 as the requirement that an invention must be “nonobvious.” This was necessary to distinguish it clearly from the separate novelty requirement, which had created some confusion among some courts and some indeterminacy in the doctrine. See *Graham v. John Deere Co.*, 383 U.S. 1, 14 (1966) (“The major distinction [between § 103 and the older case law] is that Congress has emphasized ‘nonobviousness’ as the operative test of the section, rather than the less definite ‘invention’ language...that Congress thought had led to ‘a large variety’ of expressions in decisions and writings.”).
43. *Id.* at 91.
44. *Jungersen v. Ostby & Barton Co.*, 335 U.S. 560, 572 (1949) (Jackson, J., dissenting).
45. See *supra* note 3.
46. 35 U.S.C. § 103; see also *Graham*, 383 U.S. at 15 (“Congress intended by the last sentence of § 103 to abolish the test it believed this Court announced in the controversial phrase ‘flash of creative genius’....”).
47. See *supra* note 34.
48. Another requirement eliminated the subjective and arbitrary nature of an inquiry into what counts as “creative genius” by establishing an objective standard of legal evaluation: the person having ordinary skill in the art (known in patent law by the acronym, PHOSITA).
49. For example, it is a basic requirement in assessing the novelty of an invention under § 102, in which it is called the “identity” requirement. When an examiner at the USPTO or a court assesses the novelty of a patent claim, it must match “each and every element as set forth in the claim...in a single prior art reference.” *Verdegaal Bros., Inc. v. Union Oil Co.*, 814 F.2d 628, 631 (Fed. Cir. 1987). In sum, there must be a one-to-one symmetry between a claimed invention as a whole and a single pre-existing example of the alleged invention in the prior art. It is impermissible to focus on a single element in a claim or to ignore other elements in the claim.
50. *Diehr*, 450 U.S. at 187.
51. See *Parker v. Flook*, 437 U.S. 584, 594 (1978) (“[A] patent claim must be considered as a whole.”); *Athena Diagnostics*, 915 F.3d at 750 (“The step one ‘directed to’ inquiry [of the *Alice-Mayo* framework] focuses on the claim as a whole.”); *Electric Power Group, LLC v. Alstom S.A.*, 830 F.3d 1350, 1353 (Fed. Cir. 2016) (describing “the first-stage inquiry as looking at the ‘focus’ of the claims, their ‘character as a whole’”).
52. *Mayo Collaborative Services*, 566 U.S. at 71.
53. *American Axle*, 939 F.3d at 1374 (Moore, J., dissenting).
54. *Alice*, 573 U.S. at 217 (quoting *Mayo*, 566 U.S. at 79) (emphasis added).
55. See *TDE Petroleum Data Solutions*, 657 Fed. Appx. at 993.
56. *Id.*
57. 450 U.S. 175 (1981).
58. See *id.* at 188. (observing that the “Arrhenius’ equation is not patentable in isolation....”).
59. *Id.* at 192–93.
60. U.S. CONST. art. I, § 8, cl. 8.
61. *Electric Power Group*, 830 F.3d at 1353.
62. See U.S. Patent No. X00001 (granted July 31, 1790).
63. See David W. Maxey, *Inventing History: The Holder of the First U.S. Patent*, 80 J. PAT. & TRADEMARK OFF. SOC’Y 155, 160 (1998) (stating that “it is apparent that his innovation, such as it was, consisted of burning the raw ashes in a specially designed furnace before dissolving and boiling the mixture in water all for the purpose of extracting as the end product pearlash rather than potash”).
64. See Adam Mossoff, *Who Cares What Thomas Jefferson Thought About Patents? Reevaluating the Patent “Privilege” in Historical Context*, 92 CORNELL L. REV. 93, 959–63 (2007).
65. See Neal Katyal & Paul Clement, *On the Meaning of “Natural Born Citizen,”* 128 HARV. L. REV. 161, 161 (2015) (“The Supreme Court has long recognized that two particularly useful sources in understanding constitutional terms are British common law and enactments of the First Congress.”); cf. *Wisconsin v. Pelican Ins. Co.*, 127 U.S. 265, 297 (1888) (recognizing that actions of the first Congress are “contemporaneous and weighty evidence” of the Constitution’s “true meaning”).
66. See HERNANDO DE SOTO, *THE MYSTERY OF CAPITAL: WHY CAPITALISM TRIUMPHS IN THE WEST AND FAILS EVERYWHERE ELSE* 83 (2003) (identifying title recordation and basic legal rules securing transfers of property between individuals, as protected by legal institutions governed by the rule of law, as essential to economic prosperity).

67. See *supra* note 2 (surveying a few sources confirming this economic fact).
68. See Sens. Tillis and Coons and Reps. Collins, Johnson, and Stivers Release Draft Bill Text to Reform Section 101 of the Patent Act (May 22, 2019), <https://www.tillis.senate.gov/2019/5/sens-tillis-and-coons-and-reps-collins-johnson-and-stivers-release-draft-bill-text-to-reform-section-101-of-the-patent-act>.
69. See Kristen Osenga, *Saving Functional Claiming: The Mismatch of § 112 Reform in the § 101 Reform Debate* (forthcoming 2019).