2008

INSIDE THE USPTO: A GUIDE TO THE PATENTING PROCESS

CARLOS VILLAMAR AND CHETAN SHARMA

Carlos Villamar, Partner, The Villamar Firm PLLC
(703) 623-4122. crvillamar@villamars.com. Washington DC.

Chetan Sharma, President, Chetan Sharma Consulting
(425) 657-0555. chetan@chetansharma.com. Seattle.

Table of Contents

 © Copyright 2008. All Rights Reserved.

Abstract

Patents are a key corporate asset that can give the inventor and the company an invaluable tool to protect and commercialize inventions. The process of obtaining a patent is an important one – from *start to finish*. Beginning with patent strategy, due-diligence and patent search through the United States Patent Office (USPTO) process to finally getting the grant, one needs to have a good understanding of each step. This increases the probability of success by removing uncertainty from the process. ***Inside the USPTO: A guide to the patenting process*** takes a detailed look at the ideation and the patent process, specifically, how patent applications flow through the USPTO. By having a good grasp of the intermediate steps and the various decision points associated with each of them, the paper discusses how entrepreneurs and inventors can maximize their chances of securing a patent.

 © Copyright 2008. All Rights Reserved.

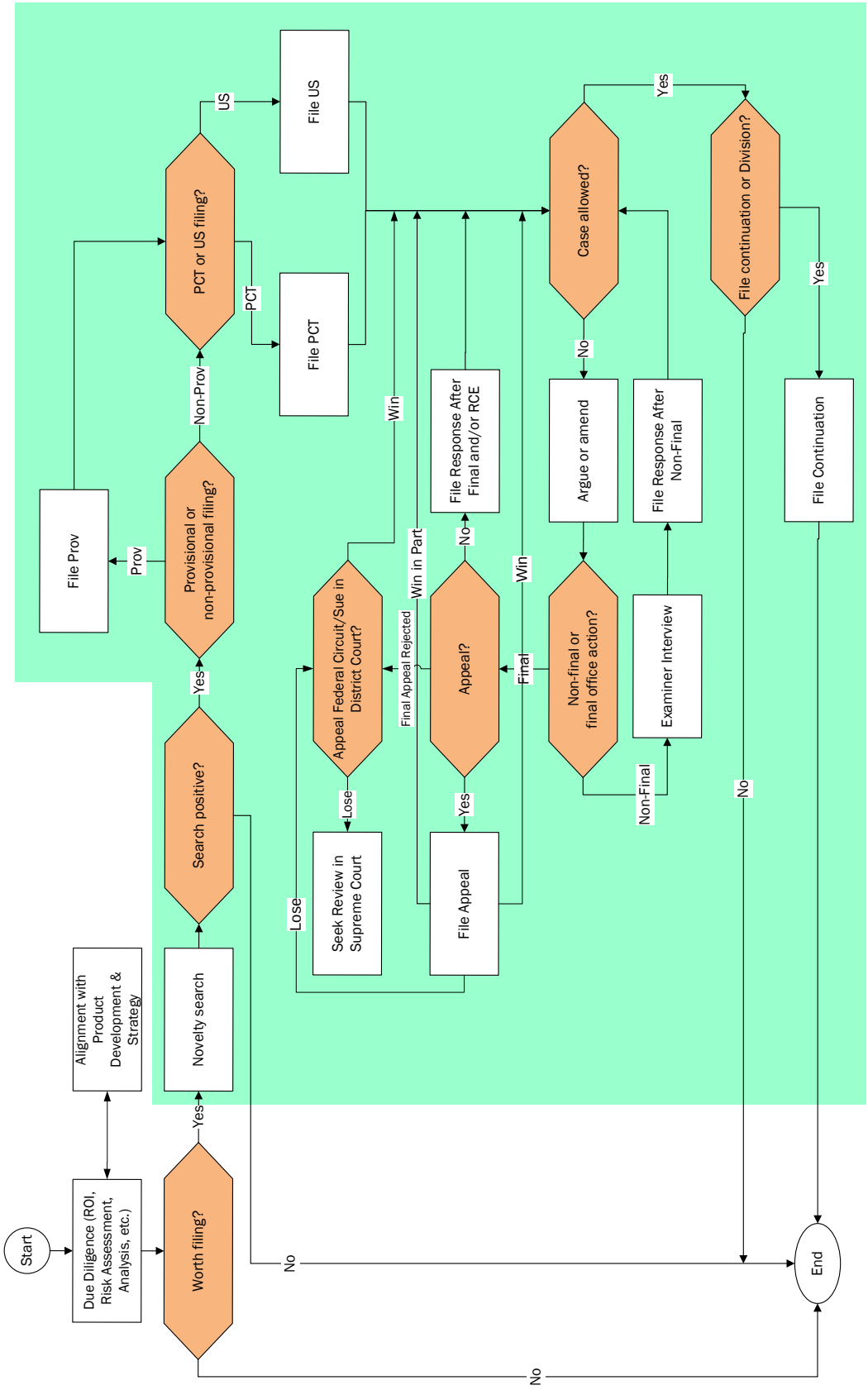
Introduction

We live in a knowledge economy and Intellectual Property is a key asset in this new ecosystem. Patents are one of the essential elements to creating barriers to entry for rivals, building credibility and confidence of investors, customers, partners, and employees, providing clarity as to the property ownership, demanding leverage from the industry, and for generating revenue from licensing and sale.

The knowledge economy thrives and sustains itself on ideas and competitive advantage based on intellectual property. For individuals, the prestige associated with being an innovator and "first to secure" patents in a given field motivates them to be creative and innovative. Entrepreneurs, engineers, and inventors can benefit from understanding how to secure and maintain their intellectual property rights. This paper discusses the important steps in designing, filing, procuring, and defending your patent rights.

The following diagram illustrates at a high-level the patenting process and important considerations in the decision flow chart. The flow chart is discussed in detail in the subsequent sections.

 © Copyright 2008. All Rights Reserved.



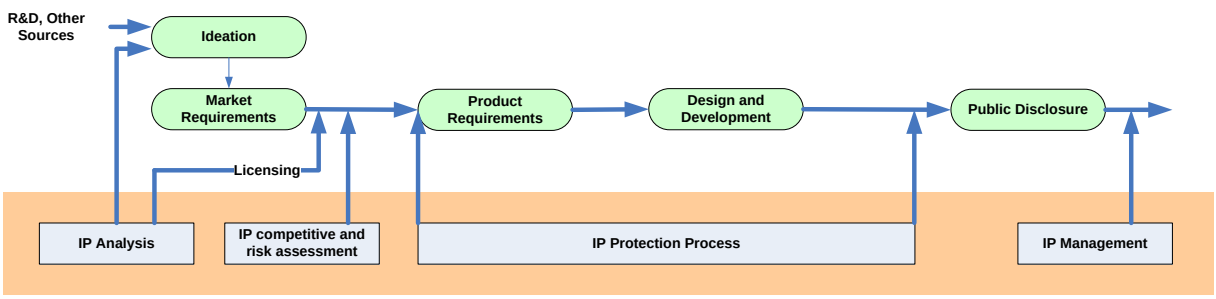
Inside the USPTO: Patent Strategy and Prosecution Flow Chart

 © Copyright 2008. All Rights Reserved.

Pre filing due diligence

IP strategy should closely align with the product development and management cycles (see figure below). Timing is crucial in filing patent applications and making public disclosures or else one can lose patent rights. Product managers and key engineers should identify patentable technologies or business methods early in the process. This way, by the time public disclosures happen, applications are already on file with the USPTO. *At other times, it is strategically important not to disclose inventions and wait until the market develops that can take advantage of such inventions. In addition, a public disclosure or offer for sale of an invention can lead to loss of rights in most foreign countries.*

Similarly, it is generally better to have a mediocre patent having great market traction vs. a great patent having little to no market traction, for in the case of the latter, even though a good patent represents a superior invention; the low commercial value negates any value it might have in the broader market. Therefore, one has to always look at the potential and the addressable market when determining whether or not to file for a patent. This analysis helps in licensing and sale of the technology further down the road. Senior management of public companies have fiduciary responsibilities to manage their IP (and hence their assets) well and in line with the strategic objectives for the company.



IP driven Product Development Cycle

Only by looking at the patent program in its entirety and by having a good grasp of the quality of patents (the scope of protection provided by "claims" recited in the patent) in the portfolio and their standing in the industry, can a realistic assessment of the Patent Portfolio Quotient (PPQ)[1] be made. This analysis has direct implications on the net-worth of any organization. IP competitive assessment needs to happen throughout the design and the development process in parallel with the IP protection process. Usually, you do not have all the information to assess existing IP until the end of the design and the development process.

[1] What is your Patent Portfolio Quotient™? Chetan Sharma, 2007. PPQ is a patent portfolio evaluation, analysis, and improvement methodology developed by Chetan Sharma Consulting that looks at multiple variables of the patent portfolio program to assess its quality, value, and areas of improvement.

ROI

Patents should not only be considered as vehicles for protecting valuable technology, but should also be a means to provide a return on such an investment. This concept was driven home in a previous whitepaper, "***What is your Patent Portfolio Quotient?***,"[2] including the concept of filing patents not just for the sake of filing, but rather as a valuable property right that can and *should yield a return*. This is even more important during economic slumps where hard earned dollars cannot be wasted. Accordingly, a first step before filing is considering whether or not a given invention is worthy of patent protection and serves an important business purpose.

Patent protection is an expensive business. One can expect to spend more than $20,000 over the life of an average patent (and more outside of the U.S.). If you consider filing in multiple geographies, costs can mount rapidly. Despite these costs, many companies file patents indiscriminately. While some fortune 500 companies can afford such a strategy, small-to-medium size companies *need* to adhere to a strict ROI-driven patent program. One should use a judicious process to select inventions to seek patent protection vs. a haphazard approach solely based on technical merits. This will give a much better return over the long haul and the valuation of such a patent portfolio will be appreciably higher. *Companies that don't have good patent-to-product and claims-to-product mapping will see their IP strategy and patent portfolio value drop like a rock during subsequent IP events like licensing or litigation*.

Attorney selection

Selection of your legal counsel is critical to establishing a good portfolio. The attorney who will be responsible for helping you with your patent strategy and actual drafting of the patent application should be well versed with the industry as well as the competitive landscape. Only by having the big-picture firmly in mind can someone do justice to your patent application. The attorney will also be responsible for communications with the USPTO for purposes of obtaining the maximum scope of protection available. Hence, it is important to partner with someone who is intimately aware of and well versed in the processes as well as has a history of successfully arguing their clients' cases in front of the patent examiner.

Novelty search

According to the U.S. Supreme Court ruling, utility patents can be sought for pretty much "anything under the sun." The utility patents can cover methods or processes, machines, manufactured articles, compositions of matter and improvements on any of these.

[2] What is your Patent Portfolio Quotient™? Chetan Sharma, Chetan Sharma Consulting, 2007

 © Copyright 2008. All Rights Reserved.

For any "invention" to be patented, it must meet three basic legal requirements:

- It must be useful (no abstract ideas)
- It must be new (not taught by any single prior art reference)
- It must be unobvious (not an obvious modification of a prior art reference nor an obvious combination of two or more prior art references)

As long as an invention actually works, it generally meets the "usefulness" requirement. Inventions meet the "new" requirement if the USPTO cannot find a previous patent or publication or other prior public knowledge that describes or anticipates the invention. If PTO does find prior related patents or publications, it then considers whether the "invention" is considered "obvious." Inventions meet the "unobvious" requirement if no combination of previous patents or publications suggest the invention.

Patent searching is a useful tool in a product development process. It can help determine the novelty of the invention, competitive landscape, licensing needs, and potential licensees and infringers of the technology and inventions, and avoid investing in technology covered by patents of others.

There are two prevailing school-of-thoughts on patent search expenses. Some firms choose to go for the patent search and the related expenses, especially for their key patents and core technologies, while others choose to just file without any or only limited patent search and leave it up to the patent office to discover if there is any prior art and engage with the patent office (and related expense) only at a later date. *Core technologies that are critical to the product roadmaps and to a line-of-business products should be investigated and searched before-hand to eliminate future surprises.*

 © Copyright 2008. All Rights Reserved.

Patent preparation

Once a decision has been made to file a patent application, the patent preparation is a most important step. The application should be prepared in view of prevailing practices and case law, as well as with a view towards future trends in the law and technology. For example, the USPTO recently attempted to pass a substantive rules package that would have drastically changed current patent practice. The USPTO was however enjoined, and will probably not be appealing the decision. *Accordingly, planning a patent preparation strategy in view of current and possible future practice will help mitigate potential pitfalls down the road. Likewise, trends in the industry should be taken into consideration in assessing the scope of protection to seek.*

Inventorship

It is important to get the inventorship of the patent right. Accordingly, time and care should be taken to carefully document which features in a patent application are attributed to each inventor. The patenting process can often take several years and properly determining and documenting inventorship up front is a crucial step in avoiding problems and having a defensible patent down the road.

Broad but detailed disclosure

Inventors often confuse having a lot of detail in a patent disclosure with limiting the invention. If properly written, however, a detailed disclosure can also be written very broadly. For example, a system may send notifications via e-mail and in an attempt to not limit the invention the inventor may simply state that a notification is sent. It may be better, however, to confirm with the inventor that a notification can be sent via e-mail, pager, telephone, fax, (carrier pigeon?), etc., to ensure that the preferred e-mail notification method as well as any equivalents, and design arounds can also be covered by corresponding claims. *In addition, the details that may not seem so important at the time of filing, may be crucial in distinguishing the invention from the prior art to get a patent approved.*

One invention per patent application

Sometimes less is more, and putting too many inventions in a single application can have the undesired effect of actually increasing prosecution costs and potentially running afoul of future rules changes. In addition, one invention per application is also a good strategy for start up companies that are looking to develop a patent portfolio. By focusing the application on a single invention, the features of the invention can be properly flushed out, claimed and pursued, leading to more patents quickly. This strategy also is in line with the way the USPTO is heading with its proposed rule changes, that, if passed, will severely limit applications that include multiple inventions in a single patent application.

 © Copyright 2008. All Rights Reserved.

3 independent and 20 claims total

Along the same lines, filing too many claims also can have the undesired effect of increasing prosecution costs and defocusing the prosecution. Under the current rules, the minimum filing costs are for applications with 3 independent claims (claims to the broadest aspects of the invention) and 20 claims total. By sticking to one invention per application for software and computer related inventions, this is a reasonable strategy to reduce costs and to focus the prosecution.

 © Copyright 2008. All Rights Reserved.

USPTO filing

Directly or via PCT

The US patent laws give inventors one year from the time the invention was first described in a printed publication anywhere in the world, or in use or on sale in the US, to get their patent applications on file. The one year anniversary date of a printed publication describing an invention, or the date on which the invention was sold or offered for sale, is often referred to as the "bar date." It is also possible to file provisional applications that qualify as patent filings. However, if obtaining of protection in other countries is important, the application should be filed as if this one year grace period benefit does not exist, as explained further below.

Provisional applications are never examined and will never mature into a patent. The purpose of a provisional patent is to give the inventor a low cost way of obtaining a year to get a proper patent application on file without risking foreign rights. The non-patent application will be given a filing date that is retroactive to the date on which the provisional application was filed.

Disclosures of an invention that do not start the one year time clock ticking are those disclosures that are under non-disclosure agreement (NDA). If an inventor is interested in obtaining foreign patents, it is important to have the patent on file before any public disclosure of the invention takes place. Most foreign countries, including those in Europe and Japan, have "absolute novelty" requirements. This means that any disclosure of the invention before the filing date may prevent the inventor from obtaining a patent in those countries.

To obtain foreign patents, separate patent applications are filed in each patent office where protection is desired. Alternatively, it is possible to use a regional filing system whereby one application is filed and examined to obtain coverage in multiple countries. Another filing system is called a Patent Cooperation Treaty (PCT) application, which provides a filing date and evaluation of the invention, but which must be converted into a national or regional application between 18 and 30 months after the earliest filing date. Many foreign countries require maintenance fees to be paid for each year that patent application is pending and for each year after foreign patent issues, while the U.S. only requires such fess at 3 intervals after granting of a patent.

Cost and timing considerations

Based on the uncertainties of the searching process, and the number of amendments and drawings that may be required, one can typically expect to spend ***at least $5,000 to $25,000*** *(without the maintenance fees) in obtaining an issued United States Patent.* The following is a basic description of the patent process and breakout of the various expenses that one can expect to incur in obtaining such an issued patent.

 © Copyright 2008. All Rights Reserved.

The costs and fees associated with obtaining a patent in the U.S. are summarized below:

Area	**Typical costs**
Prelim Patentability Search	$1000 - $2500
Prep and filing the patent application	$5000 - $10000 (and more for complex inventions)
Filing fee	$515 - $1030
Prosecuting the patent application	$3000 - $9000
Patent issue phase	$1020 - $1740
Patent maintenance fee (due at 3.5, 7.5, and 11.5 years)	$465 - $930, $1180 - $2360, and $1955 - $3910 respectively
Total	**$14,135 - $31,470**

If one wants to protect the invention outside of the United States, one can expect to expend an additional $20,000 per each foreign country in which protection is sought (and about $50,000 over the life of a Japanese or European patent from filing). In short then, obtaining a patent is a relatively expensive process. Moreover, it is time consuming and generally takes at least between about 24 to 36 months or more for highly active technologies.

A search is typically 3-6 weeks, application preparation is typically 6-8 weeks, prosecution is typically 18-24 months, and the issue process is typically 3-9 months.

Intellectual property assets must be also maintained, and should be subjected to regular consideration of whether protection should be sustained, expanded or terminated. For example, a corporate patent committee may reconsider an invention when an international patent filing becomes due for a previously filed patent application. The committee (or another body) may also be responsible for managing ongoing intellectual property development efforts. When patent maintenance fees become due, an assessment needs be made as to whether the patent remains useful to the company. *The costs for determining the scope of coverage and maintaining patents or other intellectual property should be considered in an intellectual property asset management plan.*

 © Copyright 2008. All Rights Reserved.

USPTO examination

Whether entering the US directly or via the PCT, your application will eventually get examined by the USPTO. Typically, you might receive an "office action" communication from the patent examiner rejecting all of the claims as filed. Sometimes the examiner will indicate that certain claims are approved or will be approved upon further amendment. This is the time to carefully study and consider the cited prior art, the examiner's rationale for rejecting the claims, and any approved subject matter. The first action is typically non-final, meaning that you can amend or add new claims to get around the prior art. This is also your opportunity to get the claims in the best possible form in case an appeal ends up being necessary, because the examiner refused to grant the scope of protection to which the invention is believed to be entitled.

If the claims are amended or the features in the original claims are argued to distinguish over the prior art in an appropriate response, the examiner may approve the case or make a further rejection. Such a rejection could come in the form of another non-final office action, but usually comes in the form of a "final" office action. Once a final office action is issued, your options are limited and your next response must place the case in condition for allowance, for example, by taking any subject matter indicated to be patentable and canceling all rejected claims. If the claims must be further amended and such amendments are considered by the examiner as raising new issues requiring further search and consideration, such amendment will not be entered by the examiner and typically you must file a request for continued examination (RCE) and pay a fee to obtain further consideration of the application by the examiner. Another option is to appeal the examiner's final rejection of the claims. This is why it is important to get the claims in the best possible shape for appeal in response to the non-final office action.

How examiners get credit

In working with the examiners, it is important to understand how examiners get credit for their work.[3] The USPTO system credits examiners with what are known as "counts." An examiner gets a first count for examining an application and issuing a first office action. The examiner receives his second and final count upon abandonment or allowance of the application or if the case goes to appeal. Filing of an RCE also gives the examiner a second count in the current application. Accordingly, understanding this count system can be used in negotiations with examiners. This also explains why examiners are reluctant to issue further non-final office actions, as no counts typically will be received for such an action. However, an experienced patent attorney will know techniques that can be used to require the withdrawal of a premature final rejection and to make it harder for a second office action to be made final in certain circumstances. Thus, knowing that a final rejection was issued prematurely can be used

[3] Carlos Villamar has worked as a patent examiner in the Speech Signal Processing Group of the U.S. Patent Trademark Office.

 © Copyright 2008. All Rights Reserved.

as a negotiating tool, as one can offer to file an RCE if the proposed changes will result in withdrawal of existing rejections.

Focusing the prosecution

As noted above, it may be possible to focus the prosecution by filing one invention per application and with 3 independent and 20 claims total. In addition, focusing the prosecution by limiting the number of issues in a response also can be helpful. For example, rather than arguing every single feature in the amended or original claims, it may be better to argue only the important features that go to the heart of the invention. In this way, the examiner will focus the search and arguments to such features which can help expedite the patent prosecution.

Importance of personal interview

Another way to expedite patent prosecution is to conduct a personal interview with the examiner. Upon receiving a first office action, you can request and be granted an examiner interview as a matter of right. After a final rejection, however, granting of an interview is at the examiner's discretion. The interview can be used to quickly get at the underlying issues that often may not be well communicated in an office action or response. The interview also is a chance to establish a good rapport with the examiner and the examiner's division called an "art unit." Establishing a good rapport is probably one of the best ways to have your applications favorably considered during prosecution. When attending an interview, being thoroughly prepared with respect to both the patent application and the prior art and being reasonable with examiners goes a long way towards obtaining a favorable result. Also, there is no reason to be confrontational and agreeing to disagree sometimes is the only result and in which case there is always the appeal process if needed.

The Request for Continued Examination or RCE

As noted above, if the case is not approved after your two bites at the apple, i.e., your responses to the non-final and final office actions, and an appeal is not a viable option, filing of an RCE can reset the clock and have the examiner issue another non-final office action giving you another two bites at the apple. To ensure that the examiner does not give you a first action final rejection on the RCE, it is important to have the examiner state on the record that the amendments that were not entered in the response after final raised new issues requiring further search and/or consideration.

Appeal if necessary

After focusing the prosecution and doing everything reasonable to get the case allowed, an appeal may be the only option left to obtain a patent. In order to appeal a case, the claims must have been twice rejected, and normally a clear issue or impasse will have been reached. If you can show clear examiner error, a pre-appeal conference can be used to have the case reviewed

 © Copyright 2008. All Rights Reserved.

by additional examiners, with the possible overturning of the rejections and without proceeding with the appeal. Otherwise, an appeal brief must be filed and the examiner may then re-open prosecution or go forward with the appeal by writing an examiner's answer in response to the appeal brief. Sometimes an appeal brief results in the examiner calling you to negotiate an allowance. Otherwise, you should be prepared to have the case heard by the Board of Patent Appeals and Interferences and with the opportunity for you to present oral arguments in front of the Board. The Board may affirm or reverse the examiner in whole or in part, resulting in issuance of the patent or reopening of the examination process.

 © Copyright 2008. All Rights Reserved.

After approval

After the case is approved, due diligence should be performed to ensure that all important features and inventions have been claimed. After a patent is granted, continuation or divisional applications can no longer be filed. Accordingly, prior to issuance is the only time during which continuation or divisional applications can be filed so as to keep a patent application pending. The twenty year patent term from earliest filing date can be a very long term with respect to software and computer related technologies and keeping a patent pending will give you the opportunity to develop further patents during this term and which have coverage that take into account later technological developments.

Continuation or divisional application

A continuation application is an application that is directed to an invention previously claimed in the prior application, while a divisional application is an application that is directed to an invention previously disclosed, but not claimed, in the prior application. A continuation application and a divisional application that is filed voluntarily can be subject to what is known as a double patenting rejection, whereas a divisional application that is based on a requirement by the USPTO to limit the scope of the claims that can be pursued, known as restriction or election requirement, may not subject to such a rejection. *Accordingly, it is important to know when it may be advantageous to add claims to an application, even though they may be withdrawn via a restriction requirement, in order to obtain protection for a desired divisional application.*

Future infringers

As noted above, the twenty year patent term from the earliest filing date can be relatively long term for software and computer related technologies. *As patent infringement is based on the claims as issued in a patent, for important technologies a patent should be kept pending so as to provide an opportunity to patent claims covering activities by infringers that were not around when the first patent has issued or that have designed around the issued claims.* In addition, developing a portfolio of patents covering an important technology provides a great deterrent to infringement, as is it much easier to knock out a single patent during litigation than a whole patent portfolio. However, even if an application is not pending, in limited circumstances it may be possible to have the patent “re-issued” with broadened, modified, and/or additional claims.

Maintenance fees

After successfully obtaining your patent, maintenance fees must be paid to keep your patent in force. The fees are due at 3 ½, 7 ½ and 11 ½ years from the date the U.S. patent is granted and can be paid without a surcharge during a “window-period,” which is the six month period preceding each due date, e.g., 3 years to 3 years and six months. A USPTO fee schedule lists the current maintenance fees.

 © Copyright 2008. All Rights Reserved.

Conclusions and Recommendations

Patents are a critical force for promoting innovation, growth, and competitiveness in a sector, in an industry, and in an economy. To ensure highest ROI and to minimize prosecution expenses, one needs to have a good understanding of how the system works from end-to-end. Only then, can one derive maximum value out of their inventions and patent portfolio. By increasing the quality of patents filed and by tightly coupling the product development process with intellectual property identification, analysis, and protection, one can significantly raise their Patent Portfolio Quotient and thus the shareholder value.

Some of our recommendations to the entrepreneurs and inventors are:

1. Seek professional advice
2. Take a holistic and long-term view of IP planning that is ROI driven
3. File first, publish later. Plan for patent filings and costs
4. Take steps to preserve all one's own IP, not just patents
5. Beware of infringing other's IP
6. Check inventorship on patent applications
7. Be aware of your IP environment (competitors, partners, etc.)
8. Make sure IP program is tightly linked with your product development roadmap
9. Be very diligent in dealing with the USPTO
10. If possible, minimize number of claims and inventions per application to focus the prosecution and in view of future trends in the USPTO
11. Conduct examiner interviews and be reasonable with examiners
12. Appeal if necessary

The patent and IP management process is complex but is necessary to maintain one's competitive edge in the marketplace and to open up the options for licensing revenues. Without a systematic and methodical approach (even for startups), either the chances of securing patents will go down or the costs will go up significantly. To maximize the ROI on intellectual property, one must pay attention to the details – *from start to finish.*

Acknowledgements

Our thanks to David Safran and Michel Gaultier for their assistance with this paper.

 © Copyright 2008. All Rights Reserved.

About Authors

Carlos R. Villamar is a founder of The Villamar Firm PLLC. Mr. Villamar is a patent attorney with broad experience assisting clients with foreign and domestic patent application preparation and prosecution, opinion work, litigation, and IP counseling. Mr. Villamar's expertise covers a wide variety of technologies, including wired, wireless, optical, terrestrial broadcast and satellite communications, neural networks, fuzzy logic and artificial intelligence, encryption, digital signal processing, speech recognition and language understanding, sound and image processing, video processing, medical imaging, video games, on-line gaming, gaming engines, physics engines, 3D graphics, virtual worlds, Digital Rights Management, e-commerce, military technologies, radar, sonar, fighter aircraft, missiles, ground guidance, heads-up displays, computers and architectures, computer networks and security, semiconductors, device manufacturing, nanotechnology, oil and gas exploration, renewable energy, automotive technologies, and electromechanical technologies.

Prior to founding The Villamar Firm, Mr. Villamar gained extensive experience in numerous aspects of intellectual property law as an attorney in large, national general practice and IP boutique law firms and as a patent examiner in the Speech Signal Processing Group of the U.S. Patent Trademark Office. As an electrical engineer, Mr. Villamar has over nine years of commercial experience, including production design and testing for the Standard Missile Program at the General Dynamics Corporation Missile Systems Group, high-speed digital logic and computer design for the Advanced Tactical Fighter Program at the Hughes Aircraft Company Radar Systems Group, and IR&D and design of high-speed digital signal processing and communications systems at the Hughes Aircraft Company Advanced Circuits Technology Center.

Mr. Villamar's publications include "Real IP in a virtual world: IP issues arising out of virtual characters and scenes in online video games," Intellectual Property and Entertainment Law, International Bar Association Annual Conference, Singapore (2007); "Missing the boat on IP protection," Tech Valley Times, Issue 34 (February 2006); "Legal Issues With Respect To Video Gaming Technologies," Federal Circuit Association Bench and Bar Conference (June 2005); Tadayon and Villamar, "Business Methods Patent Prosecution and Strategies," Business Methods Partnership Meeting (May 2005); and Chit-Sang and Villamar, "Performance of a Backpropagation Neural Network in Diagnostic Rhyme Test Word Recognition," The Society for Computer Simulation International, Vol. 70, No. 3 (March 1998, and Master's Thesis 1992).

Mr. Villamar is admitted in Virginia, the District of Columbia, the United States Supreme Court, the Court of Appeals for the Fourth Circuit, the Court of Appeals for the Federal Circuit, the Virginia Supreme Court, and the District Court for the Eastern District of Virginia and sits on the Board of Directors of the Federal Circuit Bar Association. Mr. Villamar has JD from the George Washington University, an MSEE from the California State University, Long Beach and BSEE from the California Polytechnic University, Pomona.

Chetan Sharma is President of Chetan Sharma Consulting and is a leading IP strategist in the wireless industry. He has served as an advisor to senior executive management of several Fortune 100 companies in the wireless space. Some of his clients include Alcatel Lucent, AT&T Wireless, BEA, China Mobile, Cincinnati Bell, Disney, HP, KDDI, KTF, Merrill Lynch, NTT DoCoMo, Qualcomm, Reliance Infocomm, Reuters, Samsung, SAP, Sony, Sprint Nextel, and Virgin Mobile.

 © Copyright 2008. All Rights Reserved.

Chetan is an advisor to CEOs and CTOs of some of the leading wireless technology companies on product strategy and IP development, and serves on the advisory board of several companies. He is a sought-after strategist on IP matters in the wireless industry. He has advised clients with some of the biggest patent portfolios in the world and has worked with players across the wireless value chain. He has been retained as an expert witness and advisor for some of the most prominent legal matters in front of the International Trade Commission (ITC) including *Qualcomm vs. Broadcom* and *Ericsson vs. Samsung*.

Chetan is the author of five best-selling books on the mobile industry including the two being released in 2008 – *Mobile Advertising: Supercharge your brand in the exploding wireless market* (John Wiley) and *Wireless Broadband Technology: Conflict and Convergence* (Wiley-IEEE Press). Chetan is interviewed frequently by leading international media publications such as *Time* magazine, *Barron's*, *New York Times, Wall Street Journal, BusinessWeek,* and *GigaOM,* and has appeared on NPR, WBBN, and CNBC as a wireless data technology expert.

He frequently addresses several telecommunications industry trade delegations to the United States, such as executive teams from Japan, Korea, and Finland. He served on the U.S. advisory committee of the Korea-Pacific U.S. States Joint Conference on wireless and multimedia. Chetan has published several articles and industry reports on a wide variety of topics. His books have been adopted in several corporate training programs and university courses at New York University and Graduate School of Tokyo University. Chetan has patents in wireless communications, is regularly invited to speak at conferences worldwide, and is an active member in industry bodies and committees.

Chetan is a senior member of IEEE, IEEE Communications Society, and IEEE Computers Society. Chetan has MSEE from Kansas State University and BSEE from the Indian Institute of Technology, Roorkee.

 © Copyright 2008. All Rights Reserved.