

Drafting a Patent Application

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tHIS ARTICLE IS FOR INVENTORS who want to be actively involved in drafting patent applications on their inventions. Most inventors want to make sure they're still a full partner on the team when a patent attorney takes over and starts writing the application. Some inventors go beyond that and want to write either or both of the following: (i) a "provisional" patent application, as discussed below; and/or, (ii) the first draft of a "utility" patent application.

Regardless of whether an inventor writes a complete first draft or hands that task over to a patent attorney, any inventor can benefit greatly if he/she knows what to expect from a patent attorney, how the information should be organized, what the specific goals are, and how to tell good work from not-so-good work. The goal of this article is to share that information with inventors, so they can work smoothly, quickly, and effectively with a patent attorney, regardless of how the roles of inventor and attorney are adjusted and balanced, once they begin working together.

PROVISIONAL VS. UTILITY APPLICATIONS

In 1995, Congress created a brand new type of "provisional" patent application, which had never before existed in the U.S. (the closest equivalents were so-called "petty patents" in Germany and certain other countries, with easier legal standards and shorter patent terms). Congress was tired of inventors, companies, and courts arguing over documents that were created by the non-patent approach to patenting ("Write it up, have it notarized, and mail it to yourself in a sealed envelope"), so it created a "halfway" approach with formal legal standing.

Under the new "provisional" system, an inventor can write up a summary of his idea in as much detail as desired, with drawings, graphs, flowcharts, and even black-and-white or color photographs. If test data is available, it can be discussed; if not, it's not mandatory. Claims are not even required. Then, the inventor files that summary, with a check for \$75, and a cover sheet, which can be downloaded from the Patent Office website (go to <http://www.uspto.gov>, then click the "forms" button, then look for PTO/SB/16; it will appear as an Adobe Acrobat file, which can be opened and printed using "Acrobat Reader" software that can be downloaded for free from www.adobe.com).

The provisional application is given an official serial number (which will begin with "60/", such as 60/123,456) and a filing date by the Patent Office. It is then filed away. It is never examined by anyone. The Patent Office simply does not care how good or bad it is.

Instead, its only legal effect is this: if the same inventor files an expanded and improved "utility" application (with



claims) within 1 year after the filing date of the provisional, and if the utility application states the number and claims the "priority date" (i.e., the filing date) of the provisional application, then the Patent Office will print that "priority claim" in the final issued U.S. patent, after the utility application has been examined and allowed.

Therefore, a provisional application gives an inventor a potentially important level of protection, when he/she begins discussing his/her invention with potential investors, manufacturers, or other people or companies. No matter what the "listener" might do next, he/she cannot file a new patent application and get a "back-dated" filing date from the Patent Office.

By this point, it should be clear that an inventor should write a provisional application as clearly, strongly, and broadly as possible. If written skillfully, a provisional application can become: (i) a well-written summary and explanation that can help get a company interested in an idea that hasn't yet been fully developed; (ii) a good way to legally notify a company that an inventor is indeed taking steps to protect his/her patent rights in an idea; and (iii) a good way to prove to a court, arbitrator, or business manager that the inventor had already thought of some particular idea before disclosing it to a company.

If and when an inventor replaces a provisional application with an expanded application that has claims at the end, the expanded application is called a "utility" patent application. That term evolved out of the need to distinguish "normal" patents (the kind that inventors are used to seeing) from specialized categories such as design patents, plant patents, etc.

The discussion which appears below under the heading "Standard Format For A Utility Application" is not necessarily binding on provisional applications. Nevertheless, it is a time-honored and well-respected format for patents. So, unless an inventor has a good reason for not following and using that same sequence of headings, it's a good idea

to go ahead and use it, in a provisional filing, with one exception: the claims.

In a utility application, the claims are what defines the invention; the claims define the boundaries and limits of the exclusive and protectable property that will thereafter belong to the inventor (or the “assignee” which owns the patent, such as an inventor’s employer). In provisional applications, claims are not necessary. Some patent attorneys argue that claims should always be included, even in a provisional case, in order to make it clear that the inventor wanted and intended to make such-and-such his property. The author of this article would argue the opposite, and follows the practice of never putting claims in a provisional application. Why not? Because provisionals should be written and filed quickly, without pains-taking efforts to make sure the prior art has been thoroughly researched and evaluated, the claims have been drafted carefully, etc. If that’s the “modus operandi” of nimble, quick, and agile provisional applications, and if they’re written mainly to get an early filing date, then putting a set of claims into a provisional filing runs a major risk of turning it into a “sitting duck,” where opponents (i.e., their lawyers, who are getting paid by the hour) can argue at great length (and expense) that the claims were invalid, overboard, or whatever. The safer approach is to not even have claims that can be attacked and criticized; instead, focus any extra time and effort that might be available on making sure the technical summary is as good, reliable, and convincing as possible.

Rephrased in the vernacular, don’t try to climb up on a horse unless you’re ready to ride it. You don’t know what that horse is going to do after you’re on it; if it suddenly bolts and takes off, it’s not going to stop just because you ask it to. So, instead of claiming to the world that you’re a skilled rider before you’re even up on that horse, approach it with respect, and a bit of caution and humility. If it’s a decent horse at all, it’ll be bigger than you, and stronger than you.

In the same way, the tone and content of a provisional application should be, “I think this might be a good idea. I’ve been working in this field for a while, and from what I’ve seen so far, no one else seems to be doing it.” No one will try to rip your head off for making a statement like that. Indeed, if you’re “the little guy,” trying to do something worthwhile and help other people, they’ll probably start rooting for you.

But, if you walk into the office of an experienced manager (or patent attorney) and start saying, “I’ve thought of a super-colossal idea, and it’s going to make millions, and it belongs to me,” I can promise you—he’s heard it before, several times, from people who never succeeded at anything (except for wasting other people’s time). His eyes will glaze over, and he’s not going to give you as much respect as you’d like.

So, don’t start out by making claims; don’t give the world the impression that you think you’ve got the right to decide what belongs to you. Instead, roll up your sleeves, start working on the problem, and try to convince any onlookers that you’re more concerned with making a useful contribution than in how much money you’re going to make.

If an inventor understands the goals of a provisional application, he/she may be fully capable of drafting, and even filing, an adequate provisional application with little or no help from a patent attorney. For more information on provisionals, go to www.uspto.gov/web/offices/pac/provapp.htm, and download the brochure issued by the

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ways have it reviewed by

a patent attorney, before it’s filed. There are hundreds of complexities and hidden traps in the patent laws, especially when it comes to drafting claims. People who have never studied law in general, and patent law and claims in particular, aren’t likely to be able to avoid every potential problem without guidance from a skilled professional who knows the ropes.

In addition, no matter what an inventor’s level of involvement will turn out to be, any inventor should be fully aware of the “prior art” which relates to his/her invention. With the explosion of information that is freely available on the Internet, any inventor can do an initial patent search, download the relevant patents in printable form, and study those patents, so that when it’s time to talk with the patent attorney, the initial search will already be finished at the lowest possible cost, and the patent attorney can begin building on top of that foundation, rather than starting from “ground zero.”

GENERAL COMMENT

Patents are written for four entirely different types of readers: (1) scientists, engineers, and other technical specialists; (2) patent examiners, who have degrees in science or engineering but who may not have much expertise in the specific field you’re working in; (3) judges, who usually have no training in science or technology except a couple of freshman science courses in college many years ago; and (4) patent attorneys who work for companies that might be interested in licensing or buying the patent. The best way to reach all four groups is to be clear, methodical, and straightforward. Avoid legalistic phrases such as, ‘the hereinbefore mentioned component.’ Plain, clear English is best, and before you describe the invention, give special care to the “Background” section discussed below.

PRIOR ART

“Prior art” is a legal term that refers to information that is publicly available (usually but not always in printed form) on the date you file your application. It includes patents, articles from journals and magazines, chapters from textbooks or encyclopedias, etc. It also includes catalogs, sales brochures and specifications, ads, technical and field literature such as instruction manuals issued by a manufacturer, etc, so long as the publications are reasonably available to interested people.

Prior art is not limited to publications printed in America, or to publications printed in English. For example,

if a translated abstract or a footnote refers to a foreign article that seems directly relevant, obtain a copy and a translation of that article if possible. Several libraries in America (such as the National Library of Medicine in Bethesda, MD) have extensive collections of foreign journals, so it's often possible to obtain copies of foreign articles without much expense or delay.

The relevant prior art includes anything that (1) resembles your invention; (2) bears directly on your invention in any way; (3) describes any major component of your invention, even if it does not include other crucial components; or (4) describes how other people tried to solve the same problem you're trying to solve. Bring anything which might be relevant to the attention of the patent attorney. He (or she) can help you decide what should be brought to the attention of a patent examiner, and what can be omitted.

Get three clean copies of the most relevant prior art. One copy is for your own "patent file." Keep it separate from your other files, so you can find articles quickly, without having to hunt for them. Typical billing rates for a good patent attorney are about \$200/hour, so you don't want to keep one waiting on the phone for 15 minutes while you try to find an article buried in some pile somewhere. The second copy is for the attorney's files. The third copy will be submitted with the application.

Patent searching is a complex task, but an inventor who makes a diligent effort at it can often come up with one or more items that will offer a good start. A great place to start is the free (for users) U.S. patent database run by IBM, available at www.delphion.com. Once you get into the main site, you can use various buttons to do a "Boolean" search, which is a weird word that means, in essence, that you can search by fields (such as by inventor's names, by assignee names in case a certain patent is owned by a company you're interested in, and by key words anywhere in title, abstract, or text). A Boolean search also lets you use "connecting" words such as AND or OR to fine-tune the search. For example, if you want to search for, say, any patents on heated ice skates, a Boolean search would let you search for "ice" AND "skat" (which would find both "skate" and "skating") AND ("heat" OR "warm").

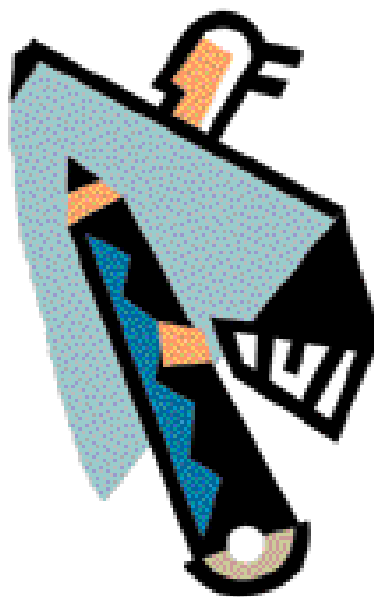
Note that the Delphion database also contains information of various foreign patent databases (including European, Japanese, Canadian, and Patent Cooperation Treaty applications), but those must be specified by a special command.

Patents can be downloaded in their final form (with cover pages, drawings, etc.) for \$4.50 each from www.micropat.com; a user account must be set up, but it's free.

Patents can also be searched using the official PTO database, which is reached through www.uspto.gov. Although that database is a bit clumsy to work with when it comes to patent drawings, the complete texts of U.S. patents can be downloaded for free from the PTO website; once downloaded, those files can be opened and manipulated using any modern word processing software. Patents are not copyrighted; they can be reproduced at no charge by anyone.

If you obtain a relevant patent, it can help you find more prior art. For example, the front page lists all items of prior art (patents as well as other publications) that were considered while that patent was being examined. Some databases can also list any subsequent patents that cited a certain patent as prior art.

If you have access to a database, it's a good idea to do your own search for articles in the scientific literature, for two reasons. First, a professional patent searcher might miss a relevant item during a manual search. They work with limited budgets and limited times, so they can never be sure they've found everything. And second, many professional patent searchers do not search any databases except patents. Many of them don't use computerized databases, and they don't consult sources such as Chemical Abstracts. If you're paying to have a patentability search done, ask the searcher to list the databases that were searched.



If an inventor is seriously interested in doing as much prior art searching as possible before getting a patent attorney involved, he/she should also find out what kinds of databases or libraries are available in that field of science or technology. As just one example, anyone who works professionally with biochemistry or medicine should know about both (i) the National Library of Medicine, in Bethesda, Maryland, which is paid for by government funds and which makes its online database available for free, at <http://igm.nlm.nih.gov>; and, (ii) specially developed searching software such as "Grateful Med," which makes it far easier and more reliable for even a novice to get good and reliable results, using a well-developed and highly sophisticated set of "MESH"

(medical subject heading) terms that are assigned to articles by a corps of technician-specialists at the NLM. That is just one example of an extraordinarily useful cost-saving resource in one particular field of research; various others are available, and the experts in a certain field (including government employees, and librarians who work at specialized libraries in universities) are the best way to identify and locate similar resources in any other field of research. Most large universities have a chemistry library, a biology library, and an engineering library, all separate, and all with at least one reference specialist who works at that particular library. Such librarians are excellent sources of guidance on where to look for information, and they often will do a for-pay literature search, for a local inventor, at rates which are usually significantly less than the costs of a typical patent search.

STANDARD FORMAT FOR A "UTILITY" APPLICATION

The headings listed below are standard. They can be altered if necessary for a clearer presentation, and subheadings may be added at will. In the early stages, it's convenient to start each major section on a new sheet of paper in case you need to add more information to any section.

The title should be short (fewer than about eight words). It's a finding aid only and does not restrict the coverage of the patent.

GOVERNMENT SUPPORT

Omit this heading unless government funding was used. Otherwise, indicate which agency provided the funds. The grant number is optional.

FIELD OF THE INVENTION

Unless the general field is immediately clear from the title, list a broad field of technology (such as chemistry, pharmacology, automotive, machinery, computers, electronics, surgery, dentistry, agriculture, pesticides, etc.) Then cite a more specific field or goal, such as "More specifically, this invention relates to drugs for treating XYZ syndrome," or "This invention relates to an improved widget for shining shoes." This section is not crucial; it simply helps a docket clerk in the Patent Office figure out which examining group ("art unit") should receive and examine the application.

BACKGROUND OF THE INVENTION

This section should contain three types of information:

1. Describe the context of the invention. Although many patents provide very little background information, this is a good chance to create a good first impression. Draft a short essay describing that particular field of science, two to five pages long (double-spaced), so that an intelligent person who has never studied that area of technology will be thinking, "That's interesting; I never knew how that worked," when he or she finishes that section. Explain each important term at any length necessary to convey a clear understanding of that term. Point out distinctions, subtleties, and substitute terms, especially if a certain word isn't used the same way by everyone. Avoid dictionary definitions; those were written by grammarians who had to be brief, rather than scientists or engineers who appreciate the complexities of science and technology. Explain key terms not just as definitions, but in terms of how each component relates to other components. And, in case you leave anything out, give citations to a couple of standard textbooks or review articles used by scientists or engineers who work in that specialty.

This set of paragraphs can also refer to broad problems, such as industrial, technical, or social problems the invention can help solve.

2. After the introductory essay, focus on specific items of prior art. Full citations can be inserted into the text, or if numerous references are cited, abbreviated citations (e.g., "Smith 1980") can be used if you provide a list of complete citations at the end of the text. Titles of articles are optional.

For each piece of prior art, provide three different pieces of information. The easiest and clearest way is to draft three paragraphs. First, summarize the item of prior art. How does it work, what does it do, and how is it used? Point out directly relevant passages by page number (or by column and line number in patents).

Second, describe the limitations of that item of prior art, in factual language. Don't say it's obsolete, clumsy, or absurd; instead, point out its limitations in clear, factual terms as a preface to describing the superiority of your invention. Comparative terms such as 'less expensive,' 'more convenient,' and 'relatively high' are fine, if it's clear what

they're being compared against. If the prior art could not accomplish a desirable goal, describe it. If the prior art has shortcomings (for example, prior machines had numerous moving parts, which made them expensive to manufacture, difficult to operate, and prone to breaking or jamming), describe those shortcomings. This sets the stage for the usefulness of the invention.

And third, point out why your invention is different and better.

These three paragraphs might be combined or reorganized in the final application, but setting forth each paragraph separately will help the inventor organize the necessary information and convey it clearly to a patent attorney.

This advice, about creating 3 different paragraphs on each item of prior art, is a very good and very cost-saving piece of advice. The problem is, most inventors think they can do it, without actually doing it. They can—and almost always do—easily tell the patent attorney everything they know about each item of prior art. And that, to the inventor, works just fine. The problem is, the patent attorney probably won't actually start drafting the patent application until several days or weeks later, and by then, several pieces of prior art are all schlumped together in a pile or file, and now the patent attorney has to sort through them, try to remember what the inventor said about each one, and either dictate or write a narrative analysis that sorts everything out.

So, here is probably the single best piece of advice in this entire article for inventors who want to save time, money, and aggravation when working with a patent attorney. For each important piece of prior art, write down, using no more than 1 or 2 sheets of paper, the three different paragraphs listed above (the brief summary; the limitations of that piece of prior art; and, why the new invention is better). Then, staple or paperclip that page, with your 3 paragraphs, onto that piece of prior art. Then, give it to the patent attorney. If you'll do that, and actually do it instead of just thinking about what you'd say if you did it, you'll be amazed at what a good patent attorney can do from that starting point and how quickly he or she can do it. It will help the patent attorney draft an application better and faster, and then, a year or two later after a Patent Office Action arrives with an "obviousness" rejection, it will help the patent attorney remember and figure out what happened, and why, a whole lot faster, which will save you even more money. So don't just think about it—do it. If you want to save money, write up all 3 paragraphs for each of the closest items of prior art, and give those analyses to the patent attorney.

3. Finally, list a set of goals and objectives for your invention. For example, "One object of this invention is to create a simple, inexpensive, and durable hyper widget with fewer moving parts, and which can bounce higher than any previous widget or hyper widget. Another object is to create a hyper widget which can generate a more concentrated vacuum in a smaller space. Another object is to create a hyper widget which can be manufactured without requiring any radioactive elements or toxic chemicals and which generates less waste during the manufacturing process."

SUMMARY OF THE INVENTION

This should be a brief (one page or less) overview for someone who doesn't know anything about the invention. This section (often repeated verbatim as the Abstract) will be



published by a number of data services after the patent issues, and it will be read by people who will decide whether to order a copy of the entire patent. After describing the invention itself, add one or two sentences indicating how it is used and/or why it is useful.

A lot of people will read the paragraph above and nod their head and say, "Yeah, yeah, I can do that," when they really can't do it cap-

ably, because they've never practiced it. It is a genuine challenge to try to summarize a complex idea in a single page of writing, and any inventor is urged to take that challenge and actually do it. One of my standard practices when I begin working with an inventor is to tell him or her, "Give me a three-to five-minute overview with a summary of the whole invention. Don't start me out by walking me down a street and pointing out one building after another. Instead, show me a map of the place. Tell me where we're starting out, and where we're going to. And then, once we start walking down those streets and seeing those buildings, I'll have a better sense of how everything fits together, and where it's heading."

To me, that's an entirely reasonable, obvious, and logical request. And yet, at least half of all inventors will respond to that request by waving their hand in the direction of a map, and then ignoring it, and start me walking down some street I haven't seen before, while I have no idea where that street is heading or why I'm going in that direction. I'll usually listen patiently for about 15 minutes, then I'll gently but firmly interrupt the person and say, "Remember how I asked for a 3-minute summary, about 15 minutes ago? Well, I never got it. This tour you're giving me is very interesting, but I don't have any idea where it's leading, or how these pieces all fit together. So, let's start over. Can you please give me about a three-minute summary of what this invention is about, what it does, and why it's useful?"

BRIEF DESCRIPTION OF THE DRAWINGS

Typical figure legends might read:

Figure 1 is a plan view showing the hyper widget of this invention.

Figure 2 is a side elevational cutaway view along line 2-2 on Figure 1.

Figure 3 is a circuit diagram of a control unit for the hyper widget of this invention.

Figure 4 is an exploded view showing the components of this invention.

Figure 5 is a chromatograph showing the purification of

the ABC substance.

Figure 6 is a graph showing a plateau in blood concentrations over a prolonged period after injection of the drug.

"Drawings" includes line drawings, graphs, flow-charts, etc. It does not include tables. Many chemical patents do not contain drawings; however, a flow chart describing a sequence of steps, a plasmid map, a DNA or amino acid sequence, or any other information, can be provided as a drawing if it will help explain the invention. Chemical structures or formulas can be inserted directly into the text, unless they are very lengthy. Small strip charts and other machine-generated data can be provided if they are properly inked to convert them into clearly reproducible black-and-white drawings.

The PTO is very reluctant to print photographs in patents because of the printing expense. However, any good photographs should be shown to the attorney, and they can be submitted to an examiner in a statement that will not be printed as part of the patent.

Carefully consider the best way to show your invention visually. Many patent attorneys and examiners look at the drawings before the text, so drawings can create the first impression. For that reason, they're worth extra effort. Study the drawings of several patents in the same field as your invention. That will give you a sense of how patent drawings are arranged and what their goal is.

When you're ready, draw up your own rough drafts. Even if they aren't high quality, they'll help the draftsman. Your only goals are to make them large and clear. Try to make each drawing (even drawings of sub-components) fill up at least two thirds of a sheet of paper. Paper is cheap, and there are few things more annoying to patent attorneys than staring at a tiny little squiggle while listening to an inventor point out a dozen parts that are invisible to anyone but him. Computer-generated drawings are often helpful, and they can sometimes be used as the formal drawings.

Drawings in patents normally use "call-out numbers" which are explained in the text. Inventors should avoid those; don't even try to assign any numbers. Instead, give the patent attorney two copies of your hand-drawn versions. On one copy (the "plain vanilla" copy), don't put any words or numbers at all; just draw the device, graph, or whatever, and leave the drawing as open and clean as possible so the patent attorney will be able to use it in any way he chooses. On the second copy, add labels (words or phrases) to identify each component, or to point out specific things that deserve extra attention in the drawing. Put any labels out around the edges of the paper, and use arrows to point out each labeled piece. Use that drawing to assign any names you want to assign to any specific components that need to be named. The attorney will assign call-out numbers later after he gets an idea of how the final drawings should appear.

Drawings of prior art are rarely printed in patents. However, such drawings can help a patent attorney figure out how your invention works, so if there are any good prior art drawings, make copies and include them with your first draft. Clearly label them as prior art (for example, "This is the device described in patent 4,567,890 by Smith").

Even though drawings are important, in some situations it may be appropriate to file a patent application with "informal" drawings. These can be drawn by an inventor or patent attorney using simple tools (straight-edges, templates, etc.), or they can be drawn by computer graphics. If

adequate versions can be generated, the expense of having formal drawings done by a professional draftsman can be delayed until after the application has been examined and allowed. If a Notice of Allowance is received, formal drawings can be created, and if the application isn't allowed, that expense can be avoided entirely. In addition, if an inventor is in a big hurry to get an application filed, informal drawings can be used to eliminate a waiting period while a professional draftsman finishes his work.

DETAILED DESCRIPTION

This section contains a narrative explanation of the invention.

If the invention is in the mechanical or electrical field, the application usually will have no examples. Instead, it will have figures. This section is the place for a detailed narrative describing the figures.

If the invention involves chemistry or biology, the examiner will want proof that the process or compound exists and functions in the way the inventor claims. This usually requires a separate section called "Examples" which will specify detailed recipes and experimental results, as described below. The "Description" section should be a narrative that explains what happens during each step of the process as the compound is being made or used.

An inventor must reveal the "best mode of carrying out the invention" that is known on the day the patent application is filed. The inventor cannot hide the best version and keep it as a trade secret while using an inferior version to obtain a patent. This is a rigid requirement which is strictly enforced. If there is any hint that an inventor was playing hide-and-seek games with the best mode requirement, most courts will simply strike down the patent. So, be up-front and entirely forthcoming with the best version you know about on the day the application is filed.

However, improvements that are discovered after the application is filed can be kept as trade secrets. Therefore, the way to win at the best mode requirement is by filing an application promptly, then following up the initial discovery with more research after the application is filed.

There is another rule that also deserves careful attention. Inventors and their attorneys must act with complete candor and good faith in bringing all relevant information to the attention of a patent examiner. Inventors must be very careful about how they treat unsuccessful experiments, early prototypes that didn't succeed, etc. If they try to conceal negative data, the patent can be invalidated after it is issued. Bring all the data to the attention of the patent attorney, and clearly point out the best mode. The attorney can help you find the best way to present the information.

In addition to pointing out the best mode, the inventor should try to anticipate possible modifications to his invention. Typical language: "In an alternate preferred embodiment of this invention, the positions of the cardioblot and framostat can be reversed. This would cause . . ."

It is also possible to use functional language in describing and claiming an invention. For example, suppose that in a machine, it is necessary to securely mount part A on part B, but it doesn't matter how you do it. The two parts could be screwed together, bolted, welded, nailed, glued, clamped, etc. Instead of specifying ways of attaching those parts, you can simply refer to "means for attaching part A to part B," and give one or two suitable examples, such as bolts or welding.

Similarly, it is often possible to use functional language in the chemical or biological field, such as "any pharmaceutically acceptable salt of this compound," or "at a dosage sufficient to generate an immune response in an injected animal, using a suitable carrier substance. Such carrier substances are well known to those skilled in the art."



EXAMPLES

Most chemical and biological patents must include examples to assure a patent examiner that the molecules, mixture, cells, etc., have been created and perform as claimed. Otherwise, people could get speculative patents merely by synthesizing a compound without having to prove its utility. Such patents would discourage research rather than promote it.

If examples are necessary, they should contain enough detail and data to allow "someone with ordinary skill in the art" to repeat the experiment and get successful results. In general, "ordinary skill" refers to someone who can carefully follow written instructions, rather than a creative whiz who can find a way to overcome any obstacle. The instructions can be very complex and demanding, and the level of skill required to follow it can be high; for example, in the field of biotechnology, "ordinary skill" often refers to people with PhD degrees, since nearly any biotechnology company will have one or more PhD's. The key point is that "ordinary skill" must not require a high degree of imagination or ability to overcome unforeseen obstacles or to think up creative additions to a set of instructions. The invention must be capable of being carried out without requiring "undue experimentation."

Whenever a reagent, piece of equipment, or other item is mentioned, the supplier should be listed along with the city where the supplier is located. Model numbers (for equipment or hardware), product codes or trademarks, and purity classifications or other specifications (for chemicals) should be specified the first time that item is mentioned. If you use a trademark, describe what that item is in technical terms or by reference to some publication that describes it in detail (e.g., "This product is a granular polyacrylamide with an average molecular weight of X daltons, an average particle diameter of Y microns, and a charge density of Z coulombs per gram," or "This chip is described in the 'Microprocessor Specification Handbook' published by the Magnarola Company, of Piston, Michigan"). If you used a special cell or plasmid, indicate not just where it is described, but where it is available to the public (if it's not available, it might be necessary to deposit a culture with a public depository). If you refer to a process that is described elsewhere, give a citation to the article or book where it is described, and point out any deviations from the published version. Even if the only deviation was increasing the quantities used, describe what actually happened.

REFERENCES

If citations were given in abbreviated form (such as “Smith 1980”) in the text, the full citations (including titles of articles or chapters) should be listed here, in alphabetical order. Example: Smith, W.C., et al, “A New Treatment for Payne Syndrome,” *Science* 123: 83-87 (1980).

CLAIMS

The claims of a patent define the property of the inventor. Everything else is merely explanation. Anything which is described but not properly and carefully claimed becomes freely available for public use.

Claim drafting is a highly specialized skill, and it is not recommended that inventors try to draft their own claims. However, inventors should understand some basic facts about patent claims, so they can tell whether their attorney is working hard and fighting for their best interests, or taking an easy way out and settling for claims that are too narrow to offer any real protection against infringers.

There are two basic rules:

1. Every “limitation” in a claim must be in-fringed for that claim to be infringed.

2. If any claim in a patent is infringed, then that entire patent is infringed. The patent owner does not need to show infringement of more than one claim.

The first rule acts as a major warning for inventors. In the broadest claims, do not include any limitations that are not absolutely essential. Every limitation in any independent claim should have a clear reason for being in that claim, and the only two reasons for including a limitation in an independent claim are (1) to define and describe the invention, or (2) to avoid prior art.

For example, suppose you invent a machine with seven essential parts (A through G), and an optional part H, which helps it work better. Your broadest claim (which will be an independent claim that stands alone and does not refer to any other claim) should specify only parts A through G. It will also need to specify the relationship between those parts; it must describe how the machine is constructed and/or how it functions; you cannot claim a machine merely by listing its parts.

After you have listed essential parts A through G in an independent claim, part H should be specified in a dependent claim, which will be written in a form such as, “The machine of Claim 1, which also contains part H.”

Why is it done this way? Well, if your broadest claim lists all eight components (A through H), then competitors can “avoid” that claim (they can make, use, and sell that invention without paying royalties) by getting rid of part H, or replacing it with some other item.

After the patent attorney has drafted the claims, study every word carefully. See if any words can be taken out while still distinguishing your invention from the prior art. And, because of rule 2, try to draft several independent claims from several different angles, using different phrases. One of those claims might cover it in a way that other claims missed.

While you’re working with a patent attorney, don’t be afraid to question, challenge, and probe. It’s your child, and you’re paying the bills. A good attorney won’t get upset, any more than you should get upset at him if he challenges you to back up your assertions. In a good relationship, each side works hard while challenging the other side to do the same. If an attorney can’t or won’t clearly explain why he did something, or why he used a certain phrase in a claim,

that’s a danger sign.

Patents aren’t really scientific documents; they’re legal and business documents, and the essence of both law and business is conflict and competition. Patent examiners get paid to challenge your application and find any flaws. And if your patent becomes valuable, people who want to infringe or ignore it will try even harder to find any flaws in it. It’s best to find those flaws before an application is filed, even if it means a bit of a struggle.

In the words of Frederick Douglass, “If there is no struggle, there is no progress.” In the words of William Shakespeare, “Life has given nothing to mankind without great struggle.” The goal is not to avoid conflict; the goal is learning to work with conflict and competition, and learning to turn them to your advantage. The struggle to create something important and valuable is the finest, most rewarding, and potentially most enjoyable part of any career. But it can be difficult. The era is long dead when an explorer could claim a huge tract of land merely by erecting a flag somewhere. Today, if you want to be recognized as the creator of something, you’ll have to work for it.

Most inventors enjoy challenges, and trying to get a good patent can be a real challenge, in every sense of the word. I hope this article can help and that you’ll enjoy being an inventor as much as I enjoy working with inventors.

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Mr. Kelly worked for the EXXON Company in 1974-77 and the Monsanto Company in 1982-85. He has written a guide to trademarks and trademark law which was published in the Spring and Summer 1998 issues of THE BENT. In 1994, he was a nominee for the U.S. Congress. He can be reached at patenter@aol.com.

Addendum: Patent Article Updates—Winter 2003

• My article on drafting patents (Fall 2002 BENT) was written some time ago, and several items should have been updated, including:

1. U.S. patent fees change every year on October 1 and are posted at www.uspto.gov, along with official forms. The fee for filing a provisional application is now \$80, not \$75.

2. Patent titles can be longer now; instead of containing up to 10 words, they now can contain up to 500 letters or digits. However, the rules state that they should be kept short and concise.

3. Delphion no longer allows free searches by non-paying subscribers. Free sites for searching patents by number, inventor, assignee, and keyword, include www.uspto.gov (U.S. patents), ep.espacenet.com (European and Japanese patents), and pctgazette.wipo.int (Patent Cooperation Treaty patents). If you know a patent number, www.delphion.com can provide pdf files with drawings for \$3/patent, and www.uspto.gov can provide text files for free.

4. The Grateful Med literature search software has been replaced by Pub Med and Entrez Med, which can be found at www.nlm.nih.gov.