



The system designed to protect and promote innovation could be slowing it down

BY TIM SABLİK

Mr. Watson, come here, I want to see you.” When Alexander Graham Bell spoke those words to his assistant Thomas Watson through the first working telephone prototype, he had a good sense of the enormous world-changing potential housed within his invention. But it is unlikely that he could have conceived in 1876 of how the phone industry would evolve in the 135 years following his receipt of U.S. patent number 174,465 for the device.

Patents, like those granted to Bell for his inventions, were designed to provide incentives to innovators while making their findings available to others. The incentive comes in the form of temporary monopoly power, the exclusive right of the original innovators to market their product without competition for a limited period of time — 20 years in the United States. In exchange, the inventors have to disclose their invention to the public, and after the patent expires, it becomes part of the public domain.

“The old notion of patents was that you had one patent, one product. And the monopoly was understood as a limited trade-off in order to have that product come into existence,” says Michael Heller, a professor at Columbia University Law School who has written about the role of intellectual property (IP) law in the economy.

The trade-off is seen as necessary to promote the development of new ideas. If an inventor like Bell spent considerable time and resources to create new knowledge only to have competitors copy his idea without compensating him for his work, then he would have little incentive to bring new technology to the marketplace. Faced with a limited ability to recoup their investments, inventors might choose to keep their knowledge secret or never explore the invention in the first place. By patenting his invention, Bell allowed other manufacturers to see his work, but if they wanted to use his developments directly, they needed to negotiate with him.

Today’s high-tech products are a far cry from the phones of Bell’s time, or even a few decades ago. This can lead to challenges. For example, mere transmitted conversation has become just one of many features today’s users expect of

their phones, and smartphone developers are not the originators of many of the ideas built into their devices. Digital cameras, GPS, and wireless data connectivity were developed and patented by separate entities, and negotiating access to all of those patents can be difficult.

“For many areas of the economy, such as telecom or biotech, the structure of innovation has shifted radically toward assembly of components of information,” says Heller. “It potentially creates a real roadblock. When you have hundreds or thousands of patents that are needed for a single product, you get no benefit socially from the monopoly power conferred by those patents — all you experience are the costs.”

Those costs are increasingly in the news. In September, Apple obtained an injunction in Germany against the sale of products by one of its competitors, Samsung, claiming that Samsung had infringed upon patents related to its mobile operating system. That same month, Samsung filed suit against Apple in Australia, raising the number of patent lawsuits filed between the two companies to 21.

And Samsung and Apple are only two of nearly two dozen tech companies involved in what many observers have dubbed a “patent war.” The number of mobile-handset-related patent lawsuits has increased by 25 percent every year since 2006.

According to Alex Tabarrok, a professor of economics at George Mason University, companies like Apple don’t expect to make money from all of their patents. Rather, they want to ensure that their innovations are not blocked by another company’s patents. “So they build up a big patent war chest in order to protect themselves from the war chests of other big firms. It’s a sort of mutual assured destruction.”

Many companies have begun stockpiling ammunition in earnest. In August, Google, which develops the Android operating system that Samsung and other mobile device manufacturers use, paid \$12.5 billion to acquire Motorola Mobility and its portfolio of 17,000 patents. It later sold some of those patents to HTC, another manufacturer that uses its operating system, allowing HTC to sue Apple for patent infringement.

Both the number of patents issued and the number of patent lawsuits have increased over the last decade (see charts). What is behind this sudden explosion in litigation? To understand how the patent system may be producing undesirable effects, it is useful to explore two of its most important functions: defining ownership and providing economic incentives for innovation.

Navigating Through the Fences

A coordination problem is playing out now in industries where manufacturers need to assemble hundreds of patents to create a single product. Since patent owners can seek injunctions against manufacturers who violate their patents, as in Apple’s litigation against Samsung, any one patent holder can block the entire device from coming to market. Patent owners can also obtain orders from the International

Trade Commission excluding a product that infringes a patent from being imported into the United States.

“For almost any cellphone, the manufacturer can potentially face a thousand lawsuits at one time, and each one requires \$7 million to defend. It is a very scary prospect for innovators,” says Heller.

Moreover, the threat of mutual assured destruction by countersuit can be empty if the party claiming infringement is a nonpracticing entity (NPE) — that is, a firm that owns patents but does not produce anything. The 2006 U.S. Supreme Court case *eBay v. MercExchange* limited the ability of NPEs to get injunctions, but they can still sue for damages. Indeed, in a review of most-litigated patents between 2000 and 2007, John Allison of the Center for Law, Business, and Economics at the University of Texas, Mark Lemley of Stanford University Law School, and Joshua Walker of the Stanford IP Litigation Clearinghouse found that NPEs were involved in more than half of the suits.

Heller notes that NPEs provide a market in which small-scale inventors can sell or license their work, making their patents more liquid. But because patent holders can seek damages beyond the value of their input, NPEs have an incentive to engage in strategic behavior. He suggests reforming the remedies available in patent litigation. Instead of granting injunctions for patent infringements, he recommends a system that only awards damages, and does so based only on the incremental value of the infringed patent to the product as a whole.

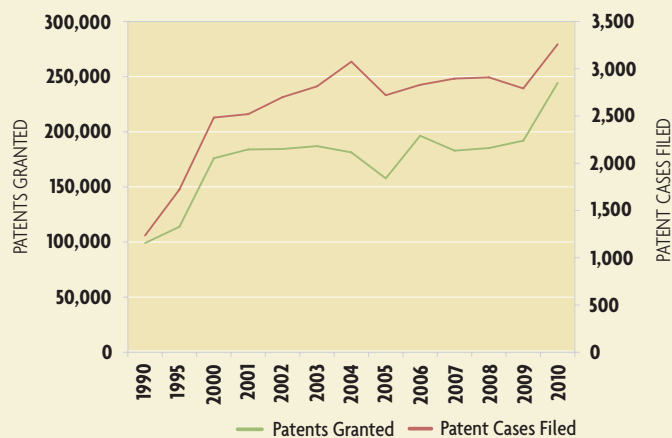
“Then you wouldn’t worry so much about individual patents blocking innovation, because if the patent is some tiny fraction of the value, the damages innovators are exposed to would be congruent with the value of the patent to the whole,” says Heller.

Strategic behavior can also be compounded by poorly marked property boundaries. Tabarrok gives the example of Jerome Lemelson, who filed a patent in 1954 for the concept of machine vision, which involves a camera or receiver scanning an object and processing the information via a computer. This has applications in various robot manufacturing systems, none of which existed when Lemelson filed the patent. Yet due to delays in processing, his patent was not actually granted until 1994, after the robot systems that used machine vision were already developed. When the patent was granted, firms that built the systems were interpreted to be infringers, even though they had no prior knowledge of its existence.

In addition to these so-called submarine patents, Heller adds that patent applicants can adjust their claims during the approval process to cover innovations others have made in the meantime. The shifting and, in the case of submarine patents, the invisible scope of patents creates the sort of challenges that would arise if physical property laws operated the same way.

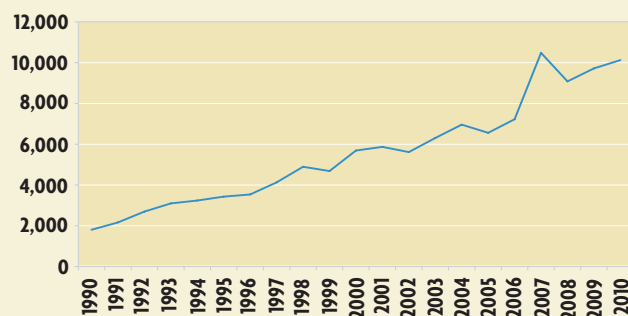
“The idea of a patent is supposed to be like fencing your property,” says Tabarrok. “The problem is that in this case the fences are much farther from where the person actually

U.S. Patent Grants and Litigation



SOURCES: U.S. Patent and Trademark Office: U.S. Patent Statistics, U.S. Courts: Judicial Facts & Figures

Number of Defendants in U.S. Patent Litigation



SOURCE: PACER and Priorsmart litigation database

homesteaded, and sometimes you don’t know exactly where the fence is. Patent law should aspire to create a system of property rights which is as clear as land titling.”

The Costs of Negotiation

Patent rules can also impose costs in the form of locating and negotiating with all individual owners. Imagine if consumers had to haggle over the price of every item when they shopped at the supermarket; shopping would be time-consuming and expensive. In the context of patents, negotiation may require the time of executives and expensive lawyers. Multiply those costs over hundreds of negotiations to assemble the rights for one product, and the costs can quickly escalate.

Defining access to complementary patents in the form of patent pools could be one solution to high negotiation costs. Patent pools typically operate as agreements among several holders of complementary patents to form a consortium that manages these related patents collectively. All member companies have access to all of the patents in the pool. The pool also sells access to nonmembers, the proceeds of which are distributed among the members of the pool according to predetermined rates.

Rudy Santore of the University of Tennessee, Michael

McKee of Appalachian State University, and David Bjornstad of Oak Ridge National Laboratory conducted an experiment to test how effective patent pools were at promoting efficient coordination and pricing. The researchers compared the performance of patent pools with individual patent holders setting separate royalties, setting fixed fees and royalties for access to their patents, or participating in nonbinding communication with other patent holders. They found that patent pools resulted in the most efficient market for IP rights, leading to greater availability of patents for downstream manufacturers.

There are some limitations to patent pools, however. Patent pools could evolve into a trust, whereby competitors collude to exert greater monopoly power over the market than they could individually. Additionally, larger pools could face greater coordination challenges, particularly if participants cannot agree how valuable each patent is to the product as a whole.

Setting the Right Incentives for Innovation

Currently, the incentive innovators receive from patents in the form of monopoly power is relatively uniform, regardless of industry. Some argue that while the current system might be appropriate for some industries, it is excessive for others.

Tabarrok says the pharmaceutical industry is a good example of a form of invention that merits the full measure of protection offered by today's system. "It takes \$1 billion to get that first pill onto the market, and the second pill costs 50 cents once you know the formula. If pharmaceutical companies did not have some protection, they would have much less of an incentive to do the \$1 billion worth of research and development to bring the drug to market."

He suggests using a system that matches rewards with innovation costs. For software and business method innova-

tions, costs are often much lower than in pharmaceuticals. One example is Amazon's patent for its "one-click purchasing" system, which covers computer software that stores a customer's address and payment information to reduce order processing time. The cost of developing the concept of such software is likely not high, says Tabarrok. In industries where innovations occur quickly and require smaller investments to produce, a lesser degree of patent protection is needed to promote innovation. Those industries would benefit from a more flexible system that offered variable patent lengths, Tabarrok argues, such as three- and 10-year patents. In exchange for lessened protection, innovators would be subject to lower filing and maintenance fees, encouraging creators of low-cost innovations to seek less protection, since they need fewer incentives to recoup their investments. In fact, in an open letter on the topic of its one-click patent, Amazon's CEO, Jeff Bezos, argued in favor of a similar system as a way to reduce coordination gridlock in the tech industry.

Carl Shapiro, who teaches at the University of California at Berkeley and is currently on leave with the President's Council of Economic Advisers, notes that the economic incentives provided by rewards are not a one-way street, and "excessive rewards, just like inadequate rewards, can reduce efficiency and stifle innovation." Indeed, there are several examples of creative industries that thrive without the protection of patents (see below), suggesting that a one-size-fits-all approach may not always promote the greatest efficiency.

Reforming the PTO

One place to start with reforms to the patent system is the entity that grants the patents: the U.S. Patent and Trademark Office (PTO). Proposals for reform at the PTO

Can Creativity and Copying Coexist?

According to Christopher Sprigman of the University of Virginia School of Law and Kal Raustiala of the University of California, Los Angeles School of Law, not all creative industries require legal protections against copying. They studied the fashion industry, which not only operates in a world of low intellectual property (IP) protection, but depends on it.

While trademarked fashion labels are vigorously protected, the actual designs have no formal legal protection against copying. Yet each season, new outfits fill the store shelves, with stores often exhibiting similar styles by different designers. Why do designers continue to create if their rivals can mimic their work?

Sprigman and Raustiala contend that the fashion industry thrives because of design copying and its ability to provide anchoring and induce obsolescence. Early fashion adopters in society seek to differentiate themselves by wearing the newest designs. At the same time, as a design

becomes more popular, it is increasingly copied. On one hand, this provides an anchor for consumers, simplifying their clothing choices to a few popular designs. But as designs are replicated, they also lose their unique status for early adopters, becoming obsolete in their eyes.

This cycle of anchoring and induced obsolescence provides a catalyst for consumers to buy the newest products — and it is made possible through widespread copying by clothing firms. Not all industries can turn copying into productive fuel like the fashion industry. But Sprigman suggests that as improvements in technology make copying easier (and harder to prevent), some industries could examine whether strong protections against copying are truly beneficial.

"The question is how vulnerable is a business model to people copying," he says. "Copying is not necessarily the death of creativity — sometimes it is actually a spur to creativity."
— TIM SABLIK

are nothing new. Indeed, the office has long had difficulty keeping pace with the demands placed upon it by modern technology. As of December, the average processing time for a new patent was about 34 months, or nearly three years, and there were more than 600,000 patents pending approval. Balancing the dual pressures of examining patent requests thoroughly while also processing them quickly can lead to overly broad or weakly defined patents, contributing to many of the problems discussed above.

Indeed, Stanford's Lemley observes that "the problem is not precisely that the Patent Office issues a large number of bad patents. Rather, it is that the Patent Office issues a small but worrisome number of economically significant bad patents."

Lemley, Allison, and Walker found in their study that less than 2 percent of patents are ever litigated in courts to begin with, and the most-litigated patents share several characteristics that can be identified ahead of time. The vast majority of the most-litigated patents were in the software or communications industries and cited a greater number of prior works in their applications. They were also more likely to be bought by another party in between the time they were issued and the time they appeared in litigation.

Lemley suggests a number of possible reforms to ensure the PTO is better equipped to catch such patents ahead of time. Since applicants often have the best view of a patent's validity, Lemley suggests a system whereby applicants could pay extra fees for a more thorough examination of their application and earn a presumption of validity that would

give them a stronger defense in any litigation. Another option would be to allow for post-grant opposition, where outside parties could request and fund a more thorough examination of a recently issued patent. This would allow the PTO officers to harness the expert information available to practitioners in the field, leading to stronger patent approvals.

In fact, this post-grant review is one of the changes in the America Invents Act on patent reform signed into law in September. The post-grant period extends nine months after the patent is issued, and outside petitioners may challenge the patent on any grounds of invalidity. Other significant reforms in the legislation include provisions to give the PTO greater control over the fees it collects and a change in patent assignment from a first-to-invent system to a first-to-file system. This will bring the United States in line with the way many other countries assign patents, but will it alleviate gridlock at the PTO and among inventors? That remains to be seen.

Patent litigation among high-tech innovators is on the rise. It could be an inevitable result of a world that has grown more complex since the time of Alexander Graham Bell, but many in the tech industries have expressed their frustration with the current state of affairs. Google's patent counsel, Tim Porter, has said that Microsoft created many of its staple software products before ever obtaining a software patent, suggesting that innovation could thrive under a different system. The debate about what that system will look like, however, is certain to continue. **RF**

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