

A Student's Guide to United States Patent Applications

By

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SUBMITTED TO THE DEPARTMENT OF MECHANICAL ENGINEERING IN PARTIAL
FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

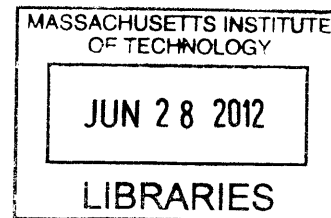
AT THE

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A Guide to United States Patent Applications

by

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on May 11, 2012 in Partial Fulfillment of the
Requirements for the Degree of Bachelor of Science in
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Abstract

This thesis presents a comprehensive guide to patent applications in the United States derived from the information provided by the United States Patent and Trademark Office (USPTO). This guide gives in-depth instructions for completing and suggestions for filing a provisional, utility, design, or plant patent with the USPTO. Several statistical analyses were done on patent applications and grants in the United States over the last two decades. In addition, a case study is completed on an invention patented in the United States and the company that resulted from it. The case study provides an example of how the patent system creates the opportunity for continued economic progress. As new technologies are discovered, inventors will continue to patent their ideas and increase the scope for commerce.

Thesis Supervisor: Cullen R. Buie
Title: Professor of Mechanical Engineering

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Biography

Jennifer N. Hammond is a candidate for a Degree of Bachelor of Science in Mechanical Engineering at the Massachusetts Institute of Technology. She has attended the institution from August of 2008 until June of 2012. She is a noted contributor in Stacy L. Figueredo's Doctorate of Philosophy in Mechanical Engineering thesis for the Department of Mechanical Engineering submitted in 2011.

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1 – Introduction

1.1 - A Brief History of Intellectual Property Law in the United States

The concept of intellectual property rights has existed since medieval times. The earliest known law providing the rights for exclusive use of an invention for a limited time existed in Venice in 1474 [1]. The USPTO and the first federal patent laws began in 1790 [1]. This first laws allowed the Attorney General and Secretary of War the power to grant patents with terms of up to 14 years for inventors that they deemed useful and important [1]. The inventors at the time only needed to provide a specification that described the invention and a model where appropriate [1]. After this initial law, several repeals, replacements, and amendments have been made over the centuries in order to create the current federal laws governing the USPTO and patent issuing. Amendments and changes continue to be made as new issues arise to fairly accommodate the breath of creativity that inventors provide.

2 – United State Patent Applications

2.1 – Definition

A patent is a type of property right. The purpose of a patent is to provide the owner, for a specified amount of time, the right to exclude others from making, using, offering to sell, selling, or importing into the United States the subject matter included in the patent in exchange for public disclosure of the invention [2]. Essentially, a patent protects the inventor by preventing others from making a profit off of the invention. The USPTO is the governing body for reviewing, granting and/or rejecting patent applications [2]. Applications can be filed by paper via mail or by hand or can be filed online through the USPTO website. If an inventor files by paper, the costs to file are significantly higher than if he filed online.

The USPTO highly recommends that those seeking to obtain a patent hire a patent lawyer. Patent lawyers have significant knowledge about what is feasible in a patent application and what is not. In addition, they have the resources to check if an idea has already been patented and can suggest alternatives. If an inventor tries to patent an idea and either does it wrong or does not cover all that he intended, there is the potential that the application will be rejected or will not protect what needed to be protected leaving the inventor with no way to correct the mistake. This can be especially costly if the invention is intended for a commercial endeavor. Every invention is entered into the U.S. Patent Classification System (USPC) [3]. This system allows inventions to be grouped together into smaller collections based on subject matter [3]. The system includes a class, or major component, and a subclass, or minor component, which is indicated by a unique alphanumeric identifier in the form of class/subclass [3]. Every U.S. patent has at least one mandatory classification and may opt to have one or more discretionary classifications [3]. The USPC uniquely identifies over 450 classes with more than 150,000 subclasses [3]. Classifications are separated by type of patent (utility, design, or plant) which makes searching for pre-existing patents much easier [3].

2.2 – Statistical Analysis of All United States Patents

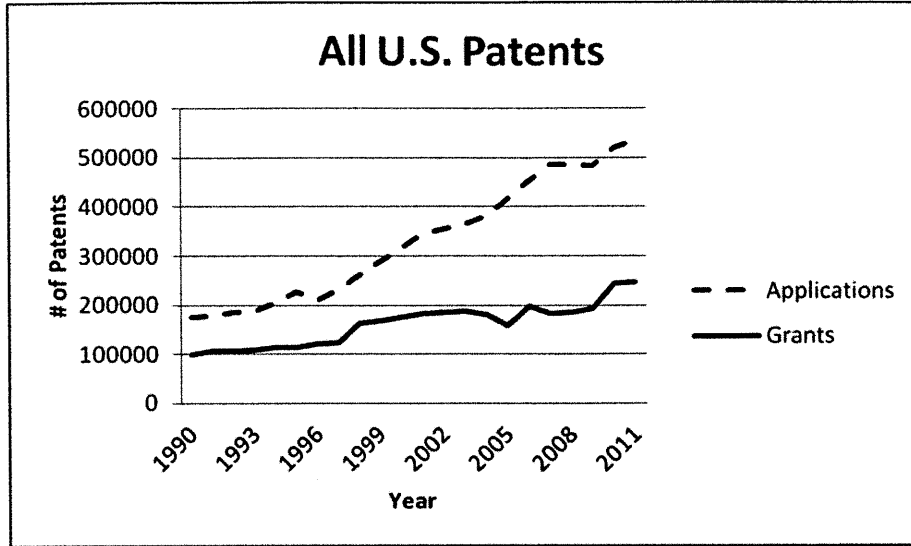


Figure 2-1: A comparison of all U.S. patent applications and grants.

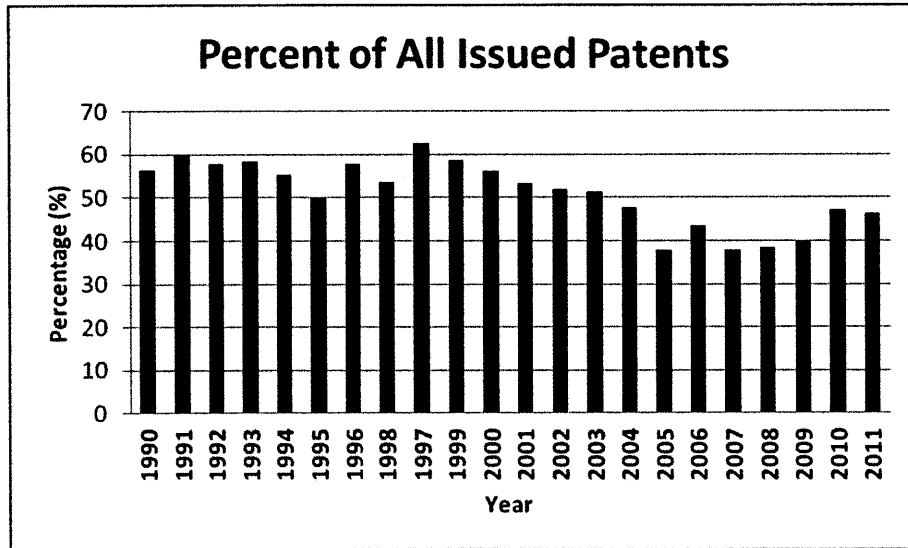


Figure 2-2: The percentage of all granted patents by the USPTO.

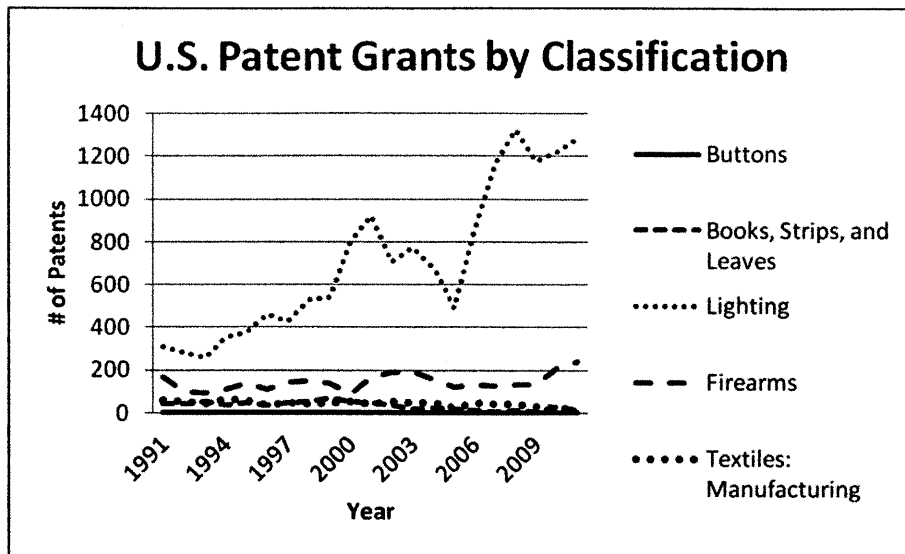


Figure 2-3: A comparison of granted U.S. patents by classification.

Since 1990, the number of patent applications submitted to the USPTO has increased by over 200% by 2010 as shown in Figure 1. On average over the past two decades, about 50% of all the patent applications are granted by the USPTO. This data does not include provisional or foreign patents filed in the U.S., only utility, plant, and design patents [14]. The increasing trend in applications fits perfectly with the technological advances made through the 2000s like smart phones, kindles, iPods, net books, etc. Figure 3 shows the trend for granted applications by classification for five well-known technologies. There has not been any significant improvement in the design or utility in buttons. There is a downward trend in granted applications for Books and Textile Manufacturing which suggests that the limit to the variations in utility and design for these technologies is close to being reached. Firearms have a steady number of granted applications over the past two decades. This suggests that there is a consistent amount of new designs, manufacture, and use in firearms to be patented every year. The trend for Lighting patents has increased dramatically. This is most likely due to the increased awareness of green energy and alternative forms of creating light. Overall, the number of patents granted in the United States continues to increase over the years as we discover new technologies, designs, and improvements.

2.3 – United States Provisional Patent Application

The contents of this section are largely adapted from the “Provisional Application for Patent” provided by the United States Patent and Trademark Office.

2.3.1 – Definition

A provisional patent is a low-cost first patent filing that allows an inventor to submit an application without completing a formal patent claim, Oath, or Declaration. This is not an official patent. Having a provisional patent allows “Patent Pending” to be amended to the invention for 12 months which cannot be extended [4]. Once a provisional patent has been filed, the inventor must file a non-provisional patent during the 12-month pendency period and specifically reference the provisional patent in order to reap the benefits of the provisional filing . At least one inventor in the provisional patent must be named in the non-provisional patent application, otherwise it cannot be referenced. Alternatively, the inventor can file a petition to convert the provisional patent into a non-provisional patent during the 12-month pendency period, but the term of the patent will be measured from the filing of the provisional patent application. The term of a patent is the length of time in which the patent protection is enforced for a particular invention. A provisional patent is only available for utility and plant patent applications.

The purpose of a provisional patent is to allow an inventor to make a smaller initial investment so that he or she can see the commercial potential for the invention. If there is none, they can choose not to complete a non-provisional application and the invention will simply be open to the public sphere. In this case, the applicant loses the right to ever patent the invention. Filing a provisional application begins the Paris Convention priority year which allows an inventor to file in another country for the same invention [4].

2.3.2 – Requirements

A provisional patent requires much less in the application than a non-provisional patent. The application may be filed up to 12 months after one of the following has occurred the date of first sale, offer for sale, public use, or publication of the invention. A filing date will be added to the application once it includes a written description of the invention and any drawings necessary to understand the invention. The completed application should include the filing fee as well as a coversheet containing the application, the name(s) of all the inventor(s), the title of the invention, the name and registration number of the patent attorney or agent and docket number if applicable, correspondence address, and any U.S. government agency that has a property interest in the application. Amendments are prohibited unless they make the application apply to USPTO regulations.

2.4 – United States Utility Patent Application

The contents of this section are largely adapted from the “Nonprovisional (Utility) Patent Application Filing Guide” provided by the United States Patent and Trademark Office.

2.4.1 – Definition

A utility patent is a non-provisional patent application that is granted to anyone who invents, discovers, or improves any new and useful process, machine, article of manufacture, or composition of matter. The specific protection offered by a utility patent covers how an invention is manufactured and used. The term for a utility patent is 20 years from the filing date. Unlike the provisional patent application, a utility patent, as with all non-provisional patents, requires a formal Oath or Declaration and a claim(s) for the invention. There is a \$400 filing fee (\$200 if claiming small entity) for a paper utility application. This fee can be avoided if the documents are submitted online through the USPTO website. One can claim to be a small entity on a non-provisional application if the filer is a single inventor, a small group of inventors, or a start-up. Large corporations and government agencies cannot claim to be a small entity in a patent application.

2.4.2 – Requirements

A utility patent application must be submitted in English or an English translation must be provided if the original language is not English. A complete utility patent application must include a specification including a description and claim(s), drawings when necessary, a Declaration or Oath, and fees for filing, patent search, and examination. A patent application may not be handwritten. The type should be 12pt font and non-script. Each page should be the standard 8.5 by 11 size and be numbered in the center below the text. A series of documents are needed in the following order for the application to be complete:

2.4.2.1 - Utility Patent Application Transmittal Form or Transmittal Letter

This document should be filed with every patent application to identify the applicant(s), type of application, title of invention, the contents of the application, and any accompanying enclosures.

2.4.2.2 – Additional Fees

The late fee for a utility patent application is \$130 (\$65) if paying after filing or if the Oath is not included. There is a size fee if the online submission exceeds 133 pages or if the paper submission exceeds 100 pages. There is an excess claims fee if the application contains more than 3 independent claims or more than 20 total claims. These fees are determined at the time of filing.

2.4.2.3 – Application Data Sheet

This document contains all the bibliographic data required by the USPTO including applicant information, correspondence information, application information, representative information, domestic priority information, foreign priority information, and assignment information. Additional Application Data Sheets may be submitted prior to fee payment to amend or update the previous data sheet, Oath, or Declaration. However, changes to the named inventors, changes in correspondence address, and changes in inventor's citizenship are not eligible for change by a supplemental Application

Data Sheet. Alterations must be shown by underlining for insertions and strike-through or brackets for removal.

2.4.2.4 – Specification

The specification is a written description of the invention and must include at least one claim along with the process of making and using the invention. This document should allow any person skilled in the particular art or science of the invention to make or use it. In the case of computer programs, a computer program listing may be included for submission. The document must include an abstract, claims, and section headings. If there is no information under the section heading, then “Not Applicable” must be written below [5]. The Title of the Invention is allowed to be up to 500 characters long. This section must include the name, citizenship, and residence of each applicant along with the title of the invention. The Cross-Reference to Related Applications section allows the applicant(s) to claim the benefit of one or more prior filed co-pending non-provisional or provisional patent application(s). A reference to each prior application must be made identifying each by number, international number, or filing date along with the relationship of the applications. The applicant could choose to add this information in the Application Data Sheet. Where applicable, the specification should include a Statement Regarding Federally Sponsored Research or Development indicating the rights to the inventions made under federal sponsorship. Depending on the invention, the applicant may need to complete the Reference to Sequence Listing, a Table, or a Computer Program Listing Compact Disc Appendix. This section allows the inventor to include a computer program, gene sequence listing, or table of information in order to more fully explain the extent of the invention. Only these three additions are allowed to be submitted via CD and must be in ASCII character and file formats. If the computer program is over 300 lines long with no more than 72 characters per line or a table of data occupies more than 50 pages on paper then they must be submitted via CD. The Background of the Invention section should include a statement about which field the invention falls into. This section may

include a paraphrasing of the applicable USPC definitions for the invention. If applicable, this section should contain references to specific problems in the particular technology that the invention is hoping to correct. The Brief Summary of the Invention presents the general idea of the claimed invention. This section may include the object of the invention and any advantages the invention has or problems that it addresses. A Brief Description of the Several Views of the Drawing must include a list of all the figures by number and their accompanying explanation of what is depicted in each figure. This concludes the summary portion of the utility application.

The following sections are the core to the utility application. The Detailed Description of the Invention contains a full explanation of the process for making and using the invention. The process, machine manufacture, composition of matter, and/or improvement made by the intended invention should be explained fully, clearly, and concisely [5]. Here, the applicant should distinguish his invention from previous inventions that are similar. This description should be detailed enough that any person of ordinary skill in the relevant science or art can replicate and use the invention without continued experimentation [5]. The Abstract of the Disclosure essentially outlines the major points about what is new about the invention. This section should be limited to a maximum of 150-word paragraph in narrative form in order to allow the USPTO the ability to quickly determine the nature of the technologies involved in the invention [5].

2.4.2.2.1 – Claims

The Claim or Claims is the most important part of the utility patent application; whether or not an application is granted is based on the claims. The claims define exactly what the patent is protecting with regards to the invention. Each claim must particularly point out and distinctly name the subject matter that the inventor claims as the invention. Each independent claim should be a single sentence and any dependent claims should be grouped together and listed below their respective independent claim.

2.4.2.4.2 – Oath or Declaration

The second most important part of any non-provisional application is the formal Oath or Declaration. The only difference between a Declaration and an Oath is that an Oath requires a notary public or other authorized officer to administer the Oath and a witness to verify its signing. The Oath or Declaration requires that each inventor make a statement that he/she believes himself/herself to be the first creator of the intended invention along with a series of statements required by law and the USPTO. Most applicants prefer to make a Declaration over an Oath. If an inventor is filing an application that is a continuation of a previous filing or references a previous filing, it may be acceptable to use the earlier Oath or Declaration. This section requires the signature, full first and last name, middle initial or name, and citizenship of each inventor on the application. If an Application Data Sheet is not provided, then the addresses of all the inventors should be provided in this section. A person other than the inventor, such as a legal representative, can make the Oath or Declaration if that person states their relationship to the inventor and the inventor is unable to sign due to death, insanity, legal incapacity, or unavailability/refusal to sign. If the inventor refuses or is unavailable then a petition must be filed and granted by the USPTO. If some of the inventors have signed the Oath or Declaration then they must sign on behalf of the non-signing inventor(s). However, if none of the inventors want to sign the Oath or Declaration then it must be signed by the party with proprietary interest in the application and must be shown in the petition.

2.4.2.4.3 – Drawings

Drawings are required in a utility patent application and the collection of drawings should show every feature of the invention that is specified in the claims. Omitting drawings may cause the invention to be considered incomplete which could result in late fees or termination of the application. There are many requirements for the Drawing section. As drawings are required with utility patent applications, they must be formatted properly. The USPTO has a specific list of guidelines for submitting drawings.

First, all drawings must be submitted in black and white. They may only be in color if a petition is granted and a \$130 fee is paid. USPTO will accept black and white photographs only where a drawing is insufficient to show the invention in the case of: electrophoresis gels, blots, autoradiographs, cell cultures (stained and unstained), histological tissue cross sections (stained and unstained), animals, plants, in vivo imaging, thin layer chromatography plates, crystalline structures, and ornamental effects. All drawings should be in PDF form to be submitted electronically and/or kept for the inventor's records. All the sheets of drawings should be numbered at the top of the middle of the sheet but not in the margin. Partial views that are meant to show one complete view should be labeled by the same number followed by consecutive capital letters. All view numbers should be preceded by "FIG" unless there is only one drawing in which case it should not be numbered and "FIG" is unnecessary [5]. The lead lines and arrows are to connect the reference characters to the details to which they refer. The lines should never cross and should be as short as possible. The top margin of each of the sheets of drawings should contain the title of the invention, the inventor's name, the application number (if known), and the docket number (if known). The drawings should also contain the name and phone number for the USPTO to call in case they are unable to match the drawings to the application if it is filed by paper. Chemical or mathematical formulas, tables, computer program listings, and waveforms may be submitted as drawings as long as the requirements for drawings are followed. The inventor is allowed to submit detailed views of portions of the invention on a large scale if they help to show the invention in its entirety. Drawings are not allowed to have any indications of scale as reproductions of the images may vary in size. Shading is allowed if it helps with the understanding of the invention. However, solid black shading is not allowed, only 45-degree angled lines. Authorized security markings are allowed if they are placed in the center of the top margin. The applicant may include a copyright or mask of work notice only if the authorization is written in the specification.

2.4.3 – Submission

The applicant should obtain a receipt for the documents he submits to the USPTO if the documents are mailed or turned in by hand. The inventor should submit a self-addressed postcard and attach it to the first page of the application. The postcard should have a list of everything contained in the application: the application number (if known), the confirmation number (if known), the filing date of the application (if known), the title of the invention, the name of the inventor(s), the title and number of pages of each USPTO form, the number of pages of specification (excluding claims), the number of figures of drawing and the number of sheets of drawings, whether an Oath or Declaration is included, the total number of pages of each document, and the amount of payment and method if the application is filed by paper. The agent at the USPTO will review the contents against the list on the postcard. Any discrepancies will be noted on the postcard and returned to the applicant with the initials and date of the person who reviewed the application in the Office of Initial Patent Examination. The returned postcard serves as a receipt to the inventor that his documents have been received by the USPTO. However, this postcard will not serve as a receipt for documents not properly itemized or for documents not received.

2.5 – Statistical Analysis of All United States Utility Patents

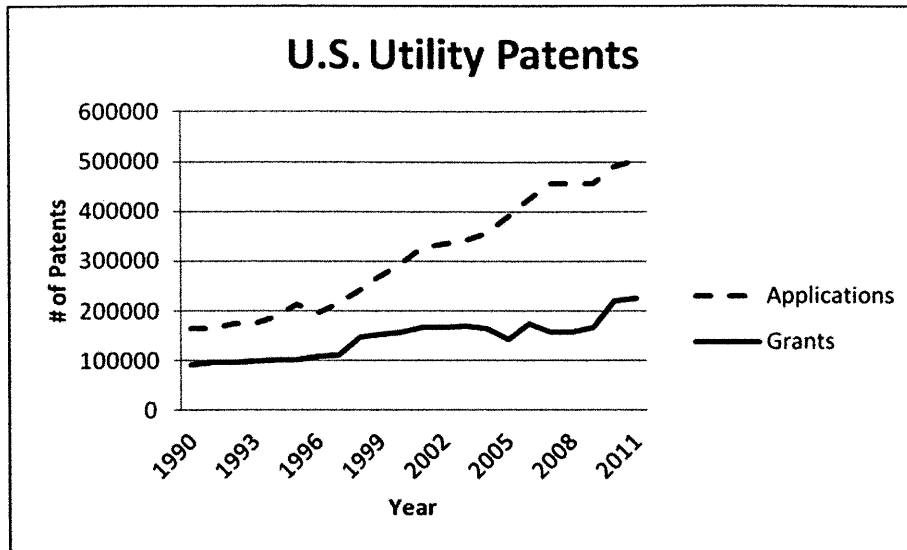


Figure 2-4: A comparison of all U.S. utility patent applications and grants.

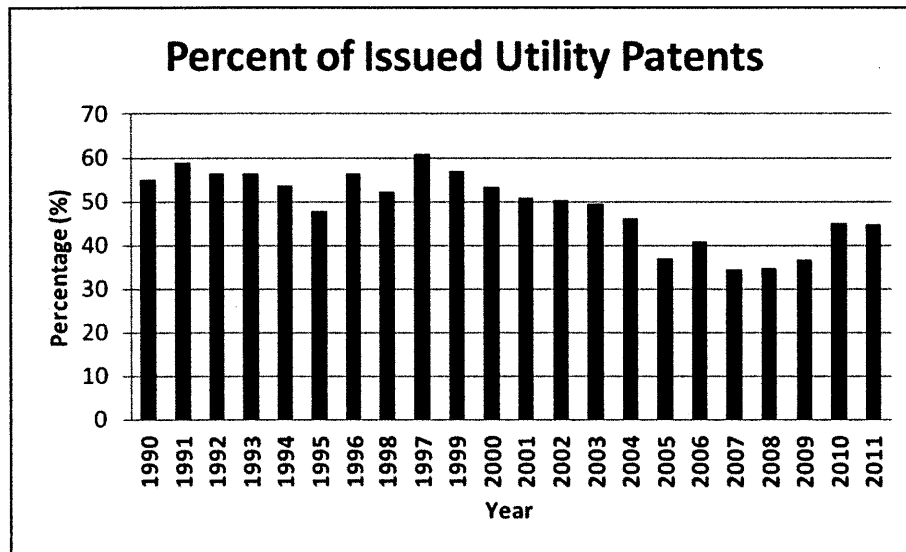


Figure 2-5: The percentage of all granted utility patents by the USPTO.

Utility patents are the highest volume applications submitted to the USPTO. However, only about 50% on average are actually granted to the inventor(s). Due to the large volume of utility patents that exist in the United States, new utility patent applications have a higher likelihood of conflicting with a pre-existing application which explains the 50% success rate of earning a utility patent. However, this does not stop inventors from submitting a plethora of utility patent applications. Everyday people are

discovering new ways to improve old technologies or discovering new ways to create new and old articles of manufacture as shown by the clear increase in utility patents over the past two decades.

2.6 – United States Design Patent Application

The contents of this section are largely adapted from “A Guide to Filing a Design Patent Application” provided by the United States Patent and Trademark Office.

2.6.1 – Definition

A design patent is a non-provisional patent that is granted to anyone who invents a new, original, and ornamental design for an article of manufacture. This patent protects the way an article looks, but not how it is made or used. This particular patent allows for only one claim and the design must be “original” [6]. Applicants may submit a utility and design patent application for a single invention if they want to protect how it looks as well as how it works and is manufactured. The design patent also requires a \$400 (\$200) filing fee if submitted to the USPTO by paper. The term for a design patent is only 14 years unlike the 20 years for a utility patent.

As defined by the USPTO, a design is the visual ornamental characteristics embodied in or applied to an article of manufacture. The design may relate to the shape, configuration, surface ornamentation, or any combination of those elements to the invention. However, the design for surface ornamentation is inseparable from the invention and must be a definite pattern. An ornamental design may exist in the entire invention or just a part. If the inventor would like to add multiple claims for independent and distinct designs, then multiple design patents must be filed. A design is independent if there is no obvious relationship between two or more inventions; a design is distinct if it has different shapes and appearance even if the inventions are related. Modified forms of a single, independent design are allowed in one design application. The following are not permitted in design patent applications: a design that is based on a function, a design that is not unique or distinct, designs that simulate pre-existing patterns or objects, and any design that is offensive to any person or group of

people. For inventors seeking to submit design patents, they may choose to seek assistance from an Invention Development Organization (IDO). These are private or public marketing and consulting businesses that attempt to help inventors profit from their ideas. However, some of these organizations are illegitimate. Inventors should be wary of any IDO that will promote his invention without asking for a detailed reason as to the merits of the invention and provides the inventor with a full range of options to pursue patent protection.

2.6.2 – Requirements

The design application is shorter than the utility patent application, requiring only six sections. First, the Preamble should state the title of the design, name of the applicant, and a brief description of the use for the invention to which the design is applied. The Title needs to identify the invention in which the design is embodied. Making a descriptive title helps the examiner develop a field of search for prior art in the field and makes it easier for them to assign the application to the proper class, subclass, and classification upon approval. In addition, the title helps the public understand the nature and use of the invention to which the design is applied. However, marketing designations are not allowed in a design application. In the Description of the Figure(s) of the Drawing, the inventor must indicate what each of the drawing views represent but provide a description of what is in the drawing. The applicant is allowed to provide a section on the Feature Description if he wishes, but it is not necessary to obtain a grant for the patent. The most important section of the design application is the single claim. Here the inventor must define the design which he hopes to protect with the patent. The description of the design of the invention in the claim should be consistent with the title of the invention. The claim must be made in formal terms such as “The ornamental design for (the invention which embodies the design or to which it is applied) as shown (and described) [6].” The inventor must submit an Oath or Declaration that follows the same rules as the utility patent application.

2.6.2.1 – Drawings

The second most important part of the design application is the drawings or photographs of the design. Unlike a utility application, black and white photographs are permitted in a design application if a drawing cannot accurately show the design. There must be enough drawings, black ink on white paper, or black and white photographs provided to fully show the entirety of the design. If photographs are used, they should be submitted on double weight photographic paper and have the drawing figure number placed on the face of the photograph. However, the applicant is not allowed to combine photographs and drawings in one application, he must use one or the other. Color drawings or color photographs may be submitted if the inventor submits and is granted a petition to the USPTO. The applicant must include three sets of color photographs or drawings along with a black and white photocopy that shows the subject matter in the color submission. If color submissions are made but the color is not part of the design, then a disclaimer should be made, otherwise color will be considered part of the design. Like the utility patent application, the design patent must include enough views to completely show the design. If two views are perfectly mirrored, one can be omitted and a statement should be provided to explain the omission. A sectional view is permitted if it shows the elements of the design more clearly. However, like the utility patent application, solid black surface shading is not allowed. Broken lines are for illustrative purposes only and may not be part of the claimed design. If the claim is only for surface ornamentation, then the invention to which it applies must be shown in broken lines. The specification for the design application should include a description of any part of the design that is not shown in the drawings, a description disclaiming any parts of the invention that is not shown and does not form any part of the design, a statement indicating that environmental structure shown by broken lines in the drawing are not a part of the design, and a description noting the nature and/or environmental use of the design. If color drawings are included, then a line must be written in the specification as follows: "The file of this patent contains at least one drawing executed in color. Copies

of this patent with color drawings will be provided by the United States Patent and Trademark Office upon request and payment of the necessary fee [6].”

2.6.3 – Examination and Submission

Once the application is filed with the appropriate fees, the USPTO goes through its examination process. The application is checked to ensure the completeness of the disclosed drawings and compared to “prior art” to ensure uniqueness [6]. “Prior art” is defined as the previously issued patents and published materials [6]. If the application is rejected, the inventor will be notified of the details that incurred the rejection and suggestions for amendments. If the examiner requests a reply to a rejected application, the inventor must comply with the requirements indicated by the examiner, or specifically argue why compliance with the requirements is not necessary. When responding to the USPTO, the applicant should include: an Application Number (to check for accuracy), a Group Art Unit Number (copied from the filing receipt or the most recent Office action), a Filing Date, a Name of the Examiner who prepared the most recent Office action, and the Title of the Invention. The application will be considered abandoned, if the inventor does not reply to the USPTO within the designated time period. To avoid this, an applicant can file a petition within six months from the mail date of the Office action provided. The fee for the petition is determined based on the amount of time requested and increases with the length of time. A “Certificate of Mailing” should be attached to any response the inventor sends to the USPTO in order to ensure that the Office knows the reply was made within the designated time period [6]. Like the utility patent application, a receipt of papers filed can be sent to the applicant if he provides a self-addressed postcard listing the contents of the application. A notification of “Change of Address” must be sent in a separate letter and a separate notification should be filed for each application [6]. If the application is rejected twice, then the decision from the USPTO is final. The inventor may file an appeal or begin a new application prior to abandonment of the original claiming the benefit of the earlier filing date allowing for prolonged prosecution on the claim.

2.7 – Statistical Analysis of All United States Design Patents

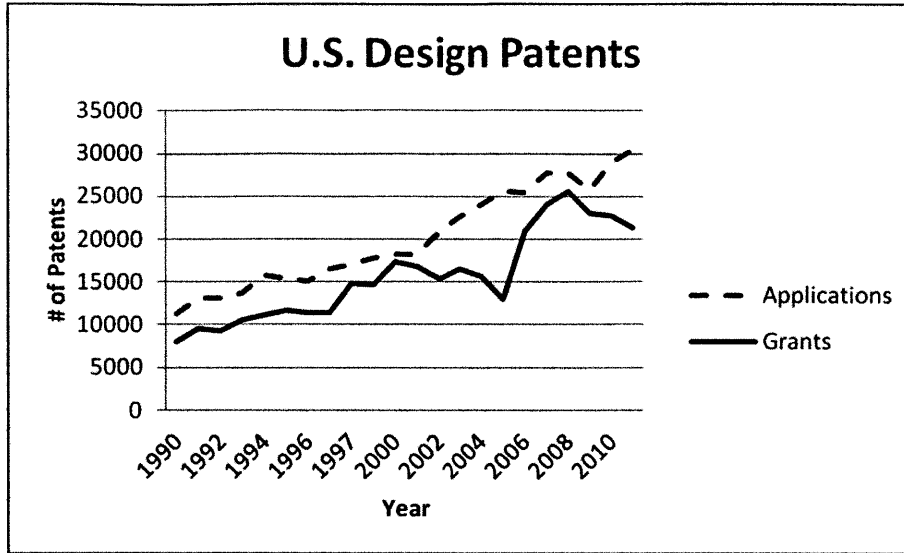


Figure 2-6: A comparison of all U.S. design patent applications and grants.

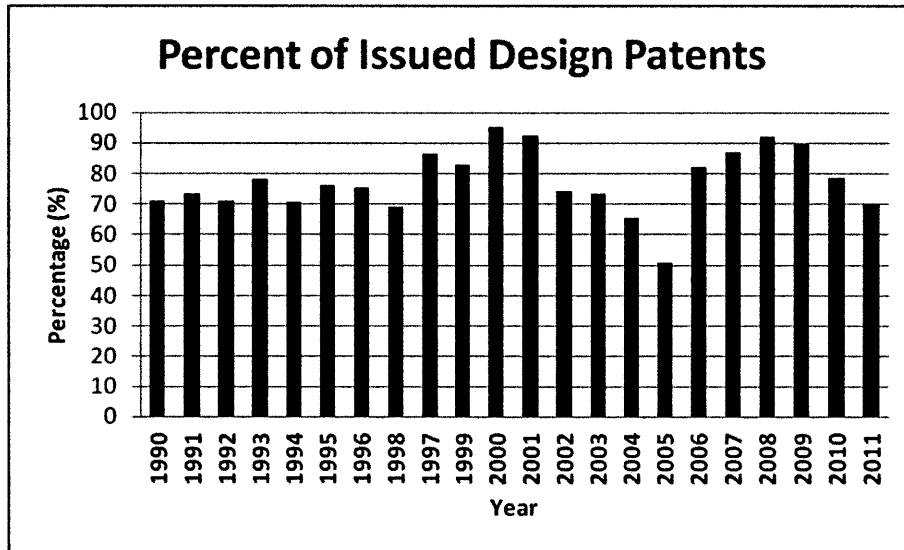


Figure 2-7: The percentage of all granted design patents by the USPTO.

The volume of design patent applications submitted in the United States is about 10% of the volume for utility patents. However, the success rate for design patent grants is around 70%, about 20% higher than utility patents. There is a steady linear increase in the number of design patents that are submitted to the USPTO over the last two decades. As new technologies are created, how they look can be patented by other inventors and as utility patents continue to increase so will design patents.

2.8 – United States Plant Patent Application

The contents of this section are largely adapted from the “General Information about 35 U.S.C. 161 Plant Patents” provided by the United States Patent and Trademark Office.

2.8.1 – Definition

A plant patent is a non-provisional patent that is granted to a person who invents or discovers and asexually reproduces any distinct and new variety of plant. The protection for a plant patent prevents anyone other than the inventor from asexually reproducing, selling, or using the plant the inventor has discovered and reproduced. The application is restricted to one plant or genome. The term of a plant patent is 20 years from the filing date similar to the utility patent. The USPTO has provided a specific definition of a plant that can be protected under a plant patent. A plant is “a living plant organism which expresses a set of characteristics determined by its single, genetic makeup or genotype, which can be duplicated through asexual reproduction, but which cannot otherwise be ‘made’ or ‘manufactured’ [7].” Algae and macro fungi are considered to be plants but bacteria are not. Sports, mutants, hybrids, and transformed plants may all be included in a plant patent application. A sport is a part of a plant that shows distinct morphological differences from the rest of the plant [8]. Mutants or sports may be spontaneous or induced, while hybrids may be natural or somatic. Though natural plant mutations occur naturally, to be patentable they must have been discovered in a cultivated area. The portion of the plant used for asexual reproduction may not be a tuber food part such as with a potato. The following would prevent an applicant for filing for a plant application: if the plant has been sold or released in the United States of America more than one year before the filing date, if the plant has been released to the public in any way such as in a printed publication with an offer to sell more than year before the filing date, if the plant cannot be shown to be different from related plants by at least one distinguishing characteristic that is not related to the environment in which it is grown, or if the plant is obvious to anyone skilled in the necessary art during the time of the invention. If an applicant is doubtful

whether the plant can be patented, he may consult a qualified legal authority prior to filing to ensure the patentability of the plant.

2.8.2 – Inventorship

Inventorship for a plant patent application is more involved than with a utility or design patent. The inventors included in a plant patent application are restricted to the person(s) who contributed to either of the following steps: discovery of a new and distinct plant and asexually reproduced it, or discovery or selection of a new and distinct plant and asexually reproduced it. Essentially, if the applicant directs the asexual reproduction to a custom propagation service or a tissue culture enterprise, the employees performing that service are not considered co-inventors in the application. Asexual reproduction is defined as the propagation of a plant to multiply without the use of genetic seeds and creating an exact genetic copy. The acceptable modes of asexual reproduction as determined by the USPTO include but are not limited to the following: rooting cuttings, apomictic seeds, division, layering, runners, tissue culture, grafting and budding, bulbs, slips, rhizomes, corms, and nucellar embryos. The purpose of asexual reproduction is to ensure the stability of the plant and the application must not be filed before the reproduced plant has had enough time to be evaluated [7].

2.8.3 – Requirements

For a plant patent, it is important for the inventor to contact the USPTO prior to filing to see if there have been any significant changes to requirements for the application. As with all incomplete patent applications, the applicant may incur late fees or lose intellectual property rights. The content for a plant patent application should follow the same requirements as for a utility patent application with a few exceptions. The specification needs to contain a full and complete botanical description of the plant and the specific characteristics that distinguish it over other known and related plants.

2.8.3.1 – Specification

The specification should have a series of sections providing more detail about the invention as with the utility patent. The Title of the Invention should include the name, citizenship, and residence of each applicant. If there are any related patent applications, the inventor should include a Cross-Reference to Related Applications section unless they provided an Application Data Sheet. In this section, the applicant may reference any of the following related applications: a utility application where the claimed plant is the subject of a divisional application; a co-pending, newly filed application for the same plant; an application that was previously rejected for the claimed plant; or co-pending applications for similar or sibling plants developed by the same breeding program. The applicant should include a Statement Regarding Federally-sponsored Research and Development, if there is any. The specification should also include the Latin name of the genus and species of the claimed plant and the variety denomination. Like the utility patent application, a Background of the Invention section should be included in the specification of the plant patent application. The Background of the Invention contains two sections: the Field of the Invention and a description of relevant prior art. In the Field of the Invention, the inventor should identify the botanical and market class for the claimed plant and describe how the plant is intended to be used. In addition, the inventor should also include the botanical name of the plant by genus and species. The description of relevant prior art should include the parent plant(s) for the claimed plant. If unknown, then the probable parent plant(s) should be identified. The most important distinguishing characteristics of the parent and claimed plant should be included in this section. The inventor should also describe how the plant was discovered and asexually reproduced. Finally, the applicant should make a statement that the clones of the claimed plant are identical to the original plant in all major characteristics to indicate the stability of the claimed plant. A Summary of the Invention should be provided in the application and must include the major characteristics of the claimed plant outlined as a list of novel characteristics or as a narrative description of the unique trait(s).

The Brief Description of the Drawing should include a brief description of each of the figure(s) or view(s) of the drawing of the claimed plant. Unlike the utility and design patent application, the drawing for a plant application must include a color photograph of the distinct features of the claimed plant that must still be identifiable if the picture is shrunk to 50% of its size. Coloring of the plant, foliage, bark, flowers, and/or fruit are all distinguishing characteristics. Each of these parts should be shown in individual photographs. The different figures need not be numbered unless the examiner requests it. The Drawing section should be in the form of a color photograph of the plant. However, a permanent water color rendering that can fully show the appearance of the claimed plant is also acceptable. Any color depicted should correspond with a specific color designation outlined in a recognized color dictionary. Two copies of color drawings must be submitted if photographs are not used and may be submitted in permanent water color or oil. The margin requirements for the submitted drawings should follow the same guidelines as a utility application.

The Detailed Botanical Description of the Plant should include a complete description of the claimed plant. The description should include the genus, species, and market class of the plant along with the parent(s) of the plant. The growth of the plant should be described and include the shape and branching habit of the plant at maturity. If there are any specific winter dormancy habits, they should be included in this section. A full description of the bark, buds, blossoms, leaves, and fruit should be disclosed. Any characteristics that cannot be explained through a written description should be outlined in this section such as fragrance, taste, disease resistances, productivity, precocity, and vigor. The descriptions should use the botanical nomenclature relevant to the art of the plant. The purpose of this section is to prevent future inventors from patenting the same plant under the rationale that the original application did not fully describe the plant.

Similar to the design patent, a plant patent application is allowed a single claim. The Claim must be a single sentence in formal terms to the plant and may reference one or more of the unique characteristics of the plant but cannot claim parts or products of the plant. The final portion of the specification should be the Abstract of the Disclosure. In this section, a brief description of the plant and its most noteworthy characteristics should be provided. As with all non-provisional patents, an Oath or Declaration must be submitted by all the applicants. If the plant is newly discovered, then the Oath or Declaration must state the plant was found in a cultivated area.

2.8.4 Examination and Submission

When submitted to the USPTO, the plant patent goes through a thorough examination process. First, the examiner will ensure that the Title, Oath or Declaration, Abstract, and arrangement of the Specification are up to USPTO standards. If they are, then the application is checked for the completeness of the botanical description, novelty of the plant, and obviousness of the discovery. If the application is rejected, the applicant will be informed and will then have to determine if he would like to re-apply. However, if the application is approved, the applicant will be informed that it is being forwarded to the USPTO Issue Branch where he must send the issue fee. The application will be published in due time after the payment is received.

2.9 – Statistical Analysis of All United States Plant Patents

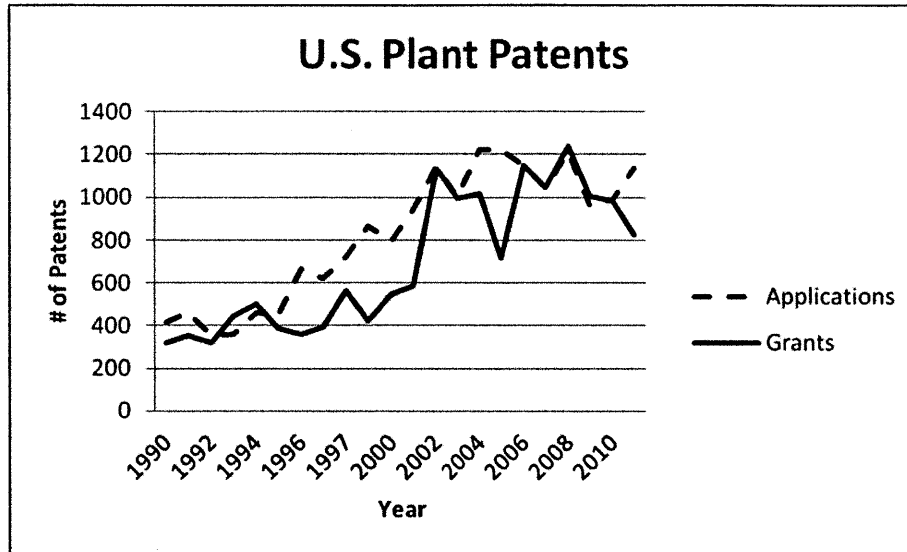


Figure 2-8: A comparison of all U.S. plant patent applications and grants.

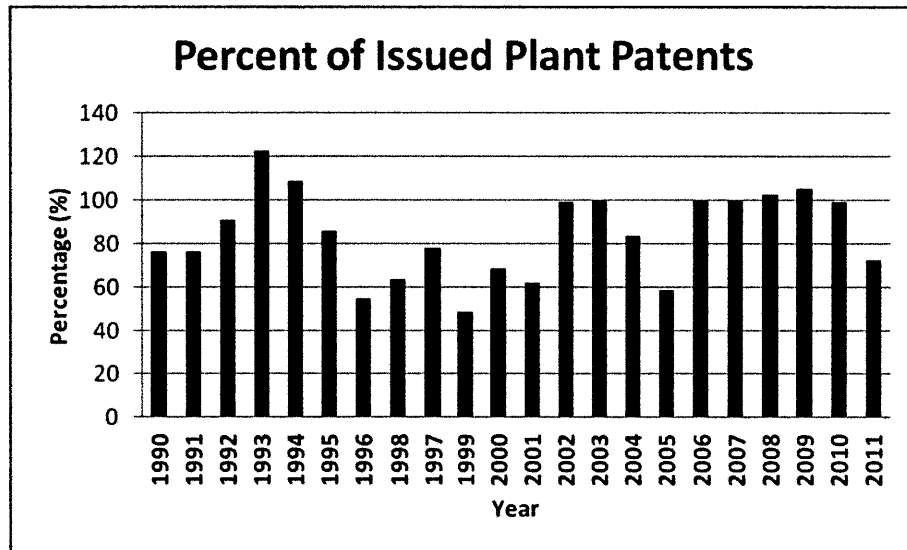


Figure 2-9: The percentage of all granted plant patents by the USPTO.

Plant patents are the lowest volume applications submitted to the USPTO. However, they have the highest issue rate. In some cases, there are more plant patents granted than submitted. This is due to foreign patent applications being approved in the United States. On average, there is an 85% success rate for plant patents. Anyone who believes they have discovered a new plant is most likely correct since there is an over abundance of literature and knowledge about all the existing species of plants. A

notable and unique difference in a plant would be fairly obvious to those knowledgeable in the art of plants, hence the high success rate in granted plant patents. The number of plant patents submitted to the USPTO is increasing like design and utility patents. This is most likely due to advances in biological fields allowing for more specific and controlled mutations in plant life.

3 – Patent Case Study

3.1 Keg Head

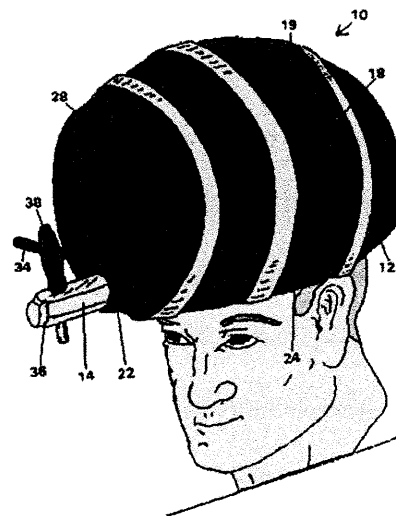


Figure 3-1: The patent illustration of Randall Flann's Keg Head. [10]

The Keg Head is a beverage dispensing helmet in the shape of a keg. The USPTO issued the utility patent for this invention on October 19, 1999 [11]. Once the patent was established, the inventor, Randall Flann, began a company to produce and sell the product called RoFo Enterprise, Corporation. The website can be visited here: <http://www.rofoheadgear.com/>. Though the invention can house any beverage, its primary purpose is to contain non-alcoholic beverages according to the website. On August 22, 2000, Jason Rowan was issued a utility patent for his Beverage Dispensing Helmet Apparatus [12]. The claims between the two inventions differed enough for the USPTO to classify them as unique and issue patents for each of them. With Flann's invention, he made sure to include in the claims that his invention included:

“a family of transportable receptacles for dispensing substances comprising...of containers presenting different identifiable spacial forms...including a bottom wall defining a generally flat surface to maintain the container in an upright, freestanding condition when placed on a horizontal surface...[and] a hat-like recess formed within the bottom wall sized for wearing on an individual’s head and for maintaining the container in the upright, freestanding condition during hands-free ambulation of the individual, and a family of spigots presenting different identifiable spacial forms, each spigot being constructed and arranged for interchangeable placement on or in the mount in communication with the chamber...” [11].

He does not mention a chin strap in his design which is not used in any of his products. Due to his expansive description, Flann is able to create products with many different styles that that fall within his patent restrictions. Rowan, on the other hand, is completely limited by the helmet shape as that was a key specification in his claims. Due to this, Rowan may only make helmet shaped beverage dispensing containers while Flann can make stadium to hotdog shaped containers. This is a key example of how being as non-specific with one’s claims as possible is necessary to gain the most out of a patent application. However, in the case that the idea one would like to patent has already been done, making a specific claim, like the helmet, will allow the patent to be granted but limits the possibilities of products that can be produced.

4 – Conclusion

In conclusion, patents are extremely important to the general health of our economy. Without the exclusive rights to ideas, there would be no need for commerce. As new technologies continue to be discovered, the rate for patent applications and grants will continue to increase. As shown by the Keg Head product, without the patent rights to his product, Randall Flann would not have been able to start a company. Though the process for applying and having an application examined by the USPTO is long and arduous and can take years, the current system seems to be the best option for filing and issuing patents. The amount of detail required in each application allows the inventor the ability to cover a broad spectrum of potential products with the patent as well as make the scope of the application clear to the USPTO and the public. Given the length and number of the applications and the limited number of examiners, it is understandable that the process may take years to process. Unfortunately, a computer program would not be able to replace human interaction with the applications in order to file them because a computer does not have a human's understanding of language and meaning. For now, the USPTO and the current patent application system is the best system we have to protect inventors and their intellectual property.

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