INVENTION ANALYSIS AND CLAIMING: Reaching for Breadth — PART I[1]

BY RONALD SLUSKY

Ronald Slusky mentored dozens of attorneys in "old school" invention analysis and claiming principles over a 31-year career at Bell Laboratories. He is now in private practice in New York City. This article is adapted from his book ***"Invention Analysis and Claiming: A Patent Lawyer's Guide"*** *published by the American Bar Association and available at* ***ababooks.org****. Ron can be reached at 212-246-4546 and rdslusky@verizon.net*

An invention should be claimed as broadly as the prior art will allow. Some practitioners are taught that the best way to arrive at such a claim is a process that the author refers to as "pruning and distilling." A claim of some indeterminate breadth is drafted. The claim is then broadened by pruning away limitations; broadening individual recitations; and/or coalescing two or more limitations into a single one (e.g., "pointing" and "clicking" become "selecting). The process continues until any further broadening would cause the claim to read on the prior art. That which remains is supposedly the broadest possible claim to the invention.

Previous columns[2] showed how this is a sub-optimal strategy because the underlying inventive concept may involve functions or relationships not present in the original claim. It is unlikely that these will find their way into the final version of the claim if they weren't present at the outset. Significant infringement loopholes can result.

A better approach, as we also saw, is summarized by the prescription Begin from the Problem [Not the Embodiment]. We first identify the problem the invention is intended to solve, then think about how—broadly and functionally—the problem was solved and then write a problem-solution statement that reflects what we've figured out. After that, drafting a broad claim that captures the inventive concept is straightforward.

Here, for example, is a problem-solution statement for the breakthrough technique for producing ammonia in commercial quantities patented by Haber et al in 1910:[3]

> The problem of producing ammonia at a low temperature and as quickly as possible is solved by passing gases containing nitrogen and hydrogen over a catalyst containing osmium.
>
> And here is the corresponding claim:
>
> The process of producing ammonia by passing gases containing nitrogen and hydrogen over a catalyst containing osmium.

This is the first of several columns offering approaches to analyzing the inventor's embodiment(s) to identify the broad inventive concept in problem/solution terms. Other upcoming columns will present ways of analyzing a problem-solution statement to determine if it is too broad, and, if it is, how best to narrow it into the patentable realm.

These techniques can also be used by practitioners who would rather dig in and write claims in the first instance.

START EARLY

A first draft of the problem-solution statement should be formulated as soon as we have enough information about the problem and the general outlines of the solution to do so. Starting early counteracts the tendency for unessential implementational details to taint our notion of what the broad invention is. It protects us from becoming blindsided by the details and going too narrow right at the outset. Waiting until all the details have been laid out, and then trying to synthesize the invention out of all that, opens the door to an analysis that is embodiment-based rather than problem-solution-based. It is difficult to be misled by what we don't know.

Our introduction to the invention may be a technical paper or other written description supplied by the inventor. In that case, we should have the problem-solution paradigm in mind as soon as we begin to read. As the inventor's exposition unfolds, we mentally separate what seems to be the problem from what seems to be the solution, as well as separating what seem to be implementational details from what seems to be at the heart of the inventive concept.

Or our introduction to the invention may occur in a face-to-face or telephone conversation with the inventor. Here, again, the problem and solution should be the early focus. The inventor should be set on a problem-solution course, being asked what problem she set out to solve and what she knows about prior art attempts to solve it.

The inventor can then be asked to explain how she solved the problem. A useful way of setting the stage for this is to bring the inventor back in time to the moment of inventive realization and to prompt her to articulate her solution in terms that put a heavy emphasis on function with as few implementational details as possible.

Typically the inventor picks up her pencil and begins explaining her solution in the context of the embodiment. This is not surprising. Inventors are used to thinking about their work in the tangible realm rather than the conceptual. Nonetheless, given the attorney's exhortation to describe the solution broadly and functionally, the inventor will present it in at least some level of generality, which is fine for a start.

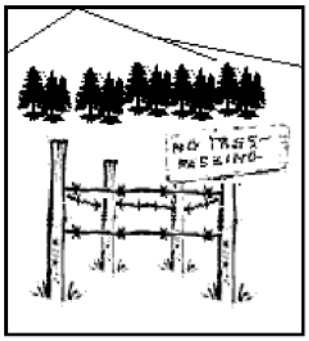
The attorney should therefore stay alert for what could be the broad solution and take an initial stab at a problem-solution statement as soon as it appears possible to do so. That initial view of the invention can then be presented to the inventor for discussion.

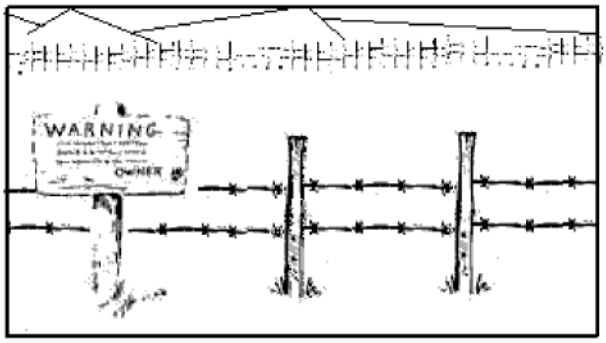
If the attorney is not familiar with the technology at hand, his initial take on the problem-solution statement can be wildly overbroad. It is nonetheless desirable to start early and aim high even though it may well mean having to fall back to a more limited view of the invention once the full extent of the prior art becomes clear. The alternative of holding back and aiming lower in the first instance may result in an invention definition that is unduly narrow. Having been apprised by the inventor that the proposed problem-solution statement is too broad, the attorney can simply prompt the inventor to pick up the thread of her story, staying alert for an opportunity to formulate a problem-solution statement that is better focused on her contribution to the art.

THINK BIG

A companion idea to the prescription Start Early is to Think Big.

Having been exposed to the broad functionality of the embodiment early on in his discussion with the inventor, the attorney who "thinks big" says to himself, "imagine the value of this patent if only we could capture the naked notion of that," meaning the broad functionality of the embodiment stripped of its implementational trappings. The earlier in the process we start thinking in these terms, the better.





To Think Big means not being satisfied to pursue a limited parcel of intellectual property, even though it may be relatively easy to acquire. It means having a persistent, relentless mindset of trying to secure as expansive a parcel of intellectual property real estate as possible, even though it may be more difficult to do so.

Imagine that our client was the inventor the first alarm clock. An embodiment-based analysis of this device would have focused on its various components—an analog clock face, a bell, a hand to indicate the desired alarm time, etc. However, an attorney who was "thinking big" at that time would have been asking himself, "Is it possible that we could get (i.e., claim) the naked notion of alarming at a selectable time? Think of royalties! Think of the market share!" And then, "What's the prior art? Can it stop us? How can we get around it?" How much easier to capture the alarm clocks of the future—electrical clocks, electronic watches, personal digital assistants, etc.—if the patent is not limited to any particular configuration of the time-keeping device or any particular alarming mechanism.

Or consider the computer mouse. An attorney thinking big would want his client to own the naked notion of random access control of a display screen cursor. Such a claim would encompass such post-mouse innovations as the trackball, joystick, touch pad or even cursor control with voice commands.

Of course, the problem-solution statement cannot be so broad as to encompass prior art. It would be great to own the naked notion of sending moving pictures over the airwaves, but that idea is already almost a century old. So at some point our grandiose ideas of how broadly the invention can be defined may have to give way to reality.

Better, however, to aim high and have to fall back somewhat than to aim low and achieve a lesser goal, only to realize too late in the game—when others enter the marketplace with a variant of the inventor's embodiment not captured by the patent's claims—that more could have been achieved.

Next Month: Reaching for Breadth—Part II

ENDNOTES

2. Intellectual Property Today, August and September, 2007.
3. U.S. Patent 971,501

USPTO Grants the EFF's Request for Re-Examination of NeoMedia Technologies' Patent

NeoMedia Technologies, Inc. (OTCBB: NEOM), the global leader in camera-initiated transactions for mobile devices, announced that the United States Patent and Trademark Office (USPTO) granted the Ex-Parte Re-examination of U.S. Patent No. 6,199,048.

NeoMedia has a large portfolio consisting of U.S. and foreign patents and pending applications relating to various inventions surrounding the processing of "machine readable codes over wireless networks." NeoMedia expects the '048 patent will be confirmed by the USPTO in course of the re-examination. According to publicly available statistics, only about 10% of patents that are re-examined have all their claims declared invalid.

NeoMedia's CEO, William J. Hoffman, states, "Regardless of the outcome of the re-examination, NeoMedia's inventions and the patent portfolio that protects them will continue to effectively serve the creation of a global and interoperable infrastructure that enables large scale adoption of mobile codes as triggers of optically initiated transactions." He added, "NeoMedia's main motivation is to use its inventions to make this wireless ecosystem a reality and create advantages for the global value chain."

Additionally, in an effort to focus its energy on building a profitable ecosystem, and not to be distracted by time-consuming and costly patent litigation, NeoMedia has agreed to stay the current patent litigation against Scanbuy pending the re-examination's outcome.

NeoMedia's CEO affirms, "NeoMedia will use the 'stay period' to develop and to deploy our turn-key solutions for reading and processing a multitude of barcode formats that are ISO certified. Our patents have been reviewed and granted by appropriate government agencies, subsequently challenged, then licensed by numerous multinational companies deeply versed in Intellectual Property Rights. At the appropriate time, NeoMedia will move forward vigorously with the litigation and protect the rights we have been granted by patent offices worldwide."

About NeoMedia Technologies, Inc.

NeoMedia Technologies, Inc. (OTCBB: NEOM) is the global leader in optically initiated wireless transactions, bridging the physical and mobile world with innovative direct to web technology solutions. To provide a robust high-performance infrastructure for the processing of optical codes NeoMedia extends their offering with award winning Gavitec technology. Located in Germany, Gavitec AG-mobile digit is a leader in development and distribution of mobile scanners and software for mobile applications. In addition, Gavitec provides standardized and individual solutions for mobile marketing, couponing, ticketing and payment systems. To learn more visit www.neom.com, www.neoreader.com, and www.mobiledigit.de.

INVENTION ANALYSIS AND CLAIMING:
Inventions are Concepts[1]

BY RONALD SLUSKY

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Last month's inaugural column by Ron Slusky was inadvertently published out of sequence. The follow-on article mentioned in that column will appear in due course. We regret the error.

For patent lawyers an invention is not something physical, but a concept. As far back as 1933, patent law author Emerson Stringham went so far as to say that an invention is an abstraction:

> The difficulty which American courts…have had ... goes back to the primitive thought that an "invention" upon which the patent gives protection is something tangible. The physical embodiment or disclosure, which, in itself is something tangible is confused with the definition or claim to the inventive novelty, and this definition or claim or monopoly, also sometimes called "invention" in one of that word's meanings is not something tangible, but is an abstraction. *Definitions are always abstractions. [emphasis added].*[2]

There is no possibility of clear thinking, says Stringham, until it is understood that an invention as protected by a patent is an abstraction.

Patent practitioners refer to that abstraction as the "inventive concept."

The patent attorney's primary mission is to discover the inventive concept underlying the inventor's embodiment, and then to capture the inventive concept in the patent claims. To fail in that mission is to open the door for a competitor to take advantage of the inventor's contribution to the art while avoiding liability under the patent.

Consider the original ballpoint pen, patented by John Loud in 1888,[3] and shown in the figure. The ball L is held against the contracted mouth *f* of tube A by spring S, which pushes against rod G, bearing H and anti-friction balls K. The spring yields when the ball is pressed against paper, thereby regulating the flow of ink onto the ball and from there onto the paper as the pen is moved.

Claim 1 defines Loud's pen:

1. A pen comprising

   a tube having a contracted mouth and adapted to hold ink,

   a spheroidal marking point projecting from the mouth, and

   ink regulating means for resiliently holding the marking point against the mouth.

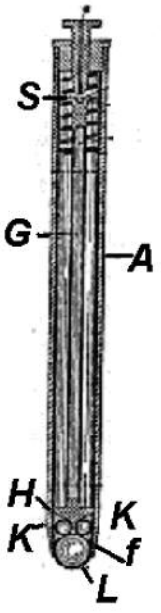
This claim seems pared down to the absolute minimum. Yet it would be of little value if Loud's patent were still in force. Modern ballpoint pens do not have anything like Loud's "ink regulating means for resiliently holding the marking point against the mouth." Instead, the ink is kept from leaking out by virtue of a tight fit between the ball and its socket and by using an ink having just the right level of viscosity.

Granted, it would have required a visionary of considerable insight to have anticipated the advent of the technology required to manufacture today's modern ballpoint pens. However, it does not require a visionary to recognize that advances do occur. Indeed, the patent attorney's task is to draft claims that preserve a patent's value *despite* such advances if improved devices embody the inventor's original work.

Loud's attorney, William Dowss, was, in fact, up to the task. Claim 1 and its "ink regulating means" is not Dowss's claim, but was written for this example by the author. If the Loud patent were still in force, Dowss's claims would command a royalty for every ballpoint pen on the market because Dowss successfully isolated—in a ten-word claim—the concept that underlies every ballpoint pen:

2. A pen having a spheroidal marking-point, substantially as described.

That's it! A pen having a spheroidal marking-point. A pen cannot be a ballpoint pen without one. Dowss's claims clearly evince his understanding that implementational details—like an "ink regulating means" or a tube with a contracted mouth—were irrelevant to the essence of Loud's invention. But how did he come to that understanding? And how can the practicing patent attorney of today know when the inventive concept has truly been found and properly claimed?



The answer to that question is an approach to invention analysis that lies at the heart of the author's book and will be a recurring theme in this series of columns in *Intellectual Property Today*.

BEGIN FROM THE PROBLEM

The path to the inventive concept begins with the problem that the inventor solved. The inventive concept is the inventor's solution to that problem, when broadly articulated at a conceptual level. Given any detail in the inventor's embodiment—a physical element, a method step, a particular functionality or a specific relationship among these—one can ask whether that detail is essential to solving the problem to at least some extent. If not, that detail is not intrinsic to the inventive concept.

The problem Loud addressed was that existing (fountain and quill) pens could not write on rough surfaces, such as wood or leather. Central to his solution is the ball itself. Problem solved. Claim 1's "ink regulating means" tells how such a pen could be constructed, not about how the problem of writing on rough surfaces can be solved. If the ink could somehow regulate itself, we

would still have a pen of the type Loud envisioned. Never mind that Loud probably never considered whether such an ink could exist. It is possible to formulate a statement of something new—a pen with a spheroidal marking-point—without having to describe how such a pen might be constructed.

It is sometimes thought there is no harm in including an implementational detail in an invention definition if the detail is absolutely needed to implement the invention. This is a dangerous view to take. We can never be certain that any particular detail always will be needed. Technology marches on. New ways of doing things are invented every day.

Moreover, whether something seems required to *implement* an inventive concept is irrelevant to the task of *claiming* it. No argument in this regard from the Patent Office of 1888. The Office issued Loud's patent with the above claim 2 just as it is presented above. Indeed, upon eliminating the "substantially as described" construct not used in modern practice, and assuming that ballpoint pens had not yet been invented, that same claim would be patentable today.

THE PROBLEM-SOLUTION STATEMENT

A useful way of coming to an understanding of the inventive concept for an invention is to draft a problem-solution statement and hone it to a fine edge as one would a claim. For example, a problem-solution statement for Loud's ball point pen could be:

> *The problem of* making a pen able to write on rough surfaces *is solved by* the pen having a spheroidal marking point.

Here's a problem-solution statement for Clarence Birdseye's food processing invention. The inventive concept is to package food in the container it is to be marketed in and then freezing it under pressure.

> *The problem of* being able to package and preserve food in an economical and commercially practical way *is solved by* first packing the food in the container in which it is to be marketed and freezing the same under pressure applied to substantial surface areas of the packed container.

And here's a problem-solution statement for a seminal invention of rocket pioneer Robert Goddard. The inventive concept is the notion of a rocket in which the fuel is carried in a casing separate from the combustion chamber.

> *The problem of* enabling a rocket to carry a large amount of combustible material while keeping the weight of the rocket as low as possible *is solved by* successively feeding portions of the material to the combustion chamber from a separate casing containing the supply of combustible material.

We will see in a future column how a problem-solution statement can be readily turned into a claim of commensurate breadth. However, next month's column—*Begin From The Problem [Not the Embodiment]*—will talk more about the importance of identifying the problem as the first step in analyzing an invention. IPT

ENDNOTES

1. Copyright © 2007 American Bar Association. Adapted with Permission. All Rights Reserved.
2. Emerson Stringham, Double Patenting. (Washington, D.C.: Pacot Publications, 1933).
3. United States Patent No. 392,046.

INVENTION ANALYSIS AND CLAIMING:
Pack Only What You Need[1]

BY RONALD SLUSKY

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The previous two columns described a claim drafting methodology called inventive-departure-based claiming. The basic idea is to start with some number of words that define how the invention departs from the prior art. We then work backward from there, adding to the claim only those limitations needed to either 1) provide antecedent support for the language used to express the inventive departure; or 2) put the inventive departure into a particular context in which the claimed subject matter is novel and non-obvious.

This column introduces the prescription *Pack Only What You Need* as a guiding principle when drafting a claim by working backwards from the inventive departure.

The prescription *Pack Only What You Need* analogizes claim drafting to packing clothes for a winter vacation. Whether you pack your heavy outerwear or your shorts and swim suit depends on where you're going—the Rockies for skiing, or the Caribbean for golf and the beach. You certainly wouldn't pack for both destinations; you pack only what you need.

In the claim drafting context, the "destination" is the inventive departure. You can't know whether you should "pack" a particular limitation into a claim until you know what inventive departure you are heading for. Thus undue limitations can be avoided by not packing a limitation into the claim until the structure of the evolving claim makes it clear that it is needed. Working backwards from the inventive departure in this way and packing only what you need avoids having to try (perhaps unsuccessfully) to ferret out unnecessary limitations after they have already inveigled their way into the fabric of the claim.

CLAIM PREAMBLES

The prescription *Pack Only What You Need* applies both to the body of a claim and its preamble. In fact, the preamble is frequently where undue limitations make their way into a claim.

Preamble limitations are supposed to be given limiting effect only if they give "life, meaning and vitality" to a claim.[2] In reality, however, preamble limitations that did *not* give "life, meaning and vitality" to a claim have been given limiting effect by the court.[3] Such limitations, in practical effect, narrow the claim without obtaining any benefit in return because preamble limitations that do not tie in to the rest of the claim (i.e., give it "life, meaning and vitality") are given no patentable weight during examination.[4]

It is useful, then, to start with the simplest possible preamble, such as "A method comprising…." As the claim begins to take shape, it may turn out that the preamble is, in fact, the best place for certain limitations. That's fine. In *those* situations we *intend* the preamble recitation to be limiting.

Unnecessary preamble limitations typically fall into one of four categories:

- Descriptive labels and modifiers
- Unnecessary elements
- Advantages of the invention
- Intended use of the invention

Let us consider these types of preamble limitations in turn, recognizing that such limitations can also be unduly narrowing when appearing in the *body* of the claim. In each of these cases, an unnecessary limitation could have been avoided if the claim drafter had followed the prescription *Pack Only What You Need*.

Descriptive labels and modifiers

Descriptive labels and modifiers in a claim rarely buy us patentability but yet may be given limiting effect when it comes time to enforce the claim.

For example, note the word "automobile" in the preamble of claim 1.

> **1. An *automobile* floor mat comprising**
>
> **a semi-rigid monolayer having a gradually sloping edge portion extending outward from a central section, said edge portion terminating in a lip disposed at an elevation above the central portion, the lip having a plurality of indentations disposed a regular intervals around its periphery.**

The descriptive label "automobile" buys us no patentability in claim 1 because it doesn't tie into the rest of the claim. There is nothing in the body of the claim that intrinsically limits the defined structure to being an *automobile* floor mat. The limitation "automobile" does not give "life, meaning or vitality" to the claim. Thus if the examiner finds a prior art mat described by the body of the claim, s/he will reject the claim whether or not the prior art mat was designed for use in an automobile (or, for that matter, intended to be placed on a floor).

Although the descriptive label "automobile" will be of no help to us in securing *allowance* of this claim, it may come back to bite us when we go to *enforce* the claim. The patent owner could be out of luck if a competitor uses the claimed semi-rigid monolayer in a way that the inventor and/or claim drafter hadn't considered, such as in mats that are intended for use in trucks or locomotive cabs and that are not capable of being used in automobiles due to, for example, the mats' size or shape.

Claim 2 is directed to a telescoping radio/TV antenna, which the claim calls "an extendible and retractable structure."

> **2. An *extendible and retractable* structure comprising**

a plurality of elongate structural sections, mounted to be slidable in the direction of their length relative to each other, each structural section including [details omitted] …

The uniqueness of this antenna is the particular geometry of the sliding structural sections, recited in the omitted details. That recited geometry and arrangement of the sections is what renders the structure "extendible and retractable." The terms "extendible" and "retractable" in the preamble are, therefore, redundant and do not enhance the claim's patentability. Yet, a competitor's antenna having sections exactly like the inventor's may be designed to permanently lock the sections in place when the antenna is initially extended. Such an antenna might be intended for delivery to a remote site, like a mountaintop, extended in place, and left for good. Because the sections would be permanently locked in place once extended, the antenna is arguably non-retractable and, as a result, arguably non-infringing.

Unnecessary Elements

Following the prescription to *Pack Only What You Need*—working a claim bottom-up from the inventive departure rather than top-down from the preamble—can help not only to avoid unnecessary labels and modifiers, but entire claim elements.

Claim 3 is directed to a method for operating an engine in which the inventive departure involves using a fuel containing certain additives to keep the engine parts clean.

3. A method for operating an engine *having a fuel pump*, the method comprising:

operating the engine using a fuel containing [certain recited additives] under conditions sufficient to clean performance-inhibiting deposits from *the fuel pump or other fuel system elements*.

The inventor was primarily concerned about fuel pump deposits. But the claim drafter, thinking broadly, structured the claim to recite that the deposits were cleaned from the "fuel pump *or* other fuel system elements." This is all to the good. Unfortunately, the preamble explicitly limits the claimed method to an environment that includes a fuel pump. An accused infringer whose engine does not have a fuel pump will argue that this claim does not apply to him.

This claim, like the two before it, bears the tell-tale evidence of a preamble that was drafted before the rest of the claim. The preamble probably includes the phrase "having a fuel pump" because the claim drafter was focused on the embodiment. If the body of the claim had been written *before* the preamble, it would probably have been drafted to call for deposits being cleaned from "fuel system elements" or even from "a fuel pump or other fuel system elements." There would then have been no impetus to pack a "fuel pump" limitation into the preamble; the claim would have been complete without it.

Advantage or Intended Use of the Invention

The preambles of the following claims set forth an advantage or intended use for the invention. As such, the preamble potentially limits the applicability of the claim without the claim gaining patentability in return:

4. A high speed rotor of a type *applicable for use with a flywheel*, the rotor comprising [no flywheel mentioned in the rest of the claim]…

5. An optical system in which at least two out of phase light beams of different frequencies are combined *with improved power efficiency*

In the case of claim 4, other parties may discover a non-flywheel-based application for the novel rotor. In the case of claim 5, a putative infringer may select an operating parameter for the optical system that achieves some other advantage, e.g., increased processing speed, without the improved power efficiency that the claim calls for.

Next Month: Define, Don't Explain.

ENDNOTES

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2. *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d *1298*, 51 *U.S.P.Q.*2d (BNA) 1161 (Fed. Cir. *1999*).
3. See generally, H. Kliebenstein et al, "Does Phillips v. AWH Mean the Life is Out of the 'Life and Meaning' Test for Whether Claim Preambles are Limitations?," AIPLA Quarterly Journal, vol. 35, no. 3, pp. 301-330 (2007).
4. See generally MPEP §2111.02.