Form and Content of a US Utility Patent Application

Course No: LE7-001
Credit: 7 PDH

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Introduction

This course is designed for engineers and inventors who want to learn more about writing and filing patent applications in the United States Patent and Trademark Office (USPTO.) It is possible for inventors to file and successfully prosecute a US patent case in the USPTO; this is called a pro se filing, which means "for oneself" or "on behalf of themselves," for joint inventors who intend to communicate and respond directly to a US patent examiner or other USPTO staff handling the patent case.

Also, as the cost of registered patent practitioner hours or fixed fees may be considerable, another objective of this course is to enable inventors to initiate some of the work themselves so that with correct preparations in place it may be possible to save the inventor or the inventive organization some of the billable workload for the registered practitioner.

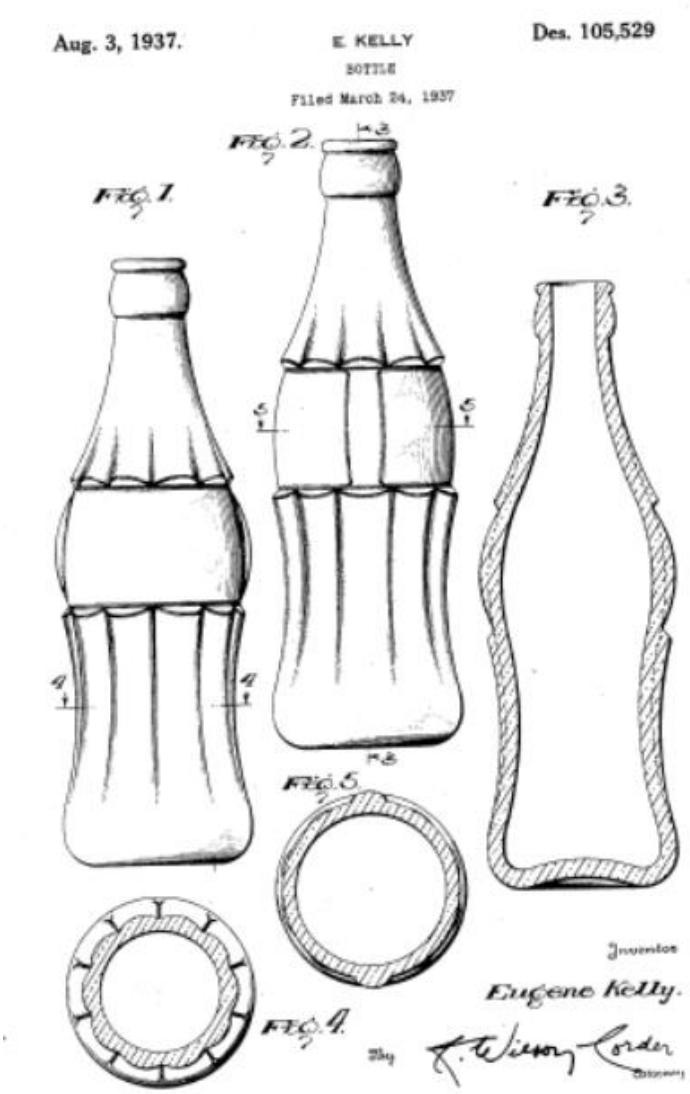
This course will describe the parts and content of a complete US utility patent application according to current practice as of June 2024. Drafting of acceptable figures or drawings, and the drafting of utility patent claims are particular skills in their own right and will be treated in detail in other courses.

The three major classes of patent applications are: plant patents, utility patents, and design patents. Plant patent applications and protections have been available since 1930. A plant patent grant covers the entire organism and not just its useful or edible parts. To secure a plant patent, the inventor must prove that the plant came into existence by means of some minimum human activity altering the natural world. It cannot be a plant discovered in the wild.

Evidence of human cultivation, no matter how far in the remote past, may be a component presented in favor of patentability in the application. Furthermore, the plant inventor must reproduce the plant asexually to prove that its distinctive attributes are stable from one generation to the next, and were not a one-time mutation or fluke.

Design patents cover the ornamentality of an object, which is its distinctive appearance. Design patents are effective for products which have a recognizable styling and “that look” has an inherent brand value. Products which may be effectively protected by design patents include car hood ornaments, decorative wheels and rims, appliance handles and external styling, apparel and fashion accessories, and containers for cosmetics and beverages. Consumers who have enjoyed a beverage or a particular shade of makeup or lipstick in the past may seek out the

brand by remembering the shape of its container. A design patent prevents competitors from selling off-brand products in containers that imply the genuine brand:



As another example, science fiction movie and television producers often file design patent protections for the spaceships, fictitious and fantastic weapons, communications and medical devices, and uniforms, headgear, apparel, and regalia worn by the characters. These patents allow the creators and producers to license production of toys and costumes and exclude unauthorized reproductions of these visually recognizable items.

United States Patent [19]

Johnston et al.

[11] **Des. 254,080**

[45] ** **Jan. 29, 1980**

[54] **TOY SPACECRAFT**

[75] Inventors: **Joseph Johnston**, North Hollywood; **Colin Cantwell**, Newhall, both of Calif.

[73] Assignee: **Twentieth Century-Fox Film Corporation**

[**] Term: **14 Years**

[21] Appl. No.: **832,518**

[22] Filed: **Sep. 12, 1977**

[51] **Int. Cl.** ..... **D21—01**
[52] **U.S. Cl.** **D21/87**
[58] **Field of Search** ..... D34/15 HH, 15 HR, 15 PP; 46/74 R, 74 A, 74 D, 53, 58; 272/31 A; D12/71, 72; D21/87

[56] **References Cited**

U.S. PATENT DOCUMENTS

D. 162,790	4/1951	Christman	D34/15 HH
D. 178,629	9/1956	Beach	D34/15 HR
D. 198,249	5/1964	Sleeman et al.	D12/71

OTHER PUBLICATIONS

Design News, 3-1957, p. 77, Aircraft.

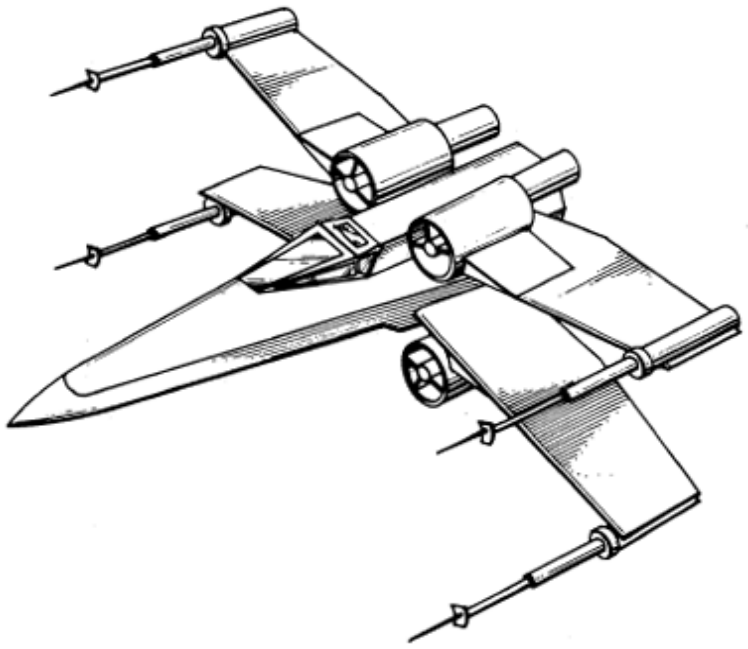
Primary Examiner—Joel Stearman
Assistant Examiner—Charles A. Rademaker
Attorney, Agent, or Firm—Michael A. Painter

[57] **CLAIM**

The ornamental design for a toy spacecraft, substantially as shown.

DESCRIPTION

FIG. **1** is a front perspective view of a toy spacecraft showing our new design;
FIG. **2** is a rear perspective view thereof; and,
FIG. **3** is a front elevational view thereof.



Sometimes a novel utility invention for a device which provides a beneficial use may happen to have distinctive physical features which are necessary for the device to perform its function. In this case, a design patent may be sufficient to exclude others from making and producing a competing product in that market, but the additional protection of a utility patent would also

protect the structure and function of the invention – which a design patent cannot provide. It is possible to apply for and receive a design patent grant and a utility patent grant for the same invention.

There are four cautions in deciding whether to file a design patent, a utility patent, or both for the same invention: First, the grace period for a utility patent filing of a publicly disclosed invention is one year, while the grace period for a design patent is only six months. If a public disclosure, a sale, or an offer for sale of the invention has been made, a design patent must be filed within six months of the earliest such disclosure, and the utility patent filing must be made within one year of the earliest such disclosure.

Secondly, design patents cannot claim priority to any provisional patent applications. Thus, compared to a **one-year** grace period plus a one-year term of a provisional application, followed by a formal utility application, the **six-month** grace period and the lack of any provisions for an informal or preliminary filing in advance of a formal design patent application filing tightens the timeline for deciding whether to file and for preparing formal drawings of the invention.

Thirdly, a design patent may be challenged and invalidated if it can be shown that the shape of the article contributes primarily to the function of the article and contributes little or nothing to its aesthetic appearance (ornamentality.) In the case of L.A. Gear, Inc. v. Thom McAn Shoe Co., 988 F.2d 1117, 1123 (Fed. Cir. 1993) the court held that "[i]f the particular design is essential to the use of the article, it cannot be the subject of a design patent." A company securing a design patent on an article and then advertising how the features of the article provide useful functions or benefits may end up having these statements used against the company in attempt to invalidate the patent in court.

Lastly, due to a “bug” in patent law, the utility patent application must be filed before or concurrent with (on the same day as) the design application. If the utility application is filed after the design application, then the drawings in the design application become available to be used as “prior art” evidence against the utility filing, and the patent office will reject the utility application.

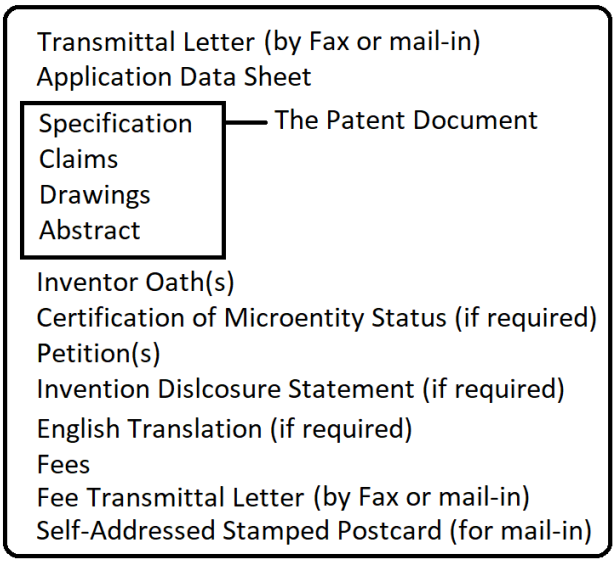
Filing Documents in USPTO:

There were two electronic modes for filing an application through the USPTO website, and the office also receives applications by fax and by mail. The older of the two web-based services was called PAIR (Patent Application Information Retrieval) and was replaced in 2023 by a new interface called Patent Center. The web-based system accepts Adobe PDF files and Microsoft Word .docx files. There is an extra fee for filing specifications in PDF format. Faxes and electronic submissions are time and date stamped according to the time and date at the USPTO headquarters in Alexandria, Virginia. Documents arriving any time before midnight are accorded a file date of that day.

Application packages may still be physically mailed. However, to encourage patent office customers to transition to electronic filing, other extra fees have been attached to physical applications. It is permissible to write and file an application in a foreign language, but the application must then be accompanied by a certified translation in English and an additional fee.

Lastly, the USPTO maintains a hand-delivery window at its main campus in Alexandria, Virginia which is open to receive document packages from 8:30am to midnight every day that the Patent Office is open. An attendant will provide a visitor with a date-stamped receipt for proof of a filing date, but will not review the documents for content or completeness at that time. If a filing deadline falls on a weekend or a US federal holiday (the Patent Office will be closed) then the deadline is extended to midnight of the next normal business day.

Contents of a Complete US Utility Application (Non-electronic)



It is no longer necessary to physically print and mail an application to the USPTO. The additional forms required for the nearly obsolete mailing method include: (next page)

- Transmittal Letter
- Fee Transmittal Letter
- Self-Addressed Itemized Postcard

The Transmittal Letter: (physical mail)
The Utility Patent Application Transmittal Letter is a check-off list describing the contents of a package delivered to the USPTO. The form is available as a fillable PDF document at:
https://www.uspto.gov/sites/default/files/web/forms/sb0005.pdf

Besides listing the inventor names, title of the invention, and the correspondence address for the USPTO to respond, the inventor or applicant will indicate in the transmittal letter the fees calculated for the application (as calculated on a separate form,) the entity size, the number of pages of the specification, the number of drawing sheets, and what other documents or media are present in the package. Genetic sequences for gene patents are large files in a special format, and these are to be sent to the USPTO on a CD-ROM disk.

The transmittal letter functions as a checklist for the inventor or applicant to help ensure that a complete application is being mailed, and also functions in the receiving mailroom of the

USPTO to confirm that the documents that the inventor or applicant sent were duly received and not lost in transit.

If some documents are check-boxed in the transmittal letter but these are not found, or if some pages or drawing sheets seem missing because of a break in the ordering of page numbers, figure numbers, or paragraph numbers in the specification text, the Patent Office will generate and send to the inventor either a "Notice of Missing Parts" or a "Notice of Omitted Items." If the patent application portion of the package (specification, claims, drawings, and abstract) appears complete, then a file date will be accorded to the application.

But if the application itself is missing pages, figures, or claim numbers, then the file date is NOT immediately accorded, and if the missing matter adds to the application, then the patent application may be accorded the later file date when the missing materials are received.

The inventor usually has two months to supply the missing materials. If the missing matter is not received, the USPTO will deem the application as abandoned.

The Fee Transmittal Letter: (physical mail)
The Fee Transmittal form is available at:
https://www.uspto.gov/sites/default/files/documents/sb0017.pdf

The fee transmittal form is a calculation worksheet which tabulates the basic application filing fee, the search fee and the examination fee. The fee transmittal form is automatically generated and inserted into the electronic application file when an application is filed electronically, when filed manually, the form must be printed out and filled in with the number of pages, figures, and claims, and other parts of the application package. The three different rates are for: (U) an undiscounted entity, (S) a small entity and (M) a micro entity.

The small entity fee is available for any inventor or organization that employs less than 500 people, including contract employees. The micro entity fee is available for small entity inventors or applicants that either
(a) makes less than three times the US median household income, and all inventors or applicants have filed fewer than four non-provisional patent applications as a micro entity, or
{b) each person makes a majority of their income from an institution of higher learning, or
(c) the inventive rights to the application are assigned to an institution of higher learning.

"The applicant" may be a different person or entity than the inventor(s.) For a company with a staff of engineers, it's common for the engineers' employment agreement to state that the employees have an obligation to assign their inventive rights for things they invent for the benefit of the company – in exchange for their salaries. Some companies pay a modest bonus as "reasonable consideration" for inventors named in a filing.

The standard fees apply for an application having up to 20 total claims, of which up to 3 claims are independent claims, and with no "multiple dependent" claims. These terms are defined in the Claims section of this course. Surcharges apply for applications having more claims than the above, or having multiple independent claims. If the application is longer than 100 pages, then additional fees apply at 50 sheet intervals. Applications may be filed in languages other than English, but if so, the application package also requires a certified translation of all non-English portions of the application.

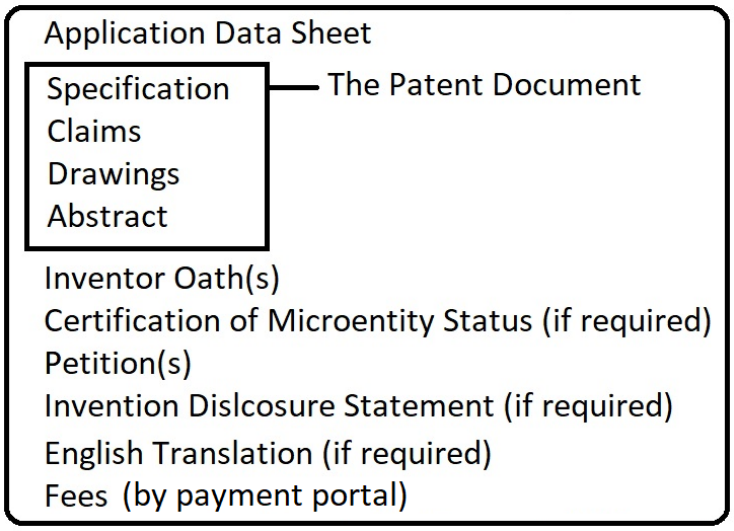
Additional petitions may be filed with the application and some of those require additional fees as well. If the application is a physical, mail-in utility application, a "non-electronic" fee applies. The fee does not apply to other types of applications received by mail. Lastly, although the USPTO does receive and respond to correspondence sent in by fax, they do not accept patent application specifications by fax, and a notice will be sent to the correspondence address that the application is deficient.

The Self-Addressed Stamped Itemized Post Card is an old tradition still followed by the USPTO. If a person mails physical correspondence to the Office and includes a stamped post card with a return address and a list of the package contents printed on the card, a USPTO mail clerk will verify the list is accurate, date stamp the card, and mail it to the address. The recipient will then have a physical card available as proof of the items having been received at the Office. If the mailing is a new application, the card will not include the newly generated application serial number for the application.

Also, the effective file date of the application or other correspondence may be the date that the package was stamped by the US post office, but not by private carrier (such as UPS or FedEx.) One may secure the mailing date as the file date for the contents by using a US Postal service which creates a tracking number, and then entering that tracking number on the Utility Patent Transmittal Letter in the space titled "Express Mail Label No." The office will then accord the date that the package was deposited with the mail carrier as the official correspondence date of the package contents, regardless of the days spent in transit to the patent office. This is called

the “mailbox rule,” and it remains a useful tool if for example, a filing deadline is nigh (such as a response to an examiner’s office action letter) and the inventor is in a region having a widespread internet outage. In this case, properly prepared papers will be accorded the date that they were picked up by a US Postal carrier or dropped off (and postage paid) at a US post office, even if weather or other exogenous factors delay the actual arrival of the papers by weeks. Regional power outages caused by hurricanes make this method still valuable to know.

Contents of a Complete US Utility Application (Electronic/Web)



The vast majority of USPTO filings and correspondence is done through the "Patent Center." The non-electronic fee is avoided and the application serial number and file date are generated immediately upon a successful submission.

For an electronic or web-based submission, after the documents are prepared and rendered as Microsoft Word .docx files or Adobe PDF files, an applicant or inventor may upload the files through the USPTO Patent Center from a computer. Registered practitioners, regular customers, and even individual inventors may sign up for an individual USPTO Customer number by filing out an application form, including a desired password. The USPTO will then physically mail a letter with an authorization code which is then used to authenticate the Customer number along with the user's password. The USPTO uses two-factor authentication, which means that when logging in, the USPTO will generate an e-mail, a telephone message, or a text message depending on the user's choice. The message contains a code which when entered with the customer number gains the user access to USPTO Patent Center, and a personal use page called MyUSPTO. Personal data and credit card information may be entered, stored, and managed in the MyUSPTO site. MyUSPTO also displays various notices about upcoming system outages or maintenance downtimes, and some "news-y" flavor of the month articles about certain inventions (e.g, "June is Camping Month") or inventors highlight by selected social or demographic factors.

The Application Data Sheet: (ADS)

Besides the content of the patent application itself, the ADS is the most important accompanying document. It declares the names of all the inventors on the application, the identity and contact information of the applicant if different from the inventor(s,) and the identity and contact information of any assignee of the rights of the invention.

Typically for a solo inventor, the inventor is the applicant, and as long as the inventor wishes to retain the intellectual property rights, there will be no assignee. If a company or another person buys or otherwise acquires the entirety of the inventive rights, then that other entity becomes the assignee. But for most individuals the inventor, the person applying for the patent, and the person who holds the rights to the intellectual property are all the same entity.

This is not necessarily the case for companies or for applications having more than one inventor. Most companies that employ inventors have employment agreements wherein the employee agrees that, in exchange for a salary or other valuable consideration, the employee will assign inventive rights to the company. Most of these agreements limit the scope of the company's interest to inventions within the company's market, so that for example, an engineer at a computer chip company may remain free to develop a kitchen gadget invention while using personal equipment, off the premises of the company, and during personal time. However, some companies have employee agreements wherein the company retains rights, or at least right of first refusal, for any sort of employee-created articles – even if the process of conceiving the invention occurred off the company premises and with no company equipment or materials involved.

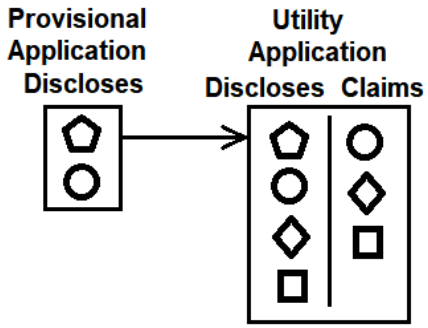
Why Priority and Priority Claims are Important:

When certain conditions are satisfied, a patent application is entitled to the benefit of the filing date of an earlier filed application. These specific conditions are set forth in 35 USC §120 and 37 CFR §1.78(a)(1) through (a)(3) for prior non-provisional applications, and 35 USC §119(e) and 37 CFR §1.78(a)(4) through (a)(6) for provisional applications.

Priority is a legal relationship between a first application and second or other applications filed after the first. Since the opportunity to patent an invention is only available to the first person to file or to publicly disclose the invention, interference between two inventors who independently happen to invent the same thing is resolved by determining which inventor disclosed or filed first.

Continuation and divisional applications are other examples of later filings which claim the benefit of content filed in an earlier application so that if another inventor files a later disclosure of the same elements, only the inventor with the earlier file date secures patent rights to the earlier filed elements. One rule in patent law states that once a utility application is filed, it may not be amended to add new matter. Thus, if an invention under development is partially complete, later advances and solutions to on-going design challenges may only be added by additional patent filings.

For example:

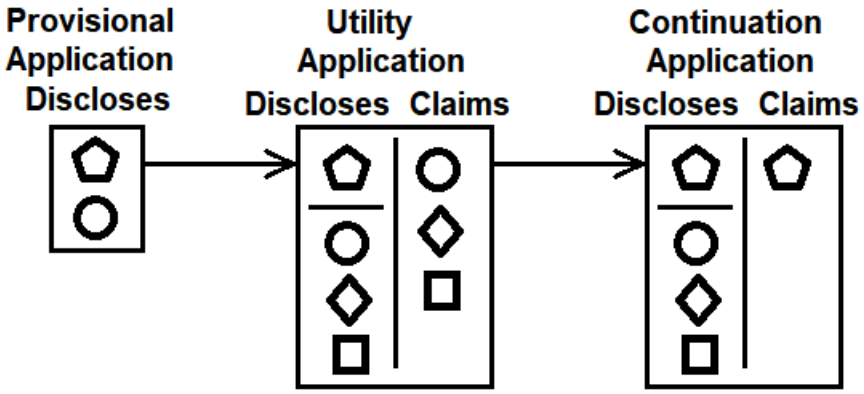


A provisional application discloses aspects of the invention which were discovered early on in the product development process. A provisional application must be replaced by a formal, utility application within one year of the file date of the provisional application. A provisional application does not publish and it is not examined by a patent examiner. The utility application will publish about 18 months after its file date and will usually receive an examination about 2 years (25 months) after the file date. An earlier examination may be available if certain petitions are filed with the application. Some of the more common petitions are discussed elsewhere in this course.

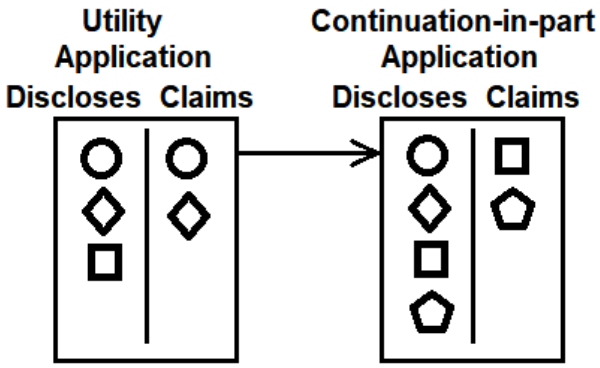
In the illustration on the previous page, further development of the invention occurs, and the utility application discloses the new matter discovered and reduced to practice after the provisional application was filed. In the event of litigation, infringement, or an interference proceeding, any matter only has priority to the earliest file date wherein it appears in the application. Also, disclosed matter in a utility application will block other later inventors from patenting the same thing, even if those elements are not claimed in any other application. Thus, in the previous example, for the element symbolized by “pentagon,” if somebody else who is not an inventor named in the two illustrated applications files an application for the same “pentagon” invention after the file date of the provisional application, the later application will be rejected by the patent office, assuming a diligent and competent search and examination

takes place. However, examiners are human beings and sometimes mistakes or oversights occur. Procedures for redress of these errors exist but are outside the scope of this course.

It is possible for a single application to describe more than one invention. Since only one patent number will be issued for any one invention, the second invention described in the disclosure requires a second "child" application to be filed having claims directed to the other invention. Of course, a second set of application fees must be also paid. The continuity between the "parent" and "child" applications, when properly asserted in the ADS, prevents matter in the earlier applications from being used as prior art against matter in the later applications. The invention would then be protected by two patents, if granted.



If a utility application has already been filed and new matter is discovered in a later phase of product development, the new matter must be introduced as an additional patent application filing. The original application may not be amended to add the new matter. The illustration below is an example of a simple continuation-in-part application sequence:

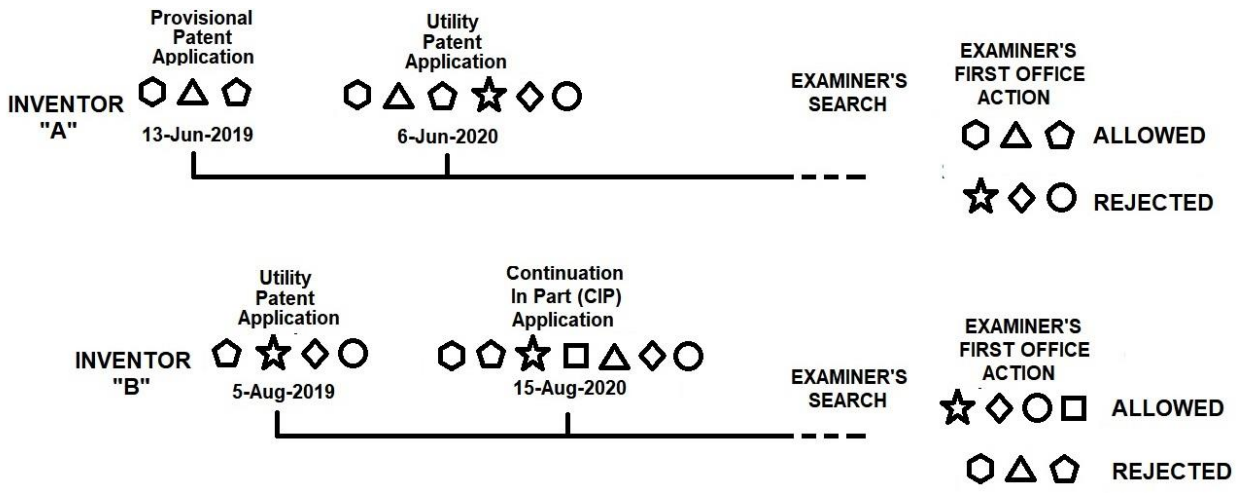


The first utility filing claims some elements present in the first disclosure. Some elements in the first disclosure are disclosed but not claimed. The non-claimed elements still block other later inventors from seeking to patent those elements. At a later time, additional elements ("pentagon" in the above) are reduced to practice within the scope of the invention, and a second application is filed as a "child" to the first "parent" application. Claimed elements in the child application have enforceability to the parent application's file date if those elements are present in the parent application.

U.S. Patent law from its founding in 1790 to 2013 operated as a "first to invent" nation. It was prudent for inventors during that era to diligently document daily, weekly, or otherwise regular, continuous, and uninterrupted endeavors to progress with the invention. An inventor who began first and progressed slowly but diligently because of limited means would prevail over another who conceived of the invention later but finished and filed earlier than the first inventor could file. However, most nations of the world have "first to file" patent filing laws. The America Invents Act (AIA,) which came into full force in 2013, converted the U.S. to a "first to file" nation, a change as monumentous as converting the U.S. to metric units just because a majority of foreign countries use that system.

Thus, in current practice, securing the earliest possible file date for important elements of an invention is paramount, and records of incremental progress of the inventors of their activities before a file date are mostly ineffectual in determining which of two inventors of the same invention is entitled to a patent. The inventor with the earlier file date, in any patent office in the world, will be accorded precedence over any inventor of the same invention having a later file date. Bound inventors' journals with dated notes and initials next to sketches, observations, and incremental improvements and breakthroughs have been consigned to the by-gone era of slide rules, eraser shields, and pocket protectors.

The illustration below shows an example of how interferences might be resolved between two competing inventors in the same field:



Inventors' "A" and "B" are independent entities who are each unaware of the other's activities. "A" and "B" may be individuals or distinct groups of inventors such as two engineering teams at two separate companies. For simplicity it is assumed that despite the possibilities of social media, there is no communication or collusion between anyone of inventorship "A" and anyone of inventorship "B." It will also be assumed that both examiners in the two cases are both diligent and competent to discover and correctly recognize all the elements disclosed by the filings of "A" and "B" in the patent filings database. Both companies are responding to market interest as best they can discern, and they develop product features over time.

In the illustration on the previous page, the features in demand are represented by geometric shapes. Inventorship "A" develops and files "hexagon," "triangle," and "pentagon" as a provisional application on June 13th, 2019. A provisional application is not examined and it does not publish. A utility application will publish 18 months after filing and will get examined about 2 years after filing. Inventorship "A" later develops additional features "star," "diamond," and "circle," and file a formal utility application on June 6, 2020, claim priority to their provisional application. The priority is recognized in the patent office.

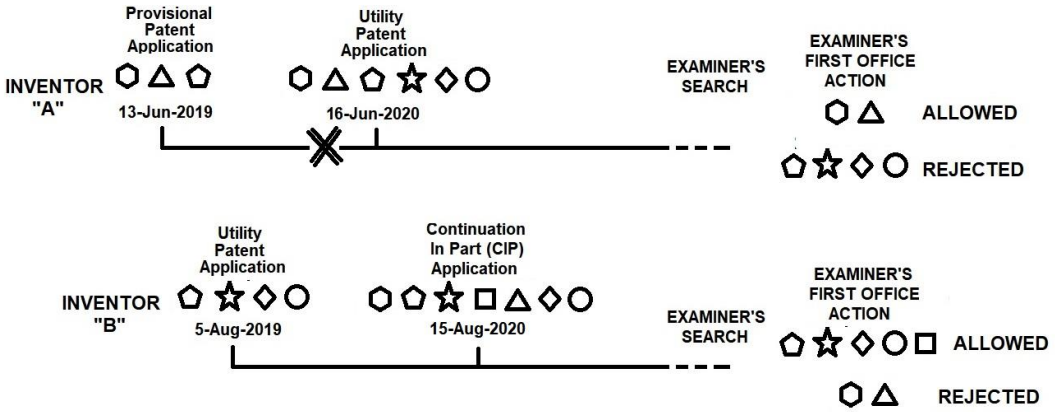
Meanwhile, inventorship "B" develops and files on August 5th, 2019 a utility application disclosing and claiming "pentagon," "star," "diamond," and "circle." A little over one year later, they develop "hexagon," "square," and "triangle" and on 15-Aug-2020 they file a continuation-in-part (CIP) application disclosing and claiming these additional elements of their product. The patent office recognizes the CIP as a "child" application of the "parent" application.

Assuming the examiners' searches properly discover all the art in the above two sets of filings, the examiner in the case of Inventor "A" will find that "A" is the first inventor of elements "hexagon," "triangle," and "pentagon," but not the first inventor of "star," "diamond" or "circle." Inventor "A" will have to amend the application to remove "star," "diamond" or "circle" from its independent claims, but may claim "hexagon," "triangle," and "pentagon."

The other examiner of the application to "B" will find that "B" is the first inventor of "star," "diamond," "circle," and "square" but not the first inventor of "hexagon," "triangle" or "pentagon." Inventor "B" will have to amend the application to remove "hexagon," "triangle" or "pentagon" from its independent claims to "star," "diamond," "circle," and "square."

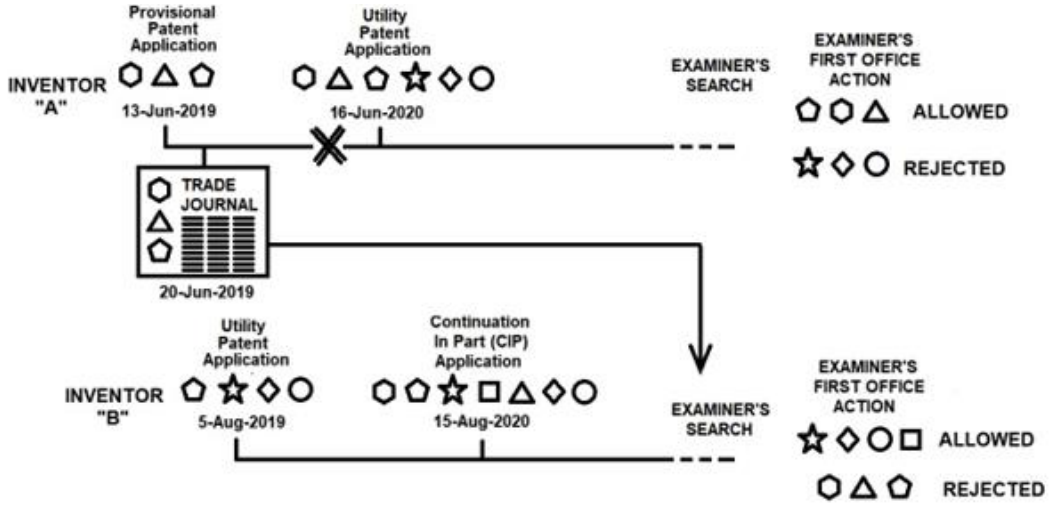
If all seven of these elements interoperate so that inconcert they provide functions and benefits which are in demand in the market and which are substantially greater than the sum of the individual elements, it would probably be beneficial for the two organizations "A" and "B" to form an industry consortium whereby they agree to cross-license their technologies and fence off later emerging competitors. If they remain antagonistic to each other, then a "patent war" may result. One of the earlier and most successful industry consortia was formed by sewing machine inventors in the 1850s, whereby the overlock stitching technology first patented by Elias Howe, Jr. was eventually made available to Isaac Singer and other major manufacturers of the time, including Wheeler & Wilson and Grover & Baker, while another formidable competitor Willcox & Gibbs successfully engineered around the "patent pool" and produced chain-stitching machines distinct from and beyond the scope of the consortium's claims. The sewing machine patent consortium was dissolved in 1877 when their last two patents expired into the public domain.

A U.S. provisional patent application lasts one year. It must be replaced with a formal utility application on or before one year after its file date. This one-year deadline does not apply to a continuation, divisional, or continuation-in-part application which is a child of a parent utility application. The example below shows what might happen between Inventors "A" and "B" if priority to an earlier application is lost:



In the example on the previous page, Inventor A's utility application was filed more than one year after its provisional application. A claim to priority made in the utility application of 16-Jun-2020 will be rejected by the patent office. Since the provisional application will not publish, A's priority to the provisional filing of 13-Jun-2019 is lost, and absent certain other public disclosures by A, according to the patent office the first inventor to file the elements "pentagon," "star," "diamond," and "circle" will be Inventor B.

One last-ditch hope for Inventorship "A" could be to publish an enabling public disclosure of the invention earlier than Inventorship "B." An enabling public disclosure may be a publication or a public use or demonstration of the invention of sufficient detail for a person of average skill in that industry to practice the invention. A sale, or offer of sale of the invention also qualifies as public disclosure of the invention. Under current patent law, an inventor must file a utility patent application within one year of such a public disclosure, publication, sale, or offer of sale:



The patent office has access to many trade journals, news articles, and manufacturer's literature from within the US and abroad. Web sites may also be discovered by an examiner's search, and archive sites such as archive.org may be used to investigate periodic snapshots of a website to determine the earliest publication date of the reference material to be cited as prior art evidence against the patent case. In the above example, a publication describing Inventor A's invention and naming the inventors, at a date earlier than the file date of Inventor B's application would be discovered by the examiner of B's patent case, and the examiner would cite that reference publication as prior art against B. B would not be able to patent the elements "hexagon," "triangle," or "pentagon" because the earlier publication of these elements by somebody other than B proves that the inventors of B are not the original inventors of those elements.

Although the invention title, inventors' names, and priority claims are all recited on the first page of the application specification, if there is an inconsistency, the USPTO will deem the ADS as the governing document. Thus, if a priority claim is made in the application but is not entered in the ADS, then the legal priority of the application will not be initially recognized, and the applicant must file a petition (and fee, if not timely filed) to restore the priority if the application was originally entitled to it.

Therefore, accurate presentation of the chain of prior applications by serial numbers, file dates, and statuses as currently pending, granted, or abandoned, must be correctly entered in the ADS so that the present application may enjoy all its legally available benefits derived from prior applications.

Also note in the above example that Inventor "A" very nearly lost patentability of "hexagon," "triangle," and "pentagon."

The Inventor Oath or Declaration:

In a utility application, an Inventor Oath or Declaration form must be signed by each individual inventor. The form states that the person signing believes that he or she is one of the true inventors in the application, and that he or she has reviewed the contents of the application, including its claims, and is aware of the duty to disclose to the Office "all information known to the person to be material to patentability." This information includes among other things, knowledge of relevant prior art related to the invention, and the 'best mode' or best methods and means to practice the invention as known by the inventors at the time of filing.

Every inventor who can identify as having invented at least one element in one claim in the application must be named as an inventor on the application and in the ADS. If the patent is granted and there is no assignee and no other agreement executed between the inventors, then every named inventor on the patent is allowed to practice the entirety of the claimed invention. Besides assigning rights to assignees, inventors may agree to apportion their inventive rights unequally, such as by receiving licensing or royalty income in unequal shares if they agree that some inventors have contributed more than others.

They may justify unequal shares by reason that some inventors have worked from the earliest inception of the invention and others have joined the team later and contributed less, or they may apportion rights based on who has contributed more or fewer of the allowed claimed elements. Numerous other reasons exist for apportioning inventive rights or income streams unequally between inventors if they so agree. In one case, two inventors decided to split the income based on the size of the article manufactured according to the claims; one inventor would seek out opportunities where the device was sized as a portable, personal-use article, and the other would seek out opportunities where the device was built as a larger, stationary machine in industrial applications.

We have noted that an application may disclose additional elements in the specification which are not claimed. The applicants retain the opportunity to file continuation applications which claim these other elements, up to the very day of issue of a patent grant of the present pending application. The continuation or "child" application must be filed while the "parent" application is still pending. This relationship is called "co-pendency." Since only the inventors who have claimed elements are named in an application, it is possible that a continuation application claiming elements which the parent application may have different named inventors. For one application to be co-pending with another, at least one inventor name must be in common between the two applications.

During prosecution of a patent application, some claims may be rejected or withdrawn, and end up canceled from the allowed application. If an amendment cancels claims so that all elements for which a particular inventor is responsible also get canceled, then amendment must also include a corrected ADS removing that inventor's name from the application. Similarly, an amendment which adds new elements from the specification into the claims which were invented by an inventor not currently named in the application must include a corrected ADS adding the new inventor. Note that adding new elements into claims from existing matter in the specification is allowed; adding new matter into the specification, claims, or drawings which

was not previously disclosed is not allowed. Submission of corrections to the application in the ADS may require a fee, a petition, or a petition and a fee depending on how far along in prosecution the correction is requested. Not surprisingly, the farther along the application is in prosecution, the more complicated and expensive is the correction process.

In one case two inventors were a husband and a wife who shortly after filing a joint application began an acrimonious divorce. To separate themselves from each other, the patent practitioner identified matter invented solely by the husband, matter solely invented by the wife, and jointly invented matter. The practitioner then canceled all claim elements directed to jointly invented matter, then canceled all elements in the application directed to claims invented by one spouse, and filed a continuation application with claims elements only invented by that one spouse. This resulted in two separate applications each with one named inventor and claims invented by that one inventor. The jointly invented matter was lost to public domain.

In other various unfortunate situations, an inventor who needs to submit a signed oath or declaration into an application package may be unavailable or uncooperative, or an inventor may become mentally or medically incapacitated, or may pass away. The patent office has long recognized the necessity of having a "work around" or an "override" when one or a minority among the inventorship become hostile to the others, so that those others may continue to seek their inventive rights. To do this, the subset of the inventors seeking patent rights establish themselves as "the applicant." Then, according to 37 CFR §1.64, "the applicant may execute a substitute statement in lieu of an oath or declaration for the inventor who is deceased, is under a legal incapacity, has refused to execute an oath or declaration, or cannot be found or reached after diligent effort."

The substitute statement must:

(1) Comply with the requirements of 37 CFR §1.63(a) in identifying the inventor or joint inventor with respect to whom a substitute statement in lieu of an oath or declaration is executed, and stating upon information and belief the facts which such inventor is required to state;

(2) Identify the person executing the substitute statement and the relationship of such person to the inventor or joint inventor with respect to whom the substitute statement is executed, and unless such information is supplied in an application data sheet, the residence and mailing address of the person signing the substitute statement;

(3) Identify the circumstances permitting the person to execute the substitute statement in lieu of an oath or declaration under §1.63, namely whether the inventor is deceased, is under

a legal incapacity, cannot be found or reached after a diligent effort was made, or has refused to execute the oath or declaration; and

(4) Unless the following information is supplied in an application data sheet, the substitute statement must also identify:

(i) Each inventor by his or her legal name; and

(ii) The last known mailing address where the inventor customarily receives mail, and last known residence, if an inventor lives at a location which is different from where the inventor customarily receives mail, for each inventor who is not deceased or under a legal incapacity.

The oaths or declarations of all inventors must be submitted at the time of filing of the application package to avoid surcharges applied to later submissions of an oath. These surcharges may be unavoidable if an application must be submitted before a certain deadline such as a bar date such as the one-year anniversary of a first sale of the invention. In this case, it would be paramount to preserve inventive rights by filing the incomplete application package ahead of the deadline, and then gather and submit the oaths or declarations from the missing inventors later, and pay the surcharge.

Lastly, although inventor oaths or declaration forms and the ADS are required for a utility patent application, for a provisional application a simplified cover sheet may be used which includes a single table listing the inventor names and the states and cities or towns where each inventor resides.

Information Disclosure Statement (if required):

The USPTO guidelines, called the Manual of Patent Examining Procedure (MPEP) state that "each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability as defined in this section (37 CFR §1.56.) The duty to disclose information exists with respect to each pending claim until the claim is cancelled or withdrawn from consideration, or the application becomes abandoned. Information material to the patentability of a claim that is cancelled or withdrawn from consideration need not be submitted if the information is not material to the patentability of any claim remaining under consideration in the application. There is no duty to submit information which is not material to the patentability of any existing claim."

The inventors have a duty to disclose to the patent office any relevant public disclosures which are directly related to the technology of the invention for which they are applying for patent rights. Relevant material includes but is not limited to products made by current or former competitors, and earlier versions of the invention disclosed to the public by the inventors themselves. Public disclosures include sales or offers of sale of the invention or its relevant predecessors, internet websites disclosing the invention, printed publications in trade journals of the field of the invention, marketing materials such as brochures distributed at trade shows, and demonstration videos uploaded to the internet which describe in detail how to make or use the invention.

The courts have also carved out certain narrow exceptions to public use, such as when the inventor is experimenting with prototypes or subassemblies of the invention, or if the size and function of the invention is such that it cannot reasonably be tested in privacy, such as agricultural machinery. One example tested in court was a novel electrical transformer adapted to withstand exceptionally cold winter temperatures. The invention was installed on a power pole in a municipality and remained in public view over a winter. Although the novel features were visible, there was no other way to expose the transformer to a full electrical load, and concealing it (such as with a fabric shroud) would shield the device from the full effect of cold winter winds, heat gains from direct sunlight, and radiational cooling at night.

The courts hold that "the use of an invention by the inventor himself, or of any other person under his direction, by way of experiment, and in order to bring the invention to perfection," is not regarded as a public use. However, in order to qualify for the experimental exception, the inventor must behave as if the use is indeed experimental, or that the prototype being used may not be the final or complete version of the invention expected to enter the stream of commerce. To determine whether a use is "experimental" as a matter of law, the totality of the circumstances would be considered, including various objective indicia of experimentation surrounding the use. These indicia include:

- the number of prototypes and duration of testing,
- whether records or progress reports were made concerning the testing,
- the existence of non-disclosure agreements (NDA) between the patentee and the party performing the testing
- whether the patentee received compensation for the use of the invention, and
- the extent of control the inventor maintained over the testing.

The last factor concerning control is relevant because if the inventor is not seen to control the alleged experiments, nor seeks to inquire about the test, nor receive reports concerning the results, then arguably the inventor is not "experimenting." In order to justify a determination that legally sufficient experimentation has occurred, there must be present certain minimal indicia, such as those presented above. When large corporations conduct experiments, governed by contracts and explicit written obligations, the documentation produced by testing may be very formal, especially if the invention concerns any aspects of public safety or health, such as medicines and automobile braking systems. Competent engineering teams take great care to allow for root causes of any failures to be investigated and eventually solved. In contrast, less formal and more casual experimentation may be expected of individual "garage" inventors or small businesses. The courts may deem fewer formal experiments as legally sufficient to avoid the public use bar if they can show the same basic element of documentation and reasoning typically applied to validate tests and results. If questioned, the court will probe whether the inventor's alleged experiments provide or lack enough of these required indicia to recognize these efforts as experimental.

Lacking a shield of experimental use, if a reference discovered in a prior art search is found which details the exact same invention, but made by someone else and made or disclosed before the current inventors have filed a patent application, then an attempt by the current inventors to file a patent application will be futile because only the first inventorship of an invention is allowed to seek patent rights for that invention.

The patent office has created a standardized form for compiling a list of references for the examiner to consider. The references may be of three sources:

- Published patents
- Published patent applications
- Non-patent Literature (NPL)

The information disclosure statement (IDS) form includes convenient and standardized tables for each of these types of documents, and table columns include the name of the first inventor, the patent document number (such as a patent number, patent application serial number, or a publication number assigned by a patent office,) the file date, date of issue, or publication date of the document, and a one or two character designator called a "kind code" based on the publication history of the document and (for patents) any history of re-issue, or re-examination. The kind code also distinguishes whether or not the application has been examined at the time of publication. For citing patents and applications, the IDS includes a space for the applicant to

point out particular figures and paragraph or column numbers locating the material relevant to the present invention.

For non-patent literature such as trade publications, the applicant should include name of the author, title of the article, the type of disclosure (book, magazine, journal, serial, symposium, catalog, publisher, city and/or country where published, etc,) the publication or disclosure date, and other details on how to locate the relevant material, such as volume or issue numbers and page numbers.

Internet pages and content are not stable over time; material may disappear if a content owner does not maintain ownership of a domain name, and content may be edited at any time. To submit an internet page as a reference, a visual snapshot must be made of the entire content of a particular page, and a complete URL (universal resource locator) for the page and the date the image was made must be submitted. Internet archive services such as archive.org may also be used to harvest old versions of pages if content was removed or altered or if the page domain has been taken down.

Certification of Micro Entity Status (if required):
The USPTO fee structure has long had two classes of fee structures based on the corporate size of the applicant or the inventorship. "Small Entity" status was accorded to inventive entities having fewer than 500 direct employees, contract employees, and contract temporary employees. A Small Entity is currently entitled to a 60% discount on most USPTO filing fees, surcharges, and petition fees. Any entity not qualifying as a Small Entity was a Large Entity which would pay full fees.

The America Invents Act (AIA) established a new third class of inventor called the Micro Entity and currently affording an 80% discount on fees. The Micro Entity fee structure became available in 2013, with a 75% discount. The applicant declares its entity status by check boxes on the ADS (and the transmittal letter in a physical application package.) For small and large entities, simply checking off the right box and then paying the correct application fee is sufficient for the patent office to accord the application the correct status.

To assert Micro Entity statues and be entitled to the 80% discounted fees, the applicant and the inventorship must satisfy either of two sets of criteria, the "Gross income Basis" or the "Institution of Higher Education Basis."

(a) Gross Income basis: The gross income basis includes four criteria which must ***all*** be met:

i. The applicant must qualify as a USPTO "small entity,"
ii. Neither the applicant, nor the inventor, nor a joint inventor has been named as an inventor on more than ***four*** previously filed non-provisional applications,
iii. Neither applicant, nor the inventor, nor a joint inventor had a gross income in the previous year from when the fee(s) is paid of more than the "Maximum Qualifying Gross Income," which is three times the median household income, and
iv. Neither the applicant nor the inventor nor a joint inventor has assigned, granted, or conveyed, nor is under an obligation to assign, grant, or convey, a license or other ownership interest to another entity that does not meet the same "Maximum Qualifying Gross Income" limit.

(b) Institution of Higher Education Basis: To qualify for the institution of higher education basis, the applicant must satisfy ***either*** of two criteria:

i. obtain the majority of their income from a United States institution of higher education as defined in section 101(a) of the Higher Education Act (20 U.S.C. 1001(a)); or
ii. the applicant must have assigned, granted, or conveyed, or be under an obligation by contract or law to assign, grant, or convey an ownership interest in the application to such a United States institution of higher education.

The USPTO has two different forms for asserting micro entity status in an application, one for the gross income basis and another for the institution of higher education basis.

After the initial filing, the USPTO requires an issue fee payment if a utility application is granted, and thereafter maintenance fees are due at 3½, 7½, and 11½ years after the date of issue of the patent. Also, prosecution of the patent may take a few or several years of office actions, responses, and amend-ments to the application, requests for continued examination, various petitions, appeals, and the office responses to those actions by the applicant. The petitions often require fees and appeals require fees. If a patent was applied for and micro entity fees were paid, it is possible (and hopeful) that during prosecution the 'patent pending' invention is a success in its market and the inventors, the applicant, or both start making enough money that the they surpass the gross income limit. If this happens, the applicant must

notify the patent office that micro entity status has been lost and that the inventive entity has now become a small entity.

The transition from a micro entity to a small entity only affects future fees to be paid in the application. Loss of micro entity status at a particular point in time does not require that the applicant pay deficits for fees previously paid while qualifying for micro entity status. If micro entity status was asserted by accident in "an error made in good faith," then deficit payments and a surcharge will be due for fees paid at the micro entity level while the entity was actually a small entity.

Similarly, inventors or an applicant who have high incomes such that they do not qualify for micro entity status by the gross income basis may come into financial distress, and then qualify for micro entity status after enduring one year below the gross income limit. The same situation may occur for an applicant or an inventorship that is wavering at the small entity or large entity qualification limit. A company operating as a large entity with 510 employees may come into distress and decide to lay off 30 people. If over the next one-year period they don't re-hire employees or contractors to staff up to 500 or more, then they may notify the patent office that they have lost large entity status and are entitled to small entity status. Although they are not entitled to refunds for previously paid full-price fees, they will enjoy small entity fees until some future time when they grow over the small entity limit.

Lastly, any human person who or corporate person that has filed four patent applications which are other than provisional applications (i.e., design, utility and plant applications, continuations, continuations in part, or divisional applications,) permanently exhausts the micro entity by gross income status, even if current or future income remains below the income threshold.

Petitions Filed in a New Application:

There are many sorts of petitions which may be filed over the course of the prosecution of a patent case, mostly involving correction of information or the resolution of special circumstances which occur or become apparent at some time after the application is filed, in response to an action by the patent office, or to correct an error discovered in the content of the application after it has been filed. This course will only concentrate on petitions which are typically filed concurrent with the filing of a new or original patent application filing.

Currently, the waiting time between the filing of a new utility application and the first response to the applicant by an examiner runs about two years. However, applications may be made

"special," a term dating back to 19th century railroad operations which became known as "express" in the 20th century and originally referred to deluxe, higher speed passenger service. The USPTO will endeavor to return a first office action for an application granted "special dispatch" within one year of the file date. If they take longer than one year, it then becomes possible to petition the patent office to extend the term of the patent by the number of days past one year until the time the first office action is mailed.

Petitions to accelerate an application out of turn for examination are the most common petitions filed with an application. Some of these are fee-based, which means that the applicant is paying to cut ahead in line for examination. Two fee-based petitions to accelerate are the Patent Prosecution Highway (PPH,) and the Request for Accelerated Examination, which is also called "Track 1." The PPH is available for an application which is a child application of either a parent application which has already been allowed (i.e, the prosecution was successful and the only thing left to do is pay an issue fee,) or if the application is a continuation of an international application called a PCT (Patent Cooperation Treaty) application, and in the PCT process an international search report has issued with a favorable opinion on patentability. International PCT application practice is beyond the scope of this course. Most fee-based petitions for accelerated examination must be filed on the same day as the rest of the application package, and they also have limits on application size, the number of claims, and they must not include multiple independent claims.

A Track I request for accelerated examination is available for an application which does not contain:
- more than four independent claims,
- more than thirty total claims, or
- any multiple dependent claims.

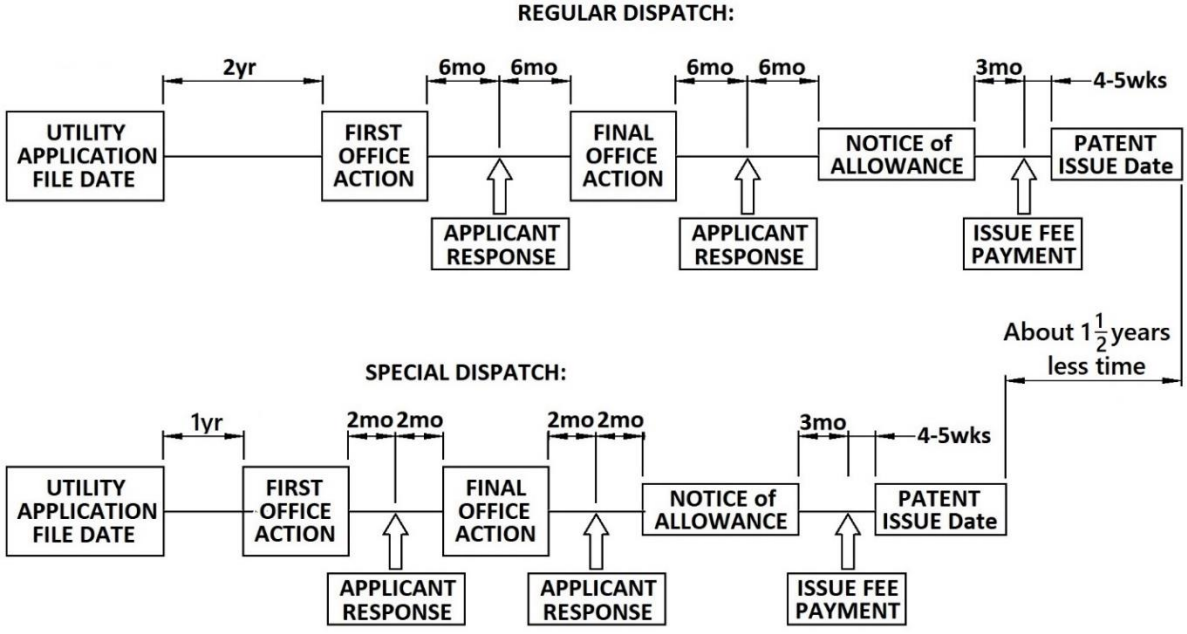
The applicant must also agree that during prosecution the application will not be amended to contain claims beyond these constraints, and that responses to the examiner will be made quickly enough not to require extension of time fees. If any of the above conditions are not met, then the application will be returned to "regular dispatch" and the "special dispatch" status will be lost for the remainder of prosecution of the case.

PPH and Track I request must be filed with the initial application package, or at least on the same day as the initial application filing. Other petitions for accelerated examination are free to

file with the application and may be filed with the application package or at some time after the application filing. Several reasons for consideration and approval are available:

Petition to Make Special Due to Age or Health: If any inventor in the inventorship is age 65 or older or may submit evidence showing that the state of health of at least one named inventor is such that at least one named inventor might not be available to assist in the prosecution of the application if it were to run its normal course, such as a doctor's certificate or other medical certificate, then the application may be made Special. This rule was introduced in the early 1950s, when being age 65 during an era when average life expectancy (male) was only 67 was in itself a significant risk factor.

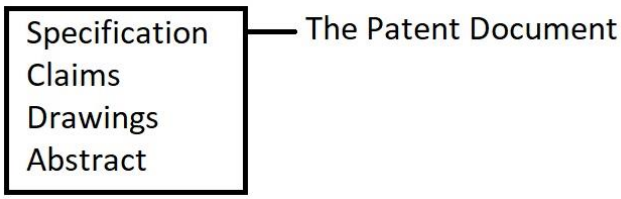
Also, from time to time the Patent Office selects certain fields of invention and offers Special Dispatch for applications in those fields in order to encourage specific investments, research, development, and economic activity as a matter of public policy by offering more immediate patent protections to successful early inventors in these fields. The patent office may limit promotional availability of Special Dispatch to a cutoff number of applications in the order of applications received directed to the preferred subject matter, or they may set a cutoff date for the promotion to elapse, or both. Previous preferred subject matters included "the information super-highway" (i.e, internet,) and recent incentives included counter-terrorism, climate change mitigation, and COVID vaccinations and treatments and manufacturing processes for these.



As seen in the comparative timeline above, "Special Dispatch" accelerates the prosecution of the patent case by shortening from 6 months to 2 months the time that an examiner is allowed for examining the application for errors, completing a search, and compiling an office action. If the examiner takes longer than 2 months to issue a response in a case designated for special dispatch, the applicant is allowed to request an extension of the patent term equal to number of days beyond 2 months that the examiner takes to issue the response, if an extension of term is not automatically or correctly credited to the application upon issue. However, the applicant must also respond to the examiner's actions within a 2-month deadline, or else the application will be returned to "regular dispatch" and the "special dispatch" status will be lost for the remainder of prosecution of the case. Per the approximate timeline on the previous page, the acceleration gained by special dispatch may be approximately a year and a half less time in prosecution.

Each office action has a deadline before which a complete response must be filed. The deadline, or "bar date" may be pushed back to a maximum of 6 months after the mailing date of the office action. However, prosecution of applications for human drug products, medical device products, animal drug products, veterinary biological products, food, skin, or hair color additive products, and some biotechnology inventions may be halted, if an effective or complete response requires that the invention show efficacy in clinical trials. The process for intermittently freezing prosecution in the patent office while the inventor complies with FDA requirements and procedures is codified in the Patent Term Extension act under 35 USC §156. The "patent dance" with the FDA, as it is called, came about because the purpose of examination by a patent examiner is limited to patentability, that us, whether the invention is of patent eligible subject matter (35 USC §101,) is novel as compared to relevant prior art in its field (35 USC §102,) and is not an obvious variant of a previous invention or other publicly known matter (35 USC §103.) The patent office does not evaluate or certify whether or not an invention may be safe to use. Patent prosecution under 35 USC §156 is outside the scope of this course.

With the discussions of the supporting documents filed with an application having been discussed above, we may now detail the form and content of a complete utility application itself.



The form and content of a US utility patent application specification has changed slowly over decades in response to the succession of results of litigated patent cases, and will likely continue to evolve steadily over time under the same influences.

The specification includes the written description of the invention and its role in its field. The claims are written descriptions of the new and distinct aspects of the invention and must clearly point out what the invention is and what it is not, much like in real estate property, wherein the title deed recites the "metes and bounds" of the property. When trespass-ing an intruder from private property, the intruder must be able to understand where the property lines lie so that he or she is not compelled to retreat further than is legally necessary. The drawings are used to illustrate at minimum the elements recited in the claims. The abstract is a single paragraph summary description of the invention which must be 150 words or fewer.

In recent writing practice, the specification may be divided into the following sections:

- Invention Title
- List of Inventors
- Copyright statement (optional)
- Cross Reference to Related Applications
- Field of the Invention
- Background
- Brief Description of the Invention
- Brief Description of the Figures
- List of Reference Characters (optional)
- Detailed Description of the Invention
- Claims
- Drawings (Figures)
- Abstract
- Sequence listing (optional, for gene patents)

The invention title should be as short and specific as possible and no more than 500 characters. One method of using patent rights to extract revenue involves others unknowingly using the invention and having it become extremely convenient if not essential, whereupon the patent holder informs them that they are infringing and must either desist or enter into an agreement for paying royalties or licenses to use the invention. To pull this off, inventors often contrive to name the invention accurately but using terms that make it difficult for others to identify in patent searches. For example, an inventor of a new dental implant stud for mounting an

artificial or reconstructed tooth might name the invention simply "Fastener," because of the tens if not hundreds of thousands of industrial fasteners on file. Such a title allows the inventor fulfill the legal obligations of a patent invention title while hiding in a crowded field of industry.

If an invention is intended to have a brand name or word mark associated with it, is therefore advantageous to title the patent application using words which although accurate are far afield from the marketing words to be associated within it. One example of an exact but obscure title is that of Mattel's trademarked and patented "Magic 8 Ball®" fortune telling toy, which was patented as "Liquid Filled Die Agitator Containing a Die Having Raised Indicia on the Facets Thereof" (US Pat. 3,119,621.) It would be difficult for a would-be copycat to look at the toy and come up with such a title for a patent search.

The list of inventors is simply that, a list of inventors by first name and surname, the city and state of residence, and citizenship. All inventors having any element recited in the claims must be named on the patent, and no other names of people who have not invented at least one claimed element should be listed. The contents of the Application Data Sheet (ADS) supersede this written list of inventors in the patent application specification. During prosecution of the patent case, claims may be canceled or amended, and if elements in the specification invented by others and not initially claimed get added, then the application and ADS must be amended to add their names to the specification. Conversely, if a claim amendment or cancellation omits all matter invented by one particular inventor, then that person's name must be stricken from the inventor list by filing a correction to the ADS.

Unless some allocation of patent rights is agreed to by the inventors, each named inventor will enjoy the right to practice the entirety of the invention. Thus, the order of names in the patent has also no legal effect or limitation on any of the inventors. Nevertheless, since patents tend to be referred to by the first named inventor, inventors may consider this a prestige and some have fought contentiously over the order of names and which among them most deserves that first name position.

A copyright statement is an optional recitation in a patent application but if copyright is asserted, the USPTO in MPEP §608.01 (also 37 CFR §1.71) allows exactly one copyright statement to be included in a design or utility patent application, and it reads as follows:

"A portion of the disclosure of this patent document contains material which is subject to copyright protection. The copyright owner has no objection to the facsimile reproduction by anyone of the patent document or the patent disclosure, as it appears in the Patent and Trademark Office patent file or records, but otherwise reserves all copyright
rights whatsoever."

In other words, if the inventor or applicant seeks to assert copyright protection, one must first pretty much disclaim all rights preventing people from copying and sharing the images contained the application. The patterns of conductors of printed circuit boards, including internal layers not visible, may also be protected by copyrights called "mask works" and may also be protected by design patents if they are ornamental in nature.

The" Cross Reference to Related Applications" statement is a set of one or more statements reciting the chain of priority from the present application to prior applications, such as a provisional application or a previously filed utility application to which the present application is a continuation or a continuation-in-part application. Each document should be mentioned by its application title, application serial number, file date, and its application status at the time of filing the present application, such as "currently pending," "abandoned," or issued. If issued as a patent, the patent number and issue date should also be noted. The maintenance status or expiry of an issued patent does not need to be mentioned.

Besides naming the priority claims to previous applications, the" Cross Reference to Related Applications" may also include "incorporation by reference" statements. A typical such statement would read: "The entire contents of [application title,] [serial number,] filed on [application file date] is hereby incorporated into this document by reference." The legal effect of incorporation by reference is to make present all the drawings and the complete texts of the named document.

Incorporation by reference reduces the number of pages in the current application and is especially useful in continuation or continuation-in-part applications where the matter in the current application is a minor variant or an extension of an invention whose core or ground-breaking material was heavily documented in the parent application. Thus, instead of consuming space in the current specification by re-presenting figures, tables, and text explanations from a parent document, an incorporation by reference allows the current specification to present content in the remote document to the reader simply by concisely

referring the reader to where the content may be found in the parent document, such as by figure number, or page, column, paragraph or line number.

It is possible to incorporate less than the entirety of a document into the current specification by reference, by identifying complementary portions exempted from incorporation, how-ever there would rarely be any legal advantage in doing so.

Many novel devices include more than one field of invention and will eventually accrue protection of multiple patents. As an example, an oscillating desk fan may include an improved safety grille around the swept volume of the blades, a new programmable timer for scheduling intervals of various fan speeds, and a new drive train or linkage for converting rotary motion of the fan motor shaft into oscillating motion to sweep the direction of the airflow back and forth. If these improvements can be practiced separately, then each would merit separate patent protection and its own patent number. Because of the first to file provisions of current patent law, the inventors' best practice would be to disclose all the novel elements as early as possible, such as in the first filing, and then claim only the most lucrative of the three inventions in the first filing. The other two aspects of the invention would then be available to claim in "continuation" filings. The first filing is called a "parent" application and the continuation filings are called "child" applications.

If ongoing development occurs and a later improvement to one of these inventions is discovered but not mentioned in the initial filing, the new matter of the latest discovery may be added into a "continuation in part" (CIP) filing. The "in part" portion of this type of filing indicates that part of the material claimed in the later application is supported by the parent application and part of the claimed material is not. There is no duty or requirement to point out the new matter in a CIP application, as the only people to whom that information would be useful would be those interested in circumventing or litigating the parent or child application or both.

After naming parent and other related applications, it is advantageous to incorporate all relevant parent filings into the current specification by reference in the" Cross Reference to Related Applications" section of the specification.

If applicable, the next section of the utility application would be titled "Statement Regarding Federally Sponsored Research or Development," and would recite any assignments of rights to the invention per the sponsorship agreement.

The next optional section of the application, if applicable, is titled "Reference to a Sequence Listing, a Large Table, or a Computer Program Listing Appendix on Read-Only Optical Disc."

To avoid additional fees associated with application documents of more than 100 pages, large tables of data, sequences of nucleic acid base pairs for gene patents, or other large volumes of material may be submitted with the application on a read-only optical disk, but these must be referenced in the specification in a separate incorporation by reference statement. The only materials accepted on disc media are: a computer program listing appendix, a sequence listing for disclosures of nucleotides, amino acids, enzymes, genetic structures, and other large tables of information. The files on disc must be in standard ASCII characters and file formats (such as .txt or .csv) unless the submission is a gene sequence listing.

The first gene patent application was submitted in 1980, and inventors decided to simply write out the entire base pair sequence, totaling thousands of pages and the requisite over-size fees. This one was granted rather speedily in that nothing like that had ever been submitted before, which by itself demonstrated novelty. When a second application arrived in a similar format, USPTO directors realized they would now need a standard format to compare one gene application to another and to examine for prior art and non-obviousness. The format which eventually emerged was standardized .xml format called ST.25, developed in cooperation with the World Intellectual Property Organization (WIPO.) Sequence listings must conform to that standard or the newer ST.26 standard. The specification must list the total number of media discs, including any required duplicates, and lists of the files on each disc.

If a computer program listing appendix is submitted and is over 300 lines long (each line of up to 72 characters), the computer program listing appendix must be submitted on a read-only optical disc in compliance with 37 CFR §1.96, and the specification must contain an incorporation by reference statement to the computer program listing appendix. A computer program listing of 300 or fewer lines may be, but is not required to be, submitted on read-only optical disc. The computer program listing appendix on read-only optical disc will not be printed with any patent or patent application publication. However, upon publication, the additional matter will be made available for download electronically at uspto.gov along with the transaction history of the patent prosecution.

If a large table of data is submitted that would occupy more than 50 pages if submitted on paper, the table may be submitted on a read-only optical disc in compliance with 37 CFR §1.58, and the specification must contain an incorporation by reference statement to the large

table on read-only optical disc. The data in the large table must properly align visually with the associated rows and columns.

The "Field of the Invention" section is a short section of one or a few sentences placing the invention in its field of technical arts. A common and effective format is a single sentence with a first part setting the invention in a general field and a second part specifying a more specific or unusual subset of the field, for example: "The invention relates to bicycles, and in particular those which derive their motive power from muscles of the arms as opposed to the legs."

The "Background" section of the specification is very common but currently considered optional. The background is used to describe the previous era of unsolved needs and problems which the current invention will solve, and the current state of the art lacking the invention as a backdrop for why the invention is useful and desirable. Some examiners treat the entire content of the "Background" section as admission of prior art, which is why current practice severely curtails or omits this section entirely. There is no necessity to provide an examiner with extraneous evidence against the patentability of the invention being described. Some current patent writers prevent the examiner from citing material in this section as prior art by combining this section with the next section, which is the "brief description of the invention." This may be done by titling the merged sections as "Background and Summary of the Invention" or such similar title which implies that the new material of the novel invention may be present anywhere in the combined section.

The "Brief Description of the Invention" recites the objectives of the invention, which are the problems or inadequacies of the past and present art. This section must be carefully written to recite the problems solved by the invention and state that the invention provides solutions to these problems but without actually presenting the solutions provided by the invention. The solutions provided by the invention should instead be presented in the "Detailed Description" section.
Examples of typical statements in the Brief Description are:

"A primary objective of the invention is to provide a washing machine for rapidly and completely cleaning eating utensils in a commercial food service environment. Another objective of the invention is to provide automated visual inspection of the utensils at the end of a cleaning cycle able to differentiate between completely cleaned utensils and other utensils which have not been completely cleaned. Another objective of the invention is to provide a sorting mechanism able to select and release properly cleaned utensils from the machine while

retaining incompletely cleaned utensils for an additional washing cycle. Another objective of the invention is to display and store the ratio of quantities of retained verses released utensils, and a corollary objective of the invention is to accumulate statistical data of the history of efficacy of washing cycles performed by the washing machine."

Each statement explains a benefit or a solution to a problem, or an unmet need mentioned in the background section. If statements are included that indicate that the problems have been only crudely or partially solved by the current art, then they should be matched with how they fall short of the superior aspects of the invention, noting that it would be desirable if the current art could achieve the degree of effectiveness of the invention, while still omitting the details of what or how the invention delivers its superior results.

The "Brief Description of the Figures" is a list wherein each figure is described by a statement or a single sentence. The sentence may begin by naming the orientation of the viewpoint of the figure, such a top view, left side view, an oblique rear right bottom view, etc. and recites whether a generic embodiment or some particular alternative embodiment of the invention is shown. If the view is of the same embodiment listed previously, this continuity is also recited. For example, if an embodiment of a new toy car is recited and shown in a front view in Fig. 1, then Fig. 2 may recite "Figure 2 shows a left side view of the toy car of Fig. 1," and so on for other view angles seen in other figures. Although many utility patents will be written for mechanisms and products that are much smaller than a physical structure, view terms used in civil engineering such as "elevation" and "plan" view for side and top views are sometimes used.

Another optional section following the list of figures would be a List of Reference Characters. Figures in patent drawings usually include reference numerals, letter characters, or combinations of both, such as "2A," "2B," etc, and sub-scripted characters such as "x_1," "x_2," etc. Devices having similar components or features arranged in bilateral symmetry may be labelled "9L" and "9R," for instance if a similar item "9" is attached to the left and the right of a central item or structure. Greek letters are also permitted. It is also permissible to follow a letter or numeral with one or more apostrophes such as "9," "9'," and "9" especially when illustrating a moveable component "9" in multiple positions. More than three apostrophes would likely be objected to by an examiner, and for these cases an alpha series such as "9A," "9B," "9C," "9D," … would be more practical. The MPEP prefers the alphabet character following the numeral to be in upper case, but lower-case characters ("9a," "9b," etc.) have long been accepted in US practice.

Although reference numerals may be non-consecutive, i.e, an object may have features [1,] [2,] [4,] and [5] without a feature [3,] the list of figures must be a consecutive list, including figures named by a numeral followed by a letter. Thus, an application listing Figs. 1, 2, and 4 and an application listing Figs. 1, 2A, 2B, 2D, and 3 would generate a Notice of Missing Parts or Notice of Omitted Items. If no figures were actually omitted and the figures were merely misnumbered, then the application and figures would have to be corrected by an amendment re-numbering the figures.

Each element in the drawings identified by a reference numeral must be mentioned in the detailed description section of the specification. For the examiner's convenience, it may be helpful to write a portion of the detailed description wherein each figure is discussed in order and each feature or component identified by reference numerals is explained. If the same referenced feature or component is labeled in several figures, it is permissible to repeat the details of that item in each of the paragraphs or sections describing each figure. While this may look redundant, during prosecution with the examiner the inventor or patent practitioner will be able to refer the examiner to texts close at hand to the figure being discussed.

Next comes the longest section of the application, which is the "Detailed Description of the Invention," and which is substantively most important part of the description and the application as a whole. The patent office states that "the invention must be explained along with the process of making and using the invention in full, clear, concise, and exact terms." Note however, that although sufficient detail must be included so as to "enable" a reader of average skill in the art to reproduce a working version of the invention, there is no requirement to write in any manner encouraging readers of the specification to make or use the invention themselves as opposed to buying the product from the inventor or through other licensed sources.

The detailed description section should also distinguish the invention from other currently available inventions and from what was practiced in earlier eras. Unlike the Background section, references to existing and earlier inventions may not be so immediately invoked by the examiner and applied as prior art against the present invention. Nevertheless, when such other matter is mentioned for comparison, clear and compelling explanations should surround citations to the art of others so as to demonstrate the superiority or desirability of the invention in its field or market.

While mentioning the superior attributes of the invention in comparison to the works of others, it is important also not to disparage the works of others. More than just a matter of decorum, if a patent application disparages a prior art technique, feature, aspect, or apparatus, the court may construe or assume a disclaimer of the disparaged subject matter and may then narrow the scope of the claims to exclude the disparaged subject matter. Therefore, it is important to portray a choice to use the invention over its competitors as a preference but not a necessity, and also that the disclosed and preferred embodiments are a subset of a larger whole of possible arrangements, all of which remains within the scope of the invention. These statements are usually made in a conclusion or summary at or near the end of the specification.
Repeated or copious comments in the patent specification about how the invention is better than the prior solutions may be construed as narrowing the claim scope. In *Open wave Systems, Inc. v. Apple, Inc*., (No. 2015-1108 Fed. Cir. December 15, 2015,) the Federal Circuit provided some guidance about when disparagement of prior art leads to a disavowal of claim scope.

Under U.S. patent law, a claim term is given its ordinary meaning unless the patent specification: (a) defines the claim term expressly or by implication, (b) disclaims the claim scope via the description in the specification, or (c) disclaims the claim scope by clear and unmistakable surrender during prosecution of the patent. For example, in litigation statements in the specification may be cited to show that they indicate the scope of the claims is limited to a specific embodiment described in the specification, leaving others to freely make and sell similar products having the “disparaged” features which were ruled to be outside the scope of the claims.

In this case, Open wave Systems, Inc. (later known as Unwired Planet, Inc.) sued Apple and RIM for infringements related to patent claim terms referring to mobile devices, wireless mobile telephones, and two-way communication devices. The patents addressed problems of 1990s era technology that could not be made small enough and powerful enough to serve the communications and data processing needs of hand-held devices of the time. The solution described in the patents split the computing power between the mobile device and a remote server. The legal arguments focused on whether or not the claims covered mobile devices containing their own "computer modules." If the claims did not cover mobile devices with "computer modules" then the accused Apple phones and RIM phones would be ruled as not infringing on the Open wave patent claims.

The Court began the analysis by noting that "the specification may reveal an intentional disclaimer, or disavowal, of claim scope by the inventor ... " and further cited that “[t]he

standard for disavowal of claim scope is ... exacting," and that "[t]o find disavowal of claim scope through disparagement of a particular feature, we ask whether 'the specification goes well beyond expressing the patentee's preference ... [such that] its repeated derogatory statements about [a particular embodiment] reasonably may be viewed as a disavowal.'" The Court found that the specification disclosed only one embodiment describing a mobile device without a computer module, and the specification distinguished between those that did and those that did not.

Next, the Court reviewed the Background section and found statements disparaging the possibility of practically combining a wireless communication module with a computing module, such as "[t]he combination of a wireless communication module with a computing module leads to a device that is too bulky, too expensive, and too inflexible to address the market requirements,' and "[t]he combination of the two modules is too large and too heavy to fit in a user's pocket."

Thus, by disparaging the combination of a wireless communication module and a computing module within a single device and writing a specification describing only mobile device without a computer module included, the Court ruled that the scope of the Open wave patent claims did not cover the Apple and RIM products.

In another example, Abbott Diabetes Care, Inc, No. 11-**1516 (**Fed. Cir. 2012,) the court scrutinized the following language from the specification: (next page)

"Some devices include a sensor guide which rests on or near the skin of the patient and may be attached to the patient to hold the sensor in place. These sensor guides are typically bulky and do not allow for freedom of movement. In addition, the sensor guides or the sensors include cables or wires for connecting the sensor to other equipment to direct the signals from the sensors to an analyzer. The size of the sensor guides and presence of cables and wires hinders the convenient use of these devices for everyday applications. There is a need for a small, compact device that can operate the sensor and provide signals to an analyzer without substantially restricting the movements and activities of a patient."

The Federal Circuit Court found that the claim term "electrochemical sensor" excluded external cables or wires, writing: "Abbott's patents repeatedly, consistently, and exclusively depict an electrochemical sensor without external cables or wires, while simultaneously disparaging sensors with external cables or wires."

Conversely, the patent writer may demonstrate the non-obviousness of an invention by citing statements by others disparaging the very solutions disclosed in the specification, especially if the statements are made by prominent inventors in the industry, published in relevant trade

publications, or are recognized as standards or best practices in the field. In a specific example, it is possible to build a turbine or pump that uses a stack of closely-spaced disks as a rotor. One challenge for disk turbines handling hot combustion gases as a working fluid is that the disk membranes tend to warp over time so the width of the passages for the working fluid becomes non-uniform.

Letourneau in US Pat. 6,692,232 cites that Nikola Tesla first attempted to solve the spacing problem by forming arrays of bumps or providing studs between the disks that prevent warping, but that in a later patent application Tesla wrote that "… with the object of cheapening the manufacture I dispense altogether with the former spacing studs … accomplishing the spacing by means of small bosses or protuberances which are raised in the plates by blows or pressure." By citing published disparagement of spacing studs by a prominent inventor, Letourneau was able to patent new types of bosses for maintaining the spacing of the disk membranes in light of Tesla's earlier attempts in the same field. When other inventors or publicly recognized experts have told prospective inventors "That way does not work well enough to be practical in its industry" and yet the inventor succeeds following the very path that prominent others had discouraged, the examiner is less able to argue that the solution provided by the invention is unpatentable obvious.

Another way patent claim scope may be unintentionally or undesirably limited is by the use of phrases or terms called "patent profanity," which has nothing to do with prurient language. If the specification uses certain exclusionary, superlative, or absolute terms such as "crucial," "very important feature," or "vital," then in litigation these terms may be found to limit the scope of the claims (and thus the volume of enforceable rights against competitors) to less than what the claim wording could have been given under otherwise normal circumstances. Two standards for the interpretation of written words are currently struggling for dominance in the patent world, depending on when and where they are invoked: a) the "broadest reasonable interpretation" or BRI, and b) the "ordinary and customary meaning," also called the Philips standard.

Under BRI, claim terms are given their broadest reasonable interpretation in view of the specification to one having ordinary skill in the art at the time of the invention, without importing limitations into the claims from the specification. Under the Philips standard, the court will review both intrinsic evidence such as the specification and claims of the patent itself, and also the patent's prosecution history (i.e., did the applicant make any statement in correspondence with the examiner that somehow expanded, limited, or otherwise influenced the definition, interpretation, or meaning of a word to mean something outside of its "ordinary

and customary meaning?") Extrinsic evidence such as dictionaries and expert testimony may also guide claim construction, although extrinsic evidence is not given as much weight as intrinsic evidence.

Thus, similar to disparagement or teaching away, if the specification is written to imply that certain conditions are mandatory in order to practice the invention, then the scope of the claims may end up being interpreted in litigation as being limited to situations where those conditions are in effect.
Furthermore, these statements become challenges for future inventors to circumvent while developing a competitive invention in the same field. New devices or processes that provide the same benefits as the patented invention while traversing or dispensing with the limitations of the patent specification will not only likely reside outside the scope of the patent claims in litigation, but the patent or its application will be unable to stand as prior art against the patentability of these new inventions.

Consider how a statement such as "conductors electrically connected to the positive battery terminal must be made of copper" in a published patent application would actually inspire other inventors to question why this must be so, and to experiment with other materials. An inventor succeeding in producing a similar device using some other conductor such as aluminum would be able to cite the published application as evidence that the aluminum apparatus represents a breakthrough in its field, and that the use of aluminum is non-obvious.

The patent office also requires that the description be sufficient so that "[any] person of ordinary skill in the pertinent art, science, or area could make and use the invention without extensive experimentation." Breaking up the elements of this requirement, a "person having ordinary skill in the art" is a legal fiction that was first codified in the Patent Act of 1952, and was based similarly on the legal concept of a "reason-able person" as used in the common law of torts as a test of negligence. The person of reasonable skill is "not an automaton" (*KSR vs Teleflex*) but is also not necessarily an expert in the field either. The level of skill is also directed to a producer, artificer (i.e., "maker,") or inventor in the field and not just a user of the product. Thus, a patent for an improved massage chair would need to be written at an instructional level for a person who designs and builds furniture that contains electrical motors, eccentric rotating masses and power switches, as opposed to a person who would sit in a massage chair and is able to learn how to operate its controls.

"Extensive experimentation," sometimes also termed "undue experimentation," deals with the number of possible adjustable or selectable variables which must be determined in order to practice the invention. The U.S. Supreme Court decision of *Minerals Separation Ltd. v. Hyde*, (1916) posed the question: is the experimentation needed to practice the invention undue or unreasonable? In evaluating whether or not the specification description enables a reader to practice the invention, the examiner will consider a number of factors, including the level of one of ordinary skill in that particular field, the level of predictability in the art, the amount of direction provided by the inventor, whether working examples of similar inventions exist, and the quantity of experimentation needed to make or use the invention based on the content of the disclosure. The "quantity of experimentation" may in turn include the time required for a trial to demonstrate success or failure. For example, if a small number of interacting components can only be connected to each other in a finite number of orientations in order to interoperate, and ample common sense exists in the field to exclude nonfunctional interconnections such as short circuits, or if there is an expected order of material process-ing such as a fiber that must be spun into thread before winding onto a bobbin and stitching may occur, then the "quantity of experimentation" may be small enough to omit certain details especially when nonfunctional modes are readily apparent.

If long times are required to determine a whether or not an experiment was successful, such as the endurance of an improved surface coating against environmental degradation, then the "quantity of experimentation" may be deemed as overwhelming even if the number of options to try is small, because of the amount of time required to determine which options were successful approaches that of having to make an excessively larger number of tests having more immediate outcomes. Thus, for an invention improving long-term environmental resistance of a coating or treatment, more details may be required to describe how to practice the invention.

Another aspect to consider is the quantity and degree of usefulness of information learned from a failed trial, and how readily an experimenter of average skill in the art would be able to discover a series of adjustments so that successive trials converge upon a workable embodiment of the invention. As a counterexample, the tumbler mechanism of a combination lock is designed to work in exactly the opposite manner; the silence and inscrutability of any failed attempt preferably reveals no clue as to the number of turns and the stopping points required to align the internal mechanism to allow it to open. If an operable version of an invention relies in part on random or unpredict-able events or conditions, then more detailed description will be required to educate a user about when and how these conditions best prevail.

Lastly for specification writing, the patent office requires that "the best mode contemplated by the inventor of carrying out the invention must be set forth in the description" (MPEP 2165.) This requirement only applies to the best mode known at the time of filing of the application. If an improvement is discovered after the filing, or if among several options disclosed in the specification for how to practice the invention one particular mode is later discovered to be substantially superior to the others, the inventor has no obligation to amend the application and in any case such an amendment would likely introduce new matter into the application. A later discovery after the filing, if the inventor believes that the new know-ledge is important and profitable to protect, may be introduced as a continuation-in-part filing. Alternatively, the inventor may decide to retain the new knowledge as a trade secret.

Claims:

Writing effective and enforceable patent claims is a specific skill worthy of an entire course on its own. In the scope of this course only basic guidelines and simple examples are presented.

The purpose and effect of the set of claims submitted with a patent application are to distinctly and particularly point out the inventive matter which the one or more inventor's regard as being their own creation. "Distinctly" in this case means that the claims must describe and distinguish the invention from all other known inventions in the field, and "particularly" means that the claims must precisely describe what the invention is and what it is not. In this regard, patent claims resemble real estate property boundaries and they are often called "the metes and bounds of the invention."

Like real estate, patent rights (and copyrights as well in this regard) are negative rights. They do not directly confer privileges, advantages, or wealth to the owners. They only allow the owners prevent others from doing things, making or selling things, or possessing unauthorized duplicates of the things. In real estate, property rights function primarily as the right to exclude others from entering or being within the exactly specified boundaries. These limits must be knowable and well-defined, so that when a property owner trespasses an intruder, both parties know exactly how far the intruder must retreat. If the intruder retreats to a public street, the property boundary definition allows both parties to know that the trespassed person is now in a public domain and need not obey any further let or hinderance from the property owner.

The claims section of the application document begins with a header at the top of the first page of the section. Examples of headers are:

"What is claimed is:"
"I claim:" / "We claim:"
"The invention claimed is:"

The next sentences to follow are the claims themselves.

Each claim is one single, complete, and exactingly punctuated sentence. The patent office strictly applies the "Oxford comma" to lists of words and clauses separated by commas. The two sentences below illustrate the difference in interpretation:

a. "We invited our grouchy neighbors, Amy and Mike."
b. "We invited our grouchy neighbors, Amy, and Mike."

In (a,) the number of invited people is two, and they are identified as Amy and Mike. In (b,) the number of people invited is at least four: an indeterminate number of grouchy neighbors who number at least two because "neighbors" is in plural, plus Amy and Mike, who are not necessarily grouchy nor neighbors.

The U.S. examiner will apply the form, content and grammar rules of MPEP 608.01 parts (i) through (o) for interpreting the meaning and proper structures of the claims. There are four types of claims:

1) Apparatus claim: This claim describes a product, and recites elements that may be active, such as a device, a physical product, a machine, or software (if recited as an operating structure.) Apparatus claims may also describe inactive inventions, such as mixtures, compositions of matter, or articles of manufacture. Apparatus claims may recite a combination of active and inactive elements, such as a machine able to function in a novel mode because of a component that is made of a new material, or perhaps a material known elsewhere but never used in that industry before.

2) Kit claim: Although commonly associated with apparatus claims, a kit claim recites a set of two or more objects which may be conveniently assembled or combined to produce a new function. Kits may include novel apparatus components and novel compositions of matter. An example would be a repair kit for a coated material such as finished wood or automobile safety glass. The kit claims could specify tools or solvents used to remove locally damaged material, a first set of ingredients which combine, react, and solidify to form a replacement for the removed material, a second set of at least one ingredient for replacing the damaged coating, and one or more tools such as applicators or tools for spreading, smoothening, or creating a matching surface texture similar to the undamaged coated surface. Additional tools for measuring and mixing ingredients and for masking areas near the repair site or for containing a spill may also be recited in dependent claims to the kit claim.

3) A Method or Process claim describes or defines a series of acts or steps for performing a desired function or accomplishing an intended result. Some software claims may be recited as process claims that specify the instruction steps that the computer follows while the application is in operation. A recipe may be recited as a process or method.

   A method claim is written as a series of enumerated steps with verbs presented in their gerund ("-Ing") forms. Where particular ingredients or tools are used to perform the

method, claim steps must be included to introduce these items first, and subsequent steps then recite how the tools are used or how the ingredients are combined and treated.

A common gerund verb used in method claims is the word "providing." For a recipe with measured proportions of ingredients, each of the ingredients, plus measuring tools such as graduated containers or scales must first be recited as having been provided, and then the ratio in which they are combined may then be recited in a following step or in a clause following the step of providing them.

One challenging aspect for inventors about method claims is that in order to avoid rejection by the patent office, the inventor must be able to identify features or characteristics about the result of the process that can only have come about because the claimed method. Otherwise, if there is some other way to produce the results that elides even one step in the process, then it is not possible to prove infringement by others who possess the results of the process. Therefore, if a new method of manufacture is discovered that is cheaper, faster, quieter, and cleaner than other known methods in its industry, but the result-ing product is indistinguishable from the other current methods, then the method is likely not patentable and would be difficult to enforce unless access or surveillance of a competitor is somehow gained and evidence of unauthorized use of the claimed process is collected. Method claims grant weaker rights than apparatus claims because discovery of precursor components or ingredients is insufficient evidence of infringement; the patent holder must catch the infringer in the act of making, and possession of results produced by the claimed method may be deemed evidence of unauthorized use of the method only when the patent holder can prove that there is no way to arrive at those results other than by practicing the claimed method. The more unique "choke points" that can be identified in the method – one cannot arrive ready to execute step (d) without having executed step (b) and then step (c) – the stronger that proof of possessions of the results may be alleged as proof of having practiced the claimed method.

4) A Product by Process claim is a claim where an article or at least one element of an article is claimed by reciting the process of making the article or an element of the article. Claiming the article and then referring back to a previously presented claim reciting a method of making the article is an acceptable way to present a product by process claim [MPEP 2173.05(f.)]

As with process or method claims, it is advantageous for the process to include at least one unique "choke point" where the product cannot be obtained except by practicing the steps in the method. If these choke points are valid then possession of the product would act as proof that the method had been used. "Because validity is determined based on the requirements of patentability, a patent is invalid if a product made by the process recited in a product-by-process claim is anticipated by or obvious from prior art products, even if those prior art products are made by different processes." Amgen Inc. v. F. Hoffmann-La Roche Ltd., 580 F.3d 1340, 1370 n 14, 92 USPQ2d 1289, 1312, n 14 (Fed. Cir. 2009)

The following are some basic and general guidelines of claim construction:
The format of a claim is:

the preamble,
the transitional phrase, and
the limitations.

A preamble may unintentionally function as prior art if it recites a general object or apparatus, and the novel aspects are introduced as limitations in the claim. Examples of preambles which recite prior art are:

"A toy …"
"A semiautomatic pistol …"
"A surfboard …"

Each of the nouns in the preamble usually recite previously known objects, but it may be possible to invent entirely unprecedented products and introduce them in a preamble which would be arguably novel, especially if it were the very first article of its kind. Such a preamble would likely contain a noun reciting a known object and at least one modifier to the noun applying a novel or unexpected feature or characteristic to the noun. Examples of such preambles might be:

"An article of buoyant cookware …"
"A noise-absorbant explosive compound …"
"A faster-than-light intercommunication device …"

While the preamble of a claim does not limit the scope of the claim, functional language related to structural elements may be used in court to disadvantageously limit the scope of the claim. Therefore, a preamble beginning with "A shovel…" is preferable to the preamble: "A shovel

for digging gravel…" It may be argued that phrase about digging gravel teaches away from using the shovel to dig other materials.

The next word or word phrase in a claim is a "transition." Commonly used transition phrases include: "comprising", "consisting essentially of," and "consisting of." "Comprising," which is synonymous with "including", is considered an open-ended term and does not exclude additional, unrecited elements. Thus, the claimed invention includes but is not limited to the elements recited in the claim.

For example, a cookie dough recipe or a cosmetic healing balm will contain several constituents blended into a mixture according to an inventor's proportions. The first, or index-pendent claim would recite a set of the minimum number of constituents for the invention to function, and the broadest ranges of proportions of these constituents. Dependent claims may then add various additional, optional ingredients or recite narrower ranges of proportions of these ingredients that produce especially desirable or effective versions of the invention. "Comprising" is generally the most commonly used transition phase. The dependent claims or sub-clauses in the independent claim may use "further comprising" to recite additional elements.

"Consisting of" is considered a closed-ended term and does not allow dependent claims to specify additional unrecited elements. The claimed invention is limited to the set of elements recited in the claim, and the dependent claims may only specify further narrowing of the proportions of the initially recites set of elements. Note however, that these ranges and proportions may include zero, or "0%," so that the presence of some ingredients may be recited as options when ranges are carefully chosen in dependent claims. Ranges that specify proportional representations of various ingredients should be supported in the specification as to whether the proportions are to be determined by weight, mass, volume, or numerical counts. Thus, if the symbol "%" is used in the claims. When using percents as ranges, the sum of minimum percentages of the ingredients cannot exceed 100%. The sum of the maximum percentages of the ingredients may total less than 100% if the transition phrase uses "comprising" or "comprised of," because this transition is an open list and would default to meaning any shortfall could be made up of unspecified, inert ingredients such as fill materials, water, or air to the extent that these are known and used in that industry.

Weight is not always the same as mass, and some English and US Customary units such as the word "pound" are ambiguous. The specification should clarify whether "pounds" are meant to

denote force or weight. Although the English and US Customary unit of mass is a “slug” this is rarely used and “pounds mass” may be used instead with the abbreviation “lbm,” with “lbf” being used for “pounds force.” Alloy patents sometimes use “atom percent” for the relative proportions a set of the metals in an alloy.

The specification should also explicitly state whether the endpoint quantities of a numerical range are or are not included in the range. The limitation “between 9 and 22 cups of olive oil” may invite litigation as to whether 9.0000 cups reside within the scope of the claim, or whether “between” only specifies the range to span from a tiny bit more than 9 up to a tiny bit less than 22. The uncertainty may be eliminated by adding the word “inclusively” in the claimed range, and an even broader expression uses the word “about,” such as: “an amount of olive oil ranging from about 9 cups to and about 22 cups inclusively.”

The MPEP further states that “Consisting essentially of” limits the scope of a claim to the specified materials or steps "and those that do not materially affect the basic and novel characteristic(s)" of the claimed invention.” A claim using “consisting essentially of” claim may occupy a middle ground between closed claims that are written in a “consisting of” format and fully open claims that are drafted in a “comprising” format, however, without clear indications in the specification or claims of what the basic and novel characteristics actually are, "consisting essentially of" will be construed as equivalent to "comprising.”

A” limitation” in a patent claim is a text description of an element or a characteristic of an invention or a portion of an invention. The set of limitations following the transition functions as the predicate to the claim sentence. Each limitation narrows the scope of the claim while increasing its chance of being found valid by further distinguishing the invention from all other related art. Like setting spikes into soil to define real estate property boundaries, each limitation adds to the” metes and bounds” of the invention to define exactly what the invention is and what it is not.

Limitations may even be “negative,” which although uncommon, may be useful in specifying certain structures. A negative limitation may specify that a claimed mixture of ingredients excludes or is free from a particular matter which is unwanted or less effective than the inventive mixture. Existing competitors may have difficulty in separating the unwanted matter from similar mixtures, and the inventor has discovered and seeks to patent and exclude them from using a new, superior process or apparatus for the improved product. Other examples of negative limitations include terms such as “non-magnetic,” or “not capable of reacting with

oxygen.” These statements must be supported in the specification by explanations or exposition describing how the negative features or the recited lack of enumerated elements contribute to the invention, unless, as may be the rare case, that it may be argued that “a skilled artisan would understand a negative limitation to necessarily be present in a disclosure." (Novartis Pharms. Corp. v. Accord Healthcare, Inc., 38 F.4th 1013, 2022 USPQ2d 569, Fed. Cir. 2022) More commonly, if the specification is entirely silent about the presence of an element, the examiner will reject a claim introducing the lack of a previously unmentioned element in a negative limitation.

Another important rule applied when examining claims is that of “antecedent basis.” At the first point in a claim that a limitation is introduced, that element must be introduced with an indefinite article (“a” or “an”,) and thereafter, either in the rest of the claim or in claims depending from this claim, the element is re-introduced by a definite article, typically “the,” or in more formal writing, the word “said.” The phrase “she said” would be rejected, however.
Claim Numbering and Claim dependencies:

The set of claims submitted in a patent application must be consecutively numbered as integers presented in numerical order. An independent claim is a stand-alone claim that contains all the limitations necessary to define a working embodiment of the invention. Claim 1 must always be an independent claim because no claim elements precede it. The preamble of an independent claim aways begins with an indefinite article, and claims which depend from that independent claim begin with a definite article and repeat the preamble of the independent claim. All the elements of an independent claim are incorporated by reference into every claim depending from it; the dependent claim adds new limitations and narrower ranges than its parent independent claim. Dependent claims may also be written to depend from dependent claims so that they recite even more limitations or even narrower ranges.

Dependent claims may never be written to broaden the scope of their parent claims. If an independent claim recites copper sheeting having a material thickness between 0.005” and 0.080”, then a dependent claim specifying the copper sheeting is between 0.006” and 0.017” thick would be proper, but a dependent claim specifying between 0.075” and 0.108” thick would not be proper. A dependent claim may not use a negative limitation to remove a previously recited element in any of its parent claims.

While an independent claim must recite enough of the elements of an invention to function at a bare minimum, the dependent claims elaborate on the better- and best-known modes to practice

the invention. A best mode invention may reside at the bottom of a series of nested dependent claims, so that if an unauthorized copy-cat were to produce the best mode, then the entire series of nested claims could be applied as multiple counts of infringement against the copy-cat, resulting in a court finding of multiple damages awarded to the patentee.

A multiple dependent claim is written to depend from any one from among a defined set of previously recited claims. All of the claims in this set must have the same type of preamble. The claim numbers are presented in ascending order and the set includes the word "or" to specify that each variant of the claim is specified by any one chosen claim within the set.

The preambles "The article of footwear according to any one of the preceding claims, wherein […]" or "The article of footwear according to Claim 2, 4-6, or 8, further comprising […]" would be in proper form, but not "The article of footwear of Claim 2 or 4, assembled according to the method of Claim 5 or 6 …" Dependent claims may be written which depend from a multiple dependent claim, but a multiple dependent claim may not depend from another multiple dependent claims.

Multiple dependent claims are encouraged in certain foreign jurisdictions like the European Patent Office (EPO,) but they are tolerated in US patent practice although discouraged by means of a stiff fee applied to each multiple dependent claims and also when counting the number of claims in an application. Each possible variation in the preamble of a multiple dependent claim counts as a single dependent claim. Thus, in the above, the claim beginning with "The article of footwear according to Claim 2, 4-6, or 8, further comprising […]" would count as five dependent claims in the fee calculation for the application.

Claims should preferably be arranged in order of scope so that the first claim presented is the least restrictive. All dependent claims should be grouped together with the claim or claims to which they refer to the extent practicable. Similarly, product and process claims should be separately grouped to make examination and classification easier.

The word "or" in patent claims may trigger an examiner's objection if the limitations separated by "or" are interpreted to represent distinct alternatives of the invention. If that is the case, then two or more claims should be written to present each of the alternatives separately. Another long-standing work-around to the word "or" is called a Markush group named after Eugene A. Markush. The prosecution of his patent, for which he prevailed in 1924, set a precedent for chemical structure patent filings which expanded in acceptance to US patent claims in general.

The Markush structure uses the words "consisting of" and recites a closed list of alternatives as a set, and selects any one element from among the recited set, such as:

"… a fruit selected from the set of fruits consisting of: an apple, a pear, an orange, a lemon, a lime, a grape, a peach, a cherry, and a plum."

Since ranges are permissible in claims (e.g, "a baffle plate comprising at least three through apertures") then "or" may also be acceptable when used as a range consisting of two adjacent integers, such as "said plate comprising four or five through apertures."

More recently, "and/or" has become admissible in patent claims since 2015. The claim setting this new precedent was originally rejected by the examiner but reversed on appeal. To eliminate ambiguity, the specification may recite whether "or" is to be interpreted as an inclusive or an exclusive conjunction. As late as 2001, the patent office interprets "or" as an exclusive meaning [A] or [B] but not both. For a claim reciting that an invention further comprises "component [A] or [B] affixed thereto," the examiner may allow "or" to stand if the essences of [A] and [B] are similar enough to be considered equivalents. An example of an allowed claim using "or" is presented from US Pat. 5,955,422 Claim 1:

"A pharmaceutical composition comprising a therapeutically effective amount of human erythropoietin and a pharmaceutically acceptable diluent, adjuvant or carrier, wherein said erythron-pointing is purified from mammalian cells grown in culture."

The above claim is a product by process claim, and the use of a "diluent, adjuvant or carrier," produces the desired product. The specification reads: "Standard diluents such as human serum albumin are contemplated for pharmaceutical compositions of the invention, as are standard carriers such as saline," and separately, a long paragraph lists over fifteen chemicals which may be used as "adjuvants."

As another example of an allowed software method claim using "or," US Patent No. 5,528,246, "Traffic Radar with Digital Signal Processing" uses "or" in its independent Claim 1:

"…(d) storing said components in a memory,

(e) searching said components in memory for the component that meets preselected magnitude or frequency criteria, and

(f) indicating the speed of the target vehicle corresponding to the component that meets said criteria."

The invention pertains to traffic enforcement radar devices, and in operation the device performs both a magnitude and a frequency analysis, but allows a user to select which of the two selection criteria (the strongest signal or the fastest signal,) the software would apply to the acquired data set and then operate based on the user's selection. In any case, the inclusive intent of "[A] or [B]" in patent claims may often be written as "at least one selected from among [A] and [B.]"

In summarizing this overview of claims writing, effective claims distinctly point out the features of what the invention is and what it is not. Claims describe and detail the elements that make up the invention and how they are connected to each other or relate to one another. Only one invention is allowed to be granted in a single patent application, although the invent-tion may be described using more than one set of alternative terminologies. These alternatives may then be set forth in more than one independent claims, with optional variations and speci-fic best modes being added with narrower, dependent claims.

Drawings:

This course concentrates on utility patent application writing. Drawings for design patents are examined under more exacting rules than for utility patents because in design patents the figures themselves function as "the claim." Plant patent applications almost always include color photographs of the plant, often at various stages of growth, and may also include detailed photos of fruits, tubers, seeds, blossoms, and other distinctive portions of the plant. The plant patent, if granted, covers the entire organism and not just its useful or edible parts.

Utility patent drawings resemble mechanical drafting; they are black and white line drawings. More seldomly, color drawings and photographs may be included in a utility patent application but these require a special petition to be filed along with the other patent application documents, and of course, a fee is required to file the petition. The petition must assert that the color images or photographs are necessary as the only practical medium by which to disclose the subject matter sought to be patented, and must be of sufficient quality such that all details in the drawings are reproducible in black and white in the printed patent.

Commonly admissible exceptions to the black and white line drawing requirements include electrophoresis gels, radiographs, cell cultures and histological tissue cross sections (stained and unstained,) in vivo images, chromatography plates, photos of animals or crystalline structures, and photomicrographic or metallographic images for material structures. If the

subject matter of the application admits of illustration by a drawing, the examiner may require a drawing in place of the photograph.

Drawing standards for patent applications are set forth in 37 CFR §1.84, including drawing sheet sizes, margins, and minimum sizes for characters. Each view in a patent application is called a "Figure." Most view types are named from civil engineering and may be described in the specification (especially the List of Figures section of the specification) using terms such as plan view, elevation view, section, and perspective views. Oblique views may be created as perspective or isometric views.

Other view types and terms for these types derive from the mechanical engineering arts. These include exploded views, detail views, and various types of cross section views. Broken views are useful for very long items such as pipes, beams, or wands, wherein the ends of the item and sometimes one or more intermediate portions of the item are shown compressed in length. Very long views may also be presented on successive drawing sheets, but they must be arranged so that the complete figure may be assembled without concealing any part of any of the views appearing on the various sheets, and the relationship between the different portions of the complete figure must be clear and unambiguous. Broken views are also useful for showing internal components of a machine which are enclosed by a housing or a shroud.

Cross section views are used to show inner details of complicated parts which would be confusing or difficult to discern properly if shown by hidden lines. U.S. patent office practice allows drawings with hidden lines although some foreign patent offices do not. The inventor or illustrator is allowed fairly wide discretion for selecting shading or cross-hatching in section views and broken views, although best practices from traditional mechanical drafting apply to patent figures, such as:

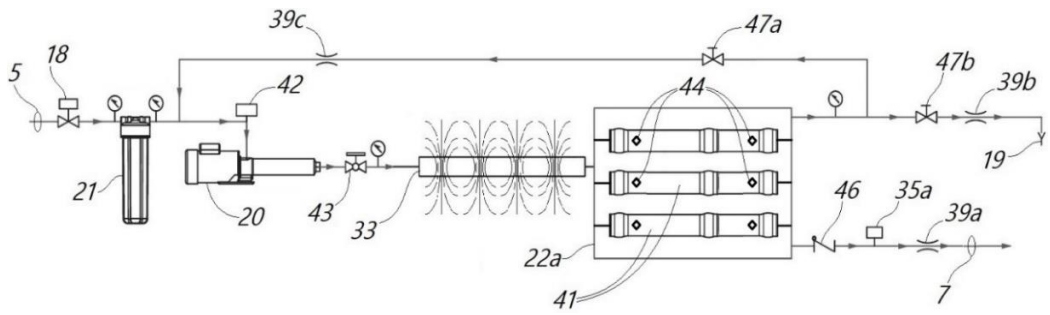
- Hatch lines of regularly spaced parallel oblique strokes should be angled to appear substantially distinct from centerline axes or principal lines
- Spacing between strokes should be chosen based on the total area to be hatched (cont'd next page)
- Multiple portions or instances of the same item should be hatched in the same manner
- The hatching of juxtaposed different elements must be angled in a different way
- For large areas, hatching may be confined to an edging drawn around the entire inside of the outline of the area to be hatched

While different angles and spacings of the same type of hatching may indicate different components made of the same material, different types of hatching should be used to connote different conventional meanings regarding the nature of mater-ials seen in cross section. Also, as in traditional mechanical and civil engineering arts, single-spaced hatching is commonly used for anisotropic metals or generic materials, double-spaced hatching is used for non-metals such as plastics and glass, and other conventional fill graphics may be used for materials such as foams, sponge, and other cancellous materials, concrete, soils and gravels, water at the waterline of a vessel or a shoreline, and liquid levels shown in a container or a tank. However, engineering standard practices are not absolutely required, and shadings may be left to the choice of the illustrator as long as they are reasonably effective.

Hatching should not impede the clear reading of the reference characters and lead lines. If it is not possible to place reference characters outside the hatched area, the hatching may be broken off surrounding wherever reference characters are inserted.

Exploded views show the relationship or order of assembly of various parts of a device. If the device is referred to by a single reference character in another figure, the exploded components may be embraced by a large bracket, especially if the drawing sheet also includes other figures. Exploded views may also include broken out components, such as representing a motor by breaking out a section of its housing and exploding some of its inner parts to positions outside the housing. In an exploded view, heavier lines are used to illustrate the components, with lighter broken-line witness lines showing the direction of displacements of the exploded parts. Fasteners that attach assembled parts may be shown with broken-line witness lines extending from the fasteners and through the parts which they engage. These witness lines may include angled “jogs” to preserve the orientation of a part displaced along other than a single implied linear motion from its assembled position.

Besides concrete representations of physical objects, chemical or mathematical formulae, tables, and waveforms may be submitted as drawings and are subject to the same requirements as drawings for physical products. Waveforms of electrical signals may be connected by dashed lines to show the relative timing of the waveforms. Schematic diagrams may also be used to show the relationships of connected components, with industry standard symbols standing in place of physical components.

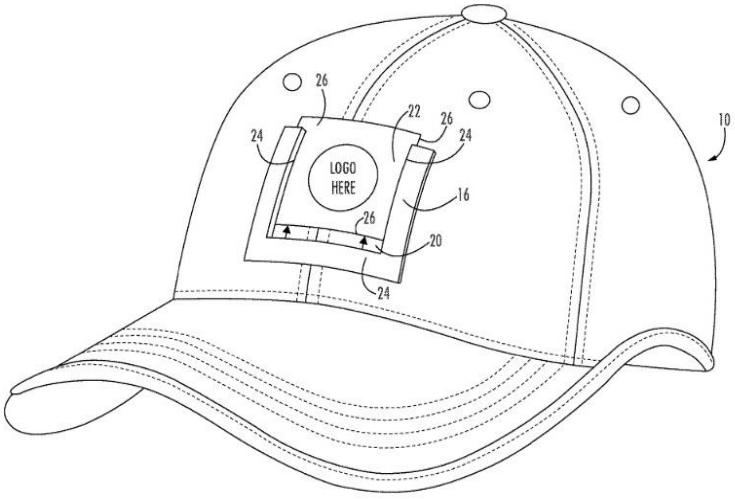


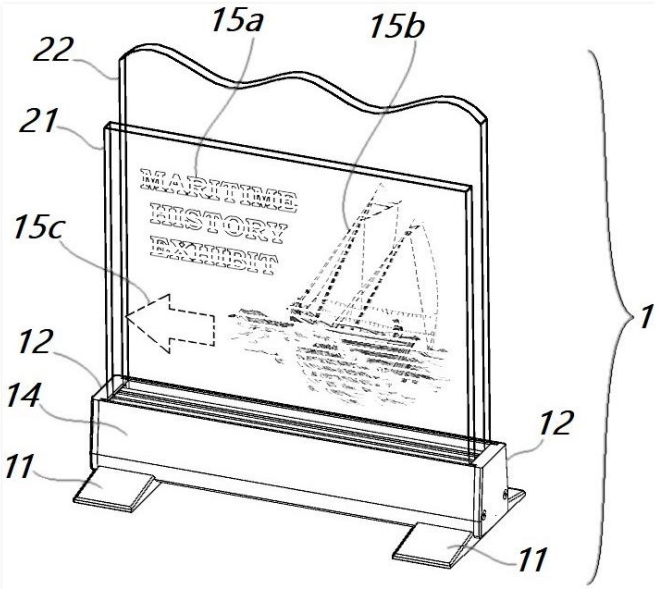
The above figure from US Pat. 11,912,607 shows a portion of a larger water filtration and purification system. Some components use stylized representations of physical items such as housings for filter cartridges at [21] and [22a,] others are represented by standard plumbing symbols (e.g., [18,] [39c,] and [47a,]) and in this case component [33] is a novel component in the invention, so the illustrator created a stylized image for a "magnetic polisher" in which fluid is passed through a series of strong magnetic fields.

An invention may also be shown in an "environment of use," especially if the device resembles other common and known tools but the novelty of the invention includes a new technique. In an environmental view, the invention itself should be drawn with heavier lines than the people using the device and the surroundings where the device is used.

US Pat. 11,796,273 is for an adjustable rifle support bracket that uses a knotted cord that a user may wrap around a tree. A slot in the bracket allows it to be hung upon the most convenient knot for aiming. The invention is shown in an exemplary environment of use where a shooter, (presumably a hunter,) has found a tree convenient for the invention to support the forestock of his rifle. The image at left wordlessly fills in a lot of information about how the invention is used and why the invention is helpful or desirable.

Direct advertising is not permitted in the patent specification nor in the drawings. Instead, inventions depicting advertising may use the word "logo," "indicia," or equivalent as a place holder to show where an advertising image or a trademarked image applies to the invention. The figure at right is from US patent application US20220039500A1, "Hat with Interchangeable Indicia Members," (now abandoned.) The inventor would seek licensing agreements from trademark holders such as sports teams and consumer brands. The text "Logo Here" indicates where a user of the invention could display a brand logo or sports team, or a political statement, but would be able to easily change the message at any time.





At left, an invention with transparent panes depicting advertising or signage is shown with text [15a,] an image [15b,] and an arrow [15c.] all drawn with broken lines to indicate that these are merely exemplary samples and are not a concrete depiction of particular or necessary elements. Solid lines may be construed as limiting the available appearance of the invention to the specific shapes that are depicted.

Some inventions such as mixtures of materials do not require illustrations, which might even be detrimental for these sorts of inventions because the drawings might be asserted by an adversarial party as limiting the scope of the invention to the types, structures, or material compositions of products as they are illustrated. One such unnecessary limitation could be an

implied ratio of particle sizes as depicted if shown. Examples of patented materials having no illustrations are US Pat. 4,371,493 to Minuto for a silicone putty mix which became known as "Silly Putty®," US Pat. 4,623,551 to Giddey et al for a "cheese foam," and US Pat. 8,992,707 to Comet et al for a commercial explosive.

Abstract:

The abstract is a single paragraph summary description of the invention which must be 150 words or fewer. It is presented in the application on its own page, following the claims section. The purpose of the abstract is to enable the USPTO examiners and the general public to determine quickly from a cursory inspection the nature and gist of the technical disclosure. This is most important in patent searches, where often a large number of patents and applications will be retrieved, and speeds up the task for an inventor or patent practitioner sifting through to select relevant references while discarding unrelated ones.

Paying Fees When Filing an application:
The minimum fees required to file a utility application are the basic application fee, the search fee and the examination fee. Other fees may be required for excess pages, claims in excess of 20, independent claims in excess of 3, and multiple dependent claims. Additional fees apply for large pages counts, physical applications mailed to the USPTO, and they have recently introduced fees for specifications filed electronically but in formats other than Microsoft Windows .docx format, such as Adobe PDF. Some petitions included with the initial filing of an application require fees. When filing electronically, they may be paid by credit or debit card using a payment portal after the application is filed.

The Patent Office allows people who file frequently and who must also frequently pay fees to the patent office to establish a cash account. Usually, these accounts are set up for large law offices. Rather than figuring out the exact filing costs for an application or petition, forms may be transmitted to the patent office with a standing instruction to draw the appropriate fee from the numbered account for the transaction at hand, or a partial or estimated payment may be submitted with a transaction with the instruction to draw any overage from the account. If there are insufficient funds in the account, then no withdrawal will take place, and the transaction would proceed as if no payment or an insufficient payment was made. Of course, the USPTO will ***not*** notify the filer that this problem has occurred, and thus it is the responsibility of the filer to ensure that fees are either timely paid or that appropriate surcharges and late fees are included with late or deficient payments.

Bouncing a check on the patent office is an error that may take over a year to detect within the office, yet the consequences will eventually apply, and an application may be deemed abandoned for lack of payment or underpayment, or a missing fee that happened unawares much earlier in the application and prosecution process. This can come as a very nasty surprise,

including loss of patent rights for an error that occurred months ago. In most cases a petition to revive an unintentionally abandoned application may be filed, but this petition carries a punitive fee and patent term is not extended to cover the time gap between the missed payment and the resumption of prosecution.

When using a credit card to pay for a physical application or for submitting a payment by fax, a USPTO form "PTO-2038" is used. The form may be viewed, downloaded, or filled in on-line from this URL:
https://www.uspto.gov/sites/default/files/documents/PTO-2038.pdf

The Form PTO-2038 may be mailed in or faxed, but it should not be uploaded in Patent Center along with other application documents, because when the application publishes or becomes otherwise available to the public, then the credit or debit card number, expiration date and CCV number, or bank the account number and it credentials will all become visible to the public and available to identity thieves and financial fraudsters.

Conclusion:

This course describes and explains acceptable formats and contents for a utility patent application in the United States Patent and Trademark Office (USPTO,) with additional highlights on patentability, how an application is processed and examined once received by the patent office, and filing requirements for both electronic and physical applications mailed in or dropped off at the USPTO hand-delivery window in Alexandria, Virginia. It is possible to file and successfully prosecute applications without hiring a patent practitioner, and the course author has done so. Registered patent agents and attorneys are available to assist *pro se* filers who, after filing papers in good faith may receive a puzzling letter from the patent office. *Pro se* or novice filers may also benefit greatly by hiring a litigating patent attorney to review the claims in a formal utility application.

Disclaimer:

These materials have been prepared solely for educational and informative purposes to contribute to an understanding of current U.S. intellectual property law. The materials reflect only the personal views of course author, and do not constitute legal advice. It is understood that each invention and patent case is and will be fact specific, and that appropriate or most efficient courses of legal actions in any case will vary. Therefore, these materials may or may not be relevant to any particular situation, and the author cannot be bound either philosophically to or as a representative of any present and future readers or clients to the comments expressed in these materials. The presentation of or access to these materials does not establish any form of attorney-client relationship with the author, nor should these be relied upon or otherwise substituted in place of seeking legal advice from qualified persons.

While every attempt was made to ensure that these materials are accurate at the time of its writing, errors or omissions may be contained herein, and patent law continues to evolve in these and other areas. Thus, the information presented herein may not be updated regularly and may not reflect the latest recent changes, the consequences of the most recent rulings, or the most current or best practices, for which any and all liability is hereby disclaimed.

References:

- 35 USC §101: (Patent Eligible Subject Matter)
  https://uscode.house.gov/view.xhtml?req=granuleid:USC-prelim-title35-section101&num=0&edition=prelim

- 35 USC §102: (Novelty)
  https://uscode.house.gov/view.xhtml?req=granuleid:USC-1994-title35-section102&num=0&edition=1994

- 35 USC §103: (Non-obviousness)
  https://uscode.house.gov/view.xhtml?req=granuleid:USC-1999-title35-section103&num=0&edition=1999

- 35 USC §112: (Patent Application Specification)
  https://uscode.house.gov/view.xhtml?req=granuleid:USC-prelim-title35-section112&num=0&edition=prelim

- USPTO Manual of Patent Examining Procedure (MPEP)
  https://www.uspto.gov/web/offices/pac/mpep/index.html