3-D Printing: Strategies to Anticipate the Next Disruptive Technology

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Personal computing, the Internet, social networking: Each of these disruptive technologies created new legal challenges to the prevailing order. And yet, even as businesses — and the courts — continue to sort out lingering legal challenges to yesterday's latest disruptions, a new technology exists on the horizon that promises to unsettle the landscape yet again. One could be forgiven for believing that 3-D printing — essentially the ability to design and "print" three-dimensional objects — remains either in the scope of far-fetched science fiction, or out of reach for the masses on account of being hopelessly expensive and complicated. Both of those assumptions, however, are wrong.

From the cover of *Wired Magazine* to the pages of the *New York Times* and *The Wall Street Journal*, it's clear that the advent of large-scale, consumer 3-D printing is fast approaching, and with it will come a host of complex and uncertain legal issues for businesses as they try to protect their proprietary goods. While traditional intellectual property laws, including patent, copyright, and trademark law, have, for the most part, risen to the occasion in shaping the legal contours of disruptive technologies in the recent past, none of those laws neatly address the business concerns raised by 3-D printing.

What Is 3-D Printing and How Can It Be Used?

At its most basic, 3-D printing allows a user to send a digital blueprint file, usually made with a computer-aided design program, to a machine that can turn the blueprint it into an object. Another form of this same process involves a 3-D scanner capable of scanning an object, creating a blueprint of it, and sending the blueprint to a 3-D printer to make an exact replica. In doing so, 3-D printers use materials — often different kinds of plastics or metals, but new materials are constantly being put into use — and builds the object layer by layer. In this way, 3-D printers cannot only create, or copy, objects that would be impossible to build otherwise, it also permits users to create objects with internal, moveable parts and build replacement parts for existing objects.

While aspects of 3-D printing have been put into use for commercial purposes for some time, several emerging companies are working to bring costs down and offer consumer 3-D printers for home use. Some of these companies have raised millions from investors and are beginning to sell 3-D printer models at retail for less than $2,500. It's generally accepted that this sticker price will continue to fall, just as the price of personal computers fell, as the technology becomes adopted on a larger scale.

In addition, some of those companies host forums where users upload and share their designs with an online 3-D printing community, making it possible to freely distribute to anyone else with a 3-D printer.

Like other disruptive technologies, 3-D printing offers unfettered creative potential for average consumers, in addition to businesses. Moreover, it promises a limitless potential for expanding creativity and object design in new and completely unexpected ways. At the same time, it also creates numerous prospective headaches for those who want to shield their proprietary designs from surreptitious copying on a massive scale.

IP Laws And 3-D Printing: An Uneasy Fit

Patent, copyright, and trademark laws have been remarkably adaptable, when one considers the technological, scientific, and other advancements over the last few decades. While each of these kinds of intellectual property protection provides some means for preventing and redressing infringements, however, none of them really fit well when facing the potential threats posed by 3-D printing.

Copyright

Copyright enforcement, of course, has been at the forefront of efforts to protect digital content, particularly on the Internet. At its essence, copyright attaches to original creative works that are fixed in a tangible medium. 17 U.S.C. §§ 101-102. Traditional copyright protection extends to works like writings, drawings, musical compilations, and other designs; such protection, however, does not extend to the function of a copyrighted work or the idea that a copyrighted work expresses.

In theory, copyright protection should apply to objects copied using 3-D printers that are purely design-oriented. To take an obvious example, one would infringe an artist's copyright if he used a 3-D scanner and printer to make an exact copy of the artist's sculpture. This can be applied similarly in the business sense. Companies that make and sell copyrightable objects — including anything from toy figurines to decorative home designs — could find that those objects are easily replicated exactly and sold by others without realizing any of the gain.

Moreover, through what's known as the "separability test," copyright protection may be available for decorative elements that are part of a functional object, if those elements exist outside the scope of the object. *See Chosun Int'l v. Chrisha Creations* (2d Cir. 2005). Consider a coffee mug, which is a functional object. The mug itself is not copyrightable; however, decorative elements that may be added to a coffee mug may be copyrightable. Again, this is relevant to businesses that offer functional products with unique design elements.

Beyond the prospect of suing anyone who makes a replica of a copyrighted design with a 3-D printer for copyright infringement, the available recourses for such problems are limited. First, it's an open question as to whether a user who simply creates a blueprint of copyrighted work for use in a 3-D printer actually infringes a copyright. By creating a blueprint for making copies, one is merely publishing instructions on how to infringe a copyrighted work; he wouldn't actually be infringing himself.

Second, some companies have attempted to apply the framework of the Digital

Millenium Copyright Act (DMCA) to the world of 3-D printing. *See* 17 U.S.C. § 512. Under the DMCA, copyrightholders are permitted to notify an online service provider of an infringement claim against some material or content that is being made available. Upon receiving this notification, called a takedown notice, online service providers qualify for a safe harbor from infringement claims, assuming they promptly block access to the allegedly infringing material. Using this legal device, companies can stop the spread of 3-D printing blueprints that infringe their copyrighted designs; however, this puts companies in the position of constantly policing online forums where 3-D printing blueprints are exchanged. And it doesn't prevent users who either don't publish their blueprints online or choose to share designs outside of an easily accessible online forum.

Patent

As copyright protection is largely limited to nonfunctional works, an obvious corollary to protect intellectual property in the context of 3-D printing is patent law. Utility patents, after all, are specifically available to protect inventions that are useful. Moreover, utility patents can be drafted to protect objects. And in addition to utility patents, U.S. law also provides protection for "new, original, and ornamental design for an article of manufacture" through design patents. 35 U.S.C. § 171. Thus, design patents are available to cover the nonfunctional elements of functional objects.

Through a combination of utility and design patents, businesses may be able to amass significant protection for their intellectual property from illicit copying by 3-D printing. By focusing patenting efforts on the utility of not only apparatuses or systems in their entirety, but on narrower inventive and useful aspects of particular parts of an apparatus or system, companies can ensure patent protection on both the objects they design, build, and sell, as well as the parts that comprise those objects. In addition, companies can use design patents to protect those unique and proprietary design elements that separate their products from others in the marketplace.

One example of how this approach could work is in the medical device industry. It is conceivable that 3-D printing technology could be used to essentially copy a new medical device after it enters the market; alternatively, it is also conceivable that 3-D printing technology could be used to copy replacement parts for existing medical devices. By seeking patent protection not only for its new medical devices, but also for novel and proprietary parts that comprise its medical devices, a medical device company may be able to fully protect its intellectual property from the threat of illicit copying and selling. In addition, to continue with the medical device example, to the extent there are particular nonfunctional design elements for a medical device or its component parts, a company can seek to obtain design patents to protect those elements from copying as well.

There are some downsides to protecting intellectual property in this way. One such disadvantage is the time and cost involved in applying for utility and design patents. Some companies may have the resources to prosecute numerous applications for utility and design patents; most companies, however, do not. Another hurdle is the time and cost of enforcement of patent rights. As with patent prosecution, some companies have the resources to monitor and enforce their patents against those who may use 3-D printing to

copy and sell their products.

Other companies may face difficulties in effectively rooting out wrongful copying in violation of their utility and design patents. In addition, any patent enforcement strategy involves a litigation element and the cost of patent litigation has continues to rise. Finally, as with the availability of copyright protection, there remains an open question as to the availability of enforcing patents against individual who merely provide the blueprints for copying patented objects as opposed to individuals who actual copy protected inventions. In other words, utility and design patents may not extend to enforcement against the source of copying a protected object using 3-D printing.

Trademark

Trademark law provides yet another layer of protection against illicit copying performed by 3-D printing, although one that is decidedly different from the other two. Trademark protection, of course, extends to brands, logos, slogans, and other symbols that mark a company's products. Thus, trademark protection extends to neither the underlying design nor the utility of an object.

In the context of 3-D printing, therefore, trademark law extends its broadest protection to exact replicas of an object; replicas that include an original protected mark. For example, if a manufacturer includes its trademark brand on a product and someone copies that product with a 3-D printer, along with the trademark, then the copy would infringe on the manufacturer's trademark. If, however, someone made a copy of that product but neglected to include the trademark on the copy, then trademark law may not provide redress.

Moreover, trademark law extends protection only to those products that are "used in commerce." 15 U.S.C. § 1051. While this element has been broadly interpreted over time — and effectively bars public uses that would dilute trademarks — it does not go so far as to capture the existence, or even the copying, of a protected mark in someone's home. Rather, the focus of trademark protection is on commercial or public uses. A related form of trademark protection, trade dress, is also available, but requires establishing distinct associations between a particular design and a manufacturer.

The availability of trademark protection in commercial and public spaces, however, may be all companies need to combat threats of counterfeit products made using 3-D printers. By effectively using trademarks to identify their products with the prospect of copying via 3-D printing in mind, those who would make copies of a company's protected products to sell, face a choice: either copy the product — and the trademark — exactly and risk a trademark enforcement action, or copy the product without the trademark and sell a more obvious knock-off. And yet, as with copyright and patent law, a large hole exists in the availability of trademark to protect a company's products; such protection would likely not extend to enforce trademark infringement against designers of blueprints for making illicit copies via 3-D printing.

Protecting Your Intellectual Property

While 3-D printing technology remains in its infancy, it is rapidly developing and becoming more accessible to more people. As it become more readily available, the technology will also attract those who seek to profit at others' expense by copying proprietary designs and inventions. Intellectual property laws, however, provide somewhat muddled options for companies that want to maximize protection for their products from such illicit copying. With that understanding there are a handful of strategies companies can employ to identify and anticipate threats to their intellectual property in the future:

- Review product lines with an eye toward what is unprotected. This may involve identifying those products that would be most susceptible to illicit copying with 3-D printing.
- Develop legal strategies with the goal of creating action plans in the event that illegal copying is detected. Every company and every industry has different needs for protecting their products; it's crucial to recognize what those needs are and determine what combination of laws can best protect proprietary designs.
- Monitor the marketplace for products that copy protected designs. As the prevalence of 3-D printing technology increases, it will be vital for companies to observe not only the traditional forums for their products, but new forums as well.
- Learn more about 3-D printing technology and how it could be applied to a company's product lines. As the technology becomes more sophisticated, so will its potential uses; it is critical to stay informed about new ways the technology could implicate products.

Conclusion

Ultimately, a large share of those who will adopt 3-D printing will use it in ways that are genuinely new, innovative, and do not infringe on the intellectual property of others. Inevitably, however, there will be those who use it to take the work of others — and sell it for their own profit — rather than make original works. By recognizing and planning for this disruptive technology before it disrupts their business, companies can use available legal protections to place themselves in the best position to meet it.

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