Patent Law Basics

and Recent Developments

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Types of Intellectual Property

America's intellectual property laws have significance for engineers in their capacities as authors, inventors, and businessmen and women. *Intellectual property*, also sometimes called "industrial property," traditionally includes: (1) patents; (2) copyrights; (3) trademarks; and (4) trade secrets.[1] It may also be used to encompass recent legal innovations, such as the maskwork protection available for integrated circuits.

A trade secret may consist of any confidential formula, device, or other information that may give someone an advantage over competitors; the classic example is the Coca-Cola formula. Unlike patents and copyrights, which are governed by federal law, trade secrets are protected under state law. A trade secret must be kept secret, and it can last indefinitely. By contrast, patents last 17-20 years, and copyrights typically last for the life of the author plus 50 years. An invention can be protected as a trade secret; however, such protection has the disadvantage that it can be lost if the invention is disclosed, independently invented, or even reverse-engineered by others.

A trademark is a word, phrase, symbol, or design that *identifies* the source of the goods or services and distinguishes them from goods or services of others. A good example is the Coca-Cola mark and design that appears on soft drink cans to identify products as coming from that firm, and which distinguishes them from competitor colas such as Pepsi. Unlike copyrights and patents, trademark rights can last indefinitely if the owner continues to use the mark. Trademarks are generally derived under state law, but may be registered federally in the United States Patent & Trademark Office (PTO). The term of a federal trademark registration is 10 years, with 10-year renewal terms being available.[2]

A relatively new type of intellectual property is the maskwork protection provided by the Semiconductor Chip Protection Act of 1984.[3] This act provides a 10-year term of protection and is designed to prevent copying of the mask sets used for manufacturing integrated circuits.

A copyright is a right given to authors of "original works" which gives them the exclusive right to reproduce the work, prepare derivative works, or to perform or play the work publicly. While patents protect the *substance* of ideas, copyrights protect only the form in which ideas are "fixed." Under the federal copyright law,[4] a copyright lasts from the moment the work is "fixed" in a "tangible medium of expression" and lasts for the life of the author plus 50 years, or a total of 75 years in certain cases where the employer owns the copyright.

Finally, a patent is a property right granted by the U.S. government to an inventor (or the inventor's assignee) to exclude others from making, using, or selling an invention.[5]

Useful brochures are available free of charge from the federal government covering some of these topics: *Basic Facts About Patents; Copyright Basics (Circular 1);* and *Basic Facts about Registering a Trademark.* The copyright brochure can be obtained by writing the Copyright Office, Library of Congress, Washington, DC 20559-6000, requesting Circular 1, or by calling 202/707-9100; for general information call 202/707-3000. The patent and trademark brochures can be obtained by writing the U.S. Department of Commerce, Patent and Trademark Office, Washington, DC 20231 or by calling the automated information lines at 703/557-INFO/4636.

Patent Protection of Inventions

The term of a patent has generally been 17 years; however, that term has been changed by Congress to 20 years from the date of filing, effective June 8, 1995. Under a patent, the inventor is granted a limited monopoly on the manufacture, use, or sale of the invention. One of the stated reasons for having a patent law is to promote the progress of science. If an inventor can receive a legal monopoly over an invention, she can obtain monopoly profits and thus have an extra economic incentive to attempt to invent. These inventions generally inure to the public benefit during the term of the patent (when sold to the public by the inventor under her monopoly), and also after the patent has expired and the invention enters the public domain.

In order to obtain a patent on an invention, the inventor must make a complete disclosure of the invention in a patent application. The application becomes public once a patent is granted, thus also benefitting the public by disseminating information about new ideas and discoveries that might otherwise be kept secret by companies. (However, although this is the stated motive behind patent laws, there is debate about whether *science* is really promoted by the grant of such monopolies and about whether or not such laws are morally justifiable in the first place.[6])

Patent protection can be very important to engineers, inventors, and to many companies. The receipt of a patent over an invention provides significant protection, because others who wish to make, use, or sell the invention must obtain the right from the patent holder. Anyone

who makes, uses, or sells the invention without the consent of the patent owner can be sued by the patentee for significant damages. For many companies involved in research or development of patentable products, patents can constitute a substantial portion of their assets. For this reason, many firms actively encourage their employees to invent and reward them for doing so. (In this case, as discussed below, a company will usually own any inventions its employees make.)

There are three major types of patents: *utility* patents; *design* patents; and *plant* patents.

Utility patents may be granted to anyone who invents any new, useful, and nonobvious process or method, machine, manufacture, or composition of matter, or any new, useful, and nonobvious improvement thereof. A utility patent is the ordinary type of patent people think of that covers inventions such as new devices, new chemical compositions, or new processes or innovative ways of doing things. *Design* patents cover new, original, and ornamental designs for an article of manufacture. Design patents protect the appearance of an article. *Plant* patents are granted to one who invents or discovers and asexually reproduces any distinct and new variety of plant.

To obtain a patent, a patent application must be prepared and filed with the PTO, where it is examined by a patent examiner. The patent application contains a description of the invention and any drawings necessary to explain the invention, and it concludes with a set of *claims*. The claims define and stake out the legal boundaries of the invention for which protection is sought. If the examiner initially rejects the patent, the applicant, through a patent attorney, can attempt to overcome the rejection, either by modifying the patent to satisfy the examiner's concerns or by arguing legally or factually with the examiner to convince the examiner that the rejection was erroneous.

This process of filing an application and going back and forth with the PTO in an attempt to obtain a patent is, strangely enough, called *patent prosecution*. Unlike trademark applications and copyright registration papers, which are sometimes filed by lay individuals, the preparation of a patent application is a complex task which normally requires the attention of a patent attorney or patent agent. The PTO cannot assist in the preparation of application papers and, indeed, strongly advises prospective applicants to engage the services of a patent attorney or agent.

A valid patent may not be obtained if, for example, the invention has been in public use or on sale in the U.S. for more than one year prior to the filing of the patent application. In addition to other formal requirements, the invention must be novel, have *utility*, and be *nonobvious*. Usually inventions can be shown to have utility or usefulness. However, not everything has utility — for example, "perpetual motion" machines that really do not work. Novelty means the invention must be *new*; i.e., it must not have been already invented, or *anticipated*, by a prior invention or by prior existing knowledge.

Under the nonobviousness test, an invention is not patentable over what was already known in the "prior art" if it would have been obvious at the time the invention was made (to a person having ordinary skill in that art) to make such changes in the prior art as to arrive at the current invention. Thus, even if an invention is novel, it might still not be nonobvious, because it could be that someone skilled in that type of technology could have relatively easily invented it if she had tried. Such an invention would be novel, but it might be considered obvious and, therefore, unpatentable.

Patent Protection for Software Inventions

The patentability of software inventions is one of the hot, growth areas in patent law nowadays. In the past, the patentability of computer software was challenged on the grounds that software is nothing more than a series of mental steps or scientific principles. Mere scientific principles or abstract ideas are unpatentable, or *non-statutory* subject matter. Until recently, software patents based on mathematical algorithms were thought to be unpatentable for this reason. However, the U.S. Supreme Court in 1981 held that certain processes are potentially patentable even if they include the use of a mathematical algorithm and a programmed computer to do the calculations.[7]

Under current law, even if a computer program recites a mathematical algorithm, it may still be patentable (assuming it meets other requirements such as utility, novelty, and nonobviousness) if the computer program is operating on data that represent a real, physical phenomenon in the real world and produces an output that represents some real quantity, i.e., one which is not a mere abstract number.[8] For example, if a program manipulates input data from a patient's heartbeat, produces a signal related to the patient's heart activity, and uses a computer to carry out the program, the invention for analyzing human heart electrocardiographic signals may be patentable even though the program carries out an algorithm.

Thus, until and unless Congress (or the courts) change the law, software inventions are patentable in certain cases. Although software may also be protected by design patents, copyrights, and trade secrets, each of these types of protection has disadvantages. Design patent protection can only protect design aspects of programs, such as the design of icons. Copyright protection is fairly easy to obtain, but it protects only the actual expression of the source or object code listing, not the inventive way of doing something that the software invention is directed to. Trade secrets may protect the inventive aspect of a program, but may be lost because of reverse engineering or independent discovery. A patent on a software invention, however, protects the invention itself and is not lost through reverse engineering or independent creation. Patent protection is potentially very powerful for commercial purposes.

Ownership of Inventions

Even though federal law governs the creation of patents, state law determines the *ownership* of patentable inventions.[9] In other words, federal patent law determines whether a given invention is patentable and even who the inventor is; but state law determines who owns the patent — for example, an inventor/employee or her employer.

The law pertaining to patent ownership in employment relations is, however, fairly uniform from state to state. Normally, if an employment agreement has been signed in which the inventor/employee assigns all work-related inventions to the employer, the employer will own the invention in cases where the contract so specifies. In the absence of an employment agreement allocating patent rights, the default legal presumption in most states is that the actual inventor owns her own inventions, even if she is an employee.

An exception is made in hired-to-invent cases, where an employee is employed to do experimental work for inventive purposes. If an employee is hired to invent or is later directed to make a particular invention after already beginning employment, the resulting invention is usually considered to be the property of the employer. This is because it is presumed that, when inventive behavior is part of the employment relationship, the inventive behavior of the employee has already been fully compensated by wages. In other words, the law usually presumes that the employee and employer have (implicitly) bargained for the employee to "sell" to the employer all inventions in return for a salary.

Even when the employee owns the invention because there is no contract and she was not hired to invent, the employer may, in some circumstances, have a right to make and use the invention, typically called a *shop right*. The fact that the employee uses time that should have been devoted to the employer's affairs in perfecting an invention does not entitle the employer to the patent — even if the employee has improperly used the employer's tools. However, if the employer's time or facilities are used without permission, and the employee invents a device that can be used in the regular business of the employer, the employer is sometimes given a nonexclusive license, or shop right, to manufacture and use the patented device or process. If the invention is made by the employee using the employer's facilities for the purpose of experimentation and invention in connection with the work for which she is employed, the employer can be awarded a nonexclusive license to manufacture and use the patented device or process in the regular course of the business in which the employee is employed at the time the invention is made.

Often disputes can arise over ownership of an employee's invention, especially when no contract has been entered into ahead of time. If the employer is awarded title to the invention, the employee may feel cheated out of her creation. However, when the employer and employee have failed to explicitly set out their rights by contract, the law cannot be blamed for attempting to deal with these situations based on general rules that appear fair for most situations. Anyone who does not wish to rely upon the general background of default legal rules that govern disputes in the absence of a contract is free to bargain for nearly any contractual relationship desired.

Employer Patent Programs

As mentioned above, employers often own their employees' inventions, either through an explicit contract or because the employee is hired to invent. A corporation, not being an actual person, can only obtain patent rights through purchasing them or by its own employees' efforts, so it makes sense for a company to arrange to receive title to its employees' inventions.

Because the intellectual property rights of many companies constitute a significant portion of their assets, firms often vigorously attempt to procure and protect intellectual property rights, such as patents and trademarks. Many companies have programs in which inventors are encouraged to prepare invention disclosure forms for all inventions they devise, so that they can be submitted to a patent attorney. The patent attorney will then consider the patentability of the invention and, if the invention looks promising, may prepare a patent application. Sometimes the inventors are even rewarded financially — for example, with a bonus for each patent disclosure prepared or for each patent application filed with the PTO.

Conclusion

Whether you or your employer owns your work-related inventions, the product of your mind may be protected under current law. If you own your own invention, and it is marketable and worth procuring patent protection, patent protection can be of immense benefit. If you are an employee and your employer owns your inventions, your inventions can still benefit you by benefitting your employer.

References

1. A useful introduction to intellectual property can be found in Arthur R. Miller & Michael H. Davis, *Intellectual Property: Patents,Trademarks, and Copyright* (1990). Ronald B. Hildreth, *Patent Law: A Practitioner's Guide* (2d. ed. 1993) contains a good introduction to patent law.
2. Trademark Act of 1946, as amended, 15 U.S.C. § 1051 *et seq.*; Trademark Rules, 37 C.F.R. Part 2; *Trademark Manual of Examining Procedure* (2d. ed. 1993).
3. 17 U.S.C. § 901 *et seq.*
4. Title 17, U.S.C.
5. The Patent Act, 35 U.S.C. § 1 *et seq.*; Patent Rules, 37 C.F.R. Part 1; *Manual of Patent Examining Procedure* (5th ed. 1983, revised 1992).
6. Useful discussions of whether intellectual property laws are justifiable may be found in Tom G. Palmer, "Are Patents and Copyrights Morally Justified? The Philosophy of Property Rights and Ideal Objects," 13 *Harvard Journal of Law & Public Policy* 817 (1990); Roger E. Meiners & Robert J. Staaf, Patents, "Copyrights, and Trademarks: Property or Monopoly?," 13 *Harvard Journal of Law & Public Policy* 911 (1990); Tom G. Palmer, "Intellectual Property: A Non-Posnerian Law and Economics Approach," 12 *Hamline Law Review* 261 (1989); Edmund W. Kitch, "Property Rights in Inventions, Writings, and Marks," 13 *Harvard Journal of Law & Public Policy* 119 (1990); and Wendy J. Gordon, "An Inquiry into the Merits of Copyright: The Challenges of Consistency, Consent, and Encouragement Theory," 41 *Stanford Law Review* 1343 (1989).
7. Parker v. Flook, 437 U.S. 584, 98 S.Ct. 2522, 198 USPQ 193 (1978). See also In re Alappat, __ F.3d __, 31 USPQ2d 1545 (Fed. Cir. 1994); Peter J. Ayers, "Interpreting In re Alappat with an Eye Towards Prosecution," 76 *Journal of the Patent & Trademark Office Society* 741 (1994); James R. Goodman, Todd E. Marlette, and Peter K. Trzyna, "The Alappat Standard for Determining that Programmed Computers are Patentable Subject Matter," 76 *Journal of the Patent & Trademark Office Society* 771 (1994); Stuart P.Meyer, "New Guidance from the Federal Circuit on Patent Prosecution for Computer Software? In re Alappat in Context," 20

Computer Law Reporter 263 (1994); Gustavo Siller, Jr. & Jonathan E. Retsky, "Patent and Trade Secret Protection of Computer Technology," 6 *APR Software Law Journal* 239 (1993); Stephen G. Kunin, "Patentability of Computer Program Related Inventions in the United States Patent and Trademark Office," 76 *Journal of the Patent & Trademark Office Society* 149 (March 1994); Roger L. Cook, "The Software Industry Anticipates a Flood of Patent Litigation," *National Law Journal* S2 (Monday, January 24, 1994); Terrance A. Meador & Norman E. Brunell, "Software Patent Applications," in *How to Write a Patent Application* ch.12 (Jeffrey G. Sheldon, ed., 1993).

8. Arrhythmia Research Technology v. Corazonix Corporation, 958 F.2d 1053, 22 USPQ2d 1033 (Fed. Cir. 1992).
9. Useful sources discussing these issues are found in Paul C. Van Slyke & Mark M. Friedman, "Employer's Rights to Inventions and Patents of Its Officers, Directors and Employees," 18 AIPLA Q.J. 127 (1990), and in Donald S. Chisum, *Patents* § 22.03 (1994).

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Executive Council Meeting

The first regular meeting of the Great Lakes Executive Council was held in Romulus, MI, on December 10, 1994. The Council's first action was election of its and the Association's officers for the 1994-98 term: E.D. Basta, President; E.W. Beans, Vice President; and M.K. Brennan, Secretary of the Council.

A resolution was adopted authorizing President Basta and Vice President Beans to sign checks on the Association's operating account. The educational loan of a borrower was extended by the Council under the usual conditions.

Vice President Beans was appointed as official installing deputy for the installations on February 4, 1995, of the Nevada Beta Chapter and on February 11 for the Georgia Beta Chapter, and President Basta was appointed as installing deputy for the February 25 installation of the Washington Delta Chapter.

Three deans of engineering were named to the selection committee for the Outstanding Advisor Award, including Drs. Jerry E. Stoneking as chair, Francis A. Kulaki, and Thomas G. McWilliams. Five members were appointed to the selection committee for the Standard of Excellence Award, including David A. Greenblatt, Margaret B. Hickel, John R. Luchini, Larry D. Tyler, and Donald B. Wallace. Presentations of both prizes will be made at the awards banquet at the Convention.

At the request of his collegiate chapter and advisory board, one alumnus was expelled from membership.

The schedule of Spring District meetings was reviewed, and assignments were made for national-officer representation at all 14 of them. The Council made preliminary plans for the meeting of District Directors on a cruise ship departing from Miami, FL, on June 17. A review was made of District personnel needs, and Karen Gilbode, *PA Θ '93*, was appointed as District 3 Director for a three-year term to expire in June 1997.

The 1994 Convention held in October in Buffalo, NY, was reviewed and was judged to have been successful. In compliance with the 1981 Convention procedure for future site choices, the invitation from Minnesota Alpha to host the 1997 meeting in Minneapolis was accepted. The Council reviewed and adjusted plans for the 1995 Convention to be held in Cleveland, OH, on October 12-14. Assignments of items of business were made to various committees. Because only 105 chapters had voted, the deadline for ratification ballots by the chapters was extended until February 28, 1995.

The Treasurer reported on the status of the 1994 Alumni Giving Program. The first-quarter financial report of the fiscal year had been sent to the Council and was accepted. A bequest of $99,300 in memory of Raymond A., *NY Γ '33*, and Ina C. Best had been received. The Council approved a new trust fund and approved policies and procedures to grant fellowships to graduate engineers who are members of Tau Beta Pi to be used exclusively for the purpose of studying business administration at Rensselaer Polytechnic Institute and for acquiring master's degrees in business.

The contract with Epsilon Data Management, Inc., for conduct of the 1995 Alumni Giving Program was reviewed and approved. The Council revised the authorization of long-term disability insurance for the national headquarters staff. J.W. Johnson Jr. was appointed to the AAES finance committee to complete a three-year term.

Director of Engineering Futures A. C. Hwang presented a review of the Engineering Futures Program and its various requirements for continued development. Vice President Beans reported on the meeting on October 27 of the AAES engineers' pre-college education council in Washington, DC, the meeting of the Trust Advisory Committee in New York City on November 9, and his discussions with representatives of the Society of Automotive Engineers regarding collaborative efforts. President Basta reported on the meeting on December 8 of the AAES board of governors in Washington, DC.

Mark J. Stratton, president of JETS, asked Tau Beta Pi to endorse his society formally, asked chapters to become involved in *Teams*, and asked chapters to develop problems and questions for tests of engineering aptitude, mathematics, and science.

A Chapter Project Grant under the Greater Interest in Government Program was given by the Council to the Illinois Alpha Chapter. The local project for which a cash award was made will be reported in a later issue of THE BENT. A proposal to establish a national Tau Beta Pi World-Wide-Web service on a full-time computer was received for study.

Headquarters Visitors

Brian A. Corn, *Virginia Beta '94*, Knoxville, TN; June 1, 1994.
Edward D. Basta, *Ohio Epsilon '82*, Chesterland, OH; June 2, 1994.
Robert O. Barr Jr., *Michigan Gamma '61*, Okemos, MI; June 2, 1994.
Molly K. Brennan, *Michigan Alpha '82*, Farmington Hills, MI; June 2, 1994.
Richard W. Mead, *Colorado Gamma '63*, Albuquerque, NM; June 3, 1994.
Thomas A. Pinkham IV, *Massachusetts Epsilon '88*, Rochester, NY; June 3, 1994.
Edward J. D'Avignon, *New York Beta '88*, Kingston, NY; June 3, 1994.
Deanna M. Chin, *California Kappa '90*, Camarillo, CA; June 4, 1994.
Michael W. Raschke, *Illinois Alpha '89*, San Antonio, TX; June 4, 1994.
Russell W. Pierce, *Washington Alpha '70*, Cocoa Beach, FL; June 4, 1994.
Ames C. Hwang, *Texas Beta '88*, Potomac, MD; June 4, 1994.
Michael L. Peterson, *Iowa Alpha '89*, Clinton Township, MI; June 4, 1994.
Richard A. Poppke, *North Dakota Beta '88*, Maplewood, MN; June 4, 1994.
Katrina Little, Chicago, IL; June 6, 1994.
Edward D. Basta Jr., Chesterland, OH; August 12, 1994.
Edward D. Basta, *Ohio Epsilon '82*, Chesterland, OH; August 12, 1994.
James T. Price, *South Carolina Alpha '49*, Norris, TN; November 10, 1994.