Chapter 1

Patent Law and Examination as Context for Patent Searching

"If nature has made any one thing less susceptible than all others of exclusive property, it is the action of the thinking power called an idea, which an individual may exclusively possess as long as he keeps it to himself; but the moment it is divulged, it forces itself into the possession of every one, and the receiver cannot dispossess himself of it."

—Thomas Jefferson, Letter to Isaac McPherson, Monticello, August 13, 1813

In hindsight, the third president of the United States and the driving force behind the establishment of America's first patent laws in 1790 was ahead of his time. Jefferson lived when a subject matter like biotechnology was known only vaguely; maybe through a farmer's knowledge of crop rotation, the use of manure, and the need for better soil preparation. Yet, the laws that he helped create still govern the practices of our present-day patent system and are able to encompass far-reaching technologies. Without knowing what the future held for intellectual property (IP), Jefferson crafted patent laws that continue to accommodate the review and prosecution of a myriad of technical subject matters.

During the early years of the U.S. Patent Office, a diligent search was important but not as difficult to carry out as it is now—considering a single cabinet ("shoe") held all of the patents ever granted. The burden of the

search was minimal on an inventor. In the present day, not only is a thorough search a "must" before entering patent prosecution (examination), but multiple searches at different stages in the life of a patent are now necessary. In the midst of our litigious culture, one has to be poised for unexpected miscues during their ideal patent term.

Patent searches before prosecution help improve the defensibility of the future patent, or can dissuade the inventor from prosecuting at all. Your preexamination preparation as an inventor, patent attorney, agent, or searcher will save the patent owner time and money later.

For example, consider spending US$25,000 to prosecute a patent application only to learn from the examiner that the invention lacks simple novelty. Worse, the examiner may not conduct an adequate search and you actually receive a patent that is later held invalid. The costs of that mishap will be enormous. A professional patent search will allow you to "look before you leap."

The many available search types that will be outlined in this text will yield invaluable data for an applicant who wants to increase their chances of earning a profitable return on a corporation's substantial investment.

The U.S. Patent System

Before discussing patent searching, it is first necessary to explain the patent system in the United States today, so that you and other readers can appreciate the challenges inherent in its navigation.

Thomas Jefferson's quote speaks to the uniqueness and idiosyncratic prospect of owning ideas, the building blocks of intellectual property (IP), and the challenges that exist in their maintenance and development.

Intellectual property consists of patents, trademarks, copyrights, and trade secrets. Article I, Section 8 of the United States Constitution empowers Congress to "promote the progress of science and useful arts by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries." Of the three types of intellectual property created by the Constitution, patents offer their inventors the strongest protection and, not surprisingly, present the highest hurdles to overcome in their application process.

To receive a patent, the inventor enters into a *quid pro quo* with the United States government or any other government where a patent is

sought. In exchange for the exclusive right to manufacture, sell, and use his invention, the inventor provides to the public a full, enabling description of how to make and use the invention.

The Benefits of Patent Protection

Governments expect that with new, patented information in the public domain, more scientists will be encouraged to innovate with knowledge of these technological and scientific advancements. This fact may be counter-intuitive at first. You might argue that the public would actually benefit more if the inventor published their findings and shared their knowledge through the literary community. After all, the process would take less time and it is free. However, considering for example the patenting that occurs in biotechnology and the patenting of drug formulations, a company needs some assurance that they will have the exclusive right to a technology before they will invest millions in its development. Only a patent can give them this right.

In the United States, a pharmaceutical company has to invest heavily in initial research and development and subsequent testing and approval processes as required by the U.S. Food and Drug Administration (FDA).[1] This substantial investment provides reasonable assurance of a profit—in the form of patent protection—if research and development (R&D) is successful. The high cost of R&D also affects others, including the electronics, automotive, and energy industries. Patents grant them exclusive rights to the technology for limited times to recoup their costs and achieve profits.

A mere disclosure of technology in a publication may not spur commerce, as it does not guarantee any such right and only discloses the researcher's propriety information on which other groups may potentially build. Similarly, other inventions may require a great deal of groundwork or marketing before the invention included in their patent truly becomes accessible to and able to impact a field. In both of these scenarios, a large investment must be made by the patent owner (assignee) to prepare their invention to reach the public. Without having a guarantee for the exclusive right to manufacture, sell, and use a technology, it is highly unlikely that an entity would spend so much time, effort, and resources nurturing their inventions. A time period of exclusive control of patent rights affords

the assignee the opportunity to recoup their research, development, or marketing costs inherent in the process.[2]

There are few assets that are as difficult to protect as IP. Therefore, it should not be a surprise that there are just as few assets in the global marketplace that demand the expertise of such a diverse population of professionals in order for the eventual worth of the technology to be realized. Patents have wide appeal across many fields, from a farmer in need of a genetically modified, insecticide-resistant soybean to a retired engineer who tinkers in his basement workshop, to a venture capitalist seeking a highly profitable investment opportunity—patents influence the choices of individuals in a variety of paradigms.

Readers may find themselves practicing their specialty in a variety of different fields: science, engineering, law, patent searching, or business development, to name a few. With the attention of such an educated and highly specialized group of professionals, obtaining and managing a patent throughout its life must not be an easy process; however, significant gains are expected once an exclusive right to a particular property is received.

The owner of a patent by right is its inventor; however, the inventor usually assigns his rights to his employer (corporation, university, or organization) in his employment contract. Therefore, the assignee has the exclusive right to the particular technology. The patent owner controls the ability to license the patented technology or to exclude others from making, using, or selling it.

Harmonization of Patent Laws

While a U.S. patent is enforceable only within the confines of the United States, there are steps being taken to harmonize the patent systems of the world, so one day many countries might have more uniform patent laws. A harmonized patent system will allow an inventor to receive patent protection in foreign countries more seamlessly. The goal of U.S. legislators is to protect an American patent holder's rights and to facilitate the filing and protection of patents internationally.

The Paris Convention Much progress has been made to accommodate the prospect of such a system. The evolution began in 1885. The Paris Convention was first signed in that year and since has been adopted by

every industrialized nation (except Taiwan). In addition to creating the concept of *priority*, which gives the patent holder up to 21 years of protection in most cases, the Convention afforded new freedoms to inventors of the adopting countries. An inventor from any of the signatory countries may file an application in any other member country within one year of the filing in their home country and receive the benefit of the home country's filing date during examination.

The Patent Cooperation Treaty Then, in 1970, the Patent Cooperation Treaty (PCT) was signed and adopted by 100 countries. This treaty allowed patent offices around the world to share in the burden involved in patent prosecution, such as the search and preliminary examination of an applicant's subject matter.

Trade-Related Intellectual Property Rights (TRIPS) More recently, the World Trade Organization's (WTO's) Trade-Related Intellectual Property Rights (TRIPS) agreement ushered in harmonization efforts, including patent agreements through the General Agreement on Tariffs and Trade (GATT) and North American Free Trade Agreement (NAFTA).

GATT was signed by U.S. President Bill Clinton in 1994 and introduced patent term alterations and the "provisional application" in America. Now U.S. patent filers may benefit from the same one-year increase in patent term as those applicants who had filed a foreign application in other countries. Before its implementation, the U.S. patent term was 17 years from the date of its issuance, subject to the payment of maintenance fees.

Following the agreement, the patent term was changed to 20 years from the date the application was *filed* in the United States, or 20 years from the earliest filed application if the application contains a specific reference to an earlier application filed under 35 U.S.C. 120, 121 or 365(c).[3] The 20 year patent term may also be extended by at most five years to compensate for various delays experienced during the patent's prosecution. The change to a 20-year patent term has also greatly reduced the occurrence of submarine patents in the United States.[4]

American Inventors Protection Act of 1999 (AIPA) Most recently, the United States passed the American Inventors Protection Act of 1999. The law requires that any application filed after November 29, 2000, be

published and made publicly available after 18 months of filing an application with the USPTO,[5] except under special circumstances. Each of these acts has brought the U.S. system into closer alignment with the rest of the world.

The Priority Date

The concept of *priority* is fundamentally tied to patentability. The criticality of "filing dates" was mentioned earlier, and the "priority date" is defined by the earliest filing date. It is the date behind which the applicable reference (also known as "prior art") will be found. The priority date is crucial to several types of patent searches.

The U.S. Provisional Application In order for inventors to enjoy the 21-year patent term in the United States, the provisional application was created after the GATT agreement. The inventor would submit the provisional application to the USPTO one year before his formal patent application and, if the patent is granted, obtains a year earlier priority and the possibility for a 21-year patent term. Thus, the provisional application is a placeholder in an applicant's chain of priority. It is never examined and it expires one year from its filing date.

Most importantly, the applicant's "priority date" is the earliest filed application (either in the United States or as a foreign application) that is recognized in the United States as a credible claim to priority (under 35 U.S.C. 120, 121, or 365(c)).

Continuing Applications The continuing application can help preserve a priority date. In the United States, the continuation application, the divisional application, and the continuation-in-part may be filed, depending on your goals with regard to the examination process.[6]

Nonprovisional Applications In the United States, you can file three types of nonprovisional patent applications: utility, design, and plant applications. Each has its own rules governing examination, but all are searched similarly.

Patent offices use a classification system to categorize patents into distinct technologies and to identify the particular claimed field in patent art.

Sometimes, a single invention may be described by multiple classification codes.[7]

The classification code also allows examiners and searchers to quickly narrow a search of the prior art to the particular subject matter of interest.

Sections of a Patent

The granted patent has many sections. At some point you will read each one of these sections to assist you in a search. The following table briefly describes the important sections of a U.S. patent. Many of these items also are printed on non-U.S. patents.

Section	Description
Front Page (The home of bibliographic data)	The front page of a U.S. patent or published patent application contains bibliographic data. This includes patent title, filing date, grant date, the name of each inventor, the patent owner (if disclosed during prosecution), priority data, and the filing dates and numbers of related patent applications. The front page includes the classes and subclasses assigned by the patent office to the document. It includes the list of classes and subclasses that the examiner searched during the prosecution process. Finally, it includes a list of all other patents and nonpatent literature cited by the applicant and the examiner as prior art during prosecution.
Abstract	The abstract provides a brief summary of the invention.
Specification	The specification is a lengthy written description of the underlying invention(s). It provides context for the invention and describes how a person of ordinary skill in the art can make and use the invention without undue burden.
Claims	The claims are most important. They define the scope of protection provided by the patent. The granted patent shows only the claims allowed by the examiner. The larger set of filed claims is accessible from the patent application and located in the official patent file history. In the United States, the claims must be interpreted in light of the specification.[8]
Drawings	The drawings provide details of the claimed invention.

(*continues*)

Section	Description
List of Cited References	Both the applicant and the examiner may cite patent and nonpatent references as prior art. The references cited by the examiner receive an asterisk (*) when printed on the granted patent. The most important references are those "considered" by the examiner and are not indicated on the patent. You would need to read the examiner's office actions located in the official patent file history to find the references that were considered by the examiner.

A Note about Reading the Specification and the Claims Although the specification is lengthy, its content may serve only as a reference for defining the terms that are in the claims. Often, patent applicants attempt to argue limitations of their specification into their claims; however, "although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims."[9] As a result, the wording of a claim and the way in which it is interpreted defines the scope of the invention and is the enforceable part of a patent. Therefore, skill, foresight, and information regarding the state of the art (obtained through a diligent search) should be relied upon by a patent professional before crafting the claims. As the searcher, you should carefully read and interpret the claims when determining whether to cite the patent during the search.

Sections of a Patent File History

Patent offices print only certain data from the examination on a granted patent. When required to conduct a thorough study of the patent, especially prior to a validity opinion, you should consult the official patent file history (see Exhibit 1.1).

The patent file history represents all the correspondence between the patent applicant and the examiner during prosecution. In addition to the material printed on the patent, the file history shows the claims as filed, the claims as prosecuted, arguments for and against patentability, appeals, petitions, references "considered" by the examiner, declarations, administrative papers, and documents specific to a technology (e.g., sequence listings for biotechnology applications). Our research indicates that up to 70 discrete

US006212461B1

(12) **United States Patent**
Ghoneim et al.

(10) **Patent No.: US 6,212,461 B1**
(45) **Date of Patent: Apr. 3, 2001**

(54) **EXTENDED BRAKE SWITCH SOFTWARE FOR VEHICLE STABILITY ENHANCEMENT SYSTEM**

(75) Inventors: **Youssef Ahmed Ghoneim**, Macomb Township, Macomb County; **David Michael Sidlosky**, Huntington Woods, both of MI (US)

(73) Assignees: **General Motors Corporation**, Detroit; **Delphi Technologies Inc.**, Troy, both of MI (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/322,841**

(22) Filed: **May 28, 1999**

(51) **Int. Cl.**[7] **B60T 8/32**
(52) **U.S. Cl.** **701/70**; 303/183; 303/191
(58) **Field of Search** 701/70, 74, 76, 701/34; 303/122.04, 122.05, 177, 183, 191; 180/197

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,480,221	*	1/1996	Morita et al.	303/113.5
5,720,533		2/1998	Pastor et al.	303/147
5,746,486		5/1998	Paul et al.	303/146

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Primary Examiner—Michael J. Zanelli
(74) *Attorney, Agent, or Firm*—George A. Grove

(57) **ABSTRACT**

A process is disclosed for use in a micro-processor managed brake control system that utilizes wheel speed sensors and a brake off/on switch when the system requires information as to whether the vehicle is experiencing hard braking. In accordance with the process, the average deceleration of the undriven wheels is estimated and the slip of each undriven wheel is estimated and the results are compared with predetermined values for these parameters over a suitable test period. At the conclusion of these tests, the data may be used in place of data from a brake pedal position sensor or to confirm the data from such a sensor.

10 Claims, 2 Drawing Sheets

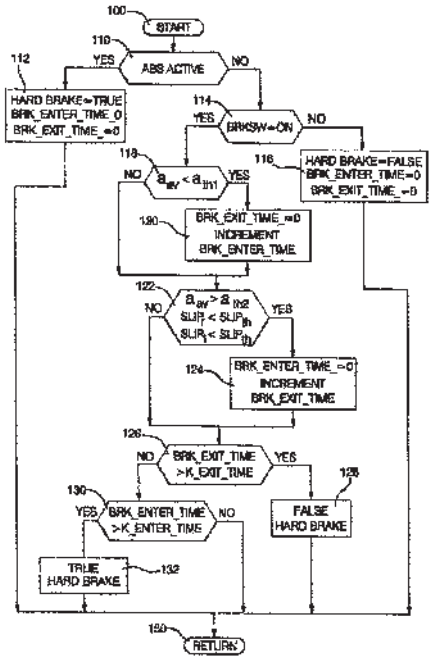
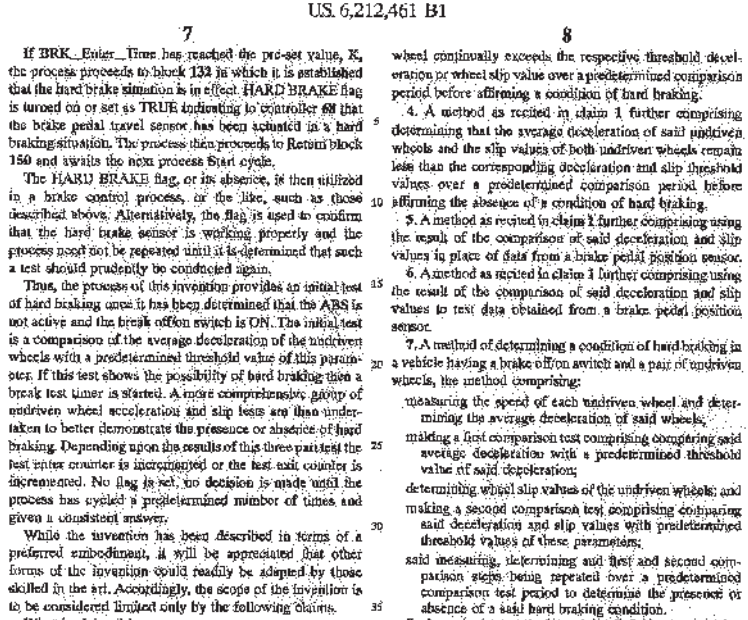


EXHIBIT 1.1 **Example of the Front Page of a U.S. Patent**



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If BRK_Enter_Time has reached the pre-set value, K, the process proceeds to block 132 in which it is established that the hard brake situation is in effect. HARD BRAKE flag is turned on or set as TRUE indicating to controller 68 that the brake pedal travel sensor has been actuated in a hard braking situation. The process then proceeds to Return block 150 and awaits the next process Start cycle.

The HARD BRAKE flag, or its absence, is then utilized in a brake control process, or the like, such as those described above. Alternatively, the flag is used to confirm that the hard brake sensor is working properly and the process need not be repeated until it is determined that such a test should prudently be conducted again.

Thus, the process of this invention provides an initial test of hard braking once it has been determined that the ABS is not active and the break off/on switch is ON. The initial test is a comparison of the average deceleration of the undriven wheels with a predetermined threshold value of this parameter. If this test shows the possibility of hard braking then a break test timer is started. A more comprehensive group of undriven wheel acceleration and slip tests are then undertaken to better demonstrate the pessence or absence of hard braking. Depending upon the results of this three part test the test enter counter is incremented or the test exit counter is incremented. No flag is set, no decision is made until the process has cycled a predetermined number of times and given a consistent answer.

While the invention has been described in terms of a preferred embodiment, it will be appreciated that other forms of the invention could readily be adapted by those skilled in the art. Accordingly, the scope of the invention is to be considered limited only by the following claims.

What is claimed is:

1. A method of determining a condition of hard braking in a vehicle having a brake off/on switch and a pair of undriven wheels, the method comprising:

measuring the speed of each undriven wheel and determining the average deceleration of said wheels;

determining wheel slip values of the undriven wheels and

comparing said deceleration and slip values with predetermined threshold values of these parameters over a predetermined comparison period to determine a said hard braking condition.

2. A method as recited in claim 1 further comprising determining that the position of said off/on brake switch is on as a precondition to measuring said wheel speeds.

3. A method as recited in claim 1 further comprising determining that at least one of (a) the average deceleration of said undriven wheels and (b) a slip value of an undriven

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wheel continually exceeds the respective threshold deceleration or wheel slip value over a predetermined comparison period before affirming a condition of hard braking.

4. A method as recited in claim 1 further comprising determining that the average deceleration of said undriven wheels and the slip values of both undriven wheels remain less than the corresponding deceleration and slip threshold values over a predetermined comparison period before affirming the absence of a condition of hard braking.

5. A method as recited in claim 1 further comprising using the result of the comparison of said deceleration and slip values in place of data from a brake pedal position sensor.

6. A method as recited in claim 1 further comprising using the result of the comparison of said deceleration and slip values to test data obtained from a brake pedal position sensor.

7. A method of determining a condition of hard braking in a vehicle having a brake off/on switch and a pair of undriven wheels, the method comprising:

measuring the speed of each undriven wheel and determining the average deceleration of said wheels;

making a first comparison test comprising comparing said average deceleration with a predetermined threshold value of said deceleration;

determining wheel slip values of the undriven wheels; and

making a second comparison test comprising comparing said deceleration and slip values with predetermined threshold values of these parameters;

said measuring, determining and first and second comparison steps being repeated over a predetermined comparison test period to determine the presence or absence of a said hard braking condition.

8. A method as recited in claim 7 further comprising determining that at least one of (a) the average deceleration of said undriven wheels and (b) a slip value of an undriven wheel continually exceeds the respective threshold deceleration or wheel slip value over a predetermined comparison period before affirming a condition of hard braking.

9. A method as recited in claim 7 further comprising determining that the average deceleration of said undriven wheels and the slip values of both undriven wheels remain less than the corresponding deceleration and slip threshold values over a predetermined comparison period before affirming the absence of a condition of hard braking.

10. A method as recited in claim 7 further comprising using the result of said repeated comparisons in place of data from a brake pedal position sensor.

* * * * *

EXHIBIT 1.2 **Example of Claims**

"papers" or entries can be found in a U.S. patent file history (see Exhibit 1.2).[10]

Look before You Leap: Considerations before Filing

When Christopher Columbus sailed the ocean blue in 1492 he brought only the Niña, the Pinta, and the Santa Maria . . . not more than three ships and 120 men. *Why?*

For one, Columbus was unsure of what he would encounter in his attempt to find a sea passage to India. He and his sponsor, Spain, did not

want to invest all of their resources solely on the hope that he would succeed. The Spanish Monarchy was thrifty by commissioning a "search party" to give them an idea of what to expect. At the outset, there was no way of knowing how he would fare or what obstacles he would face.

After Columbus returned with his "search results," King Ferdinand and Queen Isabella confidently sent more men on more expansive journeys, as they now had understood the "lay of the land" and had fewer variables about which to worry.

Now consider the hypothetical plight of a physician and his ill patient. Upon learning of his illness, the doctor orders a diagnostic "search" of the patient's entire body. He also conducts blood tests. His many searches are intended to rule out possible causes of the patient's illness. When completed, the physician may have located a malignant tumor in the patient's abdomen. He removes it and the patient lives another 20 years without a reoccurrence.

These analogies illustrate the parallel between logical operators of everyday life and those of patent prosecution. Why would you make a haphazard decision if you have the resources to reasonably predict or mitigate the outcome?

Prior to filing a patent application of any kind, in the United States or abroad, you should conduct one or more comprehensive patent searches. If properly executed, the searches will suggest whether to file or not to file the application, will assist with claims construction, and will help predict the issues that will arise during examination.

Prior to prosecution, you should conduct a patentability search. With sufficient time and budget, you also may wish to conduct a state-of-the-art or a patent landscape prior to filing an application. The latter searches provide greater assurance that your efforts are not wasted.

This text describes all the major types of professional patent searches, why they are conducted, when, and how. The discussion begins in Chapter 2.

Patent Examination Process

After conducting the appropriate search, patent applicants now have a better idea of what scope their claims should be and what to avoid claiming, and hopefully will feel confident about their chances to eventually have valuable patents in their portfolios.

The Job of the Patent Examiner

Broadly, patent examiners review patent applications for compliance with legal rules and procedures. Patent laws vary by country. In the United States, the U.S. Congress enacts patent laws, which are first interpreted by the USPTO and then by the federal courts when disputes arise.

The Examiner Follows the Courts The U.S. Court of Appeals for the Federal Circuit (Federal Circuit) is often the final interpreter of major disputes; rarely will a patent case be heard by the U.S. Supreme Court. The Federal Circuit regularly interprets U.S. patent law and continually impacts the way in which patent applications are examined. The process is fluid and never stagnant.

The Examiner Follows Patent Examining Procedure In the United States, patent examiners prosecute applications according the Manual of Patent Examining Procedure (MPEP). The USPTO publishes the MPEP to provide "patent examiners, applicants, attorneys, agents, and representatives of applicants with a reference work on the practices and procedures relative to the prosecution of patent applications before the Patent and Trademark Office."[11] In addition to practices and procedures, the MPEP contains references to U.S. laws and regulations.

Currently, the patent office requires practitioners to follow the fourth edition of the MPEP during prosecution. This is noted as a courtesy to new practitioners because often the USPTO admits individuals to the bar based on an examination of earlier editions. Until October 2006, for example, you needed to know the MPEP 2.0 to pass the patent bar, but you needed to know MPEP 4.0 to practice effectively.

Administrative Handling of the Patent Application The patent process is lengthy, with pendency lasting several years after filing. In the United States, the applicant files the application by mail, hand delivery, or electronically (using EFS-Web). Upon receipt, the Office of Initial Patent Examination (OIPE) scans the document (if filed on paper), assigns an application number, reviews the document for "formalities," classifies the invention, and sends it to the appropriate Technology Center (formerly

Group Art Unit) for examination. After examination and allowability by the examiner, the case is transmitted to the Office of Publication (PUBS), which prints the granted patent. Specifically, PUBS prepares the case for printing, submits the file to a contract printer, publishes notice in the Official Gazette every Tuesday, and mails the patent grant to the applicant.

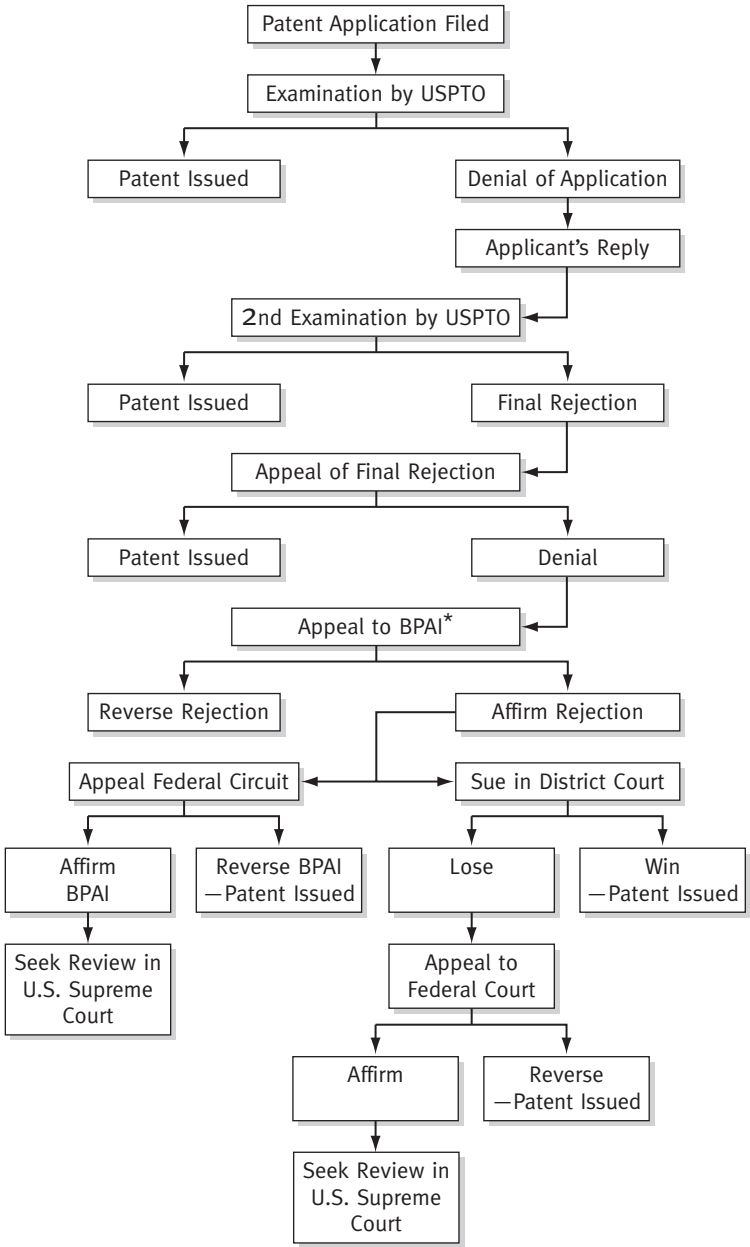
Actual Patent Examination Actual patent examination includes several "rounds" of prosecution. With each round, patent examiners evaluate the most recently amended version of the claims and compare them to the vast body of patent and nonpatent literature. The examiner decides whether the process, machine, method, article of manufacture, or composition of matter being claimed is new, useful, and nonobvious to a person of ordinary skill in that subject matter.[12]

Sometimes, prosecution begins with a restriction requirement[13] limiting the inventor to the prosecution of a single invention. The applicant must elect the invention that will be prosecuted. The first substantive step is when the examiner issues a first action on the merits (FAOM) in the case. This first "office action" may provide the applicant with any number of rejections under 35 U.S.C. 101 *(utility)*, 102 *(novelty)*, 103 *(obviousness)*, and 112 paragraph 1 *(written description, new matter, and enablement)* and paragraph 2 *(indefiniteness)*.[14]

Each office action should lead the applicant closer to allowable subject matter by identifying the remaining issues or flaws in the inventor's application.

Based on our experience with the patent office, most examiners apply mainly art-based rejections and indefiniteness rejections under 35 U.S.C. 112, paragraph 2, in their office actions. This is true, for example, for patent applications that filed in Technology Center 1600 (Biotechnology). Examiners in 1600 regularly issue rejections under 35 U.S.C. 101 *utility*; and 112 paragraph 1, *written description and enablement*.[15] These rejections are made in addition to applying art from the patent and nonpatent literature located during the patentability search (see Exhibit 1.3). The specific steps in the U.S. examination process are illustrated in Exhibit 1.4.

Based on anecdotal statements by examiners, applying these statutes occupies roughly half of an examiner's time, and the search the other half. The examiner relies primarily on 35 U.S.C. 102 (a) (b) (e) and 103 (a) (obviousness) during prosecution.



* Board of Patent Appeals and Interferences

EXHIBIT 1.3 **Prosecution Flow Chart**

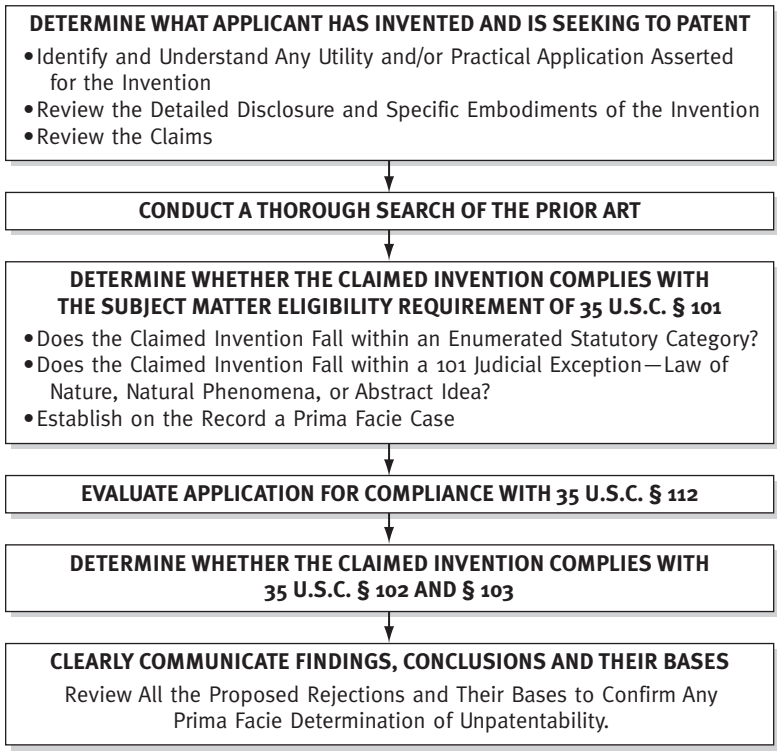


EXHIBIT 1.4 **Examination Process**

The 102 (b) rejection is the strongest, as it represents a statutory bar. If a patent or nonpatent reference exists one year before the applicant's earliest filing date, the rejection under 102 (b) cannot be overcome by an inventor's declaration under 37 CFR § 1.131 or 1.132.

The Examiner Reviews Cited Patents and Nonpatent Publications In the United States, patent applicants have a duty to disclose all known prior art references that would be of material interest to the examiner in their determination of patentability. This is accomplished with the submission of an Information Disclosure Statement (IDS) and Form 1449. In addition to his own search, the examiner reviews the patent and nonpatent literature filed with the IDS for its relevancy. Often, the filing of the IDS is the result of a patentability search by the applicant.

The Examiner Conducts an Inventor Search ("Double-Patenting" Search) Despite its importance, patent office approaches to searching vary greatly by the technology and an examiner's individual preferences and experience. There is no universal process, and most approaches are unstructured. However, the PTO requires examiners to conduct "inventor searches" to identify possible double patenting. Examiners conduct double-patenting searches of pending applications and granted patents.

Double-patenting rejections prohibit the improper extension of a patent term for a single invention. In other words, "the doctrine of double patenting seeks to prevent the unjustified extension of patent exclusivity beyond the term of a patent."[16]

The similarities in patent searching across examiners end with the double-patenting search. The following table shows some of the ways in which their approaches to searches may differ:

Type of Examiner	Usual *But Not Exclusive* Approach to the Search
Mechanical or Electrical	Focus heavily on the drawings and figures that are found in both patent and nonpatent literature.
Business Methods	Give special attention to Internet searches, as many business methods have applicability across fields.
Chemical	Focus heavily on both patent and nonpatent literature searches, but often conduct chemical structure and nucleic acid and protein sequence searches. They may send requests to the USPTO Scientific and Technical Information Center (STIC) where skilled searchers use proprietary databases[17] on their behalf.
Biotechnology	Review post–filing date art to find references that teach the unpredictability (the enablement of 112, paragraph 1) inherently present the biotechnology approach.[18] Further, these examiners rely on prior art for the provision of a "well-established" utility in a U.S.C. 101 sense.[19]

At some point the examiner has reviewed the references found through the patentability search, the double-patenting search, and the applicant's searches (as reflected on the Forms 1449). If it is an international application filed under the PCT, the examiner will also review the search report from the PCT (210) stage.

The Examiner Applies the References The patent examiner will then apply the references against the intended claims of the applicant. He will apply the many patent law statutes and correspond with the applicant's attorney or agent through his written office actions.

Upon review of the examiner's office actions, the applicant may amend his claims in order to put them condition for allowance as prescribed by the examiner throughout the prosecution. He may also abandon the application in favor of continued prosecution, or he may appeal the examiner's opinion with the USPTO Board of Patent Appeals and Interferences (Board of Appeals).

If the Board of Appeals affirms the examiner's rejection, the applicant may appeal the decision to the U.S. Court of Appeals for the Federal Circuit (Federal Circuit). In practice, few applicants appeal either the examiner decision or that of the Board of Appeals.

Instead, the applicant abandons the case and either (1) prosecutes the subject matter in a continuing application or (2) amends the claims in order for the patent to be allowed. If unsatisfied with the protection provided by the granted patent, the applicant may file a continuation and attempt prosecution a second time.

Alternatively, the U.S. Congress has afforded the USPTO a limited role in reconsidering patentability decisions after patents are granted through reissue or reexamination proceedings.[20]

After Patent Grant

Maintenance fees are due on U.S. utility patents at 3.5, 7.5, and 11.5 years after patent grant. The PTO does not remind patent holders of this responsibility, but if unpaid, the patent will expire early.[21]

Also, following the granting of a patent, new possibilities present themselves to the owners of the patent in the form of licensing agreements. As a patent is property, it may be sold, mortgaged, or willed to another, just as any other form of property.

It is not necessary for a patent to be issued before it is licensed. Because of the high bar required for patentability, licensors often stipulate compensation even when a patent does not issue. Sometimes, this is a gamble for licensees. They may reap the first-to-market benefit of being the first to reveal the technology in a marketing effort.

Backlog of Patent Applications

Several patent offices are faced with backlogs of unexamined applications, most notably the United States. Currently, the USPTO reports a backlog of 600,000 patent applications and is grappling with ways to expedite prosecution. The "average patent application pendency is 24.6 months"[22] and far from the PTO goal of 14 months.

In response, the PTO is continually hiring a record number of examiners and executing other measures to improve their situation. Among the other measures is hiring contractors to assist with the searching and examination of PCT searches (PCT/ISA 210 and 237). This began as a PCT Pilot Search program in October 2005. The USPTO later extended the pilot to longer-term contracts with qualified commercial search vendors.

We predict that the PTO will need to make more significant changes in the examination process to handle the backlog. There will continue to be a need for high-quality, professional patent searches in this process.

As more data is added to the public domain and the patent systems of the world become harmonized, the opportunities for profitable patent protection will increase.

Notes

1. It can take years for a potential new drug to advance from an idea to a drug approved by the FDA, and can cost more than $800 million. (PhRMA. *Pharmaceutical Industry Profile* 2004.) There is only a 30 percent chance that an approved drug will produce revenues that match or exceed average research and development costs.
2. Of the patent system's twin purposes, encouraging new inventions and adding knowledge to the public domain, the economic justification is probably the most important rationale. (*The Disclosure Function of the Patent System (or Lack Thereof)*, 118 Harv. L.R. 2007, 2008 (2005)).
3. www.uspto.gov/web/offices/pac/doc/general/nature.htm.
4. "Submarine patent" is used to describe the practice of an applicant by which an originally unclaimed feature becomes a part of a claimed invention as a result of successively filed continuation applications. Literally, the patents undergoing this extended prosecution are submerged from the public within the PTO until the issuance of a patent. Prior to the passage of the AIPA in 1999, the United States did not publish applications until 18 months after filing, and therefore an inventor never had to publicly disclose their subject matter until their patent issued. As a result, a "submarined" patent would avoid being issued until more modern technologies had been incorporated into the application during its extended prosecution. In the end, the incorporation was somewhat anachronistic, considering that the novelty of many added claim limitations did not necessarily predate the application's filing date. As a result, considering the "secret" nature of the changes being made during its prosecution, many infringement suits naturally followed after its issuance. The GATT agreement shifted the financial consequences of a delayed prosecution onto the inventor, and

with the AIPA passage in 1999, 90 percent of all patents filed become published, according to a Federal Trade Commission report (How To Promote Innovation Trough Balancing Competition with Patent Law and Policy (2003); www.ftc.gov/opa/2003/10/cpreport.htm), limiting submarine patents. The most egregious prosecution of submarine patents was performed by the late Jerome H. Lemelson, who holds the top 13 places in American history of the longest patent prosecutions. Recently, many "Lemelson" patents have been ruled "unenforceable" due to the unreasonable and prejudicial delay taking place in their prosecution before the USPTO. (*Symbol*, 2004 WL 161331.)

5. Under 37 CFR 1.213, a nonpublication request can be made if the invention disclosed in an application has not been and will not be the subject of an application filed in another country, or under a multilateral international agreement that requires publication of applications 18 months after filing, the application will not be published under 35 U.S.C. 122(b) and § 1.211 provided:
   (1) A request (nonpublication request) is submitted with the application upon filing;
   (2) The request states in a conspicuous manner that the application is not to be published under 35 U.S.C. 122(b);
   (3) The request contains a certification that the invention disclosed in the application has not been and will not be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication 18 months after filing; and
   (4) The request is signed in compliance with § 1.33(b).
6. See 35 U.S.C 119–121.
7. www.uspto.gov/web/patents/classification.
8. According to Fed. Cir. (CAFC) rulings as of 2006.
9. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). The rampant practice of doing so can be seen in *C.R. Bard, Inc. v. United States Surgical Corp.*, where the court *imported the limitation* "pleated" into a broad claim reciting a surgical mesh plug used for hernia repair, relying heavily in doing so on the "Summary of the Invention" that described a plug having pleats. The court repeatedly referenced the Summary of the Invention throughout the opinion, notwithstanding the fact that 23 narrow claims of the 25 in the patent *did* recite a pleated plug, without even mentioning, let alone reconciling, the "immutable" doctrine of claim differentiation that should have sustained the broad claims." www.patentresources.com/advs06/adv_crfdrf.html.
10. This figure is based on a survey of U.S. patent file histories owned by Landon IP, Inc. as of 2006, numbering over 80,000.
11. www.uspto.gov/main/glossary/index.html.
12. A "useful" item is capable of achieving some identifiable benefit. *Juicy Whip, Inc. v. Orange Bang, Inc.*, 185 F. 3d 1364, 1366 (Fed. Cir. 1999). Novelty and nonobviousness are determined by comparing the invention with "prior art." *Graham v. John Deere Co. of Kan. City*, 383 U.S. 1, 15 (1966); 35 U.S.C.A. §§ 102(a)–(e), 103 (2005).
13. Under the statute 35 U.S.C. 121, the claims of an application may properly be required to be restricted to one of two or more claimed inventions only if they are able to support separate patents and they are either independent (MPEP § 802.01, § 806.06, and § 808.01) or distinct (MPEP § 806.05–§ 806.05(j)).
14. MPEP § 706.02–706.03(x).
15. Under the statute 35 U.S.C. 112, paragraph 1: "The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention." Written Description: "The claims contain subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention." Enablement: "The claims contain subject matter which was not described in the specifica-

tion in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention."

16. "There are generally two types of double patenting rejections. One is the "same invention"–type double patenting rejection based on 35 U.S.C. 101, which states in the singular that an inventor "may obtain a patent." The second is the "nonstatutory-type" double patenting rejection based on a judicially created doctrine grounded in public policy and which is primarily intended to prevent prolongation of the patent term by prohibiting claims in a second patent not patentably distinguishing from claims in a first patent. Nonstatutory double patenting includes rejections based on either a one-way determination of obviousness or a two-way determination of obviousness. Nonstatutory double patenting could include a rejection that is not the usual "obviousness-type" double patenting rejection. This type of double patenting rejection is rare and is limited to the particular facts of the case. *In re Schneller*, 397 F.2d 350, 158 USPQ 210 (CCPA 1968)." www.uspto.gov/web/offices/pac/mpep/documents/0800_804.htm.
17. ABSS (Automated Biotechnology Sequence Search System) Coverage: Current, Full Text: Current Genetic sequence search system. USPTO internal genetic sequence search system composed of commercially available databases such as Genbank/EMBL, Geneseq, PIR, and UniProt. In-house databases (pending applications, issued patents, and published applications (PGPubs)) are also available for interference and prior art purposes. Useful for routine sequence searching as well as specialized searches, including alignments, length-limited, oligomer, and score/length.
18. For instance, if applicant is claiming "a method of diagnosing all types of cancers through the detection of a single nucleotide polymorphism (SNP) in the LSCP gene" and provides no corroborative data, an enablement rejection would be written and would cite the great unpredictability that exists in practicing such a method as portrayed in the post–filing date art. The best reference would teach that many studies have been done to show that SNPs in the LSCP gene are not reliably linked to all cancers.
19. An example of this scenario would be when a polynucleotide of a particular SEQ ID NO: with no specific or substantial utility asserted, has identity to a well-known or established family of biomolecules, the great identity affords it a "well-established utility" under 35 U.S.C. 101.
20. A post-grant review of patent claims under which third parties can request USPTO review takes place only under limited circumstances, including:
    - When a patentee files an application for reissue of a patent under 35 U.S.C. § 251 to correct at least one error in the patent,
    - When an applicant and a patentee claim the same invention and interference is declared pursuant to 35 U.S.C. § 135 between the patentee and the applicant, and the applicant seeks judgment based on the unpatentability of patent claims.
    - When a patent owner or third party requests the reexamination of a patent by means of either ex parte reexamination (35 U.S.C. § 302) or inter partes reexamination (35 U.S.C.§ 311). www.uspto.gov/web/offices/dcom/olia/reports/reexam_report.htm.
21. See 37, Code of Federal Regulations, § 1.366(c).
22. www.uspto.gov/main/faq/index.html.