Fundamentals of Intellectual Property

for Engineers, Scientists and Business Mangers

by

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Chapter I

-- Introduction --

Intellectual property is the term we use to describe a collection of legal rights. Some intellectual property rights are granted in the products of a person's mind; our ideas, innovations and inventions. Some intellectual property rights are granted in a person's expression of ideas; artistic works, writings, etc. Other intellectual property rights arise in connection with business and protect the ability of a business to identify itself and its products to customers.

There are four main categories of intellectual property: patents, copyrights, trademarks and trade secrets. In the present text, we will explore the fundamentals of each of these forms of intellectual property. However, the emphasis will be on intellectual property rights in technology, i.e., patents.

The concept of intellectual property has existed for a very long time. Around 500 BC, there was a Greek colony in Southern Italy named Sybarius. Sybarius was famous for its quality of life and the luxury in which its citizens lived. One historian has noted how a recognition of intellectual property rights contributed to the standard of living in Sybarius.

"The Sybarites, having given loose to their luxury, made a law that if any confectioner or cook invented any peculiar and excellent dish, no other artist was allowed to make this for a year, but he alone who invented it was entitled to all the profits to be derived from the manufacture of it for that time; in order that others might by induced to labour at excelling in such pursuits."

This encapsulates the principal concept that underlies intellectual property. The purpose of intellectual property is to encourage the production of things that society values. In the case of patents, the idea is to encourage invention and accelerate the pace of technology. In the case of copyrights, the idea is to encourage the production of artistic works such as books, music, film, etc.

In order to encourage the production of such things that society values, society provides a reward or incentive to those who create what we are after. That reward is intellectual property. Through the mechanism of intellectual property, we grant an inventor or author an exclusive right to capitalize on their work for a finite period of time. This provides a financial incentive to create an invention and claim a patent on it, or to write a great novel and publish it.

The other side of this arrangement is that, in order to claim intellectual property rights, the inventor or author must give their work to the public. In the case of a patent, the inventor must disclose his or her invention to the U.S. Patent Office. The application may then be published and eventually issued as a patent. The inventor then has rights in

the invention that extend for a period of years, but the idea of the invention has also been made public.

With the disclosure of the invention, the knowledge provided by the inventor can be used by others to improve upon the invention or can, potentially, be used as a spring-board to an advance in a related technology. In this way, the patent process drives a constant dissemination of new ideas and information that seed the next generation of innovation.

In addition to the publication mechanism of the U.S. Patent Office, intellectual property rights can provide an inventor with confidence to disclose his or her invention even more rapidly than it will be disclosed by the Patent Office. Once a patent application has been filed, an inventor can more freely publicize his or her invention, knowing that whatever rights to the invention he or she should be given can eventually be obtained from the U.S. Patent Office. Thus, with the patenting system in place, inventors will tend to publicize or market their inventions more rapidly.

Copyrights are similar. With the protection of the copyright system, an author, painter, photographer, sculptor, musician, filmmaker, etc. will be able, with greater confidence, to publish and distribute his or her work. The copyright system is intended to protect the artist from having his or her work copied without authorization so that the artist can profit from the popularity of the work.

Thus, the concept of intellectual property is essentially a contract. On one part, the inventor or author offers his or her work to the public. In return for the work, society grants to the inventor or author an intellectual property right in the work that allows the inventor or author to derive a reward for his or her work.

Notice also that the reward derived is directly related to the value of the work to society. The inventor of an important invention will make much larger amounts from a patent on that invention than would be the case if the invention is frivolous or insignificant. Similarly, the author of a very popular artistic work will be very well compensated as compared to the author of a work that receives no public attention or acclaim.

In the United States, the idea of intellectual property is enshrined in the federal Constitution. Article VIII of the U.S. Constitution states that "Congress shall have power to promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries."

The ability of Congress to protect the rights of "authors" is the basis for United States copyright law (United States Code § 17). The ability of Congress to protect the rights of "inventors" is the basis for United States patent law (United States Code, § 35).

It can certainly be argued that the early recognition and protection of intellectual property in the United States has contributed immensely to our history of being one of the most technologically advanced and powerful countries in the world. Interestingly, about 1890, a Japanese official was sent to the United States to study American government and institutions. He subsequently reported, "We have looked to see what nations are the greatest so that we can be like them. We asked ourselves what is it that makes the United States such a great nation? We investigated and found that it was patents, and we will have patents." Accordingly, Japan has long had strong protection for intellectual property protection for inventors and innovators.

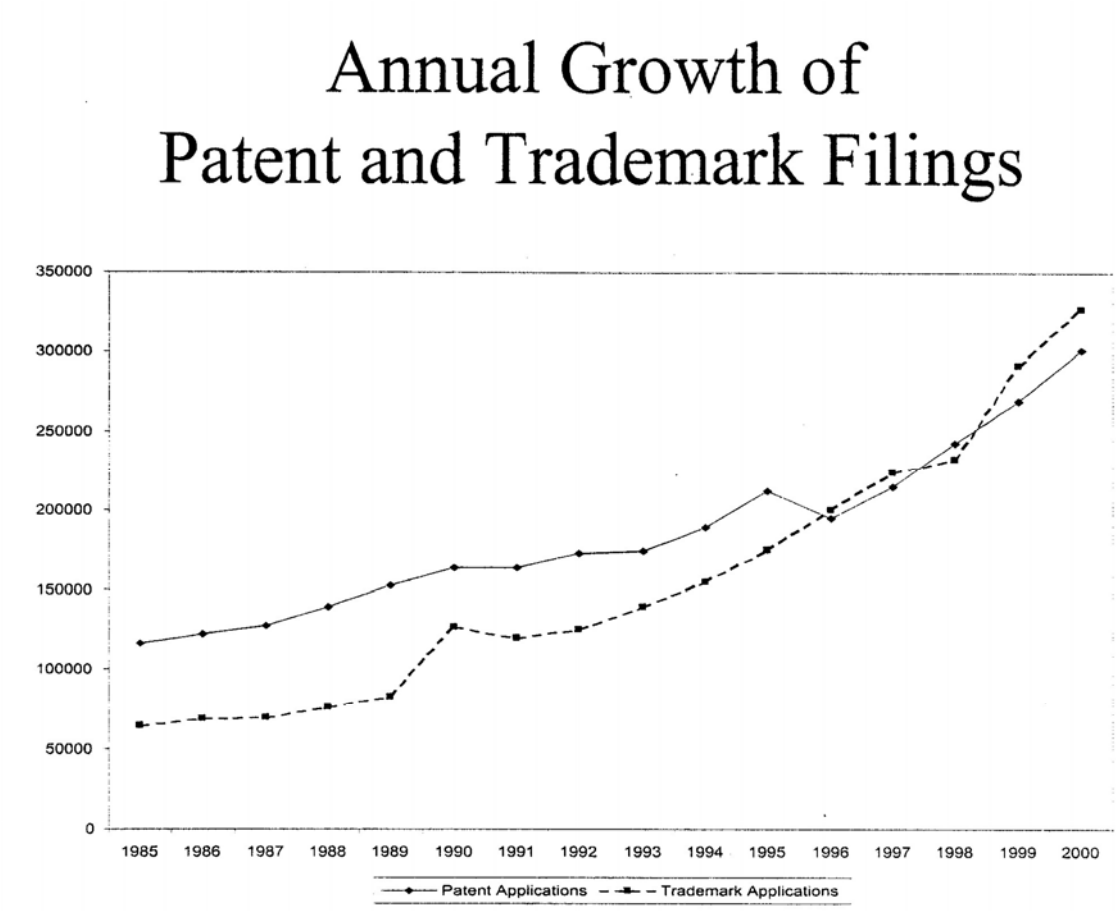
An appreciation of intellectual property is becoming more and more important for engineers, scientists and business managers. Despite the value of an invention, rights to that invention can be lost in a variety of ways through action or inaction. Potential inventors and business managers need to know how and when intellectual property rights arise and how they can be strengthened and preserved. Otherwise, ideas that could have become valuable assets may loose their value.

An engineer or scientist may be able to advance his or her career by appropriately recognizing and protecting intellectual property that will be of value to an employer. The reputation of an engineer or scientist may be greatly enhanced by being listed as an inventor on a body of patents, particularly if one or more of those patents is considered to represent an important advance in that field.

Likewise, a business manager or owner may be able to strengthen a market position by protecting key technologies with patents that bar others from duplicating the success of the business. Additionally, many businesses now derive substantial revenues by licensing their intellectual property portfolio. A lack of awareness regarding intellectual property can easily result in a lost opportunity.

As the Information Age has dawned, the value of intellectual property has been increasing geometrically. This trend, as well as the increasing awareness of the importance of intellectual property, is indicated by the increased efforts to obtain and protect intellectual property rights.

The number of patent and trademark applications being filed has been steadily increasing over the last quarter century. Consequently, the number of patents being issued has dramatically increased. For example, it took 121 years for the United States to issue its first million patents. In contrast, a million patents are expected to issue between 1999 and 2004 (5 years).



-- Patents --

A patent gives its owner the exclusive right to exclude others from making, using, selling, offering for sale or importing the invention covered by the patent. This means that if you own a patent on an invention, you can legally prevent someone else from making that invention, selling the invention, using the invention, etc.

It is important to note that a patent does *not* give its owner the right to make, use or sell the covered invention. The right granted is the ability to exclude others from the invention. It is possible to own a patent on an invention and, because of an earlier patent, not be legally able to produce your patented invention.

A patent is granted for a limited period of time. After the patent expires, anyone is free to make, use, sell, etc., the invention described in the expired patented. Unfortunately, the term of a patent has become somewhat difficult to determine. Generally speaking, a patent will be valid for 17 to 20 years. More specifically, a patent is valid and enforceable from the date it is issued by the U.S. Patent Office until 20 years from the date on which the patent application for that patent was filed. This general rule

is then modified by a number of exceptions. For example, the term of the patent cannot be less than 17 years. If the U.S. Patent Office unreasonably delays in processing the patent application, additional time may be added to the term of the patent. Fees, called maintenance fees, must be paid periodically during the life of patent to keep the patent in force.

The important thing to remember is that the patent grant is for a limited time during which the inventor or patent owner has an opportunity to reap a reward from the invention. After the patent has expired, the invention enters the public domain, meaning that anyone can capitalize on the invention without the permission of the inventor or previous patent owner. Once an invention has passed into the public domain, it remains there forever and can never be "re-patented."

-- Trade Secrets --

A trade secret is a piece of information that is not publicly available and that gives its owner a competitive advantage in the business world. Within this definition, a trade secret can be a wide variety of things. For example, a trade secret may be a list of clients, a secret formula for making a product, a piece of software, a machine, etc.

As long as the owner of a trade secret takes reasonable measures to keep the secret a secret, certain legal protections will be provided. For example, if anyone uses illicit means to discover the trade secret, a court of law may award damages to the owner of the secret. The court may also prevent the party who has illegally obtained the secret from making use of, or further disclosing, the secret.

Means of illicitly obtaining a trade secret would include, for example, breaking into the secret owner's place of business, hacking into the owner's computer network, bribing employees of the secret owner to divulge the secret, etc. Reverse engineering the secret is not illicit and is permitted. Thus, to be a valuable trade secret, the information must be something its owner can use without giving away the secret.

As noted, legal protection for a trade secret is contingent upon reasonable efforts being taken to keep the secret a secret. This is done in a variety of ways. For example, the company that owns the trade secret should restrict access to the secret as much as possible. Materials that contain or describe the trade secret can be marked as confidential or secret. The company should also keep track of who in the organization has learned about the trade secret.

As will be obvious, for a business of any size to operate, a trade secret will likely need to be known to, and used by, a variety of employees. It may also be necessary to disclose the trade secret to an outside vendor who is providing materials or equipment that relate to the trade secret or its use. In these circumstances, the employees, outside vendors, or others are asked to sign a contract that obligates them to keep the trade secret confidential. If one of these people then breaches the contract and reveals the trade

secret, a court can punish the offender for both divulging the trade secret and breaching the confidentiality agreement.

Let's now compare patent and trade secret protections for an invention. Some trade secrets, such as a client list, would not be eligible for patent protection. However, other trade secrets, such as a secret formula for producing a product, would be eligible for patent protection. Thus, the inventor will have to decide whether an invention should be held as a trade secret or patented.

While a patented invention is protected for the limited term of the patent, a trade secret is legally protected for as long as it is kept a secret and is not publicly available. Thus, the owner of a trade secret must decide how long the secret will be valuable and how long the secret can be kept secret.

If the secret will have value and can be kept secret indefinitely, it will probably not be advantageous for the secret owner to apply for a patent on the trade secret. While a patent would provide clear ownership of the trade secret, it would also start the clock running toward the time when the trade secret would be committed to the public domain. On the other hand, if the trade secret will have value for a limited time or could be readily discovered by reverse engineering or other public means, pursuing a patent may provide longer and more valuable protection for the trade secret.

Holding information as a trade secret has another risk that we will mention here and explore in more detail later. Assume that the decision is made to hold an invention as a trade secret. Subsequently, someone else, perhaps a competitor, makes the same invention and files for a patent.

Recall that one purpose of the patent system is to encourage the disclosure of inventions for the benefit of the public generally. Consequently, the patent system rewards those who disclose inventions with patent protection. Conversely, you would expect the patent system to punish those who hold back inventions, e.g., hold an invention as a trade secret. And, in fact, this is the law.

In the hypothetical given above, the original inventor who opted to keep the invention as a trade secret is said to have "suppressed" the invention. Consequently, a patent can be awarded to the subsequent inventor who disclosed the invention by filing for a patent. This subsequent inventor, who is now the patent owner, can order the original inventor to stop using the invention (trade secret), even though the original inventor made the invention first.

Thus, when an invention is made that could potentially be a valuable trade secret or a valuable patent, one must consider if the invention can be kept secret indefinitely and whether anyone else is likely to make the same invention and pursue patent rights. Because it is almost impossible to discount that someone else may make the same invention, the decision is usually made to protect inventions with a patent rather than as a trade secret.

-- Copyrights --

A copyright protects the specific manner in which ideas are expressed. For example, if two people write down an account of an event to which they were both witnesses, there will likely be similarities between the narratives because both are based on the same underlying event. However, the expression of the two accounts, the words chosen, the emphasis given to particular details, etc. will almost certainly be different. In such a case, both narratives would be protected by a copyright.

Extending this example, a copyright protects the particular expression of ideas in a wide variety of areas including news reporting, books, music, performance arts, graphic arts, architecture, and software. The specific rights a copyright provides also vary depending on the nature of the work protected. In general, however, the copyright provides the author or authors of a protected work with the right to prevent others from copying the protected work. As described above, this allows the copyright owners to profit from the creation of the work and, consequently, creates an incentive for authors to produce creative works that will be of value to society.

It is important to note that a copyright protects the expression of ideas and not the ideas themselves. As in the example above, two different people can write about the same events and both receive a copyright on the resulting story.

-- Trademarks --

Trademarks are considered to be a form of intellectual property, but are different in nature from patents, trade secrets and copyrights. A trademark protects the reputation of a person or business that provides goods or services in the marketplace.

Let's say that you go to the store and want to purchase some breakfast cereal. Obviously, you want to buy cereal that has a particular quality that you are interested in, taste, nutrition, or an exciting prize. But, how do you know which cereal will have the qualities you are looking for? The answer is likely that you have had experience with a variety of cereals in the past and, based on that experience, associate certain qualities with certain cereals. You may also have been bombarded with advertising about particular cereals that informs you of their qualities, or alleged qualities. Again, through your own experience, you may come to agree or disagree with advertising about a particular cereal.

So, assuming that you know what cereal qualities are important to you, and assuming that you think you know which cereal or cereals have those qualities, you go to the long cereal isle at the local grocery story. The question now is how to do you identify the cereal you are after. The answer is by trademark.

As you are gaining experience with cereals, you will naturally associate your thoughts about a given cereal with the name or trademark that identifies that cereal. As

you are bombarded with advertising about a cereal, it will inevitably make reference to the cereal's name or trademark so that, if you are persuaded by the advertising, you can identify and buy that cereal on your next visit to the grocery store.

Thus, the function of a trademark is to allow a consumer to consistently identify those goods or services in the marketplace that he or she wishes to buy. Obviously, it would be very difficult to find the cereal you want if all the cereals on the cereal isle were in identical boxes. You wouldn't know what you had purchased until you went home and opened the box.

Viewed from the other side, the function of a trademark is to allow the producer of goods or services to identify its goods or services to customers and potential customers. Consequently, the trademark comes to embody the reputation or goodwill that customers associate with the goods or services of a particular producer.

Because trademarks play such a vital role in facilitating commercial transactions, it becomes necessary for the law to protect trademarks. Imagine that an unscrupulous cereal producer enters the market by placing a cheap, stale-tasting cereal in a box that bears the name of a delicious, well known, premium cereal. Obviously, at least some consumers who want the premium cereal will inadvertently end up with the cheap cereal.

This makes the role of the consumer more difficult. The consumer will have to spend additional time figuring out how to tell the premium cereal from the cheap cereal if one cannot relay on the name on the box. Alternatively, the consumer may simply switch to another cereal to the detriment of the producer of the premium cereal. Or, the consumer may incorrectly assume that the cheap cereal is the premium cereal and that the premium cereal really isn't very good. Again, the consumer will likely switch cereals.

To avoid these consequences, trademark law allows the producer of goods or services to prevent others from marketing similar goods or services under a confusingly similar trademark.

A trademark can be any device that allows a producer to distinguish its goods or services from others. In other words, a trademark can be any device that identifies to consumers the source of particular goods or services. For example, a trademark can be a name, a slogan, a logo, a color, a shape, etc.