Incorporation of Parts into the Whole: Avoiding Liability When Incorporating Nanotechnology Improvements

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ABSTRACT

Although these nanotechnology inventions may still be far off in the distant future, the incorporation of nanotechnology into everyday products has been steadily increasing. Products from sunscreens, to semiconductors, to clothing have taken advantage of the unique properties that nanomaterials and inventions afford. Although the lure of nanotechnology promises to make the incorporation of these nanomaterials a prerequisite, one must ask the question: are manufacturers exposing themselves to possible future patent litigation? When incorporating nanotechnology materials into their everyday products, manufacturers may be subjecting themselves with future patent liability unless they have proper strategies to manage liability risks. This article addresses potential patent issues and suggests strategies to protect manufacturers who want to benefit from the advances that nanotechnology affords.

I. INTRODUCTION

For the past few decades, nanotechnology’s unlimited potential has been fuel for many science fiction novels, depicting often futuristic and imaginative inventions that enable self-replication or allow machines to spontaneously self-assemble identical copies, or clones of themselves.1 Others have described in intricate and fascinating detail the design and manufacture of “nanobots,” capable of selectively infiltrating and targeting cells within the body, like nanoassasins on a top-secret mission.2

In reality, nanotechnology has quietly progressed to more practical uses, primarily as a direct result of fundamental advances in the field of nanomaterials. Although not detectable by the human eye, a wide spectrum of ordinary, everyday products, such as machine lubricants, sunscreens, clothing and tennis balls have been the first commercial items in which nanomaterials have been readily incorporated. The inclusion of durable and flexible nanomaterials promises to make such products better performers, allowing commercial manufacturers to produce miraculous anti-wrinkle creams, nanoparticle-

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1 See K. ERIC DREXLER, ENGINES OF CREATION (1986) and MICHAEL CRIGHTON, PREY (2002).
impregnated fabrics to eliminate wrinkles, stain resistant clothing, and higher-bouncing/longer-lasting
tennis balls that promise to “better the game” for ordinary consumers, silicon nanowires, cadmium sulfide
nanoribbons as semi-conducting channels in high performance thin film transistors, metal rubber,
hydrogen-filled fullerenes, fullerene epoxide polymers, carbon nanotubes in flat panel television screens,
lubrication such as in nanometer-size liquid ball-bearings, nanocircuits, nanocatalysis, automobile
molding, decontamination of materials, detecting bacteria to protect food and water, nanocomposite
membranes for pressure chemical and temperature microsensor arrays, energy efficient light bulbs by
replacing tungsten filaments with strands of single-walled and multi-walled carbon nanotubes, dendrimer
nanostructures having specific, precise, and predictable physical properties such as gold and silicon
nanostructures, and dendrimer-based siRNA transfection technology.

In the not-so-distant future, these same nanoparticles and nanomaterials are expected to be
incorporated into high technology uses, such as biomedical applications and microchip technology. The
danger in incorporating futuristic or present-day nanotechnology materials, however, could open
entrepreneurial companies to potential liability, including intellectual property (“IP”) and product liability
issues.  

Although the large expense of a patent infringement trial is enough to make most traditional
companies think twice about incorporating any novel and patented material into their products, the
competitive edge nanotechnology materials afford may compel manufacturers to take this business risk.
In addition, when looking at the overall promise of the nanotechnology field, the economic impact of such
liability could be of enormous proportions. The National Science Foundation, for example, estimates that
by the year 2010, the nanotechnology market will be worth approximately $1 trillion annually.

Such estimates are only being made because of the large investment that governments and private
investors have poured into this field. Over the next four years, Congress has already allocated over $3.0
billion for nanotechnology research and has earmarked, through the 21st Century Nanotechnology
Research and Development Act, approximately $3.7 billion to be used in large part as grants to U.S.
universities and corporations. Private investment has been equally impressive. Any slow down in
production or development as a result of protracted patent litigation could negatively impact not only
bottom-line profit margins, but also the attraction of much-needed investment in this infant field.

Although the likelihood of patent or other IP litigation can never be completely eliminated,
companies can proactively minimize their liability exposure by adopting important defensive strategies
when evaluating their business strategies. Defensive strategies are especially important in situations
where a patented nanotechnology product is incorporated into an existing device or article to improve the
product.

This article discusses the IP field, the liability associated with high technology ventures and the
importance of a strong IP portfolio to protect a company’s commercial product. This article also presents
strategies that may assist a company—small or large—to avoid pitfalls associated with patent liability.

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3 For a discussion of potential product liability issues, see Keay Davidson, Big Troubles May Lurk in Super-Tiny

4 NATIONAL SCIENCE FOUNDATION, SOCIETAL IMPLICATIONS OF NANOSCIENCE AND NANOTECHNOLOGY 3-4

II. BACKGROUND: IP

A business’s IP portfolio usually consists of intangible assets, such as inventions, computer software, drawings, films, records, and semiconductor chips, including read-only memory chips (“ROMs”) and the mask works used to produce them. The U.S. Constitution,6 statutes, and common law protect these IP rights through copyright, patent, trademark, and trade secret law. For most emerging technology companies in the nanotechnology field, patents and trade secrets will play a predominant role in the protection of their intangible assets.7

A. Trade Secrets

A trade secret is a piece of confidential information that gives one’s business a competitive advantage over others in the field. Trade secrets cover a wide range of information, including chemical formulas, manufacturing processes, designs, even a customer list or a company budget. However, trade secrets, by definition, do not include any information about your company that may be publicly known. The formula for Coca-Cola and the machine lubricant WD-40, are examples of profitable, closely-guarded trade secrets.

Although trade secrets are important tools for the protection of IP rights that have the potential of lasting indefinitely, it is becoming more and more difficult to keep such information confidential. Companies are known to spend a small fortune each year protecting trade secrets from competitors. Additionally, because of an increasingly mobile workforce, the accessibility provided by the Internet, and the ease of getting and exchanging information, trade secrets are becoming more difficult to defend. For those reasons, many emerging technology companies rely primarily on patents to protect their intangible assets.

B. Patents

Patents protect new and useful inventions. However, not all inventions may be patented. To be patentable, an invention must be a useful process, machine, manufacturing method, composition of matter; or a new and useful improvement thereof. In the United States, a successful patentee will be granted a twenty year (from the date of filing the application) limited right to exclude others from making, using, or selling of the claimed invention.

Multiple patent applications are often filed with the U.S. Patent and Trademark Office (“PTO”) in order to provide increased protection for the commercial product. For example, a nanoparticle product may be covered not only by composition of matter patents that define the chemical or physical composition of the product, but also by a method of making the nanoparticle product, a method of using the nanoparticle product in commercial applications, as well as specific devices or other product instrumentalities that incorporate the nanoparticle product. In many patent applications, the specific end-product may be unknown at the time of filing. Patentees, however, are not excluded from broadly claiming a variety of theoretical fields or devices that the nanoparticle, or other nanomaterial, could be incorporated.

Because of their potentially wide patent protection and versatility, procuring and policing patents have become essential for the protection of small, emerging technology businesses, such as

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6 U.S. CONST., art. I, § 8, cl. 8 (“The Congress shall have Power … [t]o promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries; ….”).

nanotechnology companies. Patents are one of the only tools to protect a small company from infringement by others, especially large corporations that seek to control the market. Patents become even more important as a company is acquiring financing leading to an initial public offering. A company’s valuation is often linked with the strength of its IP portfolio, especially in the absence of a commercial product line. Notably, shareholders often require that their company have a competitive edge through patents, and readily seek assurance that the technology can be protected.

III. BROAD SCOPE OF NANOTECHNOLOGY

The broad scope of nanotechnology arises because of the nature of the field. Nanotechnology focuses on the scale of a device, rather than on a specific application. This allows nanotechnology applications to span and cross over traditional boundaries of science and manufacturing, affecting diverse fields of technology, such as biotechnology and electrical, chemical, and mechanical engineering. Derivatives of the same nanotechnology material may be used, for example, as components or carriers for a chemical reaction, as a nanomaterial lining machinery, for use in the manufacture of semi-conductor chips, or as special coatings in the automotive and aviation fields.

Because of its multi-dimensional aspect however, nanotechnology also has the power to impact a large variety of readily distinguishable product fields on numerous levels. For example, a patent covering the composition of a nanoparticle can impact products ranging from paints and tennis balls to microchips and medical devices. Although this diversity allows a patent holder to reach into multiple markets or fields with a single patent, such breadth entails the unfortunate side-effect of creating uncertainty among companies involved in these end-uses.

Dealing with the unlimited potential and boundaries of nanotechnology require strategies that both solidify patent portfolio protection and develops defenses designed to protect companies against potential patent liability.

IV. GETTING MORE THAN YOU APPLIED FOR: PATENTS CROSSING TRADITIONAL BOUNDARIES

As mentioned above, patents traditionally stay within certain technological boundaries, such as biotechnology, chemical, electrical, or mechanical fields. However, because nanotechnology is defined not by the type of technology but by its size, these traditional boundaries have become blurred. Technological fields, once distinct, merge into each other because of the unique capability of nanotechnology to cross technological disciplines, combining aspects of one field with another to create new uses and applications.

These novel combinations have complicated the issuance of the related patents. One particular issue revolves around the PTO’s constraints to adequately address and review nanotechnology patent applications, creating overlapping claims that can only be tested through post-issuance procedures or through the court system. Compounding this issue is the erosion of traditional rights of buyers of patented products by the courts, which potentially expands the boundaries of nanotechnology patents.

V. OVERLAPPING NANOPATENTS

Lux Research and the law firm Foley & Lardner recently conducted a study that counted the number of nanotechnology patents issued and pending at the PTO. According to their research, the PTO issued

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approximately 3,818 patents between 1985 and March 2005, with an additional 1,777 patent applications pending. This large number of patents and patent applications exemplifies the minefield that nanotechnology patents represent, making it difficult for practitioners to know if and which patent or multiple patents they may infringe.

These patents and patent applications are drafted by multiple practitioners, utilizing a variety of terms and phrases that create overlapping boundaries for the same product or field. This variety in term-usage makes it difficult to search for relevant patents, and in turn contributes to the uncertainty for practitioners in knowing whether or not their products may infringe a patent.

To compound the problem, the sheer number and variety of nanotechnology patents, and the quality of these issued patents varies. Others have previously noted that, as a result of the PTO’s failure to grasp the interdisciplinary nature of nanotechnology, as well as to appreciate the problems created due to the lack of definition of technological boundaries, a multitude of patents have been issued with broad, claims and overlapping claims in more than one patent.9

These overlapping patents can create real problems for nanotechnology companies. Practitioners need to worry not only about creating a viable IP portfolio for their nanotechnology products, but also whether any real patent estate is available because of the PTO’s past policy of allowing fairly broad claims that overlap in multiple patents. Of particular concern are the narrow fields of dendrimers and quantum dots, where many patents have already been issued.10 The Lux/Foley & Lardner report does have some bright spots, however, noting that because of the lack of application-specific patents or patent applications, the patent real estate for carbon nanotubes appears promising, especially in the fields of energy and healthcare. Fullerenes are also promising, being less entangled in terms of patent claims issued and available. Nanowire patent claims reflect the recency of this technology, but the field is already dominated by one particular player, Nanosys, which has already begun negotiating exclusive licenses of its patent portfolio.

The PTO has been working on the examination problem by creating a new interdisciplinary classification for nanotechnology applications, Class 977. The PTO’s new classification may prove to be too narrow to be of particular use, defining nanotechnology by including only those patents: (1) whose subject matter is in the scale of approximately 1-100 nanometers in at least one dimension; and (2) that involve materials, structures, devices or systems that have novel properties and functions because of their nanoscale size.11

The creation of this new classification, as well as other ongoing measures, does demonstrate the PTO’s commitment to resolving future overlapping patent claims. Despite the PTO’s recent efforts, however upcoming disputes may be inevitable because of the uncertain IP climate created by issuance of patents with overlapping claims.

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11 For a general overview of the many types of patents being found in the nanotechnology field, see Albert P. Halluin & Lorelei P. Westin, Nanotechnology: The Importance of Intellectual Property Rights in an Emerging Technology, 86 J. PAT. & TRADEMARK OFF. SOC’Y 220, 220-36 (2004).
VI. LIMITING THE SCOPE OF THE FIRST SALE DOCTRINE

The “first sale” (or “patent exhaustion”) doctrine allows an unrestricted buyer\(^ {12} \) of a patented article to repair, modify, resell or otherwise dispose of the article as the buyer sees fit, but forbids the buyer from recreating or rebuilding the original article.\(^ {13} \) The concept of relinquishing patent rights upon sale of an invention is central to the final sale doctrine: once a patent owner sells “the thing patented,” he exhausts his right in the invention.\(^ {14} \) This doctrine prevents a patent owner from receiving double the amount of royalty he would otherwise receive from his invention. To this end, an “unconditional sale” of a patented article, including the receipt of an exclusive license to make and use the invention, will trigger the first sale doctrine.\(^ {15} \) In *Jazz Photo Corp. v. International Trade Commission*,\(^ {16} \) the Federal Circuit further clarified the rights of buyers of patented articles under the final sale doctrine. Patent owner Fuji Photo Film, through the International Trade Commission (“ITC”), sought to block the importation of its patented single-use cameras, which were refurbished by Jazz Photo. Jazz Photo’s business specialized in refurbishing discarded single-use cameras, including replacing the exposed film with a new cartridge and the film-winding reel (if necessary), replacement of batteries for disposable flash-cameras, resetting of the film exposure counter, and rescaling of the outer case.

The ITC held that the refurbished cameras infringed Fuji’s patents on single-use cameras and enjoined the importation of the cameras. The Federal Circuit reversed, ruling that the “no license limitation may be implied from the circumstances of sale[...]

The court held that Jazz Photo merely extended the useful life of the cameras, which constituted repairing, not reconstructing, the patented item.

The *Jazz Photo* court also rejected Fuji’s claims that Jazz Photo’s actions infringed its method patents, notably the patent that covered the methods for loading the cameras with film and a film cartridge. The court held that, where the purchased cameras were initially loaded with the steps of the method patent in question, patent rights flowing from the same method were exhausted by the first sale of the camera in the United States.\(^ {18} \) Thus, the purchaser of a product protected by either method or composition patents cannot invoke an affirmative defense of patent exhaustion absent proof that the product is an embodiment of the patents in question.

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\(^ {12} \) A buyer may be restricted by previously agreed upon conditions, including agreements restricting modification of the patented article, or royalty payments resulting from use of the article (such as machinery) for the buyer’s benefit. The courts look upon such agreements as licenses, which can be either explicit or implied. See, e.g. Ariz. Cartridge Remanufacturers Ass’n Inc. v Lexmark Int’l Inc., 421 F.3d 981 (9th Cir. 2005) (box wrap licenses).

\(^ {13} \) See *Bloomer v. McQuewan*, 55 U.S. (14 How.) 539, 549 (1852) (an early decision by the Supreme Court regarding the first sale doctrine: “The franchise which the patent grants, consists altogether in the right to exclude every one from making, using, or vending the thing patented, without the permission of the patentee. This is all that he obtains by the patent. And when he sells the exclusive privilege of making or vending it for use in a particular place, the purchaser buys a portion of the franchise which the patent confers.”).


\(^ {15} \) See *United States v. Masonite Corp.*, 316 U.S 265, 278 (1942) (“[T]his Court has quite consistently refused to allow the form into which the parties chose to cast the transaction to govern. The test has been whether or not there has been such a disposition of the article that it may fairly be said that the patentee has received his reward for the use of the article.”) (citation omitted).

\(^ {16} \) 264 F.3d 1094 (Fed. Cir. 2001).

\(^ {17} \) Id. at 1108.

\(^ {18} \) See also *Surfco Haw. v. Fin Control Sys. Pty Ltd.*, 264 F.3d 1062, 1066 (Fed. Cir. 2001) (“The right of ‘repair’ follows from the exhaustion of a patentee’s right to control the disposition of a patented article after it has been sold. ... Although extension of the useful life of an article is the usual reason for modification or replacement of component parts, it is not the only reason allowed by law. ... The patented surf craft is not ‘recreated’ by the substitution of a different set of fins, even when the new fins are specifically adapted for use in the patented combination.”).
The first sale doctrine may also apply where a patented article is incorporated into a separate method patent where the patented article comprises a step or element of the method claims. This situation would occur, for example, where a patented nanotechnology product is incorporated into another product, such as a semi-conductor chip layer or a biomedical device. In this case, the purchaser of the patented article must show not only that an unconditional sale of the patented article was made, but also that there are no other reasonable non-infringing uses of the article except as incorporated in the patented article.

_Cyrix Corp. v. Intel Corp._ arose after Cyrix purchased licensed microprocessors from Intel and subsequently combined the patented microprocessors with external memory for sale as retail computer products. Intel sued Cyrix for infringement of method patents that covered the combination of the microprocessors with other non-infringing computer elements; Cyrix raised the affirmative defense of patent exhaustion. The court found that Cyrix did not infringe Intel’s method patents because the microprocessors could only be used if they were combined with external memory (i.e., no other reasonable, non-infringing uses existed). “The patent exhaustion doctrine is so strong that it applies even to an incomplete product that has no substantial use other than to be further manufactured into a completed patented and allegedly infringing article.”

In terms of applying the first sale doctrine specifically when incorporating a licensed and patented nanotechnology materials into a product line, it may be difficult to meet the test and overcome the bar of showing that no other reasonable, non-infringing uses of the patented article exists. Courts strictly interpret this element, as requiring a use that does not practice the patent. This may not be realistically achievable with nanotechnology materials, since its use can be applied through a broad spectrum of technologies. Thus, licensed purchasers of nanotechnology materials may be precluded from asserting a first sale affirmative defense, if the patentee holds other patents that incorporate the patented nanotechnology article.

Recent case law may further limit the application of the first sale defense. A recent decision in the Ninth Circuit Court of Appeals in finding a binding, explicit license in a box wrapper label, potentially narrows the scope of the application of the first sale doctrine for users of purchased patented technology, and broadens it for patentees. In _Arizona Cartridge Remanufacturers Association Inc. v. Lexmark International Inc._, the Ninth Circuit upheld the district court’s decision to enforce an explicit license to restrict buyers’ use of patented printer ink cartridges that were printed on the box wrapper. The Ninth Circuit held that the terms of the license were implicitly accepted by the buyer when the buyer opened the box and used the patented article.

In summary, although a patentee’s rights are traditionally exhausted with the first sale of his patented article, the courts do recognize an exception to this rule when explicit licenses are created between the buyer and the seller that restrict the use of the patented article by the buyer, irregardless of any rights recognized by the first sale doctrine. Thus, companies need to be aware of any explicit license that may be created by the simple act of opening the package of the patented article.
VII. PATENT LICENSES

Licenses are contractual agreements that, by their nature, are defined by the negotiated contract terms within the four corners of the document. Although terms or agreements not expressly spelled out in the contract are not generally recognized, the courts do make an exception where the party’s communications or actions create a binding contract by implication.

A contract by implication, or “implied license,” cannot exist where the purported implied license conflicts with a written agreement in which the parties expressed their intent. However, where an implied license is necessary for the enjoyment of an express IP right, the courts will create an implied license. Although an implied license does include a right to repair and replace the patented article, an implied license cannot extend to repair or replace directly infringing repair parts that still directly infringe, even when replaced.

The implied license doctrine, unlike the first sale doctrine, derives from principles of equity, not law. Therefore, although the two doctrines are similar in effect, they require different analyses. The first sale doctrine requires a court to examine whether the terms of the sale preclude the patent owner from claiming further rights on his patent. Application of the implied license doctrine, however, requires the court to determine whether the patent owner’s acts led the accused infringer to believe it had acquired any rights to practice the invention. To prevail on an implied license defense, an accused infringer must show that: (1) there are no other reasonable non-infringing uses of the patented invention (as with the first sale doctrine); and (2) “the circumstances of the sale must ‘plainly indicate that the grant of a license should be inferred.’”

In Bandag, Inc. v. Al Bolser’s Tire Stores, Inc., the Federal Circuit considered several affirmative patent infringement defenses, including the first sale and implied license doctrines. First, the court disposed of the first sale defense because the defendants purchased a non-patented article that, when incorporated into a specific use, infringed upon a separate method patent. Next, the court considered an implied license defense resulting from purchase of the patented article and found that an express license under one patent may create an implied license under the licensor’s other patents, where enjoyment of the express license required the implied license; such licenses cannot be created merely because one party unilaterally acted or hoped for a license. Instead, the parties must show that there are no non-infringing uses of the patented article in the combination patent, and there must be some form of action by the other party that led the defendant to imply such a license. As discussed above, in regards to nanotechnology applications, showing that no reasonable, non-infringing uses exist may be difficult to accomplish.

In addition to the high bar required to show that an implied license exists, agreements can expressly exclude any incorporation of implied licenses into a contract. For example, an agreement may include terms, such as “this agreement expressly excludes any express or implied license not expressed within the

23 See Aro Mfg. Co. v. Convertible Top Replacement Co., 365 U.S. 336 (1961) (purchase of patented article creates an implied license from an authorized dealer to maintain and repair the article); Met-Coil Sys. Corp. v. Korners Unlimited, Inc., 803 F.2d 684 (Fed. Cir. 1986) (explaining that express license under one claim of patent creates an implied license in the remaining claims of that patent as are necessary for the enjoyment of the express license).
24 See Stickle v. Heublein, Inc., 716 F.2d 1550, 1559 (Fed. Cir. 1983) (stating, “the relatively few instances where implied licenses have been found rely on the doctrine of equitable estoppel”).
25 Met-Coil, 803 F.2d at 686 (quoting Bandag, 750 F.2d at 925).
27 Id. at 924.
28 The courts in Bandag refer to these requirements under “equitable estoppel,” or some reliance by one party precipitated by the actions of the other. See id. at 925-26.
body of this agreement.” It is the nature of patent property rights which allow the patent owner to choose any number of combinations in which to exploit his patents. This includes charging one price for an apparatus patent and additional fees each time a licensee uses a method patent that incorporates the apparatus patent. Therefore, reliance on any type of implied license is realistically minimal because of the inherent limitations of this form of license.

VIII. STRATEGIES

A well-managed patent portfolio is the strongest weapon in a company’s arsenal against IP litigation, no matter how small or large the corporation. Patents allow market exclusivity, protecting entry into the market by potential competitors that can lower the price and decrease profit margins. A classic example can be found in the drug market where the cost of pharmaceuticals previously covered under a patent drops dramatically with the entry of competitor’s generic products. Patents can also remove potential roadblocks set by third-party patent holders by giving the patentee leverage to enter into cross-licensing agreements, and give sometimes needed leverage to encourage other parties to enter into licensing or collaboration agreements. Finally, patents will reasonably allow a company to stay out of any patent litigation created by the PTO’s issuance of overlapping patent claims.

But in situations where a company is foreclosed from obtaining patent protection on the manufactured product, what choices does a company have that allows commercialization of the nanotechnology-incorporated product without increasing the risk of litigation?

There are several strategies you can take to protect your company from litigious situations and improve the bottom line.

A. Due Diligence Analysis

The first step in any patent strategy when developing a new product is to conduct a strategic analysis of the patent rights supporting or threatening the product, typically through a due diligence investigation. A due diligence investigation can be straightforward, consisting of tracing ownership and title rights, and determining if any potential restrictions apply. Analysis of the scope of any patent that can be applied to the technology is also needed to assess the potential of the patent to protect, as well as block competitors in the field. Due diligence analysis in a complex technological field; however, may not be as straightforward, and should involve experienced attorneys that can provide more than a cursory analysis of the technology and applicable IP.

A thorough due diligence analysis starts with identifying and locating key IP assets. As mentioned above, a company’s IP portfolio is the strongest weapon in protecting a company from litigation disaster. Properly managing this portfolio is key to keeping competitors at bay. This includes evaluating your company’s IP assets—including patents, trademarks, copyrights, trade secrets and other IP assets—in order to realistically determine the nature and scope of the claimed rights in the IP. This evaluation encompasses not only determining if the IP is owned or licensed, but also evaluating its breadth and strength.

In terms of patents, evaluating the strength of a company’s IP includes not only determining that the claims cover the commercial products made, but also surveying other relevant patents to see if there are overlapping patents. A typical “freedom to operate” search usually involves searching for patents in the relevant field using multiple search strategies across multiple databases or searching facilities. Different searching strategies should be designed to search keywords, inventors and assignees within the PTO and international patent offices.

In order to design a comprehensive search strategy, the searcher should be familiar with the jargon used both by patent lawyers and by practitioners who use the inventions to identify obscure or obsolete
search terms that could reveal pertinent references. Searches can also be helpful in yielding information on possible inventorship issues that may assist in invalidating potentially relevant patents.

B. Licensing Strategies

Technology agreements and other IP licenses should also be reviewed to ensure that the company retains or possesses as many rights as possible to sufficiently cover the commercial product incorporating the novel nanotechnology material or article. This is especially important when the company is collaborating with another institution (e.g., pursuant to joint development agreements), where a large portion of nanotechnology research and advances are currently being made. For example, any agreement should include the rights and responsibilities of each party when IP is filed on improvements made. Careful analysis of the rights granted and retained is essential in assuring adequate protection of the company’s commercial products.

Licensing tools that should be exploited to their full capacity include, not only license and option agreements, but cross-licensing—for example, in patent pools. Patent pools may be an important tool to be used in acquiring multiple licenses needed in one single package or agreement. Patent pools are agreements between two or more patent holders that assign or license their patents to establish a “clearinghouse” for related intellectual property. Although patent pools have been associated with antitrust issues, carefully constructed patent pools that avoid anticompetitive implications can be an economical way for start-up companies to acquire needed patent protection for their products.

Patent pools have the advantage of not only decreasing costs for acquiring multiple technological licenses in complex technology applications, it also provides a source of revenue and income to patent pool members as a result of royalty streams generated from non-member licensees. Subscribing into patent pools may be an economical means to acquiring needed technology for protecting and practicing your product in the commercial marketplace.

Care should be taken, however, to avoid any situation where royalty stacking makes the price of a product unreasonably high to the point of being commercially unprofitable. Royalty stacking occurs where multiple patents overlap a technology, forcing a company to take out a multitude of licenses from each patent holder. Depending upon the number of patent holders demanding their share, royalty stacking can amount to significant increases in the price of a product, ultimately increasing costs and decreasing profitability of a product. Although costs are usually passed on to the consumer, royalty stacking in products where competition is already fierce, such as sunscreens and clothing, may spell the demise for a product where cost is a deciding factor among consumers.

Companies have several options when dealing with royalty stacking. For example, licensing agreements can be structured to include a ceiling or cap, or maximum percentage level of royalty

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30 Current viewpoints appear to view patent pools favorably in terms of competitive issues. See Andrea C. Brunetti, Wading into Patent Pooling: The Clinton Justice Department is Becoming More Tolerant of High-Tech Patent-Sharing Deals, INTELL. PROP. (Nov. 1997) (quoting Acting Assistant Attorney General Joel Klein as stating “by promoting the dissemination of technology, cross-licensing and pooling arrangements are often pro-competitive.”).


payments for a product, regardless of the number of licenses needed. A typical anti-stacking provision will require royalty payments to be correspondingly decreased, if other licenses are required for a given product. Payment of up-front fees, rather than percent royalty payments, can also help to reduce effects caused by royalty stacking. Finally, cross-licensing agreements or patent pools may prove invaluable in avoiding increased costs and decreasing profits. Whatever the method chosen, minimization of royalty stacking is essential to avoid making a product cost-prohibitive to the consumer.

C. Indemnification Clauses

Licensing IP agreements does not need to be limited to the use or practice of the patented article. Licensing agreements can also be tailored to protect the licensee from future litigation exposure and/or costs through indemnification clauses. Indemnification, or “save harmless,” clauses typically protect a licensee against infringement of third-party patents. Indemnification clauses are not routine; because of the high costs of litigation and patent awards, licensors are resistant to incorporating such clauses into licensing agreements. One should be prepared to negotiate for indemnification clauses, especially if due diligence and freedom to operate results indicate uncertainty for patent litigation risks. Agreements for increased royalties to the licensor may be needed in order to secure insurance against future litigation liability.

D. Other Agreements

Other important agreements that should be tailored to ensure benefit for the company in the use of the patented nanotechnology article include collaboration and sponsored research and development agreements. As mentioned above, a good portion of research and development is concentrated in laboratories affiliated with universities. Exclusively in-licensing key technology can enable the blocking of competitors from entering into your market space, giving your company market exclusivity for the life of the patent.

These agreements should not only accord the transfer of IP rights to the technology, but also secure rights in later-developed inventions between the two entities. Such collaborative agreements can not only give the company equal access to these patents, but can often be a valuable vehicle in overcoming rejections by the PTO should the company attempt to pursue the patented invention on its own.

Other considerations for collaborative and research agreements include ensuring the agreements have adequate and enforceable confidentiality agreements, as well as other restrictive provisions. This is especially important when employees of the collaborating company leave the research arrangement to join a competitor company. Restrictive provisions, such as non-compete or confidentiality provisions will prevent the possible divulging of sensitive information that could remove any competitive advantage built into the collaborative agreement.

Finally, because of the open and public nature of many research universities, it is also important to ensure that university investigators do not have a potential or actual conflict of interest with the company. This includes either past or present ties to close competitors, where proprietary information from the company could be divulged to the detriment of the company. Such situations can be avoided through the careful review of all agreements with the university investigators, including agreements where the university is not a party to the agreement.

E. Insurance Policies

Even after all precautions to avoid litigation are taken, a company still has options to prepare and insulate the company should patent infringement litigation be inevitable. For example, one cost-effective insurance policy is to ensure that damages are minimized by conducting regular due diligence (as discussed above) to identify patents that could pose litigation problems for the company. Companies,
however, should not stop there. Although recognizing problem patents is important, ensuring that they are not a problem is vital.

Companies may protect themselves by obtaining non-infringement and/or invalidity opinions on each problem patent identified. Non-infringement opinions serve to distinguish a commercial product or method from patent claims by first defining the claims according to case law, and then comparing the claims to the product or method, both literally and under the doctrine of equivalents.

An invalidity opinion letter, on the other hand, seeks to neutralize a potential patent problem by determining that the claims of the patent are invalid, either by searching for prior art, or by determining if the patents fail to meet the statutory requirements for patentability. Both opinion letters serve the function of avoiding a willfulness finding by the accused infringer, where damages can be tripled by a court.

Companies may also obtain “patent infringement liability insurance,” which insulates a company by covering the high costs of defending against a patent infringement suit. Most insurance policies will only cover the costs and damages of a patent infringement claim if the infringement was not intentional. These policies will also not cover treble damages associated with willfulness, making opinion letters even more valuable in these situations.

IX. LITIGATION SAVVY

Litigation is the final way to test a patent’s validity and enforceability. Because of the field’s infancy, only a handful of nanotechnology patent infringement cases have been filed in the courts so far. The number of patent infringement filings will likely increase as more nanotechnology products enter the market.

With litigation comes increasing costs that can quickly spiral out of control if companies are not litigation savvy, and do not put into place, from the beginning, litigation cost-saving measures. Conservative estimates for patent litigation range to several million dollars, depending on the number of patents and claims being litigated. These large values take into account the high attorneys’ fees typically charged by patent attorneys, as well as the large discovery costs (document production costs, etc.) and expert fees paid.

Although contingency fee attorneys are becoming more available, most firms will only take a case if the benefits are high—for example, in willful infringement cases where damages can be tripled. It is easy to see how litigation budgeting for a typical small nanotechnology company can easily become overwhelming. Because litigation for both patent holder and accused infringer is likely to be expensive, a cost-benefit analysis should be performed before any decisions are made.

How much would patent litigation cost if the suit went to trial? As mentioned above, patent litigation costs can run into the millions of dollars. Pre-litigation negotiations, including cross-licensing or royalty payments, may bring about a cost-effective amicable agreement allowing a company to practice the invention with minimal costs.


What are the chances of the opposing party’s appealing the case? If the losing party appeals the case, the costs of litigation could rise significantly. Marketing time and profits are equally lost if the suit is dragged into multiple appeals.

If the company as patent holder wins the case, can the opposing side pay damages? A permanent injunction or cessation of patent infringement activities may be the only remedy available to a patent holder if the product is not yet commercially available or successful. A patent holder may be more amenable to negotiating a reasonable licensing fee, rather than going through the expense of litigation with no prospect of money damages.

The above questions are essential to ask before patent litigation is chosen as the ultimate avenue for dispute resolution because companies may want to explore a more amicable and cost-effective route, such as cross-licensing or royalty payments.

X. CONCLUSIONS

Nanotechnology will be an important part of our lives in this century. It will provide the ability to make and do things on an atomic and molecular scale. It is likely to affect every aspect of our lives, ranging from the computers we use, our energy and food supplies, our everyday items such as automobiles, buildings, clothes and medicine, to recreational things like tennis balls that do not lose their bounce. To succeed as a business, companies that develop new discoveries and uses for nanotechnology will not only need patent protection, but also need to be aware of the potential minefield involved in nanotechnology patents that span and cross-over traditional boundaries. In order to protect your patent territory, and decrease litigation exposure, a well-planned patent strategy is key to survival.