A PATENT MANAGER’S GUIDE TO A PATENT SEARCH PROJECT

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ABSTRACT OF THE PROJECT

A Patent Manager’s Guide to a Patent Search Project
by
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Master of Arts in Rhetoric and Writing Studies
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This guide describes how to conduct a patent search project. When I worked as a patent manager, I felt the need for a guide that explains how to conduct a search project and explains the kind of documents necessary in conducting the project. This guide describes the project management methods that are absolutely necessary to manage a team search project effectively, and addresses patent related procedures including retrieving and analyzing patents.

The guide focuses on a “freedom to operate” patent search, although it could be used for other types of searches, such as “state-of-the art” searches, “patentability” searches, and “validity” searches. A patent is a right to exclude others from making, using, importing, selling and offering to sell any patented product without proper permission from the owner of the patent. Using the freedom to operate search, a company that manufactures a new product can minimize the risks caused by others’ patents and continue the business of manufacturing products without blocking the product from entering the market.
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CHAPTER 1

FRAMEWORK

When I prepared to complete my M.A. degree, I had two options: write a thesis or prepare a project. The former is rhetorical analysis about certain artifacts, for example, the speeches delivered by public figures, or advertisements that persuade consumers to purchase products or services. The latter results in an artifact used in a professional field, for example, technical manuals on how to use products or conduct research, or business proposals for sales or marketing. In order to choose a project within these fields, I had to look back at myself from the perspective of both my academic and work experience.

During my time at San Diego State University, I studied in the Rhetoric and Writing Studies department which allowed me to learn both rhetoric and professional writing. One of the first things that I learned was the definition of rhetoric. According to the Greek philosopher Aristotle, rhetoric is "the ability, in each particular case, to see the available means of persuasion" (sec. 1.2.1). The means of persuasion basic to rhetorical analysis are called appeals and are divided into three categories – logos, ethos, and pathos. These appeals form the basis for reasoned rhetorical argument which is at the base of all persuasion.

Studying rhetoric and the methods of rhetorical analysis provided an entirely new and fresh experience for me, because I only had an engineering background before participating in this M.A. program in the RWS department. In RWS600, reading and writing rhetorically, instructed by Dr. Glen McClish, I learned basic, theoretical frameworks, such as Aristotle’s three modes of persuasion described above and the Toulmin model of argument which consists of six components: claims, data, warrants, backing, rebuttal, and qualifiers. With these tools, I began to gain a small insight into the logical flow hidden in scholarly, professional, and ordinary texts.

In the RWS 602 class, modern rhetoric and composition studies, instructed by Dr. Ellen Quandahl, I could read a variety of twentieth century writers of rhetorical theory.
Among them Burke and Derrida were especially impressive to me. Moreover, I learned Joseph Harris’ composition theory, which consists of six stages: coming to terms, forwarding, countering, taking an approach, and revising. This helped me understand how to approach writing effectively.

In addition, in the RWS640 class, research methods in rhetoric and writing studies, instructed by Dr. McClish, I studied the nature of rhetorical criticism, which is “a process chosen to communicate in particular ways based on what we have discovered” (Foss, *Rhetorical Criticism* 3) and learned various modes of rhetorical criticism, such as neo-Aristotelian criticism, cluster criticism, pentadic criticism, and narrative criticism. Among these, I selected the neo-Aristotelian method to analyze a commercial film advertising an electronic device. Using this method, I demonstrated how Aristotle’s three appeals are applied in order to attract and persuade consumers to purchase the product.

Furthermore, in Dr. Jennifer Sheppard’s RWS 744 class, I studied visual rhetoric, which is a kind of communication using images made with visual symbols (Foss, "Theory of Visual Rhetoric"). In this class, I learned how to understand rhetoric hidden in visual images, through annotative and connotative messages, and how to make a visual argument. With the knowledge obtained from the class, I analyzed the rhetorical messages embedded in the picture posted in the website of Greenpeace EU. In the picture, a large number of people move a wind turbine, the sky is covered with dark clouds and the bright sun is about to rise. I concluded that the hidden message of the image is to overcome hardship, depicted by a diagonal line formed by the wind turbine, through unified efforts, portrayed by the vertical lines formed by the people in order to gain a bright future, symbolized by the sun. In addition to analyzing a visual image, I made a visual argument in the form of a movie, consisting of various still and moving images, captions, and music, in order to deliver the message that it is time to act to save the earth from global warming.

Professional writing classes also supported my career. The coursework on professional writing, such as RWS 503W and RWS 504 instructed by Dr. Linn Bekins, and RWS 505 instructed by Prof. James Hurley, gave me a chance to understand the principles and practices of professional writing. I learned how to make concise documents, including memos, reports, and proposals. The experience of conducting writing projects with team members, who come from different academic disciplines or backgrounds, gave me a great
opportunity to understand how to communicate among the diverse team members, and I continuously felt that good collaboration is very important in team projects.

By assigning each part of the project to a team member with the proper abilities, the work load for each member was so light that we actually finished the project earlier than expected, and we produced high quality final deliverables from each project. In addition, I learned the various documents needed to conduct a team project:

- **Team charter**
  In this document, each team member describes his or her experiences and skills that are helpful to the project. In addition, they can state their concerns or problems which may have negative effects on the project, such as having to be absent from regular team meetings. Based on the information, each part of the project can be properly assigned to each team member.

- **Project proposal**
  This document includes the details of the project plan, such as the purpose and background of the project, the tasks needed to complete the project, the methods needed to carry out the tasks, the schedule of the project, which can include the detailed due date of each task, the budget necessary for conducting the project, and the deliverables produced after completing the project.

- **Progress report**
  The purpose of this document reports on the progress of the project. As well as the completed tasks and their result, the report may describe the problems which have already happened or are expected to happen in the future work.

- **Usability test plan**
  A usability test is generally conducted to verify the effectiveness of final deliverables and the plan states how to conduct the test. For example, a questionnaire could be provided at the same time the deliverables are evaluated.

- **Usability report**
  This document includes the usability test results, and includes test methodology, test objectives, usability testers, the feedback from the testers, the analysis result of the feedback, and the plan to complement the deliverables based on the results of the analysis.

- **Project report**
  The activities conducted on each stage and the project result could be summarized in this report.

Before coming to SDSU, I worked for three years on a patent search project supporting the Department of Judicial Affairs in patent litigation. During the early stages of the project, our team became confused and overwhelmed; nobody on the team knew how to
proceed because no one on the team had previous work experience on a team project in search patents. We lacked a specific manual, or guidebook, that could help us complete such a comprehensive project efficiently. At that time, I recognized the need for a guide that could train a team in how to manage a patent search project, and explain both the documents and the activities required in the project.

A project management plan is absolutely necessary when conducting a patent search project. To guarantee a successful search, I think it is very important to prepare a comprehensive plan at the initial stage of the project. With a plan that defines the scope of the search, the project team can move forward with confidence. The plan becomes much more important when the project is conducted by a number of team members. The number of team members can range from a few to hundreds of people. Furthermore, they may not be working at the same site; project members may come from different departments or organizations. All project members must share common ground for the project to be successful. This can be achieved by sharing the project plan.

At my company, I worked as a patent manager for 10 years. Patent managers, including me, manage a company’s patent portfolio. They mine inventions mostly from R&D engineers, study the technologies embedded within inventions, evaluate the patentability of inventions, and file patents in patent offices if those inventions are patentable. After filing, patent managers always negotiate the scope of patent claims with patent examiners through a prosecution process in order to issue stronger patents on behalf of their companies. In addition, patent managers assess granted patents according to their value, which allows for the possibility of making claims on other companies to keep them from using the technologies of the patents in their products. By undertaking these management activities, the patent portfolio of a company could be strengthened. An excellent patent portfolio is very important to technology companies because strong patent portfolios help them maintain technological leadership in their industries and mitigate or reduce the risks associated with the infringement of third parties’ patents.

In addition to managing the patent portfolio, patent managers conduct patent searches before their company develops, and launches a new product or a technology into a market. A patent is an exclusive right to exclude any entities from manufacturing, importing, using, offering to sell, or selling the patented product without the permission from the owner or
licenssee of the patent. Patents are granted to patent owners by a government agency, such as the United States Patent and Trademarks Office (USPTO), as a reward for publishing the technology after the agency examines the technology’s patentability. To protect their exclusive rights, the patent owner or licenssee could sue the entities using the patented technology without proper permission. Therefore, patent managers need to determine if any granted patents could potentially block a new product or technology from launching into a market.

Patent managers always study patent laws. They should be well-informed about patent law, although they could be assisted by patent attorneys because patent documents, including a patent’s claims, contain important sections that should be interpreted according to the patent law. Whenever there are amendments to any patent laws, it is natural for patent managers to catch the changes to the law quickly in order to apply them to their jobs and obtain much stronger patents. Under a diligent patent manager, a company can strengthen its patent portfolio, and the individual managers can grow professionally.

As described above, patent managers have various jobs: evaluating patent ideas, filing patent applications, prosecution, patent search, and so on. Among the variety of tasks, I think that a patent search is the patent manager’s most difficult and important assignment. Since the project is usually conducted by a team, I believe that project management skills should be included in any guide to help conduct effective patent searches. Furthermore, because creating a guide for an effective patent search is an ideal application of the knowledge I obtained from the Rhetoric and Writing Studies Masters program, and because I could have benefited from a guide in my professional role as a patent manager, I selected *A Patent Manager’s Guide to a Patent Search Project* as the topic of my Masters thesis project at SDSU.

I will focus primarily on a “freedom-to-operate” search in this guide, although many of the methods may also be used in any of the four main types of patent searches: “state-of-the-art” searches, “patentability” searches, “freedom-to-operate” searches, and “validity” searches (Trippe and Ruthven). These searches serve different purposes:

- State-of-the art search: identifies the prevailing technologies in a specific subject area.
- Patentability search: identifies prior arts to determine whether a patent invention is patentable.
- Freedom-to-operate search: identifies in-force granted patents on which a new product may infringe; this search is conducted when planning to launch a product into markets.
- Validity search: identifies the prior arts allowing a granted patent to be made invalid when a company manufacturing a new product receives a patent claim demanding that the company stop the business activities related to the product.

Among these, the validity search carries the highest risk, because of the amount of monetary investment it takes to follow a technological solution to its end and the continuum of risk in the order of the lowest to the highest is state-of-the-art, patentability, freedom-to-operate, and validity search (Trippe and Ruthven). At the time of the validity search, the company is at the point of spending or has already spent significantly large sums of money in manufacturing the product. When the validity search fails in finding references to invalidate the patents that are used to claim a company stopping its business, the risk is proportional to the sums of money invested in the production of the product. Thus, the freedom-to-operate search should be conducted thoroughly when planning a product. Thorough freedom-to-operate searches can decrease the number of the patents used to make claims and therefore, lower the risk caused by third parties’ patents.

The Neustel Law Offices, whose expertise is filing patent and copyright applications and conducting patent searches, suggests these reasons why the freedom-to-operate search should be conducted and why the infringement issues should be eliminated prior to producing a new product. They point out that poor freedom-to-operate searches (Neustel):

- Are expensive: a patent infringement lawsuit requires extremely large financial outlays and the cost could be $2 ~ $5 million in legal fees alone. Moreover, if a company loses the lawsuit, it must pay damages to the patent owner. The legal fees and the damages could cause a company to become bankrupt.
- Result in injunctions: if a court commands a preliminary injunction early on the new product, the company must stop the manufacturing and sales of the product.
- Can be time consuming: many officers or engineers, who are involved in the product, have to participate in the lawsuit. If there were no lawsuit, the time spent by skilled company personnel on the lawsuit could be invested in more productive activities.
Customers may be sued: the company’s customers may be sued by the patent owner which can be very negative to business relationships. If there is an indemnification clause with the customer, the company must pay for the customer’s legal fees and any damages.

The purpose of filing a patent application is to obtain exclusive rights to a technology; the scope of the rights is bound by the claims. To be granted as a patent, the invention must meet several requirements defined by patent laws. Among them, novelty and non-obviousness requirements are representative.

- Novelty: In order for an invention to be patentable, the invention should be considered as new or novel. If any public disclosure of the invention was made before filing a patent application for the invention, the invention is not patentable.

- Non-obviousness: Although it is novel, an invention must also be a non-obvious improvement over the prior arts. The improvement is determined by comparing the invention to the prior art and making a decision as to whether the difference between the invention and the prior art is obvious to a person with ordinary skills in the field of the invention.

The target audience of a patent document varies. On one hand, the general public could be the primary audience, given the viewpoint that a patent is granted as a reward for publishing a technology in order for the improvement of an industry. On the other hand, a patent office, especially patent examiners, could be the main audience from the perspective of the prosecution because the patent examiners are the first to review the subject matter of the patent document. The patent examiners verify two main requirements of the invention necessary to grant a patent to the patent owner. Therefore, in order for an invention to be patentable, the patent examiners must be persuaded to agree that the invention is patentable.

A patent is a legal document as well as an informative one that provides technical information about an invention. The structure, operation, and composition of the invention are closely described with drawings in order to allow the ordinary person to easily understand the invention. The bibliographical information of a patent is provided in the cover page of the patent document.

The claims written in the patent document describe the scope of a legally enforceable right. With the right, the patent owner could exclude any entity that practices the invention described and claimed in the claims, without proper permission from the patent owner.
Among these elements of the patent document, which ones effectively persuade the patent examiners to consider the invention as patentable? We may find an answer using Aristotle’s three modes of persuasion, or “rhetorical appeals.” Before identifying rhetoric hidden in a patent, it is helpful to study the details of the three modes.

Logos refers to the internal consistency of the message – the clarity of the claim, the logic of its reasoning, and the effectiveness of its supporting evidence. The impact of logos on an audience is sometimes called the argument’s logical appeal. Logos is the logical appeal which supports a rhetor’s arguments in the discourse. Logos underlies the facts and statistics used to back or prove the rhetor’s claims.

In appealing to rationality, a rhetor will draw conclusions based on deductive or inductive reasoning. An example of deductive reasoning is the syllogism or enthymeme. A syllogism is a kind of logical argument that applies deductive reasoning, and arrives at a conclusion based on at least two propositions that are alleged to be true. Aristotle shows that a conclusion can be reached from the combination of a general statement (the major premise) and a specific statement (the minor statement). For instance, from the two kinds of notions that all men are mortal (major premise) and that Socrates is a man (minor premise), we can easily draw the conclusion that Socrates is mortal.

Corbett and Connors suggest that inductive reasoning comes from generalizations in observation. Inductive reasoning, as opposed to deductive reasoning, is reasoning in which the premises seek to supply strong evidence for the truth of the conclusion. While the conclusion of a deductive argument is supposed to be certain, the truth of an inductive argument is supposed to be probable, based on the evidence given. For example, from the evidence that every bird I’ve seen has feathers, we can draw the conclusion that all birds must have feathers. Aristotle found logos to be the most reliable kind of appeal because rational reasoning is closest to the truth, and therefore more persuasive (Root).

Ethos is an appeal to ethics and is a measure to convince people of the character or credibility of the rhetor. Aristotle implied that the speech itself should grant the speaker enough ethical appeal, but he also argued that the speaker’s character in general had an effect on his persuasiveness (Root). This appeal gives character and personality to the message, making it easier for the audience to relate to, trust, or place authority in the figure represented.
Pathos (an appeal to emotions) is based on the fact that people do not react solely on a rational level due to their passions and emotions. The persuasive appeal of pathos is an appeal to an audience’s sense of identity, self-interest, and emotions. Pathos can be found in vivid language, emotional language, and numerous sensory details.

These ideas gave me a basic understanding of rhetoric. The next step is to identify which mode is applied in a patent document.

Pathos is almost never used in the patent document. Because the patent document provides the technical information about the invention and the legal right of the patent owner, there is little room in which pathos could work to evoke the examiner’s emotion.

It is possible that ethos, which relates to the credibility or character of the inventor or applicant, could persuade patent examiners. The inventor should cite various references to support the technologies used in the invention, and these references could help convince the patent examiners that the description of the patent provided by the applicant can be trusted. The references show that the applicant has carefully researched his invention. This shows his good character. In addition, the prior arts described in the background of the patent also could help establish the inventor’s credibility by conveying the impression that the inventor is well-informed in the field of the invention. When filing for a patent, the applicant submits a list of documents disclosing the invention’s peripheral technologies, and this could give the patent examiner a strong impression that the patent applicant is confident about the patentability of the invention and could be used as the prior arts by the patent examiners. However, these references by themselves are not enough to effectively persuade the patent examiners to consider the invention as patentable, because they determine patentability primarily based on prior arts and not on the inventor’s research.

A patent depends principally on logos to persuade patent examiners. Patent claims are the only parts of a patent that can persuade examiners. If the claims in a patent for a new invention establish a clear difference between that new invention and its prior arts, the patent examiners should grant a patent to the new invention. If the patent claims are rejected based on the prior arts which disclose the claims, the patent applicant can amend the patent claims based on the descriptions in the patent’s specification. Then, the patent applicant can provide statements that underscore the differences between the amended patent claims and the prior arts in order to overcome the rejection. When the patent examiners receive the amended
patent claims and the statements, they will reexamine the patentability of the amended patent claims. Through the iteration of these actions, the patent applicant can obtain a granted patent. Only the logical appeals hidden in both the patent claims and the argument can persuade the patent examiners to acknowledge the patentability of an invention.
REFERENCES


WORKS CONSULTED


APPENDIX

A PATENT MANAGER’S GUIDE TO A PATENT
SEARCH PROJECT
INTRODUCTION

This guide will present the methods of conducting a patent search project. Although some readers of this guide may understand the process of searching for patents, having already completed the actual patent searches, they may not fully understand the process of managing the search process. This guide demonstrates the way to effectively manage the search project. If a project is performed by one person, project management skills may not be required. However, if a larger number of people are involved, effective project management skills are absolutely required to assure the success of the patent search. This guide can also be helpful in making a final report that delivers the project results to the clients of the search project.

There are six main chapters in this guide:

1. overview of a patent
2. defining the scope of a search project
3. patent retrieving
4. patent analysis
5. preparing countermeasures
6. reporting project results.

The first chapter addresses the basic characteristics of patents, such as patent types, patentable subject matter, and the structure of a patent document. Particular attention will be paid to the structure of the patent document; patent searchers must understand this structure when they retrieve and analyze a patent.

The second chapter defines the scope of the patent search project, and the preparation necessary before the substantial search project can begin. There will be two sections of this second chapter: a) acquiring the information needed to perform the patent search, such as the goal of the search, the due date, and resources that can be provided for the project, and b) planning the search project, which includes scheduling, distributing human resources, and calculating and reporting the cost of the search project.

The third chapter describes in detail the ways of retrieving patents related to technology. This chapter will also include methods of using a patent database. There are
three subsections in chapter three: a) identifying subject features examined through a patent search, b) defining keywords that describe the technology of each subject feature appropriately, and c) creating a search formula that may be used as the input data for the patent search database.

The fourth chapter will include methods used to analyze retrieved patents and to determine the relevance of each retrieved patent to the targeted technology. Because the “infringement” by a product of a patent is determined in a legal court, “relevance” will be used instead of the legal word “infringement” in this guide. Relevance means the matching levels determined according to the extent which the claims of each retrieved patent cover the targeted technology. The term “core patent” means a patent whose claims cover a product and could be used to file a patent infringement lawsuit. In this guide, the terms “project manager,” “patent manager,” and “patent searcher” are all used to identify the same person, the patent manager. If a search company is hired, the person working at the search company could be the searcher.

The fifth chapter describes several countermeasures for dealing with the core patents. These include:

1) designing around the core patents,

2) evaluating the validity of the core patents,

3) obtaining licenses about the core patents

The final chapter presents the elements included in a final report, which convey the project results to the patent clients.
CHAPTER 1

OVERVIEW OF PATENT

This chapter describes the basic characteristics of patents; understanding these characteristics will help managers understand how patents work, and make this guide more useful.

WHAT IS A PATENT?

A patent for an invention is an exclusive right given by a government agency, such as the United States Patent and Trademark Office (USPTO), to the owner or assignee of the patent as a reward for publishing the technology described in the patent to the general public. Once the owners are granted the patent, they have exclusive rights to produce and sell the product for a specific term. Anyone else is excluded from making, using, selling, or offering the product for sale without the consent of the patent owner for a specific period of time in the country in which the patent is granted. Individuals and organizations pay fees during the life of the patent in order to maintain that exclusive right.

WHAT CAN BE PATENTABLE?

U.S. patent law\(^1\) defines patentable subject matter as follows: processes, machine, manufacture, or the composition of matter. According to the USPTO, “process” refers to industrial and technical processes, “manufacture” means the manufactured article itself, and “composition of matter” designates the chemical composition or mixtures of ingredients and new chemical compounds (2014). Despite falling into the categories described above, some things, processes, and materials cannot be patented, such as nuclear power and technologies that destroy public peace or violate public social conventions. Some subjects are not objects

\(^1\) 35 U.S.C. 101 Inventions patentable.

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.
of a patent: these include mathematical formulas, natural laws (machines or methods which use the natural laws are entitled to be patentable), processes conducted only by human beings, and so on.

If the invention falls into one of the four categories, it should satisfy the following three requirements in order to be patentable: it must be novel, it must be non-obvious, and it must have utility. “Novelty” is described in the 35 U.S.C. (United States Code) 102 and means that the invention is new, that is, the invention should not be known to the public before the patent application of the invention. “Non-obvious” according to 35 U.S.C. 103 means that the invention is advanced when being compared to “prior art,” which are published references in existence before the patent for the new invention was filed. When an invention is compared to the prior art and determined as “obvious” by patent examiners, it cannot be patented. When assessing the non-obviousness of an invention, patent examiners adopt a hypothetical “person of skill in the art” standard that is a lens for evaluating the difference between the claimed invention and the prior art. The patent examiners determine if the prior art would lead a person of skill in the art to formulate the claimed invention. Lastly, inventions that physically operate and provide results satisfy the “utility” requirement. Most inventions satisfy this requirement.

**TYPES OF PATENTS**

There are three types of patents in the United States patent system: utility patents, design patents, and plant patents (USPTO 2014). This guide will focus on utility patents, although guidelines presented here may also apply to the two other types. The subject matter of each patent type is as follows:

- Utility patents: granted to anyone who invents or discovers any new and useful process, machine, article of manufacture, or composition of matter, or any new and useful improvement thereof;
- Design patents: granted to anyone who invents a new, original, and ornamental design for an article of manufacture; and
- Plant patents: granted to anyone who invents or discovers and asexually reproduces any distinct and new variety of plant.
TYPES OF PATENT SEARCHES

There are four main types of patent searches: “state-of-the art” searches, “patentability” searches, “freedom-to-operate” searches, and “validity” searches (Trippe and Ruthven 2011). The reason for conducting each search, the type of search, and the action that follows each search are different. Although the freedom-to-operate search is the central focus in this guide, patent searchers can apply guidelines established here to other types of searches.

A state-of-art search is generally conducted at the initial stage of a research and development (R&D) project. Many patents address updated technologies within a particular engineering field, and can be retrieved by engineers interested in acquiring information in the particular area. With the information, engineers can advance the design of new products, and patent managers can advise the engineers about infringing on the scope of others’ patents.

A patentability search is performed in order to determine whether an invention that results from R&D activities is worthy of a patent. If prior arts are found through the patentability search, any further application processes can be stopped ("prior arts" are the references published before filing the invention). This is because either the application would ultimately be rejected by the patent office examiners, or the enforceable or protectable scope of the granted patent would be so narrow that the patent becomes useless or may not be valuable.

A freedom-to-operate search can be performed when a company is planning to launch a new product into a market. These searches help applicants determine whether releasing the new product will raise legal issues, especially issues that may infringe upon others’ patents. The freedom-to-operate search is very important because the new product, which is the result of tremendous time, cost, and human resources, can be blocked from the market because it infringes on in-force patents. Before an individual or organization launches a product into the market, they should assess and minimize the risks caused by in-force patents. This guide will explain how to conduct a freedom-to-operate search and how to prepare countermeasures for the patents that have potential risks of infringement.

A validity search can be performed when patents, which can give potential risks to the new product, are searched or when the new product results in a legal suit because of patent infringement. Validity searches can help resolve the potential risks caused by others’ patents. Through the validity search, references that disclose the claims of the risky patent
can be found and used to invalidate the patent. Because the patent was erroneously granted without considering the earlier references, the risky patent may be invalidated. For example, when there is a risk of infringing upon other’s patents, several other measures can be adopted to solve the problem, such as changing the design of a new product, or getting the license from the patentee (the owner of the patent).

**STRUCTURE OF A PATENT DOCUMENT**

A patent document can become a published patent 18 months after an application or issued patent. Patent documents are divided into several sections: a cover page, drawing sheets, specifications, and claims. It is critical that patent searchers thoroughly understand the detailed structure of the patent document.

**Cover page**

The cover page of a patent document displays a variety of Internationally Agreed Numbers for the Identification of Data\(^2\) (INID) codes that identify the bibliographical information of a patent. These include the number and date of the patent, the title and inventor of the invention, the assignee or owner of the patent, and so on. The cover page also includes a representative drawing of the invention in order to provide a brief visual conception of the patent’s subject matter. Information on the cover page can be used as keywords for searching patents, which will be closely described in the second chapter, “Retrieving Patents.” Please refer to Appendix A for the appearance of the cover page, and the description of INID codes used on the cover page.

**Drawing sheets**

The drawing sheets usually provide a variety of pictures that help illustrate the descriptions of the patent document for the readers. The drawing sheets can include several types of diagrams as follows: exploded, partial, or sectional views of the subject matter, block diagrams that express the part of the claimed invention as a block, and flow charts that express the operation or movement of the claimed invention. Specific parts of the object in

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\(^2\) INID is acronym for Internationally agreed Numbers for the Identification of Data. INID codes are notated as two-digit numbers enclosed by brackets, such as [11].
the picture are indicated with reference numbers on the diagram, as seen in Figure 1. The numbers on the diagram reference the next section of the patent document, the specification, to help readers locate relevant parts of the invention.

**Specification**

The specification section of the patent document generally includes several subsections: a) Field of the Invention, b) Background of the Invention, and c) Description of a Preferred Embodiment. The technical area in which the invention belongs to is described briefly in the Field of the Invention subsection. The Background of the Invention subsection presents conventional knowledge related to the invention. And the specification section’s Description of a Preferred Embodiment subsection describes the invention’s details, such as its structure, operation or movement. This subsection may also describe the invention’s expected effect, often to emphasize the invention’s superior qualities.

![Figure 1. An example of a patent drawing from patent US 6,897,854 B2](image)

**Claim**

The claim section is the most important part in the patent document because the enforceable or protectable scope of the patent is determined and bound by the claims stated in this section. The claim section typically begins with the incomplete declarative statement, “What is claimed is:” as seen in Figure 2. Generally, the claim section includes at least one independent claim, such as the first claim in Figure 2: “1. A method for visualizing grouped
business objects in an application, the method comprising:” Other dependent claims follow, such as the second claim in Figure 2: “2. The method according to claim 1, wherein the application is a calendar application.”

An Independent claim can stand by itself and defines basic elements that form the invention. However, a dependent claim cannot stand alone, so it should follow an independent claim or another dependent claim in order to set limits or incorporate additional elements to an independent claim or another dependent claim.

![What is claimed is:](image)

**Figure 2. An example of a patent claim from patent US 8,832,583 B2**

A patent claim generally follows a standardized format consisting of the following components: “class and preamble,” “transitional phrase,” “claim body,” and “purpose clause” (Rosenberg 2014).

“Class” defines the subject matter in which the assignee wants to obtain a patent. In the above example, the claimed invention is a “method,” which can be found in the process category among the four categories of the subject matter patentable. The “preamble” component of the patent claim states the function to be performed by the claimed invention.
In the example illustrated by Figure 2, the function of the claimed invention is described as “a method visualizing grouped business object in an application.” It should be remembered that the clause of “class and preamble” is followed by comma.

A transitional phrase plays the role of connecting the preamble with the “claim body” and in the example, the word, “comprising,” fulfills this purpose (“comprising” is the most frequently used as a transitional phrase). A colon (:) follows the transitional phrase, as seen also in Figure 2. Transitional phrases can be divided into two categories according to their features:

- Open transitional phrase
  - Additional elements which form the claimed invention can be added to dependent claims.
  - Most claims include this kind of transitional phrase.
  - Examples: “comprising,” “containing,” and “including.”

- Closed transitional phrase
  - Additional elements cannot be added in a dependent claim.
  - Most commonly found in the field of pharmaceutical preparations.
  - Example: “consisting of” and “consisting essentially of.”

The claim body includes the elements and limitations of the claimed invention. In Figure 2, the elements are indicated by the words “grouping,” “assigning,” and “displaying” (twice) and constitute the method of invention. The elements are primary parts of the claimed invention. And the limitations are used to combine the elements to work together, that is, to make the elements work as a whole. The sentence including the last element should be finished with a period.

The purpose clause is selectively included in claims. This clause usually starts with functional words like “whereby” or “such as.” Because the purpose clause helps the reader understand the intended purpose of the product or method as stated in the claim, it carries no legal weight in limiting the scope of the claimed invention, while any clause starting with “wherein” explicitly limits the scope of the claim (Rosenberg 2014). This is important for the reader to note when analyzing claims.
CHAPTER 2

DEFINING THE SCOPE OF A PATENT SEARCH PROJECT

This chapter describes how to prepare a management plan for a patent search project. The plan should be written by a project manager who controls the project and has sufficient knowledge about the project. Before writing the plan, the project manager should collect information about the project, such as the purpose of the search, the project’s deadline, the resources that can be invested into the project, the project clients, and the final deliverables requested by the clients. The manager should then provide all information to each team member to establish common principles about the project.

The project’s purpose can be used to set the direction or boundary within which the project should be conducted. If the clients want the project to guarantee the safe launch of a new product, the team could conduct a freedom-to-operate search to find core patents owned by other entities and potentially used to block the business of the new product by the owners of the core patents through patent litigation. Core patents are owned by other individuals or companies and can be used to prevent a new product from entering markets if the new product infringes the core patent. In addition, if patent managers find core patents, they can perform a validity search following the freedom-to-operate search in order to find references that are capable of invalidating those core patents.

The patent search project may rely on two types of resources: human resources consisting of personnel invested in the project, and monetary resources to pay for services or products needed to conduct the project. Once team members are assigned to the project, the project manager should consider their abilities and experience and allot portions of the project to each member based on that assessment. If the human resources are too small to perform the project but the monetary source is sufficient, the project manager can outsource some portion of the patent search project, such as retrieving patents and filtering out those patents which are not relevant to the new product.

If the human resources are sufficient enough to conduct the project, the patent search could be completed by team members only. If it is important to obtain the project results
quickly, tasks within the patent search project can be conducted simultaneously. For example, the manager can outsource the patent retrieval activity and pass on the patents retrieved to the project team. Each team member can conduct an analysis of the patent in tandem and choose the core patents that cover the product.

It is important to understand the clients who request the patent search project since they will be given the final deliverable. The clients could comprise a board of directors who want to use project results for business, research and development engineers who are well-informed about the new product, or designers who design the external appearance of the new product or the Graphical User Interface (GUI) shown on the display unit of the new product. When preparing any report—or any other final deliverables—writers should determine whether to use patent law terminology, technical jargon, or common language to transmit the information to the clients effectively.

Project members should determine how to persuade the clients to follow the results of the search project. For example, if core patents are found and are determined to be valid, the team may change the design of a new product to eliminate the relevance between the core patents and the product. For instance, changing a GUI is not easy work because the GUI is usually optimized to users’ behaviors; it can take significant effort to find another optimal GUI. To change the GUI, patent managers need to persuade the designers, who are responsible for the GUI, that changing a design is absolutely necessary.

The final deliverable is a product or service given to the clients of the project. In a freedom-to-operate search project, that deliverable could be a set of analysis documents of the core patents, invalidation references to be used to invalidate the core patents, and/or the changed design of the product. A project manager should remind the team members of the final deliverables so that they can consider the deliverable when preparing the documentation.

After collecting the necessary information, project managers should make a management plan to facilitate the project. The plan should include the schedule of the project, a distribution of human resources, a cost plan, and a quality control plan for the final deliverables.
Project Schedule

A project schedule includes various benchmarks, such as the tasks forming the entire project, the due date of each task, the team members who are responsible for each task, the materials needed to conduct each task, and the deliverables produced after each task. In a freedom-to-operate search project, these tasks may be:

- acquiring information about the product,
- defining keywords based on the information about the product,
- creating a search formula by grouping and combining the keywords,
- retrieving patents by using patent search databases,
- analyzing the retrieved patents,
- consulting with patent attorneys to select core patents,
- preparing countermeasures,
- completing deliverables, and/or
- preparing a report/presentation.

<table>
<thead>
<tr>
<th>Task</th>
<th>Person in Charge</th>
<th>Material</th>
<th>Deliverable</th>
<th>Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task1: Acquire information about product</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Task2: Define keywords and create search formula</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Task3: Retrieve patents</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Task4: Analyze the retrieved patents</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Task5: Consult with patent attorneys</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Task6: Prepare counter measures for each core patent</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Task7: Complete deliverables</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Task8: Prepare report or presentation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 3. An example of a Project Schedule using a Gantt Chart
Project managers can use a Gantt chart for effective management of a task schedule; Gantt charts are more informative than conventional tables. The Gantt chart shown in Figure 3 allows readers to identify every task in the project, the person or team member who is responsible for each task, the material needed to conduct each task, and the deliverables that should be produced after each task. In addition, the chart shows how long each task will take and whether different tasks will occur simultaneously. Moreover, a Gantt chart can show the progress of the project by differentiating a completed task from an uncompleted task with different colors as shown in Figure 2 (the blue color indicates the completed tasks and the yellow color indicates the uncompleted tasks).

**Assigning a role to each team member**

A project manager should assign a role to each team member after securing his or her human resources. By conducting personal interviews with the members, the project manager can assess each member’s strength and determine project roles based on the interview results. When determining each member’s role, a team member can act as a liaison responsible for communicating with the project’s clients or outsourced companies to obtain further information about the product or the services provided by the outsourced companies.

For a freedom-to-operate search, the role of each team member can be assigned as shown in Table 1. If the human resources are small, a team member who plays a role in managing the project can conduct substantial activities, such as analyzing patents and preparing the countermeasures to core patents. In addition, outside law firms or patent search companies can be hired and assigned some portion of the project as complementary measures against the shortage of human resources within the originating company.

**Budget**

Before conducting a substantial patent search, a project manager should estimate the budget needed to facilitate the project. In a freedom-to-operate search project, budgets for hiring patent search companies should be accounted for. If the number of patents resulting from an initial keyword search overwhelms team members, a manager may contract with the patent search company to filter out patents that have no relevance to the product. The outsourced companies play the role of reducing the number of patents that are examined closely by the project members. The budget must be approved with the client’s input before
outsourcing the search. The final bill for the search must be thoroughly verified at the close of this phase of the project.

Table 1. An example of assigning a role to each team member

<table>
<thead>
<tr>
<th>Member</th>
<th>Role</th>
<th>Team membership status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Manger</td>
<td>- Manage the patent search project</td>
<td>Regular</td>
</tr>
<tr>
<td></td>
<td>- Complete final deliverables and report</td>
<td></td>
</tr>
<tr>
<td>Member A</td>
<td>- Secure all deliverables produced from every task</td>
<td>Regular</td>
</tr>
<tr>
<td></td>
<td>- Analyze retrieved patents and consult with patent attorneys</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Prepare countermeasures to core patents</td>
<td></td>
</tr>
<tr>
<td>Member B (Liaison)</td>
<td>- Provide structured, proactive, targeted communication to the clients (R&amp;D engineers, designers, or outsourced companies)</td>
<td>Regular</td>
</tr>
<tr>
<td></td>
<td>- Acquire information about targeted products or technologies and provide the information to each team member</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Analyze patents and consult with patent attorneys</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Prepare countermeasures to core patents</td>
<td></td>
</tr>
<tr>
<td>Member C</td>
<td>- Analyze patents and consult with patent attorneys</td>
<td>Regular</td>
</tr>
<tr>
<td></td>
<td>- Prepare countermeasures to core patents</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Define keywords and create search formula</td>
<td></td>
</tr>
<tr>
<td>Member D (Attorney)</td>
<td>- Consult with each team member about patent analysis</td>
<td>Ad hoc</td>
</tr>
</tbody>
</table>

- Regular: attends all project team meetings while on the project
- Ad hoc: attends project team meetings as needed

Deliverables

The final deliverables should be checked for quality before being passed on to the project clients. To control the quality of the final deliverable, the manager may assign a dedicated team member to this task. This member is responsible for approving the content before passing it on to clients. As shown in Table 2, the final deliverable of a freedom-to-operate search project can include such elements as a project report that shows the final results of the project, a changed design that has no relevance to the core patents, and/or analysis documents of the core patents that describe the details of the core patents.
Table 2. Quality control plan of deliverables

<table>
<thead>
<tr>
<th>Final Deliverables</th>
<th>Description</th>
<th>Person accountable</th>
<th>Purpose of Review</th>
<th>Approval Needed?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project report</td>
<td>Show the entire contents of the project</td>
<td>Project Manager</td>
<td>Accuracy and appearance</td>
<td>Yes</td>
</tr>
<tr>
<td>Changed design</td>
<td>New design which has no relevance with core patents</td>
<td>Project Manager</td>
<td>Accuracy and appearance</td>
<td>Yes</td>
</tr>
<tr>
<td>Core patent analysis documents</td>
<td>Explain the relevance with the product or technology</td>
<td>Member A</td>
<td>Accuracy and appearance</td>
<td>No</td>
</tr>
</tbody>
</table>
CHAPTER 3

PATENT RETRIEVING

This chapter describes the first step in a freedom-to-operate search, and focuses on the pool of patents that are related to a new product.

IDENTIFYING SUBJECT FEATURES

Project members should determine subject features that need patent searches when a patent review about a new product is requested by other departments, such as an R&D department or design department within a company. Generally, new products can have a variety of new features when they are launched into markets. This is especially true for products in an established class, such as televisions, mobile terminals and refrigerators. The features may be related either to hardware embedded in the product, software that operates the hardware, or GUI that are generated and displayed on a product during its operation. Although new features may have been added to the established product, every feature cannot be the topic of a patent search project because some features are simple changes of the previous product versions; while other features may have already been examined by patent managers who may or may not be the part of the search project.

There are several ways to determine which features need a patent search. First, every member of the team should meet, including ad-hoc members, liaisons, and the client requesting the patent search. Next, the product’s new features should be identified in the test product or design documents. During this identification phase, the team members can determine the features of the product that need patent searches. In addition, some members can provide information about features that have already been examined. If there are previous patent search results, the results can be reused to save time and cost. Moreover, if some features cannot be handled by any member in the project team, such as technical standard-related features, the project manager can request that other patent managers responsible for the standard-related features review those features.
DEFINING KEYWORDS

Before patents were digitized, searchers relied upon patent classification information, such as the United States Patent Classification (USPC), which was usually used to find patents because the patent documents were arranged according to the classification. As a result, the classification search may be a good option for starting a patent search. However, there is a risk in conducting only a classification search because targeted patents were not always properly classified due to human errors. Today, the risk is increasing because various technologies are converged in a single product, and an invention covering all technologies imbedded in a product may be filed in a single patent. Therefore, the classification determined by a patent office based on the portion of the technologies may be different from the technologies claimed by a granted patent.

Since the digitization of patent information, searchers generally conduct a keyword search to find patents they want. They may also find information using keywords in various fields in the patent document. For example, if searchers need a list of patents owned by a specific person or entity, they can submit keywords or names into the assignee information field to find the patents filed by the assignee.

After the patent searcher identifies the features of the product, he or she should determine which keywords to use for the search. The keywords should describe the core of the product features and can be either a single word or a group of words. There are several ways to determine the most productive keywords.

First, the keywords can be supplied by the engineers or designers who have firsthand knowledge of the product’s features. Because they work with the product, engineers and designers have detailed knowledge or information about the features, and can supply relevant, descriptive terms that reflect the up-to-date technology of the features. This is the easiest way for patent searchers to find the keywords about the features because they do not need to invest additional effort.

Second, patent searchers can obtain keywords from online or text resources. These resources are written by experts in the field or can be technical specifications of products, and can provide sufficient information. Online or text resources may also offer insight into the new product features by identifying the history or future of the technology implemented
in the product. This insight can play an important role in analyzing patents. This is true especially when a patent claims the invisible (or “non-visible”) part of a product, such as the operating algorithms generally implemented by software programs. Patent searchers can determine whether the product includes or will include what the patent claims.

Third, patent searchers can select keywords from patent documents that lie within the same technical boundaries of the new features. To find those patents, a patent researcher may use the USPC index number located on the cover page of a patent document. When a patent is filed at the United State Patent and Trademark Office (USPTO), it is classified according to its technical area, and the classification indexes are indicated by numbers.

To facilitate the search of the classification index, USPTO provides a webpage (http://www.uspto.gov/web/patents/classification/uspcindex/indexoutuspc.htm). For example, if a patent searcher needs patents related to “touch technology,” he or she can click the letter “T” among the 28 letters listed on the webpage keyword list. The USPC index then displays all entries that begin with “T,” including the entry “Touch System,” “323/904.” The numbers “323/904” refer to “Class 323,” “Subclass 904.”

Patent searchers can find the patents under this USPC index in the search page provided by USPTO (http://patft.uspto.gov/netahtml/PTO/search-adv.htm). To search the patents, the searcher generates a query with a field code and the USPC index. For example, if the query is “CCL/(323/904)” then 40 patents are searched. Within the list of patents, searchers can choose keywords by examining the language used to describe the technology of each patent.

Patent searchers should consider synonyms and equivalents for each keyword after compiling a list of relevant keywords. Equivalents are different from synonyms in that they are alternate parts or steps that describe features that serve the same purpose in the same way. Or, equivalents can be thought of as alternate embodiments of a product. For example, “RF” can be the synonym of “radio frequency” while “infrared,” “ultrasonic,” “WIFI,” “Bluetooth,” or “satellite” can be its equivalents in terms of transmission media. Synonyms and equivalents can be grouped as one element with keywords when creating a search formula, which will be described in the next step.

Patent searchers should avoid some words when selecting keywords. “Apparatus,” “comprise,” and “method” are the typical examples of such words because they always
appear in patent claims. As explained in chapter 1, “method” and “apparatus” should be written in claims to define the category of an invention. And “comprise” is used as a transitional phrase to connect a preamble and a claim body.

If a patent search company is hired to assist with a portion of the patent search project, patent managers must verify that the keywords selected by the outsourced company are reasonable and related to the features. If the keywords are not appropriate for the patent search, the manager must alert the search company which keywords are to be deleted or added.

**CREATING A SEARCH FORMULA**

Patent searchers should construct a search formula by combining various operators with the keywords and their synonyms and equivalents. The search formula is used as an input value to search databases. The operators can be divided into three categories according to their function in the search formula (Hunt et. al 2007). Table 4 shows the details of operators which are generally used for patent search.

- **Boolean operators**
  - Typically “AND,” “OR,” and “NOT”
  - Find unions, intersections, and subtractions from data set.

- **Proximity operators**
  - “ADJ,” “NEAR,” “WITH(IN),” and “SAME”
  - Find words within a defined perimeter of other words

- **Truncation operators**
  - Indicated by a character, such as “$”, “?” and “*”
  - Substitute various derivatives of the same word.

The truncation operators are very useful because they can effectively reduce the number of keywords that have the same derivation. For example, if keywords related to “move” are required, and truncation operators are not supported, a search formula should include its various derivatives: “moving,” “movement,” “moved,” “movable,” “moving picture,” “moving image,” “moving graphical object,” and so on. However, if the truncation operators are supported by databases, the term “mov*” is capable of covering all these variables.

Patent searchers should take into consideration that these operator types vary according to the patent search databases, although the operators listed in Table 3 are
generally used for patent search formulas in most databases. For example, some search
databases support both left and right truncation (refer to Table 3), while others do not support
left truncation. Therefore, searchers should study all available information about the search
database selected for the patent search (i.e., manuals and guidelines) to identify the types of
operators supported before constructing a search formula.

The keywords, the synonyms, and equivalents are grouped as one element with the
“OR” operator, such as “(camera OR photo* OR captur*)” in a search formula. And to find
the patents which commonly include at least two elements, the elements should be connected
with the “AND” operator, such as (camera OR photo* OR captur*) AND (power* OR
battery*).” If two elements are related to each other and always appear within a few words
from each other, the proximity operators should be adopted, such as “(cut* OR shut* OR
turn*) ADJ3 off).”

Table 3. An Example of Text Search Operators

<table>
<thead>
<tr>
<th>Operator</th>
<th>Function</th>
<th>Syntax</th>
</tr>
</thead>
<tbody>
<tr>
<td>AND</td>
<td>All terms in combination are in the document.</td>
<td>Term₁ AND Term₂</td>
</tr>
<tr>
<td>OR</td>
<td>One or the other or both terms are in the document</td>
<td>Term₁ OR Term₂</td>
</tr>
<tr>
<td>XOR</td>
<td>One or the other but not both terms are in the document</td>
<td>Term₁ XOR Term₂</td>
</tr>
<tr>
<td>NOT</td>
<td>One term is present and the other term is not in the document</td>
<td>Term₁ NOT Term₂</td>
</tr>
<tr>
<td>ADJ</td>
<td>Terms appear in the order specified next to one another or within a prescribed number of words of one another.</td>
<td>Term₁ ADJ Term₂</td>
</tr>
<tr>
<td>NEAR</td>
<td>Terms appear in any order next to one another or within a prescribed number of words of one another.</td>
<td>Term₁ NEAR Term₂</td>
</tr>
<tr>
<td>WITH</td>
<td>Terms appear in the same sentence</td>
<td>Term₁ WITH Term₂</td>
</tr>
<tr>
<td>SAME</td>
<td>Terms appear in the same paragraph</td>
<td>Term₁ SAME Term₂</td>
</tr>
<tr>
<td>“*” “$”</td>
<td>Unlimited characters or a prescribed number of characters in front (left truncation) or behind (right truncation) the term</td>
<td>Automo* (automotive or automobile)</td>
</tr>
<tr>
<td>“?”</td>
<td>Unlimited characters or a prescribed number of characters in front (left truncation) or behind (right truncation) the term</td>
<td>*motive (locomotive)</td>
</tr>
</tbody>
</table>

A SEARCH AREA IN A PATENT DOCUMENT

After constructing the search formula, patent searchers should select the search area in a patent document. That is, they need to determine the area of the patent document to be queried in order to retrieve only the patents that meet the search formula. As stated above, there are four sections which specifically describe the technology of a patent: the title, the abstract, the specification, and the claims. Depending on the type of patent search, the area to be investigated in the patent document may vary.

All four sections need to be investigated for the state-of-the-art search, the patentability search, and the validity search. The objective of each type of search is to find detailed descriptions in patent documents in order to obtain information about up-to-date technologies that can be used to develop new products, to determine the patentability of inventions, or to secure references that are capable of invalidating granted patents, respectively. Because the information disclosed in the entire area of a patent can be used to meet the object, patent searchers may select the four sections as the search area.

In a freedom-to-operate search, however, the search keywords need to be searched mainly in the claim section because this type of search aims to find the patents in which a product potentially infringes on an existing patent. The infringement is determined only through comparison of the claims with the product. In addition to the claim section, patent searchers may add the title and abstract sections to the search areas if the number of retrieved patents is small. However, it is not desirable to add the specification section to the search area because the number of patents retrieved would be tremendous; large numbers do not guarantee the accuracy of the search.

Patent searchers can effectively determine whether each retrieved patent has relevance with the feature by examining the title, abstract, and claim sections of each patent simultaneously. Displaying a representative drawing section with the three sections can improve the efficiency of the search as well, because the patent searchers can easily and quickly figure out the technology conveyed by the patent. Searchers can select the sections to be displayed simultaneously on a screen because most patent search databases support this function. Using the information contained in the four sections, patent searchers can divide the retrieved patents into two groups: one has no relevance to the product and the other needs further study to determine the relevance. Searchers can then closely analyze the patents
requiring further study to determine the actual relevance between the patent claims and the product.
CHAPTER 4

PATENT ANALYSIS

This chapter describes a procedure of analyzing a patent to determine whether the patent has relevance to an existing product, and to assess the extent of that relevance. This procedure includes two steps: the first step involves conducting a claim construction—the process of construing the claims of a patent to give the claims proper meanings. The second step involves determining the extent of the relevance by comparing the product with the meaning construed from the first step using several tools.

CLAIM CONSTRUCTION

Claim construction attempts to answer the question, “What does the claim mean?” Sometimes, the technical scope of a claim cannot be easily decided because the words used in the claim are not written clearly or can be interpreted in several ways. For example, how can the term “business object” in the claim presented in Figure 2 be defined? Does the term refer to an article needed for a business person? Or is it meant to convey an actor within the business layer of a layered object-oriented computer program representing a part of a business, or an item within it? And how can we define the meaning of the “business object attribute values”? It is difficult to understand the two terms’ meaning using only the description in the claims.

To answer the question, “What does the claim mean?” patent searchers should clearly define the meaning of the words in a claim by using evidence that supports the meaning. The evidence can be categorized as intrinsic or extrinsic. The intrinsic evidence includes the claim itself, the specification of a patent, and the prosecution history of a patent. The claim and the specification belong to the patent. The prosecution history is the official record of an application, produced during the prosecution process and provided by the USPTO.

Basically, words of a patent claim are generally given their ordinary and customary meaning. If the meaning of a claim word is clear, or there is no dispute about the meaning, the ordinary and customary meaning of the word should be used to delineate the scope of a claim. If there are disputes about the meaning of a word, other evidence from the
specification, or prosecution history should be used to clarify the word’s meaning in order to identify the scope of a claim.

The specification is the second best source for interpreting the claim. Patent searchers should pay special attention to the detailed description which portrays the unclear words of a claim when reading the specification of a patent to figure out the meaning of the words. Generally, the definition of the words or the use of the words may be described in the specification, and the definition, or the use in the specification, can limit the scope of a claim. In addition, patent searchers should consider any example that depicts the conditions or environments of the patent because the examples outlining the ways that the invention can be or must be used may limit the scope of a claimed invention.

A patent’s prosecution history can also limit the scope of a patent. The prosecution history includes a written record of proceedings between patent applicants and a patent office, as well as the original patent application and later communication. Generally, the patent applicants assert the patentability of the claimed invention during a prosecution procedure. Specifically, the patent applicants either present the difference between patent claims and the prior arts during prosecution, or revise the language in patent claims to overcome any rejections made by patent examiners. When reviewing the prosecution history, patent searchers need to focus on any argument made by the examiners in rejecting or allowing the patent, and any argument made by the patent applicants in amending the patent claims. In particular, the argument and the revision made by the applicants provide more critical evidence to limit the scope of the claim. For reference, the prosecution history of a patent can be obtained in the Patent Office’s Patent Application Information Retrieval (PAIR) system (http://portal.uspto.gov/pair/PublicPair).

In addition to the intrinsic evidence, patent searchers can use extrinsic evidence: applications related to a patent, and dictionaries published when the invention was completed or the patent was filed. Related applications include any applications filed in other countries or any application that shares the same or has very similar specifications; the latter are known as a divisional, continuation or continuation-in-part applications, especially in the U.S. patent system. The information or arguments made during the prosecution of a related application can be used to define the meaning of a word in the claimed invention. Patent searchers can use dictionaries to define the meaning of the unclear words in order to limit the scope of
patent claims if other evidence does not provide clues to the meaning of the unclear words. Furthermore, treatises, encyclopedias and expert testimony can be used in order to define the meaning of the words.

**THE EXTENT OF THE RELEVANCE**

The objective of a freedom-to-operate search is determining whether a product contains elements which are identical or equivalent to each element recited in a patented invention. In order to achieve this objective, patent searchers should follow the “all-element test” and the Doctrine of Equivalents (DOE) to determine the relevance between patent claims and a product for the purpose of a freedom-to-operate search.

The all-element test is used to identify whether each and every element or limitation recited in a patent claim is literally present in a product. For example, if a product is relevant to an existing patent claiming a “chair” as “an apparatus for sitting, that has four legs attached to a seat with a curved back rest,” then the product should have four legs attached to a seat with a curved back rest and be designed for sitting. However, if the product has only three legs, or does not have a back attached to a seat, the product has no relevance to the patent because the patent fails to meet the all-element test.

Under the DOE, a product could be relevant to a patent claim, even if one or more limitations of the patent claim are not literally present in the product. That is, although the patent claim does not pass the all-element test, the product may still be relevant to the patent claim. The purpose of the DOE is to prevent the theft of the benefit of a patented invention by changing only minor or insubstantial aspects of the claimed invention while maintaining the entire structure of the patent claim. Patent searchers should adopt a “function-way-result test” to determine whether the product still has relevance with the patent claim.

This test asks whether an element of a product performs substantially the same function in substantially the same way to obtain the same result as an element of a patent claim. For example, regarding the chair invention above, the relevance may be acceptable under the DOE, even if the chair has a straight back instead of a curved one, because the straight back may have the same way, function, and result as the curved one.

Patent searchers should also consider a patent owners’ stance: owners generally argue under the insubstantial differences test for DOE infringement that slight differences between
their invention and products are so insubstantial that the products are still within the scope of their patent claims. Regarding the above chair invention, the patent owner might argue that the straight back is a simple modification of the curved one, and thus the chair is still relevant to the owner’s patent.

Patent searchers should consider “estoppel” if the product is still relevant to the patent claim under the DOE. Estoppel means that it is prohibited to change former opinions or actions made by patent applicants. There can be two types of estoppel: one is a specification estoppel and the other is a prosecution history estoppel.

The specification estoppel limits the DOE by requiring a product to provide all the specified advantages of a patent invention. That is, when the specification of the patent shows multiple functions conducted by a claim, the product must perform all of the functions shown by the specification to be relevant to the patent. Therefore, patent searchers can assume that the product is not relevant to the patent if the product does not show one or more functions described by the specification of the claimed invention.

The prosecution history estoppel dictates that patent owners cannot recapture the claim scope that was abandoned during the prosecution process of a patent. That is, any technical scope that was relinquished by a patent applicant to overcome the prior arts in a patent application can no longer be included within the scope of the patented claim. In the chair example, if the applicant of the patent asserted that the curved back was different from the straight one as a prior art, it is not possible to assert that a chair having the straight back member lies within the scope of the patent claim. So when reviewing the prosecution history, patent searchers should closely examine what patent applicants argued and what revision was made in patent claims in order to overcome any rejections made by the patent examiner.

Patent searchers can determine the extent of the relevance between the product and the patent claim after considering each category of estoppel. Although the extent of the relevance can be generally divided into three levels – high, medium, and low – in this example, five levels may be adopted to describe the relevance: high, medium high, medium, medium low, and low. And patent searchers should determine the relevance of every dependent claim if independent claims are relevant to the product. However, it is not necessary to determine the relevance of the dependent claims if the independent claims are
not relevant to the product because the dependent claims include every element and limitation of the independent claims. Levels of relevance are defined as follows:

- **High**: there is no argument that the patent claims cover the product. The product includes every element and limitation of the patent claims.

- **Medium**: there are still arguments about interpreting language in the patent claims although the product includes every element and limitation of the claims.

- **Low**: it is explicit that patent claims do not cover a product. Every element or limitation of the patent claims is not present in the product.

Patent searchers should prepare claim construction charts for analyzed patents when they consult with patent attorneys about the review results and record analysis results of the analyzed patents. As experts in patent law with experience analyzing a variety of patents, patent attorneys can weigh in on each patent analysis case or determine whether there are any errors in applying several analyzing tools, such as the all-element test, DOE, or estoppel. In addition to the analyzing results, patent searchers may include the following items in the claim construction charts to understand the comprehensive status of a patent and to establish countermeasure to each core patent. Figure 4 shows an example of a claim construction chart:

- **Title of the patent**
- **Patent number**
- **Priority date**
  
  Priority date is the date when the priority application was filed. When conducting an invalidity search, only the references published before the priority date should be searched.

- **Assignee or owner of the patent**
  
  The owner of a patent can be changed because a patent is property. That is, the patent can be an object of a trade between entities, just like most property. However, the assignee name recorded on the cover page of a patent document may not reflect this change because the contents of the patent document are generally fixed after the patent is published if revisions are not required. It is possible to identify an ownership change by accessing the website provided by the USPTO (http://assignment.uspto.gov/).

- **Expiration date**
Generally, a patent expires twenty years from its filing date. However, if the patent was filed before June 8, 1995, the patent may expire on the date later than twenty years after the earliest filing date or seventeen years after the date of issuance. Under some circumstances, however, the duration of a patent can be changed.

If a patent is in a line of priority, that is, if it is a divisional, continuation, or continuation-in-part application of another patent, the patent expires with the priority application at the same time. In addition, if the patent contains a terminal disclaimer, which is an agreement submitted to overcome the rejection produced by a double patent owned by the same assignee, then the term of the patent will be terminated with another patent which is used for the double patent rejection. Moreover, a patent can be terminated earlier than its original duration if the owner does not pay maintenance fees. Generally, the maintenance fees are due three times during the life of a patent and should be paid at three year, seven year, and eleven year dates after the issuance date.

If the issuance of the patent was delayed due to proceedings at the patent office, a secrecy order, or appellate review patent term can be adjusted under certain conditions such as Patent Term Adjustment or Patent Term Extension. If the conditions are met, for every day the patent was delayed by the patent office, generally one additional day can be given. The adjustment of the patent term normally appears on the cover page of a patent document with a phrase “Subject to any disclaimer, the term of this patent is extended under 35 U.S.C §154(b) for XX days.”

- **Family status**

A patent can have several related patents. A patent application filed for a product in one country may be also filed in other country, either through the Patent Cooperation Treaty (PCT), or filed individually in other countries not bound by the PCT. Under the U.S. patent system, a patent may have its related patents sharing a priority application in common with the same or a very similar technical invention, such as a divisional application, continuation, or continuation-in-part application. Using the information contained in the family
patent, patent managers may establish comprehensive countermeasures to other entities’ core patents which owners can potentially use in making claims to new products.

Figure 4. An Example of a Claim Construction Chart

<table>
<thead>
<tr>
<th>Title</th>
<th>Electronic pen input device</th>
<th>Patent No.</th>
<th>US X,XXX,XXX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Priority Date</td>
<td>2001.01.01</td>
<td>Expiration date</td>
<td>2020.12.30</td>
</tr>
</tbody>
</table>

**Patent Claim**

1. An electronic pen input comprising:

An optical 3-dimensional detecting device that radiates light and detects reflection of the radiated light for detecting orientation angles of a centerline of the pen relative to a ground and height of the pen over a writing surface;

A 3-axis accelerometer for detecting a movement of the pen; and

A communication means for sending the detected information to a post processing device. *(according to the specification, communication means includes wireless and wired types)*

- Degree of Relevance: Low
- Argument: The device has no accelerometer to detect the movement of the pen, but uses an optical element to measure the angle made by the ground and the pen.
- Reviewer: James
- Patent Attorney: Daniel
- Engineer or Designer Who Participated: Peter from R&D department
CHAPTER 5
PREPARING COUNTERMEASURES

This chapter describes several countermeasures to core patents and outlines the ways a patent manager can prepare the countermeasures. This guide suggests three ways to prepare countermeasures: designing around core patents, evaluating the validity of core patents, and obtaining licenses about core patents. When a product is within the scope of a patent, the patent can be the core patent. When a company manufactures the product which is within the scope of the core patent, the owner of the core patent can demand that the company stop manufacturing the product. Preparing countermeasures can also eliminate or minimize the risks caused by the core patents. Preparing countermeasures for core patents is important because, as described above, with the countermeasures a company can continue producing the product; otherwise the product is blocked from entering markets through a patent infringement lawsuit. Therefore, after analyzing patents, patent managers should prepare countermeasures to minimize the risks caused by the core patents.

DESIGNING AROUND

Designing around a patent – called a “design-around” – means to develop a product that does not have relevance to the patent. To design around a patent, patent managers should consider every independent claim in the patent relevant to a product, and identify all elements and limitations of each independent claim. For example, in a patent claiming a chair as an apparatus for sitting, having four legs attached to a seating member, and a curved back member attached to said seating member, four legs, a seating member, and a back member are the elements. And the features including the four legs are attached to a seating member and that the back member is curved can be the limitations. Generally, patent applicants design each independent claim to have a different scope in order to strengthen the patent’s exclusive rights. When conducting a design-around, patent managers delete or change one or more elements or limitations of the patent’s claims in a product.

Patent managers should cooperate closely with R&D engineers or designers in order to succeed in designing around an existing patent. Although patent managers can prepare new product designs that have no relevance to patent claims without the aid of engineers or
designers, doing so raises the possibility that the designs will not work in the product properly. Here is the best way to obtain the designs:

1. Patent managers provide the engineers or designers with the information about patent claims that should be designed around, such as the elements and limitations of the patent claims, and conditions that eliminate the relevance to the patent claims.

2. The engineers or designers prepare the new designs by themselves based on the information provided by patent managers. When evaluating the designs, the engineers and designers should take into consideration the product design’s feasibility.

3. Patent managers verify with patent attorneys that the designs supplied by the engineers or designers can be solutions to the design-around. They should conduct a new freedom-to-operate search to identify that the designs infringe other patents which was not included in the original search.

Patent managers can offer the engineers or designers with a claim construction chart that provides information about the elements or limitations of the patent. Using the chart, engineers or designers can find the elements or limitations included in the patent claims. In addition, patent managers can provide guides to preparing the design that allow the product to avoid the patent. These guides could be the result of an all-element test, the specification, the prosecution history, and other patent documents. The detailed options for selecting the design are as follows:

**Eliminating any element or limitation in patent claims**

Eliminating any element of a patent claim in the new product is the best way to design around a patent. As described above, if every element or limitation of a patent claim is not present in a product, the product is not relevant to the patent because the patent does not succeed in an all-element test. That is, the absence of any element or limitation of a patent in the product guarantees a successful design-around. Moreover, in this situation, patent managers need no longer consider the DOE because the elements or limitations of a patent claim have lost their equivalents in the product.
After selecting the new design of the design-around, patent managers should consider the possibility of filing the design as a patent. If the design is made by only eliminating any element or limitation of the patent, it does not have patentability because the patent, designed around, already shows the structure of the design. That is, because the patent designed around can be a prior art to the design, the design is neither novel nor non-obvious. However, if the design is made by adding a new element after eliminating the element or limitation of the patent, the design can be patentable. That is, the element newly added to the product can give patentability to the design or the product which includes the design if it is new and non-obvious. In addition to considering patentability about the design, patent managers should conduct a freedom-to-operate search about the design in order to ensure that no existing patents have relevance to the design.

Selecting excluded features in the specification of a patent

As described above, the specification of a patent closely describes the patented invention. Sometimes, inventors exclude certain features in their patented designs to distinguish or differentiate their inventions from prior arts or to explain the superiority of their inventions over other alternative designs. When certain features are explicitly excluded from the scope of a patented invention, those features can be selected and exploited as the design for the design-around. If one of these design features is selected for the design-around, the patent manager should perform a “freedom-to-operate” search about the selected feature as described above.

Selecting the abandoned features in prosecution history

The arguments or statements made by patent applicants during prosecution can also serve as a framework for the design-around. Generally, patent applicants assert the differences between their claimed inventions and the prior arts, responding to a patent examiner’s rejection. To overcome the rejection, the applicants limit the scope of their inventions by arguments or by revising their claims. That is, the patent applicants delineate their designs to distinguish their new inventions from the prior arts.

As explained in the “prosecution history estoppel,” patent owners cannot assert that the claim scope abandoned during prosecution is included in the scope of their granted patents.
Thus, the features abandoned during the prosecution could be considered as a new framework for the design-around. In this case, patent managers should also perform a “freedom-to-operate” search related to the adopted design based on the framework. If the abandonments result from the prior art cited by examiners, reviewing the claims of the cited prior art can be a good starting point for the new freedom-to-operate search.

**Practicing the prior arts**

Another option of the design-around can be selected from the prior art. Because patent claims that cover the prior art are invalid, applying the prior art to a product will eliminate the relevance between patent claims and that product. When adopting the prior art, the product must duplicate the prior art exactly. Otherwise, the difference between the prior art and the actual design embedded in the product can be used in an argument denying that the new design exists in the prior art. As a prior art for a new design, it is desirable to choose an expired patent or one that was ultimately rejected by a patent office. It must be considered that the prior art for the new design is not another issued, in-force patent because the patent may bring a patent lawsuit.

In addition to a product’s usability or feasibility, patent managers should encourage engineers or designers to consider a product’s marketability when they develop new designs for the design-around. When selecting the new designs, engineers or designers can obtain help from the sales or marketing departments to help them evaluate the marketability of the designs. Otherwise, the designs for the design-around could degrade the marketability of the product even though the new design works in the product. Marketability must be considered especially when the designs for the design-around are related to a GUI of the product.

Patent managers should verify the designs for the design-around. After obtaining the designs, patent managers determine the differences between the previous design and the new one. Based on the differences, they must consult with patent attorneys about the relevance between the designs and patent claims. By applying the “all-element rule” and the DOE again to the product that includes the designs, patent managers can determine whether or not the designs can work for the design-around.
EVALUATING VALIDITY

Invalidation can be another countermeasure for core patents. Although patents are granted with a presumption of validity, in fact patent examiners cannot know everything about the patent; this lack of knowledge provides a foundation for invalidating a granted patent. If the patent is invalid, there can be no relevance between the patent and a product, regardless of whether the product lies within the scope of patent claims.

One of principal ways to invalidate a patent is to deny the novelty or non-obviousness of a granted patent in the light of the prior arts. The prior arts consist of any disclosure which shows patent claims published before the application of the patent. Published patents are most commonly cited as the prior art, and non-patent documents, such as books, journals, product manuals, and internet publications, can be the prior arts as well. Prior art also includes physical embodiments of products and evidence of sale or public use.

Patent managers should exclude the references cited as the prior arts by patent examiners to reject a patent during the prosecution. Prior arts that more closely reveal the claims of a patent rather than the references cited by examiners should be sought because patent examiners granted the original patent based on the difference between the patent claims and the references cited.

Patent managers should also carefully identify the date of prior arts that are sought to invalidate a patent. U.S. patent law changed on Mar. 16, 2013: the “first-to-invent” system was changed to the “first-to-file” system, the system accepted by most other countries. Under the “first-to-invent” system, the first inventor has a priority of a patent, regardless of the filing date of the patent. However, under the “first-to-file” system, the patent having the earlier filing date has a priority, regardless of the invention date. Thus, because of the changes in U.S. patent law, the effective date of the prior art can vary according to the filing date of a patent which is evaluated to be invalidate.

Prior art under the “first-to-invent” system

The minimum acceptable date of prior arts is a date preceding the filing date of the patent which is evaluated in terms of validity. However, patent managers should seek prior arts dated earlier than one year before the filing date of the patent. The patent owner has the option to prove that their invention was completed before the publication of the prior art, if
the publication date of the prior art and the filing date of the patent in the evaluation occur within one year. Otherwise, the patent owners cannot exercise that option.

**Prior art under the “first-to-file” system**

Patent applicants do not overcome prior art by showing that their invention precedes the prior art if they file a patent after Mar. 15, 2013. The prior art which can be used to invalidate a granted patent, which filed after Mar. 15, 2013, include any kind of disclosure published before the filing date of the granted patent. Moreover, the issued U.S. patents and published U.S. or PCT patents that were effectively filed before the filing date of the granted patent in question can be prior art, as well.

To invalidate a patent, all claims having relevance to a product should be invalidated. Patent managers should handle each patent claim separately. While it is entirely possible that prior art will invalidate all of the claims, it is common that some claims are invalidated while others remain valid. In such a situation, other options, such as designing around or obtaining a license (described below) can be selected as a countermeasure to claims that survive when evaluated for validity.

**OBTAINING LICENSES**

Licensing can be an option as a countermeasure to the core patents when it is difficult to design around the patent or the patent is valid. Generally, a license is consent to allow other parties (the licensees) to do something the granting party (the licensor) has the right to; otherwise, it is prohibited to do. In the context of patent licensing, the license is granted by the patent owner (the licensor) to the licensee that seeks this right to use the licensed patents free of suit by the patent owner and based on certain terms and conditions and subject to certain limitations.

According to the extent of the rights granted in a license, the license can be divided into two categories: an exclusive license and a non-exclusive license.

**Exclusive license**

Under an exclusive license, a patent owner gives almost all ownership to the licensee, except for the name to the patent. The licensee can have all rights under the patent and acquire the right to sub-license the patent and to sue for patent infringement.
Non-exclusive license

Having been granted a non-exclusive license, the licensee could practice the license patent. That is, the patent owner of the licensed patent essentially promises not to sue the licensee for patent infringement. However, acquiring a non-exclusive license does not mean that the licensee is safe from all other patents. If the licensee’s product infringes on another patent, the licensee may be sued by the owner of the other patents.

Patent managers who have questions about licensing can ask the officials or the department in charge of patent licensing. When requesting a license for the core patent, patent managers should fully explain the reason why the license should be secured to the persons or department that is responsible for patent licensing.
CHAPTER 6
REPORTING PROJECT RESULTS

Patent managers should present the search project results to their managers and clients after completing the project in the form of a report. The final search report may include the following sections.

1. The background of the search project
   In the background section, the patent manager explains the context of the project, such as why the search was conducted, what clients requested the project, what product was examined through the search, and so on.

2. The organization of the project team
   The roles of team members who participated in the project should be described to establish that appropriate professionals conducted the project.

3. The features of the product
   This section describes the features examined through the patent search.

4. The number of retrieved patents
   Presenting the number of retrieved patents for each subject feature in this section will prove that the patent manager examined a range of relevant and appropriate patents.

5. Brief information about core patents
   This section presents information about individual core patents, such as the patent number, the priority date, the owner, the brief description, the relevance to the subject feature, and the status of any family application of each core patent.

6. The countermeasure for each core patent
   This section describes any countermeasures to each core patent, such as a design-around, an invalidation, or licensing.

7. The analysis of each core patent and its corresponding subject feature
   Each core patent should be compared to the corresponding subject feature in order to support determination of the relevance. This can be substituted by the claim construction chart described in chapter 4.
APPENDIX A

A COVER PAGE AND AN INID CODE
Figure 5. An Example of a Cover Page from patent US 6,897,854 B2

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cho et al.</td>
<td>(45) Date of Patent:</td>
<td>May 24, 2005</td>
</tr>
</tbody>
</table>

(54) ELECTRONIC PEN INPUT DEVICE AND COORDINATE DETECTING METHOD THEREFOR

(75) Inventors: Yong-chul Cho, Kyungki-do (KR); Suk-han Lee, Kyungki-do (KR); Kyung-sig Roh, Kyungki-do (KR); Jee-won Lee, Seoul (KR)

(73) Assignee: Samsung Electronics Co., Ltd., Suwon-si (KR)

(∗) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 221 days.

(21) Appl. No.: 10/102,649
(22) Filed: Mar. 22, 2002
(65) Prior Publication Data

(30) Foreign Application Priority Data
Apr. 12, 2001 (KR) ................................. 2001-19570

(51) Int. Cl.7 ................................. G09G 5/00

(52) U.S. Cl. ................................. 345/170; 345/173; 178/19.01; 178/19.04;
(58) Field of Search ................................. 345/173, 175, 345/179, 180; 178/19.01, 19.03, 19.04, 19.05

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FOREIGN PATENT DOCUMENTS
JP* 04-242817 A 8/1992
JP* Hei 6-67799 8/1994
JP* 06-44008 A 12/1994

* cited by examiner

Primary Examiner—Guy J. Lamarre
Assistant Examiner—Fritz Alphonse
(74) Attorney, Agent, or Firm—Burros, Doane, Swecker & Mathis, L.L.P.

ABSTRACT
A electronic pen input device and a coordinate determining method are provided. The electronic pen input device includes an optical 3-dimensional detecting device for detecting orientation angles of a centerline of the pen relative to a ground and a height of the pen over a writing surface, a 3-axis accelerometer for detecting a movement of the pen, and a communication means for sending the detected information to a post processing device.

24 Claims, 9 Drawing Sheets
### Table 4. Description of an INID code in a Cover Page

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<thead>
<tr>
<th>INID Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>[11] Patent number</td>
<td>The patent number can be the number of issued patents, notated as a seven-digit number, or published patents, notated as an eleven-digit number in which the first four-digits are the year of publication. The application is published 18 months after filing date.</td>
</tr>
<tr>
<td>[19] Document type</td>
<td>The office or organization that published the patent document.</td>
</tr>
<tr>
<td>[21] Application number</td>
<td>An eight-digit number with a slash, for example, 12/123,456. The first two-digit number before the slash is a series code; the remaining six-digit number is a serial number.</td>
</tr>
<tr>
<td>[22] Date of application</td>
<td>The date when the application was made.</td>
</tr>
<tr>
<td>[30] Priority data</td>
<td>The filing date(s) and number(s) of priority application(s). The application should be filed within one year after the first filing date of a priority application to guarantee the priority date during the patent examination.</td>
</tr>
<tr>
<td>[45] Date of patent</td>
<td>The date when the patent was granted or published.</td>
</tr>
<tr>
<td>[51] IPC classification</td>
<td>The International Patent Classification pertaining to the invention. The IPC provides a hierarchical system for the classification of a patent according to the different areas of technology to which they pertain.</td>
</tr>
<tr>
<td>[52] National classification</td>
<td>The U.S. Patent Classification System denotes the subject matter of the invention.</td>
</tr>
<tr>
<td>[54] Title of the invention</td>
<td>A very brief description of the patent’s subject matter.</td>
</tr>
<tr>
<td>[56] References</td>
<td>Prior arts cited by the inventor or the patent examiner as references related to this patent.</td>
</tr>
<tr>
<td>[58] Field of search</td>
<td>The field, or area, where the patent examiner looked for prior arts.</td>
</tr>
<tr>
<td>[60] Related application data</td>
<td>The number and date of the prior application or applications related to this patent.</td>
</tr>
<tr>
<td>[65] Published application data</td>
<td>The number and date of the published application.</td>
</tr>
<tr>
<td>[72] Inventors</td>
<td>The individuals who developed the claimed invention.</td>
</tr>
<tr>
<td>[73] Assignee (owner)</td>
<td>The assigned owner or entity that holds the patent.</td>
</tr>
<tr>
<td>[74] Attorney or agent</td>
<td>The attorney or agent who represents the inventor or assignee.</td>
</tr>
</tbody>
</table>