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## Patent Law in a Nutshell

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# PATENT LAW

## IN A NUTSHELL

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# CHAPTER 1

## FOUNDATIONS OF PATENT LAW

### I. FOUNDATIONS OF PATENT LAW

While historians occasionally refer to earlier precursors in Italy or Greece, the modern patent system began with an exception to the English 1624 Statute of Monopolies. Martin J. Adelman, Randall R. Rader, John R. Thomas & Harold C. Wegner, *Cases & Materials on Patent Law* 9 (2d ed. 2003) (ARTW). From that starting point, the various American colonies imported the patent tradition. Thus, the origins of U.S. patent law antedate the Republic itself. ARTW at 9–12. From those roots, scholars have set forth various justifications for the patent law regime.

Modern economic theorists, for instance, opine that patents promote an efficient use of scarce resources. In this case, the scarce resource is the technical knowledge that patent law promotes. A scarcity of knowledge about rats, fleas, and hygiene in 1342–5, for example, cost the lives of one-third of the inhabitants of Europe in the black plague epidemic. In modern terms, the plagues of AIDS or SARS illustrate that some forms of knowledge remain far too scarce.

Historians, on the other hand, attribute the rise of patent law to the antiquation of trade guilds. At the end of the feudal era, patents began to replace the trade secret scheme of the guilds as the optimal protection for intellectual property.

Natural law theory posits that the inventive labor entitles the innovator to enjoy exclusively the fruits of the new technology. Under this property-based theory, the discoverer earns a right to exclude others from use of the invention for a limited time. A corollary of this school of thought argues that patent law converts the conceptual and theoretical invention into property rights capable of valuation and trading in the market place. This aspect of patents, in turn, encourages the efficient conversion of those property rights into useful products and technology. Even more recent theories recognize patent law as a beneficial monopoly based on the public utility model. John F. Duffy, *Rethinking the Prospect Theory of Patents*, 71 U. CHI. L. REV. 439 (2004).

This brief overview will not discuss many less comprehensive rationales for patent law. For instance, academics have offered rent dissipation and races to invent as justifications for aspects of patent law. Mark F. Grady & Jay I. Alexander, *Patent Law and Rent Dissipation*, 78 VA. L. REV. 305 (1992); Robert P. Merges & Richard R. Nelson, *On the Complex Economics of Patent Scope*, 90 COLUM. L. REV. 839 (1990).

## II. ECONOMICS (INCENTIVE TO INVENT)

The majority of modern patent literature emphasizes economic justifications. These rationales maintain that a patent system primarily creates an incentive to invent while minimizing free-riding. See, e.g., Rebecca S. Eisenberg, *Patents and the Progress of Science: Exclusive Rights and Experimental Use*, 56 U. CHI. L. REV. 1017 (1989).

The patent system creates an incentive to invest in research, which, in turn, speeds the advance of technology. Often technological advances consume millions or even billions of dollars in research and development costs. Without some form of protection, free-riders would swiftly reverse-engineer and copy the innovator's technology. The innovator would lose its vast investment in an instant. In the short run, the public would receive the copied innovation at reduced costs. After all, the market would force free-rider(s) and the innovator to price the new good or service near the cost of production—in economic terms, at the marginal cost.

On the other hand, this free-riding would kill or diminish the incentive for future innovation. Because marginal prices for an inventive product or service would drop below the average cost (which includes both the marginal cost and the per-unit development cost), investors would have little economic incentive to fund expensive development projects. Without patent protections, a rational participant in the marketplace might avoid research

investments and instead wait for others to develop a cure for cancer, then quickly copy it.

At the same time, a rational innovator would hide his advances as long as possible to boost his head-start advantage in the market. Even without patent rights, an innovator enjoys some benefit as the market's first mover. This head start, however, does not adequately protect inventions with vast research investments. Thus, inventors would protect their advances with trade secrets. In the rare event that trade secrets actually would work to impede reverse engineering, they would, in turn, make improvements and further research more difficult and impede the advance of important, even life-saving, technology.

Assume, for example, that an inventor finds the cure for AIDS or SARS. No doubt that invention would represent years of effort and millions, if not billions, of dollars in research investments. Without patent protection, a copyist might easily reverse engineer that product within a few weeks. The inventor could never hope to recoup the costs of discovery.

Without a promise of protection, the rational investor would seek more dependable investments. The patent system protects the investment by giving the inventor control over the economic benefits from the technology for a limited time. Thus, the inventor may both recover research costs and accumulate capital for other projects.

Of course, consumers pay the differential between strict marginal pricing and accurate, investment-

inducing pricing that compensates for research and development costs. Inevitably this price differential means that a smaller group of consumers may enjoy the product at the increased price during the limited period of exclusive rights. In a price-sensitive market, the higher price invariably reduces the demand for the good or service. This price elasticity restricts the use of inventions to those consumers willing (or able) to pay the exclusive-right price. Particularly in health care products (where the market is nearly inelastic), this economic reality creates a moral concern.

The limited period of exclusivity, however, substantially reduces those moral issues. Every invention before 1987 (assuming a 20-year exclusive right) is free after 2007. Thus each generation, in effect, funds a gift of technology to its children, asking only that their children do the same for their grandchildren. In essence, the patent system facilitates each generation's gift of inventive solutions to future generations. Thus, as each generation speeds life-saving or life-enhancing technology into use, the long-term benefits of early production of new technology outweigh the nominal costs of patents in the short term.

### **III. HISTORY: ANTIDOTE TO TRADE SECRETS (INCENTIVE TO DISCLOSE)**

Historians often trace the rise of the patent system to the time when trade guilds began to fade as protectors of sensitive technology. As noted earlier, without a patent system, inventors would guard

their advances as trade secrets. At the close of the feudal period, trade guilds required years of apprenticeship to earn access to proprietary secrets. These guilds restricted distribution of trade secrets to members of the guild. Although this practice prevented free-riding, the high barrier to entry (that is, completion of an apprenticeship) discouraged competition and impeded scientific advance. Only those within the guild had the incentive and know-how to make technological advances. Trade guilds, in essence, shrank the pool of potential inventors. The public patent grant removed those artificial barriers. In exchange for disclosure in the patent application, the inventor received a limited period of exclusive rights.

Even without trade guilds, trade secrets remain an option to protect innovations in the modern marketplace. Although secrecy may not protect inventions that are readily deciphered once in use, a widespread secrecy practice would impede advances in many technology fields. Patents, on the other hand, encourage rapid disclosure and give other innovators access to the most recent enhancements in technology. With this information available, each advance often spurs further improvements.

A race to disclose, however, can come at a cost. In particular, the profit incentive may concentrate scarce research resources on projects with the greatest economic rewards. For example, researchers may invest more in the search for curing universal heart-burn maladies than for curing a rare cancer. This academic complaint, however, ignores the eco-



conomic realities of limited resources and mistrusts the market to efficiently allocate scarce research resources.

The race to disclose, furthermore, may complicate research by creating a patent thicket that increases the cost of research and development. While theoretically plausible, this so-called tragedy of the anti-commons, if it exists at all, is rare. In the first place, the patent system does not permit the scope of exclusive rights to exceed the scope of disclosure. This requirement, enforced by the enablement and obviousness doctrines, ensures that patents do not preempt more than they contribute to the useful arts. Accordingly, each patent delineates both its contribution and the prospect for further patentable improvements on the same technology. In other words, patents document the state of current technology and thus facilitate further research to extend the horizons of technology.

Moreover, the market generally licenses technology at a value commensurate with its contribution to the sciences. Thus, multiple minor patents in a crowded area of technology will generally be available for "rent or purchase" at very reasonable rates. Furthermore, competitors often thin-out the patent thicket by jointly cross-licensing—that is, "pooling"—patents covering various aspects of a technology area. Market forces thus can often reduce the tragedy of the anti-commons to an academic concern. Nonetheless in the crowded information technology industry with its heavy reliance on semiconductor and software technology, major

corporations have argued that patent “trolls” (an undefined pejorative most often referring to a patentee seeking royalties without producing a product) use litigation strategies to obtain royalties beyond the economic contribution of the invention to the technology. Still, beyond anecdotal evidence, no authoritative and comprehensive study has yet documented that patents prevent technological advance by complicating research in a field preempted by multiple intellectual property rights.

#### **IV. HISTORY: TECHNOLOGY TRANSFER**

At the advent of the era of patents, a sovereign would often use the promise of an exclusive right to lure technology available in another nation into the sovereign’s domain. Thus, the inventor-turned-entrepreneur could obtain an exclusive right by merely relocating innovative technology.

In the modern world, intellectual property is still a central component of international technology transfer policy. The 1995 treaty on the Trade Related Aspects of Intellectual Property (TRIPS) made membership in the World Trade Organization (WTO) conditional on adoption of intellectual property institutions. At that point, every nation had an incentive to adopt a patent system that meets basic international standards. Functional patent-granting and patent-enforcing institutions became every nation’s ticket to enjoy minimal tariffs and other WTO trade benefits. In simple terms, protecting advanced technology became the means of acquiring advanced technology.

Even before TRIPS, however, patent protection influenced technology transfer. Most developed nations have had some form of patent protection for decades, if not centuries. Developing nations, on the other hand, generally lack robust patent systems. In many cases, patent owners no doubt declined to transfer their technology to nations without adequate enforcement. Thus, national patent policy and institutions have consistently influenced technology transfer.

Of course, even without an inventor's consent, copyists may nonetheless acquire access to patented technology available in other parts of the world. In one sense, the inventor is no worse off, because he presumably was not counting on remuneration from countries where he would hold no rights. On the other hand, nations without a vigorous patent system, at a minimum, discourage legitimate research investments and technology transfer within their borders. Often an inadequate patent system may also create incentives for a nation's own inventors, with their ability to develop a technology that may lift the economy of their entire nation, to do their work where it will be protected. Any potential for this kind of "brain drain" may have the long-term consequence of transferring technology even before its development.

## **V. NATURAL RIGHTS (ENTITLEMENT THEORY)**

Patents are a form of property. 35 U.S.C. § 261, in fact, provides that "patents shall have the attrib-

utes of personal property.” As a species of property, patents share the philosophical origins of real property. Under John Locke’s fundamental justification for property rights, a divine being created the world as a universal common in which individuals possess an equal right. See John Locke, *THE SECOND TREATISE OF GOVERNMENT* ¶ 27 (1690), in *TWO TREATISES OF GOVERNMENT* (Peter Laslett ed. 1960). Within that universal common, each individual personally owns the products of his labor. In a related theory, Georg Wilhelm Friedrich Hegel proffered that property results not from the fruit of one’s labor but from the exercise of free will. See *HEGEL’S PHILOSOPHY OF RIGHT* (T.M. Knox trans. 1952). In other words, the interaction of human will with the corporeal world creates enduring objects, or property. These objects, a natural part of their creator’s personality, deserve protection from unauthorized use.

Under either Locke’s labor theory or Hegel’s moral rights theory, invented knowledge belongs to its creator or discoverer. But these labor-based rights are not limitless: an individual cannot take from the universal common without leaving enough for others to use and enjoy. To some degree, knowledge as a form of private property is counterintuitive. Most cultures view knowledge as something to be freely shared. On the other hand, technical knowledge, often the product of expensive research ventures, must be generated. Patent rights provide the requisite “fuel of interest,” in the words of Abraham Lincoln, to stimulate inventive labor or the “fire of genius.”

Entitlement theories also show that patents serve the larger economic service of converting inchoate knowledge into useful technology for public consumption. In other words, the incentives of patent law do some of their best work after invention, disclosure, and issuance of a patent. At that point, the patent system enables an inventor to raise capital to market and manufacture the invention.

Private ownership of those valuable property rights can generate capital and incentives to convert the concepts into usable products. In other words, invention only starts the process of creating useful technology. The further work or conversion to useful products, manufacturing, and distribution also requires capital. Patents can generate that investment. In addition, patents solve the inventor's dilemma by creating a way to obtain development capital without compromising the idea. The owner of the idea, additionally, must use the knowledge efficiently or the market will transfer that ownership to better uses. In simple terms, private is more efficient than collective ownership.

A modern corollary of this principle, the prospect theory, suggests that patents promote efficient use of a scarce resource like knowledge. Edmund W. Kitch, *The Nature and Function of the Patent System*, 20 J.L. & ECON. 265 (1977). The prospect theory opines that the owner/inventor can efficiently direct future research to refine and improve the new technology.

## VI. PATENTS AND PUBLIC UTILITY THEORY

Many economists criticize the patent system for eliminating the “surplus” otherwise enjoyed by the consumer. In other words, the consumer would get the benefit of lower prices without patents recapturing the costs of research and development. The usual economic proposal to retain the consumer surplus emphasizes rewards in lieu of patents. A leading scholar, Professor Duffy, has recently made a frontal assault on this chorus by pointing out that there is a similar loss of consumer surplus in the field of public utilities—an example where economists almost universally praise the benefits of pricing above marginal cost. John F. Duffy, *Rethinking the Prospect Theory of Patents*, 71 U. CHI. L. REV. 439 (2004). Under this response, public utilities, like electricity generation, have very low marginal costs once the infrastructure of dams and power lines are in place. These utilities, however, require a monopoly to both promote efficiency in generation and distribution and to recover over time the vast investment in infrastructure. Similarly patents engender a beneficial monopoly that allows the innovator to recover research and development costs over the life of the patent. In other words, the international patent system is more efficient than an international reward system (which the governments of the world are not likely to create or administer anyway).

## VII. CONCLUSION

In spite of some defects, the patent system is one of the greatest inventions of Western civilization. With manageable costs of administration, the system stimulates inventive activity that facilitates economic expansion while simultaneously encouraging conversion of theoretical science into useful technology. Finally, the system achieves moral benefits by its limited terms with each generation providing a gift of innovation to its successors.