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From: Jason Taylor [mailto:taylor@technologyadvancement.net]

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To: AB94Comments; AB93Comments

Subject: Paper concerning proposed PTO rule changes: An Analysis of a Conversion to an Examination-Optional Patent System in the United States

May 3, 2006

The Honorable Jon W. Dudas
Undersecretary of Commerce
600 Dulany Street
Madison West, Suite 10D44
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Dear Undersecretary Dudas:

I hereby respectfully submit the following preprint paper in response to a request for comments on the recently proposed changes to the patent examination process (71 Fed. Reg. 61 RIN 0651-AB94 and 71 Fed. Reg. 48 RIN 0651-AB93 concerning claims and continuations, respectively). The work described in this preprint was written specifically in response to this request for comments on the proposed changes cited above and the problem of long patent pendencies described and discussed at the "Alexandria Town Hall Meeting on Patent Claims and Continuation Practice" on April 25, 2006. Because this preprint has not yet been accepted for publication, required changes may cause the published version to differ from this copy. Please contact me if you have any questions or desire additional input or clarifications.

Very respectfully,
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TITLE

An Analysis of a Conversion to an Examination-Optional Patent System in the United States

ABSTRACT

An "examination-optional patent system" is a patent system in which the filing fee has been isolated from the examination fee and is optional rather than required for filing. Recently, the United States Patent and Trademark Office solicited input on the potential

viability of an examination-optional patent system for the purpose of reducing long pendencies due to excessive examination backlogs. This paper attempts to analyze the general effects that a specific examination-optional patent system would have on the U.S. patent system if it were adopted today. Historical data are employed in an attempt to determine what the patent applicant behavior would be in aggregate form for this specific system. For simplicity, it was assumed that all applicants file only for anticipated financial gain. Results of this analysis suggest, but do not absolutely prove, that the existing patent backlog would be reduced upon adoption of an examination-optional patent system. In particular, it is found that the extent to which the art unit-specific backlogs would be reduced scales in proportion to the amount of the optional examination fee and inversely with the existing pendency. Therefore, it is recommended that if an examination-optional patent system be adopted in the U.S., that the examination fee initially be especially high. A surprising outcome of the study is that such a change would allow the existing examination backlogs to be reduced to approximately zero. Thereafter, examiner workflow slack from overtime flexibility could probably accommodate most transient changes that might occur due to unit-specific applicant filing rate clustering. Once the backlogs have been substantially reduced, a subsequent reduction in the examination fees would be possible without producing a significant rebound in the patent examination queues. It is argued that an art-unit specific increase of starting examiner salaries would help decrease the time for this transition to a zero-backlog system to occur. A subsequent reduction in both the effective filing fees and pendencies are eventually likely to cause an increase in the number of applications. This increase would in turn increase the utility of the unexamined application library for use as prior art in the examination process. The effect that shortening the "secrecy window" during which time unexamined applications are not publicly accessible might have upon the technology sector is also discussed. Implementation of an examination-option patent system in the U.S. would probably enable a higher patent quality threshold to be met, decrease the total money expended examining patents, and increase the usefulness of the patent system towards spurring research that ultimately results in new job creation.

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POTENTIAL CONFLICTS OF INTEREST DISCLOSURE

The employer of the author of this study is a small entity under 37 CFR 1.27(c) and a patent applicant.

INTRODUCTION

This paper is being submitted in response to the recent request by the Patent and Trademark Office (PTO) to solicit input from the intellectual property community for comments and suggestions on how the existing, very long patent pendencies and application backlogs might be reduced. Several solutions to the patent pendency problem have been suggested by others including the PTO. These include, for instance, restrictions on the number of claims that are reviewed and the number of allowable continuation patent applications. Oral comments have already been presented at PTO Town Hall Meetings held for this purpose. Written comments are requested by May 3, 2006.

Patent pendency is defined as the time elapsed from filing until either issuance or abandonment. Due to the large examination backlogs, the bulk of this time is typically the time to first action, a smaller subset of the patent pendency. In this paper, we will concern ourselves with the examination queue time. This is the time to first action minus the mean time taken by the PTO to complete the first action once a review has been initiated by an examiner. For the sake of brevity, in this document the word "pendency" is often used in place of the phrase "examination queue time" despite the fact that they are different.

In 2005 average patent pendencies in the U.S. varied between about 1.2 to 2.7 years, depending on the technology center. Within specific art units even much longer pendencies are possible. The purpose of the patent system is to reward investment in new, potentially useful technologies by allowing the potential financial reward of a temporary monopoly if a marketable product results from such research and development so that its costs can be recovered. Long pendencies largely negate this original purpose. This is partly because they expose a research project to competitors at the very stage when it is arguably the most vulnerable-when it is probably most in debt and before the revenue stream for the new resulting product has become established or high (as compared to its stabilized rate if the market develops and matures). The existing protracted pendencies also increase the risks that face investors of smaller entities. The extent to which this is true is illustrated by the common belief of many technology investors that patents are simply unimportant. Quite simply, they take longer to help produce a return on investment than common investment time horizons or time-to-profitability expectations. If patent pendencies were shortened, risk would be reduced, business cycles would be shortened, and investors could exit questionable projects sooner and at lower net losses. Since research and development (R&D) is closely coupled to new job creation, the overall economy would benefit. The PTO's initiatives to address the pendency problem are, therefore, commendable.

Long pendencies are the result of an integrated accumulation over several years of an imbalance between the rate at which patent applications can be examined and the rate at which they are filed. The existing problem of the long patent backlogs can be broken down into two separate components. On the one hand, there are the slowly growing backlogs of old patent applications. On the other hand, there are their derivatives: the imbalances between the mean filing rates in particular art units and the rates at which they can be examined. This problem may be, therefore, analogous to a boat that has been

slowly leaking for a while. Both the leak must be fixed and the water removed. Moreover, until the water is removed, it might be difficult to fix the leak. These two necessary actions are somewhat distinct and could even require different sets of tools. For this reason, in this work these two problems are initially analyzed separately.

In this paper specific comments are first made concerning the proposed changes for attacking the pendency problem. The patent filing to examining rate imbalance is then discussed. A particular examine-optional patent system is analyzed in terms of what would happen to the patent examination queues under the condition that the existing backlogs were somehow reset to zero. It is then shown that this system could possibly solve not only the pendency problem, but also several other problems with the existing patent system. The effect of having a high examination fee on the backlog examination queues is then discussed. The effects of reducing the 18-month-long secrecy window are discussed. Finally, the potential impact the system would have on some of the various intellectual property stakeholders is considered.

COMMENTS ON THE PROPOSED SOLUTIONS TO THE PATENT PENDENCY PROBLEM

One proposal for attacking the backlog is placing special distinctions between representative claims and other claims, effectively limiting the number of reviewed claims per application. Many comments about this proposal have been made. The arguments that applicants require more than a few independent claims are, in my opinion, reminiscent of arguments a rookie freelance writer might provide concerning their discovery of established word or page limits. Books, magazines, newspapers, and scientific papers all have very tight length limits. Experienced editors and writers are ruthless at cutting out excessive text. Readers everywhere should be indebted to them. There is no reason patents should be completely exempt. The question is, in my opinion, how these limits should best be established.

Some of the comments concerning the proposed changes, such as those from the Office of Advocacy of the U.S. Small Business Administration, fail, in my opinion, to clearly distinguish between independent and dependent claims in their analysis. The distinction is very important because dependent claims take relatively little time to examine once the dependent claims have been examined. I would argue that a main purpose of dependent claims is not so much as to claim anything new, but, rather, to help make clear to a potential reader what the applicant feels is a *more tangible application* of the technology. Such clarifications, especially from the maximally vague and generally aggressive patent attorneys, should not, in my opinion, be penalized. Doing so would increase the costs of patent litigation and increase confusion by the examiners (who might sometimes read a dependent claim just to help understand a particularly vague independent claim). Curtailing dependent claims would be of little benefit to most of the parties involved, with the possible exception that excessive dependent claims increase page counts somewhat. Since most searches are now done online, even this sole argument in favor of curtailing dependent claims is flawed.

I am, however, in favor of a higher fee for independent claims beyond three. Instead of \$200 per claim for a large entity, a \$300 fee per independent claim beyond three per application would probably automatically cause most attorneys to split up applications which would otherwise have five or more independent claims into smaller, more concise applications which are cheaper to file and easier (i.e., quicker) to review, comprehend, and examine. Forcing applicants onto an obstacle course of specifying which claims are the genuine, "representative" ones would, in my opinion, add slightly to the paperwork burden and make an already complex task (prosecuting an application) even more complex. It is not an elegant solution, especially as compared to increasing the examination fees and examiner starting salaries or implementing the system I subsequently analyze in this paper. Increasing the independent claim fees will accomplish the desired outcome without the complexities that would invariably be associated with representative claim declarations.

As mentioned previously, another proposed remedy to the pendency problem is limiting the number of allowable continuations. When I was an examiner going through the shoes, one of the things that initially struck me as quite odd was the fact that most of the patents were apparently actually nearly identical copies (i.e., continuations). They cluttered up the shoes. They are sometimes used to bypass the existing backlogs without having to "go to the back of the line" with a new application or as a means for modifying previously filed claims. I disagree with many of my esteemed colleagues whom are writing you to oppose the suggested limits to continuations. The primary flaw in their logic is that it ignores the fact that decreasing pendency by even a small amount would help innovators (especially small entities) far more than would the proposed limits on continuations hurt them.

Furthermore, from my experience, as already stated, the filers of continuations mostly seemed to be large entities. From my perspective, the continuation applications clog the patent queue with relatively minor improvements. In "Changes to Practice for Continuing Applications" point #1 (The PTO Should Increase the Number of Permissible Continuation Applications), the Office of Advocacy for the U.S. Small Business Administration states that small entities claimed to them that the most valuable inventions are based on continuation applications. This is difficult to reconcile in light of the statistics of who is filing the continuations, but obviously if the applicant knows they have a very valuable patent they are far more likely to pay an attorney who promises to slightly increase their chances of patent protection via the continuation process. In considering the Office of Advocacy's remarks, it is important to realize that they are unlikely to have received as many complaints from small entities that feel the suggested limits on continuations are benign or justified. Therefore, they may unknowingly have a biased perspective. That said, I strongly concur with the Office of Advocacy's point #2 (Consider Increasing the Fees for Additional Continuation Applications); increasing the fees for continuations, perhaps by a factor of 200% may be a balanced compromise that would filter out all but those who desire strongly a continuation. Moreover, it would do so in a fashion that would allow continuations without significantly harming the other regular patent applicants by potentially clogging up and lengthening the overall examination queue.

An additional rather partial solution I proposed orally on April 25 was based on a comment that Jay Thomas had just made. He mentioned Europe's use of the Jepson claim whereby prior art is relatively easily distinguishable from what is being claimed by the applicant. Independent claims written in this form probably take less time to examine since the amount of prior art that must be scanned is much less than claims written in traditional formats. I suggested that it would be too drastic to suddenly require that all claims be Jepson claims in the U.S. Instead, I suggested that we increase the fees for all non-Jepson claims. I stated that would allow a financial incentive to the slow U.S. adoption of this claim, which otherwise would probably not be used. (The reason for this is the belief that Jepson claims offer no advantage and are a slight liability, since they somewhat limit what the applicant might be able to say was actually done by the applicant should a case end up in court.)

Several speakers suggested the obvious solution to the pendency problem: increasing the number of examiners. As I stated orally to John J. Doll, this would probably require increasing their starting salaries. This is partly because salary is arguably the single most important deciding factor to a freshly-graduated engineer who is selecting employment. There is an accelerated promotion program currently in place at the PTO, but the critical issue is it does not apparently alter the starting salary, as far as I am aware. Another salary-related issue is the fact that retention is low at the PTO. This is probably because existing examiners can substantially increase their salaries by leaving the PTO to become patent searchers, agents, or attorneys.^{1[1]} To cover these increases, patent application fees would also need to be increased. But making these changes would still not eliminate all of the issues recently raised concerning patents, such as the overall increasing costs companies pay associated with the patent-related intellectual property or high-profile cases illustrating potential problems with the patent system, such as the recent Blackberry v. NTP cases. Therefore, it may be worthwhile to consider other proposals or models.

THE WASTED ENERGY SPENT EXAMINING WORTHLESS PATENT APPLICATIONS

Most patents end up being worthless. The primary reason for this is simply that they typically represent new (and hence unproven) technologies. The applicants naturally *hope* there will be a demand for their technology, and even that they will eventually get a product manufactured with the technologies they discuss in their applications. Usually, however, even they would admit that the odds are stacked against them. Frampton

^{1[1]} The starting salary of an entry level examiner in 2006 is apparently that of a GS-5 or \$13.25 per hour, though \$15.78 per hour is apparently also possible. The typical rates a patent searcher charge are around \$100 per hour, while patent agents charge between \$150-\$250 per hour. Experienced patent attorneys earn even more. The fiscal rewards for many examiners to leave the PTO is simply too high for high examiner retention.

(2000)²[2] quoted a valuable patent ratio of at most about 15%. Estimates by Allison et al. (2003) suggest that, 94.5%-95.5% of patents will never be licensed.³[3] According to their research, 98.5% of all patents during the time period they retrospectively analyzed were essentially worthless and will never be litigated. Katherine Bouton estimated that "of ten laboratory inventions, only one will receive a patent, only one in ten patents will be licensed by a company, and only one in ten licenses results in more than \$25,000 per year in income."⁴[4] A recent auction of pre-selected active patents conducted by Oceantomo yielded a median price⁵[5] that was only several thousand dollars even before the majority of patents, which were not bid on and did not even sell, are included. These grim statistics are somewhat established. Their exact values are debatable and of course change the more one knows about a particular application. It is, therefore, safe to assume that most potential patent applicants question to varying extents that they will ever succeed in making a single working prototype, let alone its mass manufacture or penetration into entrenched supply chains and existing market shares.

Patents require an enormous amount of capital to draft, prosecute, and examine. This leads one to wonder: what if, somehow, the examiners knew *a priori* which ~95% of patent applications would end being worthless? Let us pretend, for the sake of a having a gedanken experiment, that they never even examined them. What would happen?

In the first place, a tremendous amount of capital and human effort on the part of the examiners the patent prosecutors would perhaps be saved. Clearly, this possibility alone merits the effort of pursuing this gedanken experiment in perhaps some more detail. This is despite that fact that the experiment is clearly impossible: the examiner cannot know *a priori* which of the ~1.5% of patent applications will end up resulting in a valuable patent.

A SPECIFIC EXAMINATION-OPTIONAL PATENT SYSTEM

In light of these points, let us analyze what would happen if an examination-optional patent system were adopted. Examination-optional systems have been proposed before (e.g., Frampton 2000) and some countries, such as Japan, are even using them now.

²[2] Frampton, Ellis, "Method for the Examination of Utility Patent Applications," 2000, PCT application WO0077713, available online at <http://v3.espacenet.com/textdes?DB=EPODOC&IDX=WO0077713&F=0&QPN=WO0077713>.

³[3] Allison, John R., Lemley, Mark A., Moore, Kimberly A. and Trunkey, R. Derek, "Valuable Patents" (July 2003). George Mason Law & Economics Research Paper No. 03-31; UC Berkeley Public Law Research Paper No. 133. Available at SSRN: <http://ssrn.com/abstract=426020>.

⁴[4] Bouton, Katherine, "Academic Research and Big Business: A Delicate Balance," *The New York Times*, Sept. 11, 1983, §6.

⁵[5] The average price was higher. However, this is not relevant to this discussion, since of concern here is the fraction of patents that are worth examining, not the average value of patents.

However, many of previous examination-optional systems have severe shortcomings. These shortcomings will be discussed shortly. Let us first consider what would happen if the following changes were implemented:

1. Patents are not examined until an optional examination fee is paid.
2. This optional examination fee can be paid at any time after the filing date.
3. The optional examination fee is much higher than the filing fee.

As discussed previously, our primary initial questions concern eliminating the growth of the patent backlogs rather than the backlogs themselves. Therefore, in this initial analysis of the above suggested changes, the existing backlog will *temporarily* (and incorrectly) be assumed to be only a week or less.

Under these assumptions, the first proposed change implies that an applicant could, for instance, upon reducing a discovery to practice, file a patent. They could then spend a few years testing their market and/or invention manufacturing methods. Then, if they came upon market success, they could decide to *quickly* obtain any available legal protection provided by their original application from known competitors (as opposed to unknown, anticipated, possible future competitors). The reason such an applicant could *quickly* get the original patent application prosecuted is because, by artificial assumption, the pendency is under one week. Thus, this applicant is not penalized for making a late decision concerning having an application examined.

Let us now additionally consider that the additional examination fee of change 3 is several thousand dollars. (We will later discuss other possible figures in this paper.) Note that this high fee (it is of the order of three times the existing 2006 examination fees) could have two ultimate effects. First, under the desire that the PTO not generate a net profit and that somehow regulations governing examiner salaries could be amended, it should allow an increase in examiner salaries by perhaps as much as ~200%. This would probably allow more examiners to be hired and simultaneously decrease attrition. Obviously, this would help mitigate the pendency problem as well, at least in the long term. Second, proposed change #3 would allow the patent applicants to save an enormous amount of money simply by waiting until after they have a better idea of whether or not a filed application is likely to result in a patent that would ever be licensed or litigated. In particular, certain applicants who become less optimistic or more aware that the average odds they would ever actually benefit from paying the steep examination fee are only of the order of ~5% might opt to wait a while, at least until their projects are more refined. Using historical figures, most (namely ~95%) of such applicants would probably, perhaps within a few years of their filings, eventually realize that their projects will not ever work out. They would, therefore, not ever pay the steep examination fee. Naturally, this would drop the rate at which patents are added to the existing backlogs by the exam/file ratio. Again, historical data is suggestive, though obviously not conclusive in this admittedly flawed analysis, that this decrease could be ~95% (a reduction of about twenty).

The above analysis, however, assumed that all patent applicants are aware of their collective odds and act rationally. This is probably a bad assumption; if it were true, the observed success rates would perhaps be higher. In this work, for simplicity, it will be assumed that only half of the patent applicants would act rationally and would be willing to forgo an examination even when the marketing information suggests they would not profit from owning a patent on their invention. This translates into an adjusted decrease in the filing rate for an examination-optional patent system without a backlog of approximately a factor of ten. This figure will hereafter be adopted when considering the corpus of patent applicants in this patent model. The conclusions resulting from simplification are not a strong function of this number. This is partly due to the fact that most of the changes required for an examination-based patent system are based upon easily adjustable fees rather than the more complex changes in application procedures that have been proposed.

The reduction in examination queue input rates by a factor of ten would completely change the pendency situation. Naturally, under such a patent system, maintaining equilibrium between examination requests and applications examined would be much, much easier. In fact, in contrast to the current situation, the existing workforce might need to be reduced. The time derivative of the number of pending "examination-requested applications" would quickly flip from being positive to negative, as the backlogs were rapidly eliminated.

UNEXAMINED PATENT APPLICATIONS AS PRIOR ART

In the pre-internet era of intellectual property, instantaneous access by any member of the public to records was impossible. This is in stark contrast to the post-internet era, where a website can easily host such records. The difference is especially relevant when one considers the fact that the PTO website could, in theory, serve as a publishing repository for much more prior art. The PTO has already partially taken advantage of this fact by electronically publishing patent applications that are older than 18 months. However, given the drastic impact that the World Wide Web has had upon our world, it is worthwhile to consider if the World Wide Web could be used in a more profound way that might spur the innovative process itself.

In the current patent system, unexamined, rejected, and otherwise abandoned patent applications are used in an interesting way within the PTO—they serve as key sources of prior art. In this examination-optional system, this would become much more so. This is because most (~1/10, according to the number adopted previously) of patent applications would remain unexamined. Thus, most PTO-related prior art would fall into this category. Even if many of these applications have overly broad claims or would otherwise be rejected, this does not significantly alter their use from a prior art searching perspective. The reason for this has to do with the nature of the examination process; the examiner's task is primarily to determine if something invalidates the claim being evaluated. Unexamined applications which would have been rejected normally serve that role just as equally as non-patent-related prior art, such as magazine articles, books, or even WWW blog entries, all of which are potentially valid forms of prior art.

A technical reason that rejectable patent applications can be valid as prior art is because claims are not "conservative." For example, let us consider an applicant, Bob, who discloses and claims a purple square wheel in a patent application. After a few years of hard work and research, Bob decides the market for his wheel is strong enough, and, therefore, decides to file an examination request. He also pays the expensive examination fee, but unfortunately for him his application is rejected. This rejection does not generally then "free up" the patenting of a purple square wheel by someone else, nor does it generally increase scope other previously examined patent claims on wheels. The body of unpatentable prior art is a monotonically increasing function that is nearly indifferent to the validity of various patent claims.

Exceptions to the above analysis include the applications rejected due to non-enabling specifications. Here an applicant claims something they do not properly describe and might not even be able to build. Due to the existence of such invalid claims in the world of prior art, if an R&D team is considering entering into a field of research, it might wish to carefully examine specifications of unexamined applications within its area of art to be able to ascertain the potential likelihood that the patent applications it is reviewing would actually withstand examination. For several reasons, however, this is not a substantial disadvantage over the present system. First, the claims tend to take so much time to properly read that a potentially interested party scanning the prior art would probably prefer normally to read mostly only the specifications in the first place. Moreover, even with the current system, patents can be still be invalidated, disputed in court, and rendered worthless. Thus, potential competitors still need to estimate the probability that a patent application could be invalidated in both the existing and the proposed patent systems. In this respect, the changes required for the examination-optional system simply allow the entire process of deciding who invented what to be drastically more efficient where efforts are expended (on the part of all parties involved, not merely the examiner). Instead of these efforts being spent examining what is essentially a worthless piece of paper, they are more concentrated towards examining paper that would have value. The existing means of challenging patent claims would not be undermined by the changes of this examination-optional system and, therefore, would still be available to entities wishing to dispute a patent. Thus, the examiners, in balancing their error rate with the number of hours expended per examination would still be able to have a human, nonzero error rate without major damages being done to today's innovators. Moreover, due to their focus on the patent applications of interest and the increased fees per executed examination, they would probably be able to do a better job per patent examination than is feasible now. This would enable a higher quality threshold to be met, despite the fact that the total money expended examining patents is decreased and the total number of applications might increase.

A SHORTER SECRECY WINDOW

The scenario that unfolds with these proposed changes, in light of the above discussion, is quite different from the current one. The cost of filing a patent application in the proposed system is somewhat less in the proposed system since the examination fee

would not generally be paid upon filing. The unexamined applications, as with the current system, would become publicly available after a certain time period. Currently, the time period of this "secrecy window" of offering the possibility of a patent in exchange for disclosing new technology to the public is 18 months. However, with this proposed system it may be desirable for it to be less, such as only one month. The effect such a reduction would have upon the innovative process would be rather important. The availability of this prior art to potential filers who conduct prior art searches (which is probably the vast majority of filers) prior to paying an attorney to draft a patent application would probably reduce the problem of patent interference, wherein more than one persons claim (usually in ignorance of the other applications) to be the first inventors. The net effect would be further streamlining of the examination process for the rare applications that actually end up containing valuable technologies.

A further advantage of a shorter secrecy window concerns communication of scientific discovery, which was originally an intended purpose of the patent system. Currently, few scientists use patents as a means for communicating their discoveries to their peers. This is surely in part due to the fact that they are initially invisible to such peers. A forced reduction in the secrecy window by all applicants would be beneficial to other research and development teams, since they would know much sooner when they are pouring money into a technology that could ultimately be patented by someone else.

An ever-present complaint of the existing patent system is the number of expensive, protracted court battles of who was first with a now valuable technology. Part of the reason these legal cases are typically so expensive (and, therefore, difficult to resolve clearly) is because so many years have elapsed since the inventions were originally made. Each side on these cases is already entrenched via their previous investment of substantial capital on developing the technology. The R&D, marketing, and production line duplications that each inventor may have expended, let alone the collective savings of legal fees by the high-tech community make this an important advantage in favor of the three examination-optional changes over the existing system or systems incorporating the changes recently proposed by the PTO.

One can certainly envision a system where 90% of the current "work" now done by patent examiners is effectively replaced by external members of intellectual property community reading the inexpensively published unexamined patent applications on the World Wide Web. Any skilled patent attorney would be able to view this prior art library in order to estimate the likelihood that an applicant's claims would pass an examination, were it paid for. In this fashion, investors would still be able to finance patent-pending entrepreneurs. Their costs would be slightly reduced since they would not need to finance examination fees of patent applications for products which normally will never even be sold.

THE EXISTING BACKLOGS

The above analysis of my proposed changes to the patent system artificially assumed that the backlogs were approximately zero. It should now be clear why this assumption was

made: if the backlogs are nonzero, applicants who opt to wait are shortening the lifespan of any patent they ultimately obtain by an amount equal to the pendency. For many profitable technologies, the market quickly peaks until a new technology, which may or may not be completely distinct from the obsolete one, takes over. In such cases, the opportunity for a return on investment is potentially sacrificed by pushing the patent application date further out, even if the expiration date is also pushed out by an equivalent amount. The prudent applicant with a promising new technology who has already decided to go ahead and finance a patent application would be much more likely to then pay the examination fee in the chance that their speculations about the market for their invention are valid. Thus, unless backlogs are largely eliminated, the proposed changes will not have as much of an effect at reducing the examination of worthless patents. There would still be an important reduction in the accumulation examination queue rate, however, as most inventors are aware of the risks involved and there will always be some willing to save money by opting to wait until their knowledge about their market is better understood before spending additional capital towards patents. The collective behavior of all applicants should be a continuous function not unlike the relationship between supply and demand of an elastic and liquid commodity such that higher examination fees would result in the lower examination-requests-at-filing fractions.

The PTO, under the examination-optional modifications of the examination models I have described, is perhaps similar to that of a bank. The operating capital required for a bank is a decreasing function of the customers' trust in the bank. This is because the ratio of cash reserves to deposit liabilities can be reduced when the costumers trust banks. On the other hand, lack of trust (high chances for a "run on the banks"), increases the operating capital required for the safe operation of a bank. The examination-optional system essentially must operate in its initial situation with a large backlog, much as the first banks probably had to operate with large cash reserves to deposit liability ratios.

I propose that the examination-optional rules be initiated with an examination fee of \$3,000 for large entities, and \$1,500 for small entities. These fees are probably high enough that they would instantly reverse the examination queue backlog accumulation rate from positive (for some art units) to negative. Moreover, within a few years of being in operation, they would become even more popular, since the main reward for paying this fee with initial filing almost completely disappears once the backlogs have been reduced to near zero. Also, by this time, experts in the intellectual property community would be more acclimated to the examination-optional system.

Once the backlogs have been drastically reduced, I propose that the examination fee levels be reevaluated. Lower fees should be possible once the backlogs have been eliminated and the intellectual property community has become comfortable with the notion of examining only applications that appear likely to be licensed, litigated, or otherwise scrutinized. During this time, the availability of overtime-based examinations would allow accommodation of expected spikes in art unit-specific filings that might occur. Specifically, the conditional allowance of overtime with work beyond 40 hours per week only in art units with more than a month long backlog could help reduce the

chance that the backlogs corresponding to pendencies are persistent. However, such a fiscal reward for examiners in art units with persistent backlogs suggest that extra care must be taken to prevent this conditional overtime allowance from being a reward system within an art unit for maintaining backlogs greater than a month. One means of accomplishing this might be to have a bonus system for all examiners within an art unit that has sub-month examination queues. Another might be the elimination of extra pay scales for overtime work.

COMPARISON TO OTHER EXAMINATION-OPTIONAL PATENT SYSTEMS

Previous examination-optional patent systems are in use (e.g., Japanese Patent Office, or JPO) or have been proposed (e.g., Frampton 2000). These systems do not apparently have extremely short examination queues. Therefore, it could be argued that examination-optional systems do not work. However, as stated previously, the JPO is in the "catch-22" situation previously described whereby an applicant who does not yet have a market established for their invention is nevertheless forced to get in the queue in case their optimism proves vindicated. If the U.S. fails to increase examiner starting salary or adopts a moderate examination fee a similar scenario in the U.S. is also possible. This is why the changes in salaries and high examination fees are so critical to the model analyzed.

A second problem with the Japanese Patent System is that it fails to allow an unlimited non-examination window; applicants who failed to finance an examination are penalized if their market matures three years after their filing date, since that is their imposed time limit for how long an application can remain unexamined. This time limit does not exist in the examination-optional patent system described herein. Success of the model analyzed in this paper requires that there not be time limits that force the unsuccessful inventing entity into action in the event that something might happen fortuitously in the future. People are just too optimistic.

The model proposed by Frampton is somewhat similar to the model described and analyzed in this paper. The fact that it has different embodiments makes it slightly harder to compare. One difference concerns the length of the secrecy window. In one embodiment of the Frampton model applicants can apparently buy "secrecy time" by paying to avoid publication of their application. I feel that this would help non-small entities as compared to small entities, since non-small entities would be able to afford this cost. At the same time, it would increase the ability of patent applicants to "submarine" non-small entities. Overall, the bargain one currently makes with the PTO is to disclose one's invention to the world for the right to have a monopoly becomes a question of paying relatively small fees (as compared to the value of a valuable and critical technology or patent). Long secrecy windows would increase expensive duplication by competing companies and not benefit the consumer or the innovators.

These issues aside, the Frampton model should be considered seriously. Incidentally, to fear the royalties associated with using the Frampton model would be pennywise and

pound foolish; that it is written as a patent application effectively has no bearing on the situation at least from an action point of view.

ANTICIPATED REACTIONS TO ANNOUNCEMENT OF CHANGING TO AN EXAMINATION-OPTION SYSTEM

If the USPTO adopts an examination-option system, many members of the intellectual property community will be affected. Many such members stand to lose business from such a change. Since the long-term number of patent applications that would be reviewed would decrease by approximately a factor of ten, the number of required examiners would only be a fraction of what is required today. Thus, the long-term wages (as opposed to the short-term increases that are part of the model analyzed to combat the backlogs) could be decreased, if necessary. This is not in the long-term patent examiners' interests. Their interests are not critically important, in my opinion, for two reasons. First, the patent system was not designed for the benefit of the examiners. Second, they already have numerous lucrative alternative career options available, which, ironically is part of the reason we have the existing backlogs.

Roughly a third to a half of the legal expense associated with prosecuting a patent application is not associated with the drafting of it, but, rather, with the prosecution of it. The proposed changes would reduce this "follow-up revenue source" for patent agents and attorneys by a factor of ~10 in the long term. This would, roughly, result in a change in legal patent-related workload by a factor of ~ . This is a decrease of about 30% in billable hours. All things being equal, it translates into a rather sharp decrease in their billable hours and incomes. One might argue that such a strong decrease in legal workload would result in a decrease in hourly rates as firms scrambled to keep their patent attorneys and agents working. Therefore, the decrease in their billable hours might correspond to more than a 30% decrease in revenue. It is difficult to understate that for this reason, any comments from the legal community about these proposed changes must *a priori* take this into consideration. That said, in a recent list of 142 different engineering occupations, patent attorneys commanded the highest non-medical average salary.^{6[6]} Extreme prices sometimes indicate extreme demand, risk, problems, or transient abnormalities. Therefore, decreasing this demand could be desirable for society as a whole, even if it might suppress wages within the legal community somewhat.

Moreover, the issue is probably not as important as it might at first appear. This is partly due to the fact that nearly all applications in the examination-option patent system

^{6[6]} According to http://viterbi.usc.edu/pdfs/unstructured/students/Pre_college/description.xls as of May 2, 2006. Also of interest is that the various listed starting salaries varied by 340%, depending highly upon the specific engineering field. In contrast, examiners apparently have a starting salary that is independent of their field. It is, therefore, no surprise that art units with the longer backlogs correlate to engineering fields with the higher salaries.

become cheaper to file. The costs would drop for ~90% of applicants due to the lack of search fees, lack of exam fees, and, lastly, lack of prosecution fees. These net reductions in fees due to these the three changes of the model that was analyzed depend on drafting costs, and, therefore, are difficult to pinpoint. My rough estimate yields a total filing cost reduction of approximately 50% per application *including* the costs for the 10% that are fully examined and prosecuted. The decrease in filing costs would probably only bolster the demand for patents; funds ordinarily spent towards examining patents could be reinvested towards patenting other technologies that would otherwise be ignored, kept as trade secrets, or otherwise freely disclosed to the public as not being worth the costs of patent protection. Thus the patent attorneys might not object as much as one might originally think, provided they are willing, on average, to do more drafting and less prosecuting.

There have been many proposed changes to the patent system. Two recent examples are H.R. 2795 (Patent Reform Act of 2005) and H.R. 5096 (Patents Depend on Quality Act of 2006). Part of the reason that there has been so much disagreement about these changes is that many, if not most, of the proposed changes appear to help some types of entities while hurting others. Weakening injunctive relief, for instance, would likely help non-small entities and reduce the upside potential of small patent-bearing entities.

In contrast, most of the changes discussed in this work do not appear to favor significantly specific types of patent applicants. The examination-optional system simply reduces wasted efforts, something that is of interest to most patent-applying entities. This is similar to drilling for oil only in places with anticipated deposits instead of uniformly. Moreover, it does so without substantially new paperwork. Most of the changes to create the examination-optional system that was analyzed merely consist of adjustments to the fee schedule.

This is not to say that interest groups would not be opposed to the changes discussed in this paper. For instance, fortune-100 entities that compete with small entities on the innovation front probably enjoy the current long pendencies because it translates to fewer profitable startups, less competition from small entities, and a lower chance that a technology they "need" in one of their products was invented by one of the smaller startups that might otherwise have difficulty in a patent-free or long pendency patent system. However, for the most part, the parties that potentially stand to lose out by the examination-optional patent system described in this paper are not the ones promised protection in Article I, Section 8 of the U.S. Constitution. Investors in high-technology companies, entrepreneurs, PTO upper management, pharmaceutical manufacturers, and the software industry all stand in many ways to benefit from changes. The shortened secrecy window, if it is also adopted, would help decrease some of the uncertainty currently within the fortune-100 community concerning "submarine patents," "patent trolls," and so forth. This is because it requires faster public disclosure for entities wishing to obtain a patent, thereby decreasing risk that two diligent parties would unknowingly perform duplicate research or engineering. Essentially, entities would know more accurately what their risks are. Business cycles would probably shorten, and

investors would not have to wait as long to get a return on investment (since the backlogs are only nonzero in the transition period).

SUMMARY AND SPECIFIC RECOMMENDATIONS

The USPTO is to be commended for finally taking stronger initiative to combat the pendency problem that is currently scarring technological progression. The existing pendencies and backlogs are too long. Ramifications of an examination-optional patent system suggest that pendencies can that be minimized as upon the simple modification of certain fees. It was argued that such a system would drastically reduce the overall costs of supporting the patent-based reward for research and development. It should allow increases in the number of filings, decreases the mean cost per application in the long run, and decreases in the costs of litigating patents.

A critical requirement for the success of the system is the elimination of the patent backlogs. A temporary transition period in which the examination fees are temporarily very high and the starting examination salaries are elevated would decrease the time required for the examination-optional patent system to be fully implemented. The changes of the model described in this paper to eliminating backlogs, reduce patent costs, and streamline the patent system do not require unusual rules or forms. The applicants need not label each claim as representative or non-representative. Most of the changes would be made via the simple changing of some numbers representing the fees: temporarily increasing the examination fee, increasing the filing fee for continuation applications, and increasing the costs for independent claims beyond three, etc. These are simple, elegant changes that are likely to be free of strong and fair-minded opposition, yet they could streamline the patent system and renew the innovative spirit of this great country.

The proposed changes in 71 Fed. Reg. 61 and 71 Fed. Reg. 48 do not clearly include the examination-optional changes analyzed in this paper. Rather, the specific solicitation for comments on an examination-optional system were made rather late in the process orally at one of the April 2006 Town Hall meetings. For this reason, the PTO might consider adding another feedback proposal/comment cycle before implementing any changes. This would allow more specific and detailed feedback from the intellectual property community concerning the transition to an examination-option patent system.

This paper suggests that switching to an examination-optional system would be more effective and easier to implement and subsequently fine tune than most of the other proposed changes designed to attack the pendency problem. The question perhaps becomes not whether the PTO should adopt an examination-optional patent system. Rather, the question perhaps becomes, "What specific kind of examination-optional patent should be adopted?" One with a secrecy window of 18 months or 6 months? One with initial examination fees of \$3,000 per large entity application or \$2,000? How much time would it take to approve any resulting fiscal surpluses to be allocated towards increasing art-unit-specific examiner starting salaries or pay grades? These are the questions that should now be addressed.

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