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A Dozen Reasons Why Even Ideal Prior Art Searches Might Find Nothing

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How often does an anxious inventor, upon learning that a professional prior art search had not found anything describing his idea, then ask the patent prosecutor, "So does that mean my invention is patentable?" And how often does a patent litigator, defending against a validity attack on an asserted patent, imply to a jury that, merely because the PTO Examiner didn't find invalidating prior art, the patent must therefore be valid? Although some inventors or litigators may be inclined to rely on the absence of any discovered prior art to insist on patentability or validity, reality is considerably more complex.

There are at least a dozen reasons why even an ideal, expertly-implemented search of all publicly- available document collections world-wide, in all languages, and using all potentially-relevant terminology, would fail to find any relevant prior art. Thus, even beyond attempting to address imperfections in the implementation of the search, further consideration should be devoted to analyzing why a prior art search might have found nothing.

The 12 reasons enumerated here are divided into six categories: (a) document evaporation, (b) secrecy, (c) impracticality, (d) absence of market, (e) triviality, and (f) true novelty. Upon eliminating all other possible reasons except for the final reason, which is alone in the category identified here as true novelty, an analysis can solidly endorse patentability.

The dozen reasons are:

1. (Document Evaporation, Simple Discarding.)

The technology described in a prior art document may have become obsolete at some time in the past, and products incorporating that technology were no longer available. Because document storage and cataloging often cause non-trivial costs, many thousands of documents are routinely discarded and can no longer be located, after the marketplace moves to a later-generation product. Document evaporation can occur despite the possibility that the underlying technology may have been practiced, at some point in time, by multiple companies that employed thousands of employees to manufacture and use the technology.

For example, how easy would it be to locate documents that describe the manufacturing process for vacuum tubes? Yet, at one time, many different companies manufactured them. So, if a discarded document had described the same basic concept that is now at issue, and thus would have formed a solid basis for anticipation or obviousness, the failure of a prior art search to find that discarded document is a result of document evaporation, rather than the novelty of the idea.

2. (Document Evaporation, Version Control.)

Many documents are subject to revisions that replace obsolete information with new, more-current information. In order to prevent confusion that might be caused by someone inadvertently using an out-of-date document, superseded versions are often destroyed or removed from publicly-accessible locations so that the current version is the one that is most readily available. This process is often denominated configuration management or version control.

With the lapse of sufficient time, the final version can become the only available version. The end result is similar to the simple discarding scenario, but with the exception that some version of the document is still available - just not the version that contained the relevant information.

3. (Secrecy, Export Control.)

Documents may be held in tight secrecy, if they are identified as classified by a nation's military. Such documents typically cannot be found in public collections or, if found, discussed in front of a jury during a public patent trial. The issues raised by these situations can rapidly become complex. For example, in the USA, the International Traffic in Arms Regulations (ITAR), enforced by the Department of State, covers 20 different heavily-patented technology categories, including cameras, software, and electronics. It is important to note that the intended use of an idea (whether for military or civilian purpose) is not relevant in determining whether it is subject to ITAR. See 22 C.F.R. §§ 120-130. The U.S. Department of Commerce has its own export rules, called the Export Administration Regulations (EAR), covering ten technology categories. The U.S. Department of Energy and the U.S. Department of the Treasury also have their own rules regarding technology export.

It is also important to note that "technology export" is defined rather broadly by ITAR to include "[d]isclosing (including oral or visual disclosure) or transferring technical data to a foreign person, whether in the United States or abroad." 22 C.F.R. § 120.17(4). Under this definition, merely discussing the contents of a document with any non-US citizen, even within the USA's borders, qualifies as exporting technology. Patent prosecutors beware! Did you learn any of this in law school, or in a patent bar exam preparation course? What about in a CLE course?

The consequences are significant. "Export" can be as trivial as posting a document on a website without providing sufficiently rigorous access control. The access control must limit disclosure of the document to only those website visitors possessing reasonably-verified credentials that include proper citizenship. The PTO has procedures in place to preclude problems associated with inserting certain export-controlled documents into a patent's publicly-available prosecution history. See M.P.E.P. § 2306 and 37 C.F.R. § 5.3. Those procedures may result in the grant of a patent that can be invalidated upon a predating document changing status at a later time, so

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that the predating document may then later be publicly disclosed.

Additionally, even documents that are unknown to the PTO may later be used to invalidate a granted patent. If a document is classified at the time of a patent's pendency, it will likely not be discovered in even an ideal prior art search. However, when that document is declassified, after the patent has been issued, and if it both predates the patent's priority date and sufficiently describes the patent's alleged invention, the patent can then be invalidated (at least in the USA) as "known ... by others in this country" - even though the declassified document itself does not qualify as a proper prior art reference. See M.P.E.P. § 107.05(f). Note: See MPEP section 707.05(f), rather than section 107.05(f)

4. (Secrecy, Commercial Trade Secret.)

Some ideas have more value to the owner if held as trade secrets, than if disclosed in patents. Trade secrets, which are secrets held by non-governmental organizations, such as commercial enterprises, are hidden from prior art searchers. Examples include processes that increase manufacturing efficiency, but which are not readily apparent in the finished, publicly-available product. For these types of inventions, some manufacturers may believe that the efficiency improvement provides a competitively advantageous cost structure - but only if competitors remain unaware of the inventive process. In contrast, any patent on the inventive manufacturing process, in addition to spilling the idea to the patent owner's competitors, would have limited value because any actual infringement could not be easily detected by the patent owner. Enforcement would be impractical, and the patent would not derive value from enforcement potential, but from some other mechanism, such as publicity regarding a large patent count in the company's portfolio.

However, not all companies perform identical economic analysis; some may place a sufficiently high value on increasing patent count, that it trumps enforceability problems and concerns about teaching competitors how to improve efficiency. So someone may decide to file a patent application on their own later conception of the same idea, thereby triggering a prior art search.

Even a perfectly-implemented prior art search cannot find some documents that are intentionally withheld from public disclosure. What effect does the hiding of a document, by a prior inventor, have on a patent that claims the same idea by later, independent inventor? What about the earlier inventor's prior use rights? A patent may still have some value for a later inventor, but the waters are muddied for both patent value and validity in this scenario.

5. (Impracticality, Prohibited Technology.)

An idea may not be sufficiently practical to warrant mention in otherwise relevant prior art documents, because it is illegal or is otherwise prohibited. For example, there may be regulatory hurdles or intellectual property rights (IPR) barriers that prevent the use of the idea. Thus, no one would likely put forth the effort to describe that idea in any writings. For example, a simplistic alteration of hydroponic equipment, that impairs growth of tomatoes but improves the growth and potency of marijuana, is unlikely to be touted in publicly-accessible writings or find its way into a patent application. Many people (including, for example, a former college roommate of an unspecified one of the authors) may have had identical versions of the same idea over the years, but feared that publicizing the idea would invite unwanted attention from law enforcement authorities. In this scenario, if a daring inventor commissioned a prior art search, with the hope that decriminalization of marijuana might make it profitable to patent the simplistic alteration, the prior art search would likely find nothing. This failure would be a result of the impracticality of prohibited technology, rather than novelty.

6. (Impracticality, Missing Component.)

An idea may not be sufficiently practical to warrant mention in otherwise relevant prior art documents, because a necessary component or sustaining technology had not previously been available. Therefore, since no one could make profitable use of the idea, no one previously put forth the effort to describe similar inspirations. Although the cause may be different, the end result is the same as for prohibited technology: the failure of a prior art search to find any document is a result of impracticality, rather than novelty.

As an example, consider that light emitting diode (LED) bulbs have recently advanced to the point that they can exceed mere flashlight-grade tasks and now can illuminate an entire room as the sole light source. Unlike traditional incandescent and fluorescent bulbs that were designed for room-illuminating lamps, LED lights can be powered with low voltage direct current (DC) electricity, rather than requiring high voltage (greater than 100 volt) alternating current (AC) electricity. This is significant, because common batteries readily produce low voltage DC, whereas common electrical plug outlets provide high voltage AC.

Powering traditional incandescent and fluorescent light bulbs with batteries has been possible for many years, but requires a relatively inefficient voltage inverter. This impracticality is beyond the higher power demand of traditional bulbs. It has only recently become reasonably practical to power some room-illuminating devices with batteries, avoiding the expensive need to route AC-carrying wires to the devices. Many new devices are likely to appear on the market, powered by batteries and using LED bulbs, as substitutes for wired incandescent devices. Documents that describe earlier AC-powered versions of these devices are unlikely to contain any mention of batteries as the sole power source. However, it is a trivially simplistic alteration to replace one type of light bulb with another that has equivalent light output and yet demands less power. And, because it has been known for decades to power LEDs with batteries, it is another trivially simplistic alteration to forego unneeded AC wiring and AC-to-DC converters, and replace them with a simple battery compartment. Good luck, though, finding documents that mention battery power for every lighting device in which you will eventually see LED bulbs.

7. (Impracticality, Incompatibility.)

An idea may not be sufficiently practical to warrant mention in otherwise relevant prior art documents, because it is incompatible with prevailing industrial interfaces or other practical functional requirements. Therefore, since no one could make profitable use of the idea, no one previously put forth the effort to document earlier, effectively identical inspirations. In the previous LED bulb example, the room-illuminating LED bulb itself was a missing component. That example can be considered a second time for understanding compatibility issues resulting from power wiring changes, when moving from high voltage AC (which may use a standardized plug configuration) to low voltage DC. The result here is the same as that for both prohibited technology and missing component scenarios: the failure of a prior art search to find any document is a result of impracticality, rather than novelty.

8. (Absence of Market, Unrecognized Problem.)

There may have been no prior market for an idea, because the problem, for which the idea provides a solution, had previously been unrecognized by consumers and industry. Patentability and validity analyses should properly hinge on whether the alleged invention is a straightforward engineering solution, to a simple problem, that would have been obvious to try by one of ordinary skill in the art. These situations can be distinguished from ones in which the recognition of a problem involves significant novelty, even if the solution is relatively simple. But merely being the first one to document a simple problem that others are certain to independently recognize soon afterward, and then applying the most straightforward solution, that everyone else is also certain to try, should be recognized for what it is: a lack of prior recognized market, rather than novelty.

9. (Absence of Market, Cost Prohibitive.)

Some ideas go in the wrong direction: they are more expensive to implement than what is already in the market. For such ideas, there has been no prior market because at least one prior art solution is more cost-effective and had been sufficiently adopted to satisfy market demand. In such scenarios, it is possible that no one had expended the effort to describe their earlier conception of the same idea, because they would have realized that doing so would have been a waste of time. This is one portion of the cost/benefit ratio analysis for an invention idea, and may be combined with the next.

10. (Absence of Market, Insufficient Benefit.)

For some ideas, there has been no prior market because at least one prior art solution has superior benefits and had been sufficiently adopted to satisfy market demand. In such scenarios, it is possible that no one had expended the effort to describe their earlier conception of the same idea, because they would have realized that doing so would have been a waste of time. The existence of a prior art solution that provides a superior cost/benefit ratio, and satisfies market demand, is a predictable explanation for a prior art search failing to find documents that anticipate a newer, although inferior, idea. Here, in addition to the having a possible reason - other than novelty - for an empty prior art search, there is an additional issue: the inventor risks spending money to patent an idea that has little economic value. However, perhaps someone might want an expensive souvenir.

11. (Triviality.)

Some ideas are so trivial that most people consider it wasteful to spend the time to actually writing them down in detail. For example, in many older automobiles, door lock knobs were screwed onto threaded rods that operated the locking mechanism. A damaged lock knob could be replaced easily by using the following method: Twist the old lock knob off from the rod, and then screw a new lock knob onto the rod. Does this description of the replacement process make sense? Do you need more detailed guidance? Suppose someone wrote out a version of the process that included the instruction: Prior to screwing the new lock knob onto the threaded rod, coaxially align the new lock knob with the threaded rod. Do you expect that this listing of the procedure, using the exact phrase "coaxially align," is documented anywhere? Probably not. So does that make the more detailed listing into a patentable method? How often do patent prosecutors and litigators argue against a prior art reference merely on the point that it doesn't use the exact phrase or the same meticulous detail as a pending or challenged claim?

12. (True Novelty.)

Some ideas are sufficiently novel that, although they solve real-world problems with a superior cost/benefit ratio than prior art solutions, no one has previously conceived them. Such ideas have real practical advantages over the prior art, hopefully significant economic value, and are patentable because they are truly novel.

The analysis of these dozen enumerated possibilities should be conducted along with efforts to minimize imperfections in search strategy and implementation. Improving search terminology and focus are strategy and implementation issues, separate from the above; the analysis suggested here is in addition to those needs.

In addition to these dozen reasons, there are at least six (6) categories of search imperfections, that are likely the cause of the searchers (whether PTO Examiners or paid consultants) missing publicly- available prior art that does exist, and could have been found with a perfect search. These reasons are numbered to continue the list above:

13. (Search Term Failure.)

The search did not use all variations of terminology that are (or were) used properly, and are interchangeable. An example of this occurs when multiple originally- different technologies grew together, and eventually merged. Eventually, a standardized nomenclature would emerge, but it could take years. Predecessor documents from each of the different fields may use different terminology, even though they would all be relevant to the merged technology field.

Even if there wasn't a merger of two different fields, nomenclature often evolves, and a prior art document could teach a concept that is identical to that in the current alleged invention, but using "obsolete" terms. Do you know what the modern term for "kilomegacycle" is? It's GHz. And the vacuum tube example, mentioned earlier? Years ago, vacuum tubes were called "thermionic valves" in some parts of the world. How many different ways can you interchange and substitute various words for car, automobile, truck, pickup, Jeep, 4x4, semi, tractor-trailer, station wagon, van, RV, ... Get the picture on how easy it is to miss prior art, merely because of the exceptionally wide variations in easily-substituted terminology?

14. (Reference Term Failure.)

An on-point prior art reference used obscure or incorrect terminology, even though it taught the exact same concept. One variation of this, which is easy to envision, is that a prior art document was published with a consistently misspelled critical term. The differentiator from the Search Term Failure reason is that, for a Reference Term Failure, it is not that the searcher failed to include all relevant industry-accepted terms, but rather that the author of the prior art document failed to use industry- accepted terms correctly.

15. (Non-exhaustive Search.)

There are so many different collections of publicly-available documents, in so many different places, that it is unlikely any prior art search could have included all of them. Consider, for example, documents that may be sitting on library shelves in book form, but have not yet been digitized. Yet even one of those is sufficient to invalidate a patent, if it was sufficiently accessible by the public.

16. (Language Limitation.)

The search did not use all languages on the planet. Does anyone truly believe that only speakers of English can innovate, or that all documents describing valuable ideas have been translated into English?

17. (Unappreciated Relevance)

The searcher may have seen a prior art document that was exactly on point, but because of inattention, confusion, or just simple misunderstanding, improperly dismissed the document as irrelevant, and thus failed to report it as a finding.

18. (Resource Constraint.)

The searcher may have run out of time. It happens.

So there are at least 18 different reasons that a prior art search could have come up empty, and a dozen of those will persist - even if all possible sources of search imperfection could somehow be corrected. It's remarkable that only one of those 18 reasons is that the invention has truly novelty and value. The other 17 are ... well ... some other explanation.

To summarize, the mere absence of relevant documents in a prior art search is, in itself, not proof of either patentability or validity of a previously-granted patent. Therefore, a framework for further analysis is warranted.

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FEATURES

- 8** Comparing IP Examinations in U.S. and China
Dr. D'vorah Graeser — Graeser Associates International (GAI)
- 10** IPIQ™ 2011 – Chemicals
IPIQ Acquisition LLC
- 12** Behind the Scenes at the USPTO:
Accounting for the Supervisory Patent Examiner
David S. Kim & Glenn M. Kubota — Morrison & Foerster
- 14** Ten Things You May Not Know About the
New gTLDs
Lynne Boisineau — McDermott Will & Emery
- 18** Protests in Reissue Patent Applications
Matthew C. Phillips & Kevin B. Laurence — Stoel Rives LLP
- 19** The Unintended Effects of a Patent Office
Memorandum – How the USPTO is Facilitating
a Loophole to Software Patent Infringement
Patrick T. Muffo & Steven D. Jinks
- 28** A Dozen Reasons Why Even Ideal Prior Art
Searches Might Find Nothing
Kelce S. Wilson & Alejandro Soto — Research In Motion (RIM)
- 32** “Good Cause” Under 37 CFR 41202(d)(2)
Charles L. Gholz & Ryan D. Fabre

DEPARTMENTS

- 6** From The Editor
- 7** Invention Analysis and Claiming:
What's the Invention?
Ronald Slusky
- 16** Moving Up & Moving On
- 22** Litigators Corner:
Reexaminations Reexamined
Joseph N. Hosteny
- 24** CAFC Happenings
John L. Rogitz – Rogitz & Associates
- 25** Design Patent Perspective:
The Ordinary Observer Test – Part 3
Robert G. Oake, Jr.
- 36** CLASSIFIED
Opportunities, Products, Services and Situations Wanted
- 41** Calendar of Events

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iptoday.com