Patent It Yourself

Your Step-by-Step Guide to Filing at the U.S. Patent Office

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Now for the Legalese—The Claims

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Inventor's Commandment 13

In your patent application, write at least one main (independent) claim. Make this claim as broad as the prior art permits by (1) reciting as few elements as you can, and (2) using the broadest possible terms for such elements, to make it as difficult as possible for others to avoid infringing such claim.

Inventor's Commandment 14

In your patent application, write (1) one or two alternative independent claims, making these as broad as possible, and different from your first independent claim so that you have apparatus, means, and method independent claims, where possible, and (2) follow each independent claim with as many dependent claims as necessary to recite all of the significant additional features of your invention, thereby providing backup for each independent claim and a range of coverage.

Inventor's Commandment 15

Every term used in the claims should have an antecedent basis—that is, a previous reference—in the description, preferably by being defined broadly. Every feature recited in the claims must be shown in the drawings and discussed in the description. The claims must be clearly written and without ambiguity. Every term must be clear, and, if a term is recited more than once, it should be preceded by “said” (or “the”), followed by the same term used the first time.

A. What Are Claims?

If you don't yet know what patent claims are, or have never read any, you're in for a surprise. The word "claim" in the patent context is definitely a term of art. A "claim" is not what the common dictionary definitions recite—it's not a demand for something due, a title to something in the possession of another, or that which one seeks or asks for. Rather, a “claim,” in the arcane world of patents, is a very formally worded sentence fragment contained in a patent application or patent. Claims recite and define the structure, or acts, of an invention in very precise, logical, and exact terms. They serve as tools to determine whether an invention is patentable over the prior art and whether a patent is infringed. Just as a deed recites the boundary of a real estate parcel, and a criminal statute defines what acts are punishable by fine or imprisonment, patent claims recite the “bounds” or scope of an invention for the purposes of dealing with the PTO and possible infringers. In other words, claims are the nitty-gritty of patents. While the specification must teach how to make and use the invention, the claims must define its scope.

While claims are literally sentence fragments, they are supposed to be the object of the words “I [or We] claim.” They are actually interpreted, when in a patent application, as saying to the examiner, “Here is my definition of my invention. Please search to see whether my invention, as here defined, is novel and unobvious over the prior art and whether I have defined it clearly.” In a patent, claims are interpreted as your own little statutes that say to the public, “The following is a precise description of the elements of this invention; if you make, use, or sell anything that has all of these elements, or all of these elements plus additional elements, or that closely fits this description, you can be legally held liable for the consequences of patent infringement.”

Since there are only five statutory classes of inventions (see Chapter 5), every claim must define something that is classifiable into one of these five classes. Thus there are: (1) process or method claims; (2) machine claims; (3) article or article of manufacture claims; (4) composition of matter claims; and (5) claims reciting a new use of any of the previous four statutory classes. Again, the line between (2) and (3) is blurred. Fortunately, as mentioned in Chapter 5, you don’t have to do the classifying unless the PTO decides that your invention doesn’t fit within any class at all.

If all of this sounds a bit formidable, don’t let it throw you; it will become quite clear as we progress, after you see some examples. What’s more, when it comes to claims, every layperson who “prosecutes” (handles or controls) a patent application has a safety net: So long as you can convince the patent examiner that you have a patentable invention, the examiner is required by law to write at least one claim for you, for free. I discuss this, along with several aids to claim drafting, in Section G of this chapter.

But a word of caution. If you’re tempted to skip this chapter and solely rely on the examiner, you can’t. You must provide at least one claim in your application to obtain a filing date. In addition (and even if you use a patent attorney), familiarity with the information I provide here is essential to securing the strongest and broadest possible
patent on your invention. So I urge you to approach this chapter as if there were no safety net. Take this chapter as I present it, in small, easy-to-digest chunks, and you'll have no trouble. If you don't understand something the first time, go back again so you'll be further down on the learning curve where you'll see things much more clearly.

**Common Misconception:** If the devices described in the prior art have disadvantages, and a patent application describes an invention that overcomes such disadvantages, the applicant will automatically be entitled to a patent.

**Fact:** In addition to describing an invention that is different and superior to the prior art, the application must contain claims that define the invention in a proper way (a) so that it is physically novel over the prior art, and (b) so that such physical novelty is also unobvious over the prior art—that is, it produces new and unexpected results.

### B. The Law Regarding Claims

The law (statutes and PTO rules) concerning claims is written in only the most general and vague terms. Accordingly, I'll be turning to the real world of everyday practice to help you understand the actual requirements for drafting claims. Before I do, however, let's at least take a brief look at the statutes and rules.

#### 1. Legal Requirements for Patent Claims

The only pertinent statute comprises the last five paragraphs of our old friend, Section 112 of the patent laws (35 USC 112), which states:

2. *The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as the applicant's invention.*

3. *A claim may be written in independent or, if the nature of the case admits, dependent form.*

4. *Subject to the following paragraph, a claim in dependent form shall contain a reference to a claim previously set forth and then specify a further limitation of the subject matter claimed. A claim in dependent form shall be construed to incorporate by reference all the limitations of the claim to which it refers....*

5. *A claim in multiple dependent form shall contain a reference, in the alternative only, to more than one claim previously set forth and then specify a further limitation of the subject matter claimed. A multiple dependent claim shall not serve as a basis for any other multiple dependent claim. A multiple dependent claim shall be construed to incorporate by reference all the limitations of the particular claim in relation to which it is being considered.*

6. *An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.*

Paragraph 2 is the one that mandates the use of claims in patents. It also means that the claims must be specific enough to define the invention over the prior art ("particularly pointing out") and also should be clear, logical, and precise ("distinctly claiming"). This sentence is the most important part of Section 112 and is cited by patent examiners almost daily because of the frequency with which they reject claims for lack of clarity or for some other similar reason.

Paragraphs 3 to 5 define independent and dependent claims (more on this later) and make it clear that a dependent claim incorporates all the limitations of the claim to which it refers. Paragraph 5 refers to multiple dependent claims, but since they require a stiff surcharge and since examiners don't like them, I recommend that you don't use them.

Paragraph 6 was enacted to overrule two famous Supreme Court decisions (G.E. v. Wabash, 304 U.S. 371 (1938) and Halliburton v. Walker, 329 U.S. 1 (1946)). These decisions held certain claims invalid on technical grounds, specifically for "functionality at the point of novelty" because they expressed the essence of an invention in terms of its novel function, rather than reciting the specific structure that performed the novel function. In other words, they contained a broad expression such as "means for hardening latex" rather than a specific expression like "a sulfur additive." Congress enacted this paragraph to enable patent applicants to continue to claim their inventions more broadly. Under paragraph 6, if a claim uses the word "means" for performing a function, it must be construed to cover the structure, material, or acts described in the specification, and their equivalents. That is, if a claim recites "means for conveying rotational energy from said pedals to said rear wheels" and the specification describes a link chain for performing this function, the "means" claim will be construed by the PTO and the courts to cover the link chain and any equivalents, such as a driveshaft, a gear train, etc. *(In re Donaldson Co., Inc., 29 USPQ 2d 1845 (CAFC 1994).)*
2. Rules of Practice

In addition to Section 112, claims are governed by the PTO’s “Rules of Practice.” PTO Rule 75 (37 CFR 1.75), parts b, d.1, and e to i add these additional requirements:

b. More than one claim may be presented provided they differ substantially from each other and are not unduly multiplied....

d.1 The claim or claims must conform to the invention as set forth in the remainder of the specification and the terms and phrases used in the claims must find clear support or antecedent basis in the description so that the meaning of the terms in the claims may be ascertainable by reference to the description....

e. Where the nature of the case admits, as in the case of an improvement, any independent claim should contain in the following order: (1) a preamble comprising a general description of all the elements or steps of the claimed combination that are conventional or known, (2) a phrase such as “wherein the improvement comprises,” and (3) those elements, steps, and/or relationship that constitutes that portion of the claimed combination that the applicant considers as the new or improved portion.

f. If there are several claims, they shall be numbered consecutively in Arabic numerals.

g. The least restrictive claim should be presented as claim number 1, and all dependent claims should be grouped together with the claim or claims to which they refer to the extent practicable.

h. The claim or claims must commence on a separate sheet.

i. Where a claim sets forth a plurality of elements or steps, each element or step of the claim should be separated by a line indentation.

Part b requires that the claims differ substantially from each other and not be too numerous. In practice, minimal differences will suffice. The rule prohibiting numerous claims is more strictly enforced. If more than about 20 claims are presented, there should be some justification, such as a very complex invention or numerous embodiments. Also, there are substantial charges for each independent claim over three and each claim (independent or dependent) over 20—see Appendix 4, Fee Schedule.

Part d.1, enforced only sporadically, requires that the terms in the claims correspond to those used in the specification. It has often been said that the specification should serve as a dictionary for the claims. While examiners don’t often enforce this rule, most attorneys believe it is very important to follow in view of recent court decisions that tend to narrow the scope of claims.

Part e, a newcomer, was introduced to require that claims be drafted, insofar as practicable, in the German or “Japanese” style (from a famous decision of that name). The Japanese-type claim is very easy for examiners to read and understand. It puts the essence of the invention into sharp focus by providing in the first part of the claim an introduction that sets forth the environment of the invention—that is, what is already known, and in the second part, or body of the claim, the essence of the invention—that is, the improvement of the current invention. In practice, I’ve never seen this part of Rule 75 enforced. Most patent attorneys recommend that you avoid use of the Japanese-type claim since, by isolating the novel part of the invention, it’s easier to invalidate.

Parts f, h, and i are self-explanatory and part g means that the broadest claims should be number 1, all dependent claims should be together and under their independent claim, and the elements or steps of a claim should be in separate paragraphs. More information is provided in Section J of this chapter.

C. Some Sample Claims

As mentioned, claims boil the invention down to its essence. In their broadest sense, they eliminate everything nonessential to the invention. In fact, many inventors first realize what their invention truly is when they write or see a claim to it, especially after the claim has been rejected in the patent prosecution process. Conversely, you won’t be able to draft an adequate claim unless you have a clear understanding of your invention. Although not a patent attorney, the great theatrical producer David Belasco showed that he understood the principle behind claims well when he said, “If you can’t write your idea on the back of my calling card, you don’t have a clear conception of your idea.”

And claims are difficult to write just because they are so short. Blaise Pascal once concluded a letter to a friend as follows: “I have made this letter a little longer than usual because I lack the time to make it shorter.” Nevertheless, don’t get discouraged; if you follow the step-by-step, four-part procedure I give later, you’ll find that writing claims is not too much more difficult than writing the specification.

In the following sections, I provide some hypothetical simple claims and some actual ones. Any patent applications containing these hypothetical claims would now be rejected since the “inventions” they define are obviously old and in the public domain. A few of the claims—the “method of putting” and the “new use” claim—are from patents.

In this section, you’ll see examples of various method claims—one to a conventional process, one to a software-based process, one to a business method, and one to a manual method. Note that these claims recite a series of steps (or individual operations), rather than a series of hardware elements as in an article claim. Note also that the software, business method, and manual method claims are similar in construction, which shows you that these processes are generally claimed the same way as any other process.

a. Conventional Process

For the conventional process, assume that you just invented sewing and want to claim the process. Here’s how you’d do it.

A method for joining two pieces of cloth together at their edges, comprising:

a. providing said two pieces of cloth and positioning them together so that an edge portion of one piece overlaps an adjacent edge portion of the other piece, and

b. passing a thread repeatedly through and along the length of the overlapping portions in sequentially opposite directions and through sequentially spaced holes in said overlapping adjacent portions, whereby said two pieces of cloth will be attached along said edge portions.

Note that the first part of this claim contains a title, preamble, or genus, which states the purpose of the method but doesn’t use the term “sewing” because sewing is the invention and is assumed to be new at the time the claim is drafted. The claim contains two steps, a and b, that state in sequence the acts one would perform in sewing two pieces of cloth. Note that each clause begins with an “—ing” word (gerund). The claim also contains an optional “whereby” clause at the end to point out to the examiner or a judge the advantage of the process. Finally, note that the claim is single-spaced and is formatted in paragraphs with a hanging indent so that the second and subsequent lines are indented. This is the way claims are printed in patents, but when you type them in your patent application you should use the hanging indent with single or 1.5 line spacing. You can “hang” a paragraph in Microsoft Word by placing your cursor in the paragraph and pressing Control-T.

b. Software Process

For the software process, assume that you’ve just invented a word processor and want to claim the word insertion feature (which we now all take for granted) as a method. Here’s how you’d do it.

A method of inserting additional characters within an existing series of characters on a display, comprising:

a. providing a memory which is able to store a series of characters at an adjacent series of addresses in said memory,

b. providing a character input means which a human operator can use to store a series of characters in said memory at said respective adjacent series of addresses, 
c. storing said series of characters in said memory at said adjacent series of addresses,

d. providing a display which is operatively connected to said memory for displaying said series of characters stored in said memory at said adjacent series of addresses, 
e. providing a pointer means which said operator can manipulate to point to any location between any adjacent characters within said series of characters displayed on said display, 
f. providing a memory controller which will:

1. direct any additional character which said operator enters via said character input means to a location in said memory, beginning at an address corresponding to the location between said adjacent characters as displayed on said display, and

2. causing all characters in said series of characters which are stored in said memory at addresses subsequent said location in said memory to be transferred to subsequent addresses in said memory so that said additional character will be stored in said memory at said location and before all of said subsequent characters, whereby said display will display said additional character with said series of characters at said location between said adjacent characters, and a writer can add words within existing body of text and the added words are displayed in an orderly clean fashion without having to reenter said existing body of text.

Note that the preamble of this claim states the purpose of the method. The series of steps in the body of the claim first state or lay out the hardware of the computer (the memory, the display, etc.) as a series of “providing” clauses, since a method claim is not supposed to state hardware directly, that is, if this claim recited simply “a memory,"
rather than "providing a memory," the examiner in the PTO would object to it as an improper hybrid claim because it recites both hardware and method steps. More on this later. Finally, note that the end of this claim also contains a "whereby" clause which states the internal function of the claimed method, and an overall, external, and meaningful result or function of the method. The whereby clause is not considered when the examiner determines novelty but helps sell the method to the examiner, as well as to any judge who has to decide on the validity or infringement of this claim.

c. Business Method

For the business method, assume that you've just invented a procedure for checking the "creditworthiness" of a customer. Now you want to write a claim to this as a business method. Here's how you might write a suitable claim for a credit-checking process.

A method of passing on the creditworthiness of a customer comprising:

a. providing a form for said customer to complete, said form having spaces in which said customer must indicate a plurality of credit accounts and a plurality of credit references,
b. investigating each of said credit accounts and credit references and compiling a score from 1 to 100, for each account and reference, with 1 indicating a minimal credit rating and 100 indicating a maximal or excellent credit rating,
c. averaging all of said scores to compile an overall average,
d. rejecting said customer if said overall average is below a predetermined value and accepting said customer if said overall average is above said predetermined value.

This claim would almost certainly be rejected as drawn to nonstatutory subject matter under the Bilski decision (see Section G13, below) since it does not (1) connect in a substantial way to a particular machine or apparatus, or (2) transform an article into a different state or thing, or (3) cover a nonabstract process. However I provide it here to illustrate a true business method claim in case Bilski is legislatively overruled or broadened. (To make this claim statutory you could add a "providing a computer" to the claim and recite that the computer performs the steps.)

d. Manual Methods

A golfer invented a new way of putting that emphasizes the golfer's dominant hand and claimed this as a manual process (U.S. Pat. No. 5,616,089). Here's how he did it.

A method of gripping a putter comprising the steps:

a. gripping a putter grip with a dominant hand;
b. placing a non-dominant hand over an interior wrist portion of the dominant hand behind a thumb of the dominant hand;
c. resting a middle finger of the non-dominant hand on the styloid process of the dominant hand;
d. pressing a ring finger and a little finger of the non-dominant hand against the back of the dominant hand;
e. pressing the palm of the non-dominant hand against a forward surface of the putter grip as the non-dominant hand squeezes the dominant hand.

A cat owner invented a new way of exercising a cat using a laser. Some opined that this invention is ridiculous and obvious. Evidently the examiner didn't think so (U.S. Pat. No. 5,443,036). Here's the main claim.

A method of inducing aerobic exercise in an unrestrained cat, comprising:

a. directing an intense coherent beam of invisible light produced by a hand-held laser apparatus to produce a bright, highly focused pattern of light at the intersection of the beam and an opaque surface, said pattern being of visual interest to a cat; and
b. selectively redirecting said beam out of said cat's immediate reach to induce said cat to run and chase said beam and pattern of light around an exercise area.

2. Machine Claims—Conventional and Software Machines

Here are examples of two machine claims, one to a conventional machine and one to a software-based machine. Note that both claims recite a series of hardware elements, rather than a series of steps as in the process claims. Note also that both claims are similar in construction, indicating again that a software machine is generally claimed the same way as any other machine.

a. Conventional Machine

For the conventional machine, assume now that you've just invented the automobile. Here's how to claim it.

A self-propelled vehicle, comprising:

a. a body carriage having rotatable wheels mounted thereunder for enabling said body carriage to roll along a surface,
b. an engine mounted in said carriage for producing rotational energy, and
c. means for controllably coupling rotational energy from said engine to at least one of said wheels, whereby said carriage will be self-propelled along said surface.

This claim again contains a title in the first part. The second part or body contains three elements, the carriage, the engine, and the transmission. These elements are defined as connected or interrelated by the statement that the engine is mounted in the carriage and the transmission (defined broadly as "means for controllably coupling ") couples the engine to at least one wheel of the carriage. Again, the "whereby" clause recites the advantage of the hardware elements of the preamble and clauses a, b, and c.

b. Software Machine

For the software machine, let's make it easy and continue to assume that you've just invented a word processor and want to claim the word insertion feature as a machine. As I'll explain below, to obtain maximum coverage, it's best to provide both method and machine claims for an invention, if it's possible to do so. Here's the machine claim to the word processor.

A machine for inserting additional characters within an existing series of characters on a display, comprising:

a. a memory which is able to store a series of characters at an adjacent series of addresses in said memory,

b. a character input means which a human operator can use to store a series of characters in said memory at said adjacent series of addresses,

c. a display which is operatively connected to said memory for displaying said series of characters stored in said memory at said adjacent series of addresses,

d. a pointer means which said operator can manipulate to point to any location between any adjacent characters within said series of characters displayed on said display,

e. a memory controller which will:
   1. direct any additional character which said operator enters via said character input means to a location in said memory, beginning at an address corresponding to the location between said adjacent characters as displayed on said display, and
   2. cause all characters in said series of characters which are stored in said memory at addresses subsequent to said location in said memory to be transposed to subsequent addresses in said memory so that said additional characters will be stored in said memory at said location and before all of said subsequent characters,

whereby said display will display said additional characters within said series of characters at said location between said adjacent characters, and a writer can add words within the existing body of text and the added words are displayed in an orderly and clean fashion without having to reenter said existing body of text.

Note that this machine claim is essentially the same as the above method claim on word processing, but our machine claim contains only directly recited hardware elements and no method steps. It's simply an alternative way of reciting the word processing invention. As I'll discuss below, it's desirable to provide as many different ways to claim an invention as possible, just as it would be desirable to go into battle with as many different weapons as possible (rifle, pistol, knife, grenade, destroyer, fighter plane, guided missile, etc.), since you never know which one will help you win the battle.

3. Article-of-Manufacture Claim

You've done it again! Here's a claim to the pencil you've just invented.

A hand-held writing instrument comprising:

a. elongated core-element means that will leave a marking line if moved across paper or other similar surface, and

b. an elongated holder surrounding and encasing said elongated core-element means, one portion of said holder being removable from an end thereof to expose an end of said core-element means so as to enable said core-element means to be exposed for writing, whereby said holder protects said core-element means from breakage and provides an enlarged means for holding said core-element means conveniently.

This claim, like the machine claim, contains a preamble and a body with two elements: (a) the "lead" and (b) the wood. As before, the elements of the body are associated; here the wood ("elongated holder") is said to surround and encase the lead ("elongated core"). The "whereby" clause at the end of the claim states the purpose and advantage of the lead and its holder.

4. Composition-of-Matter Claim

Now, great inventor that you are, you've come up with concrete. Here's your claim.
A rigid building and paving material comprising a mixture of sand and stones, and a hardened cement binder filling the interstices between and adhering to sand and stones, whereby a hardened, rigid, and strong matrix for building and paving will be provided.

This claim, although not in subparagraph form, still contains a preamble and a body containing a recitation of the elements of the composition (sand, stones, and cement binder), plus an association of the elements (sand and stones are mixed and binder fills volume between and adheres to sand and stones). Again, the whereby clause drives home the advantages of the components.

The height of claim brevity was reached (and will never be exceeded) in two composition-of-matter patents in 1964 when the PTO issued patents 3,156,523 and 3,161,462 to the late Dr. Glenn T. Seaborg, on two new elements, americium and curium. The claim for U.S. Patent No. 3,156,523 (americium) read simply,

1. Element 95.

The claim for U.S. Patent No. 3,161,462 (curium) read,

2. Element 96.

5. New Use Claim

Someone discovered that pigs put on weight faster if aspirin is added to their diet. Here's how to claim it.

A method for stimulating the growth of swine comprising feeding such swine aspirin in an amount effective to increase their rate of growth.

This claim recites the newly discovered use of aspirin and the purpose of the new use in a manner that defines over and avoids the known, old use of aspirin (analgesic). Note that it is a method claim (as all new-use claims must be). This is because aspirin per se is old and thus must be claimed more narrowly, as a new use.

Now that you've read a few claims, I suggest you try writing a practice claim or two of your own to become more familiar with the process. Try a simple article or machine with which you are very familiar, such as a table, chair, pen, etc. Write the preamble and then the body. To write the body, first list the elements or parts of the article or machine, and then associate or interconnect them. Don't worry too much about grammar or style, but try to make the claim clear and understandable.

D. Common Misconceptions Regarding Claims

In my experience, inventors' misconceptions about claims are more widespread than in any other area of the patent law, except possibly for the misconception regarding the "Post Office Patent" explained in Chapter 3. Consider some of the following.

Common Misconception: The more claims that the PTO (Patent and Trademark Office) allows in your patent application, the broader your scope of coverage.

Fact: The scope of your monopoly is determined by the wording of your claims, not their number. One broad claim can be far more powerful than 50 narrow claims.

Common Misconception: If you want to get broad coverage on a specific feature of your invention, you should recite that specific feature in your claims.

Fact: If you recite a specific feature of your invention in a claim, that claim will be limited to that feature as recited, and variations may not be covered—for example, if you have a two-inch nylon gear in your apparatus and you recite it as such in a claim, the claim may not cover an apparatus that uses a one-inch gear, or a steel gear. The best way to cover all possible variations of your gear is to recite it simply as a "gear," or better yet, "rotary transmission means."

Common Misconception: To cover a specific feature of your invention per se, you need merely recite it in a dependent claim.

Fact: As stated in the statute quoted in Section B, above (35 USC 112, § 4), a dependent claim is construed (and reads) as if it incorporated all of the limitations of the claim to which it refers. Thus if your independent claim (§1) recites a telephone having a connecting cord and your dependent claim reads, "The telephone of Claim 1 wherein said connecting cord is coiled," the dependent claim doesn't monopolize the coiled cord per se, but rather the coiled cord in combination with the telephone. More on this later in Section J, below.

Common Misconception: If a claim doesn't recite a specific feature of your invention, then this feature is necessarily not covered. For example, if your invention includes a two-inch nylon gear and you fail to recite it specifically in a claim, then anyone who makes your invention with this gear can't infringe your patent.

Fact: The fact that a feature isn't recited doesn't mean that it isn't covered. An absurd example will make this clear. Suppose your invention is a bicycle and you show and
describe it with a front wheel having 60 spokes. You don’t mention the spokes at all in a claim; you simply recite a “front wheel.” Any bike that has all of the limitations of the claim will infringe it. Thus, a bike that has any “front wheel” will infringe, whether it has zero or 60 spokes.

As I’ll explain from time to time, to infringe a claim, an accused apparatus must have at least all of the elements of the claim; if it has more elements than recited in the claim, it still infringes, but if it has fewer, then it doesn’t infringe. Claim limitations are thus interpreted using Boolean logic, similar to computer search terms, as explained in Chapter 6, Section H.

Common Misconception: The more features of your invention you recite in a claim, the broader that claim will be. (Stated differently, the longer a claim is, the broader it is.)

Fact: As will be apparent from the previous misconceptions, the less you recite in a claim—that is, fewer the elements you recite—the broader the claim will be. This seeming paradox exists because an accused infringing device must have all the elements of a claim to infringe. Thus, the fewer the elements specified in a claim, the fewer the elements an accused infringing device needs to have to infringe. Put differently, infringement is generally easier to prove if a claim is made shorter or has fewer elements. “To claim more, you should recite less” is a Boolean concept that is difficult for most inventors to absorb, but that you should learn well if you want to secure the broadest possible coverage. Again, see Computer Searching in Chapter 6, Section H, for further clarification of this point.

E. One Claim Should Be as Broad as Possible

As stated in Inventor’s Commandment 13, there are two ways to make a claim broader: (1) minimize the number of elements; and (2) maximize the scope of these elements. Let’s see how this works.

1. Minimize the Number of Elements

Take our automobile claim, above, which recites three elements, a, b, and c—that is, the wheeled carriage, the engine, and the transmission. If an accused machine contains just these three elements, it will, of course, infringe.

If the accused machine has these three plus a fourth, such as a radio, which we’ll label d, it will still infringe.

But if our accused machine contains only elements a and b, the carriage and engine, it won’t infringe, since it simply doesn’t contain all of the claimed elements, a, b, and c.

If a claim contains many, many elements, say a to m, only devices with all 13 elements, a to m, will infringe. If the maker of the device eliminates just one of the 13 elements, say g, the device will not infringe. Thus, it’s relatively easy to avoid infringing a claim with many elements.

If a claim contains only two elements, a and b, any device with these two elements will infringe, no matter how many other elements the device has. The only way to have the device avoid infringement is to eliminate either element a or element b, a relatively difficult task.

Thus, it should be very clear that the fewer the elements in a claim, the harder the claim will be to avoid, that is, the broader it will be and the more devices it will cover. Therefore, when drafting a main or independent claim to your invention, it will behoove you to put in as few elements of your invention as possible. (You do have to include sufficient elements so that the claim recites an operative, complete assemblage that is novel and unobvious over the prior art. More on this in Sections F and G, below.)

2. Recite Each Element as Broadly as Possible

With regard to the second way of broadening a claim, that is, reciting existing elements more broadly, consider a few examples. Suppose an invention involves a chair. The chair can be drafted broadly as “a seat” or narrowly as a four-legged maple chair with a vinyl-covered padded seat and a curved plywood back. Obviously, a three-legged-plastic stool would be a “seat,” and it would infringe the broadly recited element, but would miss the narrowly recited maple chair by a country mile. In electronics, “controllable electron valve” is broader than “vacuum tube” or “transistor.” In machinery, “rotational energy connecting element” is broader than “helically cut gear” or “V-belt.”

Another way to broaden your claim is to try to anticipate what an infringer or a competitor might do to attack your patent; then cover this in the claims by eliminating it or broadening it. For example, suppose you invented a furnace that uses a blower to force air into the combustion chamber and your claim recites, “a blower for forcing air from outside said furnace into said combustion chamber.” But you realize that a competitor may use a blower to draw air from the combustion chamber and thereby cause the combustion chamber to draw outside air in. Since your claim would not cover this variation, you should broaden the limitation in question to, “a blower for causing outside
F. The Effect of Prior Art on Your Claim

Now that you've learned how to make your claims as broad as possible, it's time for the bad news. What is "possible" has generally much less breadth than you'd like. This is because each claim must define an invention that is patentable over the prior art. Remember the issues of novelty and unobviousness? Well, they (especially unobviousness) are an ever-present factor always to be considered in claim drafting.

1. Novelty

Let's go back to Section 102, which deals with novelty (Chapter 5). A claim must define an invention that is novel over the prior art. It must recite something that no single reference in the prior art shows—that is, it must contain something new or novel. Your claim must recite novel hardware (or a novel process step) in a positive, structurally supported, unequivocal manner. For example, reciting "a wheel for providing lateral stabilization" won't adequately define over a prior-art wheel that doesn't provide lateral stabilization, since the function isn't supported by novel structure. The remedy: Recite the novel structure that does provide the stabilization—such as a guide for the wheel, or a "means" for providing stabilization.

Just as a claim can be made broader by eliminating elements and reciting the existing elements more broadly, it can be made narrower in order to define novel structure (1) by adding elements, or (2) by reciting the existing elements more narrowly.

For an example of adding elements, suppose a prior-art reference shows a machine having three elements—A, B, and C, and your claim recites these three elements A, B, and C. Your claim would be said to lack novelty over the prior art and would be rejected or held invalid under Section 102. But if you added a fourth element, D, to the claim, it would clear the prior art and would recite a novel invention (but not necessarily a patentable one, because of the unobviousness requirement). (If the prior art were an in-force patent that claimed elements A, B, and C, and your device had elements A, B, C, and D, it would infringe for reasons given in Section 102, above. However, the PTO is never concerned with infringements, so you don't need to worry about this issue in a patent application.)

For an example of reciting existing elements more narrowly, suppose the prior art shows a machine having the same three elements—A, B, and C. You could also clear this prior art and claim a novel invention by reciting in your claim elements A, B, and C', where C' would be the prior-art element C with any change that isn't shown in the prior art. For example, if the prior art shows element C as a
steam engine, and you recite a gasoline engine (C'), you've obviated any question of lack of novelty (though probably not obviousness).

In sum, although you'd like to be able to eliminate as many elements as possible and recite all of your elements as broadly as possible, you will usually have to settle for less because there will always be prior art there to make you toe the line of novelty.

2. Unobviousness

As I've stressed, novelty isn't enough. Under Section 103 the claims must define an invention that in addition to being novel, must also be unobvious to one having ordinary skill in the art. Or to use the paraphrase of the law from Chapter 5, the novel feature(s) of the invention defined by each claim must have one or more new features that are important, significant, and produce valuable, unexpected new results. Thus, when you have to narrow a claim to define over the prior art, you must do so by adding one or more elements or by reciting existing elements more narrowly, and you must be sure that the added or narrowed elements define a structure or step that is sufficiently different from the prior art to be considered unobvious. More on this in Chapter 13.

For the last bit of bad news, note that if the wording of a claim has several possible interpretations, the examiner is entitled to use any one, including the one least favorable to you, in determining whether the claim clears the prior art.

Now that I've given you the bad news, I suggest you ignore it at this stage. You should try to write your main claim(s) as broadly as possible while keeping in mind the prior art that you've uncovered. In case of doubt, you should err on the side of too much breadth, since you can always narrow your claims later if your examiner thinks they're too broad. Conversely, if your examiner allows your narrow claims on your first office action (rare), you'll find it very difficult to broaden them later.

G. Technical Requirements of Claims

As stated, in addition to defining adequately over the prior art, each claim must also be worded in a clear, concise, precise, and rational way. If the wording of a claim is poor, the examiner will make a "technical" (non-prior-art) rejection under Section 112. It is this technical aspect of drafting claims that most often serves as a stumbling block to the layperson. To put it candidly, claims, like laws, are not written to be easily understood; they should be written so they cannot be misunderstood. Yet claim drafting really won't be that hard if you:

- study the sample claims listed later in this chapter, plus those of a few patents, to get the basic idea
- use the four-step method (preamble-element-interconnections-broaden) set out in Section H, below, and
- are conversant with the appropriate terminology associated with your invention's elements.

Remember also that you needn’t write perfect claims when you file the application. Why? Because if you have a patentable invention, you can have the examiner write them for you. A provision of the Manual of Patent Examining Procedure, Section 707.07(j), states:

“When, during the examination of a pro se [no attorney] case, it becomes apparent to the examiner that there is patentable subject matter disclosed in the application [the examiner] shall draft one or more claims for the applicant and indicate in office action that such claims would be allowed if incorporated in the application by amendment.

“...highly desirable and is permissible in any case where deemed appropriate by the examiner, it will be expected to be applied in all cases where it is apparent that the applicant is unfamiliar with the proper preparation and prosecution of patent applications."

You do have to at least give it a try, since you must file at least one claim with your application to get a filing date. But, as indicated, this claim need not be well-written or narrow enough for patent coverage. Instead, during the ensuing prosecution stage, you can ask the examiner to write claims for you pursuant to this section if you feel yours aren’t adequate. The examiner is bound to do so if your invention is patentable.

If you do choose this option, be sure the examiner’s claims are broad enough, since it isn’t in the examiner’s own interest to write broad claims for you. As with any other claim, ask yourself if any elements of the examiner’s claim can be eliminated or recited more broadly and still distinguish adequately over the prior art. If so, amend it as I suggest in Chapter 13, Section E.

Also remember that many patent attorneys and agents will be willing to review your specification and drawings or draft your claims at their regular hourly rates. But use this as a last alternative, since most patent attorneys in private practice charge $100 to $400 per hour. If possible, you should choose a company-employed patent attorney or a retired patent attorney who works at home, since such attorneys’ rates will usually be one-half to one-third of those charged by their downtown counterparts. See Chapter 6, Section E, for how to find patent attorneys and agents.
Now that you know there's help out here, let's look at some of the basic rules covering the drafting of claims.

1. Use Proper Antecedents and Be Precise

Your claims must be precise, logical, and determinate. One of the most common reasons for claim rejections is the improper use of articles, such as "a," "the," and "said." Generally, the first time you recite an element, use the indefinite article "a," just as you would if you were speaking to someone who is not familiar with your device—for example, "I just bought a car." If you refer to the same element again using exactly the same words to describe it, use the extremely definite article "said"—for example, "... said car has a burglar alarm." "Said" actually means, in patent law, "the following part, which in this claim (or its parent claim) is previously recited in exactly the following word(s)." If you refer to an aspect of an element by using different, but implicitly clear words, use the definite article "the" just as you would do in ordinary speech—for example, "The auto was expensive." Here's an example showing how "a," "said," and "the" are properly used in a claim to a table.

An article of furniture for holding objects for a sitting human, comprising:

a. a sheet of rigid material having sufficient size to accommodate use by a human being for writing and working,

b. a plurality of elongated support members of equal length,

c. said support members being joined perpendicularly to the undersurface of said sheet of rigid material at spaced locations so as to be able to support said sheet of rigid material in a horizontal orientation.

Note that the first time any element is mentioned, the article "a" is used, but when it's referred to again by its original designation, "said" is used. When another aspect of it is referred to with a different (but clear) designation—that is, the undersurface of the table—"the" is used.

In addition to being precise in the use of articles, you should avoid ambiguous or missing references. For example, if "said elongated lever" is used in a claim and no "elongated lever" has previously been recited in these exact words, a non sequitur has occurred and the PTO will reject the claim for indefiniteness due to a "missing antecedent." The solution is to recite the elongated lever earlier in the claim or to change "said elongated lever" to "an elongated lever." Or, if the same element is positively recited twice, such as "a lever" ... "a lever," the claim is unclear. The solution is to change the second "a lever" to "said lever."

In a dependent claim (see Section J, below), the antecedent can be provided in the dependent claim itself, the referent claim which the dependent claim depends from (whether independent or dependent), or any lower-numbered referent claim which the first referent claim depends from. Thus, if claim 3 is dependent on claim 2, which is in turn dependent on claim 1, an antecedent for "said lever" in claim 3 can be provided in either claims 1 or 2.

TIP

Computer Hint. To help provide proper antecedents, it's very helpful to use a computer and a word-processing program with a "windows" function so that you can display the first part of your claim (or your main claim if you're writing dependent claims) in one window and the latter part of your claim (or the dependent claim you're writing) in a second window. In this way, you'll be able to refer continuously to the higher-numbered (referent) claim to make sure your current writing corresponds.

Vagueness and indefiniteness can also occur if a use abbreviations—such as, "d.c." (say "direct current"); relative terms without any reference—such as, "large" (say "larger than...") or "large enough to support three adults"), or vague, casual language, such as "strong," "suitable," "standard," etc.

2. Use Only One Capital, One Period, and No Dashes, Quotes, Parentheses, Trademarks, or Abbreviations

Amateurs violate this rule so often that a friend who has a foreign patent translation agency and who wants to show he's professional includes the following blurb in his ad flyer: "We promise never to include more than one period or capital letter in any translated claim, no matter how long it is." While it may be hard for you to accept, and while it may seem silly, the rules are that the only capital letter in a claim should be the first letter of the first word, the claim should contain a period only at its end, and there should be no dashes, quotes, or parentheses, trademarks, or abbreviations. (You may use capitals, periods, and parentheses for the lettered subparagraphs of a claim, for instance, "A." or "A); also, hyphens ("hand-held") are okay, but dashes ("—") or "—" are not. The PTO will allow a second capital in a dependent claim when the word "Claim" is capitalized.)

3. Use Means Clause to Avoid Functionality of Claim

The technical error of "functionality" occurs when elements of the claim are recited in terms of their advantage, function,
or result rather than in terms of their structure. The remedy is to recite the elements of the claim as “means” or a “device” for performing the function or achieving the result. For example, here are some typical improper functional claims actually written by a layperson.

7. An additive for paints that makes the paint dry faster.

8. A belt buckle that does not tend to snag as much.

Both of these claims would be rejected under Section 112 because they don’t particularly point out and distinctly claim the invention since they recite what the invention does rather than what it is.

The remedy: Use “means” or “device” clauses and also recite the general composition or structure of the additive or buckle. But remember that the claim must be to a combination; a single “means” claim won’t pass muster. Thus, even if Claim 7 were written as follows, it would violate Section 112.

7. Additive means for paints for making them dry faster.

Here’s how the above two claims can be properly rewritten to pass muster under Section 112.

7A. paint composition comprising:
   a. a paint compound comprising an oil-based paint vehicle and a suspended pigment in said vehicle, and
   b. additive means admixed with said vehicle for decreasing the drying time of said paint compound

8A. belt buckle comprising:
   a. a catch comprising two interlocking rigid parts that can be attached to opposite ends of a belt, and
   b. anti-snag means for preventing said interlocking parts from snagging on cloth when placed adjacent said interlocking parts and
   b'. a shield for preventing [etc.].

A moment’s reflection will show you that claiming your invention in terms of its unique structure, rather than its results, effects, or functions, makes logical sense. This is because a monopoly, to be precise and to have reasonable limits, must be defined in terms of its structure, rather than the result such structure produces. In other words, if you recited “a belt buckle that doesn’t snag” you would be claiming a result only, so that any belt buckle that fulfilled this result would infringe, regardless of its structure. This “functional” type of claim would accordingly be considered unreasonably broad and therefore would have to be narrowed and made more explicit by the addition of some additional structure or a means clause in order to make it more commensurate with the invention.

However, there’s now a downside to using “means plus function” clauses: Under the pertinent statute (35 USC § 112, ¶ 6) and court decisions, a means plus function clause is supposed to be interpreted according to the corresponding structure or material described in the specification and the equivalents of such structure or material. Thus, a means plus function clause is not supposed to be interpreted literally to cover every possible means that fulfills the function of the means, but only according to the corresponding structure or material in the specification and its equivalents. Thus, in addition to a means plus function claim, it’s best to include one or more independent nonmeans claims which are as broad as possible without using means plus function language.

Of course, while both of the above claims (as I revised them) would pass Section 112, they would not be novel or patentable under Sections 102 or 103, since they recite nothing new according to our present state of knowledge.

Means Must Be Supported

Recent court decisions (for example, Biomedino, L.L.C. v. Waters Technologies Corp., 490 F.3d 946, 950 (Fed. Cir. 2007)) have emphasized the importance that every means and even every nonmeans component in the claims, whether for software or hardware inventions, is clearly described and identifiable in the specification. If any component isn’t clearly identifiable, I would add a sentence at the appropriate part of the specification, such as follows:

“Thus units xxx and yyy constitute a means for ....”

If the means is part of a software program, identify the part or object of the listing and state that it constitutes a means for ....

4. Be Complete

Each claim must stand on its own—that is, it must recite enough elements to make a working, complete device in accordance with its recognized status in its art. For example, you can recite a lightbulb per se (without reciting the entire lamp) since lightbulbs are a well-known item of commerce. But a claim to just the glass envelope of a lightbulb would probably be rejected as incomplete, since it won’t do anything on its own and isn’t a recognized item of commerce. The remedy for failing to include enough elements is simply to add the needed elements. Examiners and attorneys frequently disagree as to whether a claim is incomplete, the examiner wanting the claim narrowed
by the addition of elements and the attorney wanting it to remain broad, that is, not to add any more elements.

5. Keep Language Straightforward and Simple

Properly drafted claims use a minimum number of words to delineate the essence of the invention. Excess wordiness of a claim, termed “prolixity” by the PTO, is a frequent error committed by beginners. The remedy is to reword the claim in more compact language.

6. All Elements of Invention Must Logically Interrelate and Interconnect

Each of the elements in a claim must be logically related and connected to the other elements. When the elements of an invention don’t appear to cooperate and to be connected in a logical or functional sense, the PTO will reject the claim. This is a more substantive type of rejection, since it’s often directed at the underlying invention rather than simply the way the claim is drafted. For example, if you claim the combination of a waffle iron and tape recorder, these elements don’t cooperate and hence your claim would be rejected as drawn to an aggregation. But the elements don’t have to work at the same time to cooperate; in a typewriter, for example, the parts work at different times but cooperate toward a unitary result.

Wrong: A foot pedal device, comprising: an elongated element, a spring, and a hinge. [Elements aren’t connected together.]

Right: A foot pedal device, comprising: an elongated element, a spring, and a hinge having a pair of leaves, said elongated element being connected to one of said leaves, said spring being mounted on said hinge so that it urges said leaves to be folded adjacent each other. [Elements are connected together.]

7. Old Combination and Aggregation

Formerly, claims drafted in terms of an old or well-known combination, such as an automatic transmission and an automobile, where the invention was in the transmission, were rejected on the ground of “old combination,” but this rejection has been eliminated. However claims drafted to a combination of elements that don’t cooperate toward a common end, such as a washing machine and a telephone, can be rejected on the ground of aggregation. But the elements do not have to function simultaneously to cooperate: A typewriter is a good example of elements (keys) that don’t function simultaneously but do cooperate.

8. Use Only Positive Limitations

In the past, all negative limitations (for example, “non-circular”) were verboten, but now only those that make the claim unclear or awkward are proscribed. However, because many examiners still wince when they see negative limitations in claims, it’s best to avoid them by reciting what the invention is, rather than what it isn’t. For instance, instead of saying, “said engine connected to said wheels without any transmission,” say “said engine connected directly to said wheels.” You are permitted to recite holes, recesses, etc.; see “Voids” in the Glossary of Useful Technical Terms for a list of “hole-y” words.

9. Use Proper Alternative Expressions

Most disjunctive expressions—that is, those using “or” or the like—were formerly considered indefinite, but under MPEP 2173.05(h) are now permissible, even if two different things are meant. Thus the following expressions are acceptable: “wherein R is A, B, or C”; “made entirely or in part of”; and “iron, steel, or any other magnetic material.”

Markush Group Claims

Another, sophisticated way to write a claim for an invention with two or more elements is to recite the disjunctive elements by using a Markush group. A Markush (from a decision with that name) group is a series of related elements joined by “and,” which allows these magic words: “Selected from the group consisting of.” Thus, a tube or a transistor could be recited in one claim as follows: “Said amplifying circuit containing a device selected from the group consisting of tubes and transistors.”

10. Avoid Too Many Claims

If you’ve put in too many similar claims, even though you’ve paid for them, you’ll have to eliminate some to make the examiner’s job easier. If you ever have more than 20 claims, the invention should be complex enough or have enough ramifications to justify them and the claims should differ substantially.
11. Make Sure Claims Correspond With Disclosure

First, the literal terms or words of the claim must be present somewhere in the specification. If they aren’t, the remedy is to amend the specification by adding the exact terms used in your claims, or to amend the claims by eliminating those terms that aren’t literally in the specification. This requirement is especially important in view of patent court decisions that have narrowly interpreted terms not defined or described in the specification. As stated, it’s useful to provide a glossary in the specification that broadly defines all important terms. Second, any operation, structure, or result recited in a claim must be clearly and completely described in the “spec.”

12. Make Sure Claims Are Supported in Drawing

Under Rule 83, the drawings must show every feature recited in the claims. If they don’t, amend either the drawing or the claims. A broad recitation in a claim, such as “fuel atomizing means,” can be supported by specific hardware, such as a carburetor, in the drawings. But remember that you can’t add any new matter to an application once it’s on file. So be sure to include all possibly relevant details of your invention in your drawings and spec. before you file. For example, if an examiner rejects a claim that recites “fuel atomizing means” for lack of support in the drawings, you can overcome this rejection by adding a box labeled “fuel atomizing means” to the drawings. You can’t add a carburetor unless your spec. mentions a carburetor, since this would be verboten new matter.

13. Claim Computer Program With Hardware

If your invention involves (or actually is) a process that involves a computer program or algorithm (a set of instructions for a computer) or a business or Internet process, then your claims must recite a process that either (1) is tied in a substantial way to a particular machine or apparatus, or (2) transforms an article into a different state or thing, or (3) does not cover an abstract idea. (Bilski v. Kappos, U.S. Supreme Court, 130 S.Ct. 3218, 2010 Jun 28.)

Here’s an example of some “program” claims drafted to recite enough hardware-based or nonabstract results to pass muster; these claims go about as far as one can go in claiming programs.

9. A process of operating a general purpose data processor of known type to enable said data processor to execute formulas in an object program comprising a plurality of formulas, such that the same results will be produced when using the same given data, regardless of the sequence in which said formulas are presented in said object program comprising the steps of:
   a. examining each of said formulas in a storage area of said data processor to determine which formulas can be designated as defined
   b. storing, in the sequence in which each formula is designated as defined, said formulas that are designated as defined, and
   c. repeating steps a and b for at least undefined formulas as many times as required until all said formulas have been designated as defined and have been stored; thereby producing the same results upon sequential execution of said formulas stored by said process when using the same given data, regardless of the order in which said formulas were presented in the object program prior to said process. (Parclo & Landau, U.S. Pat. No. 4,398,249; 1983.)

Note, the claim recites an algorithm itself, but the algorithm performs useful and practical computer functions and that the claim recites hardware so as to comply with Bilski. Here’s another program claim that was held to be Statutory Subject Matter (SSM).

A method of using a computer processor to analyze electrical signals and data representative of human cardiac activity by converting said signals to time segments, applying said time segments to a high-pass filter, using said computer processor to determine the amplitude of said filter’s output, and comparing said amplitude to a predetermined value.

In all claims above, the claimed process or hardware is more than an algorithm per se. This is because claiming an algorithmic function per se would cover an abstract idea. However, the courts have held that the mere fact that a claim contains or is directed to an algorithm will not make it objectionable so long as the algorithm is recited in the context of hardware—that is, (1) it is tied in a substantial way to a particular machine or apparatus, (2) it transforms an article into a different state or thing, or (3) it does not cover an abstract idea.

Here’s a claim that was held to be Statutory Subject Matter, even though it merely recited a computer programmed to manipulate mutual fund price data, since such manipulation produced a useful, concrete, and tangible result.
1. A data processing system for managing a financial services configuration of a portfolio established as a partnership, each partner being one of a plurality of funds, comprising:
   a. computer processor means [a personal computer including a CPU] for processing data;
   b. storage means [a data disk] for storing data on a storage medium;
   c. first means [an arithmetic logic circuit configured to prepare the data disk to magnetically store selected data] for initializing the storage medium;
   d. second means [an arithmetic logic circuit configured to retrieve information from a specific file, calculate incremental increases or decreases based on specific input, allocate the results on a percentage basis, and store the output in a separate file] for processing data regarding assets in the portfolio and each of the funds from a previous day and data regarding increases and decreases in each of the funds’ assets and for allocating the percentage share that each fund holds in the portfolio;
   e. third means [an arithmetic logic circuit configured to retrieve information from a specific file, calculate incremental increases and decreases based on specific input, allocate the results on a percentage basis, and store the output in a separate file] for processing data regarding daily incremental income, expenses, and net realized gain or loss for the portfolio and for allocating such data among each fund;
   f. fourth means [an arithmetic logic circuit configured to retrieve information from a specific file, calculate incremental increases and decreases based on specific input, allocate the results on a percentage basis, and store the output in a separate file] for processing data regarding daily net unrealized gain or loss for the portfolio and for allocating such data among each fund; and
   g. fifth means [an arithmetic logic circuit configured to retrieve information from specific files, calculate that information on an aggregate basis, and store the output in a separate file] for processing data regarding aggregate year-end income, expenses, and capital gain or loss for the portfolio and each of the funds.

The bracketed portions of this claim did not form part of the claim, but were added by the court to show the corresponding parts of the specification that each means was construed to represent, pursuant to the Donaldson decision, in Section B, above. (This claim is from the State Street Bank and Trust Co. v. Signature Financial Group, Inc. case and Boes U.S. Pat. No. 5,193,056; 1993, Court of Appeals for the Federal Circuit, July 1998. The CAFC distinguished this case in Bilski, but nevertheless the claim still recites enough hardware to comply with Bilski.)

Note that even if a claim recites a process with a computer, the claim will not be regarded as statutory subject matter unless the claim (1) ties the invention in a substantial way to a particular computer, (2) recites the transformation of an article into a different state or thing, or (3) does not cover an abstract idea.

While the above rules may be difficult to understand some recent decisions by the Board of Patent Appeals and Interferences (BPAI) in the PTO may shed more light on how to claim data-processing or business methods as SSM:

- In Ex Parte Hu, App. No. 2010-000151 (2012), the Court held that a “computer-readable storage medium” is SSM but a plain “computer readable medium” is not tangible enough to be considered SSM.
- In Ex Parte Svendsen, App. No. 2011-012505 (2012), the claim included some machine-like elements such as a wired communication interface. The Board held that even though the machine elements were all known in the prior art, they were SSM since they were integral to the invention.
- However in Ex Parte Rigoutsos, App. No. 2009-010520 (2012), the Board held that a “method for annotating a query sequence” including “accessing patterns associated with a database comprising annotated sequences; assigning attributes to the patterns based on the annotated sequences; and using the patterns with assigned attributes to analyze the query sequence” was not SSM because it did not satisfy the Machine-or-Transformation test.
- In Ex Parte Webb, App. No. 2010-008274 (2012), the Board held that a “method for playing a card game” including “dealing two cards to a player” was not SSM because it did not involve an apparatus or a machine but was directed to an abstract concept.
- In Ex Parte Edelson, App. No. 2011-004285 (2012), the Board held that a “computer implemented method” for creating asset-backed derivatives was not SSM because there was no link to a particular machine and the claim recited was “no more than the abstract concept of issuing an abstract intangible asset.”

If you find these decisions difficult to reconcile, you’re not alone! Most attorneys and legal scholars are befuddled too. Perhaps Congress will cut the Gordian knot and clarify the law someday. In the meantime my advice is to put as much real hardware in your claims as possible and make sure that your invention is integrated with and really uses the hardware.
14. Recite Each Element Affirmatively as Subject of Its Clause

For maximum clarity, the elements of your invention should be affirmatively and directly recited; don't bring them in by inference or incidentally—for example, say "A transmission comprising: (a) a gear, (b) a shaft, (c) said gear being mounted on said shaft" [etc.], and not "A transmission whose gear is mounted on its shaft." In other words, each significant element of the claim should be recited for the first time (introduced) in a positive, affirmative manner, preferably with the word "a," so it's the subject of its clause, and not with wording that makes it part of the object or assumes that the reader already knows that it's there. This rule is especially important for do-it-yourselfers to follow in order to write clear and understandable claims.

15. Include Structural Support in Recitation of Operation

Assume a claim recites "a lever connected to move said pendulum to and fro at the same rate as said lights flash." The movement of the pendulum at this special rate is too much for the lever to do all by itself. In other words, there's not enough structural support for the operation recited. The remedy? Recite either (a) enough structure to do the job or (b) use a "means" clause. Here are examples of both methods.

a. a photosensitive electromechanical circuit terminating in a lever that is connected to said pendulum and is arranged to move said pendulum at the same rate as said lights flash.

b. means, including a lever connected to said pendulum, for moving said pendulum at the same rate as said lights flash.

16. Recite Each Element Affirmatively, Followed by Its Shape or Function

Do not follow any element with the function of any other element.

Right:

a container for holding said beans

Right:

a container having a cylindrical shape

Wrong:

a container which receives said beans individually at a speed of 40 cm/second or greater.

Right:

a container having a cylindrical shape, means for shooting said beans individually at a speed of 40 cm/second or greater into said container.

17. Format

As stated in PTO Rule 75(i) (37 CFR 1.75(i), quoted above), if the claim has several elements or steps, each should be in a separate paragraph with the first line of the paragraph hanging out to the left for maximum clarity, as is done in printed patents and in the claims in Section 13 above.

18. Precede Every Function by an Affirmative Recitation of the Element That Performs That Function

Don't recite any function without preceding the function with an affirmative recitation of the element that performs the function.

Wrong:

said beans being shot individually at a speed of 40 cm/second or greater into said container.

Right:

means for shooting said beans individually at a speed of 40 cm/second or greater into said container.

or

a gun for shooting said beans individually at a speed of 40 cm/second or greater into said container.
19. Make Sure Relative Terms Are Not Ambiguous

Generally the PTO will hold that a claim with a relative term, such as "small," "large," "close," etc., is indefinite—that is, it fails to particularly point out and distinctly claim the invention under Section 112, Par. 2. However if the relative term is such that it would normally be understood by a person having ordinary skill in the art (PHOSITA), the Patent Court has held that the PTO should accept it. Power-One v. Artesyn Tech (CAFC 2010 Mar 31). In this case a claim that stated that a regulator was "near" a load was held to be unambiguous to a PHOSITA because the description stated that the regulator was to be placed close enough to the load so that the system will operate properly and thus no specific distance was needed.

H. Drafting Your Main (Independent) Claim

As indicated above, there are two basic types of claims: "independent" and "dependent." "Independent claims" are those that don't refer to any preceding claim; they stand alone. Examples of independent claims are all of those given in the preceding sections of this chapter. Note that these claims don't refer back to any preceding claim and each defines a complete, operative invention by itself.

"Dependent claims," which will be covered in the next section, refer back to a preceding or "parent" claim (this preceding claim can either be independent or dependent). A dependent claim recites narrower subject matter than its preceding claim in either of the two standard ways—that is, either by adding an additional element(s) or defining one or more elements of the preceding claim more narrowly.

The reasons for providing dependent claims will be covered in the next section also; the main point to remember here is that your independent claims are the important ones, since they're the basic and broadest definitions of your invention. If a dependent claim is infringed, its independent or parent claim(s) must also be infringed. If an independent claim is infringed, however, that's enough to win the case. You don't have to worry about your dependent claims.

To draft an independent claim, the easiest and most direct way to do it is to follow these four basic steps:

1. Write a preamble giving the name or title of the invention, or the problem which it solves.
2. List the elements (or steps) of the claim.
3. Interconnect the elements or steps.
4. Broaden the claim as much as possible but not so much that it reads on the prior art.

The claim can be structured so that the elements of the claim appear together, followed by the interconnections.

Or, each element can appear in conjunction with its interconnection(s) to adjacent elements. Most patent attorneys use the latter method—see Claims 2, 3, and 4 in Section C, above, for examples—but you may find it easier to recite the interconnections separately. An exception is process claims, where you'll find it easier to directly associate each step with its predecessor.

Start by writing your first claim without regard to breadth—that is, just get a preamble written, set down the elements of the invention, and interconnect them, paying no attention to how broadly you can recite the invention. In other words, just define your invention as you believe necessary to "get it all down" in a complete manner.

Then, see how many elements (or steps) you can eliminate and how many remaining elements you can broaden so that the result maintains sufficient structure and yet does not tread on the prior art too much. Remember that the broadest way of defining any element is by using "means-plus-a-function" language. Don't forget to refer to your prior-art patents for examples. And when you are finished, try to make the claim even broader by thinking of ways that an infringer might change your invention while still using your inventive concepts and see if you can broaden the claim to cover these changes, while still defining an invention that is patentable over the prior art.

To provide a real example that everyone can understand, let's assume you've just invented a table. Since you've already written your specification, you have a name for each part of your invention, so that chore is already behind you. If you believe your part names leave something to be desired, you can get additional part names from your prior-art search patents, the Glossary of Useful Technical Terms at the end of this book, or any visual dictionary (see Appendix 2, Resources: Government Publications, Patent Websites, and Books of Use and Interest), or in a thesaurus (in a book or computer). All that remains now is to provide a title or preamble. List the parts, interconnect them, and then broaden your claims.

1. The Preamble

To write the preamble, you can name the statutory class of the claim (recommended in view of recent court decisions) or pick a name or title for the whole unit or the problem that it solves, remembering that you can't use the word "table" since it hasn't been invented until now. To have the preamble recite just a statutory class, it should simply read, "A machine, comprising:"; "An article, comprising:"; "A method, comprising:"; "A composition, comprising:"; or "A new use, comprising:". To have the preamble recite a title for the whole unit, you can say, "An article of furniture,"
comprising;" or "A work station device, comprising;" To have the claim recite a function, you can recite, "A support for holding objects to be handled by a sitting human." I've used "an article of furniture" in the sample claim since it would be hard to construe this too narrowly.

2. The Elements

Next, to list the parts of the table, I'll start with the largest, most visible part, the top, and then add the smaller, less apparent parts, the legs. Since the table's just been invented, we'll assume that the words "top" and "legs" are still unknown, but even if they were known, it's not wise to use "top" anyway, since it's a notoriously vague homonym (it can mean anything from a hat to a bottle cap to a toy). To define the top, then, we need a more meaningful term or phrase. Let's suppose we've made a model of our invention and have used a large sheet of chipboard for the top. All we need to do at this stage is to say so; thus our first and most basic element becomes "(a) a large sheet of chipboard."

Suppose our model table has four legs and we've made them of six-cm diameter circular oak dowels, each 65 cm long. Then our legs would be recited simply as "(b) four, oak dowels, each having a circular cross section 6 cm in diameter and each 65 cm long." Our elements are now all recited—wasn't that easy!

3. Interconnections

Lastly, we have to interconnect the legs to the top, an easy task. Suppose our legs are joined at the underside of the top using four metal flanges, attached at the four corners of the top with each having a cylindrical portion with female threads, and with the top sections of the legs having mating male threads that are screwed into the respective flanges so that the legs extend at right angles to the top. Merely recite the flanges positively and add an interconnection clause as follows:

- four flanges, each having means for attachment to one side of said sheet of chipboard and each having a cylindrical portion with female threads, and
- said four flanges being attached to one side of said sheet of chipboard at four respective corners thereof and said four oak dowels having male threads on a top section thereof and being screwed into the cylindrical portions of said respective flanges so that said dowels extend from said sheet of chipboard at right angles.

Eureka! It's done. You've written a complete independent claim.

Here's how it looks.

11. An article of furniture, comprising:
   a. a large sheet of chipboard,
   b. four oak dowels, each having a circular cross section 6 cm in diameter and each 65 cm long, and
   c. four flanges, each having means for attachment to one side of said sheet of chipboard and each having a cylindrical portion with female threads, and
d. said four flanges [etc.].

Note, that I always recite the elements and their interconnections in lettered subparagraphs. The PTO now requires this format, where possible, since it's easier to analyze than a continuous paragraph. Also, I format paragraphs with a hanging indent style, just as the claims are printed in patents.

Is there anything wrong with this claim? Yes! As you probably will have realized by now, this claim is far too narrow—that is, it has many elements and each of these is recited too specifically. In fact it even recites specific dimensions, which you don't generally even need in the specification. Thus the claim as written would be easy to avoid infringing: all that an infringer would have to do is to use plywood instead of chipboard, use four pine dowels instead of oak, etc. Let's broaden it then.

Remember, you broaden a claim by (1) eliminating elements where possible, and (2) reciting the remaining elements as broadly as possible.

Going through the claim to eliminate elements, we see that the top can't be eliminated since it's an essential part. However, we don't need to recite four legs—we can eliminate one of these since three legs will support the top. But better yet, we can even use the word "plurality" since this covers two or more legs. (The term "plurality" means more than one. Used here, it is an example of how you'll sometimes need to search for a word or phrase that most broadly describes a particular element. Even though two may not be sufficient to support a top, the PTO will usually not object to this word in this context. We could even go further and eliminate the recitation of legs entirely by reciting "support means," but this would include solid supports, such as in a chest or bureau, which would not be suitable for table-type uses.) Lastly, we can eliminate the flanges, since these aren't essential to the invention and since there are many other possible ways of attaching legs to a table top.

Next, let's go through the claim to see which elements can be recited more broadly. First, the top. Obviously "a large sheet of chipboard" is a very narrow recitation since plywood, solid wood, metal, and plastic tops would avoid infringement. A broad recitation would be "a large sheet of rigid material," but, as stated above, the word "large" is frowned upon by the PTO as too vague to satisfy Section 112. So let's make the top's size more specific. Since we're
interested in providing a working surface for humans, let’s merely specify that the top is “a sheet of rigid material of sufficient size to accommodate use by a human being for writing and working.”

Next the legs. Obviously, the recitation of four circular oak dowels with specific dimensions is very limiting. Let’s eliminate the material, shape, and dimensions and recite the legs as merely “a plurality of elongated support members of substantially equal length.” This covers square, round, triangular, and oval legs, regardless of their length or material.

Lastly, instead of the flanges (that we’ve eliminated as unnecessary) to join the legs to the top, let’s use “means” (to make it as broad as possible) as follows: “means for joining said elongated support members at right angles to the underside of said top at spaced locations so as to be able to support said top horizontally.”

The result would look like this.

11. An article of furniture, comprising:
   a. a sheet of rigid material of sufficient size to accommodate use by a human being for writing and working
   b. a plurality of elongated support members of equal length, and
   c. means for joining said elongated support members at right angles to the underside of said sheet at spaced locations so as to be able to support said sheet horizontally.

Obviously, Claim 11 is now far broader than our first effort. Your first independent claim should be as broad as possible, but of course, you can’t make it so broad that it lacks novelty or unobviousness. Thus, when you eliminate as many elements as possible, and when you broaden the remaining elements in the manner just described, keep in mind that you must leave enough structure or acts to define your invention in a novel manner over the prior art so that the novelty is unobvious.

Put differently, writing claims is like walking on a fence: You can’t sway too far on the side of specificity or you’ll fall onto the side of worthlessness and you can’t sway too far onto the side of breadth or you’ll fall onto the prior art. To obtain the broadest possible coverage, you should not draft your main claim primarily to cover your invention; rather, draft it as broadly as possible with at least some thought of clearing the prior art, then go back and make sure that it at least covers your invention.

Some patent attorneys compare the writing of their first claim to passing through a wall of fire. However, I have found that if I follow the above four steps—(1) write a preamble, (2) recite the elements, (3) interconnect them, and (4) broaden the claims—the going is relatively painless. In case of doubt, err on the side of breadth at this stage, since you can always narrow your claims later, but you may not be able to make them broader if the application’s allowed on the first Office Action.

1. Other Techniques in Claim Writing

Now that you understand the basics, here are some other tricks you may want to use when writing your claims. Obviously, not all apply all of the time, but you will probably find that at least several can be used to improve your claim writing.

   • **Weasel Words.** Use “weasel” words like “substantially,” “about,” or “approximately” whenever possible—that is, whenever you specify a dimension or any other specific parameter—to avoid limiting your claim to the specific dimension specified. The renowned judge, Learned Hand, who wrote many famous patent decisions, once opined that judges should read the modifier “substantially” into every claim, even if it’s not already cited. However, I strongly recommend that you don’t rely on a judge to broaden your claim for you, but rather do it yourself when you first write the claim.

   • **Antecedents.** Provide a proper antecedent in the beginning of your claim for every term you use in the latter part of the claim. For example, in Claim 11 in the preceding part, the clause “the underside of said sheet” near the end of the claim has no clear antecedent in the beginning of the claim and thus might be objected to by some examiners. The claim would be better if clause a were amended by adding, “said sheet having an underside” to provide unequivocal support for the underside phase later. Conversely, if you recite an element and recite the same element again, you must use the article “said” (some attorneys now use “the”) before the second occurrence. If you want to recite two similar elements in different parts of the claim, you should use the article “a” or “an” to introduce both elements, but you must use different adjectives to clearly differentiate the levers—for example, “a prying lever connected to ...; and a force-transmitting lever positioned on ....”

   • **“Whereby” Clause.** At the end of your claim, I recommend adding a “whereby” clause to specify the advantage or use of the invention to hammer home to the examiner, or anyone else who reads your claim, the value of your invention. Thus in Claim 11, above, you should add at the end of this claim, “whereby a human can work, eat, and write in a convenient seated position.” “Whereby” clauses don’t help to define your claim, but they do force the examiner to
consider the advantages (Section 103 features) of your invention and thus help to get the claims allowed. However, don't make the whereby clause too narrow or a court may construe it against you.

- **Reference Numbers.** You may put the drawing's reference numerals in your claims after the appropriate elements. Although this is required in some foreign jurisdictions, practitioners in the U.S. seldom do it unless the elements of the claim aren't clear.

- **Recesses.** If your invention has an opening, hole, or recess in its structure, you may, as stated, recite the hole directly as such, even though it isn't tangible. For example, the recitation "said member having a hole near its upper end" is permissible. See Appendix 3 (Glossary of Useful Technical Terms) for a list of recesses.

- **Jepson Claims.** With regard to the rarely enforced Rule 75(e) (quoted in Section B2, above) requiring the use of the *Jepson* style (a preamble containing old elements and body of claims containing improvements of your invention), most patent attorneys recommend that claims *not* be cast in this style unless the examiner requests it or unless the examiner is having trouble understanding exactly what your inventive contribution is. The reason for this is that a *Jepson* claim isolates and hence minimizes your improvement, making it easier to invalidate. If you do claim in the *Jepson* format, draft your preamble so that it includes all the elements or steps and their interconnections that are already known from the prior art; then add a "cleavage" clause such as "the improvement comprising" or "characterized in that," and then recite the elements of your invention and their interconnections.

- **Predetermined.** Examiners prefer the word "predetermined." I recommend you use it whenever possible to indicate that something has a size, thickness, length,

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**Patent Attorney Words**

- **Releasably** (indicates something can be released from a position)
- **Respectively** (used to relate several parts to several other parts in an individual manner)
- **Said** (used to refer to a previously recited part by exactly the same word)
- **Sandwiching** (used to indicate that one part is between two other parts)
- **Selected from the group consisting of** (used in a *Marx* claim to create an artificial group)
- **Slidably** (used to indicate that two parts slide with respect to each other)
- **So that** (used to restrict a part to a defined function)
- **Substantially** (used to fudge a specific recitation)
- **Such that** (used to restrict a part to a defined function)
- **Surrounding** (used to indicate that a part is surrounded)
- **The** (used to refer to a previously recited part by a slightly different word)
- **Thereby** (used to specify a result or connection between an element and what it does)
- **Thereof** (used as a pronoun to avoid repeating a part name)
- **Urging** (used to indicate that force is exacted upon a part)
- **Whereby** (used to introduce a function or result at the end of a claim)
- **Wherein** (used in a dependent claim to recite an element (part) more specifically)

For names of components, see Glossary of Useful Technical Terms in Appendix 3.
quality, etc., without limiting the claim to any specific dimension or quality. For example, "said member having a predetermined cross-sectional shape" and "said valve arranged to open when a predetermined gas pressure is developed."

- **Consisting versus Comprising.** A claim that recites a group of elements can be made "open" or "closed." An open claim (the normal case) will cover more elements than it recites, whereas a closed claim is limited to and will cover only the elements it specifically recites. To make a claim open, use "includes" or "comprising"—for example, "said machine comprising A, B, and C." In this case, a machine with four elements A, B, C, and D will infringe. To make a claim closed (rarely done), use "consist" or "having only"—for example, "said machine consisting of A, B, and C." In this case, a machine with elements A, B, C, and D will not infringe, since, in patent law, the word "consist" is interpreted to mean "having only the following elements."

- **A Plurality Of.** Also, whenever you recite several units of anything, preface your recitation with "a plurality of"—such as, "a plurality of holes in said hose."

- **Less Is More.** Remember that, because of the Boolean "less is more" rule in interpreting claims, it's not necessary to recite a specific feature in your main claim in order to cover that feature in combination with the other elements of your invention. For example, once I drafted a claim for a client where one embodiment of her invention had a fingerlike support. Not seeing the finger in the main claim, she asked me, "Did you claim the finger?" I then explained to her that since the main claim didn't recite the finger, the main claim was broad enough to cover her invention with or without the finger.

- **Is It Sketchable?** After drafting your claim, you or a friend should be able to make enough sense out of it to sketch your invention. If this isn't possible, the claim is unclear and needs to be reworked.

- **Special Terms.** You can use any technical or descriptive terms that you feel are reasonably necessary to define or describe your invention—the claim does not have to be limited to any special "legalese." One patent attorney I know had a devil of a time defining (to the satisfaction of the examiner) a convex transistor structure with a nubbin on top until he simply called it "mammary-shaped."

- **Method Claim.** If possible, provide a method claim to cover your invention; you usually can do this if there's any dynamic operation involved in the invention. Most machines and electrical circuits can be claimed in terms of a method. Method claims are usually broader than apparatus claims, since they're not limited to any specific hardware.

- **Gerunds in Method Claims.** Each substantive clause of a method claim must usually start with an "—ing" or gerund word, such as "attaching," "heating," "abrating," etc. If you want to recite some hardware in a method claim, use "providing"—such as, "providing a central processor." (Don't say "comprising the steps of" in a method claim since claims that recite "step" may tend to be interpreted less broadly.)

- **Label Means.** If you do recite any "means," it's desirable to label the means with a nonfunctional adjective in order to provide a mnemonic aid in case you need to refer to the means later. For example, "first means," "second means," etc. Also, the "means" must be followed by or be modified by a function or some structure. For example, "first means for printing" (means plus function); "second means comprising a doctor blade" (means plus structure).

- **Padding.** Lastly, many patent attorneys recommend that a claim not be too short. A claim that is short will be viewed adversely (as possibly overly broad) by many examiners, regardless of how much substance it contains. Thus, many patent attorneys like to "pad" short claims by adding "whereby" clauses, providing long preambles, adding long functional descriptions to their means clauses, etc. The trick here, of course, is to pad the claim while avoiding a charge of undue prolixity under Section 112.

You'll find that a well-written claim is like a well-written poem. Each has a beautiful symmetry, order, and logic.

J. **Drafting Dependent Claims**

In Section H, I pointed out that there are two basic types of claims—dependent claims (these stand on their own) and dependent claims (these incorporate an entire preceding claim, which can be an independent or dependent claim). A dependent claim is simply a shorthand way of writing a narrower claim—that is, a claim that includes all the elements of a preceding claim, and/or recites one or more additional elements or recites one or more elements of the preceding claim more specifically.

1. **Reasons for Writing Dependent Claims**

If an independent claim is broader, you may wonder why you need dependent (narrower) claims—especially since the independent claim must be infringed if its dependent claim is infringed. Below are eight good answers to that question:
1. **Backup.** Dependent claims are by definition always narrower than the claims on which they depend. You may accordingly be wondering, "If my broad independent claim covers my invention, why do I need any more claims of narrower scope?" True, if all goes well, your broad claim will be all you'll need. However, suppose you sue an infringer who finds an appropriate prior-art reference that neither you nor the PTO examiner found and that adversely affects the validity of ("knocks out") your broad claim. If you've written a narrower claim you can then disclaim the broad claim and fall back on the narrower claim. If the narrower claim is patentable over the prior art, your patent will still prevail. Thus the dependent claims are insurance in case of broad claim invalidity. Each claim, whether independent or dependent, is interpreted independently for examination and infringement purposes. If the claim is dependent, it's interpreted as if it included all the wording of its parent (incorporated) claim or claims, even if the incorporated claim is held invalid. Dependent claims are crucial in order to recite all of the significant subsidiary elements of your invention. A feature that doesn't seem significant now can prove to be crucial later. One inventor I know (Morrie) submitted a large set of dependent claims to recite every less-important feature of his invention that he could think of, including one that recited that a certain flap was bendable. He got a patent and was involved in a licensing negotiation where the infringer found an earlier patent that showed his complete invention, except for the bendable flap. While the earlier patent invalidated most of Morrie's claims, fortunately he was able to rely on the still-valid dependent claims that recited the bendable flap to conclude a licensing deal, albeit at a lower rate than he originally wanted.

2. **Reification and Differentiation of Broad Claims.** Dependent claims are useful to explain, reify (make real), and differentiate (broaden) some of the broad, abstract terms in your independent claims. For instance, if you recite in a claim "additive means," many judges may not be able to understand what the "additive means" actually covers, but if you add several dependent claims that state, respectively, that the additive means is benzene and toluene, they'll get a very good idea of what types of substances the "additive means" embraces. If your main claim recites a new parlor game, adding a dependent claim that recites that the game is simulated on a computer will make it clear that the main claim covers more than computer simulations, that is, it covers board versions too. (Don't forget to show the computer version in your drawings and discuss it in your specification.) This independent-claim broadening function of dependent claims is called "differentiation" and is most effective if you recite just one element in the dependent claim.

3. **Provide Spectrum of Coverage.** Narrower claims can be used to provide a range, spectrum, or menu of proposed coverage from very broad to very narrow so that your examiner can, by allowing some narrower claims and rejecting the broader ones, indicate the scope of coverage the examiner's willing to allow.

4. **Prevent Premature Final Action.** Providing dependent claims of varying scope and approaches forces the examiner to make a wider search of your invention on the first examination. This will prevent the examiner from citing new prior art against your application on the second Office Action, which usually must be made "final." (See Chapter 13.) Thus, you should include every possibly novel feature (or novel combination of features) of your invention in your dependent claims.

5. **Provide Broader Base for Infringement Damages.** By providing dependent claims that add more elements, you define your invention (in those claims) as a more comprehensive structure, thereby providing a broader base upon which a judge can calculate infringement damages.

6. **Provide a Specific, Descriptive Recitation.** This reason is slightly different than Item 2 above. If the recitation in the independent claim is broad and abstract, such as, "urging means for . . .," I strongly recommend that you provide dependent claims with a descriptive, definite recitation (for example, "wherein said urging means is a coil spring") to hit the nail on the head, or provide a specific hardware recitation so a judge won't have to use his or her imagination.

7. **Preserve Right to Rely Upon Doctrine of Equivalents.** Traditionally patent owners have been able to rely on a "Doctrine of Equivalents" (DoE) to effectively expand a claim beyond its literal wording if it didn't cover an infringing device. However, the U.S. Supreme Court in *Festo v. Shoketsu*, 122 S.Ct. 1831 (2002), held that a patentee who amended (narrowed) a claim when it was before the PTO may no longer be able to rely on the DoE. (See Chapter 13 for a more detailed explanation.) To preserve your right to rely on the DoE, draft as many dependent claims as possible to cover all aspects of your invention. In this way you'll have some claims that won't have to be amended (narrowed) if the PTO cites relevant prior art against these claims, and thus you'll preserve your right to use the DoE to expand these claims if necessary.
8. Litigators Prefer Them. Litigators prefer narrower and more specific claims (provided they cover the infringing device) because they provide a broader base for infringement damages—see Item 5 above—and are more difficult to invalidate since they read on less prior art. Furthermore, it’s easier for a litigator to prove infringement since the claim is less abstract and recites the specific structure that is infringed—see Item 6 above.

2. The Drafting

For the reasons above, when you’re satisfied with your first, basic, and broadest independent claim, you should write as many dependent claims as you can think of, keeping in mind that the PTO charges extra if the total number of claims exceeds 20. Each dependent claim should begin by referring to your basic claim, or a previous dependent claim, using its exact title.

EXAMPLE:
Independent claim:
1. A cellular telephone having a hinged body and a coiled antenna.

Improper dependent claim:
2. The hinged body of claim 1 wherein said hinge has five knuckles. (The preamble or beginning of the claim does not correspond with claim 1 and there’s no antecedent for “said hinge.”)

Proper dependent claim:
2. The cellular telephone of claim 1 wherein said hinged body includes a hinge with five knuckles.

If the dependent claim recites one or more elements of the independent claim more narrowly, it should use the word “wherein”—for example, “The bicycle of Claim 1 wherein”—and then continue by reciting one or more elements of the independent claim.

Note that a dependent claim does not narrow the scope of any previous claim from which it depends; it merely provides an alternative, narrower recitation in a shorthand manner.

If the dependent claim recites additional elements, it should use the words, “further including”—for example, “The bicycle of Claim 1, further including ...”—then continue by reciting the additional feature(s) of your invention. The additional features can be those you eliminated in broadening your basic claims and all other subsidiary features, including all combinations and permutations of such features of your invention you can think of. The features recited more narrowly or the additional elements recited by the dependent claims can be specific parameters (such as materials and temperatures) or other specifics of your invention (such as specific shapes, additional elements, or specific modes of operation). Refer to your prior art patents for guidance on how to draft these.

Note that a dependent claim must either recite the elements of its parent claim more specifically, or recite additional elements. It may not change any element to a different type or kind. Thus if the parent claim is an apparatus claim, each of its dependent claims must recite additional structure or recite some previously recited structure more specifically. For example, if your parent claim recites “1. A house made of red bricks,” its dependent claim can say “2. The house of Claim 1 wherein said bricks are made of clay” (recites bricks more specifically) or “2. The house of Claim 1, further including a layer of paint over said bricks” (recites additional structure). The dependent claim can’t say “2. The house of Claim 1 wherein said bricks are yellow.” A method claim may not be made dependent upon an apparatus claim and vice versa, but most examiners will allow an apparatus claim that is dependent upon a method claim.

If the parent claim is a method claim, each of its dependent claims must recite an additional step, or recite a previously recited step (or structure in such a step) more specifically. For example, suppose your parent, independent claim recites:

1. A method of heating comprising irradiating a foodstuff in a chamber with microwaves.

You can provide a dependent claim which recites one element of claim 1 (the microwaves) more specifically as follows:

2. The method of Claim 1 wherein said microwaves have a frequency of 2250 megahertz.

Alternatively (or in addition) you can provide a dependent claim which recites an additional step as follows:

2A. The method of Claim 1, further including freezing said foodstuff after it is irradiated.

Or as another alternative (or in addition) you can combine both dependent claims to provide a narrower dependent claim as follows:

2B. The method of claim 1 wherein said microwaves have a frequency of 2250 megahertz and further including freezing said foodstuff after it is irradiated.

You can see that many variations and permutations are possible. Although I used letter suffixes to distinguish the above claims, you must use numbers for each set of your
Multiple Dependent Claims

A dependent claim may be made directly dependent upon several previous claims. This is called "multiple dependent claiming" (MDC) and is common in Europe. Example: "3. The widget of claims 1 or 2 wherein ...". However I recommend that you do not use MDC since the PTO's examiners dislike the practice, there's a stiff surcharge for the privilege, and for fee purposes each MDC counts as the number of claims to which it refers. (See Appendix 4, Fee Schedule.)

A dependent claim will be read and interpreted by examiners and judges as if it incorporated all the limitations of its parent claim(s). Thus suppose your independent and dependent claims read, respectively, as follows:

18. A rifle having an upwardly curved barrel.
19. The rifle of Claim 18 wherein said barrel is made of austenitic steel.

The dependent claim (19) will be treated independently, but with Claim 18 incorporated, so that it effectively reads as follows:

19. A rifle having an upwardly curved barrel, said barrel being made of austenitic steel.

TIP
Use Only Significant Limitations. You can make your dependent claims as specific as you want, even to reciting the dimensions of the tabletop, its color, etc. However, extremely specific limitations like this, while possibly defining an invention that is novel over the prior art (Section 102), do not recite unobvious subject matter (Section 103), so they'll be of little use to fall back on if you lose your independent claim. Thus, you should mainly try to use significant limitations in your dependent claims—that is, limitations that an infringer might use if he or she made your invention.

You should draft dependent claims to cover all possible permutations of the subsidiary features of your invention. For example, suppose you've invented a telephone and some of the dependent features are that it has (a) a musical ringer, (b) a coiled cord, and (c) a stand. You can provide three dependent claims with features a, b, and c, respectively. Then write four more dependent claims with features a and b, a and c, b and c, and a, b, and c, if you think these combinations are feasible.
Although most of your dependent claims should have just a single element (to obtain maximum claim differentiation), you should try to draft at least one dependent claim with as many parts as possible so as to provide as broad a base as possible for maximizing infringement damages. Also try, insofar as possible, to draft at least one claim to cover parts of the invention whose infringement would be publicly verifiable, rather than a nonverifiable factory process or machine.

As with independent claims, you should not make your dependent claims purely “functional”—that is, each dependent claim should contain enough physical structure to support its operational or functional language. Here are some examples.

Wrong:

17. The bicycle of Claim 16 wherein said derailleur operates with continuously variable speed-to-power ratios. [This claim has no structure to support its operational limitation.]

Right:

17. The bicycle of Claim 16 wherein said derailleur contains means for causing it to operate with continuously variable speed-to-power ratios. [The "means" limitation is a recitation of structure that supports the operational limitation.]

Wrong:

17. The bicycle of Claim 16 wherein said derailleur contains a cone-shaped pulley and a belt pusher for causing it to operate with continuously variable speed-to-power ratios. [The pulley and pusher constitute structure that supports the operational limitation.]

If your independent claim recites a means plus a function, your dependent claim should modify the means and not the function. For example, assume an independent Claim 20 recites, "variable means for causing said transmission to have a continuously variable gear ratio." Here are the right and wrong ways to further limit this "means" in a dependent claim.

Wrong:

21. The transmission of Claim 20 wherein said continuously variable gear ratio ranges from 5 to 10.

Right:

21. The transmission of Claim 20 wherein said variable means is arranged to provide ratios from 5 to 10.

Common Misconception: If a dependent claim recites a specific feature of your invention, say a two-inch nylon gear, your invention will be limited to this gear, so that if any copy of the invention uses a one-inch gear, or a steel gear, it won't infringe on your patent.

Fact: Although the copy won't infringe the dependent claim, it will infringe the independent claim so long as it isn't limited to this specific feature. And as long as even one claim of a patent is infringed, the patent is infringed and you can recover as much damages (money) as if 50 claims were infringed.

Common Misconception: If a dependent claim recites a feature or element of the invention, it will protect this feature per se.

Fact: A dependent claim must be read to include all of the features of its referent claim (preceding or independent claim to which it refers). Thus it will not cover the feature it recites per se, but rather will cover that feature in combination with all of the elements of its referent claim.

Common Misconception: The limitations in a dependent claim will narrow its independent claim.

Fact: The independent claim is interpreted independently of its dependent claims and the latter never narrow the former although they can make the independent claim broader by claim differentiation.

If you still don't get the principle of broad and narrow claims, here are three simple claims that everyone can understand:

1. A house that has a sloping roof with a gable.
2. The house of Claim 1 wherein said gable has a dormer.
3. The house of Claim 2 wherein said dormer has eight panes of glass.

Claim 1 is very broad: It will cover any house that has a sloping roof with a gable. Thus it may cover, say 30 million houses in the United States. Claim 2 is of narrower scope because it incorporates all of Claim 1 and has additional verbiage (houses with sloping roofs that have a gable with a dormer), making it longer than Claim 1. Thus it will cover fewer houses, say ten million in the U.S. Claim 3 is still longer and is far narrower than Claim 2 since it is limited to houses with sloping roofs that have a gable with a dormer with eight panes of glass. Thus it will cover fewer houses still, say one million houses in the United States.

Note that I made the number of the independent claim (#1) bold and I indented the dependent claims to indicate
the dependency so that each dependent claim is nested under its referent claim. This is optional but desirable since it makes the claims clearer. As indicated above in Section G1, if you’re working on a computer, use its “windows” function (if available) to keep your independent claim displayed while you write your dependent claims.

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**Claims of Different Scope**

The concept of claims of different scope (independent and dependent) is confusing to most inventors. Here’s another way of explaining it, if you still don’t understand.

An independent claim (IC) is one that doesn’t refer back to any previous claim. For example, “1. A telephone comprising (a) a base, (b) a handset, and (c) a rotary dial,” is an example of an IC.

To write another independent claim like Claim 1 (C1), but which is narrower than C1 by reciting a base of black plastic, simply repeat all of Claim 1 and add that the base is black plastic. For example, “2. A telephone comprising (a) a base of black plastic, (b) a handset, and (c) a rotary dial,” is an example of a second IC which is narrower than C1.

However, there’s an easier, shorter, and cheaper way to avoid repeating all of C1 each time: Simply write a claim that refers to the IC 1 so as to incorporate all of it by reference, and then state one or more additional elements, and/or recite one or more elements of the incorporated claim more specifically. Such a shorthand claim is called a dependent claim (DC). A DC is thus one that refers back to and incorporates all of a preceding claim and adds or modifies one or more limitations to recite the invention more narrowly. For example, “2’. The telephone of Claim 1 wherein said base is made of black plastic,” is a dependent claim which has the same scope as C2. C2’ will be interpreted as if it included all of the subject matter of C1, together with the additional subject matter in C2’.

It follows that to infringe a DC, a device must have all of the elements of the DC, plus all of the elements of the incorporated claim.

Thus, adding a DC to recite a specific feature of your invention won’t broaden or narrow your coverage; it will just provide another, yet more precise, missile. The eight reasons for including DCs are in Section J.

Also note that a DC can refer back to a preceding claim, and the preceding claim can in turn refer back to a further preceding claim. To infringe such a third-level DC, the device must have all of the elements of all three claims in the chain.

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**K. Drafting Additional Sets of Claims**

After you’ve written your first independent claim (IC) and all the dependent claims you can reasonably think of (all numbered sequentially), consider writing another set of claims (an IC and a set of dependent claims) if you can think of a substantially different way to claim your invention. See the prior-art patents and the sample set of claims at the end of this chapter (Fig. 9A) for examples of different independent claims on the same invention. Your second set of dependent claims can be similar to your first set; a word processor with a block copy function will be of great aid here. Writing more sets of claims will not always give your invention broader coverage, but will provide alternative weapons to use against an infringer. That is, writing a second set of claims is like going into battle with a sword as well as a gun. Also, writing more sets of claims will give your examiner additional perspectives on your invention. That is, your chances of getting your examiner to bite will be increased if you present many flavors to choose from.

In the example above (Claim 11), I might start my second IC with the legs instead of the top and I might try to define the top and legs differently—for example, instead of “elongated members,” I might call the legs “independent support means.” Instead of calling the top a “sheet of rigid material,” I might call it a “planar member having parallel, opposed major faces.”

Here are still other ways to write a different IC: (1) Rewrite one of the dependent claims from your first set in independent form; (2) wait a few days and write an IC again, with independent thought; (3) write the IC by reciting the elements of the first IC in reverse or inverse order; and (4) if your first IC has any “means” clauses, make your next IC a structure (apparatus) claim (no means clauses), or vice versa; (5) If your invention uses any unique supplies, blanks, or starting elements, or accessories, it is wise to provide claims to these also. For example, if you’ve invented a unique paper cup which is made from a unique starting blank, provide independent claims to both the cup and the blank.

Another valuable way to write a different IC is to provide a method (process) claim if your first IC is an apparatus claim, or vice versa; you’re usually allowed to have both method and apparatus claims in the same case. You should always include an independent method claim if possible, since a method claim is usually not limited to specific hardware and thus affords broader coverage. Every step of each independent method claim must be an action step, for instance, “providing ...” or “heating ...” If your invention is a product and the process of making it is novel, or if it uses an intermediate construction in the process, you should claim the process and the intermediate construction.
Note that each independent claim must stand by itself: It may not refer to, incorporate, be based in any way on, or use referents from any previous claim. Even if claim 1 recites “a first lever” you may not recite, in a second independent claim, say claim 10, “a second lever” unless a first lever has already been recited earlier in claim 10. Similarly even if claim 1 recites “a wheel,” claim 10 may not recite “said wheel” unless “a wheel” has been recited earlier in claim 10. The basic filing fee entitles you to up to three ICs and 20 total claims. I generally try to use up my allotment by writing three ICs and three sets of five to seven dependent claims each. However, if I feel that I can write a fourth, substantially different IC and the cost can be borne by my client, I will add it, plus more dependent claims. The PTO now charges a substantial additional fee for each IC over three, and for each claim (independent or dependent) over 20.

On the other hand, for relatively simple inventions, I may not be able to think of any substantially different ways to write an IC, so I may submit only one, plus a few dependent claims. I advise you generally not to submit more than the number of claims permitted for your basic filing fee—that is, three ICs and 20 total claims—unless the complexity of your invention justifies it, or you have some other good reason. Don’t make your case like one published application (U.S. Pub. Pat. Appn. 20030100451): It has 7,215 claims!

L. Checklist for Drafting Claims

Below is the second part of the application checklist that I started in Chapter 8.

M. Summary

Claims define the invention in logical and precise terms. They are sentence fragments beginning with the words “I claim” and are provided at the end of a patent application.

The patent statute and rules regarding claims require that they (a) be clear and unambiguous, (b) be independent or dependent, (c) must use terms from the specification, and (d) should be phrased in a two-part form (prior art plus improvement). Claims can also have elements expressed in “means-plus-function” form.

Every claim should be classifiable into one of the five statutory classes of invention: machine, article, composition, process (method), or new use. Software or business claims are usually process claims, but can be machine claims. The number of claims is not as important as their breadth and the specific features of the invention need not be recited in a claim to be covered.

For a device to infringe a claim, it must meet all of the elements of the claim. Claims can be made broader by eliminating elements or broadening existing elements, but each claim should define a novel and unobvious invention over the prior art. When an element is first introduced in a claim, the article “a” should be used, but when the element is referred to again the article “the” or “said” should be used. A “means clause” in a claim covers the hardware in the specification and its equivalents. A patent application should have means, nonmeans (apparatus), and method independent claims, if possible.

Each independent claim should be followed by a set of dependent claims. Each dependent claim must recite additional element(s) or recite the existing elements more narrowly (specifically). Claims must be logical, complete, unambiguous, and every element in every claim must be shown in the drawings. All method claims must (1) be tied in a substantial way to a particular machine or apparatus, or (2) recite the transformation of an article into a different state or thing.
Checklist for Draft Claims

☐ Grammatical articles are used properly in the claims: "a" or "an" to introduce any singular part, "the" to refer to a part a second time when using a different (but clearly implied) term as before, and "said" only to refer to a part using the IDENTICAL term as before.

☐ Two articles together, such as "the said," aren't used.

☐ Every part and feature in every claim is shown in the drawings and discussed in the specification.

☐ No claim uses any disjunctive ("or") expression (except to recite two equivalent parts or a disjunctive function of a machine).

☐ No claim uses any naked functional clause; all claims contain a structural recitation or "means" to support every functional recitation.

☐ A memory aid is recited adjacent each "means," for example, "first means;" also, each "means" is followed by "for ..." plus some function or structure.

☐ For each unique "means" followed by a function in the claims, the specification describes some hardware or an element which implements or provides the function for such means, using the same words as used in the claim to describe the function.

☐ "Consisting" isn't used in any claim (except if you want to say "having only").

☐ No claim uses any abbreviation, dash, parentheses, or quote.

☐ No term is used for the first time in any claim.

☐ The subparagraph form is used in long claims for ease of reading.

☐ Each claim has just one capital letter (two if "claim" is capitalized in a dependent claim) and one period (except lettered paragraphs), and no parentheses (except lettered paragraphs, quotes, or abbreviations).

☐ All significant parts are affirmatively recited in the claims as the subject and not the object of a clause.

☐ The main (independent) claim is made as broad as possible by reciting minimum number of elements and by generalizing existing elements (without reading on prior art).

☐ No vague, loose, or casual language is used in any claim.

☐ Space between adjacent claims is greater than space between adjacent lines of a claim.

☐ No dependent claim recites an additional function unless "means" or structure is specified to support such structure.

☐ All parts recited in claims are connected.

☐ All claims recite enough parts to provide a complete assemblage.

☐ You haven't submitted over 20 total or over three independent claims unless the case is very complex or extra claims are justified.

☐ No independent claim refers to any other claim and all dependent claims refer to a previous claim in line 1 or line 2.

☐ You've filed enough dependent claims to cover all features and permutations and you've filed second and third sets of claims (with differently phrased independent claims) if possible.

☐ You've included an independent method claim and a set of dependent method claims, if possible.

☐ Every dependent claim starts with either: "The __________ of Claim x wherein ..." (to provide a separate recitation of an element(s) of the parent claim in a narrower fashion), or, "The __________ of Claim x further including ..." (to provide a separate recitation of the element(s) of the parent claim, plus a recitation of one or more element(s)).

☐ No dependent claim is used to substitute a different part for any part recited in the parent claim. Each dependent claim recites an element(s) of the parent claim in a narrower fashion, and/or recites one or more element(s), in addition to those recited in the parent claim.

☐ No dependent claim recites a method limitation if its parent claim is an apparatus claim.

☐ In order to comply with the Bilski decision, all process claims recite a process centered on hardware—that is, the process either (1) is tied in a substantial way to a particular machine or apparatus, or (2) transforms an article into a different state or thing.

☐ The same element isn't recited more than once in any claim unless the second and later recitations use "said" before the element.

☐ You've included a set of claims (one independent and several dependent) with means plus function clauses and a set without means plus function clauses.

☐ Each independent claim has a set of several dependent claims to provide backup.

☐ Every possible novel or significant feature of the invention is recited in the claims to (hopefully) provide some claims that will not have to be canceled or narrowed.

☐ At least one dependent claim has as many elements or parts of the inventive apparatus as possible, providing a larger base for infringement claims and greater damages.

☐ Method limitations and apparatus limitations aren't used together in any single claim or in any Markush group.
CLAIMS: I claim:

1. In a bag closure of the type comprising a flat body of material having a lead-in notch on one edge thereof and a gripping aperture adjacent to and communicating with said notch, the improvement wherein said bag closure has a layer of paper laminated on one of its sides.

2. The bag closure of claim 1 wherein said body of material is composed of polyethylene terephthalate.

3. The bag closure of claim 1 wherein said body is elongated and has a longitudinal groove which is on said one side of said body and extends the full length of said one side, from said gripping aperture to the opposite edge.

4. The bag closure of claim 3 wherein said groove is formed into and along the full length of said lamination.

5. The bag closure of claim 1 wherein said body is elongated and has a longitudinal groove which is on the side of said body opposite to said one side thereof and extends the full length of said one side, from said gripping aperture to the opposite edge.

6. The bag closure of claim 1 wherein said body is elongated and has two longitudinal grooves which are on opposite sides of said body and extend the full lengths of said sides, from said gripping aperture to the opposite edge.

7. The bag closure of claim 6 wherein the groove on said one side of said body is formed into and along the full length of said lamination.

8. The bag closure of claim 1 wherein said body has a paper lamination on both of said sides.

9. The bag closure of claim 8 wherein a groove is on one side of said body and extends the full length of said one side, from said gripping aperture to the opposite edge.

10. The bag closure of claim 8 wherein two grooves, on opposite sides of said body, extend the full lengths of said sides, from said gripping aperture to the opposite edge.
11. The bag closure of claim 10 wherein said grooves are rolled into and along
the full lengths of said laminations, respectively.

12. The bag closure of claim 1 wherein said paper lamination is colored.

13. The bag closure of claim 1 wherein said body is elongated and has a longitudinal
through-hole.

14. A bag closure of the type comprising a flat body of material having a lead-in notch
on one edge thereof, a gripping aperture adjacent to and communicating with said
notch, characterized in that one of its sides has a layer of paper laminated thereon.

15. The bag closure of claim 14 wherein said body of material is composed of
polyethylene terephthalate.

16. The bag closure of claim 14 wherein said body is elongated and has a
longitudinal groove on said one side of said body and which extends the full
length of said one side, from said gripping aperture to the opposite edge.

17. The bag closure of claim 14 wherein said body is elongated and has a
longitudinal groove which is on the side of said body opposite to said one side
thereof and extends the full length of said one side, from said gripping aperture
to the opposite edge.

18. The bag closure of claim 14 wherein said body is elongated and has two
longitudinal grooves which are on opposite sides of said body and extend the
full lengths of said sides, from said gripping aperture to the opposite edge.

19. The bag closure of claim 14 wherein said body has a paper lamination on both
of said sides.

20. The bag closure of claim 19 wherein a groove is on one side of said body
and extends the full length of said one side, from said gripping aperture to
the opposite edge.

21. The bag closure of claim 19 wherein two grooves, on opposite sides of said
body, extend the full lengths of said sides, from said gripping aperture to
the opposite edge.

22. The bag closure of claim 14 wherein said paper lamination is colored.
23. The bag closure of claim 14 wherein said body is elongated and has a longitudinal through-hole.

24. A method of closing a plastic bag, comprising:

25. (a) providing a bag closure of the type comprising a flat body of material having a lead-in notch on one edge thereof, a gripping aperture adjacent to and communicating with said notch, and a layer of paper laminated on one of its sides,

26. (b) providing a plastic bag and inserting contents into said plastic bag,

27. (c) twisting said plastic bag so that it forms a neck portion to hold said contents from falling out of said plastic bag,

28. (d) inserting said bag closure onto said neck portion of said plastic bag so that said neck portion of said plastic bag passes said lead-in notch and into said gripping aperture,

29. whereby said bag closure can be easily marked to identify and/or price said contents in said plastic bag.

30. The method of claim 24 wherein said flat body of material is composed of polyethylene terephthalate.

31. The method of claim 24 wherein said layer of paper is colored.