

# Patently Outdated: Patents in the Post-industrial Economy

The Case for Service Patents

By Nuno Pires de Carvalho



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*For Ana for ever*  
*For André, Hugo and Carolina*  
*For Theo, Felipe, Pedro, Sofia and Mateo*

The innovations of the “knowledge economy”—of “digital prosperity”—have been dominant contributors to today’s economy growth and societal change. Revision of the commercial structure affecting major aspects of today’s industry should be approached with care, for there has been significant reliance on the law as it has existed [. . .]. Uncertainty is the enemy of innovation. These new uncertainties not only diminish the incentives available to new enterprise, but disrupt the settled expectations of those who relied on the law as it existed.

Circuit Judge Newman, dissenting, *In re Bilski*, 545 F.3d 943, 976–977 (Fed. Cir. 2008), *aff’d*, *Bilski v. Kappos*, 561 U.S. \_ (2010).

Much of the court’s difficulty lies in its reliance on dicta taken out of context from numerous Supreme Court opinions dealing with the technology of the past. In other words, as innovators seek the past to the next techno-revolution, this court ties our patent system to dicta from an industrial age decades removed from the bleeding edge. A direct reading of the Supreme Court’s principles and cases on patent eligibility would yield the one-sentence resolution suggested above [“Because *Bilski* claims merely an abstract idea, this court affirms the Board’s rejection.”] [. . .] this Court, however, links patent eligibility to the age of iron and steel at a time of subatomic particles and terabytes [. . .].

Circuit Judge Rader, dissenting, *id.*, at 1011.

## Preface

When I joined the Secretariat of the World Trade Organization (WTO), in 1996, I found a relatively peaceful atmosphere in the multilateral trade related world of patents. Then, developed country WTO Members were finalizing the transposition of TRIPS obligations into national law and developing countries were starting doing so. The major *demandeurs* of international patent protection (the United States, Japan, and the European Communities) believed that, finally, they had been able to overcome the conflicts that presided over patent protection in the 1960s and 1970s, whereas developing countries hoped that the stronger patent standards they had promised to adopt would help them receive more technology and foreign direct investment. In the TRIPS Council, between 1995 and 1998, debates would evolve around the notification of national laws and their review, and the provision of technical assistance.

But, in the end of the 1990s, something unsettled that delicate balance. Suddenly, interventions turned sour, with developing countries complaining that they had given too much in the field of patents, in particular as regards the protection of pharmaceutical inventions. If we can point at one single factor as the trigger that changed the mood of TRIPS Council membership, that was the insistence, by the United States and the European Communities, to carry out a review of the implementation of Articles 78 and 79 (on the mail-box and exclusive marketing rights). Developing countries' reaction was uncompromising: first, they asked for a review of the implementation of Article 66.2 (on the creation of incentives leading to the establishment of a technological basis in least-developed countries). Subsequently, because Article 66.2 only applies to least-developed countries, developing countries turned their attention to the issue that for many years constituted one of the strongest point of contention with developed countries: protection of pharmaceutical inventions. The moment was opportune: the AIDS epidemic, then at its highest point, was ravaging the populations of many countries in Africa.

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When the African Group, instigated by a number of Asian and Latin American countries, voiced the concern that they might have unknowingly accepted obligations in the field of pharmaceutical patents that were significantly unbalanced and unfair, the TRIPS Council opened a new item in its agenda to discuss the impact of patent protection on access to pharmaceuticals. And the European Communities gave developing countries the pretext they needed to challenge the lack of balance when they recognized that, as designed, the TRIPS regime of patent rights created indeed an embarrassment to countries with a public health problem to the extent it prohibited that compulsory licenses be granted with the predominant purpose of exporting. Because most developing countries lacked the technology and the market size for granting compulsory licenses within their borders, and because reverse engineering in the pharmaceutical field was beyond their reach, the EC suggested that the mechanism of compulsory licenses was useless to those countries. The possibility of granting compulsory licenses by the governments of the countries that hosted pharmaceutical patent owners was also unavailable, even if they wished to help, exactly because of the prohibition to export.

The story that unfolded after this episode is known. First, WTO Members adopted a Declaration on TRIPS and health in the context of the Doha Round. Subsequently, they adopted a somewhat confusing and very complex mechanism of compulsory licenses of patents with the main purpose of exporting.

In parallel, the World Intellectual Property Organization (WIPO) (the main, if not the only, United Nations forum for the international protection of patents) did not remain as a simply bystander. Actually, WIPO had a very important role in two fronts. First, it greatly assisted WTO developing country Members to implement their TRIPS obligations, both by organizing meetings in which information was spread, and by preparing and giving advice on national statutes and regulations. Secondly, it pursued substantive negotiations, initially aimed at complementing those areas the TRIPS Agreement had not succeeded to cover. The smooth negotiations that led to the adoption of the WIPO Internet Treaties, in 1996, although increasing copyright protection, were proof of the multilateral climate of trust and easiness that prevailed in the first years that followed the TRIPS acceptance.

However, when I joined the WIPO Secretariat, in 1999, I witnessed that it also felt the change in the mood of WTO Members: WIPO was able to approve the Patent Law Treaty, in 2000, but not without difficulties, in spite of it being a purely administrative agreement. The point of attrition then was the alleged (by a few countries) necessity of designating the origin of genetic resources in patent applications as a condition of patentability. The solution to the conflict was the establishment in WIPO of the Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore (IGC). In 2004, Argentina and Brazil were successful in proposing the launching of a Development Agenda, which was aimed at impregnating all negotiating processes in WIPO with the “development dimension.” The main concern of Argentina and Brazil was the pace of the Standing Committee on the Law of Patents (SCP), which was then negotiating the Substantive Patent Law Treaty (SPLT)—a set of provisions aiming at harmonizing the rules on substantive patentability requirements. In the SCP,

developing countries formed a consistent group of opposition to what they saw as a trend towards the future adoption of a global patent. They rallied behind two propositions, one submitted by a group led by the Dominican Republic, and the other by a number of WIPO Members led by Brazil. The propositions varied in the details but both aimed at introducing matters of substantive protection (namely, as regards exclusions from patentability and exceptions to rights), in absolute divergence with the initial intent of the draft Agreement.

These historical hints show that a serious discomfort with international patent protection has been building up since the end of the 1990s, when the proposal to review the implementation of the mail-box mechanism upset the then prevailing peaceful multilateral climate.

The discomfort continues. The governments of some developing countries, a few intergovernmental organizations and non-governmental organizations constantly attack pharmaceutical patents. All sorts of more or less absurd propositions are made in order to alleviate what is seen as an unbearable burden for the poor, such as the setting of patent pools in combination with automatic compulsory licenses, and the replacement of the patent system with a prize mechanism. Patents for incremental inventions are under attack. The value of patents for biotechnological inventions is challenged, and in particular the risk that research tools may be privatized. The perceived excessive patenting in the field of biotechnology has been qualified as a tragedy of the anti-commons.<sup>1</sup> Fears are also expressed against practices involving patent thickets and reversed payments, which are used by research-based companies to block alternative inventions and rivals' entry.

The adversaries of patents have looked at other technological fields as well. When the European Commission proposed legislation on patents for computer programs it met strong resistance from non-governmental organizations (and the European Parliament). When the OECD launched work on the adoption of a treaty on investment, which would comprise intellectual property, it provoked strong discontent from many corners of society. Both initiatives ended up failing. The same strong criticisms have been heard in the last years against free trade agreements, which comprise TRIPS-plus obligations, as set by the United States and the European Union with their trading partners.

Civil rights advocates, non-governmental organizations, countries that depend on the importation of high-technology products, generic manufacturers, a few intergovernmental organizations, all have constituted an alliance against patents. And the press does not shy from echoing those voices, in many cases motivated by unconfessed economic interests and political ideologies. It seems that the scenario is (again) formed to prove right the *cri-de-coeur* of Prof. R. C. Carpenter, a prestigious engineer and professor at Cornell, who, in 1879, lectured:

That our patent system is popular with inventors is well known to everybody; in fact, the patented article is omnipresent—it is everywhere. It is in our boots,

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1. Michael A. Heller & Rebecca S. Eisenberg, *Can Patents Deter Innovation? The Anticommons in Biomedical Research*, 280 *Science* 698 (1998).



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it is in our clothes, it is in the tools we work with, in the buggy we ride in, in the harness on the horse, in the whip we strike him with. It is to be found in our fences, in our gates, in our pumps, in our kitchen, in our food, and finally in our coffin. We may suppose that we plow our land with a plow that pays the inventor 10%; we drag it with a harrow that pays him 20%; we sow our grain with a drill that pays him 50%; we reap our grain with a machine that pays him 300%; we pitch it with a fork that pays him 10%, on to a wagon that has paid 15%; and finally have it threshed with a machine that has paid 50%; and the straw delivered and preserved in a patented manner for which we pay 50% more. Such is, in effect, our patent system. It has woven around us a system of taxation more complete than was ever devised by any minister of finance. We are taxed by the use of patented inventions, from the time we enter this world until we leave it; even then our body is consigned to the dust in a coffin or casket which, ninety-nine out of one hundred times, is not free from some patented device.<sup>2</sup>

In short, there are many people around the world that believe that we have too many patents.

This book goes in a completely different direction. Actually, we do not have a problem of too many patents. It may be true that some misguided patents have been granted in several technological fields that may constitute an embarrassment to economic progress. But their major failure does not stem from the type of the technology they protect or from their quantity. Their problem is that they do not cover genuine inventions, and therefore they fail to promote and preserve actual product differentiation. But that is a problem that affects some patents only, and should not dictate the condemnation of the system as a whole. Patents have been a very effective tool to foster product differentiation and, consequently, to encourage new entrants and drive prices downwards. The fact that regulatory requirements may have a negative impact on the differentiating role of patents, such as in the pharmaceutical field, is not sufficient to impair its overall positive role. And the fact that there have been abuses by patent holders, on the one hand, and inefficiencies by patent offices and courts on how to deal with them, on the other, is not sufficient reason to reject the whole system.

Actually, if those generalized attacks against patents cannot be entirely dismissed because they have had certain influence in debates on legal standards and practices in national and international fora, they are nonetheless mostly based on a vast misunderstanding of the patent system. The myth is that patents are a necessary evil and that societies have to gain if they can get rid of them: the less patents the better.

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2. Eighteenth Annual Report of the Secretary of the State Board of Agriculture of the State of Michigan, for the Year Ending August 31, 1879, at 215 (W. S. George & Co., Lansing, 1880). It seems that Prof. Carpenter has borrowed language from a farmer of Michigan who had complained against the excesses in patenting farming tools. See Earl W. Hayter, *The Patent System and Agrarian Discontent, 1875–1888*, 34 *Miss. Valley Hist. Rev.* 59, 63–64 (1947).

This book goes in the opposite direction. There is no problem with too many patents. The problem that this book detects and alerts for is that the largest field in the economies of most countries, the field of services, is entirely left outside the positive influence of patents. The reason is that purely intangible inventions are generally deemed not patentable. Since the Court of Common Pleas in *Boulton and Watt v. Bull* (1795) held that an invention must involve the labor of human hands in order to be patentable, the principle of materiality has firmly presided over the patent system. And it still is in command, as the United States Supreme Court held in *Bilski v. Kappos* (2010).

This reminds me of the joke of the soldier who was instructed to keep sentinel over a freshly painted park bench. After several years, that same soldier continues prohibiting people to sit on that bench, because his superiors have forgotten to tell him that the paint has dried in the meantime. It seems that law makers the world all over have not understood that the economy has profoundly changed since the Industrial Revolution. We no longer live in an economy that depends only on things made or moved by human hands. Increasingly, the economy of ideas, of knowledge, of intangible actions, gains ground and every day more people get jobs in serving others. In the eighteenth and nineteenth centuries the patent system evolved from medieval proto-patents to industrial patents, in support of promotion and circulation of inventions in the old economy. Why has not the law of patents evolved to promote invention and differentiation in the Post-Industrial Economy?

The time for the patent system to move and embrace the idea of service patents has come. Lack of patent differentiation in the Post-Industrial Economy is a handicap, not an advantage. If we could imagine a pharmaceutical sector where only generic manufacturers existed, excessive entry would drive prices so low, that profits would cease being made and no private entrepreneur would be interested in risking his capital in manufacturing, let alone in sinking it into inventing. We saw a similar scenario unfolding in the first years of this century that affected the services economy, when excessive entry in the financial market reduced margins to extremely low levels, and banks were led to take imprudently high risks. The global society is now immersed in a financial crisis to which, to some extent, the unavailability of patents for inventions in the banking sector has contributed. Patents promote new entries to the extent they facilitate differentiation, but at the same time they prevent excessive entry because at some point the costs of alter-inventing become too high for new entrants in the face of lowered prices. This is what explains, for example, that new entrants in the business of cell phones are scarce. Conversely, the lack of service patents has led to excessive entry in the derivatives market.

This book alerts policy makers that the time has come to experiment with service inventions. Some precautions must be taken in the sense that patents should be granted for genuine inventions only. If taken, those precautions will ensure the positive role of patents in organizing the markets under the aegis of innovation and rivalry. And yet, as any social experiment, the very idea of service patents will attract hostility and suspicion from those same groups that have attacked industrial patents. I am aware of this. But this book ultimately aims at more than simply

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changing practices, laws, and, eventually, Constitutions. The issue is not one of simply granting more or less patents: the issue is one of a change of mindset—patents are neither a social burden imposed by misguided law makers nor a weapon used by multinational companies to oppress consumers and competitors: patents are tools of competition, of differentiation, and economic progress of free-market economies. Therefore, the economy of services (i.e., the global society) only has to lose by not incorporating patents into its development.

At this point, I should emphasize that all opinions expressed in this book are exclusively my responsibility, and they do not necessarily reflect the views of Member States of the World Intellectual Property Organization (WIPO) or its Secretariat, which I serve.

Chamonix  
December 20, 2011

## Introduction

On May 3, 2007, the Los Angeles Times published a short article under the heading “Patently out of date.” The article was essentially a complaint about the inadequacy of the current U.S. patent system to deal with the considerable increase in patent applications in recent years. The USPTO was accused of granting “too many weak or bogus patents,” which are posed “not to develop products but to slap on those who do.”

This may be true, but it is not in the eventually bureaucratic inefficiency of the USPTO—or of other patent offices around the world—that the backwardness of the patent system originates. After all, that is not even a matter of backwardness of institutions, but of lack of organizational preparedness for an increase in activities. Patent offices in other countries have been able to cope with the same issue. The KIPO, the acronym by which the Korean Intellectual Property Office is known, is one of those offices. The KIPO not only has been able to maintain a high quality of patents granted in the face of an enormously accrued number of applications, but it has even reduced the time for making final decisions on granting or rejecting applications.

The patent system is seriously outdated indeed, but this is seen mainly in its incapacity to respond to the modern economy. The views of Circuit Judges Newman and Rader expressed in the Epigraph reflect this idea in a very clear and unequivocal fashion.

This book is about showing that Circuit Judges Newman and Rader were right when they said that a system that denies patentability to Bilski’s invention (a method of hedging risk in the field of commodities trading) is outdated. However, the book also shows that they should not have dissented with the majority’s view, because the Circuit Court had no alternative to denying patentability to that particular invention.<sup>3</sup> As Judge Rader correctly pointed out, today’s patent system

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3. Actually, Judge Rader did not dissent from the majority’s digression through the Supreme Court precedents. His point of dissent was with the court’s lack of boldness in refusing to modernize the law, which has remained unchanged since its inception, during the Industrial Revolution.

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is the same that we inherited from the Industrial Revolution: it is deeply linked to iron, steel, cotton, machinery, i.e., to the making of things with human hands. In other words, our patent system is outdated. Nevertheless, repairing today's outdated patent system takes more than a court opinion: it also takes a change in mindsets. For society to be ready to accept that the term "useful arts" in the Patent Clause of the U.S. Constitution comprises services, there is the need to have a new look at the patent system, at its functions, at its operation, at its shortcomings, and at its virtues.

Recently, Prof. Lars Ole Sauerberg, of the University of Southern Denmark, suggested that the communication of ideas and knowledge through printed means is quickly changing into a system of virtual, digital communication.

From the vantage point of the early 21st century it seems likely, then, that conventional notions of the text, which since Gutenberg have often been conflated with the printed book, will be radically transformed. The emerging notion of the text is, on the one hand, a both qualitative and quantitative expansion of the particular form of virtuality which is generated by the mass-produced book, and, on the other hand, despite the apparent variety, a new uniformity of the virtual, caused, not least, by a shift from a publishing-house culture to a diffuse internet culture determined by technological standards which are no more "natural" than those of the book. In this IT version of textuality, visual and auditive, elite culture and mass culture, old and new, text and commentary, sacral and secular, are placed on an equal footing. It is a development with significant consequences for our approach to the world. It is a development which, by changing the material conditions for cognition, changes the material conditions of cognition.<sup>4</sup>

Prof. Sauerberg named the time span between 1500 and 2000, during which mass distribution of printed material dominated the circulation of culture and knowledge, the "Gutenberg Parenthesis." His point is that the Gutenberg Parenthesis stands between two long periods of oral transmission of knowledge. Gutenberg's invention interrupted the dominance of orality, but the Internet is quickly reintroducing informal means of transmission. Possibly orality is no longer an option, due to the huge amount of information available, but the immateriality of communication through the Internet is quite similar in that it permits immediate apprehension of information received and its transformation into new knowledge.

Another academic from the same University, Prof. Tom Pettitt, has submitted that the closing of the Gutenberg Parenthesis will entail a change in copyright:

The notion of an original, contained work is replaced by an articulated series of versions. From another perspective, the notion of plagiarism, very much a characteristic, along with the associated notion of copyright, of the Gutenberg

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4. O.L. Sauerberg, *The Encyclopedia and the Gutenberg Parenthesis*, at 3 (available at <[web.mit.edu/comm-forum/mit6/papers/sauerberg.pdf](http://web.mit.edu/comm-forum/mit6/papers/sauerberg.pdf)>, accessed on May 28, 2011).

Parenthesis, is replaced outside the parenthesis by the notion of imitation, any one work seen as a link in a chain of works deploying the same material, exploiting its predecessors and in turn subject to later recycling (Bjornstad 2008).<sup>5</sup>

The idea that copyright law is about to have the bedrock on which it stands deeply shaken makes sense. Property rights are naturally adapted to the nature of the subject matter they cover. It should be expected therefore that as long as the ways of producing and, in particular, of commercializing expressions of knowledge and culture evolve, so too would copyright also evolve into new forms. That has happened with the appearance of the current forms of copyright protection, in response to the increasing amounts of books produced and distributed; that is, after the dissemination of Gutenberg's invention, and when it became clear that a regime based on the grant of industrial privileges, as it prevailed for some time, would not be adequate. It is foreseeable, therefore, that similar economic and social pressures will generate a new copyright paradigm, no longer based on massively distributed printed materials or, in other words, on the fixation of works.

However, it is not probable that, regardless of the form it takes, copyright will facilitate copy or even imitation, as certain academics have suggested. Originality should continue being an overarching condition of protection, for the sake of the promotion of genuine creativity. Successful societies are those that are based on promoting and rewarding differentiation, originality, creativity, invention (all these words being synonymous and, to a large extent, interchangeable). One cannot see how incentivizing parasitism can help support the quick pace of cultural transformation we have been through in the last centuries. Condoning with parasitism and plagiarism, albeit in attenuated forms, is for losers, not for winners.

Anyway, this book is not about copyright, but about patents. Along the pages that follow, it will be shown that a phenomenon vaguely similar to the Gutenberg Parenthesis occurs with the patent system. The system, as it prevails today in international agreements, such as the Agreement on Trade-Related Aspects of Intellectual Property (TRIPS Agreement), was created in the eighteenth and nineteenth centuries to address inventions made in manufactures, and directly applied to the making of tangible articles. New technologies, such as informatics and the internet, have changed this. Today many inventions are as much abstract as e-mailed and SMS messages—they target an abstract environment. A great deal of today's inventions has gone beyond the frontiers of what, inspired by Prof. Sauerberg's expression, we could call the "James Watt Parenthesis."

There is a major difference, however, between the two "parentheses." The Gutenberg Parenthesis implies an entire shift in the way written information circulates. By contrast, the James Watt Parenthesis applies more narrowly to the patent system as far as it covers certain inventions. Actually, the expression

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5. Tom Pettitt, *Containment and Articulation: Media, Cultural Production, and the Perception of the Material World*, at 24 (available at <[web.mit.edu/comm-forum/mit6/papers/Pettitt.pdf](http://web.mit.edu/comm-forum/mit6/papers/Pettitt.pdf)>, accessed on May 28, 2011).

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“James Watt Parenthesis” would stem from the fact that James Watt’s first steam engine patent was the trigger of the judge-made doctrine that fixed the notion that patents were good only as far as the manufacture of tangible articles was concerned. Later in the United States a dispute over another patent gave the Supreme Court the pretext to set the doctrine that novelty is not enough to differentiate an invention from the prior art—something else was necessary: the inventive step (or non-obviousness). The requirements of the materiality of inventions and of non-obviousness are expressions of the patent system that the Industrial Revolution has designed.

We are now well deeply in the Post-Industrial Age. The “James Watt Parenthesis” is over. The Industrial Age is over. Many inventions today are made without any materiality. They are expressed in ideas and embodied in terabytes. They are not embodied in articles, nor are they aimed at manufacturing articles. They are nonetheless genuine inventions. Today’s patent system has, therefore, become outdated. It has to evolve. It has to adapt to the many intangible inventions that appear every day and which, because of the outdated features of the patent system, cannot benefit from its advantages. This book is about this adaptation—which will come, or, rather, as it will be shown, has slowly started to come.

Of course, unlike the Gutenberg parenthesis, it is not proposed as a possibility, let alone as a probability, that future patents will go back to the pre-James Watt Parenthesis stage, during which proto-patents<sup>6</sup> performed essentially the function of encouraging foreign artisans to exploit new techniques outside of the self-confined corporative economy. Privileges granted before the Industrial Revolution (and, mainly, before the Scientific Revolution of the seventeenth century) were based on the notion that patent owners would be obliged to transfer their knowledge (regardless of whether they were genuine inventors or simply introducers of new techniques) to local artisans. Personal contact was of the essence, due to the inability to adequately describe technology in written form, before the Scientific Revolution associated science, that is, theoretical knowledge, with concrete solutions. During the Industrial Revolution, the ability to describe inventions in patent specifications eliminated the need for personal contact. Patents could then be granted to foreigners, without the need for them to travel with their families and apprentices to the granting countries.<sup>7</sup>

On the other hand, pre-Industrial revolution patents, or proto-patents, responded already to an economic scenario that encouraged the manufacture of goods. The closing of the *James Watt Parenthesis* will not entail the return of the global economy to such a stage. What changed with the advent of the Post-Industrial Age was that the inventor and the potential user (the apprentice) were

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6. This term has been borrowed from Hansjoerg Pohlmann, *The Inventor’s Right in Early German Law—Materials of the Time from 1531 to 1700* (transl. F.D. Prager), 43 J. Pat. Off. Soc’y 121 (1961). The original sentence reads: “In the area controlled by the Elector of Saxony [note omitted] proto-patents were granted as early as 1378, preceded by still earlier, cruder privileges without monopoly feature.” *Id.*, at 122.

7. The justification for the national treatment of foreign inventors can be detected here.

again put in personal, direct contact with each other—not as a consequence of migration, but through the Internet. It would not be necessary to induce inventors to travel so as to teach their techniques to local artisans, but the need for detailed specifications will remain. Claims will continue being necessary for the sake of legal security (both of the inventor and of potential infringers at large), and modern means of communication over distances, something that bring persons together, will accelerate the dissemination of patented technology.

This book will start with a brief digression through the history of the patent system from the Middle Age to current times. The purpose of that digression is to show that if today's system is not adapted to the economic environment most countries live in, it is because of inherited perceptions that were formed in the course of centuries. Of course, it will not be easy to move on and change the system, even if there are some signs that pressure is mounting in that direction. For how long institutional inertia (and misperceptions) will resist the need for a change is something that only tomorrow will be known.

The term “proto-patents” is employed throughout the book to refer to privileges or grants by authorities (kings, feudal lords or municipal authorities, such as the *échevins* in France) for introducers of new techniques. Those privileges gave rise to a strange body of law in a scenario of corporative dominance. Guild masters would not need permission to exploit new techniques (and History shows that they were not totally averse to improvements, in spite of the detailed regulations and standards contained in guild by-laws, which might thwart creativity). However, foreign artisans would. Proto-patents, therefore, were titles that ensured some favors to introducers of new techniques, the primary of those favors being the right to use (exclusivity would be another favor frequently, but not always, granted).

After the demise of the guild regime, along the eighteenth century, in England and France, introducers of new techniques no longer needed to be authorized to exploit their inventions (or the inventions they introduced). Patent rights acquired the status of property rights, based on notions such as liberalism and individualism—the same notions that buttressed the French and American Revolutions. Courts enforced those patents, but added to them a number of conditions that responded to the economic and technological scenario of the Industrial Revolution, such as materiality and non-obviousness. These patents, whose legal profile was consolidated along the nineteenth century, are referred to in this book as *industrial patents*. For the purposes of this book, industrial patents are patents that express exclusive rights in tangible or corporeal inventions (i.e., inventions that concern material substances: their making, transformation or handling).<sup>8</sup> In spite of their having been shaped during the Industrial Revolution, as a

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8. In this sense, the expression *industrial patents*, as used in this book, comprises the three modalities of patents that are dealt with by the U.S. Patent Act (Title 35 of the U.S. Code): patents for inventions mentioned in § 101 (known in the United States as “utility patents”), plant patents (§ 161), and design patents (§ 171). The U.S. term *utility patents* corresponds in most other jurisdictions to *patents for inventions*.



supporting tool, the meaning of industrial patents has been extended to tangible goods that are outside the classical meaning of *industrial*. Today's industrial patents also cover plants, animals and their varieties. The association of patents with agriculture was introduced in the Paris Convention framework in 1883, by means of its Closing Protocol. That same association became a Convention provision in 1925, when the definition of Industrial Property established by paragraph 1 of the Protocol was transposed into a paragraph of Article 1 of the Convention (paragraph 3).<sup>9</sup> The United States introduced plant patents (for non-sexually reproduced plants only) in 1930.<sup>10</sup> In *Diamond v. Chakrabarty* (1980) the United States Supreme Court held that industrial patent protection covered micro-organisms, thus opening the gates for the protection for anything that is invented and *made* (i.e., manufactured) by man.<sup>11</sup>

The term *industrial patents*, therefore, has a broad coverage. For the purposes of this book, it also covers the *sui generis* regime that applies to new varieties of plants, under the UPOV successive conventions (1961, 1978 and 1991). Actually, in 1961, the Convention that established the International Union for the Protection of New Varieties of Plants (its acronym, from the French name, *Union pour la Protection des Obtentions Végétales*, is UPOV) accepted that the protection it provided for could be ensured either by “a special title of protection” or by a patent.<sup>12</sup> UPOV law through its three different versions varied as to whether patents and *sui generis* protection could accumulate for the same botanical genus or species, but the TRIPS Agreement, in 1994, made it clear that the name given to the title does not matter—what matters is the effectiveness of protection granted.<sup>13</sup>

Part I describes the historical transformation of medieval proto-patents into industrial patents, which took place in the course and under the direct influence of

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9. See Actes de la Conférence Internationale pour la Protection de la Propriété Industrielle réunie à Paris du 6 au 20 mars 1883, at 38 (2nd ed., Bureau International de l'Union, Bern, 1900) and Union Internationale pour la Protection de la Propriété Industrielle—Actes de la Conférence réunie à La Haye du 8 octobre au 6 novembre 1925, at 221–222 (Bureau International de l'Union, Bern, 1926). The text currently in force (Article 1(3) of the Stockholm revision, of 1967) reads:

Industrial property shall be understood in the broadest sense and shall apply not only to industry and commerce proper, but likewise to agricultural and extractive industries and to all manufactured or natural products, for example, wines, grain, tobacco leaf, fruit, cattle, minerals, mineral waters, beer, flowers, and flour.

10. Protection was intended to be limited to vegetatively propagated plants because of the need to keep major food species, like grains, out of the system. This explanation is given by UPOV in *The First Twenty-Five Years of the International Convention for the Protection of New Varieties of Plants*, at 63 (UPOV, Geneva, 1987).

11. “The Committee Reports accompanying the 1952 Act inform us that Congress intended statutory subject matter to ‘include anything under the sun that is made by man’.” *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980).

12. Article 2 of the Convention. See *supra* note 10, at 101.

13. Article 27.3(b) of the TRIPS Agreement reads (in part):

[...] Members shall provide for the protection of plant varieties either by patents or by an effective *sui generis* system or by any combination thereof. [...]